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HYD 213

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

HYDRAULIC MODEL STUDY OF GALINDO CREEK SIDE CHANNEL WASTEWAY

CONTRA COSTA CANAL
CENTRAL VALLEY PROJECT, CALIFORNIA

Hydraulic Laboratory Report No. Hyd.-213

BRANCH OF DESIGN AND CONSTRUCTION
DENVER, COLORADO

NOVEMBER 6, 1946

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Branch of Design and Construction
Engineering and Geological Control
and Research Division
Denver, Colorado
December 6, 1946

Laboratory Report No. 213
Hydraulic Laboratory
Compiled by: J. H. Douma
and Ben R. Blackwell
Reviewed by: J. N. Bradley

Subject: Hydraulic model study of Galindo Creek sidechannel wasteway--Contra Costa Canal--Central Valley Project, California.

INTRODUCTION

Hydraulic model studies of the Galindo Creek sidechannel wasteway of the Contra Costa Canal in the Central Valley Project of California were performed in the Hydraulic Laboratory in Denver in September 1939. The report was not completed at that time due to more urgent work in the laboratory.

The prototype sidechannel wasteway, Figure 1, starts at canal station 1726+67.42 and is 25 feet long on an 80-foot radius horizontal curve. The purpose of the wasteway is to prevent the overtopping of the canal banks. The sidechannel wasteway discharges into a tunnel and finally into a stilling-pool before entering into the wasteway canal. The principle purpose of the model study was to determine whether the capacity of the sidechannel wasteway was adequate.

THE MODEL

A 1:6 scale model of the sidechannel wasteway was constructed and located in a model channel previously used to determine losses for flow around piers in wash overchutes for the Coachella Canal. The sideslopes of the model canal were 1-1/2:1, whereas those of the Contra Costa Canal are 1-1/4:1. The discrepancy was thought to be insignificant in regard to the general operation of the sidechannel. It was also considered unnecessary to reproduce the slight channel curvature to determine the approximate dimensions of the sidechannel.

OPERATION OF THE ORIGINAL DESIGN

Operation of the original design showed the sidechannel to be inadequate. The spillway crest was nearly 100 percent submerged over its entire length (Figures 2 and 3). The head on the crest was 0.486 feet prototype, making the upstream canal water surface elevation 101.236. With the top of the canal lining at elevation 101.25, there was practically no freeboard.

OPERATION OF DESIGN B

To prevent submergence of the wasteway crest, the bottom sidechannel was lowered 6 inches prototype. For this case there was practically no submergence (Design B, Figures 2 and 3). The discharge coefficient was increased from 2.85 to 3.48 for the maximum discharge conditions, and the upstream canal water surface was lowered to elevation 101.175.

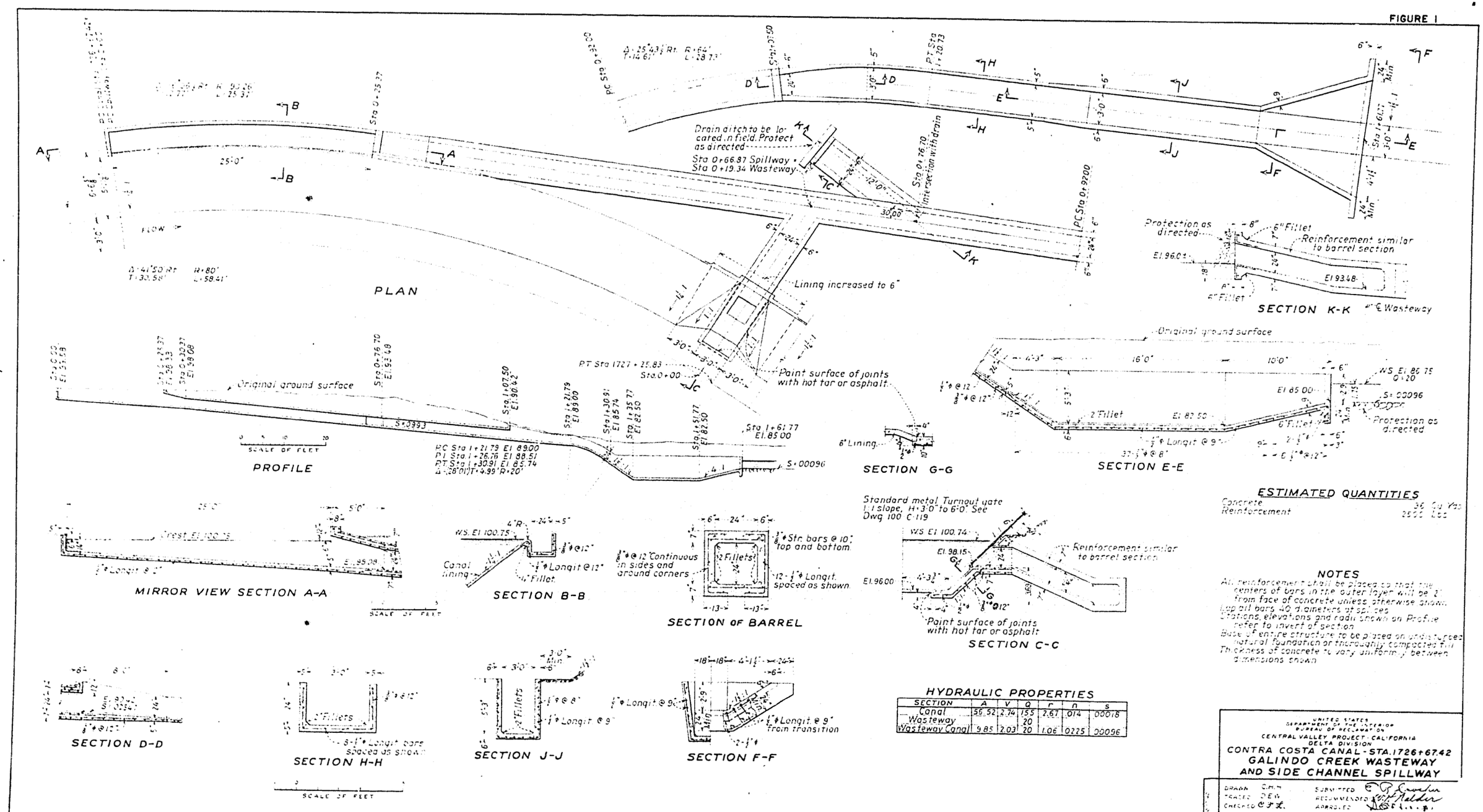
OPERATION OF DESIGN C

Lowering the bottom of the sidechannel 4 inches more eliminated all submergence but the discharge coefficient was increased only slightly to 3.53 with the canal water surface at elevation 101.172. The water surfaces in the sidechannel for this condition are shown as Design C, Figures 2 and 3.

CONCLUSIONS AND RECOMMENDATIONS

Due to the small hydraulic improvement encountered in the latter Design C and the satisfactory operation of the sidechannel for the intermediate floor position, Design B with the sidechannel floor located 6 inches below the original design is recommended. The recommended design is shown as Figure 1.

FIGURE 1



ESTIMATED QUANTITIES

Concrete	36 Cu Yds
Reinforcement	2500 Lbs

NOTES

All reinforcement shall be placed so that the centers of bars in the outer layer will be 2" from face of concrete unless otherwise shown.
Lap all bars 40 diameters at splices.
Stations, elevations and radii shown on Profile refer to invert of section.
Base of entire structure to be placed on undisturbed natural foundation or thoroughly compacted fill.
Thickness of concrete to vary uniformly between dimensions shown.

HYDRAULIC PROPERTIES

SECTION	A	V	Q	r	n	s
Canal	56.52	2.74	155	2.67	.014	.00018
Wasteway			20			
Wasteway Canal	9.85	2.03	20	1.06	.0225	.00096

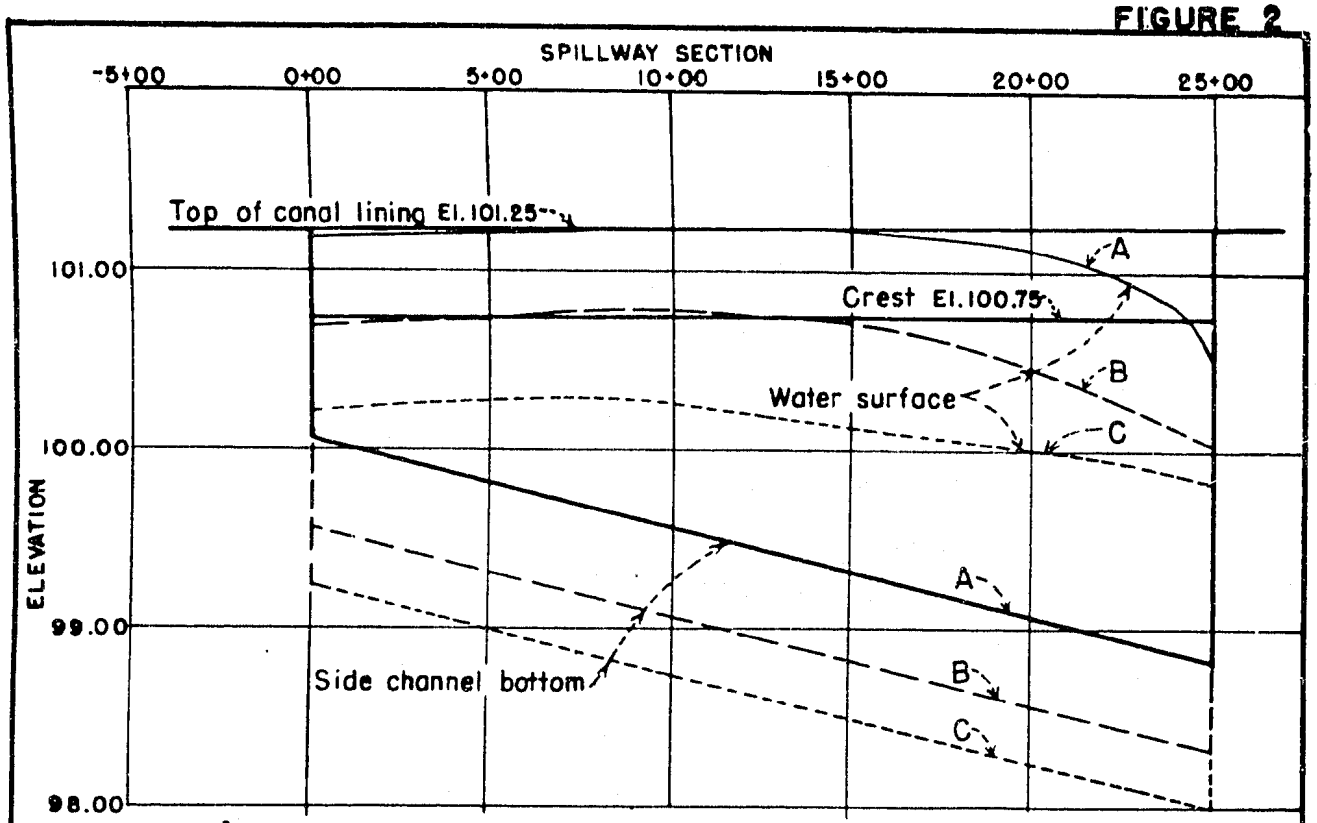
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT - CALIFORNIA
DELTA DIVISION

CONTRA COSTA CANAL - STA. 1726+67.42
GALINDO CREEK WASTEWAY
AND SIDE CHANNEL SPILLWAY

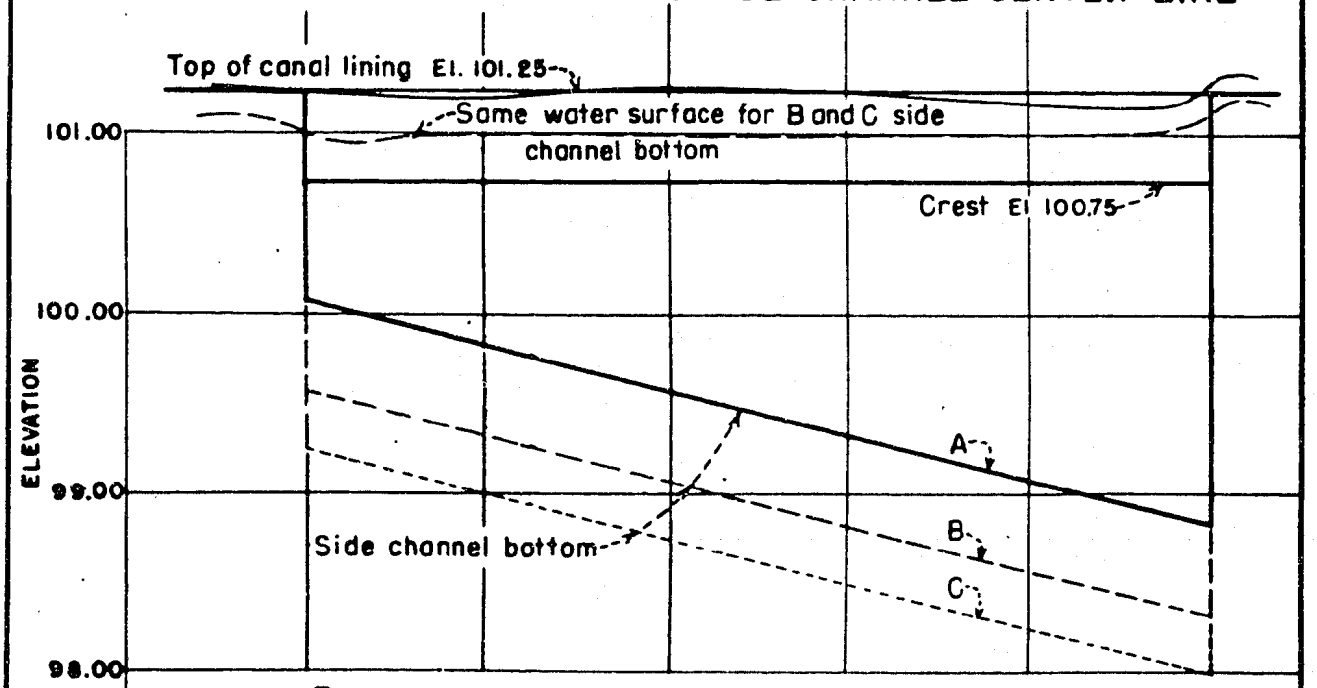
DRAWN C.H.H.
TRACED D.E.W.
CHECKED C.T.L.
SUBMITTED
RECOMMENDED
APPROVED

DENVER, COLORADO JUNE 5, 1939 | 214-D-3294

FIGURE 2



A. WATER SURFACE ALONG SIDE CHANNEL CENTER-LINE



B. WATER SURFACE OVER SPILLWAY CREST

EXPLANATION

BOTTOM	SYMBOL	DESCRIPTION	CREST COEF.
A.	————	Original design	2.85
B.	— — — —	Bottom 6" lower	3.48
C.	- - - - - - -	Bottom 10" lower	3.63

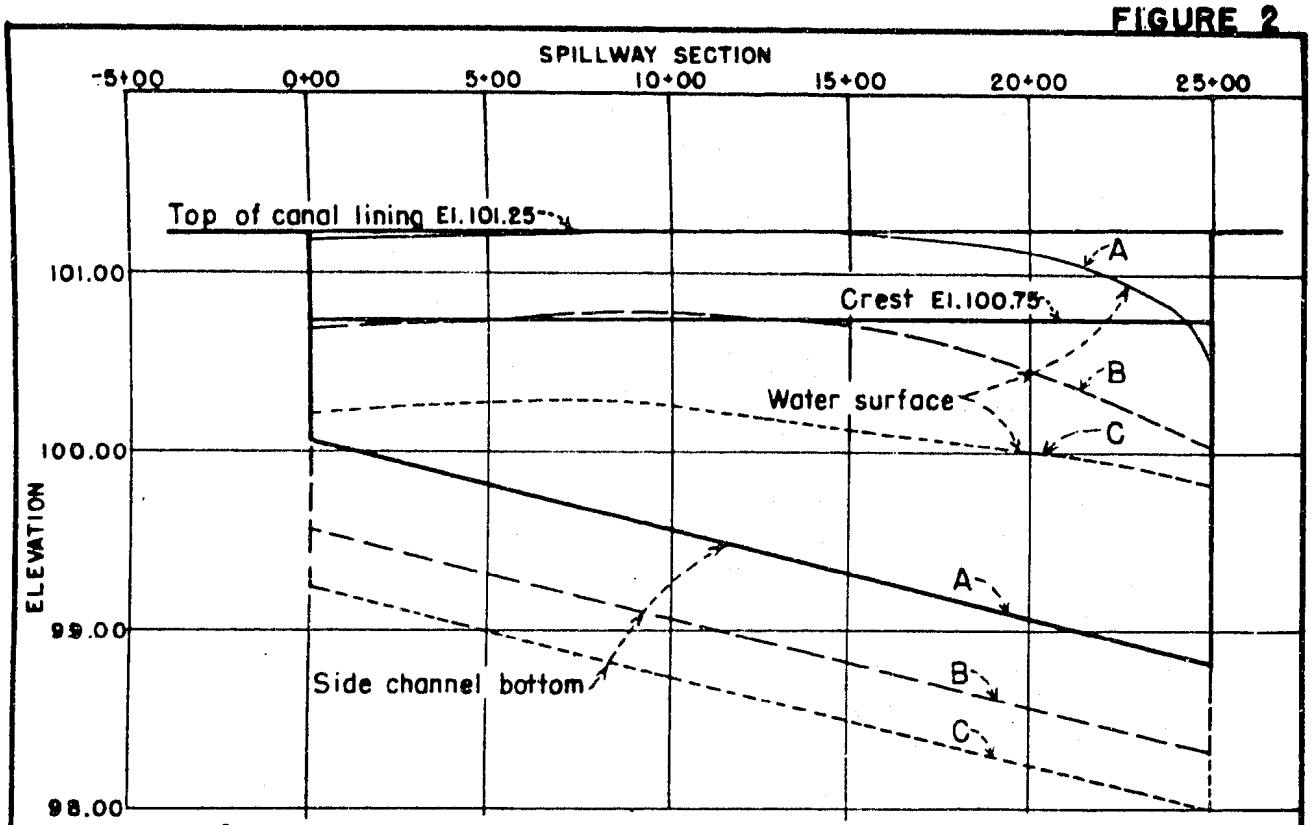
CENTRAL VALLEY PROJECT-CALIF.

CONTRA COSTA CANAL

GALINDO CREEK SIDE CHANNEL WASTEWAY

LONGITUDINAL WATER SURFACE PROFILES

FIGURE 2



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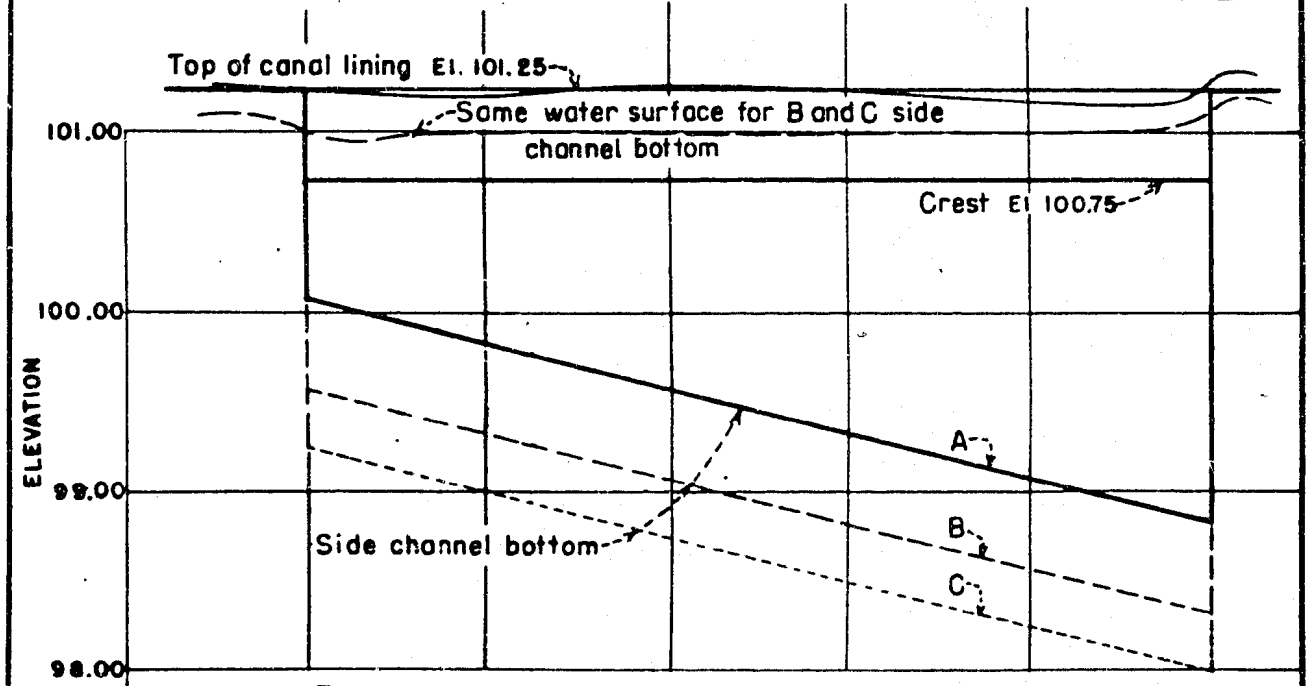

B. WATER SURFACE OVER SPILLWAY CREST

EXPLANATION

BOTTOM	SYMBOL	DESCRIPTION	CREST COEF.
A.	———	Original design	2.85
B.	— — —	Bottom 6" lower	3.48
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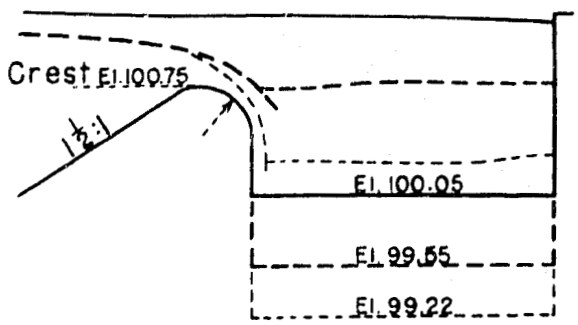
CONTRA COSTA CANAL

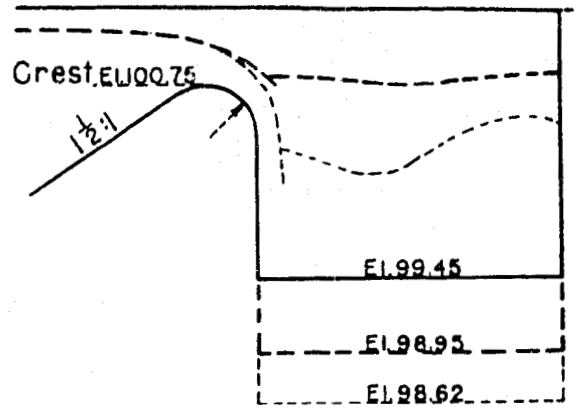
GALINDO CREEK SIDE CHANNEL WASTEWAY

LONGITUDINAL WATER SURFACE PROFILES

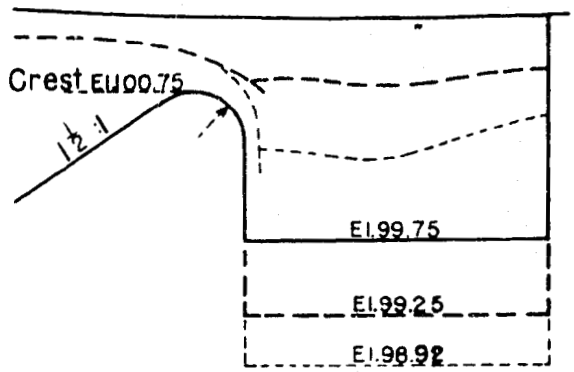
FIGURE 3



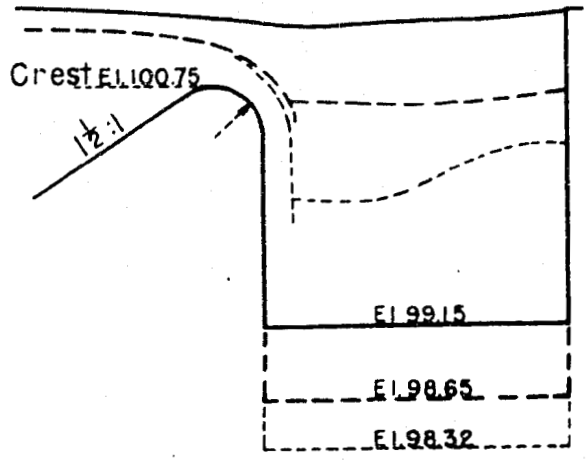
STATION 0 + 50



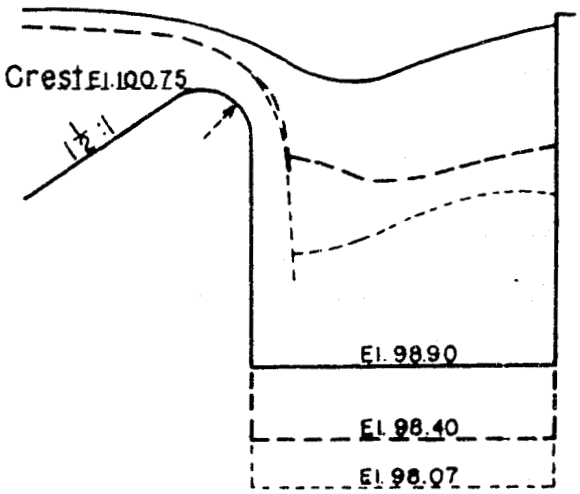
STATION 12+50



STATION 6+50



STATION 18+50



STATION 23+50

EXPLANATION

BOTTOM	SYMBOL	DESCRIPTION	CREST COEFF.
A	———	Original design	2.85
B	- - - -	Bottom 6" lower	3.48
C	·····	Bottom 10" lower	3.53

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SECTIONAL WATER SURFACE PROFILES