# Fish Passage Plan (FPP) Change Form

**Change Form # & Title**: 22LMN004 – Spill Patterns w/o Bay 3

**Date Submitted**: January 27, 2022

**Project**: Lower Monumental

**Requester Name, Agency**: Chris Peery, USACE NWW

**Final Action: APPROVED February 10, 2022**

**FPP Section**: Table LMN-8. Uniform Spill Patterns

**Justification for Change**: Spillbay 3 is out of operation per 21 LMN 07 MFR

**Proposed Change**: See Table LMN-8 below for patterns with Bay 3 out of service.

**Comments**:

2/10/22 FPOM:

Peery provided background on why Bay 3 is out of service and the timeline for repairs. This September, the Project will attempt to add grease bearings to manually grease the trunnion, with the intent to eventually make it automatic. If it works, Bay 3 can be returned to service and they will outfit the remaining bays similarly.

Bettin asked if bulkheads can be used to open the bay at a set opening for the season? Peery will ask.

FPOM had several other questions. Peery provided answers via email on Feb 15:

For Lower Monumental, can repairs be made before spill season, 3 April?

The repairs cannot happen before spill season because we need to be able to measure the before/after trunnion friction to validate that the repairs worked, and the measurement part of it cannot happen until after spill season.

Were spillbays exercised prior to taking friction coefficient.

SBs are fully exercised on a 4-year PM while doing climbing inspections (2/year).

SB#3 was fully exercised during the 4-year and climbing inspection in 2018.

Why the 2-3-year delay in receiving information that was used to tag the spillbay OOS?

Spillway gate fit-for-service evaluation performed in 2012 established trunnion coefficient of friction limit of 0.23 (a typical greased pin/bushing arrangement has a coefficient of friction of around 0.10-0.15) and recommended measuring and monitoring trunnion friction at least every 5 years moving forward.

Spillway Gate climbing inspection performed on Gate 7 in September 2018 identified a bent brace member that caused concern that the trunnion friction on Gate 7 may have exceeded limits and was starting to cause buckling of the braces.

To investigate this, Gate 7 and Gate 3 were instrumented with strain gauges and trunnion friction was calculated at 0.21 for Gate 7 and 0.23 for Gate 3. Gate 3 was intended to be the control during this investigation but ended up being worse than Gate 7.

Both datasets were analyzed by NWW and NWD engineers and eventually sent to a contracting firm.  One question that needed to be answered was, is the 0.23 coeff level based on the Folsom Dam incident applicable to the LMN gates?  They are.

We did not receive the final analysis to fully vet our established “safe” trunnion coefficient nor our results until somewhat recently.

Can stoplogs be used to relieve pressure and exercise the gate?

In Bryce’s professional opinion, operating the gate fully open/closed does not decrease the friction coefficient as the “graphite” material built into the bushing is likely degraded or worn out.

Bryce did say that once we are able to apply grease, full open/close would help reduce the friction coefficient.

Could we open the gate with a crane and leaving it at a certain stop for the season.

The gate is likely too heavy to lift with ANY crane we have in the fleet.  Additionally, the gate is connected to a huge gear reduction that would likely have to be disconnected/reconnected while the crane is attached which would be a safety issue.  This is a moot point as applying torque to the gate at any point with a bad bushing will cause strain to the bracing and risk damaging the gate.

**Record of Final Action**:

Approved at FPOM 2/10/22. When Bay 3 returns to service, a Change Form will be submitted to revert to the original patterns.

**Table LMN-8. Lower Monumental Dam Uniform Spill Patterns with RSW.**

| **LMN Uniform Spill Patterns - # Gate Stops per Spillbay** | | | | | | | | | **Total Stops** |  | |  | |  | |  | |  | |  | |  | |  | **Total Spill** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bay 1** | **Bay 2** | **Bay 3** | **Bay 4** | **Bay 5** | **Bay 6** | **Bay 7** | **Bay 8** | | **(#)** | **Bay 1** | **Bay 2** | | **Bay 3** | | **Bay 4** | | **Bay 5** | | **Bay 6** | | **Bay 7** | | **Bay 8** | | **(Kcfs)** |
| 0 | 0 |  | 0 | 0 | 0 | 0 | RSW | | **0** | 0 | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 7.525 | | 7.5 |
| 0 | 0 |  | 0 | 0 | 1 | 0 | RSW | | **1** | 0 | 0 | | 0 | | 0 | | 0 | | 1.8 | | 0 | | 7.525 | | 9.3 |
| 0 | 1 |  | 0 | 0 | 1 | 0 | RSW | | **2** | 0 | 1.8 | | 0 | | 0 | | 0 | | 1.8 | | 0 | | 7.525 | | 11.1 |
| 0 | 1 |  | 0 | 1 | 1 | 0 | RSW | | **3** | 0 | 1.8 | | 0 | | 0 | | 1.8 | | 1.8 | | 0 | | 7.525 | | 12.9 |
| 0 | 1 |  | 1 | 1 | 1 | 0 | RSW | | **4** | 0 | 1.8 | | 0 | | 1.8 | | 1.8 | | 1.8 | | 0 | | 7.525 | | 14.7 |
| 1 | 1 |  | 1 | 1 | 1 | 0 | RSW | | **5** | 1.8 | 1.8 | | 0 | | 1.8 | | 1.8 | | 1.8 | | 0 | | 7.525 | | 16.5 |
| 1 | 1 |  | 1 | 1 | 1 | 1 | RSW | | **6** | 1.8 | 1.8 | | 0 | | 1.8 | | 1.8 | | 1.8 | | 1.8 | | 7.525 | | 18.3 |
| 1 | 1 |  | 1 | 1 | 2 | 1 | RSW | | **7** | 1.8 | 1.8 | | 0 | | 1.8 | | 1.8 | | 3.3 | | 1.8 | | 7.525 | | 19.8 |
| 1 | 2 |  | 1 | 1 | 2 | 1 | RSW | | **8** | 1.8 | 3.3 | | 0 | | 1.8 | | 1.8 | | 3.3 | | 1.8 | | 7.525 | | 21.3 |
| 1 | 2 |  | 2 | 1 | 2 | 1 | RSW | | **9** | 1.8 | 3.3 | | 0 | | 3.3 | | 1.8 | | 3.3 | | 1.8 | | 7.525 | | 22.8 |
| 1 | 2 |  | 2 | 2 | 2 | 1 | RSW | | **10** | 1.8 | 3.3 | | 0 | | 3.3 | | 3.3 | | 3.3 | | 1.8 | | 7.525 | | 24.3 |
| 2 | 2 |  | 2 | 2 | 2 | 1 | RSW | | **11** | 3.3 | 3.3 | | 0 | | 3.3 | | 3.3 | | 3.3 | | 1.8 | | 7.525 | | 25.8 |
| 2 | 2 |  | 2 | 2 | 2 | 2 | RSW | | **12** | 3.3 | 3.3 | | 0 | | 3.3 | | 3.3 | | 3.3 | | 3.3 | | 7.525 | | 27.3 |
| 2 | 2 |  | 2 | 2 | 3 | 2 | RSW | | **13** | 3.3 | 3.3 | | 0 | | 3.3 | | 3.3 | | 4.8 | | 3.3 | | 7.525 | | 28.8 |
| 2 | 3 |  | 2 | 2 | 3 | 2 | RSW | | **14** | 3.3 | 4.8 | | 0 | | 3.3 | | 3.3 | | 4.8 | | 3.3 | | 7.525 | | 30.3 |
| 2 | 3 |  | 3 | 2 | 3 | 2 | RSW | | **15** | 3.3 | 4.8 | | 0 | | 4.8 | | 3.3 | | 4.8 | | 3.3 | | 7.525 | | 31.8 |
| 2 | 3 |  | 3 | 3 | 3 | 2 | RSW | | **16** | 3.3 | 4.8 | | 0 | | 4.8 | | 4.8 | | 4.8 | | 3.3 | | 7.525 | | 33.3 |
| 3 | 3 |  | 3 | 3 | 3 | 2 | RSW | | **17** | 4.8 | 4.8 | | 0 | | 4.8 | | 4.8 | | 4.8 | | 3.3 | | 7.525 | | 34.8 |
| 3 | 3 |  | 3 | 3 | 3 | 3 | RSW | | **18** | 4.8 | 4.8 | | 0 | | 4.8 | | 4.8 | | 4.8 | | 4.8 | | 7.525 | | 36.3 |
| 3 | 3 |  | 3 | 3 | 4 | 3 | RSW | | **19** | 4.8 | 4.8 | | 0 | | 4.8 | | 4.8 | | 6.2 | | 4.8 | | 7.525 | | 37.7 |
| 3 | 4 |  | 3 | 3 | 4 | 3 | RSW | | **20** | 4.8 | 6.2 | | 0 | | 4.8 | | 4.8 | | 6.2 | | 4.8 | | 7.525 | | 39.1 |
| 3 | 4 |  | 4 | 3 | 4 | 3 | RSW | | **21** | 4.8 | 6.2 | | 0 | | 6.2 | | 4.8 | | 6.2 | | 4.8 | | 7.525 | | 40.5 |
| 3 | 4 |  | 4 | 4 | 4 | 3 | RSW | | **22** | 4.8 | 6.2 | | 0 | | 6.2 | | 6.2 | | 6.2 | | 4.8 | | 7.525 | | 41.9 |
| 4 | 4 |  | 4 | 4 | 4 | 3 | RSW | | **23** | 6.2 | 6.2 | | 0 | | 6.2 | | 6.2 | | 6.2 | | 4.8 | | 7.525 | | 43.3 |
| 4 | 4 |  | 4 | 4 | 4 | 4 | RSW | | **24** | 6.2 | 6.2 | | 0 | | 6.2 | | 6.2 | | 6.2 | | 6.2 | | 7.525 | | 44.7 |
| 4 | 4 |  | 4 | 4 | 5 | 4 | RSW | | **25** | 6.2 | 6.2 | | 0 | | 6.2 | | 6.2 | | 7.9 | | 6.2 | | 7.525 | | 46.4 |
| 4 | 5 |  | 4 | 4 | 5 | 4 | RSW | | **26** | 6.2 | 7.9 | | 0 | | 6.2 | | 6.2 | | 7.9 | | 6.2 | | 7.525 | | 48.1 |
| 4 | 5 |  | 5 | 4 | 5 | 4 | RSW | | **27** | 6.2 | 7.9 | | 0 | | 7.9 | | 6.2 | | 7.9 | | 6.2 | | 7.525 | | 49.8 |
| 4 | 5 |  | 5 | 5 | 5 | 4 | RSW | | **28** | 6.2 | 7.9 | | 0 | | 7.9 | | 7.9 | | 7.9 | | 6.2 | | 7.525 | | 51.5 |
| 5 | 5 |  | 5 | 5 | 5 | 4 | RSW | | **29** | 7.9 | 7.9 | | 0 | | 7.9 | | 7.9 | | 7.9 | | 6.2 | | 7.525 | | 53.2 |
| 5 | 5 |  | 5 | 5 | 5 | 5 | RSW | | **30** | 7.9 | 7.9 | | 0 | | 7.9 | | 7.9 | | 7.9 | | 7.9 | | 7.525 | | 54.9 |
| 5 | 5 |  | 5 | 5 | 6 | 5 | RSW | | **31** | 7.9 | 7.9 | | 0 | | 7.9 | | 7.9 | | 9.6 | | 7.9 | | 7.525 | | 56.6 |
| 5 | 6 |  | 5 | 5 | 6 | 5 | RSW | | **32** | 7.9 | 9.6 | | 0 | | 7.9 | | 7.9 | | 9.6 | | 7.9 | | 7.525 | | 58.3 |
| 5 | 6 |  | 6 | 5 | 6 | 5 | RSW | | **33** | 7.9 | 9.6 | | 0 | | 9.6 | | 7.9 | | 9.6 | | 7.9 | | 7.525 | | 60.0 |
| 5 | 6 |  | 6 | 6 | 6 | 5 | RSW | | **34** | 7.9 | 9.6 | | 0 | | 9.6 | | 9.6 | | 9.6 | | 7.9 | | 7.525 | | 61.7 |
| 6 | 6 |  | 6 | 6 | 6 | 5 | RSW | | **35** | 9.6 | 9.6 | | 0 | | 9.6 | | 9.6 | | 9.6 | | 7.9 | | 7.525 | | 63.4 |
| 6 | 6 |  | 6 | 6 | 6 | 6 | RSW | | **36** | 9.6 | 9.6 | | 0 | | 9.6 | | 9.6 | | 9.6 | | 9.6 | | 7.525 | | 65.1 |
| 6 | 6 |  | 6 | 6 | 7 | 6 | RSW | | **37** | 9.6 | 9.6 | | 0 | | 9.6 | | 9.6 | | 11.3 | | 9.6 | | 7.525 | | 66.8 |
| 6 | 7 |  | 6 | 6 | 7 | 6 | RSW | | **38** | 9.6 | 11.3 | | 0 | | 9.6 | | 9.6 | | 11.3 | | 9.6 | | 7.525 | | 68.5 |
| 6 | 7 |  | 7 | 6 | 7 | 6 | RSW | | **39** | 9.6 | 11.3 | | 0 | | 11.3 | | 9.6 | | 11.3 | | 9.6 | | 7.525 | | 70.2 |
| 6 | 7 |  | 7 | 7 | 7 | 6 | RSW | | **40** | 9.6 | 11.3 | | 0 | | 11.3 | | 11.3 | | 11.3 | | 9.6 | | 7.525 | | 71.9 |
| 7 | 7 |  | 7 | 7 | 7 | 6 | RSW | | **41** | 11.3 | 11.3 | | 0 | | 11.3 | | 11.3 | | 11.3 | | 9.6 | | 7.525 | | 73.6 |
| 7 | 7 |  | 7 | 7 | 7 | 7 | RSW | | **42** | 11.3 | 11.3 | | 0 | | 11.3 | | 11.3 | | 11.3 | | 11.3 | | 7.525 | | 75.3 |
| 7 | 7 |  | 7 | 7 | 8 | 7 | RSW | | **43** | 11.3 | 11.3 | | 0 | | 11.3 | | 11.3 | | 13.1 | | 11.3 | | 7.525 | | 77.1 |
| 7 | 8 |  | 7 | 7 | 8 | 7 | RSW | | **44** | 11.3 | 13.1 | | 0 | | 11.3 | | 11.3 | | 13.1 | | 11.3 | | 7.525 | | 78.9 |
| 7 | 8 |  | 8 | 7 | 8 | 7 | RSW | | **45** | 11.3 | 13.1 | | 0 | | 13.1 | | 11.3 | | 13.1 | | 11.3 | | 7.525 | | 80.7 |
| 7 | 8 |  | 8 | 8 | 8 | 7 | RSW | | **46** | 11.3 | 13.1 | | 0 | | 13.1 | | 13.1 | | 13.1 | | 11.3 | | 7.525 | | 82.5 |
| 8 | 8 |  | 8 | 8 | 8 | 7 | RSW | | **47** | 13.1 | 13.1 | | 0 | | 13.1 | | 13.1 | | 13.1 | | 11.3 | | 7.525 | | 84.3 |
| 8 | 8 |  | 8 | 8 | 8 | 8 | RSW | | **48** | 13.1 | 13.1 | | 0 | | 13.1 | | 13.1 | | 13.1 | | 13.1 | | 7.525 | | 86.1 |
| 8 | 8 |  | 8 | 8 | 9 | 8 | RSW | | **49** | 13.1 | 13.1 | | 0 | | 13.1 | | 13.1 | | 14.8 | | 13.1 | | 7.525 | | 87.8 |
| 8 | 9 |  | 8 | 8 | 9 | 8 | RSW | | **50** | 13.1 | 14.8 | | 0 | | 13.1 | | 13.1 | | 14.8 | | 13.1 | | 7.525 | | 89.5 |
| 8 | 9 |  | 9 | 8 | 9 | 8 | RSW | | **51** | 13.1 | 14.8 | | 0 | | 14.8 | | 13.1 | | 14.8 | | 13.1 | | 7.525 | | 91.2 |
| 8 | 9 |  | 9 | 9 | 9 | 8 | RSW | | **52** | 13.1 | 14.8 | | 0 | | 14.8 | | 14.8 | | 14.8 | | 13.1 | | 7.525 | | 92.9 |
| 9 | 9 |  | 9 | 9 | 9 | 8 | RSW | | **53** | 14.8 | 14.8 | | 0 | | 14.8 | | 14.8 | | 14.8 | | 13.1 | | 7.525 | | 94.6 |
| 9 | 9 |  | 9 | 9 | 9 | 9 | RSW | | **54** | 14.8 | 14.8 | | 0 | | 14.8 | | 14.8 | | 14.8 | | 14.8 | | 7.525 | | 96.3 |
| 9 | 9 |  | 9 | 9 | 10 | 9 | RSW | | **55** | 14.8 | 14.8 | | 0 | | 14.8 | | 14.8 | | 16.5 | | 14.8 | | 7.525 | | 98.0 |
| 9 | 10 |  | 9 | 9 | 10 | 9 | RSW | | **56** | 14.8 | 16.5 | | 0 | | 14.8 | | 14.8 | | 16.5 | | 14.8 | | 7.525 | | 99.7 |
| 9 | 10 |  | 10 | 9 | 10 | 9 | RSW | | **57** | 14.8 | 16.5 | | 0 | | 16.5 | | 14.8 | | 16.5 | | 14.8 | | 7.525 | | 101.4 |
| 9 | 10 |  | 10 | 10 | 10 | 9 | RSW | | **58** | 14.8 | 16.5 | | 0 | | 16.5 | | 16.5 | | 16.5 | | 14.8 | | 7.525 | | 103.1 |
| 10 | 10 |  | 10 | 10 | 10 | 9 | RSW | | **59** | 16.5 | 16.5 | | 0 | | 16.5 | | 16.5 | | 16.5 | | 14.8 | | 7.525 | | 104.8 |
| 10 | 10 |  | 10 | 10 | 10 | 10 | RSW | | **60** | 16.5 | 16.5 | | 0 | | 16.5 | | 16.5 | | 16.5 | | 16.5 | | 7.525 | | 106.5 |
| 10 | 10 |  | 10 | 10 | 11 | 10 | RSW | | **61** | 16.5 | 16.5 | | 0 | | 16.5 | | 16.5 | | 18.1 | | 16.5 | | 7.525 | | 108.1 |
| 10 | 11 |  | 10 | 10 | 11 | 10 | RSW | | **62** | 16.5 | 18.1 | | 0 | | 16.5 | | 16.5 | | 18.1 | | 16.5 | | 7.525 | | 109.7 |
| 10 | 11 |  | 11 | 10 | 11 | 10 | RSW | | **63** | 16.5 | 18.1 | | 0 | | 18.1 | | 16.5 | | 18.1 | | 16.5 | | 7.525 | | 111.3 |
| 10 | 11 |  | 11 | 11 | 11 | 10 | RSW | | **64** | 16.5 | 18.1 | | 0 | | 18.1 | | 18.1 | | 18.1 | | 16.5 | | 7.525 | | 112.9 |
| 11 | 11 |  | 11 | 11 | 11 | 10 | RSW | | **65** | 18.1 | 18.1 | | 0 | | 18.1 | | 18.1 | | 18.1 | | 16.5 | | 7.525 | | 114.5 |
| 11 | 11 |  | 11 | 11 | 11 | 11 | RSW | | **66** | 18.1 | 18.1 | | 0 | | 18.1 | | 18.1 | | 18.1 | | 18.1 | | 7.525 | | 116.1 |
| 11 | 11 |  | 11 | 11 | 12 | 11 | RSW | | **67** | 18.1 | 18.1 | | 0 | | 18.1 | | 18.1 | | 20 | | 18.1 | | 7.525 | | 118.0 |
| 11 | 12 |  | 11 | 11 | 12 | 11 | RSW | | **68** | 18.1 | 20 | | 0 | | 18.1 | | 18.1 | | 20 | | 18.1 | | 7.525 | | 119.9 |
| 11 | 12 |  | 12 | 11 | 12 | 11 | RSW | | **69** | 18.1 | 20 | | 0 | | 20 | | 18.1 | | 20 | | 18.1 | | 7.525 | | 121.8 |
| 11 | 12 |  | 12 | 12 | 12 | 11 | RSW | | **70** | 18.1 | 20 | | 0 | | 20 | | 20 | | 20 | | 18.1 | | 7.525 | | 123.7 |
| 12 | 12 |  | 12 | 12 | 12 | 11 | RSW | | **71** | 20 | 20 | | 0 | | 20 | | 20 | | 20 | | 18.1 | | 7.525 | | 125.6 |
| 12 | 12 |  | 12 | 12 | 12 | 12 | RSW | | **72** | 20 | 20 | | 0 | | 20 | | 20 | | 20 | | 20 | | 7.525 | | 127.5 |
| 12 | 12 |  | 12 | 12 | 13 | 12 | RSW | | **73** | 20 | 20 | | 0 | | 20 | | 20 | | 21.7 | | 20 | | 7.525 | | 129.2 |
| 12 | 13 |  | 12 | 12 | 13 | 12 | RSW | | **74** | 20 | 21.7 | | 0 | | 20 | | 20 | | 21.7 | | 20 | | 7.525 | | 130.9 |
| 12 | 13 |  | 13 | 12 | 13 | 12 | RSW | | **75** | 20 | 21.7 | | 0 | | 21.7 | | 20 | | 21.7 | | 20 | | 7.525 | | 132.6 |
| 12 | 13 |  | 13 | 13 | 13 | 12 | RSW | | **76** | 20 | 21.7 | | 0 | | 21.7 | | 21.7 | | 21.7 | | 20 | | 7.525 | | 134.3 |
| 13 | 13 |  | 13 | 13 | 13 | 12 | RSW | | **77** | 21.7 | 21.7 | | 0 | | 21.7 | | 21.7 | | 21.7 | | 20 | | 7.525 | | 136.0 |
| 13 | 13 |  | 13 | 13 | 13 | 13 | RSW | | **78** | 21.7 | 21.7 | | 0 | | 21.7 | | 21.7 | | 21.7 | | 21.7 | | 7.525 | | 137.7 |
| 13 | 13 |  | 13 | 13 | 14 | 13 | RSW | | **79** | 21.7 | 21.7 | | 0 | | 21.7 | | 21.7 | | 23.4 | | 21.7 | | 7.525 | | 139.4 |
| 13 | 14 |  | 13 | 13 | 14 | 13 | RSW | | **80** | 21.7 | 23.4 | | 0 | | 21.7 | | 21.7 | | 23.4 | | 21.7 | | 7.525 | | 141.1 |
| 13 | 14 |  | 14 | 13 | 14 | 13 | RSW | | **81** | 21.7 | 23.4 | | 0 | | 23.4 | | 21.7 | | 23.4 | | 21.7 | | 7.525 | | 142.8 |
| 13 | 14 |  | 14 | 14 | 14 | 13 | RSW | | **82** | 21.7 | 23.4 | | 0 | | 23.4 | | 23.4 | | 23.4 | | 21.7 | | 7.525 | | 144.5 |
| 14 | 14 |  | 14 | 14 | 14 | 13 | RSW | | **83** | 23.4 | 23.4 | | 0 | | 23.4 | | 23.4 | | 23.4 | | 21.7 | | 7.525 | | 146.2 |
| 14 | 14 |  | 14 | 14 | 14 | 14 | RSW | | **84** | 23.4 | 23.4 | | 0 | | 23.4 | | 23.4 | | 23.4 | | 23.4 | | 7.525 | | 147.9 |
| 14 | 14 |  | 14 | 14 | 15 | 14 | RSW | | **85** | 23.4 | 23.4 | | 0 | | 23.4 | | 23.4 | | 25.2 | | 23.4 | | 7.525 | | 149.7 |
| 14 | 15 |  | 14 | 14 | 15 | 14 | RSW | | **86** | 23.4 | 25.2 | | 0 | | 23.4 | | 23.4 | | 25.2 | | 23.4 | | 7.525 | | 151.5 |
| 14 | 15 |  | 15 | 14 | 15 | 14 | RSW | | **87** | 23.4 | 25.2 | | 0 | | 25.2 | | 23.4 | | 25.2 | | 23.4 | | 7.525 | | 153.3 |
| 14 | 15 |  | 15 | 15 | 15 | 14 | RSW | | **88** | 23.4 | 25.2 | | 0 | | 25.2 | | 25.2 | | 25.2 | | 23.4 | | 7.525 | | 155.1 |
| 15 | 15 |  | 15 | 15 | 15 | 14 | RSW | | **89** | 25.2 | 25.2 | | 0 | | 25.2 | | 25.2 | | 25.2 | | 23.4 | | 7.525 | | 156.9 |
| 15 | 15 |  | 15 | 15 | 15 | 15 | RSW | | **90** | 25.2 | 25.2 | | 0 | | 25.2 | | 25.2 | | 25.2 | | 25.2 | | 7.525 | | 158.7 |
| 15 | 15 |  | 15 | 15 | 16 | 15 | RSW | | **91** | 25.2 | 25.2 | | 0 | | 25.2 | | 25.2 | | 26.9 | | 25.2 | | 7.525 | | 160.4 |
| 15 | 16 |  | 15 | 15 | 16 | 15 | RSW | | **92** | 25.2 | 26.9 | | 0 | | 25.2 | | 25.2 | | 26.9 | | 25.2 | | 7.525 | | 162.1 |
| 15 | 16 |  | 16 | 15 | 16 | 15 | RSW | | **93** | 25.2 | 26.9 | | 0 | | 26.9 | | 25.2 | | 26.9 | | 25.2 | | 7.525 | | 163.8 |
| 15 | 16 |  | 16 | 16 | 16 | 15 | RSW | | **94** | 25.2 | 26.9 | | 0 | | 26.9 | | 26.9 | | 26.9 | | 25.2 | | 7.525 | | 165.5 |
| 16 | 16 |  | 16 | 16 | 16 | 15 | RSW | | **95** | 26.9 | 26.9 | | 0 | | 26.9 | | 26.9 | | 26.9 | | 25.2 | | 7.525 | | 167.2 |
| 16 | 16 |  | 16 | 16 | 16 | 16 | RSW | | **96** | 26.9 | 26.9 | | 0 | | 26.9 | | 26.9 | | 26.9 | | 26.9 | | 7.525 | | 168.9 |
| 16 | 16 |  | 16 | 16 | 17 | 16 | RSW | | **97** | 26.9 | 26.9 | | 0 | | 26.9 | | 26.9 | | 28.7 | | 26.9 | | 7.525 | | 170.7 |
| 16 | 17 |  | 16 | 16 | 17 | 16 | RSW | | **98** | 26.9 | 28.7 | | 0 | | 26.9 | | 26.9 | | 28.7 | | 26.9 | | 7.525 | | 172.5 |
| 16 | 17 |  | 17 | 16 | 17 | 16 | RSW | | **99** | 26.9 | 28.7 | | 0 | | 28.7 | | 26.9 | | 28.7 | | 26.9 | | 7.525 | | 174.3 |
| 16 | 17 |  | 17 | 17 | 17 | 16 | RSW | | **100** | 26.9 | 28.7 | | 0 | | 28.7 | | 28.7 | | 28.7 | | 26.9 | | 7.525 | | 176.1 |
| 17 | 17 |  | 17 | 17 | 17 | 16 | RSW | | **101** | 28.7 | 28.7 | | 0 | | 28.7 | | 28.7 | | 28.7 | | 26.9 | | 7.525 | | 177.9 |
| 17 | 17 |  | 17 | 17 | 17 | 17 | RSW | | **102** | 28.7 | 28.7 | | 0 | | 28.7 | | 28.7 | | 28.7 | | 28.7 | | 7.525 | | 179.7 |
| 17 | 17 |  | 17 | 17 | 18 | 17 | RSW | | **103** | 28.7 | 28.7 | | 0 | | 28.7 | | 28.7 | | 30.5 | | 28.7 | | 7.525 | | 181.5 |
| 17 | 18 |  | 17 | 17 | 18 | 17 | RSW | | **104** | 28.7 | 30.5 | | 0 | | 28.7 | | 28.7 | | 30.5 | | 28.7 | | 7.525 | | 183.3 |
| 17 | 18 |  | 18 | 17 | 18 | 17 | RSW | | **105** | 28.7 | 30.5 | | 0 | | 30.5 | | 28.7 | | 30.5 | | 28.7 | | 7.525 | | 185.1 |
| Assumes forebay 538 ft elevation with RSW flow = 7,525 cfs | | | | | | | |  |  |  | |  | |  | |  | |  | |  | |  | |  |  |