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SALT RIVER CHANNELIZATION AND BANK PROTECTION

FROM

PIMA FREEWAY TO DOBSON ROAD

Prepared for:

Salt River Pima-Maricopa Indian Community
10263 E. Osborne Road
Scottsdale, Arizona 85256-9722

Prepared by:

BSI Consultants, Inc.
266 West Third Place
Mesa, Arizona 85201

January 13, 1994

BSI Consultants, Inc.

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FLOOD CONTROL DISTRICT of Maricopa County

Interoffice Memorandum

CMT. NO.	SUBJECT: SRPMIC CHANNELIZATION, North Bank, Pima Fwy ≈ Alma School Rd.	☒ FILE LSR(RM) 1.3 ☐ DESTROY

TO: DJR
GR
EAR
DRJ
TDJ
FILE: LSR(RM) 1.3.

FROM: RGP

DATE: 1/16/96

Re: Fax from SRPMIC (1-12-96), Ron Martinez w/ ENCLOSURE "SALT RIVER - NORTH BANK PROTECTION & CHANNELIZATION REVIEW FINDINGS"; by Dibble & Associates, January 9, 1996.

1. Please review the enclosed report and provide any comments to me.

2. I spoke to Ron Martinez this morning and informed him that FCDMC funding for the north bank was doubtful; would not be a priority project and did not have any damage-prevental benefits. He said he understood and would keep us informed of any action on this project.

3. I told him we would favorably consider a similar arrangement as that w/ ADOT for the south bank:
   - Built to FCDMC criteria
   - FCDMC would assume O&M.

4. If anything else happens on this project, I'll keep you informed.

Dick

6910-007 3-90

Salt River
PIMA-MARICOPA INDIAN COMMUNITY

Route 1, Box 216 - Scottsdale, Arizona 85256-9722 - Phone (602) ~~941-7346~~ 874-8160

FACSIMILE COVER SHEET

DATE: 1-12-96

TO: DICK PERREAULT

COMPANY: FCDMC

PHONE:

FAX: 506-9601

FROM: RON MARTINEZ ph. 874-8163

SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY
Planning & Engineering Services
Route 1, Box 216
Scottsdale, Arizona 85256
FAX (602) 874-8179

PAGES INCLUDING COVER SHEET: 7

COMMENTS:

For Your Info: Dibble report on BSI study and latest ADOT design info. for south bank of Salt River. Please give me a call when you get a chance. I'd like to discuss funding possibilities from FCDMC for our north bank project.

Thanks

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

2633 East Indian School Road, Suite 401
Phoenix, Arizona 85016-6763
Tel. (602) 957-1155
Fax (602) 957-2838

CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

January 9, 1996

Mr. Ronald F. Martinez, P.E.
Project Manager
SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY
Route 1, Box 216
Scottsdale, Arizona 85256

RE: **SALT RIVER - NORTH BANK PROTECTION AND CHANNELIZATION REVIEW FINDINGS**

Dear Mr. Martinez:

We have completed our review of the reports and plans for the above referenced project. Our findings are discussed in the following sections which correspond to the tasks identified in the Scope of Work. The attached exhibit shows the project location and bank alignments discussed.

I. BSI REPORT, ADOT AND FCDMC REVIEWS

The BSI Report and subsequent Arizona Department of Transportation (ADOT) and Flood Control District of Maricopa County (FCDMC) comment letters were reviewed. The BSI report compares two proposed Salt River bank protection plans upstream of the Pima Freeway. The first plan was proposed by ADOT to protect the Pima Freeway bridge structure and provides a flared north bank extending to the north, parallel to the freeway embankment. With the ADOT plan, the Salt River width varies from approximately 1,300 feet at the Pima Freeway to over 2,800 feet at a point 3,000 feet upstream of the Pima Freeway. The second plan is proposed by the Salt River Pima-Maricopa Indian Community (SRPMIC) and consists of constructing a soil cement north bank, defining a 1,300 foot wide channel, upstream of the Pima Freeway for approximately one mile and flaring an additional 1,500 feet to tie into higher ground.

The BSI report was submitted to ADOT and FCDMC for review and comment. Specific comments from the review letters are addressed in the following sections. The FCDMC and ADOT review letters are attached for exact wording.

Flood Control District of Maricopa County, (FCDMC) - February 11, 1994

1. Concerning the Length of Analysis. We agree the study should extend upstream some distance from the limit of proposed improvements. In this case the bridge control structures at Alma School Road appear to be a well defined upstream limit for the hydraulic study.

2. Cross-Section Alignments. Computer correction of cross-sections not perpendicular to the proposed stream section can be made. However, due to recent work by Wood, Patel & Associates (WPA), wherein they are amending the Federal Emergency Management Agency (FEMA) maps (Letter of Map Revision, LOMR) in this reach of the river, we recommend that this topography and cross-sections be utilized to re-examine the north bank alternatives. In this manner FCDMC comment number eleven (11) requesting a HEC-2 run for existing conditions is satisfied with the new FEMA submittal.

3. Impacts of the SRPMIC Alternative on the South Bank. The south bank protection for approximately 4,300 feet upstream of the Pima Freeway was studied by Simons, Li and Associates (SLA) and plans were prepared for the traffic interchange ramps and main line freeway north across the river. We have reviewed the SLA report and final plans. The analysis of the south bank protection considered two possible conditions, one with the proposed SRPMIC north bank and a smoothed channel invert, the other without a north bank and no river modifications. The adopted south bank design utilizes the worst case scenario of the two conditions analyzed in terms of water surface elevation and anticipated scour depth in the plan design. Therefore, the SRPMIC alternative is accounted for in the south bank design.

The design of the Red Mountain Freeway from Pima Road to Alma School Road also includes south bank protection of the Salt River. The hydraulic and sediment transport studies for this project were prepared by WPA. The FEMA Letter of Map Revision referred to in comment two (2) was also prepared as part of this project. We have reviewed the report and the sixty percent (60%) plans for the south bank protection. The analysis included three conditions, the first was existing conditions in the Salt River with no river modifications as a baseline condition for evaluation of the two design condition scenarios. The second condition is with the new south bank and no channelization or embankment improvements for the north bank. The third condition is with the new south bank with the SRPMIC north bank improvements and a smoothed channel invert. Again, the worst case scenario of the two conditions analyzed was adopted for the plan design. Therefore, the SRPMIC alternative is accounted for in the south bank design.

4. The SRPMIC Alternative Higher Water Surface. The alternatives evaluated as part of the ADOT south bank designs for the SRPMIC north bank included channel smoothing across the channel bottom. The WPA analysis with new topography and river bottom smoothing indicates a maximum increase in water surface of 1.2 feet from the existing condition. The maximum increase allowed by FEMA is 1.0 feet. Refinements will need to be made to the design to reduce the increase in water surface to a maximum of 1.0 feet. Refinements may include realignment of the proposed north bank and/or additional channelization of the river.

5. The SRPMIC Alternative Encroachment. We recommend the north bank improvement be extended a minimum of one-half mile upstream to a well defined north bank tieing into the newly defined floodplain limit lines presented in the WPA report. A portion of the SRPMIC proposed embankment is within the FEMA floodway limits. According to FEMA guidelines, a Conditional Letter of Map Revision (CLOMR) will be required to redefine the floodway. Without the CLOMR, no fill can be placed within the existing floodway.

6. Grain Size Distribution. The ADOT design for the south bank included sampling in this reach of the river. A plot of the approved grain size distribution for the SLA study shows no appreciable deviation from the BSI distribution. Therefore, the grain size distribution for the recently completed study should be adopted.

7. Stability of Highway Crossings. The new studies defining the south bank improvements are designed to accommodate the worst case of whether the north bank is improved or not. Therefore, there does not appear to be a concern about the stability of highway crossings.

8. Depth of Toe-Down. The new studies defining the south bank improvements are designed to accommodate the worst case of whether the north bank is improved or not. Therefore, the same toe-down would be applicable to the north bank.

9. Aggradation and Degradation. I believe the presentation of aggradation and degradation specified in units of cfs is a typographic error and that the units were intended to be in feet. I will follow-up on this and report to you on Thursday.

10. Cost Comparisons. It appears that some channelization, river bottom smoothing as a minimum, will be required. These costs aren't included in BSI's estimate. If a defined channel is established as discussed in the BSI report, the channel invert must be raised up to five feet requiring over 720,000 cubic yards of borrow material at an estimated additional cost of 1.15 million dollars. If the embankment is extended upstream so that river flows cannot get behind the embankment, there should be no concern about filling the area behind the embankment and protecting the back slope. From reviewing the ADOT south bank design, it appears that the bank height has been increased based on the proposed SRPMIC design which would be an added cost, born by ADOT, not accounted for in the BSI report.

$1.60/cy

11. Provide HEC-2 Run of Existing Condition. The WPA FEMA CLOMR submittal and HEC-2 model is the best available model of existing conditions.

12. Evaluate Impact of Sand and Gravel Pits. If the north bank improvements are extended to the newly defined flood plain the gravel pits will be isolated from the river channel (since both north and south banks will be hardened and defined).

    The ADOT proposal leaves the pits vulnerable to flooding and the accumulation of river sediments. This is a condition that is vulnerable to upstream river thalweg deterioration unless preventive measures are taken.

Arizona Department of Transportation, (ADOT) - February 23, 1994

1. Establishment of North Bank (Digitized). Various north bank locations may be studied (each would have to be digitized) to determine one which will not raise the FEMA established water surface elevation in the river.

2. Difference in ADOT and SRPMIC Water Surface Elevation. Again, the existing ADOT studies include an evaluation of the effect of the SRPMIC embankment and addresses that impact in the design of the south bank. The ADOT studies include smoothing of the river bottom which will be required, as a minimum, to convey the design flow in an acceptable manner.

3. Funneling Flow. If the embankment is extended upstream as previously described, this concern will be satisfied.

4. Geotechnical Investigation. It is anticipated that these studies would be done as part of the embankment design project.

5. Channel Aggradation. The more recent SLA studies define these conditions for both alternatives. Upon determination of a definite north bank location ADOT may require re-evaluation.

6. Possible 404 Permit. A 404 permit will be required for the project. The ADOT 404 permit covers the north bank for 2000 feet upstream of the Pima Freeway bridge. An individual 404 permit will be required for the rest of the project. An individual 404 permit will take a minimum of three to six months to obtain. If there are controversial environmental issues to be addressed the time could extend to a year or more. From discussions with the Corp of Engineers there are no known environmental issues that would be expected to delay the permit process.

7. Impact of ADOT Bank Alignment. The SLA and WPA studies should satisfy this concern.

8. Detailed Toe-Down Design Per ADOT Procedures. The studies for both bank may have answered this concern, unless closed gravel pits require a deeper toe-down depth.

9. Recommend New Mapping. By adopting the latest FEMA mapping this concern is alleviated.

II. ADOT NORTH BANK CONSTRUCTION PLANS

The current ADOT construction plans for termination of the north bank protection at the Pima Freeway have not been obtained. ADOT has investigated interim bank protection measures to protect the northeast abutment of the Pima Freeway bridge. If an SRPMIC north bank project will not be completed by October 1996, the planned opening of the Pima Freeway, the interim bank protection measures will be constructed. ADOT has indicated that the cost of those improvements would be taken from the 1.2 million dollars that was committed to the north bank project.

III. SLA HYDRAULIC ANALYSIS REPORT

The SLA hydraulic report and Final Plans were reviewed. The findings are discussed in the above comments on the BSI report from the FCDMC and ADOT. In essence the report studied both the unchanneled (ADOT) and channeled (SRPMIC) conditions and designed for the higher water surface and lower toe-down conditions of the two alternatives.

IV. WOOD, PATEL & ASSOCIATES

The studies, plans and FEMA Letter of Map Revision submittal were reviewed. The hydraulic study was from the Pima Freeway to a mile above Alma School Road.

It is recommended that this newer model be used to re-study the project, if necessary, as discussed in the above comments on the BSI report from the FCDMC and ADOT.

The following conclusions and recommendations are made to re-apply for establishing a north bank as desired by the SRPMIC:

V. CONCLUSIONS

1. The south bank is currently defined for construction from the Pima Freeway to past Alma School Road. Criteria used has utilized the higher water surface elevation and lower toe-down depth of whether a north bank is improved or left in its current state.

2. Benefits to the community.
While appreciably more money is required to establish the north bank of the river from the Pima Freeway to near Alma School Road many benefits would accrue to the SRPMIC:

   a) Reclamation of land. - A substantial land area would be removed from the river and could be reclaimed for development.
   b) Increased community income (commerce and taxes). - The reclaimed land could be put to beneficial use that would generate jobs and tax revenues to the community.
   c) Aesthetic view of the area enhanced. - Converting the land from gravel operations and river bottom to other uses would enhance the beauty of the area. With construction of the Pima and Red Mountain Freeways the area will change from being out of site to being a focal point for a large amount of traffic.

3. Benefits to other agencies.
In addition to SRPMIC benefits, the following project benefits would accrue to other agencies including FCDMC and ADOT:

   a) Defined river course for maintenance. - Construction of the bank would make this reach of the River consistent with work that has been done downstream and would maintain a consistent channel cross-section and flow direction. The potential for flow line migration would be reduced ensuring a favorable flow approach angle to the Pima Freeway bridge.
   b) The Pima Freeway bridge is being constructed to a shortened length based on a narrower river width. Construction of the new bank would protect the north embankment of the bridge which projects into the existing river.
   c) Control of river channel depth for river crossing infrastructure (both depth and length). - Any future crossings of the river would have a defined river width and depth for underground facilities.
   d) With a defined river width and the river channel control structures downstream of the Alma School Road bridges, the sediment transport conditions should reach a stable equilibrium condition.

4. The total cost of constructing the proposed SRPMIC north bank with the proposed 2700 foot extension is estimated at 5.0 million dollars with smoothing of the channel invert. The BSI original estimate of 3.0 million dollars without channel profiling is estimated at 4.2 million dollars with channel profiling.

5. The new analyses that have been done as part of ADOT's south bank design should be adequate to address the FCDMC and ADOT concerns as described in their letters. Additional analysis may be required as part of the final embankment design including additional sediment transport studies.

VI. RECOMMENDATIONS

1. It is recommended that the proposed SRPMIC embankment design be extended approximately 2,700 feet further upstream to tie into the existing well defined bank that contains the 100-year flow. The alignment proposed in the BSI report would not contain the 100-year flow due to water flowing behind the embankment upstream, which is an unacceptable condition.

2. It is recommended that additional studies and design modifications be made to reduce the rise in water surface to one foot or less.

3. It is recommended that the community continue to pursue design, construction, maintenance, and cost sharing agreements with the FCDMC and ADOT. To avoid loss of a portion of ADOT committed funds the north bank project should be coordinated with ADOT and initiated in a timely manner. FCDMC has a maintenance agreement with ADOT for the south bank. If a new north bank is constructed to FCDMC criteria it is anticipated that a maintenance agreement could be reached with the FCDMC for the SRPMIC north bank.

4. It is recommended that if the project is to be combined with the ADOT project, the 404 permit process be promptly initiated.

Thank you for the opportunity to assist you with this project. After you've had a chance to review this, I would be happy to meet with you to discuss these issues further. If you have any questions, please do not hesitate to call.

Very truly yours,

DIBBLE AND ASSOCIATES

Brian J. Fry

Brian J. Fry, P.E.
Project Manager

BJF/lc

Attachments

cc: Rich Perry, Dibble and Associates

FLOOD CONTROL DISTRICT
of
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FEB 1 1 1994

Mr. Ronald F. Martinez, P.E.
Project Manager
Salt River Pima-Maricopa Indian Community
Route 1, Box 216
Scottsdale, Arizona 85256

SUBJECT: BSI Consultants, Inc. Report on Salt River Channelization and Bank Protection, January 13, 1994

Dear Mr. Martinez:

Thank you for providing a copy of the subject report for our review and comment. I asked staff from our Hydrology and Engineering Divisions, who are familiar with this reach of the river, to review the report. Listed below, in no order of priority, are the comments that staff and I have concerning the report.

Comments:

1. The hydraulic analysis does not extend sufficiently upstream to reflect floodplain conditions with the SRPMIC alternatives. The current FEMA floodplain is 4000 feet wide at the upstream end of the SRPMIC alternatives. The hydraulic run only extends to the upstream end of the proposed levee. Concerns exist with the flows breaking out upstream of the levee and getting behind the levee.

2. The cross-section alignments used in the hydraulic run are not perpendicular to the flow direction for the SRPMIC alternatives. The cross-sections must be modified to reflect proposed conditions and provide better assessment of flow depths and velocities.

3. The impacts of the SRPMIC alternatives on the unprotected south bank upstream of the ADOT bank protection must be determined and addressed.

4. The SRPMIC alternative without channelization produces an increase of 1.5 feet in the 100-year water surface elevation when compared to the FEMA 100-year water surface elevation at the upstream end of the levee. This is unacceptable under FEMA, State, and local floodplain regulations.

5. The SRPMIC alternatives propose a north bank encroachment into the Salt River floodway of some 2800 feet. The ADOT north bank proposal ties into the natural bank of the river outside of the 100-year floodplain. The SRPMIC alternative north bank does not tie into high ground outside of the floodplain, but rather unstable high ground in the middle of the natural floodplain that has been changed as a result of years of sand and gravel mining. The proposed SRPMIC north bank must be extended upstream sufficiently to safely contain the design flow without adversely impacting adjacent properties.

6. The "Typical Grain Size Distribution" graph shown on Fig. 3 is average grain size distribution along the Salt River. It may not represent the actual grain size distribution at the location of our project. We recommend that the consultant provide more soils data for the project vicinity.

7. On Page 10, the fourth paragraph infers that the stability of the highway crossings may be affected by the unstable nature of the reach upstream. ADOT designed their crossings with the current conditions and potential unstable nature of the reach included in their analyses. The SRPMIC has agreed to restrict sand and gravel mining in the river adjacent to any levees and for a distance upstream of the crossings; therefore, to assume that the SRPMIC proposed alternative will necessarily improve the stability of the crossings is not evident.

8. On Page 10, the report mentions that, because of general aggradation potential in the river bed, previously designed toe-down depth of 20' will be adequate. We recommend that the consultant perform the scour analysis per the District's toe-down design criteria, and make his/her own recommendation about toe-down depths.

9. On Page 11, Table 1, explain the aggradation or degradation column expressed in cfs.

10. Page 12, the last paragraph states that a disadvantage of the SRPMIC Alternative over the ADOT Alternative is the $3.0 million cost. This cost is misleading, in that channelization and landfill costs are not included in the estimate, but may, in fact be a project cost. Also, no costs are included for protecting the back slope of the levee from future sand and gravel mining or from erosion, if flood flows get behind or overtop the levee (See comment #5 above.). Raising the water surface will impact the design of ADOT's south bank levee and will probably increase its costs. This project cost increase could also be added to the SRPMIC Alternative.

11. Provide HEC-II run for the existing condition in order to compare the proposed alternatives with existing ones.

12. Evaluate the impact to any existing sand and gravel pits or the bridges upstream or downstream.

As you can see from our comments, we have raised some serious concerns regarding the implementation of the SRPMIC Alternative without more technical analysis. I have enclosed a copy of the District's "Channel Design Criteria for Major Watercourses", dated February 3, 1994. This criteria, slightly modified, was used by ADOT for designing the levees west of the Pima Freeway crossing and by Simons, Li and Associates for the design of the Tri-City Landfill protection.

Should you want to meet to more fully discuss our comments, please contact me at 506-1501.

Sincerely,

Richard G. Perreault
Chief, Planning Branch

Enclosure

Copy to: Terry Bourland, ADOT

2/10/94
RGP/jnk

Coord: ~~DRW~~ RCS

Info: ~~EAR~~ ~~BJB~~ ~~SLS~~ RGP
PAG ~~CWR~~ CWR

File: LSR(RM)1.1 Copy of BSI Report filed with RCS

February 3, 1994

CHANNEL DESIGN CRITERIA FOR MAJOR WATERCOURSES*

1. All geotechnical test results shall be provided for District review. Gradation data shall be obtained that is representative of the full depth of the moveable bed. The District's rule of thumb for bore hole/test pit intervals is a minimum of one per 500 feet. If an armoring analysis is to be presented for review, gradation test results for the channel bed samples shall include the percentages of the 3 inch plus material encountered.

2. The geotechnical exploration shall determine if landfill or hazardous material deposits are present within the channel alignment, and if so, their impacts on channel design and costs.

3. If existing gravel pits are to be filled, gradation specs shall be needed for the material that is to be placed in the moveable bed zone.

4. Levees shall be designed to conform with FEMA freeboard criteria. (100-year frequency peak flow with three (3) feet of freeboard plus one (1) feet at bridges) In non-levee conditions a minimum of one (1) feet of freeboard shall be provided.

5. HEC-II shall be used to perform back water calculations, unless the District agrees to another method. A hard copy and floppy disk with input and output files shall be submitted for District review.

6. The location of cross sections used in the water surface profile calculations shall be provided on a scaled map.

7. The final plans shall include profiles showing the top of levee protection, HGL, invert, and the low chords for all bridges.

8. Tributary (side) drainage to the channel shall be addressed such that the more severe of the following conditions govern: 1) 100-year frequency peak in the main channel with 10-year frequency peak tributary drainage or 2) 10-year frequency peak in the main channel with the 100-year frequency peak tributary drainage.

9. Consideration shall be given to the upstream and downstream river and floodplain conditions and how those conditions may impact the proposed channel. Existing and potential material extraction and landfill operations shall be addressed in this context. Overbank flooding upstream of the channelization shall be analyzed to ensure that those flows enter and are contained within the improved channel. The design and analysis shall address the potential impacts of known future modifications that may be proposed by others.

* Design Criteria to be used for Flood Control District of Maricopa County designed, funded or maintained projects.

10. Maintenance access and channel invert access ramps shall be incorporated into the design.

11. The scour analysis shall be performed using an analytical approach based on the velocity associated with the 100-year frequency peak flow, the depth of the thalweg, and the soil gradation of the channel bed materials.

12. Degradation and aggradation analyses shall include factors for dunes and antidunes.

13. The depth of scour, measured from the low-flow thalweg invert elevation, shall be used to determine the toe-down elevations for bank protection based on the 100-year frequency peak flow.

14. Local scour calculations shall be provided for review. These calculations are to be tabulated at all critical design locations and presented with a map showing the locations.

15. Levee slope stability analysis calculations shall be submitted for District review. The analysis shall consider pore pressure caused by rapid draw down.

16. Provide calculations to show that the type of bank protection (riprap, gabions, etc...) is suitably sized to resist hydraulic forces at the design frequency peak flow.

17. All hydraulics and structural calculations performed to substantiate the design of slope or channel stabilization shall be provided for District review.

18. All calculations shall be independently checked by a person at least as competent as the designer before submitting them to the District. Both the designer and checker shall initial and date each page of calculations that is submitted.

19. Minimum factors of safety for scour and forces on structures shall be 1.5 based on the 100-year frequency peak flow.

ANALYTICAL APPROACH FOR DETERMINING REQUIRED TOE DEPTHS FOR BANK PROTECTION

The following analytical approach shall be utilized for determining required toe depths for bank protection:

1. Contraction Scour (includes General Scour), in the vicinity of bridge crossings and river sections that have been constricted due to landfill or any other type of encroachment shall be computed by methods described in Federal Highway Administration, FHWA, Hydraulic Engineering Circular Nos. 18 and 20, and other publications deemed appropriate for the 100-year frequency flow. General scour for

unconstricted reaches, is to be quantified by computer models for flows representing a hydrological history, as described in Item 3 below, and shall be supplemented with hand calculations.

2. Bed-form scour, due to the passage of dunes or antidunes, shall be computed from analytical relationships developed by investigators such as Yalin and Kennedy, as described in textbooks on sediment transport technology. The maximum hydraulic parameters associated with the passage of a 100-year frequency peak shall be used to establish the quantitative values for this scour component.

3. Long-term Aggradation/Degradation shall be computed by using the concept of equilibrium slope or the concept of streambed armoring, depending on which approach controls the long-term channel profile. The equilibrium slope concept shall utilize a sediment transport relationship which incorporates the D_{50} and gradation of the streambed sediment. The streambed-armoring concept shall utilize the critical tractive shear stress approach and the representative (armor) particle size. A series of flood frequency hydrographs from 10 to 100-year, shall be used to represent the hydrologic history that the structure may experience in its life as a basis for determining these long-term trends. The "dominant" discharge shall generally be assumed to be the 10-year frequency discharge.

   If a sediment analysis is required, the analysis shall consider the sediment load entering the study reach. If computer software is used to analyze the sediment transport, a hard copy and floppy disk with input and output files shall be submitted for District review.

4. The scour due to river bend shall be considered and added to the required bank toe depth calculation.

5. The scour due to any local obstruction (bridge pier, etc...) shall be considered and added to the required bank toe depth calculation.

SALT RIVER CHANNELIZATION AND BANK PROTECTION

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PIMA FREEWAY TO DOBSON ROAD

Prepared for:

Salt River Pima-Maricopa
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10263 E. Osborne Road
Scottsdale, Arizona 85256-9722

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BSI Consultants, Inc.
266 West Third Place
Mesa, Arizona 85201

Lan-Yin Weber, Ph.D., P.E.

January 13, 1994

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SHEET 1 LEVEE PLAN AND SECTION LOCATIONS
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ATTACHMENT 2 AERIAL PHOTOGRAPHS

ATTACHMENT 3 HEC-2 OUTPUT

I. INTRODUCTION

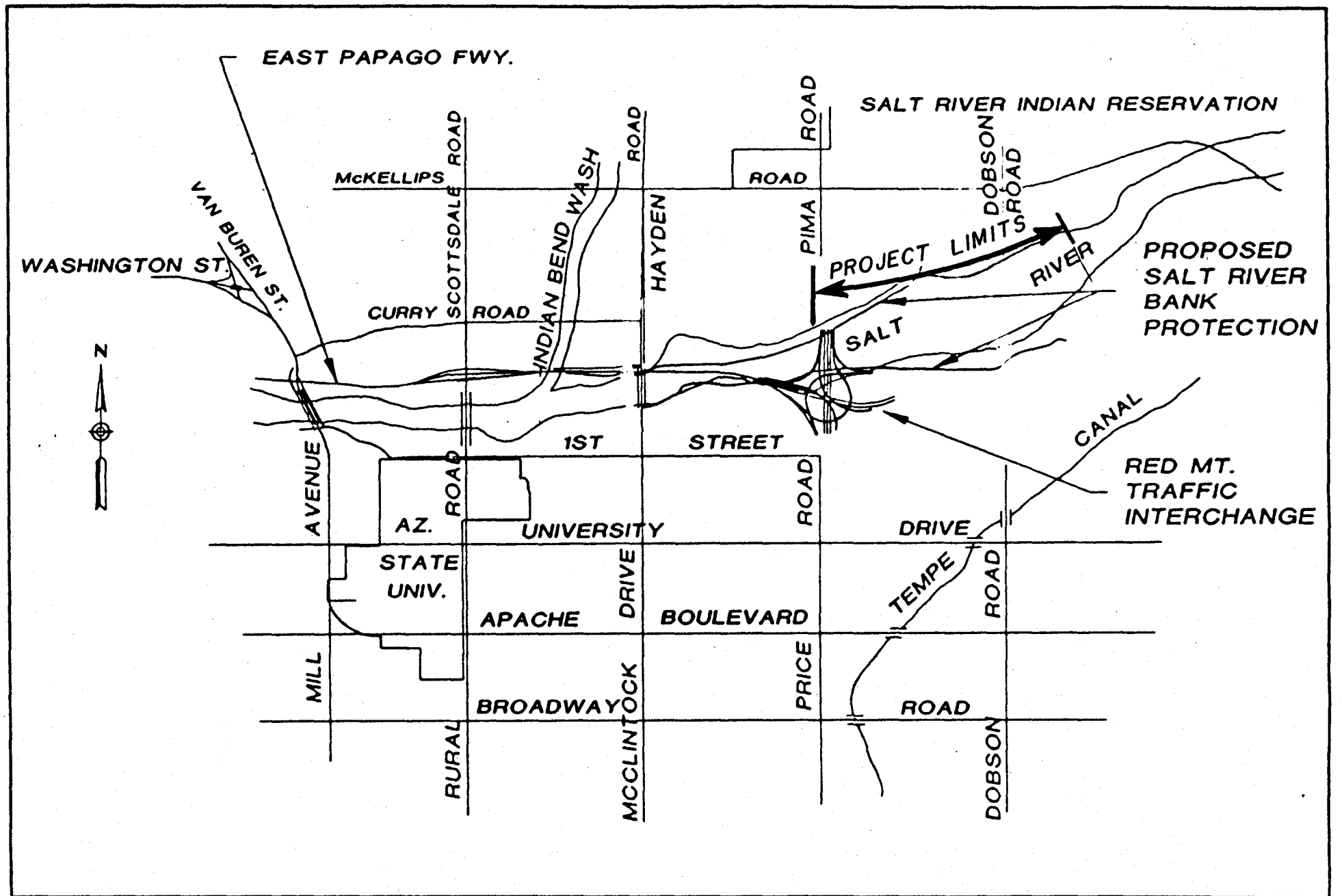
This report presents the results of an alignment study for north bank protection of the Salt River, upstream of the Red Mountain Traffic Interchange (RMTI) at Pima Freeway (Loop 101) and East Papago Freeway (Red Mountain Freeway, Loop 202). Figure 1 shows the project vicinity map. To prevent bank erosion and protect infrastructures at the bridge crossings, ADOT has incorporated the north bank protection as part of the RMTI project.

The current design plan for bank protection near freeway encroachment resulted from previous studies for the east Papago Freeway and RMTI performed by Simons, Li & Associates (SLA, September 1990 and October 1992). The final alternative involves placing Cement Stabilized Alluvium (CSA) on both banks and channelization from McClintock Drive to upstream of the proposed Pima Freeway. This alternative also includes CSA along the existing north bank approximately 3,600 ft from the proposed freeway east ramp (DMJM and SLA Design Plans prepared for ADOT, March 1992). Attachment 1 and Figure 2 show the previously proposed alignment (referred to as the ADOT Alternative).

Although many alternatives were evaluated for the Salt River under the freeway encroachment condition, that portion of the bank alignment upstream of the RMTI has not been analyzed for its compatibility with the vicinity channel improvement plans. Furthermore, the river has been modified by floods occurring in recent years, and therefore requires update of the previous analysis (SLA's analysis was based on the 1986 data). The Salt River Pima-Maricopa Indian Community (SRPMIC) has concerns over the north bank alignment and BSI Consultants, Inc., is commissioned to investigate other alternatives.

By reviewing the river changes resulting from the floods of recent years as well as the channel encroachment upstream (Tri-City Landfill) and downstream (RMTI and Loop 202), a second alternative was formulated for the north bank alignment as shown in Attachment 1 (referred to as the SRPMIC Alternative). This alternative is to locate the north bank from Pima Freeway to Dobson Road along a more southerly alignment with channel width varying from 1,000 ft to 1,400 ft.

Using ADOT alternative for comparison, the currently proposed SRPMIC alignment was evaluated for the following factors: hydraulic features, channel stability, compatibility with the long-term river management, design and construction costs, effects on the in-stream freeway facilities, sand and gravel mining, and land use potential. This report summarizes the results of evaluation.



BSI Consultants, Inc.
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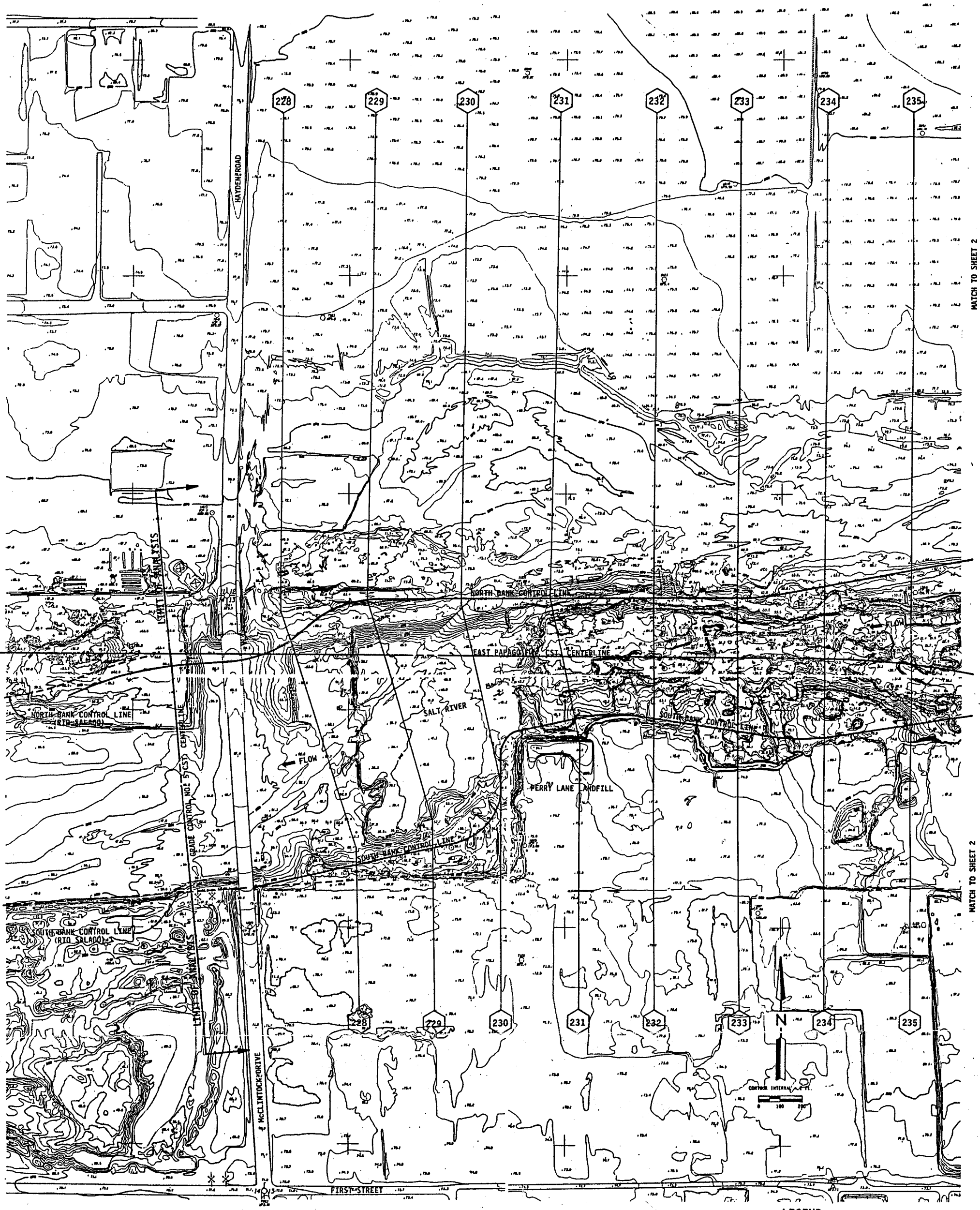
Santa Ana, CA 92705
(714) 568-7300

SALT RIVER CHANNELIZATION AND BANK PROTECTION

FIGURE 1
PROJECT LOCATION

* MODIFIED FROM SLA REPORT



LEGEND

- BANK CONTROL LINE
- ALIGNMENT CENTERLINE
- (233) CROSS-SECTION NUMBER

ADOT TOPOGRAPHIC MAPPING (PHOTO DATE: 6-14-90)

Project No.	AZ-DMUN-03
Date:	5-30-91
Design:	
Drawn:	JRM
Check:	
Revisions:	
CONTROL LINES (10-17-91)	

1 OF 3

SALT RIVER CHANNELIZATION AND BANK PROTECTION

FIGURE 2

ADOT BANK ALIGNMENT & PREVIOUS TOPOGHAPHIC MAPS

* TAKEN FROM SLA REPORT

sla SIMONS, LI & ASSOCIATES, INC.

NEWPORT BEACH, CA. • PHOENIX, AZ. • TUCSON, AZ. • FORT COLLINS, CO.

sla

2 OF 3

Project No.	AZ-DMJM-03
Date:	5-30-91
Design:	
Drawn:	JRM
Check:	
Revisions:	CONTROL LINES (10-17-91)

SALT RIVER CHANNELIZATION AND BANK PROTECTION

FIGURE 2

ADOT BANK ALIGNMENT & PREVIOUS TOPOGHAPHIC MAPS

*TAKEN FROM SLA REPORT

sla SIMONS, LI & ASSOCIATES, INC.

NEWPORT BEACH, CA. • PHOENIX, AZ. • TUCSON, AZ. • FORT COLLINS, CO.

sla

3 OF 3

Project No. AZ-DMJM-03
Date: 5-30-91
Design:
Drawn: JRM
Check:
Revisions:
South Bank Control Line (9-16-91)

SALT RIVER CHANNELIZATION AND BANK PROTECTION

FIGURE 2

ADOT BANK ALIGNMENT & PREVIOUS TOPOGHAPHIC MAPS

*TAKEN FROM SLA REPORT

sla Simons, Li & Associates, Inc.

Newport Beach, CA. • Phoenix, AZ. • Tucson, AZ. • Fort Collins, CO.

sla

II. DATA PREPARATION

2.1 Flow Rate

The 100-year flood peak discharge for the study reach was estimated as 220,000 cfs by the U.S. Army Corps of Engineers. This is commonly used in previous studies and design. The design hydrograph consists of flows exceeding 50,000 cfs for a time duration of four days.

2.2 Topographic and Cross Sectional Data

The 1986 topographic data were used by SLA to obtain the cross sectional data (Figure 2). These data were retained by BSI in the current study with the following modifications:

(1) SLA's computations assumed that the channel flow is divided by a dike, located 300 to 1,000 ft offset from the south bank, within the reach from Sections 246 through 252 (see Figure 2 and Attachment 1 for section locations). This assumption was removed in the current study since the water surface elevation is much higher than the dike elevation at several sections and the dike has been eroded by floodwater. Instead, the flow effective area was defined based on the aerial photographs taken during the January 1993 flood (see Attachment 2). The effective flow boundary shown in Attachment 1 was used to modify the encroachment stations in SLA's data.

(2) SLA's data for the study reach were taken from the 1986 topographs (see Figure 2). These were modified using topographic maps flown in 1990 and 1991 (provided by the Maricopa County Flood Control District). Primary river changes occurred near Sections 249 through 251, where high ground projecting into the river, was eroded by mining and floodwater (see Figure 2 and Attachment 1).

(4) For the SRPMIC alignment alternative, the effective flow area was further confined based on the proposed north levee locations shown in Attachment 1.

(5) It should be noted that the river bed has been significantly disturbed by historical sand/gravel mining which is difficult to survey; the pit storage area was assumed ineffective for hydraulic computations under both ADOT and SRPMIC Alternatives.

2.3 Soils Data

For sediment transport evaluation, the soil composition shown in Figure 3 was used, which represents the average gradation in the study area. More detailed soils data, sand/gravel pit mapping, and foundation exploration will be required for final design along the final selected alignment.

2.4 Backwater Control

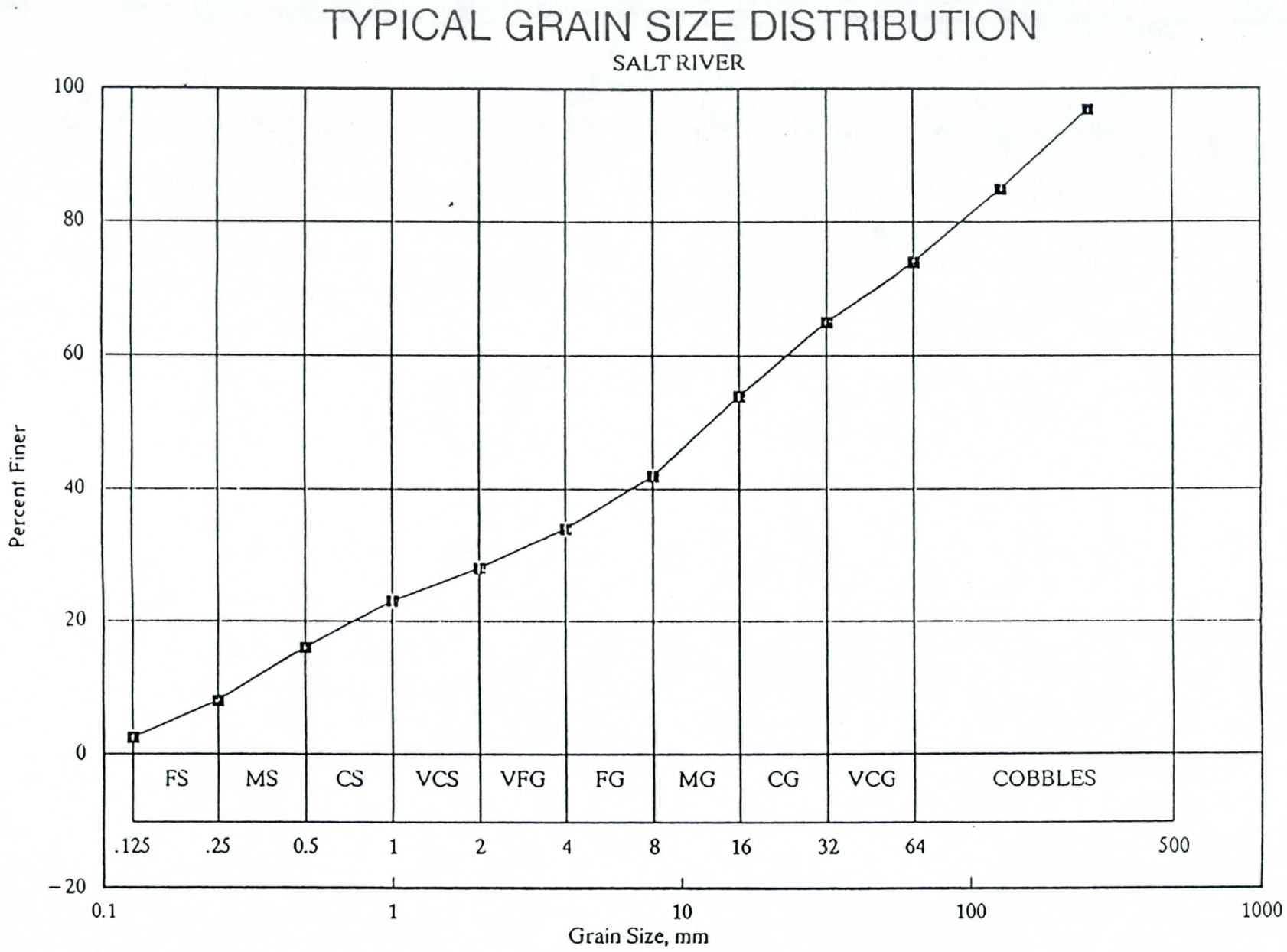
Both ADOT and SRPMIC Alternatives were analyzed based on the downstream water surface control at RMTI assuming the proposed channelization, bank protection, and freeway structure encroachment in the downstream reach. The backwater elevation was obtained from previous hydraulic computations by SLA (October 1992).

2.5 Channelization

Both ADOT and SRPMIC alternatives were evaluated for channel conditions with and without channelization. The existing channel slope varies mostly from -0.05% to 0.3%; the slope increases to 1.2% in the reach upstream of Dobson Road (Sections 252 and 253). The improved channel inverts were assumed to be uniform from RMTI to the upstream daylight invert, resulting in approximately 0.2% for the SRPMIC Alternative and 0.07% for the ADOT Alternative (see Sheet 2 of Attachment 1).

2.6 Flow Resistance

This study considers two flow resistance conditions: high resistance represented by Manning's n value of 0.04 for unimproved channel, and low resistance represented by Manning's n value of .035 for improved channel reaches.



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2001 E First St.
Santa Ana, CA 92705
(714) 568-7300

SALT RIVER CHANNELIZATION AND BANK PROTECTION

FIGURE 3
TYPICAL SALT RIVER GRAIN SIZE DISTRIBUTION

* MODIFIED FROM SLA REPORT

III. HYDRAULIC ANALYSIS

Hydraulic analysis was performed using the HEC-2 Model developed by the HEC Center of U.S. Army Corps of Engineers. The HEC-2 Model was applied to four conditions:

(1) ADOT north bank levee protection without channelization from RMTI to Section 247

(2) ADOT north bank levee protection with channelization from RMTI to Section 247

(3) SRPMIC north bank levee without channelization from RMTI to Section 253

(4) SRPMIC north bank levee with channelization from RMTI to Section 253

The HEC-2 output for each condition is included in Attachment 3 with the water surface profiles and average velocities for the ADOT and SRPMIC alternatives compared in Sheet 2, Attachment 1. The recommended levee heights are shown along with the water surface profiles. The minimum 3 ft freeboard as proposed by SLA is adequate to accommodate waves and sedimentation potential for both alternatives.

The SRPMIC Alternatives offer improvements to hydraulic transition and reduction of erosion and sedimentation problems, and, therefore, will reduce the impacts to the upstream and downstream channel reaches and the existing and proposed infrastructures, including the freeway crossings and bank protection for freeway encroachment. Its effects on the sediment transport and facility stability are discussed in the following section.

IV. EROSION/SEDIMENTATION ANALYSIS AND SCOUR PROTECTION

For Final design we may need more soils info.

Sediment transport analysis was performed for the study reaches as well as the upstream and downstream reaches. Using information obtained from the hydraulic analysis and soils gradation curve (Figure 3), the sediment transport capacity was computed for each channel reach referenced in the velocity profile (Attachment 1).

Table 1 summarizes the sediment transport capacity and aggradation and degradation potential for each reach for the four alternatives. This table shows that the study reach from Sections 242 to 250 is generally subject to sediment deposition while the reach from Sections 251 to 253 has degradation potential. The ADOT Alternatives involve higher erosion potential from Sections 251 to 253 and more significant sedimentation from Sections 242 to 250 as compared to the SRPMIC Alternatives. High deposition potential immediately upstream of the PIMA Freeway is also revealed by the fact that the low velocity in this reach cannot support the movement of most bed materials (larger than fine sand).

Although the river bed tends to aggrade, the north bank near Dobson Road has a high erosion tendency, as evidenced by the changes of topographic features from 1986 to 1991. The instability of the bank is partly related to historical sand and gravel mining activities. High velocity and scour potential near the upper limit of the study reach are anticipated because of the existing steep gradient.

The ADOT Alternatives can only provide interim protection to the north bridge abutment but offer no improvement to the upstream reach. The unstable nature of the reach upstream of the freeway may further affect the stability of the highway crossings. ?

HOW SO?

The SRPMIC Alternatives will improve channel stability by preventing further bank erosion along Sections 247 through 253, and reducing river bed erosion in the upper study reach (Sections 251 to 253) and sedimentation upstream of the PIMA Freeway crossing (Sections 242 to 250).

Not true. Still need to perform scour calculations

Because of general aggradation potential in the river bed, the previously designed toedown depth of 20 ft will be adequate to protect the levee and bank protection. This protection depth will also be sufficient for the upper study reach considering low flow impingement, bed form changes, and maximum general degradation (controlled by bed armoring).

Table 1
Sediment Transportation Analysis

	ADOT		ADOT w/channelization		SRPMIC		SRPMIC w/channelization	
	Sediment Transport Capacity (cfs)	Aggradation (f) Degradation (cfs)	Sediment Transport Capacity (cfs)	Aggradation (f) Degradation (cfs)	Sediment Transport Capacity (cfs)	Aggradation (f) Degradation (cfs)	Sediment Transport Capacity (cfs)	Aggradation (f) Degradation (cfs)
Reach 1 Downstream of PIMA Freeway	32	-20	32	-20	32	-20	32	-20
Reach 2 PIMA Freeway	12	-6	12	-10	12	10	12	-4
Reach 3 Sections 242 - 246	6	20	2	18	22	62	8	2
Reach 4 Sections 247 - 250	26	265 ?	20	221	84	12	10	25
Reach 5 Sections 251 - 253	291	-253 ?	241	-203 ?	96	-58 ?	35	3
Reach 6 Downstream of Study Reach to 2.5 miles upstream of Alma School Road	38	0	38	0	38	0	38	0

V. ADDITIONAL CONSIDERATION

The SRPMIC alignment is consistent with the long-term channelization and bank protection plan for the Salt River from Alma School Road to Val Vista Drive located upstream of the study reach (BRW, March 1992). The channel width is compatible with the proposed improvement for other reaches including upstream landfill protection and downstream freeway encroachment.

The SRPMIC Alternatives offer improvements to hydraulic transition and reduction of erosion and sedimentation problems, and, therefore, will reduce the impacts to the upstream and downstream channel reaches and the existing and proposed infrastructures, including the freeway crossings and bank protection for freeway encroachment.

Not set. backs & easements.

Sand and gravel mining in the study reach requires regulation. Regulation of sand and gravel mining may be more difficult under the ADOT Alternatives, which do not provide a physical limit of the effective flow. The SRPMIC Alternatives will define the north channel bank which separates the flood control channel from the overbank mining area. Although there is sedimentation potential within the study reach (Sections 242 to 250), the feasibility of in-stream mining needs be evaluated considering the stability of freeway crossings.

stability north levee?

The SRPMIC Alternatives offer high potential for future land use in the reclaimed overbank area. This area is expected to have high land value with freeway development and flood protection.

The disadvantage of SRPMIC Alternatives over ADOT Alternatives is the cost requirement. A preliminary cost estimate shows that the ADOT Alternatives cost approximately $ 1.5 million while the SRPMIC Alternatives require approximately $ 3.0 million (length of the SRPMIC levee is approximately twice of the ADOT bank and levee; see Tables 2 and 3).

Evaluate where the landfill is and see if any of the alt. encroach into the landfill. If it does we may need to eliminate that alternative. Or analyze true cost to remove and clean the landfill debris.

TABLE 2: ADOT ALTERNATIVE QUANTITY AND COST ESTIMATE

BSI Consultants, Inc.
2001 East First Street
Santa Ana, CA 92705

01/14/94
12:32 PM

PROJECT: SALT RIVER LEVEE
LIMITS : STA 65+00 TO STA 97+00, ADOT ALTERNATIVE

ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL COST
1	DRAINAGE EXCAVATION	CY	22,760	1.60	36,416.00
2	CHANNEL EXCAVATION	CY	113,180	0.90	101,862.00
3	SOIL CEMENT	CY	48,640	23.60	1,147,904.00

SUB-TOTAL = $1,286,182.00
15 % CONTINGENCY = $192,927.30

TOTAL = $1,479,109.30

TABLE 3: SRPMIC ALTERNATIVE QUANTITY AND COST ESTIMATES

BSI Consultants, Inc.
2001 East First Street
Santa Ana, CA 92705

01/14/94
12:30 PM

PROJECT: SALT RIVER LEVEE
LIMITS : STA 65+00 TO STA 127+00, SRPMIC ALTERNATIVE

ITEM NO.	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL COST
1	DRAINAGE EXCAVATION	CY	208,963	1.60	334,340.80
2	CHANNEL EXCAVATION	CY	0	0.90	0.00
3	SOIL CEMENT	CY	95,526	23.60	2,254,413.60

* COST FOR CHANNELIZATION AND LANDFILL BEHIND THE LEVEE IS NOT INCLUDED

SUB-TOTAL = $2,588,754.40
15 % CONTINGENCY = $388,313.16

* TOTAL = $2,977,067.56

- embankment
- protect backside

Landfill issue should be evaluated.

VI. CONCLUSIONS

It is concluded from the current study that the proposed SRPMIC north bank alignment is more costly but is preferred to the previously proposed north bank alignment by ADOT for the following reasons:

(1) The SRPMIC north bank alignment will result in channel width and hydraulic features compatible to those of the upstream and downstream reaches. The bank widths are significantly wider and the flow velocities are relatively low upstream of the freeway crossings as compared to the current and proposed improvements. In addition, this alignment is consistent with the long-term channelization and bank protection plan for the Salt River within the SRPMIC properties but also it is compatible to the from Alma School Road to Val Vista Drive located upstream of the study reach. - bad?

(2) The SRPMIC Alternatives will improve channel stability by preventing further bank erosion along Sections 247 through 253, and reducing river bed erosion in the upper study reach (Sections 251 to 253) and sedimentation upstream of the PIMA Freeway crossing (Sections 242 to 250). So what!

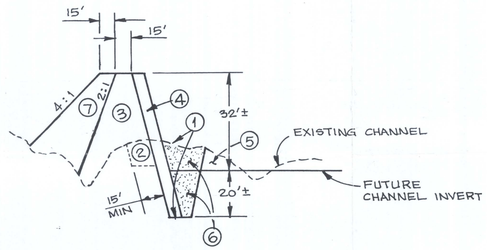
(3) The SRPMIC Alternatives offer improvements to hydraulic transition and reduction of erosion and sedimentation problems, and, therefore, will reduce the impacts to the upstream and downstream channel reaches and the existing and proposed infrastructures, including the freeway crossings and bank protection for freeway encroachment.

(4) The SRPMIC Alternatives will define the north channel bank which separates the flood control channel from the overbank mining area. This provides physical boundaries for better sand and gravel regulation.

(5) The SRPMIC Alternatives offer high potential for future land use in the reclaimed overbank area.

ATTACHMENT 1

SHEET 1
LEVEE PLAN AND SECTION LOCATIONS



1. EXCAVATE FOR CSA
2. EXCAVATION FOR CSA – TO REPLACE EXIST. LANDFILL MAT'L.
3. EMBANKMENT FOR CSA – 95% STRUCTURAL FILL
4. PLACE CSA
5. FUTURE CHANNELIZATION
6. BACKFILL CSA TOE DOWN – 85% UNCLASSIFIED FILL
7. BACKFILL – 85% UNCLASSIFIED FILL

TYPICAL SECTION OF SRPMIC LEVEE

NTS

SCALE 1" = 400'

SALT RIVER CHANNELIZATION AND BANK PROTECTION

LEVEE PLAN & SECTION LOCATIONS

ATTACHMENT 1

SHEET 1 OF 2

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Santa Ana, CA 92705
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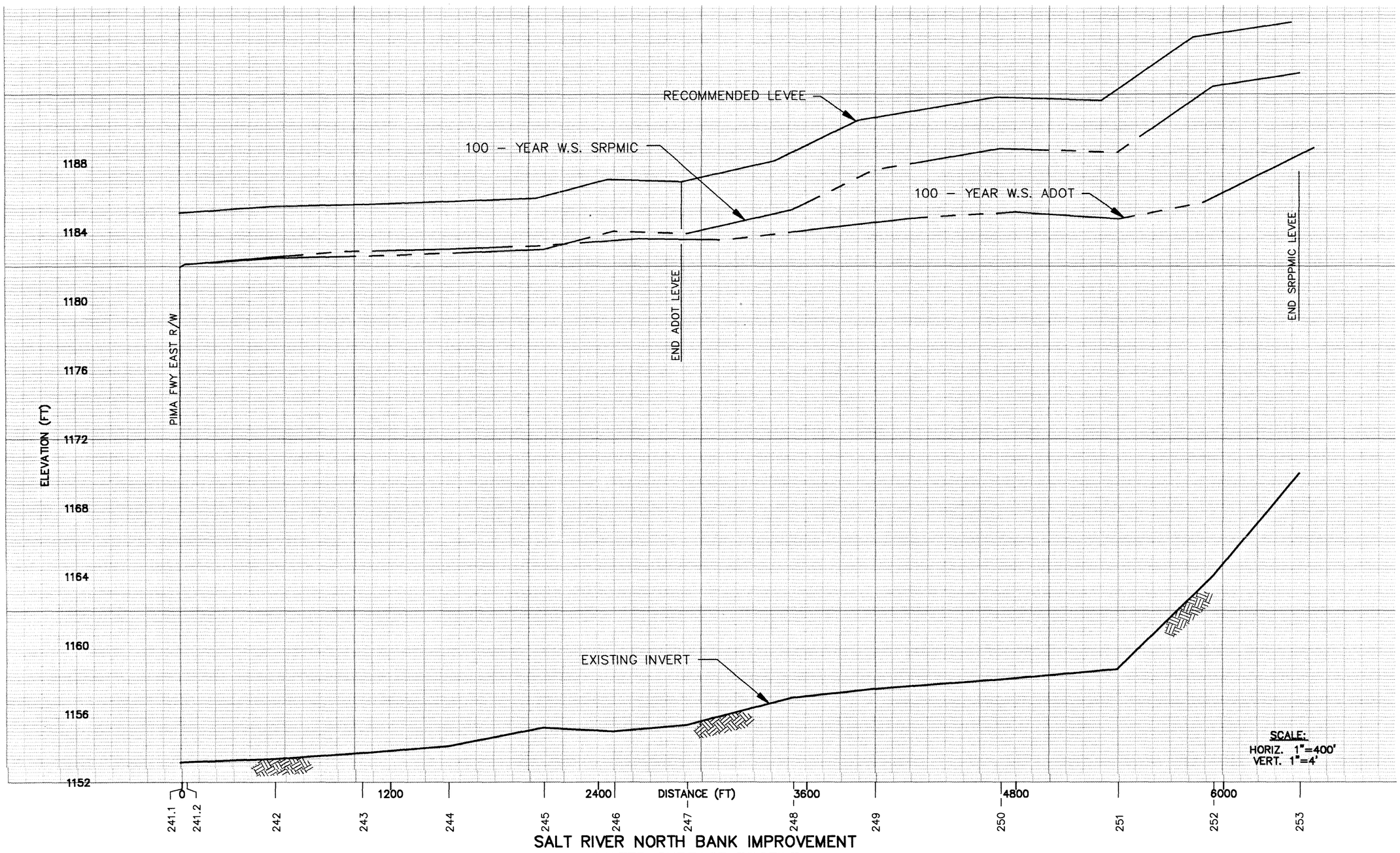
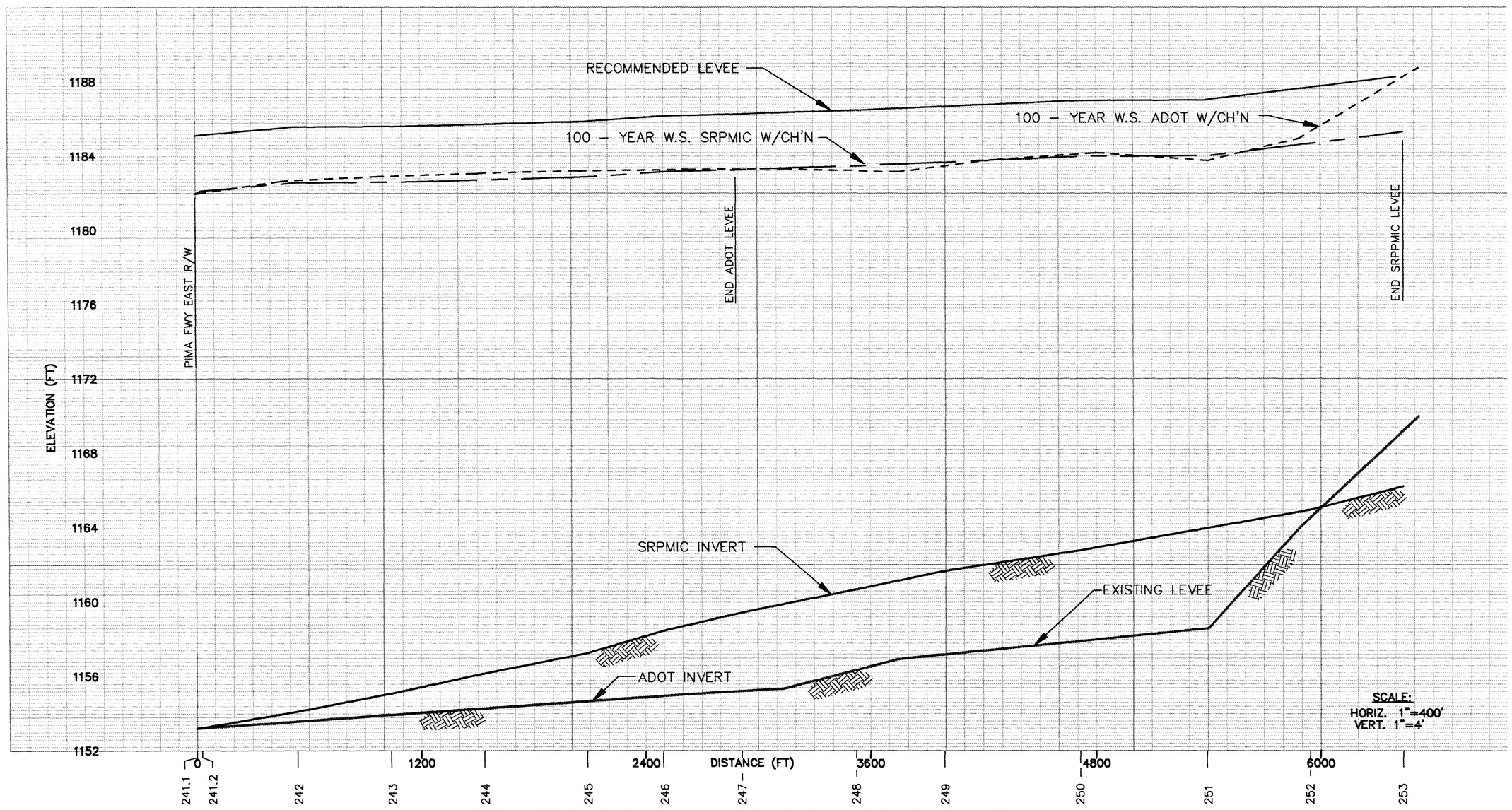
ATTACHMENT 1

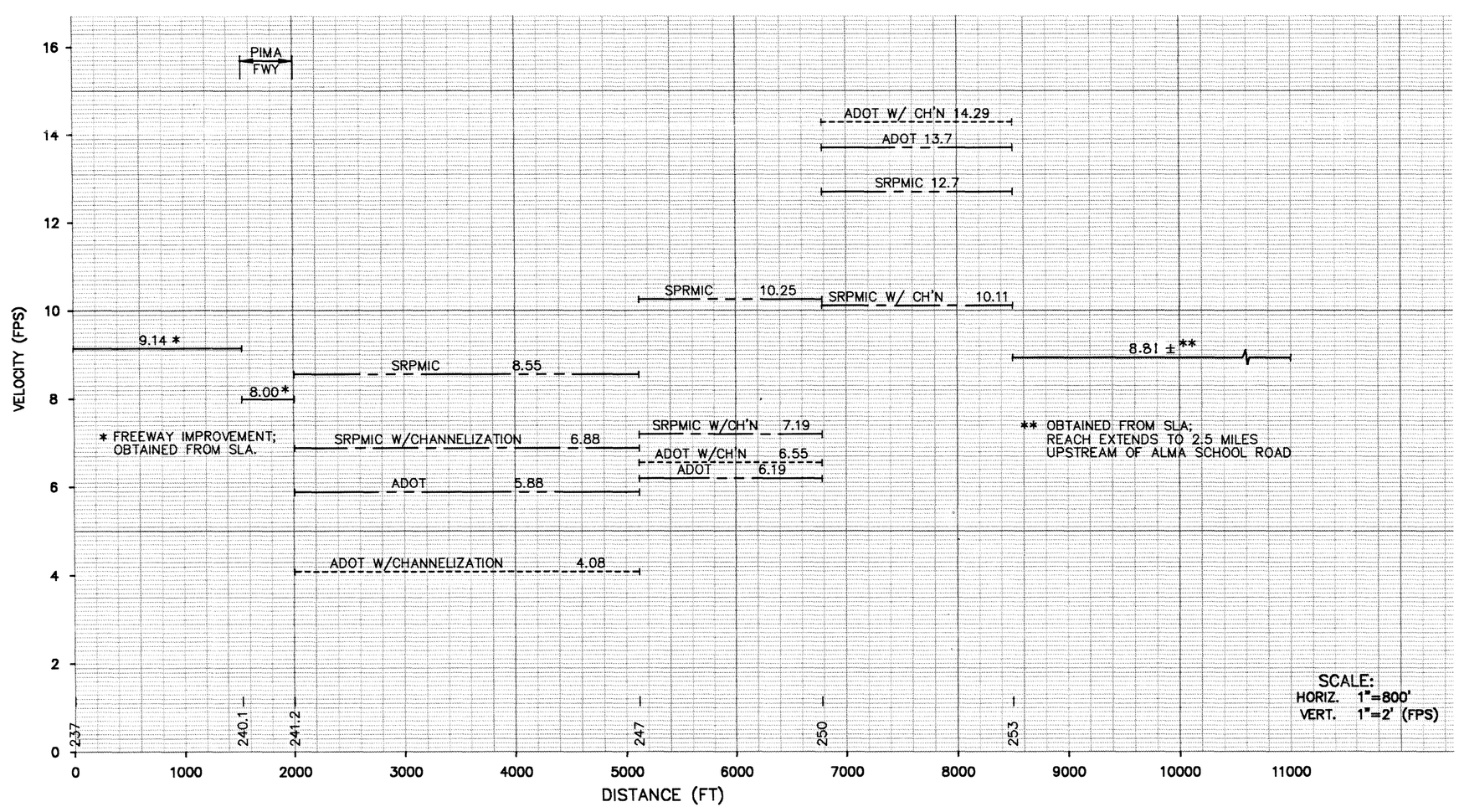
SHEET 2
WATER SURFACE AND VELOCITY PROFILES



SALT RIVER NORTH BANK IMPROVEMENT
WATER SURFACE PROFILE



SALT RIVER NORTH BANK IMPROVEMENT AND CHANNELIZATION
WATER SURFACE PROFILE



SALT RIVER NORTH BANK IMPROVEMENT AND CHANNELIZATION
WATER SURFACE PROFILE

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SALT RIVER CHANNELIZATION AND BANK PROTECTION

PROFILES

ATTACHMENT 1

SHEET 2 OF 2

12074.00 FLOOD.DWG 1-13-94 T.L.R.

ATTACHMENT 2

AERIAL PHOTOGRAPHS

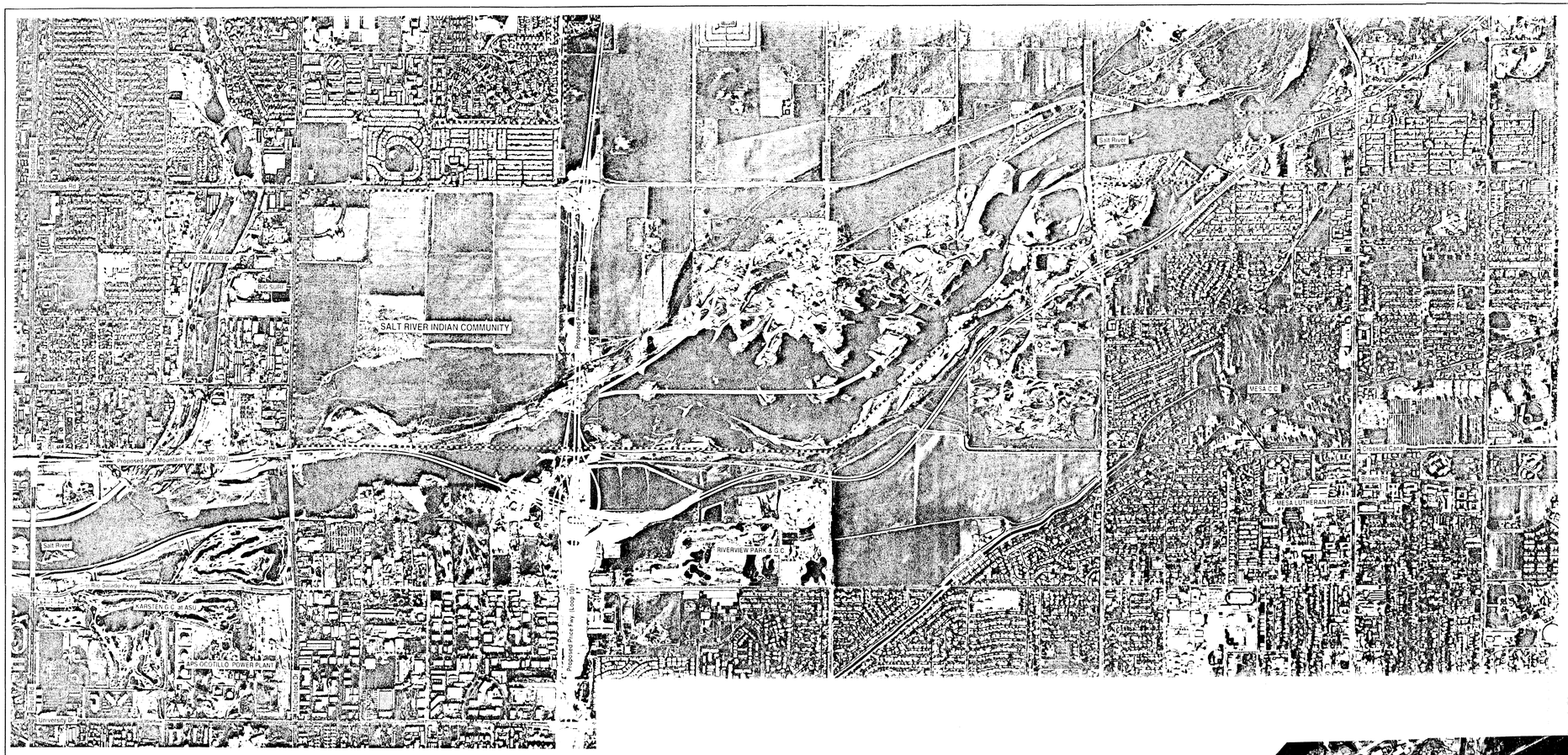

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PHOTO DATE: JANUARY 4, 1993
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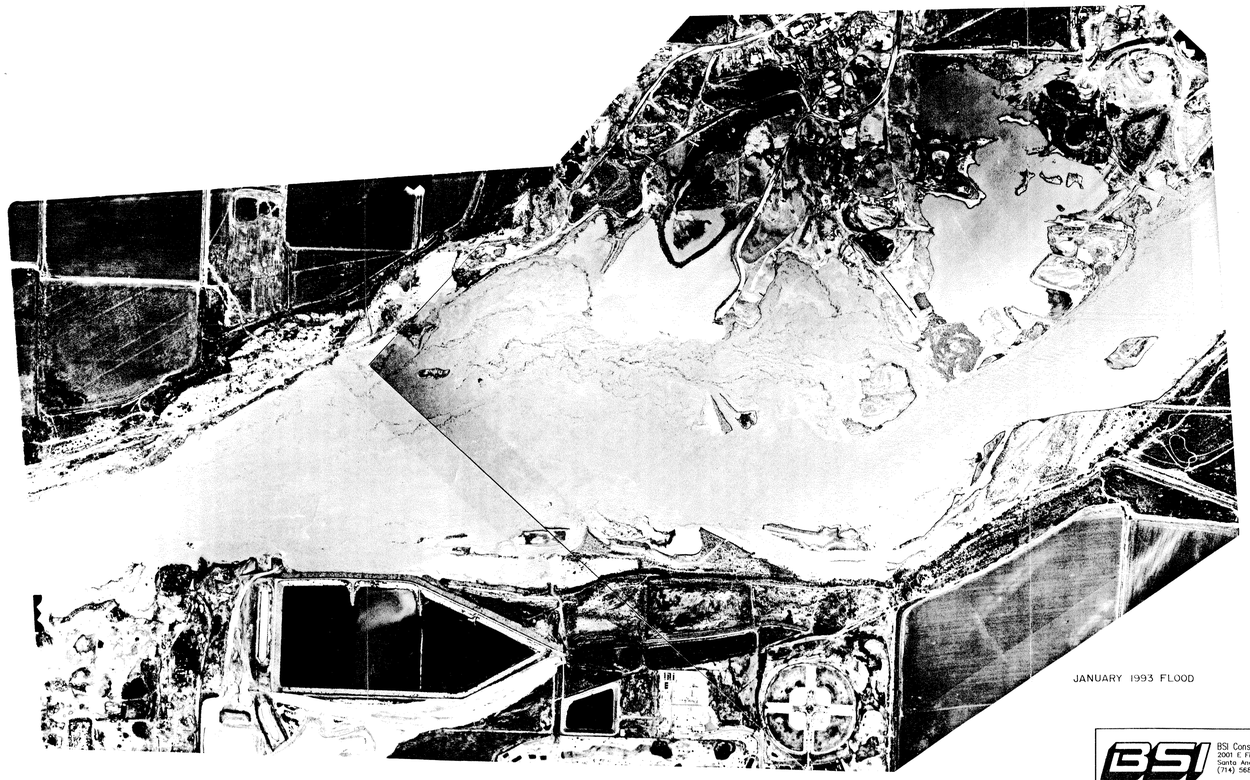
N-18



JANUARY 1993 FLOOD

BSI Consultants, Inc.
2001 E. First St.
Santa Ana, CA 92705
(714) 568-7300

SALT RIVER CHANNELIZATION AND BANK PROTECTION

AERIAL PHOTOGRAPHS

ATTACHMENT 2

SHEET 1 OF 1

12074.00 FLOOD.DWG 1-7-94 T.L.R.

SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY ALTERNATIVE WITHOUT CHANNELIZATION

ATTACHMENT 3

HEC-2 OUTPUT

THIS RUN EXECUTED 06JAN94 15:26:23

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

 Version   4.6.2;  May 1991
************************************


T1 BSI CONSULTANTS, SANTA ANA,CA /L.JOHNSON
T2 SALT RIVER HEC-2 ANALYSIS (SECTIONS 241.1 - 253.0)
T3 PROPOSED SRPMIC ALIGNMENT                        INPUT FILE:SRPMIC.DAT

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        0        0        0        0        0     1181.97     0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     -1        0       -1        0        0        0       -1        0        0        0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        1       55       26       56       13       14       15       43        4
     53       54        0       38        1        2        3       42        8        5
     33       39       67       68

J6  IHLEQ     ICOPY    SUBDIV   STRTDS   RMILE

      1


QT       2    220000
NC     .05       .05     .035       .3       .5
X1   241.1         4     5000     6084       59       59       59
X3                                5000                6084
GR  1183.6      5000  1153.20   5030.4  1153.20   6053.6   1183.6     6084

SB    1.05      1.56      2.6        0     1025      130    28486        1  1153.23  1153.20
X1   241.2         4     5000     6100       29       29       29
X2                            1     1184     1192
X3                                5000                6100
GR  1183.7      5000  1153.23   5030.5  1153.23   6069.5   1183.7     6100

X1  242.00        45    5000.0     6980    510.0    510.0    510.0
X3                                5000                6350
GR  1184.0    4880.0   1184.00   4910.0  1180.00   4920.0  1184.20   4985.0  1183.90   5000.0
GR  1153.4    5031.0   1162.00   5105.0  1164.00   5125.0  1162.00   5325.0  1160.00   5450.0
GR  1158.0    5555.0   1153.67   5594.7  1153.67   5610.0  1153.67   5645.0  1153.67   5700.0
GR  1153.7    5720.0   1153.67   5724.2  1160.00   5740.0  1160.00   5755.0  1153.67   5777.2
GR  1153.7    5790.0   1153.67   5825.0  1153.67   5843.4  1156.00   5855.0  1153.67   5868.6
GR  1153.7    5890.0   1153.67   6050.0  1153.67   6085.0  1153.67   6165.0  1153.67   6174.7
```

GR	1158.0	6200.0	1153.67	6210.8	1153.67	6220.0	1153.67	6250.0	1153.67	6259.2
GR	1154.0	6260.0	1156.00	6435.0	1160.00	6450.0	1170.00	6470.0	1172.00	6480.0
GR	1174.0	6565.0	1176.00	6705.0	1176.00	6965.0	1180.00	6975.0	1184.00	6980.0
NC			0.040	0.1	0.3					
X1	243.00	25	5000.0	7125	500.0	500.0	500.0			
X3				5000		6225				
GR	1184.0	4885.0	1180.00	4900.0	1170.00	4925.0	1164.00	4945.0	1184.80	4985.0
GR	1184.5	5000.0	1153.73	5031.0	1162.00	5085.0	1160.00	5180.0	1160.00	5520.0
GR	1154.2	5544.3	1154.16	5545.0	1154.16	5630.0	1154.16	5960.0	1154.16	6240.0
GR	1154.2	6480.0	1154.16	6505.0	1154.16	6660.0	1154.16	6689.1	1160.00	6730.0
GR	1170.0	6830.0	1176.00	6970.0	1178.00	7100.0	1180.00	7120.0	1184.00	7125.0
X1	244.00	41	5000.0	7405	495.0	495.0	495.0			
X3				5000		6220				
GR	1184.0	4830.0	1184.00	4875.0	1160.00	4920.0	1160.00	4935.0	1185.10	4985.0
GR	1184.8	5000.0	1154.14	5031.0	1160.00	5045.0	1170.00	5130.0	1170.00	5175.0
GR	1160.0	5315.0	1160.00	5500.0	1156.00	5745.0	1156.00	5910.0	1154.70	5939.5
GR	1154.7	6000.0	1154.69	6008.4	1160.00	6025.0	1162.00	6040.0	1162.00	6085.0
GR	1160.0	6105.0	1154.69	6115.6	1154.69	6125.0	1154.69	6230.0	1154.69	6272.2
GR	1160.0	6320.0	1160.00	6440.0	1170.00	6460.0	1174.00	6535.0	1170.00	6830.0
GR	1154.7	6856.8	1154.69	6865.0	1154.69	6880.0	1154.69	6960.0	1154.69	6980.0
GR	1154.7	6985.9	1170.00	7005.0	1170.00	7330.0	1172.00	7380.0	1180.00	7395.0
GR	1186.0	7405.0								
X1	245.00	44	4830.0	7855	550.0	550.0	550.0			
X3				5000		6220				
GR	1184.0	4790.0	1184.00	4830.0	1180.00	4850.0	1170.00	4905.0	1165.00	4945.0
GR	1185.4	4985.0	1185.10	5000.0	1160.00	5035.0	1168.00	5150.0	1168.00	5190.0
GR	1170.0	5200.0	1176.00	5245.0	1176.00	5330.0	1170.00	5335.0	1162.00	5490.0
GR	1162.0	5560.0	1164.00	5610.0	1168.00	5720.0	1168.00	5785.0	1166.00	5905.0
GR	1160.0	6030.0	1155.24	6049.0	1155.24	6070.0	1155.24	6115.0	1155.24	6160.0
GR	1155.2	6191.4	1160.00	6220.0	1155.24	6239.0	1155.24	6260.0	1155.24	6300.0
GR	1155.2	6486.0	1160.00	6655.0	1170.00	6670.0	1176.00	6680.0	1178.00	6710.0
GR	1178.0	7000.0	1176.00	7065.0	1174.00	7380.0	1170.00	7390.0	1170.00	7520.0
GR	1172.0	7660.0	1180.00	7685.0	1188.00	7710.0	1190.00	7855.0		
X1	246.00	42	5000.0	8160	410.0	410.0	410.0			
X3				5000		6370				
GR	1184.0	4970.0	1185.70	4985.0	1185.40	5000.0	1154.99	5031.0	1180.00	5145.0
GR	1184.0	5160.0	1180.00	5170.0	1170.00	5280.0	1155.84	5294.2	1155.84	5300.0
GR	1155.8	5338.0	1170.00	5430.0	1166.00	5735.0	1162.00	5825.0	1162.00	5960.0
GR	1164.0	6035.0	1160.00	6150.0	1155.84	6160.4	1155.84	6165.0	1155.84	6210.0
GR	1155.8	6810.0	1155.84	6819.6	1160.00	6830.0	1162.00	6840.0	1170.00	6940.0
GR	1176.0	6950.0	1176.00	7150.0	1174.00	7270.0	1174.00	7430.0	1176.00	7470.0
GR	1176.0	7520.0	1172.00	7560.0	1172.00	7760.0	1176.00	7790.0	1176.00	7825.0
GR	1174.0	7850.0	1172.00	7890.0	1172.00	7945.0	1174.00	8005.0	1180.00	8020.0
GR	1188.0	8100.0	1190.00	8160.0						

X1	247.00	49	5000.0	8330	420.0	420.0	420.0			
X3				5000		6385				
GR	1185.9	4985.0	1185.60	5000.0	1155.35	5030.0	1177.00	5073.0	1176.00	5165.0
GR	1170.0	5180.0	1160.00	5220.0	1156.34	5227.3	1156.34	5240.0	1156.34	5265.0
GR	1156.3	5353.5	1170.00	5495.0	1162.00	5590.0	1162.00	5750.0	1170.00	5780.0
GR	1180.0	5800.0	1182.00	5810.0	1184.00	5825.0	1186.00	5870.0	1186.00	6070.0
GR	1180.0	6170.0	1160.00	6255.0	1160.00	6310.0	1170.00	6335.0	1180.00	6350.0
GR	1186.0	6440.0	1186.00	6540.0	1180.00	6555.0	1160.00	6570.0	1160.00	6700.0
GR	1170.0	6740.0	1160.00	6780.0	1160.00	6900.0	1170.00	6970.0	1180.00	7030.0
GR	1180.0	7065.0	1178.00	7190.0	1176.00	7270.0	1170.00	7415.0	1176.00	7450.0
GR	1176.0	7570.0	1170.00	7695.0	1170.00	7870.0	1176.00	7885.0	1176.00	8070.0
GR	1170.0	8080.0	1170.00	8250.0	1180.00	8290.0	1190.00	8330.0		

X1	248.00	51	5000.0	8855	610.0	610.0	610.0			
X3				5000		6385				
GR	1186.2	4985.0	1185.90	5000.0	1164.00	5022.0	1174.00	5180.0	1172.00	5215.0
GR	1170.0	5225.0	1164.00	5260.0	1164.00	5450.0	1170.00	5490.0	1176.00	5535.0
GR	1178.0	5580.0	1180.00	5585.0	1186.00	5600.0	1180.00	5630.0	1170.00	5700.00
GR	1160.0	5760.0	1160.00	5790.0	1170.00	5810.0	1180.00	5940.0	1186.00	5950.0
GR	1186.0	6265.0	1180.00	6280.0	1156.95	6306.9	1156.95	6315.0	1156.95	6340.0
GR	1157.0	6505.0	1156.95	6666.0	1156.95	6670.0	1156.95	6788.2	1170.00	7010.0
GR	1172.0	7055.0	1170.00	7080.0	1162.00	7100.0	1160.00	7485.0	1160.00	7610.0
GR	1157.0	7637.4	1156.95	7700.0	1156.95	7795.0	1156.95	7941.0	1160.00	8005.0
GR	1170.0	8015.0	1174.00	8030.0	1174.00	8210.0	1176.00	8250.0	1178.00	8310.0
GR	1178.0	8410.0	1176.00	8575.0	1180.00	8590.0	1184.00	8610.0	1186.00	8830.0
GR	1190.0	8855.0								

X1	249.00	49	5000.0	8755	470.0	470.0	470.0			
X3				5000		6400				
GR	1184.0	4980.0	1186.50	4985.0	1186.20	5000.0	1164.00	5022.0	1164.00	5135.0
GR	1164.0	5210.0	1170.00	5270.0	1172.00	5300.0	1174.00	5420.0	1178.00	5530.0
GR	1180.0	5555.0	1186.00	5580.0	1188.00	5670.0	1186.00	5700.0	1180.00	5710.0
GR	1170.0	6010.0	1160.00	6245.0	1160.00	6415.0	1157.45	6421.4	1157.45	6440.0
GR	1157.5	6490.0	1157.45	6660.0	1157.45	6760.0	1157.45	7070.0	1157.45	7140.0
GR	1157.5	7165.0	1157.45	7220.0	1157.45	7300.0	1157.45	7350.0	1157.45	7368.6
GR	1170.0	7400.0	1178.00	7425.0	1170.00	7485.0	1160.00	7500.0	1157.45	7531.9
GR	1157.5	7600.0	1157.45	7795.3	1158.00	7815.0	1160.00	8020.0	1170.00	8030.0
GR	1170.0	8055.0	1170.00	8345.0	1180.00	8355.0	1182.00	8365.0	1170.00	8420.0
GR	1170.0	8530.0	1180.00	8580.0	1188.00	8640.0	1188.00	8755.0		

X1	250.00	37	5000.0	7850	720.0	720.0	720.0			
X3				5000		6390				
GR	1190.0	4910.0	1180.00	4940.0	1186.70	4985.0	1186.40	5000.0	1166.00	5020.0
GR	1170.0	5120.0	1166.00	5130.0	1166.00	5175.0	1170.00	5240.0	1178.00	5380.0
GR	1180.0	5500.0	1184.00	5540.0	1184.00	5610.0	1180.00	5640.0	1170.00	5810.0
GR	1158.0	5822.0	1158.00	5830.0	1158.00	5980.0	1158.00	6064.0	1160.00	6085.0
GR	1170.0	6100.0	1174.00	6110.0	1174.00	6220.0	1170.00	6250.0	1160.00	6320.0
GR	1158.0	6330.0	1158.00	6340.0	1158.00	6410.0	1158.00	6742.5	1160.00	7075.0
GR	1158.0	7082.0	1158.00	7110.0	1158.00	7500.0	1158.00	7628.0	1160.00	7660.0
GR	1180.0	7700.0	1190.00	7850.0						

X1	251.00	38	5000.0	8080	680.0	680.0	680.0			
X3				5000		6070				
GR	1194.0	4590.0	1194.00	4820.0	1192.00	4855.0	1190.00	4860.0	1180.00	4870.0
GR	1168.0	4895.0	1168.00	4947.0	1187.20	4985.0	1186.90	5000.0	1168.00	5019.0
GR	1172.0	5080.0	1176.00	5095.0	1174.00	5125.0	1180.00	5260.0	1186.00	5320.0
GR	1188.0	5330.0	1186.00	5560.0	1160.6	5930	1160.0	6345.0	1158.6	6428.1
GR	1197	6500	1197	6800	1159	6870	1158.60	7027.3	1160.0	7050.0
GR	1164.0	7120.0	1160.0	7145.0	1160.0	7215.0	1158.60	7217.1	1158.6	7230.0
GR	1158.6	7425.0	1158.6	7437.9	1180.0	7470.0	1182.00	7485.0	1180.0	7610.0
GR	1180.0	7670.0	1186.0	7860.0	1190.0	8080.0				
X1	252.00	29	5000.0	7555	550.0	550.0	550.0			
X3				5000		6100				
GR	1194.0	4760.0	1192.00	4945.0	1190.00	4950.0	1180.00	4965.0	1187.60	4985.0
GR	1187.3	5000.0	1170.00	5017.0	1170.00	5045.0	1170.00	5115.0	1174.00	5160.0
GR	1174.0	5240.0	1176.00	5280.0	1178.00	5310.0	1180.00	5325.0	1178.00	5340.0
GR	1178.0	5360.0	1180.00	5540.0	1186.00	5580.0	1180.00	5605.0	1170.00	5620.0
GR	1170.0	6560	1164.0	6580.0	1164.0	6800.0	1170.0	6820.0	1170.0	7085.0
GR	1180.0	7150.0	1170.0	7370.0	1180.0	7405.0	1190.0	7555.0		
X1	253.00	25	5000.0	8320	495.0	495.0	495.0			
X3				5000		6160				
GR	1188.2	4985.0	1187.90	5000.0	1176.00	5012.0	1180.00	5070.0	1178.00	5085.0
GR	1178.0	5155.0	1180.00	5170.0	1182.00	5190.0	1180.00	5230.0	1178.00	5290.0
GR	1176.0	5300.0	1176.00	5590.0	1180.00	5600.0	1170.00	5795.0	1170.00	5940.0
GR	1180.0	5960.0	1186.00	6050.0	1188.00	6070.0	1180.00	6110.0	1180.00	6260.0
GR	1176.0	6510.0	1176.00	6740.0	1180.00	6810.0	1190.0	6840.0	1190.00	8320.0

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

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .300 CEHV= .500
*SECNO 241.100

3470 ENCROACHMENT STATIONS= 5000.0 6084.0 TYPE= 1 TARGET= 1084.000

241.100	28.77	1181.97	1164.40	1181.97	1182.79	.82	.00	.00	1233.60
220000.0	.0	220000.0	.0	.0	30265.2	.0	.0	.0	100000.00
.00	.00	7.27	.00	.000	.035	.000	.000	1153.20	5001.63
.000355	59.	59.	59.	0	17	0	.00	1080.74	6082.37

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.05	1.56	2.60	.00	1025.00	130.00	28486.00	1.00	1153.23	1153.20

*SECNO 241.200
CLASS A LOW FLOW

3420 BRIDGE W.S.= 1181.71 BRIDGE VELOCITY= 8.36 CALCULATED CHANNEL AREA= 26303.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	1182.92	.16	0.	220000.	28486.	28486.	1184.00	1192.00	0.

3470 ENCROACHMENT STATIONS= 5000.0 6100.0 TYPE= 1 TARGET= 1100.000

241.200	28.90	1182.13	.00	.00	1182.92	.79	.13	.00	1233.70
220000.0	.0	220000.0	.0	.0	30863.8	.0	20.3	.7	100000.00
.00	.00	7.13	.00	.000	.035	.000	.000	1153.23	5001.57
.000339	29.	29.	29.	0	0	0	.00	1096.86	6098.43

*SECNO 242.000

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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


3470 ENCROACHMENT STATIONS=     5000.0    6350.0  TYPE=      1  TARGET=     1350.000
   242.000     29.09   1182.49   1166.38       .00   1183.13       .65       .17       .04   1183.90
  220000.0        .0  220000.0        .0        .0   34123.1        .0     400.8      15.0 100000.00
       .02       .00      6.45       .00      .000      .035      .000      .000   1153.40   5001.44
   .000324      510.      510.      510.         2        14         0       .00   1348.56   6350.00


CCHV=     .100 CEHV=     .300
*SECNO 243.000

3470 ENCROACHMENT STATIONS=     5000.0    6225.0  TYPE=      1  TARGET=     1225.000
   243.000     28.88   1182.61   1166.69       .00   1183.37       .76       .20       .03   1184.50
  220000.0        .0  220000.0        .0        .0   31482.6        .0     777.3      29.8 100000.00
       .04       .00      6.99       .00      .000      .040      .000      .000   1153.73   5001.90
   .000487      500.      500.      500.         2        14         0       .00   1223.10   6225.00


*SECNO 244.000

3470 ENCROACHMENT STATIONS=     5000.0    6220.0  TYPE=      1  TARGET=     1220.000
   244.000     28.63   1182.77   1169.39       .00   1183.72       .95       .30       .06   1184.80
  220000.0        .0  220000.0        .0        .0   28108.5        .0    1115.9      43.7 100000.00
       .06       .00      7.83       .00      .000      .040      .000      .000   1154.14   5002.05
   .000708      495.      495.      495.         2        11         0       .00   1217.95   6220.00


*SECNO 245.000

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3470 ENCROACHMENT STATIONS=     5000.0    6220.0  TYPE=      1  TARGET=     1220.000
   245.000     27.78   1182.98   1174.36       .00   1184.55      1.57       .64       .19 100000.00
  220000.0        .0  220000.0        .0        .0   21893.0        .0    1431.6      59.0 100000.00
       .08       .00     10.05       .00      .000      .040      .000      .000   1155.20   5002.96
   .001613      550.      550.      550.         2        19         0       .00   1217.04   6220.00
```

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 246.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 5000.0 6370.0 TYPE= 1 TARGET= 1370.000

246.000	29.06	1184.05	1172.80	.00	1185.09	1.04	.50	.05	1185.40
220000.0	.0	220000.0	.0	.0	26824.3	.0	1660.8	71.2	100000.00
.09	.00	8.20	.00	.000	.040	.000	.000	1154.99	5001.38
.000970	410.	410.	410.	2	14	0	.00	1368.62	6370.00

*SECNO 247.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS= 5000.0 6385.0 TYPE= 1 TARGET= 1385.000

247.000	28.56	1183.91	1176.15	.00	1186.07	2.16	.64	.33	1185.60
220000.0	.0	220000.0	.0	.0	18674.4	.0	1880.2	83.1	100000.00
.10	.00	11.78	.00	.000	.040	.000	.000	1155.35	5001.67
.002408	420.	420.	420.	2	16	0	.00	1102.96	6385.00

*SECNO 248.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 5000.0 6385.0 TYPE= 1 TARGET= 1385.000

248.000	28.35	1185.30	1179.68	.00	1187.89	2.59	1.69	.13	1185.90
220000.0	.0	220000.0	.0	.0	17031.1	.0	2130.2	98.3	100000.00
.11	.00	12.92	.00	.000	.040	.000	.000	1156.95	5000.60
.003200	610.	610.	610.	2	15	0	.00	1061.27	6385.00

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 249.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS= 5000.0 6400.0 TYPE= 1 TARGET= 1400.000

249.000	30.16	1187.61	1178.66	.00	1188.99	1.38	.98	.12	1186.20
220000.0	.0	220000.0	.0	.0	23317.7	.0	2347.9	111.4	100000.00
.13	.00	9.43	.00	.000	.040	.000	.000	1157.45	5000.00
.001543	470.	470.	470.	2	19	0	.00	1376.96	6400.00

*SECNO 250.000

3470 ENCROACHMENT STATIONS= 5000.0 6390.0 TYPE= 1 TARGET= 1390.000

250.000	30.84	1188.84	1177.51	.00	1189.93	1.09	.91	.03	1186.40
220000.0	.0	220000.0	.0	.0	26222.8	.0	2757.3	134.3	100000.00
.15	.00	8.39	.00	.000	.040	.000	.000	1158.00	5000.00
.001068	720.	720.	720.	2	11	0	.00	1390.00	6390.00

*SECNO 251.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .41

3470 ENCROACHMENT STATIONS= 5000.0 6070.0 TYPE= 1 TARGET= 1070.000

251.000	30.03	1188.63	1184.99	.00	1192.53	3.90	1.76	.84	1186.90
220000.0	.0	220000.0	.0	.0	13890.8	.0	3070.4	153.5	100000.00
.16	.00	15.84	.00	.000	.040	.000	.000	1158.60	5000.00
.006255	680.	680.	680.	3	11	0	.00	1070.00	6070.00

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 252.000
3280 CROSS SECTION 252.00 EXTENDED 2.47 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.92

3470 ENCROACHMENT STATIONS= 5000.0 6100.0 TYPE= 1 TARGET= 1100.000

252.000	28.47	1192.47	1184.10	.00	1194.21	1.74	1.46	.22	1187.30
220000.0	.0	220000.0	.0	.0	20782.4	.0	3289.3	167.2	100000.00
.18	.00	10.59	.00	.000	.040	.000	.000	1164.00	5000.00
.001691	550.	550.	550.	2	19	0	.00	1100.00	6100.00

*SECNO 253.000
3280 CROSS SECTION 253.00 EXTENDED 3.23 FEET

3470 ENCROACHMENT STATIONS= 5000.0 6160.0 TYPE= 1 TARGET= 1160.000

253.000	23.23	1193.23	1187.30	.00	1195.36	2.13	1.04	.12	1187.90
220000.0	.0	220000.0	.0	.0	18780.0	.0	3514.1	180.0	100000.00
.19	.00	11.71	.00	.000	.040	.000	.000	1170.00	5000.00
.002508	495.	495.	495.	2	14	0	.00	1160.00	6160.00

THIS RUN EXECUTED 06JAN94 15:26:30

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

SED SRPMIC ALIGNMENT

SUMMARY PRINTOUT

	SECNO	CWSEL	VLOB	VCH	VROB	QLOB	QCH	QROB	Q	TOPWID	SSTA	ENDST
	241.100	1181.97	.00	7.27	.00	.00	220000.00	.00	220000.00	1080.74	5001.63	6082.37
	241.200	1182.13	.00	7.13	.00	.00	220000.00	.00	220000.00	1096.86	5001.57	6098.43
	242.000	1182.49	.00	6.45	.00	.00	220000.00	.00	220000.00	1348.56	5001.44	6350.00
	243.000	1182.61	.00	6.99	.00	.00	220000.00	.00	220000.00	1223.10	5001.90	6225.00
	244.000	1182.77	.00	7.83	.00	.00	220000.00	.00	220000.00	1217.95	5002.05	6220.00
*	245.000	1182.98	.00	10.05	.00	.00	220000.00	.00	220000.00	1217.04	5002.96	6220.00
	246.000	1184.05	.00	8.20	.00	.00	220000.00	.00	220000.00	1368.62	5001.38	6370.00
*	247.000	1183.91	.00	11.78	.00	.00	220000.00	.00	220000.00	1102.96	5001.67	6385.00
	248.000	1185.30	.00	12.92	.00	.00	220000.00	.00	220000.00	1061.27	5000.60	6385.00
*	249.000	1187.61	.00	9.43	.00	.00	220000.00	.00	220000.00	1376.96	5000.00	6400.00
	250.000	1188.84	.00	8.39	.00	.00	220000.00	.00	220000.00	1390.00	5000.00	6390.00
*	251.000	1188.63	.00	15.84	.00	.00	220000.00	.00	220000.00	1070.00	5000.00	6070.00
*	252.000	1192.47	.00	10.59	.00	.00	220000.00	.00	220000.00	1100.00	5000.00	6100.00
	253.000	1193.23	.00	11.71	.00	.00	220000.00	.00	220000.00	1160.00	5000.00	6160.00

SED SRPMIC ALIGNMENT

SUMMARY PRINTOUT

	SECNO	CWSEL	CRIWS	EG	ELMIN	DEPTH	10*KS	K*CHSL	XLCH	SHEAR	FRCH
	241.100	1181.97	1164.40	1182.79	1153.20	28.77	3.55	.00	.00	.62	.24
	241.200	1182.13	.00	1182.92	1153.23	28.90	3.39	1.04	29.00	.60	.24
	242.000	1182.49	1166.38	1183.13	1153.40	29.09	3.24	.33	510.00	.51	.23
	243.000	1182.61	1166.69	1183.37	1153.73	28.88	4.87	.66	500.00	.78	.24
	244.000	1182.77	1169.39	1183.72	1154.14	28.63	7.08	.83	495.00	1.02	.29
*	245.000	1182.98	1174.36	1184.55	1155.20	27.78	16.13	1.93	550.00	1.81	.42
	246.000	1184.05	1172.80	1185.09	1154.99	29.06	9.70	-.51	410.00	1.19	.33
*	247.000	1183.91	1176.15	1186.07	1155.35	28.56	24.08	.86	420.00	2.03	.57
	248.000	1185.30	1179.68	1187.89	1156.95	28.35	32.00	2.62	610.00	2.46	.65
*	249.000	1187.61	1178.66	1188.99	1157.45	30.16	15.43	1.06	470.00	1.60	.41
	250.000	1188.84	1177.51	1189.93	1158.00	30.84	10.68	.76	720.00	1.26	.34
*	251.000	1188.63	1184.99	1192.53	1158.60	30.03	62.55	.88	680.00	5.07	.77
*	252.000	1192.47	1184.10	1194.21	1164.00	28.47	16.91	9.82	550.00	1.99	.43
	253.000	1193.23	1187.30	1195.36	1170.00	23.23	25.08	12.12	495.00	2.53	.51

SUMMARY OF ERRORS AND SPECIAL NOTES

```
WARNING SECNO=    245.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    247.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    249.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    251.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    252.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY ALTERNATIVE WITH CHANNELIZATION

THIS RUN EXECUTED 05JAN94 09:53:30

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

 Version   4.6.2;  May 1991
************************************


T1 BSI CONSULTANTS, SANTA ANA,CA /L.JOHNSON
T2 SALT RIVER HEC-2 ANALYSIS (SECTIONS 241.1 - 253.0)
T3 PROPOSED SRPMIC ALIGNMENT                        INPUT FILE:SRPMIC-I.DAT

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        0        0        0        0        0     1181.97     0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     -1        0       -1        0        0        0       -1        0        0        0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        1       55       26       56       13       14       15       43        4
     53       54        0       38        1        2        3       42        8        5
     33       39       67       68

J6  IHLEQ     ICOPY    SUBDIV   STRTDS   RMILE

      1


QT       2    220000
NC     .05       .05     .035       .3       .5
X1   241.1         4     5000     6084       59       59       59
X3                                5000                6084
GR  1183.6      5000  1153.20   5030.4  1153.20   6053.6   1183.6     6084

SB    1.05      1.56      2.6        0     1025      130    28486        1  1153.23  1153.20
X1   241.2         4     5000     6100       29       29       29
X2                          1     1184     1192
X3                                5000                6100
GR  1183.7      5000  1153.23   5030.5  1153.23   6069.5   1183.7     6100

NC                                  .1       .3
X1   242.00        45    5000.0    6980     510.     510.    510.0
CI      -1   1154.11         0        1        1    -5000
X3                                5000                6350
GR  1184.0    4880.0  1184.00   4910.0  1180.00   4920.0  1184.20   4985.0  1183.90   5000.0
GR  1153.4    5031.0  1162.00   5105.0  1164.00   5125.0  1162.00   5325.0  1160.00   5450.0
GR  1158.0    5555.0  1153.67   5594.7  1153.67   5610.0  1153.67   5645.0  1153.67   5700.0
GR  1153.7    5720.0  1153.67   5724.2  1160.00   5740.0  1160.00   5755.0  1153.67   5777.2
```

GR	1153.7	5790.0	1153.67	5825.0	1153.67	5843.4	1156.00	5855.0	1153.67	5868.6
GR	1153.7	5890.0	1153.67	6050.0	1153.67	6085.0	1153.67	6165.0	1153.67	6174.7
GR	1158.0	6200.0	1153.67	6210.8	1153.67	6220.0	1153.67	6250.0	1153.67	6259.2
GR	1154.0	6260.0	1156.00	6435.0	1160.00	6450.0	1170.00	6470.0	1172.00	6480.0
GR	1174.0	6565.0	1176.00	6705.0	1176.00	6965.0	1180.00	6975.0	1184.00	6980.0
X1	243.00	25	5000.0	7125	500.	500.	500.0			
CI	-1	1155.09	0	1	1	-5000				
X3				5000		6225				
GR	1184.0	4885.0	1180.00	4900.0	1170.00	4925.0	1164.00	4945.0	1184.80	4985.0
GR	1184.5	5000.0	1153.73	5031.0	1162.00	5085.0	1160.00	5180.0	1160.00	5520.0
GR	1154.2	5544.3	1154.16	5545.0	1154.16	5630.0	1154.16	5960.0	1154.16	6240.0
GR	1154.2	6480.0	1154.16	6505.0	1154.16	6660.0	1154.16	6689.1	1160.00	6730.0
GR	1170.0	6830.0	1176.00	6970.0	1178.00	7100.0	1180.00	7120.0	1184.00	7125.0
X1	244.00	41	5000.0	7405	495.	495.	495.0			
CI	-1	1156.16	0	1	1	-5000				
X3				5000		6220				
GR	1184.0	4830.0	1184.00	4875.0	1160.00	4920.0	1160.00	4935.0	1185.10	4985.0
GR	1184.8	5000.0	1154.14	5031.0	1160.00	5045.0	1170.00	5130.0	1170.00	5175.0
GR	1160.0	5315.0	1160.00	5500.0	1156.00	5745.0	1156.00	5910.0	1154.70	5939.5
GR	1154.7	6000.0	1154.69	6008.4	1160.00	6025.0	1162.00	6040.0	1162.00	6085.0
GR	1160.0	6105.0	1154.69	6115.6	1154.69	6125.0	1154.69	6230.0	1154.69	6272.2
GR	1160.0	6320.0	1160.00	6440.0	1170.00	6460.0	1174.00	6535.0	1170.00	6830.0
GR	1154.7	6856.8	1154.69	6865.0	1154.69	6880.0	1154.69	6960.0	1154.69	6980.0
GR	1154.7	6985.9	1170.00	7005.0	1170.00	7330.0	1172.00	7380.0	1180.00	7395.0
GR	1186.0	7405.0								
X1	245.00	44	4830.0	7855	550.0	550.	550.0			
CI	-1	1157.26	0	1	1	-5000				
X3				5000		6220				
GR	1184.0	4790.0	1184.00	4830.0	1180.00	4850.0	1170.00	4905.0	1165.00	4945.0
GR	1185.4	4985.0	1185.10	5000.0	1160.00	5035.0	1168.00	5150.0	1168.00	5190.0
GR	1170.0	5200.0	1176.00	5245.0	1176.00	5330.0	1170.00	5335.0	1162.00	5490.0
GR	1162.0	5560.0	1164.00	5610.0	1168.00	5720.0	1168.00	5785.0	1166.00	5905.0
GR	1160.0	6030.0	1155.24	6049.0	1155.24	6070.0	1155.24	6115.0	1155.24	6160.0
GR	1155.2	6191.4	1160.00	6220.0	1155.24	6239.0	1155.24	6260.0	1155.24	6300.0
GR	1155.2	6486.0	1160.00	6655.0	1170.00	6670.0	1176.00	6680.0	1178.00	6710.0
GR	1178.0	7000.0	1176.00	7065.0	1174.00	7380.0	1170.00	7390.0	1170.00	7520.0
GR	1172.0	7660.0	1180.00	7685.0	1188.00	7710.0	1190.00	7855.0		
X1	246.00	42	5000.0	8160	410.	410.	410.0			
CI	-1	1158.46	0	1	1	-5000				
X3				5000		6370				
GR	1184.0	4970.0	1185.70	4985.0	1185.40	5000.0	1154.99	5031.0	1180.00	5145.0
GR	1184.0	5160.0	1180.00	5170.0	1170.00	5280.0	1155.84	5294.2	1155.84	5300.0
GR	1155.8	5338.0	1170.00	5430.0	1166.00	5735.0	1162.00	5825.0	1162.00	5960.0
GR	1164.0	6035.0	1160.00	6150.0	1155.84	6160.4	1155.84	6165.0	1155.84	6210.0
GR	1155.8	6810.0	1155.84	6819.6	1160.00	6830.0	1162.00	6840.0	1170.00	6940.0
GR	1176.0	6950.0	1176.00	7150.0	1174.00	7270.0	1174.00	7430.0	1176.00	7470.0
GR	1176.0	7520.0	1172.00	7560.0	1172.00	7760.0	1176.00	7790.0	1176.00	7825.0
GR	1174.0	7850.0	1172.00	7890.0	1172.00	7945.0	1174.00	8005.0	1180.00	8020.0
GR	1188.0	8100.0	1190.00	8160.0						

X1	247.00	49	5000.0	8330	420.	420.	420.0			
CI	-1	1159.45	0	1	1	-5000				
X3				5000		6385				
GR	1185.9	4985.0	1185.60	5000.0	1155.35	5030.0	1177.00	5073.0	1176.00	5165.0
GR	1170.0	5180.0	1160.00	5220.0	1156.34	5227.3	1156.34	5240.0	1156.34	5265.0
GR	1156.3	5353.5	1170.00	5495.0	1162.00	5590.0	1162.00	5750.0	1170.00	5780.0
GR	1180.0	5800.0	1182.00	5810.0	1184.00	5825.0	1186.00	5870.0	1186.00	6070.0
GR	1180.0	6170.0	1160.00	6255.0	1160.00	6310.0	1170.00	6335.0	1180.00	6350.0
GR	1186.0	6440.0	1186.00	6540.0	1180.00	6555.0	1160.00	6570.0	1160.00	6700.0
GR	1170.0	6740.0	1160.00	6780.0	1160.00	6900.0	1170.00	6970.0	1180.00	7030.0
GR	1180.0	7065.0	1178.00	7190.0	1176.00	7270.0	1170.00	7415.0	1176.00	7450.0
GR	1176.0	7570.0	1170.00	7695.0	1170.00	7870.0	1176.00	7885.0	1176.00	8070.0
GR	1170.0	8080.0	1170.00	8250.0	1180.00	8290.0	1190.00	8330.0		

X1	248.00	51	5000.0	8855	610.	610.	610.0			
CI	-1	1160.68	0	1	1	-5000				
X3				5000		6385				
GR	1186.2	4985.0	1185.90	5000.0	1164.00	5022.0	1174.00	5180.0	1172.00	5215.0
GR	1170.0	5225.0	1164.00	5260.0	1164.00	5450.0	1170.00	5490.0	1176.00	5535.0
GR	1178.0	5580.0	1180.00	5585.0	1186.00	5600.0	1180.00	5630.0	1170.00	5700.00
GR	1160.0	5760.0	1160.00	5790.0	1170.00	5810.0	1180.00	5940.0	1186.00	5950.0
GR	1186.0	6265.0	1180.00	6280.0	1156.95	6306.9	1156.95	6315.0	1156.95	6340.0
GR	1157.0	6505.0	1156.95	6666.0	1156.95	6670.0	1156.95	6788.2	1170.00	7010.0
GR	1172.0	7055.0	1170.00	7080.0	1162.00	7100.0	1160.00	7485.0	1160.00	7610.0
GR	1157.0	7637.4	1156.95	7700.0	1156.95	7795.0	1156.95	7941.0	1160.00	8005.0
GR	1170.0	8015.0	1174.00	8030.0	1174.00	8210.0	1176.00	8250.0	1178.00	8310.0
GR	1178.0	8410.0	1176.00	8575.0	1180.00	8590.0	1184.00	8610.0	1186.00	8830.0
GR	1190.0	8855.0								

X1	249.00	40	5000.0	8030	470.	470.	470.0			
CI	-1	1161.67	0	1	1	-5000				
X3				5000		6400				
GR	1184.0	4980.0	1186.50	4985.0	1186.20	5000.0	1164.00	5022.0	1164.00	5135.0
GR	1164.0	5210.0	1170.0	5270.0	1172.00	5300.0	1174.00	5420.0	1178.00	5530.0
GR	1180.0	5555.0	1186.00	5580.0	1188.00	5670.0	1186.00	5700.0	1180.00	5710.0
GR	1170.0	6010.0	1160.00	6245.0	1160.00	6415.0	1157.45	6421.4	1157.45	6440.0
GR	1157.5	6490.0	1157.45	6660.0	1157.45	6760.0	1157.45	7070.0	1157.45	7140.0
GR	1157.5	7165.0	1157.45	7220.0	1157.45	7300.0	1157.45	7350.0	1157.45	7368.6
GR	1170.0	7400.0	1178.00	7425.0	1170.00	7485.0	1160.00	7500.0	1157.45	7531.9
GR	1157.5	7600.0	1157.45	7795.3	1158.00	7815.0	1160.00	8020.0	1170.0	8030.0

X1	250.00	37	5000.0	7850	720.	720.	720.0			
CI	-1	1162.78	0	1	1	-5000				
X3				5000		6390				
GR	1190.0	4910.0	1180.00	4940.0	1186.70	4985.0	1186.40	5000.0	1166.00	5020.0
GR	1170.0	5120.0	1166.00	5130.0	1166.00	5175.0	1170.00	5240.0	1178.00	5380.0
GR	1180.0	5500.0	1184.00	5540.0	1184.00	5610.0	1180.00	5640.0	1170.00	5810.0
GR	1158.0	5822.0	1158.00	5830.0	1158.00	5980.0	1158.00	6064.0	1160.00	6085.0
GR	1170.0	6100.0	1174.00	6110.0	1174.00	6220.0	1170.00	6250.0	1160.00	6320.0
GR	1158.0	6330.0	1158.00	6340.0	1158.00	6410.0	1158.00	6742.5	1160.00	7075.0
GR	1158.0	7082.0	1158.00	7110.0	1158.00	7500.0	1158.00	7628.0	1160.00	7660.0
GR	1180.0	7700.0	1190.00	7850.0						

X1	251.00	38	5000.0	8080	680.	680.	680.0			
CI	-1	1163.98	0	1	1	-5000				
X3				5000		6070				
GR	1194.0	4590.0	1194.00	4820.0	1192.00	4855.0	1190.00	4860.0	1180.00	4870.0
GR	1168.0	4895.0	1168.00	4947.0	1187.20	4985.0	1186.90	5000.0	1168.00	5019.0
GR	1172.0	5080.0	1176.00	5095.0	1174.00	5125.0	1180.00	5260.0	1186.00	5320.0
GR	1188.0	5330.0	1186.00	5560.0	1160.6	5930	1160.0	6345.0	1158.6	6428.1
GR	1197	6500	1197	6800	1159	6870	1158.60	7027.3	1160.0	7050.0
GR	1164.0	7120.0	1160.0	7145.0	1160.0	7215.0	1158.60	7217.1	1158.6	7230.0
GR	1158.6	7425.0	1158.6	7437.9	1180.0	7470.0	1182.00	7485.0	1180.0	7610.0
GR	1180.0	7670.0	1186.0	7860.0	1190.0	8080.0				
X1	252.00	29	5000.0	7555	550.	550.	550.0			
CI	-1	1164.95	0	1	1	-5000				
X3				5000		6100				
GR	1194.0	4760.0	1192.00	4945.0	1190.00	4950.0	1180.00	4965.0	1187.60	4985.0
GR	1187.3	5000.0	1170.00	5017.0	1170.00	5045.0	1170.00	5115.0	1174.00	5160.0
GR	1174.0	5240.0	1176.00	5280.0	1178.00	5310.0	1180.00	5325.0	1178.00	5340.0
GR	1178.0	5360.0	1180.00	5540.0	1186.00	5580.0	1180.00	5605.0	1170.00	5620.0
GR	1170.0	6560	1164.0	6580.0	1164.0	6800.0	1170.0	6820.0	1170.0	7085.0
GR	1180.0	7150.0	1170.0	7370.0	1180.0	7405.0	1190.0	7555.0		
X1	253.00	25	5000.0	8320	495.	495.	495.0			
CI	-1	1166.22	0	1	1	-5000				
X3				5000		6160				
GR	1188.2	4985.0	1187.90	5000.0	1176.00	5012.0	1180.00	5070.0	1178.00	5085.0
GR	1178.0	5155.0	1180.00	5170.0	1182.00	5190.0	1180.00	5230.0	1178.00	5290.0
GR	1176.0	5300.0	1176.00	5590.0	1180.00	5600.0	1170.00	5795.0	1170.00	5940.0
GR	1180.0	5960.0	1186.00	6050.0	1188.00	6070.0	1180.00	6110.0	1180.00	6260.0
GR	1176.0	6510.0	1176.00	6740.0	1180.00	6810.0	1190.0	6840.0	1190.00	8320.0

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

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .300 CEHV= .500
*SECNO 241.100

3470 ENCROACHMENT STATIONS= 5000.0 6084.0 TYPE= 1 TARGET= 1084.000

241.100	28.77	1181.97	1164.40	1181.97	1182.79	.82	.00	.00	1233.60
220000.0	.0	220000.0	.0	.0	30265.2	.0	.0	.0	100000.00
.00	.00	7.27	.00	.000	.035	.000	.000	1153.20	5001.63
.000355	59.	59.	59.	0	17	0	.00	1080.74	6082.37

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.05	1.56	2.60	.00	1025.00	130.00	28486.00	1.00	1153.23	1153.20

*SECNO 241.200
CLASS A LOW FLOW

3420 BRIDGE W.S.= 1181.71 BRIDGE VELOCITY= 8.36 CALCULATED CHANNEL AREA= 26303.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	1182.92	.16	0.	220000.	28486.	28486.	1184.00	1192.00	0.

3470 ENCROACHMENT STATIONS= 5000.0 6100.0 TYPE= 1 TARGET= 1100.000

241.200	28.90	1182.13	.00	.00	1182.92	.79	.13	.00	1233.70
220000.0	.0	220000.0	.0	.0	30863.8	.0	20.3	.7	100000.00
.00	.00	7.13	.00	.000	.035	.000	.000	1153.23	5001.57
.000339	29.	29.	29.	0	0	0	.00	1096.86	6098.43

CCHV= .100 CEHV= .300

```
   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 242.000
CHIMP CLSTA=    5990.00 CELCH=    1154.11 BW=    2100.00 STCHL=    4880.00 STCHR=    6980.00
EXCAVATION DATA
AEX=   18794.3SQ-FT     VEXR=        .0K*CU-YD     VEXT=         .0K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6350.0  TYPE=      1  TARGET=     1350.000
   242.000     28.47   1182.58   1163.45       .00   1183.08       .51       .14       .03 100000.00
  220000.0        .0  220000.0        .0        .0   38428.0        .0     426.0      15.0 100000.00
       .03       .00      5.72       .00      .000      .035      .000      .000   1154.11   5000.00
   .000221      510.      510.      510.         2        17         0       .00   1350.00   6350.00


*SECNO 243.000
CHIMP CLSTA=    6062.50 CELCH=    1155.09 BW=    2240.00 STCHL=    4885.00 STCHR=    7125.00
EXCAVATION DATA
AEX=   11201.4SQ-FT     VEXR=     277.7K*CU-YD     VEXT=      277.7K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6225.0  TYPE=      1  TARGET=     1225.000
   243.000     27.51   1182.60   1165.06       .00   1183.26       .66       .13       .05 100000.00
  220000.0        .0  220000.0        .0        .0   33698.2        .0     839.9      29.8 100000.00
       .05       .00      6.53       .00      .000      .035      .000      .000   1155.09   5000.00
   .000302      500.      500.      500.         2        22         0       .00   1225.00   6225.00


*SECNO 244.000
CHIMP CLSTA=    6202.50 CELCH=    1156.16 BW=    2575.00 STCHL=    4830.00 STCHR=    7405.00
EXCAVATION DATA
AEX=   20011.6SQ-FT     VEXR=     286.1K*CU-YD     VEXT=      563.9K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6220.0  TYPE=      1  TARGET=     1220.000
   244.000     26.56   1182.72   1166.17       .00   1183.44       .72       .16       .02 100000.00
  220000.0        .0  220000.0        .0        .0   32413.1        .0    1215.6      43.7 100000.00
       .07       .00      6.79       .00      .000      .035      .000      .000   1156.16   5000.00
   .000341      495.      495.      495.         0        18         0       .00   1220.00   6220.00


*SECNO 245.000
CHIMP CLSTA=    6342.50 CELCH=    1157.26 BW=    3065.00 STCHL=    4790.00 STCHR=    7855.00
```

```
   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


EXCAVATION DATA
AEX=   36351.5SQ-FT     VEXR=     574.1K*CU-YD     VEXT=     1137.9K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6220.0  TYPE=      1  TARGET=     1220.000
   245.000     25.62   1182.88   1167.26       .00   1183.65       .77       .20       .02 100000.00
  220000.0        .0  220000.0        .0        .0   31268.4        .0    1617.6      59.1 100000.00
       .09       .00      7.04       .00      .000      .035      .000      .000   1157.26   5000.00
   .000384      550.      550.      550.         1        18         0       .00   1220.00   6220.00


*SECNO 246.000
CHIMP CLSTA=    6580.00 CELCH=    1158.46 BW=    3190.00 STCHL=    4970.00 STCHR=    8160.00
EXCAVATION DATA
AEX=   29461.7SQ-FT     VEXR=     499.7K*CU-YD     VEXT=     1637.6K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6370.0  TYPE=      1  TARGET=     1370.000
   246.000     24.69   1183.15   1167.73       .00   1183.81       .66       .15       .01 100000.00
  220000.0        .0  220000.0        .0        .0   33830.7        .0    1924.0      71.3 100000.00
       .11       .00      6.50       .00      .000      .035      .000      .000   1158.46   5000.00
   .000342      410.      410.      410.         2        18         0       .00   1370.00   6370.00


*SECNO 247.000
CHIMP CLSTA=    6665.00 CELCH=    1159.45 BW=    3345.00 STCHL=    4985.00 STCHR=    8330.00
EXCAVATION DATA
AEX=   41907.6SQ-FT     VEXR=     555.1K*CU-YD     VEXT=     2192.7K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6385.0  TYPE=      1  TARGET=     1385.000
   247.000     23.83   1183.28   1168.64       .00   1183.97       .69       .15       .01 100000.00
  220000.0        .0  220000.0        .0        .0   33006.5        .0    2246.2      84.6 100000.00
       .12       .00      6.67       .00      .000      .035      .000      .000   1159.45   5000.00
   .000376      420.      420.      420.         2        18         0       .00   1385.00   6385.00


*SECNO 248.000
CHIMP CLSTA=    6927.50 CELCH=    1160.68 BW=    3870.00 STCHL=    4985.00 STCHR=    8855.00
EXCAVATION DATA
AEX=   31640.7SQ-FT     VEXR=     830.8K*CU-YD     VEXT=     3023.5K*CU-YD
```

```
   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=     5000.0    6385.0  TYPE=      1  TARGET=     1385.000
   248.000     22.80   1183.48   1169.87       .00   1184.24       .75       .25       .02 100000.00
  220000.0        .0  220000.0       .0        .0   31595.1        .0    2698.5     104.0 100000.00
       .15       .00      6.96       .00      .000      .035      .000      .000   1160.68   5000.00
   .000434      610.      610.      610.         1        18         0       .00   1385.00   6385.00


*SECNO 249.000
CHIMP CLSTA=    6515.00 CELCH=    1161.67 BW=    3050.00 STCHL=    4980.00 STCHR=    8030.00
EXCAVATION DATA
AEX=    8837.5SQ-FT     VEXR=     352.3K*CU-YD     VEXT=     3375.8K*CU-YD

3280 CROSS SECTION    249.00 EXTENDED     13.67 FEET


3470 ENCROACHMENT STATIONS=     5000.0    6400.0  TYPE=      1  TARGET=     1400.000
   249.000     22.00   1183.67   1170.79       .00   1184.46       .79       .21       .01 100000.00
  220000.0        .0  220000.0       .0        .0   30806.3        .0    3035.2     119.0 100000.00
       .17       .00      7.14       .00      .000      .035      .000      .000   1161.67   5000.00
   .000478      470.      470.      470.         0        18         0       .00   1400.00   6400.00


*SECNO 250.000
CHIMP CLSTA=    6425.00 CELCH=    1162.78 BW=    2940.00 STCHL=    4910.00 STCHR=    7850.00
EXCAVATION DATA
AEX=    9869.2SQ-FT     VEXR=     249.4K*CU-YD     VEXT=     3625.3K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6390.0  TYPE=      1  TARGET=     1390.000
   250.000     21.21   1183.99   1171.98       .00   1184.85       .86       .37       .02 100000.00
  220000.0        .0  220000.0       .0        .0   29495.4        .0    3533.5     142.1 100000.00
       .19       .00      7.46       .00      .000      .035      .000      .000   1162.78   5000.00
   .000547      720.      720.      720.         0        14         0       .00   1390.00   6390.00


*SECNO 251.000
CHIMP CLSTA=    6540.00 CELCH=    1163.98 BW=    3490.00 STCHL=    4590.00 STCHR=    8080.00
EXCAVATION DATA
AEX=   42357.4SQ-FT     VEXR=     657.7K*CU-YD     VEXT=     4282.9K*CU-YD
```

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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 =   .70


3470 ENCROACHMENT STATIONS=     5000.0    6070.0  TYPE=      1  TARGET=     1070.000
   251.000     20.04   1184.02   1174.89       .00   1185.65      1.63       .57       .23 100000.00
  220000.0        .0  220000.0        .0        .0   21442.0        .0    3931.1     161.3 100000.00
       .21       .00     10.26       .00      .000      .035      .000      .000   1163.98   5000.00
   .001127      680.      680.      680.         2        11         0       .00   1070.00   6070.00


*SECNO 252.000
CHIMP CLSTA=    6277.50 CELCH=    1164.95 BW=    2795.00 STCHL=    4760.00 STCHR=    7555.00
EXCAVATION DATA
AEX=   25584.7SQ-FT     VEXR=     692.0K*CU-YD     VEXT=     4974.9K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6100.0  TYPE=      1  TARGET=     1100.000
   252.000     19.73   1184.68   1175.66       .00   1186.28      1.60       .62       .00 100000.00
  220000.0        .0  220000.0        .0        .0   21703.6        .0    4203.5     175.0 100000.00
       .23       .00     10.14       .00      .000      .035      .000      .000   1164.95   5000.00
   .001120      550.      550.      550.         2        11         0       .00   1100.00   6100.00


*SECNO 253.000
CHIMP CLSTA=    6660.00 CELCH=    1166.22 BW=    3335.00 STCHL=    4985.00 STCHR=    8320.00
EXCAVATION DATA
AEX=   56039.5SQ-FT     VEXR=     748.2K*CU-YD     VEXT=     5723.2K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6160.0  TYPE=      1  TARGET=     1160.000
   253.000     19.08   1185.30   1176.56       .00   1186.84      1.53       .55       .01 100000.00
  220000.0        .0  220000.0        .0        .0   22136.4        .0    4452.6     187.8 100000.00
       .24       .00      9.94       .00      .000      .035      .000      .000   1166.22   5000.00
   .001122      495.      495.      495.         2        11         0       .00   1160.00   6160.00
```

THIS RUN EXECUTED 05JAN94 09:53:37

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

SED SRPMIC ALIGNMENT

SUMMARY PRINTOUT

	SECNO	CWSEL	VLOB	VCH	VROB	QLOB	QCH	QROB	Q	TOPWID	SSTA	ENDST
	241.100	1181.97	.00	7.27	.00	.00	220000.00	.00	220000.00	1080.74	5001.63	6082.37
	241.200	1182.13	.00	7.13	.00	.00	220000.00	.00	220000.00	1096.86	5001.57	6098.43
	242.000	1182.58	.00	5.72	.00	.00	220000.00	.00	220000.00	1350.00	5000.00	6350.00
	243.000	1182.60	.00	6.53	.00	.00	220000.00	.00	220000.00	1225.00	5000.00	6225.00
	244.000	1182.72	.00	6.79	.00	.00	220000.00	.00	220000.00	1220.00	5000.00	6220.00
	245.000	1182.88	.00	7.04	.00	.00	220000.00	.00	220000.00	1220.00	5000.00	6220.00
	246.000	1183.15	.00	6.50	.00	.00	220000.00	.00	220000.00	1370.00	5000.00	6370.00
	247.000	1183.28	.00	6.67	.00	.00	220000.00	.00	220000.00	1385.00	5000.00	6385.00
	248.000	1183.48	.00	6.96	.00	.00	220000.00	.00	220000.00	1385.00	5000.00	6385.00
	249.000	1183.67	.00	7.14	.00	.00	220000.00	.00	220000.00	1400.00	5000.00	6400.00
	250.000	1183.99	.00	7.46	.00	.00	220000.00	.00	220000.00	1390.00	5000.00	6390.00
*	251.000	1184.02	.00	10.26	.00	.00	220000.00	.00	220000.00	1070.00	5000.00	6070.00
	252.000	1184.68	.00	10.14	.00	.00	220000.00	.00	220000.00	1100.00	5000.00	6100.00
	253.000	1185.30	.00	9.94	.00	.00	220000.00	.00	220000.00	1160.00	5000.00	6160.00

SED SRPMIC ALIGNMENT

SUMMARY PRINTOUT

	SECNO	CWSEL	CRIWS	EG	ELMIN	DEPTH	10*KS	K*CHSL	XLCH	SHEAR	FRCH
	241.100	1181.97	1164.40	1182.79	1153.20	28.77	3.55	.00	.00	.62	.24
	241.200	1182.13	.00	1182.92	1153.23	28.90	3.39	1.04	29.00	.60	.24
	242.000	1182.58	1163.45	1183.08	1154.11	28.47	2.21	1.73	510.00	.39	.19
	243.000	1182.60	1165.06	1183.26	1155.09	27.51	3.02	1.96	500.00	.52	.22
	244.000	1182.72	1166.17	1183.44	1156.16	26.56	3.41	2.16	495.00	.57	.23
	245.000	1182.88	1167.26	1183.65	1157.26	25.62	3.84	2.00	550.00	.61	.24
	246.000	1183.15	1167.73	1183.81	1158.46	24.69	3.42	2.93	410.00	.53	.23
	247.000	1183.28	1168.64	1183.97	1159.45	23.83	3.76	2.36	420.00	.56	.24
	248.000	1183.48	1169.87	1184.24	1160.68	22.80	4.34	2.02	610.00	.62	.26
	249.000	1183.67	1170.79	1184.46	1161.67	22.00	4.78	2.11	470.00	.66	.27
	250.000	1183.99	1171.98	1184.85	1162.78	21.21	5.47	1.54	720.00	.72	.29
*	251.000	1184.02	1174.89	1185.65	1163.98	20.04	11.27	1.76	680.00	1.41	.40
	252.000	1184.68	1175.66	1186.28	1164.95	19.73	11.20	1.76	550.00	1.38	.40
	253.000	1185.30	1176.56	1186.84	1166.22	19.08	11.22	2.57	495.00	1.34	.40

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 251.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

ADOT ALTERNATIVE
WITHOUT CHANNELIZATION

THIS RUN EXECUTED 06JAN94 16:09:25

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

 Version   4.6.2;  May 1991
************************************


T1 BSI CONSULTANTS, SANTA ANA,CA /L.JOHNSON
T2 SALT RIVER HEC-2 ANALYSIS (SECTIONS 241.1 - 253.0)
T3 ADOT ALIGNMENT                                    INPUT FILE:ADOT.DAT

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        0        0        0        0        0    1181.97      0

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     -1        0       -1        0        0        0       -1        0        0        0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        1       55       26       56       13       14       15       43        4
     53       54        0       38        1        2        3       42        8        5
     33       39       67       68

J6  IHLEQ    ICOPY    SUBDIV   STRTDS   RMILE

      1


QT       2   220000
NC     .05      .05     .035       .3       .5
X1   241.1        4     5000     6084       59       59       59
X3                             5000                6084
GR  1183.6     5000  1153.20   5030.4  1153.20   6053.6   1183.6     6084

SB    1.05     1.56      2.6        0     1025      130    28486        1  1153.23  1153.20
X1   241.2        4     5000     6100       29       29       29
X2                        1     1184     1192
X3                             5000                6100
GR  1183.7     5000  1153.23   5030.5  1153.23   6069.5   1183.7     6100

X1  242.00       45    5000.0    6980    510.0    420.0    440.0
X3                             5000                6390
GR  1184.0   4880.0   1184.00   4910.0  1180.00   4920.0  1184.20   4985.0  1183.90   5000.0
GR  1153.4   5031.0   1162.00   5105.0  1164.00   5125.0  1162.00   5325.0  1160.00   5450.0
GR  1158.0   5555.0   1153.67   5594.7  1153.67   5610.0  1153.67   5645.0  1153.67   5700.0
GR  1153.7   5720.0   1153.67   5724.2  1160.00   5740.0  1160.00   5755.0  1153.67   5777.2
GR  1153.7   5790.0   1153.67   5825.0  1153.67   5843.4  1156.00   5855.0  1153.67   5868.6
GR  1153.7   5890.0   1153.67   6050.0  1153.67   6085.0  1153.67   6165.0  1153.67   6174.7
```

GR	1158.0	6200.0	1153.67	6210.8	1153.67	6220.0	1153.67	6250.0	1153.67	6259.2
GR	1154.0	6260.0	1156.00	6435.0	1160.00	6450.0	1170.00	6470.0	1172.00	6480.0
GR	1174.0	6565.0	1176.00	6705.0	1176.00	6965.0	1180.00	6975.0	1184.00	6980.0
NC			0.040	0.1	0.3					
X1	243.00	25	5000.0	7125	500.0	500.0	490.0			
X3				5000		6645				
GR	1184.0	4885.0	1180.00	4900.0	1170.00	4925.0	1164.00	4945.0	1184.80	4985.0
GR	1184.5	5000.0	1153.73	5031.0	1162.00	5085.0	1160.00	5180.0	1160.00	5520.0
GR	1154.2	5544.3	1154.16	5545.0	1154.16	5630.0	1154.16	5960.0	1154.16	6240.0
GR	1154.2	6480.0	1154.16	6505.0	1154.16	6660.0	1154.16	6689.1	1160.00	6730.0
GR	1170.0	6830.0	1176.00	6970.0	1178.00	7100.0	1180.00	7120.0	1184.00	7125.0
X1	244.00	41	5000.0	7405	495.0	550.0	535.0			
X3				5000		6945				
GR	1184.0	4830.0	1184.00	4875.0	1160.00	4920.0	1160.00	4935.0	1185.10	4985.0
GR	1184.8	5000.0	1154.14	5031.0	1160.00	5045.0	1170.00	5130.0	1170.00	5175.0
GR	1160.0	5315.0	1160.00	5500.0	1156.00	5745.0	1156.00	5910.0	1154.70	5939.5
GR	1154.7	6000.0	1154.69	6008.4	1160.00	6025.0	1162.00	6040.0	1162.00	6085.0
GR	1160.0	6105.0	1154.69	6115.6	1154.69	6125.0	1154.69	6230.0	1154.69	6272.2
GR	1160.0	6320.0	1160.00	6440.0	1170.00	6460.0	1174.00	6535.0	1170.00	6830.0
GR	1154.7	6856.8	1154.69	6865.0	1154.69	6880.0	1154.69	6960.0	1154.69	6980.0
GR	1154.7	6985.9	1170.00	7005.0	1170.00	7330.0	1172.00	7380.0	1180.00	7395.0
GR	1186.0	7405.0								
X1	245.00	44	4830.0	7855	550.0	390.0	550.0			
X3				5000		7215				
GR	1184.0	4790.0	1184.00	4830.0	1180.00	4850.0	1170.00	4905.0	1165.00	4945.0
GR	1185.4	4985.0	1185.10	5000.0	1160.00	5035.0	1168.00	5150.0	1168.00	5190.0
GR	1170.0	5200.0	1176.00	5245.0	1176.00	5330.0	1170.00	5335.0	1162.00	5490.0
GR	1162.0	5560.0	1164.00	5610.0	1168.00	5720.0	1168.00	5785.0	1166.00	5905.0
GR	1160.0	6030.0	1155.24	6049.0	1155.24	6070.0	1155.24	6115.0	1155.24	6160.0
GR	1155.2	6191.4	1160.00	6220.0	1155.24	6239.0	1155.24	6260.0	1155.24	6300.0
GR	1155.2	6486.0	1160.00	6655.0	1170.00	6670.0	1176.00	6680.0	1178.00	6710.0
GR	1178.0	7000.0	1176.00	7065.0	1174.00	7380.0	1170.00	7390.0	1170.00	7520.0
GR	1172.0	7660.0	1180.00	7685.0	1188.00	7710.0	1190.00	7855.0		
X1	246.00	42	5000.0	8160	410.0	450.0	600.0			
X3				5000		7300				
GR	1184.0	4970.0	1185.70	4985.0	1185.40	5000.0	1154.99	5031.0	1180.00	5145.0
GR	1184.0	5160.0	1180.00	5170.0	1170.00	5280.0	1155.84	5294.2	1155.84	5300.0
GR	1155.8	5338.0	1170.00	5430.0	1166.00	5735.0	1162.00	5825.0	1162.00	5960.0
GR	1164.0	6035.0	1160.00	6150.0	1155.84	6160.4	1155.84	6165.0	1155.84	6210.0
GR	1155.8	6810.0	1155.84	6819.6	1160.00	6830.0	1162.00	6840.0	1170.00	6940.0
GR	1176.0	6950.0	1176.00	7150.0	1174.00	7270.0	1174.00	7430.0	1176.00	7470.0
GR	1176.0	7520.0	1172.00	7560.0	1172.00	7760.0	1176.00	7790.0	1176.00	7825.0
GR	1174.0	7850.0	1172.00	7890.0	1172.00	7945.0	1174.00	8005.0	1180.00	8020.0
GR	1188.0	8100.0	1190.00	8160.0						

X1	247.00	49	5000.0	8330	420.0	560.0	495.0			
X3				5000		7145				
GR	1185.9	4985.0	1185.60	5000.0	1155.35	5030.0	1177.00	5073.0	1176.00	5165.0
GR	1170.0	5180.0	1160.00	5220.0	1156.34	5227.3	1156.34	5240.0	1156.34	5265.0
GR	1156.3	5353.5	1170.00	5495.0	1162.00	5590.0	1162.00	5750.0	1170.00	5780.0
GR	1180.0	5800.0	1182.00	5810.0	1184.00	5825.0	1186.00	5870.0	1186.00	6070.0
GR	1180.0	6170.0	1160.00	6255.0	1160.00	6310.0	1170.00	6335.0	1180.00	6350.0
GR	1186.0	6440.0	1186.00	6540.0	1180.00	6555.0	1160.00	6570.0	1160.00	6700.0
GR	1170.0	6740.0	1160.00	6780.0	1160.00	6900.0	1170.00	6970.0	1180.00	7030.0
GR	1180.0	7065.0	1178.00	7190.0	1176.00	7270.0	1170.00	7415.0	1176.00	7450.0
GR	1176.0	7570.0	1170.00	7695.0	1170.00	7870.0	1176.00	7885.0	1176.00	8070.0
GR	1170.0	8080.0	1170.00	8250.0	1180.00	8290.0	1190.00	8330.0		
X1	248.00	51	5000.0	8855	610.0	550.0	615.0			
X3				5000		6985				
GR	1186.2	4985.0	1185.90	5000.0	1164.00	5022.0	1174.00	5180.0	1172.00	5215.0
GR	1170.0	5225.0	1164.00	5260.0	1164.00	5450.0	1170.00	5490.0	1176.00	5535.0
GR	1178.0	5580.0	1180.00	5585.0	1186.00	5600.0	1180.00	5630.0	1170.00	5700.00
GR	1160.0	5760.0	1160.00	5790.0	1170.00	5810.0	1180.00	5940.0	1186.00	5950.0
GR	1186.0	6265.0	1180.00	6280.0	1156.95	6306.9	1156.95	6315.0	1156.95	6340.0
GR	1157.0	6505.0	1156.95	6666.0	1156.95	6670.0	1156.95	6788.2	1170.00	7010.0
GR	1172.0	7055.0	1170.00	7080.0	1162.00	7100.0	1160.00	7485.0	1160.00	7610.0
GR	1157.0	7637.4	1156.95	7700.0	1156.95	7795.0	1156.95	7941.0	1160.00	8005.0
GR	1170.0	8015.0	1174.00	8030.0	1174.00	8210.0	1176.00	8250.0	1178.00	8310.0
GR	1178.0	8410.0	1176.00	8575.0	1180.00	8590.0	1184.00	8610.0	1186.00	8830.0
GR	1190.0	8855.0								
X1	249.00	49	5000.0	8755	470.0	500.0	495.0			
X3				5000		7050				
GR	1184.0	4980.0	1186.50	4985.0	1186.20	5000.0	1164.00	5022.0	1164.00	5135.0
GR	1164.0	5210.0	1170.00	5270.0	1172.00	5300.0	1174.00	5420.0	1178.00	5530.0
GR	1180.0	5555.0	1186.00	5580.0	1188.00	5670.0	1186.00	5700.0	1180.00	5710.0
GR	1170.0	6010.0	1160.00	6245.0	1160.00	6415.0	1157.45	6421.4	1157.45	6440.0
GR	1157.5	6490.0	1157.45	6660.0	1157.45	6760.0	1157.45	7070.0	1157.45	7140.0
GR	1157.5	7165.0	1157.45	7220.0	1157.45	7300.0	1157.45	7350.0	1157.45	7368.6
GR	1170.0	7400.0	1178.00	7425.0	1170.00	7485.0	1160.00	7500.0	1157.45	7531.9
GR	1157.5	7600.0	1157.45	7795.3	1158.00	7815.0	1160.00	8020.0	1170.00	8030.0
GR	1170.0	8055.0	1170.00	8345.0	1180.00	8355.0	1182.00	8365.0	1170.00	8420.0
GR	1170.0	8530.0	1180.00	8580.0	1188.00	8640.0	1188.00	8755.0		
X1	250.00	37	5000.0	7850	720.0	440.0	555.0			
X3				5000		7060				
GR	1190.0	4910.0	1180.00	4940.0	1186.70	4985.0	1186.40	5000.0	1166.00	5020.0
GR	1170.0	5120.0	1166.00	5130.0	1166.00	5175.0	1170.00	5240.0	1178.00	5380.0
GR	1180.0	5500.0	1184.00	5540.0	1184.00	5610.0	1180.00	5640.0	1170.00	5810.0
GR	1158.0	5822.0	1158.00	5830.0	1158.00	5980.0	1158.00	6064.0	1160.00	6085.0
GR	1170.0	6100.0	1174.00	6110.0	1174.00	6220.0	1170.00	6250.0	1160.00	6320.0
GR	1158.0	6330.0	1158.00	6340.0	1158.00	6410.0	1158.00	6742.5	1160.00	7075.0
GR	1158.0	7082.0	1158.00	7110.0	1158.00	7500.0	1158.00	7628.0	1160.00	7660.0
GR	1180.0	7700.0	1190.00	7850.0						

X1	251.00	38	5000.0	8080	680.0	410.0	600.0			
X3				5000		6500				
GR	1194.0	4590.0	1194.00	4820.0	1192.00	4855.0	1190.00	4860.0	1180.00	4870.0
GR	1168.0	4895.0	1168.00	4947.0	1187.20	4985.0	1186.90	5000.0	1168.00	5019.0
GR	1172.0	5080.0	1176.00	5095.0	1174.00	5125.0	1180.00	5260.0	1186.00	5320.0
GR	1188.0	5330.0	1186.00	5560.0	1160.6	5930	1160.0	6345	1158.6	6428.1
GR	1197	6500	1197	6800	1159	6870	1158.60	7027.3	1160	7050
GR	1164	7120	1160	7145	1160	7215	1158.6	7217.1	1158.60	7230
GR	1158.6	7425	1158.60	7437.9	1180	7470	1182	7485	1180	7610
GR	1180.0	7670	1186	7860	1190	8080				
X1	252.00	29	5000.0	7555	550.0	190.0	485.0			
X3				5000		6250				
GR	1194.0	4760.0	1192.00	4945.0	1190.00	4950.0	1180.00	4965.0	1187.60	4985.0
GR	1187.3	5000.0	1170.00	5017.0	1170.00	5045.0	1170.00	5115.0	1174.00	5160.0
GR	1174.0	5240.0	1176.00	5280.0	1178.00	5310.0	1180.00	5325.0	1178.00	5340.0
GR	1178.0	5360.0	1180.00	5540.0	1186.00	5580.0	1180.00	5605.0	1170.00	5620.0
GR	1170.0	6560	1164.0	6580.0	1164.0	6800.0	1170.0	6820.0	1170.0	7085.0
GR	1180.0	7150.0	1170.0	7370.0	1180.0	7405.0	1190.0	7555.0		
X1	253.00	25	5000.0	8320	495.0	550.0	635.0			
X3				5000		6160				
GR	1188.2	4985.0	1187.90	5000.0	1176.00	5012.0	1180.00	5070.0	1178.00	5085.0
GR	1178.0	5155.0	1180.00	5170.0	1182.00	5190.0	1180.00	5230.0	1178.00	5290.0
GR	1176.0	5300.0	1176.00	5590.0	1180.00	5600.0	1170.00	5795.0	1170.00	5940.0
GR	1180.0	5960.0	1186.00	6050.0	1188.00	6070.0	1180.00	6110.0	1180.00	6260.0
GR	1176.0	6510.0	1176.00	6740.0	1180.00	6810.0	1190.0	6840.0	1190.00	8320.0

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

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .300 CEHV= .500
*SECNO 241.100

3470 ENCROACHMENT STATIONS= 5000.0 6084.0 TYPE= 1 TARGET= 1084.000

241.100	28.77	1181.97	1164.40	1181.97	1182.79	.82	.00	.00	1233.60
220000.0	.0	220000.0	.0	.0	30265.2	.0	.0	.0	100000.00
.00	.00	7.27	.00	.000	.035	.000	.000	1153.20	5001.63
.000355	59.	59.	59.	0	17	0	.00	1080.74	6082.37

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.05	1.56	2.60	.00	1025.00	130.00	28486.00	1.00	1153.23	1153.20

*SECNO 241.200
CLASS A LOW FLOW

3420 BRIDGE W.S.= 1181.71 BRIDGE VELOCITY= 8.36 CALCULATED CHANNEL AREA= 26303.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	1182.92	.16	0.	220000.	28486.	28486.	1184.00	1192.00	0.

3470 ENCROACHMENT STATIONS= 5000.0 6100.0 TYPE= 1 TARGET= 1100.000

241.200	28.90	1182.13	.00	.00	1182.92	.79	.13	.00	1233.70
220000.0	.0	220000.0	.0	.0	30863.8	.0	20.3	.7	100000.00
.00	.00	7.13	.00	.000	.035	.000	.000	1153.23	5001.57
.000339	29.	29.	29.	0	0	0	.00	1096.86	6098.43

*SECNO 242.000

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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


3470 ENCROACHMENT STATIONS=     5000.0    6390.0  TYPE=      1  TARGET=     1390.000
   242.000     29.11   1182.51   1166.13       .00   1183.12       .60       .14       .06   1183.90
  220000.0        .0  220000.0       .0        .0   35246.0        .0     354.2      13.3 100000.00
       .02       .00      6.24       .00      .000      .035      .000      .000   1153.40   5001.41
   .000302      510.      440.      420.         2        18         0       .00   1388.59   6390.00


CCHV=     .100 CEHV=     .300
*SECNO 243.000

3470 ENCROACHMENT STATIONS=     5000.0    6645.0  TYPE=      1  TARGET=     1645.000
   243.000     29.15   1182.88   1164.22       .00   1183.27       .39       .13       .02   1184.50
  220000.0        .0  220000.0       .0        .0   43863.4        .0     799.2      30.3 100000.00
       .05       .00      5.02       .00      .000      .040      .000      .000   1153.73   5001.64
   .000236      500.      490.      500.         2        22         0       .00   1643.36   6645.00


*SECNO 244.000

3470 ENCROACHMENT STATIONS=     5000.0    6945.0  TYPE=      1  TARGET=     1945.000
   244.000     28.86   1183.00   1167.27       .00   1183.44       .44       .16       .01   1184.80
  220000.0        .0  220000.0       .0        .0   41351.0        .0    1322.5      52.4 100000.00
       .08       .00      5.32       .00      .000      .040      .000      .000   1154.14   5001.81
   .000360      495.      535.      550.         1        14         0       .00   1943.19   6945.00


*SECNO 245.000

3470 ENCROACHMENT STATIONS=     5000.0    7215.0  TYPE=      1  TARGET=     2215.000
   245.000     27.99   1183.19   1170.05       .00   1183.73       .53       .26       .03 100000.00
  220000.0        .0  220000.0       .0        .0   37496.4        .0    1820.3      78.6 100000.00
       .10       .00      5.87       .00      .000      .040      .000      .000   1155.20   5002.66
   .000582      550.      550.      390.         2        11         0       .00   2212.34   7215.00


*SECNO 246.000

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     5000.0    7300.0  TYPE=      1  TARGET=     2300.000
   246.000     28.63   1183.62   1168.57       .00   1184.01       .39       .27       .01   1185.40
  220000.0        .0  220000.0       .0        .0   43949.5        .0    2381.2     109.6 100000.00
       .14       .00      5.01       .00      .000      .040      .000      .000   1154.99   5001.81
   .000362      410.      600.      450.         2        11         0       .00   2295.82   7300.00
```

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 247.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .57

3470 ENCROACHMENT STATIONS= 5000.0 7145.0 TYPE= 1 TARGET= 2145.000

247.000	28.19	1183.54	1172.39	.00	1184.49	.95	.31	.17	1185.60
220000.0	.0	220000.0	.0	.0	28131.2	.0	2790.7	132.4	100000.00
.15	.00	7.82	.00	.000	.040	.000	.000	1155.35	5002.04
.001102	420.	495.	560.	4	14	0	.00	1710.54	7145.00

*SECNO 248.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 5000.0 6985.0 TYPE= 1 TARGET= 1985.000

248.000	27.33	1184.28	1171.74	.00	1185.05	.77	.54	.02	1185.90
220000.0	.0	220000.0	.0	.0	31206.0	.0	3209.6	156.1	100000.00
.18	.00	7.05	.00	.000	.040	.000	.000	1156.95	5001.63
.000738	610.	615.	550.	2	11	0	.00	1648.33	6985.00

*SECNO 249.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 5000.0 7050.0 TYPE= 1 TARGET= 2050.000

249.000	27.38	1184.83	1170.23	.00	1185.37	.54	.29	.02	1186.20
220000.0	.0	220000.0	.0	.0	37427.8	.0	3599.6	176.4	100000.00
.20	.00	5.88	.00	.000	.040	.000	.000	1157.45	5001.36
.000491	470.	495.	500.	2	14	0	.00	1921.83	7050.00

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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 250.000

3470 ENCROACHMENT STATIONS=     5000.0    7060.0  TYPE=      1  TARGET=     2060.000
   250.000     27.15   1185.15   1169.84       .00   1185.64       .49       .27       .00   1186.40
  220000.0        .0  220000.0        .0        .0   38974.6        .0    4086.3     201.8 100000.00
       .23       .00      5.64       .00      .000      .040      .000      .000   1158.00   5001.23
   .000471      720.      555.      440.         2        14         0       .00   2058.77   7060.00


*SECNO 251.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .47


3470 ENCROACHMENT STATIONS=     5000.0    6500.0  TYPE=      1  TARGET=     1500.000
   251.000     26.16   1184.76   1176.85       .00   1186.67      1.91       .61       .43   1186.90
  220000.0        .0  220000.0        .0        .0   19815.8        .0    4491.2     224.2 100000.00
       .24       .00     11.10       .00      .000      .040      .000      .000   1158.60   5002.15
   .002171      680.      600.      410.         2        14         0       .00   1204.48   6477.08


*SECNO 252.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .66


3470 ENCROACHMENT STATIONS=     5000.0    6250.0  TYPE=      1  TARGET=     1250.000
   252.000     21.70   1185.70   1182.73       .00   1188.75      3.05      1.74       .34   1187.30
  220000.0        .0  220000.0        .0        .0   15687.6        .0    4688.8     237.9 100000.00
       .25       .00     14.02       .00      .000      .040      .000      .000   1164.00   5001.57
   .005001      550.      485.      190.         2        19         0       .00   1245.16   6250.00
```

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 253.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 5000.0 6160.0 TYPE= 1 TARGET= 1160.000

253.000	18.88	1188.88	1187.30	.00	1192.87	3.99	3.83	.28	1187.90
220000.0	.0	220000.0	.0	.0	13722.0	.0	4903.2	255.4	100000.00
.26	.00	16.03	.00	.000	.040	.000	.000	1170.00	5000.00
.007068	495.	635.	550.	3	15	0	.00	1160.00	6160.00

THIS RUN EXECUTED 06JAN94 16:09:32

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

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

ALIGNMENT

SUMMARY PRINTOUT

	SECNO	CWSEL	VLOB	VCH	VROB	QLOB	QCH	QROB	Q	TOPWID	SSTA	ENDST
	241.100	1181.97	.00	7.27	.00	.00	220000.00	.00	220000.00	1080.74	5001.63	6082.37
	241.200	1182.13	.00	7.13	.00	.00	220000.00	.00	220000.00	1096.86	5001.57	6098.43
	242.000	1182.51	.00	6.24	.00	.00	220000.00	.00	220000.00	1388.59	5001.41	6390.00
	243.000	1182.88	.00	5.02	.00	.00	220000.00	.00	220000.00	1643.36	5001.64	6645.00
	244.000	1183.00	.00	5.32	.00	.00	220000.00	.00	220000.00	1943.19	5001.81	6945.00
	245.000	1183.19	.00	5.87	.00	.00	220000.00	.00	220000.00	2212.34	5002.66	7215.00
	246.000	1183.62	.00	5.01	.00	.00	220000.00	.00	220000.00	2295.82	5001.81	7300.00
*	247.000	1183.54	.00	7.82	.00	.00	220000.00	.00	220000.00	1710.54	5002.04	7145.00
	248.000	1184.28	.00	7.05	.00	.00	220000.00	.00	220000.00	1648.33	5001.63	6985.00
	249.000	1184.83	.00	5.88	.00	.00	220000.00	.00	220000.00	1921.83	5001.36	7050.00
	250.000	1185.15	.00	5.64	.00	.00	220000.00	.00	220000.00	2058.77	5001.23	7060.00
*	251.000	1184.76	.00	11.10	.00	.00	220000.00	.00	220000.00	1204.48	5002.15	6477.08
*	252.000	1185.70	.00	14.02	.00	.00	220000.00	.00	220000.00	1245.16	5001.57	6250.00
	253.000	1188.88	.00	16.03	.00	.00	220000.00	.00	220000.00	1160.00	5000.00	6160.00

ALIGNMENT

SUMMARY PRINTOUT

	SECNO	CWSEL	CRIWS	EG	ELMIN	DEPTH	10*KS	K*CHSL	XLCH	SHEAR	FRCH
	241.100	1181.97	1164.40	1182.79	1153.20	28.77	3.55	.00	.00	.62	.24
	241.200	1182.13	.00	1182.92	1153.23	28.90	3.39	1.04	29.00	.60	.24
	242.000	1182.51	1166.13	1183.12	1153.40	29.11	3.02	.39	440.00	.48	.22
	243.000	1182.88	1164.22	1183.27	1153.73	29.15	2.36	.67	490.00	.39	.17
	244.000	1183.00	1167.27	1183.44	1154.14	28.86	3.60	.77	535.00	.48	.20
	245.000	1183.19	1170.05	1183.73	1155.20	27.99	5.82	1.93	550.00	.62	.25
	246.000	1183.62	1168.57	1184.01	1154.99	28.63	3.62	-.35	600.00	.43	.20
*	247.000	1183.54	1172.39	1184.49	1155.35	28.19	11.02	.73	495.00	.90	.38
	248.000	1184.28	1171.74	1185.05	1156.95	27.33	7.38	2.60	615.00	.72	.31
	249.000	1184.83	1170.23	1185.37	1157.45	27.38	4.91	1.01	495.00	.56	.24
	250.000	1185.15	1169.84	1185.64	1158.00	27.15	4.71	.99	555.00	.56	.23
*	251.000	1184.76	1176.85	1186.67	1158.60	26.16	21.71	1.00	600.00	1.82	.53
*	252.000	1185.70	1182.73	1188.75	1164.00	21.70	50.01	11.13	485.00	3.92	.70
	253.000	1188.88	1187.30	1192.87	1170.00	18.88	70.68	9.45	635.00	5.22	.82

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 247.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 251.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 252.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

ADOT ALTERNATIVE
WITH CHANNELIZATION

THIS RUN EXECUTED 06JAN94 15:41:27

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

 Version   4.6.2;  May 1991
*************************************


T1 BSI CONSULTANTS, SANTA ANA,CA /L.JOHNSON
T2 SALT RIVER HEC-2 ANALYSIS (SECTIONS 241.1 - 253.0)
T3 ADOT ALIGNMENT IMPROVEMENTS                    INPUT FILE ADOT-I.DAT

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        0        0        0        0        0     1181.97     0

J2  NPROF    IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     -1        0       -1        0        0        0       -1        0        0        0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38       1       55       26       56       13       14       15       43       4
     53       54       0       38        1        2        3       42        8       5
     33       39      67       68

J6  IHLEQ    ICOPY    SUBDIV   STRTDS   RMILE

     1

QT        2     220000
NC      .05       .05      .035       .3       .5
X1    241.1         4      5000     6084       59       59       59
X3                                  5000                6084
GR   1183.6      5000   1153.20   5030.4   1153.20   6053.6   1183.6     6084

SB     1.05      1.56       2.6        0     1025      130    28486        1  1153.23  1153.20
X1    241.2         4      5000     6100       29       29       29
X2                           1     1184     1192
X3                                  5000                6100
GR   1183.7      5000   1153.23   5030.5   1153.23   6069.5   1183.7     6100

X1   242.00        45     5000.0    6980    510.0    420.0    440.0
CI       -1   1153.53          0       1        1    -5000
X3                                  5000                6390
GR   1184.0    4880.0   1184.00   4910.0   1180.00   4920.0   1184.20   4985.0   1183.90   5000.0
GR   1153.4    5031.0   1162.00   5105.0   1164.00   5125.0   1162.00   5325.0   1160.00   5450.0
GR   1158.0    5555.0   1153.67   5594.7   1153.67   5610.0   1153.67   5645.0   1153.67   5700.0
GR   1153.7    5720.0   1153.67   5724.2   1160.00   5740.0   1160.00   5755.0   1153.67   5777.2
GR   1153.7    5790.0   1153.67   5825.0   1153.67   5843.4   1156.00   5855.0   1153.67   5868.6
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GR	1153.7	5890.0	1153.67	6050.0	1153.67	6085.0	1153.67	6165.0	1153.67	6174.7
GR	1158.0	6200.0	1153.67	6210.8	1153.67	6220.0	1153.67	6250.0	1153.67	6259.2
GR	1154.0	6260.0	1156.00	6435.0	1160.00	6450.0	1170.00	6470.0	1172.00	6480.0
GR	1174.0	6565.0	1176.00	6705.0	1176.00	6965.0	1180.00	6975.0	1184.00	6980.0
NC			0.040	0.1	0.3					
X1	243.00	25	5000.0	7125	500.0	500.0	490.0			
CI	-1	1153.88	0	1	1	-5000				
X3				5000		6645				
GR	1184.0	4885.0	1180.00	4900.0	1170.00	4925.0	1164.00	4945.0	1184.80	4985.0
GR	1184.5	5000.0	1153.73	5031.0	1162.00	5085.0	1160.00	5180.0	1160.00	5520.0
GR	1154.2	5544.3	1154.16	5545.0	1154.16	5630.0	1154.16	5960.0	1154.16	6240.0
GR	1154.2	6480.0	1154.16	6505.0	1154.16	6660.0	1154.16	6689.1	1160.00	6730.0
GR	1170.0	6830.0	1176.00	6970.0	1178.00	7100.0	1180.00	7120.0	1184.00	7125.0
X1	244.00	41	5000.0	7405	495.0	550.0	535.0			
CI	-1	1154.26	0	1	1	-5000				
X3				5000		6945				
GR	1184.0	4830.0	1184.00	4875.0	1160.00	4920.0	1160.00	4935.0	1185.10	4985.0
GR	1184.8	5000.0	1154.14	5031.0	1160.00	5045.0	1170.00	5130.0	1170.00	5175.0
GR	1160.0	5315.0	1160.00	5500.0	1156.00	5745.0	1156.00	5910.0	1154.70	5939.5
GR	1154.7	6000.0	1154.69	6008.4	1160.00	6025.0	1162.00	6040.0	1162.00	6085.0
GR	1160.0	6105.0	1154.69	6115.6	1154.69	6125.0	1154.69	6230.0	1154.69	6272.2
GR	1160.0	6320.0	1160.00	6440.0	1170.00	6460.0	1174.00	6535.0	1170.00	6830.0
GR	1154.7	6856.8	1154.69	6865.0	1154.69	6880.0	1154.69	6960.0	1154.69	6980.0
GR	1154.7	6985.9	1170.00	7005.0	1170.00	7330.0	1172.00	7380.0	1180.00	7395.0
GR	1186.0	7405.0								
X1	245.00	44	4830.0	7855	550.0	390.0	550.0			
CI	-1	1154.64	0	1	1	-5000				
X3				5000		7215				
GR	1184.0	4790.0	1184.00	4830.0	1180.00	4850.0	1170.00	4905.0	1165.00	4945.0
GR	1185.4	4985.0	1185.10	5000.0	1160.00	5035.0	1168.00	5150.0	1168.00	5190.0
GR	1170.0	5200.0	1176.00	5245.0	1176.00	5330.0	1170.00	5335.0	1162.00	5490.0
GR	1162.0	5560.0	1164.00	5610.0	1168.00	5720.0	1168.00	5785.0	1166.00	5905.0
GR	1160.0	6030.0	1155.24	6049.0	1155.24	6070.0	1155.24	6115.0	1155.24	6160.0
GR	1155.2	6191.4	1160.00	6220.0	1155.24	6239.0	1155.24	6260.0	1155.24	6300.0
GR	1155.2	6486.0	1160.00	6655.0	1170.00	6670.0	1176.00	6680.0	1178.00	6710.0
GR	1178.0	7000.0	1176.00	7065.0	1174.00	7380.0	1170.00	7390.0	1170.00	7520.0
GR	1172.0	7660.0	1180.00	7685.0	1188.00	7710.0	1190.00	7855.0		
X1	246.00	42	5000.0	8160	410.0	450.0	600.0			
CI	-1	1155.06	0	1	1	-5000				
X3				5000		7300				
GR	1184.0	4970.0	1185.70	4985.0	1185.40	5000.0	1154.99	5031.0	1180.00	5145.0
GR	1184.0	5160.0	1180.00	5170.0	1170.00	5280.0	1155.84	5294.2	1155.84	5300.0
GR	1155.8	5338.0	1170.00	5430.0	1166.00	5735.0	1162.00	5825.0	1162.00	5960.0
GR	1164.0	6035.0	1160.00	6150.0	1155.84	6160.4	1155.84	6165.0	1155.84	6210.0
GR	1155.8	6810.0	1155.84	6819.6	1160.00	6830.0	1162.00	6840.0	1170.00	6940.0
GR	1176.0	6950.0	1176.00	7150.0	1174.00	7270.0	1174.00	7430.0	1176.00	7470.0
GR	1176.0	7520.0	1172.00	7560.0	1172.00	7760.0	1176.00	7790.0	1176.00	7825.0
GR	1174.0	7850.0	1172.00	7890.0	1172.00	7945.0	1174.00	8005.0	1180.00	8020.0
GR	1188.0	8100.0	1190.00	8160.0						

X1	247.00	49	5000.0	8330	420.0	560.0	495.0			
CI	-1	1155.35	0	1	1	-5000				
X3				5000		7145				
GR	1185.9	4985.0	1185.60	5000.0	1155.35	5030.0	1177.00	5073.0	1176.00	5165.0
GR	1170.0	5180.0	1160.00	5220.0	1156.34	5227.3	1156.34	5240.0	1156.34	5265.0
GR	1156.3	5353.5	1170.00	5495.0	1162.00	5590.0	1162.00	5750.0	1170.00	5780.0
GR	1180.0	5800.0	1182.00	5810.0	1184.00	5825.0	1186.00	5870.0	1186.00	6070.0
GR	1180.0	6170.0	1160.00	6255.0	1160.00	6310.0	1170.00	6335.0	1180.00	6350.0
GR	1186.0	6440.0	1186.00	6540.0	1180.00	6555.0	1160.00	6570.0	1160.00	6700.0
GR	1170.0	6740.0	1160.00	6780.0	1160.00	6900.0	1170.00	6970.0	1180.00	7030.0
GR	1180.0	7065.0	1178.00	7190.0	1176.00	7270.0	1170.00	7415.0	1176.00	7450.0
GR	1176.0	7570.0	1170.00	7695.0	1170.00	7870.0	1176.00	7885.0	1176.00	8070.0
GR	1170.0	8080.0	1170.00	8250.0	1180.00	8290.0	1190.00	8330.0		
X1	248.00	51	5000.0	8855	610.0	550.0	615.0			
CI						.01				
X3				5000		6985				
GR	1186.2	4985.0	1185.90	5000.0	1164.00	5022.0	1174.00	5180.0	1172.00	5215.0
GR	1170.0	5225.0	1164.00	5260.0	1164.00	5450.0	1170.00	5490.0	1176.00	5535.0
GR	1178.0	5580.0	1180.00	5585.0	1186.00	5600.0	1180.00	5630.0	1170.00	5700.00
GR	1160.0	5760.0	1160.00	5790.0	1170.00	5810.0	1180.00	5940.0	1186.00	5950.0
GR	1186.0	6265.0	1180.00	6280.0	1156.95	6306.9	1156.95	6315.0	1156.95	6340.0
GR	1157.0	6505.0	1156.95	6666.0	1156.95	6670.0	1156.95	6788.2	1170.00	7010.0
GR	1172.0	7055.0	1170.00	7080.0	1162.00	7100.0	1160.00	7485.0	1160.00	7610.0
GR	1157.0	7637.4	1156.95	7700.0	1156.95	7795.0	1156.95	7941.0	1160.00	8005.0
GR	1170.0	8015.0	1174.00	8030.0	1174.00	8210.0	1176.00	8250.0	1178.00	8310.0
GR	1178.0	8410.0	1176.00	8575.0	1180.00	8590.0	1184.00	8610.0	1186.00	8830.0
GR	1190.0	8855.0								
X1	249.00	49	5000.0	8755	470.0	500.0	495.0			
X3				5000		7050				
GR	1184.0	4980.0	1186.50	4985.0	1186.20	5000.0	1164.00	5022.0	1164.00	5135.0
GR	1164.0	5210.0	1170.00	5270.0	1172.00	5300.0	1174.00	5420.0	1178.00	5530.0
GR	1180.0	5555.0	1186.00	5580.0	1188.00	5670.0	1186.00	5700.0	1180.00	5710.0
GR	1170.0	6010.0	1160.00	6245.0	1160.00	6415.0	1157.45	6421.4	1157.45	6440.0
GR	1157.5	6490.0	1157.45	6660.0	1157.45	6760.0	1157.45	7070.0	1157.45	7140.0
GR	1157.5	7165.0	1157.45	7220.0	1157.45	7300.0	1157.45	7350.0	1157.45	7368.6
GR	1170.0	7400.0	1178.00	7425.0	1170.00	7485.0	1160.00	7500.0	1157.45	7531.9
GR	1157.5	7600.0	1157.45	7795.3	1158.00	7815.0	1160.00	8020.0	1170.00	8030.0
GR	1170.0	8055.0	1170.00	8345.0	1180.00	8355.0	1182.00	8365.0	1170.00	8420.0
GR	1170.0	8530.0	1180.00	8580.0	1188.00	8640.0	1188.00	8755.0		
X1	250.00	37	5000.0	7850	720.0	440.0	555.0			
X3				5000		7060				
GR	1190.0	4910.0	1180.00	4940.0	1186.70	4985.0	1186.40	5000.0	1166.00	5020.0
GR	1170.0	5120.0	1166.00	5130.0	1166.00	5175.0	1170.00	5240.0	1178.00	5380.0
GR	1180.0	5500.0	1184.00	5540.0	1184.00	5610.0	1180.00	5640.0	1170.00	5810.0
GR	1158.0	5822.0	1158.00	5830.0	1158.00	5980.0	1158.00	6064.0	1160.00	6085.0
GR	1170.0	6100.0	1174.00	6110.0	1174.00	6220.0	1170.00	6250.0	1160.00	6320.0
GR	1158.0	6330.0	1158.00	6340.0	1158.00	6410.0	1158.00	6742.5	1160.00	7075.0
GR	1158.0	7082.0	1158.00	7110.0	1158.00	7500.0	1158.00	7628.0	1160.00	7660.0
GR	1180.0	7700.0	1190.00	7850.0						

X1	251.00	38	5000.0	8080	680.0	410.0	600.0			
X3				5000		6500				
GR	1194.0	4590.0	1194.00	4820.0	1192.00	4855.0	1190.00	4860.0	1180.00	4870.0
GR	1168.0	4895.0	1168.00	4947.0	1187.20	4985.0	1186.90	5000.0	1168.00	5019.0
GR	1172.0	5080.0	1176.00	5095.0	1174.00	5125.0	1180.00	5260.0	1186.00	5320.0
GR	1188.0	5330.0	1186.00	5560.0	1160.6	5930	1160.0	6345	1158.6	6428.1
GR	1197	6500	1197	6800	1159	6870	1158.60	7027.3	1160	7050
GR	1164	7120	1160	7145	1160	7215	1158.6	7217.1	1158.60	7230
GR	1158.6	7425	1158.60	7437.9	1180	7470	1182	7485	1180	7610
GR	1180.0	7670	1186	7860	1190	8080				
X1	252.00	29	5000.0	7555	550.0	190.0	485.0			
X3				5000		6250				
GR	1194.0	4760.0	1192.00	4945.0	1190.00	4950.0	1180.00	4965.0	1187.60	4985.0
GR	1187.3	5000.0	1170.00	5017.0	1170.00	5045.0	1170.00	5115.0	1174.00	5160.0
GR	1174.0	5240.0	1176.00	5280.0	1178.00	5310.0	1180.00	5325.0	1178.00	5340.0
GR	1178.0	5360.0	1180.00	5540.0	1186.00	5580.0	1180.00	5605.0	1170.00	5620.0
GR	1170.0	6560	1164.0	6580.0	1164.0	6800.0	1170.0	6820.0	1170.0	7085.0
GR	1180.0	7150.0	1170.0	7370.0	1180.0	7405.0	1190.0	7555.0		
X1	253.00	25	5000.0	8320	495.0	550.0	635.0			
X3				5000		6160				
GR	1188.2	4985.0	1187.90	5000.0	1176.00	5012.0	1180.00	5070.0	1178.00	5085.0
GR	1178.0	5155.0	1180.00	5170.0	1182.00	5190.0	1180.00	5230.0	1178.00	5290.0
GR	1176.0	5300.0	1176.00	5590.0	1180.00	5600.0	1170.00	5795.0	1170.00	5940.0
GR	1180.0	5960.0	1186.00	6050.0	1188.00	6070.0	1180.00	6110.0	1180.00	6260.0
GR	1176.0	6510.0	1176.00	6740.0	1180.00	6810.0	1190.0	6840.0	1190.00	8320.0

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

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .300 CEHV= .500
*SECNO 241.100

3470 ENCROACHMENT STATIONS= 5000.0 6084.0 TYPE= 1 TARGET= 1084.000

241.100	28.77	1181.97	1164.40	1181.97	1182.79	.82	.00	.00	1233.60
220000.0	.0	220000.0	.0	.0	30265.2	.0	.0	.0	100000.00
.00	.00	7.27	.00	.000	.035	.000	.000	1153.20	5001.63
.000355	59.	59.	59.	0	17	0	.00	1080.74	6082.37

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.05	1.56	2.60	.00	1025.00	130.00	28486.00	1.00	1153.23	1153.20

*SECNO 241.200
CLASS A LOW FLOW

3420 BRIDGE W.S.= 1181.71 BRIDGE VELOCITY= 8.36 CALCULATED CHANNEL AREA= 26303.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	1182.92	.16	0.	220000.	28486.	28486.	1184.00	1192.00	0.

3470 ENCROACHMENT STATIONS= 5000.0 6100.0 TYPE= 1 TARGET= 1100.000

241.200	28.90	1182.13	.00	.00	1182.92	.79	.13	.00	1233.70
220000.0	.0	220000.0	.0	.0	30863.8	.0	20.3	.7	100000.00
.00	.00	7.13	.00	.000	.035	.000	.000	1153.23	5001.57
.000339	29.	29.	29.	0	0	0	.00	1096.86	6098.43

*SECNO 242.000
CHIMP CLSTA= 5990.00 CELCH= 1153.53 BW= 2100.00 STCHL= 4880.00 STCHR= 6980.00

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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


EXCAVATION DATA
AEX=   20012.1SQ-FT     VEXR=        .0K*CU-YD     VEXT=        .0K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6390.0  TYPE=      1  TARGET=     1390.000
   242.000     29.14   1182.67   1162.69       .00   1183.13       .46       .11       .10 100000.00
  220000.0        .0  220000.0        .0        .0   40503.2        .0     380.8      13.3 100000.00
       .02       .00      5.43       .00      .000      .035      .000      .000   1153.53   5000.00
   .000193      510.      440.      420.         2        17         0       .00   1390.00   6390.00


CCHV=     .100 CEHV=     .300
*SECNO 243.000
CHIMP CLSTA=    6062.50 CELCH=    1153.88 BW=    2240.00 STCHL=    4885.00 STCHR=    7125.00
EXCAVATION DATA
AEX=   13911.6SQ-FT     VEXR=     307.8K*CU-YD     VEXT=      307.8K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6645.0  TYPE=      1  TARGET=     1645.000
   243.000     29.02   1182.90   1162.08       .00   1183.23       .33       .09       .01 100000.00
  220000.0        .0  220000.0        .0        .0   47740.1        .0     877.1      30.4 100000.00
       .05       .00      4.61       .00      .000      .040      .000      .000   1153.88   5000.00
   .000181      500.      490.      500.         2        14         0       .00   1645.00   6645.00


*SECNO 244.000
CHIMP CLSTA=    6202.50 CELCH=    1154.26 BW=    2575.00 STCHL=    4830.00 STCHR=    7405.00
EXCAVATION DATA
AEX=   24904.2SQ-FT     VEXR=     384.6K*CU-YD     VEXT=      692.4K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    6945.0  TYPE=      1  TARGET=     1945.000
   244.000     28.82   1183.08   1161.61       .00   1183.32       .24       .08       .01 100000.00
  220000.0        .0  220000.0        .0        .0   56059.5        .0    1514.5      52.4 100000.00
       .09       .00      3.92       .00      .000      .040      .000      .000   1154.26   5000.00
   .000131      495.      535.      550.         2        11         0       .00   1945.00   6945.00


*SECNO 245.000
CHIMP CLSTA=    6342.50 CELCH=    1154.64 BW=    3065.00 STCHL=    4790.00 STCHR=    7855.00
EXCAVATION DATA
AEX=   44381.9SQ-FT     VEXR=     705.7K*CU-YD     VEXT=     1398.1K*CU-YD
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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=     5000.0    7215.0  TYPE=      1  TARGET=     2215.000
   245.000     28.56   1183.20   1161.36       .00   1183.39       .19       .06       .01 100000.00
  220000.0        .0  220000.0        .0        .0   63267.0        .0    2267.9      78.7 100000.00
       .13       .00      3.48       .00      .000      .040      .000      .000   1154.64   5000.00
   .000104      550.      550.      390.         2        17         0       .00   2215.00   7215.00


*SECNO 246.000
CHIMP CLSTA=    6580.00 CELCH=    1155.06 BW=    3190.00 STCHL=    4970.00 STCHR=    8160.00
EXCAVATION DATA
AEX=   40307.4SQ-FT     VEXR=     941.0K*CU-YD     VEXT=     2339.1K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    7300.0  TYPE=      1  TARGET=     2300.000
   246.000     28.21   1183.27   1161.61       .00   1183.45       .18       .06       .00 100000.00
  220000.0        .0  220000.0        .0        .0   64875.6        .0    3150.4     109.8 100000.00
       .18       .00      3.39       .00      .000      .040      .000      .000   1155.06   5000.00
   .000100      410.      600.      450.         1        17         0       .00   2300.00   7300.00


*SECNO 247.000
CHIMP CLSTA=    6665.00 CELCH=    1155.35 BW=    3345.00 STCHL=    4985.00 STCHR=    8330.00
EXCAVATION DATA
AEX=   55622.1SQ-FT     VEXR=     879.4K*CU-YD     VEXT=     3218.4K*CU-YD


3470 ENCROACHMENT STATIONS=     5000.0    7145.0  TYPE=      1  TARGET=     2145.000
   247.000     27.96   1183.31   1162.23       .00   1183.52       .21       .05       .01 100000.00
  220000.0        .0  220000.0        .0        .0   59986.4        .0    3859.8     135.0 100000.00
       .22       .00      3.67       .00      .000      .040      .000      .000   1155.35   5000.00
   .000119      420.      495.      560.         1        14         0       .00   2145.00   7145.00


*SECNO 248.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS
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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 = .36

3470 ENCROACHMENT STATIONS= 5000.0 6985.0 TYPE= 1 TARGET= 1985.000

248.000	26.20	1183.15	1171.74	.00	1184.03	.87	.31	.20	1185.90
220000.0	.0	220000.0	.0	.0	29354.9	.0	4490.5	161.7	100000.00
.24	.00	7.49	.00	.000	.040	.000	.000	1156.95	5002.76
.000893	610.	615.	550.	2	11	0	.00	1634.04	6985.00

*SECNO 249.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 5000.0 7050.0 TYPE= 1 TARGET= 2050.000

249.000	26.36	1183.81	1170.26	.00	1184.40	.60	.35	.03	1186.20
220000.0	.0	220000.0	.0	.0	35458.2	.0	4858.8	181.9	100000.00
.27	.00	6.20	.00	.000	.040	.000	.000	1157.45	5002.37
.000584	470.	495.	500.	2	11	0	.00	1914.83	7050.00

*SECNO 250.000

3470 ENCROACHMENT STATIONS= 5000.0 7060.0 TYPE= 1 TARGET= 2060.000

250.000	26.18	1184.18	1169.82	.00	1184.73	.55	.32	.00	1186.40
220000.0	.0	220000.0	.0	.0	36979.3	.0	5320.2	207.2	100000.00
.29	.00	5.95	.00	.000	.040	.000	.000	1158.00	5002.18
.000560	720.	555.	440.	2	14	0	.00	2057.82	7060.00

*SECNO 251.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .47

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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=     5000.0    6500.0  TYPE=      1  TARGET=     1500.000
   251.000     25.17   1183.77   1176.83       .00   1185.93      2.16       .72       .48   1186.90
  220000.0        .0  220000.0        .0        .0   18637.3        .0    5703.3     229.4 100000.00
       .31       .00     11.80       .00      .000      .040      .000      .000   1158.60   5003.15
   .002582      680.      600.      410.         2        19         0       .00   1177.32   6475.23


*SECNO 252.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


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


3470 ENCROACHMENT STATIONS=     5000.0    6250.0  TYPE=      1  TARGET=     1250.000
   252.000     20.96   1184.96   1182.74       .00   1188.41      3.44      2.09       .38   1187.30
  220000.0        .0  220000.0        .0        .0   14772.5        .0    5889.3     242.9 100000.00
       .32       .00     14.89       .00      .000      .040      .000      .000   1164.00   5002.30
   .006047      550.      485.      190.         2        19         0       .00   1236.44   6250.00


*SECNO 253.000

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     5000.0    6160.0  TYPE=      1  TARGET=     1160.000
   253.000     18.76   1188.76   1187.30       .00   1192.83      4.07      4.24       .19   1187.90
  220000.0        .0  220000.0        .0        .0   13591.6        .0    6096.0     260.3 100000.00
       .33       .00     16.19       .00      .000      .040      .000      .000   1170.00   5000.00
   .007295      495.      635.      550.         3        15         0       .00   1160.00   6160.00
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THIS RUN EXECUTED 06JAN94 15:41:34

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

ALIGNMENT IMPROVEMENTS

SUMMARY PRINTOUT

* compare with alt. w/ channelization.

	SECNO	CWSEL	VLOB	VCH	VROB	QLOB	QCH	QROB	Q	TOPWID	SSTA	ENDST
	241.100	1181.97	.00	7.27	.00	.00	220000.00	.00	220000.00	1080.74	5001.63	6082.37
	241.200	1182.13	.00	7.13	.00	.00	220000.00	.00	220000.00	1096.86	5001.57	6098.43
	242.000	1182.67	.00	5.43	.00	.00	220000.00	.00	220000.00	1390.00	5000.00	6390.00
	243.000	1182.90	.00	4.61	.00	.00	220000.00	.00	220000.00	1645.00	5000.00	6645.00
	244.000	1183.08	.00	3.92	.00	.00	220000.00	.00	220000.00	1945.00	5000.00	6945.00
	245.000	1183.20	.00	3.48	.00	.00	220000.00	.00	220000.00	2215.00	5000.00	7215.00
	246.000	1183.27	.00	3.39	.00	.00	220000.00	.00	220000.00	2300.00	5000.00	7300.00
	247.000	1183.31	.00	3.67	.00	.00	220000.00	.00	220000.00	2145.00	5000.00	7145.00
*	248.000	1183.15	.00	7.49	.00	.00	220000.00	.00	220000.00	1634.04	5002.76	6985.00
	249.000	1183.81	.00	6.20	.00	.00	220000.00	.00	220000.00	1914.83	5002.37	7050.00
	250.000	1184.18	.00	5.95	.00	.00	220000.00	.00	220000.00	2057.82	5002.18	7060.00
*	251.000	1183.77	.00	11.80	.00	.00	220000.00	.00	220000.00	1177.32	5003.15	6475.23
*	252.000	1184.96	.00	14.89	.00	.00	220000.00	.00	220000.00	1236.44	5002.30	6250.00
	253.000	1188.76	.00	16.19	.00	.00	220000.00	.00	220000.00	1160.00	5000.00	6160.00

ALIGNMENT IMPROVEMENTS

SUMMARY PRINTOUT

	SECNO	CWSEL	CRIWS	EG	ELMIN	DEPTH	10*KS	K*CHSL	XLCH	SHEAR	FRCH
	241.100	1181.97	1164.40	1182.79	1153.20	28.77	3.55	.00	.00	.62	.24
	241.200	1182.13	.00	1182.92	1153.23	28.90	3.39	1.04	29.00	.60	.24
	242.000	1182.67	1162.69	1183.13	1153.53	29.14	1.93	.68	440.00	.35	.18
	243.000	1182.90	1162.08	1183.23	1153.88	29.02	1.81	.71	490.00	.33	.15
	244.000	1183.08	1161.61	1183.32	1154.26	28.82	1.31	.71	535.00	.24	.13
	245.000	1183.20	1161.36	1183.39	1154.64	28.56	1.04	.69	550.00	.18	.11
	246.000	1183.27	1161.61	1183.45	1155.06	28.21	1.00	.70	600.00	.18	.11
	247.000	1183.31	1162.23	1183.52	1155.35	27.96	1.19	.59	495.00	.21	.12
*	248.000	1183.15	1171.74	1184.03	1156.95	26.20	8.93	2.60	615.00	.83	.34
	249.000	1183.81	1170.26	1184.40	1157.45	26.36	5.84	1.01	495.00	.63	.26
	250.000	1184.18	1169.82	1184.73	1158.00	26.18	5.60	.99	555.00	.63	.25
*	251.000	1183.77	1176.83	1185.93	1158.60	25.17	25.82	1.00	600.00	2.04	.58
*	252.000	1184.96	1182.74	1188.41	1164.00	20.96	60.47	11.13	485.00	4.47	.76
	253.000	1188.76	1187.30	1192.83	1170.00	18.76	72.95	9.45	635.00	5.33	.83

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 248.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 251.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 252.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE