TECHNICAL DATA NOTEBOOK
FOR DAGGS WASH
SECTION 4.2 FIELD RECONNAISSANCE
AND HYDRAULIC PARAMETER ESTIMATION

DECEMBER, 1992

PREPARED FOR:
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
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FCD NO. 92-08
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4.2 FIELD RECONNAISSANCE AND HYDRAULIC PARAMETER ESTIMATION

4.2.1 Manning's 'n' Values:

4.2.1.1 Introduction. On November 13, 1992, A-N West made a reconnaissance field trip of Daggs Wash to photograph and evaluate Manning's 'n' values. The study reach proceeded from the Hassayampa River confluence to the Toyota Proving Ground Access Road, a distance of approximately 12.2 river miles. The Daggs Wash study reach is shown on Exhibit A (2 sheets). Exhibit 'A' shows the approximate river flow line and river mile numbers proceeding upstream from the confluence with the Hassayampa River. Exhibit 'A' also shows the estimated channel and right and left overbank 'n' values estimated for the study reach.

4.2.1.2 Methodology. Manning's 'n' values were estimated utilizing the document "Estimated Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona. Prepared by U.S. Geological Survey, Water Resources Division by B.W. Thomson and H.W. Hjalmarsen, Prepared for Flood Control District of Maricopa County, Dated April, 1991.

Field visit observations of vegetation and channel and overbank 'n' value characteristics were noted and representative photographs were taken. These photos are included in the following materials with reference to river mile location, orientation of photo and estimated 'n' values. Aerial photo contact prints were also utilized to evaluate changes in channel widths, vegetation types and densities and to determine appropriate reach limits of similar 'n' values. These aerial photo contact prints are included in the following materials with significant river mile markers noted on the photos to reference to field photos and the Exhibit 'A'.

Utilizing the U.S.G.S. document, field photos and site observations and the aerial photos, Manning's 'n' values were estimated at several representative cross-sections estimated from field observations and measurements. The river mile reach having similar 'n' value characteristics as these representative typical cross-sections were also noted on the calculation sheets and on Exhibit 'A'. Manning's 'n' values were estimated for the channel and left and right overbank. The location of anticipated channel bank locations is shown on the representative cross-sections.

It is anticipated that the NH line option of the HEC-2 model will be utilized to subdivide the distinct 'n' value sub-elements which were noted in the channel area. The heavy vegetation along the channel banks was quite consistent and represented a distinct 'n' value subelement. Likewise, the open channel bed of sand/gravel, in the center was quite consistent and with a distinctly different 'n' value. The channel 'n' values estimated for this report represent a weighted 'n' value, of these 'n' value subelements.

The overbank 'n' values are generally of fairly consistent vegetation cover for which a uniform 'n' value was calculated. This 'n' value is expected to be input also by NH line option for the overbank areas.

4.2.2 Expansion and Contraction Coefficients:

Expansion and contraction of flows due to changes in channel cross-section will be relatively gradual and small for the majority of the study reach. Therefore, expansion and contraction coefficients of 0.3 and 0.1, respectively, are proposed based on the HEC-2 model user manual's discussion of these parameters.

At the Daggs Wash CAP overchute crossing, the flows will experience a rapid contraction and expansion as flow passes over the CAP. For this location, an expansion and contraction coefficient of 0.5 and 0.3, respectively are proposed based on HEC-2 model user manual discussion for these parameters.

The 100-year flood event discharge at the Toyota Proving Grounds Access Road is approximately 3300 cfs. The main wash culvert structures at this road consist of 4-10 foot span x 3 foot rise box culverts. These culverts will convey approximately 840 cfs using an assumed velocity of 7 fps. Thus, overflow of the road is expected for the 100-year event. The change in channel area experienced by the 100-year flows are expected to be gradual and, as such, expansion and contraction coefficients of 0.3 and 0.1, respectively are proposed based on HEC-2 user manual discussions of these parameters.

4.2.3 Hydraulic Jump/Drop Analysis:
A hydraulic jump is expected to occur at the CAP overchute crossing for Daggs Wash for the 100-year flood. The HEC-2 model is proposed to be used to analyze the hydraulics through this structure. The sub-critical flow regime of the HEC-2 model is expected to be utilized for the full length of Daggs Wash Study. A short reach of super critical flow may occur within the baffled chute spillway of the CAP overchute, which is expected to be noted as critical depth flow in the HEC-2 sub-critical regime analysis. This short reach of super-critical flow within the structure is not expected to adversely affect the hydraulic results upstream or downstream of the structure.

4.2.4 Inventory of Road Crossings and Drainage Structures:
The following Table 1 shows an inventory of road crossings, drainage structures and sizes along the Daggs Wash study limits.

TABLE 1
ROAD CROSSING AND DRAINAGE STRUCTURE SUMMARY

Location in River Miles (RM) Upstream of Hassayampa River Confluence	Description	Surfacing Type	Structure Size
2.3	Construct./Serv. Rd. along U.S.B.O.R. Powerline R/W	Native Material	None
3.05	Construct./Serv. Rd. along U.S.B.O.R. Central AZ. Proj. Canal (S. Side)	Native Material	None
3.10	Central AZ. Proj. Canal Concrete Overchute	Concrete	47'-4" wide
3.13	Construct./Serv. Rd. along U.S.B.O.R. Central AZ. Proj. Canal (N. Side)	Native Material	None
3.15	Construct./Serv. Rd. along U.S.B.O.R. Central AZ. Proj. Canal (N. Side)	Native Material	None

TABLE 1
ROAD CROSSING AND DRAINAGE STRUCTURE SUMMARY
(Cont'd)

Location in River Miles (RM) Upstream of Hassayampa River Confluence	Description	Surfacing Type	Structure Size
3.85	Construct./Serv. Rd. along U.S.B.O.R. Powerline R/W	Native Material	None
9.75	Private Graded Construct. Haul Rd. for Toyota Proving Grounds	Gravel Base Over Native Material	None
10.4	Private Unmaintained Ranching Access Rd.	Native Material	None
10.95	Private Unmaintained Ranching Access Rd.	Native Material	None
11.20	Private Unmaintained Ranching Access Rd.	Native Material	None
12.2	Toyota Proving Grounds Access Rd.	Asphalt Pvmt.	Structure No. 1, (4-10'x 3' concrete Box culverts at Main Wash). Structure No. 2, (2-36" span x 22" rise CMPAs located 350 ft. East of Main Wash). Structure No. 3, (2-36" span x 22" rise CMPAs located 925 ft. East of Main Wash).

Of the road crossings listed in Table 1, the Toyota Proving Grounds (TPG) Access Road is the only hard - surfaced road with drainage structures that is expected to require special analysis in the HEC-2 model for culvert and weir flow. The drainage structures will convey less than one-third of the 100-year flow of 3300 cfs. Based on the roadway profile, the majority of the remaining flow will cross over the road to the west of these box culverts.

The TPG construction haul road (RM 9.75) is to be abandoned in January 1993 according to Kewitt Western, the contractor for TPG, who built the road to haul gravel from a gravel pit to the TPG site. This road will receive no maintenance after this date and the gravel surface will erode with flows. Likewise, the other road crossings will erode during flood flows to match the adjacent channel section and as such, no special HEC-2 modeling is proposed for these road crossings.

4.2.5 Daggs Wash CAP Overchute Crossing and Levees:

4.2.5.1 Description. Daggs Wash is conveyed over the Central Arizona Project (CAP) Canal at River Mile 3.1 by a rectangular concrete flume.

The flume and inlet and outlet transitions are on U.S. Bureau of Reclamation property and were designed by the Bureau in 1977 and constructed under the supervision of the Bureau in 1981. Maintenance is also performed by the Bureau.

The following description of the overchute is based on site visit and plans received from the Bureau. A plan and profile of the overchute from these plans is included in Appendix B.

The rectangular concrete flume is 47.33 feet wide and has 7 foot high vertical walls with a 5 foot high chain link fence on top of the walls. Immediately upstream of the rectangular concrete flume is a 25 foot long concrete inlet transition section with transitions in bottom width from 47.33 feet to 72.33 feet and wall height from 7.0 feet to 8.5 feet, respectively, proceeding upstream.

Immediately, upstream of the concrete inlet transition, rock rip-rap protected levees on each side of the overchute, proceed upstream for an additional 100 feet with a radii of 135 feet. The earth channel bottom width transitions from 72.33 feet to approximately 197 feet proceeding upstream over this distance of 100 feet. The channel invert is level at elevation 1373.3 over this entire length of approximately 220 feet of concrete flume, and inlet transition.

The rock rip-rap levees are protected with 2 feet thick rock on a 12-inch sand and gravel bedding material. The upstream and downstream face of the rip-rap protected dikes have slopes of 2(H):1(V) and 1.5(H):1(V), respectively. The dike top width is 14 feet.

The top of the rip-rap dike is elevation 1383.0 per plans. This elevation will be verified in subsequent structure survey verification.

The rip-rap dikes transition to collective dikes which parallel the CAP canal and extend approximately 200 feet to each side of the overchute and tie into existing high ground on each side of the overchute. The collective dikes are not protected with rip-rap.

Immediately downstream of the rectangular concrete overchute flume is a concrete spillway and baffled block energy dissipater which extends 70.75 feet downstream to the existing Daggs Wash.

4.7.5.2. Previous Flood Insurance Study. The 100-year 24-hour peak discharges and volumes for Daggs Wash at the CAP overchute crossing were computed in the following previous FIS study; "Jackrabbit Wash, Floodplain

Delineation Study, FCD No. 90-05", "Prepared for Flood Control District of Maricopa County, Phoenix, Arizona, Prepared by Burgess and Niple Inc. Phoenix, Arizona, Dated February 1991. This study routed the 100-year 24-hour storm event through the CAP overchute crossing to determine peak ponding elevation upstream of the CAP canal. This peak ponding elevation was determined to be 1382.1 from which a detailed 100-year flood hazard Zone A H was delineated.

The 100-year 24-hour storm inflow to the overchute and upstream storage was computed as 4957 ccs and the outflow through the overchute was computed as 3277 cfs.

Included in the Jackrabbit FIS was a special problems report which discussed inadequate freeboard at the overchute levees for this routed 100-year 24-hour storm event.

The conclusions of the Jackrabbit FIS report were:

1. Use the 100-year 24-hour storm event routed water surface elevation of 1382.1 to delineate the ponding area.

2. Use the routed 100-year 24-hour storm discharge of 3277 cfs downstream of the overchute for subsequent downstream floodplain delineation. (See reasons for this conclusion in attached backup data, Appendix B).

4.2.5.3 HEC-2 Model Verification Analysis of FIS Hydraulics. In the Jackrabbit FIS routing analysis the Hydraulics of Bridge and Culvert Waterways computer software program was utilized to develop the elevation versus discharge relationship. This relationship was then input to the HEC-1 hydrologic model with an elevation versus storage relationship to compute the peak water surface elevation and outlet flow at the overchute for the 100-year 24-hour storm.

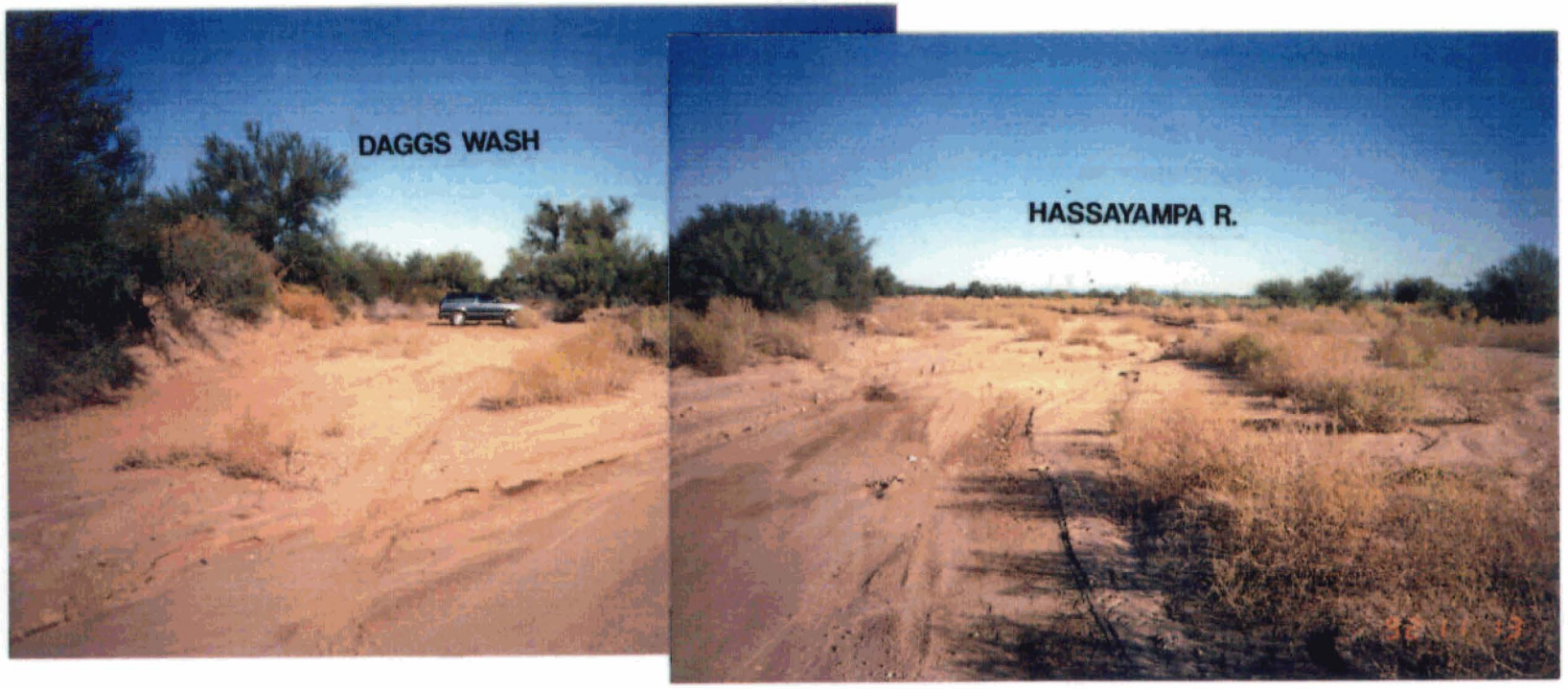
The HEC-2 model was utilized to verify the upstream water surface elevation at the overchute for the 100-year 24-hour peak discharge of 3277 cfs.

The Bureau of Reclamation CAP overchute plans were utilized in conjunction with site visit measurements by A-N West and field survey notes by Burgess and Niple of the overchute invert profile at elevation datumn 1929 (NGVD).

The HEC-2 input/output are included in Appendix B. The HEC-model verify a water surface elevation of 1382.1 at the upstream face of the rip-rap protected levees for the 100-year 24-hour discharge of 3277 cfs. The HEC-2 model indicates extended cross-sections of 0.08 and 0.06 feet respectively at cross-section Nos. 15 and 16, respectively, which were modeled at the rectangular concrete inlet transition. Overtopping of the concrete walls at this location would not be expected to cause failure of structure.

4.2.5.4 Conclusions. In conclusion, the Daggs Wash CAP overchute crossing and levees are expected to perform as computed by the previous Jackrabbit Wash FIS. Although the existing levees do not have adequate freeboard for the 100-year 24-hour flood, we would concur with the conclusions of the Jackrabbit FIS study, that the proposed downstream discharges be used in this Daggs Wash FIS.

Appendix A



RM 0.0
Looking Upstream

RM 0.0
Looking Upstream at Daggs Wash Channel
Channel Width, 36'±. Depth, 3' to 4' to Adjacent Overbank.

Wtd Channel 'n' 0.044

RM 0.6
Looking Upstream at Daggs Wash Main Channel

Channel Width, 30' to 35' Behind Truck. Depth 3'± to Overbank to Right.

Wtd. Channel 'n' = 0.044

RM 0.6
Looking Upstream at Daggs Wash Channel and Overbank

Wtd. Channel 'n' = 0.044
Overbank 'n' = 0.055

RM 0.6
Looking Downstream at Channel/ Overbanks Toward Hassayampa Riv

Wtd. Channel 'n' = 0.044
Overbank 'n' = 0.055

RM 2.1
Looking Downstream

RM 2.1
Looking Upstream

Wtd. Channel 'n' = 0.040
Overbank 'n' = 0.054

RM 2.2
Looking Upstream Overlooking
Channel and Overbanks

RM 2.2
Looking Upstream

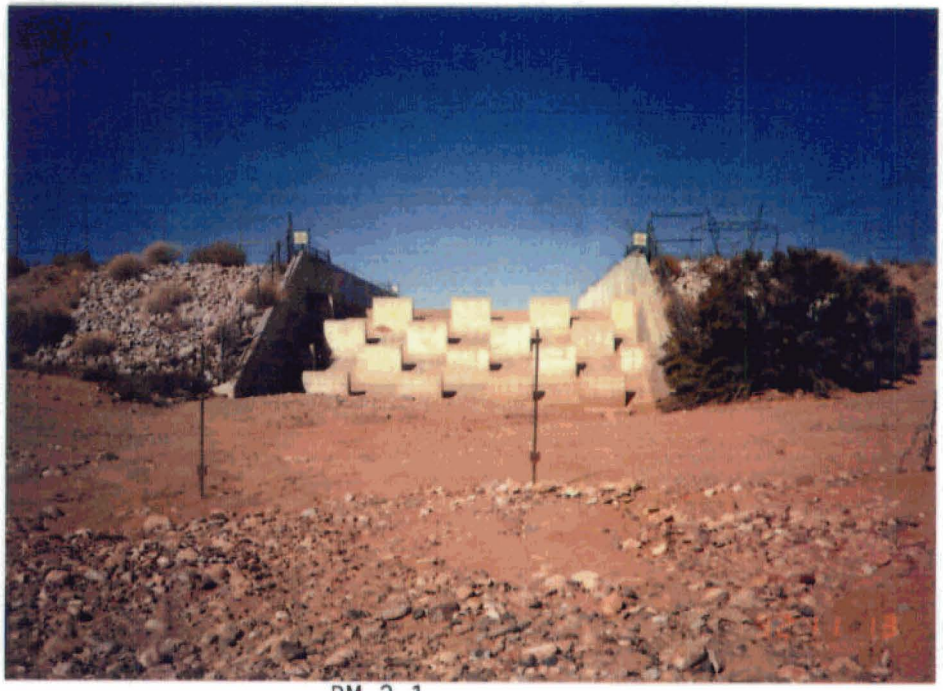
Wtd. Channel 'n' = 0.040
Overbank 'n' = 0.054

RM 2.8
Looking West Across
Channel and Overbanks
and Upstream

Wtd. Channel 'n' = 0.032
Overbank 'n' = 0.055

RM 3.0
Upstream at CAP Overchute

Wtd. Channel 'n' = 0.032



RM 3.1
Looking Upstream at CAP Overchute

RM 3.1
Looking West Along CAP on Inlet Levee of CAP Overchute

RM 3.1 Looking Upstream from CAP Overchute in Channel

Wtd. Channel 'n' = .04
Overbank 'n' = 0.65

RM 3.1
Looking Downstream at CAP Overchute Width = 47'-4".
Wall Ht. = 8.5 ', At Upstream Edge Wingwall, Transitioning to Ht. = 7.0' Through Overchute.

Channel 'n' = 0.030

RM 3.1
Looking West at CAP Overchute Inlet and Rip-rap Protected Levee

Channel 'n' = .030

RM 3.1
Looking West at CAP Overchute's West Rip-rap Protected Levee

Channel 'n' .030

RM 3.1
Looking West at CAP Overchute and Downslope side of Inlet Levee

RM 3.6
Looking Downstream
at East Overbank
and Channel

Wtd. Channel 'n' = 0.44
Overbank 'n' = .055

RM 3.6 Looking Upstream at
Channel and East Overbank

Wtd. Channel 'n' = .044
Overbank 'n' = .055

RM 4.0
Looking Southeasterly at
Overbank and Channel

Wtd. Channel 'n' = .044
Overbank 'n' = .055

RM 4.0
Looking Upstream at Channel
Width = 30', Depth = 3.5'±

Wtd. Channel 'n' = .044

RM 5.3
Looking Upstream in Channel

Wtd. Channel 'n' = .044
Overbank 'n' = .055

RM 5.3
Looking Downstream in Channel

Wtd. Channel 'n' 0.044
Overbank 'n' = .055

RM 5.3
Looking Easterly and Normal to Overbanks and Channel

Overbank 'n' = .055

RM 6.0
Looking Upstream at Channel
Channel Width = 40'±
Depth = 4'± to Adjacent Overbank

Wtd. Channel 'n' = .044

RM 6.0
Looking Downstream at Channel

Wtd. Channel 'n' = .044

RM 6.0
Looking Easterly and Normal to
Overbanks and Channel

Wtd. Channel 'n' = .044
Overbank 'n' = .055

RM 7.6
Looking Upstream at Channel
Channel Width = 40'
Depth = 4'± to Adjacent Overbank

Wtd. Channel = .044

RM 7.6
Looking Downstream at Channel

Wtd. Channel 'n' = .044

RM 7.6
Looking Easterly and Normal to Overbanks and Channel

Overbank 'n' = .055

RM 8.9
Looking Upstream at Channel
Channel Width = 150'±
Depth = 3'± to Adjacent
Overbank

Wtd. Channel 'n' = .038

RM 8.9
Looking Downstream at Channel

Wtd. Channel 'n' = .038

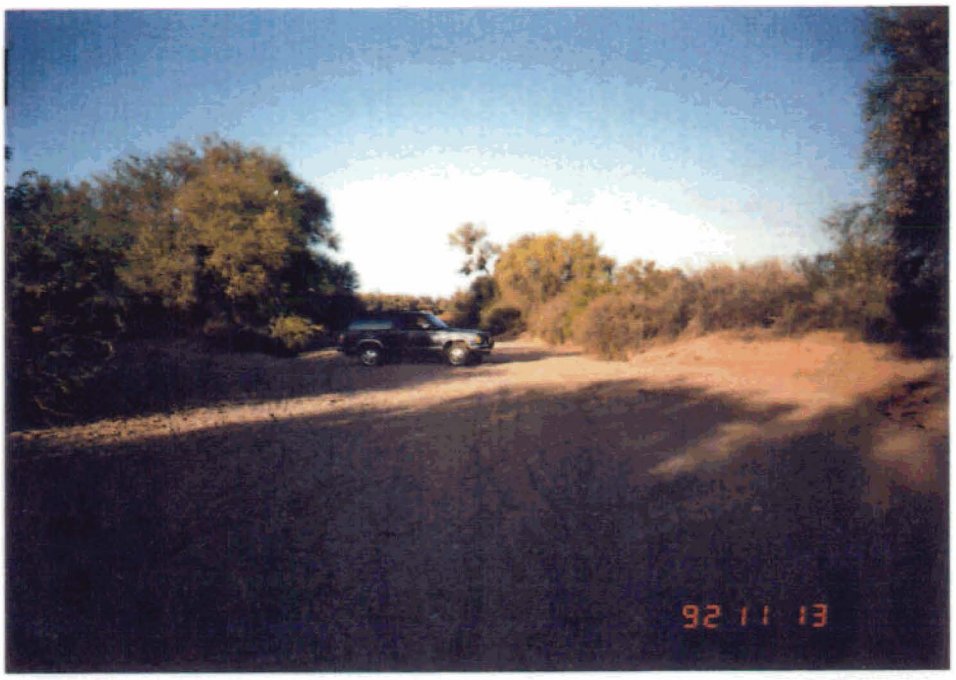
RM 8.9
Looking Easterly and Normal
to Overbanks and Channel

Wtd. Channel 'n' = .038
Overbank 'n' = .055

RM 9.75
Looking Upstream from Private Haul Road for Toyota Proving Grounds Construction Project. (Note: Road to be Abandoned in January 1993 by Contractor).

Wtd. Channel 'n' = .044
Overbank 'n' = .055

RM 9.75
Looking Upstream at Road Crossing of Channel.
Channel Width = 45'± and Depth = 4'±
Downstream of Road



RM 10.4
Looking Upstream at Private Road Crossing of Channel
Channel Width = 45'±
Depth = 3'± to Adjacent Overbank

Wtd. Channel 'n' = .044

RM 10.4
Looking Northeasterly at Overbank and Road

Wtd. Channel 'n' = 0.44
Overbank 'n' = .055

RM 10.4
Looking Northwesterly at Overbank and Road

Wtd. Channel 'n' = .044
Overbank 'n' = .055

RM 11.3
Looking Upstream at East Channel o
Two Channels
Channel Width = 20'±
Depth = 3.5'± to Adjacent Overbank

Wtd. Channel 'n' = .044

RM 11.3
Looking Easterly from East Channel
at Overbank

Overbank 'n' = .055

RM 11.3
Looking Downstream at West Channel
of Two Channels
Width = 20'±
Depth = 4.5' ± to Adjacent Overban

Wtd. Channel 'n' = .044

RM 12.2
Looking Downstream at Inlet to
4 - 10' Span x 3' Rise Concrete
Box Culverts Across Paved Access
Road to Toyota Proving Grounds

RM 12.2
Looking Upstream from Main Channel
at Box Culverts above

Wtd. Channel 'n' = .044
Overbank 'n' = 0.55

RM 12.2
Looking Downstream at 2 - 36"
Span x 22" Rise CMPAs Across
Paved TPG Access Road
Located 350'± East of Box Culvert
at Main Channel

RM 12.2
Looking Downstream at 2 - 36" Spa
x 22" Rise CMPAs Across Paved TPG
Access Road
Located 925'± East of Box Culvert
at Main Channel

Wtd. Channel 'n' = .044
Overbank 'n' = .055

DAGGS WASH AERIAL PHOTOS
(0.6) River Miles Upstream of Hassayampa R.

DAGGS WASH AERIAL PHOTOS
(0.6) River Miles Upstream of Hassayampa R.

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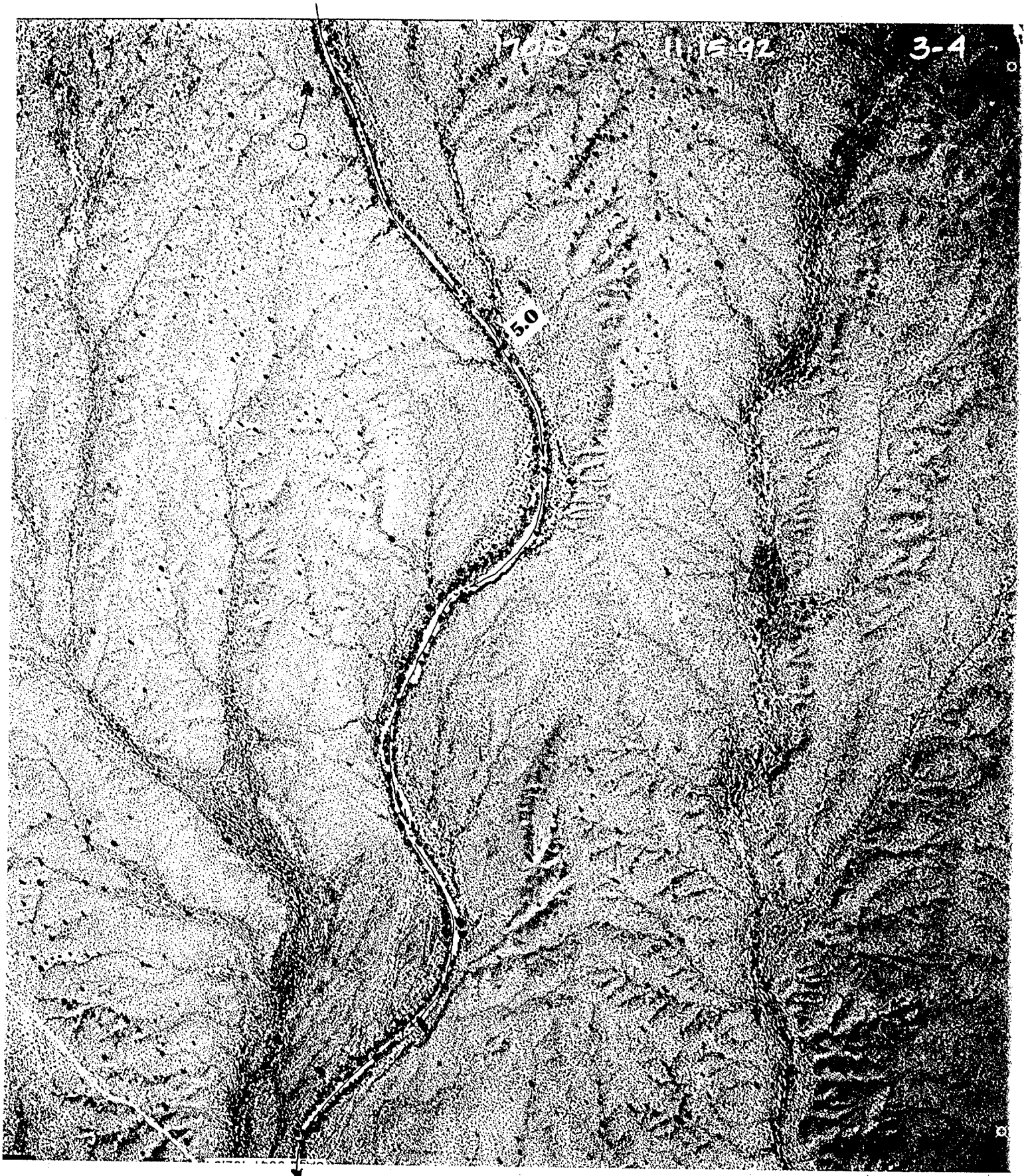

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(0.6) River Miles Upstream of Hassayampa R.

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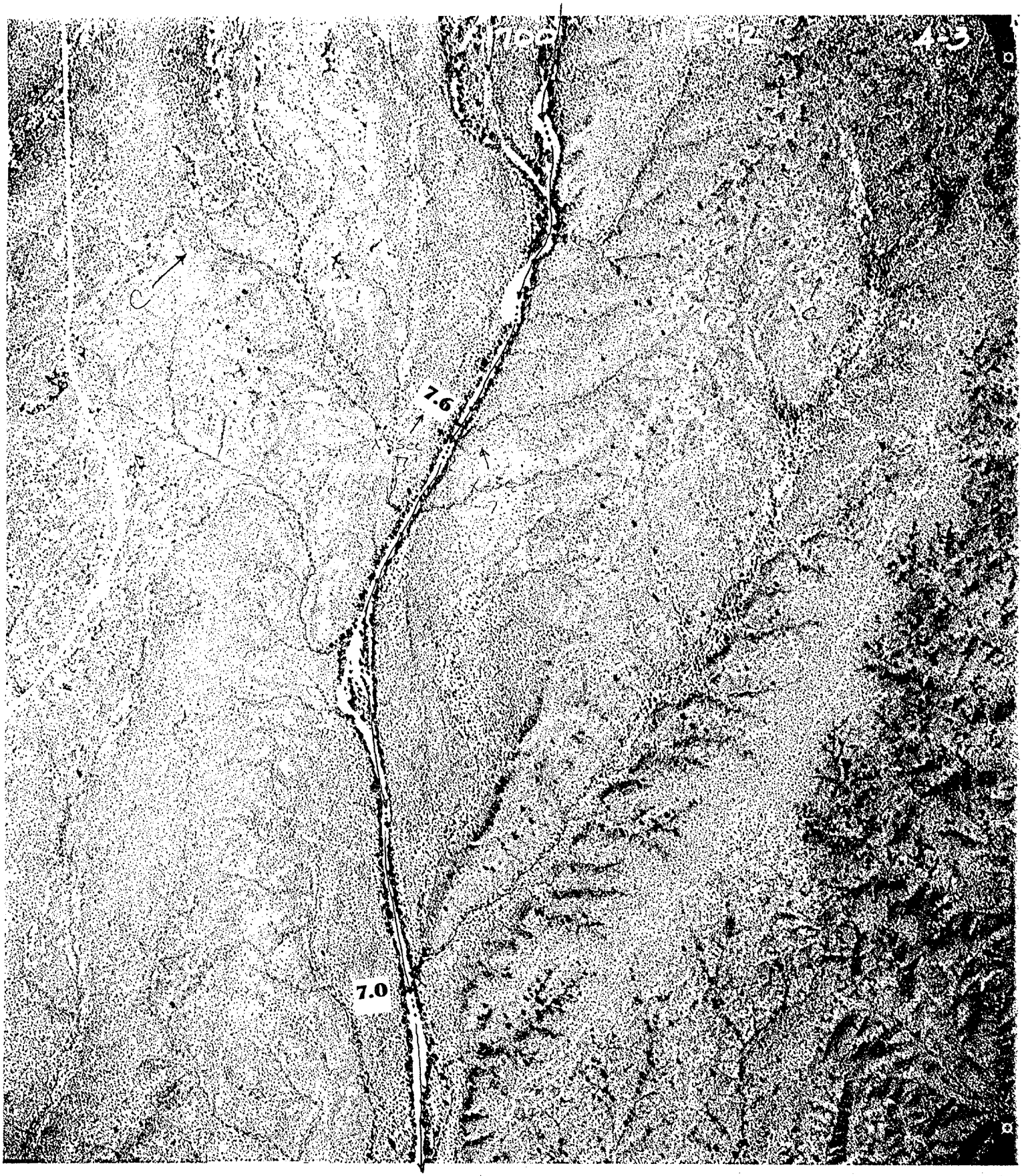

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(0.6) River Miles Upstream of Hassayampa R.

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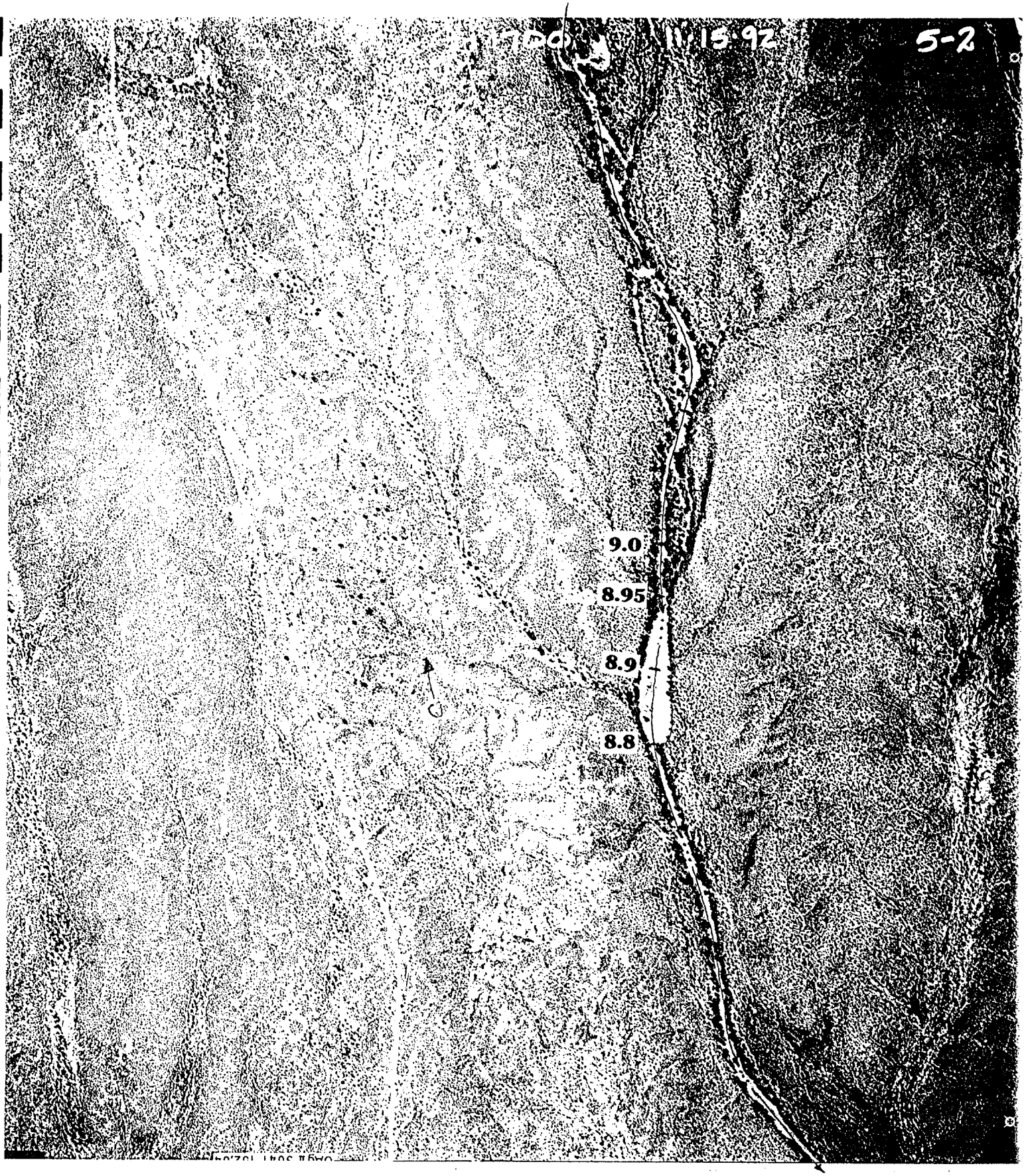
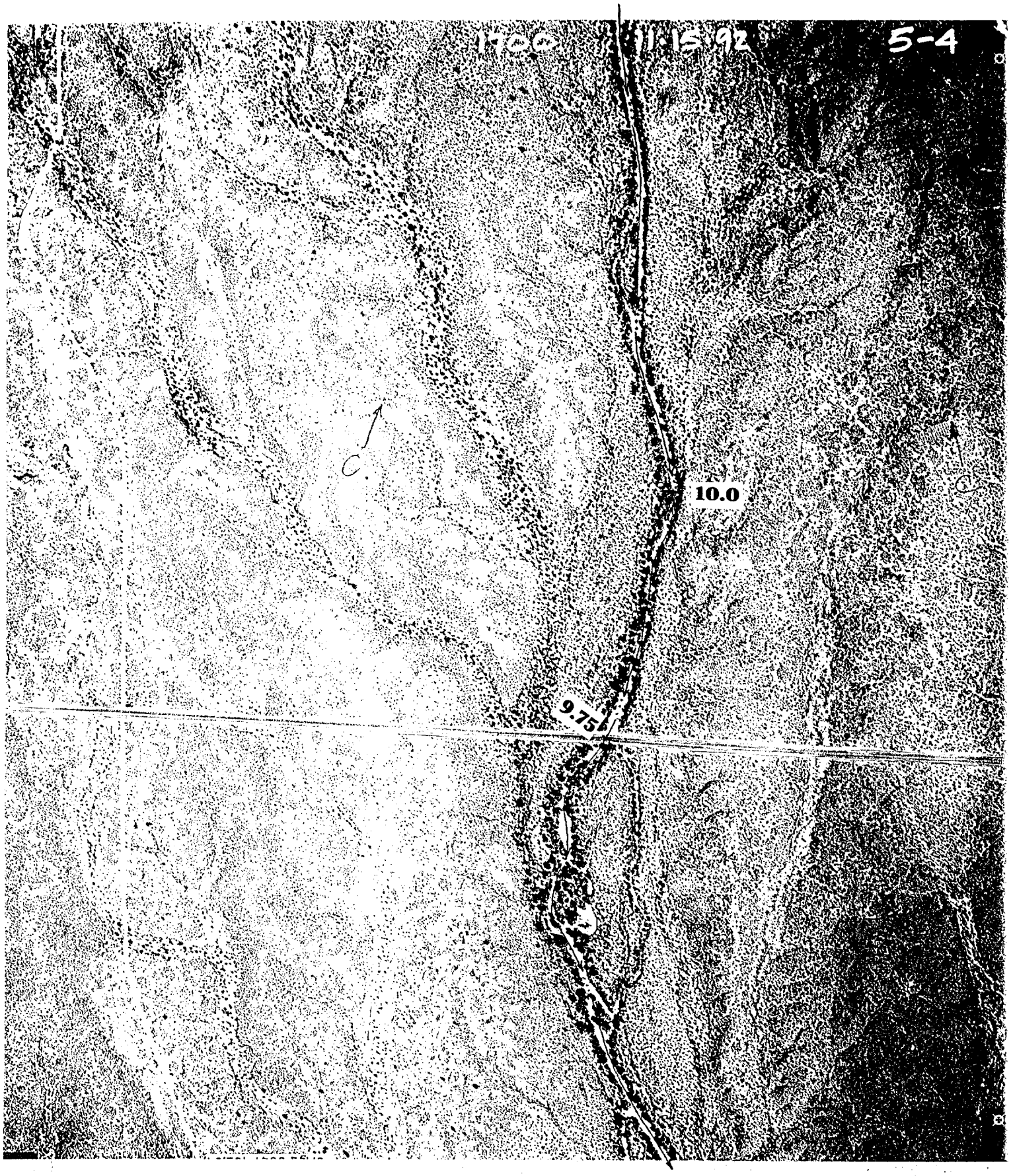
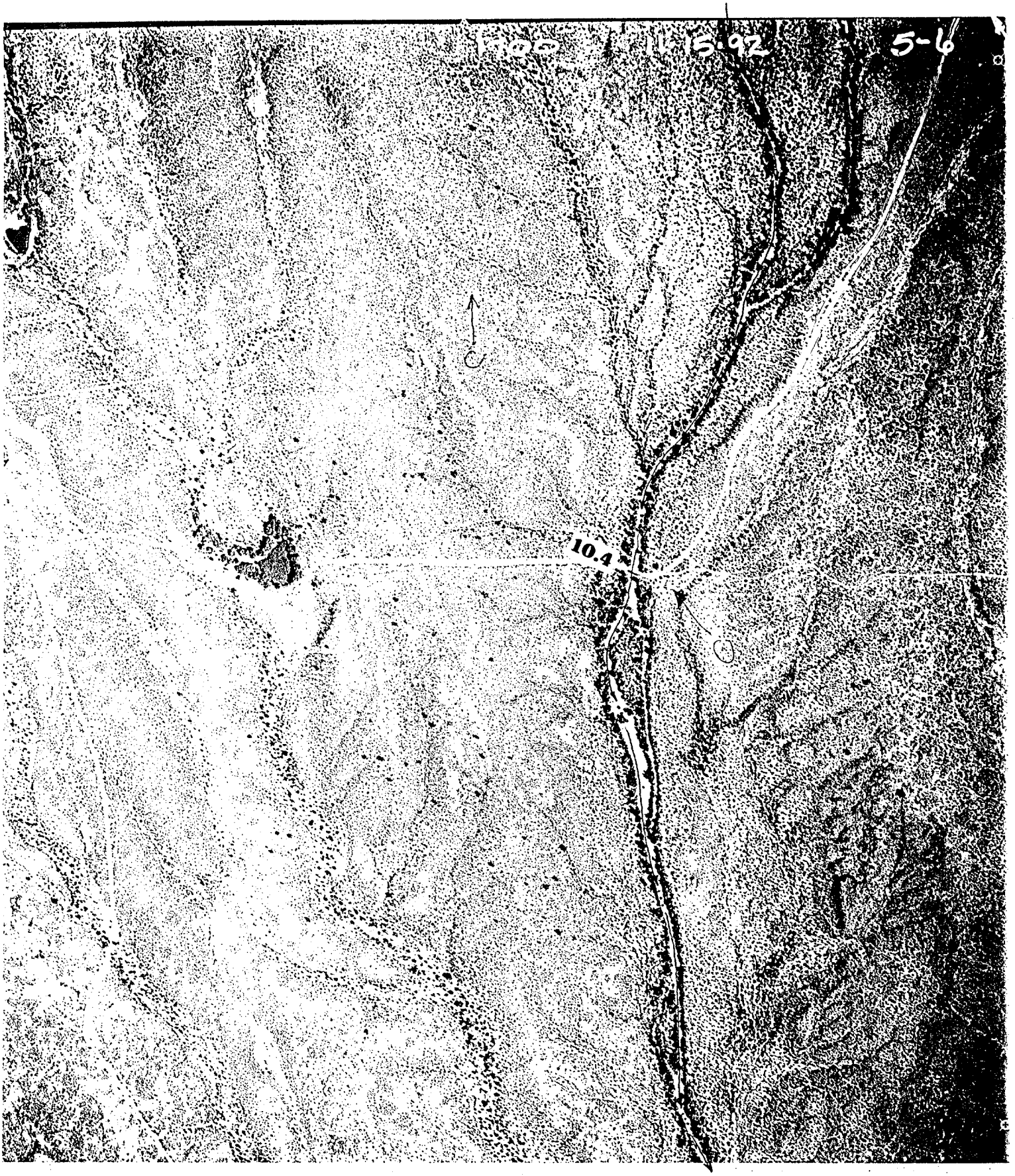
(0.6) River Miles Upstream of Hassayampa R.



DAGGS WASH AERIAL PHOTOS
(0.6) River Miles Upstream of Hassayampa R.

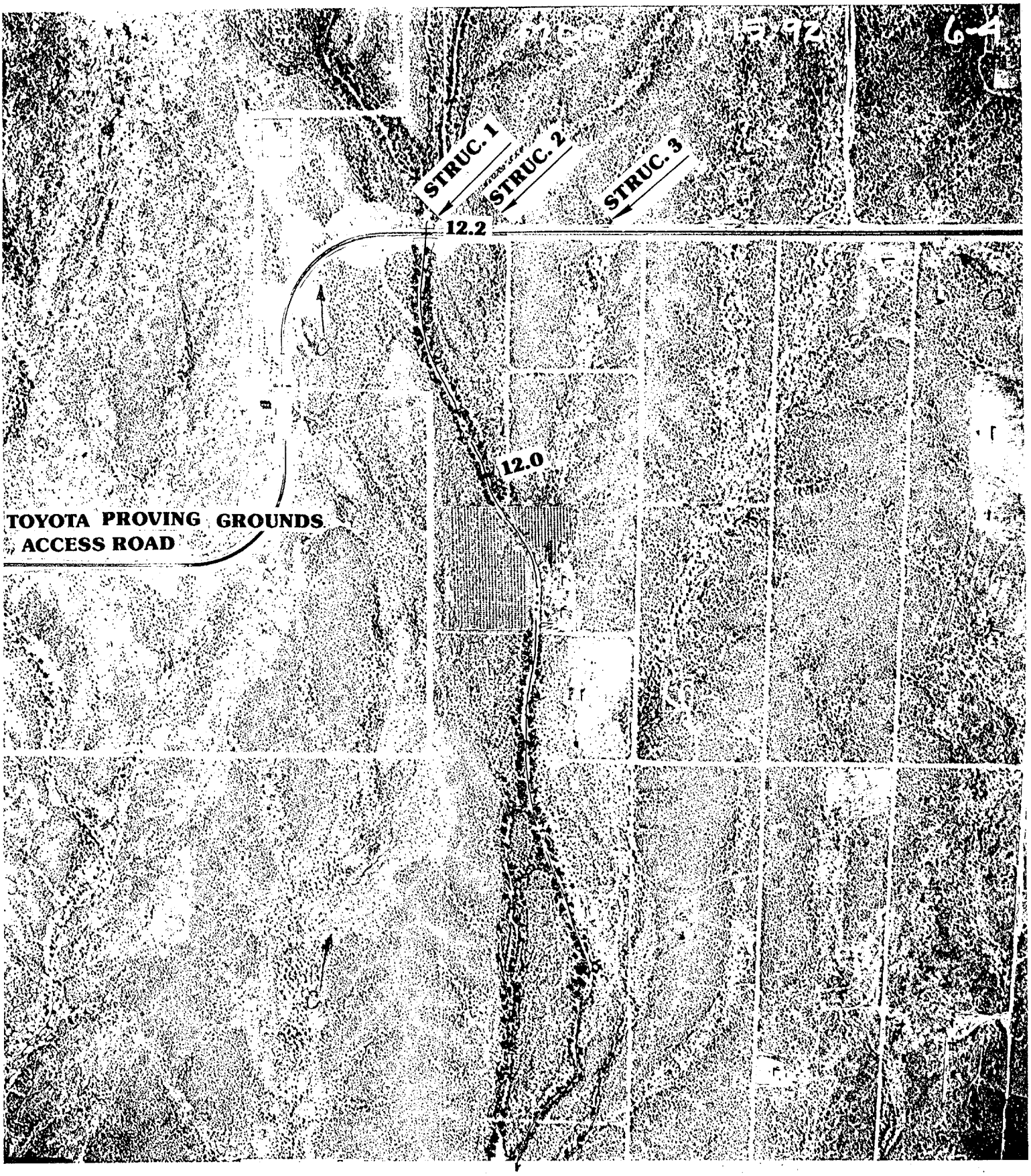


DAGGS WASH AERIAL PHOTOS
(0.6) River Miles Upstream of Hassayampa R.



DAGGS WASH AERIAL PHOTOS
(0.6) River Miles Upstream of Hassayampa R.

DAGGS WASH AERIAL PHOTOS
(0.6) River Miles Upstream of Hassayampa R.



DAGGS WASH AERIAL PHOTOS
(0.6) River Miles Upstream of Hassayampa R.

DAGGS WASH

Location of Cross-Section: 0.6 River Miles above confluence with Hassayampa River.

Representative of Channel Reach: RM 0.0 to R M 1.8 and RM 2.5 to RM 2.8.

Description of Channel: Main channel has sand/gravel bed with scattered brush. Main channel banks have a heavy growth of brush and trees which are not expected to be overtopped.

The overbanks contain small eroded rivlets interspersed among scattered creosote brush, desert grass, cactus and occasional palo verde and mesquite trees. Flow is expected to be shallow (i.e. 1-2 feet deep) in overbanks.

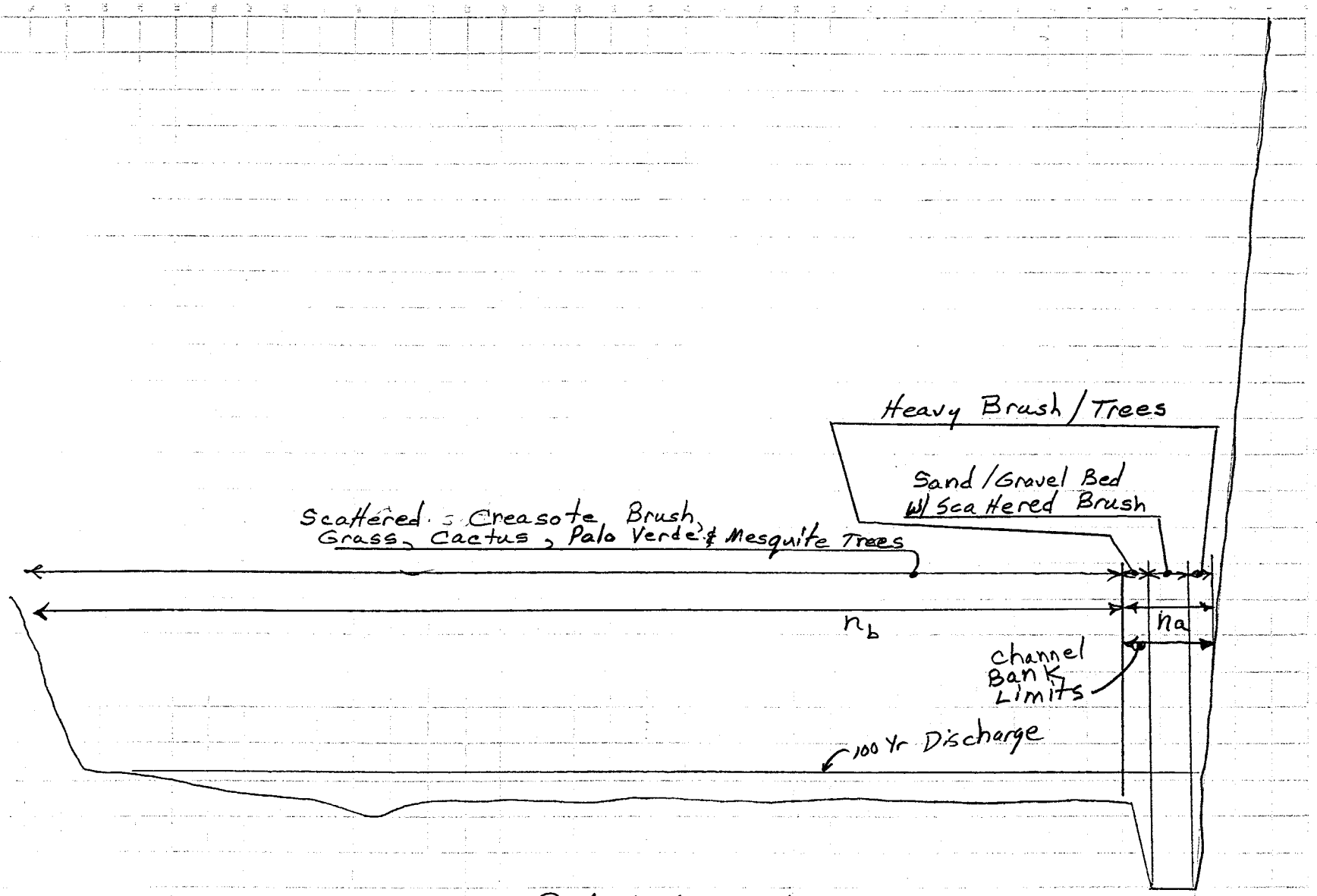
Sub-division of Cross-Section and Evaluation of 'n': Cross-section was sub-divided by area for main channel, where bank stations are anticipated just outside of the heavy vegetation growth. The overbanks were estimated based on perimeter although, 'n' value was estimated to be uniform over this area.

COMPONENTS AND WEIGHTED AND COMPOSITE VALUES OF MANNING'S 'N'

RM 0.6

100-Year Flood

Portion of area or wetted perimeter	Components	Weighted and Composite Values
Subsection A - Channel		
0.25 (by Area)	nb = --- n1 = --- n2 = --- n3 = 0.09(Dominates) n = 0.09	0.023
0.75 (by Area)	nb = .025 n1 = --- n2 = --- n3 = .003 n = .028	0.021
1.00		0.044
Subsection B - Overbanks, Left & Right		
1.00 (by Perimeter)	nb = 0.025 n1 = 0.005 n2 = 0.005 n3 = 0.020 n = 0.055	0.055



RM 0.6 Looking Downstream

Scale H : 1" = 100'
V : 1" = 5'

DAGGS WASH

Location of Cross-Section: 2.05 River Miles above Hassayampa River Confluence.

Representative of Channel Reach: RM 1.8 to RM 2.5.

Description of Channel: Main channel fluctuates in width from 50 to 350 feet and is 3 to 4 foot deep. Main channel contains brush along sides of channel in light to median density with some light brush scattered across channel.

The secondary channels contain similar densities of brush but these channels are narrower and more shallow at 20 to 30 foot wide and 2.5 foot ± deep. The overbank adjacent to channels is anticipated to receive shallow flooding of 0.5 foot average through scattered creosote brush, cactus, desert grass and occasional trees.

Sub-division of Cross-Section and Evaluation of 'n': Cross-section was sub-divided by perimeter, flood flows and are expected to overtop much of the brush in channels and meander between overbank ground cover.

COMPONENTS AND WEIGHTED AND COMPOSITE VALUES OF MANNING'S 'N'

RM 2.05

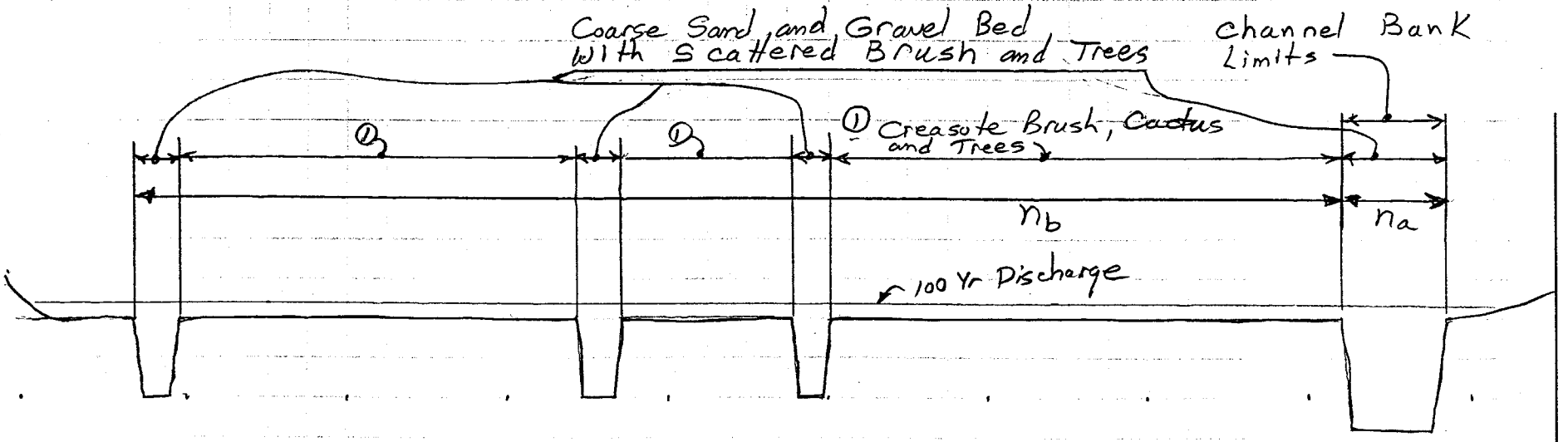
Portion of area or wetted perimeter	Components	Weighted and Composite Values
Subsection A - Channel - Main		
1.00 (by Perimeter)	nb = 0.028 n1 = 0.002 n2 = --- n3 = 0.01	
1.00	n = 0.040	0.040
Subsection B - Secondary Channels and Overbank		
0.01 (by Perimeter)	nb = 0.028 n1 = 0.003 n2 = --- n3 = 0.014	
0.10	n = 0.045	0.0045
0.90 (by Perimeter)	nb = 0.025 n1 = 0.005 n2 = --- n3 = 0.025	
0.90	n = 0.055	0.0495
1.00		0.054

Project 7158-02 Sht. ___ of ___

Calc. By GAS Date 12/4/92

Chkd. ___ Date ___

Dagg Wash



RM 2.05
Looking Downstream

Scale H: 1" = 100'
V: 1" = 5'

DAGGS WASH

Location of Cross-Section: 2.8+ River Miles above Hassayampa River Confluence.

Representative of Channel Reach: RM 2.8 to RM 3.15.

Description of Channel: Main channel is a course sand to gravel bed with none to light density of bushes along bank and across bed. Flow expected to overtop and push over this vegetation.

Overbank contains typical light density creosote brush, cactus, desert grass and occasional tree cover with rivlets interspersed amongst cover.

Sub-division of Cross-Section and Evaluation of 'n': Cross-section was sub-divided by perimeter method.

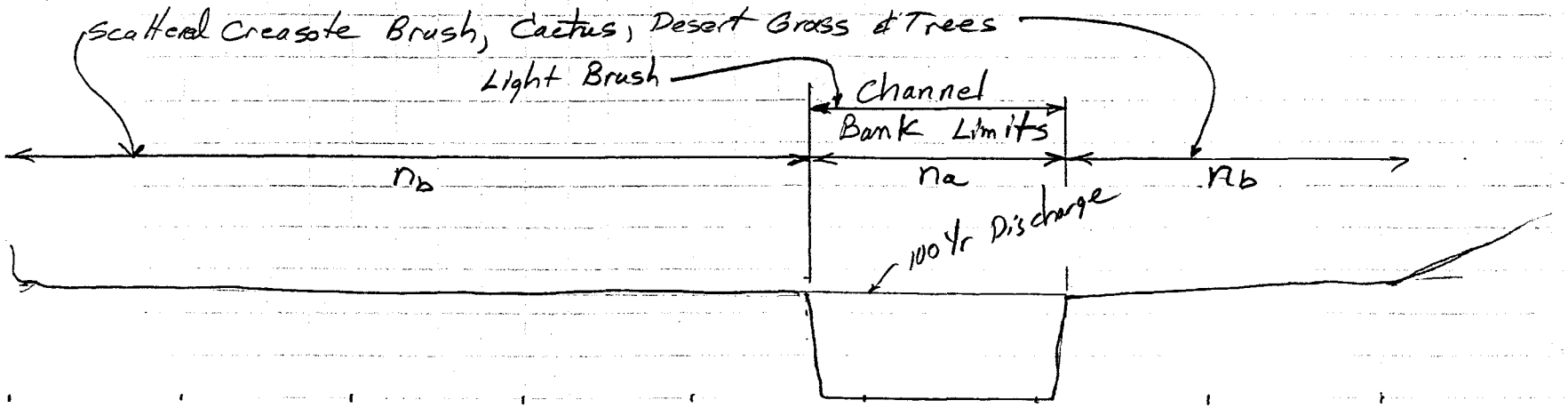
COMPONENTS AND WEIGHTED AND COMPOSITE VALUES OF MANNING'S 'N'

RM 2.8+

100-Year Flood

Portion of area or wetted perimeter	Components	Weighted and Composite Values
Subsection A - Channel		
1.00 (by Perimeter)	n_b = 0.028 n_1 = 0.002 n_2 = --- n_3 = 0.002	
	n = 0.032	0.032
Subsection B - Overbank		
1.00 (by Perimeter)	n_b = 0.025 n_1 = 0.005 n_2 = --- n_3 = 0.025	
1.00	n = 0.055	0.055

Diggs Wash



scale H: 1" = 100'
V: 1" = 5'

RM 2.8 +
Looking Downstream

DAGGS WASH

Location of Cross-Section: 3.2 River Miles above Hassayampa River Confluence.

Representative of Channel Reach: RM 3.15 to RM 3.25.

Description of Channel: Sand and silt bed materials with scattered brush along edges of channel with occasional brush in channel. Overbanks contain medium cover of brush.

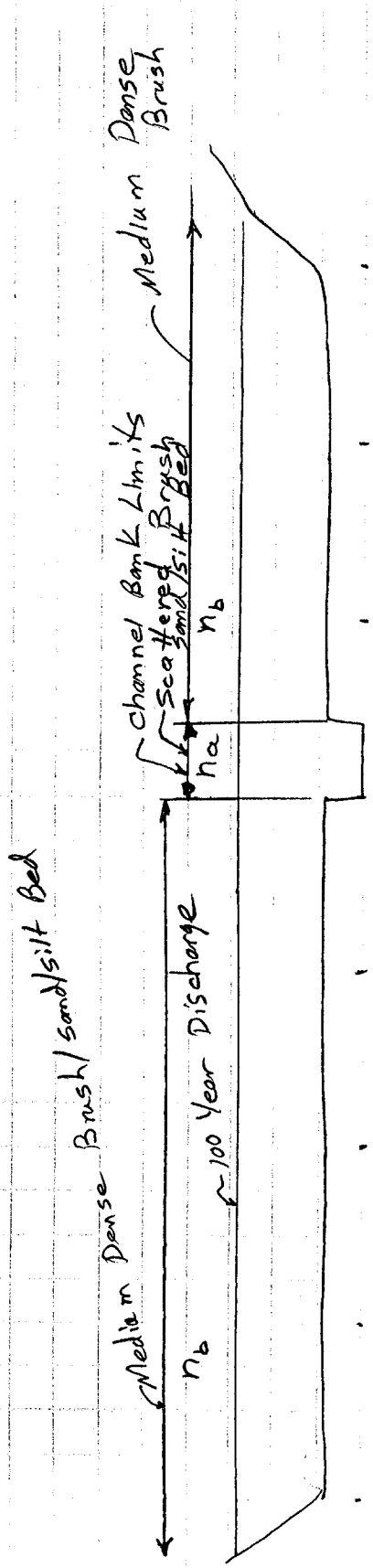
Sub-division of Cross-Section and Evaluation of 'n': Cross-section was sub-divided by perimeter method.

COMPONENTS AND WEIGHTED AND COMPOSITE VALUES OF MANNING'S 'N'

RM 3.2

100-Year Flood

Portion of area or wetted perimeter	Components	Weighted and Composite Values
Subsection A - Channel		
1.00 (by Perimeter)	n_b = 0.025 n_1 = 0.005 n_2 = --- n_3 = 0.010	
1.00	n = 0.04	0.04
Subsection B - Overbanks		
1.00 (by Perimeter)	n_b = 0.025 n_1 = 0.005 n_2 = --- n_3 = 0.035	
1.00	n = 0.065	0.065



Scale H: 1" = 100'
V: 1" = 5'

RM 3.2
Looking Downstream

DAGGS WASH

Location of Cross-Section: 4.0 and 5.3 River Miles above confluence with Hassayampa River. Cross-sections 6.0, 7.6, 9.75, 10.4, 11.3 and 12.2 are also representative of RM 4.0 and 5.3.

Representative of Channel Reach: RM 3.25 to RM 6.15, RM 6.7 to RM 8.8 and RM 8.95 to RM 12.2.

Description of Channel: Main channel has sand/gravel bed. Main channel banks have a heavy growth of brush and trees which are not expected to be overtopped.

The overbanks contain small eroded rivlets interspersed among scattered creosote brush, desert grass, cactus and occasional palo verde and mesquite trees. Flow is expected to be shallow (i.e. 1-2 feet deep) in overbanks.

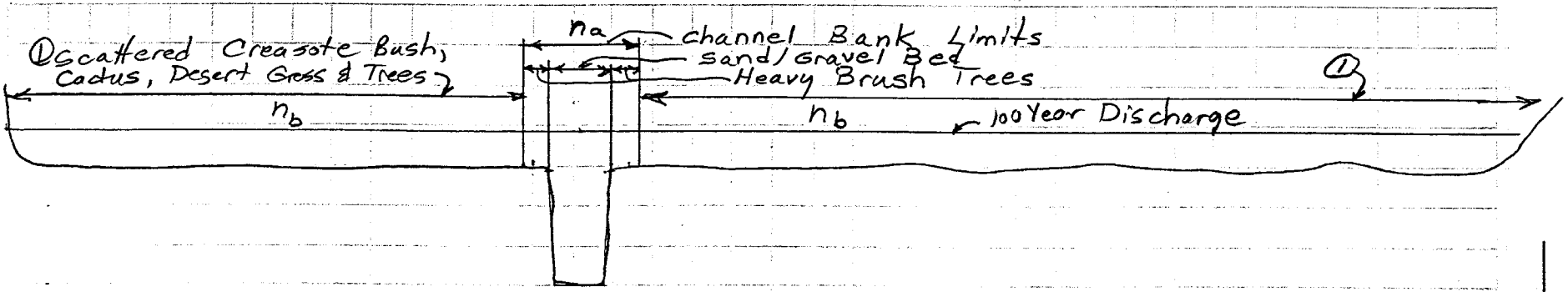
Sub-division of Cross-Section and Evaluation of 'n': Cross-section was sub-divided by area for main channel, where bank stations are anticipated just outside of the heavy vegetation growth. The overbanks were estimated based on perimeter although, 'n' value was estimated to be uniform over this area.

COMPONENTS AND WEIGHTED AND COMPOSITE VALUES OF MANNING'S 'N'

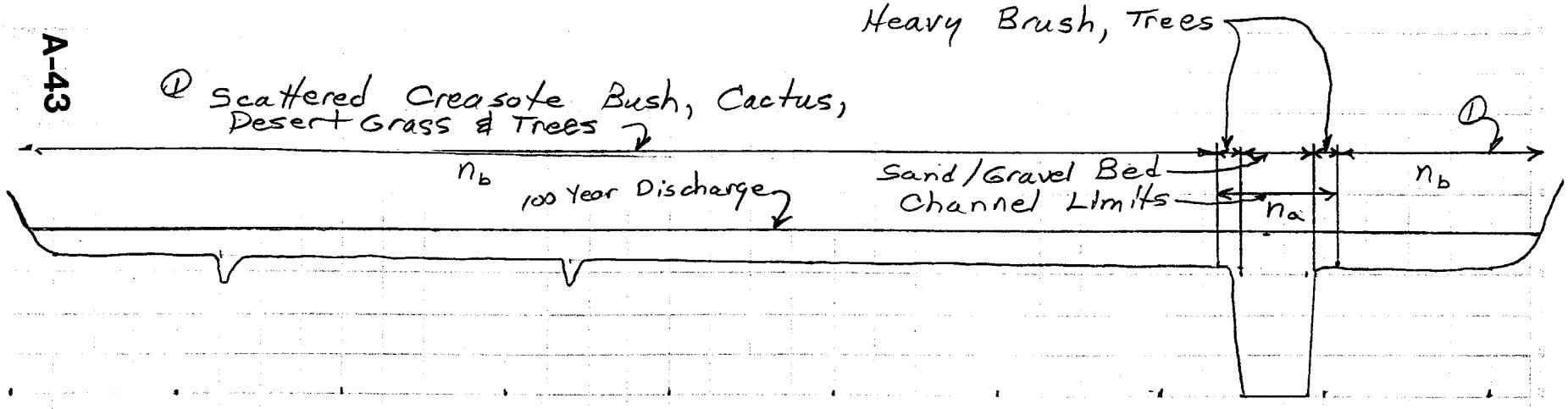
RM 4.0, 5.3, 6.0, 7.6, 9.75, 10.4, 11.3 and 12.2

100-Year Flood

Portion of area or wetted perimeter	Components	Weighted and Composite Values
Subsection A - Channel		
0.25 (by Area)	nb = --- n1 = --- n2 = --- n3 = 0.09(Dominates)	
	n = 0.09	0.023
0.75 (by Area)	nb = .025 n1 = --- n2 = --- n3 = .003	
	n = .028	0.021
1.00		0.044
Subsection B - Overbanks, Left & Right		
1.00 (by Perimeter)	nb = 0.025 n1 = 0.005 n2 = 0.005 n3 = 0.020	
1.00	n = 0.055	0.055



RM 4.0 Looking Upstream
Scale: H: 1"=100'
V: 1"=5'



RM 5.3 Looking Downstream Scale: H: 1"=100'
V: 1"=5'

Note: Cross-sections at RM 6.0, 7.6, 9.75, 10.4, 11.3 and 12.2 are representative of RM 4.0 and 5.3 above

A-43

AMWEST INC. Consulting Engineers

Project Daggs Wash 7158-02
Calc. By GAS Date 12/4/92
Chkd. Date
Sht. of

DAGGS WASH

Location of Cross-Section: 8.9 River Miles above confluence with Hassayampa River.

Representative of Channel Reach: RM 6.15 to RM 6.7 and RM 8.8 to RM 8.95.

Description of Channel: Main channel is relatively wide and has sand/gravel bed with scattered brush. Main channel banks have a heavy growth of brush and trees on average of one side of channel, which are not expected to be overtopped.

The overbanks contain small eroded rivlets interspersed among scattered creosote brush, desert grass, cactus and occasional palo verde and mesquite trees. Flow is expected to be shallow (i.e. 1-2 feet deep) in overbanks.

Sub-division of Cross-Section and Evaluation of 'n': Cross-section was sub-divided by area for main channel, where bank stations are anticipated just outside of the heavy vegetation growth. The overbanks were estimated based on parameter although, 'n' value was estimated to be uniform over this area.

COMPONENTS AND WEIGHTED AND COMPOSITE VALUES OF MANNING'S 'N'

RM 8.9

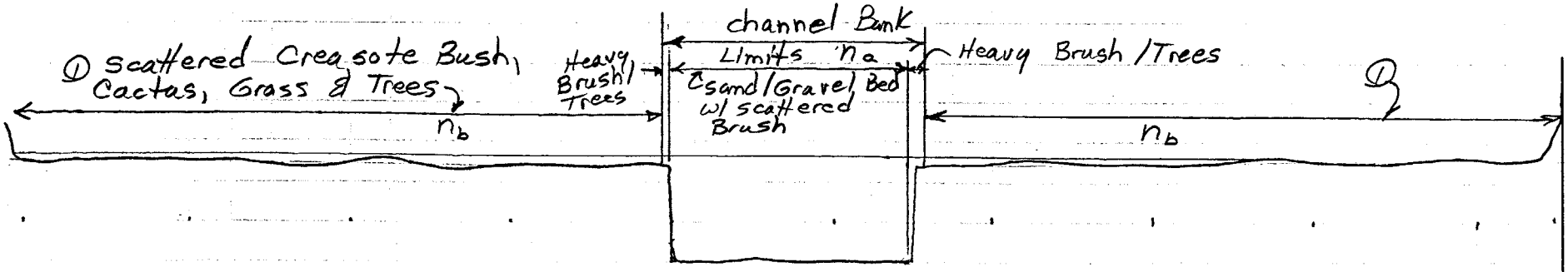
100-Year Flood

Portion of area or wetted perimeter	Components	Weighted and Composite Values
Subsection A - Channel		
0.04 (by Area)	nb = --- n1 = --- n2 = --- n3 = 0.09(Dominates)	
0.04	n = 0.09	0.004
0.96 (by Area)	nb = .025 n1 = --- n2 = --- n3 = 0.01	
0.96	n = 0.035	0.034
1.00		0.038
Subsection B - Overbanks, Left & Right		
1.00 (by Perimeter)	nb = 0.025 n1 = 0.005 n2 = 0.005 n3 = 0.020	
1.00	n = 0.055	0.055

Project Daggs Wash 7560-02 Sht. ___ of ___

Calc. By GAS Date 12/4/92

Chkd. ___ Date ___



RM 8.9 Looking Downstream Scale H: 1"=100'
V: 1"=5'

MANNINGS 'N' VALUE
ESTIMATION SUMMARY

'N' CH = CHANNEL
'N' LOB = LEFT OVERBANK
'N' ROB = RIGHT OVERBANK

DAGGS WASH
FLOOD DELINEATION STUDY
200 SCALE 2' C.I. MAPPING

JOB #7158-02
A-N WEST INC.

EXHIBIT A

'N' CH = 0.040
'N' LOB/ROB = .054

'N' CH = 0.040
'N' LOB/ROB = .065

MAPPING LIMITS

MAPPING LIMITS

'N' CH = 0.032
'N' LOB/ROB = .055

'N' CH = 0.044
'N' LOB/ROB = .055

'N' CH = 0.044
'N' LOB/ROB = .055

'N' CH = 0.038
'N' LOB/ROB = .055

UNINCORP. MARICOPA COUNTY

TOWN OF BUCKEYE CORP. LIMITS

GRAVEL RD. 1/2 MILE TO SUN VALLEY PARKWAY PAVED

UNINCORP. MARICOPA COUNTY

TOWN OF BUCKEYE CORP LIMITS

Hassayampa River

Daggs Wash

Wagner Wash

Trans Line

Granite Reef Aqueduct

Duck Tank

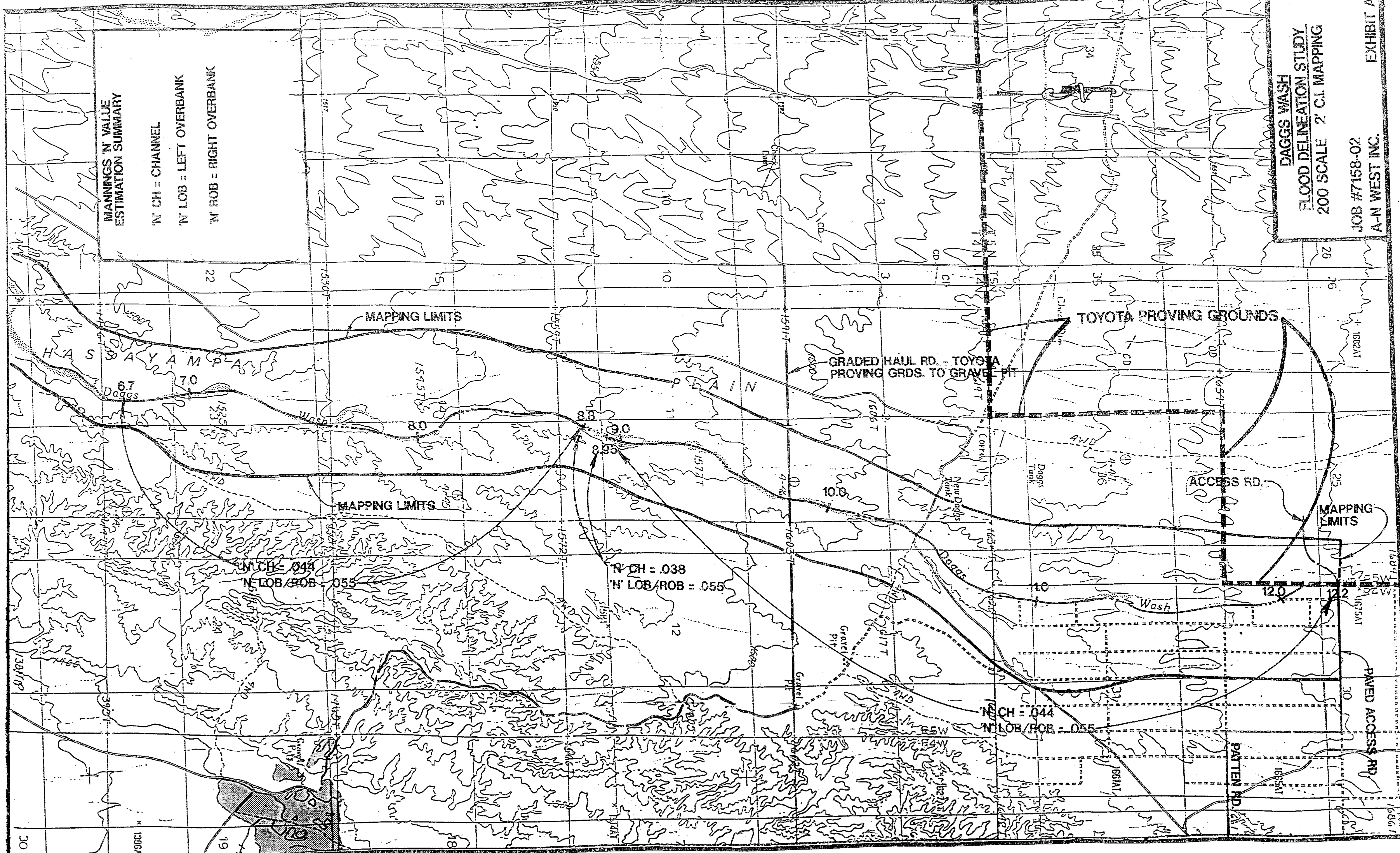
WTP Flower Pol Well

Wagner Wash Well

R5W

R4W

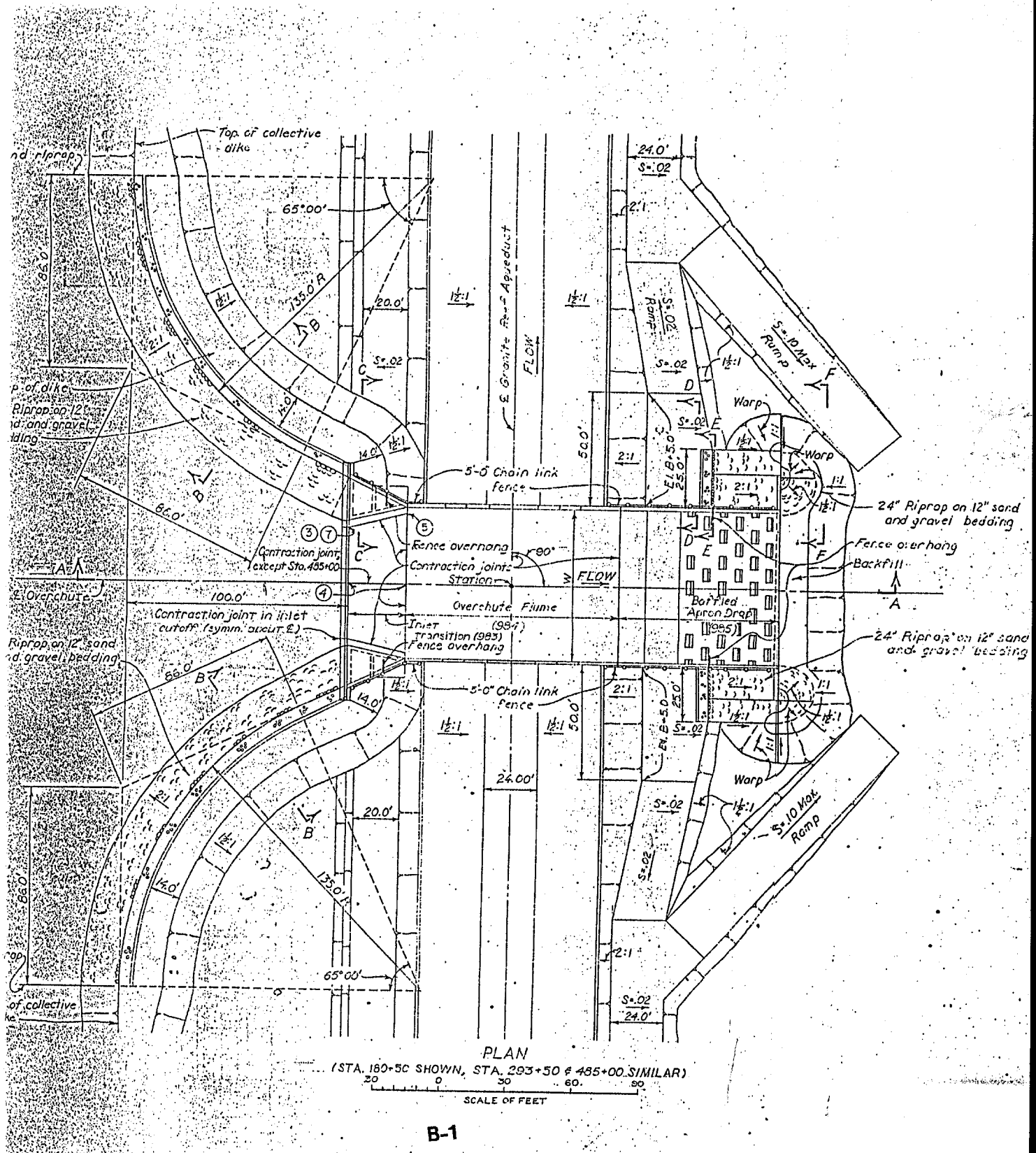
0.0 1.0 1.8 2.0 2.5 2.8 3.0 3.25 4.0 5.0 6.0 6.15 6.7 7.0

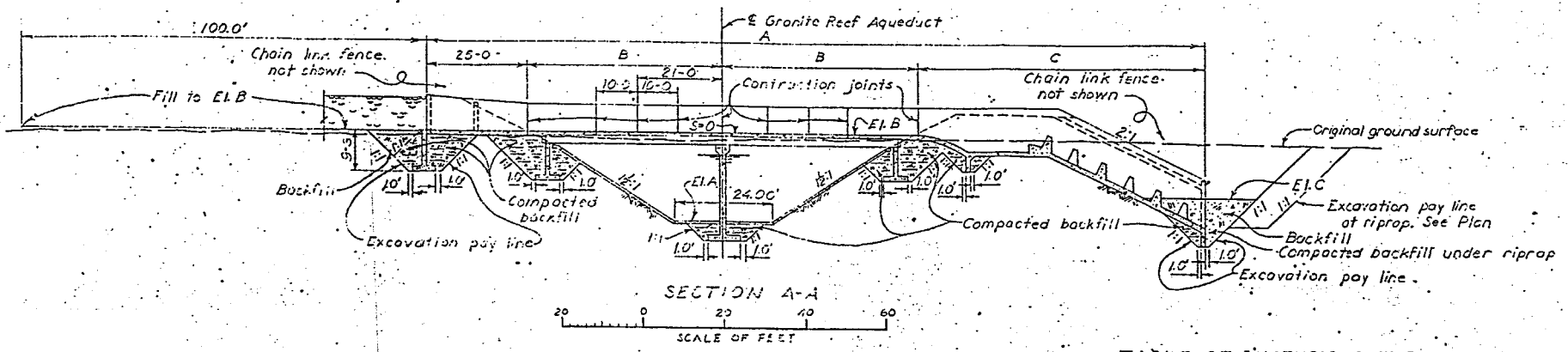


DAGGS WASH
FLOOD DELINEATION STUDY
200 SCALE 2' C.I. MAPPING
JOB #7158-02
A-N WEST INC.
EXHIBIT A
MANNINGS 'N' VALUE
ESTIMATION SUMMARY
'N' CH = CHANNEL
'N' LOB = LEFT OVERBANK
'N' ROB = RIGHT OVERBANK
MAPPING LIMITS
TOYOTA PROVING GROUNDS
GRADED HAUL RD. - TOYOTA PROVING GRDS. TO GRAVEL PIT
H A S S A Y A M P A
P L A I N
Daggs
Wash
6.7
7.0
8.0
8.8
9.0
8.95
10.0
11.0
12.0
12.2
MAPPING LIMITS
ACCESS RD.
MAPPING LIMITS
'N' CH = .044
'N' LOB/ROB = .055
'N' CH = .038
'N' LOB/ROB = .055
'N' CH = .044
'N' LOB/ROB = .055
PAVED ACCESS RD.
PATTEN RD.
New Daggs Tank
Daggs Tank
Corral
Gravel Pit
4WD
R5W
R4W

Appendix B

DAGGS WASH OVERCHUTE R.M.3.1
C.A.P. STA.485+00





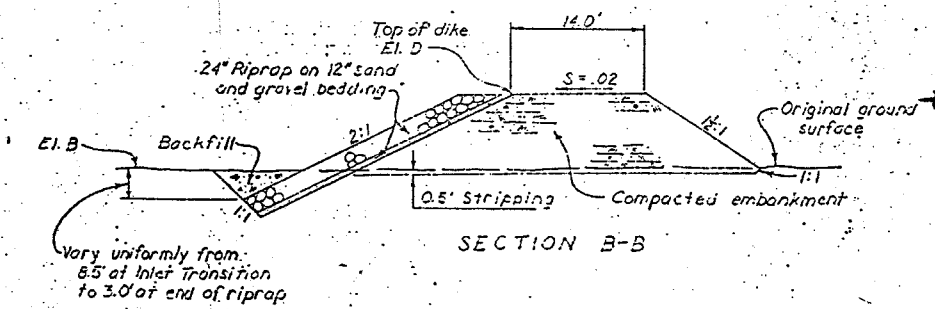


TABLE OF DIMENSIONS AND ELEVATIONS

STATION	W	El. A	El. B	El. C	El. D	A	B	C
180+50	67-6	1355.33	1377.16	1362.0	1385.7	191-1 3/8	47-7 3/4	70-9 7/8
293+50	67-6	1354.42	1376.67	1357.0	1385.7	199-2 1/4	48-3	77-8 1/4
485-00	47-4	1351.48	1373.31	1358.0	1383.0	191-1 3/8	47-7 3/4	70-9 7/8

NOTES

For general notes, see 344-D-978
For chain link fencing details, see 40-D-6265: EXCEPT barbed wire supporting arms shall be oriented vertically.
① Indicates type of waterstop intersection. For details, see 344-D-992

DAGGS WASH OVERCHUTE R.M.3.1
C.A.P. STA.485+00

ALWAYS THINK SAFETY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION-ARIZONA
GRANITE REEF AQUEDUCT
REACH 7
STATIONS 180+50, 293+50 AND 485+00
OVERCHUTES

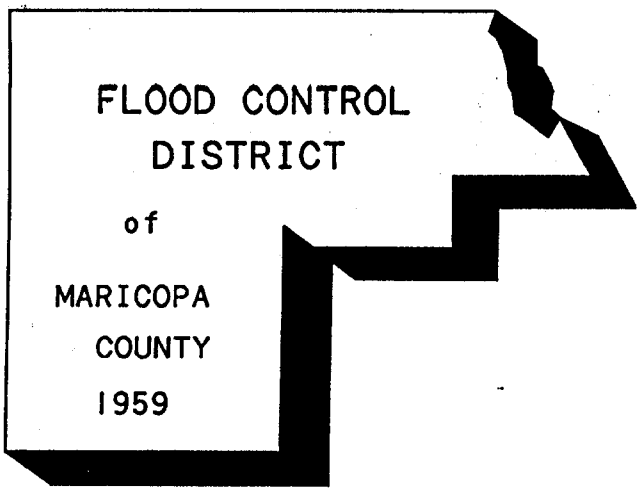
DESIGNED R.S. SUBMITTED
DRAWN Y.C.S. DMT RECOMMENDED
CHECKED P.C. Hagman APPROVED
CHIEF, WATER CONVEYANCE BRANCH

O, LTR'S. 4-15-81 AND 11-23-81.

DENVER, COLORADO JULY 27, 1977
SHEET 1 OF 4
344-D-982

21" x 36"

B-2



JACKRABBIT WASH FLOODPLAIN DELINEATION STUDY

FCD 90-05

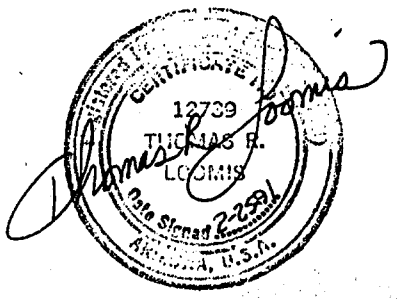
TECHNICAL DATA NOTEBOOK HYDROLOGY

Prepared For:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
3335 West Durango Street
Phoenix, Arizona 85009
(602) 262-1501

Prepared By:

BURGESS & NIPLE, INC.
5025 East Washington Street
Phoenix, AZ 85034
(602) 244-8100



Project No. 10310

February, 1991

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TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

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STUDY DOCUMENTATION ABSTRACT

Community: Maricopa County, Arizona

NFIP Community Number: 040037

County: Maricopa

State: Arizona

Date Study Accepted by FEMA: Pending

Study Contractor: Burgess & Niple, Inc.
Attn: Mr. James E. Mischler, P.E.
5025 East Washington Street, Suite 212
Phoenix, AZ 85034
(602) 244-8100
FCD Contract 90-05

Subconsultants:

Aerial Mapping Co., Inc.
McKuen Global Positioning Systems, Inc.

FEMA Technical Reviewer: Pending

FEMA Regional Reviewer: Pending

State Reviewer: Mr. James R. Morris, P.E.
(602) 542-1541

Local Reviewer: Mr. Pedro Calza
(602) 262-1501

River of Stream Name:

*Jackrabbit Wash

*Star Wash

*Unnamed Tributary of Jackrabbit Wash

*CAP Canal Ponding Areas

Reach Description: The following areas are included on FIRM panel numbers 1050, 1075, and 1525.

*Jackrabbit Wash, CAP Canal to Vulture Mine Road (approximately 10.0 miles)

*Star Wash, confluence with Jackrabbit Wash to high voltage power lines (approximately 2.1 miles)

*Unnamed Tributary of Jackrabbit Wash, Confluence with Jackrabbit Wash to Vulture Mine Road (Approximately 7.1 miles)

*CAP Canal Ponding Areas, Reach 7 structures CAP-l to CAP-11.

Study Type: Jackrabbit Wash, Star Wash, Unnamed Tributary of Jackrabbit Wash - Detailed riverine using HEC-2 CAP Canal Ponding Areas - Approximate ponding using HEC-1.

ARIZONA
DEPARTMENT
OF WATER
RESOURCES

Rose Mofford, Governor
N. W. Plummer
Director

15 South 15th Avenue
Phoenix, Arizona 85007

October 29, 1990

Joe Tram
Floodplain Branch Manager
Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

RE: Central Arizona Project and Flood Insurance Studies

Dear Mr. Tram:

This is in response to your letter of 11 October 1990 requesting guidance on modeling CAP cross-drainage structures when completing studies for floodplain mapping purposes. ADWR recommends that CAP cross-drainage structures be critically examined during any floodplain study and only be credited if they can be certified according to FEMA requirements and if they have assured maintenance.

Since many of the CAP cross-drainage structures are sized for floods less than a 100-year event, this will mean that an evaluation of the CAP's effect both upstream for ponding and downstream for maximum expected outflows under 100-year condition will have to be made. We would be happy to discuss the exact procedure with you as necessary.

Please feel free to contact me at 542-1541 if you have any questions or need any additional information.

Sincerely,

James R. Morris

James R. Morris, P.E.
Chief
Flood Management Section

JRM:bw

BURGESS & NIPLE

ENGINEERS

ARCHITECTS

Project: FCD 90-05; Jackrabbit Wash Floodplain Delineation

Subject: Meeting No. 3

Date: November 8, 1990

Attendees: Mr. Russ Cruff, MCFCD
Mr. Amir Motamedi, MCFCD
Mr. Jim Morris, ADWR
Mr. Tom Loomis, B&N
Mr. James Mischler, B&N

Burgess & Niple, Inc.
5025 East Washington Street
Suite 212
Phoenix, AZ 85034
602 244-8100
Fax 602 244-1915

Note: If this discussion does not reflect your understanding of the subject matter covered in the meeting, please notify the preparer.

1. The 100-Year pond may exceed structural height, but not spoil height. If this be the case, it may not be possible to presume, under FEMA guidelines, that the levee will hold.

2. Burgess & Niple will proceed as if the CAP will hold, and the problem, (if any), will be evaluated based on pond elevations vs. structural and spoil elevations.

3. Jim Morris recommends 2 hydrologic routings - with ponding and without ponding. The study will need to consider at structures at each location in more detail.

Respectfully submitted,

James E Mischler

James E. Mischler, P.E.

cc: Attendees
Mr. Pedro Calza, MCFCD

BURGESS
& NIPLE
ENGINEERS
ARCHITECTS

Project: FCD 90-05; Jackrabbit Wash Floodplain Delineation

Subject: Meeting No. 8

Date: February 13, 1991

Attendees: Mr. Jim Morris, ADWR
Mr. Dave Creighton, ADWR
Mr. Dan Lawrence, ADWR (Briefly)
Mr. Thomas Loomis, B&N

Burgess & Niple, Inc.
5025 East Washington Street
Suite 212
Phoenix, AZ 85034
602 244-8100
Fax 602 244-1915

Note: If this discussion does not reflect your understanding of the subject matter covered in the meeting, please notify the preparer.

1. Mr. Loomis presented the problem with Daggs Wash at the Central Arizona Project Canal crossing, Structure CAP-8.

   Problem: 100-Year 24-hour storm at structure. Stage exceeds the top of compacted embankment by 1.3' and is 0.9' below the top of uncompacted embankment. Flow probably tops the concrete overshoot walls and drains into the canal. The duration of stage above the top of compacted embankment is probably very short.

   The CAP canal at this location is situated with the top of canal lining approximately at the original natural grand surface. The drainage structure crossing the canal is a concrete flume with a base width of 47.5' and a wall height of 7'. The height of the collective dikes is approximately 10'.

   Mr. Loomis and Mr. Morris agreed the failure of the embankment is extremely unlikely, and that if a failure occurred, it would involve scouring of the uncompacted 2' at the top of the dike. It was tentatively agreed that the routed peak through the structure should be used for flood control regulation downstream, since any flow which overtops the

embankment or flume walls will be trapped by the canal. Therefore, this would be a conservative assumption. Burgess & Niple is to estimate the time duration that the flood stage exceeds the top elevation of the compacted embankment. If it is, in fact, a very short time, then Burgess & Niple is to proceed with this assumption in preparation of the final report.

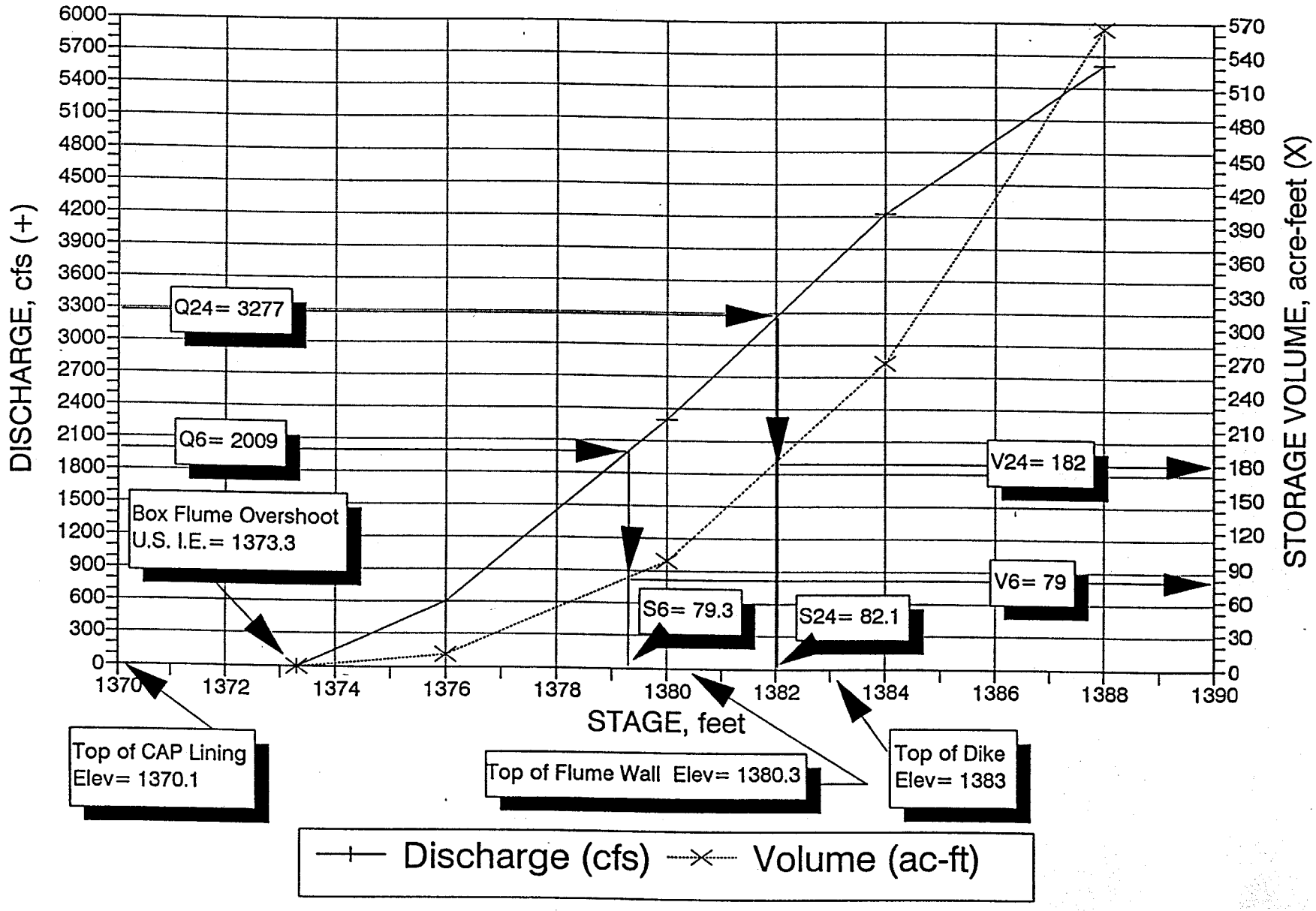
Respectfully submitted,

James E Mischler, for

Thomas R. Loomis, P.E.

cc: Attendees
Mr. Pedro Calza, MCFCD
Mr. James Mischler, B&N

FIGURE 8: CAP-8
DISCHARGE AND STORAGE VOLUME vs STAGE



SECTION 3: Hydrologic Analysis

3.4 Special Problems & Solutions

3.4.5 Central Arizona Project Canal Structure CAP-8

3.4.5.1 Discussion of Problem

The structure at CAP-8 is the only structure along the study reach of the CAP canal where there is less than 3 feet of freeboard from the top of the canal collective dike to the estimated 100-year peak flood stage. Refer to Tables F-4b and F-4c. It is also the only structure where the top of compacted embankment is exceeded. The problem is to analyze the computed data in more detail and then determine whether it is reasonable to accept the computed 100-year ponding elevation and routed outflow peak discharge for regulation purposes.

3.4.5.2 Problem Solution

The structure at Central Arizona Project Canal CAP-8 is a concrete box flume overchute with a bottom width of 47.5 feet, and a wall height of 7 feet. The canal at this location is constructed with the top of the canal lining at the original ground elevation. Flow is directed from Daggs Wash to the crossing structure by collective dikes which extend east and west along the northerly side of the canal. The inlet structure has lined transition dikes which funnel the flow into the box flume. The dikes form an arc on both sides of the structure with a 90° central angle and a 135 foot radius to transition from the collective dikes, which parallel the canal, to the flume concrete wing walls. These dikes are lined with 24" thick rock riprap on a 12" thick sand and gravel filter blanket. The transition dikes are lined and compacted to the 1383.0 top elevation of the collective dikes. The above information was taken from the plans of the CAP canal furnished by the USBR.

The outflow hydrograph for CAP-8 was examined to estimate the duration that ponding would exceed elevation 1380.0, the top of the compacted portion of the collective dikes. Refer to Figure 15. Assuming the uncompacted embankment does not fail, the duration is estimated to be less than 3 hours.

The following conclusions were made after examining the available data:

1. The peak stage of 1382.1 will be used for delineating the 100-year ponding limits against the CAP canal at this crossing. In the event the uncompacted portion of the collective dikes fail, this will still be the most conservative assumption.

2. The peak outflow of 3,300 cfs will be used for floodplain administration downstream of the CAP canal. The reasons for this conclusion are:

   a. In the event that the uncompacted portions of the collective dikes fail, the peak stage will not be reached, so the peak flow through the box flume will not exceed 3,300 cfs.

   b. Flow which may breach the uncompacted embankments will be trapped and conveyed by the CAP canal.

   c. Flow which may top the box flume walls will spill into the CAP canal and will not contribute to the peak downstream in Daggs Wash.

   d. The areas of high velocity are protected by the lined transition dikes. There will not be scourable flow velocities against the collective dikes. The danger of failure of the collective dikes is due to the potential for wave action and piping. Failure due to wave action is slight because the exposure of the uncompacted portion of the levee to wave action is less than 3 hours. The possibility of failure due to piping is also slight since the compacted portions of the collective dikes were constructed under USBR specifications and inspection. Cutoff trenches were also constructed under the collective dikes where areas of clean sand and gravels were encountered.

FIGURE 15: CAP-8
100-Yr 24-Hr Inflow and Outflow Hyds.

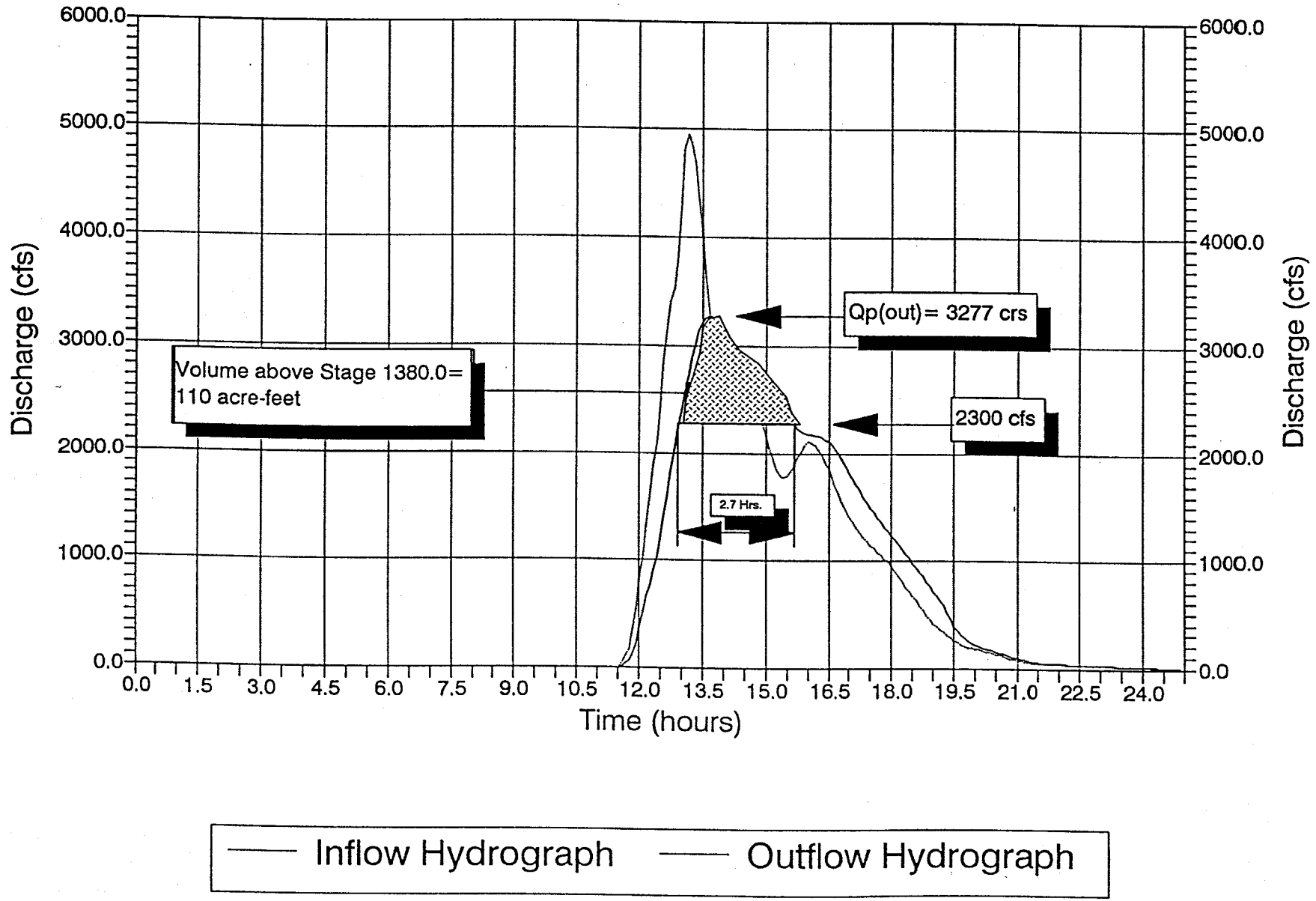


Table F-4b

Central Arizona Project Canal Structures Summary Table
Critical Elevations

Structure	100-Year Peak		Physical Elevations			
	Discharge (cfs)	Stage	Top of Canal Linings$_2$	Top of Compacted Dikes$_2$	Top of Uncompacted Dikes	Top of Flume Wall
CAP-1	1	1358.5	1374.4	1373.6	1376.6	---
CAP-2$_1$	268	1361.8	1374.2	1373.4	1376.4	---
CAP-3	1519	1381.1	1373.9	1382.7	1385.7	1384.1
CAP-4	1944	1380.8	1373.4	1382.7	1385.7	1383.7
CAP-6&7	244	1376.9	1370.8	1378.4	1381.4	---
CAP-8	3277	1382.1	1370.1	1380.0	1383.0	1380.3
CAP-9$_1$	205	1354.7	1370.5	1370.5	1372.7	---
CAP-10$_1$	65	1348.9	1370.4	1369.9	1372.1	---
CAP-11$_1$	32	1353.4	1370.3	1369.9	1372.1	---

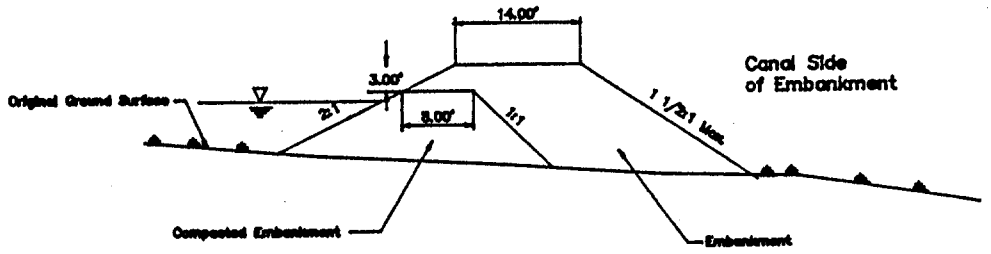
$_1$ - Peak discharge and stage are for the 100-year 6-hour storm

$_2$ - Represents the collective dikes, not the lined inlet transition dikes

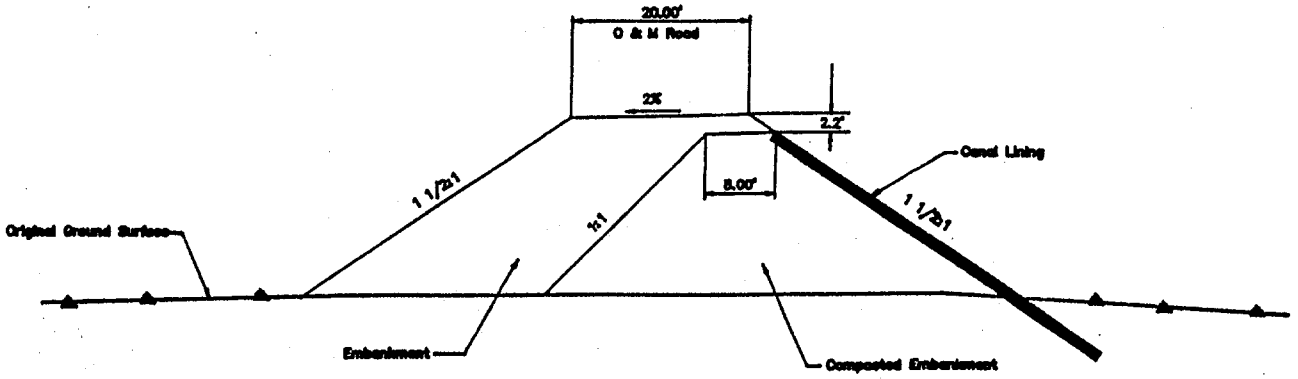
Table F-4c

Central Arizona Canal Structures Summary Table
Freeboard at Structures

Structure	Freeboard at Top of Compacted Embankment (ft)	Freeboard at Top of Embankment (ft)
CAP-1	14.8	17.8
CAP-2	11.6	14.6
CAP-3	1.7	4.7
CAP-4	1.5	4.5
CAP-6	1.5	4.5
CAP-7	1.5	4.5
CAP-8	(2.1)	0.9
CAP-9	15.8	18.0
CAP-10	21.0	23.2
CAP-11	16.5	18.7



TYPICAL SECTION OF COLLECTIVE DIKE
STRUCTURES CAP–1 through CAP–8

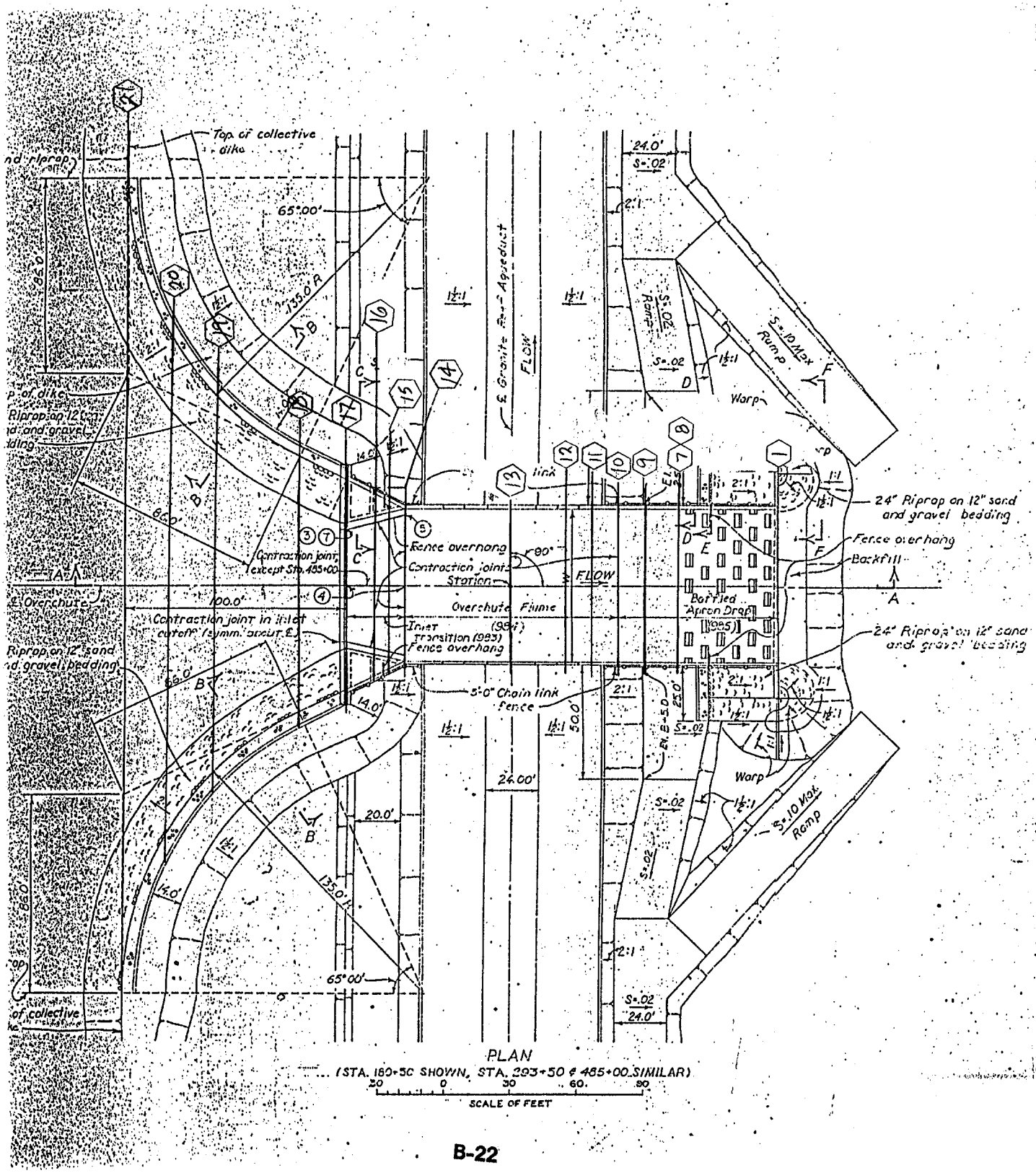


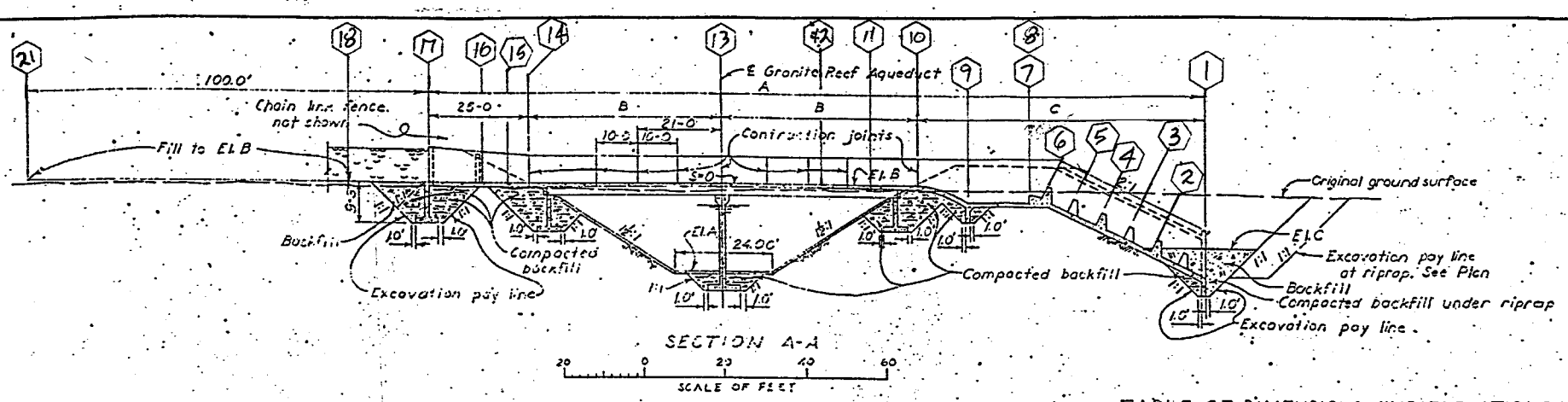
TYPICAL SECTION OF CAP CANAL NORTHERLY EMBANKMENT
STRUCTURES CAP–9 through CAP–11

DAGGS WASH OVERCHUTE R.M.3.1

C.A.P. STA.485+00

HEC-2 MODEL CROSS-SECTION LOCATION EXHIBIT





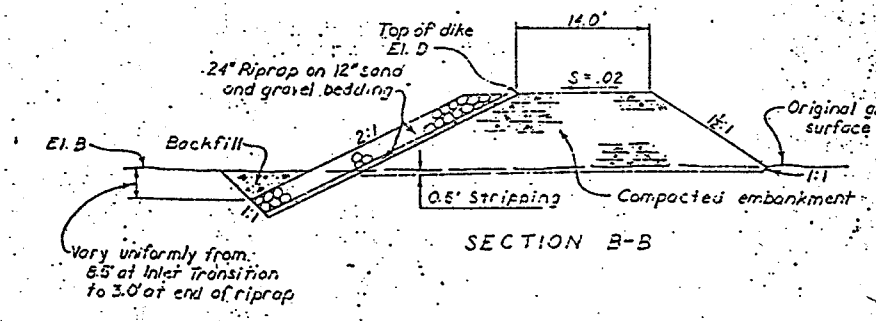


TABLE OF DIMENSIONS AND ELEVATIONS

STATION	W	El. A	El. B	El. C	El. D	A	B	
180+50	67-6	1355.33	1377.18	1362.0	1385.7	191-1 3/8	47-7 3/4	7
293+50	67-6	1354.42	1376.67	1357.0	1385.7	199-2 1/4	45-3	7
485-00	47-4	1351.46	1373.31	1358.0	1383.0	191-1 3/8	47-7 3/4	7

NOTES

For general notes, see 344-D-978
For chain link fencing details, see 40-D-6265; EXCEPT barbed wire supporting arms shall be oriented vertically.
① Indicates type of waterstop intersection. For details, see 344-D-992

ALWAYS THINK SAFETY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION-ARIZONA

GRANITE REEF AQUEDUCT
REACH 7
STATIONS 150+50, 293+50 AND 485+00
OVERCHUTES

DESIGNED D.S.S. SUBMITTED
DRAWN T.C.S. DMT RECOMMENDED
CHECKED P.C. Hagman APPROVED
CHIEF, WATER CONVEYANCE BRANCH

O, LTR'S. 4-15-81 AND 11-23-81.

DENVER, COLORADO JULY 27, 1977 SHEET 1 OF 4

344-D-982

DAGGS WASH OVERCHUTE R.M.3.1
C.A.P. STA.485+00

HEC-2 MODEL CROSS-SECTION LOCATION EXHIBIT

B-23

21" x 3

THIS RUN EXECUTED 10DEC92 12:14:23

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

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

T1      DAGGS WASH F.I.S.           CONTRACT:FCDMC NO.92-08   FILE:DAGS1
T2      100-YR. WATER SURFACE PROFILE                A-N WEST, INC. PHX. AZ.
T3      DAGGS WASH  100-YEAR PROFILE AT CAP CANAL    DATE:12\08\92

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2                             -1                                    1364

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      -1                  -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26        39        21        22        27        28
     53        54         0        38        13        14        15        55        26        56
     63         1        51         4        42        57         0        38        39        33
      3        10        11        12         5         7         8        16        17        18
      0

NC      .03       .03       .03       .3        .5
QT        1      3277
        BEGIN BAFFLED BLOCK SPILLWAY ENERGY DISSIPATOR
        THIS SECTION IS AT DOWNSTREAM END OF CONCRETE SPILLWAY OVER CAP CANAL.
        STARTING WATER SURFACE ELEVATION WAS ASSUMED TO BE CRITICAL DEPTH
X1        1         4    9976.3   10023.7         0         0         0
GR     1367    9976.3      1361    9976.3      1361   10023.7      1367   10023.7

        THIS IS FIRST OF FIVE CROSS-SECTIONS MODELING ROWS OF  BAFFLED BLOCKS
        WITHIN 47.33 FOOT WIDE SPILLWAY.
        BAFFLE BLOCKS ARE 5.67 FOOT WIDE X 3.8 FOOT HIGH (NORMAL TO FLOOR).
        BAFFLE BLOCKS HAVE 5.67 FOOT WIDE SPACE BETWEEN BLOCKS,AND
        ALTERNATING ROWS HAVE 3.8 FOOT SPACE BETWEEN BLOCK AND OUTSIDE WALL.
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      EACH SECTION MODELS SAME ORIENTATION OF BLOCKS EVEN THOUGH BLOCKS
      SHIFT TRANSVERSE TO CENTERLINE FROM ROW TO ROW OF BLOCKS.
X1       2        20     9976.3   10023.7      13.5      13.5      13.5
GR  1369.4    9976.3    1358.4    9976.3    1358.4    9980.1    1362.1    9980.1    1362.1    9985.8
GR  1358.4    9985.8    1358.4    9991.4    1362.1    9991.4    1362.1    9997.1    1358.4    9997.1
GR  1358.4   10002.8    1362.1   10002.8    1362.1   10008.5    1358.4   10008.5    1358.4   10014.1
GR  1362.1   10014.1    1362.1   10019.8    1358.4   10019.8    1358.4   10023.7    1369.4   10023.7

X1       3         0         0         0       7.3       7.3       7.3                 3.0

X1       4         0         0         0       7.3       7.3       7.3                 3.0

X1       5         0         0         0       7.3       7.3       7.3                 3.1

      THIS IS LAST OF FIVE CROSS-SECTIONS MODELING BAFFLE BLOCKS IN SPILLWAY.
X1       6         0         0         0       7.3       7.3       7.3                 3.0

      THIS SECTION IS RECTANGULAR SECTION AT APPROACH TO SLOPED SPILLWAY.
X1       7         4    9976.3   10023.7         2         2         2
GR  1380.3    9976.3    1371.0    9976.3    1371.0   10023.7    1380.3   10023.7

NC    .013      .013      .013
      THIS SECTION IS RECTANGULAR SECTION 20 INCHES LOWER IN ELEV. THAN
      DOWNSTREAM SECTION (I.E. VERTICAL GRADE CHANGE)
X1       8         4    9976.3   10023.7        .1        .1        .1
GR  1380.3    9976.3   1369.37    9976.3   1369.37   10023.7    1380.3   10023.7

      THIS SECTION IS RECTANGULAR SECTION AT SAME ELEV. AS DOWNSTREAM SEC.
X1       9         0         0         0      14.7      14.7      14.7

      END BAFFLED BLOCK SPILLWAY ENERGY DISSIPATOR
      BEGIN OVERCHUTE FLUME.  WIDTH =47.33 FEET.WALL HT.=7.0 FEET,(VERTICAL),
      LONGITUDINAL SLOPE =0.0 FT./FT.
X1      10         4    9976.3   10023.7      12.5      12.5      12.5
GR  1380.3    9976.3    1373.3    9976.3    1373.3   10023.7    1380.3   10023.7

X1      11         0         0         0      11.9      11.9      11.9

X1      12         0         0         0      11.9      11.9      11.9

X1      13         0         0         0      23.8      23.8      23.8

      END CONCRETE OVERCHUTE FLUME. BEGIN CONCRETE INLET TRANSITION.
X1      14         0         0         0      47.7      47.7      47.7

X1      15         4    9973.2   10026.9       6.3       6.3       6.3
GR  1380.7    9973.2    1373.3    9973.2    1373.3   10026.9    1380.7   10026.9

X1      16         4    9970.1   10030.0       6.2       6.2       6.2
GR  1381.1    9970.1    1373.3    9970.1    1373.3   10030.0    1381.1   10030.0
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      END CONCRETE INLET TRANSITION. BEGIN TRANSITION CONSISTING OF EARTH
      INVERT (SLOPE =0.0 FT./FT.) AND ROCK RIPRAP SIDESLOPES.
      END OF CONCRETE TRANSITION HAS WIDTH =72.33 FEET AND VERTICAL WALL
      HT.=8.5 (I.E. TOP OF WALL EL=1381.8)
X1      17        4      9963.8    10036.2      12.5      12.5      12.5
GR   1381.8    9963.8    1373.3     9963.8    1373.3    10036.2    1381.8    10036.2

NC     .035      .035      .030
X1      18        4      9953.8    10046.2      22.1      22.1      22.1
GR    1383    9934.4    1373.3     9953.8    1373.3    10046.2      1383    10065.6

X1      19        4      9955.3    10046.7      38.4      38.4      38.4
GR    1383    9925.9    1373.3     9955.3    1373.3    10046.7      1383    10074.1

X1      20        4      9933.4    10067.7        20        20        20
GR    1383    9896.7    1373.3     9933.4    1373.3    10067.7      1383    10103.4

      UPSTREAM END OF ROCK RIPRAP SIDESLOPED CHANNEL TRANSITION
X1      21        4      9901.5    10098.6      19.5      19.5      19.5
GR    1383    9830.5    1373.3     9901.5    1373.3    10098.6      1383    10169.6
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

#PROF 1

CCHV= .300 CEHV= .500
#SECNO 1.000
3720 CRITICAL DEPTH ASSUMED
BEGIN BAFFLED BLOCK SPILLWAY ENERGY DISSIPATOR
THIS SECTION IS AT DOWNSTREAM END OF CONCRETE SPILLWAY OVER CAP CANAL.
STARTING WATER SURFACE ELEVATION WAS ASSUMED TO BE CRITICAL DEPTH

1.000	5.28	1366.28	1366.28	1364.00	1368.94	2.66	.00	.00	1367.00
3277.0	.0	3277.0	.0	.0	250.2	.0	.0	.0	1367.00
.00	.00	13.10	.00	.000	.030	.000	.000	1361.00	9976.30
.009951	0.	0.	0.	0	13	0	.00	47.40	10023.70

#SECNO 2.000

3301 HV CHANGED MORE THAN HVINS

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

THIS IS FIRST OF FIVE CROSS-SECTIONS MODELING ROWS OF BAFFLED BLOCKS
WITHIN 47.33 FOOT WIDE SPILLWAY.
BAFFLE BLOCKS ARE 5.67 FOOT WIDE X 3.8 FOOT HIGH (NORMAL TO FLOOR).
BAFFLE BLOCKS HAVE 5.67 FOOT WIDE SPACE BETWEEN BLOCKS,AND
ALTERNATING ROWS HAVE 3.8 FOOT SPACE BETWEEN BLOCK AND OUTSIDE WALL.
EACH SECTION MODELS SAME ORIENTATION OF BLOCKS EVEN THOUGH BLOCKS
SHIFT TRANSVERSE TO CENTERLINE FROM ROW TO ROW OF BLOCKS.

2.000	10.00	1368.40	.00	.00	1369.50	1.10	.09	.47	1369.40
3277.0	.0	3277.0	.0	.0	389.0	.0	.1	.0	1369.40
.00	.00	8.42	.00	.000	.030	.000	.000	1358.40	9976.30
.004536	14.	14.	14.	4	0	0	.00	47.40	10023.70

#SECNO 3.000

3301 HV CHANGED MORE THAN HVINS

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

3.000	7.04	1368.44	1368.44	.00	1371.12	2.68	.06	.79	1372.40
3277.0	.0	3277.0	.0	.0	249.2	.0	.2	.0	1372.40
.00	.00	13.15	.00	.000	.030	.000	.000	1361.40	9976.30
.018408	7.	7.	7.	20	19	0	.00	47.40	10023.70

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

#SECNO 4.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4.000	7.05	1371.45	1371.45	.00	1374.12	2.67	.13	.00	1375.40
3277.0	.0	3277.0	.0	.0	249.9	.0	.2	.0	1375.40
.00	.00	13.11	.00	.000	.030	.000	.000	1364.40	9976.30
.018239	7.	7.	7.	20	5	0	.00	47.40	10023.70

#SECNO 5.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5.000	7.05	1374.55	1374.55	.00	1377.22	2.67	.13	.00	1378.50
3277.0	.0	3277.0	.0	.0	249.7	.0	.2	.0	1378.50
.00	.00	13.12	.00	.000	.030	.000	.000	1367.50	9976.30
.018295	7.	7.	7.	20	5	0	.00	47.40	10023.70

#SECNO 6.000
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
THIS IS LAST OF FIVE CROSS-SECTIONS MODELING BAFFLE BLOCKS IN SPILLWAY.

6.000	7.05	1377.55	1377.55	.00	1380.22	2.67	.13	.00	1381.50
3277.0	.0	3277.0	.0	.0	249.8	.0	.3	.0	1381.50
.00	.00	13.12	.00	.000	.030	.000	.000	1370.50	9976.30
.018273	7.	7.	7.	20	5	0	.00	47.40	10023.70

#SECNO 7.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.93

THIS SECTION IS RECTANGULAR SECTION AT APPROACH TO SLOPED SPILLWAY.

7.000	8.78	1379.78	.00	.00	1380.74	.96	.01	.51	1380.30
3277.0	.0	3277.0	.0	.0	416.0	.0	.3	.0	1380.30
.00	.00	7.88	.00	.000	.030	.000	.000	1371.00	9976.30
.002125	2.	2.	2.	4	0	0	.00	47.40	10023.70

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 8.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.15

THIS SECTION IS RECTANGULAR SECTION 20 INCHES LOWER IN ELEV. THAN
DOWNSTREAM SECTION (I.E. VERTICAL GRADE CHANGE)

8.000	10.84	1380.21	.00	.00	1380.84	.63	.00	.10	1380.30
3277.0	.0	3277.0	.0	.0	514.1	.0	.3	.0	1380.30
.00	.00	6.37	.00	.000	.013	.000	.000	1369.37	9976.30
.000214	0.	0.	0.	2	0	0	.00	47.40	10023.70

#SECNO 9.000

THIS SECTION IS RECTANGULAR SECTION AT SAME ELEV. AS DOWNSTREAM SEC.

9.000	10.85	1380.22	.00	.00	1380.85	.63	.00	.00	1380.30
3277.0	.0	3277.0	.0	.0	514.5	.0	.5	.1	1380.30
.00	.00	6.37	.00	.000	.013	.000	.000	1369.37	9976.30
.000214	15.	15.	15.	1	0	0	.00	47.40	10023.70

#SECNO 10.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .44

END BAFFLED BLOCK SPILLWAY ENERGY DISSIPATOR
BEGIN OVERCHUTE FLUME. WIDTH =47.33 FEET.WALL HT.=7.0 FEET,(VERTICAL),
LONGITUDINAL SLOPE =0.0 FT./FT.

10.000	6.30	1379.60	.00	.00	1381.47	1.87	.01	.62	1380.30
3277.0	.0	3277.0	.0	.0	298.8	.0	.6	.1	1380.30
.00	.00	10.97	.00	.000	.013	.000	.000	1373.30	9976.30
.001082	13.	13.	13.	3	0	0	.00	47.40	10023.70

#SECNO 11.000

11.000	6.33	1379.63	.00	.00	1381.49	1.86	.01	.00	1380.30
3277.0	.0	3277.0	.0	.0	299.4	.0	.7	.1	1380.30
.00	.00	10.95	.00	.000	.013	.000	.000	1373.30	9976.30
.001076	12.	12.	12.	1	0	0	.00	47.40	10023.70

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 12.000									
12.000	6.41	1379.71	.00	.00	1381.51	1.81	.01	.02	1380.30
3277.0	.0	3277.0	.0	.0	303.7	.0	.7	.1	1380.30
.00	.00	10.79	.00	.000	.013	.000	.000	1373.30	9976.30
.001030	12.	12.	12.	2	0	0	.00	47.40	10023.70
#SECNO 13.000									
13.000	6.49	1379.79	.00	.00	1381.55	1.76	.02	.01	1380.30
3277.0	.0	3277.0	.0	.0	307.7	.0	.9	.1	1380.30
.00	.00	10.65	.00	.000	.013	.000	.000	1373.30	9976.30
.000990	24.	24.	24.	2	0	0	.00	47.40	10023.70
#SECNO 14.000									
END CONCRETE OVERCHUTE FLUME. BEGIN CONCRETE INLET TRANSITION.									
14.000	6.64	1379.94	.00	.00	1381.62	1.69	.05	.02	1380.30
3277.0	.0	3277.0	.0	.0	314.6	.0	1.3	.2	1380.30
.00	.00	10.42	.00	.000	.013	.000	.000	1373.30	9976.30
.000926	48.	48.	48.	2	0	0	.00	47.40	10023.70
#SECNO 15.000									
3280 CROSS SECTION	15.00 EXTENDED	.08 FEET							
3301 HV CHANGED MORE THAN HVINS									
15.000	7.49	1380.79	.00	.00	1381.82	1.03	.00	.20	1380.70
3277.0	.0	3277.0	.0	.0	401.8	.0	1.3	.2	1380.70
.00	.00	8.15	.00	.000	.013	.000	.000	1373.30	9973.20
.000483	6.	6.	6.	3	0	0	.00	53.70	10026.90
#SECNO 16.000									
3280 CROSS SECTION	16.00 EXTENDED	.06 FEET							
16.000	7.85	1381.15	.00	.00	1381.91	.75	.00	.08	1381.10
3277.0	.0	3277.0	.0	.0	470.8	.0	1.4	.2	1381.10
.01	.00	6.96	.00	.000	.013	.000	.000	1373.30	9970.10
.000324	6.	6.	6.	2	0	0	.00	59.90	10030.00

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 17.000

END CONCRETE INLET TRANSITION. BEGIN TRANSITION CONSISTING OF EARTH INVERT (SLOPE =0.0 FT./FT.) AND ROCK RIPRAP SIDESLOPES. END OF CONCRETE TRANSITION HAS WIDTH =72.33 FEET AND VERTICAL WALL HT.=8.5 (I.E. TOP OF WALL EL=1381.8)

17.000	8.22	1381.52	.00	.00	1381.99	.47	.00	.08	1381.80
3277.0	.0	3277.0	.0	.0	595.6	.0	1.5	.2	1381.80
.01	.00	5.50	.00	.000	.013	.000	.000	1373.30	9963.80
.000183	13.	13.	13.	2	0	0	.00	72.40	10036.20

#SECNO 18.000

18.000	8.57	1381.87	.00	.00	1382.08	.21	.01	.08	1373.30
3277.0	139.4	2998.2	139.4	73.5	792.0	73.5	1.9	.3	1373.30
.01	1.90	3.79	1.90	.035	.030	.035	.000	1373.30	9936.66
.000333	22.	22.	22.	2	0	0	.00	126.68	10063.34

#SECNO 19.000

19.000	8.61	1381.91	.00	.00	1382.10	.19	.01	.01	1373.30
3277.0	213.4	2865.7	197.9	112.3	787.0	104.7	2.8	.4	1373.30
.01	1.90	3.64	1.89	.035	.030	.035	.000	1373.30	9929.20
.000306	38.	38.	38.	2	0	0	.00	141.82	10071.02

#SECNO 20.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.49

20.000	8.74	1382.04	.00	.00	1382.13	.09	.00	.03	1373.30
3277.0	188.9	2904.6	183.5	144.6	1174.3	140.7	3.3	.5	1373.30
.01	1.31	2.47	1.30	.035	.030	.035	.000	1373.30	9900.32
.000138	20.	20.	20.	2	0	0	.00	199.57	10099.88

#SECNO 21.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.55

UPSTREAM END OF ROCK RIPRAP SIDESLOPED CHANNEL TRANSITION

21.000	8.81	1382.11	.00	.00	1382.15	.04	.00	.02	1373.30
3277.0	244.8	2787.5	244.8	284.2	1736.9	284.2	4.2	.6	1373.30
.02	.86	1.60	.86	.035	.030	.035	.000	1373.30	9837.00
.000058	20.	20.	20.	2	0	0	.00	326.11	10163.10

THIS RUN EXECUTED 10DEC92 12:14:34

HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991

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

DAGGS WASH 100-YEAR PRO

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	CRIWS	VCH	XLCH	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST
*	1.000	3277.00	1366.28	1366.28	13.10	.00	9976.30	10023.70	.00	.00	9976.30	10023.70
*	2.000	3277.00	1368.40	.00	8.42	13.50	9976.30	10023.70	.00	.00	9976.30	10023.70
*	3.000	3277.00	1368.44	1368.44	13.15	7.30	9976.30	10023.70	.00	.00	9976.30	10023.70
*	4.000	3277.00	1371.45	1371.45	13.11	7.30	9976.30	10023.70	.00	.00	9976.30	10023.70
*	5.000	3277.00	1374.55	1374.55	13.12	7.30	9976.30	10023.70	.00	.00	9976.30	10023.70
*	6.000	3277.00	1377.55	1377.55	13.12	7.30	9976.30	10023.70	.00	.00	9976.30	10023.70
*	7.000	3277.00	1379.78	.00	7.88	2.00	9976.30	10023.70	.00	.00	9976.30	10023.70
*	8.000	3277.00	1380.21	.00	6.37	.10	9976.30	10023.70	.00	.00	9976.30	10023.70
	9.000	3277.00	1380.22	.00	6.37	14.70	9976.30	10023.70	.00	.00	9976.30	10023.70
*	10.000	3277.00	1379.60	.00	10.97	12.50	9976.30	10023.70	.00	.00	9976.30	10023.70
	11.000	3277.00	1379.63	.00	10.95	11.90	9976.30	10023.70	.00	.00	9976.30	10023.70
	12.000	3277.00	1379.71	.00	10.79	11.90	9976.30	10023.70	.00	.00	9976.30	10023.70
	13.000	3277.00	1379.79	.00	10.65	23.80	9976.30	10023.70	.00	.00	9976.30	10023.70
	14.000	3277.00	1379.94	.00	10.42	47.70	9976.30	10023.70	.00	.00	9976.30	10023.70
	15.000	3277.00	1380.79	.00	8.15	6.30	9973.20	10026.90	.00	.00	9973.20	10026.90
	16.000	3277.00	1381.15	.00	6.96	6.20	9970.10	10030.00	.00	.00	9970.10	10030.00
	17.000	3277.00	1381.52	.00	5.50	12.50	9963.80	10036.20	.00	.00	9963.80	10036.20

	SECNO	Q	CWSEL	CRIWS	VCH	XLCH	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST
	18.000	3277.00	1381.87	.00	3.79	22.10	9953.80	10046.20	.00	.00	9936.66	10063.34
	19.000	3277.00	1381.91	.00	3.64	38.40	9955.30	10046.70	.00	.00	9929.20	10071.02
*	20.000	3277.00	1382.04	.00	2.47	20.00	9933.40	10067.70	.00	.00	9900.32	10099.88
*	21.000	3277.00	1382.11	.00	1.60	19.50	9901.50	10098.60	.00	.00	9837.00	10163.10

DAGGS WASH 100-YEAR PRO

SUMMARY PRINTOUT

	SECNO	QLOB	QCH	QROB	VLOB	VCH	VROB	TELMX	CWSEL	DIFWSX	TOPWID	ELMIN	ALPHA
*	1.000	.00	3277.00	.00	.00	13.10	.00	1367.00	1366.28	.00	47.40	1361.00	1.00
*	2.000	.00	3277.00	.00	.00	8.42	.00	1369.40	1368.40	2.12	47.40	1358.40	1.00
*	3.000	.00	3277.00	.00	.00	13.15	.00	1372.40	1368.44	.04	47.40	1361.40	1.00
*	4.000	.00	3277.00	.00	.00	13.11	.00	1375.40	1371.45	3.02	47.40	1364.40	1.00
*	5.000	.00	3277.00	.00	.00	13.12	.00	1378.50	1374.55	3.09	47.40	1367.50	1.00
*	6.000	.00	3277.00	.00	.00	13.12	.00	1381.50	1377.55	3.00	47.40	1370.50	1.00
*	7.000	.00	3277.00	.00	.00	7.88	.00	1380.30	1379.78	2.23	47.40	1371.00	1.00
*	8.000	.00	3277.00	.00	.00	6.37	.00	1380.30	1380.21	.43	47.40	1369.37	1.00
	9.000	.00	3277.00	.00	.00	6.37	.00	1380.30	1380.22	.00	47.40	1369.37	1.00
*	10.000	.00	3277.00	.00	.00	10.97	.00	1380.30	1379.60	-.61	47.40	1373.30	1.00
	11.000	.00	3277.00	.00	.00	10.95	.00	1380.30	1379.63	.02	47.40	1373.30	1.00
	12.000	.00	3277.00	.00	.00	10.79	.00	1380.30	1379.71	.08	47.40	1373.30	1.00
	13.000	.00	3277.00	.00	.00	10.65	.00	1380.30	1379.79	.08	47.40	1373.30	1.00
	14.000	.00	3277.00	.00	.00	10.42	.00	1380.30	1379.94	.14	47.40	1373.30	1.00
	15.000	.00	3277.00	.00	.00	8.15	.00	1380.70	1380.79	.85	53.70	1373.30	1.00
	16.000	.00	3277.00	.00	.00	6.96	.00	1381.10	1381.15	.37	59.90	1373.30	1.00
	17.000	.00	3277.00	.00	.00	5.50	.00	1381.80	1381.52	.37	72.40	1373.30	1.00
	18.000	139.40	2998.20	139.40	1.90	3.79	1.90	1383.00	1381.87	.35	126.68	1373.30	1.10
	19.000	213.42	2865.66	197.92	1.90	3.64	1.89	1383.00	1381.91	.04	141.82	1373.30	1.13
*	20.000	188.88	2904.62	183.51	1.31	2.47	1.30	1383.00	1382.04	.13	199.57	1373.30	1.11
*	21.000	244.77	2787.46	244.77	.86	1.60	.86	1383.00	1382.11	.07	326.11	1373.30	1.14

DAGGS WASH 100-YEAR PRO

SUMMARY PRINTOUT

	SECNO	XLCH	K*CHSL	EG	HV	HL	OLOSS	10*KS	VOL	DEPTH	K*XNL	K*XNCH	K*XNR
*	1.000	.00	.00	1368.94	2.66	.00	.00	99.51	.00	5.28	.00	30.00	.00
*	2.000	13.50	-192.59	1369.50	1.10	.09	.47	45.36	.10	10.00	.00	30.00	.00
*	3.000	7.30	410.96	1371.12	2.68	.06	.79	184.08	.15	7.04	.00	30.00	.00
*	4.000	7.30	410.96	1374.12	2.67	.13	.00	182.39	.19	7.05	.00	30.00	.00
*	5.000	7.30	424.65	1377.22	2.67	.13	.00	182.95	.24	7.05	.00	30.00	.00
*	6.000	7.30	410.96	1380.22	2.67	.13	.00	182.73	.28	7.05	.00	30.00	.00
*	7.000	2.00	250.00	1380.74	.96	.01	.51	21.25	.29	8.78	.00	30.00	.00
*	8.000	.10	-16300.05	1380.84	.63	.00	.10	2.14	.29	10.84	.00	13.00	.00
	9.000	14.70	.00	1380.85	.63	.00	.00	2.14	.47	10.85	.00	13.00	.00
*	10.000	12.50	314.40	1381.47	1.87	.01	.62	10.82	.58	6.30	.00	13.00	.00
	11.000	11.90	.00	1381.49	1.86	.01	.00	10.76	.67	6.33	.00	13.00	.00
	12.000	11.90	.00	1381.51	1.81	.01	.02	10.30	.75	6.41	.00	13.00	.00
	13.000	23.80	.00	1381.55	1.76	.02	.01	9.90	.92	6.49	.00	13.00	.00
	14.000	47.70	.00	1381.62	1.69	.05	.02	9.26	1.26	6.64	.00	13.00	.00
	15.000	6.30	.00	1381.82	1.03	.00	.20	4.83	1.31	7.49	.00	13.00	.00
	16.000	6.20	.00	1381.91	.75	.00	.08	3.24	1.37	7.85	.00	13.00	.00
	17.000	12.50	.00	1381.99	.47	.00	.08	1.83	1.52	8.22	.00	13.00	.00
	18.000	22.10	.00	1382.08	.21	.01	.08	3.33	1.91	8.57	35.00	30.00	35.00
	19.000	38.40	.00	1382.10	.19	.01	.01	3.06	2.77	8.61	35.00	30.00	35.00
*	20.000	20.00	.00	1382.13	.09	.00	.03	1.38	3.33	8.74	35.00	30.00	35.00
*	21.000	19.50	.00	1382.15	.04	.00	.02	.58	4.18	8.81	35.00	30.00	35.00

SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=     1.000  PROFILE=  1  CRITICAL DEPTH ASSUMED

WARNING SECNO=     2.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     3.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     3.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     3.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     4.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     4.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     4.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     5.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     5.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     5.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     6.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     6.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     6.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=     7.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     8.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    10.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    20.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    21.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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