Study Documentation Abstract	Initial Study	X	Restudy		Lowr		Other		Page 1

Section 1: General Information

1A	Community	Maricopa County
1B	Community Number	
1C	County	Maricopa
1D	State	Arizona
1E	Date Study Accepted	
1F	Study Contractor	HDR Engineering, Inc.
	Contact(s)	Steve Miller
	Address	Suite 205 5353 N 16th Street
		Phoenix, Arizona 85016-3226
	Phone	602 264-0731
	Internal Ref #	07162 001 044
1G	Tech Reviewer (FEMA)	
	Phone	
1H	FEMA Regional Reviewer	
	Phone	
1I	State Reviewer	
	Phone	
1J	Local Reviewer	Flood Control District of Maricopa County
	Phone	602 262-1501
1K	River or Stream Name	Wagner Wash
1L	Reach Description	
	(FIRM Panel & EPA Reach #)	
1M	Study Type (Riverine, Alluvial Fan, etc)	Riverine

Section 2: Mapping Information

2A	USGS Quad Sheet(s)	White Tanks Mts. SE
		White Tanks Mts. NE
		Daggs Tank
		Wagner Wash Well
2B	Mapping For Hydrologic Study	
	Type/Source	USGS Quad Sheets
	Scale	1:24000
	Date	Varies, 1957 to 1988
2C	Mapping For Hydraulic Study	
	Type/Source	Topographic, 2-foot Contour Interval
	Scale	1"=200'
	Date	Sept. 1990
	Subcontractor (Aerial)	McLain Harbers Co., Inc. 720 W. Prince Rd., Tucson AZ
	Date of Aerial Mapping	Sept. 1990

Section 3: Hydrology

3A	Model or Method Used (including vendor and version description)	HEC-1 U.S. Corps of Engineers Dec. 1988
3B	Storm Duration	6 Hour
3C	Hyetograph Type	
3D	Frequencies Determined	100 Year
3E	List of Gages Used in Frequency Analysis or Calibration (location, years of record, gage ownership)	
3F	Rainfall Amounts and Reference	
3G	Unique Conditions and Problems	Upstream watershed controlled by Central Arizona Project canal, causing impoundment of runoff. Overflow directed through two overchutes, one at Wagner Wash and the other 6900' west.
3H	Coordination of Q's (agency, date, comments)	

Section 4: Hydraulics

4A	Model or Method Used (including vendor and version description)	HEC-2 Haestad Methods Version 6.2 Feb. 1991
4B	Regime	Mixed
4C	Frequencies for Which Profiles Were Computed	100 Year
4D	Method of Floodway Calculation	Method 1
4E	Unique Conditions and Problems	Area of wash known as Broken Tank undergoing earthwork by the owner at time of survey and hydraulic modeling -- cross-section 7.26(CH) digitized by aerial firm will differ from utimate condition. Bridge modeling of the two Sun Valley Parkway crossings was not amenable to HEC-2 bridge routines, given the multiple box culvert openings of differing sizes and elevations and potential weir flow. HY-8 used independently to analyze culvert losses at those locations.

Additional Study Information

Item	Description/Discussion
Notes on HEC-2 Culvert Modeling Procedures	17 pages including HY-8 analysis of two Sun Valley Parkway crossings.
Memo to FCD concerning capacity of interceptor channel on d.s. side of u.s. Sun Valley Parkway crossing.	6 pages of narrative and calculations estimating hydraulic capacity of side channel -- not directly affecting Wagner Wash.

SECTION 1: GENERAL DOCUMENTATION AND CORRESPONDENCE

1.3

To: FILE

From: Dave Buras

Date: January 22, 1991

Subject: Wagner Wash - Progress Meeting

Copy: All Participants
Meeting Date - January 18, 1991

HDR

Memorandum

Attendees:
Pedro Calza
Dave Buras
Eric Lovstad
Steve Miller

Base sheets containing aerial topographic mapping has been received from McLain-Harbers. HDR has reviewed and is generally satisfied with the mapping. Several sheets have been returned with minor questions. McLain-Harbors will advise.

Project Engineering Consultants has provided survey information for the two Sun Valley Parkway structures and for about one-half of the quality control cross-sections. The quality control cross-sections have been plotted against the HEC-2 digitized cross-sections with good correlation. The plots were reviewed in the meeting and copies will be supplied to FCDMC.

The message "3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO:" was discussed. It appears on 20-25% of all cross-sections. It was agreed that the reason for the caution message will be investigated and addressed in the Final Report to FCDMC. No extra-ordinary methods will be used to eliminate the message if the reason for this message can be satisfactorily addressed.

The initial 100-year floodplain was presented and reviewed.

HDR was directed to use hydraulic calculations outside of the HEC-2 analysis to verify water surface elevations at the two Sun Valley Parkway crossings. It was agreed HY-8 would be used.

Pedro directed that tributaries with flows in excess of 800 cfs should be shown with a cut-off floodplain and labeled as limit of study.

Delineation of floodplains upstream of the C.A.P. was discussed. The ADWR requirement that structural verification of the C.A.P. above the level of the top of canal lining was discussed.

It was agreed that this is a function of hydrology, not hydraulics. The reasonableness of this general requirement as applied to our specific case will be addressed in the Final Report.

The Burns International mylars will be reproduced as of January 21, 1991.

jj/progmtg.wp

cc: All participants

1.4

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009
(602) 262-1501

FAX # 269-4601

COVER SHEET

TO: Steve Miller

COMPANY OR DEPT: _____ FAX # 265-6472

FROM: Magnus Jolayemi

NUMBER OF PAGES BEING SENT INCLUDING COVER SHEET: _____

IF THERE ARE ANY PROBLEMS, PLEASE CALL (602) 262-1501.

COMMENTS: If you have any questions give me a Call or Pedro

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

INTEROFFICE MEMORANDUM

Subject: WAGNER WASH REVIEW **File:** MEMO

To: PAC **From:** MRJ **Date:** 03/16/91

The review of the Wagner Wash has been completed. Here are my review comments.

1) There is a discrepancy between the Hec-2 version used by HDR Engineering inc. and the Hec-2 version we use here at the FDC. HDR uses HEC-2 version 4.5.1 September 1990. FCD HEC-2 version is September 1988 updated September 1989.
These differences in the two versions shows an increase in water surface elevation in the following cross-sections:

Cross-section	HDR RUN	FCD RUN
0.89	1.0	1.1
3.37	1.0	1.1
4.86	1.0	1.1
5.13	1.0	1.1

2) Floodways are not represented in the plot for cross-sections 5.13 and 6.59

3) Submergence and weir flow occur through the Culvert in sections 6.30 and 6.303; Missing low chord and top of the road.

4) 'N' value of 0.012 is recommended for culvert channel why is .04 used.

5) On the Work Map the Bank stations do not agree with the Hec-2 output Bank stations in cross-sections: 0.09, 0.35, 1.48, 2.14, 2.52, 3.60, 4.47, 4.67, 4.76, 4.95, 6.40 and 8.04; It seems that elevations were used to determine the banks.

1.4

HDR

Memorandum

To: Flood Control District of Maricopa County

From: Steve Miller

Date: April 2, 1991

Subject: Wagner Wash review comments and Schedule

Attached is HDR's written responses to the Flood Control Districts (FCD) review comments concerning the Wagner Wash Flood Plain Mapping. A meeting was held on March 20, 1991 at the District office to go over them. It was discussed that the HDR 1990 version of the HEC-2 model results were substantiated by the 1984 and 1988 versions of HEC-2 which HDR has in their office. If it was deemed necessary, HDR would run the model on the FCD provided model and adjust out the idiosyncrasies of the FCD 1989 model.

It was further discussed that comment #2 was a problem which was out of the control of HDR since it was about a cross section plot which FCD had generated.

Comment #3 generated a discussion concerning the appropriateness of modeling roadway overflows which are not at the box culverts under the roadway. It was decided that the existing condition floodplain run should reflect the existing condition floodplain even when the flooded area does not correspond to the provided flood water conveyance facility. Therefore the HDR analysis and mapping is appropriate.

Comment #4 was dismissed as the culvert roughness coefficient used in the analysis was 0.012 while the approach section was modeled using 0.04 as the comment suggests.

Finally, HDR agrees with the review comment #5 and will insure that the mapping agress meticulously with the model output.

During the conversation yesterday, the project schedule was discussed. The contractual project schedule began on September 4, 1990 and was to run 255 calendar days or until May 17, 1991 at which time the Flood Insurance Study would be submitted to FEMA. Some confusion as to the completion date has occurred because the contract was not approved until September 4, 1990 instead of August

HDR Engineering, Inc.

Suite 205
5353 N. 16th Street
Phoenix, Arizona
85016-3226

Telephone
602-264-0731
FAX
602-265-6472

4, 1991 as had been used in the initial schedule and fee submitted. Even though the contract period extends to May 17, 1991, HDR feel that a late April submittal is possible and is working to meet this early completion.
If you have any comments or concerns, please don't hesitate to contact me.

HDR Engineering, Inc.

Suite 205
5353 N. 16th Street
Phoenix, Arizona
85016-3226

Telephone
602-264-0731
FAX
602-265-6472

April 1, 1991

HDR

Mr. Pedro Calza
Flood Control District of Maricopa County
3335 West Durango St.
Phoenix, AZ 85009

Re: Response to FCD Wagner Wash Flood Insurance Study review memo (3-16-91). Job No. 07162 001 044.

Dear Mr. Calza,

Following are the responses or actions, correspondingly numbered, to the items listed in the above referenced review memo, the subject of which was a submitted preliminary HEC-2 computer run and work maps of the Wagner Wash 100-year floodplain and floodway.

1) HDR would first note that the differences between the two HEC-2 versions appears to be relatively small. HDR has adjusted their HEC-2 input to prevent floodway water surface increases from rounding up to 1.1 feet at the four cross-sections sited in the memo.

If further adjustments are required, HDR would gladly comply in any fashion that the FCD prefers. HDR would be willing to utilize a copy of FCD's HEC-2 version to run the model in HDR's office, if it is deemed necessary.

2) Apparently, the floodway water surface did not appear in two cross-sections when FCD plotted the submitted HEC-2 cross-sections, using FCD's own PLOT2 program. HDR can not readily explain that occurrence, but can assure the FCD that floodway encroachments will be present at sections 5.13 and 6.59, as well as at every cross-section in the final submittal.

3) The low chord and top of road are properly coded in the previously submitted HEC-2 run for section 6.30 and appear in the plotted cross-sections previously submitted.

No low chord or top of road elevations are present in section 6.303 because this section falls immediately upstream (in this case, 10 feet) of the bridge section and is intended to be ground (GR) points only, with an X3 card confining flow areas in the channel width equal to bridge opening width. The right bank X3 elevation is lower to ensure that flow could flow through the relief culvert (1000 feet away, see plots) which does not fall in the main channel.

4) A closer inspection of the HEC-2 run will indicate that the 0.04 value was for transitional cross-sections and that 0.012 was properly applied to the box culvert sections.

HDR Engineering, Inc.

Suite 205
5353 N. 16th Street
Phoenix, Arizona
85016-3226

Telephone
602 264-0731

5) HDR presumes that the reviewer is referring to flood boundary stations and not bank stations. Extensive effort has been made to rectify any and all inconsistencies or misplots of flooding topwidths, flood stations, etc. for both the flood plain and floodway final mapping submittal.

HDR appreciates the FCD's helpful and timely review of the preliminary data and will continue to strive to produce a final submittal which will meet FCD's satisfaction. If I can be of any further assistance, please do not hesitate to call.

Yours,

Steve Miller, P.E.
Project Manager
HDR Engineering, Inc.

cc: Project File

1.4.7

INVOICE NO. 05476

ANNOUNCEMENT OF FLOOD ELEVATION STUDY

The Flood Control District of Maricopa County, under authority of the National Flood Insurance Act of 1968 (P.L. 90-448), as amended, and the Flood Disaster Protection Act of 1973 (P.L. 93-234), is funding a detailed study of flood hazard areas along Wagner Wash in Maricopa County between the Central Arizona Project Canal and The Hassayampa River.

The study is being performed for the Flood Control District by HDR Engineering, Inc., of Phoenix, Arizona.

The purpose of this study is to examine and evaluate flood hazard areas which are developed or which are likely to be developed and to determine flood elevations for Maricopa County carry out floodplain management objectives of the National Flood Insurance Program. They will be used as the basis for determining appropriate flood insurance premium rates applicable for buildings and their contents.

This announcement is intended to notify all interested persons of the commencement of this study so that they may have an opportunity to bring any relevant facts and technical data concerning local flood hazards to the attention of the Flood Control District for consideration in the course of this study. Such information should be furnished to Mr. Pedro Caiza or Mr. Joe Tram, Flood Control District of Maricopa County, 3335 West Durango Street, Phoenix, Arizona 85009, telephone 262-1501 for HDR Engineering's use in performing the study.

Published: Arizona Republic, September 15, 1990.

AFFIDAVIT OF PUBLICATION

THE ARIZONA REPUBLIC / *The Phoenix Gazette*

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

JOAN LOHR, being first duly sworn, upon oath deposes and says: That she is the assistant legal advertising manager of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic and The Phoenix Gazette, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic
~~*The Phoenix Gazette*~~ XX

SEPTEMBER 15, 1990

Joan Lohr

Sworn to before me this

16TH day of

OCTOBER A.D. 19 90

OFFICIAL SEAL
MARY LEE MEASEL
NOTARY PUBLIC STATE OF ARIZONA
MARICOPA COUNTY
My Comm. Expires March 17, 1991

Mary Lee Measel
Notary Public

1.5

Revised 7/13/80
LSM

SCOPE OF WORK
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
Topographic Mapping and Flood Insurance Study

General

The project consists of topographic mapping and floodplain and floodway delineations of Wagner Wash for approximately 9 miles from the Hassayampa River upstream to the Central Arizona Project (CAP) Granite Reef Aquaduct overchute, and also the floodplain mapping of approximately three miles of the stormwater detention ponding upstream of the CAP. The hydrology developed by the Flood Control District will be used for the backwater analysis. The HEC-2 computer model will be used to determine floodplain and floodway delineations for the 100-year flood peak. All work will be reviewed by Flood Control District and ADWR and accepted by the Flood Control District prior to the review and acceptance by the Federal Emergency Management Agency (FEMA). Revision to the mapping and report in response to FEMA comments will finalize this contract. The Consultant shall be responsible for Public Notification regarding this project. All work under this Scope will be completed within 255 calendar days from the date of the Notice to Proceed, including 60 days for Flood Control District reviews.

Task 1 Data Collection

1.1 The Consultant will collect and review pertinent data from the District and other outside sources. Data to be collected will include previous flood hazard reports and hydrology for the study area, existing topographic mapping, historical flooding information from the Flood Control Districts' Hydrology Report, as-built plans for existing structures, FEMA Flood Hazard Boundary Maps and any Letters of Map Amendment and/or Revisions and other pertinent information.

1.2 A written summary of data collection will be submitted to the District for information purposes.

1.3 The consultant will submit a project schedule showing coordination meetings and completion dates for each of the tasks in the contract.

Task 2 Topographic Mapping

2.1 The Consultant will notify all property owners by certified letter to obtain any necessary Rights of Entry for the study area. The District will assist the Consultant as may be necessary to complete this task.

2.2 An aerial survey subconsultant shall be retained by the consultant as part of this contract. The Consultant shall coordinate all the aerial surveying work with the aerial surveying consultant to ensure that the specifications of the aerial surveying

work is met. Quality control on surveys will be per FEMA 37, Flood Insurance Study Guidelines and Specifications for Study Consultants.

2.2.1 Prepare topographic mapping to a 2-foot contour interval, 1"=200' scale, with spot elevations and 1-foot contours on Sun Valley Parkway at the wash crossings.

2.2.2 Ground Control:

a. The Consultant shall provide all survey control.

b. The Consultant shall systematically set panel points and establish horizontal and vertical control throughout the areas to be mapped for use in compilation by the aerial survey Consultant. Where readily available, surveys will tie into the State Plan Coordinate System. Field control shall be sufficient to readily allow for compilation of maps by the aerial survey Consultant at the desired map scale and contour interval and will be based on the National Geodetic Vertical Data (NGVD).

c. The horizontal and vertical control points shall be located and marked by the Consultant. The controls for the area mapping shall be in sufficient numbers and shall be in locations which will be compatible with the accuracy of the mapping requirements. The controls shall be of at least third order accuracy. Section corners, quarter corners, and mid-section points shall be used for control points wherever possible.

2.2.3 Digital contour and planimetric data developed for this project shall be delivered in AutoCAD DXF or Intergraph ISIF ASCII format, as specified in Autodesk, Inc., publication TD106-009 (May 7, 1986) or Intergraph publication DIX4110 (May 12, 1985). Layer names and graphics attributes shall be fully documented by the Consultant. The delivered DXF or ISIF files shall be compatible with the requirements, and subject to the limitations, of the ESRI DSFARC or the ESRI SIF2ARC software translator as detailed in the January 1989 release of the "ARC/INFO Users Guide". All mapping file deliveries shall be in ASCII format on industry-standard 1/2" magnetic tape, 2400-foot reels, written in a generic unlabeled COPY format, with specified record-lengths and block sizes.

2.2.4 The Consultant shall provide permanent non-erasable topographic mylar sheets 24" x 36" with a scale of 1-inch equal to 200 feet, with a contour interval of 2 feet for all mapping with the exception at Sun Valley Parkway which will have a contour interval of 1-foot. A cover sheet will be provided with the project title, date of topographic mapping, and a location map showing geographic range covered by each specific mapping sheet. Each manuscript shall include a minimum of a north arrow, scale, section corners and quarter corners, Sun Valley Parkway labeled, State Plane Coordinate System if available, major drainage features, corporate boundaries, cross-section lines, channel station center line, index map, description and elevation of control points and ERMs, and reference marks used in ground control. The mapping will have an accuracy such that ninety percent (90%) of all contours shall be within one-half contour of the true elevations and the

remaining ten percent (10%) of the contours shall not be in error by more than one contour interval.

2.2.5 The Consultant shall provide permanent non-erasable topographic mylars as described above in Section 2.2.4 with delineated floodplains included.

2.2.6 Sketch maps no larger than 11" x 17" for the study area must be included in the narrative report along with the flood profile maps.

2.2.7 Since the hydrology will be provided by the Flood Control District of Maricopa County, no new hydrologic mapping will be developed as a part of this Scope of Work.

Task 3 Hydrology

3.1 The Consultant shall use the Hydrology developed by the District.

3.2 Review comments from the Consultant concerning the hydrology proposed to be used for this study will be submitted to the District for review and comment prior to the hydraulic modeling of the wash.

Task 4 Field Survey

4.1 Prepare topographic mapping a 2-foot contour interval with a scale of 1"=200 feet, with spot elevations and 1 foot contours on Sun Valley Parkway, for floodplain/floodway delineation areas as identified in Task 2 or FEMA criteria, whichever is more stringent.

4.2 Ground Control for Floodplain Delineations:

a. All topographic mapping and survey work shall meet or exceed Federal Emergency Management Agency (FEMA) minimum criteria as defined in FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Consultants, Appendix 4, September 1985. This would include, but is not limited to: the establishment of "permanent" elevation reference marks (ERM's), field control, and verification of profiles by the ground survey profile procedure.

b. Horizontal and Vertical Control: Systematically set panel points and establish horizontal and vertical control throughout the area to be mapped for use in compilation by the aerial survey consultant. Where readily available, surveys will tie into State Plane Coordinate System. Field control shall be sufficient, at least one "permanent" point per one-half mile, such point(s) being used as Elevation Reference Marks (ERMs). Surveys will be based on National Geodetic Vertical Datum (NGVD), per FEMA guidelines. "Permanent" survey points shall consist of existing monumentation, such as brass caps or similar survey monuments. Where

additional monumentation is needed, the Consultant will establish approximately 17 new permanent survey monuments which conform to Maricopa Association of Governments (MAG) Uniform Standard Detail for Public Works Construction, detail 120-1, Type C, and shall be placed 2" +/- above grade. Elevation Reference Marks will be labeled on available maps and described in a manner which allow them to be readily located in the field.

c. Available "As-Built" plans or surveys of all bridges and hydraulic structures are to be obtained by the Study Consultant.

d. The Consultant shall verify profiles to the extent that reliable existing information is available. Verification will be by the ground survey profile procedure as described in FEMA Document 37 or other methods approved by FEMA.

4.3 The Consultant will conduct field reconnaissance of the full study reach. This will include observation of channel and floodplain conditions for estimation of Manning's "n" values, photographic documentation of floodplain characteristics, determination of channel bank stations, observation of possible overflow areas, inspection of levees or other flood control structures; and measurement of bridge dimensions.

4.3.1 A written summary of the field inspection, including photographs to document "n" value estimation will be submitted to the District for review and approval.

Task 5 Floodplain and Floodway Delineation

5.1 Floodplain and floodway delineations must be obtained using the U.S. Army Corps of Engineers HEC-2 Water Surface Profiles computer model, 1989 version, and using methodology acceptable to FEMA. This model will simulate the effects of floodplain geomorphology, flow changes, bridges and culverts, hydraulic roughness factors, effective flow limitations, split-flows, and other considerations. The Consultant will prepare the study using the guidelines established in "The Flood Insurance Study Guidelines and Specifications for Study Consultants", dated September 1985 and "Appeals, Revisions, and Amendments to Flood Insurance Maps", September 1985.

5.2 Bridges and culverts must be modeled in compliance with HEC-2 modeling requirements for the selected routine. Where multiple bridges occur, each bridge will be modeled separately.

5.3 All cross sections will be plotted using the screen print option from the Corps of Engineers PLOT 2 software and will be pin plotter quality plots. (See attached sample) The horizontal and vertical scales will be maximized for each cross-section. The cross-section plots will show water surface profiles, ineffective flow

areas, "n" values, encroachments, channel stationing and other pertinent information. These plots are to be available at all reviews following floodplain modeling.

5.4 The floodplain area upstream of the Central Arizona Project is a ponding area and floodplain mapping will be developed using the Flood Control District HEC-1 water surface elevation provided. For other floodplain areas identified as ponding areas, it is preferable to analyze the area by using the HEC-2 model, which will provide the District with water-surface-elevations. If appropriate, the Consultant shall identify in the ponded floodplains a floodway. No floodway will be identified in the ponding area upstream of the Central Arizona Project canal.(The report narrative will address restrictions to increasing downstream discharges by increasing water surface elevations in the ponding area.)? WHAT DOES THIS MEAN?

5.5 Flood zones must be determined according to FEMA criteria.

5.6 The Consultant will prepare working maps and models of the 100-year floodplain and floodway during the course of the hydraulic modeling analysis for review by the Flood Control District at progress meetings. Floodways are to be determined using equal conveyance encroachment methods to start with, but only encroachment method 1 will be used in the final analysis.

5.7 The delineation work shall meet requirements for floodplain delineations as prescribed by FEMA and the Arizona Department of Water Resources.

5.8 The final report for the floodplain/floodway delineation study will include, but is not limited to the following:

I. Introduction
   a. Purpose of study
   b. Authority for study
   c. Coordination and acknowledgements
II. Area Studies
   a. Scope of study
   b. Community description
III. Engineering methods
   a. Hydraulic analyses

IV. Floodplain Management applications
   a. Flood boundaries
   b. Floodways
V. Insurance applications
VI. Other studies
VII. Location of data
VIII. Bibliography

Task 6 Coordination

6.1 The Consultant shall participate in 12 one half hour coordination meetings (one every three weeks) with the District's Project Manager at the consultants office. Submittals and review comments will be an agenda item at these meetings. No other coordination meetings are anticipated.

6.2 Three field trips are scheduled. One for manning N development at the beginning of the project, one to verify overflow/breakout points indicated from the modeling and a final trip at the conclusion of the study with FCDMC project manager.

6.3 The hydrologic data provided to the Consultant by the Flood Control District will have been reviewed by ADWR and any other governmental Agency reviewers prior to the Consultant receiving it for use in this study. All necessary modifications will be made by the District and the Consultant will not be responsible for the hydrologic data used in the study.

6.4 The Consultant will submit maps, report, and HEC-2 model through the District to ADWR, FEMA for review by the Technical Evaluation Consultant (TEC), and any other governmental agency reviewers. The Consultant will respond to minor questions by the reviewers other than FCDMC and make minor modifications to maps, models and report, if required. Significant revisions and or questions are not anticipated within this scope due to the close coordination with the District. Response to review comments of a significant nature will be considered out of scope services.

Task 7 Final Products

7.1 Mapping:

a. One complete set of 9" x 9" contact prints of the aerial stereo photographs sequentially numbered and catalogued. Prints will be delivered to the District upon receipt from the aerial mapping company.
b. One complete set of contour maps, blueline, draft copy for Flood Control District reference during the project, delivered immediately following the topographic mapping.
c. One complete set of contour maps at 1"=200' scale with the floodplain delineations in reproducible form (mylar) and six blueline copies as outlined in Task 2.
d. One set of transparent overlays of photo-mylars.
e. One complete set of mylars for the foldout maps (no larger than 11" x 17") used in the report.

7.2 One-half inch magnetic tape formatted at 1600 bpi containing the topographic data and the digitized floodplain/floodway boundaries in either the AutoCAD DXF ASCII format or the Intergraph ISIF ASCII format.

7.3 Six hard copies of the HEC-2 printouts and a copy of the HEC-2 model input/output on 5-1/4", 1.2 Mb diskettes compatible with an IBM-AT personal computer.

7.4 Tabular list of control points (ERM's) used with descriptions, elevations, and coordinates.

7.5 Reports:

a. The Consultant will produce a draft final report incorporating the comments of the District, for review by FEMA and other reviewers. Six copies of the draft final hydraulic report as outlined in Task 5, will be delivered.

b. FEMA' review comments will be incorporated into the final Hydraulic Report. Six copies will be delivered to FCDMC.

7.6 Documentation for this study will be as outlined in Instructions for Organizing and Submitting Technical Documentation for Flood Studies as required by ADWR.

SECTION 2: MAPPING AND SURVEY INFORMATION

2.1 New topographic mapping was developed for purposes of the Wagner Wash study. McLain Harbers Co. of Tucson, Arizona was subcontracted to aerial photograph and photogrammetrically produced 200 scale, 2 foot contour mapping for creation of standard 24" by 36" sheets. The digitized topography can be computer drawn using the Intergraph computer drafting system.

Ground control, horizontal and vertical, was subcontracted to Professional Engineering Consultants of Phoenix, Arizona. The horizontal control is not tied into the state plane grid coordinate system. The vertical control was based on US Government Land Office field monuments previously installed in the project area and typically located at section corners and quarter corners.

HEC-2 cross sections were photogrammetrically digitized from the aerial data base and field checked at intervals of 2 cross sections per mile by Professional Engineering Consultants. Adequate correlation was achieved.

2.2 Index of Maps. Attached.

2.3 All field survey and ground control was performed by Professional Engineering Consultants, of Phoenix, Arizona. These surveyors also gathered structural and geometric data at the two box culvert locations. Survey notes are included.

2.4 Watershed maps, hydrologic analysis maps. USGS 7.5 minute quad maps were used to develop the hydrologic model. Partial 1 foot contour mapping, prepared by a local development company, became available which significantly aided in determining the influence of the Central Arizona Project Canal upon the hydrology.

2.5 Hydraulic Analysis Maps. No mapping other than those created by the aerial mapping firm were used and those 2-foot contour maps were used as the basis of the work maps, 11 sheets.

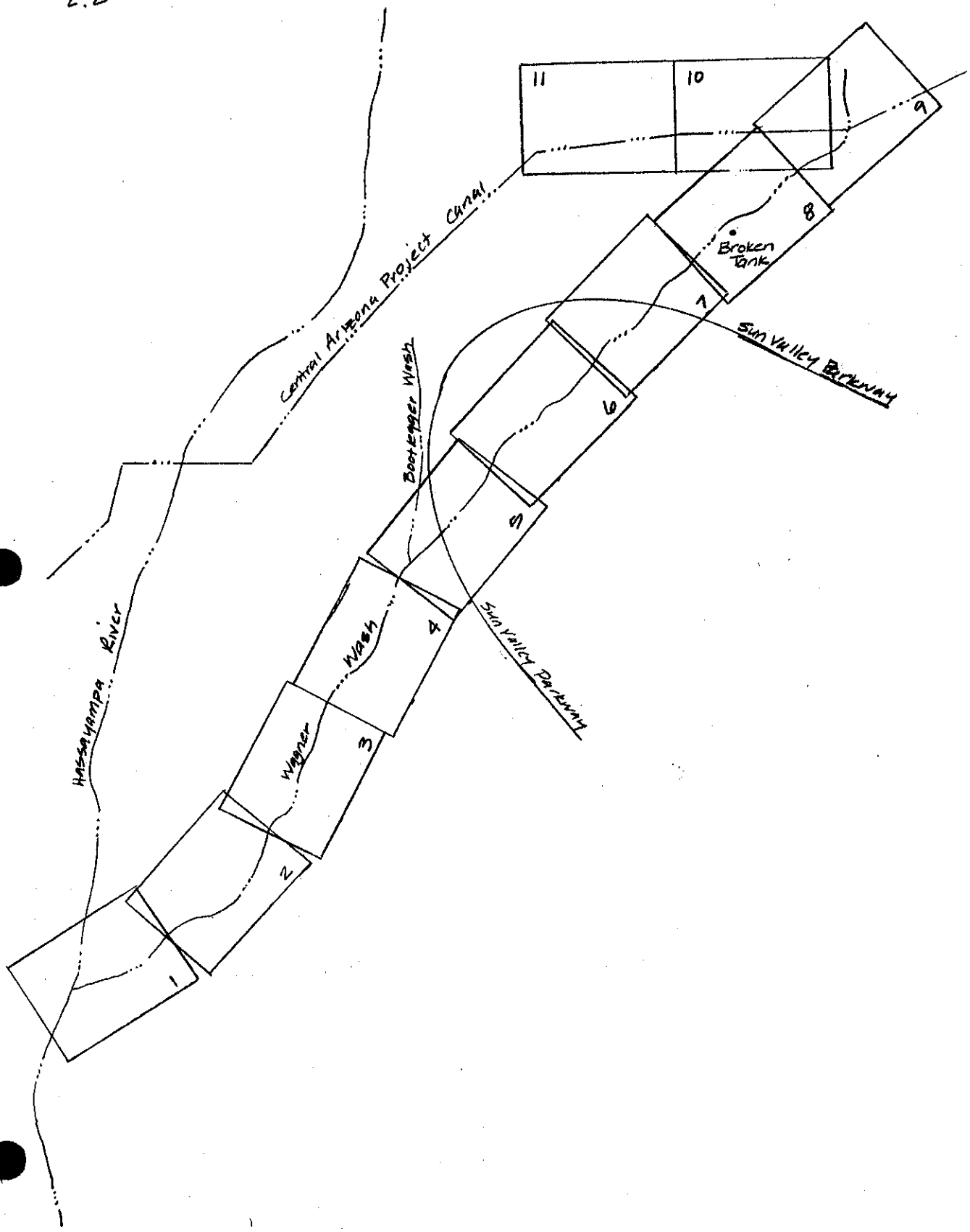
2.6 FIRM, FHBM draft maps.

2.7 Community Maps. None.

2.8 Misc. Maps. None.

Wagner Wash FIS
Maricopa Co. AZ
HDR Engineering, Inc.
07162-001-044

2.2 INDEX MAP



SECTION 3: HYDROLOGIC ANALYSES (by Flood Control District of Maricopa County)

Material to be inserted by FCDMC.

4.8 HEC-2 Model File.

One HEC-2 data input file on diskette shall be submitted with this information. The file name is "WAGFLD.IN".

4.2.1

MANNING'S "n" VALUE SELECTION REPORT

FOR

WAGNER WASH

FLOOD PLAIN DELINEATION STUDY

FCD Project 90-03

FOR

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

By

HDR Engineering, Inc.
5353 North 16th Street, Suite 205
Phoenix, Arizona 85016

January, 1991

PURPOSE

This report documents and summarizes the procedures used to select Manning's Roughness coefficients ("n" values) to be used as input parameters in the HEC-2 Water Surface Profile Model of Wagner Wash. This effort is prepared as one of the tasks identified in the Wagner Wash Floodplain Delineation Study, FCD Contract 90-03.

DISCUSSION

The proper selection of "n" values for natural open channels requires the application of considerable engineering judgment and experience as this single value represents a number of interdependent conditions. These include surface roughness, vegetation, channel irregularity, channel alignment, silting and scouring, obstruction, size and shape of channel, stage and discharge, seasonal change, suspended material and bed load.

Manning's "n" values were chosen as a result of both office and field investigations. The office procedures consisted of identifying through the use of topographic mapping and aerial photographs, such physical characteristics as channel slope, alignment, size and shape. Previously prepared hydraulic and hydrologic studies were reviewed as well as several "n" value selection manuals as listed in the references section of this report. The hydrologic analysis of Wagner Wash prepared by the Flood Control District used values ranging from 0.02 to 0.04 for purposes for flood routing. For the Hassayampa River Flood Insurance Study, "n" values used near river mile 21.1, the confluence with Wagner Wash, were 0.030 Channel longitudinal slope is about 0.5% for the entire reach except for the lowest 3 miles where the slope approaches 1.0%.

The primary reference source used to select "n" values was the preliminary draft of "Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona", U.S. Geological Survey, July, 1990.

The field investigation consisted of a single day long trip to the stream reach. The trip occurred on December 13, 1990. The investigation began at the downstream end of the reach at the confluence with the Hassayampa River, and proceeded upstream to the C.A.P. Photographs were taken at significant points along the reach and are included in this report.

LOCATION OF STUDY REACH

The Wagner Wash Study Reach begins at the confluence with the Hassayampa River at mile 21.1 and ends approximately 9 miles upstream at the C.A.P. overchute.

DESCRIPTION OF CHANNEL

Channel bed material from the confluence to mile 7.20 at Broken Tank is gravelly coarse sand. Banks are clearly defined, varying moderately and vegetated with a medium density of desert brush with occasional trees. Low flow areas of the channel bottom are clear. Higher portions

of the channel bottom also have a medium growth of brush and trees. Right and left overbank areas are natural, gently rolling desert areas with a light growth of brush.

From mile 7.20 to mile 8.30 above Broken Tank, the bed material changes from gravelly coarse sand to a clayey native soil as the channel becomes narrower, shallower and less well defined. Entire width of the channel in the reach has a medium density of desert brush and trees.

"n" Value Determination

$$n = n_b + n_1 + n_2 + n_3 + n_4$$

Where,

n_b = Base Value of "n" for a straight uniform channel
n_1 = Value for surface irregularities
n_2 = Value for bends
n_3 = Value for obstruction, and
n_4 = Value for vegetation

Mile 0.00 to 0.35 - Channel

n_b = 0.024
n_1 = 0.008 Moderate irregularity
n_2 = 0.000
n_3 = 0.002 Minor obstruction
n_4 = <u>0.005</u> Medium vegetation, trees along banks
0.039 Say <u>0.040</u>

Mile 0.00 to 0.35 - <u>Overbanks:</u>

Light brush and trees, in summer. Trees, flow depth reaching branches, 0.065 (left) 0.100 (right).

Mile 0.35 to 5.88 - <u>Channel</u>

n_b = 0.024
n_1 = 0.008 Moderate irregularity
n_2 = 0.005 Main Flow shifting occasionally from side to side
n_3 = 0.002 Minor obstructions
n_4 = <u>0.005</u> Sparse vegetation
0.044 Say <u>0.045</u>

Mile 0.35 to 5.88 - <u>Overbanks:</u>

Light brush and trees, in summer. 0.065 (left and right).

Mile 5.88 to 7.20 - Channel

n_b = 0.024
n_1 = 0.005 Minor irregularity
n_2 = 0.005 Main flow shifting occasionally from side to side
n_3 = 0.000
n_4 = 0.025 Dense brush along banks, small trees
0.059 Say 0.060

Mile 5.88 to 7.20 - Overbanks:

Light brush and trees, in summer. 0.065 (left and right)

Mile 7.20 to 8.30 - Channel

n_b = 0.031
n_1 = 0.000
n_2 = 0.000
n_3 = 0.015 Minor obstructions, logs, stumps, etc.
n_4 = 0.060 Flow depth less than 1/2 of vegetation height, numerous trees, brush
0.106 Say 0.105

Mile 5.88 to 7.20 - Overbanks:

Light brush and trees, in summer, 0.065 (left and right)

SUMMARY

WAGNER WASH "n" VALUES

River Miles	Left Overbank	Right Overbank	Channel
0 - 0.35	0.065	0.100	0.040
0.35 - 5.88	0.065	0.065	0.045
5.88 - 7.20	0.065	0.065	0.060
7.20 - 8.30	0.065	0.065	0.105

PHOTOGRAPHS

12/13/90

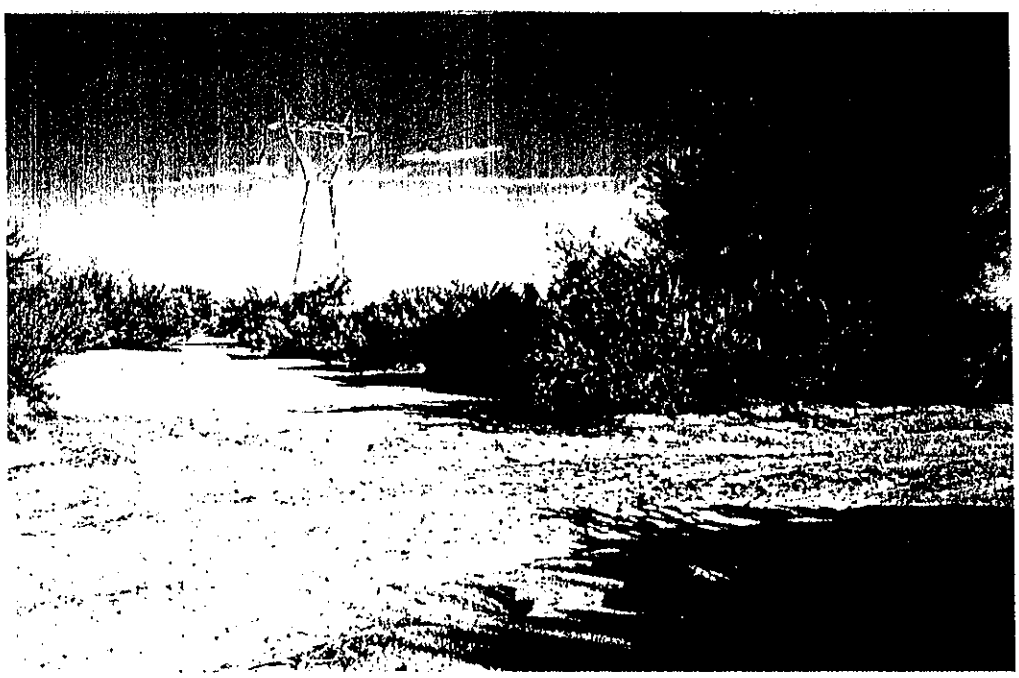
Mile 0.18
Looking Upstream at
Channel and Right
Overbank

Looking Upstream at
Channel

Looking Upstream at
Channel and Left
Overbank

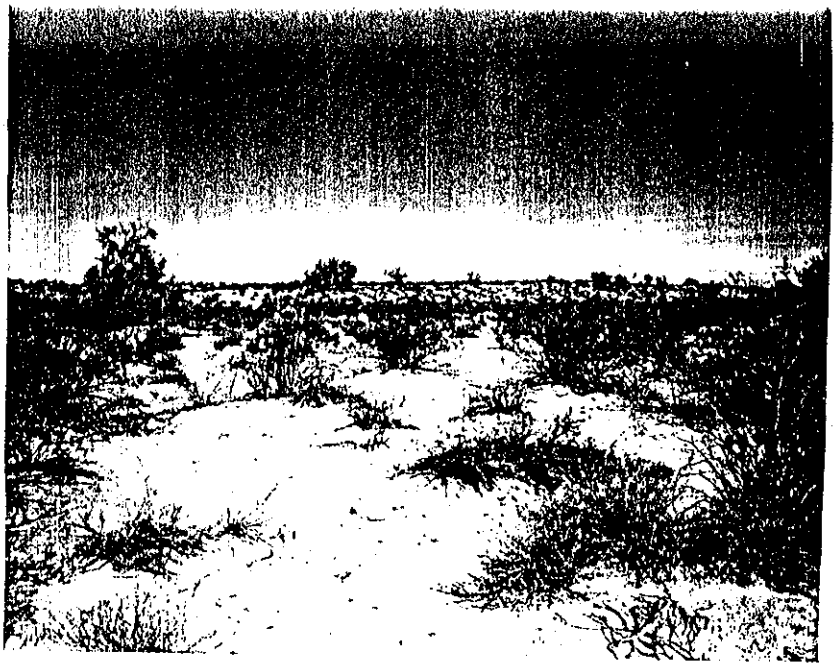
Looking Upstream at Channel. Note Bank on Right Side

Looking Upstream at Channel. Note Left Bank in Center of Photo.



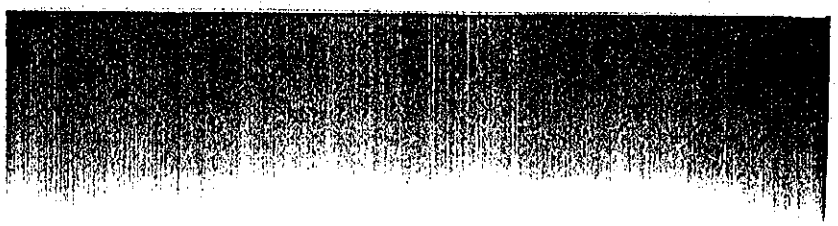
Looking Upstream at Channel and Right Overbank

Looking Upstream at Channel and Left Overbank



Mile 2.2
Looking Upstream
at Left Overbank
Area

Looking Upstream
at Channel
Note Left Bank



Standing in Channel,
Looking Upstream at
Right Overbank

Looking Upstream Across Channel at Right Bank

Standing in Channel Looking at Left Overbank

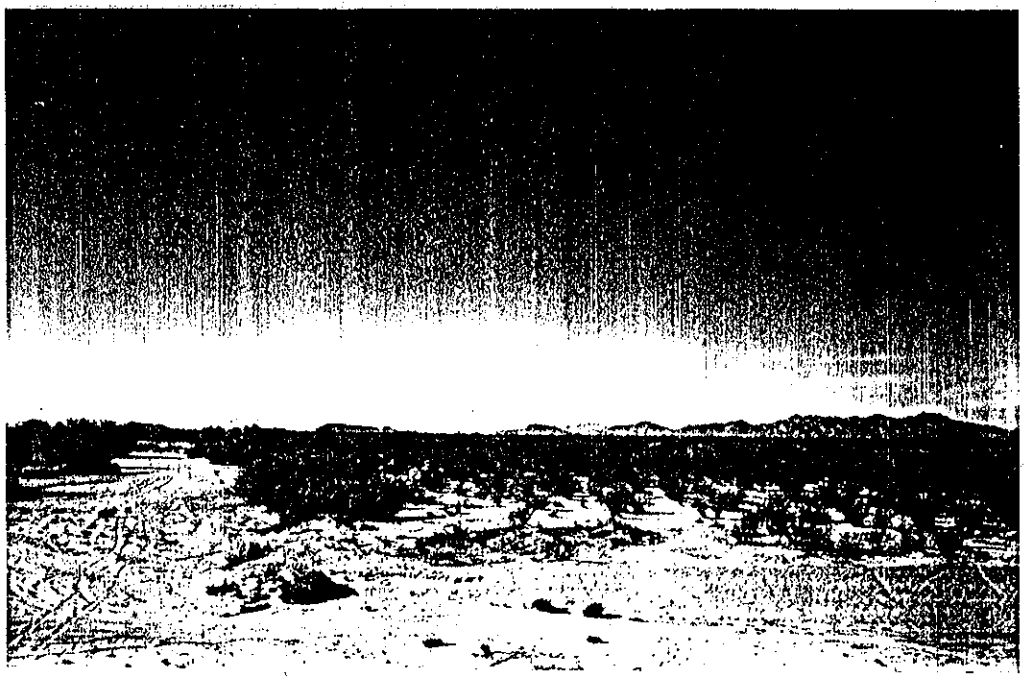
Mile 4.6
Looking Upstream
in Channel

Mile 5.5
Looking Downstream
in Channel

Looking Upstream
in Channel

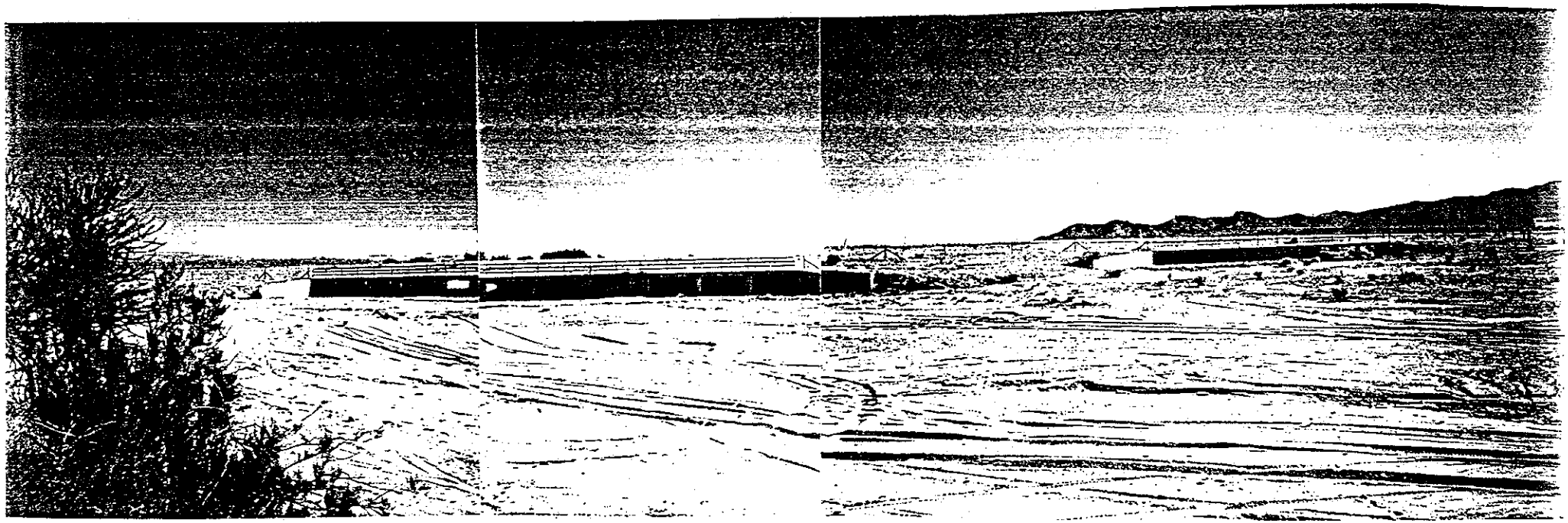
Mile 4.1
Looking Downstream
at Left Overbank

Looking Downstream
at Channel. Area
on Right is with-
in Channel, Not
Overbank



Looking Downstream
at Right Overbank.

Mile 4.1



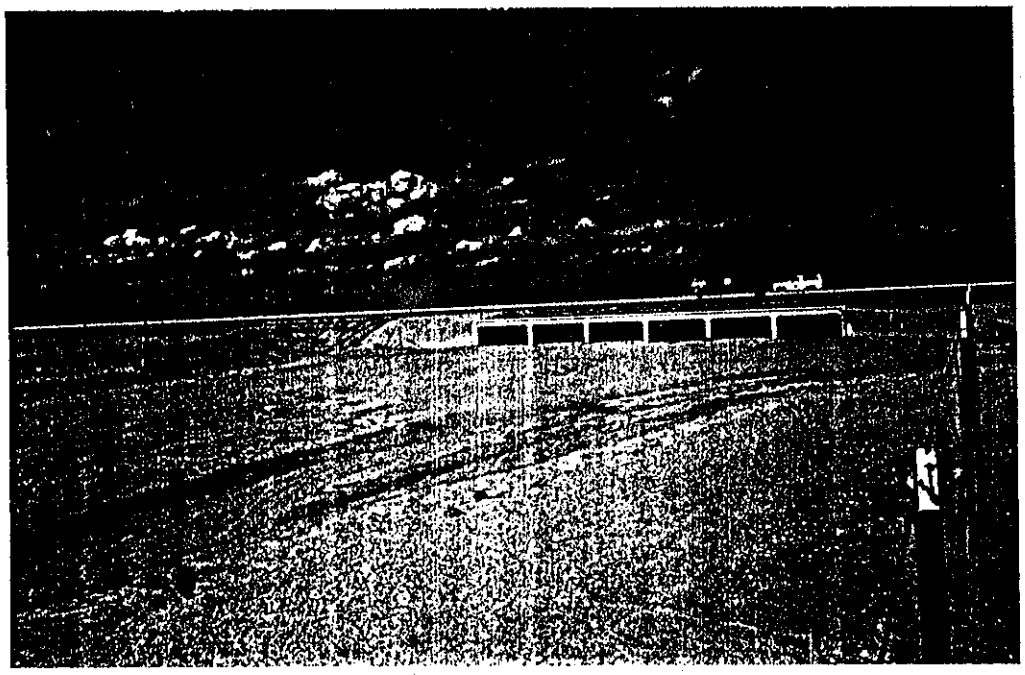
Panoramic View of Channel Looking Upstream at Crossing
with Sun Valley Parkway

Mile 4.1
Looking Upstream
at Left Overbank

Standing on Headwall,
Looking Upstream at
Channel

Looking Upstream at
Right Overbank

Mile 6.2



Looking Upstream at Crossing with Sun Valley Parkway

Mile 6.3
Looking Upstream
at Left Overbank

Looking Upstream
at Channel

Looking Upstream
at Right Overbank

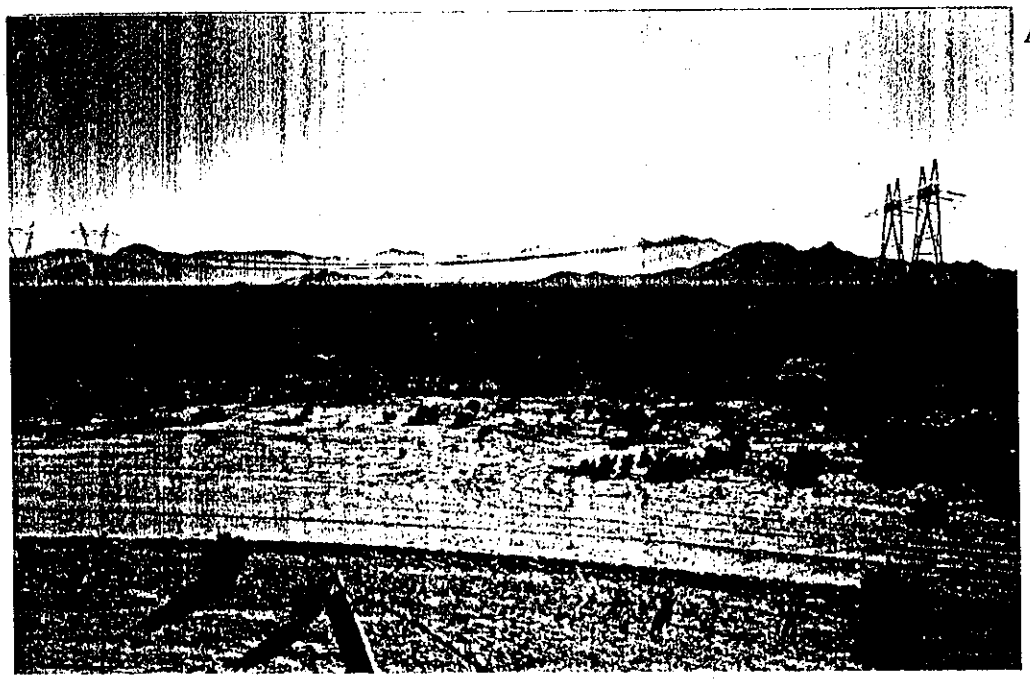
Mile 7.3
Looking Downstream
at Channel

Looking Downstream
at Left Overbank

Looking Downstream
at Right Overbank

Mile 7.3
Looking Upstream
at Channel

Mile 8.3
Looking Downstream
Over Watershed
Area Standing on
top of CAP
Overchute



REFERENCES

"Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona", U.S. Geological Survey, July, 1990.

"Open-Channel Hydraulics", Chow, V.T., McGraw-Hill Book Company, New York, N.Y., 1959.

"Applied Hydraulics in Engineering", Morris, H.M., Wiggert, J.M., The Romano Press Co., New York, N.Y., 1972.

"Highways in the River Environment" U.S. Department of Transportation, Federal Highway Administration, January, 1987.

February 15, 1992
Notes on HEC-2 culvert modeling procedures

Culvert head losses for the two Sun Valley Parkway crossings over Wagner Wash were calculated independently of the HEC-2 model analyses. It was the opinion of the client and engineer that accuracy could be better achieved and calculations more easily verified using methods other than the HEC-2 bridge subroutines, which are often deficient under pressure flow and weir flow conditions and where complex multiple hydraulic structures are not readily applicable to the model's input requirements.

HY-8, a FHWA culvert design and analysis computer program was applied to compute the hydraulic structure losses at the two Parkway crossings. In addition, FHWA's HDS-5 culvert design manual was used to confirm those losses calculated by the HY-8 computer model.

The downstream Wagner Wash crossing, which had the largest combination of box culvert structures, varying in size, length and elevation, was analyzed satisfactorily by HY-8. The total head loss in the structures was then input to HEC-2 as a specific value of loss, in feet. This value would be added to the HEC-2 downstream (tailwater) computed WSEL. A loss value was input, with an X5 card, rather than inputting a specific design headwater elevation because minor modeling changes that could affect the tailwater elevation would directly translate upstream the same incremental change to the headwater elevation. This makes it unnecessary to recalculate the new headwater elevation if the change to the structure's tailwater elevation is minor (a few tenths of a foot or less). At both Parkway crossings over Wagner Wash, the headwater water surface elevation is riding on the tailwater water surface, a condition termed 'outlet control'.

The upstream crossing, unlike the downstream crossing, is experiencing minor roadway overflow during the 100-year flooding event. HY-8 attempted, in its iterative process, to balance and solve the correct headwater value for the boxes' pressure flow and roadway weir flow. The program was unable to achieve a mathematically perfect solution to the problem, apparently due to internal computational limitations (although its computed results were very close to the ultimate solution); therefore the solution was hand computed, using HDS-5 procedures. The two sets of structures at the upstream crossing are approximately 1000 feet apart, the smaller structure (2-10'x3') being that distance west of the main channel. The discharge from the two sets of structures converge at a point three HEC-2 cross-sections downstream of the roadway. Therefore, the flow passing the smaller structure (offset from the main channel) is diverted from Wagner Wash for the three HEC-2 cross-section reach distance and discharges into a substantial, but smaller waterway. The head loss calculations estimated that 490 cfs would pass the smaller set of boxes during the 100-year event. That flow amount was thus deducted from the full design flows for the distance of the three cross-sections downstream. Examination of the HEC-1 hydrology model indicated that this was a simplistic, but not unreasonable prediction of the impact on the downstream flows due to this minor diversion. Since the diverted flow is relatively small portion (14 percent or less, as you move downstream) of the total flow, this analysis and solution was deemed adequate. The identical tailwater elevation was used at both sets of structures (main channel and offset 1000 feet), in order to expedite the calculations. In actuality, the smaller structure, offset to the west, sits 3 feet higher than the main channel structure and given the outlet channel condition, is not as likely to be 'outlet controlled'. If that structure is flowing under 'inlet control', the difference in capacity is increased 30 cfs, which was not considered significant. A hand calculation of the downstream channel capacity is attached.

Attachments:
'SUNUP', upstream crossing HY-8 analysis (void) and hand computations
'SUNDOWN', downstream crossing HY-8 analysis and hand check computations
Culvert sketches, weir calculations
D.S. channel capacity of 2-10x3 box culvert at S.V. Parkway, U.S. crossing

'SUNUP' Calculations related to Sun Valley Parkway upstream crossing.

02-12-1991 08:29:56 SUNUP

MINUMUM DISCHARGE (CFS)	0
DESIGN DISCHARGE (CFS)	3446
MAXIMUM DISCHARGE (CFS)	5000

Void - This run did not provide absolutely correct solution, but is close enough for an approximation.

CULV #	A - SITE DATA: INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	B - CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANN. N	INLET TYPE
1	1491.55	1490.42	137.00	6 - RCB	12.00	5.00	.012	CONVENTIONAL
2	1494.54	1492.75	136.00	2 - RCB	10.00	3.00	.012	CONVENTIONAL
3								
4								
5								
6								

CULVERT NUMBER: 1

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1491.55
OUTLET STATION (FT)	137.00
OUTLET ELEVATION (FT)	1490.42
NUMBER OF BARRELS	6.00
SLOPE (V-FT/H-FT)	0.0082
CULVERT LENGTH ALONG SLOPE (FT)	137.00

BARREL SHAPE: 12.00 FT X 5.00 FT BOX
BARREL MATERIAL: CONCRETE
WITH A MANNING'S N OF 0.012
INLET TYPE: CONVENTIONAL
INLET EDGE AND WALL: 1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION: NONE

CULVERT NUMBER: 2

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1494.54
OUTLET STATION (FT)	136.00
OUTLET ELEVATION (FT)	1492.75
NUMBER OF BARRELS	2.00
SLOPE (V-FT/H-FT)	0.0132
CULVERT LENGTH ALONG SLOPE (FT)	136.00

BARREL SHAPE: 10.00 FT X 3.00 FT BOX
BARREL MATERIAL: CONCRETE
WITH A MANNING'S N OF 0.012
INLET TYPE: CONVENTIONAL
INLET EDGE AND WALL: 1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION: NONE

USER DEFINED CROSS-SECTION OF DOWNSTREAM CHANNEL

SLOPE OF CHANNEL	0.0025
SUBCHANNEL OPTION (4 POSSIBLE)	2

CHANNEL BOUNDARIES COORDINATE NUMBERS

LEFT	2.00
RIGHT	5.00
MANNING N LEFT OVER BANK	0.040
MANNING N MAIN CHANNEL	0.040
MANNING N RIGHT OVER BAN	0.040

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9500.00	1498.90
2	9960.00	1498.90
3	9960.10	1490.70
4	10039.90	1490.70
5	10040.00	1498.90
6	10500.00	1498.90
7	10989.00	1498.90
8	10990.00	1492.70
9	11011.00	1492.70
10	11012.00	1498.90

UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NO.	VEL. (FPS)	SHEAR (PSF)
0.00	1490.70	0.000	0.00	0.00
500.00	1492.82	0.359	2.96	0.31
1000.00	1493.94	0.378	3.86	0.47
1500.00	1494.87	0.389	4.51	0.59
2000.00	1495.69	0.396	5.02	0.69
2500.00	1496.45	0.401	5.45	0.78
3000.00	1497.15	0.405	5.83	0.87
3446.00	1497.74	0.407	6.13	0.93
4000.00	1498.45	0.410	6.47	1.01
4500.00	1498.90	0.411	6.67	1.06
5000.00	1498.90	0.411	6.67	1.06

SELECTED OVERTOPPING CREST

ROADWAY SURFACE: PAVED

EMBANKMENT TOP WIDTH (FT): 110.00

USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9500.00	1502.40
2	9600.00	1501.30
3	9700.00	1500.60
4	9800.00	1500.27
5	9960.00	1499.64
6	10100.00	1499.40
7	10300.00	1498.90
8	10400.00	1498.89
9	10500.00	1499.83
10	10700.00	1501.11
11	10900.00	1501.78
12	10989.00	1502.10
13	11100.00	1502.40

Note that 3 flows do not sum to 3446 cfs.

SUMMARY OF CULVERT FLOWS (CFS) FILE: SUNUP DATE: 01-25-1991

ELEV (FT)	TOTAL	1	2	3	4	5	6	OVERTOP	ITER
1491.55	0	0	0	0	0	0	0	0	0
1493.22	500	500	0	0	0	0	0	0	2
1494.44	1000	1000	0	0	0	0	0	0	2
1495.49	1500	1440	60	0	0	0	0	0	3
1496.46	2000	1835	164	0	0	0	0	0	4
1497.32	2500	2227	273	0	0	0	0	0	3
1498.34	3000	2599	400	0	0	0	0	0	3
1499.32	3446	3000	469	0	0	0	0	155	11
1499.78	4000	2756	431	0	0	0	0	719	10
1500.09	4500	2603	407	0	0	0	0	1387	5
1500.22	5000	2743	429	0	0	0	0	1742	3

CULVERT # 1 PERFORMANCE CURVE
FOR 6 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	1491.55	1490.70	0.00	-0.85	-0.85	1491.55	0.00	0.00
500	1494.08	1492.82	1.67	2.53	2.53	0.00	0.00	2.89
1000	1495.44	1493.94	2.71	3.89	3.89	0.00	0.00	3.94
1440	1496.46	1494.87	3.51	4.91	4.91	0.00	0.00	4.49
1835	1496.46	1495.69	4.18	4.91	4.91	0.00	0.00	5.10
2227	1497.32	1496.45	4.83	5.77	5.77	0.00	0.00	6.19
2599	1498.34	1497.15	5.44	6.79	6.79	0.00	0.00	7.22
3000	1499.32	1497.74	6.11	7.77	7.77	0.00	0.00	8.33
2756	1499.78	1498.45	5.70	8.23	8.23	0.00	0.00	7.65
2603	1500.09	1498.90	5.44	8.54	8.54	0.00	0.00	7.23
2743	1500.22	1498.90	5.68	8.67	8.67	0.00	0.00	7.62

CULVERT # 2 PERFORMANCE CURVE
FOR 2 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	1494.54	1490.70	0.00	-1.79	-1.79	1494.54	0.00	0.00
0	1494.54	1492.82	0.00	-1.72	-1.72	1494.54	0.00	0.00
0	1494.54	1493.94	0.00	-0.60	-0.60	1494.54	0.00	0.00
60	1496.54	1494.87	0.95	2.00	2.00	0.00	0.00	1.42
164	1497.47	1495.69	1.92	2.93	2.93	0.00	0.00	2.78
273	1497.32	1496.45	2.78	2.50	2.50	0.00	0.00	4.55
400	1498.34	1497.15	3.77	3.80	3.80	0.00	0.00	6.67
469	1499.32	1497.74	4.34	4.78	4.78	0.00	0.00	7.81
431	1499.78	1498.45	4.02	5.24	5.24	0.00	0.00	7.18
407	1500.09	1498.90	3.82	5.55	5.55	0.00	0.00	6.78
429	1500.22	1498.90	4.00	5.68	5.68	0.00	0.00	7.14

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: SUNUP DATE: 01-25-1991

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1491.55	0.00	0	0	0.00
1493.22	0.00	500	0	0.00
1494.44	0.00	1000	0	0.00
1495.49	0.01	1500	-0	-0.03
1496.46	0.00	2000	-1	-0.05
1497.32	0.00	2500	0	0.01
1498.34	0.00	3000	-0	-0.01
1499.32	0.01	3446	178	5.15
1499.78	0.01	4000	-95	-2.37
1500.09	0.02	4500	-103	-2.29
1500.22	0.02	5000	-87	-1.74

PROJECT: Wagner Wash FIS

DESIGNER: E.L.

DATE: 2-13-91

HYDROLOGIC AND CHANNEL INFORMATION

1. 6-10'x5' box
2. 2-10'x3' box.

Q_1 = 3446

Q_2 = _____

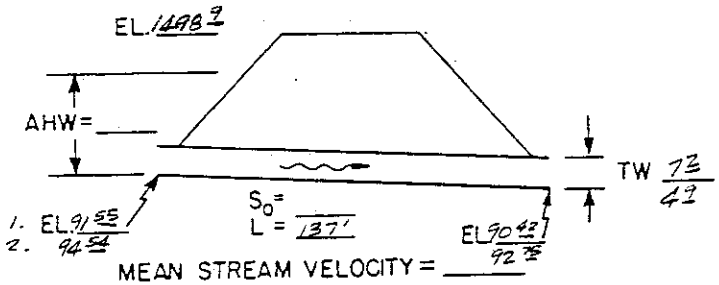
TW_1 = 1497.6

TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION: RM 6.27



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

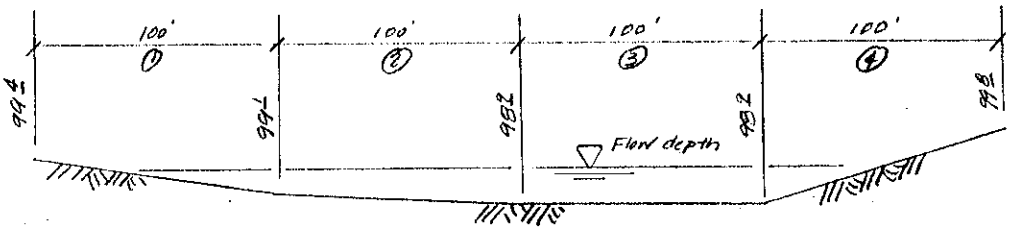
	CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
1.	6-10'x5' box @DHW=99.4 45° Wings	540	10x5	1.57	7.85	⟹ 6 x 540 = 3240 cfs (inlet ctrl.)											
	" "	450	10x5	—	—	.2	1.78	-	-	7.2	7.2	1.13	7.85				
						⟹ 6 x 450 = 2700 cfs (outlet ctrl.)											Outlet ctrl. capacity = 2700 cfs
2.	2-10'x3' box @DHW=99.4 45° wings	260	10x3	1.62	4.86	⟹ 2 x 260 = 520 cfs (inlet ctrl.)											
	" "	245	10x3	—	—	.2	1.75	-	-	4.9	4.9	1.79	4.86				
						⟹ 2 x 245 = 490 cfs (outlet ctrl.)											Outlet ctrl. capacity = 490 cfs

2700
490
235 (weir)
3425 cfs
≈ 3446 cfs

SUMMARY & RECOMMENDATIONS:
By trial & error, the respective capacities of boxes 1 and 2, combined with weir flow were calculated until balanced solution at el. 1499.4 was achieved. (Weir flow calcs. are separate.)
~~The Q values were derived from HW elevs., not vice versa.~~
TW el. taken from HEC-2 analysis.

7/17

Project Wagner Wash FIS		Computed EL	Date 2-13-91
Subject Weir flow calcs for S.V. Parkway (U.S. x-ing)		Checked	Date
Task Calc. simultaneously with culvert h.w.		Sht. 8	Of 17



$Q = CLH^{3/2}$ $C = 3.00$ (from HEC-2 manual)

Trial

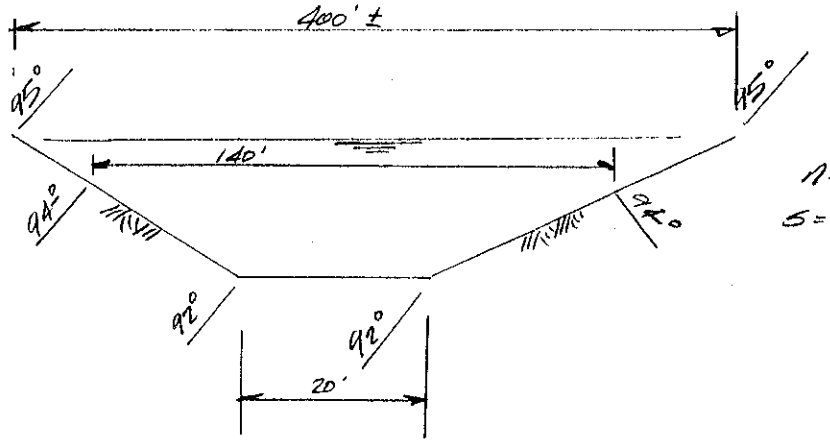
El.	L	H	Qcap.
98.8	—	—	—
~~99.2~~	~~183~~	~~.3~~	~~90 cfs~~ (~~Effective L = 166'/2 + 100 = 183'±~~)
99.4	355	varies	235 cfs*

* @ 99.4, $Q = 3.0(100).15^{3/2} =$ 17 cfs ①
, $Q = 3.0(100).45^{3/2} =$ 91 ②
, $Q = 3.0(100).5^{3/2} =$ 104 ③
, $Q = 3.0(55).25^{3/2}$ 21 ④

235 cfs Total Flow (see culvert calcs.)

Project Wagner Wash FIS		Computed EL	Date 2-22-91
Subject Bridge Hydraulics		Checked	Date
Task D.S. channel capacity of 2-10'x3' box culv.		Sht. 9	Of 17

@ upstream crossing - check of tailwater condition.



$n = .04$

$S = 2/450' = .0044'/'$

$A = \frac{160}{2} \times 2' + \frac{540}{2} \times 1' = 430 SF$

$P = 400' \pm$

$Q = 430 \frac{1.49}{.04} \frac{430}{400}^{2/3} .0044^{1/2} = \underline{1115 \text{ cfs}} > 490 \text{ cfs}$, okay

Notes: At 2' deep, $Q_{cap.} = 432$ cfs ≈ 490 cfs (Calc. not shown)
Downstream control is less than TW assumed in HY-8 and hand calcs. ⇒ approx 95% vs. 97%. Culvert actually acting in inlet control.

(Map attached)

2-10'x3' Box
1499.0
1495.5
1500
1503.0
1500
Check Dam
1497.5
N 68000
1497.5
1497.0
500 ft
1495.0
72000
E
Limit
6.07
1491.0
1497.5
6.15
6.22
1493.0
1490
1491.0
Match to Sheet 7
Start 14 below bridge
14

'SUNDOWN' Calculations related to Sun Valley Parkway downstream crossing.

02-12-1991 08:00:10 SUNDOWN

MINUMUM DISCHARGE (CFS)	0
DESIGN DISCHARGE (CFS)	10358
MAXIMUM DISCHARGE (CFS)	13000

CULV #	A - SITE DATA INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	B - CULVERT SHAPE, MATERIAL, INLET BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANN. N	INLET TYPE
1	1432.92	1432.38	171.00	9 - RCB	12.00	6.00	.012	CONVENTIONAL
2	1435.52	1434.98	140.00	6 - RCB	10.00	4.00	.012	CONVENTIONAL
3	1435.39	1435.00	179.00	6 - RCB	10.00	4.00	.012	CONVENTIONAL
4								
5								
6								

CULVERT NUMBER: 1

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1432.92
OUTLET STATION (FT)	171.00
OUTLET ELEVATION (FT)	1432.38
NUMBER OF BARRELS	9.00
SLOPE (V-FT/H-FT)	0.0032
CULVERT LENGTH ALONG SLOPE (FT)	171.00

BARREL SHAPE: 12.00 FT X 6.00 FT BOX
BARREL MATERIAL: CONCRETE
WITH A MANNING'S N OF 0.012
INLET TYPE: CONVENTIONAL
INLET EDGE AND WALL: 1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION: NONE

CULVERT NUMBER: 2

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1435.52
OUTLET STATION (FT)	140.00
OUTLET ELEVATION (FT)	1434.98
NUMBER OF BARRELS	6.00
SLOPE (V-FT/H-FT)	0.0039
CULVERT LENGTH ALONG SLOPE (FT)	140.00

BARREL SHAPE: 10.00 FT X 4.00 FT BOX
BARREL MATERIAL: CONCRETE
WITH A MANNING'S N OF 0.012
INLET TYPE: CONVENTIONAL
INLET EDGE AND WALL: 1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION: NONE

CULVERT NUMBER: 3

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1435.39
OUTLET STATION (FT)	179.00
OUTLET ELEVATION (FT)	1435.00
NUMBER OF BARRELS	6.00
SLOPE (V-FT/H-FT)	0.0022
CULVERT LENGTH ALONG SLOPE (FT)	179.00

BARREL SHAPE: 10.00 FT X 4.00 FT BOX
BARREL MATERIAL: CONCRETE
WITH A MANNING'S N OF 0.012
INLET TYPE: CONVENTIONAL
INLET EDGE AND WALL: 1:1 BEVEL (45 DEG. FLARE)
INLET DEPRESSION: NONE

USER DEFINED CROSS-SECTION OF DOWNSTREAM CHANNEL

SLOPE OF CHANNEL	0.0040
SUBCHANNEL OPTION (4 POSSIBLE)	2

CHANNEL BOUNDARIES COORDINATE NUMBERS

LEFT	2.00
RIGHT	12.00

MANNING N LEFT OVER BANK	0.040
MANNING N MAIN CHANNEL	0.040
MANNING N RIGHT OVER BAN	0.040

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9350.00	1438.00
2	9680.00	1436.00
3	9681.00	1435.00
4	9779.00	1435.00
5	9781.00	1435.00
6	9900.00	1434.00
7	9901.00	1432.40
8	10075.00	1432.40
9	10076.00	1434.00
10	10250.00	1434.00
11	10251.00	1435.00
12	10354.00	1435.00
13	10355.00	1438.00

UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NO.	VEL. (FPS)	SHEAR (PSF)
0.00	1432.40	0.000	0.00	0.00
1300.00	1434.56	0.425	2.63	0.29
2600.00	1435.32	0.434	2.86	0.34
3900.00	1435.70	0.452	3.37	0.43
5200.00	1436.02	0.465	3.78	0.51
6500.00	1436.31	0.476	4.13	0.58
7800.00	1436.58	0.484	4.43	0.65
9100.00	1436.82	0.492	4.71	0.71
10358.00	1437.04	0.498	4.95	0.76
11700.00	1437.26	0.504	5.18	0.82
13000.00	1437.46	0.509	5.39	0.87

SELECTED OVERTOPPING CREST

ROADWAY SURFACE: PAVED

EMBANKMENT TOP WIDTH (FT): 110.00

USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9000.00	1443.00
2	9300.00	1442.10
3	9600.00	1443.10
4	9680.00	1444.22
5	9740.00	1444.60
6	9900.00	1445.20
7	9959.00	1445.30
8	10056.00	1445.40
9	10295.00	1445.20
10	10400.00	1444.83

SUMMARY OF CULVERT FLOWS (CFS) FILE: SUNDOWN DATE: 01-24-1991

ELEV (FT)	TOTAL	1	2	3	4	5	6	OVERTOP	ITER
1432.92	0	0	0	0	0	0	0	0	0
1435.36	1300	1300	0	0	0	0	0	0	2
1436.49	2600	2239	179	195	0	0	0	0	5
1437.32	3900	3000	455	453	0	0	0	0	5
1438.06	5200	3724	742	737	0	0	0	0	5
1438.75	6500	4412	1037	1040	0	0	0	0	4
1439.42	7800	5083	1342	1368	0	0	0	0	4
1440.10	9100	5749	1648	1704	0	0	0	0	4
1440.80	10358	6411	1950	2002	0	0	0	0	3
1441.59	11700	7122	2267	2315	0	0	0	0	3
1442.73	13000	8074	2673	2715	0	0	0	243	11

CULVERT # 1 PERFORMANCE CURVE
FOR 9 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	1432.93	1432.40	0.00	-0.52	-0.52	1432.92	0.00	0.00
1300	1435.36	1434.56	2.44	2.39	2.39	0.00	0.00	5.52
2239	1436.49	1435.32	3.57	3.50	3.50	0.00	0.00	7.04
3000	1437.32	1435.70	4.40	4.19	4.19	0.00	0.00	8.37
3724	1438.06	1436.02	5.14	4.81	4.81	0.00	0.00	9.47
4412	1438.75	1436.31	5.83	5.44	5.44	0.00	0.00	10.39
5083	1439.42	1436.58	6.50	6.00	6.00	0.00	0.00	11.21
5749	1440.10	1436.82	7.18	6.57	6.57	0.00	0.00	11.98
6411	1440.80	1437.04	7.88	7.11	7.11	0.00	0.00	12.73
7122	1441.59	1437.26	8.67	7.67	7.67	0.00	0.00	13.35
8074	1442.74	1437.46	9.82	8.38	8.38	0.00	0.00	13.95

CULVERT # 2 PERFORMANCE CURVE
FOR 6 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	1435.53	1432.40	0.00	-0.54	-0.54	1435.52	0.00	0.00
0	1435.53	1434.56	0.00	-0.54	-0.54	1435.52	0.00	0.00
179	1436.49	1435.32	0.97	0.50	0.50	0.00	0.00	5.21
455	1437.32	1435.70	1.80	1.40	1.40	0.00	0.00	7.14
742	1438.06	1436.02	2.54	2.15	2.15	0.00	0.00	8.43
1037	1438.75	1436.31	3.23	2.82	2.82	0.00	0.00	9.16
1342	1439.42	1436.58	3.90	3.45	3.45	0.00	0.00	10.08
1648	1440.10	1436.82	4.58	4.04	4.04	0.00	0.00	10.89
1950	1440.80	1437.04	5.28	4.58	4.58	0.00	0.00	11.21
2267	1441.59	1437.26	6.07	5.12	5.12	0.00	0.00	11.71
2673	1442.73	1437.46	7.21	5.78	5.78	0.00	0.00	12.29

CULVERT # 3 PERFORMANCE CURVE
FOR 6 BARREL(S)

Q (cfs)	HWE (ft)	TWE (ft)	ICH (ft)	OCH (ft)	CCE (ft)	FCE (ft)	TCE (ft)	VO (fps)
0	1435.60	1432.40	0.00	-0.39	-0.39	1435.39	0.00	0.00
0	1435.60	1434.56	0.00	-0.39	-0.39	1435.39	0.00	0.00
195	1436.49	1435.32	1.02	1.10	1.10	0.00	0.00	4.70
453	1437.32	1435.70	1.79	1.93	1.93	0.00	0.00	6.23
737	1438.06	1436.02	2.53	2.67	2.67	0.00	0.00	7.33
1040	1438.75	1436.31	3.24	3.36	3.36	0.00	0.00	8.22
1368	1439.42	1436.58	3.96	4.03	4.03	0.00	0.00	9.00
1704	1440.10	1436.82	4.71	4.66	4.66	0.00	0.00	9.68
2002	1440.80	1437.04	5.41	5.19	5.19	0.00	0.00	10.22
2315	1441.59	1437.26	6.20	5.35	5.35	0.00	0.00	10.89
2715	1442.73	1437.46	7.34	5.99	5.99	0.00	0.00	12.77

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: SUNDOWN DATE: 01-24-1991

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1432.92	0.00	0	0	0.00
1435.36	0.00	1300	0	0.00
1436.49	0.03	2600	12	0.48
1437.32	0.02	3900	8	0.20
1438.06	0.01	5200	3	0.06
1438.75	0.03	6500	-11	-0.17
1439.42	0.02	7800	-7	-0.09
1440.10	0.01	9100	0	0.00
1440.80	0.03	10358	5	0.05
1441.59	0.02	11700	4	0.03
1442.73	0.01	13000	705	5.43

PROJECT: Wagner Wash

DESIGNER: EL

DATE: 1-30-91 Rev 2/12

HYDROLOGIC AND CHANNEL INFORMATION

Verification of HY-8

Q_1 = 6411

Q_2 = 1950

Q_3 = 2002

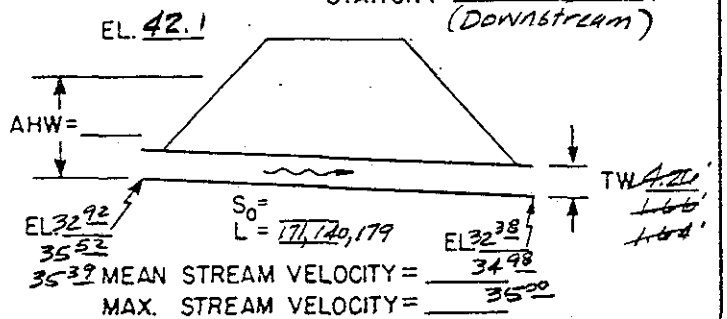
(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

TW_1 = ~~34.64~~ 37.04 (2-12)

TW_2 = ↓

SKETCH

STATION: Sun Valley Pkwy. (Downstream)



Rev 2/12/91

MEAN STREAM VELOCITY = ~~34 98~~

MAX. STREAM VELOCITY = ~~35 00~~

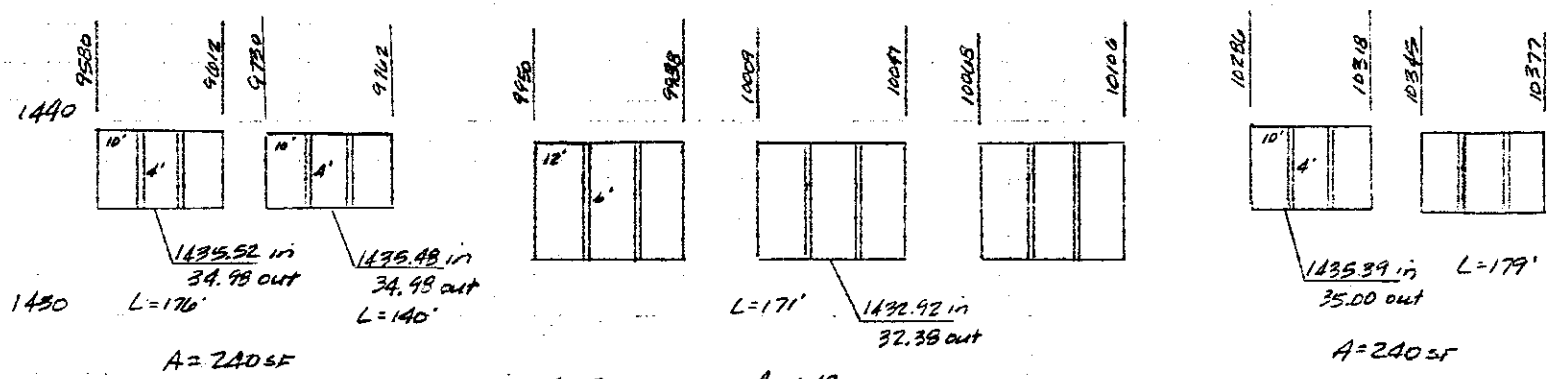
CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H+h_o−LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
9-12x6 45° Wings	6411	12x 6	1.31	7.86	.2	2.4	4.75	5.4	4.66 ~~4.20~~	5.4	.54	7.26	7.86			HW= 40.78
6-10x4 45° Wings	1950	10x 4	1.32	5.28	.2	1.7	3.2	3.6	2.06 ~~1.66~~	3.6	.54	4.76	5.28			HW= 40.80
6-10x4 45° Wings	2002	10x 4	1.35	5.40	.2	1.8	3.3	3.65	2.04 ~~1.64~~	3.65	.39	5.06	5.40			HW= 40.79

SUMMARY & RECOMMENDATIONS:

Confirms HY-8 analysis.

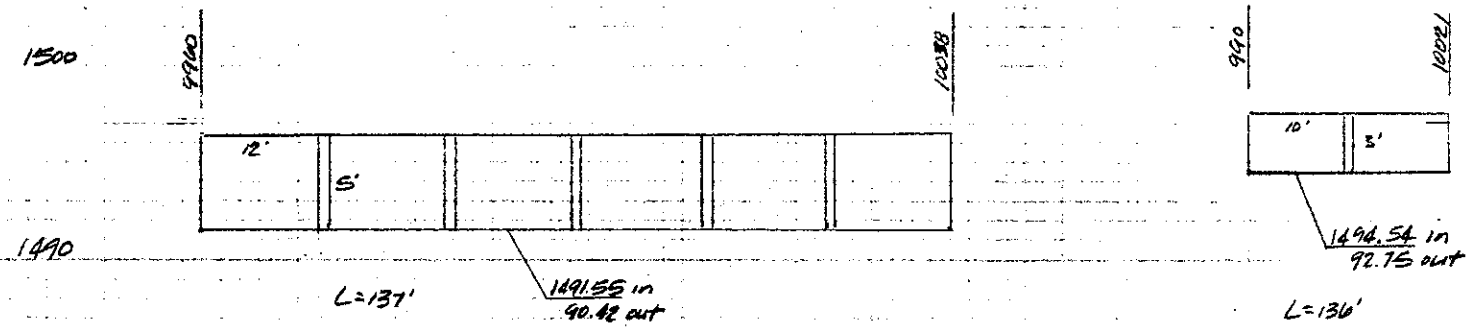
Revision on 2/12 – no effect on DHW

1/01/17



Section 45.3

DOWNSTREAM



Section 49.3

UPSTREAM

L1/21

1/6

4.5

Date: Jan. 29, 1991 **Project No.:** 07162 001 044

HDR

Memorandum

To: Pedro Calza, Flood Control District of Maricopa County

From: HDR Engineering, Inc.
Phoenix, Arizona

Subject: Wagner Wash FIS. Capacity calculations of interceptor channel which parallels the Sun Valley Parkway and discharges into Wagner Wash. One page plus attachments.

Discussion:

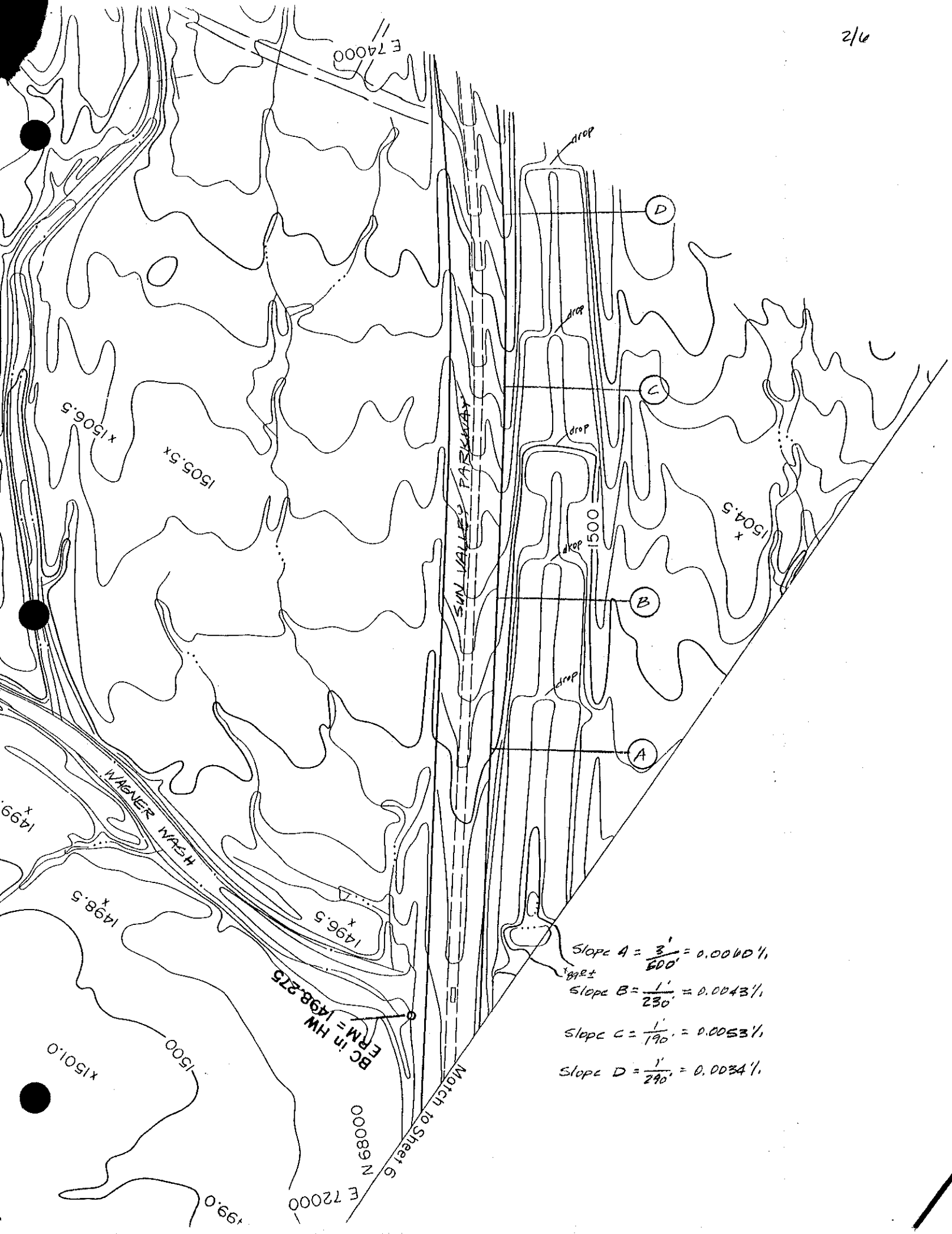
At the request of Mr. Calza, four field surveyed cross-sections were taken of a man-made channel which was constructed on the south side of and in conjunction with the Sun Valley Parkway. The channel intercepts runoff from a large mountainous drainage area (the size of which was not determined in this study). Prior to the Parkway construction, that runoff would have naturally travelled roughly south to north, passing across the new Parkway alignment. The runoff would then find its way, via small rills and gullies, westerly to Wagner Wash which, in turn, flows north to south.

From those four surveyed cross-sections and with the aid of new topographic mapping, an estimate was made of the hydraulic capacity of this man-made channel. Due to limited mapping coverage and for practical purposes of limiting the time and effort dedicated, the cross-sections were taken only within a quarter-mile from the side channel's confluence with Wagner Wash. Normal depth calculations were performed upon the cross-section data in order to calculate the capacities. Drop structures in this reach and tailwater control from Wagner Wash would necessarily have an impact upon a water surface profile up the channel, but normal depth calculations were deemed sufficient to be a general indicator of the channel's bank full capacity --which was the purpose of this task. The shape of the channel is trapezoidal with a low flow channel. The channel is straight, uniform and clean. A Manning's n of 0.025 was assigned to the channel which consists of sandy soil with small rocks and gravel. HY-8, a culvert analysis computer program was used for its capability to calculate a flow rating curve for an irregularly shaped channel. The natural channel slope was input as the slope of the energy grade line and was estimated from the topographic mapping.

The results of the analyses are shown in the table below. The flow capacity is given for a depth equal to the back of curb elevation on Sun Valley Parkway. See the attached map for locations of the four cross-sections.

Cross-Section	Back/Curb Elevation	Depth	Flow(cfs)
A	1500.31	9.33'	15,000
B	1503.35	9.78'	16,000
C	1509.93	8.29'	14,000
D	1513.62	8.94'	12,000

Also attached are summaries of the HY-8 input and output data for each cross-section.


E 74000
drop
D
C
B
A
SUN VALLEY PARKWAY
1500
1504.5
1505.5
1506.5
WAGNER WASH
1496.5
1498.5
1499
±3688
BC in HW
FM = 1498.275
1500
1501.0
N 68000
E 72000
Match to Sheet 6
Slope A = 3'/600' = 0.0060%
Slope B = 1'/230' = 0.0043%
Slope C = 1'/190' = 0.0053%
Slope D = 1'/290' = 0.0034%

01-28-1991 15:21:58 WAGNERA
SUN VALLEY PARKWAY SIDE CHANNEL TO WAGNER WASH
SURVEY SECTION A 400' UPSTREAM FROM WASH

MINUMUM DISCHARGE (CFS)	0
DESIGN DISCHARGE (CFS)	5000
MAXIMUM DISCHARGE (CFS)	17000

USER DEFINED CROSS-SECTION OF DOWNSTREAM CHANNEL

SLOPE OF CHANNEL	0.0060
SUBCHANNEL OPTION (4 POSSIBLE)	4

CHANNEL BOUNDARIES COORDINATE NUMBERS

LEFT	0.00
RIGHT	0.00
MANNING N LEFT OVER BANK	0.000
MANNING N MAIN CHANNEL	0.025
MANNING N RIGHT OVER BAN	0.000

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)	
1	45.90	1499.36	LEFT BANK
2	66.30	1493.68	
3	103.30	1493.03	
4	109.70	1491.05	
5	130.40	1490.98	
6	136.90	1492.95	
7	177.40	1493.70	
8	196.50	1499.25	
9	207.50	1500.31	BACK OF CURB

UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NO.	VEL. (FPS)	SHEAR (PSF)
0.00	1490.98	0.000	0.00	0.00
1700.00	1494.83	0.905	7.23	0.74
3400.00	1495.89	0.963	9.32	1.08
5000.00	1496.70	0.996	10.69	1.32
6800.00	1497.47	1.022	11.90	1.56
8500.00	1498.13	1.041	12.85	1.75
10200.00	1498.73	1.057	13.66	1.91
11900.00	1499.29	1.070	14.37	2.07
13600.00	1499.86	1.079	14.85	2.17
15300.00	1500.31	1.086	15.22	2.25
17000.00	1500.31	1.086	15.22	2.25

01-28-1991 10:37:07 WAGNERA
SUN VALLEY PARKWAY SIDE CHANNEL TO WAGNER WASH
SURVEY SECTION B 685' UPSTREAM FROM WASH

MINUMUM DISCHARGE (CFS)	0
DESIGN DISCHARGE (CFS)	5000
MAXIMUM DISCHARGE (CFS)	17000

USER DEFINED CROSS-SECTION OF DOWNSTREAM CHANNEL

SLOPE OF CHANNEL	0.0043
SUBCHANNEL OPTION (4 POSSIBLE)	4

CHANNEL BOUNDARIES COORDINATE NUMBERS

LEFT	0.00
RIGHT	0.00
MANNING N LEFT OVER BANK	0.000
MANNING N MAIN CHANNEL	0.025
MANNING N RIGHT OVER BAN	0.000

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)	
1	44.10	1503.13	LEFT BANK
2	70.30	1496.39	
3	110.30	1495.68	
4	117.70	1493.64	
5	136.80	1493.57	
6	144.60	1495.59	
7	184.60	1496.31	
8	205.10	1502.10	
9	217.40	1503.35	BACK OF CURB

UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NO.	VEL. (FPS)	SHEAR (PSF)	
0.00	1493.57	0.000	0.00	0.00	
1700.00	1497.67	0.776	6.43	0.57	
3400.00	1498.82	0.825	8.25	0.83	
5000.00	1499.68	0.852	9.44	1.01	
6800.00	1500.52	0.875	10.49	1.18	
8500.00	1501.22	0.891	11.30	1.33	
10200.00	1501.86	0.904	12.00	1.45	
11900.00	1502.49	0.914	12.54	1.55	
13600.00	1503.09	0.922	12.97	1.63	
15300.00	1503.13	0.922	13.00	1.63	
17000.00	1503.13	0.922	13.00	1.63	ANALYSIS LIMITED TO LOWEST BANK ELEVATION

01-28-1991 10:47:56 WAGNERA
SUN VALLEY PARKWAY SIDE CHANNEL TO WAGNER WASH
SURVEY SECTION C 1060' UPSTREAM FROM WASH

MINUMUM DISCHARGE (CFS)	0
DESIGN DISCHARGE (CFS)	5000
MAXIMUM DISCHARGE (CFS)	17000

USER DEFINED CROSS-SECTION OF DOWNSTREAM CHANNEL

SLOPE OF CHANNEL	0.0053
SUBCHANNEL OPTION (4 POSSIBLE)	4

CHANNEL BOUNDARIES COORDINATE NUMBERS

LEFT	0.00
RIGHT	0.00

MANNING N LEFT OVER BANK	0.000
MANNING N MAIN CHANNEL	0.025
MANNING N RIGHT OVER BAN	0.000

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)	
1	49.00	1509.88	LEFT BANK
2	71.90	1504.51	
3	118.40	1503.65	
4	125.10	1501.76	
5	145.10	1501.64	
6	152.50	1503.82	
7	199.20	1504.27	
8	216.50	1509.51	
9	224.90	1509.93	BACK OF CURB

UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NO.	VEL. (FPS)	SHEAR (PSF)	
0.00	1501.64	0.000	0.00	0.00	
1700.00	1505.53	0.845	6.60	0.62	
3400.00	1506.54	0.900	8.52	0.91	
5000.00	1507.31	0.931	9.78	1.12	
6800.00	1508.05	0.956	10.89	1.32	
8500.00	1508.68	0.974	11.76	1.48	
10200.00	1509.25	0.989	12.51	1.63	
11900.00	1509.85	0.998	12.99	1.72	
13600.00	1509.88	0.998	13.00	1.72	
15300.00	1509.88	0.998	13.00	1.72	
17000.00	1509.88	0.998	13.00	1.72	ANALYSIS LIMITED TO LOWEST BANK ELEVATION

01-28-1991 11:05:04 WAGNERA
SUN VALLEY PARKWAY SIDE CHANNEL TO WAGNER WASH
SURVEY SECTION D 1380' UPSTREAM FROM WASH

MINUMUM DISCHARGE (CFS)	0
DESIGN DISCHARGE (CFS)	5000
MAXIMUM DISCHARGE (CFS)	17000

USER DEFINED CROSS-SECTION OF DOWNSTREAM CHANNEL

SLOPE OF CHANNEL	0.0034
SUBCHANNEL OPTION (4 POSSIBLE)	4

CHANNEL BOUNDARIES COORDINATE NUMBERS

LEFT	0.00
RIGHT	0.00

MANNING N LEFT OVER BANK	0.000
MANNING N MAIN CHANNEL	0.025
MANNING N RIGHT OVER BAN	0.000

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)	
1	51.40	1514.16	LEFT BANK
2	76.00	1507.47	
3	119.00	1506.76	
4	126.30	1504.68	
5	144.80	1504.71	
6	152.00	1506.55	
7	188.60	1507.02	
8	211.80	1511.52	
9	220.70	1513.62	BACK OF CURB

UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NO.	VEL. (FPS)	SHEAR (PSF)
0.00	1504.68	0.000	0.00	0.00
1700.00	1508.86	0.696	5.92	0.47
3400.00	1510.09	0.739	7.55	0.68
5000.00	1511.00	0.763	8.60	0.83
6800.00	1511.88	0.783	9.53	0.97
8500.00	1512.61	0.797	10.26	1.08
10200.00	1513.27	0.809	10.89	1.18
11900.00	1513.62	0.814	11.21	1.23
13600.00	1513.62	0.814	11.21	1.23
15300.00	1513.62	0.814	11.21	1.23
17000.00	1513.62	0.814	11.21	1.23

HEC2 S/N: ********** HMVersion: 6.20 Data File: wagfld.in

4.7

```
*******************************************
* HEC-2 WATER SURFACE PROFILES            *
*                                         *
*  Version   4.6.0;  February 1991        *
*                                         *
*  RUN DATE     3APR91    TIME    6:22:59 *
*******************************************
```

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***************************************
*  U.S. ARMY CORPS OF ENGINEERS       *
*  HYDROLOGIC ENGINEERING CENTER      *
*  609 SECOND STREET, SUITE D         *
*  DAVIS, CALIFORNIA 95616-4687       *
*          (916) 756-1104             *
***************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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:::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::
:::                                       :::
:::   FULL MICRO-COMPUTER IMPLEMENTATION   :::
:::                                       :::
:::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::
```

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============================
H A E S T A D   M E T H O D S
============================
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS RUN EXECUTED 3APR91 6:23:00

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.0;  February 1991
************************************


T1      100-Year Flood - Natural Conditions        Final Run
T2      Water Surface Profile (Culvert losses input with X5 cards)
T3      Wagner Wash FIS
T4      Maricopa County, Arizona
T5      Model by HDR Engineering, Inc., Phx., AZ.   March 1991
T6      Job No. 07162 001 044

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                                                                 1257.33

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1                  -1


   VARIABLE CODES FOR SUMMARY PRINTOUT

   110       115       200       150

QT       2     15717     15717
NC   0.065     0.100     0.040       0.1       0.3
   Starting WS determined previously by slope-area method, not influenced by
   Hassayampa River.
ET                         9.1                                                          9568      10108
X1    0.09        78    9568.0    9699.3         0         0         0
   Section A
GR   1289.7    9410.3    1289.4    9440.6    1285.6    9452.5    1277.8    9466.7    1275.3    9480.4
GR   1269.3    9498.4    1263.3    9514.6    1263.0    9528.8    1260.0    9545.6    1254.7    9568.0
GR   1253.0    9573.8    1252.8    9598.9    1252.0    9608.4    1252.9    9636.2    1252.9    9660.9
GR   1253.3    9693.3    1254.3    9699.3    1253.8    9711.9    1254.3    9725.5    1253.7    9737.3
GR   1254.3    9769.6    1254.9    9788.9    1254.9    9805.4    1252.7    9812.8    1252.7    9820.6
GR   1254.9    9821.8    1255.3    9837.0    1255.3    9861.0    1253.4    9870.6    1254.0    9882.8
GR   1252.7    9892.1    1254.0    9901.2    1254.2    9912.0    1253.4    9924.7    1255.3    9939.7
GR   1253.8    9954.1    1253.4    9960.4    1254.5    9970.7    1254.3    9978.4    1252.1    9988.3
GR   1252.3   10000.0    1254.7   10012.8    1254.9   10026.9    1254.1   10043.4    1253.6   10048.3
GR   1253.9   10058.1    1254.1   10067.8    1254.3   10080.6    1254.6   10089.8    1253.9   10109.8
GR   1254.4   10128.3    1254.2   10144.9    1254.3   10163.6    1253.7   10172.8    1254.3   10189.9
GR   1254.4   10204.3    1253.6   10215.7    1254.9   10223.6    1255.1   10235.3    1253.1   10247.6
GR   1253.4   10270.9    1254.2   10288.5    1254.8   10314.9    1254.9   10331.4    1253.9   10341.1
GR   1254.9   10351.8    1255.1   10372.8    1255.7   10400.4    1255.3   10424.4    1254.6   10434.8
GR   1255.4   10453.1    1255.6   10467.9    1254.7   10481.8    1253.9   10492.4    1260.8   10507.9
GR   1269.9   10519.3    1278.7   10536.8    1281.8   10552.9
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ET                      9.1                                                     9730      10300
X1    0.18       52    9795.5    10029.2      590       330       470
   Section B
GR   1284.3    9616.8   1282.5    9624.3    1269.7    9652.3    1262.7    9669.1    1261.0    9679.5
GR   1259.8    9692.1   1261.7    9696.7    1262.1    9723.6    1262.1    9755.1    1261.9    9786.4
GR   1261.8    9795.5   1260.1    9803.6    1260.1    9819.3    1260.3    9839.6    1260.7    9861.8
GR   1260.9    9887.4   1260.7    9912.5    1260.3    9942.9    1260.2    9954.2    1260.0    9966.9
GR   1260.1    9984.9   1259.5    9994.7    1259.5   10000.0    1261.0   10029.2    1261.2   10056.3
GR   1261.1   10085.5   1261.7   10106.2    1260.6   10126.0    1260.1   10131.0    1259.2   10153.9
GR   1260.7   10168.2   1261.4   10189.6    1260.5   10218.0    1260.1   10227.9    1260.2   10250.5
GR   1260.3   10278.6   1260.6   10282.7    1260.2   10291.9    1261.0   10313.5    1260.1   10322.7
GR   1260.4   10345.1   1261.0   10361.8    1260.4   10372.3    1260.5   10386.3    1260.7   10401.1
GR   1260.4   10424.4   1260.0   10439.3    1259.5   10474.1    1262.6   10484.2    1274.0   10496.8
GR   1287.4   10510.9   1286.7   10529.4

ET                      9.1                                                     9799      10300
X1    0.26       44    9799.8    10049.6      450       350       415
   Section C
GR   1286.0    9709.9   1280.2    9720.8    1269.1    9760.7    1268.0    9787.7    1268.1    9799.8
GR   1265.1    9809.2   1264.9    9896.8    1266.0    9904.8    1266.5    9937.1    1266.2    9965.8
GR   1266.1    9970.0   1265.6   10000.0    1266.1   10026.6    1267.0   10037.0    1267.5   10049.6
GR   1267.5   10083.4   1267.0   10094.6    1267.6   10106.5    1266.9   10135.6    1266.5   10153.8
GR   1266.9   10169.8   1266.9   10187.8    1266.2   10199.6    1267.1   10208.2    1267.1   10250.9
GR   1266.1   10257.0   1265.0   10267.3    1266.3   10275.1    1266.6   10321.7    1266.2   10331.4
GR   1266.2   10346.5   1266.0   10356.7    1264.8   10360.2    1265.4   10404.1    1266.0   10435.0
     1266.6   10452.7   1266.6   10488.7    1265.3   10505.3    1265.2   10526.1    1273.2   10555.2
GR   1284.8   10588.5   1300.6   10627.5    1301.5   10639.2    1300.9   10648.2

ET                      9.1                                                     9900      10411
X1    0.35       35    9961.3    10216.1      490       450       480
   Section D
GR   1292.0    9664.9   1290.1    9689.0    1276.0    9760.0    1273.6    9804.5    1272.4    9810.3
GR   1273.1    9838.1   1274.3    9855.5    1275.1    9874.5    1274.3    9896.2    1273.6    9917.5
GR   1274.0    9928.6   1272.3    9944.7    1271.6    9953.6    1272.0    9961.3    1271.3    9967.2
GR   1271.3   10000.0   1272.4   10043.7    1273.0   10088.7    1273.3   10113.6    1273.1   10198.6
GR   1273.6   10216.1   1273.1   10243.9    1272.0   10304.2    1272.3   10358.7    1272.0   10376.1
GR   1271.6   10408.1   1271.5   10417.8    1271.9   10427.5    1271.1   10468.7    1273.8   10493.4
GR   1276.1   10512.5   1279.0   10548.0    1281.1   10581.2    1286.1   10607.7    1299.1   10638.0

ET                      9.1                                                     9750      10200
X1    0.45       41    9935.0    10093.4      500       470       490
   Section E
GR   1314.9    9228.8   1314.1    9244.3    1300.1    9291.1    1292.4    9318.2    1280.5    9356.5
GR   1279.9    9443.1   1279.5    9448.2    1279.9    9454.8    1279.4    9516.4    1280.1    9550.9
GR   1279.9    9642.6   1279.2    9695.1    1279.4    9738.8    1278.0    9749.5    1279.1    9840.1
GR   1279.8    9853.0   1280.5    9935.0    1280.0    9951.0    1279.9   10000.0    1278.6   10050.1
GR   1278.2   10088.8   1279.2   10093.4    1279.5   10128.3    1279.8   10173.6    1278.5   10176.8
GR   1278.5   10190.5   1280.0   10196.9    1279.7   10224.5    1278.4   10241.0    1278.3   10258.9
GR   1279.6   10268.9   1279.6   10290.8    1278.6   10297.3    1278.6   10324.5    1279.8   10330.5
GR   1280.8   10373.2   1280.7   10382.2    1279.1   10391.5    1281.4   10398.1    1291.0   10437.1
     1300.6   10474.9
```

```
NC     .065      .065      .040
ET                         9.1                                                    9849      10129
X1     0.53        27    9985.5   10123.9       560       350       420
   Section F
GR   1320.8    9280.4    1310.6    9356.5    1301.7    9411.6    1298.1    9438.3    1299.1    9472.2
GR   1294.0    9507.2    1287.2    9528.9    1287.4    9609.1    1286.0    9622.8    1285.1    9630.0
GR   1286.1    9631.2    1286.2    9645.5    1286.4    9709.1    1284.1    9767.3    1284.3    9775.2
GR   1285.8    9792.3    1284.0    9893.7    1283.8    9906.9    1284.0    9919.3    1283.1    9985.5
GR   1282.3   10000.0    1282.0   10016.4    1282.9   10071.3    1281.8   10085.0    1282.6   10123.9
GR   1300.0   10140.9    1302.9   10165.0

ET                         9.1                                                    9800      10122
X1     0.61        34    9971.5   10121.5       430       440       430
   Section G
GR   1321.0    9239.3    1311.0    9284.4    1303.5    9323.6    1297.4    9357.5    1294.0    9458.3
GR   1300.8    9487.8    1300.1    9523.2    1288.2    9558.3    1288.1    9576.9    1291.0    9587.5
GR   1289.9    9612.1    1289.5    9617.4    1290.0    9622.8    1290.5    9680.5    1290.6    9741.0
GR   1290.0    9771.1    1289.0    9800.0    1290.2    9839.5    1290.2    9893.5    1286.1    9944.4
GR   1287.1    9959.6    1288.9    9971.5    1286.5   10018.2    1285.9   10055.3    1285.7   10110.5
GR   1289.5   10121.5    1290.0   10158.7    1292.5   10179.2    1302.5   10214.5    1304.8   10240.5
GR   1306.2   10276.9    1300.1   10313.4    1305.4   10336.8    1311.7   10373.1

ET                         9.1                                                    9850      10184
X1     0.70        27    9900.8   10200.0       450       550       510
   Section H
   1320.2    9342.2    1311.3    9411.2    1302.0    9482.7    1296.0    9557.5    1295.0    9568.4
GR   1295.9    9607.7    1295.2    9615.1    1295.1    9631.0    1295.9    9699.5    1295.9    9800.0
GR   1295.9    9817.2    1296.4    9879.5    1295.9    9900.8    1293.9    9916.4    1293.5    9929.9
GR   1293.6    9941.4    1293.1    9964.3    1292.6   10018.8    1292.8   10046.6    1293.3   10061.3
GR   1293.3   10091.0    1292.7   10108.8    1291.5   10169.4    1304.1   10200.0    1305.5   10236.0
GR   1307.9   10255.4    1309.8   10266.1

ET                         9.1                                                    9838      10280
X1     0.79        24    9838.9   10013.6       450       460       460
   Section I
GR   1345.2    9696.3    1345.6    9723.8    1344.0    9755.1    1323.0    9799.3    1312.0    9824.5
GR   1300.0    9838.9    1299.6    9908.9    1298.9    9944.0    1299.6    9963.7    1298.5   10000.0
GR   1299.9   10013.6    1300.0   10060.8    1301.0   10140.4    1300.1   10196.2    1299.9   10248.6
GR   1299.5   10330.6    1297.4   10353.8    1295.5   10367.4    1296.1   10372.7    1298.0   10410.5
GR   1299.9   10431.3    1306.0   10453.9    1309.9   10491.9    1310.0   10517.7

ET                         9.1                                                    9761      10270
X1     0.89        25    9869.8   10030.0       500       700       520
   Section J
GR   1347.1    9624.5    1341.1    9690.3    1331.4    9737.6    1310.0    9760.0    1307.0    9801.3
GR   1307.1    9869.8    1306.0    9894.1    1304.7    9953.3    1304.7    9978.3    1305.6   10000.0
GR   1306.0   10030.0    1306.9   10067.7    1308.1   10099.4    1308.3   10122.2    1307.1   10175.2
GR   1306.9   10223.0    1305.3   10235.0    1306.0   10257.3    1306.2   10268.9    1306.4   10291.9
GR   1305.9   10319.5    1305.5   10374.7    1308.3   10393.0    1311.3   10421.7    1317.0   10442.0
```

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NH      5     .065    9865.1     .04   10071.3     .065   10133.1     .04   10202.6     .065
NH  10223
ET                     9.1                                                 9873     10200
X1   0.94        23   9880.9  10202.6     300      320      300
   Section K
GR  1320.6    9731.5  1320.1   9789.3  1318.0   9810.1   1318.4   9821.5  1315.6   9844.7
GR  1316.8    9858.0  1315.7   9865.1  1310.9   9880.9   1310.9   9893.2  1308.7   9902.7
GR  1308.5    9935.7  1309.0   9974.2  1308.9  10000.0   1309.8  10020.4  1309.5  10050.4
GR  1309.2   10053.7  1309.2  10068.7  1310.9  10071.3   1310.6  10133.1  1308.7  10145.7
GR  1310.1   10197.8  1318.4  10202.6  1320.2  10223.0

NH      8     .065    9601.5     .04   9684.7     .065    9784.1     .04   9862.8     .065
NH   9943.5    .04   10041.5    .065  10087.1     .04     10187
ET                     9.1                                                 9603     10183
X1   1.02        54   9601.5  10187.0     500      350      420
   Section L
GR  1321.4    8839.6  1322.2   8908.0  1322.1   8921.6   1322.2   8929.1  1321.8   8960.3
GR  1321.8    8971.7  1322.1   9006.7  1322.1   9018.6   1322.3   9021.9  1321.9   9036.3
GR  1321.9    9044.4  1321.9   9055.3  1321.7   9088.3   1322.2   9138.3  1322.3   9144.3
GR  1322.3    9148.8  1323.3   9191.7  1323.3   9235.5   1323.1   9246.4  1323.2   9274.2
GR  1323.3    9305.7  1322.6   9349.7  1322.9   9393.8   1323.4   9456.4  1324.3   9499.0
GR  1324.0    9542.6  1324.0   9580.7  1320.0   9601.5   1314.5   9607.7  1314.4   9650.5
GR  1314.4    9673.9  1316.1   9684.7  1316.8   9705.5   1316.3   9718.9  1316.1   9759.5
GR  1315.7    9784.1  1314.9   9789.8  1315.2   9806.9   1315.7   9825.3  1315.1   9832.6
GR  1314.7    9862.8  1315.9   9868.3  1316.4   9889.2   1315.8   9911.5  1316.3   9943.5
    1315.9    9958.1  1315.5   9971.5  1315.0  10000.0   1316.1  10041.5  1316.3  10047.0
GR  1315.9   10087.1  1312.0  10094.2  1313.3  10176.3   1321.0  10187.0

NH      5     .065    9668.9     .04   9761.7     .065    9946.2     .04  10147.9     .065
NH  10201
ET                     9.1                                                 9684     10160
X1   1.12        50   9668.9  10147.9     500      480      490
   Section M
GR  1329.6    8812.3  1330.1   8849.7  1330.1   8872.6   1328.5   8888.4  1328.0   8906.6
GR  1328.2    8931.3  1327.6   8979.7  1327.7   9051.9   1327.5   9124.4  1327.2   9131.6
GR  1327.3    9136.1  1326.6   9206.3  1326.3   9212.9   1326.3   9219.6  1326.1   9248.0
GR  1326.4    9257.6  1326.3   9273.2  1327.3   9348.5   1327.2   9385.6  1326.5   9441.3
GR  1325.7    9466.3  1325.9   9492.0  1327.9   9557.4   1328.5   9647.0  1326.5   9668.9
GR  1320.2    9695.9  1319.1   9710.3  1319.5   9718.7   1319.9   9721.7  1319.8   9737.8
GR  1319.5    9761.7  1319.1   9775.2  1319.3   9793.5   1320.3   9825.3  1320.2   9836.8
GR  1318.8    9844.1  1320.2   9878.7  1320.6   9921.9   1320.2   9946.2  1320.1   9957.6
GR  1319.8    9967.5  1319.8   9976.6  1319.1  10000.0   1318.9  10052.9  1318.3  10106.4
GR  1318.0   10115.6  1321.0  10147.9  1321.6  10156.6   1332.0  10189.7  1337.2  10201.0

NC    .065     .065     .040
ET                     9.1                                                 9744     10077
X1   1.21        48   9744.2  10049.0     500      480      490
   Section N
GR  1337.1    8728.2  1337.9   8777.1  1338.6   8813.4   1338.3   8869.1  1338.3   8898.0
GR  1338.4    8903.2  1338.2   8928.7  1336.3   8970.7   1335.9   8988.1  1334.9   9007.9
    1334.8    9108.2  1334.3   9189.3  1333.8   9279.4   1332.6   9328.8  1332.2   9338.5
GR  1332.1    9343.7  1331.6   9442.9  1331.3   9461.1   1331.1   9480.3  1330.7   9492.5
GR  1331.7    9537.8  1330.9   9568.7  1330.3   9603.7   1330.8   9632.4  1330.4   9644.4
```

```
     1327.0     9663.0     1325.9     9678.7     1325.9     9698.3     1325.8     9728.8     1326.2     9744.2
GR   1324.2     9786.2     1323.6     9796.3     1323.6     9848.3     1322.4     9852.5     1324.1     9975.3
GR   1325.0    10000.0     1324.8    10027.0     1326.4    10049.0     1326.1    10069.0     1326.1    10095.6
GR   1325.9    10114.6     1325.7    10123.6     1325.4    10137.7     1325.3    10153.4     1326.2    10175.1
GR   1331.9    10197.7     1342.7    10232.2     1350.2    10249.2

NH        5       .065     9772.7       .04     9832.1       .065     9866.8       .04    10035.1       .065
NH    10388
ET                         9.1                                                                9763     10097
X1     1.30         41     9772.7    10035.1       510        490       490
   Section O
GR   1340.1     9253.0     1341.8     9289.0     1340.1     9344.1     1338.1     9351.1     1338.1     9410.1
GR   1337.8     9431.2     1338.2     9448.4     1338.4     9486.1     1338.1     9555.6     1337.1     9583.2
GR   1336.4     9606.6     1334.5     9671.2     1329.8     9691.0     1330.2     9717.3     1330.1     9742.1
GR   1330.0     9763.4     1330.0     9772.7     1328.1     9777.3     1328.3     9794.3     1328.4     9803.0
GR   1328.8     9814.6     1329.2     9832.1     1328.3     9866.8     1328.2     9876.1     1328.3     9921.9
GR   1328.5     9969.3     1328.7    10000.0     1327.9    10013.1     1327.6    10022.3     1328.0    10035.1
GR   1330.3    10071.5     1331.6    10088.7     1338.1    10127.8     1337.5    10160.7     1339.9    10181.5
GR   1340.0    10200.1     1346.8    10238.3     1349.7    10263.3     1352.2    10309.1     1354.9    10341.3
GR   1355.1    10388.0
  Natural section manually truncated (left) at station 9817.2 to eliminate
  ineffective flow area in overbank.

NC      .065       .065       .04
ET                         9.1                                                                9852     10066
X1     1.39         19     9852.7    10011.8       500        460       470
   Section P
GR   1340.6     9817.2     1340.1     9825.0     1335.5     9852.7     1332.2     9865.5     1331.9     9874.3
GR   1333.7     9887.1     1333.7     9897.1     1332.5     9902.0     1333.0     9940.2     1334.0     9966.6
GR   1332.0     9982.9     1332.0    10000.0     1332.5    10011.8     1333.6    10038.2     1337.6    10061.0
GR   1346.1    10091.0     1348.1    10106.1     1348.3    10133.5     1348.1    10158.0

NH        5       .065     9852.6       .04     9897.5       .065     9920.4       .04    10037.3       .065
NH    10083
ET                         9.1                                                                9848     10048
QT        2      15351     15351
X1     1.48         21     9852.6    10037.3       470        460       450
   Section Q
GR   1345.0     9430.0     1344.0     9510.0     1342.0     9590.0     1340.0     9740.0     1339.1     9802.4
GR   1338.1     9852.6     1336.8     9864.9     1336.0     9874.1     1335.0     9887.4     1336.3     9897.5
GR   1336.2     9920.4     1336.0     9925.8     1335.0     9957.4     1334.5     9961.0     1334.4     9969.6
GR   1334.4     9982.7     1335.1    10000.0     1336.6    10022.7     1338.0    10037.3     1346.0    10052.5
GR   1348.1    10083.0

NC      .065       .065       .04
ET                         9.1                                                                9920     10234
X1     1.58         43     9962.9    10233.6       510        540       520
   Section R
GR   1347.1     9514.3     1347.1     9547.8     1347.5     9564.3     1346.6     9628.0     1346.1     9642.1
GR   1344.2     9661.4     1343.0     9676.1     1343.1     9682.5     1343.1     9693.8     1344.1     9704.2
GR   1343.8     9746.5     1344.2     9771.9     1343.5     9797.9     1342.3     9816.1     1342.1     9840.2
GR   1342.3     9845.9     1342.3     9853.2     1342.6     9887.3     1342.3     9897.1     1342.0     9901.0
GR   1342.3     9904.8     1342.2     9927.0     1341.9     9937.5     1342.3     9943.9     1342.2     9960.9
GR   1342.9     9962.9     1340.2     9993.1     1340.1     9997.6     1340.1    10000.0     1340.3    10017.3
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	1341.1	10057.6	1341.5	10068.1	1342.0	10116.7	1341.9	10127.6	1341.1	10179.5
GR	1342.8	10228.7	1345.4	10233.6	1344.4	10251.2	1346.2	10263.8	1348.1	10296.7
GR	1350.6	10330.3	1352.5	10364.8	1353.3	10377.8				
ET			9.1						9775	10237
X1	1.67	58	9948.7	10236.5	520	500	500			
	Section S									
GR	1357.0	8904.7	1356.2	8946.5	1354.6	9003.9	1353.3	9017.8	1352.0	9052.1
GR	1352.0	9058.7	1353.0	9093.5	1353.9	9110.4	1354.3	9133.4	1354.3	9149.7
GR	1354.1	9152.8	1354.2	9163.2	1354.4	9169.9	1353.9	9218.1	1352.5	9251.5
GR	1352.4	9271.4	1352.2	9283.6	1352.2	9295.4	1352.3	9317.9	1353.1	9391.6
GR	1352.8	9417.0	1352.5	9439.1	1351.9	9465.4	1351.8	9487.3	1352.1	9522.8
GR	1352.2	9551.3	1351.4	9570.2	1351.0	9581.0	1351.0	9591.3	1350.9	9610.3
GR	1350.2	9636.7	1350.1	9647.5	1350.3	9668.8	1350.3	9685.3	1350.1	9701.7
GR	1348.1	9707.5	1348.6	9719.6	1350.0	9730.1	1349.1	9759.7	1348.2	9777.6
GR	1348.1	9781.9	1348.0	9789.8	1347.9	9797.9	1348.3	9849.1	1348.3	9877.7
GR	1348.4	9917.3	1348.1	9948.7	1347.0	9961.9	1346.9	9985.8	1346.3	10000.0
GR	1346.2	10023.3	1346.3	10056.5	1346.0	10079.7	1345.1	10123.6	1345.5	10176.6
GR	1347.5	10236.5	1358.0	10239.9	1360.0	10253.6				
ET			9.1						9750	10320
X1	1.77	36	9972.5	10320.0	510	550	530			
	Section T									
GR	1361.0	9052.3	1360.6	9109.3	1360.1	9148.2	1360.1	9159.6	1360.3	9177.3
GR	1360.0	9258.8	1358.2	9342.3	1357.8	9366.0	1357.8	9376.5	1358.0	9388.5
	1358.0	9483.5	1357.5	9524.7	1357.1	9575.4	1356.6	9685.1	1355.0	9735.2
	1354.5	9767.0	1353.8	9790.0	1354.0	9798.0	1355.5	9827.8	1354.2	9867.3
GR	1352.3	9896.3	1352.5	9953.5	1352.0	9972.5	1351.0	9985.8	1351.1	10000.0
GR	1350.9	10037.8	1351.2	10055.6	1351.1	10127.6	1351.0	10137.6	1350.5	10211.3
GR	1350.0	10242.3	1349.9	10253.7	1349.2	10280.4	1350.1	10312.0	1352.1	10320.0
GR	1358.0	10348.6								
ET			9.1						9780	10155
X1	1.87	38	9818.3	10066.7	500	490	500			
	Section U									
GR	1364.7	9276.7	1364.6	9346.2	1363.0	9390.1	1363.4	9409.0	1362.9	9452.1
GR	1361.4	9462.1	1363.0	9470.1	1362.8	9552.3	1361.7	9626.8	1360.3	9672.1
GR	1361.1	9706.0	1360.0	9774.3	1357.2	9786.6	1357.3	9818.3	1356.1	9829.2
GR	1355.3	9846.9	1354.1	9875.3	1354.0	9904.5	1354.3	9981.0	1354.2	10000.0
GR	1354.3	10044.5	1355.4	10066.7	1355.0	10087.2	1355.7	10104.9	1355.8	10147.6
GR	1354.4	10152.3	1354.8	10173.5	1356.7	10181.9	1356.5	10201.3	1354.7	10212.7
GR	1356.4	10220.3	1356.1	10249.5	1356.1	10274.8	1353.8	10277.9	1353.8	10291.4
GR	1356.4	10293.1	1359.8	10335.0	1366.0	10370.0				
ET			9.1						9810	10350
X1	1.95	41	9810.2	10066.1	460	410	440			
	Section V									
GR	1367.0	9673.2	1366.5	9723.4	1364.1	9761.9	1361.4	9772.2	1361.4	9806.0
GR	1360.0	9810.2	1358.4	9884.2	1359.5	9898.7	1358.9	9939.3	1359.8	9944.9
GR	1359.8	9983.8	1358.8	9992.2	1358.8	10016.9	1359.1	10056.7	1359.6	10066.1
GR	1359.5	10135.6	1358.9	10228.9	1358.3	10282.9	1358.2	10295.8	1358.2	10300.0
	1358.0	10313.9	1357.9	10328.1	1358.3	10340.8	1358.3	10366.4	1358.1	10402.2
GR	1358.1	10410.7	1358.4	10418.1	1359.1	10463.5	1358.0	10491.7	1358.1	10497.2
GR	1358.6	10505.3	1357.0	10517.5	1357.9	10523.7	1358.0	10529.2	1359.2	10536.2

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    1360.1    10541.8    1361.1    10560.0    1365.3    10609.6    1366.0    10642.9    1369.3    10670.8
GR  1370.0    10688.5

ET                       9.1                                                            9700      10250
X1    2.05        34    9769.8    10051.0     610       440       500
   Section W
GR  1368.9     9448.9   1365.8     9531.6    1364.6     9571.9    1364.8     9594.9    1363.8     9600.1
GR  1362.5     9623.9   1363.8     9643.0    1363.8     9675.7    1363.8     9708.2    1362.9     9714.7
GR  1362.8     9724.8   1364.3     9769.8    1363.2     9818.5    1362.8     9904.1    1363.5     9974.1
GR  1362.9    10000.0   1363.0    10046.0    1363.7    10051.0    1364.7    10084.4    1363.6    10190.8
GR  1362.9    10219.9   1363.3    10236.4    1362.2    10253.7    1361.7    10263.9    1361.7    10268.0
GR  1362.2    10271.6   1363.3    10295.6    1363.9    10313.4    1362.0    10358.1    1361.9    10366.9
GR  1362.8    10394.7   1364.7    10409.5    1372.6    10434.5    1377.0    10464.2

ET                       9.1                                                            9550      10200
X1    2.14        46    9724.3    10044.4     450       560       490
   Section X
GR  1378.5     8966.4   1377.8     8996.0    1375.9     9024.7    1371.5     9048.2    1371.5     9075.5
GR  1374.5     9097.6   1372.7     9127.2    1372.7     9174.3    1372.2     9230.7    1370.3     9290.2
GR  1365.7     9308.7   1365.7     9340.5    1367.3     9357.0    1367.2     9388.1    1368.6     9415.1
GR  1368.6     9440.7   1366.9     9463.5    1368.4     9476.9    1368.4     9539.6    1368.1     9614.1
GR  1368.1     9646.5   1366.7     9649.9    1366.7     9663.9    1368.9     9665.2    1368.6     9724.3
GR  1367.2     9774.1   1367.3     9805.0    1367.9     9846.3    1366.9     9854.2    1367.0     9918.6
GR  1367.8     9925.5   1368.1     9953.9    1367.9    10000.0    1367.0    10020.9    1366.9    10040.1
GR  1368.3    10044.4   1368.3    10154.4    1367.8    10189.0    1366.9    10206.3    1367.0    10264.3
GR  1366.2    10270.1   1367.8    10279.5    1368.0    10327.1    1369.9    10352.3    1374.7    10373.6
    1377.3    10393.7

ET                       9.1                                                            9650      10300
X1    2.23        53    9828.2    10038.4     480       450       480
   Section Y
GR  1382.5     8753.3   1381.9     8835.7    1381.8     8893.4    1380.8     8970.7    1379.9     9052.9
GR  1377.3     9093.4   1377.0     9140.9    1376.4     9183.0    1375.5     9203.4    1374.8     9216.2
GR  1375.1     9227.8   1375.2     9235.0    1376.4     9258.1    1377.6     9282.2    1376.5     9350.9
GR  1374.3     9407.3   1372.3     9435.3    1371.7     9464.1    1371.7     9472.9    1372.3     9481.2
GR  1370.3     9571.2   1370.2     9577.3    1370.0     9583.9    1369.9     9590.5    1370.4     9644.6
GR  1370.9     9654.9   1370.4     9701.7    1372.3     9733.4    1372.2     9753.0    1372.1     9828.2
GR  1370.2     9838.0   1370.2     9851.1    1370.4     9867.5    1370.3     9894.6    1370.2     9899.0
GR  1369.6     9957.8   1369.9    10000.0    1369.9    10014.8    1370.1    10027.2    1371.8    10038.4
GR  1371.9    10108.5   1371.9    10189.0    1372.3    10301.6    1368.9    10334.6    1370.3    10355.8
GR  1371.6    10402.7   1372.1    10445.3    1374.1    10471.5    1379.9    10508.9    1382.3    10536.8
GR  1384.2    10582.5   1389.9    10616.3    1392.8    10633.4

QT        2     12861     12861
  Natural section manually truncated (left) at station 9549.0 to eliminate
  ineffective flow area in overbank.
ET                       9.1                                                            9700      10250
X1    2.33        39    9879.0    10026.3     480       560       510
   Section Z
GR  1380.3     9548.0   1380.3     9548.5    1380.3     9549.0    1377.8     9590.4    1376.4     9646.4
GR  1375.1     9665.0   1374.2     9682.0    1374.8     9712.2    1375.6     9768.8    1376.4     9829.3
    1373.9     9844.5   1373.9     9879.0    1373.4     9922.3    1373.0     9986.3    1371.9    10000.0
GR  1374.4    10026.3   1374.7    10041.0    1374.4    10050.0    1375.6    10060.5    1375.7    10073.3
GR  1374.1    10079.5   1374.5    10088.7    1373.7    10102.5    1374.3    10117.3    1375.4    10176.0
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     1375.4    10190.5    1377.2    10216.3    1375.9    10278.9    1375.2    10408.9    1375.6    10514.3
GR   1373.8    10547.2    1374.7    10558.7    1375.4    10572.8    1373.9    10604.6    1375.8    10669.8
GR   1377.3    10688.7    1383.5    10721.4    1387.9    10757.1    1388.9    10774.2

ET                          9.1                                                            9950      10550
X1     2.43         60    9950.0    10111.3     500       510       500
   Section AA
GR   1387.4     9344.7    1385.6     9404.7    1383.3     9415.3    1385.1     9424.8    1384.5     9458.4
GR   1382.7     9463.6    1384.9     9469.5    1385.3     9490.0    1385.9     9537.2    1385.0     9573.3
GR   1386.6     9620.7    1384.6     9640.6    1382.9     9665.7    1384.1     9712.1    1383.4     9735.7
GR   1381.6     9751.0    1382.9     9760.7    1382.1     9767.6    1383.2     9781.6    1382.6     9839.3
GR   1384.4     9882.2    1382.8     9916.3    1380.0     9950.0    1376.9     9963.5    1376.8    10000.0
GR   1377.9    10026.6    1379.0    10111.3    1377.9    10129.1    1378.4    10175.3    1377.4    10193.5
GR   1378.8    10213.7    1379.4    10269.6    1377.9    10281.5    1379.2    10290.9    1379.8    10350.3
GR   1378.0    10357.2    1379.6    10365.8    1379.9    10381.4    1378.2    10392.6    1379.7    10398.0
GR   1379.3    10438.6    1377.2    10449.9    1377.1    10470.7    1379.4    10494.2    1378.9    10508.7
GR   1379.7    10542.6    1377.9    10552.3    1379.6    10572.4    1381.1    10605.8    1380.5    10677.9
GR   1380.9    10754.9    1380.3    10831.8    1379.5    10924.8    1379.2    10983.1    1380.5    11038.2
GR   1381.0    11106.7    1381.9    11185.2    1384.5    11223.3    1387.2    11261.5    1389.1    11278.1

NH        5       .065    9968.5       .04   10034.9       .065   10167.4       .04   10317.9       .065
NH    11120
  Natural section manually truncated (left) at station 9813.8 to eliminate
  ineffective flow area in overbank.
ET                          9.1                                                            9950      10550
      2.52         43   10167.4    10317.9     510       590       510
   Section AB
GR   1386.0     9813.6    1385.7     9813.7    1385.7     9813.8    1385.6     9873.7    1383.0     9884.5
GR   1385.7     9896.3    1384.6     9958.9    1381.2     9968.5    1380.7     9976.9    1380.0    10000.0
GR   1380.9    10034.9    1382.3    10048.3    1382.3    10073.7    1381.0    10089.5    1380.9    10107.3
GR   1382.0    10167.4    1382.0    10265.3    1381.1    10272.9    1381.1    10306.9    1384.2    10317.9
GR   1384.6    10386.2    1384.8    10473.6    1383.5    10502.5    1382.2    10547.8    1383.6    10566.0
GR   1383.5    10594.9    1382.0    10601.7    1383.8    10615.4    1383.8    10640.2    1382.3    10666.6
GR   1383.7    10681.5    1382.2    10696.0    1383.8    10709.7    1383.3    10785.3    1384.4    10802.4
GR   1382.8    10805.7    1384.6    10820.3    1384.9    10909.0    1385.5    10978.0    1386.4    10994.2
GR   1390.4    11047.0    1391.4    11091.5    1393.0    11120.0

NH        5       .065    9940.7       .04   10071.3       .065   10262.6       .04   10405.5       .065
NH    10721
ET                          9.1                                                            9866      10406
X1     2.62         40   10262.6    10405.5     500       450       500
   Section AC
GR   1394.0     9066.8    1395.4     9076.8    1394.8     9165.5    1393.3     9278.1    1391.7     9306.8
GR   1391.6     9327.5    1392.7     9336.5    1392.0     9402.3    1389.8     9422.8    1391.3     9434.9
GR   1390.2     9523.8    1389.4     9563.5    1388.0     9602.5    1389.4     9631.2    1387.8     9762.8
GR   1387.6     9831.6    1385.8     9860.6    1384.5     9876.3    1386.8     9885.2    1387.8     9918.4
GR   1386.5     9940.7    1384.1     9962.7    1384.1    10000.0    1385.2    10009.3    1386.0    10071.3
GR   1386.9    10090.9    1387.2    10262.6    1385.8    10269.6    1384.4    10391.0    1387.5    10405.5
GR   1386.0    10452.3    1387.2    10469.7    1388.2    10526.0    1388.8    10555.5    1390.8    10583.1
GR   1393.0    10607.7    1394.6    10631.6    1394.6    10661.3    1394.4    10691.9    1393.2    10721.0
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NC     .065      .065       .04
ET                          9.1                                                    9725      10215
QT        2     12363     12363
X1     2.71        59   10067.9   10197.6       480       480       480
   Section AD
GR   1402.2    8871.7    1400.1    8914.7    1395.8    8963.0    1396.2    8991.1    1396.1    9000.2
GR   1396.2    9048.1    1396.3    9080.8    1395.8    9101.3    1396.0    9126.2    1394.9    9207.3
GR   1394.1    9241.8    1393.9    9254.9    1393.9    9281.3    1393.3    9355.3    1392.5    9468.4
GR   1390.1    9522.9    1389.6    9535.2    1389.5    9545.1    1390.1    9555.3    1390.3    9561.9
GR   1390.7    9568.0    1390.7    9597.4    1389.2    9605.3    1389.2    9618.8    1390.3    9629.1
GR   1390.9    9688.7    1391.1    9728.3    1390.0    9751.4    1388.1    9764.7    1388.2    9779.4
GR   1388.9    9796.7    1388.9    9806.3    1390.2    9821.1    1390.2    9839.0    1389.3    9846.1
GR   1390.3    9852.0    1389.5    9904.0    1390.0    9914.6    1390.5    9929.2    1390.3    9947.8
GR   1387.9    9978.0    1388.2   10000.0    1388.5   10021.7    1387.9   10027.8    1388.3   10040.0
GR   1390.0   10049.6    1390.0   10067.9    1389.1   10077.7    1387.9   10124.1    1390.1   10183.7
GR   1390.3   10197.6    1389.8   10245.1    1391.3   10291.6    1391.9   10321.1    1393.5   10359.2
GR   1396.0   10387.5    1399.5   10414.2    1402.5   10451.5    1405.3   10482.5

ET                          9.1                                                    9600      10100
X1     2.80        44    9898.5   10058.3       500       500       500
   Section AE
GR   1403.5    8661.0    1403.0    8740.1    1401.0    8878.6    1400.4    9007.3    1397.7    9148.6
GR   1396.0    9196.1    1397.6    9251.6    1395.3    9320.3    1394.8    9380.0    1395.3    9408.0
GR   1391.1    9412.3    1394.3    9418.0    1395.1    9438.7    1393.7    9448.4    1395.8    9457.9
     1395.5    9514.2    1395.0    9623.2    1395.3    9664.1    1396.4    9698.2    1394.9    9747.1
     1392.9    9750.9    1392.9    9775.1    1395.0    9777.5    1393.9    9794.6    1395.1    9848.1
GR   1395.4    9898.5    1392.4    9912.5    1392.1    9953.0    1390.5   10000.0    1390.0   10039.0
GR   1394.0   10058.3    1394.6   10104.6    1393.5   10179.7    1394.8   10236.8    1395.7   10296.8
GR   1397.3   10342.1    1397.7   10356.3    1396.9   10367.9    1398.3   10379.4    1400.9   10409.4
GR   1402.2   10444.8    1405.2   10477.5    1408.7   10521.6    1409.2   10536.2

ET                          9.1                                                    9750      10290
X1     2.90        48    9752.7   10025.9       520       610       540
   Section AF
GR   1402.6    9353.8    1402.1    9389.3    1402.5    9404.5    1401.6    9462.8    1399.0    9554.3
GR   1397.9    9564.5    1399.3    9573.6    1399.1    9636.8    1398.5    9728.8    1397.9    9752.7
GR   1396.5    9757.7    1396.4    9813.8    1396.5    9841.4    1397.7    9851.0    1397.4    9884.9
GR   1396.6    9918.9    1397.3    9938.7    1396.2    9964.2    1396.6   10004.8    1398.1   10025.9
GR   1398.0   10045.5    1396.0   10062.5    1396.5   10077.2    1398.0   10119.2    1396.6   10194.6
GR   1394.5   10198.6    1394.5   10200.0    1396.6   10222.3    1396.7   10281.2    1396.6   10322.2
GR   1396.1   10328.4    1396.6   10341.4    1394.5   10412.0    1396.1   10422.4    1396.6   10437.6
GR   1396.2   10443.3    1396.6   10481.1    1396.9   10498.0    1395.6   10508.3    1396.6   10523.1
GR   1398.0   10581.7    1399.1   10658.7    1400.5   10715.7    1401.5   10763.8    1399.5   10780.0
GR   1400.1   10795.0    1402.8   10830.0    1405.7   10877.8

ET                          9.1                                                    9847      10400
X1     2.99        32    9845.1   10091.0       480       510       490
   Section AG
GR   1406.6    9487.3    1405.8    9540.7    1404.0    9579.0    1405.6    9679.2    1404.4    9792.0
GR   1403.4    9845.1    1399.1    9854.0    1399.8    9863.9    1400.0    9921.3    1400.0    9962.6
     1398.8    9977.7    1400.1    9987.1    1399.7   10000.0    1398.9   10025.7    1399.5   10071.5
GR   1400.0   10091.0    1399.3   10173.8    1398.9   10269.5    1398.9   10368.1    1397.5   10375.1
GR   1399.1   10381.4    1399.8   10464.4    1400.0   10515.6    1400.9   10588.9    1403.6   10635.9
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     1404.0    10665.6    1402.7    10698.9    1401.6    10715.2    1402.4    10733.7    1402.0    10756.4
GR   1403.6    10765.3    1404.6    10808.2

ET                        9.1                                                            9880      10505
X1   3.09        42       9962.3    10143.9    500       500        500
   Section AH
GR   1410.9    9398.3     1410.2    9523.4     1409.6    9564.4     1409.6    9573.3     1409.4    9590.2
GR   1409.5    9635.9     1408.6    9719.3     1407.9    9823.3     1406.6    9904.0     1404.1    9962.3
GR   1402.6    9966.8     1403.1    9990.3     1403.6    10000.0    1404.5    10025.2    1404.7    10035.7
GR   1404.5    10047.0    1404.3    10143.9    1405.0    10165.8    1404.3    10210.5    1404.0    10217.5
GR   1404.3    10232.9    1404.6    10303.3    1404.6    10379.2    1404.2    10445.2    1404.1    10451.2
GR   1404.1    10486.9    1403.9    10496.6    1403.6    10516.3    1403.7    10521.5    1404.2    10541.0
GR   1404.5    10587.1    1404.0    10629.0    1404.1    10635.0    1404.0    10642.4    1405.1    10753.9
GR   1405.5    10791.2    1406.0    10816.2    1407.0    10877.5    1407.9    10927.7    1408.0    10971.7
GR   1408.3    11016.2    1411.0    11068.5
  Natural section manually truncated (right) at station 10851.4 to eliminate
  ineffective flow area in overbank.

ET                        9.1                                                            9900      10560
X1   3.18        41       9972.9    10047.1    470       400        470
   Section AI
GR   1413.3    9533.8     1412.2    9596.5     1412.1    9656.9     1410.5    9673.3     1411.6    9691.3
GR   1411.3    9751.5     1409.7    9864.1     1408.7    9889.0     1407.2    9896.5     1408.7    9914.6
GR   1408.2    9972.9     1404.9    9979.4     1404.8    10000.0    1404.8    10028.0    1406.2    10047.1
GR   1407.4    10077.2    1407.7    10137.6    1406.7    10172.1    1406.0    10184.5    1407.1    10209.5
     1407.6    10250.8    1407.5    10314.7    1406.5    10345.2    1407.4    10362.5    1406.2    10373.5
     1407.4    10392.5    1407.9    10440.3    1407.9    10471.2    1407.1    10508.0    1407.2    10541.1
GR   1407.4    10553.5    1406.0    10558.7    1407.3    10603.4    1406.6    10692.0    1404.0    10716.4
GR   1405.7    10749.4    1406.2    10768.8    1406.4    10788.0    1409.1    10816.1    1410.3    10851.3
GR   1412.0    10851.4

ET                        9.1                                                            9875      10525
X1   3.27        50       9960.2    10206.6    530       450        500
   Section AJ
GR   1417.9    9505.8     1416.9    9543.9     1414.5    9606.8     1413.8    9661.0     1413.0    9725.5
GR   1413.7    9744.8     1413.0    9794.0     1409.9    9848.0     1411.0    9875.0     1410.9    9917.7
GR   1409.8    9960.2     1408.6    9990.9     1408.5    10000.0    1409.7    10009.2    1410.5    10042.6
GR   1410.2    10075.2    1408.9    10078.2    1409.3    10116.8    1408.8    10177.8    1408.5    10202.5
GR   1412.2    10206.6    1410.6    10263.4    1410.8    10322.5    1411.6    10345.5    1410.5    10383.8
GR   1408.8    10395.2    1408.7    10411.5    1410.5    10416.8    1410.2    10457.8    1408.8    10464.0
GR   1410.2    10475.2    1408.4    10493.5    1408.4    10505.6    1409.9    10514.7    1408.9    10556.8
GR   1410.3    10568.2    1408.8    10628.8    1407.6    10649.5    1407.5    10660.1    1409.9    10666.7
GR   1408.1    10701.4    1410.7    10718.0    1411.8    10738.5    1411.7    10759.6    1410.4    10790.9
GR   1410.3    10832.0    1409.6    10854.5    1411.9    10864.0    1413.6    10897.8    1414.6    10914.8

ET                        9.1                                                            9950      10600
X1   3.37        49       9956.7    10233.8    490       570        500
   Section AK
GR   1421.2    9276.4     1420.3    9335.2     1419.9    9388.4     1418.5    9472.7     1418.1    9514.5
GR   1418.0    9551.9     1418.0    9570.3     1416.6    9620.1     1414.0    9648.1     1413.0    9715.0
GR   1412.6    9737.8     1412.2    9748.4     1414.1    9763.9     1414.1    9775.4     1413.7    9797.2
     1413.6    9867.6     1413.2    9942.4     1412.4    9948.1     1413.5    9956.7     1413.0    9971.5
GR   1413.5    9992.3     1412.0    10000.0    1413.5    10010.0    1413.9    10042.5    1414.1    10093.3
GR   1414.0    10104.0    1413.5    10125.6    1413.7    10133.9    1413.3    10157.1    1413.9    10162.2
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	1413.7	10192.3	1414.0	10233.8	1413.3	10283.8	1413.7	10326.6	1412.5	10391.0
GR	1413.9	10398.0	1413.7	10456.6	1412.9	10516.3	1413.6	10568.4	1414.1	10580.8
GR	1414.1	10599.3	1413.2	10683.7	1411.9	10716.3	1411.9	10725.3	1411.1	10740.1
GR	1411.8	10753.5	1411.7	10798.2	1415.8	10824.0	1418.2	10843.7		
ET			9.1						9900	10550
X1	3.43	41	9950.6	10106.9	370	330	350			
	Section AL									
GR	1422.2	9426.2	1420.4	9479.0	1418.1	9529.4	1418.9	9539.5	1418.7	9608.2
GR	1419.4	9644.1	1419.6	9696.9	1418.4	9749.0	1416.5	9803.2	1415.8	9829.5
GR	1416.4	9863.2	1415.7	9883.1	1416.2	9919.7	1416.2	9950.6	1414.1	9965.3
GR	1414.8	10000.0	1415.0	10032.1	1414.7	10100.4	1416.7	10106.9	1415.5	10151.1
GR	1416.0	10206.9	1414.7	10242.4	1416.2	10263.3	1415.5	10348.3	1415.7	10407.2
GR	1414.4	10418.5	1414.8	10436.3	1415.6	10454.9	1415.2	10487.6	1415.2	10531.0
GR	1413.8	10539.1	1415.4	10551.8	1414.3	10570.0	1416.0	10581.9	1415.1	10622.2
GR	1413.1	10652.3	1413.8	10674.7	1414.4	10718.2	1418.4	10751.4	1419.9	10788.2
GR	1420.8	10825.3								
ET			9.1						9950	10575
X1	3.51	46	9955.2	10069.0	400	420	430			
	Section AM									
GR	1425.1	9493.9	1425.1	9524.6	1423.2	9542.9	1421.8	9620.0	1421.8	9658.0
GR	1421.4	9712.2	1420.4	9799.4	1419.3	9865.8	1417.8	9894.7	1419.0	9904.9
GR	1418.9	9955.2	1416.7	9964.8	1416.6	10000.0	1416.5	10064.2	1418.2	10069.0
GR	1418.2	10111.8	1419.5	10129.1	1419.0	10186.4	1419.0	10219.4	1419.4	10231.5
	1419.5	10306.3	1417.3	10324.8	1418.1	10391.4	1417.2	10399.5	1417.9	10434.8
	1416.9	10446.1	1416.9	10452.7	1418.3	10464.6	1419.3	10501.3	1419.1	10557.6
GR	1417.2	10622.1	1416.0	10641.5	1417.0	10654.8	1417.5	10680.9	1417.0	10720.7
GR	1415.9	10728.1	1417.3	10737.1	1417.8	10776.7	1419.9	10826.0	1422.2	10868.5
GR	1423.4	10908.4	1423.7	10937.4	1422.3	10954.3	1424.4	10970.7	1426.6	11025.4
GR	1427.3	11053.2								
ET			9.1						9905	10530
QT	2	10964	10964							
X1	3.60	46	9984.4	10114.3	450	450	450			
	Section AN									
GR	1427.9	9056.7	1427.6	9134.8	1427.9	9182.4	1427.1	9280.3	1425.6	9307.5
GR	1426.0	9349.5	1425.1	9467.7	1424.4	9495.9	1422.5	9508.8	1424.0	9530.0
GR	1423.5	9562.5	1422.3	9567.7	1423.6	9576.1	1423.3	9639.8	1422.7	9689.5
GR	1422.3	9790.6	1421.9	9906.8	1422.2	9984.4	1418.0	10000.0	1418.0	10024.8
GR	1419.3	10103.6	1421.5	10114.3	1421.7	10143.9	1421.0	10170.8	1419.4	10184.5
GR	1421.5	10200.1	1423.1	10224.1	1423.3	10250.8	1422.6	10313.3	1421.3	10417.8
GR	1420.2	10501.8	1420.5	10554.4	1420.4	10633.2	1419.6	10651.5	1420.3	10666.6
GR	1419.5	10682.7	1420.8	10696.5	1420.4	10740.8	1421.4	10807.9	1422.9	10835.3
GR	1423.6	10875.9	1423.8	10912.5	1424.8	10949.2	1425.8	10982.1	1428.6	11019.7
GR	1429.6	11059.1								
ET			9.1						9950	10425
X1	3.70	44	9983.0	10168.3	520	530	520			
	Section AO									
GR	1433.7	8867.7	1432.3	8977.8	1431.4	9112.1	1430.8	9167.4	1429.3	9178.8
	1430.1	9192.1	1429.8	9327.8	1428.6	9488.7	1426.8	9659.6	1425.2	9820.9
GR	1424.8	9845.4	1422.9	9848.8	1422.9	9854.7	1425.3	9859.9	1425.4	9927.0
GR	1424.5	9983.0	1420.8	10000.0	1420.9	10054.1	1422.4	10075.8	1421.1	10086.6

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    1421.6   10115.6    1422.7   10152.8    1424.8   10168.3    1422.8   10197.6    1423.3   10213.5
GR  1425.4   10218.4    1425.4   10287.1    1424.2   10382.8    1423.6   10409.8    1424.0   10464.0
GR  1424.8   10519.7    1423.7   10578.2    1422.9   10615.3    1423.7   10627.1    1423.3   10660.2
GR  1424.0   10711.6    1424.6   10793.0    1425.0   10862.5    1426.2   10924.7    1427.1   10998.5
GR  1428.9   11056.2    1431.2   11100.6    1433.1   11157.7    1433.6   11172.7

ET                        9.1                                                          9900     10325
X1     3.79       46   10020.9   10213.5     480      600      510
   Section AP
GR  1435.0    8902.7    1434.7    8973.2    1433.5    9084.7    1433.5    9211.7    1431.4    9357.5
GR  1430.0    9460.3    1429.9    9472.3    1430.2    9492.0    1428.5    9626.5    1427.3    9713.0
GR  1427.9    9740.8    1427.1    9796.5    1427.7    9811.8    1427.5    9861.3    1428.5    9909.5
GR  1427.6    9934.0    1428.2    9952.7    1428.2    9990.4    1425.6   10004.3    1426.7   10020.9
GR  1426.3   10058.2    1425.9   10085.3    1425.6   10117.4    1425.7   10128.9    1425.6   10145.8
GR  1424.6   10165.0    1424.1   10200.0    1426.3   10213.5    1427.3   10239.2    1428.3   10286.3
GR  1428.6   10337.5    1428.3   10406.5    1427.6   10464.6    1427.9   10486.8    1428.3   10567.4
GR  1428.4   10669.7    1428.8   10726.0    1428.6   10758.9    1429.0   10785.8    1429.5   10843.9
GR  1431.9   10915.8    1433.5   10969.4    1434.0   11008.2    1434.5   11056.0    1436.3   11096.7
GR  1437.0   11112.0

ET                        9.1                                                          9750     10200
X1     3.91       47    9764.6   10036.3     530      800      600
   Section AQ
GR  1437.8    8899.3    1436.0    9055.7    1435.9    9086.1    1436.0    9103.3    1435.4    9201.7
GR  1434.5    9338.0    1432.8    9485.6    1432.6    9563.9    1431.6    9670.4    1430.1    9764.6
    1428.0    9771.5    1428.3    9800.0    1429.9    9887.8    1430.0    9896.5    1429.6    9973.9
    1430.0   10036.3    1431.4   10051.1    1432.2   10091.6    1432.3   10131.5    1430.9   10184.5
GR  1430.0   10196.8    1430.4   10210.3    1432.1   10260.8    1432.1   10332.5    1430.7   10372.7
GR  1430.1   10409.5    1430.0   10416.3    1432.1   10425.9    1431.9   10441.8    1432.0   10455.1
GR  1432.6   10467.0    1433.0   10523.4    1433.5   10564.0    1435.9   10651.0    1437.4   10696.1
GR  1440.0   10744.0    1442.1   10802.7    1443.0   10875.6    1443.0   10899.8    1440.8   10932.7
GR  1441.6   10945.0    1443.1   10974.2    1444.5   11005.5    1444.9   11043.1    1443.9   11080.1
GR  1443.8   11128.3    1444.2   11144.8
  Natural section manually truncated (right) at station 10454.0 to eliminate
  ineffective flow area in overbank.

ET                        9.1                                                          9659     10210
X1     3.99       25    9659.9   10052.4     440      430      440
   Section AR
GR  1440.0    8950.0    1438.0    9200.0    1436.0    9508.1    1434.3    9573.3    1434.2    9631.3
GR  1432.5    9659.9    1429.0    9679.2    1428.3    9690.8    1429.3    9759.4    1430.0    9836.0
GR  1432.4    9844.8    1432.4    9919.0    1432.5    9960.3    1431.6    9968.5    1430.8   10000.0
GR  1430.8   10024.8    1433.5   10052.4    1434.0   10097.7    1433.1   10174.3    1432.7   10243.5
GR  1433.1   10294.7    1434.3   10325.0    1435.6   10363.2    1435.7   10394.3    1436.1   10454.0

QT        2   10358     10358
ET                        9.1                                                          9670     10260
X1     4.04       42    9706.3   10032.3     200      290      240
   Section AS
GR  1440.4    8995.7    1439.1    9096.0    1438.7    9152.3    1438.1    9192.3    1438.3    9262.0
GR  1437.3    9323.7    1437.3    9386.5    1436.5    9455.2    1435.7    9535.5    1435.1    9633.1
    1434.9    9678.8    1434.2    9706.3    1434.0    9720.6    1430.4    9772.4    1430.3    9826.3
GR  1431.1    9893.6    1431.9    9941.3    1432.0    9969.4    1432.5   10000.0    1432.7   10023.6
GR  1433.0   10032.3    1435.6   10064.3    1435.6   10131.8    1435.0   10175.3    1435.3   10226.1
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    1435.0    10252.4    1435.5    10287.6    1436.0    10329.4    1436.2    10367.1    1437.8    10418.8
GR  1437.8    10474.2    1438.7    10526.5    1439.1    10583.3    1438.2    10642.5    1438.1    10663.7
GR  1438.9    10708.9    1440.1    10770.7    1440.3    10805.9    1439.5    10855.9    1439.7    10881.7
GR  1440.6    10931.2    1442.1    10991.5

NC                                  .3         .5
ET                         9.1                                                          9680      10354
X1    4.07        15       9680    10354.0     150        150       150
X3      10                                                                   1440       1440
GR  1440.0      9050       1438      9350      1436       9680    1435.00      9681    1435.00      9779
GR  1435.0      9781       1434      9900    1432.40      9901    1432.40     10075      1434     10076
GR    1434     10250       1435     10251      1435      10354      1438     10355      1442     10850
   Sun Valley Parkway - downstream crossing (multi-structure)

NC                         .012
ET                         9.1                                                          9679      10328
X1   4.071        90       9679     10328        10         10        10
   Section AT
BT      88      9000    1443.00    1443.00      9300    1442.10    1442.10      9600    1443.10    1443.10
BT    9679   1444.22    1444.22      9680    1444.22    1438.98      9690    1444.22    1438.98     9690.1
BT  1444.2   1434.98     9690.9    1444.22    1434.98      9691    1444.22    1438.98      9701    1444.22
BT  1439.0    9701.1    1444.22    1434.98     9701.9    1444.22    1434.98      9702    1444.22    1438.98
BT    9712   1444.22    1438.98     9712.1    1444.22    1444.22      9740    1444.60    1444.60     9740.1
BT  1444.5   1438.98      9750    1444.55    1438.98     9750.1    1444.55    1434.98     9750.9    1444.55
BT    1435      9751    1444.55    1438.98      9761    1444.55    1438.98     9761.1    1444.55    1434.98
    9761.9   1444.55    1434.98      9762    1444.55    1438.98      9772    1444.55    1438.98     9772.1
    1444.5    1444.5      9900    1445.20    1445.20     9900.1    1445.2    1438.38      9912     1445.2
BT  1438.4    9912.1     1445.2    1432.38     9912.9     1445.2    1432.38      9913     1445.2    1438.38
BT    9925    1445.2    1438.40     9925.1     1445.2    1432.38     9925.9     1445.2    1432.38      9926
BT  1445.2   1438.38      9938     1445.2    1438.38     9938.1     1445.2     1445.2      9959     1445.3
BT  1445.3    9959.1     1445.3    1438.38      9971     1445.3    1438.38     9971.1     1445.3    1432.38
BT  9971.9    1445.3    1432.40      9972     1445.3    1438.38      9984     1445.3    1438.38     9984.1
BT  1445.3   1432.38     9984.9     1445.3    1432.38      9985     1445.3    1438.40      9997     1445.3
BT  1438.4    9997.1     1445.3     1445.3      10018    1445.35    1445.35     10018.1    1445.35    1438.38
BT   10030   1445.35    1438.40    10030.1    1445.35    1432.38    10030.9    1445.35    1432.38      10031
BT  1445.4   1438.38      10043    1445.35    1438.38    10043.1    1445.35    1432.40    10043.9    1445.35
BT  1432.4     10044    1445.35    1438.38      10056     1445.4    1438.38    10056.1     1445.4     1445.4
BT   10236    1445.3     1445.3    10236.1     1445.3      1439     10246     1445.3      1439    10246.1
BT  1445.3      1435    10246.9     1445.3      1435     10247     1445.3      1439     10257     1445.3
BT    1439   10257.1     1445.3      1435    10257.9     1445.3      1435     10258     1445.3      1439
BT   10268    1445.3      1439    10268.1     1445.3     1445.3     10295     1445.2     1445.2    10295.1
BT  1445.2      1439     10305     1445.2      1439    10305.1     1445.2      1435    10305.9     1445.2
BT    1435     10306     1445.2      1439     10316     1445.2      1439    10316.1     1445.2      1435
BT   10317    1445.2      1435    10317.1     1445.2      1439     10327     1445.2      1439     10328
BT  1445.2    1445.2     10400    1444.83    1444.83
GR  1443.0      9000    1442.10      9300    1443.10      9600    1444.22      9679    1438.98      9680
GR  1435.0    9680.1    1434.98    9690.0    1434.98    9690.1    1434.98    9690.9    1434.98      9691
GR  1435.0      9701    1434.98    9701.1    1434.98    9701.9    1434.98    9702.0    1434.98      9712
GR  1444.2    9712.1    1444.60      9740    1434.98    9740.1    1434.98    9740.2    1434.98    9750.0
GR  1434.9    9750.1     1435.0    9750.9    1434.98      9751    1434.98      9761    1434.98    9761.1
GR  1434.9    9761.9    1434.98      9762    1434.98      9772    1444.50    9772.1     1445.2      9900
    1432.4    9900.1    1432.38      9912    1432.38    9912.1    1432.38    9912.9    1432.38      9913
GR  1432.4      9925    1432.38    9925.1    1432.38    9925.9    1432.38      9926    1432.38      9938
GR  1445.2    9938.1     1445.3      9959    1432.38    9959.1    1432.38      9971    1432.38    9971.1
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    1432.4     9971.9    1432.38      9972    1432.38      9984    1432.38    9984.1    1432.38    9984.9
GR  1432.4       9985    1432.38      9997     1445.3    9997.1    1445.35     10018    1432.38   10018.1
GR  1432.4      10030    1432.38   10030.1    1432.38   10030.9    1432.38     10031    1432.38     10043
GR  1432.4    10043.1     1432.4   10043.9    1432.38     10044    1432.38     10056     1445.4   10056.1
GR  1445.3      10236       1435   10236.1       1435     10246       1435   10246.1       1435   10246.9
GR     1435     10247       1435     10257       1435   10257.1       1435   10257.9       1435     10258
GR     1435     10268     1445.3   10268.1     1445.2     10295       1435   10295.1       1435     10305
GR     1435   10305.1       1435   10305.9       1435     10306       1435     10316       1435   10316.1
GR     1435     10317       1435   10317.1       1435     10327     1445.2     10328    1444.83     10400

ET                          9.1                                                          9579     10378
X1     4.10        90      9579     10378       170       170       170
   Section AU
X5       -2      3.08      3.08
   Culvert head losses input with X5 card
BT       88      9000   1443.00   1443.00      9300   1442.10   1442.10      9500   1442.72   1442.72
BT     9579   1443.10   1443.10      9580   1443.10   1439.50      9590   1443.10   1439.50    9590.1
BT   1443.1   1435.50    9590.9   1443.10   1435.50      9591   1443.10   1439.50      9601   1443.10
BT   1439.5    9601.1   1443.10   1435.50    9601.9   1443.10   1435.50      9602   1443.10   1439.50
BT     9612   1443.10   1439.50    9612.1   1443.10   1443.10      9730   1444.60   1444.60    9730.1
BT   1444.5   1439.50      9740   1444.55   1439.50    9740.1   1444.55   1435.50    9740.9   1444.55
BT   1435.5      9741   1444.55   1439.50      9751   1444.55   1439.50    9751.1   1444.55   1435.50
BT   9751.9   1444.55   1435.50      9752   1444.55   1439.50      9762   1444.55   1439.50    9762.1
BT   1444.5    1444.5      9950   1445.28   1445.28    9950.1    1445.3   1438.92      9962    1445.3
BT   1438.9    9962.1    1445.3   1432.92    9962.9    1445.3   1432.92      9963    1445.3   1438.92
BT     9975    1445.3   1438.92    9975.1    1445.3   1432.92    9975.9    1445.3   1432.92      9976
BT   1445.3   1438.92      9988    1445.3   1438.92    9988.1    1445.3    1445.3     10009    1445.3
BT   1445.3   10009.1    1445.3   1438.92     10021    1445.3   1438.92    10021.1    1445.3   1432.92
BT   10022.    1445.3   1432.92   10022.1    1445.3   1438.92     10034    1445.3   1438.92   10034.1
BT   1445.3   1432.92   10034.9    1445.3   1432.92     10035    1445.3   1438.92     10047    1445.3
BT   1438.9   10047.1    1445.3    1445.3     10068   1445.35   1445.35    10068.1   1445.35   1438.92
BT    10080   1445.35   1438.92   10080.1   1445.35   1432.92   10080.9   1445.35   1432.92     10081
BT   1445.4   1438.92     10093   1445.35   1438.92   10093.1   1445.35   1432.92   10093.9   1445.35
BT   1432.9     10094   1445.35   1438.92     10106    1445.4   1438.92   10106.1    1445.4    1445.4
BT    10286    1445.3    1445.3   10286.1    1445.3   1439.39     10296    1445.3   1439.39   10296.1
BT   1445.3   1435.39   10296.9    1445.3   1435.39     10297    1445.3   1439.39     10307    1445.3
BT   1439.4   10307.1    1445.3   1435.39   10307.9    1445.3   1435.39     10308    1445.3   1439.39
BT    10318    1445.3   1439.39   10318.1    1445.3    1445.3     10345    1445.2    1445.2   10345.1
BT   1445.2   1439.39     10355    1445.2   1439.39   10355.1    1445.2   1435.40   10355.9    1445.2
BT   1435.4     10356    1445.2   1439.39     10366    1445.2   1439.39   10366.1    1445.2   1435.39
BT    10367    1445.2   1435.40   10367.1    1445.2   1439.39     10377    1445.2   1439.39     10378
BT   1445.2    1445.2     10400   1444.83   1444.83
GR   1443.0      9000   1442.10      9300   1442.72      9500   1443.10      9579   1435.50      9580
GR   1435.5    9580.1   1435.50    9590.0   1435.50    9590.1   1435.50    9590.9   1435.50      9591
GR   1435.5      9601   1435.50    9601.1   1435.50    9601.9   1435.50    9602.0   1435.50      9612
GR   1443.1    9612.1   1444.60      9730   1435.50    9730.1   1435.50    9740.0   1435.50    9740.1
GR   1435.5    9740.9    1435.5      9741    1435.5    9751.0    1435.5    9751.1    1435.5    9751.9
GR   1435.5   9751.99   1435.50      9752   1435.50      9762   1444.50    9762.1   1445.28      9950
GR   1432.9    9950.1   1432.92      9962   1432.92    9962.1   1432.92    9962.9   1432.92      9963
GR   1432.9      9975   1432.92    9975.1   1432.92    9975.9   1432.92      9976   1432.92      9988
GR   1445.3    9988.1    1445.3     10009   1432.92   10009.1   1432.92     10021   1432.92   10021.1
GR   1432.9   10022.0   1432.92   10022.1   1432.92   10034.0   1432.92   10034.1   1432.92   10034.9
GR   1432.9     10035   1432.92     10047    1445.3   10047.1   1445.35     10068   1432.92   10068.1
GR   1432.9     10080   1432.92   10080.1   1432.92   10080.9   1432.92     10081   1432.92     10093
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	1432.9	10093.1	1432.9	10093.9	1432.92	10094	1432.92	10106	1445.4	10106.1
GR	1445.3	10286	1435.39	10286.1	1435.39	10296	1435.39	10296.1	1435.39	10296.9
GR	1435.4	10297	1435.39	10307	1435.39	10307.1	1435.39	10307.9	1435.39	10308
GR	1435.4	10318	1445.30	10318.1	1445.20	10345	1435.39	10345.1	1435.39	10355
GR	1435.4	10355.1	1435.40	10355.9	1435.39	10356	1435.39	10366	1435.39	10366.1
GR	1435.4	10367	1435.39	10367.1	1435.39	10377	1445.2	10378	1444.83	10400
NC			.040							
ET			9.1						9560	10378
X1	4.11	90	9579	10378	10	10	10		1.6	
X3	10							1442.1	1442.1	
GR	1443.0	9000	1442.10	9300	1442.72	9500	1443.10	9579	1435.50	9580
GR	1435.5	9580.1	1435.50	9590.0	1435.50	9590.1	1435.50	9590.9	1435.50	9591
GR	1435.5	9601	1435.50	9601.1	1435.50	9601.9	1435.50	9602.0	1435.50	9612
GR	1443.1	9612.1	1444.60	9730	1435.50	9730.1	1435.50	9740.0	1435.50	9740.1
GR	1435.5	9740.9	1435.5	9741	1435.5	9751.0	1435.5	9751.1	1435.5	9751.9
GR	1435.5	9751.99	1435.50	9752	1435.50	9762	1444.50	9762.1	1445.28	9950
GR	1432.9	9950.1	1432.92	9962	1432.92	9962.1	1432.92	9962.9	1432.92	9963
GR	1432.9	9975	1432.92	9975.1	1432.92	9975.9	1432.92	9976	1432.92	9988
GR	1445.3	9988.1	1445.3	10009	1432.92	10009.1	1432.92	10021	1432.92	10021.1
GR	1432.9	10022.0	1432.92	10022.1	1432.92	10034.0	1432.92	10034.1	1432.92	10034.9
GR	1432.9	10035	1432.92	10047	1445.3	10047.1	1445.35	10068	1432.92	10068.1
GR	1432.9	10080	1432.92	10080.1	1432.92	10080.9	1432.92	10081	1432.92	10093
GR	1432.9	10093.1	1432.9	10093.9	1432.92	10094	1432.92	10106	1445.4	10106.1
GR	1445.3	10286	1435.39	10286.1	1435.39	10296	1435.39	10296.1	1435.39	10296.9
	1435.4	10297	1435.39	10307	1435.39	10307.1	1435.39	10307.9	1435.39	10308
	1435.4	10318	1445.30	10318.1	1445.20	10345	1435.39	10345.1	1435.39	10355
GR	1435.4	10355.1	1435.40	10355.9	1435.39	10356	1435.39	10366	1435.39	10366.1
GR	1435.4	10367	1435.39	10367.1	1435.39	10377	1445.2	10378	1444.83	10400
NC				.1	.3					
ET			9.1						9700	10300
X1	4.20	38	9932.2	10028.6	600	290	490			
	Section AV									
GR	1447.1	9023.0	1447.1	9072.4	1445.5	9082.8	1446.6	9088.4	1446.1	9148.8
GR	1445.1	9256.5	1444.0	9373.0	1443.2	9464.8	1441.9	9597.3	1440.8	9730.0
GR	1439.9	9846.3	1439.9	9890.3	1437.8	9900.3	1440.2	9912.0	1439.8	9932.2
GR	1436.6	9939.2	1436.9	9983.8	1437.0	10000.0	1437.7	10023.0	1439.0	10028.6
GR	1438.8	10047.0	1440.4	10065.8	1441.1	10089.9	1440.7	10127.8	1439.9	10163.3
GR	1439.4	10237.8	1440.1	10265.8	1440.5	10321.4	1439.3	10328.3	1440.6	10336.4
GR	1440.6	10358.5	1441.5	10400.5	1442.5	10444.7	1443.1	10508.0	1444.1	10565.1
GR	1446.3	10622.6	1447.0	10659.3	1447.0	10704.5				
ET			9.1						9700	10150
X1	4.29	33	9906.6	10077.6	530	480	500			
	Section AW									
GR	1448.9	9064.3	1448.8	9141.3	1447.7	9235.7	1446.9	9337.2	1445.9	9432.7
GR	1445.2	9506.4	1444.0	9631.5	1443.0	9748.8	1442.1	9769.6	1442.5	9799.7
GR	1443.5	9831.2	1443.9	9870.2	1443.9	9906.6	1440.7	9917.2	1440.7	9929.5
GR	1441.9	9934.9	1441.9	9961.2	1440.3	9970.7	1439.4	9993.8	1439.6	10000.0
GR	1440.5	10030.2	1440.5	10064.2	1443.1	10077.6	1443.1	10132.5	1444.1	10181.2
	1443.2	10219.7	1443.2	10268.3	1443.8	10327.8	1445.0	10409.8	1446.4	10465.7
GR	1447.9	10506.1	1448.7	10554.4	1449.1	10595.1				

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ET                          9.1                                                   9750      10150
X1    4.39        40     9800.2     9949.8       500       500       500
   Section AX
GR   1452.3    9052.4    1451.5     9127.4    1450.2    9202.2    1450.7    9246.7    1449.2    9326.9
GR   1448.5    9383.8    1447.8     9476.9    1446.5    9603.1    1445.8    9709.1    1444.4    9720.5
GR   1445.9    9730.4    1444.9     9777.7    1445.5    9800.2    1443.4    9803.0    1443.9    9884.1
GR   1443.2    9917.0    1442.9     9939.0    1445.5    9949.8    1445.1    9989.2    1445.4   10000.0
GR   1446.0   10044.2    1445.2    10089.5    1443.4   10097.2    1443.4   10104.2    1445.6   10111.0
GR   1445.9   10134.0    1445.4    10155.1    1443.8   10161.8    1445.0   10170.4    1445.8   10193.7
GR   1445.7   10259.7    1446.8    10327.4    1447.6   10405.8    1450.0   10475.2    1449.4   10528.9
GR   1451.2   10567.5    1452.0    10601.2    1452.7   10637.0    1452.6   10663.3    1452.1   10673.6

ET                          9.1                                                   9825      10200
X1    4.47        40     9931.3    10040.0       450       490       470
   Section AY
GR   1453.8    9326.3    1453.0     9390.9    1451.9    9460.3    1449.3    9536.4    1449.8    9568.5
GR   1451.3    9637.4    1450.9     9674.3    1448.6    9750.4    1447.3    9831.0    1447.7    9860.7
GR   1448.7    9894.1    1448.2     9931.3    1445.8    9943.6    1447.1    9959.9    1446.9   10000.0
GR   1445.1   10029.3    1447.6    10040.0    1446.5   10059.8    1447.7   10077.2    1447.7   10114.8
GR   1446.6   10120.9    1447.4    10150.5    1450.4   10198.1    1449.6   10261.3    1448.7   10326.8
GR   1449.6   10361.3    1449.5    10390.4    1449.1   10409.5    1450.1   10431.0    1448.9   10436.5
GR   1450.1   10460.2    1450.7    10522.6    1448.8   10527.1    1450.5   10535.1    1450.3   10570.2
GR   1449.2   10577.9    1451.0    10581.3    1452.0   10638.4    1452.7   10715.1    1454.1   10763.5

        2       8904       8904
                            9.1                                                   9920      10250
X1    4.57        37     9977.8    10067.4       510       510       510
   Section AZ
GR   1456.5    9339.1    1455.8     9434.9    1454.2    9505.8    1453.1    9587.9    1453.1    9624.8
GR   1449.9    9631.8    1449.9     9645.9    1452.9    9649.7    1452.3    9719.7    1450.3    9756.7
GR   1452.2    9777.1    1452.1     9795.9    1449.3    9801.9    1452.0    9810.4    1451.5    9879.4
GR   1449.8    9920.1    1450.6     9940.4    1450.3    9977.8    1446.5    9982.5    1447.0   10000.0
GR   1448.4   10051.5    1449.8    10067.4    1448.6   10072.9    1449.9   10079.7    1450.7   10105.9
GR   1450.7   10159.4    1450.6    10195.8    1449.1   10205.6    1450.3   10225.1    1450.0   10239.4
GR   1452.6   10294.2    1453.3    10343.8    1452.8   10403.9    1454.0   10474.2    1455.0   10528.2
GR   1456.3   10578.9    1457.5    10627.2

ET                          9.1                                                   9810      10140
X1    4.67        36     9951.1    10031.9       570       450       520
   Section BA
GR   1462.6    9119.4    1460.2     9213.3    1459.5    9272.5    1459.2    9363.3    1457.8    9456.8
GR   1456.4    9567.7    1454.8     9660.9    1454.1    9708.5    1453.6    9812.2    1450.4    9824.4
GR   1452.7    9834.5    1450.4     9849.5    1450.1    9873.3    1452.5    9883.9    1453.2    9951.1
GR   1448.7    9959.1    1450.7     9976.7    1449.1    9994.4    1449.1   10000.0    1449.1   10022.7
GR   1452.6   10031.9    1452.9    10049.6    1452.2   10084.6    1453.2   10110.8    1454.1   10162.8
GR   1455.3   10186.1    1453.8    10227.2    1454.6   10291.8    1455.1   10356.7    1454.1   10363.6
GR   1455.2   10372.5    1455.9    10444.7    1457.8   10567.6    1458.1   10618.0    1459.3   10685.8
GR   1460.7   10733.2
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ET                          9.1                                                   9825      10125
X1     4.76        37     9981.9    10032.6      490       490       490
   Section BB
GR   1463.7    9091.5    1462.7     9182.1    1461.7    9271.9    1460.8    9353.7    1459.9    9382.0
GR   1458.4    9397.3    1460.0     9416.4    1458.7    9445.5    1459.5    9458.8    1458.0    9519.8
GR   1458.4    9549.7    1457.6     9627.6    1456.3    9705.9    1455.9    9752.9    1456.5    9780.8
GR   1454.9    9821.9    1455.6     9852.9    1456.2    9888.5    1455.0    9937.5    1455.9    9944.0
GR   1454.3    9969.5    1454.3     9981.9    1451.2    9985.5    1451.2   10000.0    1451.3   10025.0
GR   1455.9   10032.6    1455.6    10047.0    1454.8   10075.7    1456.8   10108.6    1457.7   10145.0
GR   1457.2   10206.0    1456.6    10237.3    1457.9   10309.3    1460.1   10338.5    1462.6   10365.2
GR   1463.8   10381.3    1463.0    10395.9

ET                          9.1                                                   9820      10175
X1     4.86        31     9960.6    10043.3      450       540       500
   Section BC
GR   1463.8    9249.8    1463.0     9359.1    1461.8    9452.8    1461.3    9499.6    1460.5    9582.6
GR   1460.1    9674.4    1459.2     9772.2    1457.9    9855.2    1458.4    9876.2    1457.9    9947.0
GR   1456.7    9953.5    1458.0     9960.6    1456.1    9968.8    1455.5    9977.9    1454.0   10000.0
GR   1456.0   10027.8    1458.5    10043.3    1458.5   10074.8    1457.8   10087.0    1458.1   10168.7
GR   1460.2   10256.1    1460.8    10360.3    1460.5   10390.0    1461.0   10416.7    1461.9   10448.1
GR   1463.5   10501.2    1464.5    10555.5    1466.0   10601.1    1468.4   10640.5    1469.5   10678.6
GR   1469.0   10705.8

ET                          9.1                                                   9850      10150
     4.95        33     9895.8    10031.2      450       530       500
   Section BD
GR   1465.7    9311.0    1463.9     9398.8    1463.5    9457.3    1463.0    9513.5    1462.0    9573.5
GR   1462.6    9662.7    1462.5     9700.7    1462.0    9729.6    1461.4    9777.1    1461.4    9816.3
GR   1460.5    9895.8    1460.1     9913.0    1457.9    9957.0    1457.9    9969.4    1457.8   10000.0
GR   1457.9   10012.5    1458.5    10019.6    1459.6   10031.2    1459.6   10057.1    1459.9   10069.0
GR   1460.6   10101.1    1460.0    10135.8    1460.0   10159.8    1462.2   10229.2    1462.4   10298.2
GR   1462.1   10308.0    1462.5    10325.0    1463.3   10364.3    1463.2   10404.8    1463.6   10455.6
GR   1464.6   10493.8    1465.0    10527.5    1466.0   10545.5

ET                          9.1                                                   9900      10350
X1     5.04        42     9966.0    10038.6      450       440       460
   Section BE
GR   1468.9    9574.2    1468.2     9651.8    1466.9    9736.9    1465.5    9817.4    1465.1    9874.6
GR   1466.4    9912.7    1466.9     9939.2    1466.5    9955.6    1465.3    9966.0    1459.9    9973.1
GR   1460.7   10000.0    1461.4    10023.2    1463.2   10038.6    1462.8   10056.4    1463.9   10068.9
GR   1462.7   10094.7    1464.1    10122.3    1463.6   10154.3    1461.6   10172.2    1461.6   10184.0
GR   1463.2   10193.9    1463.0    10210.9    1463.6   10219.1    1463.9   10272.0    1463.5   10336.4
GR   1463.9   10372.3    1464.2    10416.0    1464.0   10441.7    1462.7   10476.3    1462.4   10487.2
GR   1463.6   10497.4    1463.6    10536.3    1462.2   10544.2    1463.9   10551.1    1462.8   10581.7
GR   1463.6   10590.3    1464.0    10637.2    1464.0   10686.1    1464.7   10764.9    1465.0   10849.5
GR   1466.0   10895.8    1468.0    11000.0

ET                          9.1                                                   9880      10330
QT        2       8079       8079
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     5.13        24    9969.5   10028.7       490       490       490
  Section BF
GR   1470.4    9671.7   1469.1    9772.8    1468.4    9831.3    1468.9    9864.1    1470.1    9900.9
GR   1468.6    9939.0   1466.9    9969.5    1462.2    9978.2    1462.3   10000.0    1462.3   10012.3
GR   1466.8   10028.7   1466.3   10077.2    1466.3   10095.8    1467.2   10107.0    1466.6   10155.6
GR   1466.1   10253.8   1464.1   10261.0    1464.1   10279.0    1465.6   10300.4    1466.3   10358.5
GR   1467.1   10430.7   1467.6   10509.3    1469.1   10699.0    1471.0   10700.0

ET                        9.1                                                        9900     10150
X1     5.23        26    9938.5   10046.5       550       550       500
  Section BG
GR   1473.6    9491.3   1473.2    9581.4    1472.0    9684.6    1470.6    9761.6    1469.9    9811.8
GR   1467.0    9824.5   1468.1    9841.3    1468.6    9844.7    1468.1    9867.4    1468.0    9874.6
GR   1468.6    9884.9   1468.2    9938.5    1465.8    9958.4    1465.8   10000.0    1465.6   10021.5
GR   1467.1   10046.5   1468.5   10121.4    1469.8   10186.1    1470.2   10248.3    1471.8   10317.0
GR   1471.9   10391.2   1471.6   10451.3    1472.0   10520.1    1472.1   10536.4    1473.0   10570.2
GR   1473.6   10582.5

ET                        9.1                                                        9800     10050
X1     5.32        30    9965.4   10044.9       450       460       500
  Section BH
GR   1476.8    9294.3   1474.0    9429.0    1473.2    9508.3    1473.6    9554.3    1472.6    9585.2
GR   1473.1    9633.6   1472.2    9689.5    1473.7    9720.6    1473.7    9743.0    1471.3    9772.5
GR   1471.3    9812.0   1472.2    9848.2    1471.1    9874.9    1472.0    9890.7    1472.4    9947.1
GR   1472.3    9965.4   1469.1    9977.0    1467.9   10000.0    1468.3   10039.0    1471.5   10044.9
     1471.5   10060.6   1475.8   10080.0    1476.2   10108.9    1474.8   10159.3    1475.5   10195.1
     1475.1   10247.1   1476.0   10304.4    1476.3   10363.9    1477.6   10407.2    1478.5   10427.9

ET                        9.1                                                        9850     10100
X1     5.42        27    9885.5   10034.5       470       500       500
  Section BI
GR   1479.5    9354.5   1477.8    9482.5    1476.4    9593.3    1475.4    9718.3    1474.8    9784.8
GR   1475.8    9801.1   1476.1    9818.9    1473.1    9846.0    1474.6    9855.4    1474.3    9874.6
GR   1472.2    9885.5   1471.0    9937.8    1471.4    9976.9    1470.6   10000.0    1470.8   10029.3
GR   1473.7   10034.5   1473.7   10054.7    1475.3   10107.3    1476.4   10175.8    1477.2   10231.1
GR   1477.0   10271.3   1476.4   10323.5    1476.4   10368.2    1477.0   10422.8    1477.9   10428.0
GR   1477.9   10438.8   1478.8   10445.6

ET                        9.1                                                        9800     10070
X1     5.51        33    9920.9   10017.4       500       500       500
  Section BJ
GR   1480.5    9644.7   1480.6    9687.0    1479.5    9738.2    1476.3    9770.6    1474.5    9778.8
GR   1475.0    9785.0   1476.6    9841.2    1475.0    9860.7    1474.5    9868.8    1476.0    9905.7
GR   1475.3    9920.9   1474.0    9984.6    1473.5    9991.9    1472.0   10000.0    1473.5   10007.2
GR   1474.0   10017.4   1476.6   10087.7    1476.5   10106.3    1476.1   10127.5    1477.8   10149.0
GR   1477.1   10182.7   1476.5   10218.3    1476.2   10225.0    1475.6   10231.8    1476.2   10252.3
GR   1475.6   10257.8   1476.5   10260.8    1476.5   10276.5    1476.5   10303.9    1477.6   10362.7
GR   1478.5   10402.8   1479.1   10444.3    1481.0   10489.7
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QT      2      7225      7225
ET                        9.1                                                    9850      10150
X1    5.60        39    9895.9    10033.7       450       430       450
   Section BK
GR  1484.5    9522.1    1484.2     9524.3    1484.2    9536.4    1484.1    9539.7    1483.5    9596.9
GR  1482.0    9664.7    1481.4     9695.9    1479.8    9750.9    1479.8    9776.1    1479.9    9786.4
GR  1479.1    9843.1    1479.0     9853.2    1478.5    9866.9    1479.6    9874.5    1479.9    9895.9
GR  1476.3    9915.9    1476.3     9917.6    1477.1    9945.8    1478.3    9969.3    1476.5    9977.3
GR  1475.6   10000.0    1478.1    10018.5    1479.0   10033.7    1479.5   10062.5    1480.0   10082.5
GR  1480.5   10120.4    1480.0    10171.8    1479.8   10194.6    1480.0   10206.4    1480.3   10243.9
GR  1480.1   10256.7    1479.5    10269.2    1479.8   10277.6    1479.9   10297.8    1480.5   10364.1
GR  1481.0   10410.7    1481.9    10481.5    1483.1   10516.8    1485.1   10561.5

ET                        9.1                                                    9875      10125
X1    5.69        32    9897.5    10024.4       540       490       500
   Section BL
GR  1485.9    9620.7    1485.1     9624.5    1485.1    9685.8    1484.8    9756.1    1484.0    9790.5
GR  1483.0    9832.6    1481.6     9881.4    1482.5    9897.5    1478.0    9958.3    1478.0    9960.4
GR  1478.5    9974.6    1479.5     9990.6    1479.9   10000.0    1477.9   10006.3    1477.9   10010.7
GR  1480.0   10022.9    1481.8    10024.4    1481.9   10035.9    1482.6   10065.1    1483.1   10090.8
GR  1483.6   10128.8    1483.3    10160.0    1483.0   10206.2    1483.5   10258.5    1483.6   10267.1
GR  1483.8   10279.0    1483.1    10310.2    1483.5   10334.8    1483.9   10393.2    1484.2   10460.2
GR  1485.0   10512.0    1485.6    10529.3

                          9.1                                                    9875      10125
X1    5.79        19    9960.2    10027.7       500       500       500
   Section BM
GR  1488.2    9483.1    1488.1     9524.1    1488.1    9550.2    1486.5    9618.1    1485.8    9681.9
GR  1485.8    9764.9    1485.1     9892.6    1484.5    9933.5    1484.5    9960.2    1484.1    9967.7
GR  1480.1    9975.4    1479.1    10000.0    1480.1   10013.2    1483.7   10027.7    1484.9   10084.5
GR  1485.8   10140.2    1486.6    10199.2    1488.1   10249.7    1490.0   10295.4

NC                         .06
ET                        9.1                                                    9875      10125
X1    5.88        23    9968.1    10035.5       510       460       490
   Section BN
GR  1490.7    9590.1    1490.0     9648.5    1489.3    9709.9    1487.8    9776.0    1486.4    9825.8
GR  1487.1    9841.4    1486.5     9891.8    1486.1    9936.8    1487.5    9952.3    1486.3    9968.1
GR  1484.5    9975.5    1481.1     9987.0    1481.1   10000.0    1480.3   10006.0    1481.1   10016.8
GR  1484.0   10035.5    1485.1    10055.6    1485.6   10077.9    1486.6   10134.4    1487.3   10184.6
GR  1488.0   10241.2    1490.9    10294.1    1492.1   10334.0

ET                        9.1                                                    9820      10130
X1    5.98        29    9975.1    10036.5       420       600       500
   Section BO
GR  1492.8    9488.9    1491.7     9563.5    1491.1    9637.4    1490.2    9714.5    1489.5    9749.5
GR  1487.0    9755.0    1489.8     9763.2    1489.5    9820.8    1488.9    9876.1    1488.1    9901.6
GR  1487.3    9915.1    1488.5     9929.3    1489.7    9954.5    1488.4    9975.1    1483.5    9988.3
GR  1483.4    9998.3    1482.1    10000.0    1482.4   10015.3    1484.1   10027.6    1488.5   10036.5
GR  1488.1   10071.8    1488.1    10110.2    1488.9   10144.5    1489.9   10197.4    1490.4   10244.5
    1490.9   10301.1    1491.8    10352.0    1492.0   10416.5    1493.0   10417.0
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QT        2      6735      6735
   Flow reduced 490 cfs (approx. capacity diverted by western-most box culvert)
ET                          9.1                                                    9875      10125
X1     6.07        20    9976.0   10032.2       450       500       490
   Section BP
GR   1494.8    9618.3    1494.2    9692.9    1493.3    9758.2    1494.0    9805.8    1493.4    9875.1
GR   1492.3    9924.8    1491.3    9963.5    1491.2    9976.0    1484.1    9982.6    1484.8   10000.0
GR   1484.8   10018.8    1489.4   10032.2    1490.7   10056.3    1489.9   10077.4    1490.7   10103.8
GR   1490.1   10174.0    1491.3   10221.7    1491.6   10266.5    1494.1   10367.0    1495.0   10368.0

ET                          9.1                                                    9850      10150
X1     6.15        20    9983.9   10032.1       470       420       440
   Section BQ
GR   1496.0    9600.0    1494.0    9660.6    1494.0    9660.7    1494.4    9786.8    1493.2    9878.2
GR   1492.8    9957.9    1491.7    9983.9    1484.6    9997.0    1484.6   10000.0    1484.6   10023.0
GR   1492.7   10032.1    1492.6   10075.3    1492.5   10110.5    1490.2   10114.2    1490.2   10133.0
GR   1492.5   10146.4    1494.1   10202.2    1495.2   10246.0    1496.6   10289.1    1496.9   10324.2

QT        2      5416      5416
   Flow reduced 490 cfs (approx. capacity diverted by western-most box culvert)
ET                          9.1                                                    9850      10150
X1     6.22        20    9971.2   10074.6       440       280       360
   Section BR
GR   1497.9    9638.1    1497.8    9681.3    1497.1    9736.9    1496.8    9802.9    1495.3    9867.6
GR   1492.3    9935.6    1492.1    9952.4    1492.2    9962.9    1491.9    9971.2    1487.4    9986.0
GR   1487.2   10000.0    1487.9   10029.0    1490.3   10043.9    1494.0   10074.6    1493.8   10104.0
GR   1493.4   10125.3    1493.2   10168.9    1495.9   10217.3    1497.4   10283.3    1497.9   10321.4

NC      .04       .04       .04        .3        .5
QT        2      3446      3446
ET                          9.1                                                    9900      10100
X1     6.27        10      9960     10040       400       260       290
   Section BS
X3       10                                                            1498.0    1494.0
GR   1498.9      9500    1498.9      9960    1490.7    9960.1    1490.9   10039.9    1498.9     10040
GR   1498.9     10500    1498.9     10989   1492.70     10990   1492.70     11011    1498.9     11012

NC              .012      .012
   Sun Valley Parkway - upstream crossing
ET                          9.1                                                    9900      10100
X1    6.272        45      9960     10038        10        10        10
BT       44      9500   1502.40   1501.27      9600   1501.30   1500.17      9700   1500.60   1499.47
BT     9800   1500.27   1499.14      9960   1499.64   1498.51    9960.1   1499.64    1495.4      9972
BT   1499.6   1495.42    9972.1   1499.64   1490.42    9972.9   1499.64   1490.42      9973   1499.64
BT   1495.4      9985   1499.64   1495.42    9985.1   1499.64   1490.42    9985.9   1499.64   1490.42
BT     9986   1499.64   1495.42      9998   1499.64   1495.42    9998.1   1499.64   1490.42    9998.9
BT   1499.6   1490.42      9999   1499.64   1495.42     10011   1499.64   1495.42   10011.1   1499.64
BT   1490.4   10011.9   1499.64   1490.42     10012   1499.64   1495.42   10023.9   1499.64   1495.42
BT    10024   1499.64   1490.42   10024.9   1499.64   1490.42     10025   1499.64   1495.42     10037
BT   1499.6   1495.42     10038   1499.64   1498.51     10100    1499.4   1498.27     10300    1499.0
BT   1497.8     10400   1498.89   1497.76     10500   1499.83   1498.70     10700   1501.11   1499.98
BT    10900   1501.78   1500.65     10989   1502.10   1500.90     10990   1502.08   1496.41     11000
BT   1502.1   1496.41   11000.1   1502.08   1493.41   11000.9   1502.08   1493.41     11001   1502.08
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     1496.4     11011   1502.08    1496.4     11012   1502.08   1500.95     11100   1502.40   1501.27
BT    11300   1502.96   1501.83
GR   1501.2      9500   1500.17      9600   1499.47      9700   1499.14      9800   1498.51      9960
GR   1490.4    9960.1    1490.4    9960.2   1490.42      9972   1490.42    9972.1   1490.42    9972.9
GR   1490.4      9973   1490.42      9985   1490.42    9985.1   1490.42    9985.9   1490.42      9986
GR   1490.4      9998   1490.42    9998.1   1490.42    9998.9   1490.42      9999   1490.42     10011
GR   1490.4   10011.1   1490.42   10011.9   1490.42     10012   1490.42   10023.9   1490.42     10024
GR   1490.4   10024.9   1490.42     10025   1490.42     10037   1498.51     10038   1498.27     10100
GR   1497.8     10300   1497.76     10400   1498.70     10500   1499.98     10700   1500.65     10900
GR   1500.9     10989   1493.41     10990   1493.41     11000   1493.41   11000.1   1493.41   11000.9
GR   1493.4     11001   1493.41     11011   1500.95     11012   1501.27     11100   1501.83     11300

ET                        9.1                                                          9900     10100
X1    6.30                                      136       136       136                1.13
   Section BT
X2                                                                    1
X5      -2      2.12      2.12
   Culvert head losses input with X5 card

NC                .04       .04
ET                          9.1                                                          9900     10100
X1   6.303                                      10        10        10
X3      10                                                                1498.89   1495.00

NC    .065      .065      .060        .1        .3
                            9.1                                                          9800     10200
     6.35        33    9967.2   10072.0       240       290       240
   Section BU
GR   1503.3    9438.8    1501.0    9507.0    1500.5    9560.7    1501.8    9579.5    1500.0    9635.6
GR   1500.1    9653.2    1500.9    9661.6    1499.6    9713.3    1498.3    9771.6    1497.5    9845.3
GR   1497.4    9889.5    1497.7    9898.9    1497.3    9912.1    1497.4    9924.8    1497.8    9951.1
GR   1497.1    9967.2    1491.2    9991.1    1491.5   10000.0    1493.0   10034.4    1496.3   10072.0
GR   1496.8   10117.3    1497.8   10133.6    1498.2   10203.8    1499.7   10279.9    1499.0   10322.8
GR   1499.3   10355.7    1499.1   10374.6    1499.3   10436.8    1500.0   10493.2    1500.5   10545.5
GR   1500.5   10602.7    1500.6   10625.0    1502.0   10626.0

ET                          9.1                                                          9900     10250
X1    6.40        24    9972.9   10040.0       220       280       250
   Section BV
GR   1503.3    9593.2    1502.7    9670.5    1502.1    9751.4    1499.7    9774.0    1501.4    9790.4
GR   1502.3    9838.7    1501.3    9911.6    1500.2    9962.9    1498.8    9972.9    1493.6    9984.1
GR   1493.9   10000.0    1494.4   10030.6    1496.2   10040.0    1494.3   10051.7    1498.2   10058.8
GR   1498.7   10096.4    1498.0   10224.3    1499.5   10304.8    1500.2   10382.9    1501.0   10499.3
GR   1501.0   10606.2    1501.1   10691.4    1501.5   10753.6    1502.0   10754.0

ET                          9.1                                                          9950     10150
X1    6.49        21    9974.7   10082.9       520       530       500
   Section BW
GR   1506.5    9545.9    1505.6    9597.3    1506.2    9651.5    1505.8    9714.6    1505.2    9732.4
GR   1505.5    9767.9    1504.2    9847.4    1502.3    9913.1    1500.3    9950.3    1498.8    9963.3
GR   1500.9    9974.7    1494.7    9989.8    1494.8   10000.0    1494.8   10014.2    1496.0   10023.3
     1499.0   10082.9    1500.2   10134.4    1501.0   10237.1    1502.0   10330.2    1503.5   10399.4
GR   1504.9   10442.7
   Flow from CAP west overchute enters Wagner Wash above sect. 6.59.  Increase
```

in flow not significant enough to warrant Q deduction at upstream sect.

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ET                          9.1                                                   9900      10050
X1     6.59        21     9948.9    10031.2       490       550       510
   Section BX
GR   1506.3    9532.3    1505.1     9593.7    1505.9    9633.7    1505.0    9711.1    1503.8    9774.7
GR   1503.4    9819.4    1504.3     9892.5    1504.7    9919.2    1504.0    9948.9    1497.2    9957.0
GR   1496.3    9971.6    1498.3    10000.0    1497.5   10018.2    1501.6   10031.2    1501.7   10074.4
GR   1503.3   10125.2    1505.7    10196.9    1506.9   10265.7    1507.5   10339.2    1507.6   10403.0
GR   1508.1   10468.6

ET                          9.1                                                   9900      10063
X1     6.67        15     9987.8    10062.5       400       500       450
   Section BY
GR   1508.5    9599.1    1508.1     9740.0    1505.8    9821.3    1506.0    9859.5    1506.1    9903.3
GR   1504.6    9987.8    1500.1    10000.0    1498.2   10020.7    1500.0   10026.7    1503.8   10062.5
GR   1505.1   10116.9    1505.8    10169.4    1505.8   10210.8    1507.1   10251.0    1507.9   10271.8

ET                          9.1                                                   9950      10200
X1     6.77        23     9983.6    10034.0       510       300       470
   Section BZ
GR   1514.1    9493.5    1512.4     9600.8    1510.7    9724.9    1511.1    9793.3    1509.4    9839.1
GR   1508.7    9908.2    1508.3     9949.1    1507.2    9983.6    1504.7    9993.0    1500.3   10000.0
GR   1501.5   10021.0    1506.4    10034.0    1507.3   10069.2    1508.4   10110.7    1507.6   10155.4
GR   1507.1   10218.9    1507.1    10266.0    1507.1   10330.9    1507.9   10389.9    1507.9   10441.5
     1508.7   10479.8    1509.3    10505.7    1510.5   10506.0

ET                          9.1                                                   9900      10150
X1     6.82        24     9986.8    10019.4       280       210       260
   Section CA
GR   1512.0    9587.3    1510.4     9685.9    1509.3    9803.2    1507.3    9806.4    1508.9    9814.7
GR   1508.8    9824.4    1507.4     9828.2    1509.4    9856.2    1509.6    9933.4    1508.1    9986.8
GR   1501.6    9995.7    1501.6    10000.0    1501.6   10014.1    1507.3   10019.4    1508.2   10060.6
GR   1507.2   10107.9    1508.2    10147.6    1508.1   10184.8    1507.8   10263.7    1508.9   10323.6
GR   1508.2   10383.1    1509.2    10450.6    1510.3   10455.0    1512.0   10456.0

ET                          9.1                                                   9835      10110
X1     6.90        18     9963.7    10032.2       300       460       400
   Section CB
GR   1513.9    9376.3    1513.1     9464.7    1512.0    9563.7    1511.3    9701.2    1510.7    9811.8
GR   1510.7    9912.4    1510.7     9963.7    1510.1    9971.2    1503.3   10000.0    1504.0   10012.4
GR   1509.7   10032.2    1508.9    10054.3    1505.1   10058.4    1506.0   10063.5    1509.7   10106.2
GR   1511.1   10147.3    1514.9    10193.0    1515.9   10213.0

QT        2       2894       2894
ET                          9.1                                                   9900      10125
X1     6.99        18     9981.9    10012.8       450       480       470
   Section CC
GR   1516.4    9616.0    1515.7     9674.8    1513.6    9763.1    1513.6    9836.4    1513.0    9920.1
GR   1513.4    9952.2    1513.3     9981.9    1512.0    9990.7    1505.8    9994.1    1505.4   10000.0
GR   1505.8   10007.7    1511.9    10012.8    1512.2   10086.2    1511.9   10168.6    1512.8   10230.6
     1513.5   10309.3    1514.3    10375.7    1515.2   10425.1
```

Natural section manually truncated (left) at station 9752.2 to eliminate ineffective flow area in overbank.

```
ET                          9.1                                                   9850      10075
X1    7.08        25      9973.0    10044.1       480       420       460
   Section CD
GR   1520.0    9752.1     1513.4     9752.2    1513.8    9832.2    1513.8    9849.4    1513.1    9854.4
GR   1513.6    9862.7     1512.6     9884.8    1512.1    9900.3    1512.0    9909.1    1512.4    9919.3
GR   1512.9    9939.6     1512.9     9973.0    1510.1    9982.9    1507.5   10000.0    1507.6   10012.0
GR   1509.3   10021.5     1510.3    10038.4    1512.6   10044.1    1514.0   10101.9    1515.4   10148.8
GR   1517.0   10193.2     1516.5    10250.5    1517.6   10286.6    1518.1   10323.6    1518.5   10370.8

ET                          9.1                                                   9900      10100
X1    7.16        20      9987.7    10031.8       400       420       410
   Section CE
GR   1517.9    9798.0     1517.0     9834.4    1515.4    9865.4    1514.1    9873.0    1514.0    9880.2
GR   1514.6    9899.7     1515.4     9944.2    1515.6    9949.2    1515.8    9957.5    1515.8    9965.5
GR   1516.1    9987.7     1510.1     9993.1    1508.6   10000.0    1508.6   10008.5    1512.1   10014.8
GR   1513.8   10031.8     1514.6    10096.8    1515.0   10193.0    1516.0   10210.0    1518.0   10420.0

NC                           .105
ET                          9.1                                                   9950      10104
X1    7.20        23      9980.2    10104.0       150       370       250
   Section CF
GR   1518.7    9812.2     1519.8     9831.4    1517.1    9883.4    1515.8    9899.4    1517.8    9917.8
GR   1517.9    9932.8     1517.7     9952.2    1514.9    9980.2    1510.1    9992.9    1509.1   10000.0
GR   1510.1   10011.0     1512.5    10020.5    1516.4   10043.3    1516.1   10053.5    1515.1   10057.5
GR   1515.0   10070.4     1516.1    10078.4    1516.4   10086.0    1517.8   10104.0    1518.9   10137.0
GR   1520.0   10197.5     1521.1    10286.3    1520.7   10340.1

ET                          9.1                                                   9965      10094
X1    7.23        10        9965       10030       140       140       140
   Section CG
GR     1522       9965       1520        9975      1510       9990      1509     10000      1510     10010
GR     1520      10030       1520       10050    1518.5      10100      1520     10155      1522     10170
  Natural section manually truncated (left) at station 9940.3 to eliminate
  ineffective flow area in overbank (broken tank).
  Natural section manually truncated (right) at station 10304.9 to eliminate
  ineffective flow area in overbank.

ET                          9.1                                                   9940      10140
X1    7.26        15      9940.4    10073.8       250       130       150
   Section CH
GR   1523.0    9818.5     1523.0     9838.0    1523.0    9940.3    1516.6    9940.4    1516.6    9988.7
GR   1514.4    9994.8     1514.2    10000.0    1514.4   10008.2    1516.3   10028.3    1518.0   10073.8
GR   1518.5   10135.3     1518.5    10179.6    1526.1   10210.9    1521.0   10233.7    1522.2   10304.9

ET                          9.1                                                   9790      10110
X1    7.34        26      9791.8    10108.5       450       370       400
   Section CI
GR   1525.8    9398.5     1522.3     9499.4    1523.4    9544.7    1522.6    9609.0    1521.0    9681.9
GR   1520.5    9740.0     1520.3     9778.2    1520.1    9791.8    1518.0    9843.2    1517.8    9848.8
GR   1518.2    9868.9     1517.9     9928.9    1518.0    9971.1    1517.1    9995.5    1516.4   10000.0
GR   1518.0   10011.3     1518.4    10050.7    1519.1   10108.5    1520.9   10164.9    1521.5   10227.7
GR   1522.3   10288.7     1523.6    10350.2    1524.1   10416.5    1524.8   10492.5    1524.9   10564.4
GR   1526.0   10668.3
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ET                          9.1                                                   9825      10125
X1     7.41        23     9863.9    10083.4       440       380       400
   Section CJ
GR   1526.1    9439.0    1524.7     9532.3    1524.3    9579.9    1524.1    9649.8    1522.0     9745.0
GR   1521.8    9845.5    1520.2     9863.9    1520.1    9877.4    1520.2    9935.7    1519.5    10000.0
GR   1520.6   10044.8    1521.1    10083.4    1520.7   10091.1    1520.7   10108.9    1520.4    10117.0
GR   1520.7   10125.8    1521.1    10162.4    1521.9   10225.6    1523.8   10317.1    1524.2    10371.3
GR   1525.1   10425.5    1526.3    10519.0    1527.1   10623.6

ET                          9.1                                                   9782      10075
X1     7.51        18     9782.5    10042.3       500       500       500
   Section CK
GR   1527.8    9387.0    1526.3     9521.2    1525.1    9642.6    1524.0    9701.7    1523.5     9782.5
GR   1522.5    9798.7    1522.0     9840.5    1522.0    9852.7    1522.2    9858.6    1522.0     9895.5
GR   1521.8    9963.7    1521.9    10000.0    1521.9   10015.3    1522.6   10042.3    1523.8    10076.4
GR   1525.0   10106.3    1528.2    10163.2    1528.6   10188.7

ET                          9.1                                                   9875      10172
X1     7.59        29     9996.4    10171.9       450       420       430
   Section CL
GR   1529.6    9525.7    1528.6     9597.4    1528.1    9659.9    1526.6    9733.3    1526.4     9792.1
GR   1525.2    9828.5    1525.1     9859.4    1524.6    9879.0    1523.7    9887.6    1524.1     9899.4
GR   1524.6    9915.5    1525.0     9923.8    1525.4    9930.8    1524.6    9996.4    1523.6     9998.4
GR   1523.9   10000.0    1524.6    10045.9    1524.0   10059.2    1524.6   10078.3    1524.6    10114.4
     1524.0   10121.6    1523.9    10129.8    1524.0   10143.9    1525.6   10171.9    1526.3    10201.7
     1529.2   10228.8    1530.5    10266.8    1531.8   10322.4    1532.1   10360.0

ET                          9.1                                                   9900      10225
X1     7.68        30     9952.4    10222.2       480       500       480
   Section CM
GR   1534.5    9578.4    1531.5     9648.8    1529.8    9736.2    1528.6    9784.5    1527.9     9838.8
GR   1528.2    9861.8    1527.3     9887.2    1528.2    9905.0    1528.6    9952.4    1526.8     9963.7
GR   1528.4    9971.9    1527.7     9996.2    1525.8   10000.0    1528.3   10011.4    1527.6    10041.8
GR   1526.8   10051.1    1528.4    10060.3    1528.2   10097.0    1527.7   10118.6    1526.3    10128.7
GR   1527.4   10133.7    1527.4    10180.3    1526.7   10213.5    1527.7   10222.2    1527.6    10263.3
GR   1527.9   10316.4    1530.1    10346.8    1533.6   10391.2    1535.0   10425.9    1535.0    10435.5

ET                          9.1                                                   9925      10345
X1     7.77        29     9986.0    10344.7       480       500       490
   Section CN
GR   1537.4    9487.0    1535.6     9574.2    1534.2    9643.8    1533.3    9731.8    1533.5     9771.4
GR   1534.2    9793.3    1532.8     9825.8    1530.6    9844.9    1532.3    9853.6    1532.2     9884.3
GR   1530.8    9899.9    1532.0     9911.9    1531.7    9930.4    1529.9    9941.6    1531.4     9952.2
GR   1531.1    9986.0    1527.9     9998.8    1530.9   10000.0    1530.2   10038.4    1530.8    10060.5
GR   1530.6   10123.7    1530.2    10190.8    1530.2   10263.8    1530.2   10323.9    1531.0    10344.7
GR   1533.6   10377.9    1535.6    10406.7    1536.4   10436.1    1537.1   10482.8

ET                          9.1                                                   9950      10250
X1     7.85        26     9960.1    10238.8       460       460       440
   Section CO
     1539.2    9377.5    1538.2     9461.7    1537.6    9541.6    1536.9    9614.4    1535.7     9674.4
GR   1538.0    9687.4    1536.0     9697.4    1535.2    9789.6    1533.9    9880.3    1533.3     9886.7
GR   1533.9    9897.3    1533.7     9960.1    1530.0    9992.3    1529.9    9996.9    1530.0    10000.0
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    1532.1   10011.4    1532.5   10079.5    1532.0   10142.3    1532.0   10188.6    1532.5   10238.8
GR  1533.6   10329.0    1533.8   10402.9    1534.3   10448.0    1535.3   10515.5    1536.6   10585.9
GR  1538.0   10653.0

QT      2       1723       1723
ET                          9.1                                                      9800     10108
X1   7.95         26     9876.8   10107.7     510      470      500
   Section CP
GR  1540.1    9331.1    1539.2    9418.0    1538.6    9445.3    1538.0    9487.1    1537.1    9509.7
GR  1535.8    9590.8    1534.0    9662.2    1534.3    9728.5    1534.3    9735.2    1534.9    9745.3
GR  1534.3    9818.4    1533.9    9876.8    1532.6    9954.5    1532.1    9994.3    1532.1    9998.0
GR  1532.6   10000.0    1533.0   10026.9    1533.5   10069.6    1534.0   10107.7    1534.6   10150.2
GR  1536.1   10210.1    1537.1   10250.5    1537.6   10293.5    1538.3   10331.7    1538.6   10376.9
GR  1538.6   10391.7

ET                          9.1                                                      9850     10135
X1   8.04         23     9856.3   10130.6     500      500      500
   Section CQ
GR  1543.6    9340.7    1542.3    9382.4    1541.8    9427.1    1539.5    9524.9    1539.1    9592.6
GR  1538.0    9663.5    1537.6    9700.2    1537.1    9725.8    1536.3    9782.3    1535.6    9856.3
GR  1535.0    9900.9    1535.5    9977.5    1535.6   10000.0    1535.6   10021.6    1535.8   10067.3
GR  1535.9   10099.5    1536.5   10130.6    1538.6   10167.0    1540.0   10220.1    1541.1   10269.8
GR  1542.0   10317.6    1542.2   10380.5    1542.6   10421.6

ET                          9.1                                                      9839     10209
X1   8.13         18     9839.3   10205.5     500      450      470
   Section CR
GR  1543.2    9606.9    1542.0    9649.8    1541.1    9674.8    1539.5    9773.3    1539.1    9839.3
GR  1538.2    9910.4    1538.3    9971.5    1536.1    9981.0    1536.3    9993.1    1536.3   10000.0
GR  1536.3   10008.9    1536.5   10022.9    1538.0   10125.6    1539.5   10205.5    1540.9   10236.7
GR  1542.4   10269.2    1543.0   10327.0    1543.6   10354.0

QT      2        873        873
ET                          9.1                                                      9815     10090
X1   8.23         20     9818.6   10090.0     550      500      500
   Section CS
GR  1543.6    9410.9    1543.0    9435.2    1542.9    9484.9    1542.5    9553.6    1541.6    9646.7
GR  1541.1    9767.9    1541.5    9818.6    1540.0    9927.0    1539.5   10000.0    1539.8   10035.3
GR  1540.1   10064.8    1541.0   10090.0    1542.3   10124.9    1542.5   10169.9    1543.1   10184.0
GR  1543.3   10222.1    1543.6   10289.9    1543.0   10338.1    1543.1   10370.0    1543.5   10415.8
   Hec2 terminates at outfall of CAP east overchute.  Ponding elevation from
   hydrologic analysis is mapped above CAP canal.

QT      2        113        113
ET                          9.1                                                      9900     10100
X1   8.30         16     9918.7   10099.1     540      200      400
   Section CT
GR  1543.6    9544.1    1543.4    9562.7    1543.0    9629.3    1541.9    9702.1    1541.1    9789.0
GR  1540.7    9836.7    1541.9    9918.7    1540.6    9976.3    1540.0   10000.0    1541.0   10043.6
GR  1542.6   10075.6    1543.0   10099.1    1544.0   10163.3    1543.9   10229.3    1544.6   10307.2
GR  1544.6   10376.9
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*PROF 1



CCHV=     .100 CEHV=     .300
*SECNO  .090
     .090      5.33   1257.33       .00   1257.33   1258.38      1.05       .00       .00   1254.70
  15717.0      46.3    6830.7    8840.1      14.6     581.5    2386.3        .0        .0   1254.30
     .00      3.17     11.75      3.70      .065      .040      .100      .000   1252.00   9556.88
  .013797        0.        0.        0.         0         0         0       .00    943.22  10500.11


*SECNO  .180
     .180      4.46   1263.66       .00       .00   1264.82      1.15      6.40       .03   1261.80
  15717.0    1159.8    8465.4    6091.8     239.8     768.5    1415.8      23.4       7.7   1261.00
     .01      4.84     11.02      4.30      .065      .040      .100      .000   1259.20   9666.79
  .018007      590.      470.      330.         2         0         0       .00    818.59  10485.38


*SECNO  .260
     .260      4.81   1269.61       .00       .00   1270.70      1.09      5.88       .01   1268.10
  15717.0     143.4    9800.5    5773.1      48.2     957.7    1557.5      45.1      14.7   1267.50
     .03      2.98     10.23      3.71      .065      .040      .100      .000   1264.80   9758.85
  .012686      450.      415.      350.         3         0         0       .00    783.31  10542.16


*SECNO  .350
     .350      4.92   1276.02       .00       .00   1277.05      1.03      6.35       .01   1272.00
  15717.0    2242.0    8794.0    4681.0     441.0     870.8    1077.7      71.5      22.9   1273.60
     .05      5.08     10.10      4.34      .065      .040      .100      .000   1271.10   9759.88
  .014357      490.      480.      450.         4         0         0       .00    751.97  10511.86


*SECNO  .450

3301 HV CHANGED MORE THAN HVINS

     .450      4.56   1282.56       .00       .00   1283.09       .52      5.98       .05   1280.50
  15717.0    8332.7    4248.1    3136.2    1701.3     510.2     948.0     102.5      33.0   1279.20
     .07      4.90      8.33      3.31      .065      .040      .100      .000   1278.00   9349.85
  .010570      500.      490.      470.         2         0         0       .00   1052.98  10402.83
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO .530

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

.530	6.17	1287.97	1287.97	.00	1289.60	1.63	5.19	.33	1283.10
15717.0	6014.5	9650.6	52.0	1172.3	776.8	14.1	131.0	42.4	1282.60
.08	5.13	12.42	3.69	.065	.040	.065	.000	1281.80	9526.43
.011217	560.	420.	350.	2	11	0	.00	602.72	10129.15

*SECNO .610

.610	6.80	1292.50	.00	.00	1293.79	1.29	4.15	.03	1288.90
15717.0	5508.9	9727.0	481.1	1222.2	881.1	127.7	151.8	48.5	1289.50
.10	4.51	11.04	3.77	.065	.040	.065	.000	1285.70	9545.63
.008383	430.	430.	440.	2	0	0	.00	633.54	10179.17

*SECNO .700
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

.700	6.03	1297.53	1297.53	.00	1299.08	1.55	4.79	.08	1295.90
15717.0	2185.3	13531.7	.0	616.7	1268.5	.0	174.6	55.5	1304.10
.11	3.54	10.67	.00	.065	.040	.000	.000	1291.50	9538.45
.011242	450.	510.	550.	2	15	0	.00	645.60	10184.04

*SECNO .790

3301 HV CHANGED MORE THAN HVINS

.790	7.77	1303.27	.00	.00	1304.15	.87	5.00	.07	1300.00
15717.0	17.6	6293.7	9405.7	6.4	672.0	1583.9	196.5	62.1	1299.90
.13	2.73	9.37	5.94	.065	.040	.065	.000	1295.50	9834.97
.010553	450.	460.	460.	3	0	0	.00	608.82	10443.79

*SECNO .890

.890	5.24	1309.94	.00	.00	1311.12	1.18	6.88	.09	1307.10
15717.0	1198.3	7858.6	6660.0	257.2	712.9	1184.2	228.5	71.2	1306.00
.15	4.66	11.02	5.62	.065	.040	.065	.000	1304.70	9760.85
.012032	500.	520.	700.	3	0	0	.00	647.82	10408.67

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

1490 NH CARD USED
*SECNO .940

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

.940	5.29	1313.79	1313.79	.00	1315.88	2.09	4.14	.27	1310.90
15717.0	79.3	15637.7	.0	13.8	1345.7	.0	240.9	74.7	1318.40
.16	5.75	11.62	.00	.040	.041	.000	.000	1308.50	9871.37
.015539	300.	300.	320.	2	5	0	.00	328.56	10199.94

1490 NH CARD USED
*SECNO 1.020

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

1.020	7.16	1319.16	.00	.00	1319.88	.72	3.86	.14	1320.00
15717.0	.0	15717.0	.0	.0	2314.2	.0	258.6	79.0	1321.00
.17	.00	6.79	.00	.000	.042	.000	.000	1312.00	9602.45
.006050	500.	420.	350.	3	0	0	.00	582.00	10184.44

1490 NH CARD USED
*SECNO 1.120

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

1.120	5.17	1323.17	.00	.00	1324.53	1.36	4.46	.19	1326.50
15717.0	.0	15639.0	78.0	.0	1666.1	20.1	281.1	85.0	1321.00
.19	.00	9.39	3.89	.000	.046	.065	.000	1318.00	9683.21
.015226	500.	490.	480.	2	0	0	.00	478.36	10161.57

*SECNO 1.210

1.210	6.29	1328.69	.00	.00	1329.88	1.20	5.33	.02	1326.20
15717.0	884.3	13335.0	1497.8	225.3	1422.6	366.9	301.9	90.7	1326.40
.20	3.93	9.37	4.08	.065	.040	.065	.000	1322.40	9653.78
.008173	500.	490.	480.	3	0	0	.00	531.17	10184.95

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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


1490 NH CARD USED
*SECNO 1.300
    1.300      5.55   1333.15       .00       .00   1334.72      1.57      4.72       .11   1330.00
  15717.0    1393.4   13254.8    1068.8     276.3    1239.6     190.7     322.9      96.1   1328.00
     .22      5.04     10.69      5.60      .065      .042      .065      .000   1327.60   9676.88
 .011469      510.      490.      490.         3         0         0       .00    421.15  10098.03


*SECNO 1.390

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    1.390      7.12   1339.02   1339.02       .00   1341.84      2.82      5.75       .38   1335.50
  15717.0     140.9   13756.6    1819.5      37.3     972.9     239.2     338.9      99.6   1332.50
     .23      3.77     14.14      7.61      .065      .040      .065      .000   1331.90   9831.49
 .013047      500.      470.      460.         2        11         0       .00    234.52  10066.02


490 NH CARD USED
*SECNO 1.480

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.96

    1.480      9.43   1343.83       .00       .00   1344.68       .84      2.64       .20   1338.10
  15351.0    3140.8   12131.0      79.2    1022.8    1490.2      32.3     358.8     103.7   1338.00
     .25      3.07      8.14      2.45      .065      .042      .065      .000   1334.40   9516.60
 .003242      470.      450.      460.         3         0         0       .00    531.79  10048.39


*SECNO 1.580

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .68

    1.580      6.05   1346.15       .00       .00   1347.10       .94      2.39       .03   1342.90
  15351.0    4124.4   11158.1      68.5     974.7    1273.5      32.9     387.4     110.5   1345.40
     .27      4.23      8.76      2.08      .065      .040      .065      .000   1340.10   9640.49
 .007084      510.      520.      540.         3         0         0       .00    623.02  10263.50
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1.670

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.670	5.36	1350.46	1350.46	.00	1352.05	1.59	4.56	.19	1348.10
15351.0	2011.9	13337.0	2.1	506.5	1240.9	1.4	410.9	117.7	1347.50
.28	3.97	10.75	1.48	.065	.040	.065	.000	1345.10	9626.94
.011933	520.	500.	500.	3	11	0	.00	610.52	10237.46

*SECNO 1.770

3301 HV CHANGED MORE THAN HVINS

1.770	6.31	1355.51	.00	.00	1356.49	.99	4.38	.06	1352.00
15351.0	1327.3	13953.0	70.7	425.8	1680.9	28.1	434.3	125.1	1352.10
.30	3.12	8.30	2.51	.065	.040	.065	.000	1349.20	9719.32
.006110	510.	530.	550.	3	0	0	.00	617.20	10336.52

*SECNO 1.870

1.870	5.27	1359.07	.00	.00	1360.23	1.16	3.68	.05	1357.30
15351.0	202.6	11014.0	4134.3	65.2	1131.4	833.6	458.1	131.7	1355.40
.32	3.11	9.73	4.96	.065	.040	.065	.000	1353.80	9778.40
.009100	500.	500.	490.	3	0	0	.00	547.56	10325.96

*SECNO 1.950

3301 HV CHANGED MORE THAN HVINS

1.950	5.86	1362.86	.00	.00	1363.32	.45	3.02	.07	1360.00
15351.0	140.5	6187.4	9023.1	62.7	934.8	2038.0	482.7	138.4	1359.60
.34	2.24	6.62	4.43	.065	.040	.065	.000	1357.00	9766.61
.005649	460.	440.	410.	3	0	0	.00	814.22	10580.84

*SECNO 2.050

2.050	4.64	1366.34	.00	.00	1367.04	.70	3.65	.07	1364.30
15351.0	2598.3	7355.1	5397.6	582.1	888.9	1070.0	513.4	148.0	1363.70
.36	4.46	8.27	5.04	.065	.040	.065	.000	1361.70	9517.06
.010694	610.	500.	440.	2	0	0	.00	897.64	10414.71

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.140

2.140	5.08	1370.78	.00	.00	1371.22	.44	4.15	.03	1368.60
15351.0	4938.5	6956.0	3456.5	1257.9	1045.3	892.9	546.4	159.3	1368.30
.39	3.93	6.65	3.87	.065	.040	.065	.000	1365.70	9275.22
.006632	450.	490.	560.	3	0	0	.00	1080.98	10356.20

*SECNO 2.230

2.230	5.17	1374.07	.00	.00	1374.67	.60	3.40	.05	1372.10
15351.0	4610.6	6853.2	3887.2	1118.7	833.1	1027.2	579.8	170.9	1371.80
.41	4.12	8.23	3.78	.065	.040	.065	.000	1368.90	9410.54
.007832	480.	480.	450.	3	0	0	.00	1060.55	10471.09

*SECNO 2.330

2.330	5.87	1377.77	.00	.00	1378.25	.48	3.57	.01	1373.90
12861.0	2199.1	5183.4	5478.5	651.7	664.7	1637.7	615.4	183.9	1374.40
.44	3.37	7.80	3.35	.065	.040	.065	.000	1371.90	9591.75
.005917	480.	510.	560.	2	0	0	.00	1099.41	10691.16

*SECNO 2.430

2.430	4.72	1381.52	.00	.00	1382.15	.64	3.86	.05	1380.00
12861.0	26.9	5157.3	7676.8	14.0	583.3	1913.5	647.2	197.4	1379.00
.46	1.92	8.84	4.01	.065	.040	.065	.000	1376.80	9931.67
.010234	500.	500.	510.	2	0	0	.00	1220.65	11152.32

1490 NH CARD USED
*SECNO 2.520

2.520	5.74	1385.74	.00	.00	1386.22	.48	4.06	.02	1382.00
12861.0	5636.9	4102.1	3122.0	1002.9	590.3	1134.4	680.6	213.0	1384.20
.49	5.62	6.95	2.75	.052	.040	.065	.000	1380.00	9813.69
.005679	510.	510.	590.	2	0	0	.00	1168.71	10982.39

1490 NH CARD USED
*SECNO 2.620

3265 DIVIDED FLOW

2.620	4.95	1389.05	.00	.00	1389.73	.68	3.44	.06	1387.20
12861.0	7467.6	4599.9	793.6	1361.8	542.7	243.3	707.8	224.6	1387.50
.51	5.48	8.48	3.26	.049	.040	.065	.000	1384.10	9573.18
.008824	500.	500.	450.	2	0	0	.00	950.09	10558.98

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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 2.710
    2.710      5.05   1392.95       .00       .00   1393.39       .44      3.64       .02   1390.00
  12363.0    7514.3    3856.7     992.0    1845.6     513.1     301.9     734.3     235.1   1390.30
      .53      4.07      7.52      3.29      .065      .040      .065      .000   1387.90   9405.21
  .006551      480.      480.      480.         3         0         0       .00    940.83  10346.03


*SECNO 2.800

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    2.800      6.50   1396.50   1396.50       .00   1397.58      1.08      3.81       .19   1395.40
  12363.0    2631.5    7926.6    1804.9     875.1     782.8     503.0     762.0     246.6   1394.00
      .55      3.01     10.13      3.59      .065      .040      .065      .000   1390.00   9182.25
  .008984      500.      500.      500.         2        11         0       .00   1065.79  10319.33


*SECNO 2.900

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.63

    2.900      5.84   1400.34       .00       .00   1400.57       .24      2.91       .08   1397.90
  12363.0     567.7    4794.8    7000.4     331.1     961.7    2245.7     799.3     261.4   1398.10
      .59      1.71      4.99      3.12      .065      .040      .065      .000   1394.50   9507.21
  .003369      520.      540.      610.         3         0         0       .00   1226.78  10798.09


*SECNO 2.990

3265 DIVIDED FLOW
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .64

2.990	5.17	1402.67	.00	.00	1403.15	.49	2.50	.07	1403.40
12363.0	.0	5055.7	7307.3	.0	729.3	1647.2	833.4	273.2	1400.00
.62	.00	6.93	4.44	.000	.040	.065	.000	1397.50	9846.63
.008147	480.	490.	510.	2	0	0	.00	833.41	10760.06

*SECNO 3.090

3.090	4.52	1407.12	.00	.00	1407.62	.50	4.46	.00	1404.10
12363.0	348.6	4224.4	7790.0	111.3	549.3	1806.1	861.2	283.8	1404.30
.65	3.13	7.69	4.31	.065	.040	.065	.000	1402.60	9871.89
.009818	500.	500.	500.	3	0	0	.00	1012.16	10884.04

*SECNO 3.180

3.180	6.18	1410.18	.00	.00	1410.56	.37	2.93	.01	1408.20
12363.0	447.9	2914.4	9000.7	192.3	374.4	2476.2	887.5	293.5	1406.20
.67	2.33	7.78	3.63	.065	.040	.065	.000	1404.00	9829.40
.005150	470.	470.	400.	2	0	0	.00	1018.76	10848.16

*SECNO 3.270

3.270	5.25	1412.75	.00	.00	1413.12	.37	2.57	.00	1409.80
12363.0	858.8	5291.7	6212.4	311.8	835.0	1745.3	919.3	304.8	1412.20
.70	2.75	6.34	3.56	.065	.040	.065	.000	1407.50	9798.34
.005772	530.	500.	450.	3	0	0	.00	1082.57	10880.91

*SECNO 3.370

3.370	4.94	1416.04	.00	.00	1416.30	.26	3.17	.01	1413.50
12363.0	2799.1	3392.2	6171.7	829.0	657.6	1672.6	956.6	318.9	1414.00
.74	3.38	5.16	3.69	.065	.040	.065	.000	1411.10	9626.14
.006099	490.	500.	570.	3	0	0	.00	1199.82	10825.96

*SECNO 3.430

3265 DIVIDED FLOW

3.430	5.10	1418.20	.00	.00	1418.60	.40	2.26	.04	1416.20
12363.0	1067.7	3711.5	7583.8	353.3	526.2	1867.1	979.8	327.6	1416.70
.76	3.02	7.05	4.06	.065	.040	.065	.000	1413.10	9527.18
.007173	370.	350.	330.	1	0	0	.00	998.59	10749.75

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3.510

3.510	5.11	1421.01	.00	.00	1421.44	.43	2.83	.01	1418.90
12363.0	800.4	3795.1	7767.5	295.1	488.5	2080.9	1006.8	337.6	1418.20
.78	2.71	7.77	3.73	.065	.040	.065	.000	1415.90	9746.01
.006310	400.	430.	420.	2	0	0	.00	1100.55	10846.55

*SECNO 3.600

3265 DIVIDED FLOW

3.600	5.59	1423.59	.00	.00	1424.04	.46	2.59	.01	1422.20
10964.0	882.5	4639.8	5441.7	459.3	615.5	1711.6	1036.0	350.2	1421.50
.80	1.92	7.54	3.18	.065	.040	.065	.000	1418.00	9501.45
.005216	450.	450.	450.	2	0	0	.00	1336.49	10874.87

*SECNO 3.700

3.700	5.51	1426.31	.00	.00	1426.86	.56	2.79	.03	1424.50
10964.0	527.5	6355.3	4081.3	273.9	845.7	1457.9	1068.4	365.7	1424.80
.83	1.93	7.51	2.80	.065	.040	.065	.000	1420.80	9709.30
.005432	520.	520.	530.	2	0	0	.00	1224.18	10933.48

*SECNO 3.790

3.790	5.52	1429.62	.00	.00	1430.29	.67	3.39	.03	1426.70
10964.0	2445.2	6408.6	2110.2	803.8	779.5	820.6	1099.5	381.7	1426.30
.86	3.04	8.22	2.57	.065	.040	.065	.000	1424.10	9537.96
.007605	480.	510.	600.	2	0	0	.00	1309.50	10847.47

*SECNO 3.910

3.910	5.53	1433.53	.00	.00	1434.02	.49	3.71	.02	1430.10
10964.0	1178.4	7405.5	2380.1	493.6	1126.4	927.8	1136.6	400.6	1430.00
.89	2.39	6.57	2.57	.065	.040	.065	.000	1428.00	9422.04
.004710	530.	600.	800.	3	0	0	.00	1143.13	10565.16

*SECNO 3.990

3.990	6.94	1435.24	.00	.00	1435.67	.43	1.65	.01	1432.50
10964.0	190.6	9707.8	1065.6	128.6	1744.1	538.9	1161.5	410.4	1433.50
.91	1.48	5.57	1.98	.065	.040	.065	.000	1428.30	9537.18
.003081	440.	440.	430.	3	0	0	.00	815.50	10352.68

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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 4.040
    4.040      5.67   1435.97       .00       .00   1436.67       .71       .92       .08   1434.20
  10358.0     209.5    9847.7     300.8     142.6    1426.1     205.2    1173.3     415.1   1433.00
      .92      1.47      6.91      1.47      .065      .040      .065      .000   1430.30   9508.45
 .004831      200.      240.      290.         2         0         0       .00    818.40  10326.85


CCHV=     .300 CEHV=     .500
*SECNO 4.070

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1440.00 ELREA=      1440.00

    4.070      4.65   1437.05       .00       .00   1437.43       .39       .67       .09   1436.00
  10358.0        .0   10358.0        .0        .0    2067.8        .0    1179.9     417.7   1435.00
      .93       .00      5.01       .00      .000      .040      .000      .000   1432.40   9680.00
 .004099      150.      150.      150.         3         0         0       .00    674.00  10354.00


*SECNO 4.071

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE, NRD=  88 MIN ELTRD=  1442.10 MAX ELLC=  1445.40

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    4.071      5.34   1437.72   1437.72       .00   1439.74      2.02       .03       .82   1444.22
  10358.0        .0   10358.0        .0        .0     907.4        .0    1180.3     417.8   1445.20
      .93       .00     11.42       .00      .000      .012      .000      .000   1432.38   9680.03
 .002800       10.       10.       10.        20        18         0    -47.64    242.05  10327.27


*SECNO 4.100
 WATER EL=X5 CARD=   1440.795

3265 DIVIDED FLOW
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.84

4.100	7.90	1440.80	.00	.00	1441.46	.66	.13	.41	1443.10
10358.0	.0	10358.0	.0	.0	1584.8	.0	1185.1	418.7	1445.20
.94	.00	6.54	.00	.000	.012	.000	.000	1432.90	9579.30
.000346	170.	170.	170.	0	0	0	.00	243.38	10377.55

*SECNO 4.110

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .18

3295 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1442.10 ELREA= 1442.10

4.110	5.97	1440.47	.00	.00	1441.80	1.33	.01	.33	1444.70
10358.0	.0	10358.0	.0	.0	1118.3	.0	1185.5	418.8	1446.80
.94	.00	9.26	.00	.000	.040	.000	.000	1434.50	9579.56
.010976	10.	10.	10.	2	0	0	.00	242.71	10377.36

CCHV= .100 CEHV= .300
*SECNO 4.200

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.15

4.200	7.09	1443.69	.00	.00	1443.99	.30	2.08	.10	1439.80
10358.0	2761.9	4011.9	3584.1	1215.2	634.1	1445.0	1208.5	426.0	1439.00
.97	2.27	6.33	2.48	.065	.040	.065	.000	1436.60	9407.08
.002381	600.	490.	290.	2	0	0	.00	1135.35	10542.43

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.290

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .55

4.290	5.88	1445.28	.00	.00	1446.15	.86	1.99	.17	1443.90
10358.0	1910.5	6838.9	1608.6	626.5	767.3	546.8	1238.7	437.9	1443.10
.99	3.05	8.91	2.94	.065	.040	.065	.000	1439.40	9497.43
.007840	530.	500.	480.	3	0	0	.00	923.75	10421.19

*SECNO 4.390

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.40

4.390	5.61	1448.51	.00	.00	1448.91	.40	2.72	.05	1445.50
10358.0	1890.9	4961.4	3505.7	748.4	735.1	1220.1	1265.4	449.3	1445.50
1.02	2.53	6.75	2.87	.065	.040	.065	.000	1442.90	9383.11
.003986	500.	500.	500.	3	0	0	.00	1048.97	10432.07

*SECNO 4.470

3265 DIVIDED FLOW

4.470	5.85	1450.95	.00	.00	1451.56	.61	2.59	.06	1448.20
10358.0	2668.5	4201.1	3488.4	735.5	474.5	969.1	1291.9	460.6	1447.60
1.05	3.63	8.85	3.60	.065	.040	.065	.000	1445.10	9488.12
.008020	450.	470.	490.	2	0	0	.00	1044.66	10581.21

*SECNO 4.570

4.570	7.37	1453.87	.00	.00	1454.31	.44	2.73	.02	1450.30
8904.0	2398.2	4015.0	2490.8	927.9	543.8	880.2	1318.4	472.2	1449.80
1.07	2.58	7.38	2.83	.065	.040	.065	.000	1446.50	9530.51
.003643	510.	510.	510.	1	0	0	.00	936.01	10466.52

*SECNO 4.670

4.670	7.21	1455.91	.00	.00	1456.51	.60	2.15	.05	1453.20
8904.0	2933.2	4177.3	1793.5	865.1	494.6	684.5	1344.4	482.7	1452.60
1.10	3.39	8.45	2.62	.065	.040	.065	.000	1448.70	9596.28
.004769	570.	520.	450.	3	0	0	.00	849.03	10445.31

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.760

3265 DIVIDED FLOW

4.760	7.33	1458.53	.00	.00	1459.46	.92	2.85	.10	1454.30
8904.0	3568.1	3829.6	1506.3	976.3	346.7	484.4	1366.1	492.1	1455.90
1.12	3.65	11.05	3.11	.065	.040	.065	.000	1451.20	9395.95
.007251	490.	490.	490.	3	0	0	.00	822.47	10317.69

*SECNO 4.860

4.860	7.62	1461.62	.00	.00	1462.09	.46	2.58	.05	1458.00
8904.0	2784.3	3808.5	2311.2	1013.4	494.6	834.4	1389.3	502.1	1458.50
1.15	2.75	7.70	2.77	.065	.040	.065	.000	1454.00	9469.04
.003993	450.	500.	540.	1	0	0	.00	969.52	10438.56

*SECNO 4.950

4.950	5.87	1463.67	.00	.00	1464.15	.48	2.06	.01	1460.50
8904.0	1593.5	4842.4	2468.1	699.8	678.1	837.4	1415.1	513.3	1459.60
1.18	2.28	7.14	2.95	.065	.040	.065	.000	1457.80	9432.66
.004319	450.	500.	530.	3	0	0	.00	1025.55	10458.22

*SECNO 5.040

3265 DIVIDED FLOW

5.040	6.11	1466.01	.00	.00	1466.45	.44	2.30	.00	1465.30
8904.0	78.6	2862.6	5962.9	62.6	350.1	1865.1	1438.1	523.9	1463.20
1.20	1.25	8.18	3.20	.065	.040	.065	.000	1459.90	9787.98
.006156	450.	460.	440.	2	0	0	.00	1049.92	10896.41

*SECNO 5.130

3265 DIVIDED FLOW

5.130	6.79	1468.99	.00	.00	1469.68	.69	3.15	.08	1466.90
8079.0	105.6	3276.6	4696.7	65.6	340.7	1352.2	1460.8	534.5	1466.80
1.22	1.61	9.62	3.47	.065	.040	.065	.000	1462.20	9781.96
.006763	490.	490.	490.	2	0	0	.00	840.96	10685.14

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5.230

3265 DIVIDED FLOW

5.230	6.21	1471.81	.00	.00	1472.35	.53	2.65	.02	1468.20
8079.0	1691.6	4523.8	1863.6	569.5	613.7	649.4	1482.9	544.2	1467.10
1.25	2.97	7.37	2.87	.065	.040	.065	.000	1465.60	9694.97
.003890	550.	500.	550.	2	0	0	.00	709.17	10487.66

*SECNO 5.320

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5.320	6.48	1474.38	1474.38	.00	1475.49	1.11	2.63	.17	1472.30
8079.0	3064.8	4774.7	239.5	930.1	449.2	63.9	1500.5	551.5	1471.50
1.27	3.30	10.63	3.75	.065	.040	.065	.000	1467.90	9410.75
.008306	450.	500.	460.	2	8	0	.00	662.84	10073.59

*SECNO 5.420

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.68

5.420	6.69	1477.29	.00	.00	1477.82	.53	2.27	.06	1472.20
8079.0	1232.6	5993.8	852.6	611.4	900.6	456.4	1519.6	560.1	1473.70
1.29	2.02	6.66	1.87	.065	.040	.065	.000	1470.60	9522.73
.002935	470.	500.	500.	3	0	0	.00	901.76	10424.49

*SECNO 5.510

5.510	7.16	1479.16	.00	.00	1479.54	.38	1.71	.01	1475.30
8079.0	1949.6	3288.7	2840.7	585.6	479.1	998.9	1542.7	569.3	1474.00
1.32	3.33	6.86	2.84	.065	.040	.065	.000	1472.00	9741.74
.004049	500.	500.	500.	2	0	0	.00	703.77	10445.51

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5.600
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5.600	5.79	1481.39	1481.39	.00	1482.24	.86	2.45	.14	1479.90
7225.0	972.2	5007.3	1245.5	318.6	573.3	488.6	1560.2	576.6	1479.00
1.34	3.05	8.73	2.55	.065	.040	.065	.000	1475.60	9696.35
.008322	450.	450.	430.	3	14	0	.00	744.79	10441.14

*SECNO 5.690

5.690	6.85	1484.75	.00	.00	1485.49	.74	3.23	.01	1482.50
7225.0	606.0	5270.6	1348.4	228.7	663.9	621.6	1576.9	585.2	1481.80
1.36	2.65	7.94	2.17	.065	.040	.065	.000	1477.90	9757.96
.005108	540.	500.	490.	1	0	0	.00	738.30	10496.26

*SECNO 5.790

5.790	8.27	1487.37	.00	.00	1488.33	.96	2.78	.07	1484.50
7225.0	1786.0	4319.0	1120.0	650.6	436.5	365.6	1594.0	593.1	1483.70
1.38	2.75	9.89	3.06	.065	.040	.065	.000	1479.10	9581.24
.006059	500.	500.	500.	3	0	0	.00	643.84	10225.08

*SECNO 5.880

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.44

5.880	9.85	1490.15	.00	.00	1490.39	.25	1.99	.07	1486.30
7225.0	2023.7	2856.6	2344.7	786.9	538.1	792.2	1614.0	600.4	1484.00
1.42	2.57	5.31	2.96	.065	.060	.065	.000	1480.30	9636.18
.002938	510.	490.	460.	2	0	0	.00	644.20	10280.38

*SECNO 5.980

5.980	9.76	1491.86	.00	.00	1492.17	.31	1.75	.02	1488.40
7225.0	2310.2	2935.4	1979.3	845.3	479.8	689.9	1637.9	608.7	1488.50
1.45	2.73	6.12	2.87	.065	.060	.065	.000	1482.10	9552.86
.004146	420.	500.	600.	3	0	0	.00	817.45	10370.31

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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 6.070

3265 DIVIDED FLOW

    6.070      9.85   1493.95       .00       .00   1494.39       .44      2.19       .04   1491.20
   6735.0     457.5    3231.7    3045.9     219.8     470.9     895.9    1657.8     616.7   1489.40
     1.48      2.08      6.86      3.40      .065      .060      .065      .000   1484.10   9710.75
  .004930      450.      490.      500.         2         0         0       .00    641.94  10361.13


*SECNO 6.150
    6.150     11.30   1495.90       .00       .00   1496.22       .33      1.82       .01   1491.70
   6735.0    1861.8    2880.8    1992.4     785.8     461.1     649.8    1675.4     623.4   1492.70
     1.51      2.37      6.25      3.07      .065      .060      .065      .000   1484.60   9603.14
  .003563      470.      440.      420.         2         0         0       .00    664.29  10267.44


*SECNO 6.220
    6.220      9.80   1497.00       .00       .00   1497.21       .20       .97       .01   1491.90
   5416.0    1057.0    3353.9    1005.1     457.1     785.7     470.9    1690.4     628.4   1494.00
     1.54      2.31      4.27      2.13      .065      .060      .065      .000   1487.20   9757.91
  .002016      440.      360.      280.         2         0         0       .00    507.99  10265.90


CCHV=     .300 CEHV=     .500
*SECNO 6.270

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .62


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1498.00 ELREA=      1494.00

    6.270      6.79   1497.49       .00       .00   1497.95       .46       .61       .13   1498.90
   3446.0        .0    2950.1     495.9        .0     534.5     104.3    1698.7     630.6   1498.90
     1.55       .00      5.52      4.75      .000      .040      .040      .000   1490.70   9960.02
  .002150      400.      290.      260.         2         0         0       .00    102.51  11011.77


*SECNO 6.272
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE, NRD= 44 MIN ELTRD= 1498.89 MAX ELLC= 1498.51

6.272	6.83	1497.23	.00	.00	1498.25	1.02	.02	.28	1498.51
3446.0	.0	2990.3	455.7	.0	364.2	62.0	1698.8	630.6	1498.51
1.55	.00	8.21	7.34	.000	.012	.012	.000	1490.40	9960.02
.002162	10.	10.	10.	2	0	0	-183.23	99.84	11011.51

*SECNO 6.300
WATER EL=X5 CARD= 1499.350

3265 DIVIDED FLOW

3370 NORMAL BRIDGE, NRD= 44 MIN ELTRD= 1498.89 MAX ELLC= 1499.64

6.300	7.82	1499.35	1495.77	.00	1500.16	.81	.28	.06	1499.64
3446.0	.0	2813.8	632.2	.0	364.4	145.1	1700.2	631.5	1499.64
1.56	.00	7.72	4.36	.000	.012	.012	.000	1491.53	9960.00
.001959	136.	136.	136.	0	12	0	-291.95	428.14	11011.64

*SECNO 6.303

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

6.303	8.65	1500.18	.00	.00	1500.36	.18	.01	.19	1499.64
3446.0	16.2	2564.9	864.9	37.5	669.3	586.9	1700.4	631.6	1499.64
1.56	.43	3.83	1.47	.040	.040	.040	.000	1491.53	9822.07
.000768	10.	10.	10.	3	0	0	.00	755.61	11011.75

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .100 CEHV= .300
*SECNO 6.350

3265 DIVIDED FLOW

6.350	9.31	1500.51	.00	.00	1500.56	.06	.19	.01	1497.10
3446.0	793.7	1822.1	830.2	680.0	737.5	787.6	1710.9	637.0	1496.30
1.60	1.17	2.47	1.05	.065	.060	.065	.000	1491.20	9560.12
.000746	240.	240.	290.	2	0	0	.00	964.87	10603.90

*SECNO 6.400

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .51

6.400	7.15	1500.75	.00	.00	1500.94	.19	.34	.04	1498.80
3446.0	29.4	1823.5	1593.1	30.0	415.3	742.2	1720.9	641.5	1496.20
1.62	.98	4.39	2.15	.065	.060	.065	.000	1493.60	9764.13
.002838	220.	250.	280.	2	0	0	.00	545.28	10462.64

*SECNO 6.490

6.490	7.55	1502.25	.00	.00	1502.47	.22	1.52	.01	1500.90
3446.0	192.5	2545.1	708.4	97.5	594.4	375.9	1734.2	647.3	1499.00
1.66	1.97	4.28	1.88	.065	.060	.065	.000	1494.70	9914.12
.003136	520.	500.	530.	2	0	0	.00	427.39	10341.51

*SECNO 6.590

3265 DIVIDED FLOW

6.590	7.82	1504.12	.00	.00	1504.57	.45	2.03	.07	1504.00
3446.0	44.0	2888.6	513.4	48.0	502.8	199.7	1745.1	651.9	1501.60
1.69	.92	5.74	2.57	.065	.060	.065	.000	1496.30	9757.46
.005069	490.	510.	550.	2	0	0	.00	327.11	10149.85

*SECNO 6.670

6.670	8.45	1506.65	.00	.00	1507.09	.45	2.53	.00	1504.60
3446.0	321.6	2569.0	555.5	177.3	423.0	228.8	1753.4	655.9	1503.80
1.71	1.81	6.07	2.43	.065	.060	.065	.000	1498.20	9791.30
.006103	400.	450.	500.	2	0	0	.00	445.75	10237.05

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 6.770

6.770	8.79	1509.09	.00	.00	1509.38	.29	2.27	.02	1507.20
3446.0	119.8	1770.7	1555.5	77.8	314.4	701.0	1762.1	660.5	1506.40
1.74	1.54	5.63	2.22	.065	.060	.065	.000	1500.30	9869.74
.004804	510.	470.	300.	2	0	0	.00	626.88	10496.62

*SECNO 6.820

6.820	8.57	1510.17	.00	.00	1510.34	.17	.95	.01	1508.10
3446.0	379.4	1169.8	1896.8	255.6	235.3	870.9	1768.6	664.2	1507.30
1.76	1.48	4.97	2.18	.065	.060	.065	.000	1501.60	9710.57
.003444	280.	260.	210.	2	0	0	.00	743.91	10454.47

*SECNO 6.900

6.900	8.49	1511.79	.00	.00	1512.09	.29	1.71	.04	1510.70
3446.0	415.0	1832.8	1198.1	275.1	355.5	334.2	1779.5	669.8	1509.70
1.79	1.51	5.16	3.58	.065	.060	.065	.000	1503.30	9605.76
.004977	300.	400.	460.	1	0	0	.00	549.79	10155.55

*SECNO 6.990

6.990	8.95	1514.35	.00	.00	1514.55	.20	2.45	.01	1513.30
2894.0	357.2	942.1	1594.6	220.3	180.4	605.3	1790.1	676.2	1511.90
1.83	1.62	5.22	2.63	.065	.060	.065	.000	1505.40	9731.73
.005481	450.	470.	480.	3	0	0	.00	646.50	10378.23

*SECNO 7.080

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.78

7.080	8.21	1515.71	.00	.00	1515.84	.13	1.28	.01	1512.90
2894.0	1031.4	1577.3	285.3	567.5	451.3	188.6	1801.6	681.6	1512.60
1.87	1.82	3.50	1.51	.065	.060	.065	.000	1507.50	9752.17
.001733	480.	460.	420.	3	0	0	.00	405.38	10157.55

*SECNO 7.160

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

7.160	8.17	1516.77	.00	.00	1517.02	.25	1.14	.04	1516.10
2894.0	524.2	1300.0	1069.8	220.8	245.7	408.5	1811.4	685.6	1513.80
1.90	2.37	5.29	2.62	.065	.060	.065	.000	1508.60	9838.92
.005161	400.	410.	420.	2	0	0	.00	451.62	10290.53

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 7.200

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .68

7.200	9.52	1518.62	.00	.00	1518.86	.24	1.84	.00	1514.90
2894.0	634.1	2246.6	13.4	182.7	557.7	10.1	1816.2	687.8	1517.80
1.92	3.47	4.03	1.33	.065	.105	.065	.000	1509.10	9854.15
.011110	150.	250.	370.	2	0	0	.00	274.42	10128.57

*SECNO 7.230

7.230	11.28	1520.28	.00	.00	1520.86	.57	1.90	.10	1522.00
2894.0	.0	2557.9	336.1	.0	400.7	114.3	1818.2	688.5	1520.00
1.93	.00	6.38	2.94	.000	.105	.065	.000	1509.00	9973.59
.016869	140.	140.	140.	3	0	0	.00	183.53	10157.12

*SECNO 7.260

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.26

7.260	7.52	1521.72	.00	.00	1521.82	.11	.92	.05	1516.60
2894.0	.0	1796.4	1097.6	.2	720.5	393.7	1820.9	689.3	1518.00
1.94	.15	2.49	2.79	.065	.105	.065	.000	1514.20	9940.32
.003292	250.	150.	130.	3	0	0	.00	298.39	10276.34

*SECNO 7.340

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

7.340	6.26	1522.66	.00	.00	1522.69	.03	.86	.01	1520.10
2894.0	396.3	2095.2	402.5	298.7	1396.7	291.6	1835.1	694.0	1519.10
2.02	1.33	1.50	1.38	.065	.105	.065	.000	1516.40	9488.95
.001555	450.	400.	370.	4	0	0	.00	727.24	10305.85

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 7.410

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

7.410	4.05	1523.55	.00	.00	1523.62	.07	.91	.01	1520.20
2894.0	502.7	1428.5	962.8	267.3	743.2	414.1	1850.8	700.3	1521.10
2.07	1.88	1.92	2.33	.065	.105	.065	.000	1519.50	9674.71
.003628	440.	400.	380.	2	0	0	.00	630.38	10305.08

*SECNO 7.510

7.510	3.83	1525.63	.00	.00	1525.71	.08	2.09	.00	1523.50
2894.0	483.7	2102.5	307.7	229.5	918.6	123.0	1866.3	707.0	1522.60
2.14	2.11	2.29	2.50	.065	.105	.065	.000	1521.80	9589.23
.004857	500.	500.	500.	3	0	0	.00	528.23	10117.46

*SECNO 7.590

7.590	4.00	1527.60	.00	.00	1527.69	.09	1.98	.00	1524.60
2894.0	1649.3	1134.0	110.7	620.4	565.6	57.0	1878.9	712.3	1525.60
2.19	2.66	2.00	1.94	.065	.105	.065	.000	1523.60	9684.39
.004227	450.	430.	420.	2	0	0	.00	529.45	10213.84

*SECNO 7.680

7.680	4.21	1530.01	.00	.00	1530.10	.09	2.41	.00	1528.60
2894.0	908.9	1262.9	722.2	353.7	647.0	247.1	1892.7	718.7	1527.70
2.24	2.57	1.95	2.92	.065	.105	.065	.000	1525.80	9725.67
.005971	480.	480.	500.	3	0	0	.00	619.82	10345.49

*SECNO 7.770

7.770	5.19	1533.09	.00	.00	1533.18	.08	3.08	.00	1531.10
2894.0	654.7	2185.5	53.9	250.2	975.0	28.0	1906.7	725.2	1531.00
2.30	2.62	2.24	1.92	.065	.105	.065	.000	1527.90	9818.95
.006673	480.	490.	500.	4	0	0	.00	552.50	10371.45

*SECNO 7.850

7.850	5.42	1535.32	.00	.00	1535.37	.06	2.19	.00	1533.70
2894.0	316.6	1727.1	850.4	194.7	907.1	415.9	1920.9	731.9	1532.50
2.37	1.63	1.90	2.04	.065	.105	.065	.000	1529.90	9776.15
.003759	460.	440.	460.	3	0	0	.00	740.25	10516.40

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 7.950

7.950	4.35	1536.45	.00	.00	1536.47	.02	1.10	.00	1533.90
1723.0	716.0	832.7	174.3	585.5	776.3	161.0	1938.2	740.0	1534.00
2.49	1.22	1.07	1.08	.065	.105	.065	.000	1532.10	9549.57
.001141	510.	500.	470.	3	0	0	.00	675.11	10224.68

*SECNO 8.040

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .36

8.040	2.64	1537.64	.00	.00	1537.72	.08	1.23	.02	1535.60
1723.0	490.4	1216.2	16.3	185.3	569.0	11.2	1951.4	746.4	1536.50
2.55	2.65	2.14	1.46	.065	.105	.065	.000	1535.00	9696.73
.008622	500.	500.	500.	2	0	0	.00	453.59	10150.32

*SECNO 8.130

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.44

8.130	4.34	1540.44	.00	.00	1540.48	.04	2.76	.00	1539.10
1723.0	144.5	1569.8	8.7	102.0	926.5	9.8	1961.2	751.7	1539.50
2.63	1.42	1.69	.89	.065	.105	.065	.000	1536.10	9715.65
.004162	500.	470.	450.	4	0	0	.00	510.72	10226.37

*SECNO 8.230

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

8.230	2.77	1542.27	.00	.00	1542.29	.02	1.81	.00	1541.50
873.0	197.3	656.6	19.1	184.4	553.6	21.7	1971.7	758.0	1541.00
2.75	1.07	1.19	.88	.065	.105	.065	.000	1539.50	9577.16
.002715	550.	500.	500.	3	0	0	.00	546.99	10124.15

*SECNO 8.300

8.300	2.74	1542.74	.00	.00	1542.74	.00	.44	.00	1541.90
113.0	72.5	40.5	.0	336.7	271.8	.0	1978.7	763.3	1543.00
3.41	.22	.15	.00	.065	.105	.000	.000	1540.00	9646.58
.000057	540.	400.	200.	3	0	0	.00	437.18	10083.76

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     100-Year Floodway - Method 1 Encroachment     Final Run
T2   Water Surface Profile (Culvert losses input with X5 cards)
T3   Wagner Wash FIS

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

    -10        3                                                          1258.33

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     2                 -1
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*PROF 2



CCHV=     .100 CEHV=     .300
*SECNO  .090

3470 ENCROACHMENT STATIONS=     9568.0   10108.0  TYPE=      1  TARGET=      540.000
     .090      6.33   1258.33       .00   1257.33   1259.69      1.36       .00       .00   1254.70
  15717.0        .0    8596.0    7121.0        .0     712.8    1713.6        .0        .0   1254.30
     .00       .00     12.06      4.16      .000      .040      .100      .000   1252.00   9568.00
  .011494        0.        0.        0.         0         0         0       .00    540.00  10108.00


*SECNO  .180

3470 ENCROACHMENT STATIONS=     9730.0   10300.0  TYPE=      1  TARGET=      570.000
     .180      4.94   1264.14   1264.09   1263.66   1265.80      1.66      6.02       .09   1261.80
  15717.0     695.9   10664.0    4357.1     139.0     879.5     941.6      19.6       5.0   1261.00
     .01      5.01     12.13      4.63      .065      .040      .100      .000   1259.20   9730.00
  .018223      590.      470.      330.         5        15         0       .00    570.00  10300.00


*SECNO  .260

3470 ENCROACHMENT STATIONS=     9799.0   10300.0  TYPE=      1  TARGET=      501.000
     .260      5.42   1270.22       .00   1269.61   1271.86      1.64      6.06       .00   1268.10
  15717.0       3.1   12576.2    3137.7       1.7    1110.0     836.4      36.9       9.7   1267.50
     .02      1.80     11.33      3.75      .065      .040      .100      .000   1264.80   9799.00
  .012772      450.      415.      350.         2         0         0       .00    501.00  10300.00


*SECNO  .350

3470 ENCROACHMENT STATIONS=     9900.0   10411.0  TYPE=      1  TARGET=      511.000
     .350      5.52   1276.62       .00   1276.02   1277.93      1.31      6.04       .03   1272.00
  15717.0    1281.5   10818.1    3617.4     213.7    1023.0     826.6      58.5      15.2   1273.60
     .04      6.00     10.57      4.38      .065      .040      .100      .000   1271.10   9900.00
  .012700      490.      480.      450.         3         0         0       .00    511.00  10411.00


*SECNO  .450

3470 ENCROACHMENT STATIONS=     9750.0   10200.0  TYPE=      1  TARGET=      450.000
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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


    .450      5.46   1283.46       .00   1282.56   1284.98      1.52      6.99       .06   1280.50
  15717.0    5708.3    7917.1    2091.6     764.8     651.6     435.2      80.3      20.5   1279.20
     .05      7.46     12.15      4.81      .065      .040      .100      .000   1278.00   9750.00
 .016247      500.      490.      470.         3         0         0       .00    450.00  10200.00


*SECNO  .530

3470 ENCROACHMENT STATIONS=     9849.0   10129.0  TYPE=      1  TARGET=      280.000
    .530      7.01   1288.81       .00   1287.97   1290.79      1.97      5.67       .14   1283.10
  15717.0    4324.4   11322.2      70.4     672.5     894.0      18.4      98.8      24.5   1282.60
     .06      6.43     12.66      3.82      .065      .040      .065      .000   1281.80   9849.00
 .009668      560.      420.      350.         2         0         0       .00    280.00  10129.00


*SECNO  .610

3470 ENCROACHMENT STATIONS=     9800.0   10122.0  TYPE=      1  TARGET=      322.000
    .610      7.29   1292.99       .00   1292.50   1294.88      1.89      4.09       .01   1288.90
  15717.0    3961.6   11753.2       2.2     687.6     955.3       1.7     114.8      27.4   1289.50
     .08      5.76     12.30      1.27      .065      .040      .065      .000   1285.70   9800.00
 .009347      430.      430.      440.         2         0         0       .00    322.00  10122.00


*SECNO  .700

3470 ENCROACHMENT STATIONS=     9850.0   10184.0  TYPE=      1  TARGET=      334.000
    .700      6.50   1298.00       .00   1297.53   1299.84      1.84      4.96       .00   1295.90
  15717.0     302.7   15414.3        .0      90.2    1402.6        .0     132.6      31.1 100000.00
     .09      3.36     10.99       .00      .065      .040      .000      .000   1291.50   9850.00
 .010455      450.      510.      550.         2         0         0       .00    334.00  10184.00


*SECNO  .790

3470 ENCROACHMENT STATIONS=     9838.0   10280.0  TYPE=      1  TARGET=      442.000
    .790      8.37   1303.87       .00   1303.27   1305.51      1.63      5.64       .02   1300.00
  15717.0       7.1    9427.1    6282.8       3.1     777.0     969.1     149.7      35.2   1299.90
     .10      2.25     12.13      6.48      .065      .040      .065      .000   1295.50   9838.00
 .014592      450.      460.      460.         3         0         0       .00    442.00  10280.00
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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .890

3470 ENCROACHMENT STATIONS=     9761.0   10270.0  TYPE=      1  TARGET=      509.000
      .890      6.14   1310.84       .00   1309.94   1312.04      1.20      6.49       .04   1307.10
   15717.0    1713.9    9137.9    4865.2     355.8     858.1     915.3     176.7      41.9   1306.00
      .12      4.82     10.65      5.32      .065      .040      .065      .000   1304.70   9761.00
   .008770      500.      520.      700.         2         0         0       .00    509.00  10270.00


1490 NH CARD USED
*SECNO  .940
1530 MANNINGS N VALUES FOR CHANNEL COMPOSITED

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9873.0   10200.0  TYPE=      1  TARGET=      327.000
      .940      5.40   1313.90       .00   1313.79   1315.88      1.98      3.61       .23   1310.90
   15717.0      95.0   15622.0        .0      14.2    1380.0        .0     189.0      44.8 100000.00
      .13      6.67     11.32       .00      .040      .045      .000      .000   1308.50   9873.00
   .017128      300.      300.      320.         2         0         0       .00    327.00  10200.00


1490 NH CARD USED
*SECNO 1.020

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.65


3470 ENCROACHMENT STATIONS=     9603.0   10183.0  TYPE=      1  TARGET=      580.000
     1.020      7.53   1319.53       .00   1319.16   1320.13       .60      4.11       .14 100000.00
   15717.0        .0   15717.0        .0        .0    2530.4        .0     208.0      49.2 100000.00
      .15       .00      6.21       .00      .000      .050      .000      .000   1312.00   9603.00
   .006311      500.      420.      350.         2         0         0       .00    580.00  10183.00


1490 NH CARD USED
*SECNO 1.120
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .68

3470 ENCROACHMENT STATIONS= 9684.0 10160.0 TYPE= 1 TARGET= 476.000

1.120	5.53	1323.53	.00	1323.17	1324.65	1.12	4.36	.16	100000.00
15717.0	.0	15616.2	100.8	.0	1836.2	24.1	232.7	55.2	1321.00
.16	.00	8.50	4.18	.000	.051	.065	.000	1318.00	9684.00
.013476	500.	490.	480.	3	0	0	.00	476.00	10160.00

*SECNO 1.210

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 9744.0 10077.0 TYPE= 1 TARGET= 333.000

1.210	6.40	1328.80	.00	1328.69	1330.51	1.71	5.69	.18	1326.20
15717.0	.4	15419.3	297.3	.5	1456.6	72.5	251.7	59.7	1326.40
.18	.75	10.59	4.10	.065	.040	.065	.000	1322.40	9744.00
.010099	500.	490.	480.	3	0	0	.00	333.00	10077.00

1490 NH CARD USED
*SECNO 1.300

3470 ENCROACHMENT STATIONS= 9763.0 10097.0 TYPE= 1 TARGET= 334.000

1.300	6.11	1333.71	.00	1333.15	1335.26	1.55	4.74	.02	1330.00
15717.0	182.9	14299.9	1234.2	35.9	1384.4	224.8	269.6	63.5	1328.00
.19	5.09	10.33	5.49	.065	.042	.065	.000	1327.60	9763.00
.009252	510.	490.	490.	2	0	0	.00	334.00	10097.00

*SECNO 1.390

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 9852.0 10066.0 TYPE= 1 TARGET= 214.000

1.390	7.14	1339.04	1339.04	1339.02	1341.92	2.88	5.14	.40	1335.50
15717.0	4.5	13875.6	1836.9	2.4	975.1	240.0	285.0	66.4	1332.50
.20	1.85	14.23	7.65	.065	.040	.065	.000	1331.90	9852.00
.013175	500.	470.	460.	1	8	0	.00	214.00	10066.00

1490 NH CARD USED
*SECNO 1.480

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

3470 ENCROACHMENT STATIONS= 9848.0 10048.0 TYPE= 1 TARGET= 200.000

1.480	9.52	1343.92	.00	1343.83	1345.48	1.56	3.43	.13	1338.10
15351.0	79.7	15168.7	102.5	26.6	1505.5	33.2	299.4	68.6	1338.00
.21	3.00	10.08	3.09	.065	.042	.065	.000	1334.40	9848.00
.004899	470.	450.	460.	3	0	0	.00	200.00	10048.00

*SECNO 1.580

3470 ENCROACHMENT STATIONS= 9920.0 10234.0 TYPE= 1 TARGET= 314.000

1.580	7.00	1347.10	.00	1346.15	1348.39	1.30	2.89	.03	1342.90
15351.0	1052.5	14297.9	.6	210.3	1525.5	.7	319.1	71.6	1345.40
.23	5.01	9.37	.86	.065	.040	.065	.000	1340.10	9920.00
.006372	510.	520.	540.	2	0	0	.00	314.00	10234.00

*SECNO 1.670

3470 ENCROACHMENT STATIONS= 9775.0 10237.0 TYPE= 1 TARGET= 462.000

1.670	5.74	1350.84	.00	1350.46	1352.22	1.38	3.80	.03	1348.10
15351.0	1894.5	13455.1	1.5	456.5	1350.5	1.3	339.6	76.1	1347.50
.24	4.15	9.96	1.14	.065	.040	.065	.000	1345.10	9775.00
.009158	520.	500.	500.	2	0	0	.00	462.00	10237.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1.770

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 9750.0 10320.0 TYPE= 1 TARGET= 570.000

1.770	6.17	1355.37	.00	1355.51	1356.44	1.07	4.19	.03	1352.00
15351.0	1266.8	14084.2	.0	382.6	1633.5	.0	362.6	82.3	100000.00
.26	3.31	8.62	.00	.065	.040	.000	.000	1349.20	9750.00
.006935	510.	530.	550.	2	0	0	.00	563.50	10320.00

*SECNO 1.870

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 9780.0 10155.0 TYPE= 1 TARGET= 375.000

1.870	5.46	1359.26	.00	1359.07	1360.98	1.72	4.35	.19	1357.30
15351.0	270.4	13143.1	1937.5	72.5	1180.5	335.3	383.3	87.7	1355.40
.27	3.73	11.13	5.78	.065	.040	.065	.000	1353.80	9780.00
.011247	500.	500.	490.	2	0	0	.00	375.00	10155.00

*SECNO 1.950

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.43

3470 ENCROACHMENT STATIONS= 9810.0 10350.0 TYPE= 1 TARGET= 540.000

1.950	6.73	1363.73	.00	1362.86	1364.39	.66	3.30	.11	1360.00
15351.0	.4	8743.5	6607.0	.7	1157.3	1367.1	403.5	92.2	1359.60
.29	.56	7.55	4.83	.065	.040	.065	.000	1357.00	9810.00
.005535	460.	440.	410.	2	0	0	.00	540.00	10350.00

*SECNO 2.050

3470 ENCROACHMENT STATIONS= 9700.0 10250.0 TYPE= 1 TARGET= 550.000

2.050	5.38	1367.08	.00	1366.34	1368.23	1.14	3.69	.14	1364.30
15351.0	1406.7	10595.9	3348.4	252.4	1094.4	641.5	428.3	98.2	1363.70
.31	5.57	9.68	5.22	.065	.040	.065	.000	1361.70	9700.00
.011097	610.	500.	440.	2	0	0	.00	550.00	10250.00

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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 2.140

3470 ENCROACHMENT STATIONS=     9550.0   10200.0  TYPE=      1  TARGET=      650.000
    2.140      6.01   1371.71       .00   1370.78   1372.44       .74      4.18       .04   1368.60
  15351.0    2553.3   10494.8    2302.9     604.0    1342.0     547.1     454.1     105.1   1368.30
     .33      4.23      7.82      4.21      .065      .040      .065      .000   1365.70   9550.00
 .006565      450.      490.      560.         3         0         0       .00    650.00  10200.00


*SECNO 2.230

3470 ENCROACHMENT STATIONS=     9650.0   10300.0  TYPE=      1  TARGET=      650.000
    2.230      6.03   1374.93       .00   1374.07   1375.87       .94      3.37       .06   1372.10
  15351.0    2701.6    9453.5    3195.9     596.6    1015.2     775.6     480.5     112.1   1371.80
     .35      4.53      9.31      4.12      .065      .040      .065      .000   1368.90   9650.00
 .007711      480.      480.      450.         3         0         0       .00    650.00  10300.00


*SECNO 2.330

3470 ENCROACHMENT STATIONS=     9700.0   10250.0  TYPE=      1  TARGET=      550.000
    2.330      6.75   1378.65       .00   1377.77   1379.46       .81      3.57       .01   1373.90
  12861.0    2569.9    7101.6    3189.5     620.7     794.5     759.7     507.7     119.3   1374.40
     .37      4.14      8.94      4.20      .065      .040      .065      .000   1371.90   9700.00
 .006128      480.      510.      560.         1         0         0       .00    550.00  10250.00


*SECNO 2.430

3470 ENCROACHMENT STATIONS=     9950.0   10550.0  TYPE=      1  TARGET=      600.000
    2.430      5.42   1382.22       .00   1381.52   1382.93       .71      3.46       .01   1380.00
  12861.0        .0    5956.2    6904.8        .0     695.4    1494.4     533.0     126.0   1379.00
     .39       .00      8.56      4.62      .000      .040      .065      .000   1376.80   9950.00
 .007737      500.      500.      510.         1         0         0       .00    600.00  10550.00


1490 NH CARD USED
*SECNO 2.520

3470 ENCROACHMENT STATIONS=     9950.0   10550.0  TYPE=      1  TARGET=      600.000
    2.520      6.03   1386.03       .00   1385.74   1386.76       .73      3.82       .01   1382.00
  12861.0    6595.4    4969.6    1296.0     998.9     632.9     433.4     559.7     133.6   1384.20
     .41      6.60      7.85      2.99      .052      .040      .065      .000   1380.00   9950.00
 .006610      510.      510.      590.         2         0         0       .00    600.00  10550.00
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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


1490 NH CARD USED
*SECNO 2.620

3470 ENCROACHMENT STATIONS=     9866.0   10406.0  TYPE=      1  TARGET=      540.000
     2.620      5.40   1389.50       .00   1389.05   1390.29       .79      3.52       .02   1387.20
   12861.0    7719.2    5140.7       1.1    1269.6     607.2       1.0     582.1     140.0   1387.50
       .43      6.08      8.47      1.08      .048      .040      .065      .000   1384.10   9866.00
   .007578      500.      500.      450.         1         0         0       .00    540.00  10406.00


*SECNO 2.710

3470 ENCROACHMENT STATIONS=     9725.0   10215.0  TYPE=      1  TARGET=      490.000
     2.710      5.42   1393.32       .00   1392.95   1394.07       .76      3.78       .00   1390.00
   12363.0    7126.4    5022.7     213.9    1350.3     562.1      54.2     603.3     145.7   1390.30
       .45      5.28      8.94      3.94      .065      .040      .065      .000   1387.90   9725.00
   .008196      480.      480.      480.         2         0         0       .00    490.00  10215.00


*SECNO 2.800

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9600.0   10100.0  TYPE=      1  TARGET=      500.000
     2.800      7.08   1397.08       .00   1396.50   1398.53      1.45      4.25       .21   1395.40
   12363.0    2394.9    9485.9     482.2     634.3     876.5     117.2     623.9     151.4   1394.00
       .47      3.78     10.82      4.11      .065      .040      .065      .000   1390.00   9600.00
   .008830      500.      500.      500.         1         0         0       .00    500.00  10100.00


*SECNO 2.900

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.48


3470 ENCROACHMENT STATIONS=     9750.0   10290.0  TYPE=      1  TARGET=      540.000
     2.900      6.80   1401.30       .00   1400.34   1401.79       .49      3.16       .10   1397.90
   12363.0      17.3    7842.8    4502.9       9.1    1225.8    1159.1     649.7     158.0   1398.10
       .50      1.90      6.40      3.88      .065      .040      .065      .000   1394.50   9750.00
   .004015      520.      540.      610.         2         0         0       .00    540.00  10290.00
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 2.990

3470 ENCROACHMENT STATIONS=     9847.0   10400.0  TYPE=      1  TARGET=      553.000
     2.990      6.07   1403.57       .00   1402.67   1404.07       .50      2.27       .00 100000.00
   12363.0        .0    6309.5    6053.5        .0     952.6    1366.3     676.8     164.3   1400.00
       .52       .00      6.62      4.43      .000      .040      .065      .000   1397.50   9847.00
   .005229      480.      490.      510.         3         0         0       .00    553.00  10400.00


*SECNO 3.090

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .60


3470 ENCROACHMENT STATIONS=     9880.0   10505.0  TYPE=      1  TARGET=      625.000
     3.090      4.75   1407.35       .00   1407.12   1408.32       .97      4.11       .14   1404.10
   12363.0     537.7    5853.9    5971.3     129.8     591.3    1055.8     700.3     171.0   1404.30
       .54      4.14      9.90      5.66      .065      .040      .065      .000   1402.60   9880.00
   .014747      500.      500.      500.         3         0         0       .00    625.00  10505.00


*SECNO 3.180

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.76


3470 ENCROACHMENT STATIONS=     9900.0   10560.0  TYPE=      1  TARGET=      660.000
     3.180      7.20   1411.20       .00   1410.18   1411.70       .50      3.33       .05   1408.20
   12363.0     628.8    3798.8    7935.3     206.1     449.5    2016.4     721.8     177.3   1406.20
       .56      3.05      8.45      3.94      .065      .040      .065      .000   1404.00   9900.00
   .004756      470.      470.      400.         2         0         0       .00    660.00  10560.00


*SECNO 3.270

3470 ENCROACHMENT STATIONS=     9875.0   10525.0  TYPE=      1  TARGET=      650.000
     3.270      6.10   1413.60       .00   1412.75   1414.19       .59      2.46       .02   1409.80
   12363.0     875.6    7571.9    3915.5     251.4    1044.6    1021.0     748.9     184.4   1412.20
       .58      3.48      7.25      3.83      .065      .040      .065      .000   1407.50   9875.00
   .005602      530.      500.      450.         4         0         0       .00    650.00  10525.00
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3.370

3470 ENCROACHMENT STATIONS= 9950.0 10600.0 TYPE= 1 TARGET= 650.000

3.370	5.88	1416.98	.00	1416.04	1417.54	.55	3.34	.00	1413.50
12363.0	90.5	6463.3	5809.2	26.2	919.4	1287.6	776.8	192.4	1414.00
.61	3.45	7.03	4.51	.065	.040	.065	.000	1411.10	9950.00
.007247	490.	500.	570.	3	0	0	.00	650.00	10600.00

*SECNO 3.430

3470 ENCROACHMENT STATIONS= 9900.0 10550.0 TYPE= 1 TARGET= 650.000

3.430	6.10	1419.20	.00	1418.20	1419.71	.51	2.17	.00	1416.20
12363.0	540.1	5104.0	6718.9	155.0	683.9	1636.6	795.1	197.4	1416.70
.63	3.48	7.46	4.11	.065	.040	.065	.000	1413.10	9900.00
.005659	370.	350.	330.	1	0	0	.00	650.00	10550.00

*SECNO 3.510

3470 ENCROACHMENT STATIONS= 9950.0 10575.0 TYPE= 1 TARGET= 625.000

3.510	5.86	1421.76	.00	1421.01	1422.53	.76	2.74	.08	1418.90
12363.0	44.2	5398.5	6920.3	14.9	573.9	1592.0	817.7	203.6	1418.20
.64	2.97	9.41	4.35	.065	.040	.065	.000	1415.90	9950.00
.007458	400.	430.	420.	2	0	0	.00	625.00	10575.00

*SECNO 3.600

3470 ENCROACHMENT STATIONS= 9905.0 10530.0 TYPE= 1 TARGET= 625.000

3.600	6.58	1424.58	.00	1423.59	1425.27	.69	2.74	.01	1422.20
10964.0	595.1	6213.5	4155.4	201.4	745.5	1212.2	840.1	210.0	1421.50
.66	2.95	8.33	3.43	.065	.040	.065	.000	1418.00	9905.00
.004937	450.	450.	450.	2	0	0	.00	625.00	10530.00

*SECNO 3.700

3470 ENCROACHMENT STATIONS= 9950.0 10425.0 TYPE= 1 TARGET= 475.000

3.700	6.36	1427.16	.00	1426.31	1428.07	.91	2.73	.07	1424.50
10964.0	230.7	8537.1	2196.2	79.0	1003.6	665.4	863.6	216.7	1424.80
.68	2.92	8.51	3.30	.065	.040	.065	.000	1420.80	9950.00
.005539	520.	520.	530.	3	0	0	.00	475.00	10425.00

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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 3.790

3470 ENCROACHMENT STATIONS=     9900.0   10325.0  TYPE=      1  TARGET=      425.000
    3.790      6.29   1430.39       .00   1429.62   1431.47      1.08      3.35       .05   1426.70
  10964.0    1287.7    8554.6    1121.7     324.8     928.8     291.2     883.7     222.3   1426.30
     .70      3.97      9.21      3.85      .065      .040      .065      .000   1424.10   9900.00
 .007556      480.      510.      600.         2         0         0       .00    425.00  10325.00


*SECNO 3.910

3470 ENCROACHMENT STATIONS=     9750.0   10200.0  TYPE=      1  TARGET=      450.000
    3.910      6.30   1434.30       .00   1433.53   1435.00       .69      3.48       .04   1430.10
  10964.0     196.2    9472.2    1295.6      59.6    1334.7     440.2     908.4     228.8   1430.00
     .73      3.29      7.10      2.94      .065      .040      .065      .000   1428.00   9750.00
 .004377      530.      600.      800.         1         0         0       .00    450.00  10200.00


*SECNO 3.990

202 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.44


3470 ENCROACHMENT STATIONS=     9659.0   10210.0  TYPE=      1  TARGET=      551.000
    3.990      7.64   1435.94       .00   1435.24   1436.32       .38      1.29       .03   1432.50
  10964.0       2.6   10228.1     733.3       3.1    2019.1     387.7     929.7     233.8   1433.50
     .75       .84      5.07      1.89      .065      .040      .065      .000   1428.30   9659.00
 .002100      440.      440.      430.         3         0         0       .00    551.00  10210.00


*SECNO 4.040

3470 ENCROACHMENT STATIONS=     9670.0   10260.0  TYPE=      1  TARGET=      590.000
    4.040      6.14   1436.44       .00   1435.97   1437.00       .56       .63       .06   1434.20
  10358.0     127.2    9766.4     464.4      65.6    1581.3     286.0     942.0     237.2   1433.00
     .76      1.94      6.18      1.62      .065      .040      .065      .000   1430.30   9670.00
 .003368      200.      240.      290.         2         0         0       .00    590.00  10260.00


CCHV=     .300 CEHV=     .500
*SECNO 4.070

3470 ENCROACHMENT STATIONS=     9680.0   10354.0  TYPE=      1  TARGET=      674.000
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1440.00 ELREA=      1440.00

    4.070      4.83   1437.23       .00   1437.05   1437.57       .35       .51       .06   1436.00
  10358.0        .0   10358.0        .0        .0    2196.4        .0     949.1     239.4 100000.00
      .77       .00      4.72       .00      .000      .040      .000      .000   1432.40   9680.00
  .003367      150.      150.      150.         2         0         0       .00    674.00  10354.00


*SECNO 4.071

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE, NRD=  88 MIN ELTRD=  1442.10 MAX ELLC=  1445.40

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9679.0   10328.0  TYPE=      1  TARGET=      649.000
    4.071      5.36   1437.74   1437.74   1437.72   1439.74      2.00       .03       .83   1444.22
  10358.0        .0   10358.0        .0        .0     913.3        .0     949.5     239.5 100000.00
      .77       .00     11.34       .00      .000      .012      .000      .000   1432.38   9680.03
  .002750       10.       10.       10.        20        12         0    -47.98    242.05  10327.27


*SECNO 4.100
 WATER EL=X5 CARD=   1440.821

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.84


3470 ENCROACHMENT STATIONS=     9579.0   10378.0  TYPE=      1  TARGET=      799.000
    4.100      7.92   1440.82       .00   1440.80   1441.48       .66       .13       .40   1443.10
  10358.0        .0   10358.0        .0        .0    1591.0        .0     954.4     240.4 100000.00
      .78       .00      6.51       .00      .000      .012      .000      .000   1432.90   9579.30
  .000342      170.      170.      170.         0         0         0       .00    243.39  10377.55
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.110

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .18

3470 ENCROACHMENT STATIONS= 9560.0 10378.0 TYPE= 1 TARGET= 818.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1442.10 ELREA= 1442.10

4.110	6.00	1440.50	.00	1440.47	1441.82	1.31	.01	.33	1444.70
10358.0	.0	10358.0	.0	.0	1126.2	.0	954.7	240.5	100000.00
.78	.00	9.20	.00	.000	.040	.000	.000	1434.50	9579.55
.010745	10.	10.	10.	2	0	0	.00	242.72	10377.36

CCHV= .100 CEHV= .300
*SECNO 4.200

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.91

3470 ENCROACHMENT STATIONS= 9700.0 10300.0 TYPE= 1 TARGET= 600.000

4.200	7.27	1443.87	.00	1443.69	1444.30	.43	2.40	.09	1439.80
10358.0	2544.6	4643.6	3169.8	857.4	650.1	1040.3	974.1	244.9	1439.00
.81	2.97	7.14	3.05	.065	.040	.065	.000	1436.60	9700.00
.002936	600.	490.	290.	2	0	0	.00	600.00	10300.00

*SECNO 4.290

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

3470 ENCROACHMENT STATIONS= 9700.0 10150.0 TYPE= 1 TARGET= 450.000

4.290	6.28	1445.68	.00	1445.28	1446.74	1.06	2.25	.19	1443.90
10358.0	1922.2	7764.6	671.3	514.3	835.1	183.8	997.7	251.0	1443.10
.83	3.74	9.30	3.65	.065	.040	.065	.000	1439.40	9700.00
.007620	530.	500.	480.	2	0	0	.00	450.00	10150.00

*SECNO 4.390

3470 ENCROACHMENT STATIONS= 9750.0 10150.0 TYPE= 1 TARGET= 400.000

4.390	6.19	1449.09	.00	1448.51	1449.85	.76	3.09	.03	1445.50
10358.0	753.1	6745.1	2859.8	195.1	821.0	736.0	1016.5	255.9	1445.50
.85	3.86	8.22	3.89	.065	.040	.065	.000	1442.90	9750.00
.005098	500.	500.	500.	2	0	0	.00	400.00	10150.00

*SECNO 4.470

3470 ENCROACHMENT STATIONS= 9825.0 10200.0 TYPE= 1 TARGET= 375.000

4.470	6.72	1451.82	.00	1450.95	1452.70	.87	2.81	.03	1448.20
10358.0	1835.6	5324.9	3197.5	401.7	569.4	644.7	1034.9	260.1	1447.60
.87	4.57	9.35	4.96	.065	.040	.065	.000	1445.10	9825.00
.007018	450.	470.	490.	2	0	0	.00	375.00	10200.00

*SECNO 4.570

3470 ENCROACHMENT STATIONS= 9920.0 10250.0 TYPE= 1 TARGET= 330.000

4.570	8.16	1454.66	.00	1453.87	1455.34	.68	2.63	.02	1450.30
8904.0	923.9	5024.3	2955.8	248.7	615.1	794.7	1054.0	264.2	1449.80
.89	3.71	8.17	3.72	.065	.040	.065	.000	1446.50	9920.00
.003784	510.	510.	510.	2	0	0	.00	330.00	10250.00

*SECNO 4.670

3470 ENCROACHMENT STATIONS= 9810.0 10140.0 TYPE= 1 TARGET= 330.000

4.670	7.97	1456.67	.00	1455.91	1457.37	.70	2.02	.01	1453.20
8904.0	2735.5	4710.5	1458.0	658.5	556.0	411.4	1073.2	268.0	1452.60
.91	4.15	8.47	3.54	.065	.040	.065	.000	1448.70	9810.00
.004106	570.	520.	450.	3	0	0	.00	330.00	10140.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.760

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .67

3470 ENCROACHMENT STATIONS= 9825.0 10125.0 TYPE= 1 TARGET= 300.000

4.760	7.76	1458.96	.00	1458.53	1460.51	1.55	2.88	.25	1454.30
8904.0	2782.9	4744.8	1376.2	554.5	368.2	289.8	1089.2	271.6	1455.90
.93	5.02	12.89	4.75	.065	.040	.065	.000	1451.20	9825.00
.009110	490.	490.	490.	3	0	0	.00	300.00	10125.00

*SECNO 4.860

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.64

3470 ENCROACHMENT STATIONS= 9820.0 10175.0 TYPE= 1 TARGET= 355.000

4.860	8.60	1462.60	.00	1461.62	1463.19	.58	2.58	.10	1458.00
8904.0	2276.4	4512.1	2115.5	636.1	575.2	591.4	1106.2	275.3	1458.50
.95	3.58	7.84	3.58	.065	.040	.065	.000	1454.00	9820.00
.003389	450.	500.	540.	2	0	0	.00	355.00	10175.00

*SECNO 4.950

3470 ENCROACHMENT STATIONS= 9850.0 10150.0 TYPE= 1 TARGET= 300.000

4.950	6.61	1464.41	.00	1463.67	1465.18	.77	1.94	.06	1460.50
8904.0	580.9	6231.2	2091.9	167.4	779.0	519.3	1124.9	279.0	1459.60
.97	3.47	8.00	4.03	.065	.040	.065	.000	1457.80	9850.00
.004502	450.	500.	530.	3	0	0	.00	300.00	10150.00

*SECNO 5.040

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 9900.0 10350.0 TYPE= 1 TARGET= 450.000

5.040	6.97	1466.87	.00	1466.01	1467.71	.83	2.51	.02	1465.30
8904.0	38.3	4024.3	4841.4	28.1	413.2	1090.9	1140.3	282.8	1463.20
.99	1.36	9.74	4.44	.065	.040	.065	.000	1459.90	9900.00
.007006	450.	460.	440.	2	0	0	.00	448.15	10350.00

*SECNO 5.130

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 9880.0 10330.0 TYPE= 1 TARGET= 450.000

5.130	7.70	1469.90	.00	1468.99	1470.57	.67	2.84	.02	1466.90
8079.0	200.2	3524.7	4354.1	90.5	394.4	1127.7	1158.0	287.8	1466.80
1.01	2.21	8.94	3.86	.065	.040	.065	.000	1462.20	9880.00
.004802	490.	490.	490.	2	0	0	.00	438.70	10330.00

*SECNO 5.230

3470 ENCROACHMENT STATIONS= 9900.0 10150.0 TYPE= 1 TARGET= 250.000

5.230	6.66	1472.26	.00	1471.81	1473.16	.90	2.53	.07	1468.20
8079.0	560.3	5739.9	1778.8	150.4	661.0	432.3	1175.4	292.1	1467.10
1.03	3.73	8.68	4.12	.065	.040	.065	.000	1465.60	9900.00
.004890	550.	500.	550.	2	0	0	.00	250.00	10150.00

*SECNO 5.320

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 9800.0 10050.0 TYPE= 1 TARGET= 250.000

5.320	7.01	1474.91	.00	1474.38	1476.53	1.62	3.15	.22	1472.30
8079.0	2235.9	5782.2	60.9	498.8	492.0	17.4	1187.8	294.8	1471.50
1.04	4.48	11.75	3.49	.065	.040	.065	.000	1467.90	9800.00
.008994	450.	500.	460.	2	0	0	.00	250.00	10050.00

*SECNO 5.420

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.89

3470 ENCROACHMENT STATIONS= 9850.0 10100.0 TYPE= 1 TARGET= 250.000

5.420	7.55	1478.15	.00	1477.29	1478.77	.62	2.14	.10	1472.20
8079.0	411.4	6935.7	731.9	145.8	1028.0	260.1	1201.6	297.6	1473.70
1.07	2.82	6.75	2.81	.065	.040	.065	.000	1470.60	9850.00
.002529	470.	500.	500.	2	0	0	.00	250.00	10100.00

*SECNO 5.510

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .68

70 ENCROACHMENT STATIONS= 9800.0 10070.0 TYPE= 1 TARGET= 270.000

5.510	7.81	1479.81	.00	1479.16	1480.62	.81	1.79	.06	1475.30
8079.0	2197.9	4707.4	1173.7	507.2	542.9	254.5	1217.3	300.6	1474.00
1.09	4.33	8.67	4.61	.065	.040	.065	.000	1472.00	9800.00
.005470	500.	500.	500.	3	0	0	.00	270.00	10070.00

*SECNO 5.600

3470 ENCROACHMENT STATIONS= 9850.0 10150.0 TYPE= 1 TARGET= 300.000

5.600	6.68	1482.28	.00	1481.39	1483.21	.93	2.55	.04	1479.90
7225.0	495.8	5872.8	856.5	137.5	696.3	271.7	1229.6	303.5	1479.00
1.10	3.61	8.43	3.15	.065	.040	.065	.000	1475.60	9850.00
.005987	450.	450.	430.	2	0	0	.00	300.00	10150.00

*SECNO 5.690

3470 ENCROACHMENT STATIONS= 9875.0 10125.0 TYPE= 1 TARGET= 250.000

5.690	7.22	1485.12	.00	1484.75	1486.17	1.05	2.92	.04	1482.50
7225.0	244.8	6220.4	759.8	71.3	709.9	241.0	1241.9	306.6	1481.80
1.12	3.43	8.76	3.15	.065	.040	.065	.000	1477.90	9875.00
.005693	540.	500.	490.	2	0	0	.00	250.00	10125.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5.790

3470 ENCROACHMENT STATIONS= 9875.0 10125.0 TYPE= 1 TARGET= 250.000

5.790	8.83	1487.93	.00	1487.37	1489.18	1.25	2.95	.06	1484.50
7225.0	1016.3	4976.1	1232.5	268.2	474.1	315.2	1253.8	309.5	1483.70
1.14	3.79	10.50	3.91	.065	.040	.065	.000	1479.10	9875.00
.006107	500.	500.	500.	2	0	0	.00	250.00	10125.00

*SECNO 5.880

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 9875.0 10125.0 TYPE= 1 TARGET= 250.000

5.880	10.73	1491.03	.00	1490.15	1491.45	.42	2.20	.08	1486.30
7225.0	1497.4	3698.6	2028.9	418.4	597.8	493.4	1268.1	312.3	1484.00
1.16	3.58	6.19	4.11	.065	.060	.065	.000	1480.30	9875.00
.003468	510.	490.	460.	2	0	0	.00	250.00	10125.00

*SECNO 5.980

3470 ENCROACHMENT STATIONS= 9820.0 10130.0 TYPE= 1 TARGET= 310.000

5.980	10.76	1492.86	.00	1491.86	1493.25	.39	1.80	.00	1488.40
7225.0	2228.5	3371.6	1624.9	629.7	541.5	433.5	1286.1	315.5	1488.50
1.19	3.54	6.23	3.75	.065	.060	.065	.000	1482.10	9820.00
.003656	420.	500.	600.	2	0	0	.00	310.00	10130.00

*SECNO 6.070

3470 ENCROACHMENT STATIONS= 9875.0 10125.0 TYPE= 1 TARGET= 250.000

6.070	10.70	1494.80	.00	1493.95	1495.47	.66	2.13	.08	1491.20
6735.0	843.1	4008.0	1884.0	258.0	518.7	417.5	1301.5	318.5	1489.40
1.21	3.27	7.73	4.51	.065	.060	.065	.000	1484.10	9875.00
.005493	450.	490.	500.	2	0	0	.00	250.00	10125.00

*SECNO 6.150

3470 ENCROACHMENT STATIONS= 9850.0 10150.0 TYPE= 1 TARGET= 300.000

6.150	12.27	1496.87	.00	1495.90	1497.23	.36	1.73	.03	1491.70
6735.0	1619.5	3084.2	2031.2	526.7	508.0	569.6	1315.7	321.4	1492.70
1.24	3.07	6.07	3.57	.065	.060	.065	.000	1484.60	9850.00
.002957	470.	440.	420.	2	0	0	.00	300.00	10150.00

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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 6.220

3470 ENCROACHMENT STATIONS=     9850.0   10150.0  TYPE=      1  TARGET=      300.000
     6.220     10.63   1497.83       .00   1497.00   1498.02       .19       .77       .02   1491.90
    5416.0    1250.9    3458.7     706.4     516.9     870.8     316.3    1329.5     323.9   1494.00
      1.27      2.42      3.97      2.23      .065      .060      .065      .000   1487.20   9850.00
   .001522      440.      360.      280.         2         0         0       .00    300.00  10150.00


CCHV=     .300 CEHV=     .500
*SECNO 6.270

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .53


3470 ENCROACHMENT STATIONS=     9900.0   10100.0  TYPE=      1  TARGET=      200.000
     6.270      7.48   1498.18       .00   1497.49   1498.71       .53       .52       .17   1498.90
    3446.0        .0    3446.0        .0        .0     589.5        .0    1337.7     325.3   1498.90
      1.28       .00      5.85       .00      .000      .040      .000      .000   1490.70   9960.01
   .002158      400.      290.      260.         2         0         0       .00     79.98  10039.99


*SECNO 6.272

3301 HV CHANGED MORE THAN HVINS


3370 NORMAL BRIDGE, NRD=  44 MIN ELTRD=  1498.89 MAX ELLC=  1498.51


3470 ENCROACHMENT STATIONS=     9900.0   10100.0  TYPE=      1  TARGET=      200.000
     6.272      7.37   1497.77       .00   1497.23   1499.16      1.39       .02       .43   1498.51
    3446.0        .0    3446.0        .0        .0     364.3        .0    1337.8     325.3   1498.51
      1.29       .00      9.46       .00      .000      .012      .000      .000   1490.40   9960.01
   .002907       10.       10.       10.         2         0         0   -205.25     77.90  10037.91


*SECNO 6.300
 WATER EL=X5 CARD=   1499.894

3370 NORMAL BRIDGE, NRD=  44 MIN ELTRD=  1498.89 MAX ELLC=  1499.64
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=     9900.0   10100.0  TYPE=      1  TARGET=      200.000
     6.300      8.36   1499.89   1495.66   1499.35   1501.05      1.15       .43       .07   1499.64
    3446.0       4.7    3353.6      87.7       8.1     384.7      23.2    1339.0     325.7   1499.64
      1.29       .58      8.72      3.79      .040      .012      .012      .000   1491.53   9900.00
   .003511      136.      136.      136.         0        15         0   -262.06    200.00  10100.00


*SECNO 6.303

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.01


3470 ENCROACHMENT STATIONS=     9900.0   10100.0  TYPE=      1  TARGET=      200.000
     6.303      9.52   1501.05       .00   1500.18   1501.33       .28       .02       .26   1499.64
    3446.0      99.6    3210.6     135.8      77.5     736.9      94.8    1339.2     325.8   1499.64
      1.29      1.28      4.36      1.43      .040      .040      .040      .000   1491.53   9900.00
   .000873       10.       10.       10.         3         0         0       .00    200.00  10100.00


CCHV=     .100 CEHV=     .300
*SECNO 6.350

3470 ENCROACHMENT STATIONS=     9800.0   10200.0  TYPE=      1  TARGET=      400.000
     6.350     10.26   1501.46       .00   1500.51   1501.51       .06       .17       .02   1497.10
    3446.0     843.4    1901.9     700.7     652.4     837.3     520.4    1347.6     327.5   1496.30
      1.33      1.29      2.27      1.35      .065      .060      .065      .000   1491.20   9800.00
   .000533      240.      240.      290.         2         0         0       .00    400.00  10200.00


*SECNO 6.400

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .56


3470 ENCROACHMENT STATIONS=     9900.0   10250.0  TYPE=      1  TARGET=      350.000
     6.400      8.02   1501.62       .00   1500.75   1501.76       .14       .22       .03   1498.80
    3446.0      72.5    1753.3    1620.2      69.1     474.3     738.4    1357.2     329.7   1496.20
      1.35      1.05      3.70      2.19      .065      .060      .065      .000   1493.60   9900.00
   .001686      220.      250.      280.         1         0         0       .00    350.00  10250.00
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 6.490

3470 ENCROACHMENT STATIONS= 9950.0 10150.0 TYPE= 1 TARGET= 200.000

6.490	7.95	1502.65	.00	1502.25	1502.91	.26	1.11	.03	1500.90
3446.0	184.2	2776.3	485.5	73.0	638.6	194.6	1370.1	333.0	1499.00
1.39	2.52	4.35	2.50	.065	.060	.065	.000	1494.70	9950.00
.002938	520.	500.	530.	2	0	0	.00	200.00	10150.00

*SECNO 6.590

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 9900.0 10050.0 TYPE= 1 TARGET= 150.000

6.590	8.15	1504.45	.00	1504.12	1505.02	.57	2.01	.10	1504.00
3446.0	2.6	3279.3	164.1	4.3	529.3	53.1	1378.9	334.9	1501.60
1.41	.62	6.20	3.09	.065	.060	.065	.000	1496.30	9900.00
.005508	490.	510.	550.	2	0	0	.00	122.30	10050.00

*SECNO 6.670

3470 ENCROACHMENT STATIONS= 9900.0 10063.0 TYPE= 1 TARGET= 163.000

6.670	8.91	1507.11	.00	1506.65	1507.73	.62	2.69	.01	1504.60
3446.0	406.2	3038.1	1.8	151.8	457.2	1.6	1385.1	336.3	1503.80
1.43	2.68	6.65	1.06	.065	.060	.065	.000	1498.20	9900.00
.006586	400.	450.	500.	2	0	0	.00	163.00	10063.00

*SECNO 6.770

3470 ENCROACHMENT STATIONS= 9950.0 10200.0 TYPE= 1 TARGET= 250.000

6.770	9.56	1509.86	.00	1509.09	1510.28	.42	2.54	.02	1507.20
3446.0	184.4	2183.4	1078.2	71.5	353.5	381.8	1392.1	338.3	1506.40
1.46	2.58	6.18	2.82	.065	.060	.065	.000	1500.30	9950.00
.004945	510.	470.	300.	2	0	0	.00	250.00	10200.00

*SECNO 6.820

3470 ENCROACHMENT STATIONS= 9900.0 10150.0 TYPE= 1 TARGET= 250.000

6.820	9.47	1511.07	.00	1510.17	1511.41	.34	1.12	.01	1508.10
3446.0	399.4	1590.1	1456.6	169.2	264.7	437.0	1396.7	339.7	1507.30
1.47	2.36	6.01	3.33	.065	.060	.065	.000	1501.60	9900.00
.004298	280.	260.	210.	2	0	0	.00	250.00	10150.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 6.900

3470 ENCROACHMENT STATIONS= 9835.0 10110.0 TYPE= 1 TARGET= 275.000

6.900	9.34	1512.64	.00	1511.79	1512.86	.22	1.44	.01	1510.70
3446.0	472.4	1802.8	1170.8	249.3	413.8	348.3	1405.4	342.0	1509.70
1.50	1.90	4.36	3.36	.065	.060	.065	.000	1503.30	9835.00
.002903	300.	400.	460.	2	0	0	.00	275.00	10110.00

*SECNO 6.990

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .45

3470 ENCROACHMENT STATIONS= 9900.0 10125.0 TYPE= 1 TARGET= 225.000

6.990	9.22	1514.62	.00	1514.35	1515.13	.51	2.19	.09	1513.30
2894.0	325.2	1370.0	1198.8	115.1	189.1	286.2	1414.0	344.6	1511.90
1.53	2.83	7.24	4.19	.065	.060	.065	.000	1505.40	9900.00
.009901	450.	470.	480.	2	0	0	.00	225.00	10125.00

*SECNO 7.080

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.59

3470 ENCROACHMENT STATIONS= 9850.0 10075.0 TYPE= 1 TARGET= 225.000

7.080	8.93	1516.43	.00	1515.71	1516.57	.14	1.40	.04	1512.90
2894.0	948.1	1743.9	202.0	452.7	502.4	106.9	1422.7	347.0	1512.60
1.57	2.09	3.47	1.89	.065	.060	.065	.000	1507.50	9850.00
.001481	480.	460.	420.	3	0	0	.00	225.00	10075.00

*SECNO 7.160

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .50

3470 ENCROACHMENT STATIONS= 9900.0 10100.0 TYPE= 1 TARGET= 200.000

7.160	8.73	1517.33	.00	1516.77	1517.73	.40	1.08	.08	1516.10
2894.0	462.0	1641.3	790.7	169.2	270.9	212.8	1430.7	349.0	1513.80
1.59	2.73	6.06	3.72	.065	.060	.065	.000	1508.60	9900.00
.005939	400.	410.	420.	2	0	0	.00	200.00	10100.00

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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 7.200

3470 ENCROACHMENT STATIONS=     9950.0   10104.0  TYPE=      1  TARGET=      154.000
     7.200     10.20   1519.30       .00   1518.62   1519.55       .24      1.80       .02   1514.90
    2894.0     381.6    2512.4        .0      87.6     642.5        .0    1434.7     349.9 100000.00
      1.61      4.36      3.91       .00      .065      .105      .000      .000   1509.10   9950.00
   .008807      150.      250.      370.         3         0         0       .00    154.00  10104.00


*SECNO 7.230

3470 ENCROACHMENT STATIONS=     9965.0   10094.0  TYPE=      1  TARGET=      129.000
     7.230     11.69   1520.69       .00   1520.28   1521.26       .57      1.62       .10   1572.00
    2894.0        .0    2660.3     233.7        .0     424.3      73.3    1436.6     350.4   1520.00
      1.62       .00      6.27      3.19      .000      .105      .065      .000   1509.00   9971.54
   .015768      140.      140.      140.         2         0         0       .00    122.46  10094.00


*SECNO 7.260

02 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.14


3470 ENCROACHMENT STATIONS=     9940.0   10140.0  TYPE=      1  TARGET=      200.000
     7.260      7.92   1522.12       .00   1521.72   1522.24       .13       .94       .04   1516.60
    2894.0        .0    2070.3     823.7        .2     773.9     255.0    1439.2     350.9   1518.00
      1.63       .17      2.68      3.23      .065      .105      .065      .000   1514.20   9940.31
   .003445      250.      150.      130.         3         0         0       .00    199.69  10140.00


*SECNO 7.340

3470 ENCROACHMENT STATIONS=     9790.0   10110.0  TYPE=      1  TARGET=      320.000
     7.340      6.81   1523.21       .00   1522.66   1523.26       .05      1.01       .01   1520.10
    2894.0       6.2    2881.1       6.7       5.6    1573.9       6.1    1451.1     353.3   1519.10
      1.69      1.11      1.83      1.08      .065      .105      .065      .000   1516.40   9790.00
   .001975      450.      400.      370.         3         0         0       .00    320.00  10110.00


*SECNO 7.410

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .70
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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=     9825.0   10125.0  TYPE=      1  TARGET=      300.000
     7.410      4.78   1524.28       .00   1523.55   1524.38       .10      1.10       .02   1520.20
    2894.0     316.9    2087.7     489.4     110.6     902.3     149.7    1463.7     356.1   1521.10
      1.74      2.87      2.31      3.27      .065      .105      .065      .000   1519.50   9825.00
   .004060      440.      400.      380.         2         0         0       .00    300.00  10125.00


*SECNO 7.510

3470 ENCROACHMENT STATIONS=     9782.0   10075.0  TYPE=      1  TARGET=      293.000
     7.510      4.52   1526.32       .00   1525.63   1526.41       .09      2.03       .00   1523.50
    2894.0       1.2    2587.7     305.2       1.4    1097.3     102.7    1477.3     359.5   1522.60
      1.79       .82      2.36      2.97      .065      .105      .065      .000   1521.80   9782.00
   .004068      500.      500.      500.         2         0         0       .00    293.00  10075.00


*SECNO 7.590

3470 ENCROACHMENT STATIONS=     9875.0   10172.0  TYPE=      1  TARGET=      297.000
     7.590      4.53   1528.13       .00   1527.60   1528.26       .13      1.84       .01   1524.60
    2894.0    1404.6    1489.3        .1     411.6     657.5        .2    1488.6     362.5   1525.60
      1.84      3.41      2.26       .32      .065      .105      .065      .000   1523.60   9875.00
   .004413      450.      430.      420.         1         0         0       .00    297.00  10172.00


*SECNO 7.680

3470 ENCROACHMENT STATIONS=     9900.0   10225.0  TYPE=      1  TARGET=      325.000
     7.680      5.07   1530.88       .00   1530.01   1531.00       .13      2.74       .00   1528.60
    2894.0     471.1    2399.7      23.2     131.3     881.6       8.9    1500.1     365.9   1527.70
      1.88      3.59      2.72      2.61      .065      .105      .065      .000   1525.80   9900.00
   .007685      480.      480.      500.         3         0         0       .00    325.00  10225.00


*SECNO 7.770

3470 ENCROACHMENT STATIONS=     9925.0   10345.0  TYPE=      1  TARGET=      420.000
     7.770      5.79   1533.69       .00   1533.09   1533.77       .07      2.76       .01   1531.10
    2894.0     444.4    2449.1        .5     157.8    1189.6        .8    1513.4     370.1   1531.00
      1.94      2.82      2.06       .63      .065      .105      .065      .000   1527.90   9925.00
   .004317      480.      490.      500.         2         0         0       .00    420.00  10345.00
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 7.850

3470 ENCROACHMENT STATIONS=     9950.0   10250.0  TYPE=      1  TARGET=      300.000
     7.850      5.95   1535.85       .00   1535.32   1535.95       .11      2.18       .01   1533.70
    2894.0      53.8    2722.5     117.7      21.5    1053.2      36.6    1525.9     373.7   1532.50
      1.99      2.51      2.59      3.21      .065      .105      .065      .000   1529.90   9950.00
   .005679      460.      440.      460.         2         0         0       .00    300.00  10250.00


*SECNO 7.950

3470 ENCROACHMENT STATIONS=     9800.0   10108.0  TYPE=      1  TARGET=      308.000
     7.950      5.25   1537.35       .00   1536.45   1537.38       .03      1.42       .01   1533.90
    1723.0     423.1    1299.6        .3     244.5     981.4       1.0    1539.3     377.2   1534.00
      2.09      1.73      1.32       .34      .065      .105      .065      .000   1532.10   9800.00
   .001272      510.      500.      470.         3         0         0       .00    308.00  10108.00


*SECNO 8.040

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .49


3470 ENCROACHMENT STATIONS=     9850.0   10135.0  TYPE=      1  TARGET=      285.000
     8.040      3.47   1538.47       .00   1537.64   1538.54       .07      1.14       .01   1535.60
    1723.0      46.4    1660.5      16.1      17.8     794.5       8.1    1551.1     380.6   1536.50
      2.16      2.60      2.09      2.00      .065      .105      .065      .000   1535.00   9850.00
   .005282      500.      500.      500.         2         0         0       .00    285.00  10135.00


*SECNO 8.130

3470 ENCROACHMENT STATIONS=     9839.0   10209.0  TYPE=      1  TARGET=      370.000
     8.130      4.53   1540.63       .00   1540.44   1540.67       .05      2.13       .00   1539.10
    1723.0        .3    1718.2       4.6        .5     994.5       3.7    1560.9     384.2   1539.50
      2.23       .57      1.73      1.25      .065      .105      .065      .000   1536.10   9839.00
   .003938      500.      470.      450.         3         0         0       .00    370.00  10209.00


*SECNO 8.230

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .55
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 9815.0 10090.0 TYPE= 1 TARGET= 275.000

8.230	3.01	1542.51	.00	1542.27	1542.54	.03	1.86	.00	1541.50
873.0	4.1	868.9	.0	3.7	615.8	.0	1570.2	387.9	100000.00
2.33	1.13	1.41	.00	.065	.105	.000	.000	1539.50	9815.00
.003358	550.	500.	500.	2	0	0	.00	275.00	10090.00

*SECNO 8.300

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3470 ENCROACHMENT STATIONS= 9900.0 10100.0 TYPE= 1 TARGET= 200.000

8.300	3.23	1543.23	.00	1542.74	1543.23	.00	.69	.00	1541.90
113.0	9.9	103.1	.0	27.5	358.9	.2	1574.9	390.1	1543.00
2.71	.36	.29	.09	.065	.105	.065	.000	1540.00	9900.00
.000165	540.	400.	200.	3	0	0	.00	200.00	10100.00

THIS RUN EXECUTED 3APR91 6:25:55

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

Wagner Wash FIS

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	.090	1257.33	.00	1258.38	943.22	46.26	6830.67	8840.06	.00	.00	9568.00	9699.30	.00
	.090	1258.33	1.00	1259.69	540.00	.00	8595.99	7121.01	540.00	9568.00	9568.00	9699.30	10108.00
	.180	1263.66	.00	1264.82	818.59	1159.76	8465.39	6091.85	.00	.00	9795.50	10029.20	.00
	.180	1264.14	.48	1265.80	570.00	695.91	10664.03	4357.06	570.00	9730.00	9795.50	10029.20	10300.00
	.260	1269.61	.00	1270.70	783.31	143.41	9800.50	5773.09	.00	.00	9799.80	10049.60	.00
	.260	1270.22	.61	1271.86	501.00	3.06	12576.24	3137.70	501.00	9799.00	9799.80	10049.60	10300.00
	.350	1276.02	.00	1277.05	751.97	2242.05	8793.97	4680.98	.00	.00	9961.30	10216.10	.00
	.350	1276.62	.59	1277.93	511.00	1281.49	10818.12	3617.39	511.00	9900.00	9961.30	10216.10	10411.00
	.450	1282.56	.00	1283.09	1052.98	8332.71	4248.08	3136.21	.00	.00	9935.00	10093.40	.00
	.450	1283.46	.90	1284.98	450.00	5708.32	7917.10	2091.57	450.00	9750.00	9935.00	10093.40	10200.00
*	.530	1287.97	.00	1289.60	602.72	6014.46	9650.55	51.98	.00	.00	9985.50	10123.90	.00
	.530	1288.81	.84	1290.79	280.00	4324.38	11322.24	70.38	280.00	9849.00	9985.50	10123.90	10129.00
	.610	1292.50	.00	1293.79	633.54	5508.87	9727.02	481.11	.00	.00	9971.50	10121.50	.00
	.610	1292.99	.50	1294.88	322.00	3961.57	11753.21	2.22	322.00	9800.00	9971.50	10121.50	10122.00
*	.700	1297.53	.00	1299.08	645.60	2185.26	13531.73	.00	.00	.00	9900.80	10200.00	.00
	.700	1298.00	.47	1299.84	334.00	302.69	15414.30	.00	334.00	9850.00	9900.80	10200.00	10184.00
	.790	1303.27	.00	1304.15	608.82	17.56	6293.69	9405.74	.00	.00	9838.90	10013.60	.00
	.790	1303.87	.60	1305.51	442.00	7.07	9427.11	6282.82	442.00	9838.00	9838.90	10013.60	10280.00
	.890	1309.94	.00	1311.12	647.82	1198.32	7858.65	6660.03	.00	.00	9869.80	10030.00	.00
	.890	1310.84	.90	1312.04	509.00	1713.87	9137.93	4865.19	509.00	9761.00	9869.80	10030.00	10270.00
*	.940	1313.79	.00	1315.88	328.56	79.32	15637.68	.00	.00	.00	9880.90	10202.60	.00
	.940	1313.90	.11	1315.88	327.00	94.95	15622.05	.00	327.00	9873.00	9880.90	10202.60	10200.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	1.020	1319.16	.00	1319.88	582.00	.00	15717.00	.00	.00	.00	9601.50	10187.00	.00
*	1.020	1319.53	.37	1320.13	580.00	.00	15717.00	.00	580.00	9603.00	9601.50	10187.00	10183.00
*	1.120	1323.17	.00	1324.53	478.36	.00	15639.02	77.98	.00	.00	9668.90	10147.90	.00
*	1.120	1323.53	.36	1324.65	476.00	.00	15616.25	100.75	476.00	9684.00	9668.90	10147.90	10160.00
	1.210	1328.69	.00	1329.88	531.17	884.26	13334.95	1497.79	.00	.00	9744.20	10049.00	.00
	1.210	1328.80	.11	1330.51	333.00	.39	15419.29	297.32	333.00	9744.00	9744.20	10049.00	10077.00
	1.300	1333.15	.00	1334.72	421.15	1393.44	13254.78	1068.78	.00	.00	9772.70	10035.10	.00
	1.300	1333.71	.56	1335.26	334.00	182.88	14299.91	1234.22	334.00	9763.00	9772.70	10035.10	10097.00
*	1.390	1339.02	.00	1341.84	234.52	140.89	13756.64	1819.47	.00	.00	9852.70	10011.80	.00
*	1.390	1339.04	.01	1341.92	214.00	4.49	13875.61	1836.90	214.00	9852.00	9852.70	10011.80	10066.00
*	1.480	1343.83	.00	1344.68	531.79	3140.79	12130.97	79.24	.00	.00	9852.60	10037.30	.00
*	1.480	1343.92	.08	1345.48	200.00	79.73	15168.74	102.52	200.00	9848.00	9852.60	10037.30	10048.00
*	1.580	1346.15	.00	1347.10	623.02	4124.40	11158.11	68.49	.00	.00	9962.90	10233.60	.00
	1.580	1347.10	.94	1348.39	314.00	1052.47	14297.95	.58	314.00	9920.00	9962.90	10233.60	10234.00
*	1.670	1350.46	.00	1352.05	610.52	2011.87	13337.04	2.10	.00	.00	9948.70	10236.50	.00
	1.670	1350.84	.38	1352.22	462.00	1894.47	13455.07	1.46	462.00	9775.00	9948.70	10236.50	10237.00
	1.770	1355.51	.00	1356.49	617.20	1327.26	13953.02	70.73	.00	.00	9972.50	10320.00	.00
	1.770	1355.37	-.14	1356.44	563.50	1266.78	14084.21	.00	570.00	9750.00	9972.50	10320.00	10320.00
	1.870	1359.07	.00	1360.23	547.56	202.62	11014.03	4134.35	.00	.00	9818.30	10066.70	.00
	1.870	1359.26	.20	1360.98	375.00	270.38	13143.13	1937.48	375.00	9780.00	9818.30	10066.70	10155.00
	1.950	1362.86	.00	1363.32	814.22	140.50	6187.36	9023.14	.00	.00	9810.20	10066.10	.00
*	1.950	1363.73	.86	1364.39	540.00	.42	8743.55	6607.04	540.00	9810.00	9810.20	10066.10	10350.00
	2.050	1366.34	.00	1367.04	897.64	2598.27	7355.13	5397.60	.00	.00	9769.80	10051.00	.00
	2.050	1367.08	.74	1368.23	550.00	1406.75	10595.86	3348.39	550.00	9700.00	9769.80	10051.00	10250.00
	2.140	1370.78	.00	1371.22	1080.98	4938.47	6956.00	3456.52	.00	.00	9724.30	10044.40	.00
	2.140	1371.71	.92	1372.44	650.00	2553.26	10494.84	2302.90	650.00	9550.00	9724.30	10044.40	10200.00
	2.230	1374.07	.00	1374.67	1060.55	4610.57	6853.20	3887.24	.00	.00	9828.20	10038.40	.00
	2.230	1374.93	.87	1375.87	650.00	2701.63	9453.46	3195.91	650.00	9650.00	9828.20	10038.40	10300.00
	2.330	1377.77	.00	1378.25	1099.41	2199.12	5183.37	5478.50	.00	.00	9879.00	10026.30	.00
	2.330	1378.65	.89	1379.46	550.00	2569.95	7101.57	3189.48	550.00	9700.00	9879.00	10026.30	10250.00
	2.430	1381.52	.00	1382.15	1220.65	26.86	5157.32	7676.82	.00	.00	9950.00	10111.30	.00
	2.430	1382.22	.70	1382.93	600.00	.00	5956.17	6904.83	600.00	9950.00	9950.00	10111.30	10550.00
	2.520	1385.74	.00	1386.22	1168.71	5636.91	4102.07	3122.02	.00	.00	10167.40	10317.90	.00
	2.520	1386.03	.28	1386.76	600.00	6595.37	4969.62	1296.00	600.00	9950.00	10167.40	10317.90	10550.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	2.620	1389.05	.00	1389.73	950.09	7467.58	4599.85	793.57	.00	.00	10262.60	10405.50	.00
	2.620	1389.50	.46	1390.29	540.00	7719.24	5140.68	1.08	540.00	9866.00	10262.60	10405.50	10406.00
	2.710	1392.95	.00	1393.39	940.83	7514.29	3856.68	992.02	.00	.00	10067.90	10197.60	.00
	2.710	1393.32	.37	1394.07	490.00	7126.42	5022.67	213.91	490.00	9725.00	10067.90	10197.60	10215.00
*	2.800	1396.50	.00	1397.58	1065.79	2631.48	7926.59	1804.93	.00	.00	9898.50	10058.30	.00
	2.800	1397.08	.59	1398.53	500.00	2394.89	9485.88	482.23	500.00	9600.00	9898.50	10058.30	10100.00
*	2.900	1400.34	.00	1400.57	1226.78	567.73	4794.82	7000.45	.00	.00	9752.70	10025.90	.00
*	2.900	1401.30	.97	1401.79	540.00	17.33	7842.79	4502.87	540.00	9750.00	9752.70	10025.90	10290.00
*	2.990	1402.67	.00	1403.15	833.41	.00	5055.70	7307.29	.00	.00	9845.10	10091.00	.00
	2.990	1403.57	.91	1404.07	553.00	.00	6309.47	6053.53	553.00	9847.00	9845.10	10091.00	10400.00
	3.090	1407.12	.00	1407.62	1012.16	348.62	4224.35	7790.03	.00	.00	9962.30	10143.90	.00
*	3.090	1407.35	.23	1408.32	625.00	537.74	5853.94	5971.32	625.00	9880.00	9962.30	10143.90	10505.00
	3.180	1410.18	.00	1410.56	1018.76	447.90	2914.39	9000.70	.00	.00	9972.90	10047.10	.00
*	3.180	1411.20	1.01	1411.70	660.00	628.82	3798.85	7935.33	660.00	9900.00	9972.90	10047.10	10560.00
	3.270	1412.75	.00	1413.12	1082.57	858.84	5291.71	6212.45	.00	.00	9960.20	10206.60	.00
	3.270	1413.60	.85	1414.19	650.00	875.62	7571.92	3915.45	650.00	9875.00	9960.20	10206.60	10525.00
	3.370	1416.04	.00	1416.30	1199.82	2799.10	3392.20	6171.70	.00	.00	9956.70	10233.80	.00
	3.370	1416.98	.94	1417.54	650.00	90.49	6463.33	5809.18	650.00	9950.00	9956.70	10233.80	10600.00
	3.430	1418.20	.00	1418.60	998.59	1067.69	3711.53	7583.78	.00	.00	9950.60	10106.90	.00
	3.430	1419.20	1.00	1419.71	650.00	540.10	5103.98	6718.92	650.00	9900.00	9950.60	10106.90	10550.00
	3.510	1421.01	.00	1421.44	1100.55	800.42	3795.12	7767.46	.00	.00	9955.20	10069.00	.00
	3.510	1421.76	.75	1422.53	625.00	44.16	5398.55	6920.29	625.00	9950.00	9955.20	10069.00	10575.00
	3.600	1423.59	.00	1424.04	1336.49	882.53	4639.81	5441.66	.00	.00	9984.40	10114.30	.00
	3.600	1424.58	1.00	1425.27	625.00	595.08	6213.52	4155.39	625.00	9905.00	9984.40	10114.30	10530.00
	3.700	1426.31	.00	1426.86	1224.18	527.47	6355.28	4081.26	.00	.00	9983.00	10168.30	.00
	3.700	1427.16	.85	1428.07	475.00	230.73	8537.08	2196.19	475.00	9950.00	9983.00	10168.30	10425.00
	3.790	1429.62	.00	1430.29	1309.50	2445.21	6408.59	2110.20	.00	.00	10020.90	10213.50	.00
	3.790	1430.39	.77	1431.47	425.00	1287.73	8554.59	1121.68	425.00	9900.00	10020.90	10213.50	10325.00
	3.910	1433.53	.00	1434.02	1143.13	1178.38	7405.49	2380.13	.00	.00	9764.60	10036.30	.00
	3.910	1434.30	.77	1435.00	450.00	196.19	9472.22	1295.59	450.00	9750.00	9764.60	10036.30	10200.00
	3.990	1435.24	.00	1435.67	815.50	190.58	9707.82	1065.60	.00	.00	9659.90	10052.40	.00
*	3.990	1435.94	.70	1436.32	551.00	2.58	10228.11	733.31	551.00	9659.00	9659.90	10052.40	10210.00
	4.040	1435.97	.00	1436.67	818.40	209.50	9847.67	300.83	.00	.00	9706.30	10032.30	.00
	4.040	1436.44	.48	1437.00	590.00	127.15	9766.44	464.41	590.00	9670.00	9706.30	10032.30	10260.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	4.070	1437.05	.00	1437.43	674.00	.00	10358.00	.00	.00	.00	9680.00	10354.00	.00
	4.070	1437.23	.18	1437.57	674.00	.00	10358.00	.00	674.00	9680.00	9680.00	10354.00	10354.00
*	4.071	1437.72	.00	1439.74	242.05	.00	10358.00	.00	.00	.00	9679.00	10328.00	.00
*	4.071	1437.74	.03	1439.74	242.05	.00	10358.00	.00	649.00	9679.00	9679.00	10328.00	10328.00
*	4.100	1440.80	.00	1441.46	243.38	.00	10358.00	.00	.00	.00	9579.00	10378.00	.00
*	4.100	1440.82	.03	1441.48	243.39	.00	10358.00	.00	799.00	9579.00	9579.00	10378.00	10378.00
*	4.110	1440.47	.00	1441.80	242.71	.00	10358.00	.00	.00	.00	9579.00	10378.00	.00
*	4.110	1440.50	.03	1441.82	242.72	.00	10358.00	.00	818.00	9560.00	9579.00	10378.00	10378.00
*	4.200	1443.69	.00	1443.99	1135.35	2761.93	4011.94	3584.12	.00	.00	9932.20	10028.60	.00
*	4.200	1443.87	.17	1444.30	600.00	2544.61	4643.64	3169.75	600.00	9700.00	9932.20	10028.60	10300.00
*	4.290	1445.28	.00	1446.15	923.75	1910.53	6838.92	1608.55	.00	.00	9906.60	10077.60	.00
*	4.290	1445.68	.39	1446.74	450.00	1922.16	7764.57	671.27	450.00	9700.00	9906.60	10077.60	10150.00
*	4.390	1448.51	.00	1448.91	1048.97	1890.87	4961.42	3505.71	.00	.00	9800.20	9949.80	.00
	4.390	1449.09	.58	1449.85	400.00	753.08	6745.11	2859.80	400.00	9750.00	9800.20	9949.80	10150.00
	4.470	1450.95	.00	1451.56	1044.66	2668.51	4201.12	3488.37	.00	.00	9931.30	10040.00	.00
	4.470	1451.82	.87	1452.70	375.00	1835.65	5324.85	3197.50	375.00	9825.00	9931.30	10040.00	10200.00
	4.570	1453.87	.00	1454.31	936.01	2398.19	4014.97	2490.84	.00	.00	9977.80	10067.40	.00
	4.570	1454.66	.80	1455.34	330.00	923.91	5024.30	2955.79	330.00	9920.00	9977.80	10067.40	10250.00
	4.670	1455.91	.00	1456.51	849.03	2933.24	4177.31	1793.46	.00	.00	9951.10	10031.90	.00
	4.670	1456.67	.76	1457.37	330.00	2735.46	4710.55	1457.99	330.00	9810.00	9951.10	10031.90	10140.00
	4.760	1458.53	.00	1459.46	822.47	3568.07	3829.59	1506.34	.00	.00	9981.90	10032.60	.00
*	4.760	1458.96	.42	1460.51	300.00	2782.93	4744.84	1376.23	300.00	9825.00	9981.90	10032.60	10125.00
	4.860	1461.62	.00	1462.09	969.52	2784.28	3808.52	2311.20	.00	.00	9960.60	10043.30	.00
*	4.860	1462.60	.98	1463.19	355.00	2276.39	4512.10	2115.51	355.00	9820.00	9960.60	10043.30	10175.00
	4.950	1463.67	.00	1464.15	1025.55	1593.51	4842.38	2468.11	.00	.00	9895.80	10031.20	.00
	4.950	1464.41	.75	1465.18	300.00	580.90	6231.20	2091.91	300.00	9850.00	9895.80	10031.20	10150.00
	5.040	1466.01	.00	1466.45	1049.92	78.56	2862.55	5962.89	.00	.00	9966.00	10038.60	.00
	5.040	1466.87	.86	1467.71	448.15	38.27	4024.31	4841.41	450.00	9900.00	9966.00	10038.60	10350.00
	5.130	1468.99	.00	1469.68	840.96	105.64	3276.63	4696.73	.00	.00	9969.50	10028.70	.00
	5.130	1469.90	.91	1470.57	438.70	200.20	3524.70	4354.11	450.00	9880.00	9969.50	10028.70	10330.00
	5.230	1471.81	.00	1472.35	709.17	1691.65	4523.80	1863.56	.00	.00	9938.50	10046.50	.00
	5.230	1472.26	.44	1473.16	250.00	560.28	5739.91	1778.80	250.00	9900.00	9938.50	10046.50	10150.00
*	5.320	1474.38	.00	1475.49	662.84	3064.80	4774.66	239.54	.00	.00	9965.40	10044.90	.00
	5.320	1474.91	.53	1476.53	250.00	2235.90	5782.20	60.90	250.00	9800.00	9965.40	10044.90	10050.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	5.420	1477.29	.00	1477.82	901.76	1232.62	5993.81	852.57	.00	.00	9885.50	10034.50	.00
*	5.420	1478.15	.86	1478.77	250.00	411.35	6935.70	731.95	250.00	9850.00	9885.50	10034.50	10100.00
	5.510	1479.16	.00	1479.54	703.77	1949.63	3288.66	2840.71	.00	.00	9920.90	10017.40	.00
*	5.510	1479.81	.65	1480.62	270.00	2197.86	4707.42	1173.71	270.00	9800.00	9920.90	10017.40	10070.00
*	5.600	1481.39	.00	1482.24	744.79	972.18	5007.31	1245.51	.00	.00	9895.90	10033.70	.00
	5.600	1482.28	.89	1483.21	300.00	495.77	5872.76	856.47	300.00	9850.00	9895.90	10033.70	10150.00
	5.690	1484.75	.00	1485.49	738.30	605.97	5270.58	1348.44	.00	.00	9897.50	10024.40	.00
	5.690	1485.12	.37	1486.17	250.00	244.81	6220.40	759.78	250.00	9875.00	9897.50	10024.40	10125.00
	5.790	1487.37	.00	1488.33	643.84	1786.03	4318.99	1119.97	.00	.00	9960.20	10027.70	.00
	5.790	1487.93	.56	1489.18	250.00	1016.34	4976.12	1232.54	250.00	9875.00	9960.20	10027.70	10125.00
*	5.880	1490.15	.00	1490.39	644.20	2023.74	2856.57	2344.69	.00	.00	9968.10	10035.50	.00
	5.880	1491.03	.89	1491.45	250.00	1497.41	3698.65	2028.94	250.00	9875.00	9968.10	10035.50	10125.00
	5.980	1491.86	.00	1492.17	817.45	2310.24	2935.41	1979.35	.00	.00	9975.10	10036.50	.00
	5.980	1492.86	1.01	1493.25	310.00	2228.46	3371.60	1624.94	310.00	9820.00	9975.10	10036.50	10130.00
	6.070	1493.95	.00	1494.39	641.94	457.47	3231.67	3045.86	.00	.00	9976.00	10032.20	.00
	6.070	1494.80	.85	1495.47	250.00	843.05	4007.96	1883.99	250.00	9875.00	9976.00	10032.20	10125.00
	6.150	1495.90	.00	1496.22	664.29	1861.81	2880.78	1992.40	.00	.00	9983.90	10032.10	.00
	6.150	1496.87	.97	1497.23	300.00	1619.54	3084.22	2031.24	300.00	9850.00	9983.90	10032.10	10150.00
	6.220	1497.00	.00	1497.21	507.99	1057.00	3353.91	1005.09	.00	.00	9971.20	10074.60	.00
	6.220	1497.83	.82	1498.02	300.00	1250.95	3458.65	706.40	300.00	9850.00	9971.20	10074.60	10150.00
*	6.270	1497.49	.00	1497.95	102.51	.00	2950.13	495.87	.00	.00	9960.00	10040.00	.00
*	6.270	1498.18	.69	1498.71	79.98	.00	3446.00	.00	200.00	9900.00	9960.00	10040.00	10100.00
	6.272	1497.23	.00	1498.25	99.84	.00	2990.33	455.67	.00	.00	9960.00	10038.00	.00
	6.272	1497.77	.54	1499.16	77.90	.00	3446.00	.00	200.00	9900.00	9960.00	10038.00	10100.00
*	6.300	1499.35	.00	1500.16	428.14	.00	2813.78	632.22	.00	.00	9960.00	10038.00	.00
*	6.300	1499.89	.54	1501.05	200.00	4.72	3353.56	87.72	200.00	9900.00	9960.00	10038.00	10100.00
*	6.303	1500.18	.00	1500.36	755.61	16.16	2564.95	864.89	.00	.00	9960.00	10038.00	.00
*	6.303	1501.05	.87	1501.33	200.00	99.57	3210.65	135.78	200.00	9900.00	9960.00	10038.00	10100.00
	6.350	1500.51	.00	1500.56	964.87	793.72	1822.09	830.20	.00	.00	9967.20	10072.00	.00
	6.350	1501.46	.95	1501.51	400.00	843.37	1901.95	700.68	400.00	9800.00	9967.20	10072.00	10200.00
*	6.400	1500.75	.00	1500.94	545.28	29.37	1823.53	1593.11	.00	.00	9972.90	10040.00	.00
*	6.400	1501.62	.87	1501.76	350.00	72.51	1753.29	1620.20	350.00	9900.00	9972.90	10040.00	10250.00
	6.490	1502.25	.00	1502.47	427.39	192.54	2545.10	708.36	.00	.00	9974.70	10082.90	.00
	6.490	1502.65	.41	1502.91	200.00	184.16	2776.30	485.54	200.00	9950.00	9974.70	10082.90	10150.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	6.590	1504.12	.00	1504.57	327.11	43.99	2888.63	513.37	.00	.00	9948.90	10031.20	.00
	6.590	1504.45	.32	1505.02	122.30	2.64	3279.27	164.09	150.00	9900.00	9948.90	10031.20	10050.00
	6.670	1506.65	.00	1507.09	445.75	321.55	2568.96	555.49	.00	.00	9987.80	10062.50	.00
	6.670	1507.11	.46	1507.73	163.00	406.15	3038.09	1.75	163.00	9900.00	9987.80	10062.50	10063.00
	6.770	1509.09	.00	1509.38	626.88	119.81	1770.68	1555.51	.00	.00	9983.60	10034.00	.00
	6.770	1509.86	.77	1510.28	250.00	184.40	2183.43	1078.17	250.00	9950.00	9983.60	10034.00	10200.00
	6.820	1510.17	.00	1510.34	743.91	379.40	1169.75	1896.84	.00	.00	9986.80	10019.40	.00
	6.820	1511.07	.90	1511.41	250.00	399.37	1590.05	1456.57	250.00	9900.00	9986.80	10019.40	10150.00
	6.900	1511.79	.00	1512.09	549.79	415.03	1832.82	1198.15	.00	.00	9963.70	10032.20	.00
	6.900	1512.64	.85	1512.86	275.00	472.39	1802.79	1170.81	275.00	9835.00	9963.70	10032.20	10110.00
	6.990	1514.35	.00	1514.55	646.50	357.24	942.14	1594.62	.00	.00	9981.90	10012.80	.00
*	6.990	1514.62	.28	1515.13	225.00	325.21	1369.96	1198.83	225.00	9900.00	9981.90	10012.80	10125.00
*	7.080	1515.71	.00	1515.84	405.38	1031.43	1577.26	285.31	.00	.00	9973.00	10044.10	.00
*	7.080	1516.43	.72	1516.57	225.00	948.07	1743.92	202.01	225.00	9850.00	9973.00	10044.10	10075.00
*	7.160	1516.77	.00	1517.02	451.62	524.18	1300.01	1069.81	.00	.00	9987.70	10031.80	.00
*	7.160	1517.33	.56	1517.73	200.00	461.99	1641.31	790.70	200.00	9900.00	9987.70	10031.80	10100.00
	7.200	1518.62	.00	1518.86	274.42	634.06	2246.58	13.36	.00	.00	9980.20	10104.00	.00
	7.200	1519.30	.68	1519.55	154.00	381.59	2512.41	.00	154.00	9950.00	9980.20	10104.00	10104.00
	7.230	1520.28	.00	1520.86	183.53	.00	2557.94	336.06	.00	.00	9965.00	10030.00	.00
	7.230	1520.69	.41	1521.26	122.46	.00	2660.31	233.69	129.00	9965.00	9965.00	10030.00	10094.00
*	7.260	1521.72	.00	1521.82	298.39	.03	1796.39	1097.58	.00	.00	9940.40	10073.80	.00
*	7.260	1522.12	.40	1522.24	199.69	.04	2070.27	823.69	200.00	9940.00	9940.40	10073.80	10140.00
*	7.340	1522.66	.00	1522.69	727.24	396.33	2095.16	402.51	.00	.00	9791.80	10108.50	.00
	7.340	1523.21	.55	1523.26	320.00	6.21	2881.13	6.66	320.00	9790.00	9791.80	10108.50	10110.00
*	7.410	1523.55	.00	1523.62	630.38	502.70	1428.46	962.84	.00	.00	9863.90	10083.40	.00
*	7.410	1524.28	.72	1524.38	300.00	316.92	2087.72	489.35	300.00	9825.00	9863.90	10083.40	10125.00
	7.510	1525.63	.00	1525.71	528.23	483.75	2102.52	307.73	.00	.00	9782.50	10042.30	.00
	7.510	1526.32	.69	1526.41	293.00	1.16	2587.66	305.18	293.00	9782.00	9782.50	10042.30	10075.00
	7.590	1527.60	.00	1527.69	529.45	1649.28	1133.98	110.74	.00	.00	9996.40	10171.90	.00
	7.590	1528.13	.53	1528.26	297.00	1404.60	1489.32	.08	297.00	9875.00	9996.40	10171.90	10172.00
	7.680	1530.01	.00	1530.10	619.82	908.85	1262.93	722.22	.00	.00	9952.40	10222.20	.00
	7.680	1530.88	.87	1531.00	325.00	471.06	2399.71	23.23	325.00	9900.00	9952.40	10222.20	10225.00
	7.770	1533.09	.00	1533.18	552.50	654.66	2185.47	53.87	.00	.00	9986.00	10344.70	.00
	7.770	1533.69	.60	1533.77	420.00	444.36	2449.13	.50	420.00	9925.00	9986.00	10344.70	10345.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	7.850	1535.32	.00	1535.37	740.25	316.58	1727.07	850.35	.00	.00	9960.10	10238.80	.00
	7.850	1535.85	.53	1535.95	300.00	53.84	2722.48	117.68	300.00	9950.00	9960.10	10238.80	10250.00
	7.950	1536.45	.00	1536.47	675.11	715.95	832.75	174.30	.00	.00	9876.80	10107.70	.00
	7.950	1537.35	.89	1537.38	308.00	423.08	1299.57	.34	308.00	9800.00	9876.80	10107.70	10108.00
*	8.040	1537.64	.00	1537.72	453.59	490.43	1216.24	16.34	.00	.00	9856.30	10130.60	.00
*	8.040	1538.47	.83	1538.54	285.00	46.38	1660.50	16.12	285.00	9850.00	9856.30	10130.60	10135.00
*	8.130	1540.44	.00	1540.48	510.72	144.47	1569.84	8.68	.00	.00	9839.30	10205.50	.00
	8.130	1540.63	.19	1540.67	370.00	.26	1718.16	4.58	370.00	9839.00	9839.30	10205.50	10209.00
*	8.230	1542.27	.00	1542.29	546.99	197.25	656.62	19.13	.00	.00	9818.60	10090.00	.00
*	8.230	1542.51	.23	1542.54	275.00	4.14	868.86	.00	275.00	9815.00	9818.60	10090.00	10090.00
	8.300	1542.74	.00	1542.74	437.18	72.46	40.54	.00	.00	.00	9918.70	10099.10	.00
*	8.300	1543.23	.49	1543.23	200.00	9.87	103.11	.02	200.00	9900.00	9918.70	10099.10	10100.00

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SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	.090	.00	.00	.00	1252.00	15717.00	1257.33	.00	1258.38	137.97	11.75	2982.42	1338.09
	.090	.00	.00	.00	1252.00	15717.00	1258.33	.00	1259.69	114.94	12.06	2426.38	1466.02
	.180	470.00	.00	.00	1259.20	15717.00	1263.66	.00	1264.82	180.07	11.02	2424.07	1171.25
	.180	470.00	.00	.00	1259.20	15717.00	1264.14	1264.09	1265.80	182.23	12.13	1960.03	1164.29
	.260	415.00	.00	.00	1264.80	15717.00	1269.61	.00	1270.70	126.86	10.23	2563.39	1395.43
	.260	415.00	.00	.00	1264.80	15717.00	1270.22	.00	1271.86	127.72	11.33	1948.11	1390.72
	.350	480.00	.00	.00	1271.10	15717.00	1276.02	.00	1277.05	143.57	10.10	2389.59	1311.72
	.350	480.00	.00	.00	1271.10	15717.00	1276.62	.00	1277.93	127.00	10.57	2063.27	1394.63
	.450	490.00	.00	.00	1278.00	15717.00	1282.56	.00	1283.09	105.70	8.33	3159.52	1528.71
	.450	490.00	.00	.00	1278.00	15717.00	1283.46	.00	1284.98	162.47	12.15	1851.58	1233.05
*	.530	420.00	.00	.00	1281.80	15717.00	1287.97	1287.97	1289.60	112.17	12.42	1963.26	1483.96
	.530	420.00	.00	.00	1281.80	15717.00	1288.81	.00	1290.79	96.68	12.66	1584.94	1598.49
	.610	430.00	.00	.00	1285.70	15717.00	1292.50	.00	1293.79	83.83	11.04	2231.00	1716.58
	.610	430.00	.00	.00	1285.70	15717.00	1292.99	.00	1294.88	93.47	12.30	1644.69	1625.63
*	.700	510.00	.00	.00	1291.50	15717.00	1297.53	1297.53	1299.08	112.42	10.67	1885.11	1482.37
	.700	510.00	.00	.00	1291.50	15717.00	1298.00	.00	1299.84	104.55	10.99	1492.82	1537.12
	.790	460.00	.00	.00	1295.50	15717.00	1303.27	.00	1304.15	105.53	9.37	2262.29	1529.94
	.790	460.00	.00	.00	1295.50	15717.00	1303.87	.00	1305.51	145.92	12.13	1749.26	1301.12
	.890	520.00	.00	.00	1304.70	15717.00	1309.94	.00	1311.12	120.32	11.02	2154.41	1432.84
	.890	520.00	.00	.00	1304.70	15717.00	1310.84	.00	1312.04	87.70	10.65	2129.21	1678.26
*	.940	300.00	.00	.00	1308.50	15717.00	1313.79	1313.79	1315.88	155.39	11.62	1359.49	1260.85
	.940	300.00	.00	.00	1308.50	15717.00	1313.90	.00	1315.88	171.28	11.32	1394.25	1200.94
*	1.020	420.00	.00	.00	1312.00	15717.00	1319.16	.00	1319.88	60.50	6.79	2314.24	2020.68
*	1.020	420.00	.00	.00	1312.00	15717.00	1319.53	.00	1320.13	63.11	6.21	2530.42	1978.40
*	1.120	490.00	.00	.00	1318.00	15717.00	1323.17	.00	1324.53	152.26	9.39	1686.20	1273.75
*	1.120	490.00	.00	.00	1318.00	15717.00	1323.53	.00	1324.65	134.76	8.50	1860.29	1353.89
	1.210	490.00	.00	.00	1322.40	15717.00	1328.69	.00	1329.88	81.73	9.37	2014.77	1738.52
	1.210	490.00	.00	.00	1322.40	15717.00	1328.80	.00	1330.51	100.99	10.59	1529.66	1563.96
	1.300	490.00	.00	.00	1327.60	15717.00	1333.15	.00	1334.72	114.69	10.69	1706.62	1467.59
	1.300	490.00	.00	.00	1327.60	15717.00	1333.71	.00	1335.26	92.52	10.33	1645.05	1633.98
*	1.390	470.00	.00	.00	1331.90	15717.00	1339.02	1339.02	1341.84	130.47	14.14	1249.43	1375.97
*	1.390	470.00	.00	.00	1331.90	15717.00	1339.04	1339.04	1341.92	131.75	14.23	1217.47	1369.31

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.480	450.00	.00	.00	1334.40	15351.00	1343.83	.00	1344.68	32.42	8.14	2545.27	2696.21
*	1.480	450.00	.00	.00	1334.40	15351.00	1343.92	.00	1345.48	48.99	10.08	1565.28	2193.31
*	1.580	520.00	.00	.00	1340.10	15351.00	1346.15	.00	1347.10	70.84	8.76	2281.15	1823.91
	1.580	520.00	.00	.00	1340.10	15351.00	1347.10	.00	1348.39	63.72	9.37	1736.42	1923.06
*	1.670	500.00	.00	.00	1345.10	15351.00	1350.46	1350.46	1352.05	119.33	10.75	1748.78	1405.31
	1.670	500.00	.00	.00	1345.10	15351.00	1350.84	.00	1352.22	91.58	9.96	1808.34	1604.11
	1.770	530.00	.00	.00	1349.20	15351.00	1355.51	.00	1356.49	61.10	8.30	2134.84	1963.96
	1.770	530.00	.00	.00	1349.20	15351.00	1355.37	.00	1356.44	69.35	8.62	2016.01	1843.41
	1.870	500.00	.00	.00	1353.80	15351.00	1359.07	.00	1360.23	91.00	9.73	2030.27	1609.20
	1.870	500.00	.00	.00	1353.80	15351.00	1359.26	.00	1360.98	112.47	11.13	1588.33	1447.51
	1.950	440.00	.00	.00	1357.00	15351.00	1362.86	.00	1363.32	56.49	6.62	3035.46	2042.50
*	1.950	440.00	.00	.00	1357.00	15351.00	1363.73	.00	1364.39	55.35	7.55	2525.16	2063.37
	2.050	500.00	.00	.00	1361.70	15351.00	1366.34	.00	1367.04	106.94	8.27	2541.05	1484.45
	2.050	500.00	.00	.00	1361.70	15351.00	1367.08	.00	1368.23	110.97	9.68	1988.33	1457.26
	2.140	490.00	.00	.00	1365.70	15351.00	1370.78	.00	1371.22	66.32	6.65	3196.17	1885.05
	2.140	490.00	.00	.00	1365.70	15351.00	1371.71	.00	1372.44	65.65	7.82	2493.13	1894.57
	2.230	480.00	.00	.00	1368.90	15351.00	1374.07	.00	1374.67	78.32	8.23	2978.96	1734.64
	2.230	480.00	.00	.00	1368.90	15351.00	1374.93	.00	1375.87	77.11	9.31	2387.34	1748.18
	2.330	510.00	.00	.00	1371.90	12861.00	1377.77	.00	1378.25	59.17	7.80	2954.15	1671.98
	2.330	510.00	.00	.00	1371.90	12861.00	1378.65	.00	1379.46	61.28	8.94	2174.92	1642.95
	2.430	500.00	.00	.00	1376.80	12861.00	1381.52	.00	1382.15	102.34	8.84	2510.76	1271.34
	2.430	500.00	.00	.00	1376.80	12861.00	1382.22	.00	1382.93	77.37	8.56	2189.80	1462.17
	2.520	510.00	.00	.00	1380.00	12861.00	1385.74	.00	1386.22	56.79	6.95	2727.69	1706.66
	2.520	510.00	.00	.00	1380.00	12861.00	1386.03	.00	1386.76	66.10	7.85	2065.17	1581.83
	2.620	500.00	.00	.00	1384.10	12861.00	1389.05	.00	1389.73	88.24	8.48	2147.84	1369.11
	2.620	500.00	.00	.00	1384.10	12861.00	1389.50	.00	1390.29	75.78	8.47	1877.86	1477.41
	2.710	480.00	.00	.00	1387.90	12363.00	1392.95	.00	1393.39	65.51	7.52	2660.49	1527.51
	2.710	480.00	.00	.00	1387.90	12363.00	1393.32	.00	1394.07	81.96	8.94	1966.59	1365.56
*	2.800	500.00	.00	.00	1390.00	12363.00	1396.50	1396.50	1397.58	89.84	10.13	2160.89	1304.32
	2.800	500.00	.00	.00	1390.00	12363.00	1397.08	.00	1398.53	88.30	10.82	1627.96	1315.70
*	2.900	540.00	.00	.00	1394.50	12363.00	1400.34	.00	1400.57	33.69	4.99	3538.52	2130.04
*	2.900	540.00	.00	.00	1394.50	12363.00	1401.30	.00	1401.79	40.15	6.40	2394.03	1951.08
*	2.990	490.00	.00	.00	1397.50	12363.00	1402.67	.00	1403.15	81.47	6.93	2376.47	1369.68
	2.990	490.00	.00	.00	1397.50	12363.00	1403.57	.00	1404.07	52.29	6.62	2318.89	1709.68

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	3.090	500.00	.00	.00	1402.60	12363.00	1407.12	.00	1407.62	98.18	7.69	2466.74	1247.69
*	3.090	500.00	.00	.00	1402.60	12363.00	1407.35	.00	1408.32	147.47	9.90	1776.94	1018.04
	3.180	470.00	.00	.00	1404.00	12363.00	1410.18	.00	1410.56	51.50	7.78	3042.95	1722.72
*	3.180	470.00	.00	.00	1404.00	12363.00	1411.20	.00	1411.70	47.56	8.45	2672.04	1792.71
	3.270	500.00	.00	.00	1407.50	12363.00	1412.75	.00	1413.12	57.72	6.34	2892.15	1627.21
	3.270	500.00	.00	.00	1407.50	12363.00	1413.60	.00	1414.19	56.02	7.25	2317.05	1651.77
	3.370	500.00	.00	.00	1411.10	12363.00	1416.04	.00	1416.30	60.99	5.16	3159.20	1583.05
	3.370	500.00	.00	.00	1411.10	12363.00	1416.98	.00	1417.54	72.47	7.03	2233.14	1452.24
	3.430	350.00	.00	.00	1413.10	12363.00	1418.20	.00	1418.60	71.73	7.05	2746.52	1459.72
	3.430	350.00	.00	.00	1413.10	12363.00	1419.20	.00	1419.71	56.59	7.46	2475.59	1643.37
	3.510	430.00	.00	.00	1415.90	12363.00	1421.01	.00	1421.44	63.10	7.77	2864.43	1556.39
	3.510	430.00	.00	.00	1415.90	12363.00	1421.76	.00	1422.53	74.58	9.41	2180.79	1431.56
	3.600	450.00	.00	.00	1418.00	10964.00	1423.59	.00	1424.04	52.16	7.54	2786.40	1518.12
	3.600	450.00	.00	.00	1418.00	10964.00	1424.58	.00	1425.27	49.37	8.33	2159.18	1560.38
	3.700	520.00	.00	.00	1420.80	10964.00	1426.31	.00	1426.86	54.32	7.51	2577.49	1487.68
	3.700	520.00	.00	.00	1420.80	10964.00	1427.16	.00	1428.07	55.39	8.51	1748.05	1473.22
	3.790	510.00	.00	.00	1424.10	10964.00	1429.62	.00	1430.29	76.05	8.22	2403.88	1257.23
	3.790	510.00	.00	.00	1424.10	10964.00	1430.39	.00	1431.47	75.56	9.21	1544.71	1261.31
	3.910	600.00	.00	.00	1428.00	10964.00	1433.53	.00	1434.02	47.10	6.57	2547.71	1597.53
	3.910	600.00	.00	.00	1428.00	10964.00	1434.30	.00	1435.00	43.77	7.10	1834.48	1657.24
	3.990	440.00	.00	.00	1428.30	10964.00	1435.24	.00	1435.67	30.81	5.57	2411.63	1975.10
*	3.990	440.00	.00	.00	1428.30	10964.00	1435.94	.00	1436.32	21.00	5.07	2409.88	2392.68
	4.040	240.00	.00	.00	1430.30	10358.00	1435.97	.00	1436.67	48.31	6.91	1773.91	1490.20
	4.040	240.00	.00	.00	1430.30	10358.00	1436.44	.00	1437.00	33.68	6.18	1932.85	1784.84
	4.070	150.00	.00	.00	1432.40	10358.00	1437.05	.00	1437.43	40.99	5.01	2067.77	1617.79
	4.070	150.00	.00	.00	1432.40	10358.00	1437.23	.00	1437.57	33.67	4.72	2196.37	1785.00
*	4.071	10.00	1442.10	1445.40	1432.38	10358.00	1437.72	1437.72	1439.74	28.00	11.42	907.38	1957.53
*	4.071	10.00	1442.10	1445.40	1432.38	10358.00	1437.74	1437.74	1439.74	27.50	11.34	913.28	1975.15
*	4.100	170.00	100000.00	100000.00	1432.90	10358.00	1440.80	.00	1441.46	3.46	6.54	1584.75	5568.79
*	4.100	170.00	100000.00	100000.00	1432.90	10358.00	1440.82	.00	1441.48	3.42	6.51	1591.02	5601.46
*	4.110	10.00	.00	.00	1434.50	10358.00	1440.47	.00	1441.80	109.76	9.26	1118.33	988.67
*	4.110	10.00	.00	.00	1434.50	10358.00	1440.50	.00	1441.82	107.45	9.20	1126.15	999.24
*	4.200	490.00	.00	.00	1436.60	10358.00	1443.69	.00	1443.99	23.81	6.33	3294.31	2122.79
	4.200	490.00	.00	.00	1436.60	10358.00	1443.87	.00	1444.30	29.36	7.14	2547.72	1911.53

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4.290	500.00	.00	.00	1439.40	10358.00	1445.28	.00	1446.15	78.40	8.91	1940.48	1169.83
*	4.290	500.00	.00	.00	1439.40	10358.00	1445.68	.00	1446.74	76.20	9.30	1533.13	1186.59
*	4.390	500.00	.00	.00	1442.90	10358.00	1448.51	.00	1448.91	39.86	6.75	2703.69	1640.66
	4.390	500.00	.00	.00	1442.90	10358.00	1449.09	.00	1449.85	50.98	8.22	1752.12	1450.72
	4.470	470.00	.00	.00	1445.10	10358.00	1450.95	.00	1451.56	80.20	8.85	2179.17	1156.63
	4.470	470.00	.00	.00	1445.10	10358.00	1451.82	.00	1452.70	70.18	9.35	1615.82	1236.46
	4.570	510.00	.00	.00	1446.50	8904.00	1453.87	.00	1454.31	36.43	7.38	2351.90	1475.15
	4.570	510.00	.00	.00	1446.50	8904.00	1454.66	.00	1455.34	37.84	8.17	1658.54	1447.38
	4.670	520.00	.00	.00	1448.70	8904.00	1455.91	.00	1456.51	47.69	8.45	2044.25	1289.33
	4.670	520.00	.00	.00	1448.70	8904.00	1456.67	.00	1457.37	41.06	8.47	1625.89	1389.49
	4.760	490.00	.00	.00	1451.20	8904.00	1458.53	.00	1459.46	72.51	11.05	1807.31	1045.63
*	4.760	490.00	.00	.00	1451.20	8904.00	1458.96	.00	1460.51	91.10	12.89	1212.51	932.88
	4.860	500.00	.00	.00	1454.00	8904.00	1461.62	.00	1462.09	39.93	7.70	2342.34	1409.01
*	4.860	500.00	.00	.00	1454.00	8904.00	1462.60	.00	1463.19	33.89	7.84	1802.69	1529.59
	4.950	500.00	.00	.00	1457.80	8904.00	1463.67	.00	1464.15	43.19	7.14	2215.24	1354.90
	4.950	500.00	.00	.00	1457.80	8904.00	1464.41	.00	1465.18	45.02	8.00	1465.72	1327.02
	5.040	460.00	.00	.00	1459.90	8904.00	1466.01	.00	1466.45	61.56	8.18	2277.89	1134.83
	5.040	460.00	.00	.00	1459.90	8904.00	1466.87	.00	1467.71	70.06	9.74	1532.20	1063.81
	5.130	490.00	.00	.00	1462.20	8079.00	1468.99	.00	1469.68	67.63	9.62	1758.49	982.43
	5.130	490.00	.00	.00	1462.20	8079.00	1469.90	.00	1470.57	48.02	8.94	1612.60	1165.90
	5.230	500.00	.00	.00	1465.60	8079.00	1471.81	.00	1472.35	38.90	7.37	1832.64	1295.28
	5.230	500.00	.00	.00	1465.60	8079.00	1472.26	.00	1473.16	48.90	8.68	1243.66	1155.29
*	5.320	500.00	.00	.00	1467.90	8079.00	1474.38	1474.38	1475.49	83.06	10.63	1443.27	886.44
	5.320	500.00	.00	.00	1467.90	8079.00	1474.91	.00	1476.53	89.94	11.75	1008.30	851.89
*	5.420	500.00	.00	.00	1470.60	8079.00	1477.29	.00	1477.82	29.35	6.66	1968.37	1491.13
*	5.420	500.00	.00	.00	1470.60	8079.00	1478.15	.00	1478.77	25.29	6.75	1433.86	1606.61
	5.510	500.00	.00	.00	1472.00	8079.00	1479.16	.00	1479.54	40.49	6.86	2063.64	1269.71
*	5.510	500.00	.00	.00	1472.00	8079.00	1479.81	.00	1480.62	54.70	8.67	1304.60	1092.36
*	5.600	450.00	.00	.00	1475.60	7225.00	1481.39	1481.39	1482.24	83.22	8.73	1380.50	792.00
	5.600	450.00	.00	.00	1475.60	7225.00	1482.28	.00	1483.21	59.87	8.43	1105.58	933.75
	5.690	500.00	.00	.00	1477.90	7225.00	1484.75	.00	1485.49	51.08	7.94	1514.24	1010.88
	5.690	500.00	.00	.00	1477.90	7225.00	1485.12	.00	1486.17	56.93	8.76	1022.23	957.54
	5.790	500.00	.00	.00	1479.10	7225.00	1487.37	.00	1488.33	60.59	9.89	1452.78	928.18
	5.790	500.00	.00	.00	1479.10	7225.00	1487.93	.00	1489.18	61.07	10.50	1057.54	924.54

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	5.880	490.00	.00	.00	1480.30	7225.00	1490.15	.00	1490.39	29.38	5.31	2117.14	1333.01
	5.880	490.00	.00	.00	1480.30	7225.00	1491.03	.00	1491.45	34.68	6.19	1509.59	1226.95
	5.980	500.00	.00	.00	1482.10	7225.00	1491.86	.00	1492.17	41.46	6.12	2015.05	1122.04
	5.980	500.00	.00	.00	1482.10	7225.00	1492.86	.00	1493.25	36.56	6.23	1604.62	1194.85
	6.070	490.00	.00	.00	1484.10	6735.00	1493.95	.00	1494.39	49.30	6.86	1586.63	959.21
	6.070	490.00	.00	.00	1484.10	6735.00	1494.80	.00	1495.47	54.93	7.73	1194.31	908.73
	6.150	440.00	.00	.00	1484.60	6735.00	1495.90	.00	1496.22	35.63	6.25	1896.69	1128.34
	6.150	440.00	.00	.00	1484.60	6735.00	1496.87	.00	1497.23	29.57	6.07	1604.37	1238.56
	6.220	360.00	.00	.00	1487.20	5416.00	1497.00	.00	1497.21	20.16	4.27	1713.71	1206.13
	6.220	360.00	.00	.00	1487.20	5416.00	1497.83	.00	1498.02	15.22	3.97	1704.01	1388.34
*	6.270	290.00	.00	.00	1490.70	3446.00	1497.49	.00	1497.95	21.50	5.52	638.81	743.25
*	6.270	290.00	.00	.00	1490.70	3446.00	1498.18	.00	1498.71	21.58	5.85	589.50	741.85
	6.272	10.00	1498.89	1498.51	1490.40	3446.00	1497.23	.00	1498.25	21.62	8.21	426.24	741.20
	6.272	10.00	1498.89	1498.51	1490.40	3446.00	1497.77	.00	1499.16	29.07	9.46	364.32	639.16
*	6.300	136.00	1498.89	1499.64	1491.53	3446.00	1499.35	1495.77	1500.16	19.59	7.72	509.49	778.58
*	6.300	136.00	1498.89	1499.64	1491.53	3446.00	1499.89	1495.66	1501.05	35.11	8.72	415.98	581.55
	6.303	10.00	.00	.00	1491.53	3446.00	1500.18	.00	1500.36	7.68	3.83	1293.64	1243.80
*	6.303	10.00	.00	.00	1491.53	3446.00	1501.05	.00	1501.33	8.73	4.36	909.24	1166.48
	6.350	240.00	.00	.00	1491.20	3446.00	1500.51	.00	1500.56	7.46	2.47	2205.15	1261.50
	6.350	240.00	.00	.00	1491.20	3446.00	1501.46	.00	1501.51	5.33	2.27	2010.10	1493.20
*	6.400	250.00	.00	.00	1493.60	3446.00	1500.75	.00	1500.94	28.38	4.39	1187.49	646.82
*	6.400	250.00	.00	.00	1493.60	3446.00	1501.62	.00	1501.76	16.86	3.70	1281.76	839.32
	6.490	500.00	.00	.00	1494.70	3446.00	1502.25	.00	1502.47	31.36	4.28	1067.85	615.38
	6.490	500.00	.00	.00	1494.70	3446.00	1502.65	.00	1502.91	29.38	4.35	906.23	635.80
	6.590	510.00	.00	.00	1496.30	3446.00	1504.12	.00	1504.57	50.69	5.74	750.48	484.01
	6.590	510.00	.00	.00	1496.30	3446.00	1504.45	.00	1505.02	55.08	6.20	586.63	464.34
	6.670	450.00	.00	.00	1498.20	3446.00	1506.65	.00	1507.09	61.03	6.07	829.12	441.11
	6.670	450.00	.00	.00	1498.20	3446.00	1507.11	.00	1507.73	65.86	6.65	610.60	424.61
	6.770	470.00	.00	.00	1500.30	3446.00	1509.09	.00	1509.38	48.04	5.63	1093.23	497.20
	6.770	470.00	.00	.00	1500.30	3446.00	1509.86	.00	1510.28	49.45	6.18	806.81	490.05
	6.820	260.00	.00	.00	1501.60	3446.00	1510.17	.00	1510.34	34.44	4.97	1361.76	587.21
	6.820	260.00	.00	.00	1501.60	3446.00	1511.07	.00	1511.41	42.98	6.01	870.83	525.66
	6.900	400.00	.00	.00	1503.30	3446.00	1511.79	.00	1512.09	49.77	5.16	964.76	488.44
	6.900	400.00	.00	.00	1503.30	3446.00	1512.64	.00	1512.86	29.03	4.36	1011.33	639.56

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	6.990	470.00	.00	.00	1505.40	2894.00	1514.35	.00	1514.55	54.81	5.22	1006.02	390.90
*	6.990	470.00	.00	.00	1505.40	2894.00	1514.62	.00	1515.13	99.01	7.24	590.49	290.85
*	7.080	460.00	.00	.00	1507.50	2894.00	1515.71	.00	1515.84	17.33	3.50	1207.37	695.14
*	7.080	460.00	.00	.00	1507.50	2894.00	1516.43	.00	1516.57	14.81	3.47	1062.05	751.99
*	7.160	410.00	.00	.00	1508.60	2894.00	1516.77	.00	1517.02	51.61	5.29	875.00	402.82
*	7.160	410.00	.00	.00	1508.60	2894.00	1517.33	.00	1517.73	59.39	6.06	652.97	375.53
*	7.200	250.00	.00	.00	1509.10	2894.00	1518.62	.00	1518.86	111.10	4.03	750.49	274.56
	7.200	250.00	.00	.00	1509.10	2894.00	1519.30	.00	1519.55	88.07	3.91	730.11	308.38
	7.230	140.00	.00	.00	1509.00	2894.00	1520.28	.00	1520.86	168.69	6.38	515.05	222.82
	7.230	140.00	.00	.00	1509.00	2894.00	1520.69	.00	1521.26	157.68	6.27	497.58	230.47
*	7.260	150.00	.00	.00	1514.20	2894.00	1521.72	.00	1521.82	32.92	2.49	1114.37	504.37
*	7.260	150.00	.00	.00	1514.20	2894.00	1522.12	.00	1522.24	34.45	2.68	1029.05	493.05
*	7.340	400.00	.00	.00	1516.40	2894.00	1522.66	.00	1522.69	15.55	1.50	1987.01	733.94
	7.340	400.00	.00	.00	1516.40	2894.00	1523.21	.00	1523.26	19.75	1.83	1585.64	651.28
*	7.410	400.00	.00	.00	1519.50	2894.00	1523.55	.00	1523.62	36.28	1.92	1424.53	480.44
*	7.410	400.00	.00	.00	1519.50	2894.00	1524.28	.00	1524.38	40.60	2.31	1162.55	454.19
	7.510	500.00	.00	.00	1521.80	2894.00	1525.63	.00	1525.71	48.57	2.29	1271.01	415.24
	7.510	500.00	.00	.00	1521.80	2894.00	1526.32	.00	1526.41	40.68	2.36	1201.35	453.74
	7.590	430.00	.00	.00	1523.60	2894.00	1527.60	.00	1527.69	42.27	2.00	1243.03	445.13
	7.590	430.00	.00	.00	1523.60	2894.00	1528.13	.00	1528.26	44.13	2.26	1069.37	435.62
	7.680	480.00	.00	.00	1525.80	2894.00	1530.01	.00	1530.10	59.71	1.95	1247.80	374.52
	7.680	480.00	.00	.00	1525.80	2894.00	1530.88	.00	1531.00	76.85	2.72	1021.79	330.12
	7.770	490.00	.00	.00	1527.90	2894.00	1533.09	.00	1533.18	66.73	2.24	1253.17	354.27
	7.770	490.00	.00	.00	1527.90	2894.00	1533.69	.00	1533.77	43.17	2.06	1348.22	440.44
	7.850	440.00	.00	.00	1529.90	2894.00	1535.32	.00	1535.37	37.59	1.90	1517.79	472.02
	7.850	440.00	.00	.00	1529.90	2894.00	1535.85	.00	1535.95	56.79	2.59	1111.28	384.03
	7.950	500.00	.00	.00	1532.10	1723.00	1536.45	.00	1536.47	11.41	1.07	1522.82	510.09
	7.950	500.00	.00	.00	1532.10	1723.00	1537.35	.00	1537.38	12.72	1.32	1226.92	483.12
*	8.040	500.00	.00	.00	1535.00	1723.00	1537.64	.00	1537.72	86.22	2.14	765.55	185.56
*	8.040	500.00	.00	.00	1535.00	1723.00	1538.47	.00	1538.54	52.82	2.09	820.42	237.08
*	8.130	470.00	.00	.00	1536.10	1723.00	1540.44	.00	1540.48	41.62	1.69	1038.23	267.06
	8.130	470.00	.00	.00	1536.10	1723.00	1540.63	.00	1540.67	39.38	1.73	998.56	274.58
*	8.230	500.00	.00	.00	1539.50	873.00	1542.27	.00	1542.29	27.15	1.19	759.76	167.53
	8.230	500.00	.00	.00	1539.50	873.00	1542.51	.00	1542.54	33.58	1.41	619.47	150.64

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	8.300	400.00	.00	.00	1540.00	113.00	1542.74	.00	1542.74	.57	.15	608.44	149.47
*	8.300	400.00	.00	.00	1540.00	113.00	1543.23	.00	1543.23	1.65	.29	386.57	88.02

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	.090	15717.00	1257.33	.00	.00	.00	943.22	.00
	.090	15717.00	1258.33	1.00	.00	1.00	540.00	.00
	.180	15717.00	1263.66	.00	6.33	.00	818.59	470.00
	.180	15717.00	1264.14	.48	5.81	.48	570.00	470.00
	.260	15717.00	1269.61	.00	5.94	.00	783.31	415.00
	.260	15717.00	1270.22	.61	6.08	.61	501.00	415.00
	.350	15717.00	1276.02	.00	6.42	.00	751.97	480.00
	.350	15717.00	1276.62	.59	6.40	.59	511.00	480.00
	.450	15717.00	1282.56	.00	6.54	.00	1052.98	490.00
	.450	15717.00	1283.46	.90	6.85	.90	450.00	490.00
*	.530	15717.00	1287.97	.00	5.41	.00	602.72	420.00
	.530	15717.00	1288.81	.84	5.35	.84	280.00	420.00
	.610	15717.00	1292.50	.00	4.52	.00	633.54	430.00
	.610	15717.00	1292.99	.50	4.18	.50	322.00	430.00
*	.700	15717.00	1297.53	.00	5.03	.00	645.60	510.00
	.700	15717.00	1298.00	.47	5.01	.47	334.00	510.00
	.790	15717.00	1303.27	.00	5.74	.00	608.82	460.00
	.790	15717.00	1303.87	.60	5.87	.60	442.00	460.00
	.890	15717.00	1309.94	.00	6.67	.00	647.82	520.00
	.890	15717.00	1310.84	.90	6.96	.90	509.00	520.00
*	.940	15717.00	1313.79	.00	3.85	.00	328.56	300.00
	.940	15717.00	1313.90	.11	3.06	.11	327.00	300.00
*	1.020	15717.00	1319.16	.00	5.37	.00	582.00	420.00
*	1.020	15717.00	1319.53	.37	5.63	.37	580.00	420.00
*	1.120	15717.00	1323.17	.00	4.01	.00	478.36	490.00
*	1.120	15717.00	1323.53	.36	4.00	.36	476.00	490.00
	1.210	15717.00	1328.69	.00	5.52	.00	531.17	490.00
	1.210	15717.00	1328.80	.11	5.27	.11	333.00	490.00
	1.300	15717.00	1333.15	.00	4.47	.00	421.15	490.00
	1.300	15717.00	1333.71	.56	4.91	.56	334.00	490.00
*	1.390	15717.00	1339.02	.00	5.87	.00	234.52	470.00
*	1.390	15717.00	1339.04	.01	5.32	.01	214.00	470.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.480	15351.00	1343.83	.00	4.81	.00	531.79	450.00
*	1.480	15351.00	1343.92	.08	4.88	.08	200.00	450.00
*	1.580	15351.00	1346.15	.00	2.32	.00	623.02	520.00
	1.580	15351.00	1347.10	.94	3.18	.94	314.00	520.00
*	1.670	15351.00	1350.46	.00	4.30	.00	610.52	500.00
	1.670	15351.00	1350.84	.38	3.74	.38	462.00	500.00
	1.770	15351.00	1355.51	.00	5.05	.00	617.20	530.00
	1.770	15351.00	1355.37	-.14	4.53	-.14	563.50	530.00
	1.870	15351.00	1359.07	.00	3.56	.00	547.56	500.00
	1.870	15351.00	1359.26	.20	3.90	.20	375.00	500.00
	1.950	15351.00	1362.86	.00	3.80	.00	814.22	440.00
*	1.950	15351.00	1363.73	.86	4.46	.86	540.00	440.00
	2.050	15351.00	1366.34	.00	3.48	.00	897.64	500.00
	2.050	15351.00	1367.08	.74	3.36	.74	550.00	500.00
	2.140	15351.00	1370.78	.00	4.44	.00	1080.98	490.00
	2.140	15351.00	1371.71	.92	4.62	.92	650.00	490.00
	2.230	15351.00	1374.07	.00	3.29	.00	1060.55	480.00
	2.230	15351.00	1374.93	.87	3.23	.87	650.00	480.00
	2.330	12861.00	1377.77	.00	3.70	.00	1099.41	510.00
	2.330	12861.00	1378.65	.89	3.72	.89	550.00	510.00
	2.430	12861.00	1381.52	.00	3.75	.00	1220.65	500.00
	2.430	12861.00	1382.22	.70	3.57	.70	600.00	500.00
	2.520	12861.00	1385.74	.00	4.22	.00	1168.71	510.00
	2.520	12861.00	1386.03	.28	3.81	.28	600.00	510.00
	2.620	12861.00	1389.05	.00	3.31	.00	950.09	500.00
	2.620	12861.00	1389.50	.46	3.48	.46	540.00	500.00
	2.710	12363.00	1392.95	.00	3.90	.00	940.83	480.00
	2.710	12363.00	1393.32	.37	3.81	.37	490.00	480.00
*	2.800	12363.00	1396.50	.00	3.55	.00	1065.79	500.00
	2.800	12363.00	1397.08	.59	3.77	.59	500.00	500.00
*	2.900	12363.00	1400.34	.00	3.84	.00	1226.78	540.00
*	2.900	12363.00	1401.30	.97	4.22	.97	540.00	540.00
*	2.990	12363.00	1402.67	.00	2.33	.00	833.41	490.00
	2.990	12363.00	1403.57	.91	2.27	.91	553.00	490.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	3.090	12363.00	1407.12	.00	4.45	.00	1012.16	500.00
*	3.090	12363.00	1407.35	.23	3.78	.23	625.00	500.00
	3.180	12363.00	1410.18	.00	3.07	.00	1018.76	470.00
*	3.180	12363.00	1411.20	1.01	3.85	1.01	660.00	470.00
	3.270	12363.00	1412.75	.00	2.57	.00	1082.57	500.00
	3.270	12363.00	1413.60	.85	2.40	.85	650.00	500.00
	3.370	12363.00	1416.04	.00	3.29	.00	1199.82	500.00
	3.370	12363.00	1416.98	.94	3.38	.94	650.00	500.00
	3.430	12363.00	1418.20	.00	2.16	.00	998.59	350.00
	3.430	12363.00	1419.20	1.00	2.22	1.00	650.00	350.00
	3.510	12363.00	1421.01	.00	2.81	.00	1100.55	430.00
	3.510	12363.00	1421.76	.75	2.56	.75	625.00	430.00
	3.600	10964.00	1423.59	.00	2.57	.00	1336.49	450.00
	3.600	10964.00	1424.58	1.00	2.82	1.00	625.00	450.00
	3.700	10964.00	1426.31	.00	2.72	.00	1224.18	520.00
	3.700	10964.00	1427.16	.85	2.58	.85	475.00	520.00
	3.790	10964.00	1429.62	.00	3.31	.00	1309.50	510.00
	3.790	10964.00	1430.39	.77	3.24	.77	425.00	510.00
	3.910	10964.00	1433.53	.00	3.91	.00	1143.13	600.00
	3.910	10964.00	1434.30	.77	3.91	.77	450.00	600.00
	3.990	10964.00	1435.24	.00	1.71	.00	815.50	440.00
*	3.990	10964.00	1435.94	.70	1.64	.70	551.00	440.00
	4.040	10358.00	1435.97	.00	.73	.00	818.40	240.00
	4.040	10358.00	1436.44	.48	.50	.48	590.00	240.00
	4.070	10358.00	1437.05	.00	1.08	.00	674.00	150.00
	4.070	10358.00	1437.23	.18	.79	.18	674.00	150.00
*	4.071	10358.00	1437.72	.00	.67	.00	242.05	10.00
*	4.071	10358.00	1437.74	.03	.51	.03	242.05	10.00
*	4.100	10358.00	1440.80	.00	3.08	.00	243.38	170.00
*	4.100	10358.00	1440.82	.03	3.08	.03	243.39	170.00
*	4.110	10358.00	1440.47	.00	-.32	.00	242.71	10.00
*	4.110	10358.00	1440.50	.03	-.32	.03	242.72	10.00
*	4.200	10358.00	1443.69	.00	3.22	.00	1135.35	490.00
	4.200	10358.00	1443.87	.17	3.36	.17	600.00	490.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	4.290	10358.00	1445.28	.00	1.59	.00	923.75	500.00
*	4.290	10358.00	1445.68	.39	1.81	.39	450.00	500.00
*	4.390	10358.00	1448.51	.00	3.22	.00	1048.97	500.00
	4.390	10358.00	1449.09	.58	3.41	.58	400.00	500.00
	4.470	10358.00	1450.95	.00	2.44	.00	1044.66	470.00
	4.470	10358.00	1451.82	.87	2.74	.87	375.00	470.00
	4.570	8904.00	1453.87	.00	2.92	.00	936.01	510.00
	4.570	8904.00	1454.66	.80	2.84	.80	330.00	510.00
	4.670	8904.00	1455.91	.00	2.04	.00	849.03	520.00
	4.670	8904.00	1456.67	.76	2.00	.76	330.00	520.00
	4.760	8904.00	1458.53	.00	2.62	.00	822.47	490.00
*	4.760	8904.00	1458.96	.42	2.29	.42	300.00	490.00
	4.860	8904.00	1461.62	.00	3.09	.00	969.52	500.00
*	4.860	8904.00	1462.60	.98	3.65	.98	355.00	500.00
	4.950	8904.00	1463.67	.00	2.04	.00	1025.55	500.00
	4.950	8904.00	1464.41	.75	1.81	.75	300.00	500.00
	5.040	8904.00	1466.01	.00	2.35	.00	1049.92	460.00
	5.040	8904.00	1466.87	.86	2.46	.86	448.15	460.00
	5.130	8079.00	1468.99	.00	2.98	.00	840.96	490.00
	5.130	8079.00	1469.90	.91	3.02	.91	438.70	490.00
	5.230	8079.00	1471.81	.00	2.82	.00	709.17	500.00
	5.230	8079.00	1472.26	.44	2.36	.44	250.00	500.00
*	5.320	8079.00	1474.38	.00	2.56	.00	662.84	500.00
	5.320	8079.00	1474.91	.53	2.65	.53	250.00	500.00
*	5.420	8079.00	1477.29	.00	2.91	.00	901.76	500.00
*	5.420	8079.00	1478.15	.86	3.24	.86	250.00	500.00
	5.510	8079.00	1479.16	.00	1.87	.00	703.77	500.00
*	5.510	8079.00	1479.81	.65	1.66	.65	270.00	500.00
*	5.600	7225.00	1481.39	.00	2.23	.00	744.79	450.00
	5.600	7225.00	1482.28	.89	2.47	.89	300.00	450.00
	5.690	7225.00	1484.75	.00	3.36	.00	738.30	500.00
	5.690	7225.00	1485.12	.37	2.84	.37	250.00	500.00
	5.790	7225.00	1487.37	.00	2.62	.00	643.84	500.00
	5.790	7225.00	1487.93	.56	2.81	.56	250.00	500.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	5.880	7225.00	1490.15	.00	2.78	.00	644.20	490.00
	5.880	7225.00	1491.03	.89	3.11	.89	250.00	490.00
	5.980	7225.00	1491.86	.00	1.71	.00	817.45	500.00
	5.980	7225.00	1492.86	1.01	1.83	1.01	310.00	500.00
	6.070	6735.00	1493.95	.00	2.10	.00	641.94	490.00
	6.070	6735.00	1494.80	.85	1.94	.85	250.00	490.00
	6.150	6735.00	1495.90	.00	1.94	.00	664.29	440.00
	6.150	6735.00	1496.87	.97	2.06	.97	300.00	440.00
	6.220	5416.00	1497.00	.00	1.11	.00	507.99	360.00
	6.220	5416.00	1497.83	.82	.96	.82	300.00	360.00
*	6.270	3446.00	1497.49	.00	.49	.00	102.51	290.00
*	6.270	3446.00	1498.18	.69	.35	.69	79.98	290.00
	6.272	3446.00	1497.23	.00	-.26	.00	99.84	10.00
	6.272	3446.00	1497.77	.54	-.40	.54	77.90	10.00
*	6.300	3446.00	1499.35	.00	2.12	.00	428.14	136.00
*	6.300	3446.00	1499.89	.54	2.12	.54	200.00	136.00
	6.303	3446.00	1500.18	.00	.83	.00	755.61	10.00
*	6.303	3446.00	1501.05	.87	1.16	.87	200.00	10.00
	6.350	3446.00	1500.51	.00	.32	.00	964.87	240.00
	6.350	3446.00	1501.46	.95	.41	.95	400.00	240.00
*	6.400	3446.00	1500.75	.00	.24	.00	545.28	250.00
*	6.400	3446.00	1501.62	.87	.16	.87	350.00	250.00
	6.490	3446.00	1502.25	.00	1.50	.00	427.39	500.00
	6.490	3446.00	1502.65	.41	1.03	.41	200.00	500.00
	6.590	3446.00	1504.12	.00	1.88	.00	327.11	510.00
	6.590	3446.00	1504.45	.32	1.79	.32	122.30	510.00
	6.670	3446.00	1506.65	.00	2.52	.00	445.75	450.00
	6.670	3446.00	1507.11	.46	2.66	.46	163.00	450.00
	6.770	3446.00	1509.09	.00	2.44	.00	626.88	470.00
	6.770	3446.00	1509.86	.77	2.75	.77	250.00	470.00
	6.820	3446.00	1510.17	.00	1.08	.00	743.91	260.00
	6.820	3446.00	1511.07	.90	1.21	.90	250.00	260.00
	6.900	3446.00	1511.79	.00	1.62	.00	549.79	400.00
	6.900	3446.00	1512.64	.85	1.57	.85	275.00	400.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	6.990	2894.00	1514.35	.00	2.55	.00	646.50	470.00
*	6.990	2894.00	1514.62	.28	1.98	.28	225.00	470.00
*	7.080	2894.00	1515.71	.00	1.37	.00	405.38	460.00
*	7.080	2894.00	1516.43	.72	1.81	.72	225.00	460.00
*	7.160	2894.00	1516.77	.00	1.05	.00	451.62	410.00
*	7.160	2894.00	1517.33	.56	.90	.56	200.00	410.00
*	7.200	2894.00	1518.62	.00	1.86	.00	274.42	250.00
	7.200	2894.00	1519.30	.68	1.97	.68	154.00	250.00
	7.230	2894.00	1520.28	.00	1.66	.00	183.53	140.00
	7.230	2894.00	1520.69	.41	1.39	.41	122.46	140.00
*	7.260	2894.00	1521.72	.00	1.43	.00	298.39	150.00
*	7.260	2894.00	1522.12	.40	1.43	.40	199.69	150.00
*	7.340	2894.00	1522.66	.00	.94	.00	727.24	400.00
	7.340	2894.00	1523.21	.55	1.09	.55	320.00	400.00
*	7.410	2894.00	1523.55	.00	.89	.00	630.38	400.00
*	7.410	2894.00	1524.28	.72	1.06	.72	300.00	400.00
	7.510	2894.00	1525.63	.00	2.08	.00	528.23	500.00
	7.510	2894.00	1526.32	.69	2.04	.69	293.00	500.00
	7.590	2894.00	1527.60	.00	1.97	.00	529.45	430.00
	7.590	2894.00	1528.13	.53	1.81	.53	297.00	430.00
	7.680	2894.00	1530.01	.00	2.41	.00	619.82	480.00
	7.680	2894.00	1530.88	.87	2.74	.87	325.00	480.00
	7.770	2894.00	1533.09	.00	3.09	.00	552.50	490.00
	7.770	2894.00	1533.69	.60	2.82	.60	420.00	490.00
	7.850	2894.00	1535.32	.00	2.22	.00	740.25	440.00
	7.850	2894.00	1535.85	.53	2.16	.53	300.00	440.00
	7.950	1723.00	1536.45	.00	1.14	.00	675.11	500.00
	7.950	1723.00	1537.35	.89	1.50	.89	308.00	500.00
*	8.040	1723.00	1537.64	.00	1.18	.00	453.59	500.00
*	8.040	1723.00	1538.47	.83	1.12	.83	285.00	500.00
*	8.130	1723.00	1540.44	.00	2.80	.00	510.72	470.00
	8.130	1723.00	1540.63	.19	2.16	.19	370.00	470.00
*	8.230	873.00	1542.27	.00	1.84	.00	546.99	500.00
	8.230	873.00	1542.51	.23	1.88	.23	275.00	500.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	8.300	113.00	1542.74	.00	.47	.00	437.18	400.00
*	8.300	113.00	1543.23	.49	.73	.49	200.00	400.00

SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=      .530  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      .530  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      .700  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      .700  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      .940  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      .940  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     1.020  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     1.020  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     1.120  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     1.120  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     1.390  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     1.390  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     1.390  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     1.390  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     1.480  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     1.480  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     1.580  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     1.670  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     1.670  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     1.950  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     2.800  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     2.800  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     2.900  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     2.900  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     2.990  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     3.090  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     3.180  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     3.990  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     4.071  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     4.071  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     4.071  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=     4.071  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     4.071  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     4.071  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
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NOTE    SECNO=     4.100  PROFILE=  1  WSEL BASED ON X5 CARD
WARNING SECNO=     4.100  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
NOTE    SECNO=     4.100  PROFILE=  2  WSEL BASED ON X5 CARD
WARNING SECNO=     4.100  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     4.110  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     4.110  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     4.200  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     4.200  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     4.290  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     4.290  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     4.390  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     4.760  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     4.860  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     5.320  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     5.320  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     5.420  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     5.420  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     5.510  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     5.600  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     5.600  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     5.880  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     6.270  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     6.270  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

NOTE    SECNO=     6.300  PROFILE=  1  WSEL BASED ON X5 CARD
NOTE    SECNO=     6.300  PROFILE=  2  WSEL BASED ON X5 CARD

WARNING SECNO=     6.303  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     6.303  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     6.400  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     6.400  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     6.990  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     7.080  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     7.080  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     7.160  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     7.160  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     7.200  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO=      7.260  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      7.260  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      7.340  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      7.410  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      7.410  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      8.040  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      8.040  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      8.130  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      8.230  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      8.230  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      8.300  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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Floodway width summary: Wagner Wash FIS
Profile No. 2

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
.090	1.00	540.00	9568.00	65.65	9633.65	474.35	10108.00
.180	.48	570.00	9730.00	182.35	9912.35	387.65	10300.00
.260	.61	501.00	9799.00	125.70	9924.70	375.30	10300.00
.350	.59	511.00	9900.00	188.70	10088.70	322.30	10411.00
.450	.90	450.00	9750.00	264.20	10014.20	185.80	10200.00
.530	.84	280.00	9849.00	205.70	10054.70	74.30	10129.00
.610	.50	322.00	9800.00	246.50	10046.50	75.50	10122.00
.700	.47	334.00	9850.00	200.40	10050.40	133.60	10184.00
.790	.60	442.00	9838.00	88.25	9926.25	353.75	10280.00
.890	.90	509.00	9761.00	188.90	9949.90	320.10	10270.00
.940	.11	327.00	9873.00	168.75	10041.75	158.25	10200.00
1.020	.37	580.00	9603.00	291.25	9894.25	288.75	10183.00
1.120	.36	476.00	9684.00	224.40	9908.40	251.60	10160.00
1.210	.11	333.00	9744.00	152.60	9896.60	180.40	10077.00
1.300	.56	334.00	9763.00	140.90	9903.90	193.10	10097.00
1.390	.01	214.00	9852.00	80.25	9932.25	133.75	10066.00
1.480	.08	200.00	9848.00	96.95	9944.95	103.05	10048.00
1.580	.94	314.00	9920.00	178.25	10098.25	135.75	10234.00
1.670	.38	462.00	9775.00	317.60	10092.60	144.40	10237.00
1.770	-.14	570.00	9750.00	396.25	10146.25	173.75	10320.00
1.870	.20	375.00	9780.00	162.50	9942.50	212.50	10155.00
1.950	.86	540.00	9810.00	128.15	9938.15	411.85	10350.00
2.050	.74	550.00	9700.00	210.40	9910.40	339.60	10250.00
2.140	.92	650.00	9550.00	334.35	9884.35	315.65	10200.00
2.230	.87	650.00	9650.00	283.30	9933.30	366.70	10300.00
2.330	.89	550.00	9700.00	252.65	9952.65	297.35	10250.00
2.430	.70	600.00	9950.00	80.65	10030.65	519.35	10550.00
2.520	.28	600.00	9950.00	292.65	10242.65	307.35	10550.00
2.620	.46	540.00	9866.00	468.05	10334.05	71.95	10406.00
2.710	.37	490.00	9725.00	407.75	10132.75	82.25	10215.00
2.800	.59	500.00	9600.00	378.40	9978.40	121.60	10100.00
2.900	.97	540.00	9750.00	139.30	9889.30	400.70	10290.00
2.990	.91	553.00	9847.00	121.05	9968.05	431.95	10400.00
3.090	.23	625.00	9880.00	173.10	10053.10	451.90	10505.00
3.180	1.01	660.00	9900.00	110.00	10010.00	550.00	10560.00
3.270	.85	650.00	9875.00	208.40	10083.40	441.60	10525.00
3.370	.94	650.00	9950.00	145.25	10095.25	504.75	10600.00
3.430	1.00	650.00	9900.00	128.75	10028.75	521.25	10550.00
3.510	.75	625.00	9950.00	62.10	10012.10	562.90	10575.00
3.600	1.00	625.00	9905.00	144.35	10049.35	480.65	10530.00
3.700	.85	475.00	9950.00	125.65	10075.65	349.35	10425.00
3.790	.77	425.00	9900.00	217.20	10117.20	207.80	10325.00
3.910	.77	450.00	9750.00	150.45	9900.45	299.55	10200.00
3.990	.70	551.00	9659.00	197.15	9856.15	353.85	10210.00
4.040	.48	590.00	9670.00	199.30	9869.30	390.70	10260.00
4.070	.18	674.00	9680.00	337.00	10017.00	337.00	10354.00
4.071	.03	649.00	9679.00	324.50	10003.50	324.50	10328.00

4.100	.03	799.00	9579.00	399.50	9978.50	399.50	10378.00
4.110	.03	818.00	9560.00	418.50	9978.50	399.50	10378.00
4.200	.17	600.00	9700.00	280.40	9980.40	319.60	10300.00
4.290	.39	450.00	9700.00	292.10	9992.10	157.90	10150.00
4.390	.58	400.00	9750.00	125.00	9875.00	275.00	10150.00
4.470	.87	375.00	9825.00	160.65	9985.65	214.35	10200.00
4.570	.80	330.00	9920.00	102.60	10022.60	227.40	10250.00
4.670	.76	330.00	9810.00	181.50	9991.50	148.50	10140.00
4.760	.42	300.00	9825.00	182.25	10007.25	117.75	10125.00
4.860	.98	355.00	9820.00	181.95	10001.95	173.05	10175.00
4.950	.75	300.00	9850.00	113.50	9963.50	186.50	10150.00
5.040	.86	450.00	9900.00	102.30	10002.30	347.70	10350.00
5.130	.91	450.00	9880.00	119.10	9999.10	330.90	10330.00
5.230	.44	250.00	9900.00	92.50	9992.50	157.50	10150.00
5.320	.53	250.00	9800.00	205.15	10005.15	44.85	10050.00
5.420	.86	250.00	9850.00	110.00	9960.00	140.00	10100.00
5.510	.65	270.00	9800.00	169.15	9969.15	100.85	10070.00
5.600	.89	300.00	9850.00	114.80	9964.80	185.20	10150.00
5.690	.37	250.00	9875.00	85.95	9960.95	164.05	10125.00
5.790	.56	250.00	9875.00	118.95	9993.95	131.05	10125.00
5.880	.89	250.00	9875.00	126.80	10001.80	123.20	10125.00
5.980	1.01	310.00	9820.00	185.80	10005.80	124.20	10130.00
6.070	.85	250.00	9875.00	129.10	10004.10	120.90	10125.00
6.150	.97	300.00	9850.00	158.00	10008.00	142.00	10150.00
6.220	.82	300.00	9850.00	172.90	10022.90	127.10	10150.00
6.270	.69	200.00	9900.00	100.00	10000.00	100.00	10100.00
6.272	.54	200.00	9900.00	99.00	9999.00	101.00	10100.00
6.300	.54	200.00	9900.00	99.00	9999.00	101.00	10100.00
6.303	.87	200.00	9900.00	99.00	9999.00	101.00	10100.00
6.350	.95	400.00	9800.00	219.60	10019.60	180.40	10200.00
6.400	.87	350.00	9900.00	106.45	10006.45	243.55	10250.00
6.490	.41	200.00	9950.00	78.80	10028.80	121.20	10150.00
6.590	.32	150.00	9900.00	90.05	9990.05	59.95	10050.00
6.670	.46	163.00	9900.00	125.15	10025.15	37.85	10063.00
6.770	.77	250.00	9950.00	58.80	10008.80	191.20	10200.00
6.820	.90	250.00	9900.00	103.10	10003.10	146.90	10150.00
6.900	.85	275.00	9835.00	162.95	9997.95	112.05	10110.00
6.990	.28	225.00	9900.00	97.35	9997.35	127.65	10125.00
7.080	.72	225.00	9850.00	158.55	10008.55	66.45	10075.00
7.160	.56	200.00	9900.00	109.75	10009.75	90.25	10100.00
7.200	.68	154.00	9950.00	92.10	10042.10	61.90	10104.00
7.230	.41	129.00	9965.00	32.50	9997.50	96.50	10094.00
7.260	.40	200.00	9940.00	67.10	10007.10	132.90	10140.00
7.340	.55	320.00	9790.00	160.15	9950.15	159.85	10110.00
7.410	.72	300.00	9825.00	148.65	9973.65	151.35	10125.00
7.510	.69	293.00	9782.00	130.40	9912.40	162.60	10075.00
7.590	.53	297.00	9875.00	209.15	10084.15	87.85	10172.00
7.680	.87	325.00	9900.00	187.30	10087.30	137.70	10225.00
7.770	.60	420.00	9925.00	240.35	10165.35	179.65	10345.00
7.850	.53	300.00	9950.00	149.45	10099.45	150.55	10250.00
7.950	.89	308.00	9800.00	192.25	9992.25	115.75	10108.00
8.040	.83	285.00	9850.00	143.45	9993.45	141.55	10135.00
8.130	.19	370.00	9839.00	183.40	10022.40	186.60	10209.00
8.230	.23	275.00	9815.00	139.30	9954.30	135.70	10090.00

8.300	.49	200.00	9900.00	108.90	10008.90	91.10	10100.00

FLOODWAY DATA, Wagner Wash FIS
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
.090	540.	2426.	6.5	1258.3	1257.3	1.0
.180	570.	1960.	8.0	1264.2	1263.7	.5
.260	501.	1948.	8.1	1270.2	1269.6	.6
.350	511.	2063.	7.6	1276.6	1276.0	.6
.450	450.	1852.	8.5	1283.5	1282.6	.9
.530	280.	1585.	9.9	1288.8	1288.0	.8
.610	322.	1645.	9.6	1293.0	1292.5	.5
.700	334.	1493.	10.5	1298.0	1297.5	.5
.790	442.	1749.	9.0	1303.9	1303.3	.6
.890	509.	2129.	7.4	1310.8	1309.9	.9
.940	327.	1394.	11.3	1313.9	1313.8	.1
1.020	580.	2530.	6.2	1319.6	1319.2	.4
1.120	476.	1860.	8.4	1323.6	1323.2	.4
1.210	333.	1530.	10.3	1328.8	1328.7	.1
1.300	334.	1645.	9.6	1333.8	1333.2	.6
1.390	214.	1217.	12.9	1339.0	1339.0	.0
1.480	200.	1565.	9.8	1343.9	1343.8	.1
1.580	314.	1736.	8.8	1347.1	1346.2	.9
1.670	462.	1808.	8.5	1350.9	1350.5	.4
1.770	570.	2016.	7.6	1355.4	1355.5	-.1
1.870	375.	1588.	9.7	1359.3	1359.1	.2
1.950	540.	2525.	6.1	1363.8	1362.9	.9
2.050	550.	1988.	7.7	1367.0	1366.3	.7
2.140	650.	2493.	6.2	1371.7	1370.8	.9
2.230	650.	2387.	6.4	1375.0	1374.1	.9
2.330	550.	2175.	5.9	1378.7	1377.8	.9
2.430	600.	2190.	5.9	1382.2	1381.5	.7
2.520	600.	2065.	6.2	1386.0	1385.7	.3
2.620	540.	1878.	6.8	1389.5	1389.0	.5
2.710	490.	1967.	6.3	1393.3	1392.9	.4
2.800	500.	1628.	7.6	1397.1	1396.5	.6
2.900	540.	2394.	5.2	1401.3	1400.3	1.0
2.990	553.	2319.	5.3	1403.6	1402.7	.9
3.090	625.	1777.	7.0	1407.3	1407.1	.2
3.180	660.	2672.	4.6	1411.2	1410.2	1.0
3.270	650.	2317.	5.3	1413.6	1412.7	.9
3.370	650.	2233.	5.5	1416.9	1416.0	.9
3.430	650.	2476.	5.0	1419.2	1418.2	1.0
3.510	625.	2181.	5.7	1421.8	1421.0	.8
3.600	625.	2159.	5.1	1424.6	1423.6	1.0
3.700	475.	1748.	6.3	1427.2	1426.3	.9
3.790	425.	1545.	7.1	1430.4	1429.6	.8

FLOODWAY DATA, Wagner Wash FIS
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
3.910	450.	1834.	6.0	1434.3	1433.5	.8
3.990	551.	2410.	4.5	1435.9	1435.2	.7
4.040	590.	1933.	5.4	1436.5	1436.0	.5
4.070	674.	2196.	4.7	1437.2	1437.0	.2
4.071	647.	913.	11.3	1437.7	1437.7	.0
4.100	798.	1591.	6.5	1440.8	1440.8	.0
4.110	798.	1126.	9.2	1440.5	1440.5	.0
4.200	600.	2548.	4.1	1443.9	1443.7	.2
4.290	450.	1533.	6.8	1445.7	1445.3	.4
4.390	400.	1752.	5.9	1449.1	1448.5	.6
4.470	375.	1616.	6.4	1451.8	1450.9	.9
4.570	330.	1659.	5.4	1454.7	1453.9	.8
4.670	330.	1626.	5.5	1456.7	1455.9	.8
4.760	300.	1213.	7.3	1458.9	1458.5	.4
4.860	355.	1803.	4.9	1462.6	1461.6	1.0
4.950	300.	1466.	6.1	1464.4	1463.7	.7
5.040	450.	1532.	5.8	1466.9	1466.0	.9
5.130	450.	1613.	5.0	1469.9	1469.0	.9
5.230	250.	1244.	6.5	1472.2	1471.8	.4
5.320	250.	1008.	8.0	1474.9	1474.4	.5
5.420	250.	1434.	5.6	1478.2	1477.3	.9
5.510	270.	1305.	6.2	1479.9	1479.2	.7
5.600	300.	1106.	6.5	1482.3	1481.4	.9
5.690	250.	1022.	7.1	1485.1	1484.7	.4
5.790	250.	1058.	6.8	1488.0	1487.4	.6
5.880	250.	1510.	4.8	1491.0	1490.1	.9
5.980	310.	1605.	4.5	1492.9	1491.9	1.0
6.070	250.	1194.	5.6	1494.9	1494.0	.9
6.150	300.	1604.	4.2	1496.9	1495.9	1.0
6.220	300.	1704.	3.2	1497.8	1497.0	.8
6.270	80.	589.	5.8	1498.2	1497.5	.7
6.272	78.	364.	9.5	1497.7	1497.2	.5
6.300	200.	416.	8.3	1499.9	1499.4	.5
6.303	200.	909.	3.8	1501.1	1500.2	.9
6.350	400.	2010.	1.7	1501.5	1500.5	1.0
6.400	350.	1282.	2.7	1501.6	1500.7	.9
6.490	200.	906.	3.8	1502.6	1502.2	.4
6.590	150.	587.	5.9	1504.4	1504.1	.3
6.670	163.	611.	5.6	1507.1	1506.6	.5
6.770	250.	807.	4.3	1509.9	1509.1	.8
6.820	250.	871.	4.0	1511.1	1510.2	.9
6.900	275.	1011.	3.4	1512.6	1511.8	.8

FLOODWAY DATA, Wagner Wash FIS
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
6.990	225.	590.	4.9	1514.6	1514.3	.3
7.080	225.	1062.	2.7	1516.4	1515.7	.7
7.160	200.	653.	4.4	1517.4	1516.8	.6
7.200	154.	730.	4.0	1519.3	1518.6	.7
7.230	122.	498.	5.8	1520.7	1520.3	.4
7.260	200.	1029.	2.8	1522.1	1521.7	.4
7.340	320.	1586.	1.8	1523.3	1522.7	.6
7.410	300.	1163.	2.5	1524.3	1523.6	.7
7.510	293.	1201.	2.4	1526.3	1525.6	.7
7.590	297.	1069.	2.7	1528.1	1527.6	.5
7.680	325.	1022.	2.8	1530.9	1530.0	.9
7.770	420.	1348.	2.1	1533.7	1533.1	.6
7.850	300.	1111.	2.6	1535.8	1535.3	.5
7.950	308.	1227.	1.4	1537.4	1536.5	.9
8.040	285.	820.	2.1	1538.4	1537.6	.8
8.130	370.	999.	1.7	1540.6	1540.4	.2
8.230	275.	619.	1.4	1542.5	1542.3	.2
8.300	200.	387.	.3	1543.2	1542.7	.5

Normal program termination

SECTION 5: EROSION/SEDIMENT TRANSPORT

No analyses performed.

SECTION 6 : REFERENCE MATERIALS

Refer to FIS draft report for list of reference materials.

SECTION 7 : CROSS-REFERENCING AND LABELING INFORMATION

7.1 Refer to FIS draft report for information regarding other studies.

7.2 A cross-section labeling key follows this page.

7.2 KEY TO CROSS-SECTION (XS) LABELING

Prepared by :
SC: ETL
TEC:

Community: Maricopa County
State: Arizona

Date prepared:
SC: March 6, 1991
TEC:

Stream Name: Wagner Wash
Run Date: March 5, 1991

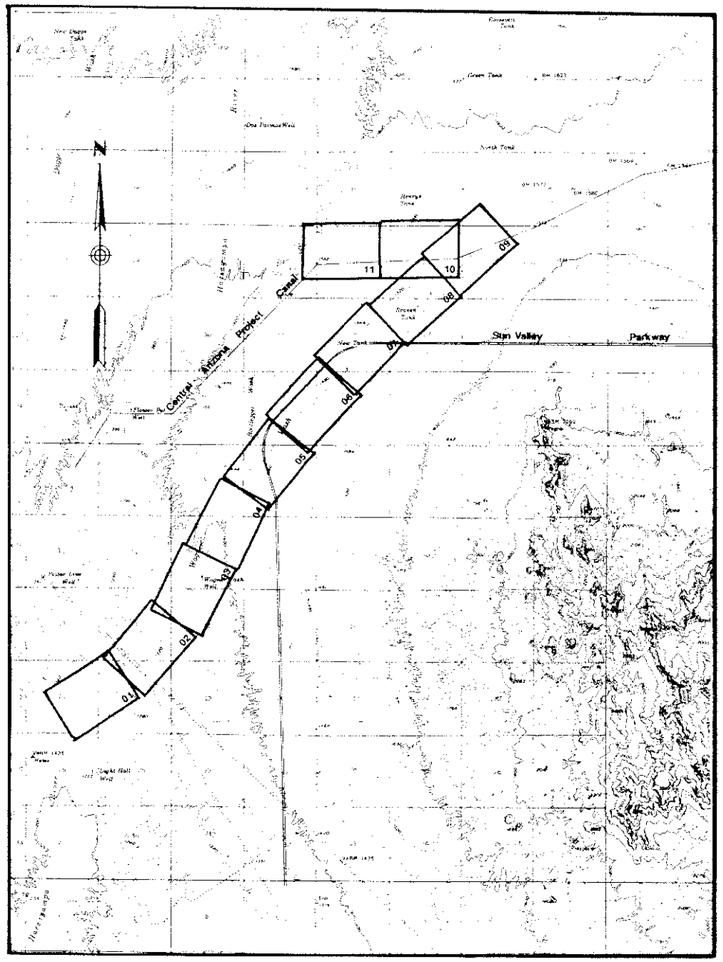
Field Survey Section No.	XS Letter Draft FIS	Computer Stationing	EPA Reach File No. (If Available)	XS Letter Final FIS
1	A	0.090		A
2	B	0.180		B
3	C	0.260		C
4	D	0.350		D
5	E	0.450		E
6	F	0.530		F
7	G	0.610		G
8	H	0.700		H
9	I	0.790		I
10	J	0.890		J
11	K	0.940		K
12	L	1.020		L
13	M	1.120		M
14	N	1.210		N
15	O	1.300		O
16	P	1.390		P
17	Q	1.480		Q
18	R	1.580		R
19	S	1.670		S
20	T	1.770		T
21	U	1.870		U
22	V	1.950		V
23	W	2.050		W
24	X	2.140		X
25	Y	2.230		Y
26	Z	2.330		Z
27	AA	2.430		AA
28	AB	2.520		AB
29	AC	2.620		AC
30	AD	2.710		AD
31	AE	2.800		AE
32	AF	2.900		AF
33	AG	2.990		AG
34	AH	3.090		AH
35	AI	3.180		AI
36	AJ	3.270		AJ
37	AK	3.370		AK
38	AL	3.430		AL
39	AM	3.510		AM
40	AN	3.600		AN
41	AO	3.700		AO
42	AP	3.790		AP

43	AQ	3.910	AQ
44	AR	3.990	AR
45	AS	4.040	AS
	AT	4.071	AT
	AU	4.100	AU
47	AV	4.200	AV
48	AW	4.290	AW
49	AX	4.390	AX
50	AY	4.470	AY
51	AZ	4.570	AZ
52	BA	4.670	BA
53	BB	4.760	BB
54	BC	4.860	BC
55	BD	4.950	BD
56	BE	5.040	BE
57	BF	5.130	BF
58	BG	5.230	BG
59	BH	5.320	BH
60	BI	5.420	BI
61	BJ	5.510	BJ
62	BK	5.600	BK
63	BL	5.690	BL
64	BM	5.790	BM
65	BN	5.880	BN
66	BO	5.980	BO
67	BP	6.070	BP
68	BQ	6.150	BQ
69	BR	6.220	BR
	BS	6.270	BS
	BT	6.300	BT
71	BU	6.350	BU
72	BV	6.400	BV
73	BW	6.490	BW
74	BX	6.590	BX
75	BY	6.670	BY
76	BZ	6.770	BZ
77	CA	6.820	CA
78	CB	6.900	CB
79	CC	6.990	CC
80	CD	7.080	CD
81	CE	7.160	CE
82	CF	7.200	CF
	CG	7.230	CG
83	CH	7.260	CH
84	CI	7.340	CI
85	CJ	7.410	CJ
86	CK	7.510	CK
87	CL	7.590	CL
88	CM	7.680	CM
89	CN	7.770	CN
90	CO	7.850	CO
91	CP	7.950	CP
92	CQ	8.040	CQ
93	CR	8.130	CR
94	CS	8.230	CS
95	CT	8.300	CT

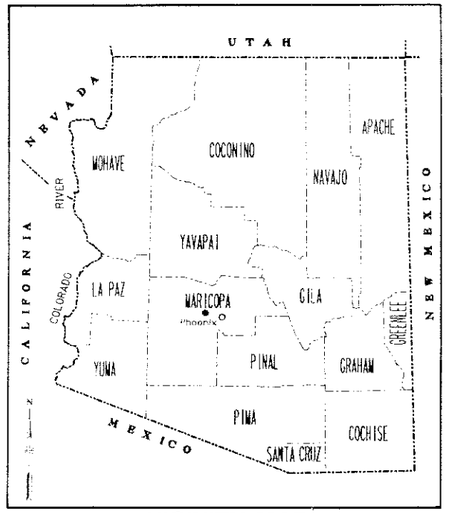
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

D. E. SAGRAMOSO, CHIEF ENGINEER AND GENERAL MANAGER

WAGNER WASH FLOOD DELINEATION STUDY



SHEET INDEX MAP



VICINITY MAP

100 YEAR PEAK DISCHARGE	
WAGNER WASH AT CONFLUENCE	15717 CFS

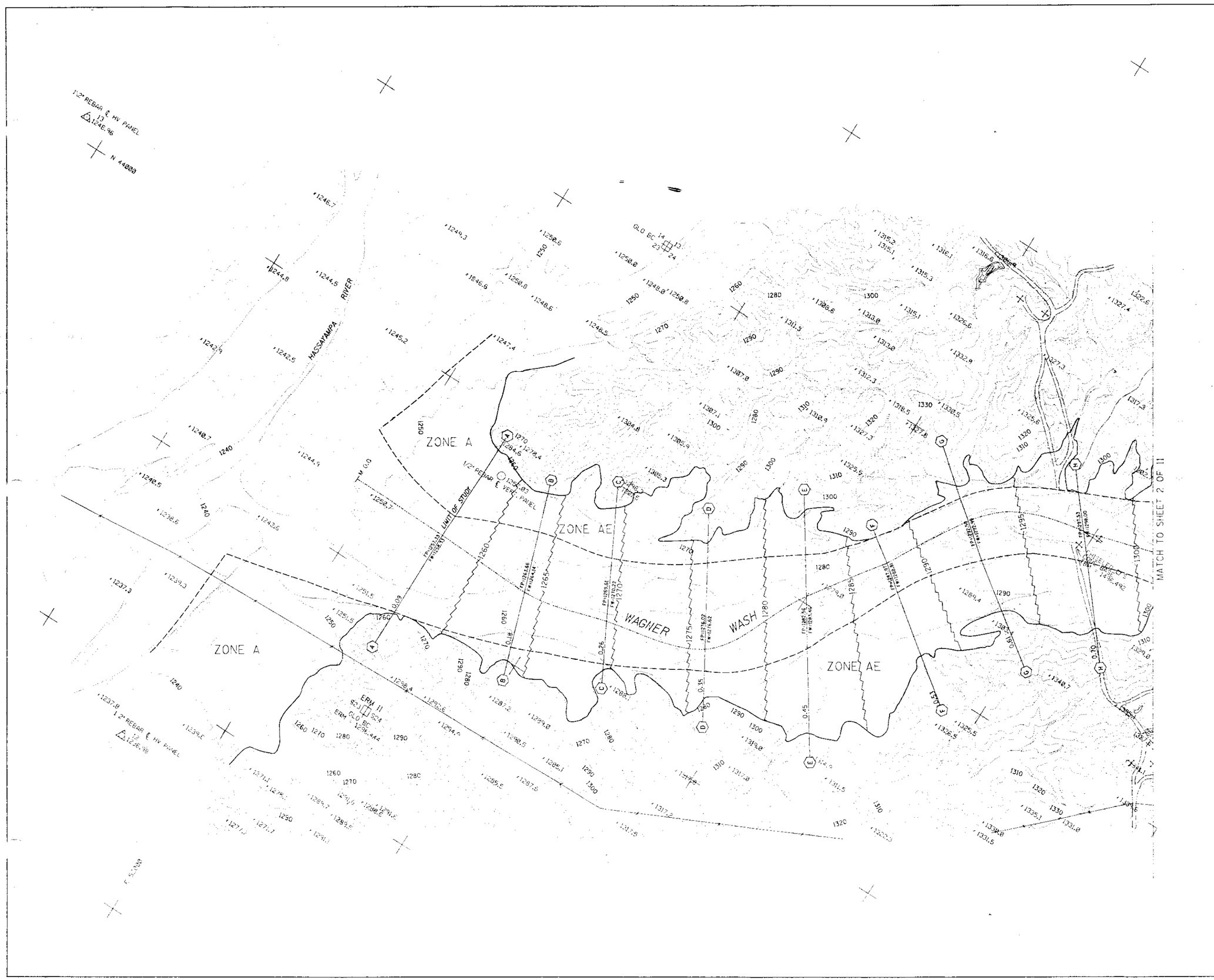
STUDY DATE - 1991

MAPPING DATE - 1990

MCLAIN-HARBERS AERIAL CO., TUCSON, AZ.

PREPARED BY: HDR ENGINEERING, INC.

	BY	DATE		DATE	SHEET
DESIGN	ETL	3/91	SUBMITTED BY:		
DESIGN CHK.	DWB	4/91	RECOMMENDED BY:	DATE	
PLAN	ETL	3/91	APPROVED BY:	DATE	
PLAN CHK.	DWB	4/91	CHIEF ENGINEER AND GENERAL MANAGER		OF



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

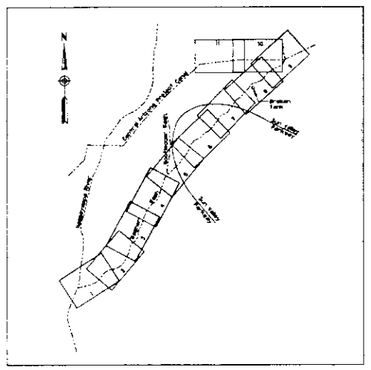
LEGEND

100-Yr Floodplain Boundary
Floodway Boundary
Hydraulic Base Line With River Mile — M75.0 M76.0
Cross Section — A FP 100 Yr. WSE / FW = FLOODWAY WSE A
Elevation Reference Marks — ERM7 X
Base Flood Elevations — 580
Zone Designations — ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 11	1296.44	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 23 and 24, Township 3 North, Range 5 West.

INDEX MAP



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Scale: 1" = 200'
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HDR ENGINEERING, INC.

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

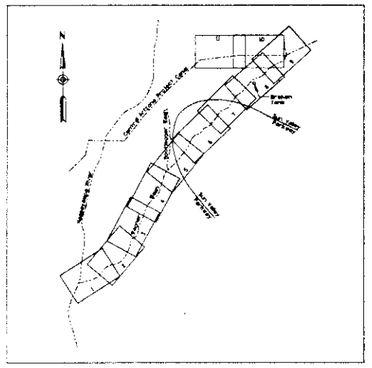
LEGEND

100-Yr Floodplain Boundary
Floodway Boundary
Hydraulic Base Line With River Mile — M75.0 M76.0
Cross Section — A FP=100 Yr. WSE / FW = FLOODWAY WSE A
Elevation Reference Marks — ERM7 X
Base Flood Elevations — 580
Zone Designations — ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 5	1329.17	Brass Cap Stamped U.S. Government Land Office at Corner of Sections 13, 18, 19, and 24, Township 3 North, Range 5 West.
ERM 5A	1352.57	Brass Cap Stamped U.S. Government Land Office at East Quarter Corner of Section 13, Township 3 North, Range 5 West

INDEX MAP



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PREPARED BY:
HDR
HDR ENGINEERING, INC.

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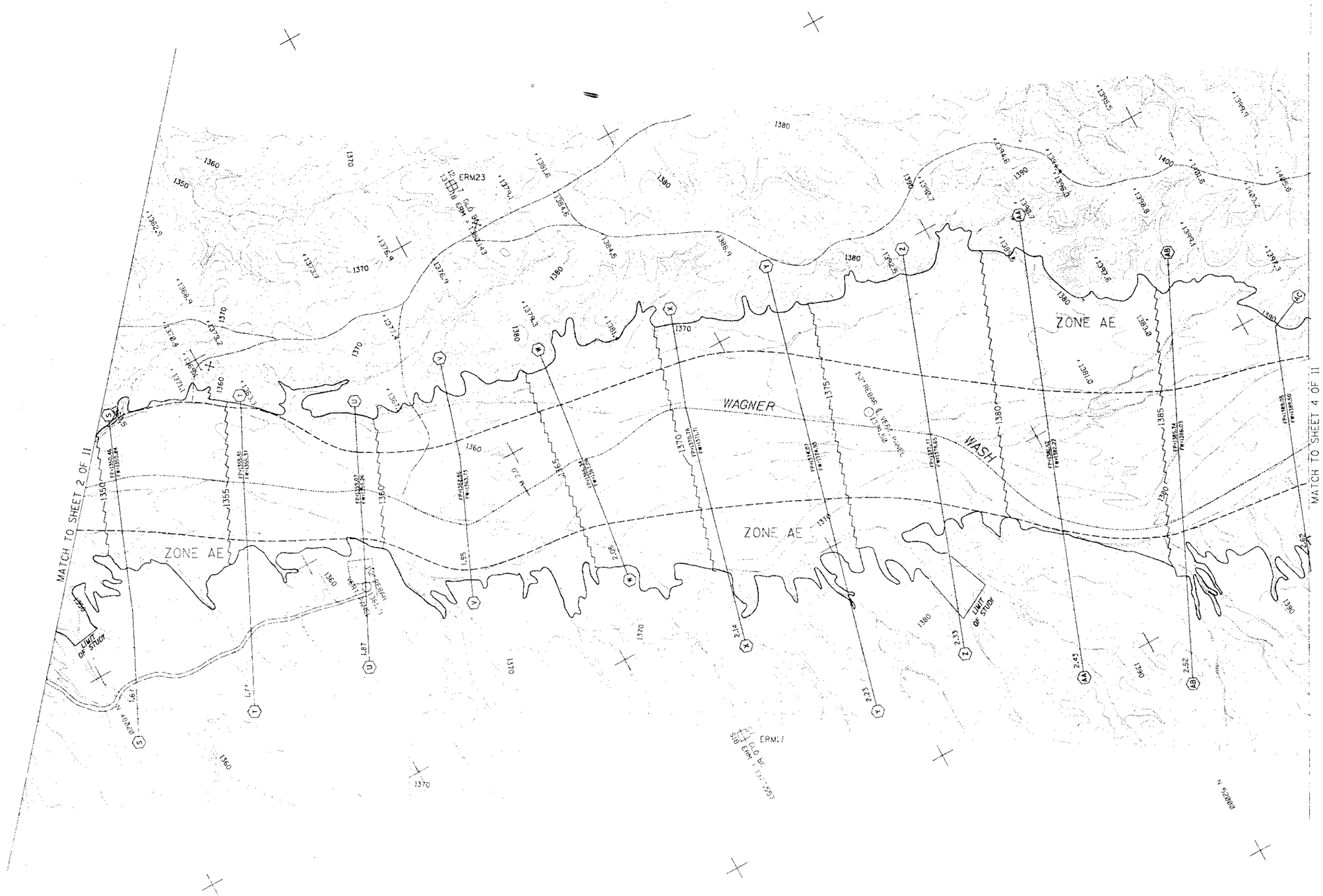


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

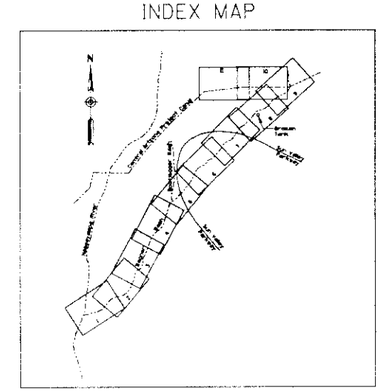
LEGEND

100-Yr Floodplain Boundary
Floodway Boundary
Hydraulic Base Line With River Mile — M75.0 M76.0
Cross Section — A — EP-100 Yr. WSE / FW = FLOODWAY WSE — A
Elevation Reference Marks — ERM7 X
Base Flood Elevations — 580
Zone Designations — ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 17	1377.56	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 7 and 18, Township 3 North, Range 4 West.
ERM 23	1380.14	Brass Cap Stamped U.S. Government Land Office at Corner of Sections 7, 12, 13 and 18, Township 3 North, Range 5 West.

INDEX MAP



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PREPARED BY: HDR ENGINEERING, INC.

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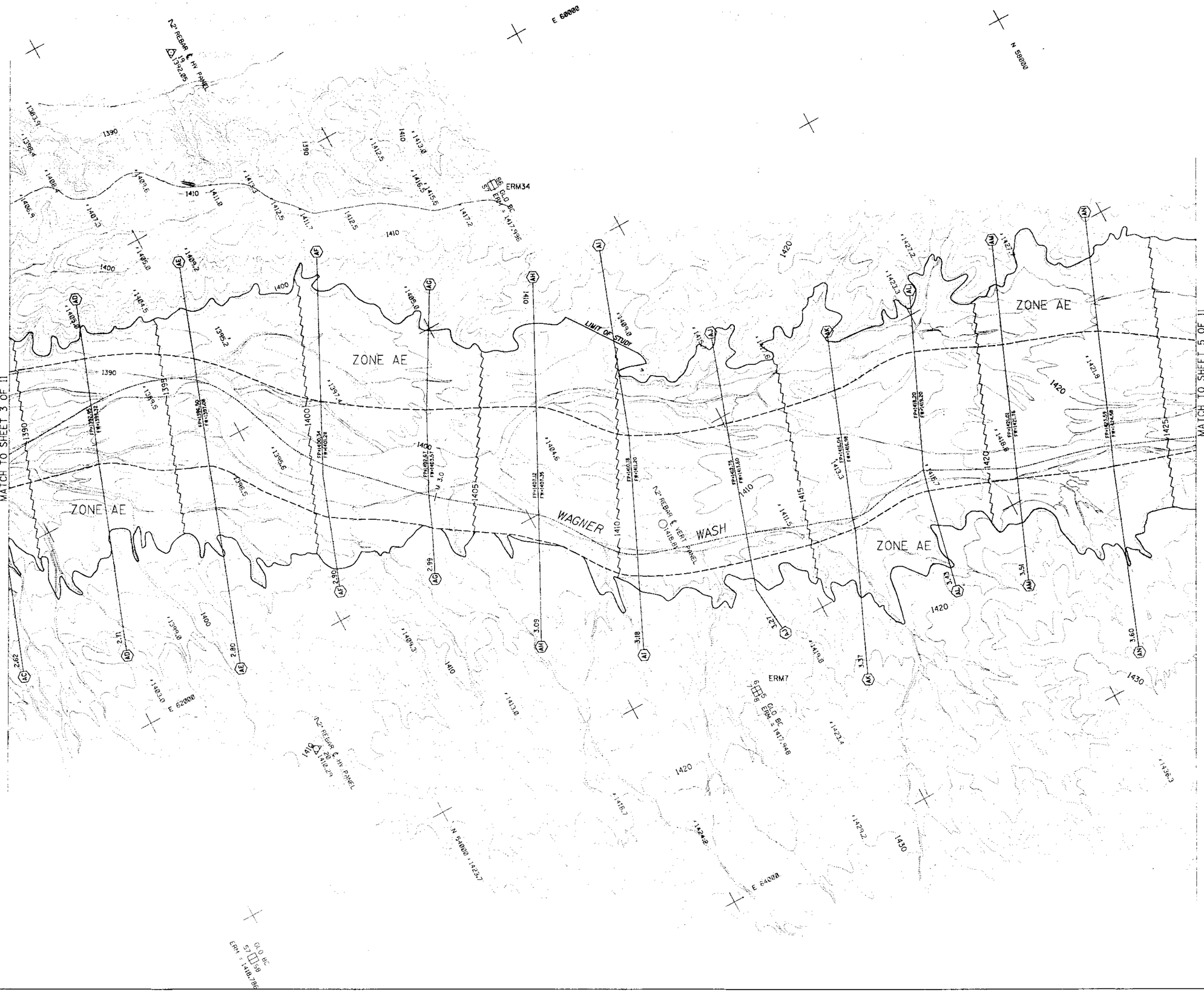
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP



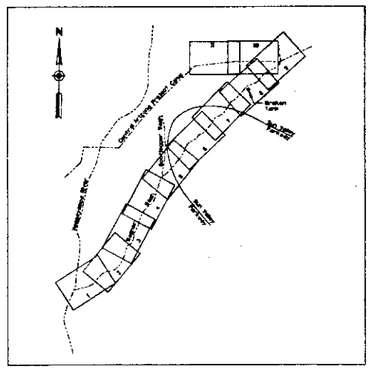
LEGEND

100-Yr Floodplain Boundary	
Floodway Boundary	
Hydraulic Base Line With River Mile	M75.0 M76.0
Cross Section	A FP=100 Yr. WSE / FW = FLOODWAY WSE A
Elevation Reference Marks	ERM7 X
Base Flood Elevations	580
Zone Designations	ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 34	1418.00	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 6 and 7, Township 3 North, Range 4 West.
ERM 7	1417.95	Brass Cap Stamped U.S. Government Land Office at Corner of Sections 5,6, 7 and 8, Township 3 North, Range 4 West.

INDEX MAP



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HDR ENGINEERING, INC.

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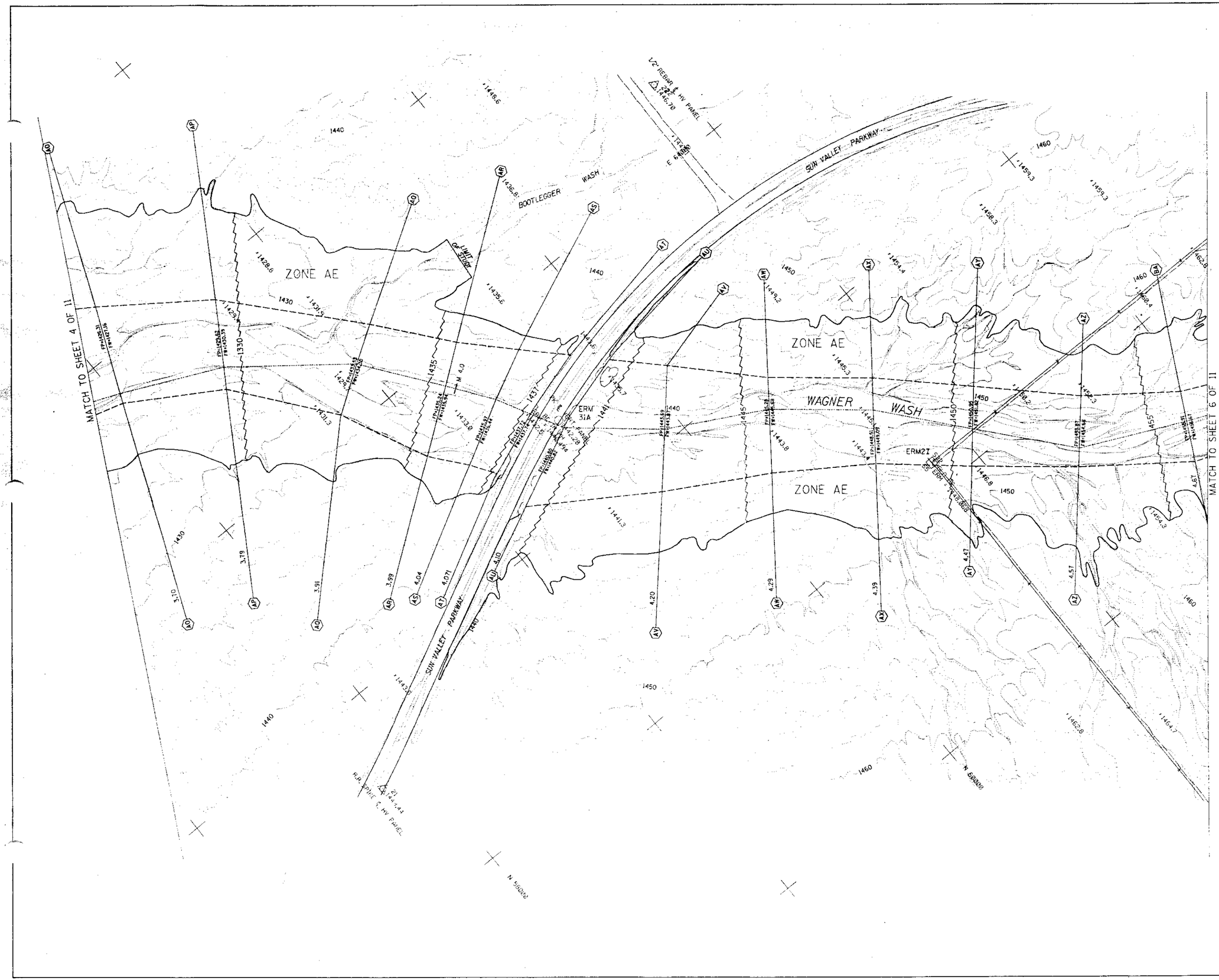


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

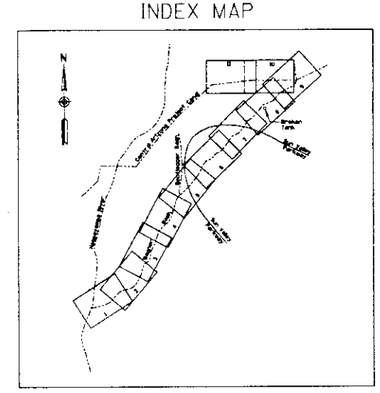
LEGEND

100-Yr Floodplain Boundary
Floodway Boundary
Hydraulic Base Line With River Mile — M75.0 M76.0
Cross Section — A FP-100 YR. WSE / FW - FLOODWAY WSE A
Elevation Reference Marks — ERM7 X
Base Flood Elevations — 580
Zone Designations — ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 27	1448.07	Brass Cap Stamped U.S. Government Land Office at North Quarter Corner of Section 5, Township 3 North, Range 4 West.
ERM 31A	1440.49	Brass Cap in NE Corner of Center Box Culvert at Wagner Wash and Sun Valley Parkway. Stamped 1442.00. Near Center of Section 5, Township 3 North, Range 4 West.

INDEX MAP



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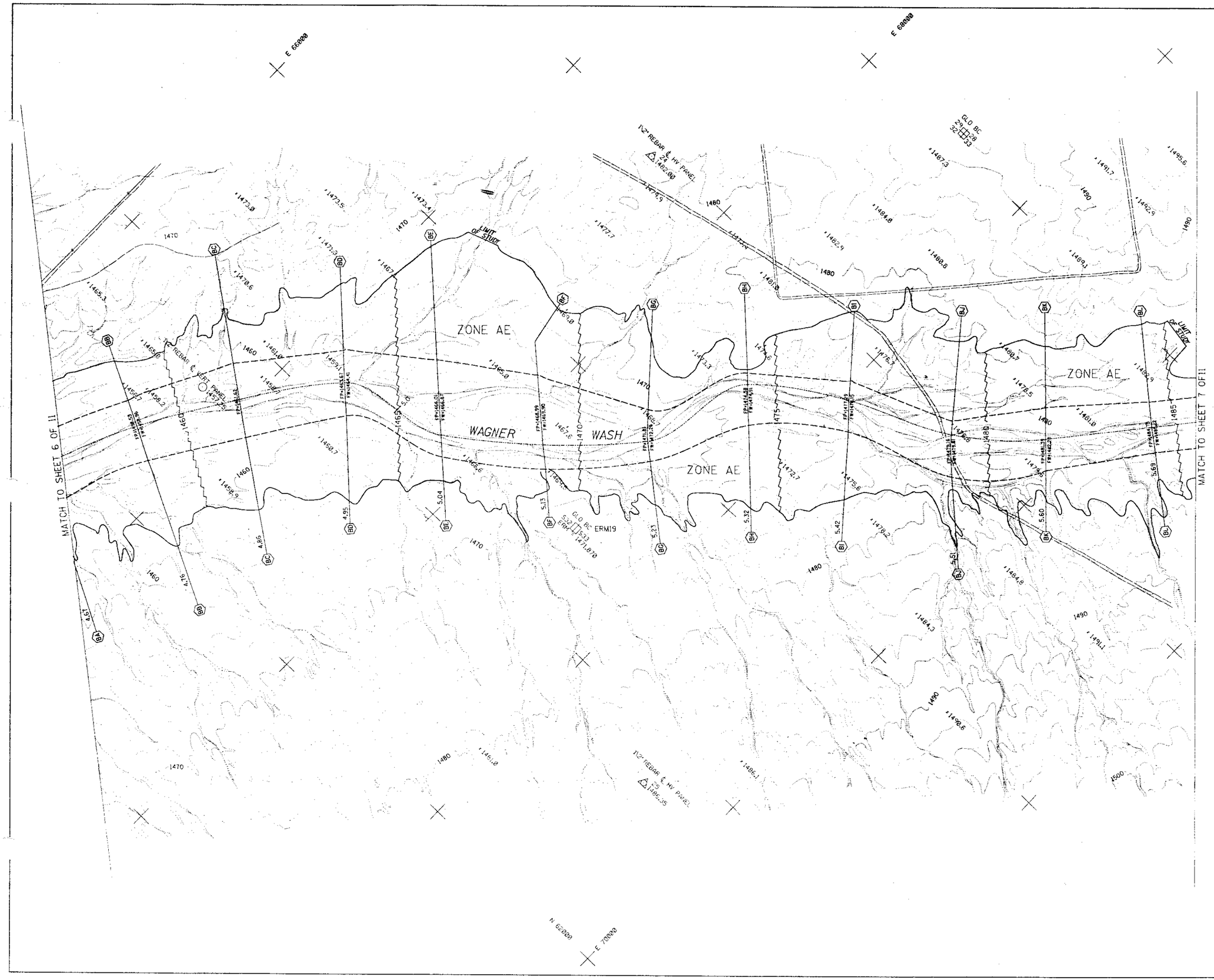


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

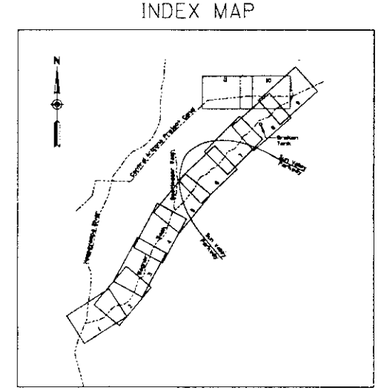
LEGEND

100-Yr Floodplain Boundary	
Floodway Boundary	
Hydraulic Base Line With River Mile	M75.0 M76.0
Cross Section	A FP=100 Yr. WSE / FW = FLOODWAY WSE A
Elevation Reference Marks	ERM7 X
Base Flood Elevations	580
Zone Designations	ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 19	1471.87	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 32 and 33, Township 4 North, Range 4 West.

INDEX MAP



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Scale: 1" = 200'

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HDR ENGINEERING, INC.

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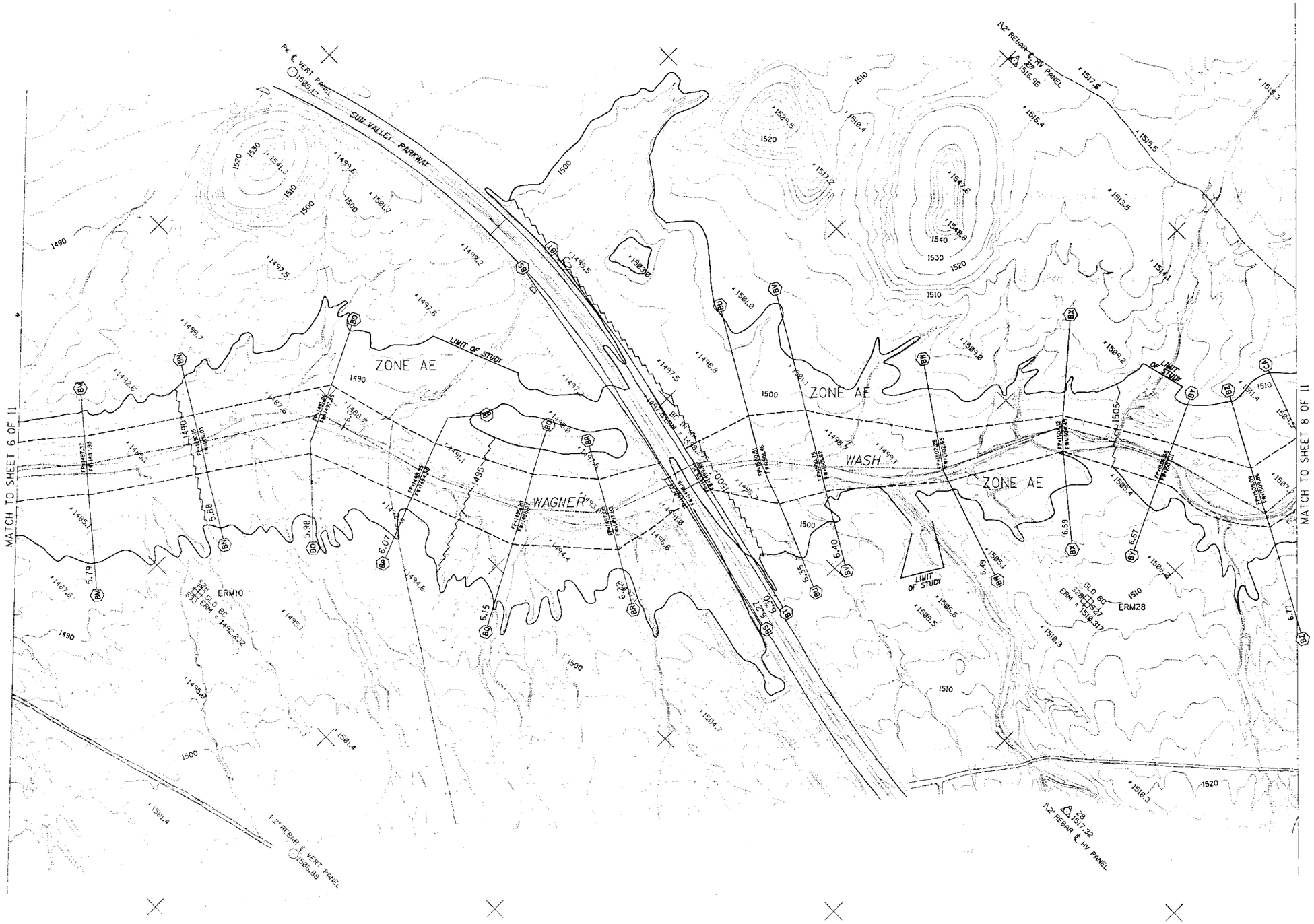


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

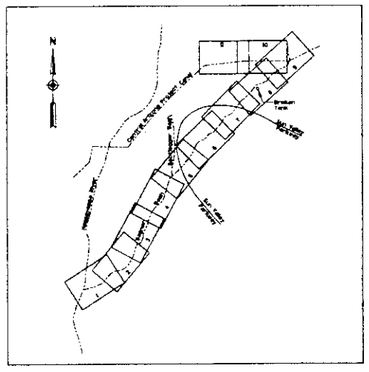
LEGEND

100-Yr Floodplain Boundary
Floodway Boundary
Hydraulic Base Line With River Mile — M75.0 M76.0
Cross Section — A FP=100 Yr. WSE / FW = FLOODWAY WSE A
Elevation Reference Marks — ERM7 X
Base Flood Elevations — 580
Zone Designations — ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 10	1492.23	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 28 and 33, Township 4 North, Range 4 West.
ERM 28	1510.32	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 28 and 27, Township 4 North, Range 4 West.

INDEX MAP



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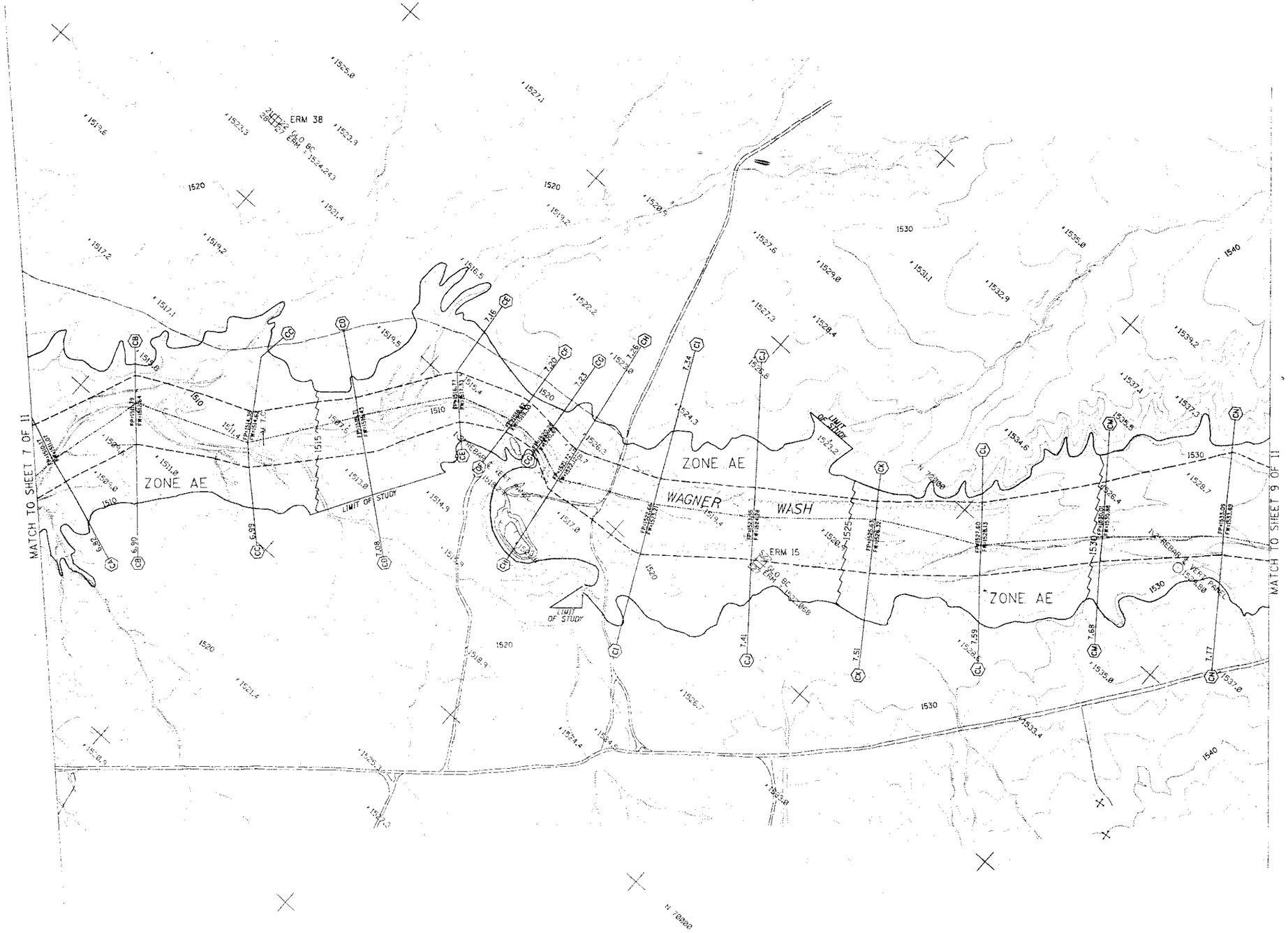


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

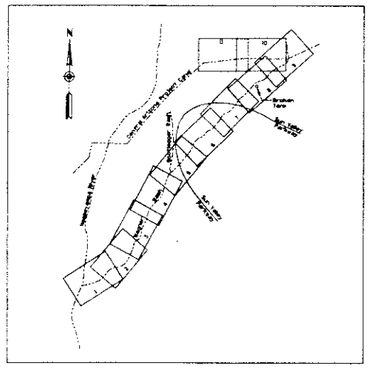
LEGEND

100-Yr Floodplain Boundary
Floodway Boundary
Hydraulic Base Line With River Mile — M75.0 M76.0
Cross Section — A — FP-100 Yr. WSE / FW - FLOODWAY WSE — A
Elevation Reference Marks — ERM7 X
Base Flood Elevations — 580
Zone Designations — ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 38	1524.24	Brass Cap Stamped U.S. Government Land Office at Corner of Sections 21,22, 27 and 28, Township 4 North, Range 4 West.
ERM 15	1522.07	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 22 and 27, Township 4 North, Range 4 West.

INDEX MAP



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HDR
HDR ENGINEERING, INC.

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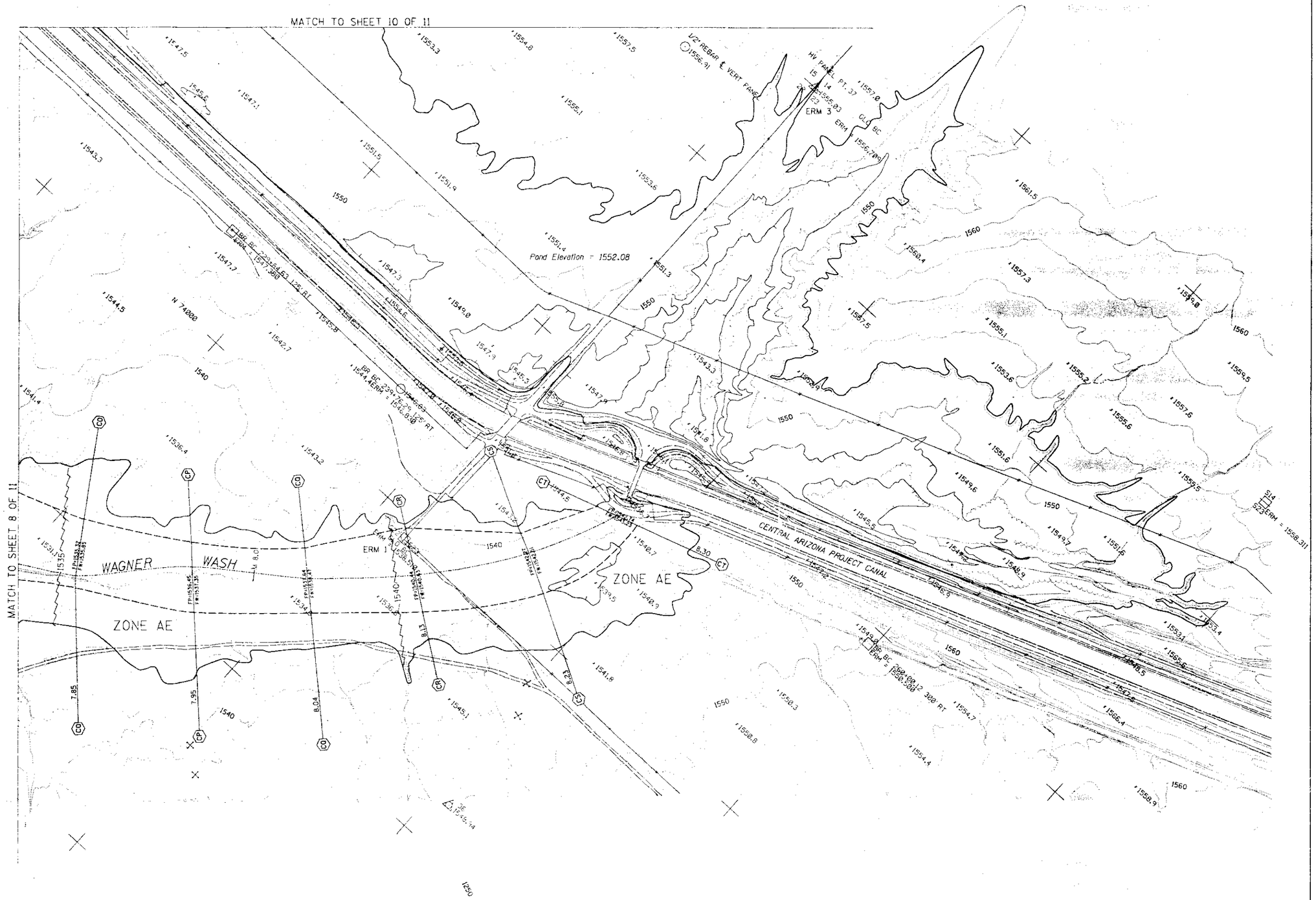


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

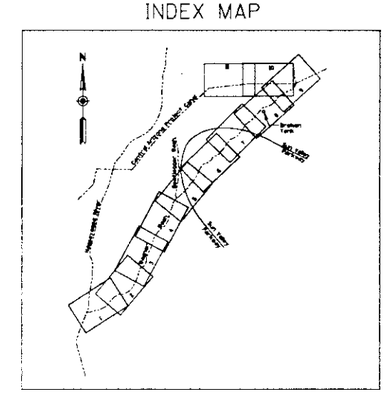
LEGEND

100-Yr Floodplain Boundary	
Floodway Boundary	
Hydraulic Base Line With River Mile	M75.0 M76.0
Cross Section	A — FP=100 Yr. WSE; FW = FLOODWAY WSE — A
Elevation Reference Marks	ERM7 X
Base Flood Elevations	580
Zone Designations	ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 1	1538.51	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 22 and 23, Township 4 North, Range 4 West.
ERM 3	1556.71	Brass Cap Stamped U.S. Government Land Office at Corner of Sections 14,15, 22 and 23, Township 4 North, Range 4 West.

INDEX MAP



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Contour interval = 2 Feet

PREPARED BY:
HDR ENGINEERING, INC.

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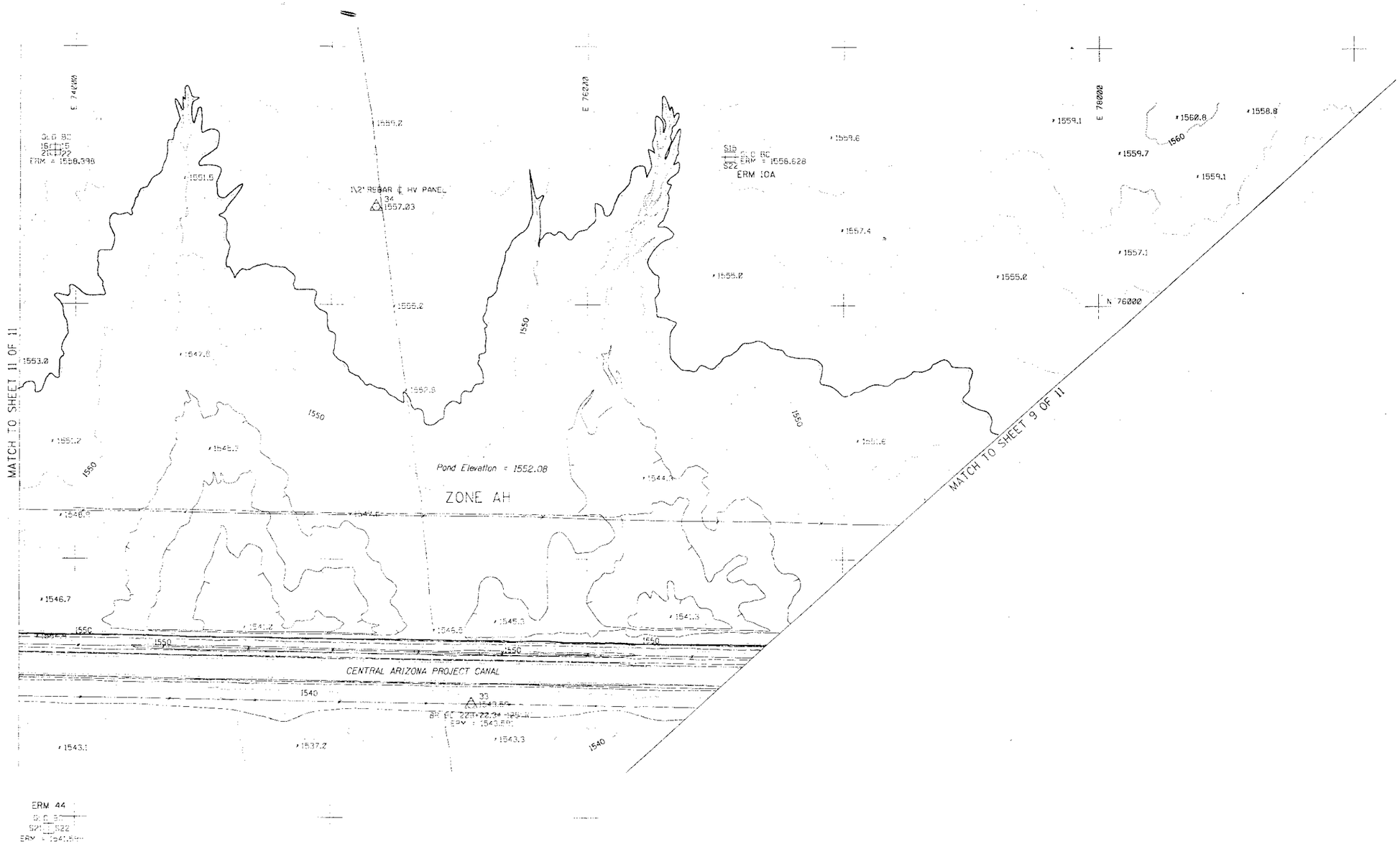


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

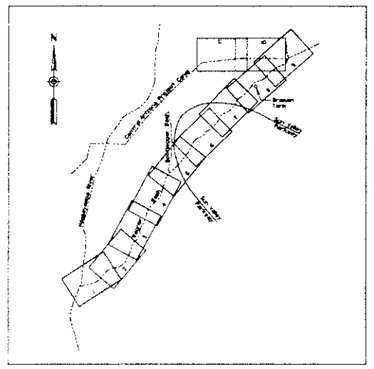
LEGEND

100-Yr Floodplain Boundary
Floodway Boundary
Hydraulic Base Line With River Mile — M75.0 M76.0
Cross Section — A — FP=100 Yr. WSE / FW = FLOODWAY WSE — A
Elevation Reference Marks — ERM7 X
Base Flood Elevations — 580
Zone Designations — ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 10A	1558.63	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 15 and 22, Township 4 North, Range 4 West.
ERM 44	1541.60	Brass Cap Stamped U.S. Government Land Office at Quarter Corner of Sections 21 and 22, Township 4 North, Range 4 West.

INDEX MAP



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PREPARED BY: HDR ENGINEERING, INC.

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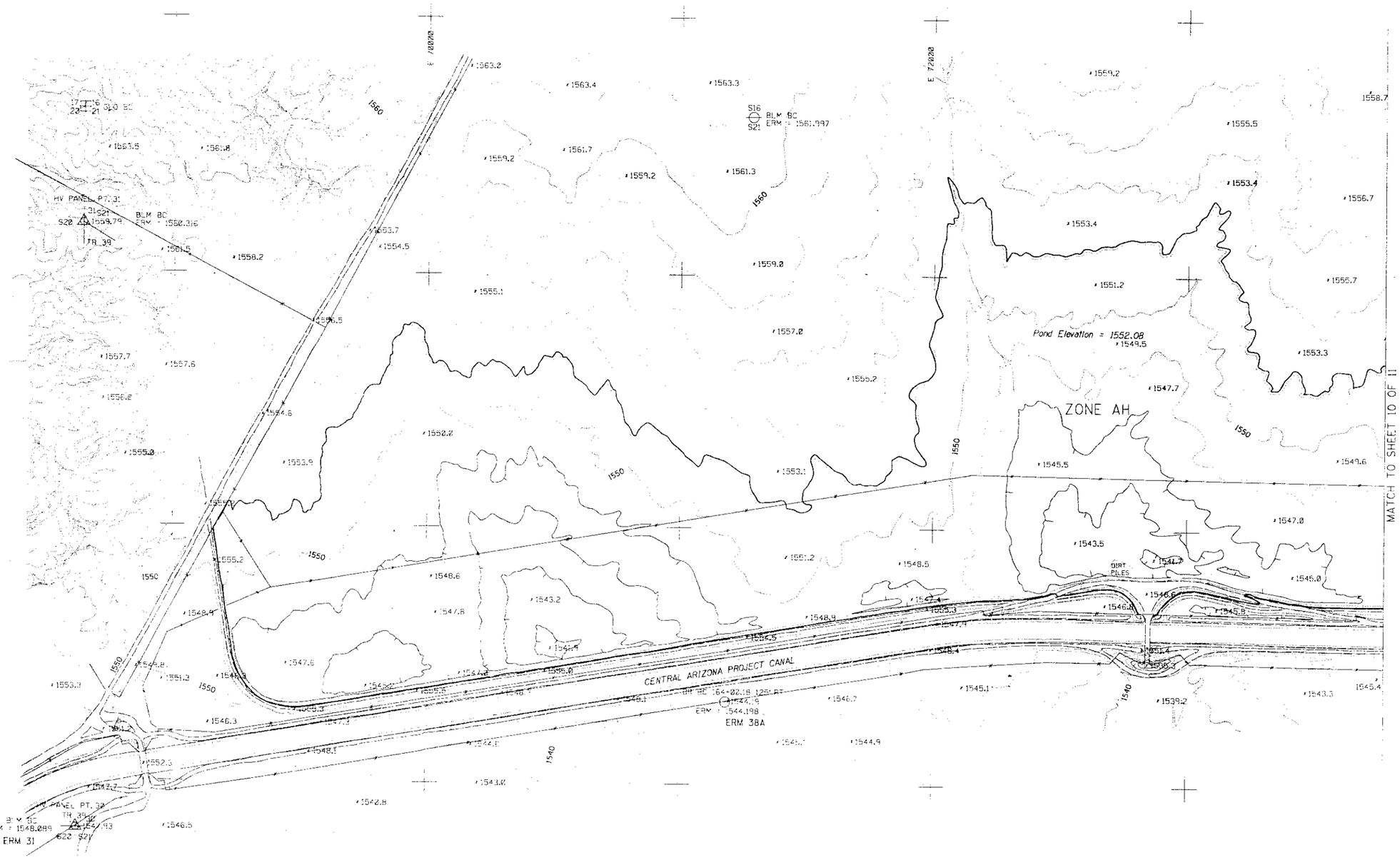


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF WAGNER WASH WORK MAP

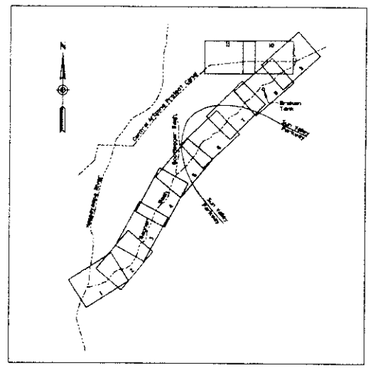
LEGEND

100-Yr Floodplain Boundary
Floodway Boundary
Hydraulic Base Line With River Mile — M75.0 M76.0
Cross Section — A — FP=100 Yr. WSE, FW = FLOODWAY WSE — A
Elevation Reference Marks — ERM7 X
Base Flood Elevations — 580
Zone Designations — ZONE AE

ELEVATION REFERENCE MARKS

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 31	1548.09	Bureau of Land Management Brass Cap Marked TR 39 at Quarter Corner of Sections 20 and 21, Township 4 North, Range 4 West.
ERM 38A	1544.20	Central Arizona Project R/W Brass Cap Located at R/W Sta. 164+00.18, 125' Rt. Near Center of Section 21, Township 4 North, Range 4 West.

INDEX MAP



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PREPARED BY: HDR ENGINEERING, INC.

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PLAN CHK.	DWB	4-91	CHIEF ENGINEER AND GENERAL MANAGER		OF 11

Topographic Mapping Prepared by McLelin Kerbers Co., Inc. Photo Date 9-90

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4-9-91

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- 1.2 Authority and Acknowledgments
- 1.3 Coordination

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- 2.2 Community Description
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Flood Boundary and Floodway

PUBLISHED SEPARATELY

Flood Insurance Rate Map Index
Flood Insurance Rate Map

PRELIMINAL

Registered Professional Engineer (Civil)
CERTIFICATE NO. 17
HARRY STEVEN MILLER
Date Signed 4-11-91
ARIZONA, U.S.A.

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in an unincorporated area of Maricopa County, Arizona, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for an area of the County that will be used to establish actuarial flood insurance rates and assist the County in their effors to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic analyses for this study were prepared by the Flood Control District of Maricopa County, Arizona. The hydraulic analyses were prepared by HDR Engineering, Inc., the study contractor. This work was completed in April 1991.

1.3 Coordination

2.0 AREA STUDIED

2.1 Scope of Study

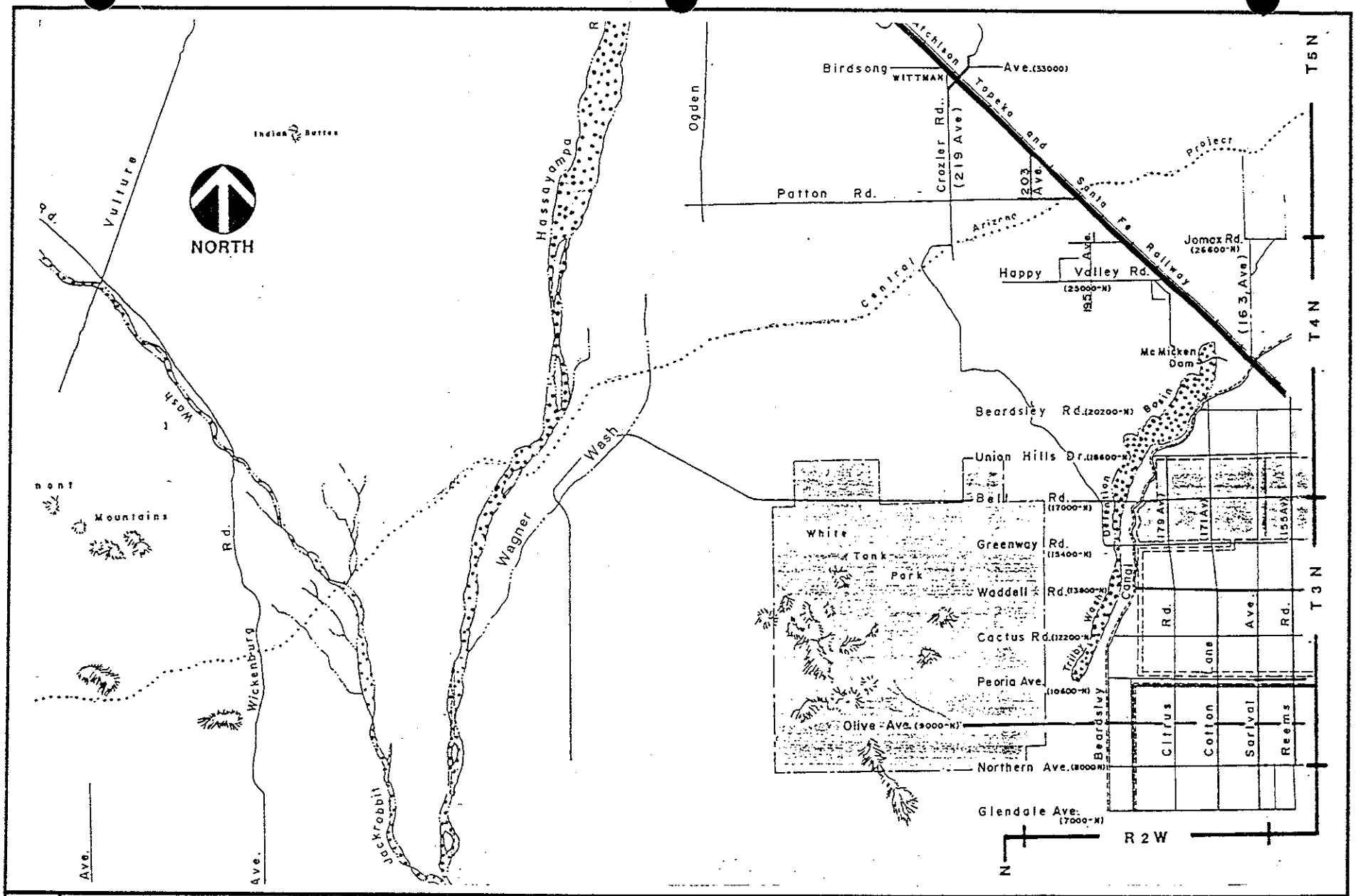
This Flood Insurance Study covers an unincorporated area of Maricopa County, Arizona. The area of study is shown on the Vicinity Map (Figure 1).

Riverine flooding on Wagner Wash from Central Arizona Project (CAP) Canal downstream to the stream's confluence with the Hassayampa River was studied by detailed methods. Ponded flooding above the CAP Canal was mapped at a single water surface elevation which was determined in the hydrologic analyses performed by the Flood Control District of Maricopa County. The scope and methods of study were proposed to, and agreed upon by, the Arizona Department of Water Resources and the Flood Control District of Maricopa County, Arizona.

2.2 Community Description

Maricopa County, encompassing a total area of 9238 square miles, is located in south-central Arizona. It is bordered by Yavapai County to the north, Pinal and Gila Counties to the east, Pima County to the south and Yuma and La Paz Counties to the west. The incorporated communities within the county cover an area in excess of 100 square miles and an additional 3,330 square miles are Government-owned lands. A large portion of the the remaining county is undeveloped. The Wagner Wash drainage area is largely undeveloped at this time. The 1980 population of the county was 1.5 million.

The topography of Maricopa County varies from rugged mountainous areas in the north to arid plain and desert in southern areas. Small intermittent streams and washes traverse most of the county.



FEDERAL EMER. MANAGEMENT AGENCY

MARICOPA COUNTY
(UNINCORPORATED AREAS)

1 0 1 2 3 4 5 6 7

Scale in Miles

VICINITY MAP

The climate in Maricopa County is mild with short, moderate winters and long, hot summers. Mean annual precipitation ranges from 7 inches in the southern desert regions of the county to more than 25 inches in the mountainous northern areas. Two periods of the year produce the heaviest rainfall amounts. Winter storms occur during the December to March period and summer storms occur most frequently from June through October.

2.3 Principal Flood Problems

Historically, large portions of Maricopa County are prone to destructive floods. However, there are no severe flood problems, life or property threatening, evident in the area of study. The area is still largely in its natural state and manmade structures within the flood plain limits are minimal, with the exception of electrical transmission towers which have been constructed in the flood plain at several locations.

The two roadway crossings, both Sun Valley Parkway, are of recent construction and the adequacy of the culvert structures under flood conditions of any frequency has not been observed.

The installation of the Central Arizona Project Canal at the upstream area of study has created a levee that impounds flood waters on its north side. Relief through the canal is provided by overchutes located at periodic intervals along the canal.

2.4 Flood Protection Measures

No flood protection measures currently exist in Wagner Wash watershed, nor are any planned in the foreseeable future. The effect of the CAP Canal serves as a protection measure, but it was not constructed for that purpose. Cursory inspection of the canal indicates that it is adequate to withstand the hydraulic pressures induced by the expected impoundment of water during the study's rainfall event; however, this study does not warrant that the canal levees will not fail, either partially or fully, under rainfall events of any frequency.

3.0 ENGINEERING METHODS

For the flooding source studied in detail, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. A flood event of a magnitude which is expected to be equalled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for flood plain management and for flood insurance premium rates. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual occurrence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported here reflect flooding potentials based on conditions existing in the county at the time of completion of the study. Maps and flood elevations may be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

The hydrologic analyses were performed by the study's sponsor, the Flood Control District of Maricopa County. The study contractor reviewed the hydrologic model at the initial stages of the flood study and prepared review comments for the Flood Control District, as did the Arizona Department of Water Resources. The Flood Control District made adjustments to their hydrologic analysis and revised the hydrology for use in the flood plain analysis. The study contractor felt the revised hydrology was sufficient for use on this study.

Table 2. Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	100-year Peak Discharge (cubic feet per second)
Wagner Wash at confluence with Hassayampa River	42.07	15717
Wagner Wash at east quarter corner of Section 13, T. 3 N, R. 5 W.	40.21	15351
Wagner Wash near center of the SE 1/4 SW 1/4, Section 7, T. 3 N, R. 4 W.	38.63	12861
Wagner Wash near center of Section 7, T. 3 N, R. 4 W.	38.17	12363
Wagner Wash, 1700 feet below confluence with Bootlegger Wash	37.39	10964
Wagner Wash at Sun Valley Parkway (south crossing)	28.62	10358
Wagner Wash, 2000 feet upstream of Sun Valley Parkway (south crossing)	25.93	8904
Wagner Wash, 5200 feet upstream of Sun Valley Parkway (south crossing)	24.54	8079
Wagner Wash, 3700 feet downstream of Sun Valley Parkway (north crossing)	22.72	7225
Wagner Wash, downstream side of Sun Valley Parkway (north crossing)	20.38	5906
Wagner Wash, upstream of Sun Valley Parkway (north crossing)	15.99	3446
Wagner Wash, 3200 feet north of Sun Valley Parkway (north crossing)	15.07	2894
Wagner Wash, 1700 feet downstream of CAP canal	13.14	1723
Wagner Wash downstream of CAP canal	11.89	873

3.2 Hydraulic Analysis

Analysis of the hydraulic characteristics of flooding from the riverine source studied was carried out to provide an estimate of the elevation of flooding of the selected 100-year recurrence interval.

Cross-section data for the backwater analysis was obtained photogrammetrically from aerial photographs obtained by aerial survey in September, 1990. Topographic maps were also compiled from the aerial survey and were used for base map information and to supplement the cross-section data, where required. The topographic maps were computer generated at a scale of 1:2400 with a contour interval of 2 feet. All culvert crossings were field surveyed to obtain elevation data and structural geometry.

Water-surface elevations of the flood of the selected recurrence interval were computed using the COE HEC-2 step-backwater computer program. The starting water-surface elevation for Wagner Wash was determined using the slope-area method. HY-8, a Federal Highways Administration culvert analysis computer program was supplementally used to calculate hydraulic losses through the modeled culvert structures.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and flood plain areas. The channel "n" values for Wagner Wash ranged from 0.04 to 0.105 and overbank "n" values ranged from 0.065 to 0.10.

The hydraulic analysis for this study was based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if the hydraulic structures remain unobstructed.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain and floodway boundaries to assist communities in developing flood plain management measures.

4.1 Flood Plain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. For the stream studied in detail, the 100-year flood plain boundary has been delineated using the flood elevations determined at each cross section.

Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2400 with a contour interval of 2 feet.

The 100-year flood plain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

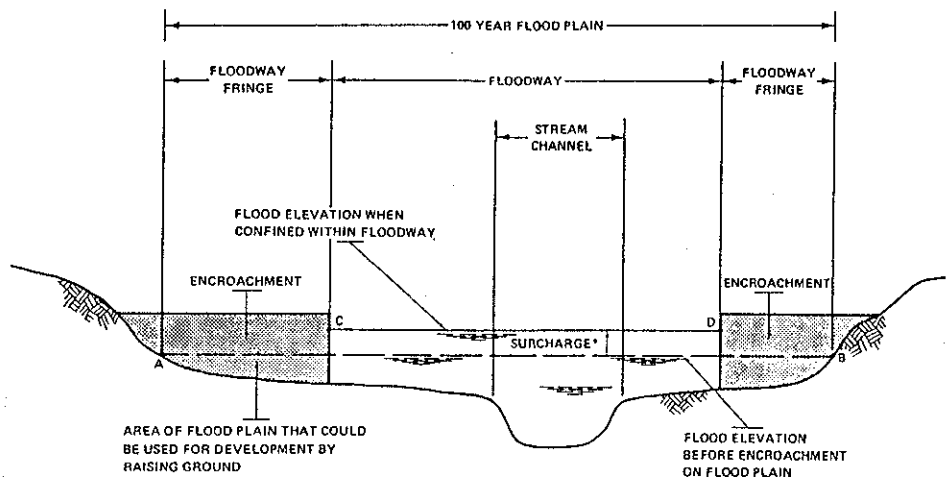
4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increases in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodway in this study is presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this study was computed for the entire stream length on the basis of engineering judgment which consisted of utilizing equal conveyance methodology as a starting point but completing the floodway delineation by specifying the exact location of the encroachment for any given cross section. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table _). In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure _.

Development or encroachment shall be prohibited within the flood plain area shown upstream of the CAP Canal.



*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE (NOTE)	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Wagner Wash								
A	475	540	2426	6.5	1257.3	1257.3	1258.3	1.0
B	945	570	1960	8.0	1263.7	1263.7	1264.2	0.5
C	1360	501	1948	8.1	1269.6	1269.6	1270.2	0.6
D	1840	511	2063	7.6	1276.0	1276.0	1276.6	0.6
E	2330	450	1852	8.5	1282.6	1282.6	1283.5	0.9
F	2750	280	1585	9.9	1288.0	1288.0	1288.8	0.8
G	3180	322	1645	9.6	1292.5	1292.5	1293.0	0.5
H	3690	334	1493	10.5	1297.5	1297.5	1298.0	0.5
I	4150	442	1749	9.0	1303.3	1303.3	1303.9	0.6
J	4670	509	2129	7.4	1309.9	1309.9	1310.8	0.9
K	4970	327	1394	11.3	1313.8	1313.8	1313.9	0.1
L	5390	580	2530	6.2	1319.2	1319.2	1319.6	0.4
M	5880	476	1860	8.4	1323.2	1323.2	1323.6	0.4
N	6370	333	1530	10.3	1328.7	1328.7	1328.8	0.1
O	6860	334	1645	9.6	1333.2	1333.2	1333.8	0.6
P	7330	214	1217	12.9	1339.0	1339.0	1339.0	0.0
Q	7780	200	1565	9.8	1343.8	1343.8	1343.9	0.1
R	8300	314	1736	8.8	1346.2	1346.2	1347.1	0.9
S	8800	462	1808	8.5	1350.5	1350.5	1350.9	0.4
T	9330	570	2016	7.6	1355.5	1355.5	1355.4	-0.1
U	9870	375	1588	9.7	1359.1	1359.1	1359.3	0.2
V	10300	540	2525	6.1	1362.9	1362.9	1363.8	0.9
W	10820	550	1988	7.7	1366.3	1366.3	1367.0	0.7
X	11300	650	2493	6.2	1370.8	1370.8	1371.7	0.9
Y	11770	650	2387	6.4	1374.1	1374.1	1375.0	0.9
Z	12300	550	2175	5.9	1377.8	1377.8	1378.7	0.9
AA	12830	600	2190	5.9	1381.5	1381.5	1382.2	0.7

NOTE: Distance In Feet Above Mouth Along Profile Base Line

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE (NOTE)	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Wagner Wash								
AB	13340	600	2065	6.2	1385.7	1385.7	1386.0	0.3
AC	13840	540	1878	6.8	1389.0	1389.0	1389.5	0.5
AD	14320	490	1967	6.3	1392.9	1392.9	1393.3	0.4
AE	14820	500	1628	7.6	1396.5	1396.5	1397.1	0.6
AF	15360	540	2394	5.2	1400.3	1400.3	1401.3	1.0
AG	15850	553	2319	5.3	1402.7	1402.7	1403.6	0.9
AH	16350	625	1777	7.0	1407.1	1407.1	1407.3	0.2
AI	16820	660	2672	4.6	1410.2	1410.2	1411.2	1.0
AJ	17320	650	2317	5.3	1412.7	1412.7	1413.6	0.9
AK	17820	650	2233	5.5	1416.0	1416.0	1416.9	0.9
AL	18170	650	2476	5.0	1418.2	1418.2	1419.2	1.0
AM	18600	625	2181	5.7	1421.0	1421.0	1421.8	0.8
AN	19050	625	2159	5.1	1423.6	1423.6	1424.6	1.0
AO	19570	475	1748	6.3	1426.3	1426.3	1427.2	0.9
AP	20080	425	1545	7.1	1429.6	1429.6	1430.4	0.8
AQ	20680	450	1834	6.0	1433.5	1433.5	1434.3	0.8
AR	21120	551	2410	4.5	1435.2	1435.2	1435.9	0.7
AS	21360	590	1933	5.4	1436.0	1436.0	1436.5	0.5
AT	21520	647	913	11.3	1437.7	1437.7	1437.7	0.0
AU	21690	798	1591	6.5	1440.8	1440.8	1440.8	0.0
AV	22190	600	2548	4.1	1443.7	1443.7	1443.9	0.2
AW	22690	450	1533	6.8	1445.3	1445.3	1445.7	0.4
AX	23190	400	1752	5.9	1448.5	1448.5	1449.1	0.6
AY	23660	375	1616	6.4	1450.9	1450.9	1451.8	0.9
AZ	24170	330	1659	5.4	1453.9	1453.9	1454.7	0.8
BA	24690	330	1626	5.5	1455.9	1455.9	1456.7	0.8
BB	25180	300	1213	7.3	1458.5	1458.5	1458.9	0.4

NOTE: Distance In Feet Above Mouth Along Profile Base Line

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE (NOTE)	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
Wagner Wash								
BC	25680	355	1803	4.9	1461.6	1461.6	1462.6	1.0
BD	26180	300	1466	6.1	1463.7	1463.7	1464.4	0.7
BE	26640	450	1532	5.8	1466.0	1466.0	1466.9	0.9
BF	27130	450	1613	5.0	1469.0	1469.0	1469.9	0.9
BG	27630	250	1244	6.5	1471.8	1471.8	1472.2	0.4
BH	28130	250	1008	8.0	1474.4	1474.4	1474.9	0.5
BI	28630	250	1434	5.6	1477.3	1477.3	1478.2	0.9
BJ	29130	270	1305	6.2	1479.2	1479.2	1479.9	0.7
BK	29580	300	1106	6.5	1481.4	1481.4	1482.3	0.9
BL	30080	250	1022	7.1	1484.7	1484.7	1485.1	0.4
BM	30580	250	1058	6.8	1487.4	1487.4	1488.0	0.6
BN	31070	250	1510	4.8	1490.1	1490.1	1491.0	0.9
BO	31570	310	1605	4.5	1491.9	1491.9	1492.9	1.0
BP	32060	250	1194	5.6	1494.0	1494.0	1494.9	0.9
BQ	32500	300	1604	4.2	1495.9	1495.9	1496.9	1.0
BR	32860	300	1704	3.2	1497.0	1497.0	1497.8	0.8
BS	33150	80	589	5.8	1497.5	1497.5	1498.2	0.7
BT	33296	200	416	8.3	1499.4	1499.4	1499.9	0.9
BU	33546	400	2010	1.7	1500.5	1500.5	1501.5	1.0
BV	33796	350	1282	2.7	1500.7	1500.7	1501.6	0.9
BW	34296	200	906	3.8	1502.2	1502.2	1502.6	0.4
BX	34806	150	587	5.9	1504.1	1504.1	1504.4	0.3
BY	35256	163	611	5.6	1506.6	1506.6	1507.1	0.5
BZ	35726	250	807	4.3	1509.1	1509.1	1509.9	0.8
CA	35986	250	871	4.0	1510.2	1510.2	1511.1	0.9
CB	36386	275	1011	3.4	1511.8	1511.8	1512.6	0.8
CC	36880	225	590	4.9	1514.3	1514.3	1514.6	0.3

NOTE: Distance In Feet Above Mouth Along Profile Base Line

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE (NOTE)	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Wagner Wash								
CD	37380	225	1062	2.7	1515.7	1515.7	1516.4	0.7
CE	37790	200	653	4.4	1516.8	1516.8	1517.4	0.6
CF	38040	154	730	4.0	1518.6	1518.6	1519.3	0.7
CG	38180	122	498	5.8	1520.3	1520.3	1520.7	0.4
CH	38330	200	1029	2.8	1521.7	1521.7	1522.1	0.4
CI	38730	320	1586	1.8	1522.7	1522.7	1523.3	0.6
CJ	39130	300	1163	2.5	1523.6	1523.6	1524.3	0.7
CK	39630	293	1201	2.4	1525.6	1525.6	1526.3	0.7
CL	40060	297	1069	2.7	1527.6	1527.6	1528.1	0.5
CM	40540	325	1022	2.8	1530.0	1530.0	1530.9	0.9
CN	41030	420	1348	2.1	1533.1	1533.1	1533.7	0.6
CO	41470	300	1111	2.6	1535.3	1535.3	1535.8	0.5
CP	41970	308	1227	1.4	1536.5	1536.5	1537.4	0.9
CQ	42470	285	820	2.1	1537.6	1537.6	1538.4	0.8
CR	42940	370	999	1.7	1540.4	1540.4	1540.6	0.2
CS	43440	275	619	1.4	1542.3	1542.3	1542.5	0.2
CT	43840	200	387	0.3	1542.7	1542.7	1543.2	0.5

NOTE: Distance In Feet Above Mouth Along Profile Base Line

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. For this study, these zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed in such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and flood plain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year flood plains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For flood plain management applications, the map shows by tints, screens, and symbols, the 100-year flood plains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The Sun Valley Development Company of Phoenix, Arizona prepared one-foot contour topographic mapping for most portions of the Wagner Wash stream reach. Hydrologic analyses was performed for purposes of design for the two Sun Valley Parkway roadway crossings over Wagner Wash.

A Flood Insurance Re-Study for the Hassayampa River, of which Wagner Wash is tributary, was performed by Cella-Barr Associates of Phoenix, Arizona in 1989.

This study is authoritative for the purposes of the National Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations.

8.0 LOCATION OF DATA

9.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, White Tank Mts NE, Arizona (1957) Photorevised (1971); White Tank Mts SE, Arizona (1957) Photorevised (1971); Daggs Tank, Arizona (Provisional Ed. 1988); Wagner Wash Well, Arizona (Provisional Ed. 1988)

2. U.S. Department of the Interior, Geological Survey, 15-Minute Series Topographic Map, Scale 1:62500, Contour Interval 40 feet, White Tank Mts., Arizona (1957)

3. Federal Emergency Management Agency, Flood Insurance Study, Maricopa County and Incorporated Areas (Preliminary), 1990

4. U.S. Department of the Interior, Geological Survey, Mannings's Roughness Coefficients For Stream Channels and Flood Plains In Maricopa County, Arizona (Preliminary Draft), 1990

5. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles User's Manual, Davis, California 1990

6. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Computer Program HEC-2 Water Surface Profiles, Davis, California, Version 4.5.1, February, 1991 (Haestad Methods Version 6.2)

7. McLain Harbers Aerial Survey, Topographic Maps, Scale 1:2,400, Contour Interval 2 feet, Wagner Wash, Arizona (1990)

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (feet NGVD)	Description of Location
ERM 1	1538.51	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 22 and 23, Township 4 North, Range 4 West.
ERM 3	1556.71	Brass cap stamped U.S. Government Land Office at corner of Sections 15, 14, 22 and 23, Township 4 North, Range 4 West.
ERM 5	1329.17	Brass cap stamped U.S. Government Land Office at corner of Sections 13, 18, 19 and 24, Township 3 North, Range 5 West.
ERM 5A	1352.57	Brass cap stamped U.S. Government Land Office at east quarter corner of Section 13, Township 3 North, Range 5 West.
ERM 7	1417.95	Brass cap stamped U.S. Government Land Office at corner of Sections 6, 5, 7 and 8, Township 3 North, Range 4 West.
ERM 10	1492.23	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 28 and 33, Township 4 North, Range 4 West.
ERM 10A	1558.63	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 15 and 22, Township 4 North, Range 4 West.
ERM 11	1296.44	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 23 and 24, Township 3 North, Range 5 West.
ERM 15	1522.07	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 22 and 27, Township 4 North, Range 4 West.
ERM 17	1377.56	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 7 and 18, Township 3 North, Range 4 West.
ERM 19	1471.87	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 32 and 33, Township 4 North, Range 4 West.
ERM 23	1380.14	Brass cap stamped U.S. Government Land Office at corner of Sections 12, 7, 13 and 18, Township 3 North, Range 5 West.
ERM 27	1448.07	Brass cap stamped U.S. Government Land Office at north quarter corner of Section 5, Township 3 North, Range 4 West.
ERM 28	1510.32	Brass cap stamped U.S. Government Land Office at quarter corner of Section 28 and 27, Township 4 North, Range 4 West.
ERM 31	1548.09	Bureau of Land Management brass cap marked TR39 at quarter corner of Sections 20 and 21, Township 4 North, Range 4 West.

ERM 31A	1440.49	Brass cap in NE corner of center box culvert at Wagner Wash and Sun Valley Parkway. Stamped 1442.00. Near center of Section 5, Township 3 North, Range 4 West.
ERM 34	1418.00	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 6 and 7, Township 3 North, Range 4 West.
ERM 38	1524.24	Brass cap stamped U.S. Government Land Office at corner of Sections 21, 22, 28 and 27, Township 4 North, Range 4 West.
ERM 38A	1544.20	Central Arizona Project R/W brass cap located at R/W station 164+00.18, 125' rt., near center of Section 21, Township 4 North, Range 4 West.
ERM 44	1541.60	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 21 and 22, Township 4 North, Range 4 West.

4-9-91

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PUBLISHED SEPARATELY

Flood Insurance Rate Map Index
Flood Insurance Rate Map

PREFINAL

Registered Professional Engineer (Civil)
CERTIFICATE NO.
LARRY STEVEN MILLER
Date Signed 4-11-91
ARIZONA, U.S.A.

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in an unincorporated area of Maricopa County, Arizona, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for an area of the County that will be used to establish actuarial flood insurance rates and assist the County in their effors to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic analyses for this study were prepared by the Flood Control District of Maricopa County, Arizona. The hydraulic analyses were prepared by HDR Engineering, Inc., the study contractor. This work was completed in April 1991.

1.3 Coordination

2.0 AREA STUDIED

2.1 Scope of Study

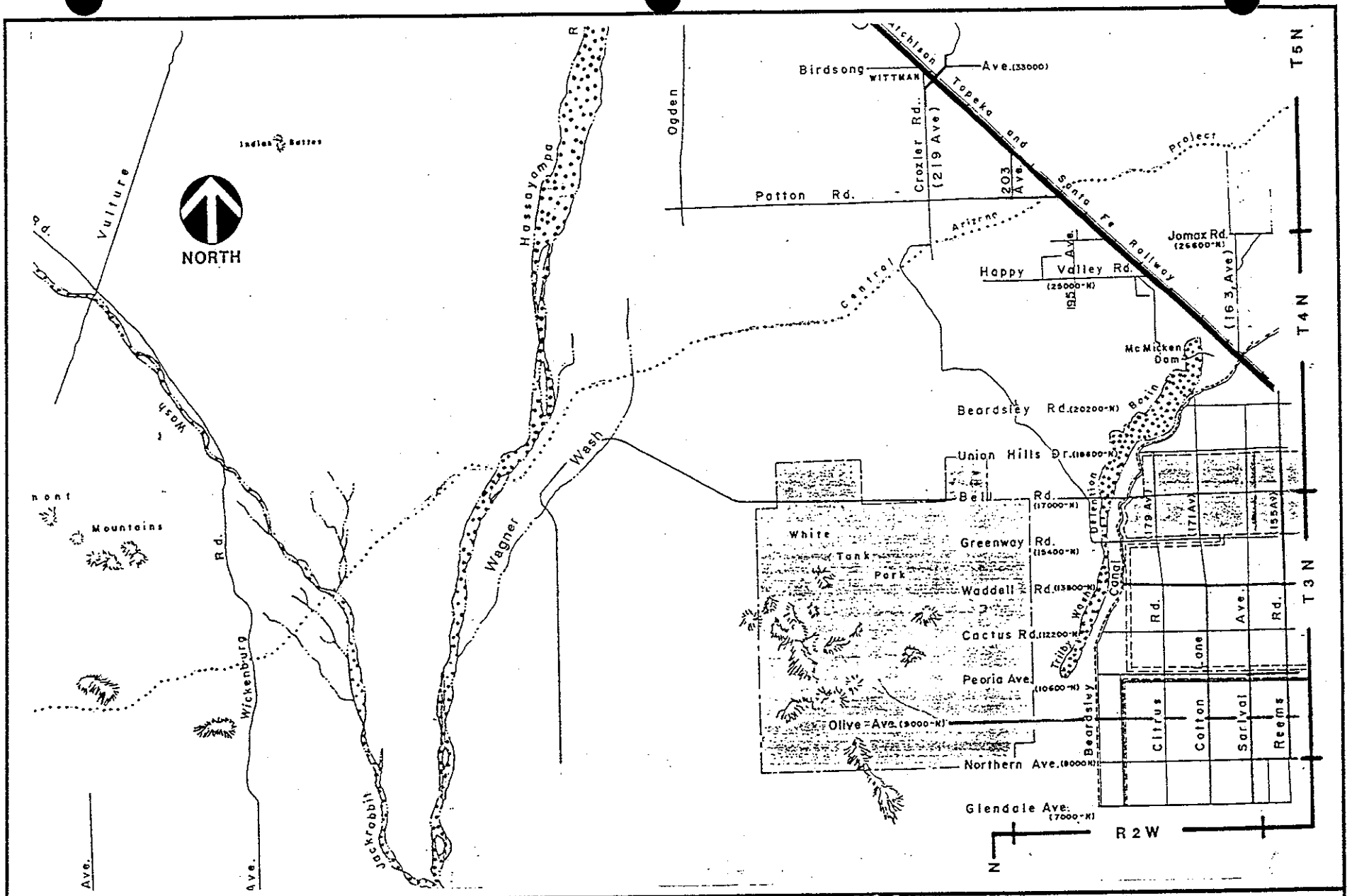
This Flood Insurance Study covers an unincorporated area of Maricopa County, Arizona. The area of study is shown on the Vicinity Map (Figure 1).

Riverine flooding on Wagner Wash from Central Arizona Project (CAP) Canal downstream to the stream's confluence with the Hassayampa River was studied by detailed methods. Ponded flooding above the CAP Canal was mapped at a single water surface elevation which was determined in the hydrologic analyses performed by the Flood Control District of Maricopa County. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Flood Control District of Maricopa County, Arizona.

2.2 Community Description

Maricopa County, encompassing a total area of 9238 square miles, is located in south-central Arizona. It is bordered by Yavapai County to the north, Pinal and Gila Counties to the east, Pima County to the south and Yuma and La Paz Counties to the west. The incorporated communities within the county cover an area in excess of 100 square miles and an additional 3,330 square miles are Government-owned lands. A large portion of the the remaining county is undeveloped. The Wagner Wash drainage area is largely undeveloped at this time. The 1980 population of the county was 1.5 million.

The topography of Maricopa County varies from rugged mountainous areas in the north to arid plain and desert in southern areas. Small intermittent streams and washes traverse most of the county.



FEDERAL EMER. MANAGEMENT AGENCY

MARICOPA COUNTY
(UNINCORPORATED AREAS)

1 0 1 2 3 4 5 6 7

Scale in Miles

VICINITY MAP

The climate in Maricopa County is mild with short, moderate winters and long, hot summers. Mean annual precipitation ranges from 7 inches in the southern desert regions of the county to more than 25 inches in the mountainous northern areas. Two periods of the year produce the heaviest rainfall amounts. Winter storms occur during the December to March period and summer storms occur most frequently from June through October.

2.3 Principal Flood Problems

Historically, large portions of Maricopa County are prone to destructive floods. However, there are no severe flood problems, life or property threatening, evident in the area of study. The area is still largely in its natural state and manmade structures within the flood plain limits are minimal, with the exception of electrical transmission towers which have been constructed in the flood plain at several locations.

The two roadway crossings, both Sun Valley Parkway, are of recent construction and the adequacy of the culvert structures under flood conditions of any frequency has not been observed.

The installation of the Central Arizona Project Canal at the upstream area of study has created a levee that impounds flood waters on its north side. Relief through the canal is provided by overchutes located at periodic intervals along the canal.

2.4 Flood Protection Measures

No flood protection measures currently exist in Wagner Wash watershed, nor are any planned in the foreseeable future. The effect of the CAP Canal serves as a protection measure, but it was not constructed for that purpose. Cursory inspection of the canal indicates that it is adequate to withstand the hydraulic pressures induced by the expected impoundment of water during the study's rainfall event; however, this study does not warrant that the canal levees will not fail, either partially or fully, under rainfall events of any frequency.

3.0 ENGINEERING METHODS

For the flooding source studied in detail, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. A flood event of a magnitude which is expected to be equalled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for flood plain management and for flood insurance premium rates. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual occurrence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported here reflect flooding potentials based on conditions existing in the county at the time of completion of the study. Maps and flood elevations may be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

3.2 Hydraulic Analysis

Analysis of the hydraulic characteristics of flooding from the riverine source studied was carried out to provide an estimate of the elevation of flooding of the selected 100-year recurrence interval.

Table 2. Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	100-year Peak Discharge (cubic feet per second)
Wagner Wash at confluence with Hassayampa River	42.07	15717
Wagner Wash at east quarter corner of Section 13, T. 3 N, R. 5 W.	40.21	15351
Wagner Wash near center of the SE 1/4 SW 1/4, Section 7, T. 3 N, R. 4 W.	38.63	12861
Wagner Wash near center of Section 7, T. 3 N, R. 4 W.	38.17	12363
Wagner Wash, 1700 feet below confluence with Bootlegger Wash	37.39	10964
Wagner Wash at Sun Valley Parkway (south crossing)	28.62	10358
Wagner Wash, 2000 feet upstream of Sun Valley Parkway (south crossing)	25.93	8904
Wagner Wash, 5200 feet upstream of Sun Valley Parkway (south crossing)	24.54	8079
Wagner Wash, 3700 feet downstream of Sun Valley Parkway (north crossing)	22.72	7225
Wagner Wash, downstream side of Sun Valley Parkway (north crossing)	20.38	5906
Wagner Wash, upstream of Sun Valley Parkway (north crossing)	15.99	3446
Wagner Wash, 3200 feet north of Sun Valley Parkway (north crossing)	15.07	2894
Wagner Wash, 1700 feet downstream of CAP canal	13.14	1723
Wagner Wash downstream of CAP canal	11.89	873

Cross-section data for the backwater analysis was obtained photogrammetrically from aerial photographs obtained by aerial survey in September, 1990. Topographic maps were also compiled from the aerial survey and were used for base map information and to supplement the cross-section data, where required. The topographic maps were computer generated at a scale of 1:2400 with a contour interval of 2 feet. All culvert crossings were field surveyed to obtain elevation data and structural geometry.

Water-surface elevations of the flood of the selected recurrence interval were computed using the COE HEC-2 step-backwater computer program. The starting water-surface elevation for Wagner Wash was determined using the slope-area method.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and flood plain areas. The channel "n" values for Wagner Wash ranged from 0.04 to 0.105 and overbank "n" values ranged from 0.065 to 0.10.

The hydraulic analysis for this study was based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if the hydraulic structures remain unobstructed.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local govemments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain and floodway boundaries to assist communities in developing flood plain management measures.

4.1 Flood Plain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. For the stream studied in detail, the 100-year flood plain boundary has been delineated using the flood elevations determined at each cross section.

Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2400 with a contour interval of 2 feet.

The 100-year flood plain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increases in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodway in this study is presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this study was computed for the entire stream length on the basis of engineering judgment which consisted of utilizing equal conveyance methodology as a starting point but completing the floodway delineation by specifying the exact location of the encroachment for any given cross section. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table _). In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure _.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. For this study, these zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed in such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and flood plain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year flood plains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For flood plain management applications, the map shows by tints, screens, and symbols, the 100-year flood plains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE (NOTE)	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Wagner Wash								
A	475	540	2426	6.5	1257.3	1257.3	1258.3	1.0
B	945	570	1960	8.0	1263.7	1263.7	1264.2	0.5
C	1360	501	1948	8.1	1269.6	1269.6	1270.2	0.6
D	1840	511	2063	7.6	1276.0	1276.0	1276.6	0.6
E	2330	450	1852	8.5	1282.6	1282.6	1283.5	0.9
F	2750	280	1585	9.9	1288.0	1288.0	1288.8	0.8
G	3180	322	1645	9.6	1292.5	1292.5	1293.0	0.5
H	3690	334	1493	10.5	1297.5	1297.5	1298.0	0.5
I	4150	442	1749	9.0	1303.3	1303.3	1303.9	0.6
J	4670	509	2129	7.4	1309.9	1309.9	1310.8	0.9
K	4970	327	1394	11.3	1313.8	1313.8	1313.9	0.1
L	5390	580	2530	6.2	1319.2	1319.2	1319.6	0.4
M	5880	476	1860	8.4	1323.2	1323.2	1323.6	0.4
N	6370	333	1530	10.3	1328.7	1328.7	1328.8	0.1
O	6860	334	1645	9.6	1333.2	1333.2	1333.8	0.6
P	7330	214	1217	12.9	1339.0	1339.0	1339.0	0.0
Q	7780	200	1565	9.8	1343.8	1343.8	1343.9	0.1
R	8300	314	1736	8.8	1346.2	1346.2	1347.1	0.9
S	8800	462	1808	8.5	1350.5	1350.5	1350.9	0.4
T	9330	570	2016	7.6	1355.5	1355.5	1355.4	-0.1
U	9870	375	1588	9.7	1359.1	1359.1	1359.3	0.2
V	10300	540	2525	6.1	1362.9	1362.9	1363.8	0.9
W	10820	550	1988	7.7	1366.3	1366.3	1367.0	0.7
X	11300	650	2493	6.2	1370.8	1370.8	1371.7	0.9
Y	11770	650	2387	6.4	1374.1	1374.1	1375.0	0.9
Z	12300	550	2175	5.9	1377.8	1377.8	1378.7	0.9
AA	12830	600	2190	5.9	1381.5	1381.5	1382.2	0.7

NOTE: Distance In Feet Above Mouth Along Profile Base Line

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE (NOTE)	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Wagner Wash								
AB	13340	600	2065	6.2	1385.7	1385.7	1386.0	0.3
AC	13840	540	1878	6.8	1389.0	1389.0	1389.5	0.5
AD	14320	490	1967	6.3	1392.9	1392.9	1393.3	0.4
AE	14820	500	1628	7.6	1396.5	1396.5	1397.1	0.6
AF	15360	540	2394	5.2	1400.3	1400.3	1401.3	1.0
AG	15850	553	2319	5.3	1402.7	1402.7	1403.6	0.9
AH	16350	625	1777	7.0	1407.1	1407.1	1407.3	0.2
AI	16820	660	2672	4.6	1410.2	1410.2	1411.2	1.0
AJ	17320	650	2317	5.3	1412.7	1412.7	1413.6	0.9
AK	17820	650	2233	5.5	1416.0	1416.0	1416.9	0.9
AL	18170	650	2476	5.0	1418.2	1418.2	1419.2	1.0
AM	18600	625	2181	5.7	1421.0	1421.0	1421.8	0.8
AN	19050	625	2159	5.1	1423.6	1423.6	1424.6	1.0
AO	19570	475	1748	6.3	1426.3	1426.3	1427.2	0.9
AP	20080	425	1545	7.1	1429.6	1429.6	1430.4	0.8
AQ	20680	450	1834	6.0	1433.5	1433.5	1434.3	0.8
AR	21120	551	2410	4.5	1435.2	1435.2	1435.9	0.7
AS	21360	590	1933	5.4	1436.0	1436.0	1436.5	0.5
AT	21520	647	913	11.3	1437.7	1437.7	1437.7	0.0
AU	21690	798	1591	6.5	1440.8	1440.8	1440.8	0.0
AV	22190	600	2548	4.1	1443.7	1443.7	1443.9	0.2
AW	22690	450	1533	6.8	1445.3	1445.3	1445.7	0.4
AX	23190	400	1752	5.9	1448.5	1448.5	1449.1	0.6
AY	23660	375	1616	6.4	1450.9	1450.9	1451.8	0.9
AZ	24170	330	1659	5.4	1453.9	1453.9	1454.7	0.8
BA	24690	330	1626	5.5	1455.9	1455.9	1456.7	0.8
BB	25180	300	1213	7.3	1458.5	1458.5	1458.9	0.4

NOTE: Distance In Feet Above Mouth Along Profile Base Line

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE (NOTE)	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Wagner Wash								
BC	25680	355	1803	4.9	1461.6	1461.6	1462.6	1.0
BD	26180	300	1466	6.1	1463.7	1463.7	1464.4	0.7
BE	26640	450	1532	5.8	1466.0	1466.0	1466.9	0.9
BF	27130	450	1613	5.0	1469.0	1469.0	1469.9	0.9
BG	27630	250	1244	6.5	1471.8	1471.8	1472.2	0.4
BH	28130	250	1008	8.0	1474.4	1474.4	1474.9	0.5
BI	28630	250	1434	5.6	1477.3	1477.3	1478.2	0.9
BJ	29130	270	1305	6.2	1479.2	1479.2	1479.9	0.7
BK	29580	300	1106	6.5	1481.4	1481.4	1482.3	0.9
BL	30080	250	1022	7.1	1484.7	1484.7	1485.1	0.4
BM	30580	250	1058	6.8	1487.4	1487.4	1488.0	0.6
BN	31070	250	1510	4.8	1490.1	1490.1	1491.0	0.9
BO	31570	310	1605	4.5	1491.9	1491.9	1492.9	1.0
BP	32060	250	1194	5.6	1494.0	1494.0	1494.9	0.9
BQ	32500	300	1604	4.2	1495.9	1495.9	1496.9	1.0
BR	32860	300	1704	3.2	1497.0	1497.0	1497.8	0.8
BS	33150	80	589	5.8	1497.5	1497.5	1498.2	0.7
BT	33296	200	416	8.3	1499.4	1499.4	1499.9	0.9
BU	33546	400	2010	1.7	1500.5	1500.5	1501.5	1.0
BV	33796	350	1282	2.7	1500.7	1500.7	1501.6	0.9
BW	34296	200	906	3.8	1502.2	1502.2	1502.6	0.4
BX	34806	150	587	5.9	1504.1	1504.1	1504.4	0.3
BY	35256	163	611	5.6	1506.6	1506.6	1507.1	0.5
BZ	35726	250	807	4.3	1509.1	1509.1	1509.9	0.8
CA	35986	250	871	4.0	1510.2	1510.2	1511.1	0.9
CB	36386	275	1011	3.4	1511.8	1511.8	1512.6	0.8
CC	36880	225	590	4.9	1514.3	1514.3	1514.6	0.3

NOTE: Distance In Feet Above Mouth Along Profile Base Line

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE (NOTE)	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Wagner Wash								
CD	37380	225	1062	2.7	1515.7	1515.7	1516.4	0.7
CE	37790	200	653	4.4	1516.8	1516.8	1517.4	0.6
CF	38040	154	730	4.0	1518.6	1518.6	1519.3	0.7
CG	38180	122	498	5.8	1520.3	1520.3	1520.7	0.4
CH	38330	200	1029	2.8	1521.7	1521.7	1522.1	0.4
CI	38730	320	1586	1.8	1522.7	1522.7	1523.3	0.6
CJ	39130	300	1163	2.5	1523.6	1523.6	1524.3	0.7
CK	39630	293	1201	2.4	1525.6	1525.6	1526.3	0.7
CL	40060	297	1069	2.7	1527.6	1527.6	1528.1	0.5
CM	40540	325	1022	2.8	1530.0	1530.0	1530.9	0.9
CN	41030	420	1348	2.1	1533.1	1533.1	1533.7	0.6
CO	41470	300	1111	2.6	1535.3	1535.3	1535.8	0.5
CP	41970	308	1227	1.4	1536.5	1536.5	1537.4	0.9
CQ	42470	285	820	2.1	1537.6	1537.6	1538.4	0.8
CR	42940	370	999	1.7	1540.4	1540.4	1540.6	0.2
CS	43440	275	619	1.4	1542.3	1542.3	1542.5	0.2
CT	43840	200	387	0.3	1542.7	1542.7	1543.2	0.5

NOTE: Distance In Feet Above Mouth Along Profile Base Line

7.0 OTHER STUDIES

The Sun Valley Development Company of Phoenix, Arizona prepared one-foot contour topographic mapping for most portions of the Wagner Wash stream reach. Hydrologic analyses was performed for purposes of design for the two Sun Valley Parkway roadway crossings over Wagner Wash.

A Flood Insurance Re-Study for the Hassayampa River, of which Wagner Wash is tributary, was performed by Cella-Barr Associates of Phoenix, Arizona in 1989.

This study is authoritative for the purposes of the National Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations.

8.0 LOCATION OF DATA

9.0 BIBLIOGRAPHY AND REFERENCES

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4. U.S. Department of the Interior, Geological Survey, Mannings's Roughness Coefficients For Stream Channels and Flood Plains in Maricopa County, Arizona (Preliminary Draft), 1990

5. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles User's Manual, Davis, California 1990

6. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Computer Program HEC-2 Water Surface Profiles, Davis, California, Version 4.5.1, February, 1991 (Haestad Methods Version 6.2)

7. McLain Harbers Aerial Survey, Topographic Maps, Scale 1:2,400, Contour Interval 2 feet, Wagner Wash, Arizona (1990)

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (feet NGVD)	Description of Location
ERM 1	1538.51	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 22 and 23, Township 4 North, Range 4 West.
ERM 3	1556.71	Brass cap stamped U.S. Government Land Office at corner of Sections 15, 14, 22 and 23, Township 4 North, Range 4 West.
ERM 5	1329.17	Brass cap stamped U.S. Government Land Office at corner of Sections 13, 18, 19 and 24, Township 3 North, Range 5 West.
ERM 5A	1352.57	Brass cap stamped U.S. Government Land Office at east quarter corner of Section 13, Township 3 North, Range 5 West.
ERM 7	1417.95	Brass cap stamped U.S. Government Land Office at corner of Sections 6, 5, 7 and 8, Township 3 North, Range 4 West.
ERM 10	1492.23	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 28 and 33, Township 4 North, Range 4 West.
ERM 10A	1558.63	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 15 and 22, Township 4 North, Range 4 West.
ERM 11	1296.44	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 23 and 24, Township 3 North, Range 5 West.
ERM 15	1522.07	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 22 and 27, Township 4 North, Range 4 West.
ERM 17	1377.56	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 7 and 18, Township 3 North, Range 4 West.
ERM 19	1471.87	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 32 and 33, Township 4 North, Range 4 West.
ERM 23	1380.14	Brass cap stamped U.S. Government Land Office at corner of Sections 12, 7, 13 and 18, Township 3 North, Range 5 West.
ERM 27	1448.07	Brass cap stamped U.S. Government Land Office at north quarter corner of Section 5, Township 3 North, Range 4 West.
ERM 28	1510.32	Brass cap stamped U.S. Government Land Office at quarter corner of Section 28 and 27, Township 4 North, Range 4 West.

ERM 31	1548.09	Bureau of Land Management brass cap marked TR39 at quarter corner of Sections 20 and 21, Township 4 North, Range 4 West.
ERM 31A	1440.49	Brass cap in NE corner of center box culvert at Wagner Wash and Sun Valley Parkway. Stamped 1442.00. Near center of Section 5, Township 3 North, Range 4 West.
ERM 34	1418.00	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 6 and 7, Township 3 North, Range 4 West.
ERM 38	1524.24	Brass cap stamped U.S. Government Land Office at corner of Sections 21, 22, 28 and 27, Township 4 North, Range 4 West.
ERM 38A	1544.20	Central Arizona Project R/W brass cap located at R/W station 164+00.18, 125' rt., near center of Section 21, Township 4 North, Range 4 West.
ERM 44	1541.60	Brass cap stamped U.S. Government Land Office at quarter corner of Sections 21 and 22, Township 4 North, Range 4 West.

LIETZ
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1980
ARIZONA, U.S.A.

90007
Wagner Wash

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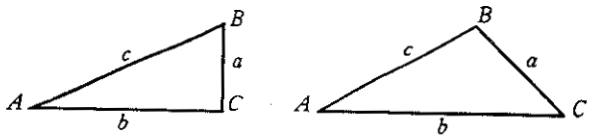
Book 3

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES



$$\text{Sin } A = \frac{a}{c} = \text{Cos } B \qquad \text{Cot } A = \frac{b}{a} = \text{Tan } B$$

$$\text{Cos } A = \frac{b}{c} = \text{Sin } B \qquad \text{Sec } A = \frac{c}{b} = \text{Cosec } B$$

$$\text{Tan } A = \frac{a}{b} = \text{Cot } B \qquad \text{Cosec } A = \frac{c}{a} = \text{Sec } B$$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A,\ a = C \sin A,\ b = C \cos A.$
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ C = \frac{b}{\cos A}.$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ C = \frac{a}{\sin A}.$
a, c	A, B, b	$\sin A = \frac{a}{c},\ \cos B = \frac{a}{c},\ b = \sqrt{(c+a)\ (c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b},\ \cot B = \frac{a}{b},\ c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a},\ c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C,\ C = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $\frac{a+b+c}{2}$, area $= \sqrt{s(s-a)\ (s-b)\ (s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

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90017

Book 3

Hopper Mac
X-Sections
for
HDR
by
Hoffman Eng. Co.
484-7691

Jan. 91

Index

Item	Page
X-Sec Sta + Elev	73-102
Channel	85-89

Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
BS	1364.84	TP 20 p32	90-30-10 259-29-45	584.15	6.04	1
T Sta		109 p61				
0+00	1367.55	110 p61	89-52-20	1013.41	10.70	2
0+86 E	1366.10	1	89-57-05	727.19	10.70	2
0+99 B	1362.37	2	89-52-55	914.14	15.53	3
1+33 L	1361.85	3	89-54-40	880.31	15.53	3
1+41 E	1359.53	4	90-03-45	872.03	15.53	3
1+59 B	1358.59	5	90-03-50	797.50	15.53	3
2+18 B	1360.21	6	90-01-10	795.18	15.53	3
2+42 L	1359.90	7	90-03-40	751.54	15.53	3
2+65 O	1360.39	8	90-00-25	748.42	15.53	3
3+23 O	1360.06	9	90-03-05	692.40	15.53	3
3+41 E	1359.68	10	90-04-05	672.26	15.53	3
3+52 B	1360.19	11	90-01-30	660.54	15.53	3
3+70 L	1360.39	12	90-00-30	645.68	15.53	3
3+77 L	1359.88	13	90-29-20	636.33	10.70	2
3+84 B	1360.43	14	90-26-40	629.20	10.70	2
4+62 B	1360.05	15	90-32-50	550.52	10.70	2
5+44 E	1359.88	16	90-39-45	468.92	10.70	2
5+96 B	1360.26	17	90-41-40	415.50	10.70	2
6+19 O	1359.07	18	90-54-20	392.44	10.70	2
6+36 B	1359.77	19	90-50-25	377.15	10.70	2
6+62 L	1358.30	20	90-45-25	351.35	15.53	3
6+76 E	1360.45	21	90-49-35	336.52	10.70	2
7+28 B	1360.53	22	90-57-35	285.15	10.70	2

X-Sec 110-109

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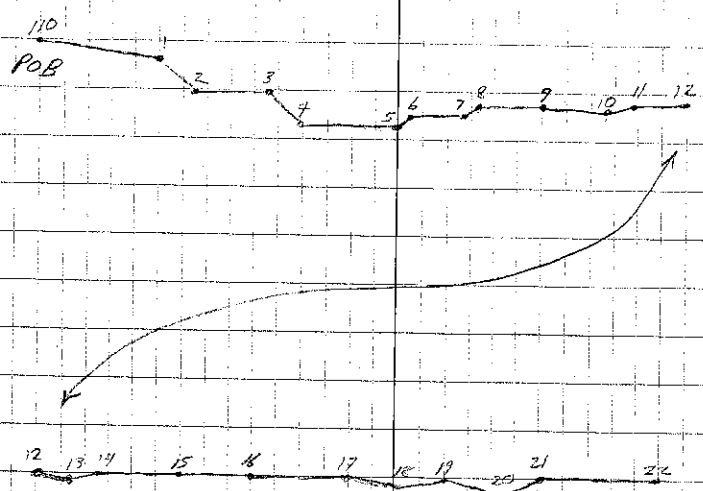
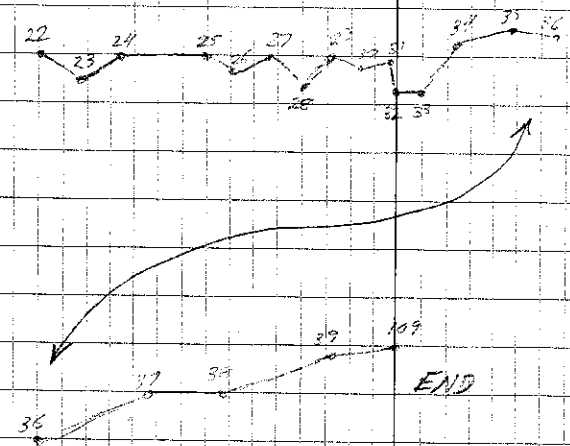


Cont Next Page

Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
7+35 ⅝	1359.09	23	90-17-05	278.41	15.53 ~~10.70~~	2
7+39 ⅝	1360.42	24	91-01-20	273.64	10.70	2
7+77 ⅝	1360.29	25	91-13-45	233.64	10.70	2
8+09 ½	1359.21	26	91-42-45	203.68	10.70	3
8+16 ½	1360.26	27	91-28-00	197.00	10.70	3
8+23 ½	1358.02	28	93-35-50	189.90	6.04	1
8+30 ½	1360.64	29	92-54-30	182.44	6.04	1
8+40 ½	1359.10	30	93-35-15	173.29	6.04	1
8+46 ½	1359.57	31	93-33-30	167.17	6.04	1
8+48 ½	1357.49	32	94-19-15	165.01	6.04	1
8+51 ⅝	1357.59	33	94-22-35	161.64	6.04	1
8+58 ½	1359.74	34	93-45-30	155.19	6.04	1
8+77 ½	1361.57	35	93-31-15	136.29	6.04	1
8+88 ½	1361.04	36	94-04-35	125.15	6.04	1
9+34 ½	1365.92	37	92-56-05	78.21	6.04	1
9+59 ⅝	1365.67	38	94-34-55	53.55	6.04	1
9+99 ⅝	1370.33	39	88-36-35	13.64	6.04	1
10+13 ½	1370.89	109 p.61	↑ Sta.	0	5.11	
check	1380.95 c 1380.98 c	TP 22 p.32	88-22-30 271-37-20	551.76	10.70	3

x-Sec 110-109



Z-Sec 112-111

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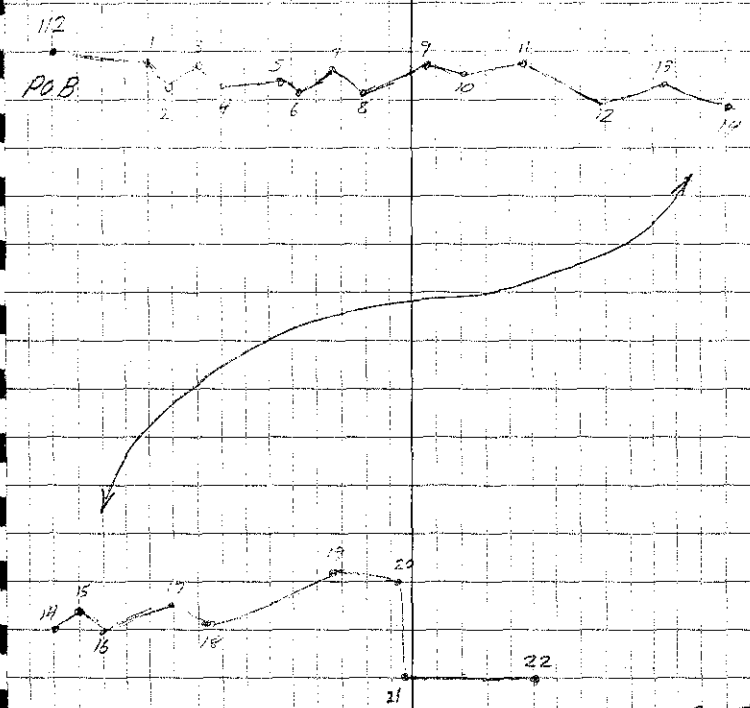
Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
BS	1396.160	TP 28 p 33	89-39-15 271-20-35	295.19	5.04	1
Z Sta		111 p 61				
0+00	1387.60	112 p 61	[illegible]	1042.43	15.52	3
0+66 1	1385.75	1	89-45-15	1079.76	20.37	4
0+71 0	1383.96	2	89-34-40	1275.07	25.20	5
0+84 6	1385.35	3	89-31-55	1861.92	25.20	5
0+91 3	1384.35	4	89-33-40	1855.00	25.20	5
1+18 6	1384.32	5	89-33-15	1829.84	25.20	5
1+19 6	1383.47	6	89-34-55	1826.91	25.20	5
1+36 0	1385.32	7	89-31-10	1810.51	25.20	5
1+57 3	1384.17	8	89-32-25	1789.16	25.20	5
2+03 1	1385.73	9	89-29-15	1743.35	25.20	5
2+18 8	1385.04	10	89-30-20	1728.45	25.20	5
2+65 3	1386.35	11	89-26-50	1681.31	25.20	5
3+26 3	1383.01	12	[illegible]	1620.32	25.20	5
3+65 4	1383.96	13	89-29-55	1581.08	25.20	5
4+08 1	1382.09	14	[illegible]	[illegible]	25.20	5
4+14 1	1382.64	15	89-31-55	[illegible]	25.20	5
4+18 1	1381.75	16	89-33-50	1537.72	25.20	5
4+50 1	1382.99	17	89-30-85	[illegible]	25.20	5
4+57 2	1382.31	18	89-31-40	[illegible]	25.20	5
5+57 5	1384.46	19	89-35-30	1391.69	20.37	4
6+16 8	1382.19	20 ✓	89-41-15	[illegible]	20.37	4
6+17 3	1376.55	21	89-43-30	[illegible]	25.20	5
6+75 3	1376.79	22	89-41-55	[illegible]	25.20	5



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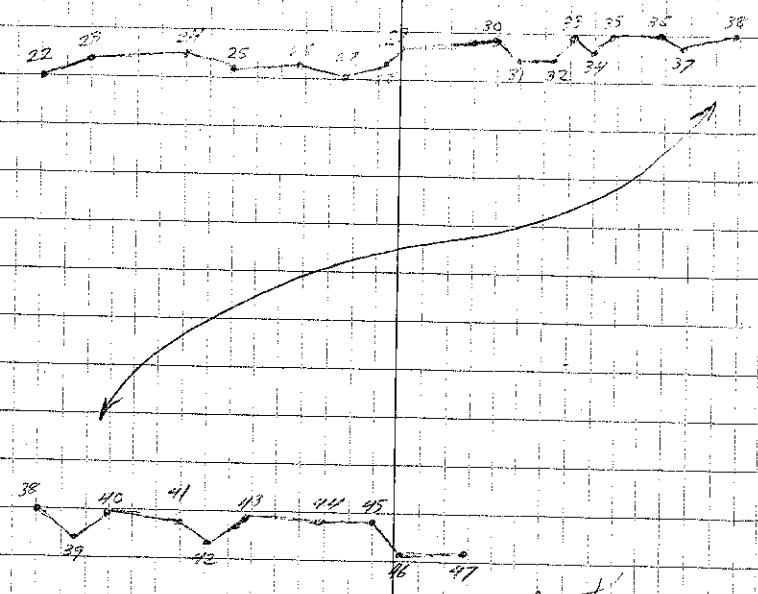
Sta	Elev	Point	Zn Δ	Hz Dist	Rod	
6+88.2	1378.00	23	89-38-25	1257.73	25.20	5
7+58.2	1379.23	24	89-55-30	1187.57	25.20	5
7+79.2	1377.51	25	89-57-35	1155.58	25.20	5
8+14.2	1375.23	26	90-03-20	1121.51	6.04	1
8+45.2	1377.95	27	90-07-45	1093.46	6.04	1
8+51.4	1377.66	28	90-05-05	1086.57	6.04	1
8+68.0	1378.73	29	90-02-15	1082.50	6.04	1
8+75.2	1379.25	30	90-00-05	1079.23	6.04	1
9+31.2	1377.84	31	90-02-40	1050.57	6.04	1
9+39.0	1377.82	32	90-00-50	1007.52	6.04	1
9+47.8	1379.30	33	90-34-15	948.55	6.04	1
9+53.6	1378.23	34	90-32-10	942.90	6.04	1
9+58.3	1379.12	35	90-35-15	988.21	6.04	1
9+79.8	1379.13	36	90-36-05	966.57	6.04	1
9+83.3	1378.46	37	90-38-30	963.15	6.04	1
10+05.8	1379.90	38	90-34-10	940.32	6.04	1
10+14.5	1377.92	39	90-41-25	932.49	6.04	1
10+23.0	1379.69	40	90-35-35	923.45	6.04	1
10+37.8	1378.81	41	90-39-50	908.91	6.04	1
10+42.3	1377.68	42	90-44-00	903.21	6.04	1
10+53.5	1379.61	43	90-37-25	892.32	6.04	1
10+76.3	1378.38	44	90-44-45	870.17	6.04	1
10+97.2	1378.95	45	90-42-05	849.[illegible]	6.04	1
11+02.7	1377.28	46	90-29-45	844.20	10.70	2
11+24.5	1376.89	47	90-32-10	821.79	10.70	2

Sec 112-111



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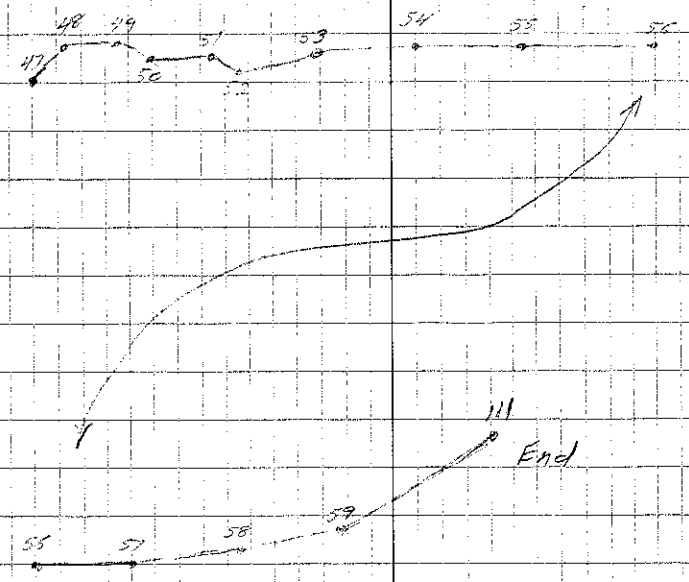
Sec 1/2-111

Sta.	Elev.	Point	Zn ∠	Ho Dist	Rod.	
11+30 ℄	1379.54	48	90-[illegible]	[illegible]	6.04	1
11+54 ℄	1380.08	49	90-39-45	[illegible]	6.04	1
11+62 ℄	1378.59	50	90-40-15	[illegible]	6.04	1
11+95 ℄	1379.07	51	90-43-30	750.53	6.04	1
12+05 ℄	1377.37	52	90-52-30	[illegible]	6.04	1
12+55 ℄	1380.88	53	90-41-00	689.29	6.04	1
13+45 ℄	1380.66	54	90-49-10	[illegible]	6.04	1
14+49 ℄	1380.40	55	[illegible]	[illegible]	6.04	1
15+60 ℄	1379.43	56	91-27-20	385.91	6.04	1
16+25 ℄	1379.38	57	91-45-30	320.42	6.04	1
17+29 ℄	1381.05	58	92-10-20	216.91	6.04	1
18+48 ℄	1382.44	59	93-59-00	97.58	6.04	1
19+46 ℄	1390.10	111 p.61	[illegible]	0	5.17	
check	1394.08 C 1394.08 R	TP27 p.33	89-16-35 270-43-20	388.78	6.04	1



Sta	Elev	Sec	Bnd	Angle	Rod	
BS	1410.297	TM 10 p31	89-05-10 270-54-50	521.81	6.04	1
0+00	1402.81	114 pB	A [illegible]	0	5.30	
1+05.5	1401.40	1	90-22-20	105.56	6.04	1
2+62.5	1399.57	2	89-30-40	262.59	10.70	2
3+07.8	1399.21	3	89-40-05	307.76	10.70	2
4+04.7	1398.42	4	89-51-35	404.71	10.70	2
5+19.2	1398.25	5	90-10-25	519.25	10.70	2
5+85.4	1396.61	6	90-04-50	585.65	10.70	2
6+34.1	1394.85	7	90-14-00	634.07	10.70	2
6+81.8	1394.42	8	90-15-10	681.85	10.70	2
6+86.4	1393.22	9	90-18-05	686.45	10.70	2
6+97.6	1394.36	10	90-15-10	697.63	10.70	2
7+04.8	1393.66	11	90-18-25	704.85	10.70	2
7+11.5	1394.45	12	90-18-25	711.65	10.70	2
7+31.5	1394.30	13	90-19-35	731.59	10.70	2
7+34.2	1391.79	14	90-25-35	734.27	10.70	2
7+37.4	1391.75	15	90-26-30	737.42	10.70	2
7+41.9	1394.51	16	90-18-35	741.90	10.70	2
7+51.3	1393.79	17	90-16-40	751.34	10.70	2
7+58.4	1394.46	18	90-13-30	758.37	10.70	2
7+67.8	1393.30	19	90-18-45	767.62	10.70	2
7+73.7	1395.02	20	90-19-45	773.70	10.70	2
7+88.8	1394.58	21	90-13-45	788.42	10.70	2
~~8+40.3~~	~~1395.10~~	~~22~~	~~90-22-35~~	840.85	10.70	2
9+15.9	1394.55	23	90-13-50	915.90	10.70	2

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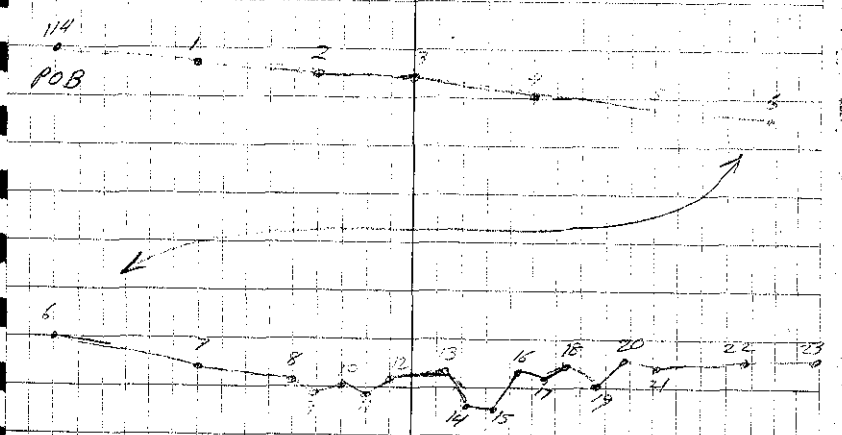

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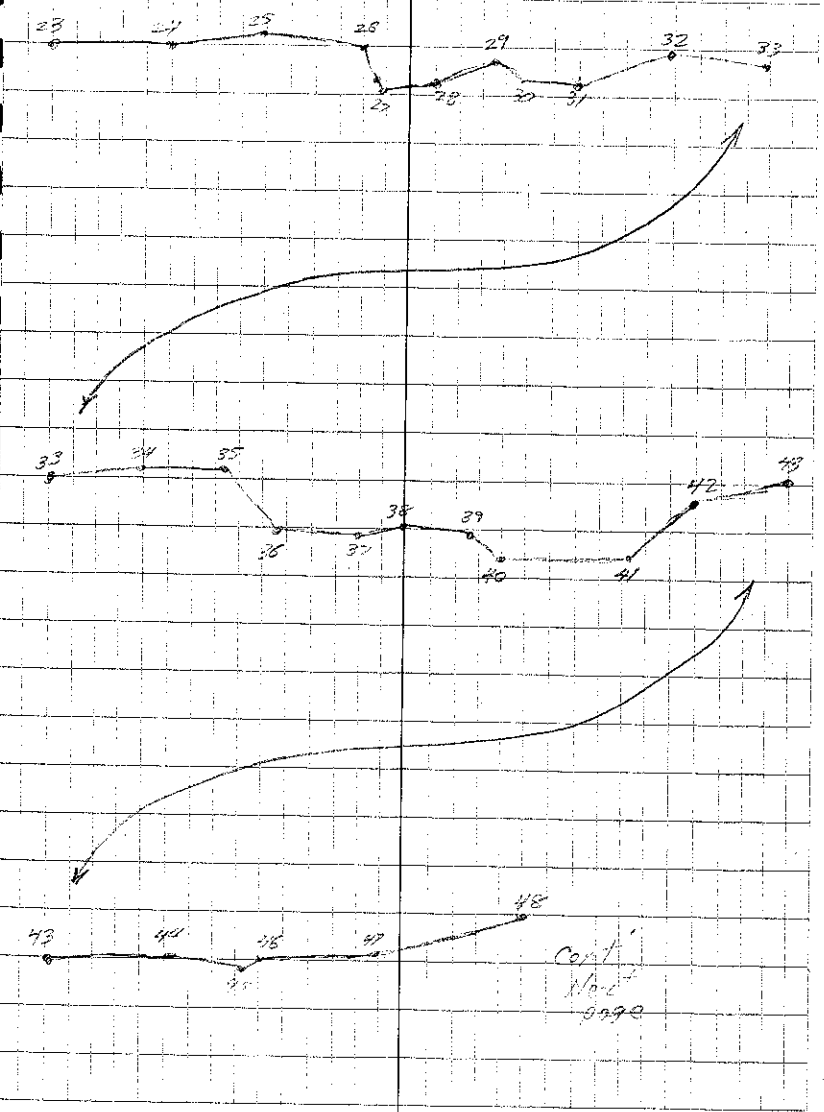
Sta.	Elev	Point	Zn ∠	Hz Dist	Rod	
9+75 ±	1394.37	24	90-10-50	975.22	10.70	2
10+12 ±	1395.54	[illegible]	90-08-25	1012.[illegible]	10.70	2
10+51 ±	1394.36	[illegible]	90-09-55	1051.27	10.70	2
10+74 ±	1392.53	[illegible]	90-15-45	1074.45	10.70	2
10+90 ±	1390.70	[illegible]	90-14-55	1090.15	10.70	2
11+00 ±	1393.95	[illegible]	90-10-55	1100.[illegible]	10.70	2
11+03 ±	1393.01	[illegible]	90-13-50	1103.35	10.70	2
11+09 ±	1392.66	[illegible]	90-14-50	1109.19	10.70	2
11+26 ±	1394.66	32	90-08-30	1126.66	10.70	2
11+62 ±	1393.96	33	90-10-20	1162.22	10.70	2
12+01 ±	1395.09	34	90-06-45	1201.54	10.70	2
12+39 ±	1394.24	35	90-08-55	1239.15	10.70	2
12+44 ±	1391.48	36	90-03-10	1244.68	15.53	3
12+69 ±	1391.24	37	90-03-45	1269.61	15.53	3
12+89 ±	1392.19	38	90-01-10	1289.44	15.53	3
13+01 ±	1391.93	[illegible]	90-01-50	1301.42	15.53	3
13+07 ±	1390.47	40	90-0[illegible]-45	1306.[illegible]	15.53	3
13+63 ±	1389.45	41	90-07-55	1365.21	15.53	3
13+68 ±	1392.33	[illegible]	90-00-45	1368.90	15.53	3
14+12 ±	1393.92	[illegible]	89-45-05	1412.[illegible]	20.37	4
14+75 ±	1393.59	44	89-46-50	1475.45	20.37	4
15+02 ±	1392.72	45	89-48-45	1502.55	20.37	4
15+05 ±	1393.27	46	89-47-30	1505.65	20.37	4
15+77 ±	1394.23	47	89-46-00	1577.15	20.37	4
16+11 ±	1396.64	48	89-51-35	1611.[illegible]	15.71	4

Z-Sec 14-113



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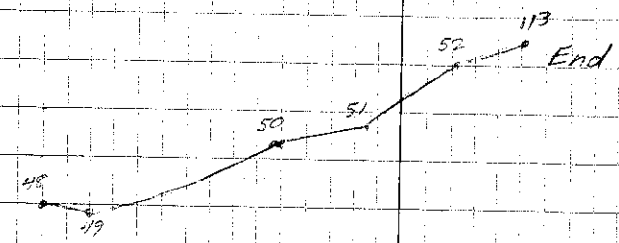
Next page

Sta	Elev	Point	In ∡	Hz Dist	Rod	
16+83 L	1396.[illegible]	49	89-42-25	1683.[illegible]	20.37	4
17+74 L	1403.2[illegible]	50	89-30-10	1774.[illegible]	20.37	4
17+97 E	1403.[illegible]	51	89-30-15	1797.58	20.37	4
18+25 R	1406.80	52	89-24-15	1825.29	20.57	4
18+65 E	1408.3[illegible]	113 p.61	89-[illegible]-30	1865.[illegible]	10.70	2
check	1404.77 C 1404.77 R	TP 11 (p.31)	89-25-35 270-33-40	272.88	6.04	1

X-Sec 114-113



Sta	Elev	[illegible]	[illegible]	[illegible]	Rod	
GS	1417.948	EPM 7p3	10-17-45 269-42-15	533.24	6.04	1
0+00	1421.50	116 p.55	TSta	0	5.24	
1+24	1417.86	1	88-14-15	124.37	10.70	2
2+49 2	1418.14	2	89-31-00	249.17	10.70	2
2+67 2	1417.28	3	89-44-35	268.03	10.70	2
2+92 2	1417.97	4	89-38-15	292.21	10.70	2
3+87 2	1415.11	5	90-02-15	387.81	10.70	2
4+43 2	1414.11	6	90-14-55	443.25	10.70	2
4+62 2	1414.38	7	90-12-20	462.79	10.70	2
4+65 2	1412.77	8	90-24-00	465.29	10.70	2
4+83 2	1414.72	9	90-11-30	483.15	10.70	2
4+97 2	1412.26	10	90-26-05	497.82	10.70	2
5+10 2	1414.04	11	90-13-20	510.59	10.70	2
5+84 2	1413.40	12	90-15-35	583.85	10.70	2
6+60 2	1413.45	13 ✓	~~90-10-30~~ 90-13-30	660.26	10.70	2
6+63 2	1412.63	14	90-17-45	655.87	10.70	2
6+68 2	1413.53	15	90-12-55	668.[illegible]	10.70	2
6+77 2	1412.91	16	90-15-55	677.45	10.70	2
6+85 2	1413.69	17	90-11-50	685.64	10.70	2
6+92 2	1412.44	18	90-17-55	692.90	10.70	2
7+01 2	1414.02	19	90-03-55	701.10	10.70	2
7+12 2	1411.49	20	90-22-30	712.54	10.70	2
7+19 2	1413.92	21	90-08-10	719.19	10.70	2
7+45 2	1413.13	22	90-10-55	764.57	10.70	2
8+10 2	1413.87	23 ✓	90-09-15 ~~90-[illegible]~~	[illegible]	10.70	2
8+17 2	1412.44	24	90-15-10	816.24	10.70	2

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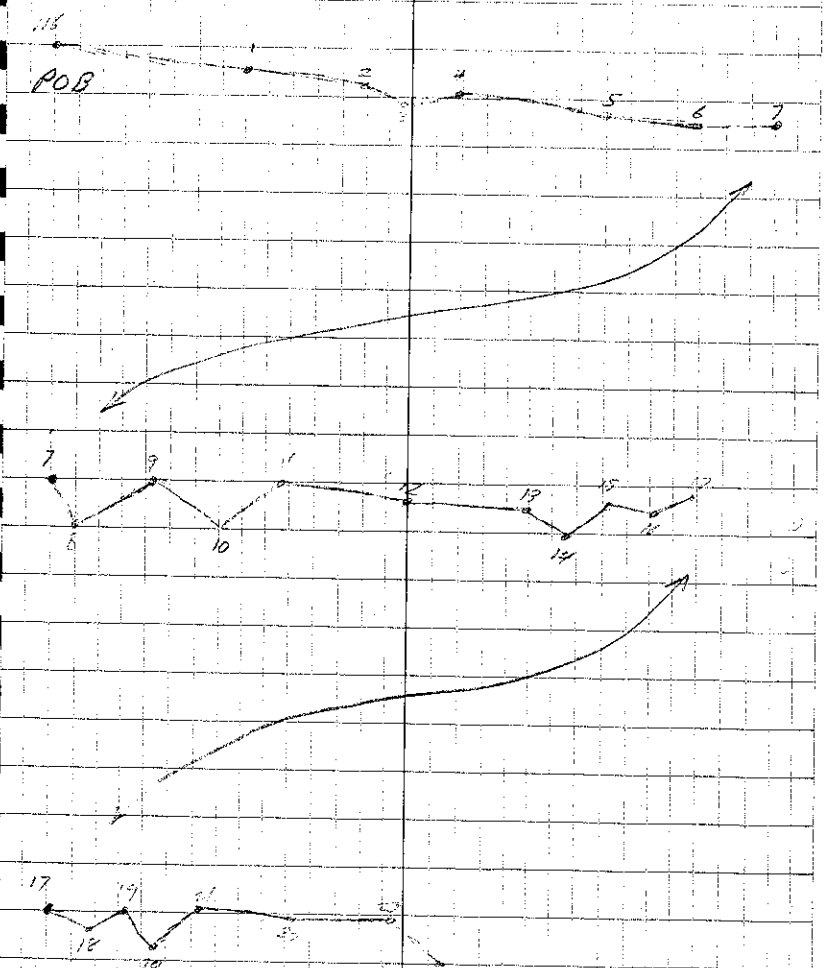

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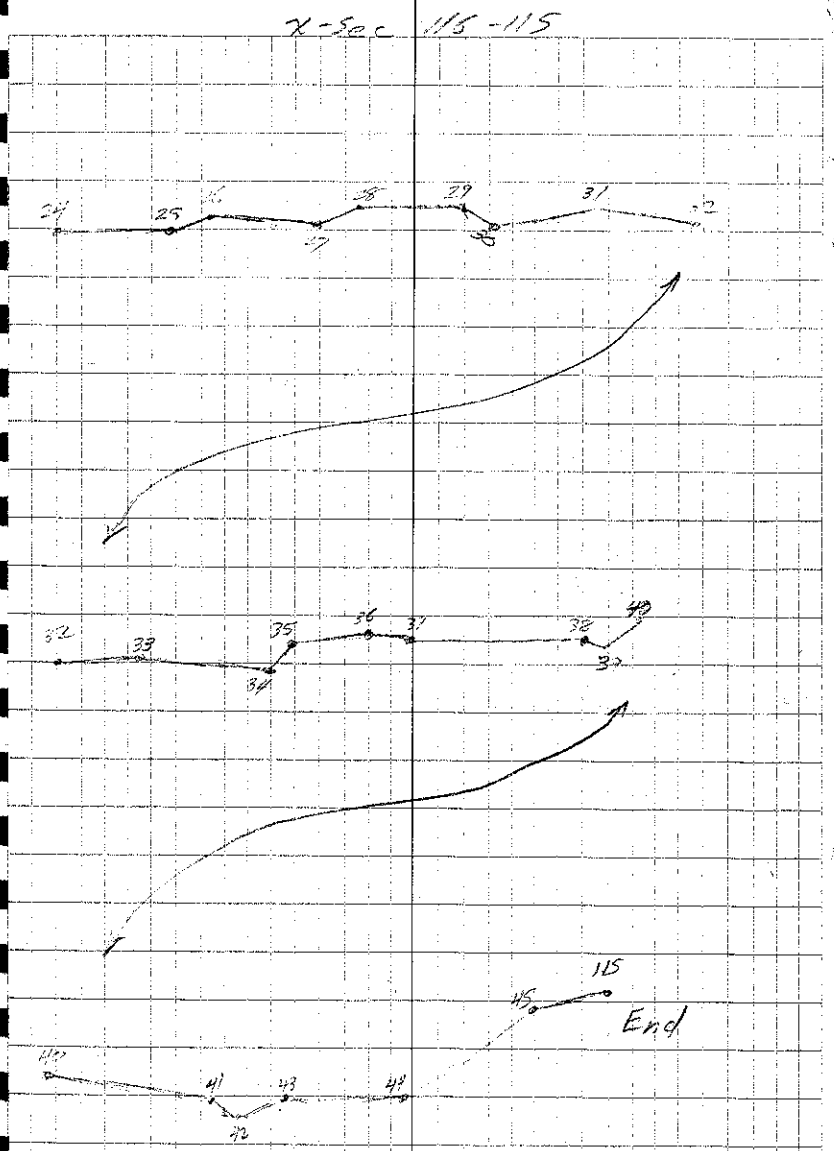
Sta.	Elev	Point	In ∠	Hz Dist	Rod	
8+42 ℄	1412.99	25	90-[illegible]	[illegible]59	10.70	2
8+47 ℄	1413.44	26	90-10-35	[illegible]	10.70	2
8+57 ℄	1412.23	27	90-12-45	867.85	10.70	2
8+74 ℄	1413.78	28	90-09-[illegible]	874.25	10.70	2
Check Mid	1413.84	→ Same point	90-08-35	884.28	10.70	2
Check Rt	1413.89	40'± Lt.	89-56-00	678.48	10.70	2
8+99 ℄	1413.99	29	89-30-15	651.48	15.53	3
9+02 ℄	1413.25	30	89-28-35	657.19	20.37	4
9+46 ℄	1414.26	31	89-26-25	618.93	15.53	3
9+94 ℄	1413.38	32	89-28-55	555.24	15.53	3
10+25 ℄	1413.82	33	89-24-20	535.43	15.53	3
10+07 ℄	1412.89	34	89-25-[illegible]	453.64	15.53	3
10+09 ℄	1413.31	35	89-18-[illegible]	451.25	15.53	3
11+33 ℄	1414.22	36	89-09-35	425.76	15.53	3
11+02 ℄	1413.59	37	89-15-35	412.37	15.53	3
12+68 ℄	1413.47	38	88-58-45	[illegible]	15.53	3
12+81 ℄	1412.78	39	89-04-15	278.[illegible]	15.53	3
12+93 ℄	1414.29	40	89-04-30	265.70	10.70	2
14+19 ℄	1412.83	41	90-06-20	140.74	10.70	2
14+32 ℄	1411.24	42	90-09-30	128.[illegible]	10.70	2
14+50 ℄	1412.31	43	90-24-20	[illegible]	10.70	2
15+12.17	1412.05	44	95-[illegible]-25	46.[illegible]	5.04	1
15+18 ℄	1412.20	45	[illegible]	16.[illegible]	5.04	1
15+60 ℄	1418.47	115 p. 52	[illegible]	0	5.32	
BS	1405.964	To 36 p. 33	90-20-45 269-39-10	1182.48	10.70	2



Sta	Elev	Point	Zn ∠	H. Dist	Rod	
B.S.	1430.439	TP 3 p 81	90-13-10 269-46-45	329.19	6.64	1
0+00	1435.23	118 p 82	89-25-10	347.67	6.04	1
1+12.3	1434.45	1	89-20-00	235.44	5.34	1
2+12.1	1433.28	2	89-20-10	135.53	5.34	1
3+47.2	[illegible]	3	⊼ Sta	0	5.28	
4+85.3	1431.23	4	90-16-50	138.61	5.34	1
5+83.2	1429.22	5	90-36-30	334.51	6.04	1
5+98.8	[illegible]	6	90-34-40	251.10	5.34	1
7+29.8	1429.30	7	90-2[illegible]-40	382.12	5.04	1
8+11.9	1427.06	8	90-34-25	464.83	6.04	1
8+18.3	1427.92	9	90-27-40	470.62	6.04	1
8+91.6	1426.97	10	90-00-30	542.36	10.70	2
10+10.8	1428.00	11	89-55-05	553.10	10.70	2
10+28.5	1427.17	12	89-59-25	620.55	10.70	2
10+52.5	1427.79	13	89-53-25	724.45	10.70	2
10+99.2	1427.46	14	90-[illegible]	752.83	10.70	2
11+08.2	1425.82	15	90-05-35	760.73	10.70	2
11+78.8	1426.50	16	90-03-00	770.13	10.70	2
11+84.6	1425.90	17	90-05-30	815.38	10.70	2
11+90.1	1424.45	18	90-10-40	842.40	10.70	2
12+29.2	1425.01	19	90-08-00	821.42	10.70	2
12+32.5	1425.43	20	90-06-30	824.82	10.70	2
12+66.5	1424.19	21	90-10-45	912.80	10.70	2
13+13.6	1424.21	22	90-10-10	965.94	10.70	2
13+13.9	1426.78	23	90-01-00	965.30	10.70	2

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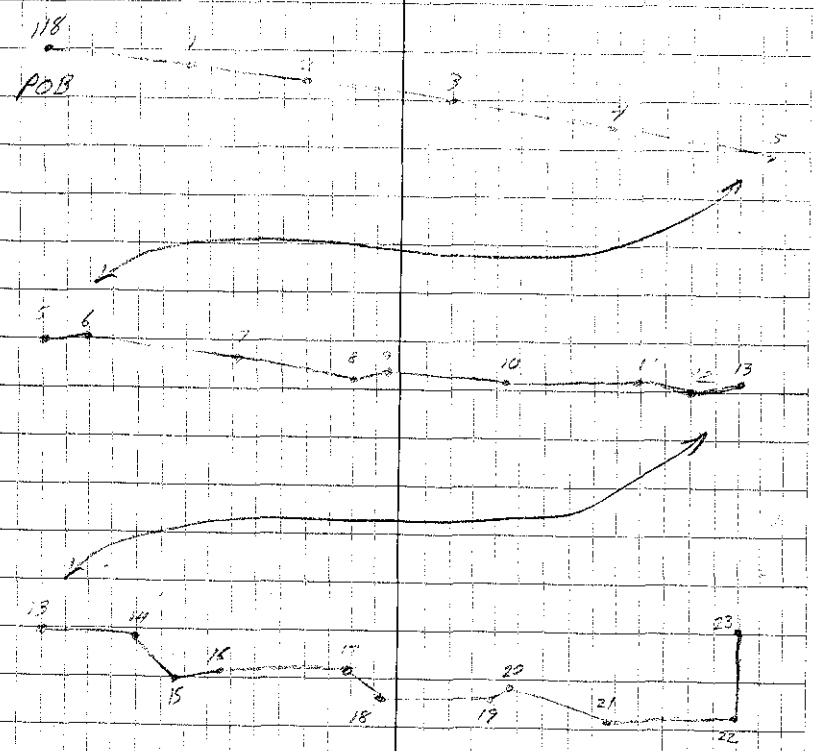

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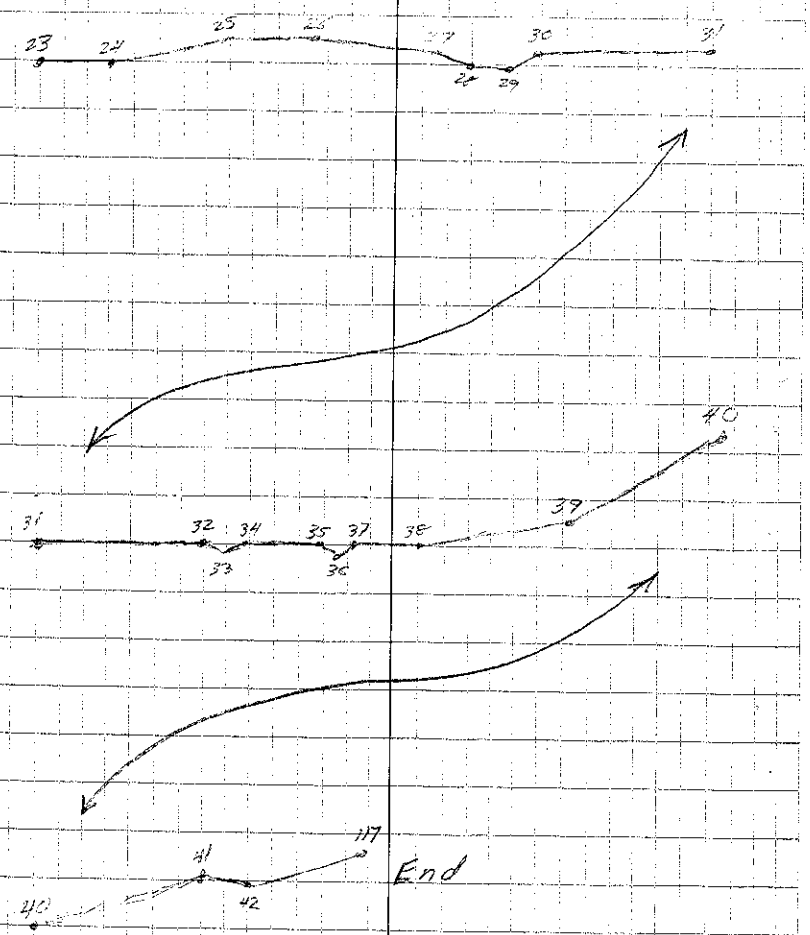
Sta	Elev	Point	Dir ∠	Dist	Rod	
13+35 L	1426.85	24	90-00-45	988.47	10.70	2
13+92 E	1428.51	25	89-55-05	1045.18	10.70	2
14+51 R	1428.75	26	89-54-50	1103.57	10.70	2
15+54 L	1427.40	27	89-59-05	1206.74	10.70	1
15+57 L	1426.27	28	90-00-35	1212.00	10.70	1
15+58 E	1426.78	29	90-00-50	1216.50	10.70	2
15+62 R	1427.55	30	89-58-40	1220.58	10.70	2
16+65 R	1427.53	31	89-58-50	1318.[illegible]	10.70	2
18+25 L	1428.85	32	89-55-55	1477.28	10.70	2
18+28 L	1428.24	33	89-57-30	1480.[illegible]	10.70	2
18+30 L	1428.29	34	89-55-50	1482.98	10.70	2
18+48 R	1429.54	35	89-55-05	1500.46	10.70	2
18+51 R	1428.30	36	89-57-05	1503.39	10.70	2
18+54 L	1429.14	37	89-55-30	1507.04	10.70	2
18+83 R	1428.99	38	89-55-45	1535.54	10.70	2
20+24 E	1431.41	39	89-51-10	1576.79	10.70	2
20+25 E	1433.96	40	89-55-45	1737.87	6.04	1
21+53 L	1434.66	41	89-54-30	1805.44	6.04	1
21+63 R	1434.[illegible]	42	89-55-35	1816.25	6.04	1
22+04 E	1436.86	117 p.62	89-50-35	1856.81	6.04	1
check	1432.61 R 1432.61 R	TP 2 p 31	89-50-10 270-00-10	336.13	6.04	1

x-sec 118-117



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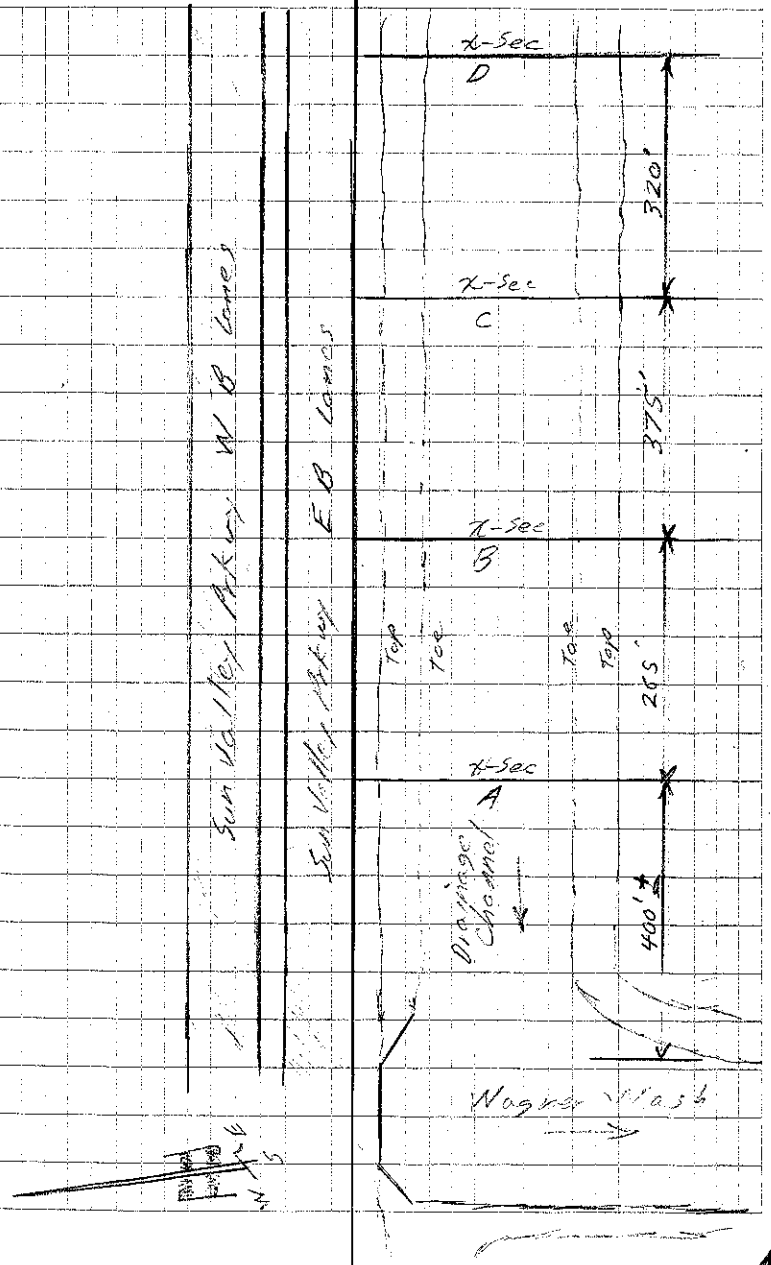

Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
BS	1498.275	ERM 4 p2	90-28-35 269-31-10	481.94	3.16	
℄ Sta		Rt Curb				
0+00	1498.25	1	90-19-15	207.55	6.04	1
0+23 4	1496.93	2	90-46-20	184.[illegible]	6.04	1
0+35 8	1499.35	3	90-01-15	171.77	6.04	1
0+45 7	1499.36	4	90-01-15	161.89	6.04	1
0+65 2	1493.68	5	92-19-30	141.24	6.04	1
1+03 2	1493.03	6	93-30-30	104.22	6.04	1
1+09 7	1491.05	7	94-53-15	97.83	6.04	1
1+30 4	1490.98	8	96-14-25	77.11	6.04	1
1+36 9	1492.95	9	95-19-45	70.69	6.04	
1+77 4	1493.70	10	100-44-30	30.12	6.04	
1+96 5	1499.25	11	90-50-00	11.10	6.04	
2+07 5	1500.31	12	℄ Sta	0	5.14	

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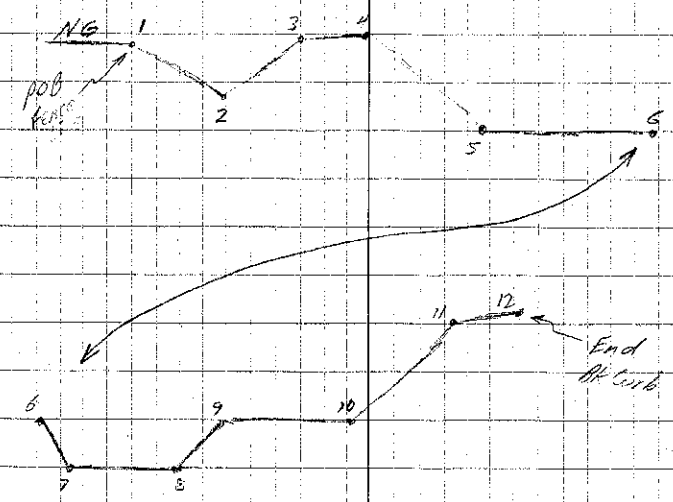
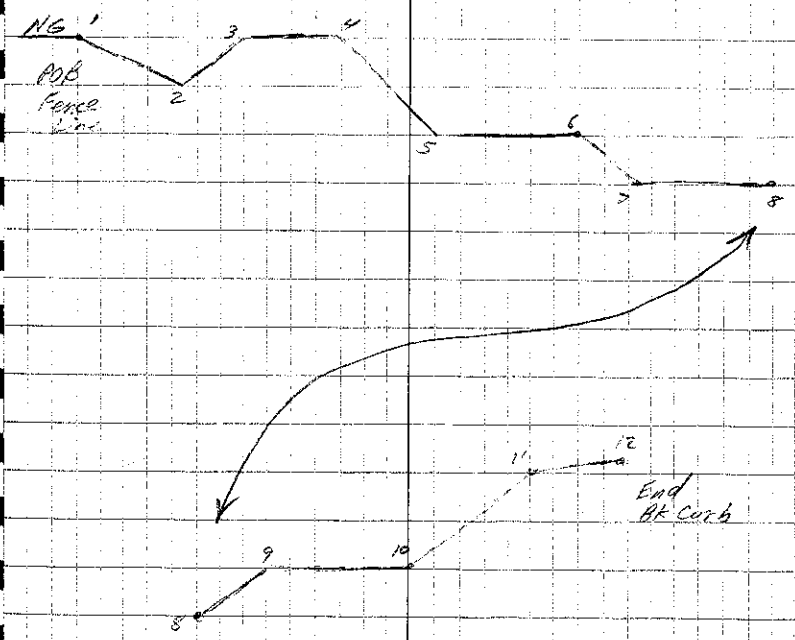
Looking Down Stream



Sta	Elev	Point	Zn ∡	Hz Dist	Rod
BS	1498.275	ERM 4 PBC	90-33-15 269-26-33	741.45	3.28
∡ Sta		Bk Curb			
0+00	1501.62	1	90-15-10	217.45	6.04
0+22.8	1500.42	2	90-38-10	194.51	6.05
0+37.0	1502.97	3	89-52-35	180.41	5.04
0+44.1	1503.13	4	89-49-05	173.35	6.04
0+70.3	1496.99	5	92-24-30	147.17	6.04
1+10.3	1495.68	6	93-41-00	107.18	6.04
1+17.1	1493.64	7	95-07-15	99.77	6.04
1+36.8	1493.57	8	96-22-35	80.62	6.04
1+44.6	1495.59	9	95-29-00	72.87	6.04
1+84.6	1496.31	10	100-48-30	32.83	6.04
2+05.1	1502.10	11	92-15-25	12.30	5.04
2+17.4	1503.35	12	∡ Sta	0	5.27

X-sec B p. 85

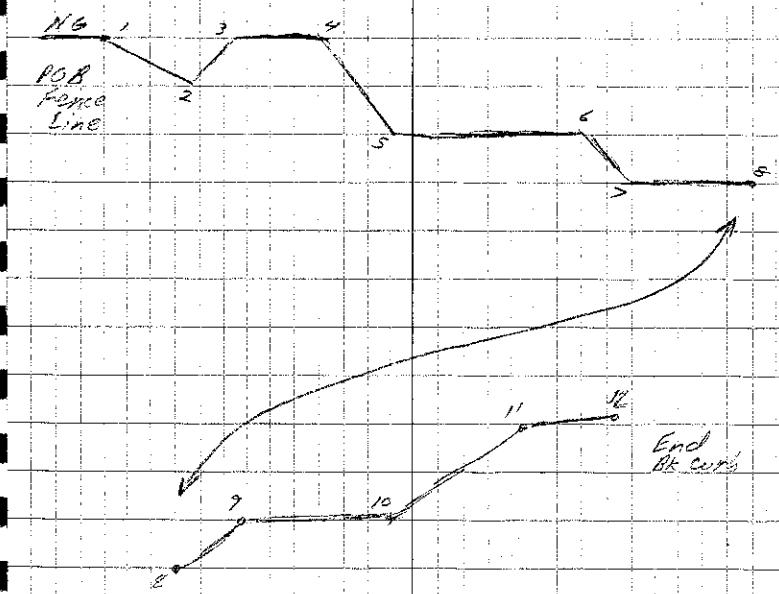
Looking Downstream



Sta	Elev	Point	Zn ∠	Hz Dist	Rod
83	1498.275	EFM 4 p. 26	90-42-00 26 917-50	1110.55	8.16
π Sta		Bk Curb			
0+00	1508.09	1	90-13-25	224.94	6.04
0+26.5	1507.45	2	90-26-50	198.37	6.04
0+38.1	1509.68	3	89-46-55	186.21	6.04
0+49.3	1509.88	4	89-42-10	175.91	6.04
0+71.1	1504.51	5	91-40-05	153.08	6.04
1+18.4	1503.65	6	92-51-35	106.52	6.04
1+25.1	1501.76	7	94-07-35	99.85	6.04
1+45.1	1501.64	8	95-14-20	79.28	6.04
1+52.3	1503.82	9	94-03-50	72.43	6.04
1+99.3	1504.57	10	99-42-25	25.72	6.04
2+16.5	1509.51	11	89-17-20	8.40	6.04
2+24.3	1509.93	12	π Sta	0	5.08

π Sec C page 85

Looking Down Stream



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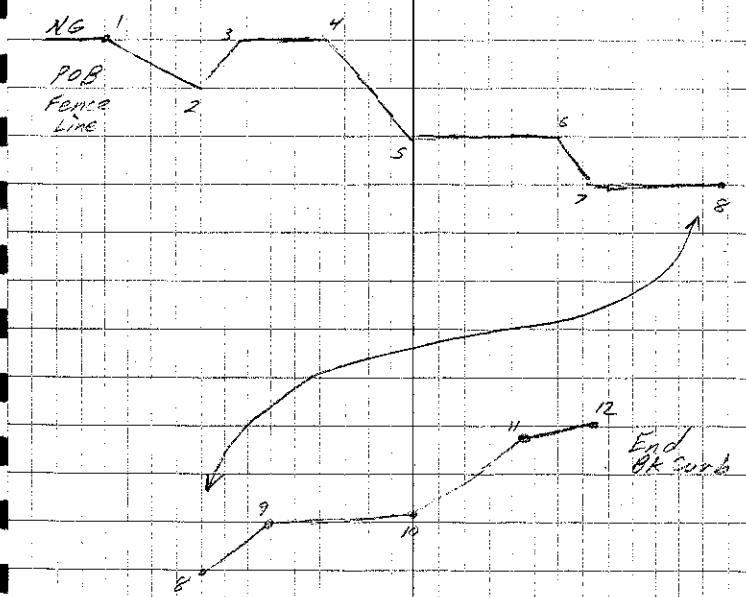
Looking Down Station

Sta	Elev	Point	Zn ∠	Hz Dist	Rod
BS	1498.275	ERM 4 p.26	90-41-35 269-18-15	1424.71	3.15
⊼Sta		Bk Curb			
0+00	1513.75	1	89-42-25	220.70	6.04
0+29 ±	1512.00	2	90-11-15	191.47	6.04
0+41 ±	1514.16	3	89-30-25	178.99	6.04
0+51 ±	1514.28	4	89-26-15	169.27	6.04
0+76 ±	1507.47	5	92-02-25	144.57	6.04
1+19 ±	1506.76	6	93-18-35	101.45	6.04
1+26 ±	1504.68	7	94-48-50	94.36	6.04
1+44 ±	1504.71	8	95-55-50	75.94	6.04
1+52 ±	1506.55	9	95-02-50	68.75	6.04
1+88 ±	1507.02	10	99-54-10	32.10	6.04
2+11 ±	1511.52	11	87-04-20	8.85	6.04
2+20 ±	1513.62	12	⊼Sta	0	5.04



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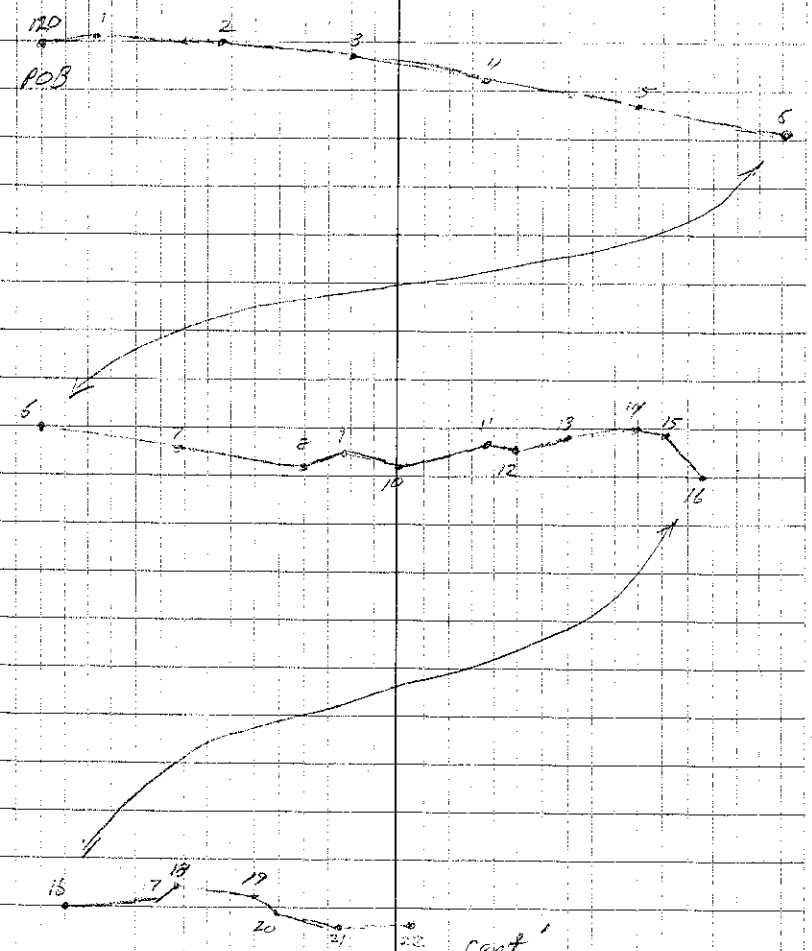
Sta	Elev	Point	In ∡	Hz Dist	Rod	
BS	1448.068	EAW 27 p28	89-31-35 89-55-20	987.60 987.81	5.55	3
0+00	1449.25	120 p62	75°0	0	5.24	
0+20 8	1449.74	1	85-29-50	20.79	6.04	1
1+20 7	1448.55	2	89-57-20	120.67	5.54	1
2+22 2	1447.58	3	90-16-40	222.25	6.34	1
3+40 2	1445.78	4	90-25-00	340.17	6.24	1
4+41 3	1445.09	5	90-26-15	441.33	6.04	
5+36 7	1444.01	6	89-55-00	536.70	10.70	2
6+38 1	1442.55	7	90-05-45	638.15	10.70	2
7+02 9	1441.57	8	90-10-55	702.94	10.70	2
7+09 5	1442.48	9	90-05-30	709.52	10.70	2
7+20 5	1441.78	10	90-09-40	720.54	10.70	2
7+62 1	1442.99	11	90-03-40	762.07	10.70	2
7+71 2	1442.33	12	90-05-35	771.20	10.70	2
7+90 1	1442.99	13	90-02-55	790.09	10.70	2
8+35 6	1443.20	14	90-02-30	835.63	10.70	2
8+46 2	1442.00	15	90-07-20	846.26	10.70	2
8+50 6	1439.68	16	90-16-40	850.57	10.70	2
8+63 2	1440.04	17	90-15-00	863.67	10.70	2
8+67 1	1440.74	18	90-12-10	867.11	10.70	2
9+03 0	1440.33	19	89-36-35	901.05	20.37	4
check BK	1440.35	(19)	89-40-40	614.00	20.37	4
9+05 3	1439.51	20	89-25-10	[illegible]	20.37	4
9+21 5	1439.69	21	89-27-00	[illegible]	20.37	4
9+58 7	1439.05	22	89-14-45	[illegible]	20.37	4



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Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
9+61 E	1440.83	23	89-13-35	555.57	20.87	4
9+77 E	1440.81	24	90-12-50	539.54	10.87	3-1
9+81 E	1439.58	25	90-20-35	535.50	10.87	3-1
9+95 E	1439.27	26	90-23-25	521.11	10.87	3-1
10+14 E	1442.18	27	90-04-25	502.26	10.87	3-1
10+30 E	1442.10	28	90-37-15	486.56	6.04	1
11+09 E	1442.99	29	90-39-20	407.45	6.04	1
11+69 E	1442.25	30	90-53-25	347.80	6.04	1
12+50 E	1443.18	31	90-57-35	266.52	6.04	1
13+76 E	1445.40	32	90-54-55	140.72	6.04	1
14+51 E	1448.09	33	89-37-05	66.00	6.04	1
15+17 E	1448.59	119	⊼ Sta	0	5.10	
BS	1445.73	Tp 1 ⌀ 43	269-48-25 90-11-35	571.15	6.04	1

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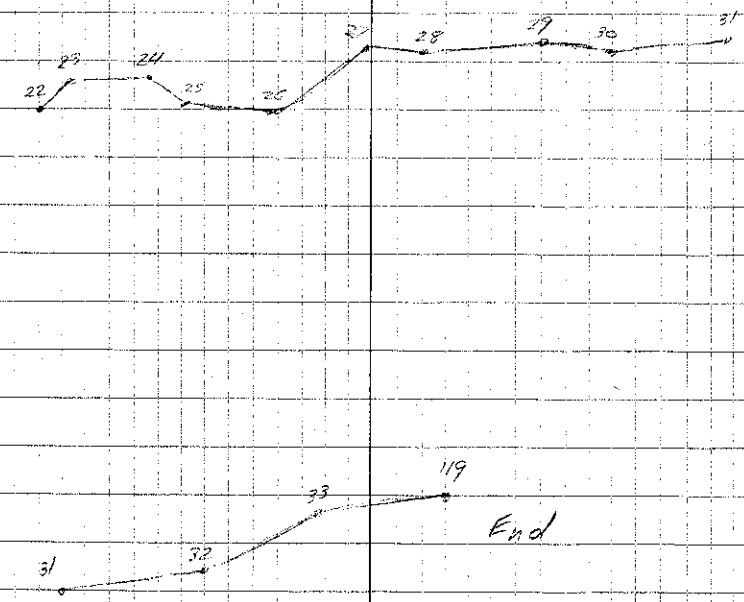

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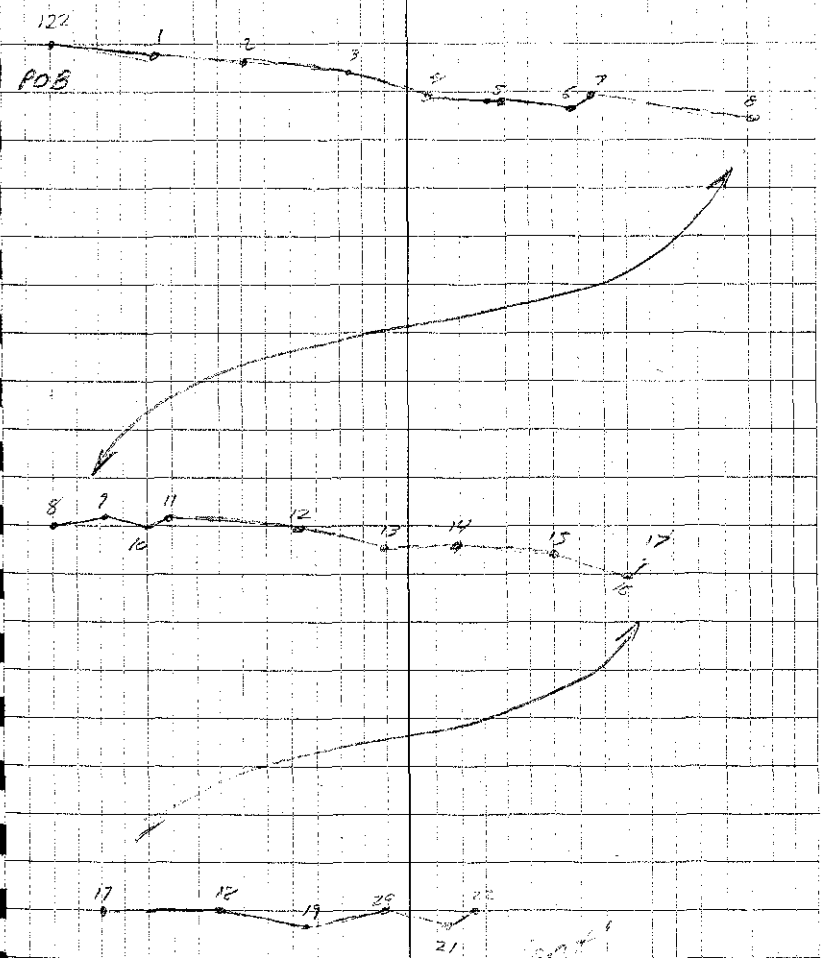
Sta	Elev	Point	Zn ∡	Hz Dist	Rod	
BS	1459.58	TP23 p27	89-52-35 270-07-20	947.18	10.70	2
Sta		121 p62				
0+00	1463.75	122 p62	89-44-00	1327.55	10.70	2
0+85 9	1462.44	1	89-46-30	1241.66	10.70	2
2+05 3	1461.45	2	89-48-05	1122.35	10.70	2
2+96 4	1460.40	3	89-50-30	1031.14	10.70	2
3+31 5	1459.10	4	89-54-46	996.05	10.70	2
3+49 0	1459.45	5	89-53-20	978.51	10.70	2
3+74 1	1458.52	6	89-55-30	953.45	10.70	2
3+79 6	1459.11	7	89-54-20	947.95	10.70	2
4+49 8	1457.91	8	89-58-35	877.78	10.70	2
4+65 9	1458.84	9	89-54-50	861.67	10.70	2
4+76 3	1458.00	10	89-58-10	850.92	10.70	2
4+81 0	1458.37	11	89-56-46	846.59	10.70	2
5+92 5	1457.25	12	90-01-30	735.01	10.70	2
6+24 1	1456.14	13	90-05-50	703.46	10.70	2
6+44 1	1456.36	14	90-05-55	683.45	10.70	2
7+14 7	1456.41	15	90-06-20	612.87	10.70	2
7+49 8	1455.00	16	90-15-05	577.75	10.70	2
7+55 3	1455.44	17	90-12-35	572.25	10.70	2
8+19 3	1455.70	18	90-12-25	508.28	10.70	2
8+53 7	1454.88	19	90-19-15	473.87	10.70	2
8+77 2	1455.51	20	90-15-25	450.35	10.70	2
8+92 0	1453.85	21	90-29-05	435.50	10.70	2
8+97 5	1454.40	22	90-25-55	430.04	10.70	2



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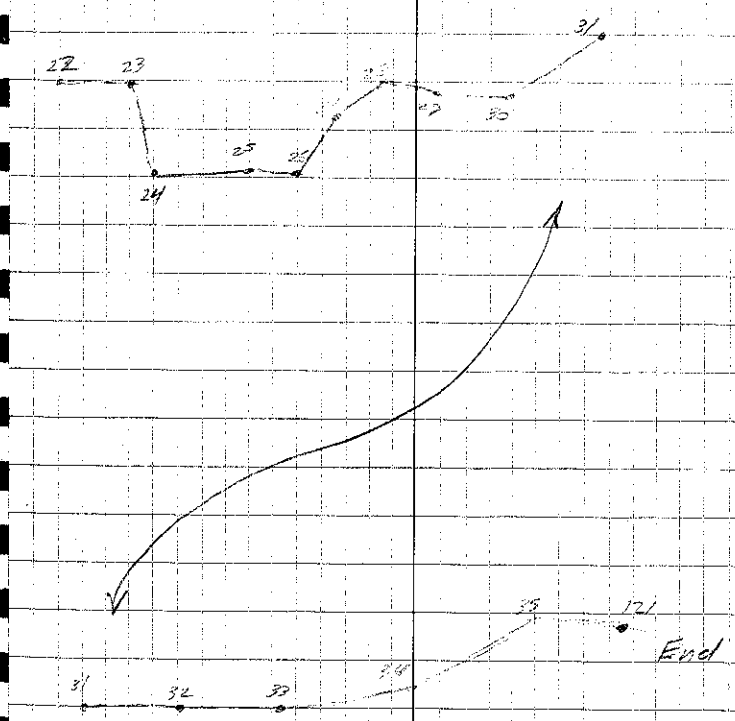
Page

Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
9+10 2	1454.35	23	[illegible]	417.55	10.70	2
9+14 2	1450.92	24	90-55-00	412.24	[illegible]	2
9+42 5	1451.89	25	90-53-20	385.07	10.70	2
9+54 0	1451.48	26	90-55-40	373.57	10.70	2
9+57 3	1454 4	27	90-38-50	370.27	[illegible]	2
9+65 3	1455.53	28	90-19-00	362.21	10.70	2
9+82 2	1454.63	29	90-28-55	345.34	[illegible]	2
10+11 4	1454.35	30	90-26-05	316.16	10.70	2
10+40 2	1457.25	31	90-53-25	287.36	10.70	
11+10 1	1457.18	32	90-05-35	217.41	10.70	2
11+62 2	1456.67	33	89-17-50	165.37	10.70	2
12+59 2	1458.89	34	88-54-40	68.21	10.70	2
13+05 2	1463.62	35	86-21-45	22.53	6.04	1
13+27 5	1463.04	121	[illegible]	0	5.19	
Check	1457.25 ←	TBM p 49	90-02-05	[illegible]	10.70	2
	1457.26 ←		269-57-55			

x-Sec 122-121



x-Sec 124-123

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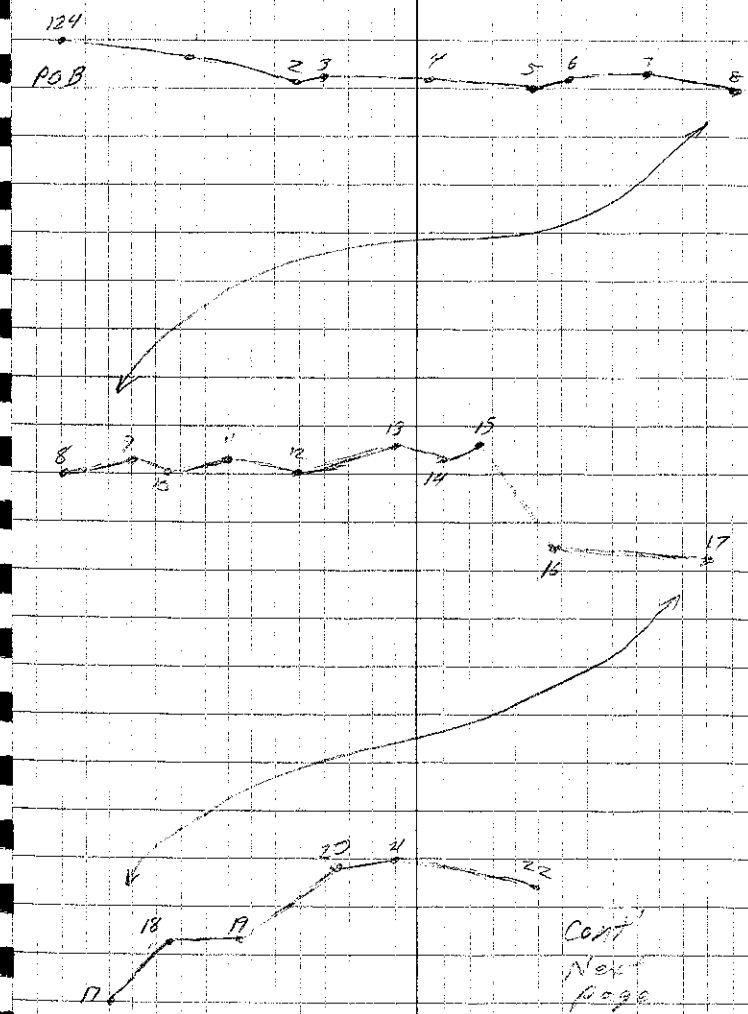
Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
BS	1478.110	TP 17 p 25	89-55-00 270-03-50	1319.83	6.04	1
⊼ Sta		123 p 22				
0+00	1475.34	124 p 62	90-03-30	1129.58	6.04	1
1+07.3	1474.53	1	90-06-55	1022.23	6.04	1
2+13.1	1471.93	2	90-00-00	916.42	10.70	2
2+27.3	1472.41	3	89-58-10	902.27	10.70	2
3+17.8	1471.61	4	90-01-20	811.81	10.70	2
4+00.3	1470.86	5	90-05-00	729.30	10.70	2
4+18.0	1472.23	6	89-58-30	711.56	10.70	2
4+52.0	1472.12	7	89-59-00	677.57	10.70	2
4+79.9	1470.11	8	90-09-35	649.71	10.70	2
5+08.6	1470.82	9	90-06-05	620.76	10.70	2
5+15.3	1469.98	10	90-10-50	614.24	10.70	2
5+49.3	1470.89	11	90-06-35	580.29	10.70	2
5+75.5	1469.94	12	90-12-15	554.09	10.70	2
6+38.1	1471.88	13	90-00-15	491.46	10.70	2
6+55.5	1470.58	14	90-09-40	474.08	10.70	2
6+65.3	1471.42	15	90-03-40	464.40	10.70	2
6+82.0	1468.35	16	90-29-40	447.62	10.70	2
7+37.5	1465.66	17	90-46-50	390.10	10.70	2
7+50.3	1470.02	18	90-17-10	379.38	10.70	2
7+61.3	1469.91	19	90-18-45	368.71	10.70	2
7+80.5	1474.20	20	89-37-30	348.77	10.70	2
8+01.3	1474.64	21	90-20-15	328.35	6.04	1
8+61.2	1473.51	[illegible]	90-[illegible]-00	267.85	6.04	1
EP	1472.[illegible]	1472.46				



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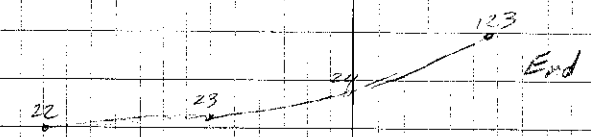
x-Sec 124-123

Sta.	Elev	Point	Zn ∠	Hz Dist	Red
9+75 ℄	1474.68	23	90-40-35	152.67	6.04 1
10+30 ℄	1474.96	24	90-55-50	66.09	6.04 1
11+29 ℄	1477.45	123 p62	⊼ Sta.	0	5.16
Check	1481.[illegible] c 1482.03 A	TBM 26 p 48	89-37-05 270-22-45	214.20	6.04 1



Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
BS	1489.291	TP 12 p 25	89-07-50 270-52-00	384.29	6.04	1
0+00	1484.10	126 p 62	↑ Sta.	0	5.41	
0+32 ±	1483.48	1	89-58-15	32.83	6.04	1
0+52 ±	1484.17	2	89-15-50	52.14	6.04	1
1+19 ±	1482.84	3	90-18-00	118.98	6.04	1
1+59 ±	1483.30	4	90-03-40	159.05	6.04	1
1+96 ±	1481.63	5	90-32-15	196.17	6.04	1
2+60 ±	1481.24	6	90-29-25	260.00	6.04	1
3+21 ±	1481.83	7	90-17-30	321.62	6.04	1
3+25 ±	1476.92	8	89-29-00	326.17	15.53	3
3+52 ±	1476.98	9	89-30-40	352.29	15.53	3
3+59 ±	1479.04	10	89-57-45	358.55	10.70	2
3+77 ±	1478.67	11	90-01-15	377.70	10.70	2
3+81 ±	1477.02	12	89-32-35	381.45	15.53	3
5+92 ±	1477.07	13	89-32-55	392.10	15.53	3
3+98 ±	1480.22	14	89-47-50	398.30	10.70	2
4+19 ±	1481.88	15	89-34-50	419.80	10.70	2
5+61 ±	1482.27	16	89-35-50	561.51	10.70	2
6+93 ±	1482.88	17	89-39-50	693.42	10.70	2
7+99 ±	1483.20	18	89-41-10	799.52	10.70	2
8+93 ±	1484.47	125 p 62	89-38-15	893.37	10.70	2
Check	1489.950 1489.97 R	TP 11 p 26	89-18-50 270-41-00	540.47	6.04	1

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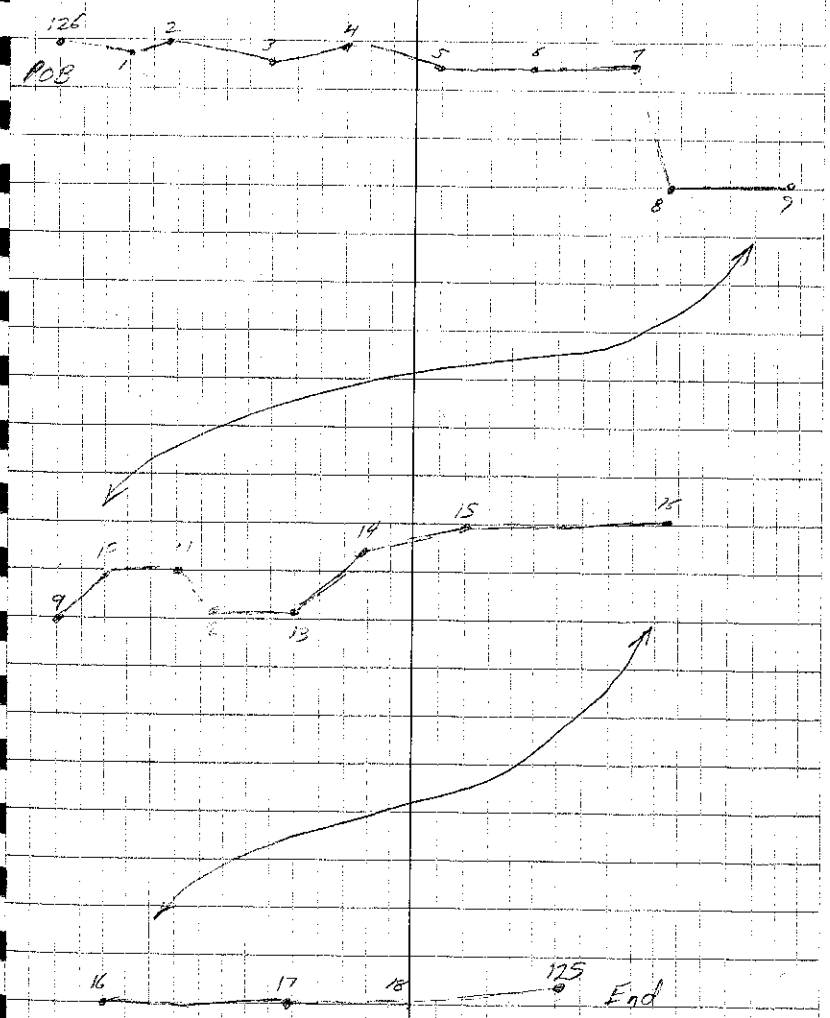
1485.05 Page 62



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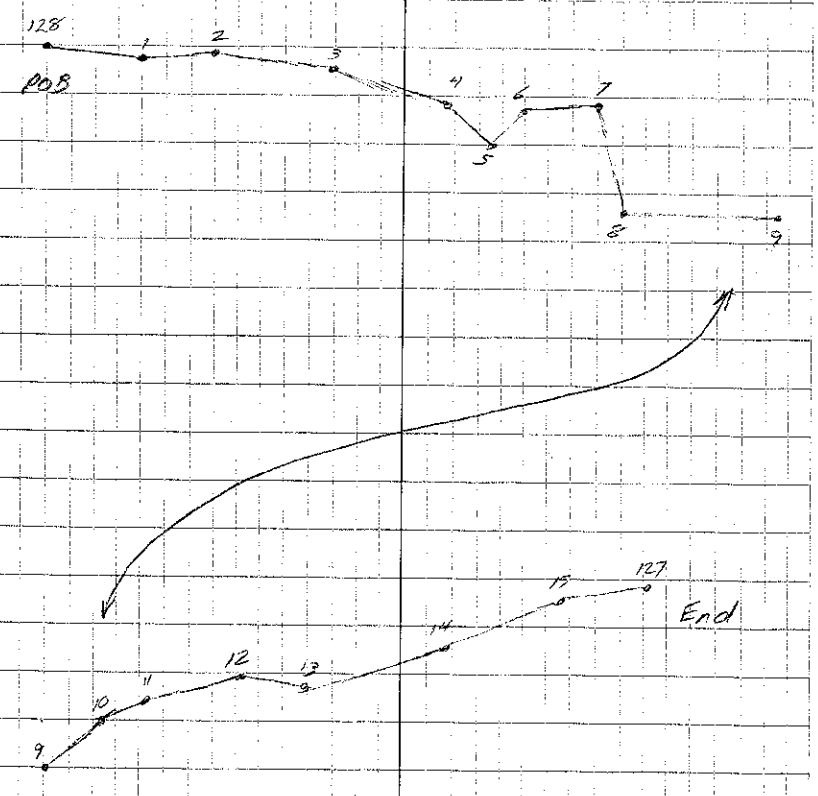
Sta	Elev	Point	Zn ∠	Hz Dist	Red	
BS	1498.275	EF-114 p 26	89-48-25 270-11-40	461.70	6.04	1
⊼ Sta		127 p63				
0+00	1498.58	128 p 63	89-50-35	678.51	6.04	1
0+57 S	1497.62	1	89-55-00	621.15	6.04	1
1+01 S	1497.72	2	89-54-00	577.01	6.04	1
2+03 S	1496.45	3	90-01-55	476.45	6.04	1
2+97 L	1494.18	4	89-40-50	380.87	10.70	2
3+05 S	1492.71	5	89-53-55	373.16	10.70	2
3+09 S	1494.24	6	89-39-40	369.46	10.70	2
3+25 S	1494.23	7	89-38-50	353.30	10.70	2
3+38 S	1487.50	8	89-08-15	340.16	20.37	4
3+79 S	1488.11	9	88-54-10	299.14	20.37	4
3+86 L	1490.50	10	89-21-20	291.94	15.53	3
3+94 L	1491.78	11	89-04-45	283.88	15.53	3
4+35 S	1494.03	12	89-32-00	242.77	10.70	2
4+75 S	1493.47	13	90-54-50	203.14	6.04	1
5+69 L	1495.14	14	90-49-10	109.50	6.04	1
6+42 L	1497.36	15	88-58-20	36.50	6.04	1
6+78 S	1497.70	127 p63	⊼ Sta	0	5.05	
Check	1495.97 C 1495.97 R	TP 5 p 26	90-05-45 269-54-10	429.35	5.04	

Z-Sec 128-127



x-Sec 130 - 129

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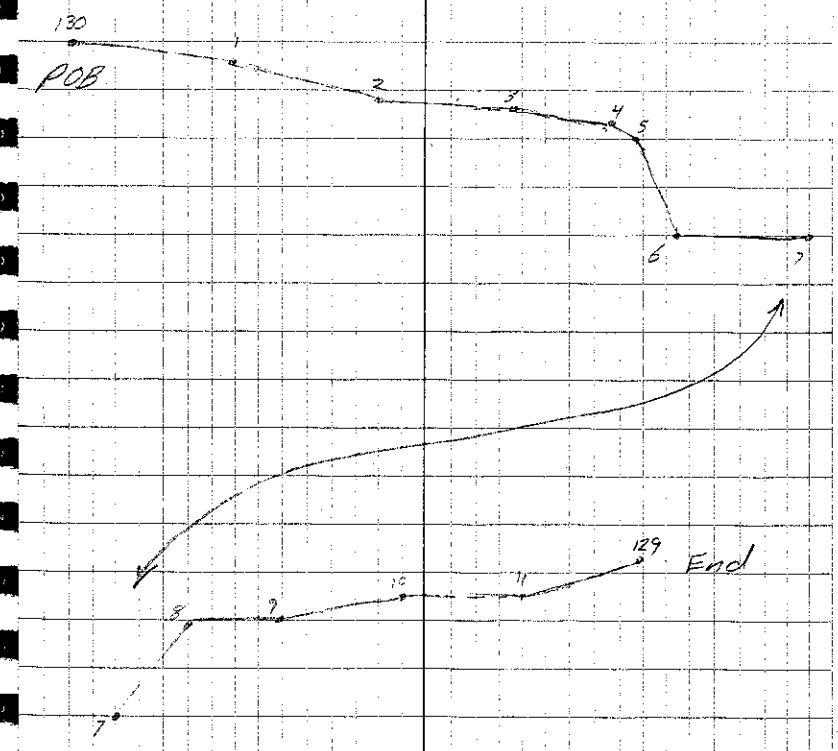
Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
BS	1510.317	EAW 22 p 23	89-14-45 270-45-30	261.84	6.04	1
0+00	1507.86	130 p 62	⊼ Sta	0	5.04	
1+27 4	1507.21	1	89-50-25	127.42	6.04	1
2+50 5	1505.84	2	90-14-00	250.49	6.04	1
3+42 8	1506.17	3	90-06-55	342.23	6.04	1
3+91 1	1505.16	4	89-44-00	391.13	10.70	2
3+99 2	1504.94	5	89-44-10	399.17	10.70	2
4+06 5	1498.76	6	89-48-15	406.49	15.53	3
4+28 3	1497.81	7	89-56-25	426.26	15.53	3
4+29 2	1503.44	8	89-50-05	429.86	10.70	2
4+60 2	1503.76	9	89-48-30	459.98	10.70	2
5+35 2	1505.53	10	89-38-40	535.73	10.70	2
6+12 2	1505.56	11	89-41-10	612.74	10.70	2
6+73 5	1507.91	129 p 62	89-54-40	673.46	6.04	1
check	1505.268 c 1505.253 R	TP 29 p 23	90-21-30 269-38-40	255.22	6.04	1



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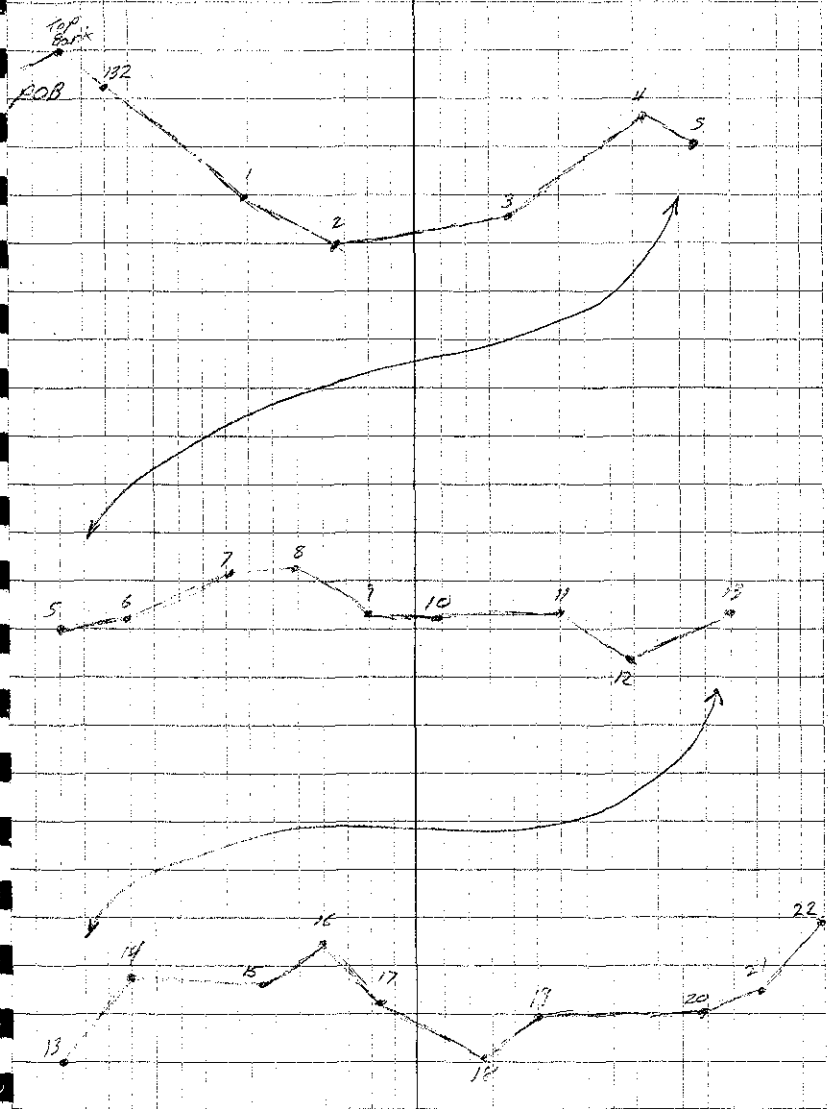
Sta	Elev	Point	Zn ∠	Hz Dist	Rod	
BS	1518.269	TBM 18 p22	90-23-20 269-36-30	275.67	6.04	1
0+00	1525.62	Top Bank	88-30-45	205.20	6.04	1
0+04 a	1524.77	132 p62	88-43-25	201.64	6.04	1
0+34 b	1513.61	1	92-14-00	171.10	6.04	1
0+55 3	1501.01	2	94-18-35	150.27	6.04	1
0+98 1	1509.68	3	95-39-45	106.94	6.04	1
1+56 c	1518.56	4	92-03-30	49.10	6.04	1
1+63 1	1516.60	5	94-57-00	42.50	6.04	1
1+72 a	1517.17	6	95-17-25	33.65	6.04	1
1+97 6	1520.91	7	85-30-45	8.00	6.04	1
2+05 6	1521.02	8	⊼ Sta	0	5.30	
2+27 2	1517.68	9	96-51-45	21.65	6.04	1
2+37 1	1517.23	10	95-25-10	32.15	6.04	1
2+98 8	1517.14	11	91-55-50	93.20	6.04	1
3+16 1	1514.78	12	92-51-05	110.47	6.04	1
3+42 4	1517.04	13	91-21-25	136.24	6.04	1
3+52 8	1520.62	14	89-52-00	147.17	6.04	1
3+85 5	1520.57	15	89-52-35	179.91	6.04	1
3+96 2	1523.82	16	88-56-10	190.70	6.04	1
4+05 4	1520.28	17	90-00-00	199.72	6.04	1
4+35 3	1516.09	18	89-53-05	230.02	10.70	2
4+52 5	1518.84	19	89-15-15	246.93	10.70	2
5+52 c	1519.49	20	89-21-40	346.87	10.70	2
5+67 1	1521.87	21	89-44-55	361.50	6.04	1
5+86 3	1523.89	22	89-04-50	380.01	6.04	1



Sta	Elev	Point	Zn ∡	Hz Dist	Rod
5+93 Q	1526.49	23	89-04-55	387.38	6.04
6+07 Q	1522.24	24	89-43-15	401.35	6.04
6+72 Q	1522.57	25	89-42-25	467.00	6.04
8+05 Q	1522.35	26	89-21-30	599.72	10.70
8+40 Q	1522.85	27	89-20-55	635.22	10.70
8+45 Q	1522.28	28	89-24-5	639.36	10.70
8+64 Q	1523.01	29	89-21-30	658.72	10.70
10+02 Q	1524.23	131 p62	89-22-55	796.40	10.70
Check	1518.00 C 1518.01 R	TP 17 p 22	90-35-30 269-04-40	221.23	6.04

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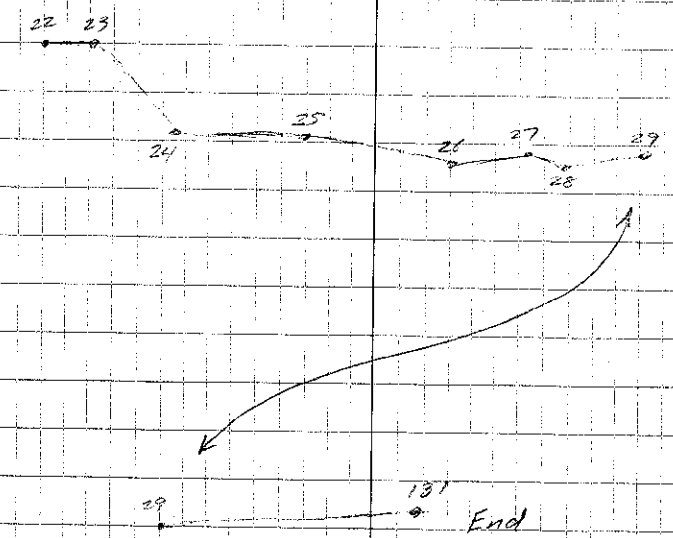

Sta	Elev	Point	Zn Z	Hdist	Cod	
BS	1531.993	TP10 p21	90-02-15 269-57-35	599.19	10.70	2
Check	1534.78 C 1534.80 R	TP8 p21	89-21-30 270-38-15	64[illegible]	15.53	3
0+00	1537.82	135 p63	ΔSta	0	5.27	
1+56 9	1536.77	1	90-08-50	156.94	6.04	1
2+56 E	1535.37	2	90-22-35	256.51	6.04	1
2+59 Z	1534.87	3	90-29-00	259.24	6.04	1
2+69 E	1534.88	4	90-27-40	269.79	6.04	1
2+71 2	1535.25	5	90-22-50	270.97	6.04	1
3+78 E	1534.10	6	90-25-50	378.52	6.04	1
4+69 E	1533.01	7	90-29-35	469.80	6.04	1
4+72 E	1532.35	8	90-00-20	472.78	10.70	2
4+80 2	1532.15	9	90-01-45	480.19	10.70	2
4+84 3	1532.93	10	89-56-15	484.34	10.70	2
5+36 E	1532.45	11	89-59-45	536.82	10.70	2
5+48 E	1531.80	12	90-03-45	548.78	10.70	2
5+83 2	1531.99	13	90-02-25	583.91	10.70	2
5+89 4	1528.50	14	90-22-45	589.40	10.70	2
5+92 E	1528.52	134 p63	90-22-30	592.50	10.70	2
Check BK	1528.53	(134)	89-50-30	649.91	15.53	3
5+96 7	1531.46	15	90-00-35	645.70	10.70	2
6+13 6	1531.84	16	89-58-30	628.[illegible]	10.70	2
6+18 0	1530.72	17	90-04-40	624.20	10.70	2
6+27 4	1531.91	18	89-58-05	614.98	10.70	2
7+14 3	1531.69	19	89-59-10	532.[illegible]	10.70	2
8+13 E	1531.36	20	90-01-35	428.35	10.70	2

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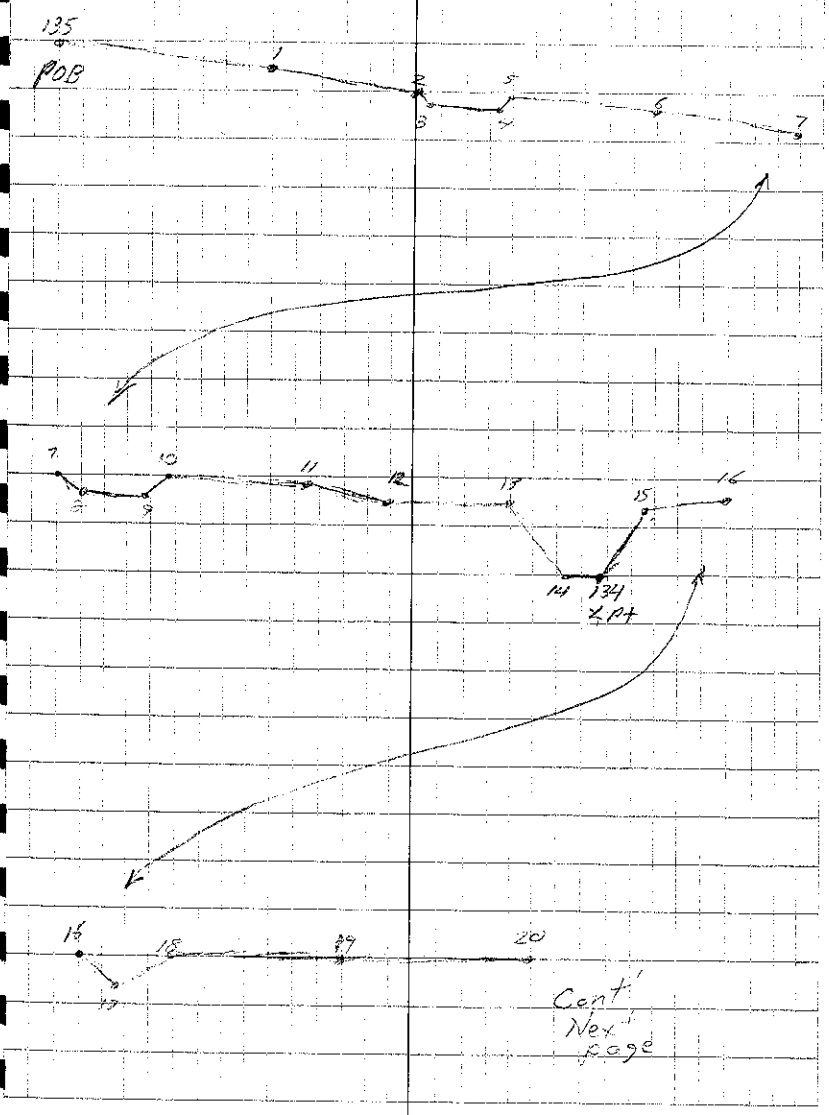

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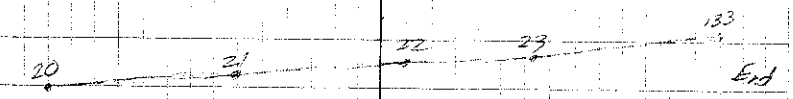
Sta	Elev	Point	Zn ∡	Hz Dist	Rod	
9+12 ±	1532.29	21	89-52-25	330.37	10.70	2
10+04 ±	1532.58	22	89-45-15	238.02	10.70	
11+17 ±	1534.2	23	90-47-55	124.56	6.04	
12+42 ±	1536.97	133	[illegible]	0	5.29	
BS	1534.903	TP 9 p21	89-28-50 270-33-10	846.01	15.53	3

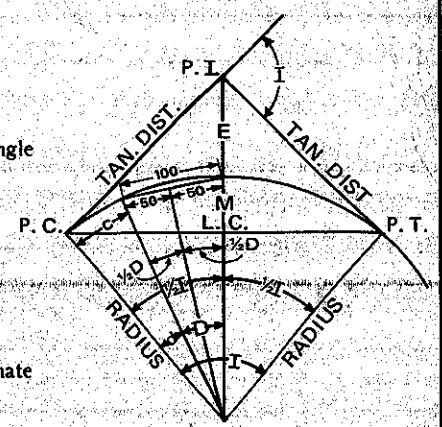
L-Sec 135-134-133



Station	Rod
0	0.35
1	6.04
2	10.70
3	15.53
4	20.37
5	25.20

CURVE FORMULAE

D=Degree of Curve
1°=1-Degree of Curve
2°=2-Degree of Curve
P.C.=Point of Curve
P.T.=Point of Tangent
P.I.=Point of Intersection
I=Intersection of Angle, Angle Between Two Tangents
L=Length of Curve, from P.C. to P.T.
T=Tangent Distance
E=External Distance
R=Radius
L.C.=Length of Chord
M=Length of Middle Ordinate
c=Length of Sub-Chord
d=Angle of Sub-Chord



$$R = \frac{L.C.}{2\sin\frac{1}{2}I},\ T = R\tan\tfrac{1}{2}I = \frac{L.C.}{2\cos\frac{1}{2}I}$$

$$\frac{L.C.}{2} = R\sin\frac{I}{2},\ D\,1^\circ = R = 5730,\ D\,2^\circ = \frac{5730}{2},\ D = \frac{5730}{R}$$

$$M = R(1-\cos\tfrac{1}{2}I),\ = R - R\cos\frac{I}{2}$$

$$\frac{E+R}{R} = \sec\frac{I}{2},\ \frac{R-M}{R} = \cos\frac{I}{2}$$

$$c = 2R\sin\tfrac{1}{2}d,\ d = \frac{c}{2R}$$

$$L.C. = 2R\sin\tfrac{1}{2}I,\ E = R(\sec\tfrac{1}{2}I - 1),\ = R\sec\frac{I}{2} - R$$

Minutes in Decimals of a Degree

1′	.0167	11′	.1833	21′	.3500	31′	.5167	41′	.6833	51′	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

Inches in Decimals of a Foot

1/16	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

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SINCE 1882

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
ARIZONA, U.S.A.

2002
Wagner Wash

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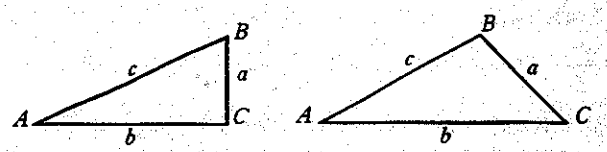
Book 2

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES



$$\text{Sin } A = \frac{a}{c} = \text{Cos } B \qquad \text{Cot } A = \frac{b}{a} = \text{Tan } B$$

$$\text{Cos } A = \frac{b}{c} = \text{Sin } B \qquad \text{Sec } A = \frac{c}{b} = \text{Cosec } B$$

$$\text{Tan } A = \frac{a}{b} = \text{Cot } B \qquad \text{Cosec } A = \frac{c}{a} = \text{Sec } B$$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A, a = C \sin A, b = C \cos A.$
A, b	B, a, c	$B = 90° - A, a = b \tan A, C = \frac{b}{\cos A}.$
A, a	B, b, c	$B = 90° - A, b = a \cot A, C = \frac{a}{\sin A}.$
a, c	A, B, b	$\sin A = \frac{a}{c}, \cos B = \frac{a}{c}, b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}, \cot B = \frac{a}{b}, c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}, c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C, C = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $\frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

Book 2

Wagner Wash

Levels for Aerial Control

Oct, Nov, Dec, 1990

Job 90007

Project Eng Consult
484-7691

Index

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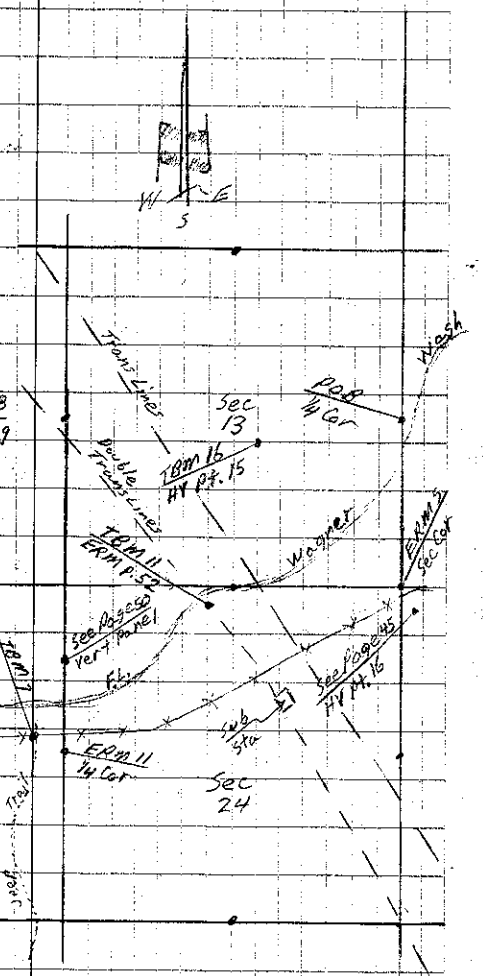
REGISTERED LAND SURVEYOR
CERTIFICATE NO. 16863
MARICOPA
ARIZONA, U.S.A.

Sta	BS+	FS-	Stadia	Elev	Panel	Remarks
POB				1352.565	-4.08 1351.48	ERM 5 p.35 (S13 1/4 Cor S18)
	3915		5.3 / 2.5 280			
TP1		12,494	11.07 280	43.984 ~~943~~		Hub
	2540		3.58 230			
TP 2		9,120	11.0 / 7.3 370	37.407 ~~407~~ 2		Hub on SE Bank Wagner Wash
	5,192		6.7 / 3.7 300			
TP 3		7505	8.3 / 8.1 270	35.094 ~~091~~ 3		Hub
	4922		6.3 / 3.6 270			
TP 4		5460	6.8 / 4.1 270	34.557 ~~572~~ 4		Hub
	4570		6.1 / 3.0 310			
ERM 5		9955	11.1 / 8.8 230	1329.173 ~~167~~ 6	-0.77 1328.40	GLO BC marked: S13 / S24 | S18 / S19
	3886		5.24 / — 270			
TP 6		9771	11.2 / 8.4 280	23.290 ~~289~~ 7		Hub
	5,348		7.0 / 3.6 340			
TP 7		5612	6.6 / 4.6 200	23.025 ~~017~~ 8		Hub SE Bank Wagner Wash
	0257		1.54 / — 260			
TP 8		12,556	11.23 / — 260	10.727 ~~776~~ 9		Hub in Wash
	1057		2.52 / — 290			
TP 9		9040	10.8 / 7.3 350	02.776 ~~766~~ 10		Hub in Wash
	1684		2.9 / 0.5 240			
TP 10		8091	9.4 / 6.7 270	96.371 ~~309~~ 12		Hub in Wash
	4468		5.4 / 3.6 180			
TBM 11		4348	4.9 / 3.8 110	1296.492 ~~479~~ 13		Chiseled "□" in S. Conc Base S leg of S.W. Trans Strut (of two)
	6,863		8.4 / 5.3 310			
TP 12		4035	5.0 / 3.0 200	99.320 ~~306~~ 14		Hub N.E. of above ERM
	12,429		8.1 320			



Sta	BS+	FS-	Stadia	Elev	Panel	Remarks	
TP 13		1,835	2.7 / 1.0 170	10.413 / ~~.375~~ 15		Hub by Trail	
	12,931		— / 11.82 220				
TP 14		4,745	6.0 / 3.5 250	18.601 / ~~.582~~ 13		Hub	
	8,144		9.5 / 6.8 270				
TP 15		3,861	5.2 / 2.5 270	22.885 / ~~.818~~ 11		Hub	
	9,589		11.0 / 8.3 270				See Diagram
TBM 16		1,734	3.78 / — 410	1330.840 / ~~.822~~ 14	-.01 / 1332.83	½" Rebar HV Control Pt 15	
	5,822		— / 3.84 400				page 38
TP 17		3,700	6.1 / 1.3 480	32.967 / ~~.448~~ 10		Hub	
	13,061		— / 11.38 340				
TP 18		0,504	1.48 / — 200	45.526 / ~~.505~~ 21		Hub in Ravine	
	12,325		12.5 / 12.2 30				
TP 19		1,076	1.5 / 0.7 80	56.776 / ~~.757~~ 22		Hub in Ravine	
	7,816		9.67 / — 350				
End 20		12,971	— / 9.35 420	1352.565 / ~~.542~~ 23		POB 1352.565	

Error = -0.023 in 10,800' or 2.05 mi

3rd order: 0.072 2nd order: 0.047

Sta	BS+	FS −	Stadia	Elev	Point	Remarks:
POB				1296.492		TBM 11 p 38
	0.115		1.66 – 300			Chiseled "O" Conc Base Trans Struct
TP 1		11.002	12.6 9.4 320	85.~~605~~ .501		Hub in wash
	2704		4.3 1.1 320			
TP 2		7724	9.2 6.3 290	80.~~565~~ .579		Hub in wash
	1303		2.35 – 330			
TP 3		8254	9.3 6.7 310	73.~~633~~ .622		Hub in wash
	1197		2.33 – 330			See Diagram
TP 4		9327	10.9 7.8 310	65.~~502~~ .493		Hub in wash
	1339		3.07 – 350			page 38
TP 5		8088	9.5 6.6 290	58.~~757~~ .735		Hub in wash
	1919		3.1 0.7 240			
TP 6		9185	10.9 7.4 350	51.~~488~~ .431		Hub in wash
	5459		6.3 4.6 170			
TBM 7		5596	6.3 4.9 140	1251.~~351~~ .332		Nail in N Gate post 1½ up
	11.820		12.8 10.8 200			
TP 8		0.227	0.66 – 90	62.~~940~~ .925		Hub on Ridge
	12987		– 200 80			
TP 9		0314	0.86 – 110	75.~~576~~ .609		Hub on Ridge
	12251		12.8 11.7 110			
TP 10		0323	0.90 – 120	87.~~574~~ .530		Hub on Ridge
	11026		11.8 10.3 150			
ERM 11		2113	2.5 1.8 70	1296.~~457~~ .444	-1.30 1295.14	Glo BC marked: S23 1/4 S24
	2210		2.6 1.9 70			
TP 12		11.127	11.9 10.4 150	87.~~549~~		TP 10
	0073		0.66 – 120			

Sta	BS +	FS −	Stadia	Elev	Panel	Remarks	
TP 13		12,005	12.8 11.4 120	75.~~548~~		TP 9	
	0.211		0.76 – 110				
TP 14		12,887	– 12.56 80	52.~~932~~		TP 8	
	0.565		1.0 0.1 90				
TP 15		12,161	13.1 11.2 190	51.~~337~~		TBM 7	
	5.338		5.0 4.6 140				
TP 16		5.195	6.0 4.9 160	51.~~480~~		TP 6	See Diagram
	2.963		10.7 7.2 350				
TP 17		1.699	2.9 0.5 240	58.~~712~~		TP 5	page 38
	8.450		10.1 6.8 330				
TP 18		1.684	3.2 0.2 300	65.~~558~~		TP 4	
	9.399		10.9 7.9 300				
TP 19		1.272	2.89 – 320	73.~~655~~		TP 3	
	8.417		10.1 6.8 330				
TP 20		1.455	3.02 – 310	80.~~542~~		TP 2	
	7.630		9.0 6.2 280				
TP 21		2.605	4.3 0.9 240	90.~~621~~		TP 1	
	11.014		12.5 9.4 320				
END 22		0.120	1.6 – 300	98.~~517~~		POB 1296.492	

Error = 0.025 in 9900'± or 1.88 mi

3rd Order: 0.069 2nd order: 0.045

Sta	BS +	FS −		Elev	Panel	Remarks	
POB				1498.28		ERM 4 p. 26 (BC in Head	
	5.75		↑			wall 1499.80)	
TP 1		2.57		01.46		PK N. EP	
	6.46		+6.84				
TP 2		4.08		03.84		PK N. EP	See
	6.31						Diagram
TBM 3		5.03	↓	1505.12	1505.12	PK & Panel Vert Control Pt	page
	4.89		↑			by "New Tank"	26
TP 4		6.17		03.84		TP 2	
	4.11						
TP 5		6.50	-6.84	01.45		TP 1	
	2.74						
End 6		5.91	↓	98.28		POB 1498.28	
						Error = 0.00	

Sta	BS +	FS −		Elev	panel	Remarks	
POB				1440.49		ERM 31 p 28 (BC on Hand wall stamped 1442.00)	
	9.43						
TP 1		4.19		45.73 ~~45.75~~		PK in EP N of Speed Gun	
	7.45						
TP 2		10.87		42.31		Hole by Dist Rd Maint Sign	See Diagram page 28
	5.79						
TBM 3		1.40		1446.70	-0 1446.70	Rebar & H.V. Control Pt 22 p5	
	1.50						
TP 4		5.89		42.31		TP 2	
	10.63						
TP 5		7.20		45.74		TP 1	
	3.86						
End 6		9.10		40.50		POB 1440.49	
						Error = 0.01	

Sta	BS +	FS −		Elev	panel	Remarks
POB				1440.49		ERM 31 p 28 (BC in Head-wall stamped 1442.00)
	687					
TBM 1		508		1442.28	1442.28	PK & Panel Vert Control Pt on Prkwy Bridge over wagner Nash
	420					
TP 2		557		40.91		PK E.E.P
	673					
TP 3		273		44.91		PK E.E.P
	8.06					
TBM 4		353		1449.44	1449.44	R.R. Spike H.V. Control Pt. 21 p # +5
	340					
TP 5		793		44.91		TP 3
	264					
TP 6		664		40.91		TP 2
	560					
TP 7		422		42.29		TBM 1
	477					
End 8		656		40.50		POB 1440.49
						Error = 0.01

See Diagram page 28

	BS+	FS−		Elev	Panel	Remarks	
POB				1329.173		ERM 5 p38 S13 S18 / S24 S19 Col 0 BC marked	
	12.773						See Diagram
TBM 1a		3.289		1338.357	−.02 1338.64	½" Rebar HV Control pt 16	
	3.168						page 38
End 2a		12.652		1329.173		POB 1329.173	
						Error = 0.000	
POB				1410.24		TBM 31 p 33 Inv pt 18 by Deep Tro	
	0.26						
TP 1b		11.80		98.700		Hub	
	0.56						
TBM 2b		7.19		1392.07	−0.02 1392.05	Rebar HV Control pt 19	See Diagram
	7.38						
TP 3b		0.75		98.70		TP 1b	page 28
	12.28						
End 4b		0.74		1410.24		POB 1410.24	
						Error = 0.00	

Sta	BS +	FS -		Elev	Panel	Remarks
POB				1365.50		TP 19 p 32 (Hub in wash marked "19")
	0.62					
TP 1a		8.57		57.55		Hub
	10.44					
TBM 2a		6.38		1361.71	1361.71	½" Rebar ℄ Vert Panel by Wagner wash well
	6.29					
TP 3a		10.35		57.65		TP 1a
	9.86					
End 4a		1.91 ±		1365.60		POB 1365.60
						Error = 0.00
						See Diagram page 32
POB				1365.50		TP 19 p 32 (Hub in wash marked "19")
	7.09					
TP 1b		3.50		69.19		Hub
	6.30					
TBM 2b		0.99		1374.50	1374.50	½" Rebar ℄ Vert Panel ½ mi ± N. of Wagner well
	0.86					
TP 3b		6.16		69.20		TP 1b
	3.20					
End 4b		6.79		1365.61		POB
						Error = 0.01

Sta	BS+	FS−		Elev	Panel	Remarks	
POB				1492.23		ERM 10 p 26 GLO BC marked: 1/4 S28 S33	
	9.55						
TP 1		2.83		98.95		Hub	
	10.69						See Diagram
TBM 2		2.75		1506.89	..01 1506.88	Rebar Vert Panel 1/4 mi I E of 1/4 Cor above	page 26
	2.68						
TP 3		10.52		98.95		TP 1	
	2.75						
End 4		9.48		92.22		POB 1492.23	
						Error = 0.01	

Sta	BS +	FS −		Elev	Panel	Remarks
POB				1471.87		ERM 19 p 27 1/4 GLO BC marked: S32 & S33
	11.30					
TP 1a		2.98		80.19		Hub
	10.03					
TBM 2a		3.83		1486.39	−.04 1486.35	Rebar HV Control pt 25
	3.65					
TP 3a		9.85		80.19		TP 1a
	2.39					
End 4a		10.70		71.88		POB 1471.87
						Error = 0.01
POB				1471.87		ERM 19 p 27 1/4 GLO BC marked: S32 & S33
	0.09					
TP 1b		2.15		69.81		Hub
	13.03					
TBM 2b		0.81		1482.03	−.03 1482.00	Rebar HV Control pt 24
	0.70					
TP 3b		12.92		69.81		TP 2b
	2.15					
End 4b		0.09		71.87		POB 1471.87
						Error = 0.00

See Diagram page 26

	BS +	FS −		Elev	Panel	Remarks	
POB	6.14 7.29 4.99			1459.58		TP 23 p. 27 (Flagged well)	
TBM		8.46 11.41 5.51		1457.26	-.01 1457.25	½" Rebar Vert Panel 1000'± SE of Center Sec 32	See Diagram page 26 & 28
			Ck by Stadia Reading table was good				
POB				1410.299		TBM 10 p. 31 Control pt 20	
	9.432						
TP 1		9.851		14~~00~~ .875		Hub	
	8.185						
ERM 2		4.274		1418.~~774~~ .785	-1.61 1417.18	GLOBC marked: 1/4 57 58	See Diagram
	4.142						
TP 3		8.052		14~~00~~		TP1	page 28
	4.930						
End 4		9.502		10.~~399~~ 10		POB 1410.299	
						Error = 0.010 in 0.19 mi	
						3rd order : 0.022	
						2nd order : 0.014	

Sta	BS+	FS-		Elev	Panel	Elev	
POB				1251.33		TBM 7 p 40 (Nail in w. Gate Post)	
	0.55						
TP 1a		8.33		43.55		Hub	
	2.14						
TBM 2a		8.70		1236.99	-.01 1236.98	Rebar HV Control pt 12 p.3	
	8.62						
TP 3a		2.06		43.55		TP 1	
	8.36						
End 4a		0.58		51.33		POB 1251.33 Error = 0.00	See Diagram page 38
POB				1251.33		TBM 7 p 40 (Nail in w. Gate post)	
	6.89						
TP 1b		2.75		55.47		Hub	
	12.70						
TBM 2b		11.12		1257.05	-.02 1257.03	Rebar Vert Panel 1/4 Mi ± N of E 1/4 Cor Sec 23	
	11.13						
TP 3b		12.71		55.47		TP 1b	
	2.91						
End 4b		7.05		51.33		POB 1251.33 Error = 0.00	

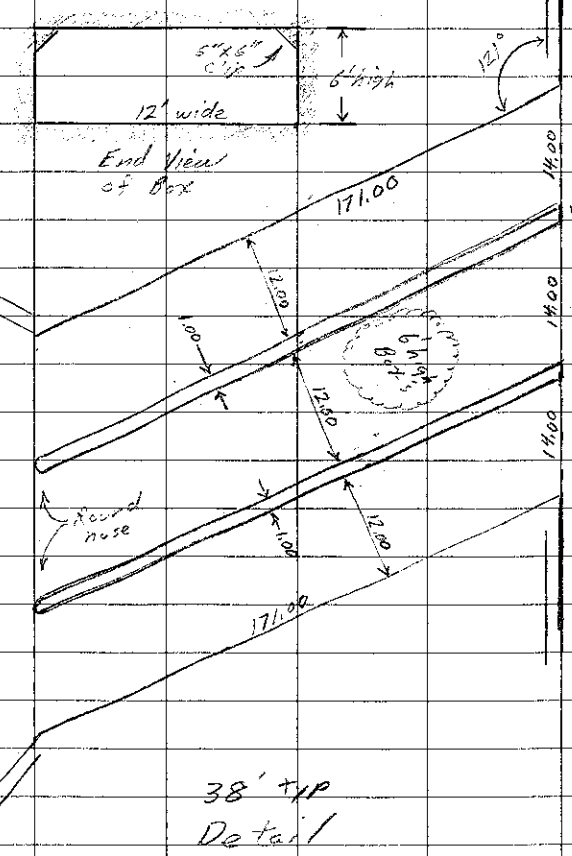
Sta	BS +	FS −		Elev	Panel	Remarks	
POB				1257.05	-.02 1257.03	TBM 26 p.50 (Vert Panel)	
	1.15						
TP 1		11.84		46.36		Hub	
	5.37						
TP 2		4.82		46.~~41~~ .90		Hub	
	7.54						
TP 3		3.40		51.~~05~~ .04		Hub	
	6.75						
TBM 4		8.82		1248.~~96~~ 96	-0 1248.96	Rebar HV Control pt.13 p3	See Diagram
	8.93						
TP 5		6.86		51.~~05~~		Hub	page 38
	3.37						
TP 6		7.50		49.~~47~~		Hub	
	4.83						
TP 7		5.37		49.~~50~~		Hub	
	11.80						
End 8		1.10		57.~~08~~		POB 1257.05	
						Error = 0.03	

Sta	BS-	FS-		Elev		
POB				1296.492	TBM 11 P. 38	
	3.837					
ERM		3.857		1296.472	BC epoxed in S. Conc Base S. Leg of SW Trans Struct (of two)	See Diagram page 38

Note: All conc. wall are 9" wide unless otherwise noted

Note: 3½' high Guard Rail on top of W. head wall at 8' centers and at 9.15' center on East head walls

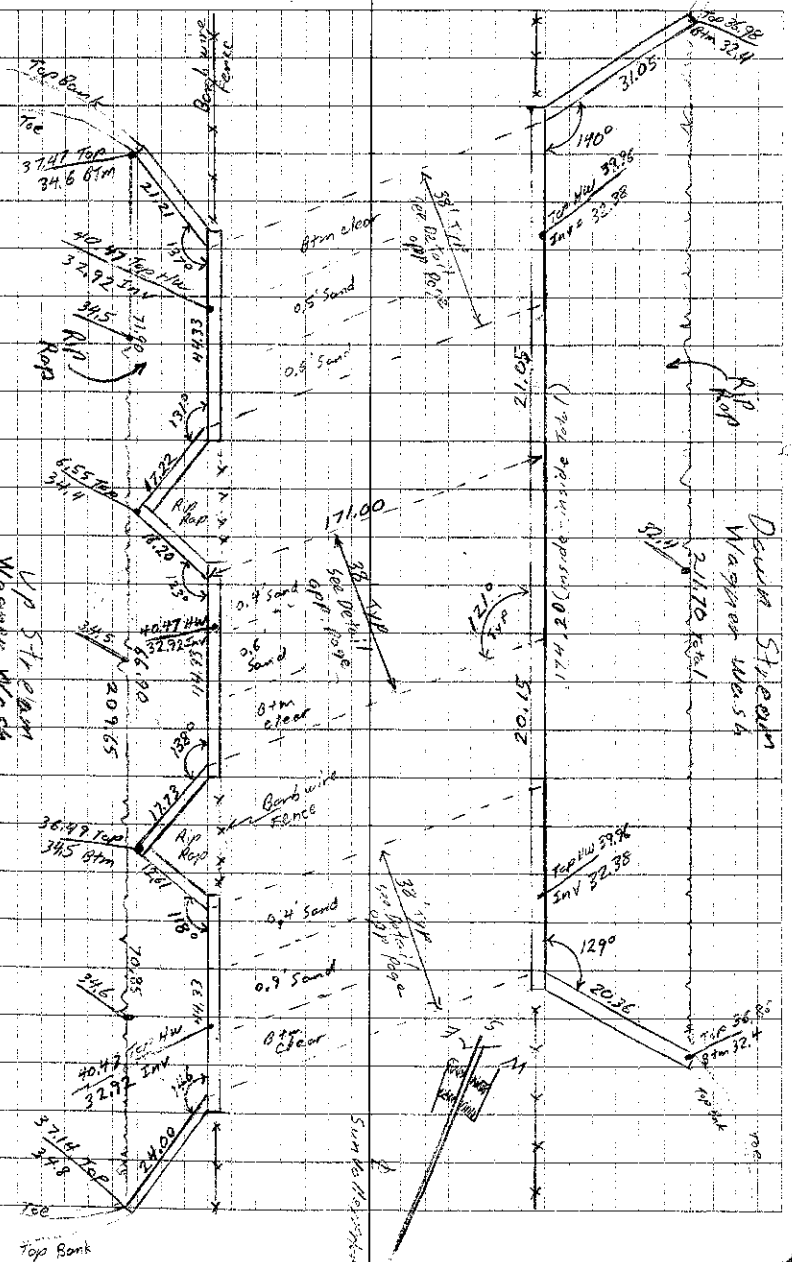
TBM = 1440.49



Down Stream

Up Stream

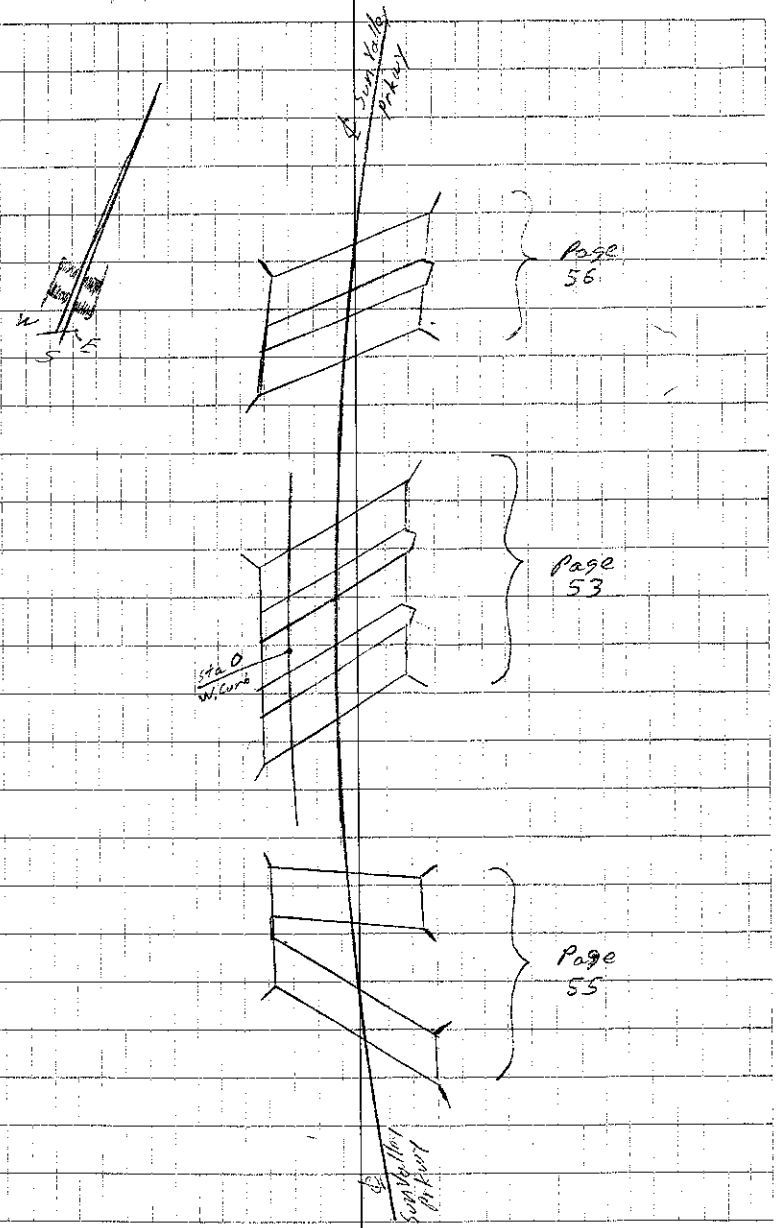
Sun Valley Prkwy @ Wagner Wash Box Culverts in the NW ¼ of Section 5 T3N R4W



Elev. Profile for all Box Culverts
Pages 53–56

Sta.	Elev	Elev	Remarks		
Note: Sta 0+00 is the ℄ of the Center Box Culvert at the W. Curb S.V.P.					
1000 N	46.70		Top of W. Curb S.B. Lane S.V.P.		
900 N	46.08		"	"	"
800 N	45.49		"	"	"
700 N	44.92		"	"	"
600 N	44.59		"	"	"
500 N	44.62		"	"	"
400 N	44.83		"	"	"
300 N	45.17		"	"	"
200 N	45.41		"	"	"
100 N	45.48		"	"	"
0	45.35		"	"	"
100 S	45.20		"	"	"
200 S	44.88		"	"	"
300 S	44.22		"	"	"
400 S		43.10	Top of E. Curb of Median Planter		
500 S		42.72	"	"	"
600 S		42.31	"	"	"
700 S		42.10	"	"	"
800 S		42.16	"	"	"
900 S		42.52	"	"	"
1000 S		43.04	"	"	"

TBM - 1442.22



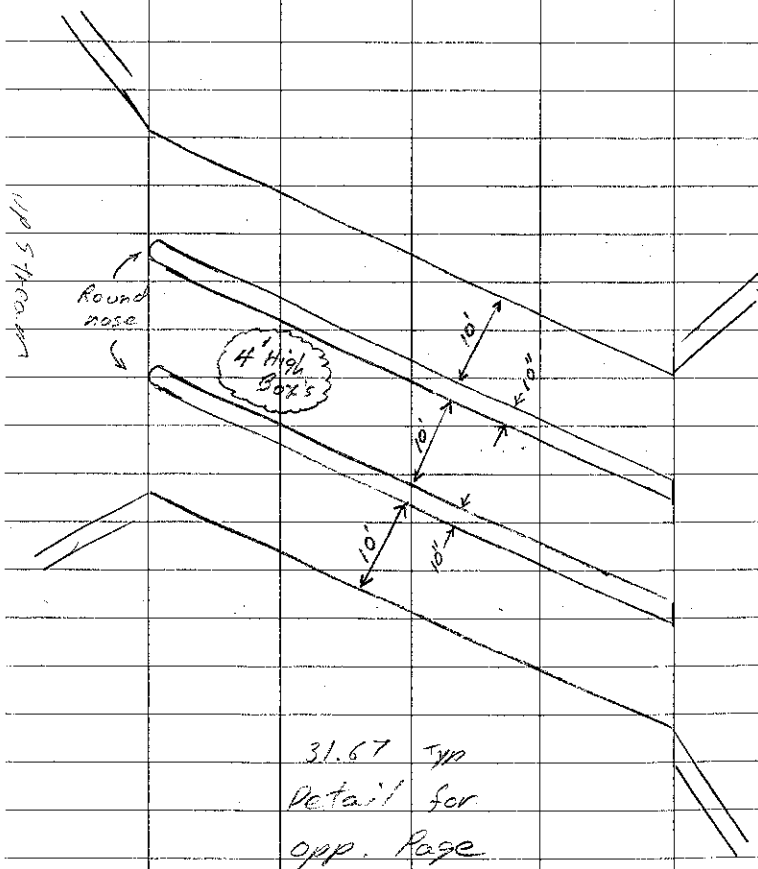
Box Culverts on S.V.P. South of Wagner Wash in Sec. 5

Note: All Conc Walls are 9" wide unless otherwise noted

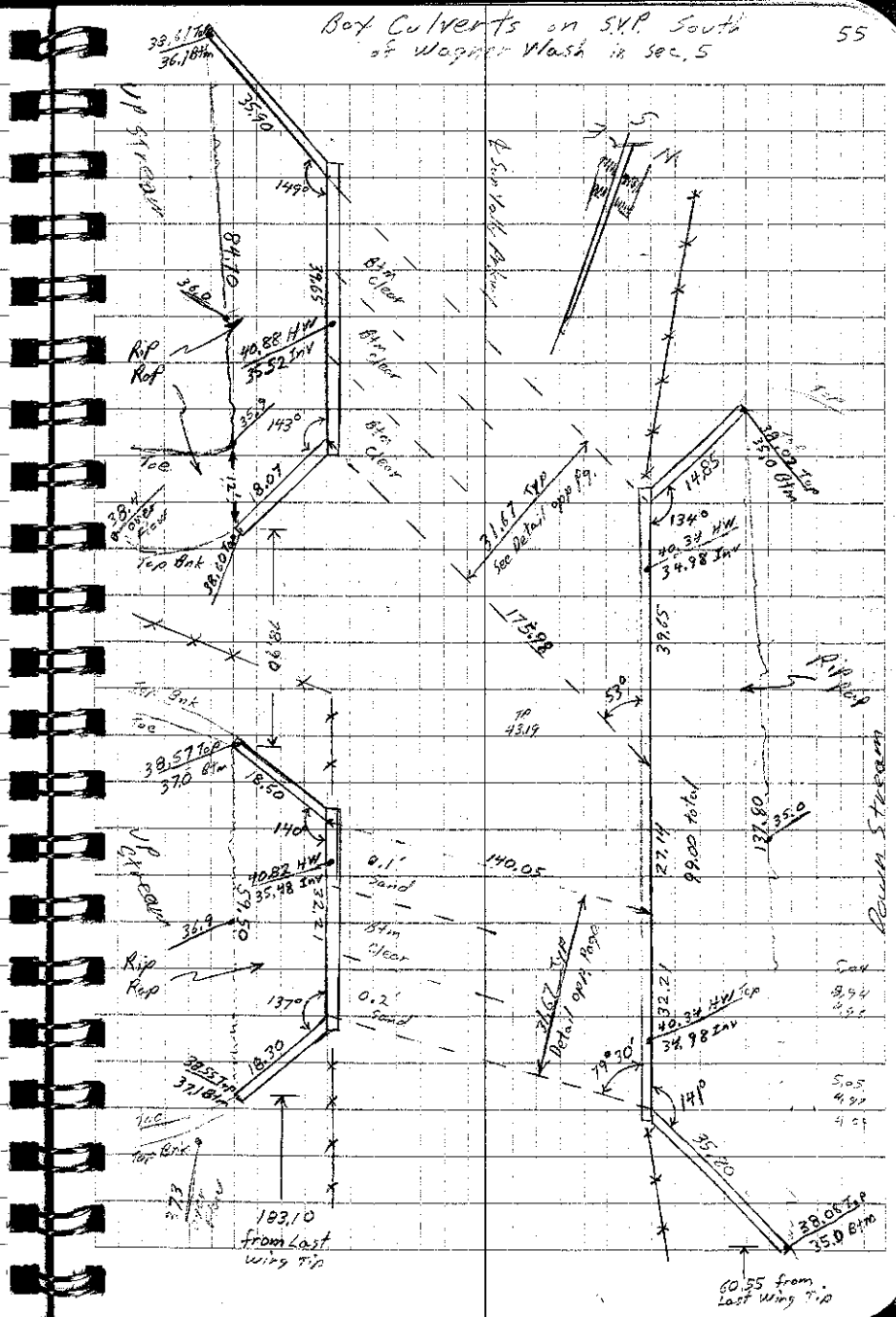
Note: 3½' high Guard Rail on Top All Headwalls @ 8' centers

Note: All Box have 6"x6" clips in upper Corner (p 58)

TBM 1400.49



31.67 Typ
Detail for
opp. Page



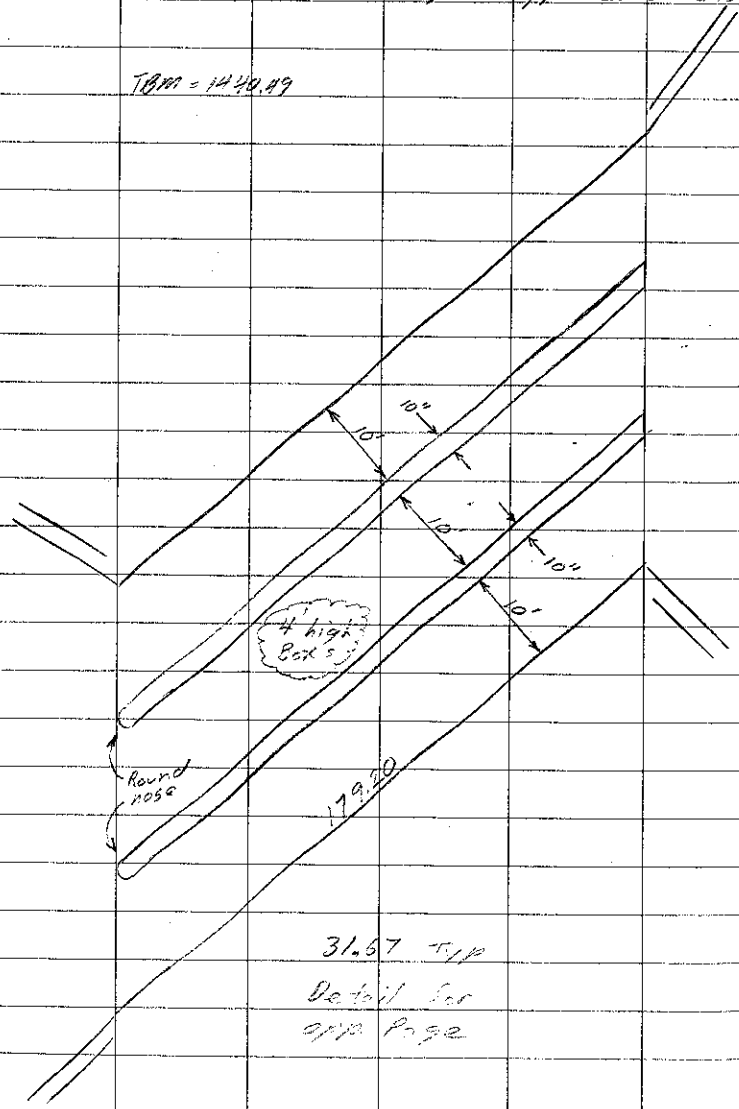
Box Culverts on S.V.R. North of Wagner Wash in sec 5

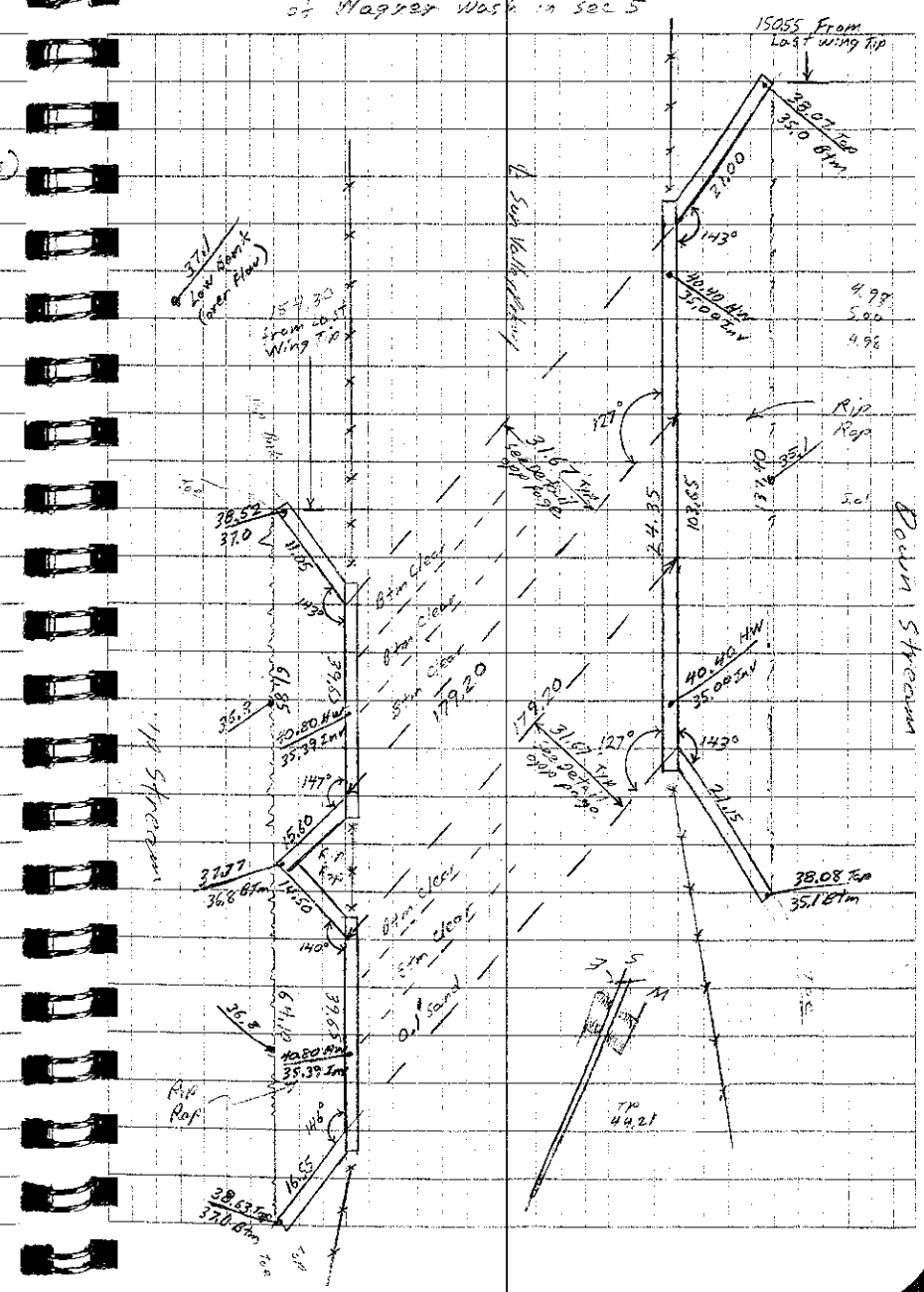
Note: All Conc Walls are 9" unless other wise noted

Note: 3½' high Guard Rail w. 8' centers on Head walls

Note: All Boxes have 6"x6" Clips in upper Corners (P.53)

TBM = 1440.49



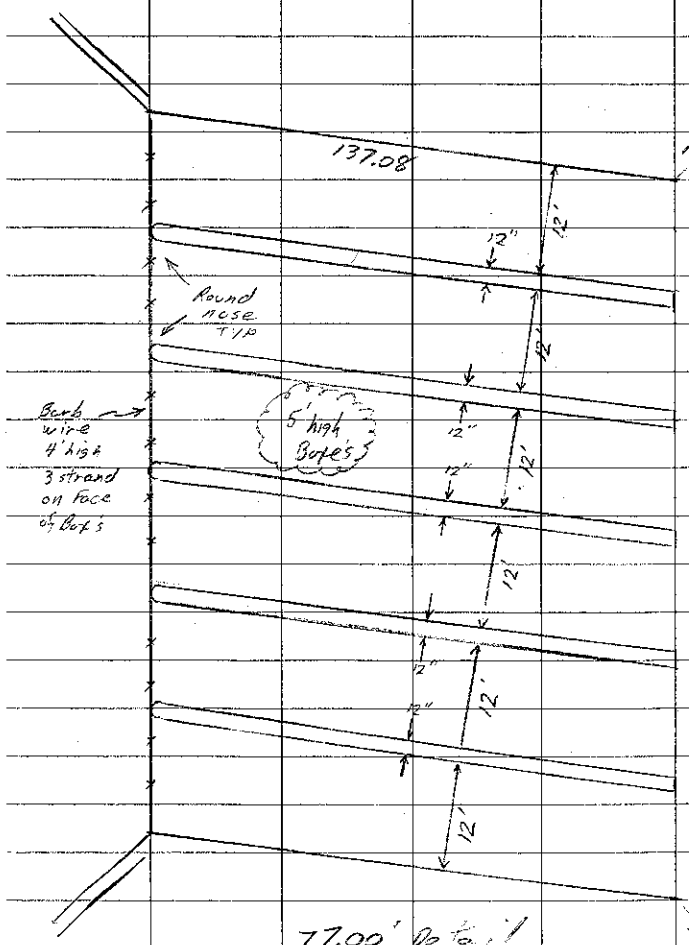


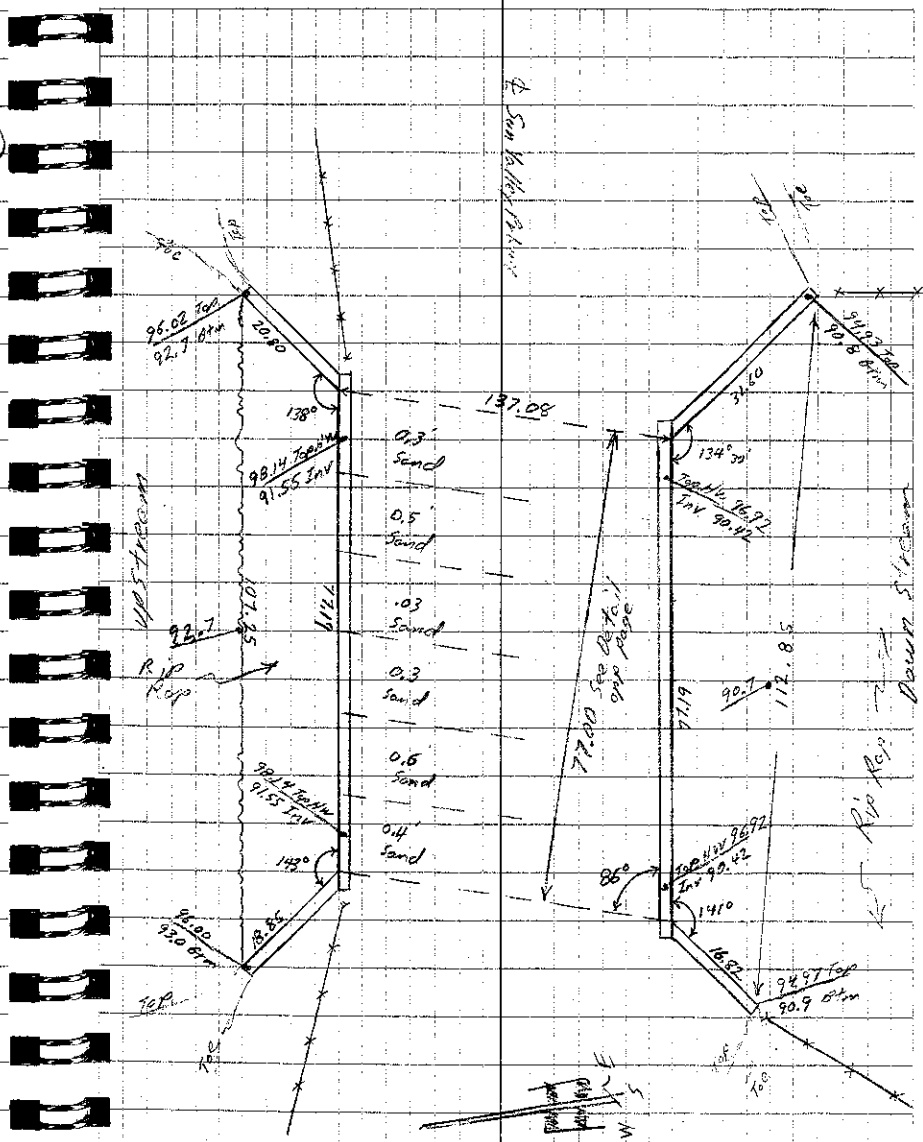
Box Culvert on SKP at
Wagner Wash in SE 1/4 Sec 28

Note: All Conc Walls are 9" wide unless otherwise noted

Note: 3½' high Guard Rail w. 8' Centers on Head walls

Note: All Boxes have 6"x6" clips in upper Corners (p.53)





TBM = 149827

Sta.	Elev	Remarks
Note: Sta. 0+00 is the ℄ of the Box Culvert at the N. Curb of Med. Planter on SVP.		
500' E	1502.40	Top W. Curb Med Planter
400' E	1501.30	" "
300' E	1500.60	" "
200' E	1500.27	" "
100' E	1499.93	" "
0	1499.64	" "
100' W	1499.35	" "
200' W	1499.05	" "
300' W	1498.88	" "
400' W	1498.89	" "
500' W	1499.03	" "

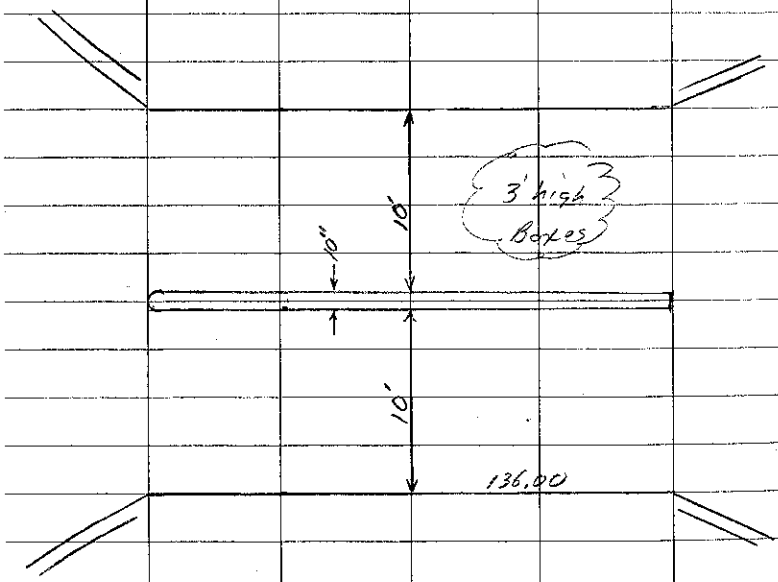
See Diagram page 57

Box Culvert 1000' ± West of Wagner Wash in Sec 28

Note: All conc walls are 9" unless other wise Noted

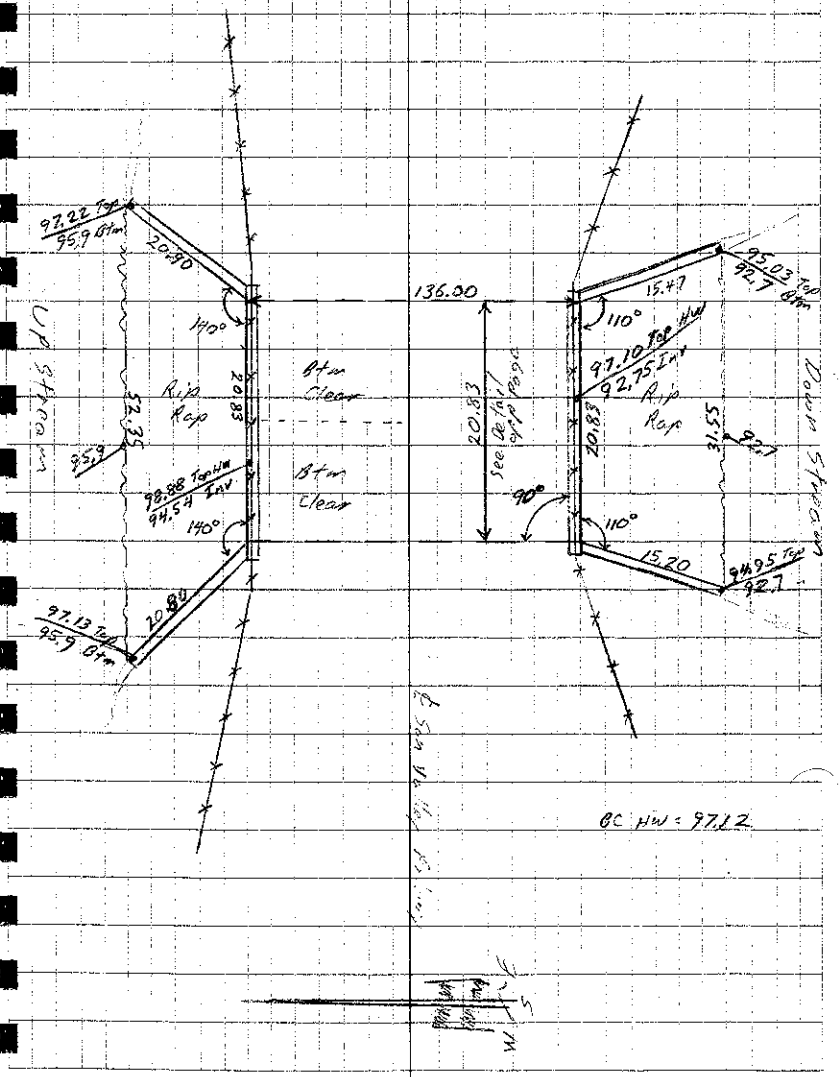
Note: All Boxes have 6"x6" clip in upper Corners (p.53)

TBM = 1501.46



20.83' Detail

for opp Page

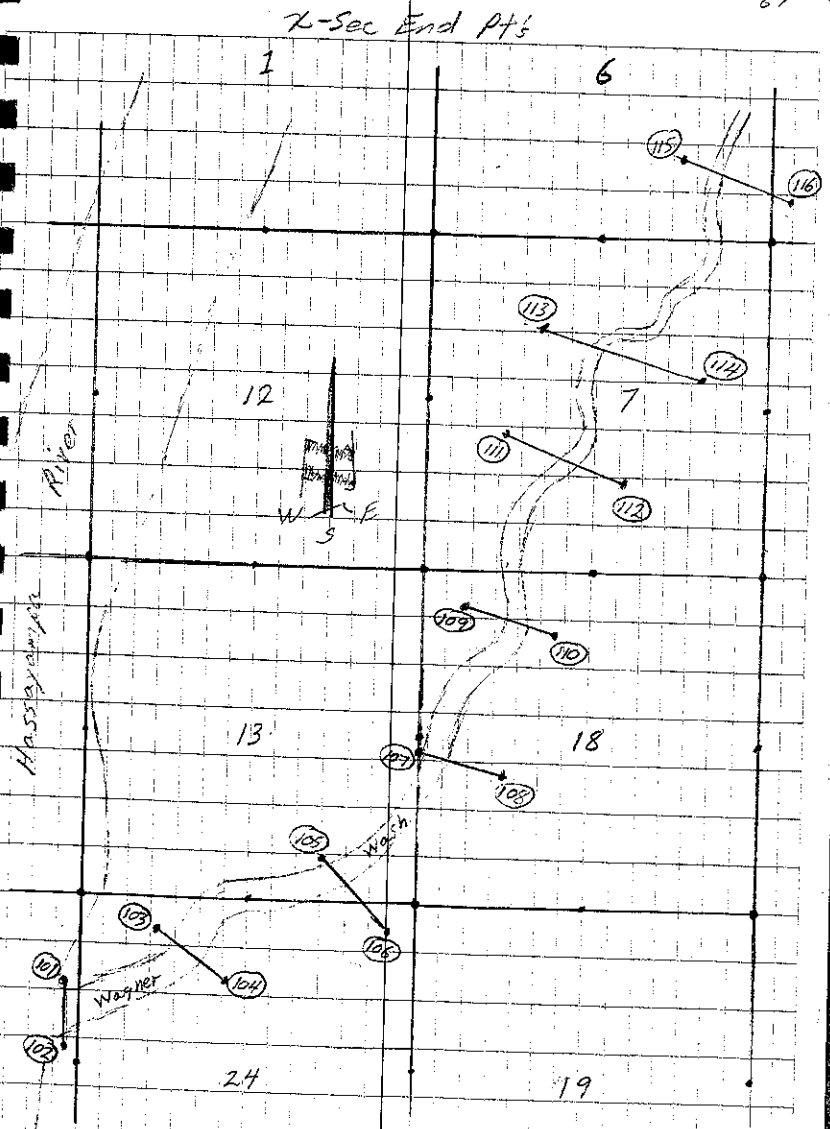


Sta	Elev	Remarks		
Note: Sta 0+00 is the ℄ Box Culvert at the N. Curb of WB Lane SVP				
500' E	99.83		Top North Curb	
400' E	00.66		"	"
300' E	01.11		"	"
200' E	01.44		"	"
100' E	01.75		"	"
0	02.08		"	"
100' W	02.40		"	"
200' W	02.64		"	"
300' W	02.96		"	"
400' W	03.24		"	"
500' W	03.51		"	"

Elev Profile for Box Culvert p. 59

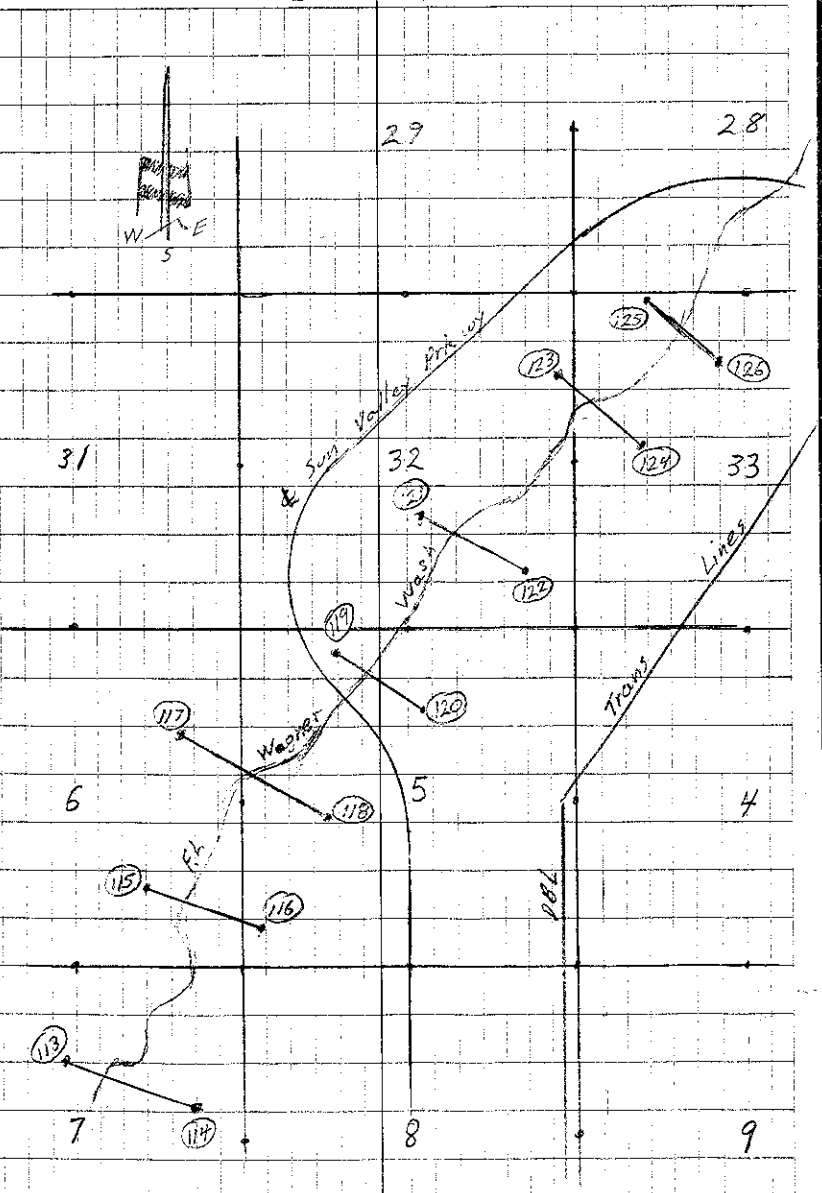
See Diagram page 59

Sta	Hz ∠	Hz Dist	Remarks
11 ⊼ Sta			Rebar (p.3)
10 BS	00-00-00		Tower (p.3)
101 ∠R1	265-35-24	1134.66	Set Nail & Lath
102 ∠R1	343-05-33	24.72	" " "
103 ∠R1	309-21-07	2464.31	" " "
104 ∠R1	328-07-15	2731.99	" " "
14 ⊼ Sta			Rebar (p.3)
10 BS	00-00-00		Tower (p.3)
105 ∠R1	117-00-49	757.21	Set Nail & Lath
106 ∠R1	61-31-27	1629.41	" " "
107 ∠R1	297-54-47	1538.07	" " "
108 ∠R1	321-46-16	2010.25	" " "
17 ⊼ Sta			Rebar (p.3)
10 BS	00-00-00		Tower (p.3)
109 ∠R1	185-40-11	2051.63	Set Nail & Lath
110 ∠R1	193-07-08	1055.53	" " "
112 ∠R1	265-25-59	2643.50	" " "
18 ⊼ Sta			Rebar (p.4)
10 BS	00-00-00		Tower (p.3)
111 ∠R1	35-29-08	2010.80	Set Nail & Lath
113 ∠R1	359-47-25	408.57	" " "



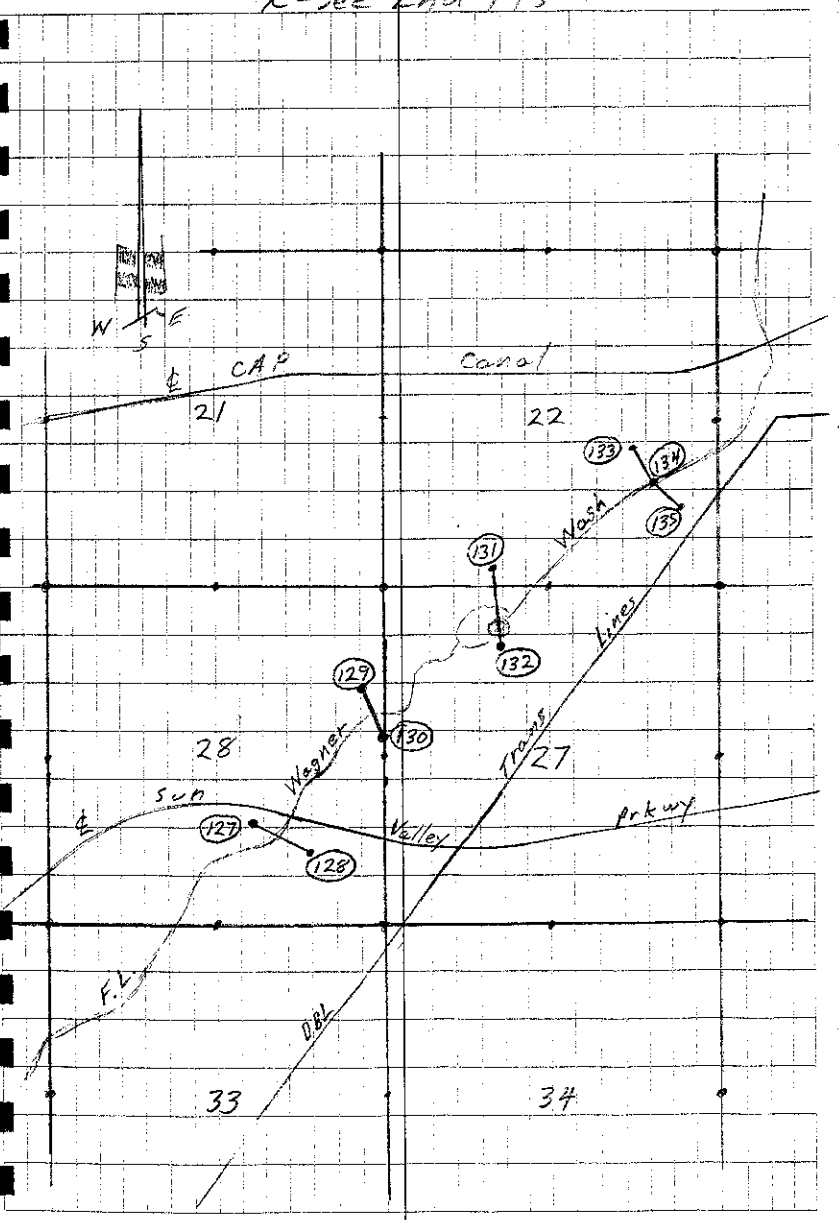
Sta	Hz ∠	HD	Remarks
20 ⊼ Sta			Rebar (p.4)
10 BS	00-00-00		Tower (p.3)
114 ∠RH	141-08-46	522.09	Set Nail + Lath
115 ∠RH	235-59-11	3092.69	" " "
116 ∠RH	266-15-21	2596.66	" " "
21 ⊼ Sta			RR Spike (p.4)
10 BS	00-00-00		Tower (p.3)
117 ∠RH	171-10-18	3224.60	Set Nail + Lath
118 ∠RH	153-12-59	1100.20	" " "
119 ∠RH	224-47-40	3008.22	" " "
120 ∠RH	252-34-32	2083.66	" " "
24 ⊼ Sta			Rebar (p.5)
10 BS	00-00-00		Tower (p.3)
121 ∠RH	74-55-15	2735.80	Set Nail + Lath
122 ∠RH	49-11-35	3055.83	" " "
123 ∠RH	330-29-00	814.24	" "
124 ∠RH	349-58-19	1864.12	" "
125 ∠RH	292-36-38	2451.40	" "
126 ∠RH	308-35-34	2940.67	" "

x-Sec End Pts



Sta	Hz ∡	Hz Dist	Remarks
26 π Sta			Rebar (p5)
10 BS	00-00-00		Tower (p3)
127 ∡Rt	24-41-45	1617.67	Set Nail + Lath
128 ∡Rt	11-39-34	2148.30	" " "
130 ∡Rt	316-49-29	2361.98	" " "
27 π Sta			Rebar (p6)
10 BS	00-00-00		Tower (p3)
129 ∡Rt	326-15-49	1610.08	Set Nail + Lath
131 ∡Rt	285-03-13	3914.19	" " "
132 ∡Rt	299-49-02	3780.64	" " "
36 π Sta			Rebar (p9)
10 BS	00-00-00		Tower (p3)
133 ∡Rt	121-48-14	2224.50	Set Nail + Lath
134 ∡Rt	106-13-55	1887.49	" " "
135 ∡Rt	88-38-07	1638.52	" " "

X-Sec End Pt's



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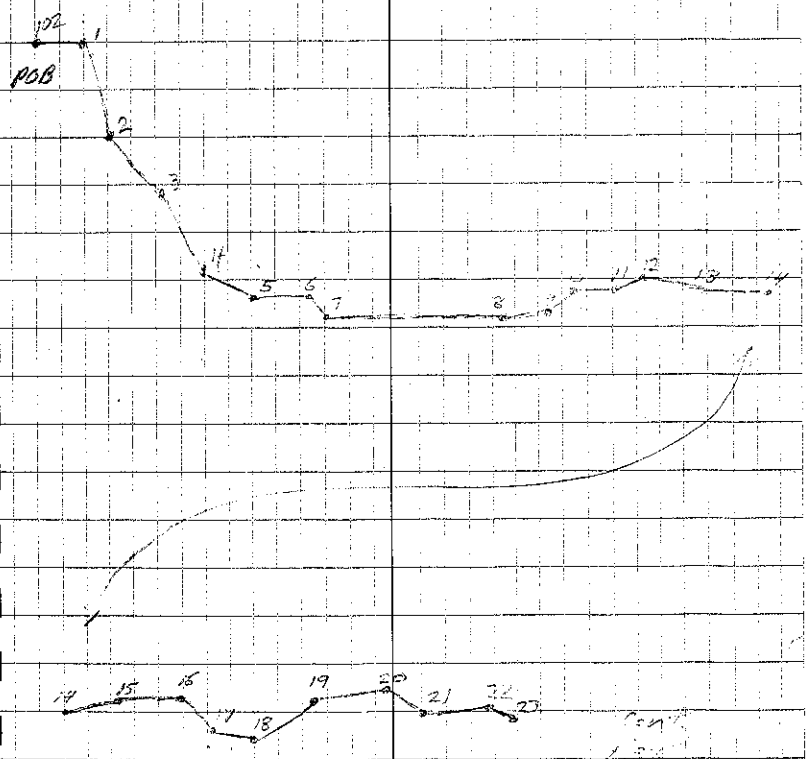
Sta	Elev	Point	Zn ∠	H. Dist	Rod
BS	1251.332	TBM 7 p40	97-57-15 / 99-00-40	233.97	[illegible]
0+00	1288.58	102 p61	⊼ Sta	0	5.15
0+14	1288.93	1	[illegible]	[illegible]	5.04
0+51 6	1275.56	2	104-15-40	51.59	[illegible]
0+73 8	1270.09	3	104-08-05	73.83	[illegible]
1+07 0	1258.40	4	103-28-35	105.95	10.70 2
1+24 3	1255.61	5	102-49-00	124.29	10.70 2
1+41 4	1254.90	6	101-38-15	141.40	10.70 2
1+48 5	1253.22	7	101-43-15	148.50	10.70 2
2+34 2	1253.20	8	97-29-55	234.20	10.70 2
2+69 8	1253.84	9	96-23-05	269.78	10.70 2
2+74 9	1254.49	10	96-07-55	274.92	10.70 2
2+87 8	1254.48	11	95-51-45	287.75	10.70 2
2+94 1	1255.58	12	95-31-20 / ~~93-41-30~~	294.11	10.70 2
3+05 8	1254.65	13	95-28-10	306.75	10.70 2
3+32 1	1254.66	14	95-02-40	332.73	10.70 2
3+46 7	1255.64	15	94-40-50	346.73	10.70 2
3+81 6	1255.42	16	94-17-15	381.53	10.70 2
3+88 8	1253.75	17	94-27-05	388.75	10.70 2
3+94 5	1253.59	18	94-24-45	394.45	10.70 2
4+00 7	1255.73	19	94-02-20	400.74	10.70 2
4+29 9	1256.38	20	93-40-45	429.94	10.70 2
4+42 2	1254.59	21	93-41-05	442.32	10.70 2
4+54 9	1254.97	22	93-02-55	454.86	10.70 2
4+57 9	1254.49	23	93-05-20	457.87	10.70 2



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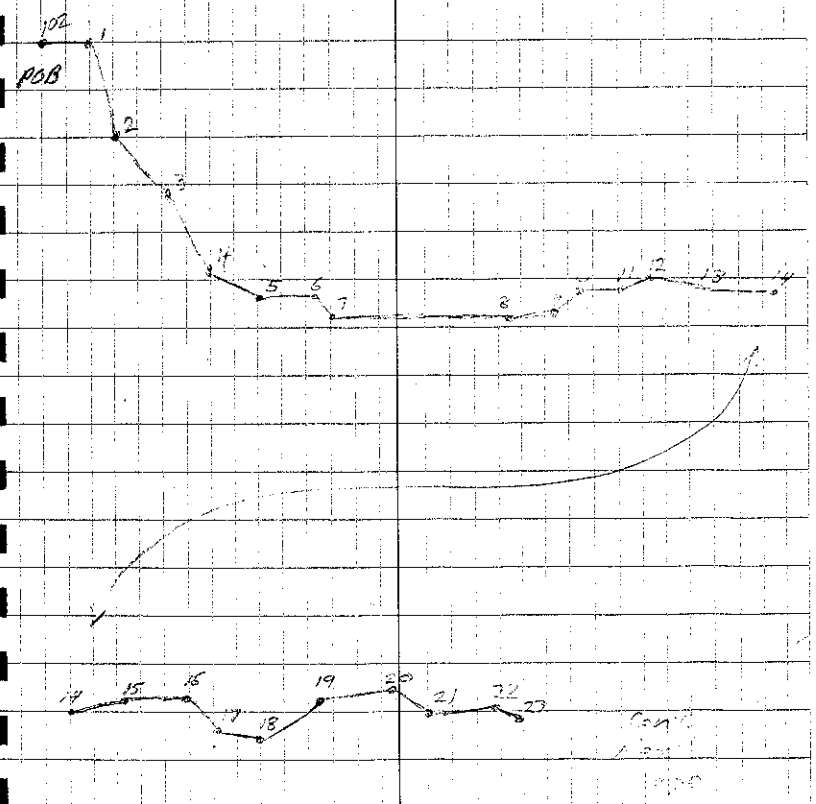
Sta	Elev	Point	Zn ∠	H. Dist	Rod	
85	1251.332	TBM 7 pio	97-57-15 / 99-00-40	233.97	[illegible]	[illegible]
0+00	1289.58	102 psl	⊥ Sta	0	5.15	
0+14.[illegible]	1288.93	1	[illegible]	[illegible]	[illegible]	
0+57.6	1275.56	2	104-15-40	51.59	[illegible]	
0+73.8	1270.09	3	104-08-05	73.83	[illegible]	[illegible]
1+07.0	1258.20	4	103-28-35	106.95	10.70	2
1+24.3	1255.61	5	102-49-00	124.89	10.70	2
1+41.3	1254.90	6	101-38-15	141.40	10.70	2
1+48.5	1253.22	7	101-43-15	148.50	10.70	2
2+34.2	1253.20	8	97-29-55	234.20	10.70	2
2+69.8	1253.84	9	96-23-05	269.78	10.70	2
2+74.9	1254.49	10	96-07-55	274.92	10.70	2
2+87.8	1254.48	11	95-51-45	287.78	10.70	2
2+94.1	1255.58	12	95-31-50 / ~~95-21-30~~	294.11	10.70	2
3+05.2	1254.65	13	95-28-10	306.76	10.70	2
3+32.7	1254.66	14	95-02-40	332.73	10.70	2
3+45.7	1255.64	15	94-40-50	345.73	10.70	2
3+81.6	1255.42	16	94-17-15	381.53	10.70	2
3+88.8	1253.7[illegible]	17	94-27-05	388.75	10.70	2
3+94.5	1253.59	18	94-24-45	394.45	10.70	2
4+00.7	1255.73	19	94-02-20	400.74	10.70	2
4+29.2	1256.38	20	93-40-45	429.94	10.70	2
4+42.2	1254.59	21	93-[illegible]-05	442.32	[illegible]	2
4+54.9	1254.97	22	93-02-55	454.66	[illegible]	2
4+57.9	1254.49	23	93-05-20	457.87	[illegible]	2



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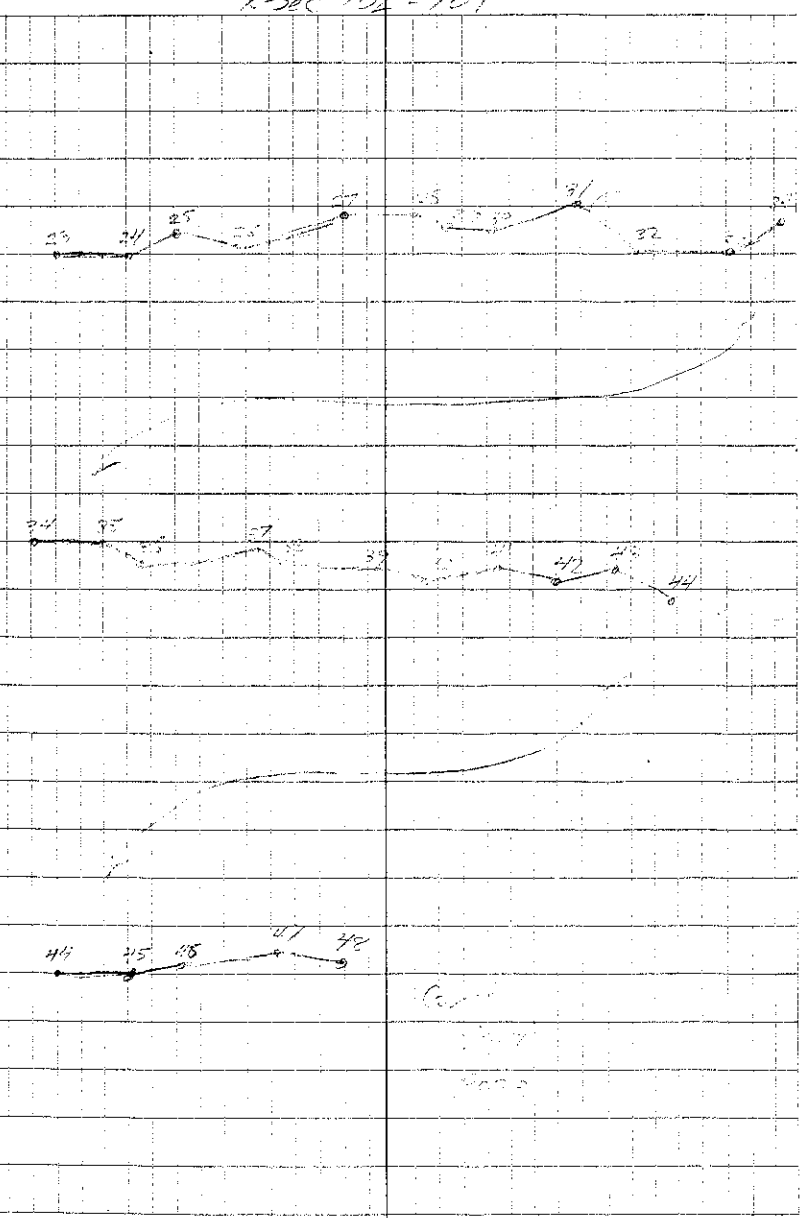
Sta	Elev	Point	Zn X	Hz Dis	Rod
4+69 1	1254.47	24	92-30-50	459.05	15.53 3
4+72 5	1255.24	[illegible]	[illegible]	472.52	[illegible]
4+87 2	1254.47	[illegible]	92-54-05	487.72	[illegible]
5+11 1	1255.23	[illegible]	92-40-55	511.78	15.53 3
5+26 0	1255.27	[illegible]	92-36-20	525.95	[illegible] 3
5+30 0	1254.27	29	92-39-40	530.04	[illegible]
5+36 4	1254.47	30	92-38-25	536.38	15.53 3
5+48 5	1255.42	31	92-28-55	548.57	15.53 3
5+64 3	1253.29	32	92-37-45	564.33	[illegible]
5+77 3	1255.30	33	92-34-10	577.26	15.53 3
5+85 3	1254.77	34	92-23-25	585.28	15.53 3
6+18 1	1254.78	35	92-15-45	618.12	15.53 3
6+21 2	1254.37	36	92-19-15	621.74	15.53 3
6+53 5	1255.4[illegible]	37 ✓	~~93-11-25~~	653.47	15.53 3
6+69 8	1254.69	38	92-05-45	669.78	15.53 3
7+32 5	1254.84	39	91-54-20	732.47	15.53 3
7+45 1	1254.25	40	91-55-00	745.66	15.53 3
7+68 1	1255.2	41 ✓	~~92-17-25~~	768.08	15.53 3
7+93 2	1254.74	42	91-46-00	793.18	15.53 3
8+09 0	1255.76	43	92-19-55	808.36	6.04 1
8+19 3	1254.38	44	92-33-50	819.57	6.04 1
8+39 2	1254.21	45	92-21-05	839.93	6.04 1
8+53 0	1255.14	46	91-37-00	853.97	15.53 3
9+00 5	1255.21	47	92-05-30	900.24	6.04 1
9+14 2	1255.11	48	92-05-10	914.94	6.04 1



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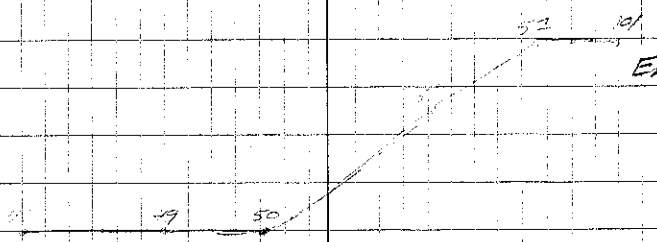
Sta	Elev	Point	Zn ∡	Hz Dist	Rod
9+95 ℄	1256.04	49 ✓	91-52-50	995.00	6.04
10+62 ℄	1255.62	50	91-47-00	1062.90	6.04
10+98 ℄	1252.22	51	90-45-20	1098.58	6.04
11+20 ±	1282.63	52	90-13-45	1120.12	6.04
11+29 ℄	1284.30	101	90-13-25	1128.05	6.04
check	1287.08	[illegible]	91-[illegible]	1135.30	6.04
	1255.25 ✓				



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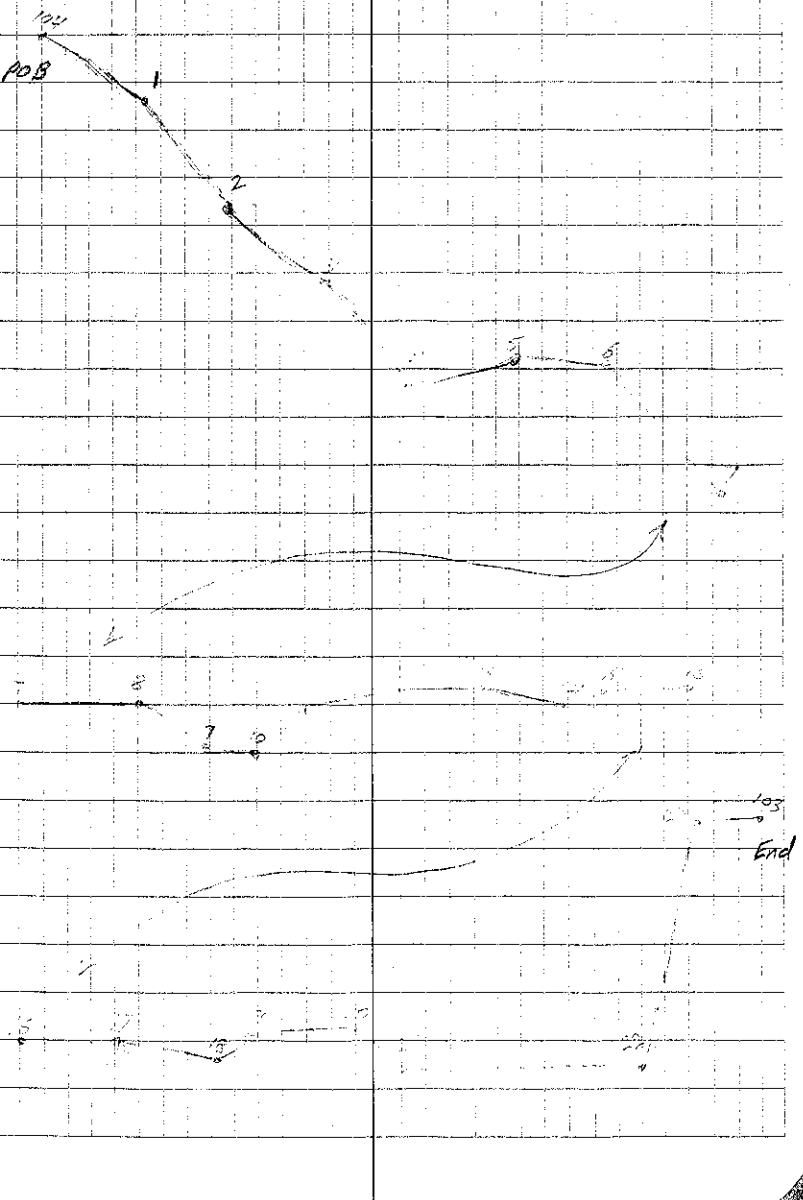
Sta.	Elev	Point	Bn ∠	L. Feet	Rod
BP	[illegible]	[illegible] p.52	[illegible]	973.55	[illegible]
0+00	1319.97	104 p.51	[illegible]	0	5.44
0+29 ∠	1317.07		96-50-20	29.29	[illegible]
0+79 ∠	1313.70	2	[illegible]	79.50	[illegible]
0+13 ∠	1306.02	3	96-32-40	113.52	[illegible]
1+55 ∠	1297.21	4	97-58-45	155.74	6.04
1+81 ∠	1299.67	5	96-05-35	181.52	6.04
2+28 ∠	1297.15	6	95-27-55	228.24	6.04
2+57 ∠	1286.36	7	96-21-10	256.74	10.70
3+32 ∠	1286.22	8	94-52-10	332.79	10.70
3+44 ∠	1285.97	9	95-57-05	344.08	10.70
3+48 ∠	1283.89	10	[illegible]	348.19	10.70
3+54 ∠	1285.42	11	94-40-30	354.10	10.70
3+97 ∠	1285.80	12	94-18-30	397.89	10.70
4+73 ∠	1285.19	13	93-31-40	473.51	10.70
4+97 ∠	1283.98	14	94-01-45	497.84	6.04
5+04 ∠	1284.73	15	93-53-30	504.40	6.04
5+60 ∠	1284.88	16	93-29-15	560.51	6.04
6+06 ∠	1284.70		93-14-35	606.55	6.04
6+32 ∠	1283.14	18	[illegible]	632.55	6.04
6+41 ∠	1284.99		93-05-10	641.55	[illegible]
7+08 ∠	1284.85	20 ✓	92-23-15	[illegible]	10.70
7+25 ∠	[illegible]	21	[illegible]	724.99	10.70
8+49 ∠	1284.85	22	92-15-40	849.02	10.70
8+66 ∠	1301.42	23	91-10-00	866.25	6.04
[illegible]	1302.02	103	[illegible]	947.85	6.04
[illegible]	[illegible]	C/R	[illegible]	947.21	15.53



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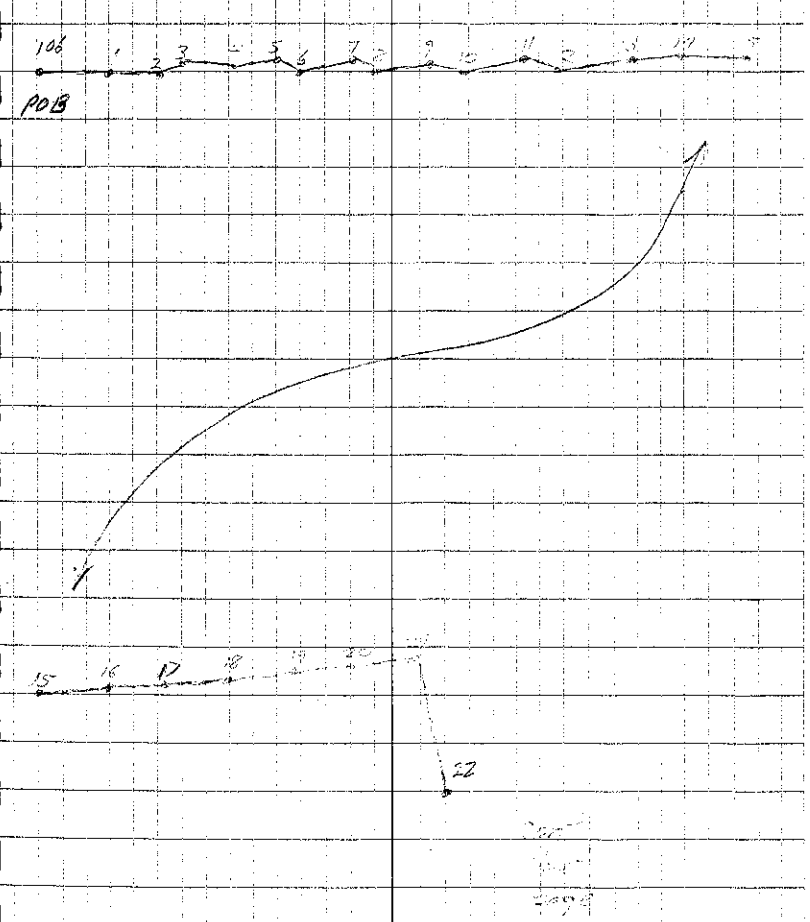
Sta	Elev	Point	Ty ∠	Hz Dist	Rod	
BS	1323.025	TP 7 0.38	90-32-20 239-27-35	608.29	6.04	
1 Sta		105 p 61				
0+00	1320.15	106 p 61	90-10-05	1353.12	10.70	2
0+44 Rt	1319.87	1	90-11-10	1309.15	10.70	2
0+65 Rt	1313.84	2	90-11-25	1287.32	10.70	2
0+70 Rt	1320.45	3	90-09-50	1282.64	10.70	2
1+19 Rt	1320.02	4	90-11-25	1233.37	10.70	2
1+52 Rt	1320.97	5	90-09-00	1200.65	10.70	2
1+61 Rt	1320.04	6	90-11-45	1191.74	10.70	2
1+85 Rt	1322.10	7	90-05-55	1169.60	10.70	2
1+92 Rt	1320.03	8	90-12-05	1160.64	10.70	2
2+18 Lt	1320.30	9	90-10-20	1135.03	10.70	2
2+34 Lt	1320.15	10	90-12-10	1118.29	10.70	2
2+84 Rt	1320.64	11	90-11-10	1068.51	10.70	2
2+95 Rt	1320.35	12	90-13-10	1061.09	10.70	2
3+14 Rt	1321.09	13	90-10-00	1039.[illegible]	10.70	2
3+53 Lt	1321.90	14	90-07-35	999.34	10.70	2
3+94 Rt	1321.43	15	90-09-35	959.10	10.70	2
4+38 Rt	[illegible]	16 ✓	90-07-20	914.32	10.70	2
5+02 Rt	1321.30	17 ✓	90-11-20	850.87	10.70	2
5+76 Rt	1321.90	18 ✓	90-09-45	776.57	10.70	2
6+40 Rt	1322.27	19	90-05-55	712.71	10.70	2
7+14 Rt	1322.50	20	90-08-35	632.59	10.70	2
7+47 Rt	1323.12	21	90-05-30	605.29	10.70	
7+52 Rt	1313.83	22	90-58-45 ~~90-55-45~~	600.30	10.70	2



Sta	Elev	Point	In ∡	½ Dist	Rod
8+19 Z	1313.82	23 -	91-06-10	535.87	10.70 2
8+24 Z	1315.05	24	90-58-45	528.85	10.70
8+53 Z	1315.58	25	91-30-40	499.83	6.04 1
8+70 Z	1314.71	26	91-40-00	482.37	6.04 1
8+82 Z	1315.28	27	91-38-20	470.88	6.04
9+30 Z	1315.18	28	91-50-20	422.79	6.04
9+33 Z	1314.09	29	92-00-05	419.40	6.04 1
10+10 Z	1313.98	30	91-41-30	342.28	10.70 2
10+24 Z	1315.14	31	91-33-35	328.80	10.70 2
10+65 Z	1314.55	32	91-54-00	287.29	10.70 2
10+83 Z	1315.49	33	91-54-00	259.31	10.70 2
11+15 Z	1314.96	34	92-12-10	237.20	10.70 2
11+87 Z	1315.38	35	95-41-05	155.19	6.04
11+93 Z	1315.19	36	94-57-40	152.85	6.04 1
12+35 Z	1315.1[illegible]	37	96-36-46	117.58	6.04 1
12+45 Z	1312.55	38	98-24-22	109.58	6.04 1
12+62 Z	1312.14	39	100-25-30	90.24	6.04
13+22 Z	1312.25	40	118-63-30	30.95	6.04
13+44 Z	1329.86	41	82-34-00	8.55	6.04 1
13+53 Z	1329.92	105	⊥ Sta	0	4.87
[illegible]	1323.30 C	[illegible]	90-17-15	1090.80	6.04
	1323.29 R				

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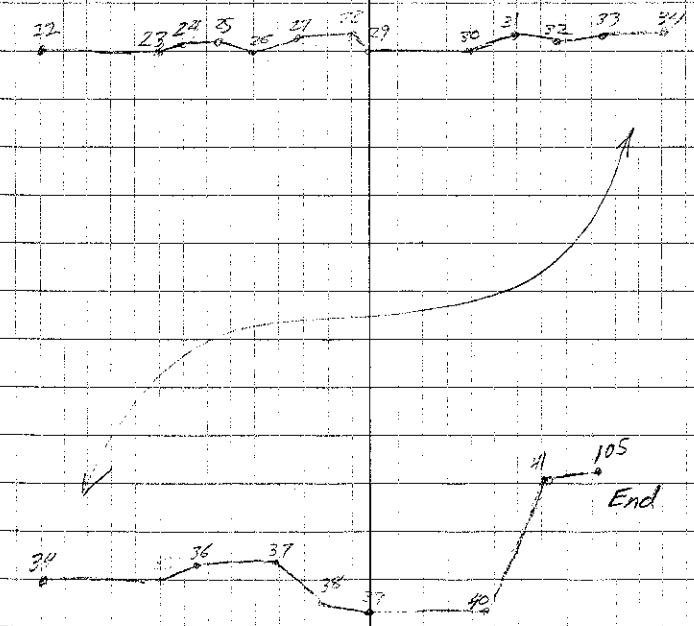

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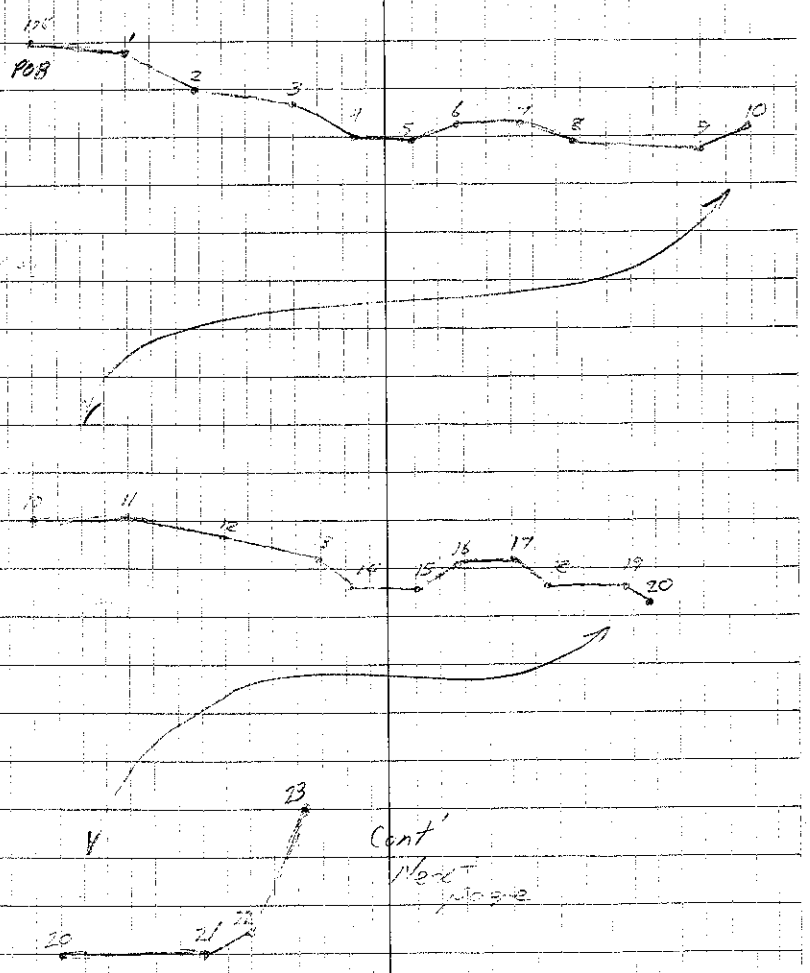
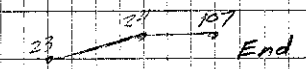
Sta	Elev	Point	In ∡	Hz Dist	Rod	
BS	1352.565	P08 p32	89-30-00 270-29-50	913.47	10.70	2
0+00	1350.17	108 p61	TS 5+0	0	5.13	
0+72 S	1348.97	1	90-13-45	72.48	6.04	1
1+05 S	1344.74	2	92-25-20	106.86	6.04	1
1+57 I	1344.05	3	91-53-30	157.72	6.04	1
1+88 S	1340.84	4	92-33-25	188.60	6.04	1
2+09 S	1340.46	5	92-24-30	209.20	6.04	1
2+15 S	1341.65	6	92-01-20	215.50	6.07	1
2+58 I	1341.15	7	90-45-50	258.74	10.70	2
2+69 I	1340.93	8	90-58-45	269.32	10.70	2
3+26 I	1339.24	9	90-56-30	326.43	10.70	2
3+38 S	1341.30	10	90-33-30	338.52	10.70	2
4+29 I	1341.72	11	90-23-05	429.27	10.70	2
5+38 S	1339.80	12	90-30-40	538.81	10.70	2
6+40 S	1338.19	13	90-34-25	640.75	10.70	2
6+51 S	1336.50	14	90-43-50	651.62	10.70	2
6+88 S	1336.26	15	90-18-05	658.54	15.53	3
6+94 S	1337.91	16	90-09-30	674.52	15.53	3
6+98 I	1338.10	17	90-02-05	698.18	15.53	3
7+07 S	1336.21	18	90-17-20	707.58	15.53	3
7+38 S	1336.23	19	90-16-30	738.93	15.53	3
7+45 S	1334.89	20	90-22-35	744.95	15.53	3
8+00 I	1334.74	21	90-21-40	800.29	15.53	3
8+11 S	1336.59	22	90-13-30	811.57	15.53	3
8+18 S	1345.46	23	90-16-05	817.91	6.04	1



Cont'
Next page

% - Sec 108-107

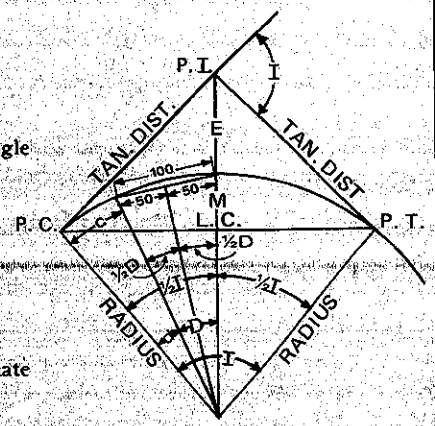
Sta	Elev	Point	Zn ∠	Hz Dist	Rod
8+45±	1348.49	24	90-03-10	845.41	5.04 L
8+57.8	1348.24	107	90-02-30	867.78	5.04 L
check	1337.40 C 1337.41 F	TP2 p28	90-05-5[illegible]	889.40	10.70 [illegible]



0	0.35
1	5.04
2	10.70
3	15.53
4	20.37
5	25.20

CURVE FORMULAE

D = Degree of Curve
1° = 1 Degree of Curve
2° = 2 Degree of Curve
P.C. = Point of Curve
P.T. = Point of Tangent
P.I. = Point of Intersection
I = Intersection of Angle, Angle Between Two Tangents
L = Length of Curve, from P.C. to P.T.
T = Tangent Distance
E = External Distance
R = Radius
L.C. = Length of Chord
M = Length of Middle Ordinate
c = Length of Sub-Chord
d = Angle of Sub-Chord



$$R = \frac{L.C.}{2 \sin \frac{1}{2} I}, \quad T = R \tan \tfrac{1}{2} I = \frac{L.C.}{2 \cos \frac{1}{2} I}$$

$$\frac{L.C.}{2} = R \sin \frac{I}{2}, \quad D\,1^\circ = R = 5730, \quad D\,2^\circ = \frac{5730}{2}, \quad D = \frac{5730}{R}$$

$$E = R(1 - \cos \tfrac{1}{2} I), = R - R \cos \frac{I}{2}$$

$$\frac{E + R}{R} = \sec \frac{I}{2}, \quad \frac{R - M}{R} = \cos \frac{I}{2}$$

$$c = 2 R \sin \tfrac{1}{2} d, \quad d = \frac{c}{2R}$$

$$L.C. = 2 R \sin \tfrac{1}{2} I, \quad E = R(\sec \tfrac{1}{2} I - 1), = R \sec \frac{I}{2} - R$$

Minutes in Decimals of a Degree

1	.0167	11′	.1833	21′	.3500	31′	.5167	41′	.6833	51′	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

Inches in Decimals of a Foot

1/16	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

REGISTERED LAND SURVEYOR
CERTIFICATE
16863
ARIZONA, U.S.A.

10007

Wagner Wash

LIETZ

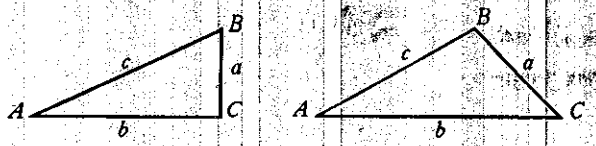
SINCE 1882

Book 1

ECONOMY FIELD BOOK

No. 8152-05

FORMULAE FOR SOLVING RIGHT TRIANGLES



$$\text{Sin } A = \frac{a}{c} = \text{Cos } B \qquad \text{Cot } A = \frac{b}{a} = \text{Tan } B$$

$$\text{Cos } A = \frac{b}{c} = \text{Sin } B \qquad \text{Sec } A = \frac{c}{b} = \text{Cosec } B$$

$$\text{Tan } A = \frac{a}{b} = \text{Cot } B \qquad \text{Cosec } A = \frac{c}{a} = \text{Sec } B$$

Given	Required	Solution
A, c	B, a, b	$B = 90° - A, a = C \sin A, b = C \cos A.$
A, b	B, a, c	$B = 90° - A, a = b \tan A, C = \frac{b}{\cos A}.$
A, a	B, b, c	$B = 90° - A, b = a \cot A, C = \frac{a}{\sin A}.$
a, c	A, B, b	$\sin A = \frac{a}{c}, \cos B = \frac{a}{c}, b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan A = \frac{a}{b}, \cot B = \frac{b}{a}, c = \sqrt{a^2 + b^2}$

FORMULAE FOR SOLVING OBLIQUE TRIANGLES

Given	Required	Solution
A, a, b	B, c	$\sin B = \frac{b \sin A}{a}, c = \frac{a \sin C}{\sin A}$
A, B, a	b	$b = \frac{a \sin B}{\sin A}$
a, b, C	A, c	$A + B = 180° - C, C = \frac{a \sin C}{\sin A}$
a, b, c	Area	side $\frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

MADE IN U.S.A.

Job 90007

Book 1

Wagner Wash
Aerial Control
Hz & Vert
for
HDR
by
Project Eng. Consult.
(Karl Mortensen
Survey Manager)
484-7571
July, Aug, Sept, 1990

REGISTERED LAND SURVEYOR
CERTIFICATE NO. 16963
LARRY
MACDONALD
Exp. 4-4-91
ARIZONA, U.S.A.

Table

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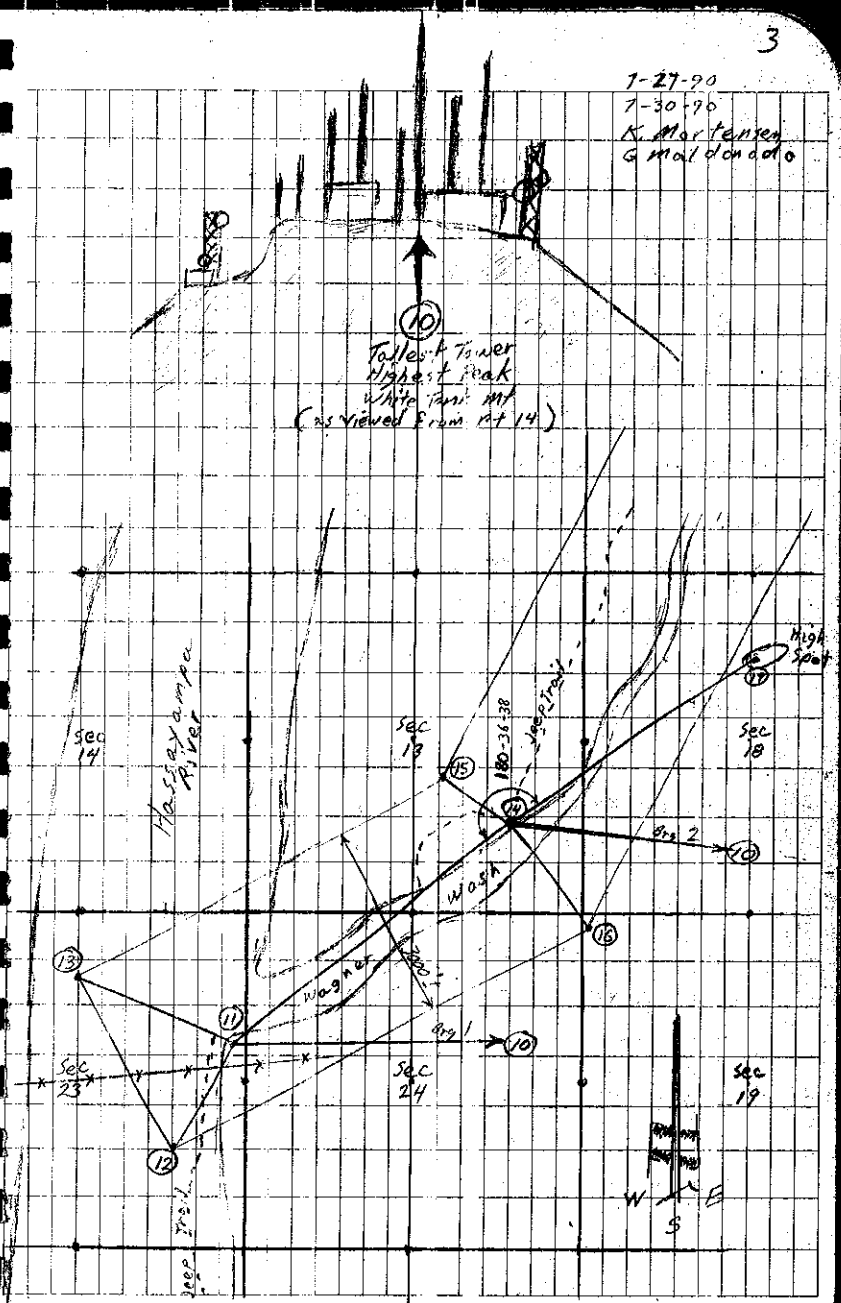
Channel X-Sec's	85-89	Book 3 p. 72-106

Hz Coord System
is an
Assumed Datum
Based off of
SPCS tick marks
on 7½ min Quadrangle
maps.

~~Avg Grid Factor =~~
~~0.9998951~~
~~(Ground to Grid)~~

Sta		H_2 ∠ ° ′ ″	H_2 Dist	Remarks
11	⊼ Sta			Random Pt ½" Rebar NW Cor Top Ridge Left SE Bank Wagner Wash + Hassayampa
10	BS	00-00-00	(9 mi ±)	Tallest Tower Highest Peak White Tank Mt.
12	SS 1D	118-54-00	1277.54	½" Rebar & Panel H.V. Control
	2DR	115-35-55	1277.54	1000' ± S. of Fence Line and
	4RT	118-53-59		300' ± W of Jeep Trail
13	SS 1D	202-15-10	2801.56	½" Rebar & Panel H.V. Control
	2DR	89-00-30	2801.57	1000' ± S. of W¼ Cor Sec 23
	4RT	202-15-08		
14	FS 1D	315-07-25	5762.52	½" Rebar Top Ridge (Random Pt)
	2DR	180-29-25	5762.53	High Pt over Looking Wagner Wash
	4RT	315-07-21	5762.51 m	15' ± S. of Jeep Trail Turn
14	⊼ Sta			Rebar (above)
10	BS	00-00-00	(8 mi ±)	Tallest Tower (above)
11	SS 1D	129-38-00	5762.50	Rebar Cor Wagner + Hassayampa (above)
	2DR	158-31-50	5762.49	
	4RT	129-37-58	5762.51 m	
15	SS 1D	209-21-05	1513.85	½" Rebar & Panel H.V. Control
	2DR	117-24-15	1513.85	700' ± SE of Center Sec 13
	4RT	209-21-04		
16	SS 1D	41-57-50	1835.27	½" Rebar & Panel H.V. Control
	2DR	167-51-15	1835.27	250' ± S + 50' ± E of SE Cor Sec 13
	4RT	41-57-49		
17	FS 1D	310-14-40	4527.76	½" Rebar 10' ± W of Small Cat
	2DR	160-58-25	4527.75	Claw Tree on High Spot W. End
	4RT	310-14-36	4527.76 m	¼ mi ± E. of Wagner Well



Sta		Hz ∠ ° ' "	Hz Dist	Remarks
17	R Sta			Rebar on High spot (p.3)
10	BS	00-00-00	(7½ mi ±)	Tallest Tower (p.3)
14	SS 1D	125-14-55	4527.75	Rebar on Wash Ridge (p.3)
	2DR	140-59-45	4527.76	
	∠Rt	125-14-56.3	4527.76 π	
18	FS 1D	246-19-10	5191.20 .21	Rebar on Rid. 2.20'± W. of
	2DR	265-16-50	5191.22	Jeep Trail 1500'± SW of
	∠Rt	246-19-12.5	5191.205 π	1/4 Cor Sec 7
10	R Sta			Rebar by Jeep Trail (above)
10	BS 1D	00-00-00	(8½ mi ±)	Tallest Tower (p.3)
17	SS 1D	59-50-20	5191.21	Rebar on High Spot (p.3)
	3DR	359-01-30	5191.19 .20	
	∠Rt	59-50-15.0	5191.205 π	
19	SS 1D	185-07-50	582.91 .91	½" Rebar & Panel H.V. Control
	2DR	20-31-10	582.91 .91	1700'± SW of N 1/4 Cor Sec 7
	∠Rt	185-07-48		
20	SS 1D	350-16-00	2718.19 .19	½" Rebar & Panel H.V. Control
	2DR	321-04-10	2718.19 .19	1000'± NW of E 1/4 Cor Sec 7
	∠Rt	350-16-03		
21	FS 1D	304-15-35	6617.81 .80	RR Spike & Panel HV Control
	2DR	137-02-25	6617.80 .83	in NB Emergency Lane of
	∠Rt	304-15-36	6517.81 π	Sun Valley Parkway 1800'± S of
				Wagner Wash Bridge

7-31-90
8-01-90

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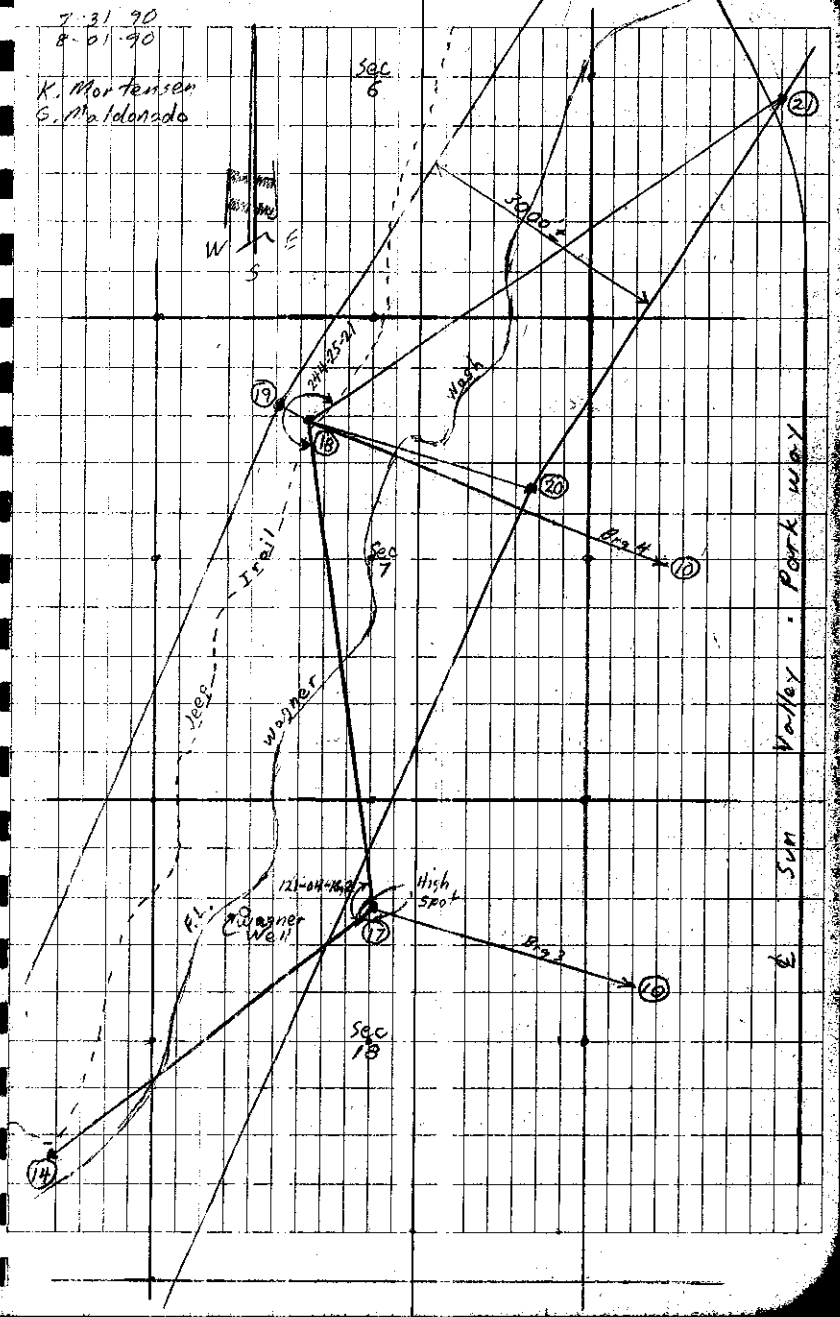
G. Maldonado



Sta	Hz ∡ ° ' "	1/2 Dist	Remarks
21 ⊼ Sta			RR spike VB Line (p. 4)
10 BS D	00-00-00	(7½ mi ±)	Fallest Tower (p. 3)
18 SS 1D	116-38-40	6617.81	Rebar by Jeep Trail (p. 4)
2DR	104-39-40	6617.82	
∡RT	116-08-40	6617.81 m	
22 SS 1D	208-54-00	3376.50	½ Rebar Panel H.V. Control
2DR	115-36-00	3376.53	20' N of roaded East-West Rd. and
∡RT	208-54-00		500' ± W of Sunvalley Parkway
23 FS 1D	244-35-30	6525.38	½" Rebar (Random #4) on high spot
2DR	258-21-55	6525.36	20' ± Sides of top
∡RT	244-35-29	6525.365 m ~~6637.365 m~~	
23 ⊼ Sta			Rebar on High Spot (above)
10 BS D	00-00-00	(8 mi ±)	Fallest Tower (p. 3)
21 SS 1D	56-31-00	6525.36	RR spike VB Ln. (p. 4)
2DR	226-04-00	6525.37	
∡RT	56-31-00	6525.365 m	
24 SS 1D	295-47-50	1593.49	½" Rebar & Panel H.V. Control
2DR	103-11-20	1593.48	100' ± N. of Jeep Trail & 300' ± SE
∡RT	295-47-50		of Sunvalley Parkway
25 SS 1D	343-38-25	3805.52	½" Rebar & Panel H.V. Control
2DR	294-33-50	3805.55	600' ± S & 400' ± E of
∡RT	343-38-28	3805.54 m	W ¼ Cor Sec 33
26 FS 1D	277-54-55	7237.14	½" Rebar (Random #4) Top of
2DR	31-39-35	Avg of 14 Readings	Hill near Center Sec 28
∡RT	277-54-54	7237.09 m	

8-01-90
8-02-90
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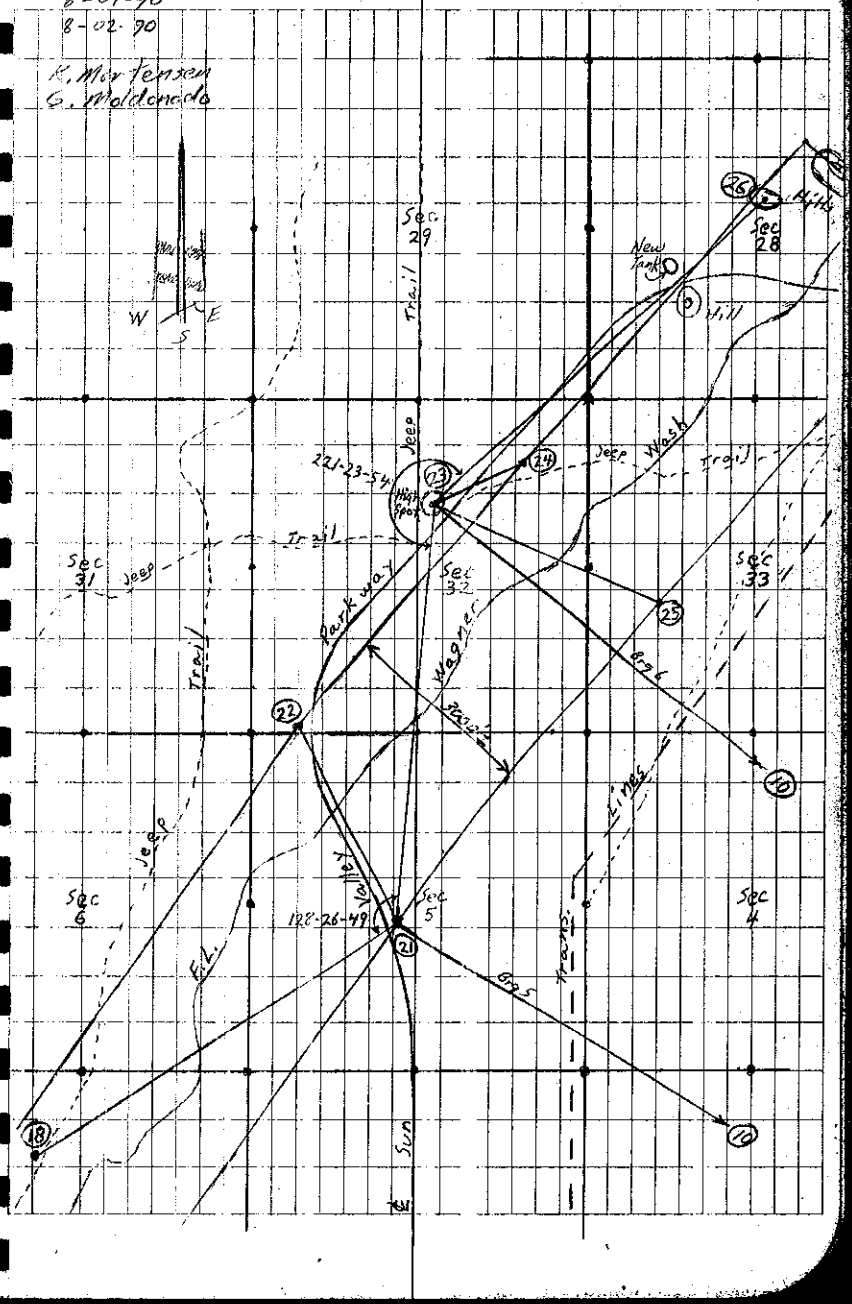
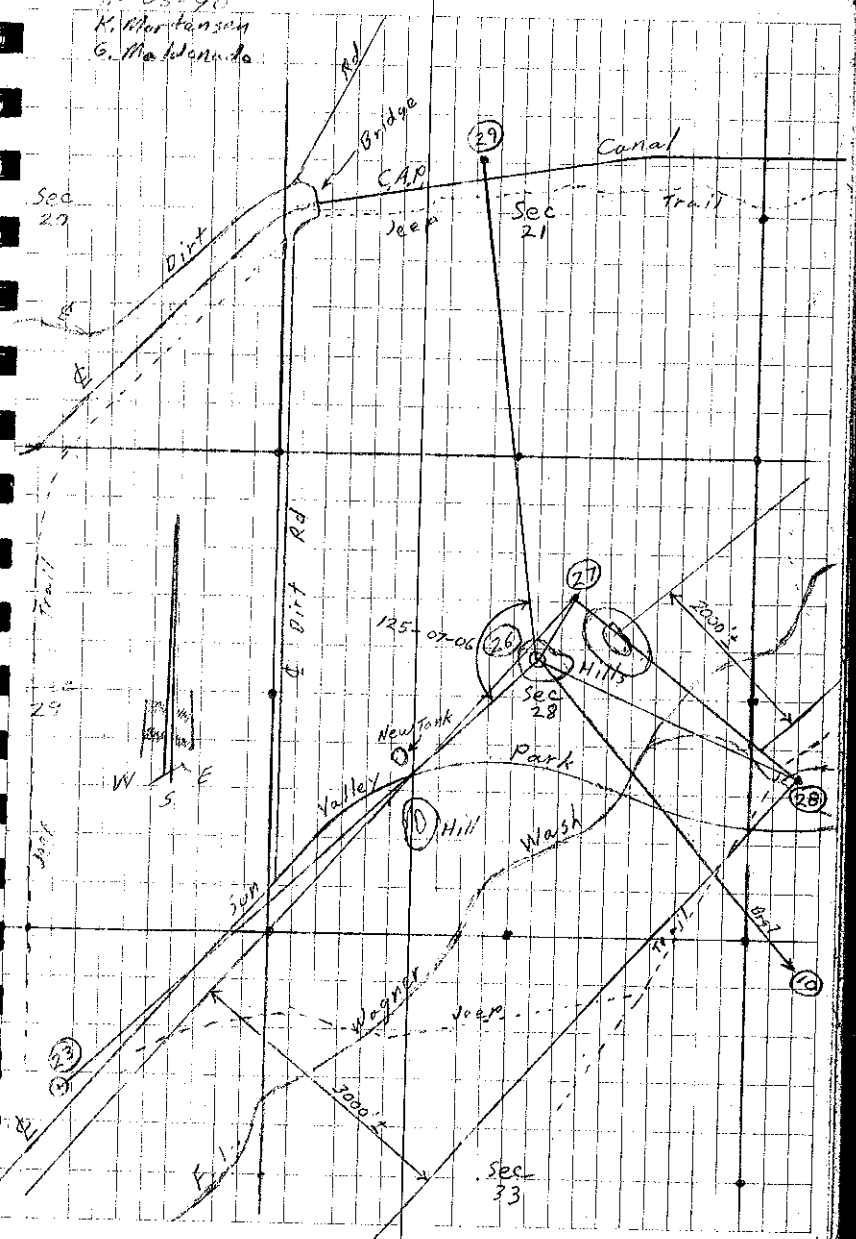
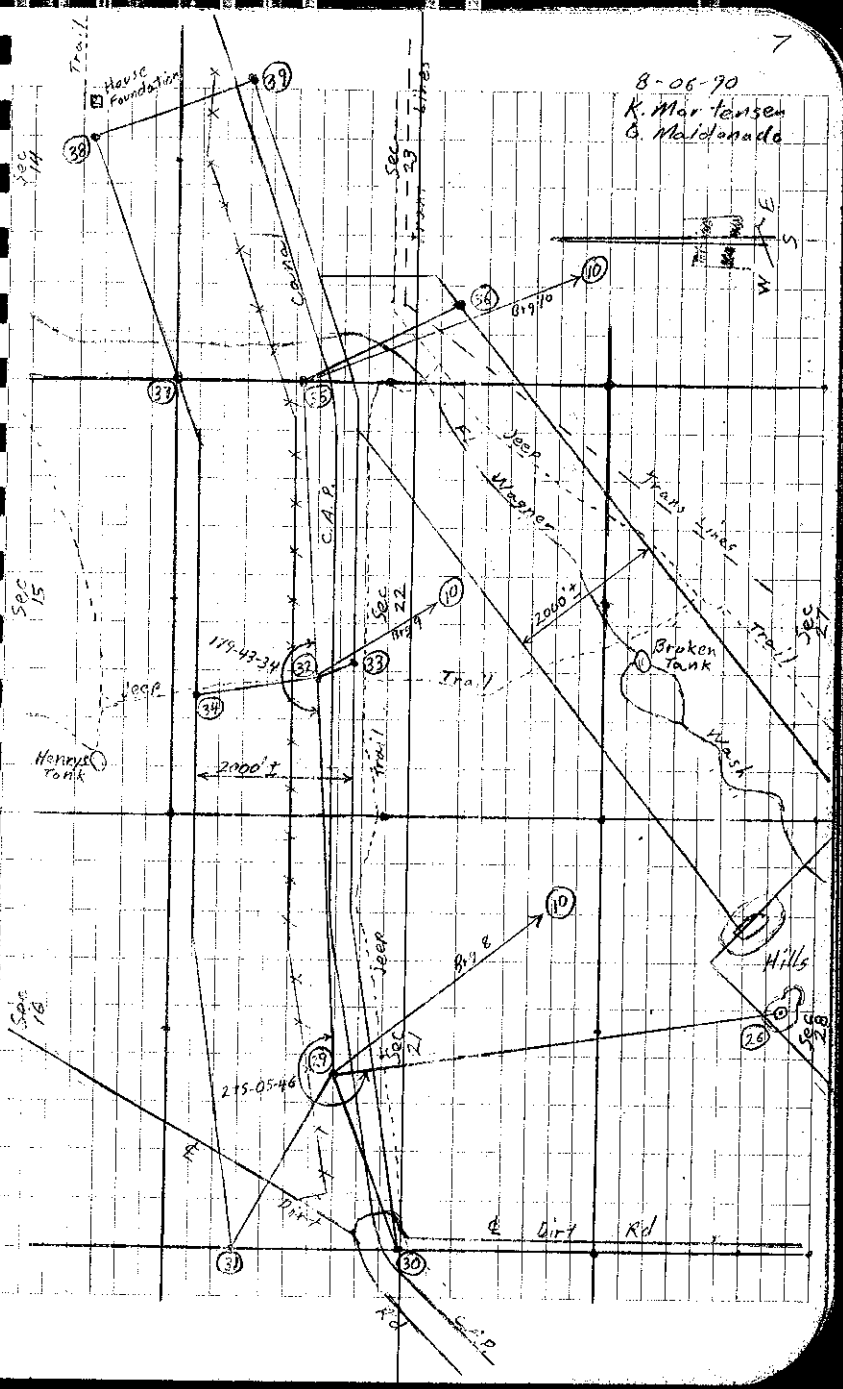
G. Moldonado



Sta		∠	Dist	Remarks
25	⊼ Sta			Rebar in Hill (CAS)
10	BS D	00-00-00	(9 mi ±)	Tallest Tower (p.3)
20	BS D	92-59-10	7237.04 Avg of 12 Readings	Rebar [illegible] (p.5)
	FDR	343-55-05		
	FRI	87-59-[illegible]	7237.09 m	
27	BS D	254-15-10	1013.36 35	½ Rebar @ Parcel H.V. Control
	FDR	297-41-10	1013.36 35	200'± N.W. of Largest Hill
	FRI	254-25-35		
28	BS D	332-35-20	3164.70 70	½" Rebar @ Parcel / H.V. Control
	FDR	250-21-05	3164.70 70	200'± SE of Jeep Trail ∡ Pt.
	FRI	332-35-15		∀ E. of M.S.R. "Y" Pt
29	BS D	213-06-20	5360.15	½" Rebar Top Dike N. Side CAP Canal
	FDR	132-20-55	Avg of 7 Readings	(Roadway Pt.) 1900'± E.
	FRI	213-06-[illegible]	5360.1[illegible] m	Bridge over CAP



Sec	Hz ∠	H. Dist	Remarks
29 N.Sh			Rebar on Dike (P6)
10 SE D	00-00-00	(9 mi ±)	Tilt Tower (P.)
26 SE D	29-20-15	5360.19 Avg of 12 Readings	Rebar Top Hill (P5)
20R	117-52-35		
AR-1	29-28-24	53 0.16 m	
20 SE D	109-16-25	22 4.97	BLM BC marked: WP TANK HILL TR39
20R	77-05-40	22 4.97	used for
AR-1	109-16-25		HV Control
21 SE D	165-17-05	27 6.30	BLM BC marked: S20 S21
20R	301-18-25	27 6.29	used for
AR-1	165-17-06		HV Control
32 SE D	304-34-10	46 39.71	½" Rebar (Randolph) Top Dike
20R	138-16-40	46 39.70	N Side CAP Canal on Jeep Trail
AR-1	304-34-10	46 9.70	Alignment



8-07-90
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G. Maldonado

Sta.	Hz ∠	H. Dist		
32 A 90			Pole - Top [illegible] (P.7)	
10 [illegible]	00-00-00	(8½ mi±)	[illegible] Tower (P.3)	
29 [illegible]	119-[illegible]-10	4639.70	Rear Top Pole (P.6)	
20R	118-[illegible]-20	4639.71		
4R	119-[illegible]-10	4639.705m		
[illegible] 10	01-10-45	270.74	BR. BCC (CAP) H.V. Control	
10R	01-[illegible]-35	270.74	stamped 208+00.54 R4.25'	
4R	01-10-48			See Diagram
34 [illegible] 10	203-[illegible]	1723.37	½" Rebar ± Panel H.V. Control	
20R	95-[illegible]	1723.37	15' [illegible] loop trail ± 1200'±	page 7
4R	203-[illegible]		N. of CAP Canal	
35 [illegible] 10	299-16-[illegible]	3775.66	½" Rebar & Rd 200'± N. of	
20R	117-07-[illegible]	3775.66	Bridge over CAP Canal	
4R	299-16-[illegible]	3775.66m		

8-08-90
K. Mortensen
G. Maldonado

Sta			Hz ∡	Hz Dist	Remarks
35	⊼ Sta				Rebar & RP (P.E)
10	BS	D	00-00-00	(8 mi ±)	Tallest Tower (P.3)
32	SS	ID	114-46-45	3775.54	Rebar on Silo @ Tower (P.Y)
		2DR	99-07-05	3775.67	
		∡Rt	114-46-46	3775.66 m	
36	SS	ID	358-27-30	1873.95	½" Rebar & Parcel H.V. Control
		2DR	353-49-55	1873.95	500'± S. of Transmission Line ∡ Pt.
		∡Rt	358-27-29		
37	SS	ID	207-41-12	1717.56	510 BC. H.V. Control Pt.
		2DR	110-44-50	1717.56	Offset line marked: S15 S19 S22 S23
		∡Rt	207-41-13		
38	SS	ID	255-27-15	4245.82	½" Rebar H.V. Control Pt.
		2DR	301-49-05	4245.83	400'± W. of House foundation
		∡Rt	255-27-16		+50'± W. of Lone Tree
39	SS	ID	285-03-45	3750.59	Pt. BC. (for CA1) H.V. Control
		2DR	60-15-05	3750.60	Marked: 220+00.5 Rt. 300'
		∡Rt	285-03-46		

See Diagram

Page 1

Vert Control
on
USGS Datum
using a
Pentax AL-M2
Precision Level with
a Parallel Plat Micro.
(Rated Accuracy:
± 0.4 mm for 1 Km DBL Run)

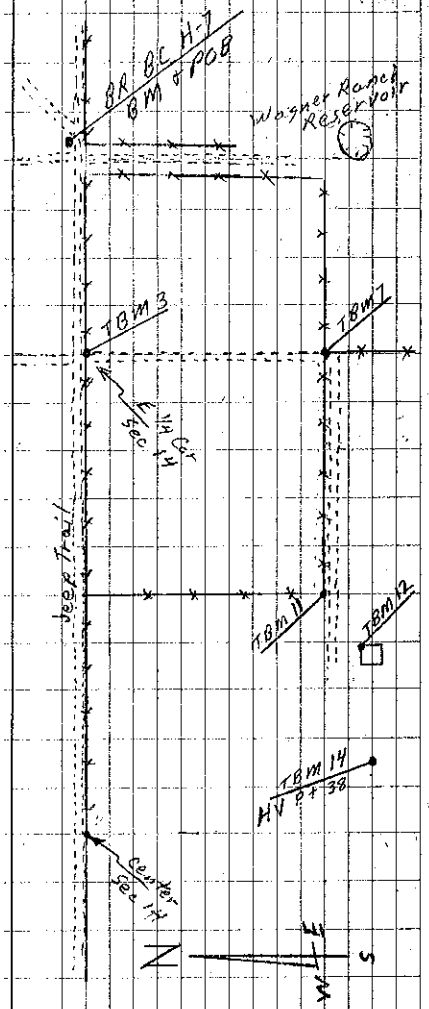
All Elev's in this
book have been Adjusted

All Bench Loop Closing
Errors are better than
3rd order and most
are better than 2nd order.

Bench Loop A

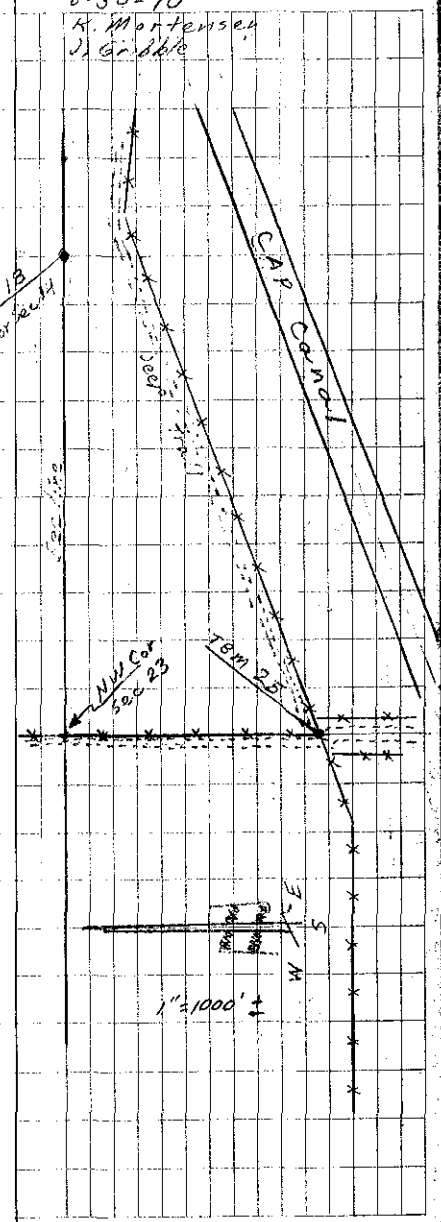
8-29-90
K.M. + G.M.

Sta.	BS +	FS −	Stadia	Elev	Remarks
POB				1576.483	BR BC (Conc Post) "H7 1576.9"
	4.269		5.3 / 3.1 150		1985 USGS Datum = 1576.483
TP 1		5.373	6.1 / 4.5 180	75.~~379~~ .376 / 78	Nail (2) Fence Line
	5.130		6.1 / 4.2 190		
TP 2		5.205	6.2 / 4.2 200	75.~~304~~ .304 / 64	Nail @ Tree on Fence Line
	5.381		6.4 / 4.3 210		
TBM 3		4.356	5.1 / – 160	1576.~~335~~ .335 / 46	Nail C Gate Post
	3.328		4.0 / 2.3 220		
TP 4		5.066	5.12 190	73.~~597~~ .597 / 93	Hub
	4.025		4.1 / 3.1 180		
TP 5		5.859	– / 4.8 212	71.~~754~~ .754 / 51	Hub
	4.238		5.0 / 3.5 180		
TP 6		5.857	6.6 / 5.1 150	70.~~724~~ .725 / 27	Hub
	4.536		5. / 3.7 120		
TBM 7		4.080	4.7 / 3.5 120	1570.~~580~~ .585 / 79	Nail E. Gate Post
	5.265		4.0 / 2.5 150		
TP 8		5.268	5.8 / 4.7 110	68.~~77~~ .577 / 74	Nail
	5.050		5.8 / 4.2 160		
TP 9		4.589	5.4 / 3.9 170	69.~~038~~ .037 / 35	Nail
	4.400		5.2 / 3.5 180		
TP 10		4.986	5.1 / 4.5 140	68.~~451~~ .447 / 45	Nail
	4.451		5.1 / 3.4 200		
TBM 11		4.107	5. / 3.1 200	1566.~~795~~ .793 / 47	Nail SW Corner Post
	3.848		3.9 / 1.7 220		
TBM 12		5.320	6.1 / 4.6 150	1566.~~323~~ .319 / 19	Nail Concrete Foundation (Abandon)



8-30-90
K. Mortensen
J. Gribble

Sta	BS	FS	Station	Elev	Point	Remarks
	4.336		3.1 / 3.5 160			
TP 12		5.093	4.9 / 4.5 90	65.6 ~~5~~ (.54)		Hub
	5.765		3.2 / 1.2 100			
TBM 14		5.934	1.5 / 5.3 120	1565.~~487~~ (.486)	1565.49	Top Rebar HI Control Pt 38 (See Page 9)
	4.182		3.1 / 3.2 190			
TP 15		5.036	6.6 / 5.4 120	63.~~672~~ (.600)		Hub
	4.320 ~~4.307~~		5.1 ~~4.4~~ 160 / 3.5 ~~4.7~~ ~~120~~			
TP 16		5.729 ~~6.01~~	6.4 ~~5.5~~ 130 / 5.1 ~~4.4~~ ~~170~~	62.~~2~~ (.220)		Hub
	3.764		7.5 / 3.0 150			
TP 17		6.092	6.6 / 5.4 120	59.~~8~~ (.831)		Hub
	4.142		4.8 / 5.5 130			
EKM 18		5.723	6.9 / 4.5 240	1558.~~44~~ (.311)	1556.84 (-1.47)	OLD BC marked by 5.14 / 5.23
	2.272		3.2 / 1.4 180			
TP 19		7.166	3.4 / 5.9 250	53.+~~21~~ (.414)		Hub @ Fence Line
	4.183		5.2 / 3.1 210			
TP 20		6.183	7.5 / 4.9 260	51.~~422~~ (.416)		Hub on hill in Road
	4.656		5.8 / 3.5 230			
TP 21		5.370	6.5 / 4.2 230	50.~~797~~ (.701)		Nail on Trail
	3.540		4.5 / 2.4 220			
TP 22		4.095	5.5 / 2.9 240	50.+~~3~~ (.148)		Nail on Trail
	6.731 ~~6.457~~		~~7.5~~ 250 / ~~5.5~~ ~~200~~			
TP 23		5.372 ~~5.113~~	6.1 ~~3.5~~ 260 / ~~3.0~~ ~~310~~	51.~~312~~ (.506)		Nail on Trail
	0.664		1.2 / 0.1 110			
TP 24		8.268	9.5 / 7.2 ~~2.1~~ 210	43.~~39~~ (.903)		Set Hub by Road Top Fence Post
	8.924		9.9 / 8.0 190			



Sta.	BS +	FS -	Stadia	Elev	Point	Remarks
TBM 25		1.745	2.8 2.7 210	1551.40		Nail NE Cor Fence Post of Fence
	1.646		2.7 3.6 210			N-E+W 500'± N of CAP Bridge
TP 26		8.882	190	43.4		used TP 24
	8.502		210			
TP 27		0.898	110	51.5		used TP 23
	5.226 ~~5.701~~		6.5 3.9 260			
TP 28		6.583 ~~6.567~~	7.8 5.3 250	50.4		used TP 22
	4.202		5.4 3.8 240			See Diagram P. 13
TP 29		3.650	4.8 2.5 230	50.7		used TP 21
	5.258		6.7 4.2 220			
TP 30		4.543	5.7 3.4 230	51.4		used TP 20
	5.711		6.0 4.5 240			
TP 31		3.713	4.0 2.1 240	53.4		used TP 19
	7.179		8.4 5.9 250			
TP 32		2.278	3.2 1.4 170	58.3		used RW 18
	5.501		6.4 4.5 170			
TP 33		3.922	4.8 3.1 170	59.2		used TP 17
	6.107 ~~6.064~~	6.8 ~~6.7~~ 5.4 ~~5.4~~ 140 ~~140~~				
TP 34		3.777 ~~3.756~~ 4.6 3.0	4.5 ~~2.9~~ 160	62.2		used TP 16
	5.557		6.3 4.8 150			
TP 35		4.147	4.7 3.4 150	63.6		used TP 15
	6.070		6.7 5.5 120			
TP 36		4.213	5.1 3.3 180	65.5		used TBM 14
	5.095		5.6 4.6 100			
TP 37		4.928	5.1 4.0 130	65.4		used TP 13
	5.203		5.9 4.6 120			

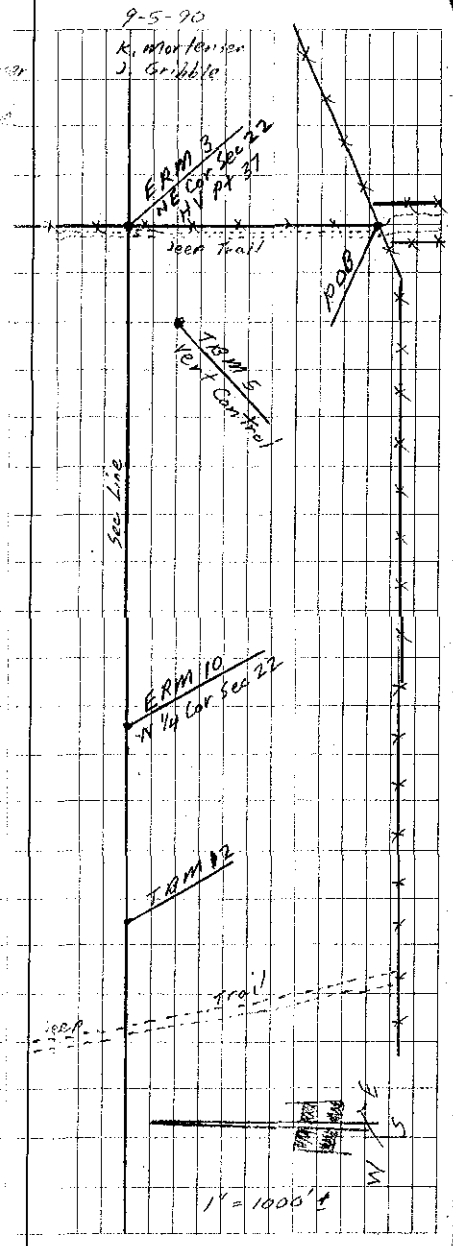
Sta	BS +	FS -	Stadia	Elev	Panel	Remarks
TP 38		4,539	5.9 3.9 120	66. ~~234~~		used TBM 12
	5,306		6.1 4.6 150			
TP 39		2,331	3.9 1.1 220	68. ~~704~~		used TBM 11
	4,211		5.1 3.1 180			
TP 40		4,561	5.7 3.4 230	68. ~~457~~		used TP 10
	5,170		5.9 4.2 150			
TP 41		4,575	5.4 3.2 170	69. ~~452~~		used TP 9
	4,839		5.7 4.0 170			
TP 42		5,298	6.1 4.5 160	68. ~~93~~		used TP 8
	5,347		5.9 4.8 110			
TP 43		3,338	2.6 150	70. ~~409~~		used TBM 7
	4,290		4.9 3.7 120			
TP 44		4,749	5.1 4.2 110	70. ~~43~~		used TP 6
	6,054		6.8 5.3 150			
TP 45		4,425	5.1 3.7 140	71. ~~477~~		used TP 5
	6,008		7.9 5.1 200			
TP 46		4,167	5.2 3.1 200	73. ~~445~~		used TP 4
	6,121		7.1 5.3 180			
TP 47		3,382	4.4 2.3 210	76. ~~352~~		used TBM 3
	4,774		5.5 4.0 15			
TP 48		5,907	6.9 4.7 220	75. ~~220~~		used TP 2
	5,643		6.5 4.8 170			
TP 49		5,574	6.7 4.4 230	75. ~~332~~		used TP 1
	5,460		6.4 4.6 180			
END 50		4,351	5.1 3.6 150	76. ~~491~~		POB 15 76.483

Closing Error = 0.01'

see Diagram p. 12

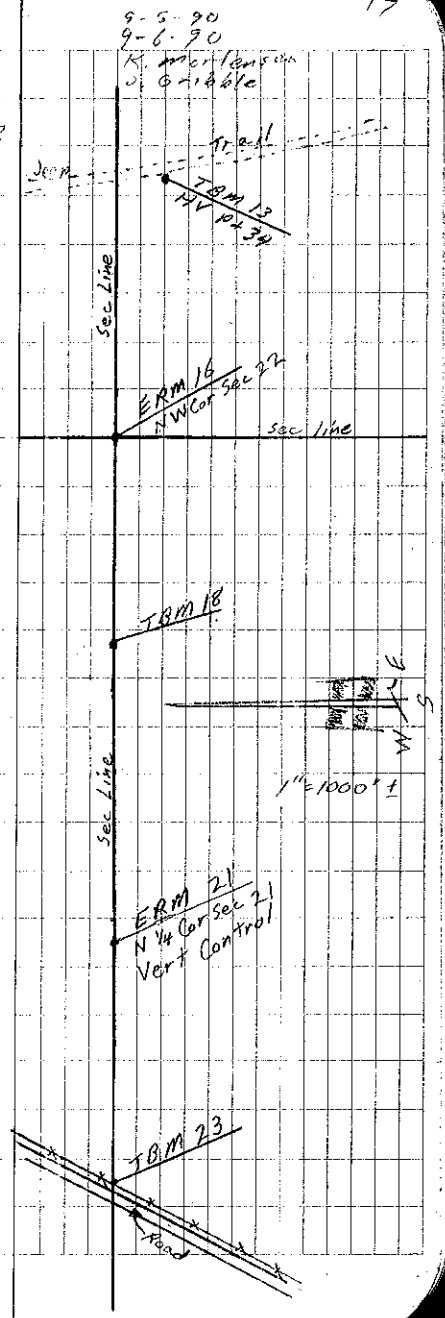
Dist = 17700±' (3.35 mi)
(1st: 0.092 2nd: 0.060)

Sta	BS +	FS −	Stadia	Elev	Point	Remarks
POB				1551.140		TBM 25 E M Nail in Corner
	5.147		3.250			Found at Sec'l M. CAP Bridge
TP 1		5.448	4.290	50.~~437~~ .338		Nail
	5.710		4.230			
TP 2		5.967	5.180	50.~~392~~ .580		Nail
	7.799	(2.50 ARS)	6.200			
ERM 3		1.670	0.170	1556.~~711~~ .709	−1.55 1555.03	SLO BC marked 515/522 515/523
	2.189		1.220			M. Control Pt 37 p. 7
TP 4		3.449	2.170	55.~~450~~ .447		Nail
	6.198		5.120			
TBM 5		4.721	4.100	155.~~211~~ .923	−.81 1556.91	1/2 Below Nail Control Pt
	6.850		5.230			600± WSW of Control Pt 37
TP 6		4.052	3.190	59.~~7~~ .720		Nail
	4.886		3.5			
TP 7		6.703	5.520	57.~~197~~ .903		Nail
	4.788		3.8 270			
TP 8		5.433	4.4 230	57.~~147~~ .456		Nail
	5.845		4.5 260			
TP 9		4.966	3.7 250	58.~~744~~ .334		Nail
	4.360		3.4 190			
ERM 10		4.065	3 180	1556.~~136~~ .628	−1.00 1557.63	SLO BC marked 1/4 515/522
	0.515		1.2 140			
TP 11		5.030	3.5 220	54.~~127~~ .114		Nail
	5.604		4.7 280			
TBM 12		4.525	3 200	152.~~229~~ .191		BLM BC marked 515/522 APS TR 37



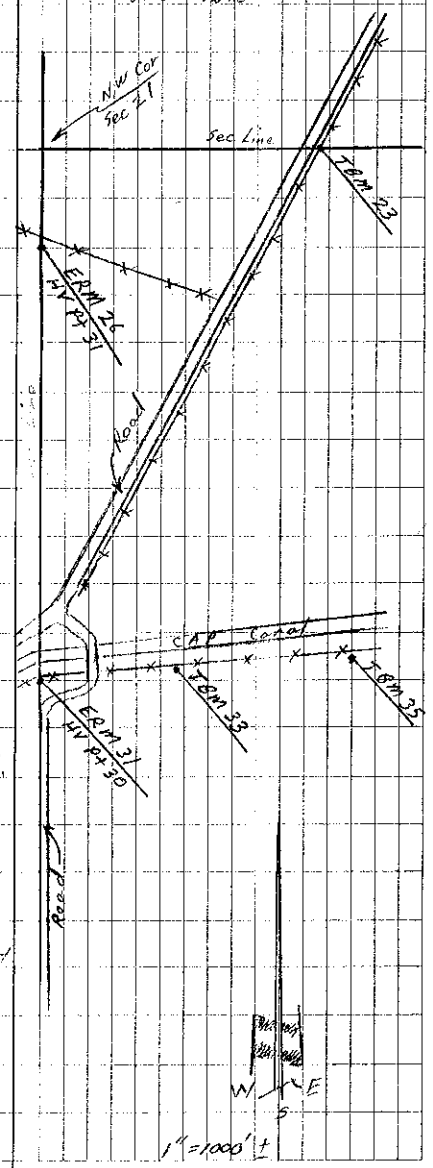
9-5-90
9-6-90

	BS	FS	Sta.	Elev	Rod cf	Remarks
	6.177		8.5 5.2 310			
TBM 13		8.924	6.1 3.7 300	.043 / 15 / 1557.03	-.01	½" Rebar HV on Sol 1434.8
	4.069		5.0 3.3 180			
TP 14		5.661	7.8 5.6 220	.450 / 11		Hub
	4.552 / 3.28K		6.6 4.0 200 / 3.2 ~~220~~			
TP 15		6.447 / ~~5.779~~	8.0 4.2 310 / 3.9 ~~260~~	.557 / 5.345 / 7		Hub
	8.121 / ~~7.928~~		7.2 3.7 210 / 4.0 ~~240~~			
ERM 16		3.216 / ~~3.082~~	3.0 180 / 1.1 ~~140~~	.798 / 1558.410 / 19	-1.33	1558.407 GLO BC marked 516/521 515/522
	5.124		6.6 3.2 290			
TP 17		2.417	8.6 5.2 240	.103 / 56.~~1~~		Hub
	4.379		6.1 5.6 210			
TBM 18		3.662	5.2 3.0 300	.320 / 15		BLM BC marked 516 / 521 TR 39
	2.587		3.9 3.3 250			
TP 19		2.287	6.1 4.9 180	.216 / 57.~~430~~		Hub
	2.106		3.45 2.7 270			
TP 20		3.770	5.1 - 270	.351 / 55.~~56~~ / 15		Hub
	6.524		10.0 7.0 310			
ERM 21		2.077	3.6 0.7 240	1561.997 / ~~13~~ / 7	-0.42	1561.58 BLM BC marked 516/521
	4.809		6.1 3.6 280			Vert Control Sol 21
TP 22		5.977	7.6 4.3 350	.832 / 60.~~149~~ / 17		Hub
	5.900		6.0 4.1 250			
TBM 23		4.240	6.3 2.1 310	.943 / 1561.~~160~~ / 17		Hub @ approx 35' and Fence
	2.185		3.1 0.5 210			Fence and Road
TP 24		9.413	10.1 8.1 240	.211 / 54.~~29~~ / 11		Hub
	10.163		8.3 270			



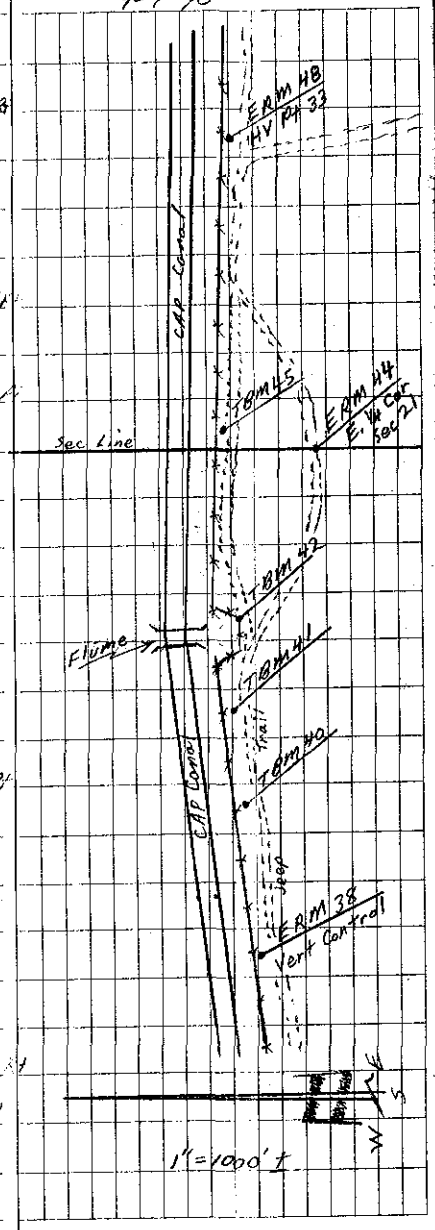
Sta	BS	FS	Stadia	Elev	Remarks
TP 25		6.075	7.4 290	58.248 ~~.117~~	Hub
	9.214		10.3 8.3 220		
CRW 26		7.195	8.3 6.1 220	155.316 ~~.286~~	-0.53 1559.79 Hub Vert Control Pt 31 Pt 7
	2.191		3.7 0.2 310		BLM BC Marked: 520 521 AR 17 TR 39
TP 27		6.270	8.4 7.2 290	55.737 ~~.757~~	Hub
	3.646		5.0 2.0 280		
TP 28		8.151	7.1 6.0 250	51.221 ~~.442~~	Hub
	2.210		3.2 0.2 280		
TP 29		4.420	5.1 3.1 250	49.010 ~~.192~~	Hub Vert Control
	5.110		6.1 4.6 220		
TP 30		2.300	3.05 1.5 150	51.818 ~~.844~~	Edge Rd Shoulder CAP
	1.073		1.0 0.5 120		
TBM 31		4.252	5.2 3.1 580	1548.089 ~~.43~~	-0.16 1547.93 BLM BC marked WP TR 39 520 521
	4.643		6.1 3.2 290		Hub Vert Control Pt 30 Pt 7
TP 32		2.319	8.1 6.1 250	45.417 ~~.472~~	Hub new Road
	3.220		4.3 2.4 160		
TBM 33		6.112	6.5 5.6 100	1543.524 ~~.549~~	CAP Rlw BC 146+00.17 125' Rt. Rec 1542.967
	4.406		5.5 3.3 220		
TP 34		5.264	6.1 4.1 220	41.165 ~~.44~~ .26	Hub new Road
	6.908		8.1 5.2 220		
TBM 35		3.849	4.5 3.5 130	1541.224 ~~.250~~ .25	CAP Rlw BC 153+82.54 125 Rt Rec 1543.977
	2.193		3.5 1.0 230		
TP 36		7.956	9.1 6.6 230	38.450 ~~.479~~ .29	Hub Set Rd Shoulder
	6.233		6.1 5.1 140		
TP 37		3.718	4.1 3.0 140	40.954 ~~.982~~ .28	Hub [illegible]

9-6-90
K. Mortensen
J. Grisbee



9-7-90

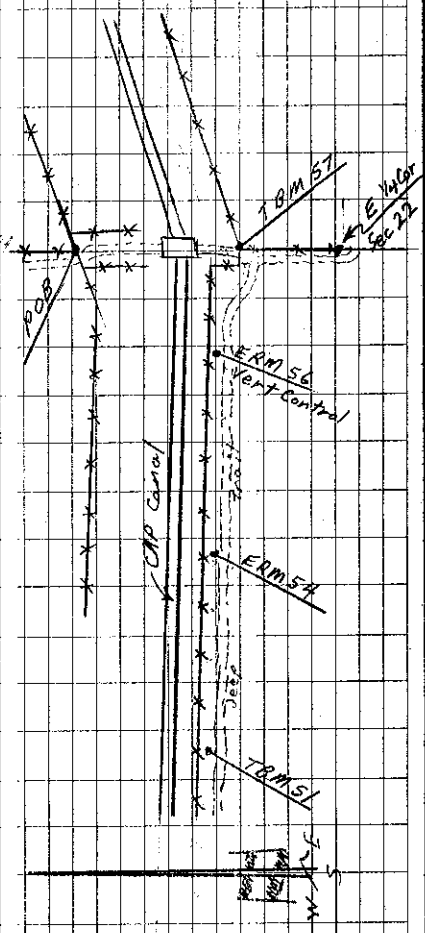
Sta.	BS 1	FS	Stadia	Elev	Parcel	Remarks
	6.693		3.6 / 5.8 / 1.0			
ERM 38		3.440	4.2 / 3.7 / 1.0	1544.227 (.192)	-0.01 / 1544.19	CAP R/W BC. 169+00.28 125' R
						* Vert Control Point
	7.172		3.2 / 5.0 / 2.0			
TP 39		4.737	7 / 5.2 / 2.0	46.44 (.582)		Hub by Fence
	4.416		5.3 / 2.5 / 1.0			
TBM 40		6.101	7.0 / 5.2 / 1.0	1544.926 (.893)		CAP R/W BC 171+86.39 125' R
						Rec 1544.642
	5.763		7.3 / 4.6 / 2.0			
TBM 41		5.644	7.8 / 5.5 / 2.0	1544.245 (.214)		CAP R/W BC 177+06.37 125' R
						Rec 1543.951
	2.966		4.27 / — / 2.0			
TBM 42		5.702	8.4 / 5.0 / 3.0	1540.540 (.478)		Alum Cap in Conc. SE Cor Fence
						of Spillway Easement
	7.124		8.1 / 5.0 / 2.0			
TP 43		5.143	6.2 / 4.1 / 2.0	42.491 (.458)		Hub in Fence
	5.640		5.9 / 4.4 / 2.0			
ERM 44		6.499	8.0 / 5.0 / 3.0	1541.678 (.599)	-1.24 / 1540.36	GLO BC Marker 1/4 521 522
	5.970		7.3 / 4.6 / 2.0			
TBM 45		3.186	4.4 / 2.0 / 2.0	1544.446 (.382)		CAP R/W BC 181+99.49 125' R
						Rec 1544.109
	4.420		5.8 / 3.0 / 2.0			
TP 46		7.581	8.8 / 5.3 / 2.0	1541.255 (.220)		Hub
	2.750		4.0 / 1.5 / 2.50			
TP 47		5.230	6.6 / 3.7 / 2.70	38.775 (.740)		Hub
	8.650		10.2 / 7.1 / 3.0			
ERM 48		3.798	5.20 / — / 2.70	1543.891 (.591)	-0 / 1543.59	Rec. 1543.315
						CAP R/W BC 208+00.34 125' R
	2.539		3.97 / — / 2.70			Hz + Vert Control Pt 33 p. 8
TP 49		5.719	7.0 / 4.4 / 2.60	40.44 (.409)		Hub
	3.163		3.9 / 2.4 / 1.50			



Sta	BS	FS	Stadia	Elev	Final	Remarks
TP 50		6.005	6.9 5.1 180	31.567 ~~605~~		Hub
	8.216		4.3 3.2 210			
TBM 51		2.809	8.5 [illegible] 140	1542.973 ~~1543.941~~		CAP R/W BC 220+00.10 125 Rt Rec 1542.66
	5.993		6.9 3.1 180			
TP 52		5.446	5.4 3.4 200	4.519 ~~558~~		Hub
	5.586		1.6 4.6 200			
TP 53		3.922	4.6 3.2 140	4.282 ~~222~~		Hub
	6.408		7.3 5.5 140			
ERM 54		4.209	4.9 3.5 140	15-7.380 ~~427~~	1547.38	CAP R/W BC 229+84.63 125 Rt Rec 1547.040
	3.656		4.9 2.4 250			
TP 55		5.571	6.8 [illegible] 200	4.443 ~~485~~		Hub
	4.579		5.19 [illegible] 220			
ERM 56		3.172	[illegible] 280	154[illegible].830 ~~872~~	1546.83	CAP R/W BC 239+76.29 125 Rt Rec 1546.550
	3.946 ~~4.097~~		4.952 250 2.027 ~~290~~			
TBM 57		9.030 ~~8.515~~	9.903 260 [illegible] ~~271~~	1541.745 ~~786~~		Yellow Cap on Rebar & Rd at Gate
	10.470		1.4 9.4 200			
TP 58		0.595	1.32 [illegible] 150	51.569 ~~613~~		℄ S. Edge Bridge over CAP
	7.303		5.1 6.5 160			
TP 59		3.532	4.3 2.8 [illegible]	5.340 ~~384~~		Top Rebar Tri Pt 57 p8
	2.432		3.1 [illegible] 140			
End 60		6.632	3.9 5.4 250	155[illegible].140 ~~185~~		POB = 1551.140

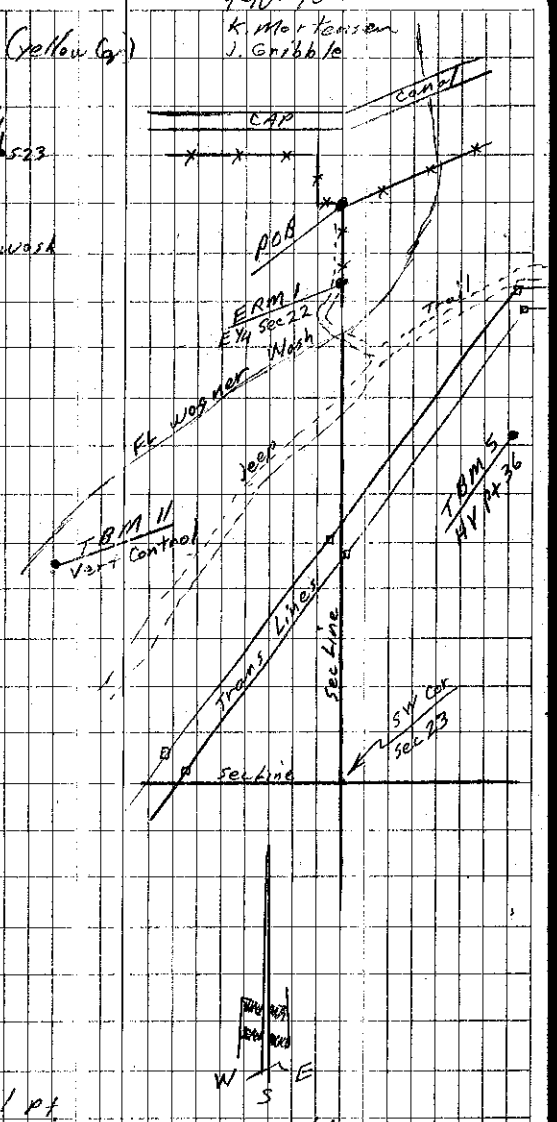
Closing Error = 0.045
Σ Dist = 27,340' or 5.18 mi
3rd order : 0.114
2nd order : 0.075

9-7-90
K Mortensen
J. Gribble



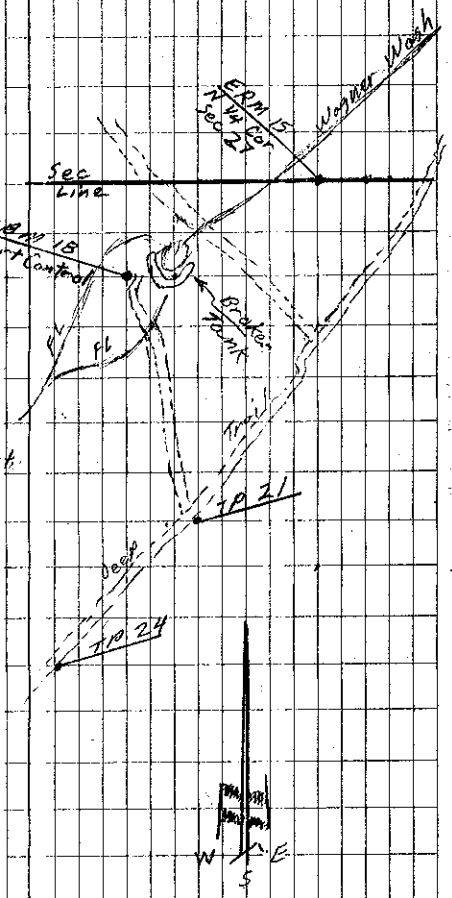
9-10-90
K Mortensen
J. Gribble

Sta	BS +	FS −	Stadia	Elev	Panel	Remarks
POB				1541.745		TBM 57 page 20 (yellow Cap)
	4448		5.2 3.8 140			
ERM 1		7682	6.4 7.0 140	.510 1538.~~54~~	-.20 1537.31	GLO BC marked: 1/4 522 / 523
	5683		6.7 4.6 210			
TP 2		7623	7.0 6.3 270	.571 36.~~572~~		Hub on Trail through wash
	6212		7.4 5.0 240			
TP 3		2284	3.5 1.1 240	.498 40.~~500~~		Hub
	8329		9.2 7.4 180			
TP 4		2996	3.7 2.3 140	.829 45.~~832~~		Hub
	6780		7.6 5.9 170			
TBM 5		3650	4.3 3.0 130	.949 1548.~~950~~	-.01 1548.94	1/2" Rebar HV Control, Pt 36 p9
	3759		4.4 3.1 130			
TP 6		8211	0.0 7.8 230	.797 43.~~801~~		Hub
	4400		5.6 3.2 240			
TP 7		9088	10.2 7.9 230	.108 39.~~113~~		Hub
	2121		3.25 — 230			
TP 8		6427	7.6 5.3 230	.802 34.~~807~~		Hub w Side Trail
	5782		7.1 4.5 250			
TP 9		5680	7.0 4.3 270	.903 34.~~909~~		Nail in Stump
	2752		3.8 1.7 210			
TP 10		5661	5.8 4.5 250	.993 31.~~000~~		Hub
	6701		7.4 5.0 140			
TBM 11		8892	7.8 7.9 190	.802 1529.~~809~~	-.0 1529.80	1/2" Rebar Vert Control Pt
	6990		8.3 5.7 260			
TP 12		9198	10.3 8.1 220	.593 37.~~601~~		Hub
	4224		5.3 3.1 220			



9-10-90
9-11-90

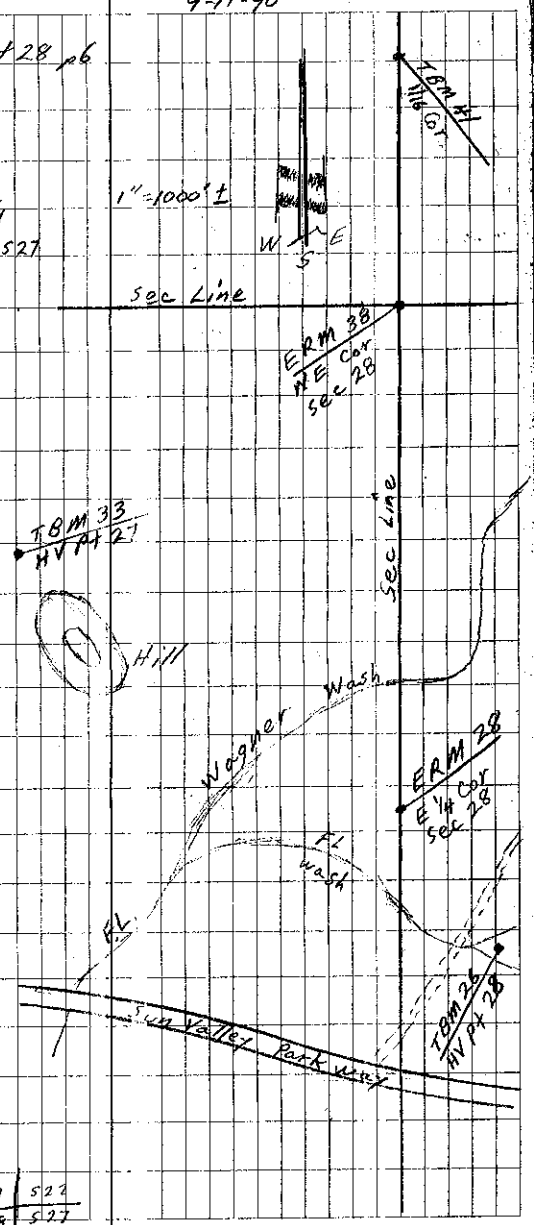
Sta	BS +	FS −	Stadia	Elev		Remarks
TP 13		5.170	6.3 / 4.0 230	26.646 ~~.655~~		Hub
	5.029		6.63 / 3.2 320			
TP 14		6.907	8.7 / 5.8 260	24.767 ~~.776~~		Hub
	3.822		4.9 / 2.8 210			
ERM 15		6.520	7.1 / 5.8 120	1520.068 ~~.078~~	-0.21 1521.86	GLO BC marked: 1/4 S 22 / S 27
	5.675		6.7 / 4.6 210			
TP 16		6.057	7.4 / 4.7 270	21.688 ~~.699~~		Hub
	5.208		6.11 / 4.0 240			
TP 17		8.888	10.2 / 7.8 260	18.008 ~~.019~~		Hub S. of trail across wash N. of "Broken Tank"
	8.247		9.4 / 7.1 230			
TBM 18		7.986	9.3 / 6.8 270	1518.269 ~~.281~~	+0.02 1518.29	½" Rebar Vert Control 50' West of "Broken Tank"
	5.322		6.1 / 4.5 170			
TP 19		6.241	7.3 / 5.1 220	17.349 ~~.362~~		Hub by trail
	6.329		7.3 / 5.3 200			
TP 20		3.257	4.6 / 1.9 270	20.422 ~~.435~~		Hub by trail
	8.521		9.5 / 7.5 200			
TP 21		2.959	3.9 / 2.0 190	21.983 ~~.997~~		Hub by trail "T" Point
	5.599		6.8 / 4.4 240			
TP 22		6.037	7.3 / 4.8 250	20.544 ~~.559~~		Hub by Trail
	3.907		5.1 / 2.7 240			
TP 23		6.499	7.7 / 5.3 240	21.955 ~~.967~~		Hub by Trail
	3.833		5.2 / 2.4 280			
TP 24		7.203	8.6 / 5.8 280	19.581 ~~.597~~		Hub by Trail
	4.820		6.2 / 3.4 280			
TP 25		6.050	7.7 / 4.4 330	18.352 ~~.368~~		Hub by Trail
	3.861		5.2 / 2.5 270			



1" = 1000' ±

9-11-90

Sta	BS +	FS −	Stadia	Elev	Point	Remarks
TBM 26		4.866	6.1 / 3.2 240	1517.~~367~~ .345	-.03 1517.32	½" Rebar HV Control Pt 28 pb
	4.879		5.1 / 2.7 240			
TP 27		6.966	3.2 / 1.7 250	15.2~~25~~ .257		Hub
	3.261		4.1 / 2.4 170			
ERM 28		3.202	9.5 / 1.9 260	1510.~~245~~ .317	-1.36 1508.96	GLO BC marked: 5/23 | 5/27
	2.375		3.3 / 1.4 190			
TP 29		1.438	8.5 / 5.3 230	05.~~72~~ .253		Hub E of Wagner wash
	5.362		6.4 / 4.4 200			
TP 30		3.985	5.3 / 2.6 270	06.~~50~~ .630		Hub W of Wagner wash
	2.911		9.1 / 6.7 240			
TP 31		4.154	5.1 / 2.9 250	10.~~07~~ .387		Hub
	6.828		8.1 / 5.5 260			
TP 32		2.954	4.1 / 1.8 230	14.~~8~~ .260		Hub
	7.728		8.8 / 6.7 210			
TBM 33		5.007	6.2 / 3.8 240	1516.980 ~~1517.002~~	-.32 1516.96	½" Rebar HV Control Pt 27 pb
	6.659		8.0 / 5.3 270			
TP 34		4.374	5.5 / 3.3 220	19.~~287~~ .265		Hub
	4.889		6.0 / 3.8 220			
TP 35		6.836	8.1 / 5.6 250	17.~~340~~ .317		Hub
	5.903		7.0 / 4.9 300			
TP 36		2.061	3.4 / 0.9 270	21.~~87~~ .158		Hub
	7.621		8.0 / 6.4 250			
TP 37		5.492	6.7 / 4.0 240	23.~~310~~ .286		Hub
	5.654		6.3 / 4.7 190			
ERM 38		4.697	5.7 / 3.7 200	152~~4.268~~ .243	-1.32 1522.32	GLO BC marked 5/21 | 5/22 / 5/28 | 5/27
	6.143		7.5 / 4.3 270			



9-11-90

Sta	BS +	FS −	Stadia	Elev	Level	Remarks
TP 39		3620	4.0 / 2.3 260	26.764 ~~790~~		Hub
	6,579		7.7 / 5.4 230			
TP 40		4,068	5.2 / 2.9 230	25.275 ~~301~~		Hub
	6.704		7.6 / 5.8 180			
TBM 41		3,635	4.4 / 2.9 150	1532.343 ~~370~~		BLM BC marked: 521 4/16 522
	6.455		7.7 / 5.2 250			
TP 42		3,595	4.7 / 2.5 220	25.202 ~~230~~		Hub
	6.225		7.4 / 5.0 240			
TP 43		3,742	4.8 / 2.9 210	37.685 ~~713~~		
	6.624		7.6 / 5.9 190			
End 44		2,709	3.9 / 1.9 200	15[illegible].599 ~~1,628~~		BLM BC marked: 521 4/4 522

ERM 44 p19 1541.599

Error = 0.029

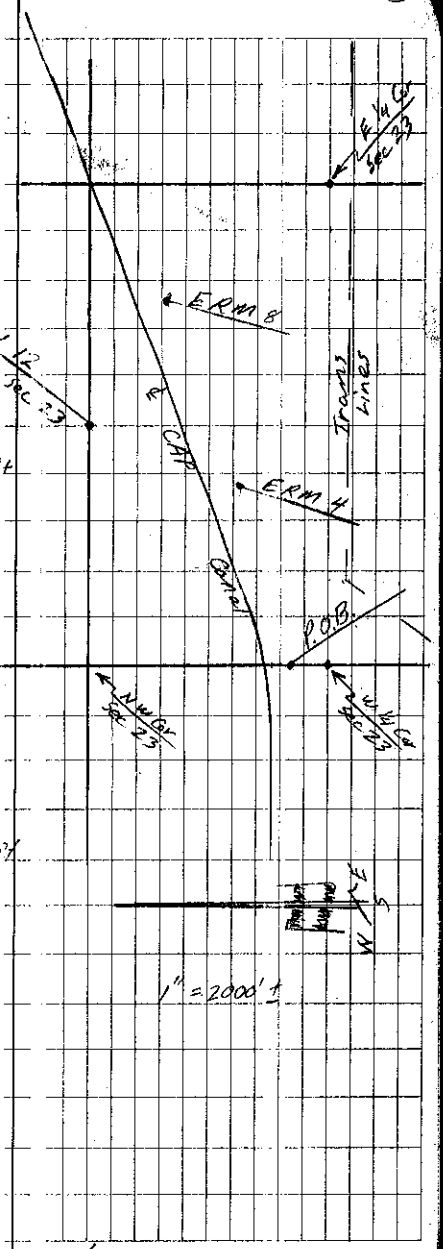
Σ Dist = 19,900 or 3.77 mi

3rd order: 0.097

2nd order: 0.064

See Diagram page 23 and page 19

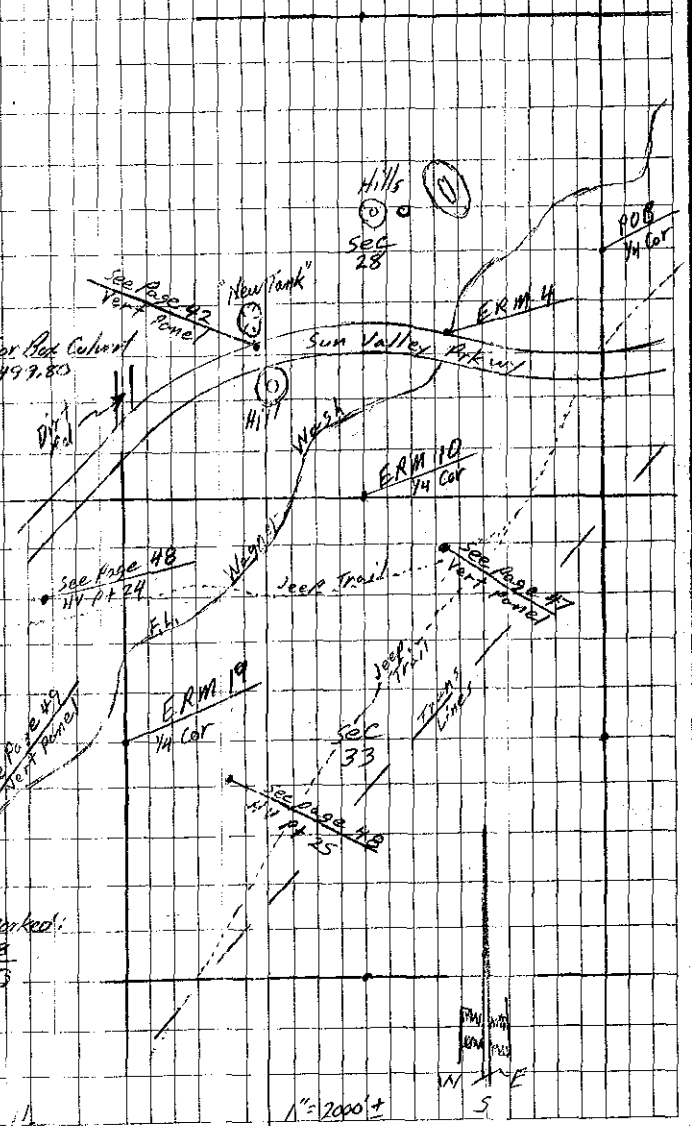
Sta	BS +	FS -	Stadia	Elev	Panel	Remarks
POB				1541.745		TBM 57 p 20 (Yellow cap)
	6.731		7.5 – 250			
TP 1		4.846	6.1 3.5 250	.131 43.~~130~~		Hub Edge Trail
	3.055		4.2 1.7 230			
TP 2		1.375	2.88 – 300	.813 44.~~84~~		Hub Edge Trail
	6.727		8.3 5.6 240			
TP 3		2.135	3.1 1.0 230	.456 49.~~453~~		Hub Edge Dike
	8.242		9.5 7.2 210			
ERM 4		2.199	8.1 5.0 280	.500 1550.~~496~~	-2.03 1550.47	CAP R/W BC 260 00.12 300' Rt Rec 1550.103
	8.021		9.5 6.6 280			
TP 5		1.515	2.0 0.9 220	.007 57.~~307~~		Hub Edge Dike
	8.280		10.3 7.8 240			
TP 6		2.223	3.5 0.9 250	.565 63.~~557~~		Hub Edge Dike
	5.577		7.8 5.3 280			
TP 7		4.315	5.3 3.3 290	.827 65.~~320~~		Hub Edge Dike
	7.511		8.9 6.1 270			
ERM 8		11.077	12.4 9.7 270	.262 1562.~~254~~	-0.02 1562.24	CAP R/W BC 280 00.25 300' Rt Rec 1561.897
	12.951		11.8 – 210			HV Control Pt 37 p 9
TP 9		2.729	4.2 1.2 300	.986 72.~~977~~		Hub N. of CAP
	1.637		2.7 1.1 110			
TP 10		12.434	12 12.1 30	.690 61.~~680~~		Hub side Dike
	0.164		1.5 – 280			
TP 11		6.365	7.3 5.1 250	.490 55.~~479~~		Hub on Trail
	6.263		7.4 5.1 230			
END 12		3.444	8.1 4.7 320	.311 1558.~~299~~		ERM 18 p 13 = 1558.311



Error ± -0.012 Σ Dist = 5,720' OR 1.08 mi

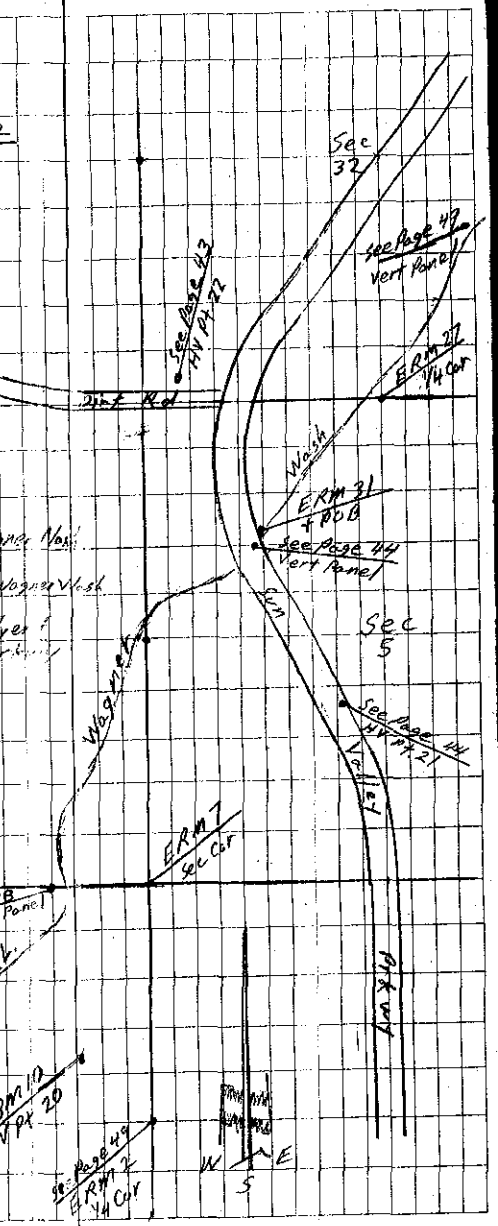
3rd order: 0.052 2nd order: 0.034

Sta	BS	FS	Stadia	Elev	Rev'd	Remarks
POB				1510.317	1508.36 (-1.96)	ERM 28 p 2 (E 1/4 Cor Sec 33)
	3.136		4.5 / 2.8 280			
TP 1		8.986	6.0 / 8.0 200	04 .464 ~~.446~~		Hub
	6.603		5.0 / 5.0 220			
TP 2		7.600	8.1 / 6.1 260	03 .467 ~~.410~~		Hub
	3.633		4.7 / 2.5 220			
TP 3		7.099	8.1 / 6.1 200	99 .399 ~~.003~~		Hub
	4.006		4.9 / 3.1 180			
ERM 4		5.730	7.0 / 4.5 250	1498 .275 ~~.284~~		BC in Nu Cor Box Culvert Stamped 1499.80
	4.141		4.9 / 3.4 150			
TP 5		6.405	6.6 / 5.3 230	95 .971 ~~.977~~		Hub
	5.502		6.4 / 4.4 220			
TP 6		6.001	7.0 / 5.0 200	95 .469 ~~.478~~		Hub
	5.574		6.5 / 4.7 180			
TP 7		6.591	7.6 / 5.6 200	9 .451 ~~.457~~		Hub
	6.158		7.1 / 5.2 190			
TP 8		6.528	7.5 / 5.5 200	94 .082 ~~.091~~		Hub
	4.528		7.6 / 5.5 210			
TP 9		5.973	6.8 / 5.1 170	92 .636 ~~.641~~		Hub
	5.165		6.0 / 4.6 150			
ERM 10		5.669	6.5 / 4.8 110	1492 .232 ~~.243~~	-1.15 / 1491.08	GLO BC marked: 1/4 S 28 / S 33
	4.841		5.0 / 3.7 230			
TP 11		7.105	8.3 / 5.9 240	89 .969 ~~.977~~		Hub
	5.666		6.6 / 4.7 190			
TP 12		6.345	7.4 / 5.3 210	87 .291 ~~.300~~		Hub 500' N of Trail
	4.296		5.9 / 3.9 200			



Sta	BS +	FS −	Station	Elev	Panel	Remarks
TP 13		6.988	3.0 6.0 200	87.198 ~~.208~~		Hub 200' ± S. of Jeep Trail
	6.196		7.1 .2 190			
TP 14		5.53	6.5 4.5 200	87.868 ~~.873~~		Hub
	3.316		2.4 .3 210			
TP 15		5.800	6.9 4.7 220	84.379 ~~.384~~		Hub
	3.674		4.84 – 230			
TP 16		7.671	8.7 6.6 210	80.392		Hub
	4.591		5.8 3.4 240			See Diagram
TP 17		6.859	7.9 5.8 210	83.110 ~~.124~~		Hub
	4.055		5.2 2.9 230			page 26
TP 18		7.933	8.9 7.0 190	74.229 ~~.245~~		Hub
	3.923		5.0 2.8 220			
ERM 19		6.283	7.6 5.0 250	147.870 ~~.885~~	1470.62	GLO BC marked 1/4 S32 | S33
	4.101		5.6 3.6 200			
TP 20		7.359	8.6 6.1 250	68.619 ~~.632~~		Hub
	5.452		6.8 4.0 280			
TP 21		7.667	7.0 6.3 270	66.400 ~~.418~~		Hub
	4.681		6.0 3.3 230			
TP 22		8.196	9.4 7.0 240	62.885 ~~.903~~		Hub
	5.113		6.4 3.8 260			
TP 23		8.419	9.8 7.1 270	59.580 ~~.597~~		Hub
	5.861		7.2 4.5 290			
TP 24		7.451	8.7 6.2 250	57.990 ~~8.007~~		Hub
	4.516		6.0 3.1 290			
TP 25		8.686	10.0 7.4 260	53.811 ~~.826~~		Hub
	4.638		5.8 3.5 290			

Sta	BS	FS	Stadia	Elev	Panel	Remarks
TP 26		6068	7.3 4.8 250	52.388 ~~.408~~		Hub
	3.499		4.3 2.1 260			
ERM 27		7.821	9.2 6.5 270	1443.068 ~~1443.085~~	1446.61	GLO BC marked: ¼ S32/S5
	3.022		2.1 1.9 220			
TP 28		8.179	9.2 7.0 230	42.915 ~~.933~~		Hub in Wash
	4.136		5.9 — 250			
TP 29		8.668	10.4 7.8 270	38.383 ~~.401~~ 18		Hub in Wash
	3.266		5.0 2.1 200			
TP 30		6.266	7.5 5.1 240	35.083 ~~.101~~ 18		Hub in Wash
	6.045		7.2 4.9 230			
SC		1.606		1440.520 ~~1440.540~~		(Stamped 1442.02) BC NE Cor of South Box Culv. Wagner Wash
S		1.666		1440.460 ~~1440.480~~		(Stamped 1440.97) BC NE Cor of North Box Culvert Wagner Wash
ERM 31		1.632	2.4 1.7 150	1440.494 ~~1440.514~~ 20		BC NE Cor of Center Box Culvert Wagner Wash & Sun Valley Parkway Stamped 1442.69
	1.573		3.8 1.8 150			
TP 32		5.984	7.1 4.8 230	36.404 20		used TP 30
	6.312		2.4 5.2 230	087		
TP 33		4.011	5.1 2.9 230	33.405 21		used TP 29
	8.679		2.0 7.3 270	528		
TP 34		4.147	5.4 2.9 230	12.935 21		used TP 28
	8.285		9.4 7.1 230	915		
TP 35		3.132	4.2 2.1 210	43.009		used TP 27
	1.418		8.7 5.1 250	087		
TP 36		3.098	4.40 — 270	32.409 3		used TP 26
	6.082		7.3 4.8 250	386		
TP 37		4.651	5.8 3.5 230	33.840 3		used TP 25
	8.067		9.4 6.6 230	777		



Sta	BS	FS	Stadia	Elev	Panel	Remarks
TP 38		3.835	5.0 / 2.7 230	53.042 / 1.4 / 1.958		used TP 24
	6.954		3.3 / 5.6 270			
TP 39		5.363	6.5 / 4.2 250	59.602 / 1.5 / 1.598		used TP 23 (Flagged wall)
	7.999		230			
TP 40		4.696	210	62.906 / 1.5 / 1.601		used TP 22
	8.455		240			
TP 41		4.937	210	66.422 / 2.0 / 2.096		used TP 21
	7.630		270			
TP 42		5.451	280	69.644 / 2.6 / 2.74		used TP 20
	7.159		250			
TP 43		3.910	200	71.892 / 2.2 / 3.58		used ERM 19
	6.594		150			
TP 44		4.235	230	74.751 / 2.6 / 2.83		used TP 18
	8.087		190			
TP 45		4.207	230	78.134 / 2.7 / 2.92		used TP 17
	7.619		240			
TP 46		5.348	240	80.405 / 2.7 / 2.72		used TP 16
	8.219		310			
TP 47		4.220	230	84.404 / 2.7 / 2.74		used TP 15
	6.069		320			
TP 48		2.584	210	87.087 / 2.6 / 1.69		used TP 14
	5.430		200			
TP 49		6.092	190	87.227 / 2.5 / 1.96		used TP 3
	7.830		300			
TP 50		5.736	200	89.324 / 2.5 / 2.00		used TP 13
	6.242		210			

See Diagram page 26

Sta	BS+	FS-	Dist	Elev	Panel	Remarks
TP 51		5.665	190	99.~~922~~ 22 126		used TP 11
	2.775		240			
TP 52		5.514	210	92.~~257~~ 23 526		used ERM 10
	5.675		65 48 170			
TP 53		5.269	60 45 170	92.~~667~~ 8 86		used TP 9
	6.314		71 55 170			
TP 54		4.867	61 36 250	94.~~442~~ 29 678		used TP 8
	6.763		79 58 230			
TP 55		6.396	72 56 150	94.~~479~~ 35 446		used TP 7
	6.859		82 55 270			
TP 56		5.838	66 50 160	95.~~499~~ 3 466		used TP 6
	6.549		71 59 120			
TP 57		6.047	81 40 410	96.~~007~~ 25 760		used TP 5
	6.494		230			
TP 58		4.188	170	98.~~309~~ 5 292		used ERM 4
	5.462		250			
TP 59		3.737	170	00.~~034~~ 52 997		used TP 3
	7.711		200			
TP 60		4.242	220	03.~~503~~ 25 465		used TP 2
	7.397		270			
TP 61		6.409	310	04.~~500~~ 29 462		used TP 1
	9.696		200			
End 62		3.840	210	10.~~356~~ 39 479		

POB 1510.317

Error: 0.039 in 27700'± OR 5.25 mi

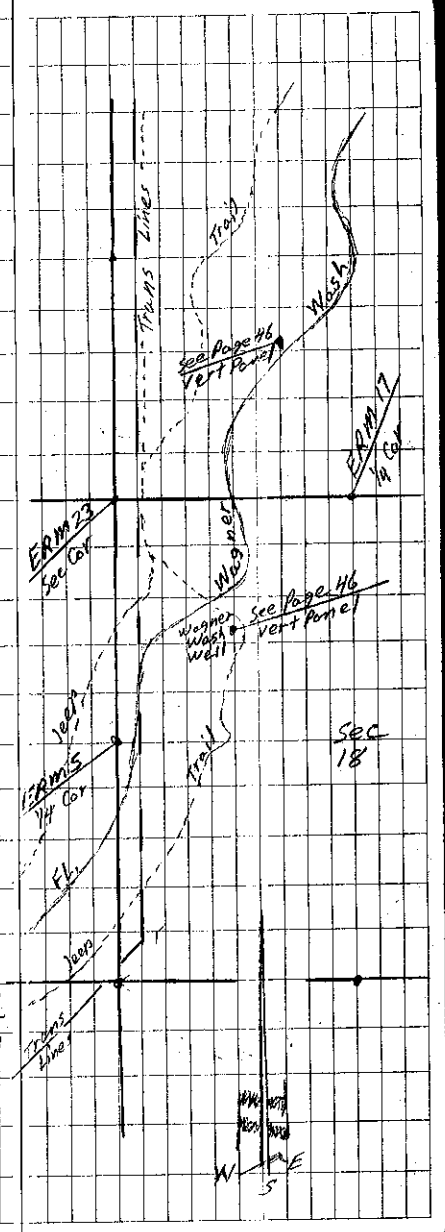
3rd order: 0.115 2nd order: 0.076

See Diagram page 26

Sta	BS +	FS −	Stadia	Elev	Panel	Remarks
PCB				1440.494		ERM 31 p. 28 (BC in middle Head wall)
	5.112		6.0 – 250			
TP 1		10.223	11.5 8.4 310	35.~~384~~ .376		Hub 5. side wash
	4.964		7.2 – 430			
TP 2		7.740	7.5 6.7 330	32.~~696~~ .613		Hub
	4.913		6.07 – 350			
TP 3		7.082	8.5 5.5 300	30.~~436~~ .439		Hub
	3.540		5.9 – 350			
TP 4		6.087	7.9 4.3 360	27.~~440~~ .389		Hub
	6.021		7.33 – 360			
TP 5		12.500	10.85 5.23 330	21.~~460~~ .451		Hub
	3.438		– 360			
TP 6		6.184	7.4 4.7 250	18.~~713~~ .707		Hub
	7.427		8.5 6.5 200			
ERM 7		8.233	9.4 7.1 230	1417.~~957~~ .948	-0.9' 1417.04	GLO BC marked: 86 | 55 / 57 | 58
	5.744		7.3 4.2 310			
TP 8		6.421	8.1 4.7 340	17.~~280~~ .263		Hub
	5.510		6.8 4.2 260			
TP 9		8.553	10.2 6.7 330	14.~~237~~ .218		Hub
	5.747		7.4 4.1 330			
TBM 10		9.667	12.1 7.2 490	1410.~~320~~ .299	-.01 1410.29	Rebar & Panel HV Control PA.20 p.4
	3.600		4.75 – 230			
TP 11		9.129	10.4 7.7 250	04.~~791~~ .768		Hub
	3.681		5.05 – 270			
TP 12		8.957	10.4 7.5 280	99.~~515~~ .489		Hub
	5.828		6.8 4.9 390			

See Diagram page 28

Sta	BS+	FS−	Stadia	Elev	Panel	Remarks
TP 13		9,981	11.6 / 8.3 / 3.0	9.~~362~~ .334 / 28		Hub
	5210		6.7 / 3.2 / 3.0			
TP 14		11,338	12.9 / 9.7 / 3.2	81.~~334~~ .204 / 30		Hub
	5019		6.7 / 3.3 / 3.3			
TP 15		9,110	10.6 / 7.5 / 3.0	85.~~142~~ .110 / 31		Hub
	3,921		6.7 / 3.1 / 3.60			
TP 16		6,671	7.9 / 5.4 / 2.50	82.~~372~~ .358 / 40		Hub
	4,442		5.5 / 3.4 / 2.10		135	
ERM 17		9,281	10.2 / 8.4 / 1.80	1377.~~593~~ .551 / 36	1376.22	GLO BC marked: 1/4 57/518
	3,657		5.3 / 2.0 / 3.30			
TP 18		9,212	10.4 / 8.0 / 2.40	71.~~490~~ .952 / 38		Hub 200' ± E of wash
	4,459		5.5 / 3.4 / 2.0			
TP 19		9,809	7.0 / 3.6 / 3.40	67.~~640~~ .500 / 40		Hub in Wagner Wash
	2,843		4.78 / — / 3.40			
TP 20		4,604	5.5 / 3.2 / 1.80	64.~~817~~ .834 / 43		Hub 150' ± W of wash
	10,018		11.5 / 8.5 / 3.00			
TP 21		2,168	2.9 / 0.4 / 2.50	72.~~727~~ .682 / 40		Hub on slope
	12,878		12.24 / — / 3.00			
TP 22		4,628	5.5 / 3.7 / 1.80	80.~~727~~ .930 / 40		Hub
	3,817		4.8 / 2.8 / 2.00			
ERM 23		4,604	5.6 / 3.6 / 2.00	1380.~~192~~ .143 / 40	1378.98	GLO BC. marked: 512/57 / 513/518
	7,987		9.5 / 6.4 / 3.10			
TP 24		3,872	5.2 / 2.6 / 2.60	84.~~256~~ .205 / 5		Hub by Trail
	6,718		8.2 / 5.2 / 3.00			
TP 25		7,321	3.8 / 0.9 / 2.90	88.~~654~~ .601 / 53		Hub by Trail
	9,496		11.0 / 7.9 / 3.10			



Sta	BS +	FS −	Stadia	Elev	Panel	Remarks
TP 26		7.515	9.0 6.0 300	20.~~635~~ 580 55		Hub by Trail
	6.347		8.0 4.7 330			
TP 27		2.839	4.2 1.5 270	24.~~442~~ .085 57		Hub by Trail
	5.755		7.3 4.2 310			
TP 28		3.675	5.0 2.3 270	26.~~221~~ .160 66		Hub by Trail
	8.804		10.6 7.0 360			
TP 29		0.564	2.18 – 320	24.~~451~~ .399 62		Hub by Trail
	6.739		8.4 5.1 330			
TP 30		4.068	5.6 2.5 310	27.~~137~~ .071 64		Hub by Trail
	6.188		7.4 5.0 240			
TBM 31		3.017	4.0 2.0 300	1410.~~308~~ .242 65		Rebar Tri. Control Pt 18, 24
	6.502		8.1 4.9 320			
TP 32		7.051	8.4 5.6 280	27.~~755~~ .687 68		Hub by Trail
	8.673		9.9 7.4 250			
TP 33		4.540	5.9 3.2 270	13.~~381~~ .818 70		Hub by Trail
	2.970		9.0 6.9 210			
BRM 34		3.790	4.8 2.7 210	1417.996 ~~1418.068~~ 72	-1.20 1416.80	GLO BC marked: 1/4 5.6/5.7
	4.338		5.4 3.3 210			
TP 35		10.521	12.7 9.1 370	11.~~003~~ .809 74		Hub (heading East)
	3.982		4.8 3.2 150			
TP 36		3.826	11.6 8.0 360	05.~~017~~ .964 71		Hub
	6.649		8.3 5.0 330			
TP 37		4.975	6.0 4.0 200	07.~~744~~ .635 67		Hub
	6.838		7.7 6.0 170			
TBM 38		5.652	6.3 5.0 130	1408.~~200~~ .819 77	-.01 1408.81	Rebar Vert Control Panel
	7.132		8.7 5.6 310			

See Diagram page 28

Sta	BS +	FS −	Stadia	Elev	Panel	Remarks
TP 39		3.574	4.69 − 220	1 ~~457~~ 374		Hub
	9.936		10.8 9.2 180			
TBM 40		4.354	5.3 3.4 190	14 ~~7.948~~ ~~14 3.039~~	6.01 1417.04	ERM 7 p 31 GLOBC 56/55 57/58
	8.359		9.6 7.1 250			
TP 41		7.596	8.5 6.7 180	13 ~~.891~~		TP 6 p 31
	6.616		7.7 5.3 260			
TP 42		3.867	5.69 − 360	21 ~~.541~~		TP 5 p 31 See Diagram
	12.498		− 10.81 340			
TP 43		6.062	7.82 − 350	27 ~~.988~~		TP 4 p 31 page 28
	5.906		7.7 4.1 360			
TP 44		3.350	5.11 − 350	30 ~~.543~~		TP 3 p 31
	7.188		8.7 6.7 300			
TP 45		5.012	6.7 3.3 340	34 ~~.720~~		TP 2 p 31
	7.322		8.9 5.7 300			
TP 46		4.577	7.04 − 490	35 ~~.468~~		TP 1 p 31
	9.997		8.5 300			
END 47		4.870	6.4 − 250	40 ~~.594~~		POB p 31 1440.494

Error = 0.100 in 25,800'+ OR 5.08 mi

3rd order: 0.113 2nd order: 0.074

Sta.	BS +	FS −	Stadia	Elev.	Point	Remarks
POB				1380.143	1378.98	ERM 23 p 32 S12/S7 S13/S18
	3,233		5.0 / 5.5 350			
TP 1		9,235	0.5 / 8.0 250	74.42 ~~+40~~ 1		Hub by Trail
	4,842		6.0 / 7.7 230			
TP 2		8,376	9.9 / 6.9 300	70.511 ~~+97~~ 1		Hub
	4,917		8.4 / 7.4 300			
TP 3		2,985	7.3 / 7.3 330	62.546 ~~+41~~ 2		Hub
	1,762		3.2 / 0.3 290			
TP 4		1,691	2.9 / 0.5 240	52.617 ~~+4~~ 2		Hub
	4,192		5.6 / 3.3 230			
ERM 5		1,541	5.7 / 3.4 230	1352.565 ~~+42~~ 3	1.08 / 1351.48	GLO BC marked: S13 1/4 S18
	4,599		5.7 / 3.4 230			
TP 6		4,543	5.7 / 3.4 230	52.518 3		TP 4
	11,995		0.7 / 260			
TP 7		7,069	3.5 / 5.7 280	62.545 4		TP 3
	12,840		11.5 / 310			
TP 8		4,775	6.2 / 3.2 310	70.549 4		TP 2
	8,938		10.1 / 5.9 310			
TP 9		4,909	6.0 / 3.8 220	74.579 5		TP 1
	2,724		9.1 / 6.4 270			
End 10		2,725	7.4 / 7.1 330	80.518 6		POB 1380.143

Error = 0.005 in 1 mi

3rd order: 0.010

2nd order: 0.033

See Diagram page 32

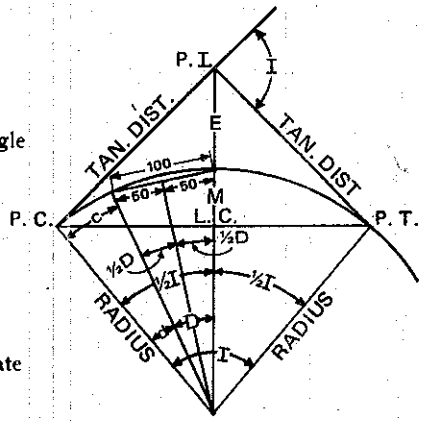
Levels
Continued
in
Book 2

Leveling Accuracy Limits

2nd order (class 2)	—	0.033' $\sqrt{mi}$
	OR	8 mm $\sqrt{Km}$
3rd order	—	0.050 $\sqrt{mi}$
	OR	12 mm $\sqrt{Km}$

CURVE FORMULAE

D=Degree of Curve
1°=1-Degree of Curve
2°=2-Degree of Curve
P.C.=Point of Curve
P.T.=Point of Tangent
P.I.=Point of Intersection
I=Intersection of Angle, Angle Between Two Tangents
L=Length of Curve, from P.C. to P.T.
T=Tangent Distance
E=External Distance
R=Radius
L.C.=Length of Chord
M=Length of Middle Ordinate
c=Length of Sub-Chord
d=Angle of Sub-Chord



$$R = \frac{L.C.}{2 \sin \frac{1}{2} I}, \; T = R \tan \tfrac{1}{2} I = \frac{L.C.}{2 \cos \frac{1}{2} I}$$

$$\frac{L.C.}{2} = R \sin \frac{I}{2}, \; D\,1^\circ = R = 5730, \; D\,2^\circ = \frac{5730}{2}, \; D = \frac{5730}{R}$$

$$M = R\,(1 - \cos \tfrac{1}{2} I), = R - R \cos \frac{I}{2}$$

$$\frac{E + R}{R} = \sec \frac{I}{2}, \; \frac{R - M}{R} = \cos \frac{I}{2}$$

$$c = 2\,R \sin \tfrac{1}{2} d, \; d = \frac{c}{2\,R}$$

$$L.C. = 2\,R \sin \tfrac{1}{2} I, \; E = R\,(\sec \tfrac{1}{2} I - 1), = R \sec \frac{I}{2} - R$$

Minutes in Decimals of a Degree

1′	.0167	11′	.1833	21′	.3500	31′	.5167	41′	.6833	51′	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

Inches in Decimals of a Foot

1/16	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167