THE DALLES SPILLWAY FLOW DEFLECTORS

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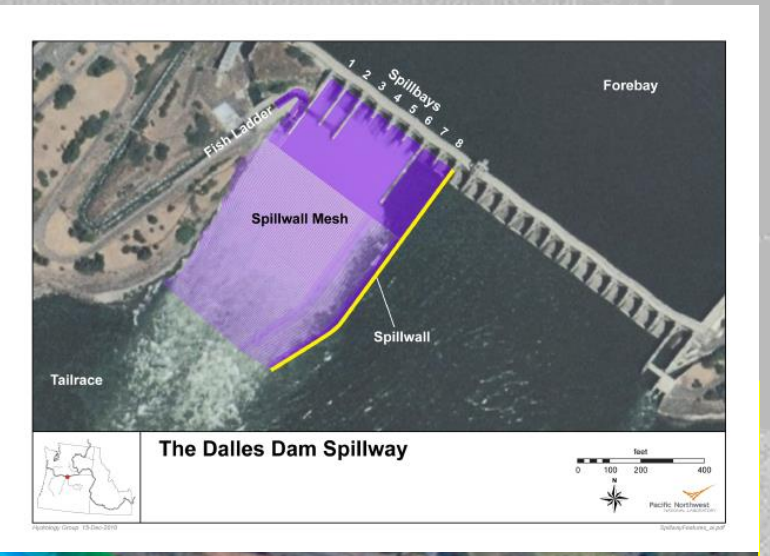

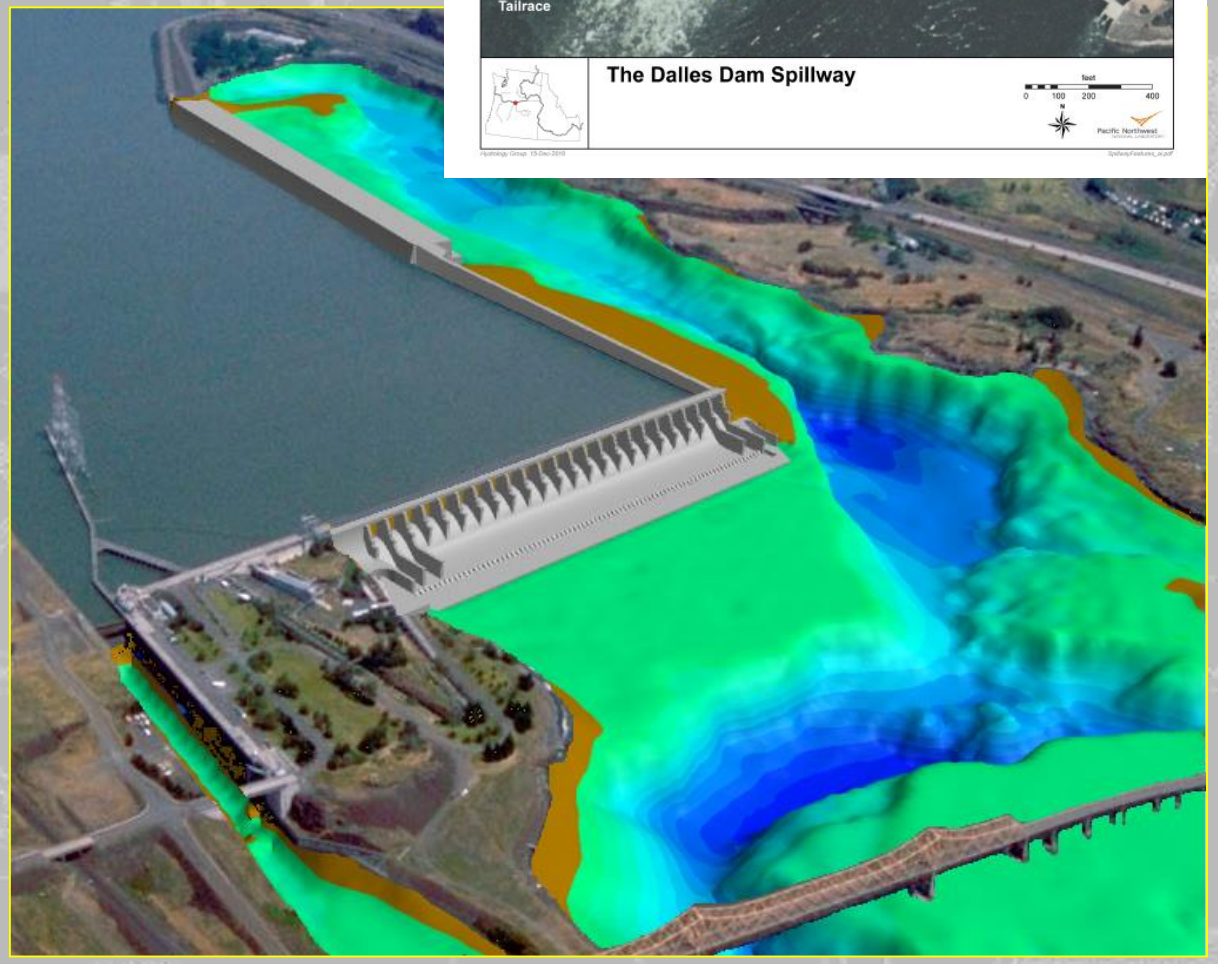

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AGENDA

– History
– Model Studies results
– Comparisons between JDA, TDA and BON

HISTORY

– Flow Deflectors for TDA were evaluated in the early 90s and again in 2000-2002
– Flow Deflectors were eliminated as a potential solution for TDA in 2002

MODEL STUDIES

Deflectors were tried at Elevation 68, 70 and 73

Summary of results for Elevation 68

– A narrower range of skimming occurs at this elevation of deflector.

Summary of results for Elevation 70

– This deflector could not be recommended as optimal or even improved over the same deflector shape at elevation 73. The Deflector at elevation 73 demonstrated a wider range of acceptable hydraulic performance.

MODEL STUDIES

Summary of results for Elevation 73

– Air was transported to greater distance downstream with deflectors than without the deflector.

Ideal Deflector Elevation Ranges-

Discharge	Submergence	Average TW	Ideal Deflector Elevation
2,600 cfs/bay	2-7	76.8	74.8-69.8
3,200 cfs/bay	3-8	77.0	64.0-69.0
5,000 cfs/bay	7-11	77.5	70.5-66.5
6,400 cfs/bay	10-13	78.3	68.5-63.5
9,000 cfs/bay	16-18	79.0	64.0-61.0

– NOTE This Was Based on Adult Spill Pattern but current pattern has spill per bay between 4500 cfs and 21,000 cfs. TW still ranges from 74 to 85 during spill season.

PHOTOGRAPHS TAKEN FROM MODEL STUDIES FOLLOW

When looking at them remember that there were no spill walls and either the Old Juvenile Pattern or the Old Adult Pattern were being considered. But first what we want to see - JDA:

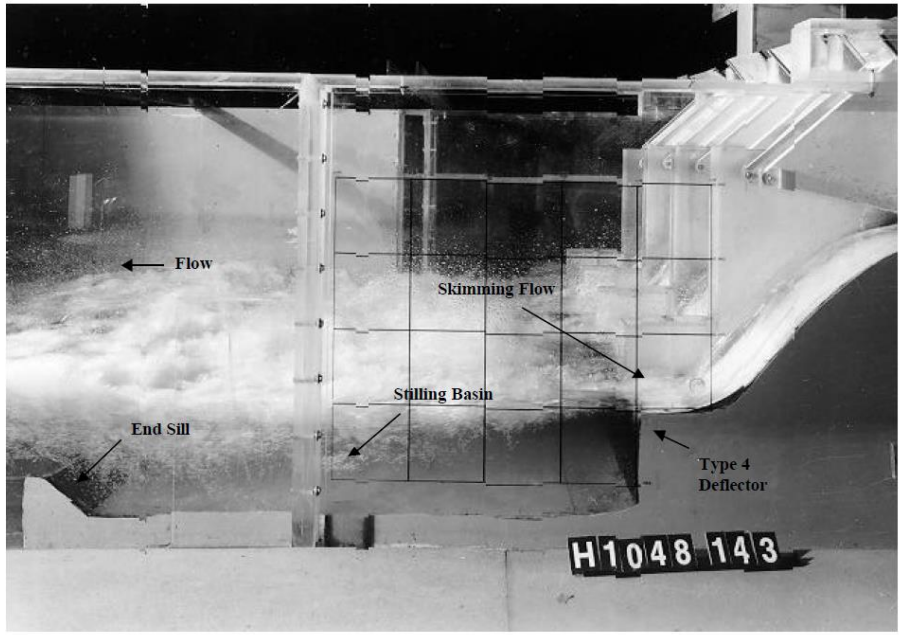
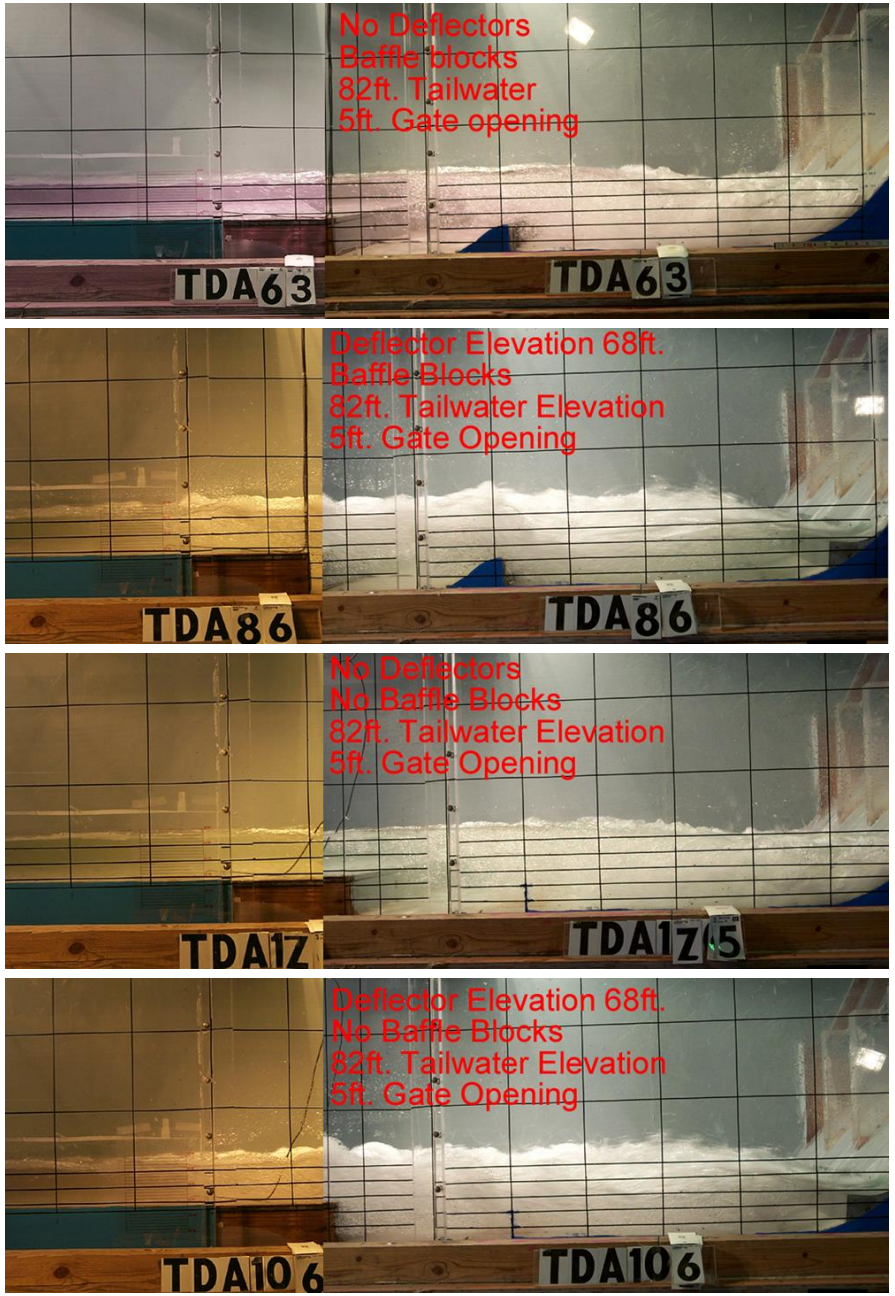


Figure 7a. Type 4 Deflector, Discharge 9,000 cfs/bay, Pool El 268.0, Tailwater el 159.0

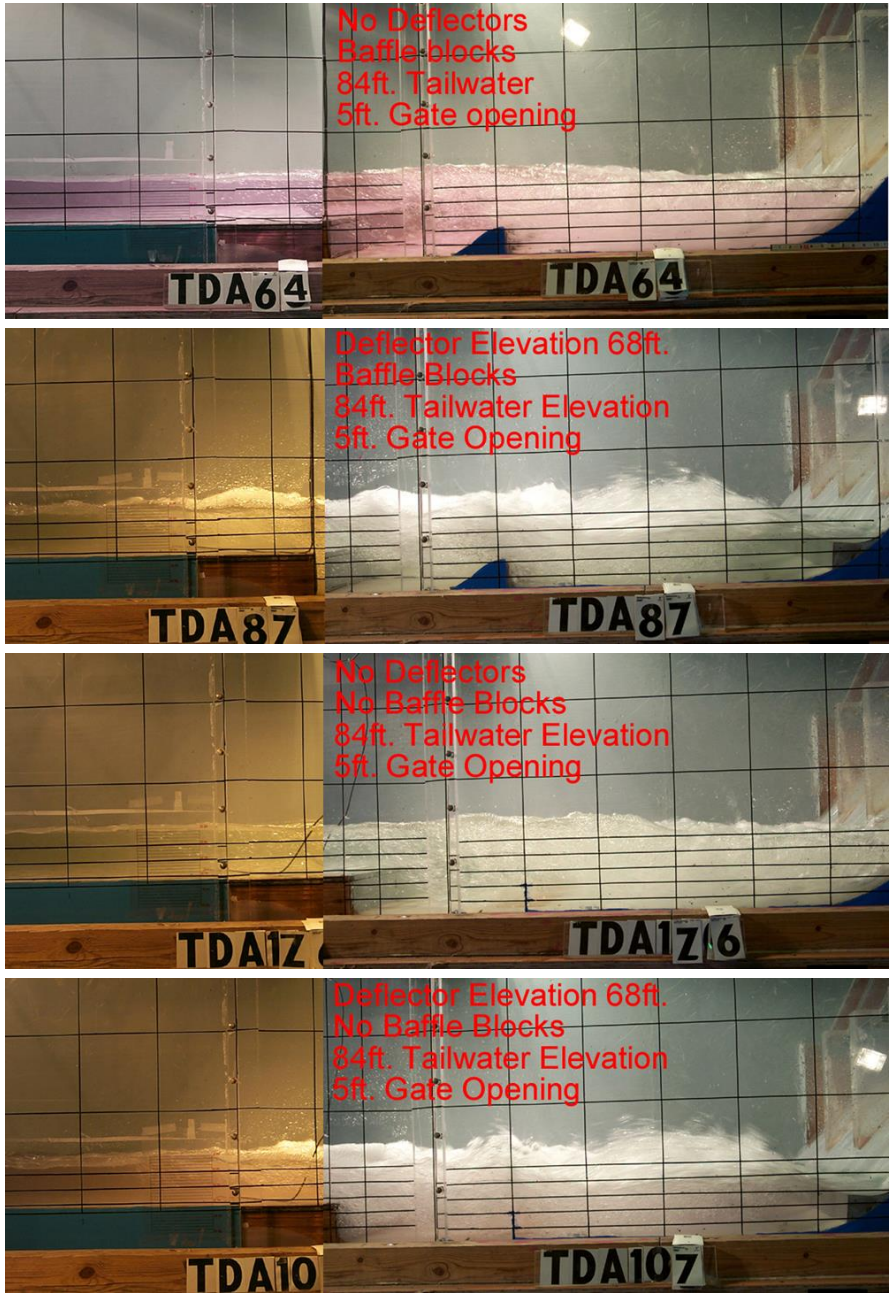
78ft. Tailwater Elevation, 5ft. Gate Opening

80ft. Tailwater Elevation, 5ft. Gate Opening

82ft. Tailwater Elevation, 5ft. Gate Opening

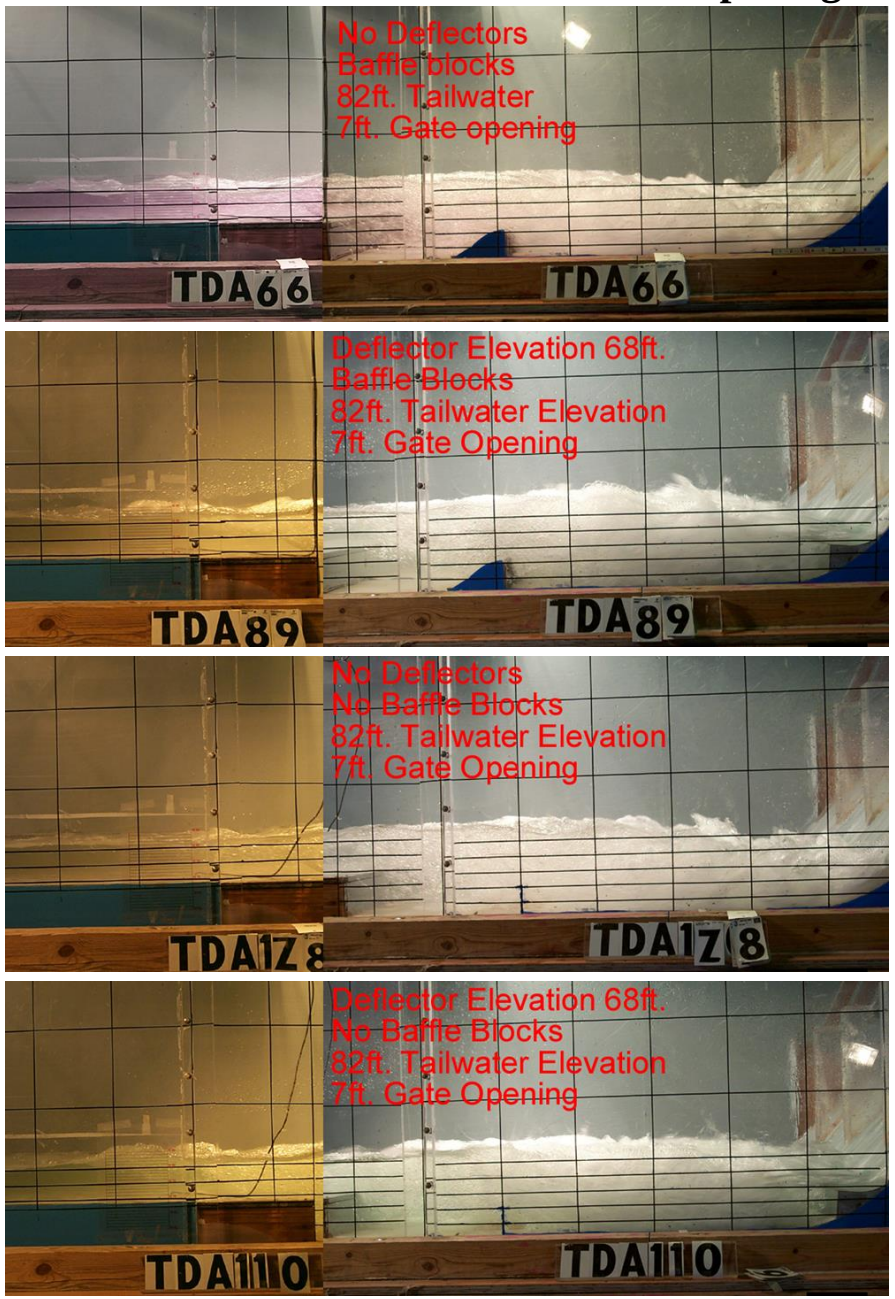


84ft. Tailwater Elevation, 5ft. Gate Opening



80ft. Tailwater Elevation, 7ft. Gate Opening

82ft. Tailwater Elevation, 7ft. Gate Opening



BUT WHY DOES IT WORK AT JOHN DAY AND BONNEVILLE?

Need to look at the cross sections through the spillway

THE DALLES SPILLWAY SECTION

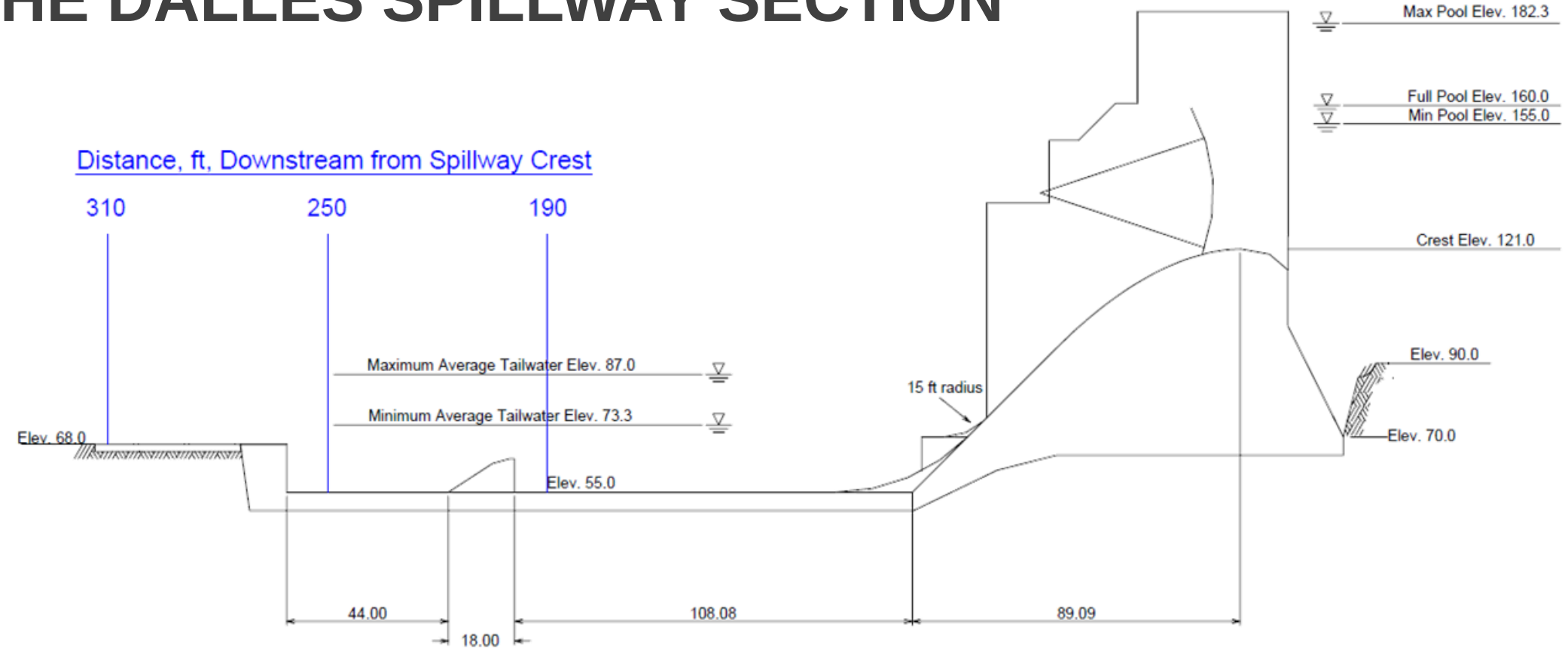


Figure 1. The Dalles Section Model, Elevation View

Things to Note:

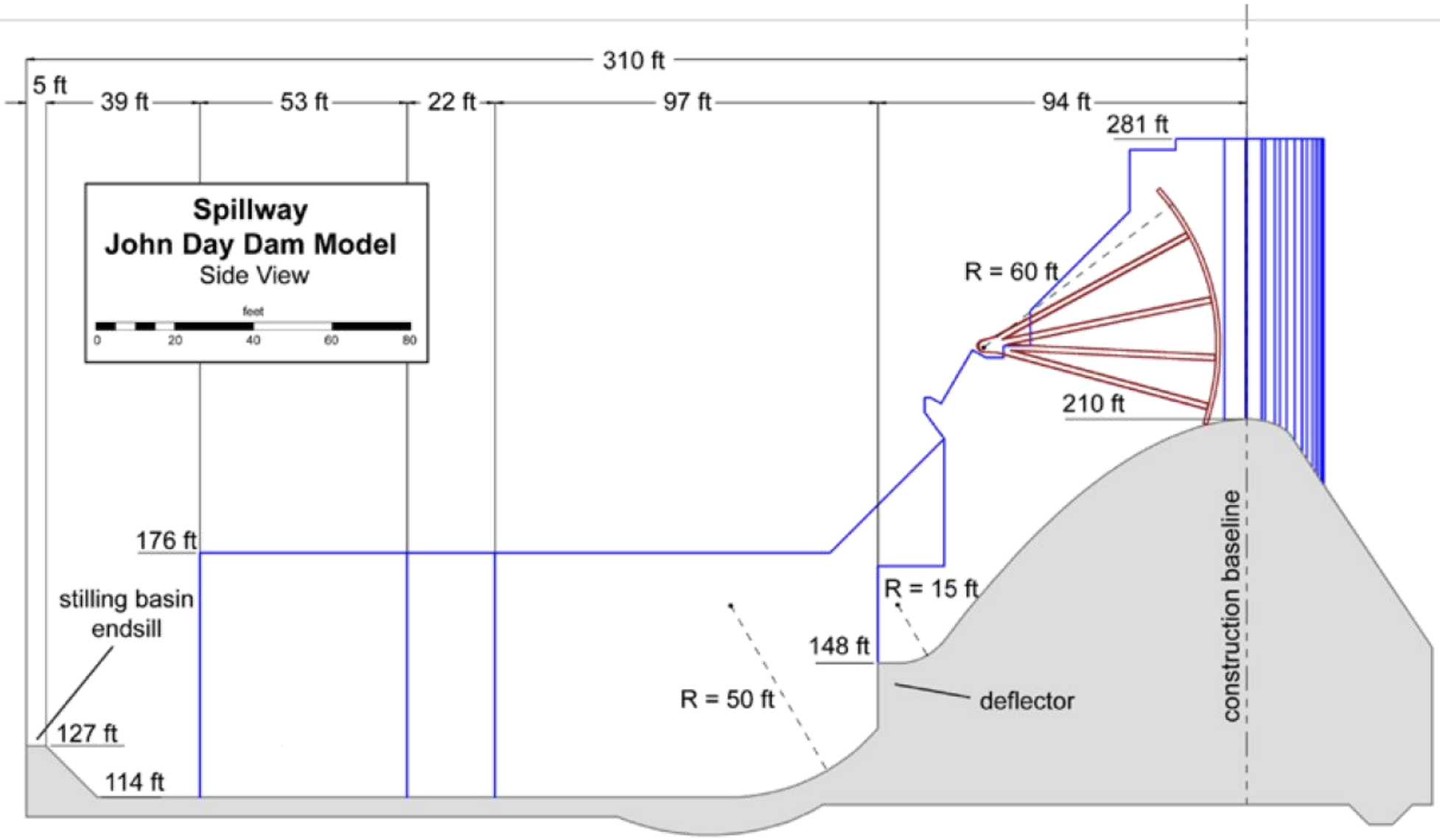
- SHALLOW Tailrace down stream
- SHALLOW stilling basin

JOHN DAY SPILLWAY SECTION

Things to Note:

Deep Tailrace downstream

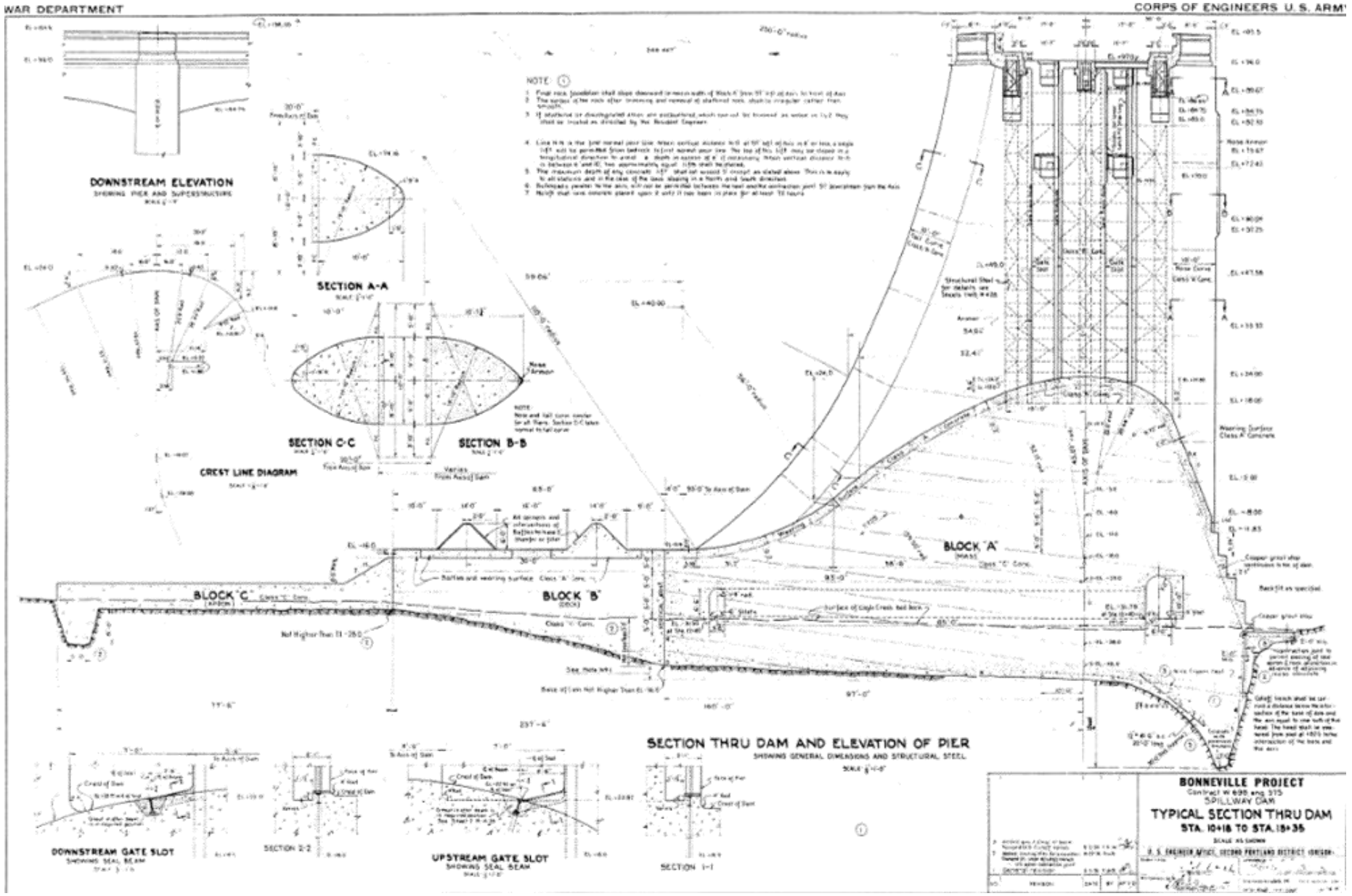
Deep stilling basin



BONNEVILLE SPILLWAY SECTION

Thing to Note:

Very Little Elevation Change Between Ogee and Tailwater



BONNEVILLE SPILLWAY

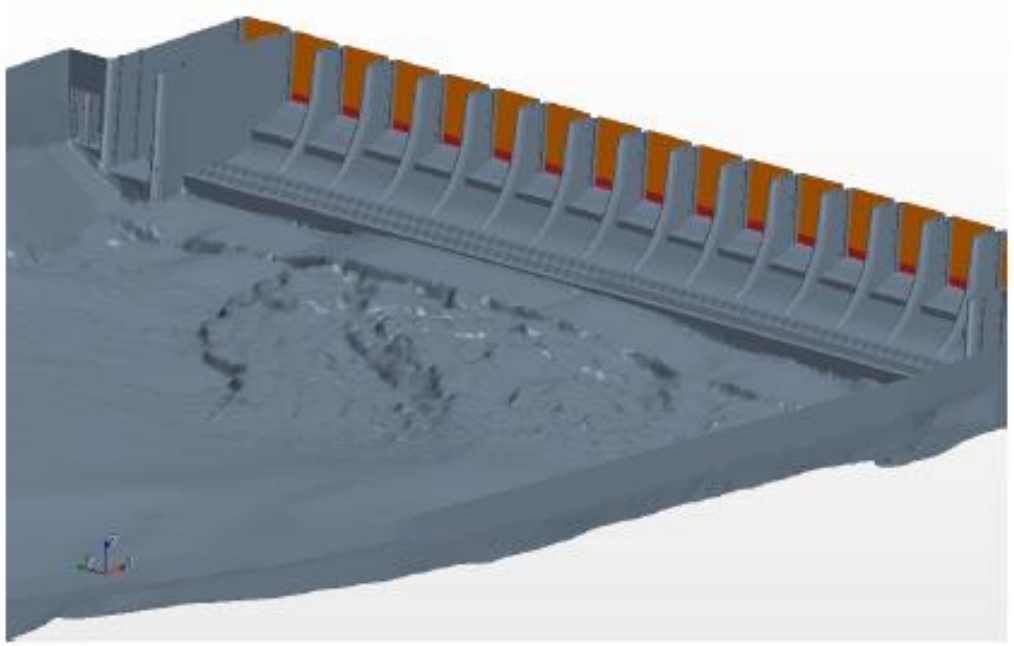


Figure 2.1. Spillway structure integrated with bathymetry. View is looking obliquely upstream, north side of the spillway is on the left.

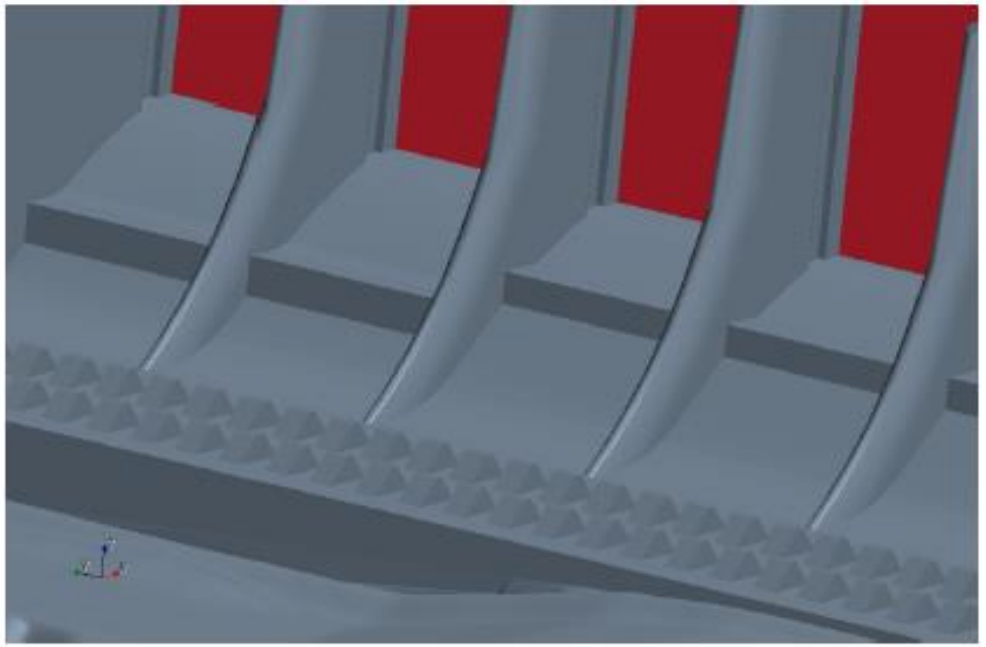


Figure 2.2. Detail of spillway structure integrated with bathymetry. View is of Bays 2, 3, 4, and 5 from left to right, respectively. Note 7 ft deflectors in Bays 2 and 3, 14 ft deflectors in Bays 4 and 5.

QUESTIONS?