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RESEARCH PROJECT INITIATION

Date: January 31, 1974

Project Title: Hydraulic Model Studies - Plant Wansley

Project No: E-20-648

Principal Investigator Dr. Paul G. Mayer

Sponsor: Georgia Power Company

Agreement Period: From 10/1/73 Until Open

Type Agreement: Verbal at present - agreement to be negotiated

Amount: $13,900 (estimated)*

Reports Required: as needed, Final Report upon completion

Sponsor Contact Person (s):

Mr. C. R. Thrasher
Georgia Power Company
Atlanta, Georgia 30303

Phone: 521-3400, ext. 2971

*Includes charges previously made to E-20-617 (Wallace Dam Account) for Plant Wansley work which should be transferred to this account now.

Assigned to: School of Civil Engineering

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RESEARCH PROJECT TERMINATION

Date: July 16, 1974

Project Title: Hydraulic Model Studies - Plant Wansley

Project No: E-20-648

Principal Investigator: Dr. Paul G. Mayer

Sponsor: Georgia Power Company

Effective Termination Date: 7-12-74 (Final Report submitted)

Clearance of Accounting Charges: ASAP

~~Grant~~/Contract Closeout Actions Remaining: Final Invoice as soon as all applicable charges clear.

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WANSLEY PROJECT MODEL STUDIES

Final Report on Supercritical Curved
Spillway Model Tests

by PAUL G. MAYER

Project No. E20-648, for the
Georgia Power Company
Atlanta, Georgia

1974

School of Civil Engineering
GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia

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CIVIL ENGINEERING

TELEPHONE:
(404) 894-2225

July 3, 1974

Mr. C. R. Thrasher
Civil Engineer
Georgia Power Company
P O Box 4545
Atlanta, Georgia 30302

Re: Plant Wansley Project Hydraulic Model

Dear Mr. Thrasher:

Attached please find the final report on the results of our laboratory test on a 1:50 scale hydraulic model. This report contains test results for spillway ratings under various operating conditions, recommendations for changes in channel slope and channel superelevations, and recommendations for side wall modifications. Additional recommendations are made for the wall height requirements.

Please feel free to contact me if questions arise in connection with this report.

Sincerely yours,

Paul G. Mayer
Regents' Professor

PGM/mf
Encl.

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FINAL REPORT: HYDRAULIC MODEL TESTS OF THE WANSLEY PROJECT SPILLWAY

I. Introduction

The Wansley Project is a proposed electric generation facility of the Georgia Power Company. The project includes a storage reservoir created by an earthen dam. The emergency spillway of the project consists of three bays with crest-control Tainter gates. Subsequently, flood flows from the reservoir are carried by a supercritical curved channel into an energy dissipator. The design of the spillway, supercritical channel, and energy dissipator contained a number of unusual features which warranted verification studies by means of a hydraulic model.

II. Scope of Studies

The objectives of this study were originally set forth on September 29, 1973, in a conference between Mr. Van Peavy and Dr. Chen of Southern Services, Birmingham, Alabama, Mr. George Allen of the Georgia Power Company, Atlanta, Georgia, and Dr. Paul G. Mayer, School of Civil Engineering, Atlanta, Georgia. Mr. C. R. Thrasher of the Georgia Power Company was the authorized representative of the Company. Liaison was maintained primarily through Mr. George Allen.

The test objectives included the following items contained in a letter to Mr. C. R. Thrasher dated December 3, 1973:

a) Construct a scale model of the proposed spillway using layout and dimensions supplied by the Georgia Power Company.

b) Investigate whether or not the proposed spillway is capable of accommodating the probable maximum flood for that project.

c) Should the proposed spillway not be able to carry the probable maximum flood, recommendations are to be made for its modification and model tests are to be conducted for the purpose of verification of such modifications of the spillway.

d) The spillway should be rated for ungated operations. Recommendations should be made for the length of spillway piers and for the shapes of these piers.

e) Investigations should be conducted to establish the proper functioning of the energy dissipator. Detailed velocity surveys should be made in the stilling basin and in the downstream channel for various rates of flow and for various tailwater conditions.

f) On the basis of the results of the velocity surveys, recommendations should be made for the types and amounts of riprap required in order to prevent scour and erosion in the downstream channel.

g) Work on these studies was initiated pursuant to prior verbal authorization and are expected to be completed on or about June 30, 1974.

Additional test objectives were established in conversations between Mr. C. R. Thrasher and Mr. George Allen of the Company, and Dr. Paul G. Mayer on February 22, 1974. During this conference, the following additional test objectives included:

h) Establish the wall height requirements for the curved spillway channel.

i) Determine the feasibility of bottom sills at Station 9 + 50 in order to improve flow patterns in the dissipator area.

j) Confirm the sequence of operation of the crest control gates.

k) Furnish spillway rating curves for various gate openings and reservoir elevations.

l) Other tests as may be determined by the Georgia Power Company.

The experimental work was carried out in the Hydraulics Laboratory of the School of Civil Engineering, Georgia Institute of Technology.

III. The Hydraulic Model

The laboratory studies of the Wansley Project spillway were carried out with an undestorted 1:50 scale hydraulic model. The model was constructed primarily of timber and plywood. The model configurations were in complience with drawings supplied by the Georgia Power Company. Model test results were used in part to alter the design configurations. Such alterations were undertaken when deemed necessary and after conferences between the principal investigator and representatives of the Company.

The hydraulic model consisted of a head bay some 4 x 8 feet in plan view and approximately 4 feet high. From the head bay a pie-shaped approach apron led to a three-bay gated spillway. The crest control gates were Tainter gates, each 21 feet in width and approximately 15 feet high. The Tainter gates were separated and supported by 5-foot thick piers. The piers had semi-circular ends. Details of the spillway crest and Tainter gates are shown in the Georgia Power Company drawing 10-209, Sheet No. H12355. Subsequent to the gated spillway crest (approximately station 0 + 00), a curved supercritical channel led to the energy dissipator. From the spillway crest, the channel was narrowed down to 50 feet at station 3 + 00. The curved portion of the channel had a center line radius of 468 feet and an included angle of 86° 30'. Prior to the energy dissipator the rectangular supercritical channel was transitioned from the 50-foot width (station 8 + 50) to a width of 100 feet (station 13 + 00). The vertical profile of the supercritical channel was originally made to proceed at a slope of 1% from the spillway to station 3 + 00. Subsequently, a 7% grade carried the channel to station 11 + 00. For the last 200 feet prior to the energy dissipator (station 13 + 00), the channel slope was 20%. As a result of the model tests, the model was rebuilt to have a vertical profile consisting of a 1% slope for some 50 feet (station

0 + 50), approximately $5\frac{1}{2}\%$ slope for 1050 feet (station 11 + 00) and again 20% for the last 200 feet. As a further consequence of the model test results, the lateral configurations of the supercritical curved channel were altered in order to improve flow conditions in the energy dissipator. The original horizontal and vertical configurations of the Wansley Project spillway and channel are shown in the Georgia Power Company drawing 10-209, Sheet No. H12362.

Details of the energy dissipator are shown in Georgia Power Company drawing 10-209, Sheet No. H12354. At the end of the dissipator, 45° vertical wing walls expanded the channel into a trapezoidal configuration. The trapezoidal channel had a bottom width of 100 feet and side slopes of 1 on 2. In the model the trapezoidal section was some 8 feet in length and terminated in a tailwater control weir.

The water supply to the model was accomplished by a means of a 6-inch line. A gate valve was used for the control of flow rates. The discharges into the model were measured by a 6 x 3 inch calibrated venturi meter. Depths of flow and model elevations were measured by staff gages and a surveyor's level.

Figure 1 shows a birds-eye view of the hydraulic model in the laboratory.

IV. Model Test Results

a. Scale Relations. For a hydraulic model of the type represented by the Wansley Project spillway, the model test results can be interpreted in terms of prototype performance. The accepted equations of hydraulic similitude are based on the Froude Number. The general relationships between model and prototype are presented below:

Quantity	Scale Ratio
Length	1:50
Area	1:2500
Velocity	1:7.07
Discharge	1:17,680

For each of the test sequences, the model discharges were set by observing the manometer attached to the calibrated venturi meter. For large flow rates, a mercury-water pot-type manometer was used. For relatively small rates of flow, an inverted air-water U-tube manometer was used. For each rate of discharge, the reservoir elevation was determined by means of a staff gage and a precision level. After the model discharge relationships had been repeatedly tested, subsequent experiments utilized the head-discharge curves by using the reservoir elevations to establish the flow rates through the model.

b. Model Spillway Capacity. The model spillway capacity was tested for both ungated and gated flows. Table 1 shows the test results for ungated flows through all three spillway bays. In this table, the reservoir elevations are indicated in prototype dimensions (Mean Sea Level). Also, the head on the spillway crest and the discharges are shown in prototype dimensions. In Figure 2, the test results are shown in graphical form.

For relatively small discharges from the Wansley reservoir, only the center gate may be completely open and the outside gates remain closed. Table 2 shows the results for ungated flows through the center bay only. Again, the reservoir elevations, heads, and discharges are given in prototype dimensions. Figure 3 shows the test results for ungated center gate flows in graphical form.

Under some conditions of reservoir operation, flows may be discharges from partially open Tainter gates. A series of tests were made to establish the head-discharge relationships for flows through the equally-open gates. Table 3 summarizes the test results.

c. Supercritical Curved Channel Tests. The supercritical channel was modeled according to the Georgia Power Company drawing 10-209, Sheet No. H12362. The superelevations for the curved portion were supplied by Southern Services, Incorporated. Model tests established that near design discharges, the curved channel was not able to maintain supercritical flow. Under certain flow conditions, a hydraulic jump occurred immediately below the spillway crest and subcritical flow maintained itself for a considerable distance. The test results for the original channel are presented in Tables 4 through 8. In these tables the water surface elevations and depths of flow are indicated for various transverse and longitudinal channel locations. As can be noted, while at relatively high discharges the hydraulic jump formed at the upper end, subcritical flow conditions persisted for several hundred feet. Also, at relatively low discharges, the flows were concentrated on the lower inside portion of the curved channel, leaving dry considerable portions of the channel floor.

After consultation and by mutual consent, the model was rebuilt to new specifications of slopes and superelevations. Accordingly, a one percent slope persisted to station 0 + 50. At station 0 + 50 and at elevation 767.0 feet (MSL), a 5.5 % slope commenced and was terminated at station 11 + 00 and at elevation 711.0 feet. The subsequent slope down to the energy dissipator was maintained at twenty percent as in the original model. New superelevations were computed and the rebuilt model corresponded to values shown in Table 9.

The rebuilt model was tested at relatively high discharges. As can be seen from the test results, the flow conditions were considerably improved. Tables 10, 11, and 12 show these results. In order to establish a complete range of performance characteristics of the curved supercritical channel, a test series was conducted to establish depths of flow throughout the channel for various discharges. Tables 13 through 23 give the depths of flow for given discharges at various stations and for right side, center line, and left side locations.

From the rating curve (Figure 2) the probable maximum flood (PMF) of some 22,700 cubic feet per second would correspond to a reservoir elevation of approximately 796.4 feet. The model tests indicated that the maximum wall height requirements corresponded to maximum spillway discharges. Table 24 shows the elevations of both the channel floor and the water surface for the conditions of the PMF. Since the maximum reservoir was projected by the Company to be at elevation 800.0 feet, Figure 2 indicates that the corresponding spillway discharge would be some 27,900 cubic feet per second. The depths of flow for this flow rate are shown in Table 25.

d. Energy Dissipator Tests. Although the flow patterns in the supercritical curved channel appeared satisfactory after the channel slopes and the superelevations had been modified, some asymmetrical flows remained in the stilling basin of the energy dissipator.

A study was requested of the feasibility of bottom sills in order to improve the flow patterns in the dissipator area. Preliminary laboratory studies showed only with difficulty and quite inconclusively the utility of bottom sills, both in terms of the number of sills required and their locations. This difficulty, coupled with the potential danger of cavitation damage at low submergence, suggested the need for an alternate scheme of channel modification in order to improve flow patterns. The alternate approach consisted of modification of the channel walls.

In the laboratory, three alternate channel wall configurations were investigated. These channel modifications were successively based on observations of resulting wave patterns in the model as well as on the resulting velocity distributions in the dissipator area. The velocities in the stilling basin and in the channel downstream from the dissipator were measured by means of a U.S.G.S. calibrated current meter.

The three channel modification schemes were designated as Alternate A, Alternate B, and Alternate C. Alternate A is shown in the attached Figure 4. In this modification, the 50-foot wide channel was extended to station 9 + 70. A symmetrically expanding section was inserted from station 9 + 70 to station 11 + 00 where it was joined to the original channel configuration. Alternate B is shown in Figure 5. In this channel modification only the left side wall was extended on a tangent to station 9 + 70 and then the left wall was expanded uniformly to join the 100-foot wide stilling basin at station 13 + 00. The right channel wall was kept in its original alignment. Thus the right wall was expanded uniformly from the 50-foot wide section at station 8 + 50 to the 100-foot wide section at station 13 + 00. Alternate C is shown in Figure 6. In this channel modification, again only the left side wall was varied from the original design. In the Alternate C, the left side wall was expanded from the 50-foot wide section at station 8 + 50 to an offset from the tangent of 1.0 feet at station 9 + 70. From station 9 + 70 the wall was uniformly expanded to join the 100-foot wide stilling basin at station 13 + 00.

In all tests the tail water elevations were set to conform to the rating curve provided by Southern Services. The velocity measurements were made at 15 locations in the dissipator area. The locations and the corresponding velocities are given in Tables 26 through 43. The velocity measurements were taken at one-half of the prevailing depth of flow.

In the original channel alignment the flow patterns in the dissipator area showed a very pronounced asymmetry. Particularly at medium and low discharges a pronounced clockwise vortex formed in the dissipator itself and the flow in the trapezoidal channel downstream from the dissipator also showed reverse flow patterns along the right bank.

Subsequently, Alternate A was conceived to allow a better reflection of the incident standing wave along the left side wall at about station 9 + 00. Although considerable improvement in the flow patterns in the dissipator area could be noted, a less strong clockwise vortex in the dissipator still formed at medium and low discharges. The test results for Alternate A are tabulated in Tables 26 through 28.

Inasmuch as the flow improvements seemed largely the result of modification of the left side wall, Alternate B was constructed. As can be seen from the test results, the flow distribution in the dissipator was profoundly effected to the extent that the higher velocities were now near the right side wall and the vortex rotated in a counter-clockwise direction. These results are shown in Tables 29 through 34.

Since Alternate B shifted the flow distribution in the lower part of the spillway from predominently high velocities near the left side wall to predominently high velocities near the right side wall, it seemed obvious that some flare of the left side wall should be allowed at the location of the incident standing wave. Thus Alternate C was constructed and tested. The test results are shown in Tables 35 through 43.

Alternate C thus seemed a reasonable channel modification in order to have reasonable flow patterns in the dissipator area and in the trapezoidal channel downstream from the dissipator.

V. Discussion of Test Results

The tests on the hydraulic model of the Plant Wansley spillway indicated that the gated spillway, the modified supercritical channel and the energy dissipator will perform satisfactorily for all ranges of spillway discharges. The spillway ratings established relationships of discharges under various conditions of reservoir elevations and gate operations.

The water surface elevations in the supercritical channel as presented in this report were calculated by using the model test results and the appropriate model scale. These water surface elevations do not allow for any bulking which will occur in the prototype channel because of air entrainment.

The entrainment of air is a characteristic of high velocity open channel flow. Various theories have been advanced and laboratory studies, principally at the University of Minnesota, have contributed to the understanding of the phenomenon. Nevertheless, precise calculations are not possible to determine the amount of air insufflated with the attendant bulking of the flow. An additional complication in connection with the Wansley Project spillway is its curved alignment. Among prototype observations on curved spillways, L. Standish Hall (Transactions ASCE, Vol. 108, 1943, p. 1394) indicated that the percentage air-entrainment was reduced with increasing depth of flow.

From Hall's observation and from other indications in the literature, the percentage bulking for the Wansley chute could be of the order of

15-20 percent. Assuming that a maximum reservoir elevation of 800 feet is used in the design and since our test results shown in the attached Table 25 indicate a water depth of about 17 feet at the right side of station 4 + 50, the required depth of channel at that location should be at least 20 feet. As a matter of design practice, an additional depth is provided as freeboard. The recommendations are also based upon the practice of the Bureau of Reclamation as indicated in <u>Design of Small Dams</u>, Second Edition, 1973, p. 393. Accordingly, the freeboard is calculated by

$$\text{Freeboard} = 2.0 + 0.025\, v \sqrt[3]{d}$$

The velocity v at station 4 + 50 is approximately 40 feet per second and d is some 17 feet. Therefore, the USBR freeboard including the requirements for wave action, air entrainment, splash and spray would be some 4.6 feet. While the Bureau's recommendations result in an approximate channel depth of 22 feet, this would correspond to an additional freeboard of two feet when using the results of the Wansley Project model studies with an allowance of some 20% increase in depth due to air-entrainment. Thus, the Wansley Project spillway should have side walls at least 22 feet high from the spillway to station 8 + 00 (see Table 25). A reduction in wall height may be effected further downstream. Thus, unless a continuously varying wall height is desired, the wall height beyond station 8 + 00 should be at least 17 feet. This height of 17 feet is arguable both on the basis of the USBR criterion and on the results of the Wansley model tests.

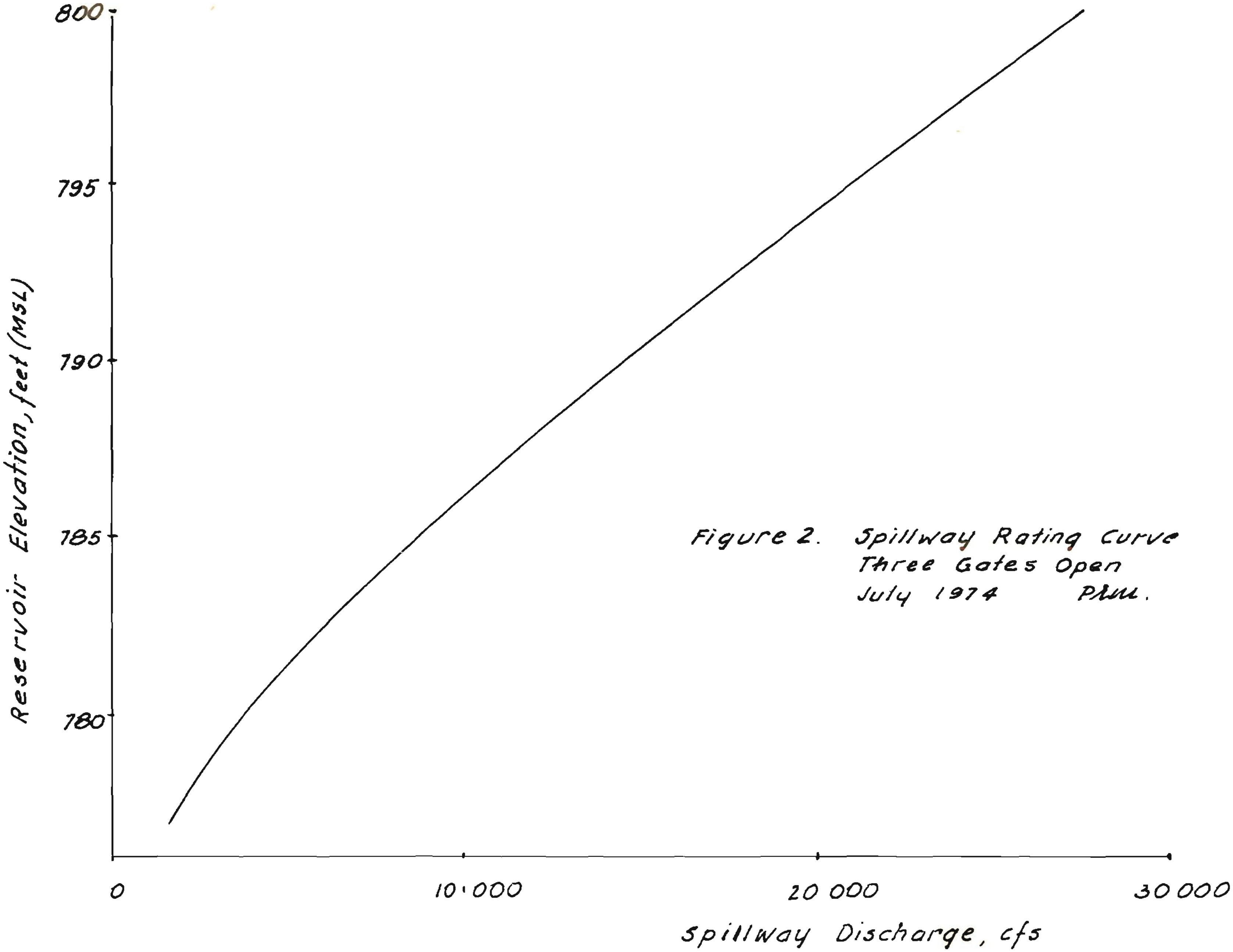


Figure 2. Spillway Rating Curve
Three Gates Open
July 1974 PAu.

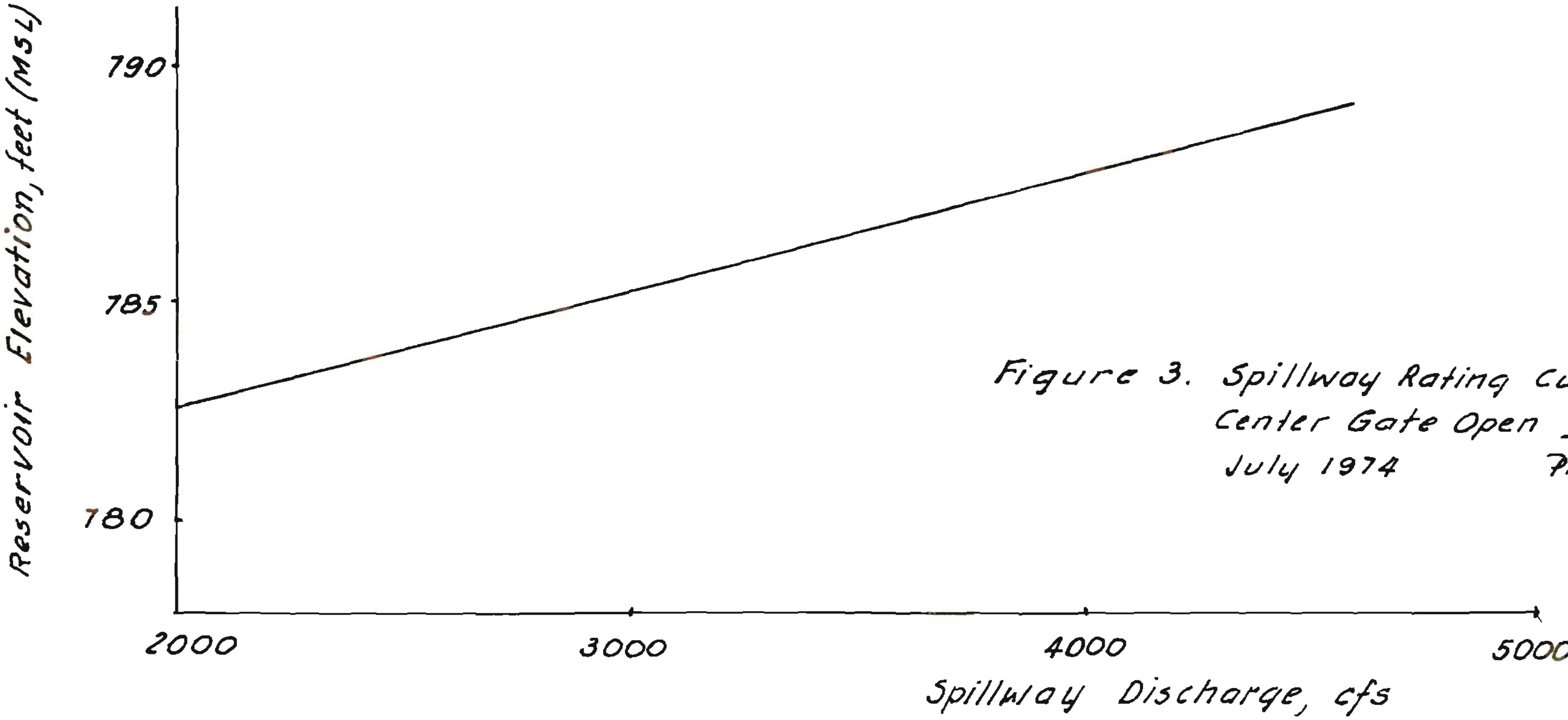


Figure 3. Spillway Rating Curve
Center Gate Open Only.
July 1974 PAW.

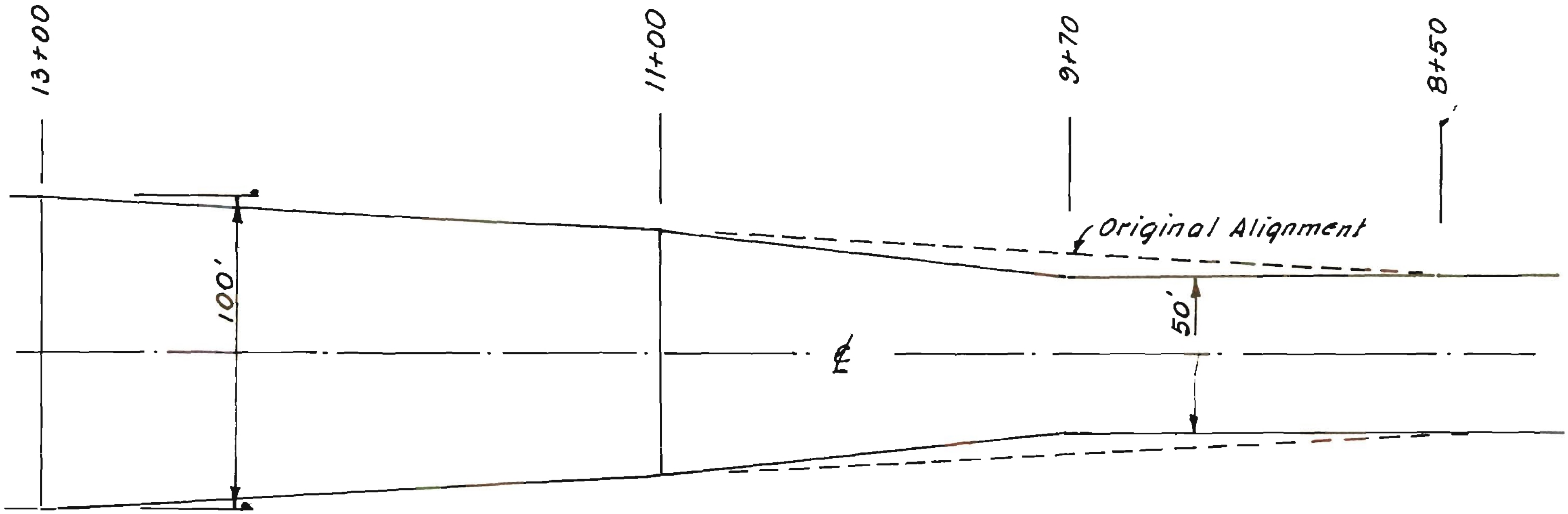


Figure 4 Channel Wall Modification
Alternate A
July 1974

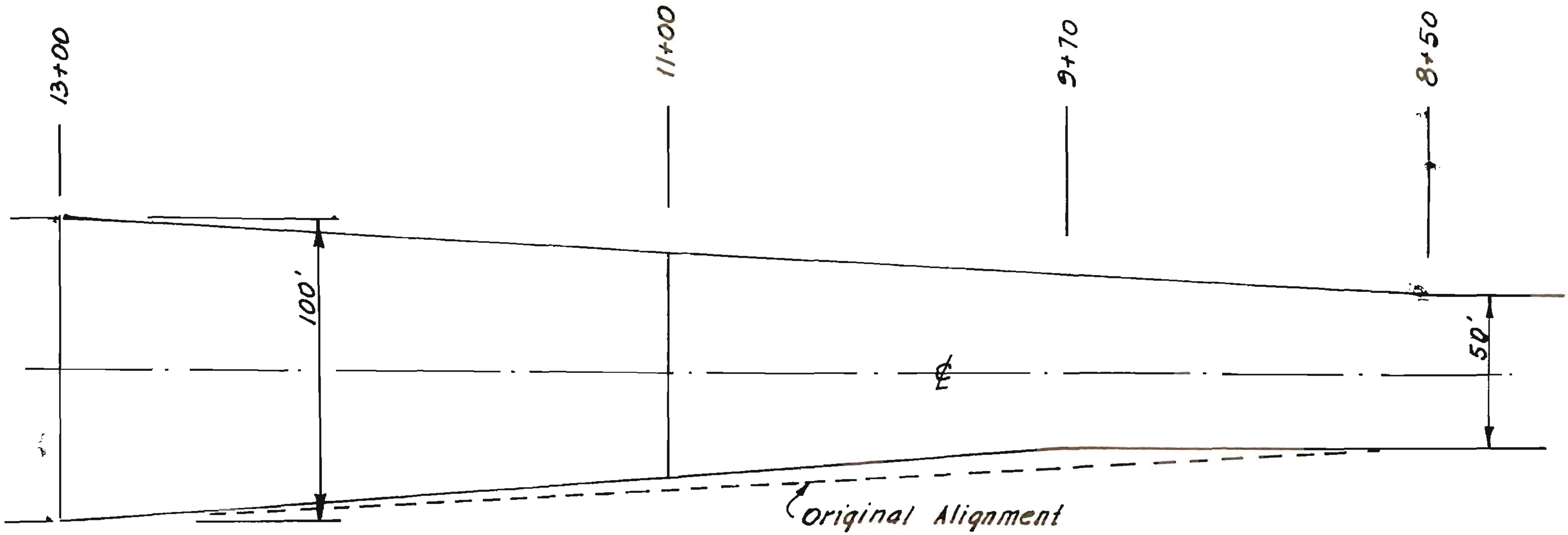


Figure 5 Channel Wall Modification
Alternate B
July 1974 R.W.M.

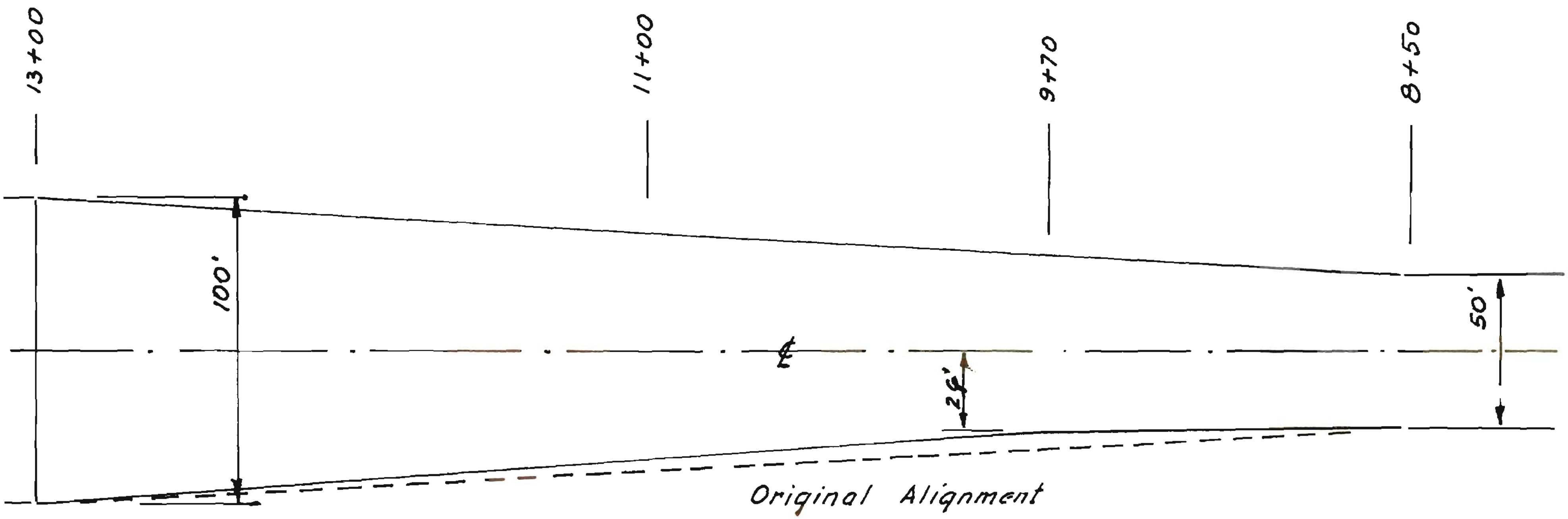


Figure 6 Channel Modification
Alternate C
July 1974 PLM.

Table 1. Plant Wansley Spillway Study
Spillway Rating Three Gates Open
Model scale 1:50
Discharge scale 1:17680

Q model = .513 R (R inches Hg)

Q prototype = $C_D L H^{3/2}$ (L = 63 ft)

Reservoir Elevation ft(MSL)	Head ft	Q_m cfs	Q_p cfs	$H^{3/2}$	$C_D = Q/LH^{3/2}$	Comments
777.2	4.2	0.11	1.940	8.61		
779.3	6.3	0.16	2.830	15.81	2.84	
781.6	8.6	0.30	5.300	25.22	3.33	
782.6	9.6	0.36	6.360	29.74	3.39	
783.9	10.9	0.44	7.780	35.99	3.43	
786.3	13.3	0.57	10.080	48.50	3.30	
788.6	15.6	0.72	12.730	61.62	3.28	$C_{D\ avg}$=3.2
791.0	18.0	0.89	15.730	76.37	3.27	Jump occurs
792.8	19.8	1.03	18.210	88.10	3.28	at upstream
794.9	21.9	1.16	20.510	102.49	3.18	of curved channel
795.9	22.9	1.26	22.270	109.59	3.23	do.
797.5	24.5	1.36	24.040	121.27	3.15	do.
798.3	25.3	1.45	25.630	127.26	2.95	do.
800.1	27.1	1.57	27.750	141.08	3.12	do.
777.4	4.4	.11	1940	8.61		
779.0	6.0	.16	2830	14.70	3.06	
779.8	6.8	.21	3710	17.73	3.32	
781.6	8.6	.28	4950	25.22	3.12	
783.2	10.2	.36	6360	32.58	3.10	
785.0	12.0	.49	8660	41.57	3.31	
787.8	14.8	.67	11840	56.94	3.30	$C_{D\ avg}$ = 3.2
790.5	17.5	.86	15.200	73.21	3.30	
791.0	18.0	.88	15.560	76.37	3.23	
791.8	18.8	.92	16.260	81.51	3.17	
792.5	19.5	.93	17.500	86.11	3.23	
793.8	20.8	1.09	19.270	94.86	3.22	
795.4	22.4	1.21	21.390	106.02	3.20	
796.4	23.4	1.31	23.160	113.19	3.25	
798.5	25.5	1.45	25.630	128.77	3.16	
800.3	27.3	1.58	27.980	142.64	3.11	

Table 2 Plant Wansley Spillway Study
Spillway Rating - Center Gate Only

Reservoir Elevation ft (MSL)	Head feet	Discharge cfs
782.5	9.5	1980
783.5	10.5	2500
784.0	11.0	2560
785.0	12.0	3030
786.3	13.3	3490
788.0	15.0	4070
788.8	15.8	4440

Table 3 Plant Wansley Spillway Study
Flow Through Partially Open Tainter Gates

Head ft.	Gate Opening ft.	Discharge cfs
13.7	3	3530
15.2	3	3800
18.0	3	4500
8.0	4	3530
10.9	4	3800
13.5	4	4510
15.0	4	4730
17.0	4	5190
7.0	5	3530
8.5	5	3800
10.5	5	4510
13.0	5	5190
16.2	5	6010
18.5	5	6730
8.5	6	4510
10.5	6	5190
13.2	6	6010
15.2	6	6730
17.2	6	7210

Table 4 Water Surface Elevations
Wansley Project Spillway

Discharge: 27,700 cfs
Reservoir Elevation: 800'
Tailwater Elevation: 723'

Station	Left side		Center		Right side		Comments
	W.S. Elev.	Depth	W.S. Elev.	Depth	W.S. Elev.	Depth	
0 + 20	786.0	18.2	785.5	17.7	785.0	17.2	Jump begins
0 + 50	793.6	26.6	792.8	25.5	793.3	25.8	Jump ends
1 + 00	794.1	27.9	793.3	27.3	793.3	27.3	
1 + 50	793.8	28.1	793.3	28.1	792.8	27.6	
2 + 00	793.3	28.1	792.5	28.1	792.0	26.8	
2 + 50	792.3	27.4	791.5	27.1	791.0	26.1	
3 + 00	790.7	26.0	789.1	24.4	788.6	24.5	
3 + 50	786.5	19.5	784.7	20.8	783.4	22.6	Supercritical flow begins
4 + 00	780.6	14.9	778.2	17.4	776.9	20.8	
4 + 50	774.6	12.0	772.2	15.3	769.9	18.3	
5 + 00	770.1	10.1	767.8	13.8	764.4	17.2	
5 + 50	766.8	9.4	763.9	13.8	760.5	17.2	
6 + 00	760.5	5.5	755.8	9.1	760.5	21.4	
6 + 50	756.6	3.9	756.9	13.6	751.9	16.9	
7 + 00	757.1	7.0	752.2	11.8	747.2	16.9	
7 + 50	751.6	4.9	748.3	12.8	743.8	17.7	
8 + 00	743.1	3.7	742.5	10.6	744.4	19.3	
8 + 50	735.8	3.4	738.9	10.2	744.4	18.8	
9 + 00	730.0	4.4	736.5	11.2	737.6	12.0	
9 + 50	732.9	10.9	730.3	8.6	731.3	9.1	
10 + 00	732.4	13.6	724.8	6.0	725.6	6.8	
10 + 50	725.4	10.5	720.9	6.0	721.2	6.0	
11 + 00	719.6	8.1	717.5	6.2	715.4	3.9	
11 + 50	707.4	5.8	710.5	8.9	706.1	4.5	

Table 5 Water Surface Elevations
Wansley Project Spillway

Discharge: 21,000 cfs
Reservoir Elevation: 795'
Tailwater Elevation: 704'

Station	Left side W.S. Elev.	Left side Depth	Center W.S. Elev.	Center Depth	Right side W.S. Elev.	Right side Depth	Comments
0 + 30	778.0		778.0		778.5		Jump begins
0 + 75	787.1		787.1		786.5		Jump ends
1 + 00	788.4	22.2	787.6	21.6	785.5	19.50	
1 + 50	788.6	22.9	787.6	22.4	787.6	22.4	
2 + 00	788.1	22.9	787.1	22.7	786.8	21.6	
2 + 50	787.1	22.2	786.3	21.9	786.0	21.1	
3 + 00	785.5	20.8	784.7	20.0	783.9	19.8	
3 + 50	781.6	14.6	777.7	13.8	779.5	18.7	Supercritical flow begins
4 + 00	776.1	10.4	774.0	13.2	773.8	17.7	
4 + 50	771.2	8.6	769.4	12.5	766.5	14.9	
5 + 00	766.8	6.8	764.2	10.2	761.8	14.6	
5 + 50	763.1	5.7	760.2	10.1	757.9	14.6	
6 + 00	760.0	5.0	757.4	10.7	753.2	14.1	
6 + 50	757.4	4.7	753.7	10.4	744.3	14.3	
7 + 00	754.0	3.9	799.6	9.2	745.1	14.8	
7 + 50	748.8	2.1	744.4	8.9	741.5	15.4	
8 + 00	740.7	1.3	740.7	8.8	742.0	16.9	
8 + 50	733.7	1.3	736.3	7.6	741.0	15.4	
9 + 00	727.2	1.6	734.2	8.9	735.8	10.2	
9 + 50	731.1	9.1	728.7	7.0	729.8	7.6	
10 + 00	730.0	11.2	723.8	5.0	724.6	5.8	
10 + 50	723.5	8.6	719.4	4.5	719.6	4.4	
11 + 00	718.0	6.5	715.7	4.4	715.2	3.7	
12 + 00	697.5	5.5	697.5	5.5	697.5	5.5	

Table 6 Water Surface Elevations
Wansley Project Spillway

Discharge: 17,000 cfs
Reservoir Elevation: 792'
Tailwater Elevation: 696'

Station	Left side		Center		Right side		Comments
	W.S. Elev.	Depth	W.S. Elev.	Depth	W.S. Elev.	Depth	
0 + 50	775.6	8.6	775.1	7.8	776.1	8.6	
0 + 80	776.1		778.7		774.3		Jump begins
1 + 50	788.9	23.2	783.9	18.7	783.7	18.5	Jump ends
2 + 00	784.5	19.3	783.4	19.0	783.7	18.5	
2 + 50	783.9	19.0	783.1	18.7	782.9	18.0	
3 + 00	782.9	18.2	781.8	17.1	781.3	17.2	
3 + 50	779.2	12.2	777.7	13.8	777.2	16.4	Supercritical flow begins
4 + 00	774.0	8.3	773.5	12.7	771.4	15.3	
4 + 50	768.6	5.0	768.3	11.4	765.2	13.6	
5 + 00	765.2	5.2	762.8	8.8	760.2	13.0	
5 + 50	761.5	4.1	759.2	9.1	756.1	12.8	
6 + 00	762.3	7.3	755.3	8.1	751.9	12.8	
6 + 50	755.3	2.6	751.6	8.3	748.0	13.0	
7 + 00	751.9	1.8	748.0	7.6	743.3	13.0	
7 + 50	dry	0	743.3	7.8	740.2	14.1	
8 + 00		0	739.1	7.2	740.7	15.6	
8 + 50		0	735.5	6.8	739.9	14.3	
9 + 00	dry	0	733.2	7.9	734.7	9.1	
9 + 50	730.5	8.5	727.7	6.0	728.7	6.5	
10 + 00	728.7	9.9	723.0	4.2	724.0	5.2	
10 + 50	722.7	7.8	718.6	3.7	719.1	3.9	
11 + 00	718.0	6.5	716.2	4.9	715.2	3.7	
12 + 00	705.8		697.0	5.0	694.1	2.1	

Table 7 Water Surface Elevations
Wansley Project Spillway

Discharge: 8,800 cfs
Reservoir Elevation: 785'
Tailwater Elevation: 670'

Station	Left side W.S. Elev.	Left side Depth	Center W.S. Elev.	Center Depth	Right side W.S. Elev.	Right side Depth	Comments
0 + 50	772.7	5.7	771.4	4.1	772.7	5.2	
1 + 00	773.0	6.0	770.7	4.7	769.6	3.6	
1 + 50	774.0	8.3	770.4	5.2	767.3	2.1	
2 + 00	771.7	6.5	771.4	7.0	768.3	3.1	
2 + 50	771.7	6.8	770.4	6.0	770.7	5.8	
3 + 00	770.1	5.4	772.2	7.5	770.1	6.0	
3 + 50	771.7	4.7	770.9	7.0	770.7	9.9	
4 + 00	768.8	3.1	768.0	7.2	766.5	10.4	
4 + 50	763.6	1.0	762.6	5.7	760.2	8.6	
5 + 00	761.2	1.2	757.9	3.9	756.3	9.1	5 + 25
5 + 50	dry	0	755.3	5.3	752.4	9.1	Dry begins
6 + 00		0	751.1	4.4	748.8	9.7	
6 + 50		0	747.2	3.9	745.9	10.9	
7 + 00		0	744.4	4.0	740.4	10.1	
7 + 50		0	739.6	4.1	736.3	10.2	
8 + 00		0	735.8	3.9	736.5	11.4	
8 + 50		0	732.6	3.9	735.5	9.9	
9 + 00	dry	0	729.2	3.9	731.3	5.7	9 + 10
9 + 50	727.2	5.2	725.4	3.7	726.1	3.9	Dry ends
10 + 00	723.0	4.2	721.7	2.9	722.0	3.2	
10 + 50	719.9	5.0	717.3	2.4	717.8	2.6	
11 + 00	716.2	4.7	713.6	2.3	713.4	1.9	
12 + 00	694.3	2.3	695.7	3.7	693.6	1.6	

Table 8 Water Surface Elevations
Wansley Project Spillway

Discharge: 4,600 cfs
Reservoir Elevation: 781'
Tailwater Elevation: 670'

Station	Left side W.S. Elev.	Left side Depth	Center W.S. Elev.	Center Depth	Right side W.S. Elev.	Right side Depth	Comments
0 + 50	771.0	4.0	769.9	2.6	771.2	3.7	
1 + 00	771.4	5.2	769.4	3.4	768.3	2.3	
1 + 50	771.9	6.2	768.3	3.1	767.3	2.1	
2 + 00	769.9	4.7	768.8	4.4	768.0	2.8	
2 + 50	770.4	5.5	769.3	5.0	768.6	3.9	
3 + 00	770.9	6.2	769.6	4.9	768.6	4.5	
3 + 50	771.4	4.4	768.3	4.4	768.3	7.5	
4 + 00	767.0	1.3	765.1	4.4	764.4	8.3	4 + 10
4 + 50	dry	0	761.0	4.1	760.0	8.4	Dry begins
5 + 00		0	755.8	1.8	753.2	6.0	
5 + 50		0	752.7	2.6	756.9	7.57	
6 + 00		0	748.3	1.6	744.9	5.8	
6 + 50		0	745.4	2.1	743.0	8.0	
7 + 00		0	dry	0	736.5	6.2	
7 + 50		0	dry	0	734.7	8.6	
8 + 00		0	dry	0	734.2	9.1	
8 + 50		0	730.6	1.9	732.6	7.0	
9 + 00	dry	0	727.7	2.4	729.8	4.2	9 + 30
9 + 50	724.8	2.8	724.3	2.6	724.8	2.6	Dry ends
10 + 00	722.2	3.4	721.7	2.9	720.9	2.1	
10 + 50	718.6	3.7	716.8	1.9	716.5	1.3	
11 + 00	714.4	2.91	713.4	2.1	713.4	1.9	
12 + 00	694.3	2.3	693.3	1.3	690.7		

Table 9 Plant Wansley Spillway Study
Bottom Elevations
Model Scale 1:50
Discharge Scale 1:17680

Note: New slopes and superelevations as supplied by Southern Services.

Station	Left	Center	Right
0 + 50	767.0	767.0	767.0
0 + 75	766.55	765.69	764.85
1 + 00	765.95	764.38	762.45
1 + 25	765.45	763.07	760.45
1 + 50	764.70	761.76	758.65
1 + 75	763.75	760.45	757.20
2 + 00	762.60	759.14	755.80
3 + 00	757.55	753.91	750.26
4 + 00	752.50	748.67	744.72
5 + 00	747.45	743.43	739.18
6 + 00	742.40	738.19	733.64
7 + 00	737.35	732.95	728.10
7 + 25	736.10	731.64	726.35
7 + 50	734.85	730.33	726.30
7 + 75	733.30	729.02	725.50
8 + 00	731.40	727.72	725.05
8 + 25	728.85	726.41	724.85
8 + 50	725.85	725.10	724.60
8 + 60	724.58	724.58	724.58

Table 10 Water Surface Elevations
Wansley Project Spillway

Discharge: 23,100 cfs
Reservoir Elevation: 796 ft.

Station	Left Side		Center		Right Side	
	W.S. Elev.	Depth	W.S. Elev.	Depth	W.S. Elev.	Depth
0 + 00	781.8	13.7	779.5	11.2	781.9	14.0
1 + 00	778.5	12.1	776.1	12.3	771.0	8.4
2 + 00	771.3	8.7	769.7	10.8	767.1	11.3
3 + 00	767.8	10.1	764.8	11.5	762.0	11.7
4 + 00	763.9	11.8	760.0	11.6	756.3	11.6
5 + 00	756.3	8.9	753.2	9.8	751.7	12.6
6 + 00	753.7	11.4	747.3	8.9	743.0	9.3
7 + 00	746.4	8.7	741.8	8.8	739.0	11.1
8 + 00	738.1	8.5	737.7	10.3	736.8	11.6
9 + 00	729.9	8.2	731.0	9.3	729.7	8.0
10 + 00	724.4	8.2	721.7	5.5	722.9	6.7
11 + 00	718.5	7.4	718.0	6.9	717.0	5.9
12 + 00	696.2	3.4	292.9	4.1	695.9	3.1

Table 11 Water Surface Elevations
Wansley Project Spillway

Discharge: 19,150 cfs
Reservoir Elevation: 793.3 ft.

Station	Left Side W.S. Elev.	Left Side Depth	Center W.S. Elev.	Center Depth	Right Side W.S. Elev.	Right Side Depth
0 + 00	779.5	11.4	778.1	9.8	779.4	11.5
1 + 00	776.3	9.9	773.3	9.5	769.7	7.1
2 + 00	769.9	7.3	768.3	9.4	764.5	8.7
3 + 00	764.5	6.8	763.5	10.2	760.3	10.0
4 + 00	763.3	11.2	758.2	9.8	753.4	8.7
5 + 00	754.9	7.5	751.8	8.4	750.9	11.8
6 + 00	751.8	9.5	745.5	7.1	741.0	7.3
7 + 00	745.4	7.7	741.9	8.9	737.1	9.2
8 + 00	735.8	6.2	735.1	7.7	736.0	10.8
9 + 00	727.3	5.6	729.4	7.7	728.2	6.5
10 + 00	724.5	8.3	721.3	5.1	721.8	5.6
11 + 00	717.6	6.5	717.0	5.9	715.7	4.6
12 + 00	696.2	3.4	696.8	4.0	695.5	2.7

Table 12 Water Surface Elevations
Wansley Project Spillway

Discharge: 15,600 cfs
Reservoir Elevation: 790.8 feet

Station	Left Side		Center		Right Side	
	W.S. Elev.	Depth	W.S. Elev.	Depth	W.S. Elev.	Depth
0 + 00	777.5	9.4	776.8	8.5	777.1	9.2
1 + 00	770.4	4.0	771.5	7.7	768.5	5.9
2 + 00	768.4	5.8	766.5	7.6	763.8	8.0
3 + 00	762.3	4.6	761.8	8.5	759.7	9.4
4 + 00	760.3	7.2	756.4	8.0	752.3	7.6
5 + 00	753.7	6.3	750.1	6.7	748.8	9.7
6 + 00	748.7	6.4	745.5	7.1	740.9	7.2
7 + 00	744.4	7.1	739.7	6.7	735.6	7.7
8 + 00	734.8	5.2	734.2	6.8	735.5	10.3
9 + 00	725.3	3.6	729.6	7.9	727.6	5.9
10 + 00	724.3	8.1	721.0	4.8	721.1	4.9
11 + 00	716.5	5.4	715.5	4.4	715.4	4.3
12 + 00	695.5	2.7	696.3	3.5	694.6	1.8

Table 13 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 797.75 ft.
Gates - 3 Gates open
Discharge - 24,400 cfs

Station	Depth in Feet			Comments
	Left Side	Center	Right Side	
0 + 50	11.75	12.65	11.35	
1 + 00	13.30	14.15	9.15	
1 + 50	14.90	11.35	10.85	
2 + 00	10.45	13.10	12.75	
2 + 50	9.90	12.60	18.30	
3 + 00	12.20	12.85	13.50	
3 + 50	14.40	13.45	11.95	
4 + 00	13.60	13.30	13.95	
4 + 50	10.85	12.60	15.95	
5 + 00	10.80	12.85	14.15	
5 + 50	13.65	12.65	11.60	
6 + 00	13.85	12.10	11.45	
6 + 50	12.80	12.55	11.80	
7 + 00	11.10	11.50	12.40	
7 + 50	9.85	10.75	13.90	
8 + 00	10.70	11.75	12.50	
8 + 50	10.35	11.35	11.15	
9 + 00	9.90	11.25	10.50	
9 + 50	10.40	9.30	8.95	
10 + 00	8.75	7.70	7.90	
10 + 50	7.80	7.75	7.75	
11 + 00	7.75	7.00	6.90	

Table 14 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 789.5 ft.
Gates - 3 Gates open
Discharge - 14,330 cfs

Station	Depth in Feet Left Side	Center	Right Side	Comments
0 + 50	8.00	7.65	7.60	
1 + 00	7.80	7.40	5.40	
1 + 50	8.40	9.10	7.10	
2 + 00	5.70	7.10	8.50	
2 + 50	4.40	7.35	11.55	
3 + 00	4.45	8.85	10.00	
3 + 50	9.15	7.95	8.95	
4 + 00	8.35	7.80	8.20	
4 + 50	7.10	8.85	8.95	
5 + 00	6.30	6.60	9.65	
5 + 50	5.65	8.15	9.35	
6 + 00	6.35	7.60	7.45	
6 + 50	9.05	6.30	7.55	
7 + 00	8.10	6.50	7.90	
7 + 50	5.85	7.25	7.90	
8 + 00	5.45	6.75	10.25	
8 + 50	4.60	6.35	9.15	
9 + 00	4.15	7.75	6.75	
9 + 50	6.15	5.80	5.45	
10 + 00	9.25	5.20	5.15	
10 + 50	5.80	4.25	4.25	
11 + 00	5.50	4.00	3.65	

Table 15 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 788.0 ft.
Gates - 3 Gates open
Discharge - 12,550 cfs

Station	Depth in Feet Left Side	Center	Right Side	Comments
0 + 50	7.25	6.90	7.60	
1 + 00	7.05	6.65	5.15	
1 + 50	8.15	8.35	6.10	
2 + 00	5.45	5.60	8.00	
2 + 50	4.90	6.85	10.80	
3 + 00	3.95	7.85	9.50	
3 + 50	7.90	8.20	7.95	
4 + 00	7.35	7.05	7.70	
4 + 50	7.35	8.10	7.45	
5 + 00	4.80	5.85	8.65	
5 + 50	5.15	7.40	8.85	
6 + 00	5.35	7.10	7.70	
6 + 50	7.05	6.55	7.30	
7 + 00	7.60	5.75	7.15	
7 + 50	5.85	6.75	6.65	
8 + 00	4.95	6.25	8.75	
8 + 50	4.10	5.60	8.65	
9 + 00	3.65	7.25	6.25	
9 + 50	4.90	5.30	4.70	
10 + 00	8.50	4.45	4.40	
10 + 50	5.05	3.75	3.75	
11 + 00	5.25	3.50	3.90	

Table 16 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 786.6 ft.
Gates - 3 Gates open
Discharge - 10,870 cfs

Station	Depth in Feet Left Side	Depth in Feet Center	Depth in Feet Right Side	Comments
0 + 50	6.65	5.80	7.05	
1 + 00	6.20	5.80	4.60	
1 + 50	6.70	7.05	4.90	
2 + 00	4.95	6.25	7.80	
2 + 50	4.15	5.95	9.55	
3 + 00	2.95	7.35	9.35	
3 + 50	5.30	7.00	7.90	
4 + 00	6.10	6.10	7.20	
4 + 50	6.15	7.20	6.60	
5 + 00	5.30	5.90	7.35	
5 + 50	9.50	6.25	9.30	
6 + 00	9.55	6.20	7.25	
6 + 50	5.00	6.40	7.05	
7 + 00	7.40	5.60	7.10	
7 + 50	5.10	6.10	6.25	
8 + 00	4.60	6.30	7.70	
8 + 50	3.60	4.10	7.60	
9 + 00	3.25	6.70	6.20	
9 + 50	9.55	5.05	4.35	
10 + 00	6.50	4.45	3.95	
10 + 50	5.75	3.75	3.10	
11 + 00	4.75	3.10	3.30	

Table 17 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 783.5 ft.
Gates - 3 Gates open
Discharge - 7,246 cfs

Station	Depth in Feet Left Side	Center	Right Side	Comments
0 + 50	5.30	4.15	5.30	
1 + 00	4.55	4.95	3.15	
1 + 50	4.05	5.00	3.45	
2 + 00	3.45	3.95	6.35	
2 + 50	2.35	4.15	6.95	
3 + 00	1.65	5.30	7.60	
3 + 50	1.05	5.05	7.00	
4 + 00	3.75	4.75	6.05	
4 + 50	9.30	4.20	5.90	
5 + 00	8.65	5.10	4.70	
5 + 50	2.95	3.70	6.50	
6 + 00	2.90	4.40	7.00	
6 + 50	1.85	4.70	5.70	
7 + 00	2.50	4.55	6.25	
7 + 50	3.55	3.85	6.20	
8 + 00	2.75	5.00	6.35	
8 + 50	2.45	4.40	5.15	
9 + 00	2.50	4.90	4.00	
9 + 50	3.75	3.95	3.30	
10 + 00	4.95	3.20	3.31	
10 + 50	4.05	2.95	2.85	
11 + 00	3.55	2.85	2.30	

Table 18 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 781.75 ft.
Gates - 3 Gates open
Discharge - 4,990 cfs

Station	Depth in Feet			Comments
	Left Side	Center	Right Side	
0 + 50	3.50	2.90	3.60	
1 + 00	3.10	3.20	2.20	
1 + 50	2.40	4.10	2.90	
2 + 00	2.50	3.10	5.50	
2 + 50	1.70	2.60	5.30	
3 + 00	1.00	4.10	6.30	
3 + 50	0	4.00	6.20	
4 + 00	1.60	3.60	5.20	
4 + 50	2.10	3.10	4.70	
5 + 00	2.80	3.40	4.70	
5 + 50	1.90	3.40	4.60	
6 + 00	1.90	3.40	5.50	
6 + 50	.80	3.30	5.30	
7 + 00	0	3.80	5.90	
7 + 50	0	3.00	5.70	
8 + 00	1.50	4.00	5.50	
8 + 50	1.40	3.90	5.20	
9 + 00	2.90	4.00	3.30	
9 + 50	3.90	3.30	2.70	
10 + 00	4.50	3.00	2.70	
10 + 50	3.80	2.30	1.80	
11 + 00	3.30	2.80	1.70	

Table 19 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 785.0 ft.
Gates - 3 Gates open
Discharge - 8,875 cfs

Station	Depth in Feet			Comments
	Left Side	Center	Right Side	
0 + 50	5.50	5.00	5.85	
1 + 00	5.50	5.20	3.30	
1 + 50	5.30	6.15	3.90	
2 + 00	4.30	4.95	7.25	
2 + 50	3.20	5.15	8.20	
3 + 00	2.10	7.20	8.25	
3 + 50	2.00	5.75	7.35	
4 + 00	4.70	5.20	6.50	
4 + 50	5.50	5.15	6.10	
5 + 00	4.40	5.30	5.90	
5 + 50	3.70	4.45	8.25	
6 + 00	3.60	4.75	6.95	
6 + 50	3.40	5.90	6.60	
7 + 00	5.40	4.60	6.35	
7 + 50	4.70	5.00	6.40	
8 + 00	3.50	5.50	6.20	
8 + 50	3.00	5.25	6.20	
9 + 00	2.80	5.20	5.05	
9 + 50	3.80	4.35	4.45	
10 + 00	4.90	3.85	3.35	
10 + 50	5.00	3.25	2.60	
11 + 00	4.20	3.05	2.45	

Table 20 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 786.25 ft.
Gates - Center Gate Only
Discharge - 3,490 cfs

Station	Depth in Feet			Comments
	Left Side	Center	Right Side	
0 + 50	3.15	4.15	3.00	
1 + 00	4.15	1.30	3.60	
1 + 50	2.10	1.55	2.50	
2 + 00	1.20	2.60	2.05	
2 + 50	.60	1.25	6.70	
3 + 00	0	.95	5.40	
3 + 50	0	2.55	5.15	
4 + 00	1.00	1.45	4.25	
4 + 50	1.10	2.25	3.30	
5 + 00	.80	2.75	2.90	
5 + 50	0	2.05	3.80	
6 + 00	0	2.00	4.85	
6 + 50	0	1.95	4.80	
7 + 00	0	1.00	4.65	
7 + 50	0	1.25	4.75	
8 + 00	0	2.30	4.85	
8 + 50	0	2.10	3.15	
9 + 00	2.15	2.20	1.80	
9 + 50	2.20	1.40	1.35	
10 + 00	2.45	.95	.80	
10 + 50	2.10	.10	.05	
11 + 00	1.95	1.20	1.05	

Table 21 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 788.0 ft.
Gates - Center Gate Only
Discharge - 4,065 cfs

Station	Depth in Feet			Comments
	Left Side	Center	Right Side	
0 + 50	4.00	3.40	3.45	
1 + 00	4.85	1.45	4.25	
1 + 50	2.65	1.55	2.70	
2 + 00	1.35	2.65	1.90	
2 + 50	.85	2.20	1.85	
3 + 00	0	1.55	5.25	
3 + 50	0	2.10	4.60	
4 + 00	1.05	2.15	4.45	
4 + 50	1.35	1.95	3.80	
5 + 00	1.05	2.25	3.25	
5 + 50	.90	1.15	3.60	
6 + 00	0	2.30	4.35	
6 + 50	0	1.70	4.75	
7 + 00	0	2.25	4.85	
7 + 50	0	6.75	5.15	
8 + 00	0	2.95	4.50	
8 + 50	.0	2.30	3.65	
9 + 00	2.15	2.85	2.10	
9 + 50	2.60	1.90	1.15	
10 + 00	3.25	1.60	1.55	
10 + 50	2.55	1.35	.95	
11 + 00	2.25	1.25	.90	

Table 22 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 788.75 ft.
Gates - Center Gate Only
Discharge - 4,440 cfs

Station	Depth in Feet Left Side	Center	Right Side	Comments
0 + 50	5.25	3.40	4.25	
1 + 00	5.55	1.65	5.15	
1 + 50	2.65	3.10	3.10	
2 + 00	1.70	3.35	2.25	
2 + 50	.90	3.35	8.05	
3 + 00	0	2.60	5.25	
3 + 50	0	4.20	5.20	
4 + 00	1.10	2.80	5.45	
4 + 50	1.35	3.10	4.20	
5 + 00	1.80	3.10	3.65	
5 + 50	1.40	3.40	4.10	
6 + 00	1.35	3.35	4.70	
6 + 50	0	2.80	5.30	
7 + 00	0	2.75	4.99	
7 + 50	0	3.00	6.15	
8 + 00	0	3.25	5.00	
8 + 50	.85	3.10	4.40	
9 + 00	2.65	3.75	3.65	
9 + 50	5.10	2.55	2.20	
10 + 00	3.70	1.95	1.65	
10 + 50	3.05	1.75	1.25	
11 + 00	2.50	2.75	1.65	

Table 23 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 783.5 ft.
Gates - Center Gate Only
Discharge - 2,500 cfs

Station	Depth in Feet Left Side	Center	Right Side	Comments
0 + 50	1.95	3.35	1.95	
1 + 00	2.50	1.15	2.25	
1 + 50	1.50	2.10	2.20	
2 + 00	.85	1.20	2.20	
2 + 50	0	.75	5.15	
3 + 00	0	0	4.80	
3 + 50	0	1.45	4.75	
4 + 00	0	1.55	3.05	
4 + 50	0	1.70	7.20	
5 + 00	0	1.10	3.95	
5 + 50	0	.80	4.10	
6 + 00	0	1.40	4.10	
6 + 50	0	.85	4.00	
7 + 00	0	1.00	3.50	
7 + 50	0	1.00	3.40	
8 + 00	0	2.10	4.25	
8 + 50	0	1.85	3.35	
9 + 00	.70	1.90	3.25	
9 + 50	6.90	1.30	1.20	
10 + 00	2.10	1.05	1.75	
10 + 50	1.60	1.15	.55	
11 + 00	1.25	1.05	.80	

Table 24 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 796.4 ft.
Gates - 3 Gates open
Discharge - 22,700 cfs

Station	Depth in Feet					
	Left Side		Center		Right Side	
	Channel Bottom	Water Surface	Channel Bottom	Water Surface	Channel Bottom	Water Surface
0 + 50	767.3	(778.3)	766.6	(777.1)	767.2	(777.7)
1 + 00	766.5	(778.5)	763.9	(775.6)	762.8	(771.6)
1 + 50	764.6	(777.1)	761.4	(773.4)	758.4	(768.3)
2 + 00	762.6	(772.4)	758.9	(770.5)	755.8	(768.1)
2 + 50	760.1	(769.1)	756.1	(767.7)	752.4	(771.0)
3 + 00	757.6	(767.9)	753.9	(765.9)	750.3	(762.9)
3 + 50	754.9	(768.6)	751.1	(763.6)	747.3	(758.9)
4 + 00	751.9	(764.7)	748.7	(760.9)	744.8	(756.4)
4 + 50	749.7	(760.0)	745.9	(757.6)	741.8	(755.9)
5 + 00	749.2	(759.4)	743.4	(754.3)	739.4	(752.9)
5 + 50	744.6	(756.4)	740.6	(751.6)	736.4	(747.2)
6 + 00	741.7	(754.9)	737.9	(748.1)	733.8	(743.3)
6 + 50	739.5	(751.4)	735.7	(746.7)	730.7	(741.0)
7 + 00	737.2	(747.1)	733.3	(742.8)	728.4	(739.3)
7 + 50	734.4	(742.9)	730.5	(740.2)	726.4	(739.4)
8 + 00	729.8	(739.2)	727.3	(738.2)	725.3	(737.5)
8 + 50	724.7	(733.0)	724.4	(733.9)	724.4	(734.4)
9 + 00	721.4	(730.0)	722.0	(731.7)	721.8	(730.4)
9 + 50	718.9	(729.2)	719.0	(726.9)	720.0	(727.4)
10 + 00	716.3	(724.5)	716.3	(722.9)	716.4	(723.0)
10 + 50	714.0	(721.1)	714.3	(721.4)	714.8	(720.7)
11 + 00	711.8	(719.2)	711.8	(718.6)	711.9	(717.6)

Table 25 Water Surface Elevations
Wansley Project Spillway

Reservoir Elevation - 800.0 feet
Gates - 3 Gates open
Discharge - 27,900 cfs

Station	Depth of Flow Left Side	Depth of Flow Right Side
0 + 50	12.9	13.6
1 + 00	15.0	10.2
1 + 50	15.0	16.4
2 + 00	12.2	13.3
2 + 50	11.3	16.2
3 + 00	13.4	14.2
3 + 50	15.4	12.9
4 + 00	14.5	14.6
4 + 50	12.2	16.8
5 + 00	10.4	14.8
5 + 50	14.2	12.2
6 + 00	14.9	11.4
6 + 50	12.7	12.2
7 + 00	11.6	12.6
7 + 50	10.8	14.8
8 + 00	11.6	12.7
8 + 50	11.3	11.2
9 + 00	11.5	10.4
9 + 50	11.0	8.8
10 + 00	9.5	8.8
10 + 50	7.0	8.2
11 + 00	6.2	7.9

Table 26 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	16.5
2	3.8
3	9.3
4	14.8
5	2.7
6	1.1
7	10.3
8	4.3
9	0
10	8.1
11	4.3
12	-1.3
13	7.4
14	7.7
15	-1.1

Alternate A

Reservoir Elevation - 786 feet
Gates - 3 Gates open
Discharge - 10,000 cfs
Tailwater Elevation - 688 feet

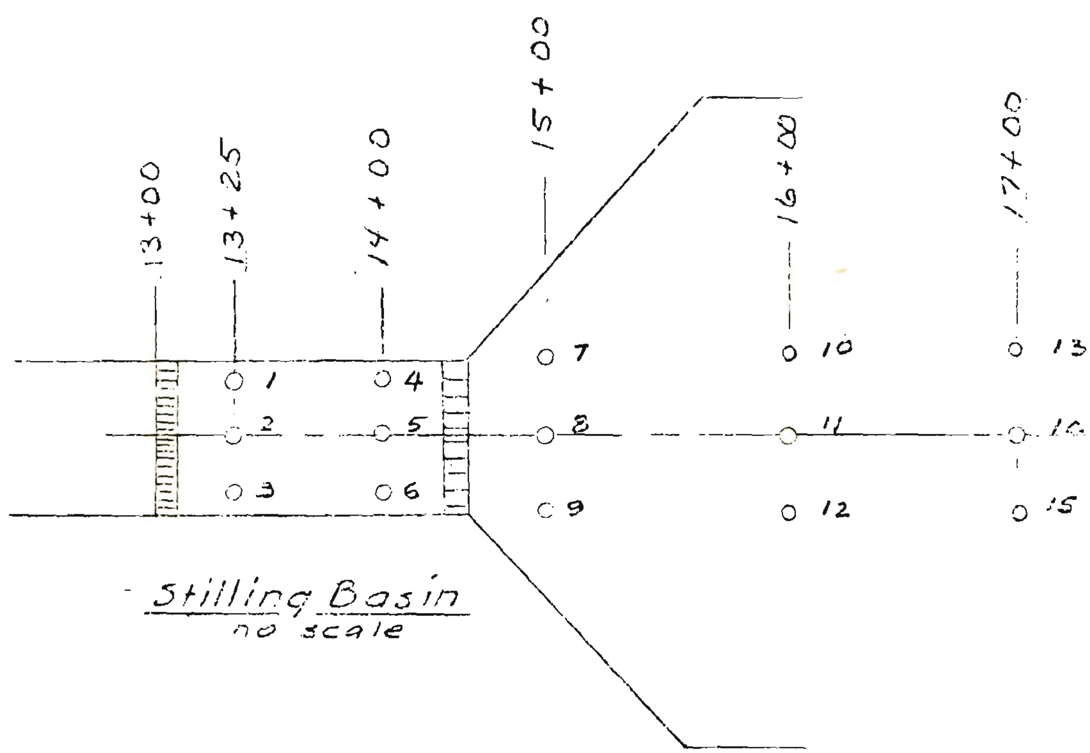


Table 27 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	12.2
2	11.1
3	12.2
4	12.2
5	2.8
6	5.7
7	7.6
8	3.3
9	0.6
10	6.7
11	3.5
12	-0.6
13	6.5
14	6.8
15	-1.1

Alternate A

Reservoir Elevation - 788 feet
Gates - 3 Gates open
Discharge - 12,000 cfs
Tailwater Elevation - 690 feet

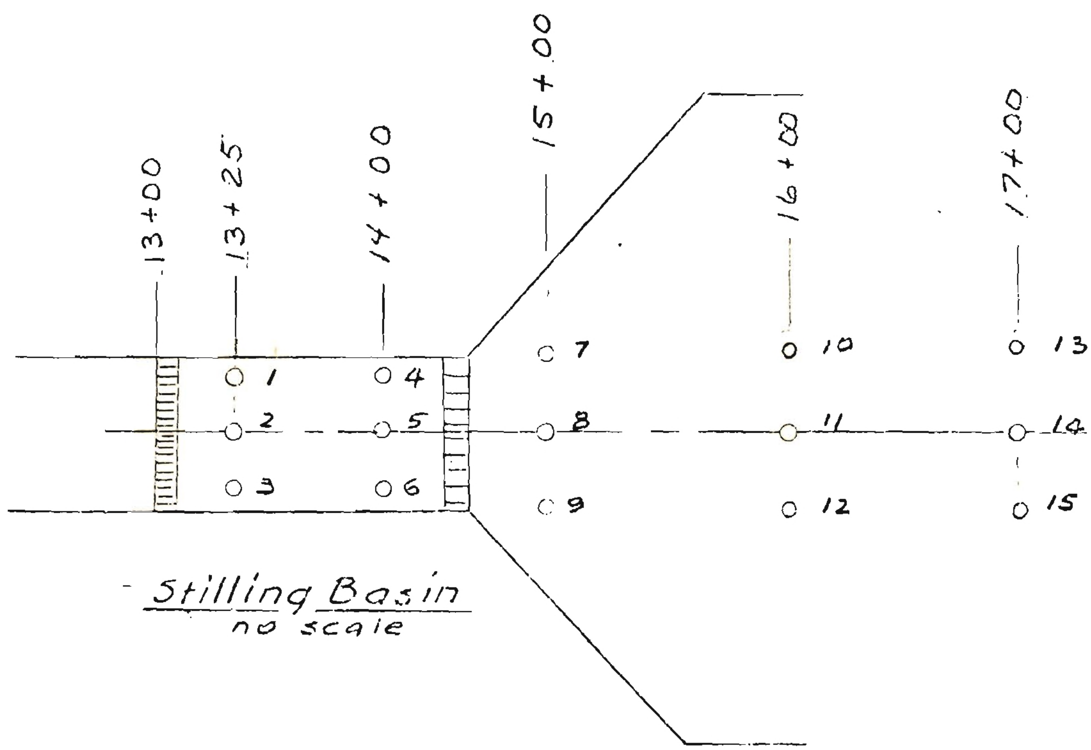
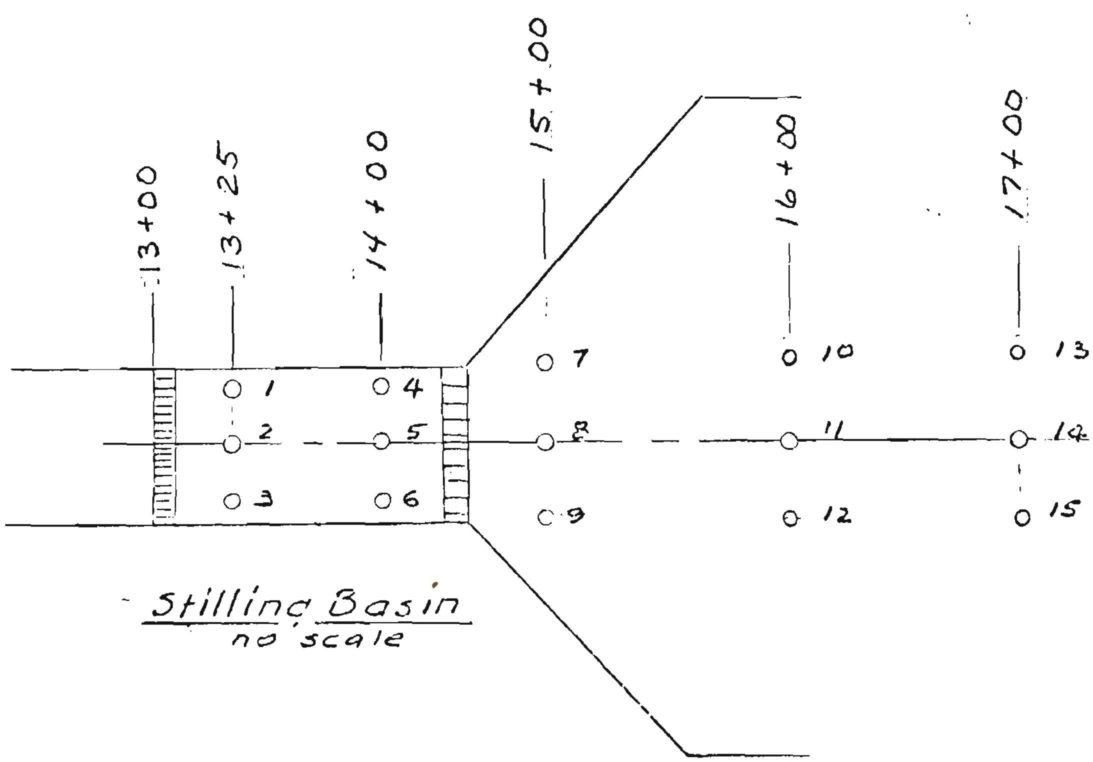


Table 28 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	13.2
2	11.1
3	13.2
4	10.5
5	3.1
6	5.3
7	7.0
8	4.7
9	0.9
10	4.5
11	4.7
12	0.8
13	4.5
14	4.0
15	1.9

Alternate A

Reservoir Elevation - 790 feet
Gates - All open
Discharge - 14,300 cfs
Tailwater Elevation 698 feet



Stilling Basin
no scale

Table 29 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	13.5
2	10.6
3	9.1
4	5.7
5	4.0
6	4.5
7	2.6
8	3.5
9	3.1
10	2.3
11	3.0
12	1.9
13	2.8
14	2.6
15	1.8

Alternate B

Reservoir Elevation - 786 feet
Gates - All open
Discharge - 10,000 cfs
Tailwater Elevation - 688 feet

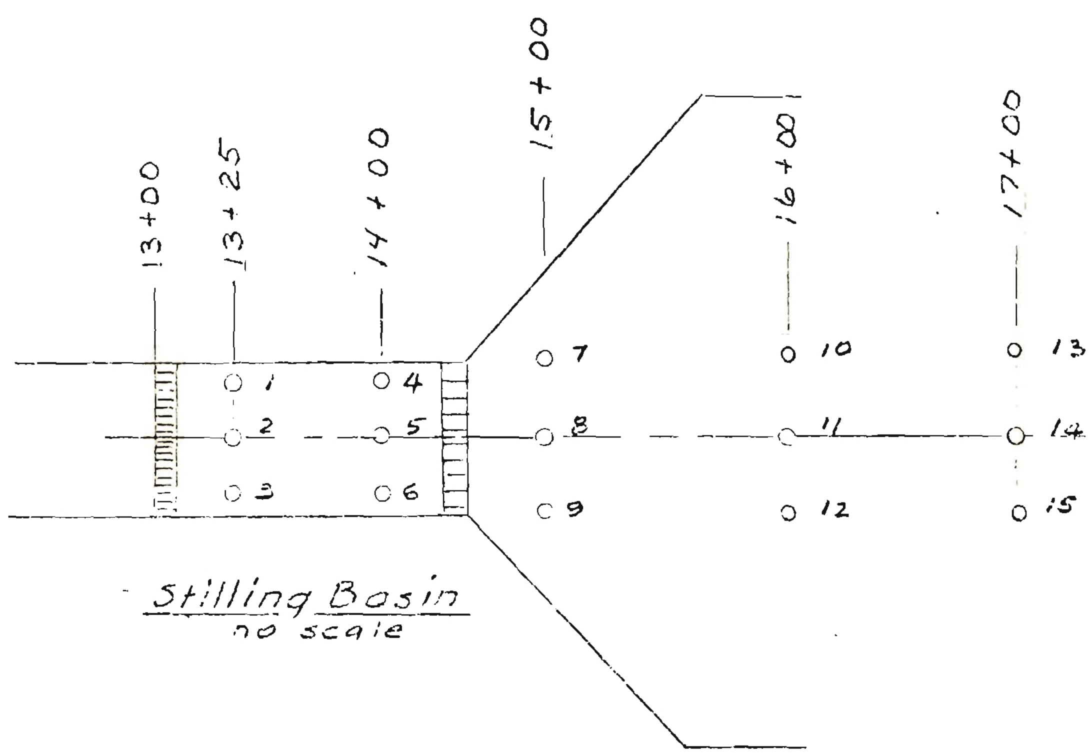


Table 30 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	11.3
2	11.5
3	12.8
4	7.0
5	5.7
6	9.8
7	3.5
8	4.0
9	3.1
10	5.2
11	3.8
12	.4
13	4.0
14	3.0
15	2.5

Alternate B

Reservoir Elevation - 788 feet
Gates - All open
Discharge - 12,000 cfs
Tailwater Elevation - 690 feet

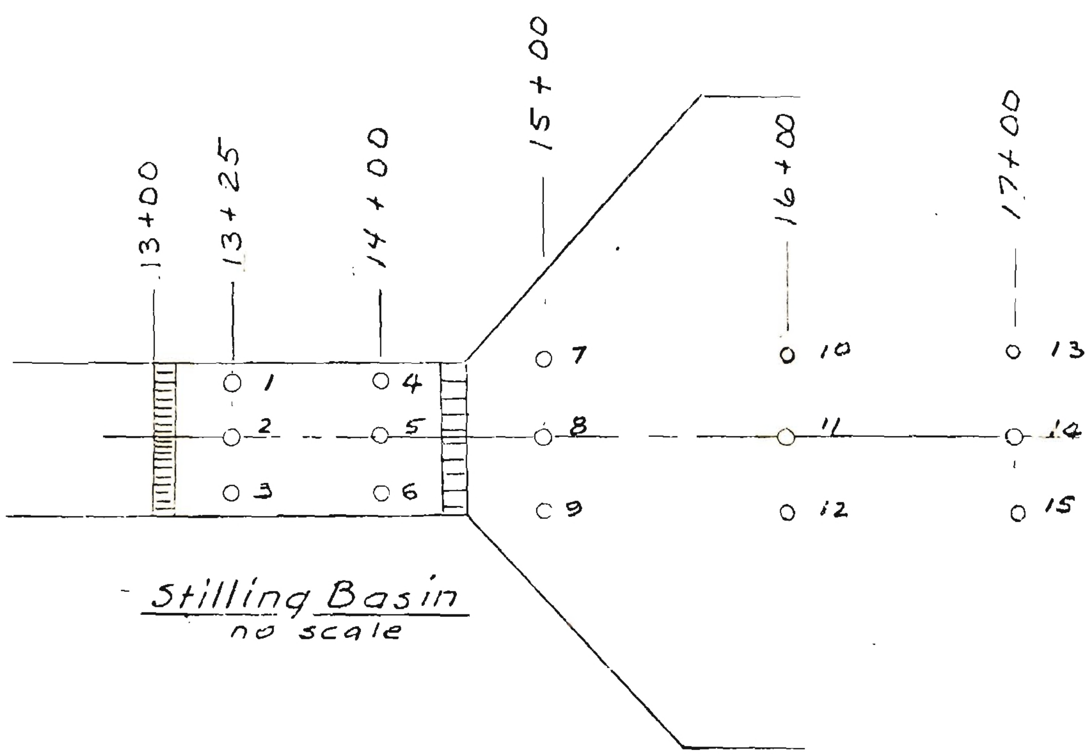


Table 31 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	-6.7
2	15.0
3	13.5
4	-9.4
5	18.6
6	10.5
7	5.5
8	4.0
9	1.3
10	6.9
11	3.3
12	-1.1
13	7.4
14	2.6
15	.9

Alternate B

Reservoir Elevation - 790 feet
Gates - All open
Discharge - 14,500 cfs
Tailwater Elevation - 698 feet

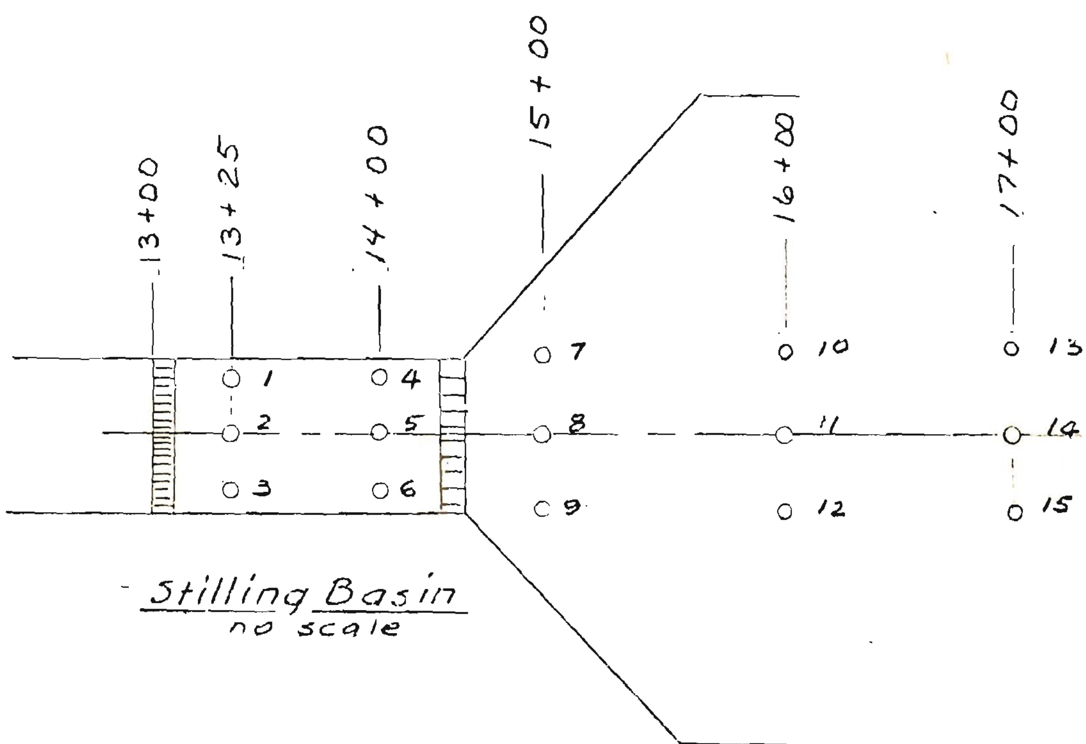


Table 32 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	-8.8
2	19.4
3	7.9
4	-7.6
5	7.6
6	3.5
7	5.9
8	2.6
9	1.6
10	4.7
11	1.8
12	0.9
13	5.2
14	1.4
15	0

Alternate B

Reservoir Elevation - 792 feet
Gates - 3 Gates open
Discharge - 17,500 cfs
Tailwater Elevation - 706 feet

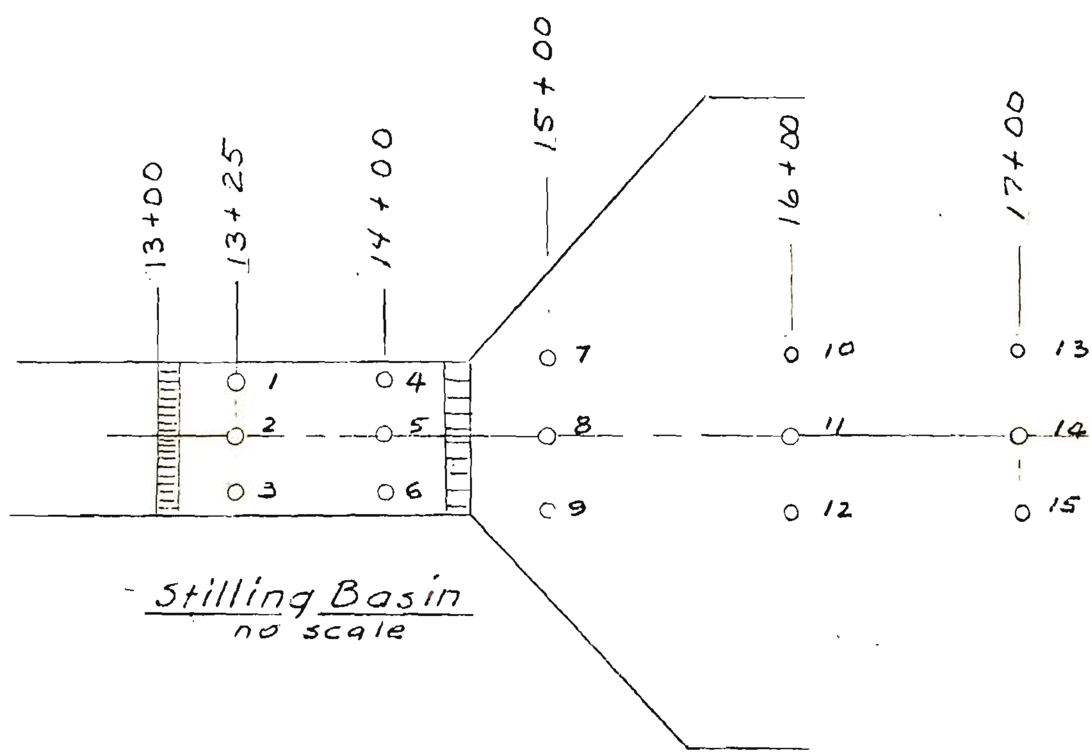


Table 33 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	-8.8
2	14.4
3	7.6
4	5.3
5	10.1
6	4.0
7	5.2
8	3.3
9	1.8
10	3.5
11	1.9
12	1.6
13	2.6
14	2.3
15	1.4

Alternate B

Reservoir Elevation - 794 feet
Gates - All open
Discharge - 20,000 cfs
Tailwater Elevation - 715 feet

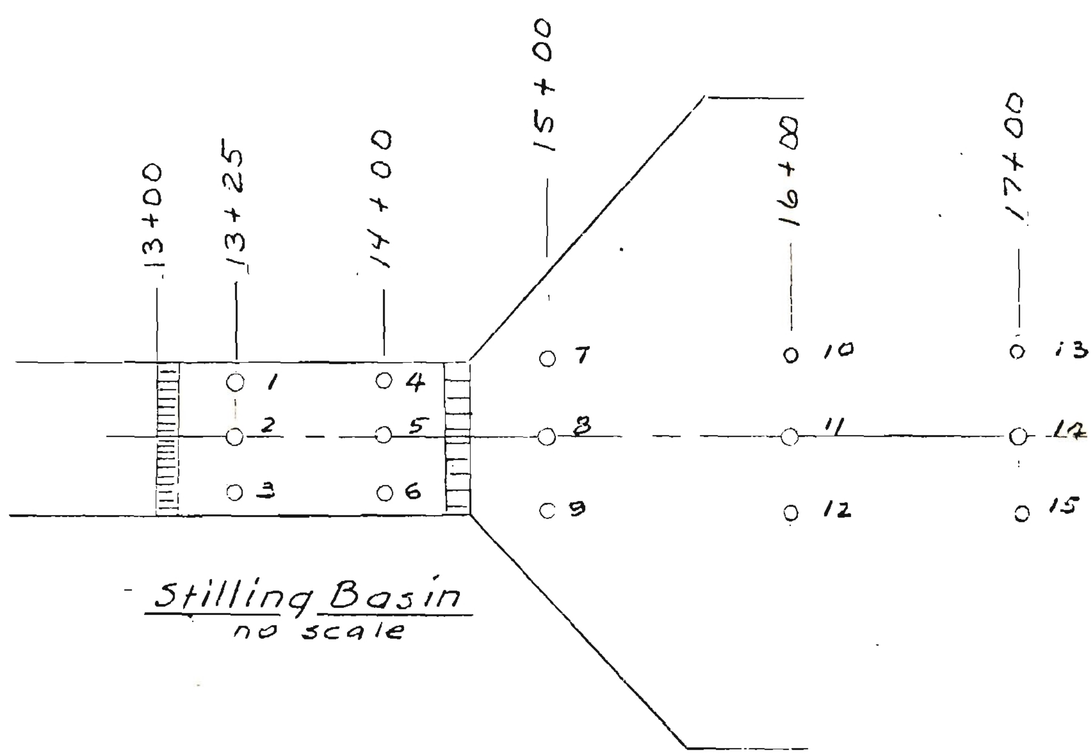


Table 34 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	±5.3
2	10.7
3	6.0
4	3.8
5	6.7
6	4.7
7	4.2
8	4.3
9	4.2
10	2.8
11	2.5
12	2.6
13	2.3
14	2.6
15	1.8

Alternate B

Reservoir Elevation - 796 feet
Gates - All open
Discharge - 22,400 cfs
Tailwater Elevation - 724 feet

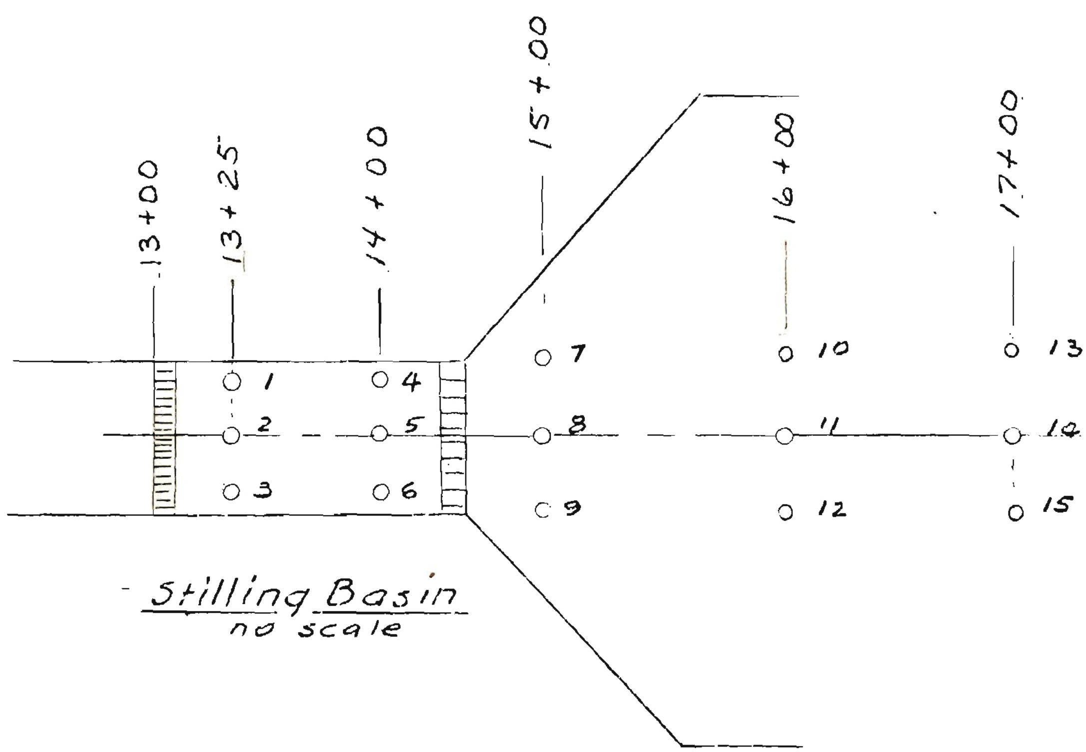


Table 35 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	9.8
2	11.9
3	10.5
4	11.0
5	4.8
6	2.1
7	7.7
8	6.9
9	1.4
10	5.9
11	5.5
12	0.9
13	5.5
14	4.8
15	1.1

Alternate C

Reservoir Elevation - 786 feet
Gates - All open
Discharge - 10,000 cfs
Tailwater Elevation 688 feet

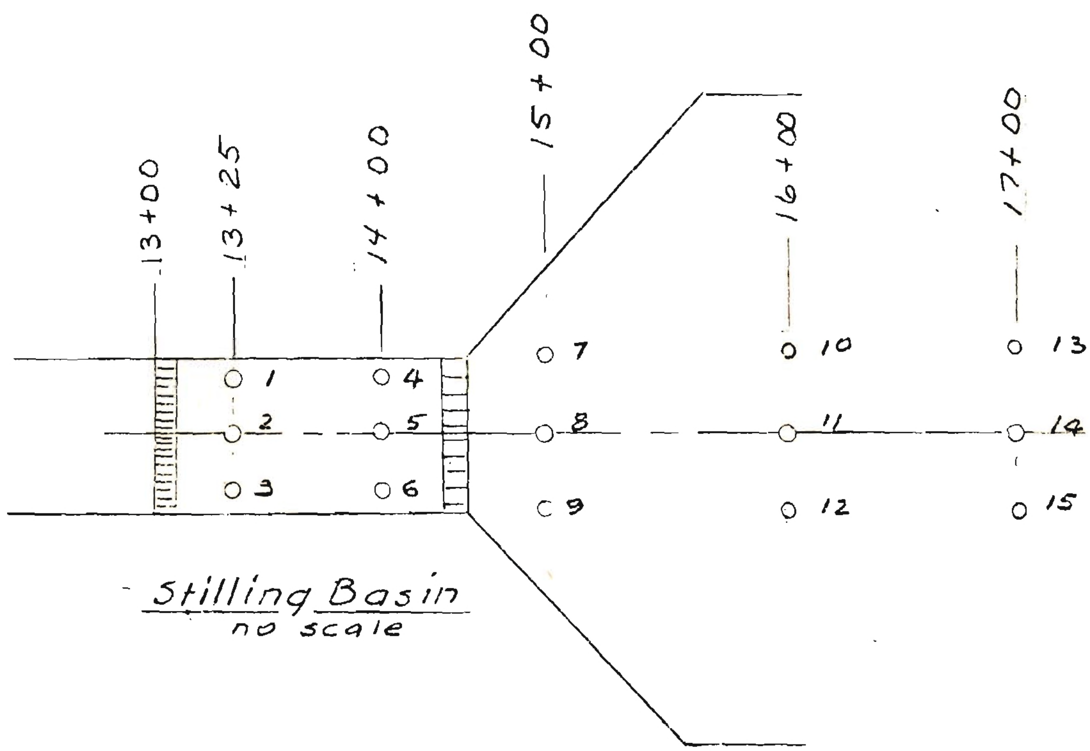


Table 36 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1*	
2*	
3*	
4	18.7
5	14.1
6	22.1
7	5.5
8	4.5
9	4.5
10	3.3
11	4.5
12	2.8
13	4.0
14	4.0
15	2.5

Alternate C

Reservoir Elevation - 788 feet
Gates - All open
Discharge - 12,000 cfs
Tailwater Elevation - 690 feet

*Jump did not form until after positions 1, 2 and 3.

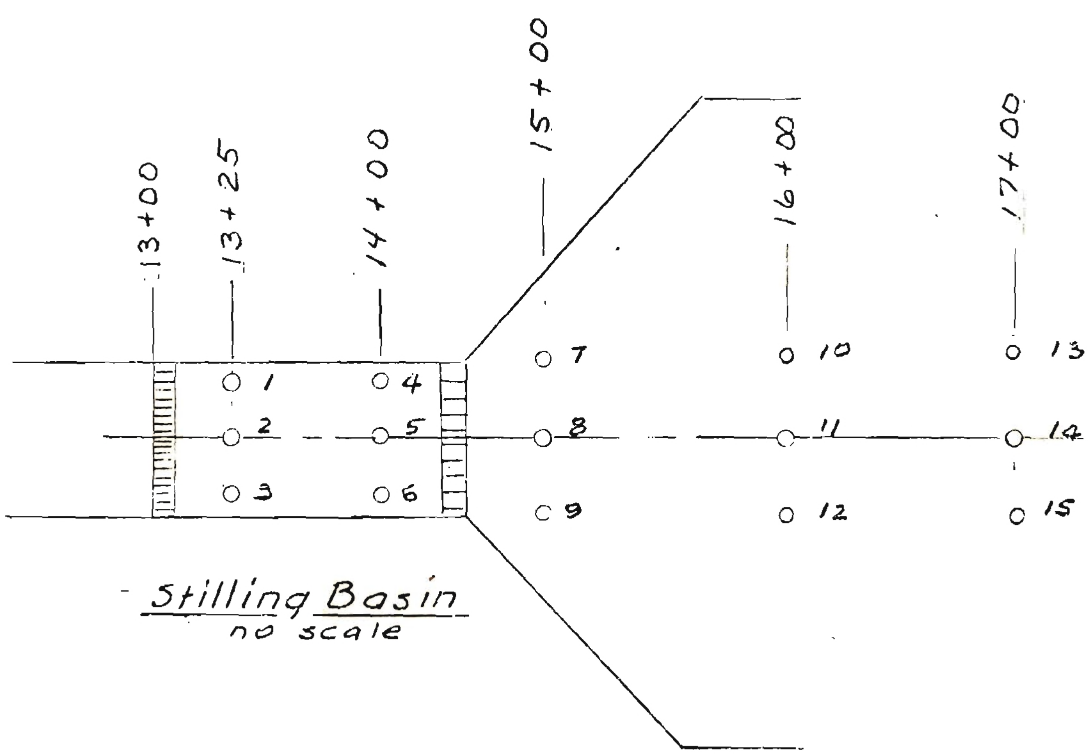


Table 37 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	-13.2
2	10.3
3	12.0
4	9.6
5	5.3
6	7.6
7	7.0
8	4.3
9	3.1
10	5.0
11	3.5
12	1.8
13	4.7
14	3.6
15	1.8

Alternate C

Reservoir Elevation - 790 feet
Gates - All open
Discharge - 14,500 cfs
Tailwater Elevation - 698 feet

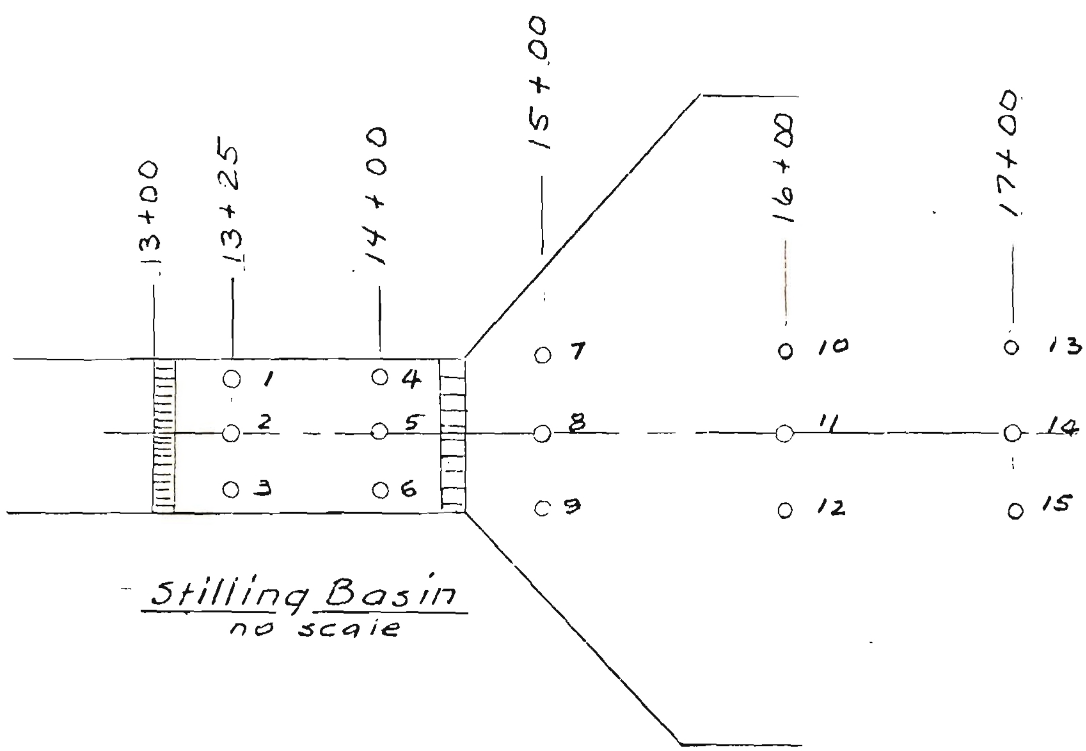


Table 38 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	9.9
2	11.6
3	9.3
4	5.7
5	6.5
6	7.2
7	4.3
8	4.0
9	3.6
10	3.5
11	3.8
12	2.3
13	2.8
14	3.1
15	1.9

Alternate C

Reservoir Elevation - 792 feet
Gates - All open
Discharge - 17,500 cfs
Tailwater Elevation - 706 feet

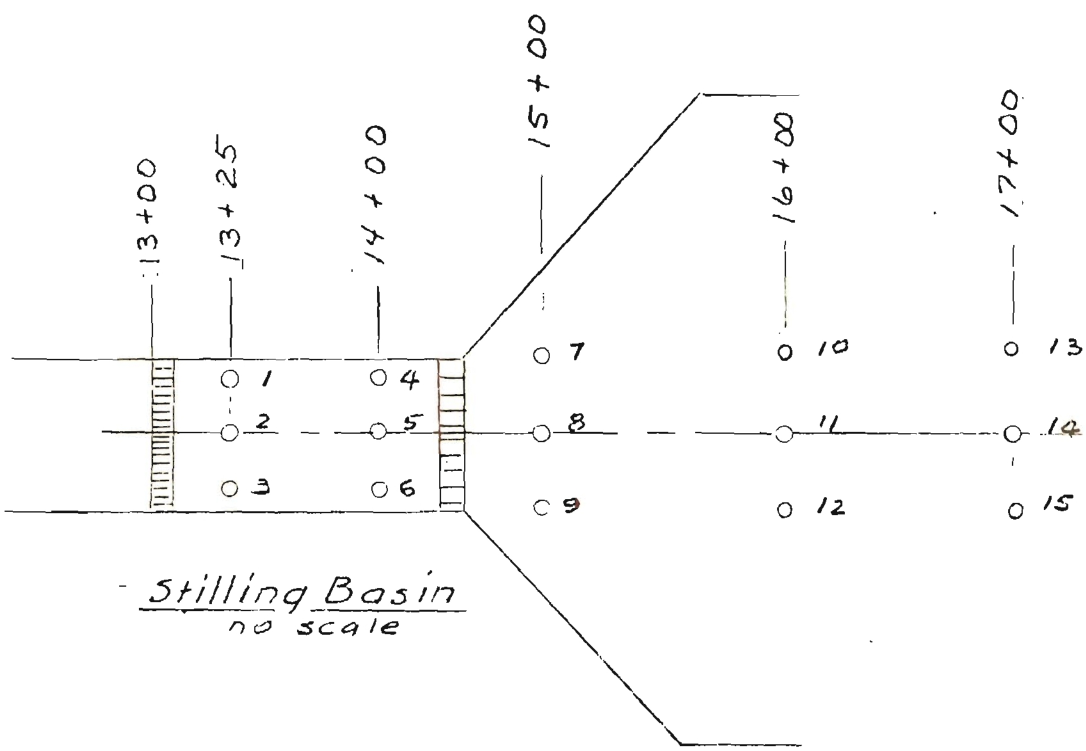


Table 39 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	8.1
2	10.5
3	9.6
4	4.5
5	5.9
6	7.0
7	4.0
8	4.2
9	3.3
10	3.1
11	3.0
12	2.1
13	2.6
14	2.8
15	1.8

Alternate C

Reservoir Elevation - 794 feet
Gates - All open
Discharge - 20,000 cfs
Tailwater Elevation - 715 feet

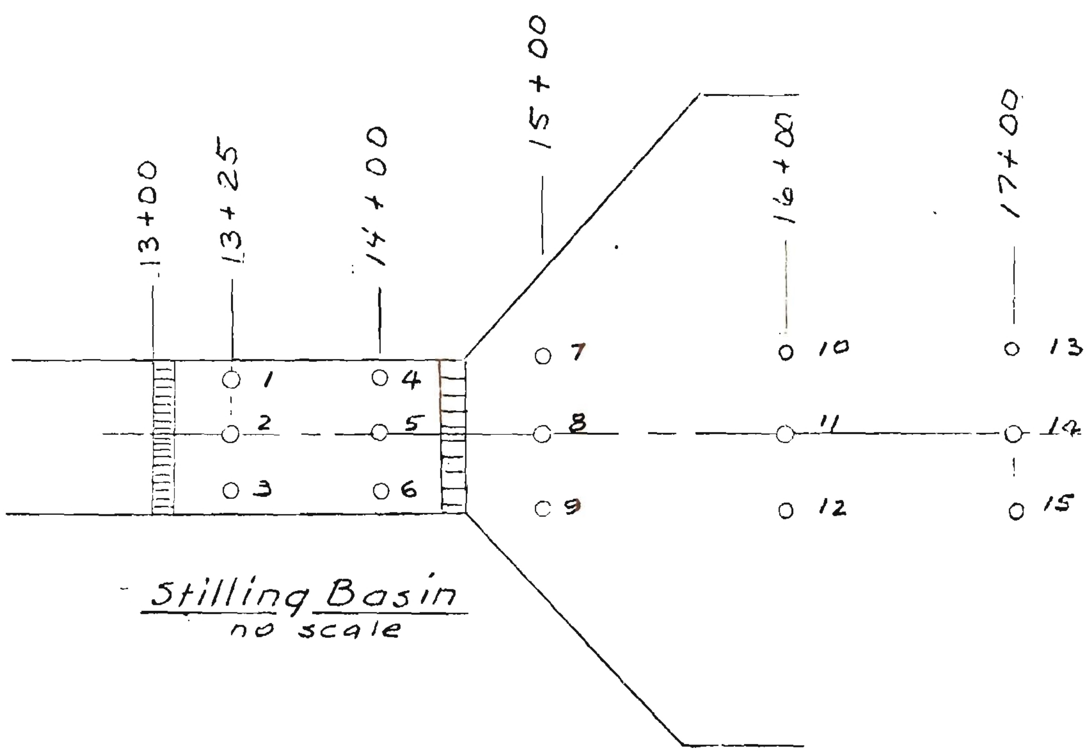


Table 40 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	5.5
2	7.9
3	7.2
4	7.2
5	6.0
6	5.3
7	4.3
8	5.0
9	4.7
10	2.6
11	4.0
12	2.8
13	2.3
14	1.9
15	1.4

Alternate C

Reservoir Elevation - 796 feet
Gates - All open
Discharge - 22,500 cfs
Tailwater Elevation - 724 feet

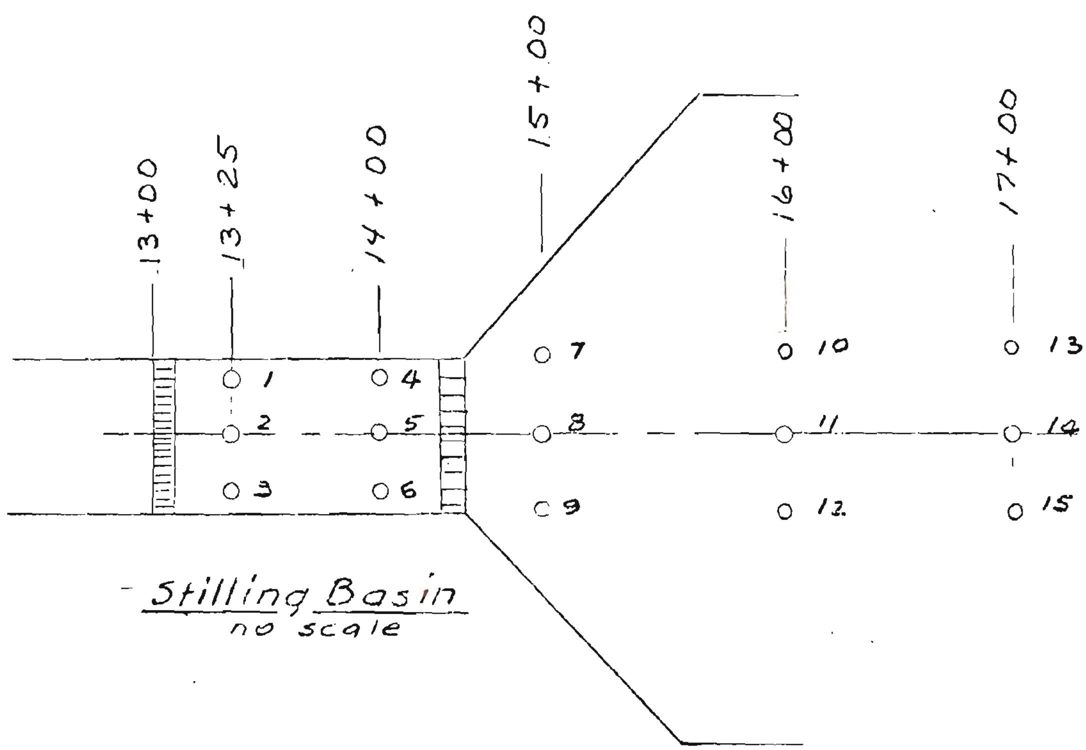


Table 41 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	7.2
2	4.2
3	0.4
4	6.5
5	4.2
6	1.9
7	1.4
8	3.6
9	2.1
10	1.1
11	2.6
12	2.6
13	1.1
14	2.5
15	1.1

Alternate C

Reservoir Elevation - 784 feet
Gates - Middle gate open
Discharge - 2600 cfs
Tailwater Elevation - 682 feet

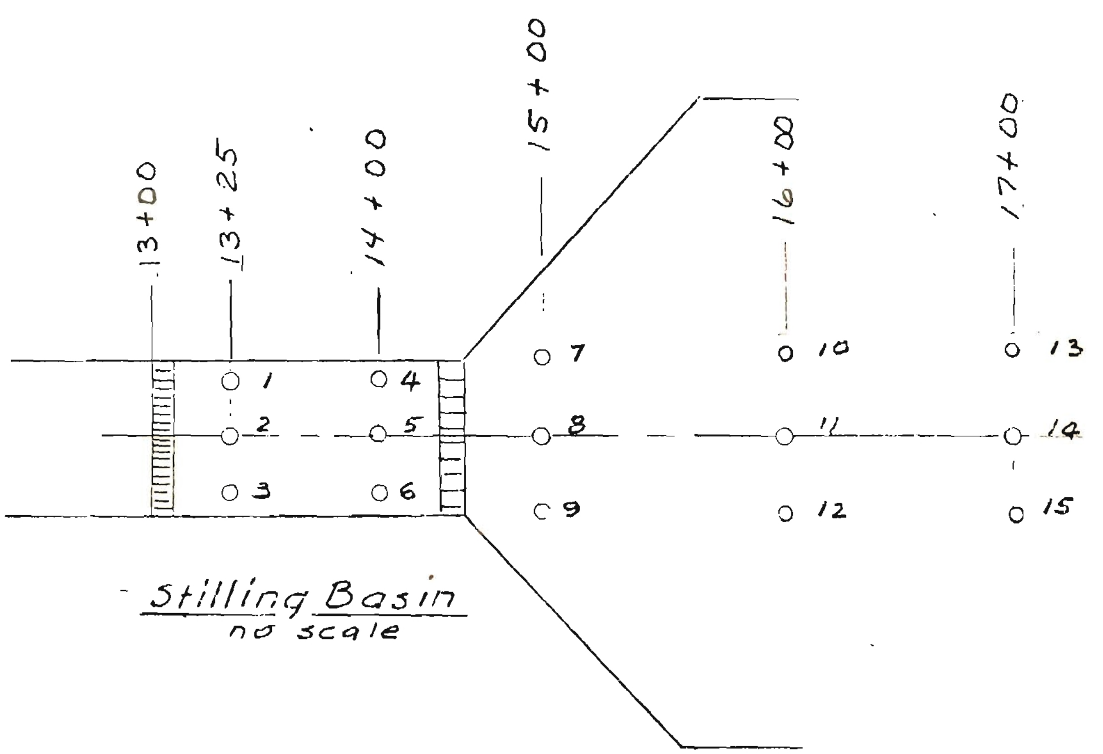


Table 42 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	7.0
2	6.4
3	0.8
4	7.4
5	7.2
6	0.4
7	3.5
8	2.8
9	3.0
10	3.1
11	3.0
12	2.8
13	3.0
14	3.0
15	2.1

Alternate C

Reservoir Elevation - 788 feet
Gates - Middle gate open
Discharge - 4100 cfs
Tailwater Elevation - 283.5 feet

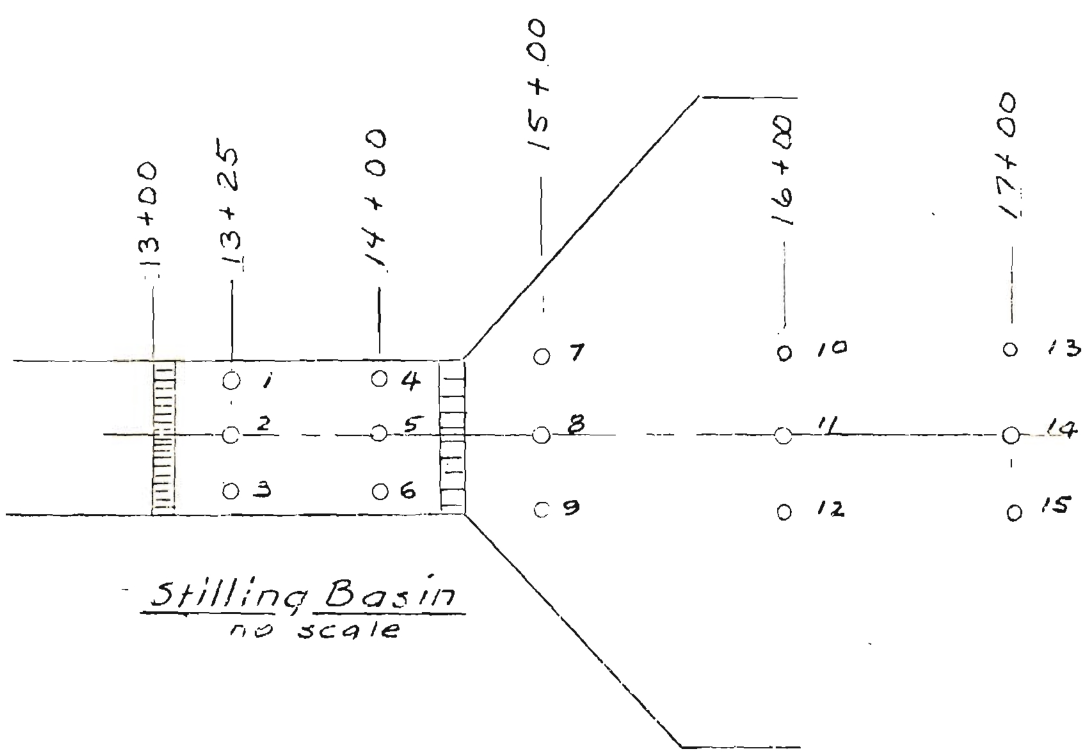


Table 43 Wansley Project Spillway
Hydraulic Model Tests
Velocity Distributions in Dissipator Area

Position	Velocity, fps
1	5.5
2	5.7
3	0.6
4	7.7
5	5.2
6	1.9
7	1.8
8	4.2
9	2.6
10	1.6
11	3.5
12	3.1
13	1.6
14	2.8
15	2.3

Alternate C

Reservoir Elevation - 786 feet
Gates - Middle gate open
Discharge - 3280 cfs
Tailwater Elevation - 283 feet