Franklin County Water District

Preliminary Engineering Report (PER)

Emergency Spillway

2/20/2018

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WATER

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Lake Cypress Springs

urley

2723

3122

900

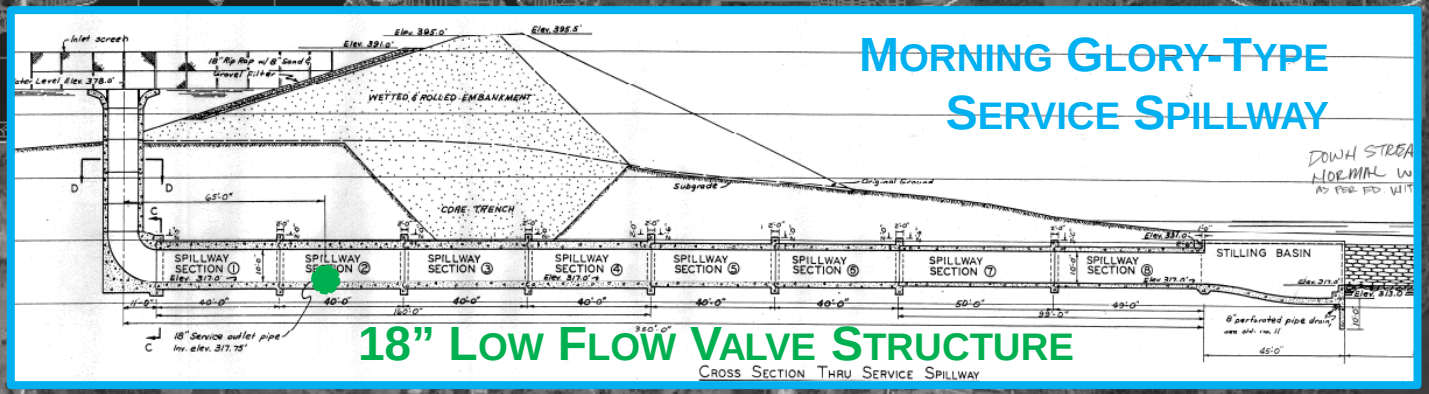
EMERGENCY SPILLWAY

Co Rd SE 3122

Lake Cypress Springs

LCS DAM

LAKE BOB SANDLIN

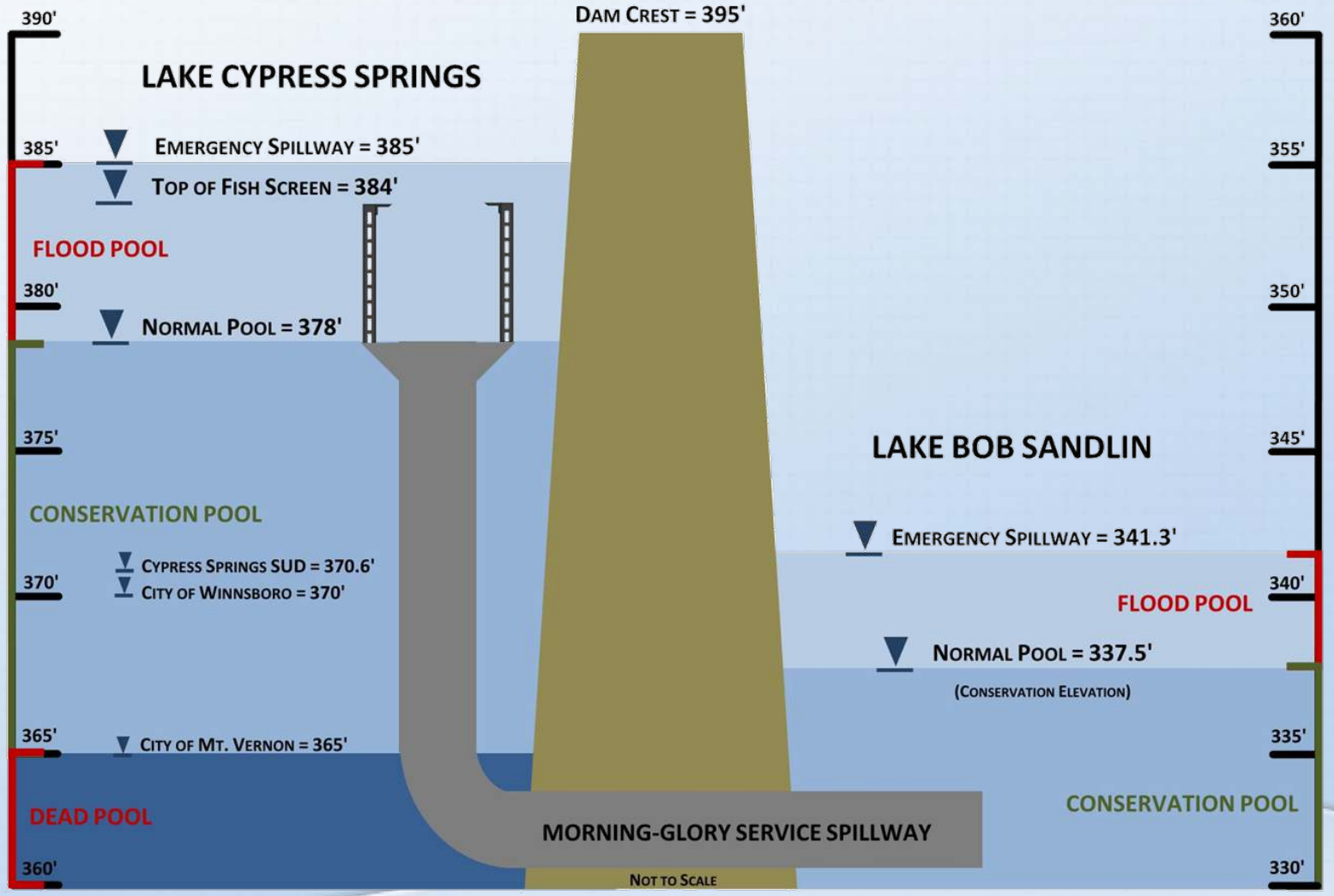


MORNING GLORY-TYPE SERVICE SPILLWAY

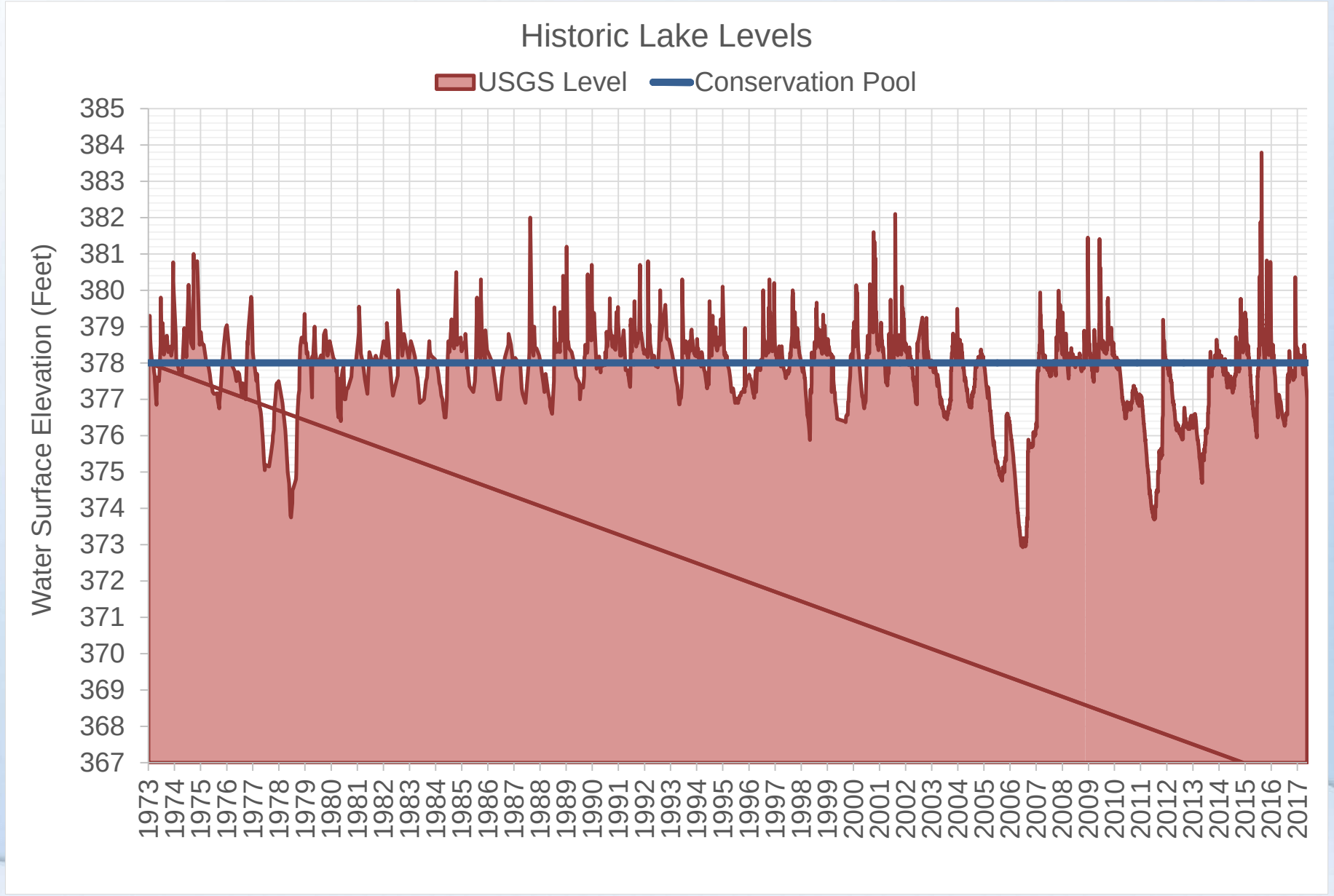
18" LOW FLOW VALVE STRUCTURE

CROSS SECTION THRU SERVICE SPILLWAY

Lake Cypress Springs Spillway



December 2015 Event (383.92’)



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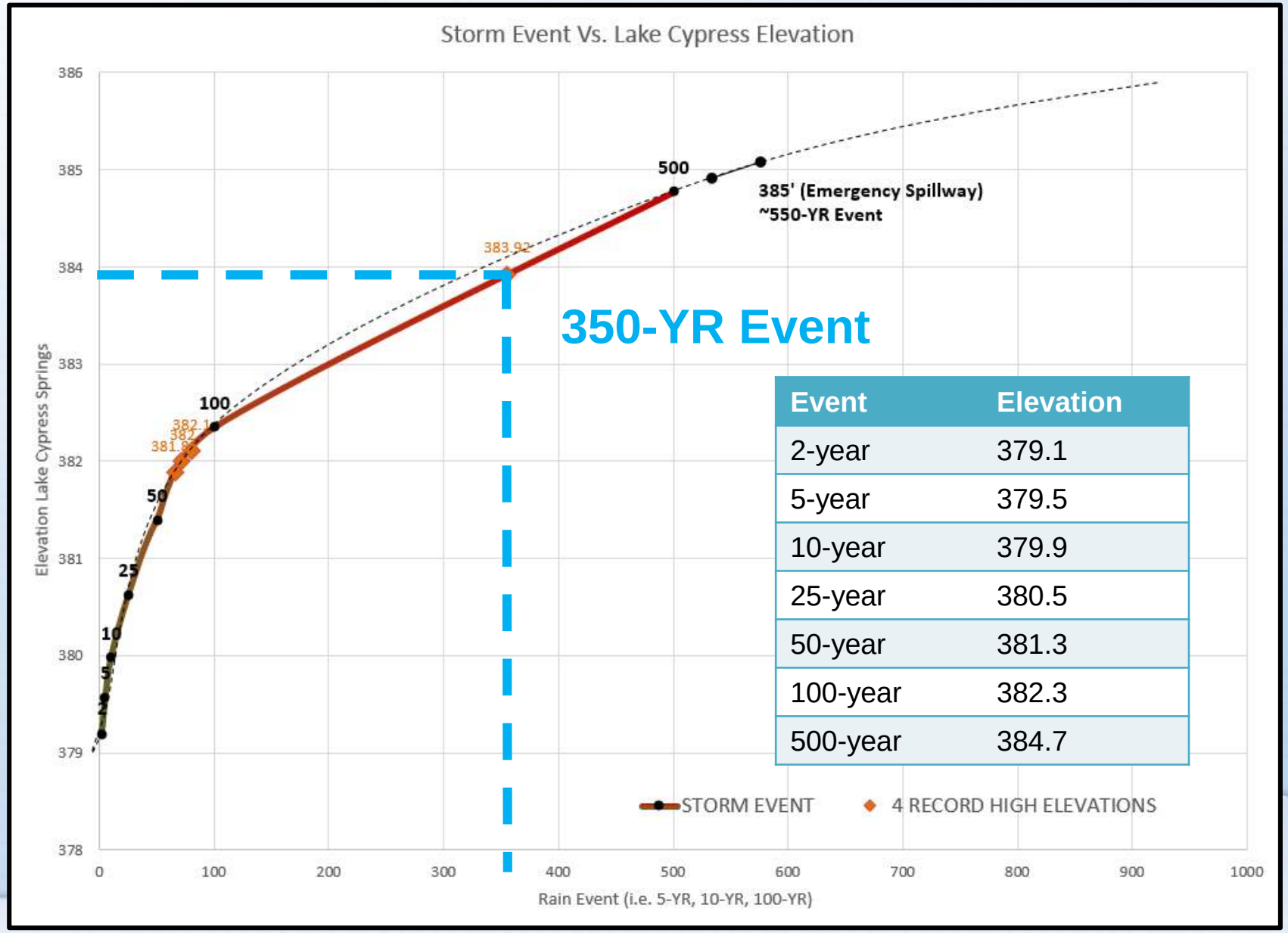
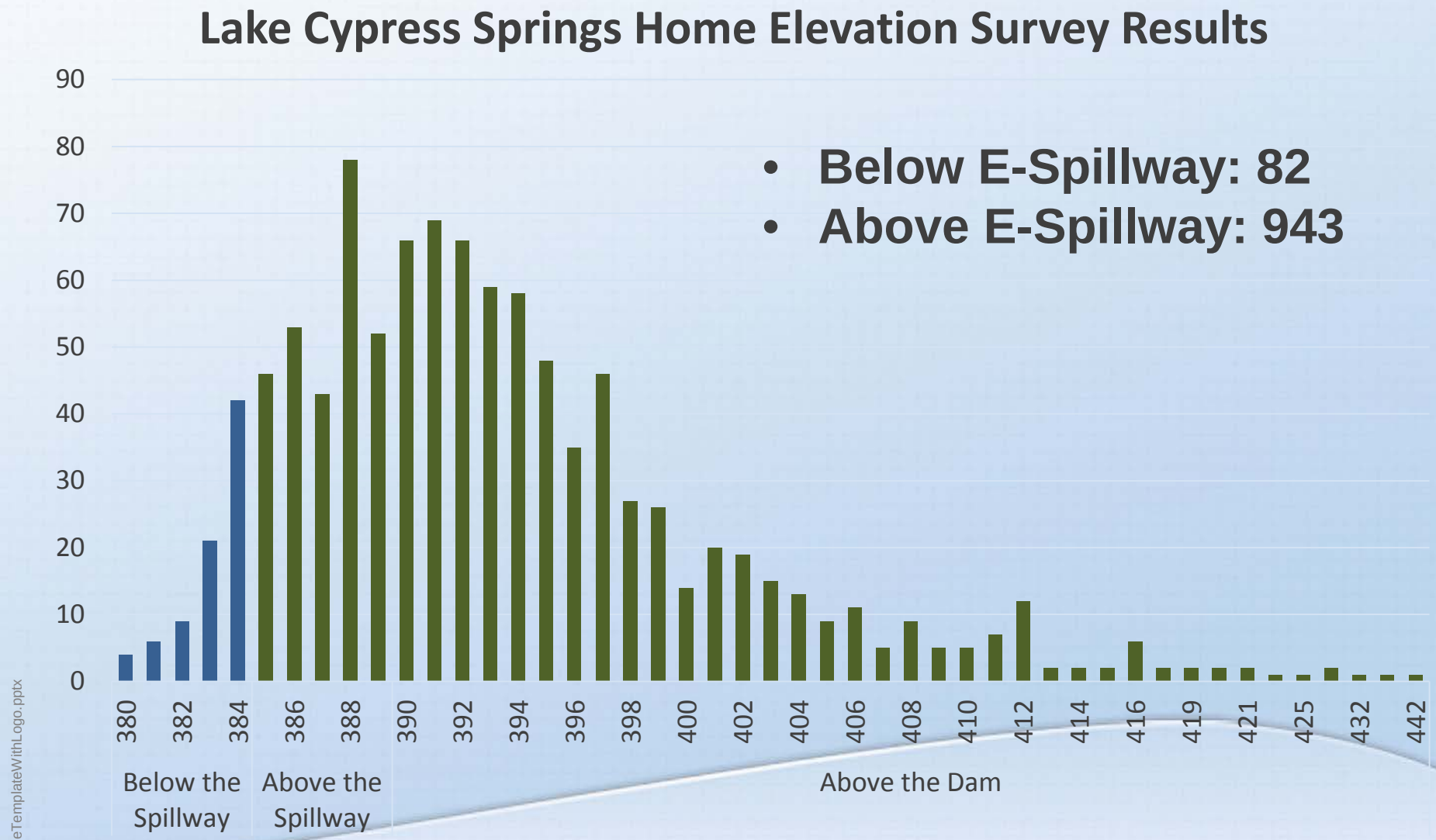


Event	Elevation
2-year	379.1
5-year	379.5
10-year	379.9
25-year	380.5
50-year	381.3
100-year	382.3
500-year	384.7

Data Gathering for Analysis – Elevations



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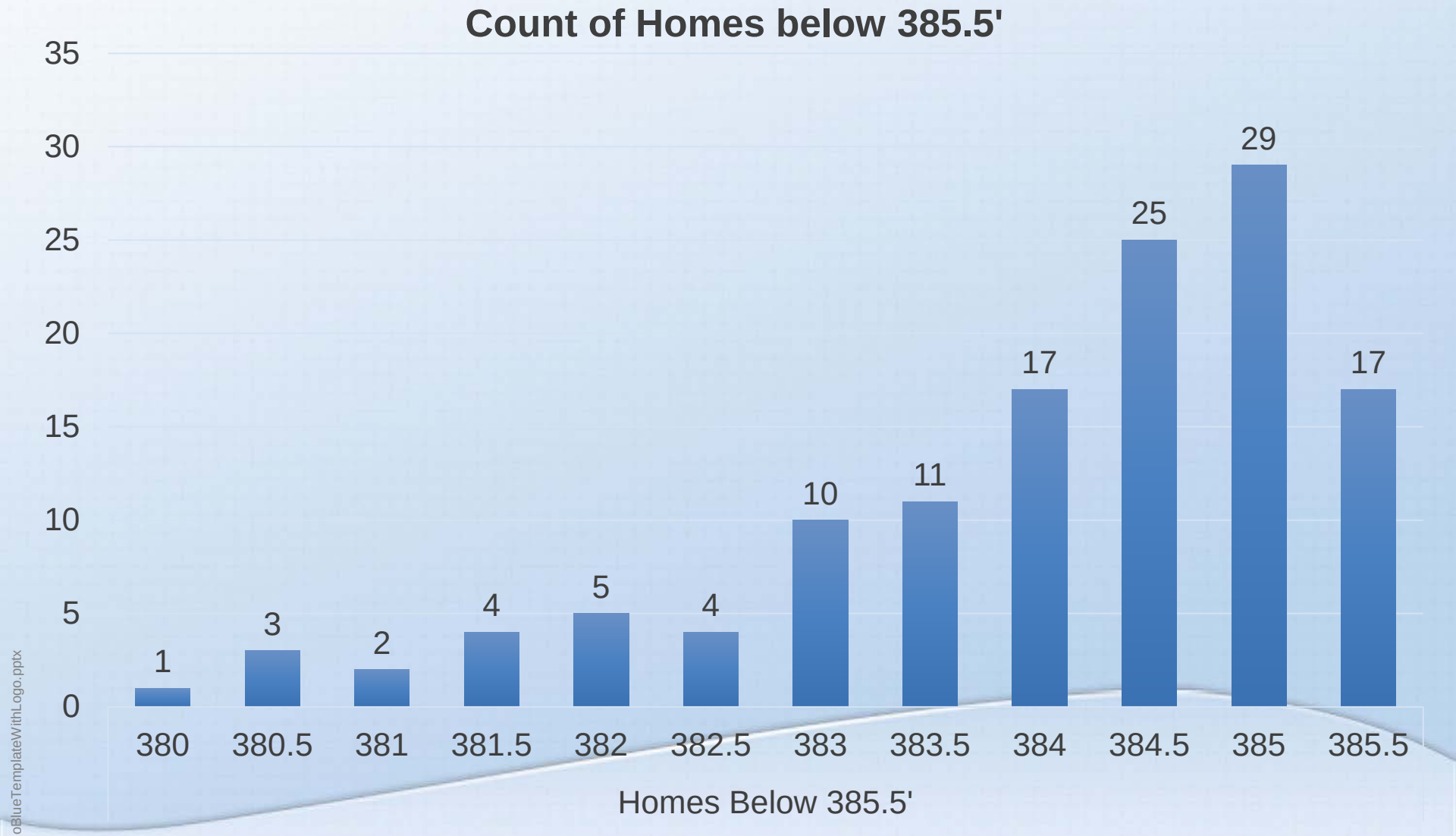

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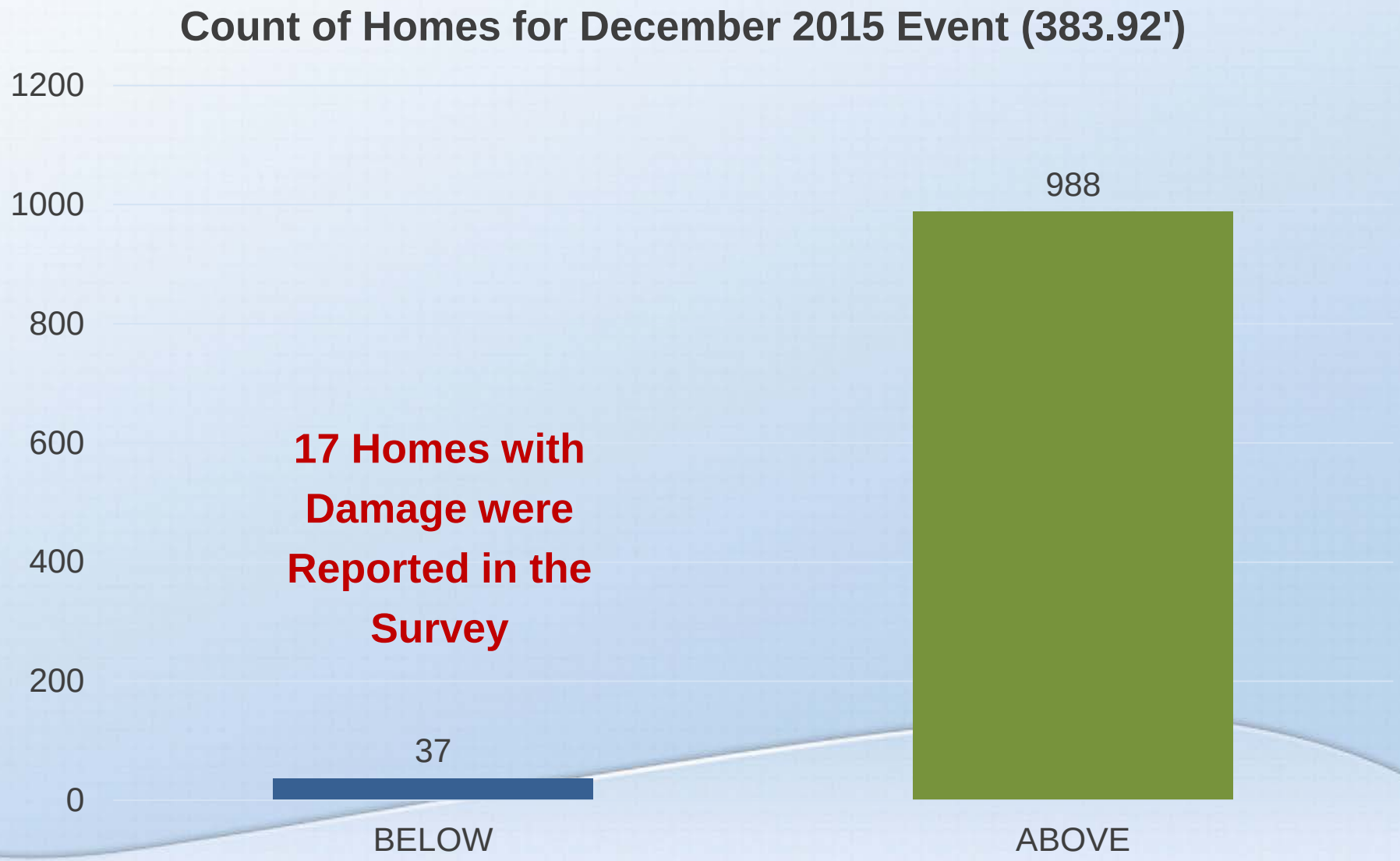
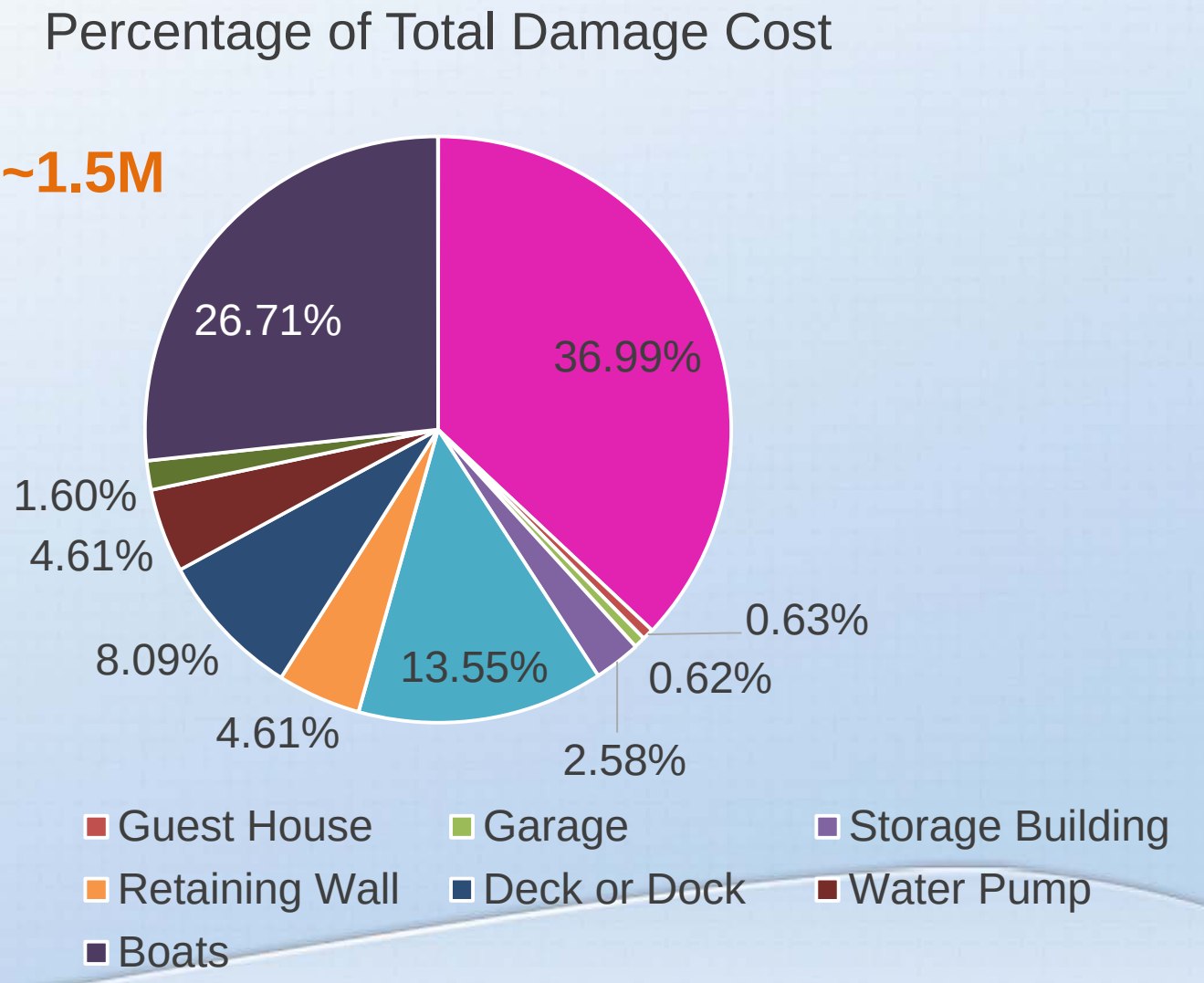
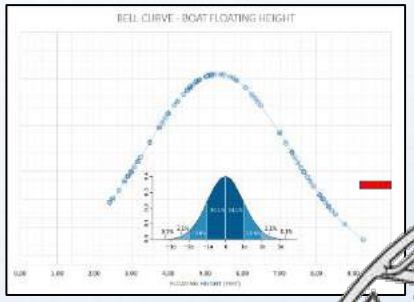


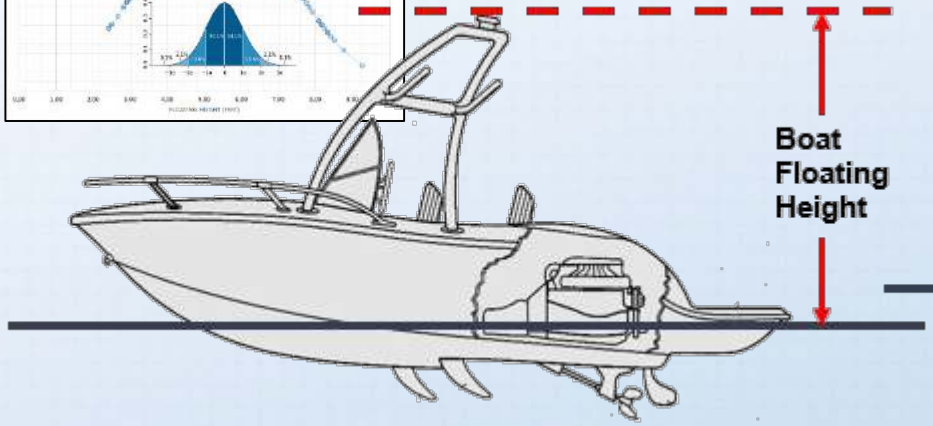
Data Gathering for Analysis – Online Survey

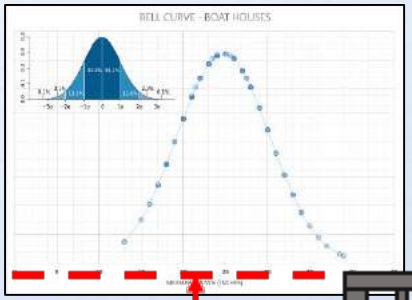
Total Damage ~1.5M

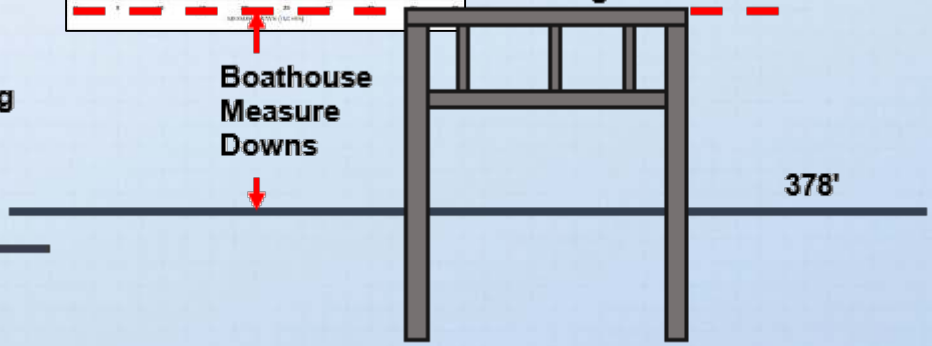


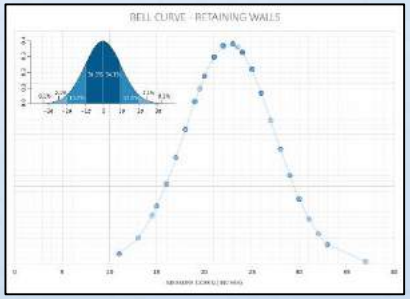
Data Gathering for Analysis - Samples

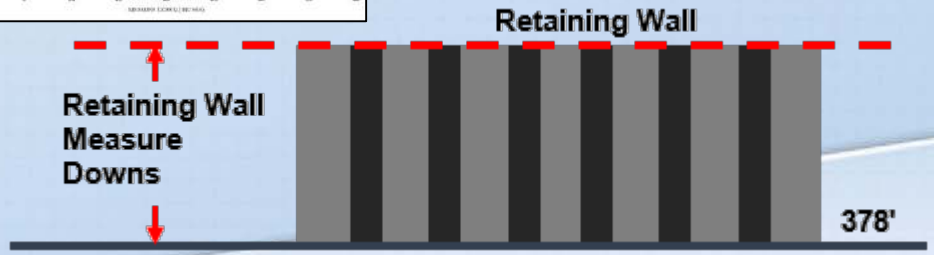


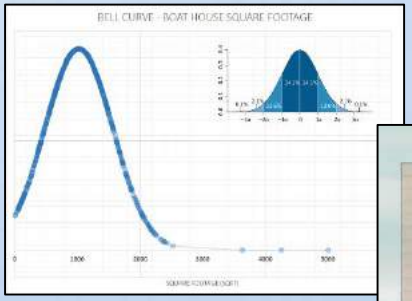




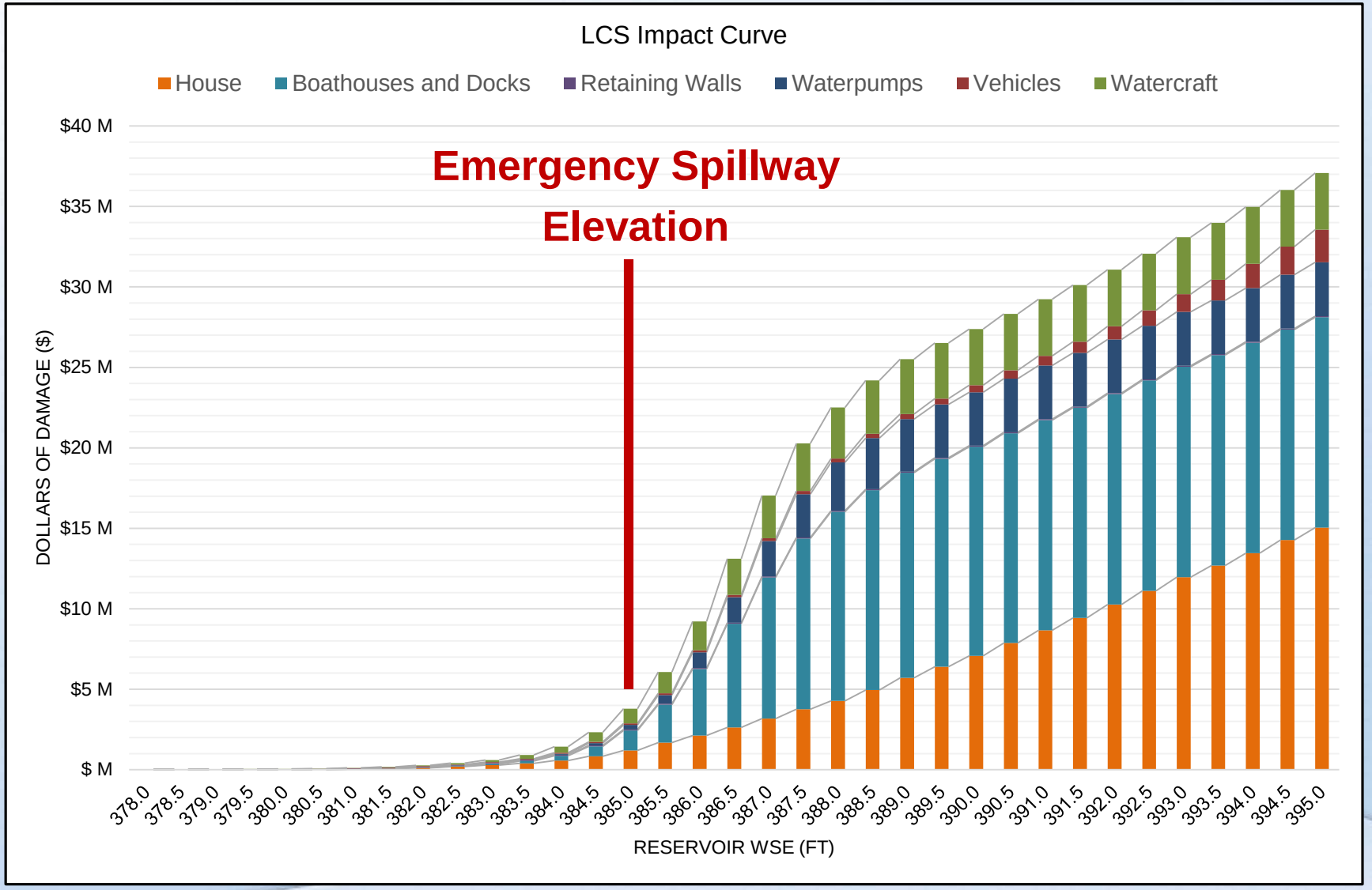








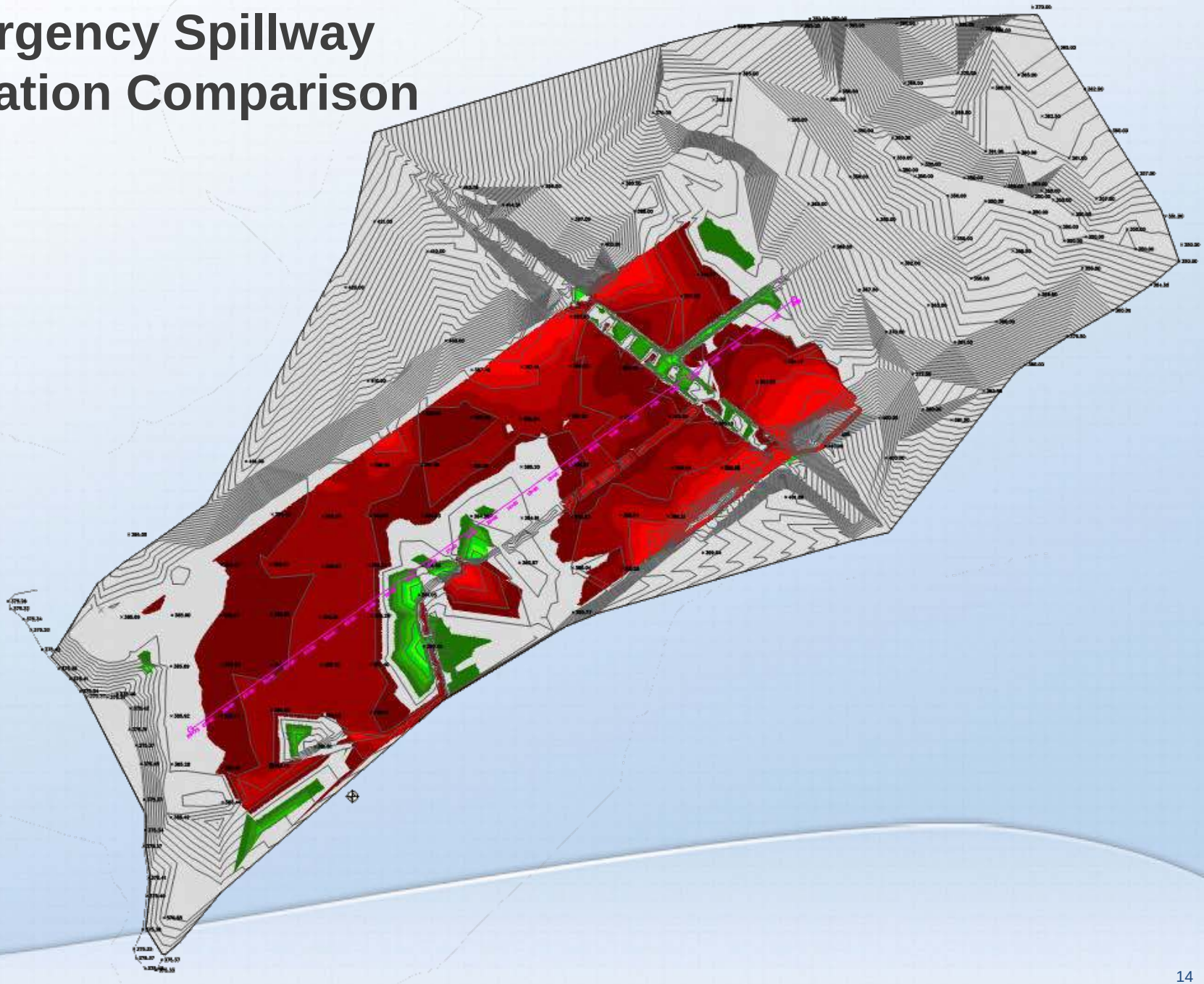
Total Lake Cypress Springs Impact Curve



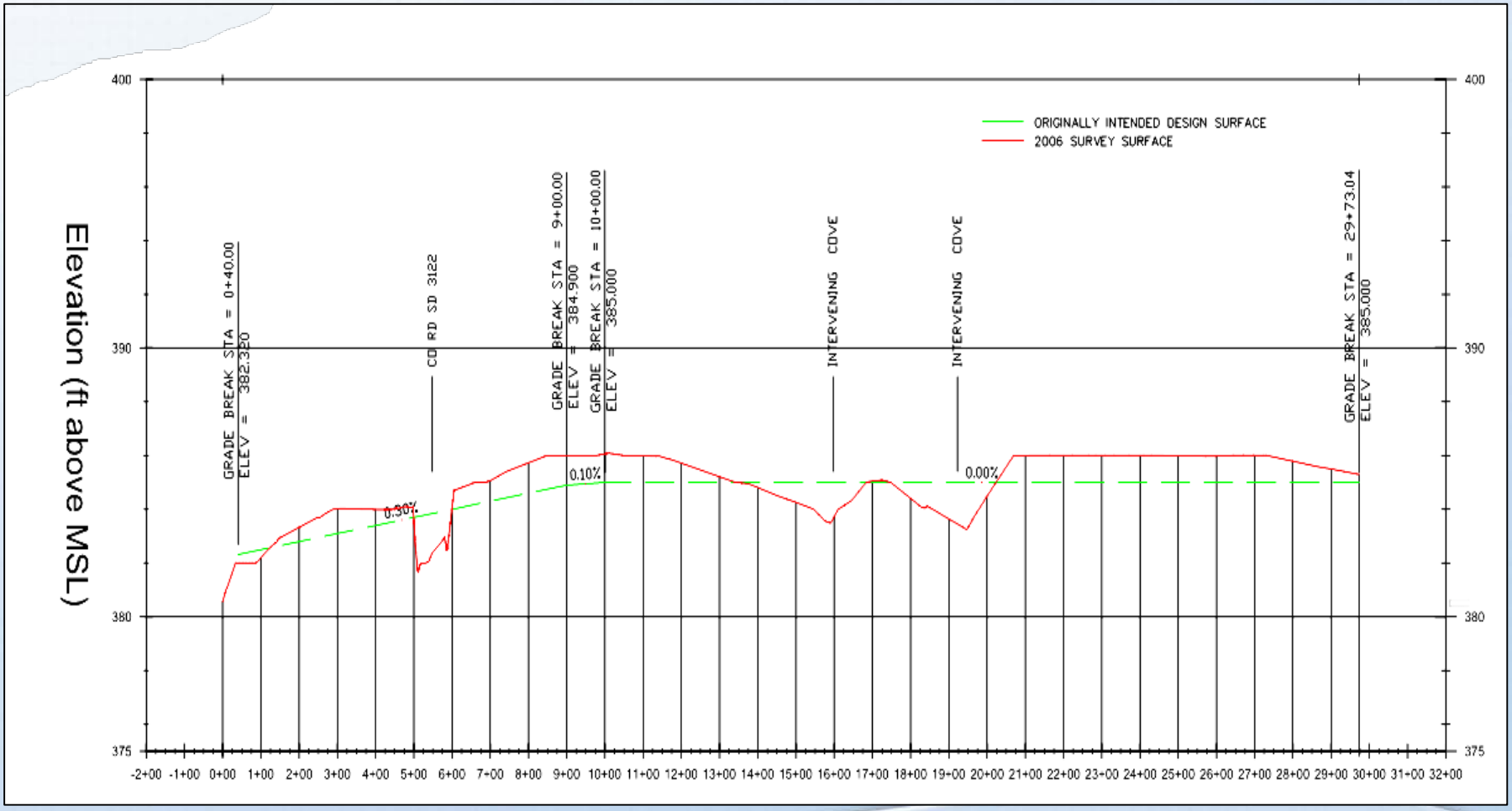
Emergency Spillway

Hydraulic Analysis

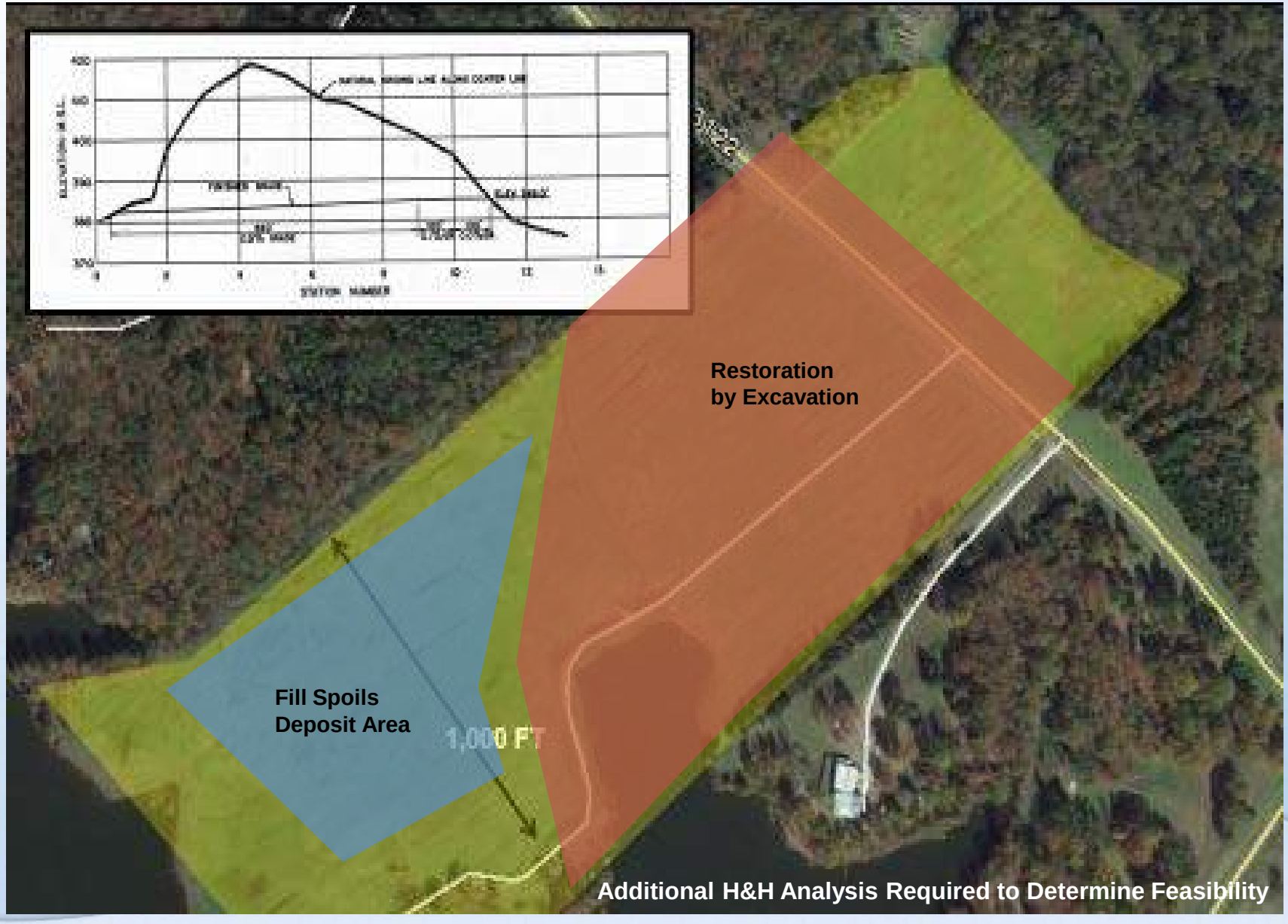
Emergency Spillway Elevation Comparison



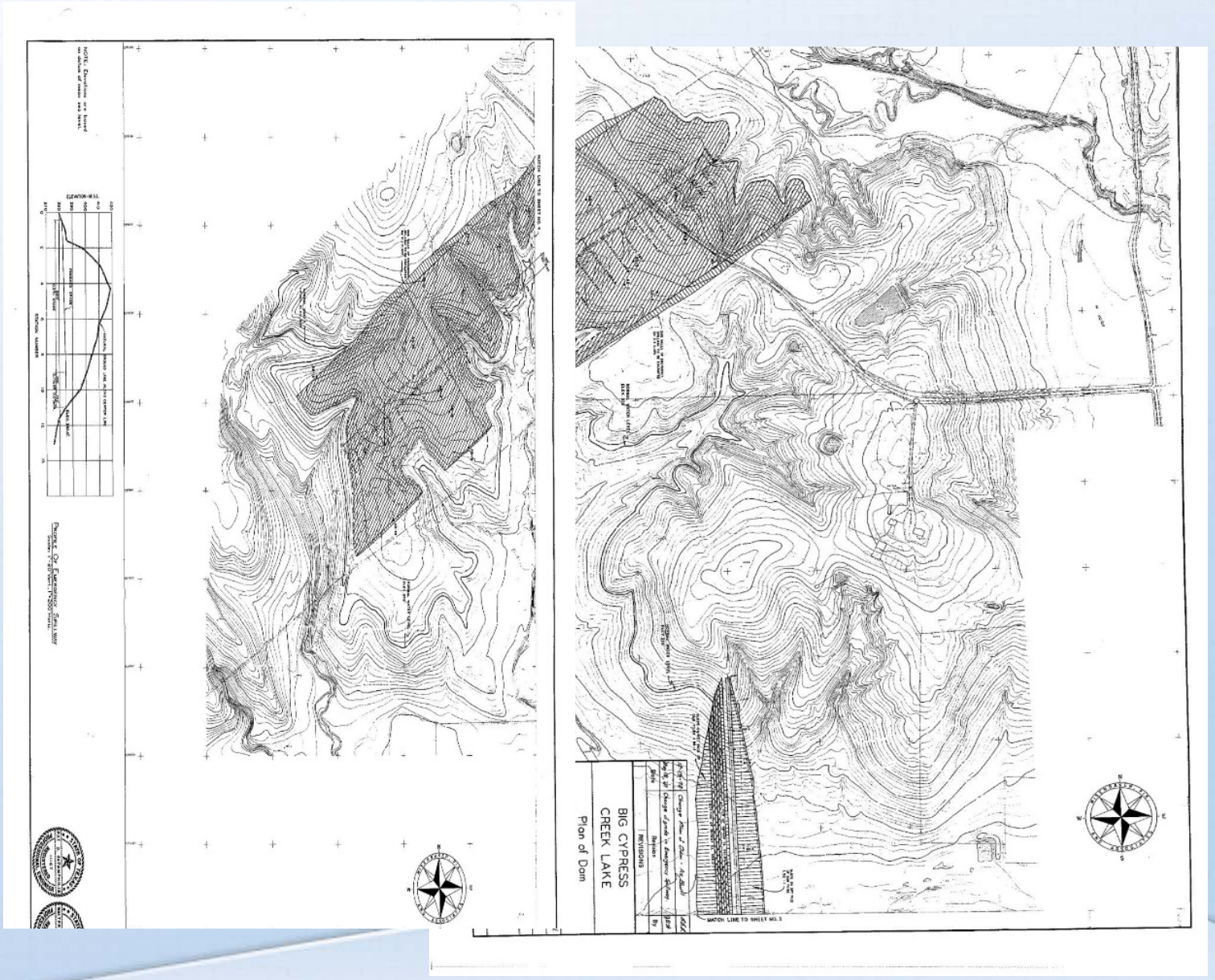
LCS Emergency Spillway Cross Section



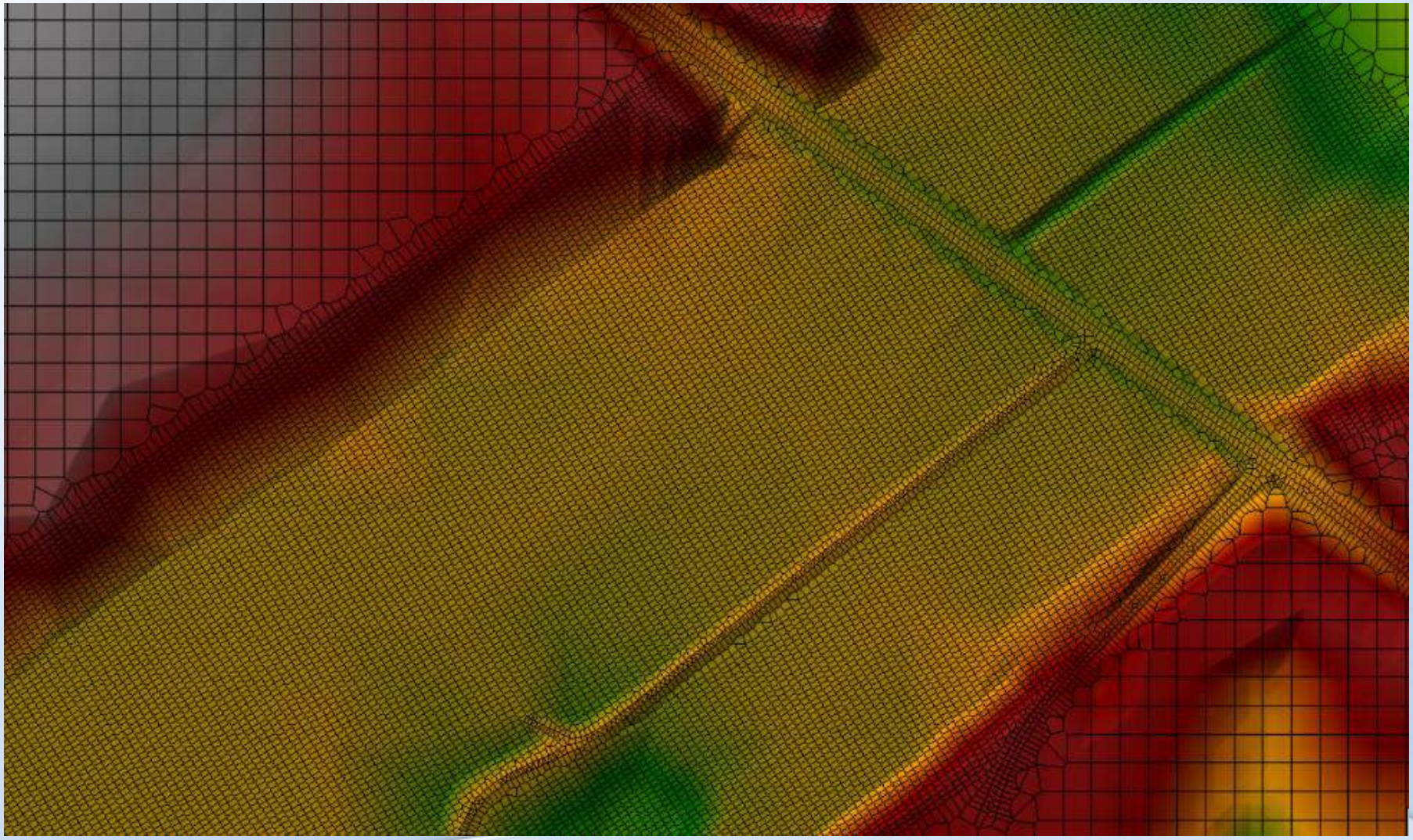
Emergency Spillway Restoration Possibility



Original Design



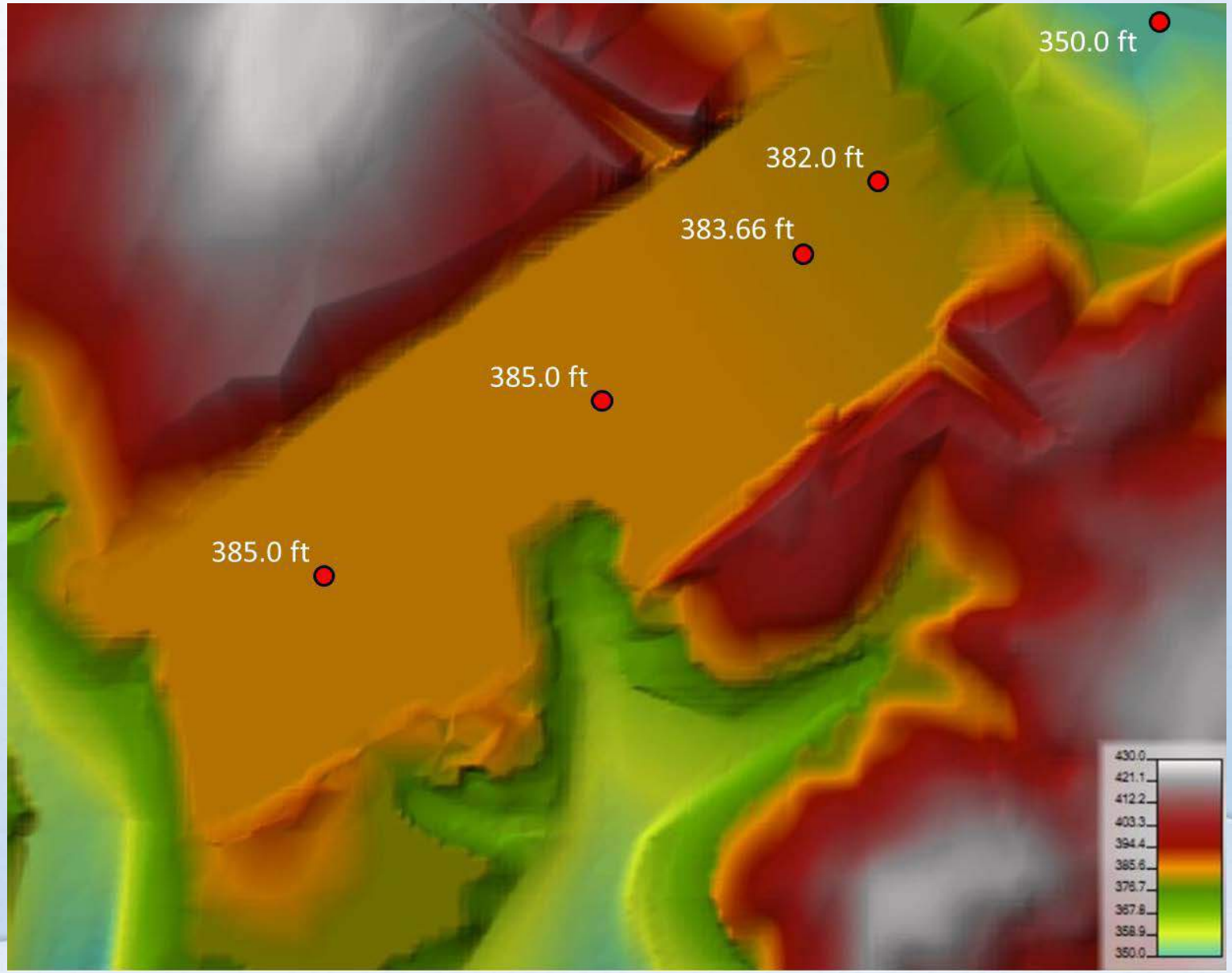
2D Hydraulic Mesh



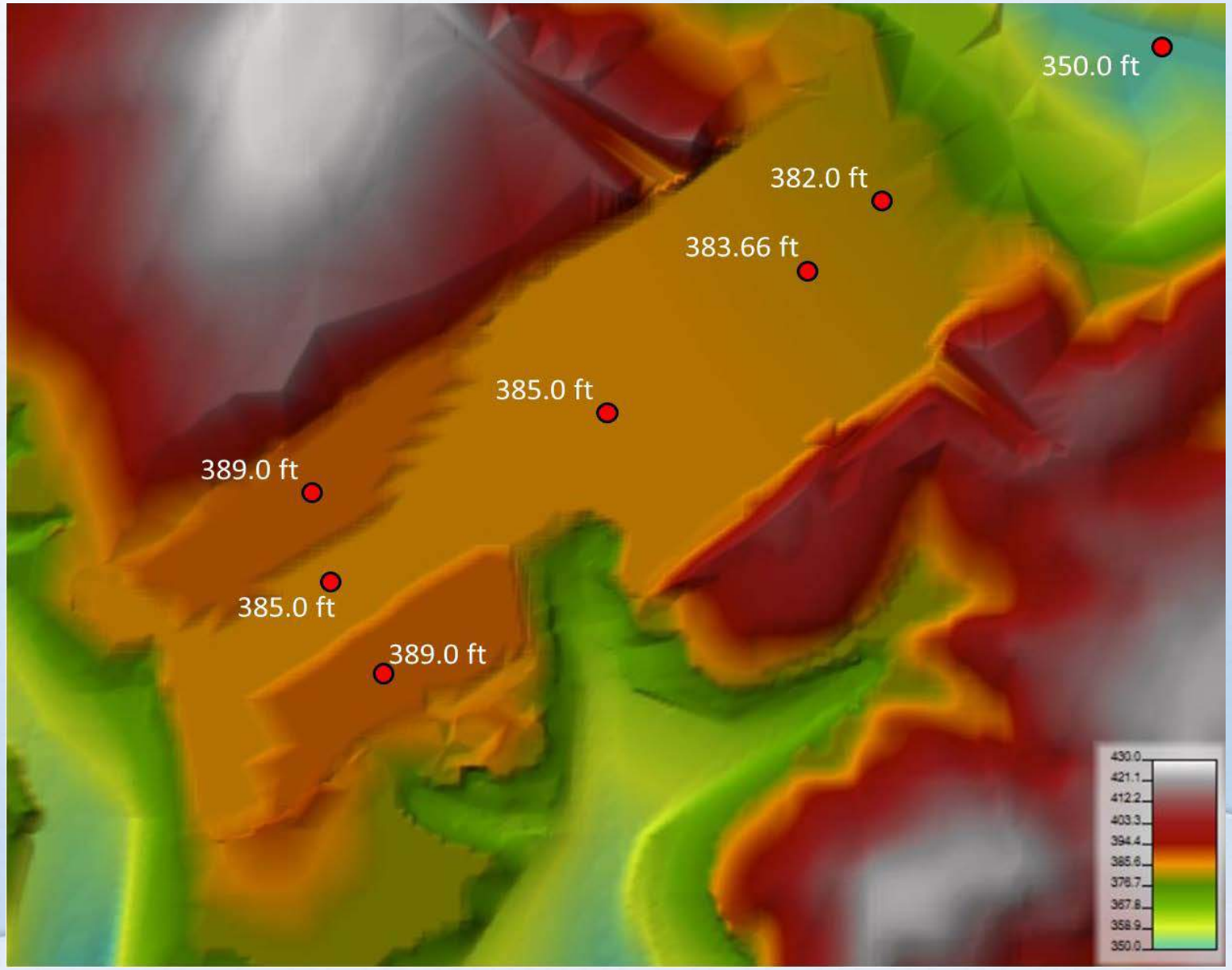
Alternatives

- **Alternative 1**
  - Leave the spillway as it is
- **Alternative 2**
  - Renovate the spillway back to original design
    - Includes lowering of FM3122
    - Removal of all fill materials offsite
- **Alternative 3A**
  - Includes lowering of FM3122
  - Re-deposition of material throughout the emergency spillway corridor.
- **Alternative 3B**
  - Leaving FM3122 as it is
  - Re-deposition of material throughout the emergency spillway corridor.

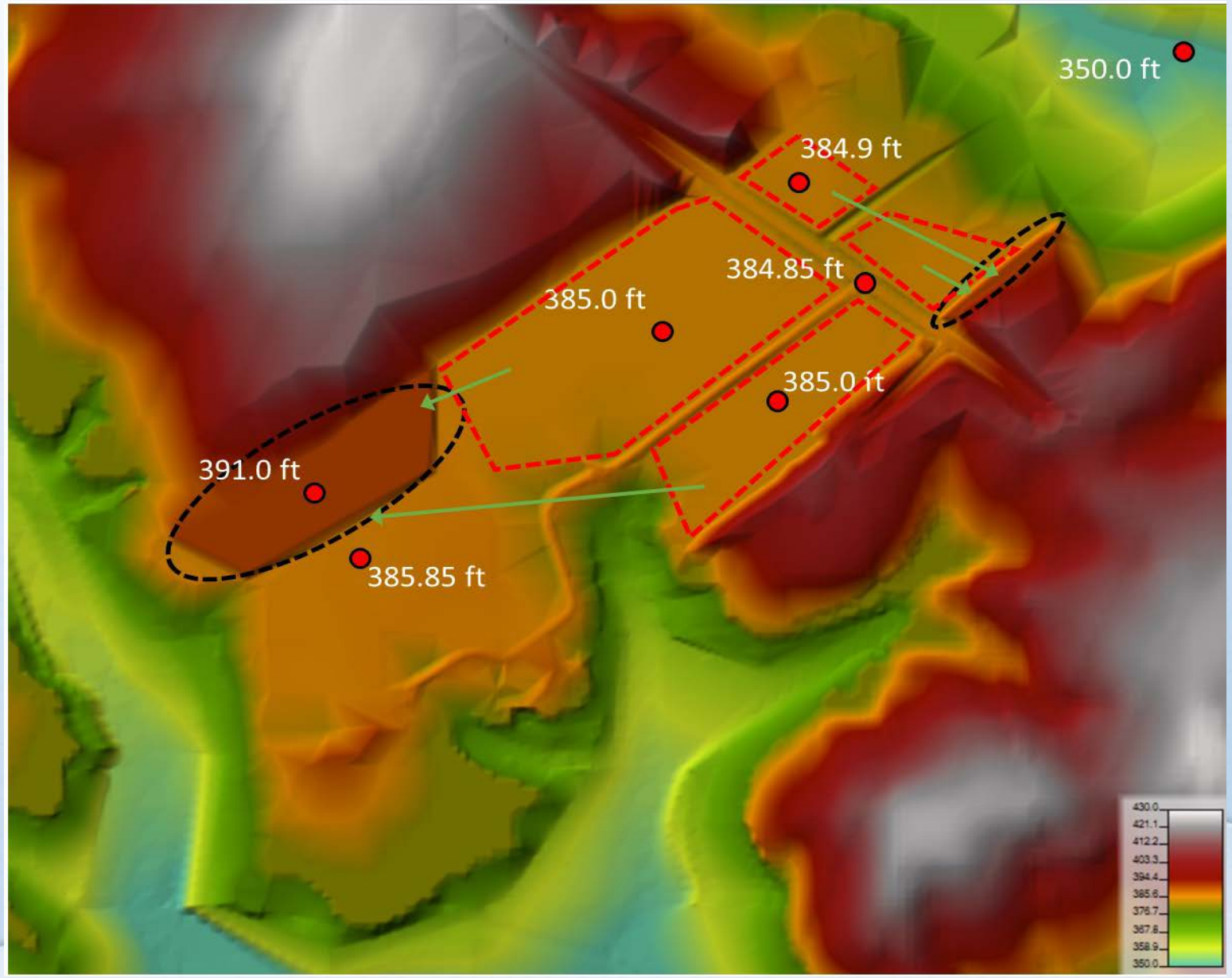
Alternative 2



Alternative 3A



Alternative 3B



Video Links

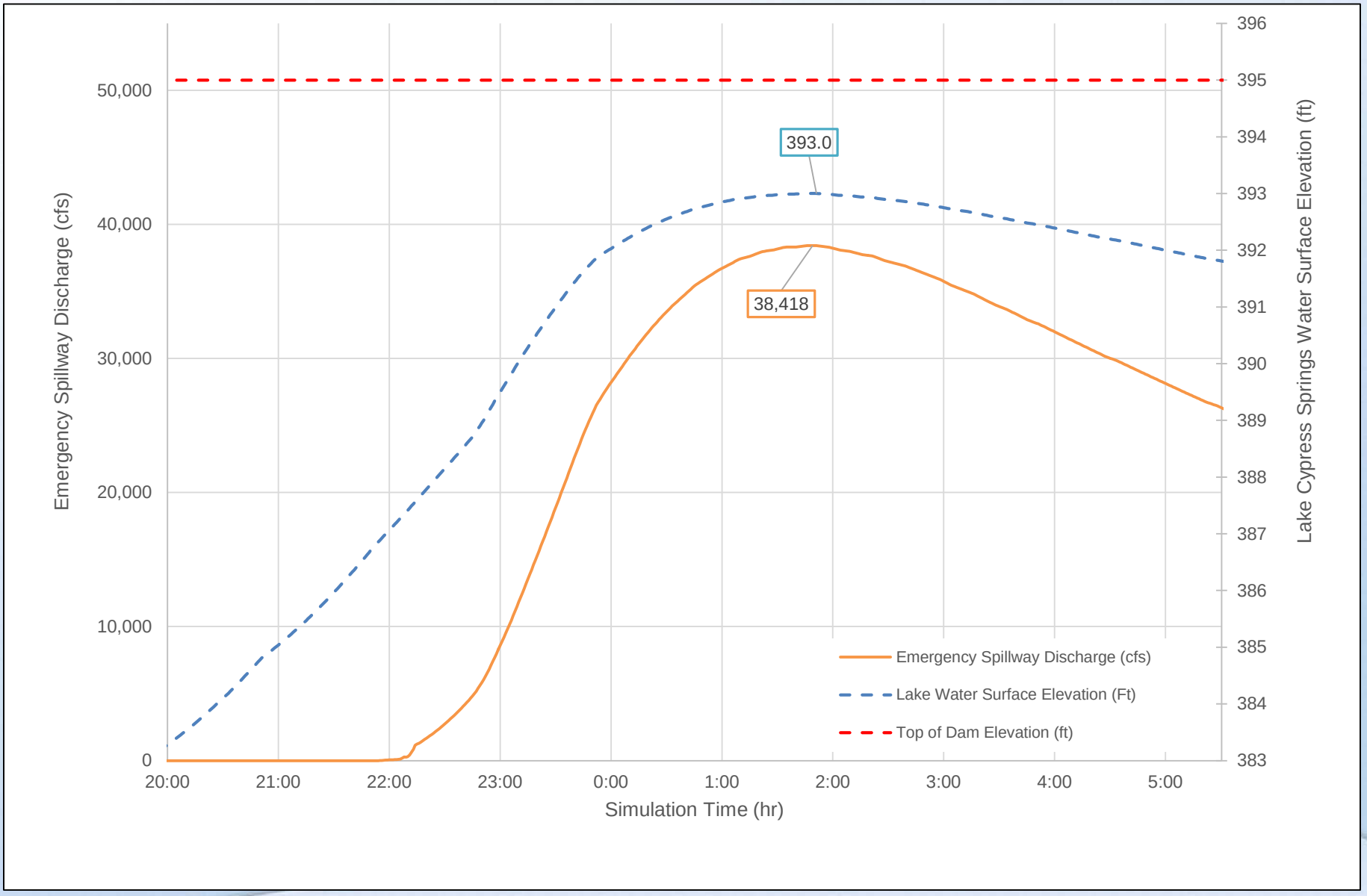
Alternative1 Timeseries Depth Aerial

Alternative1 Qpeak Velocity Aerial

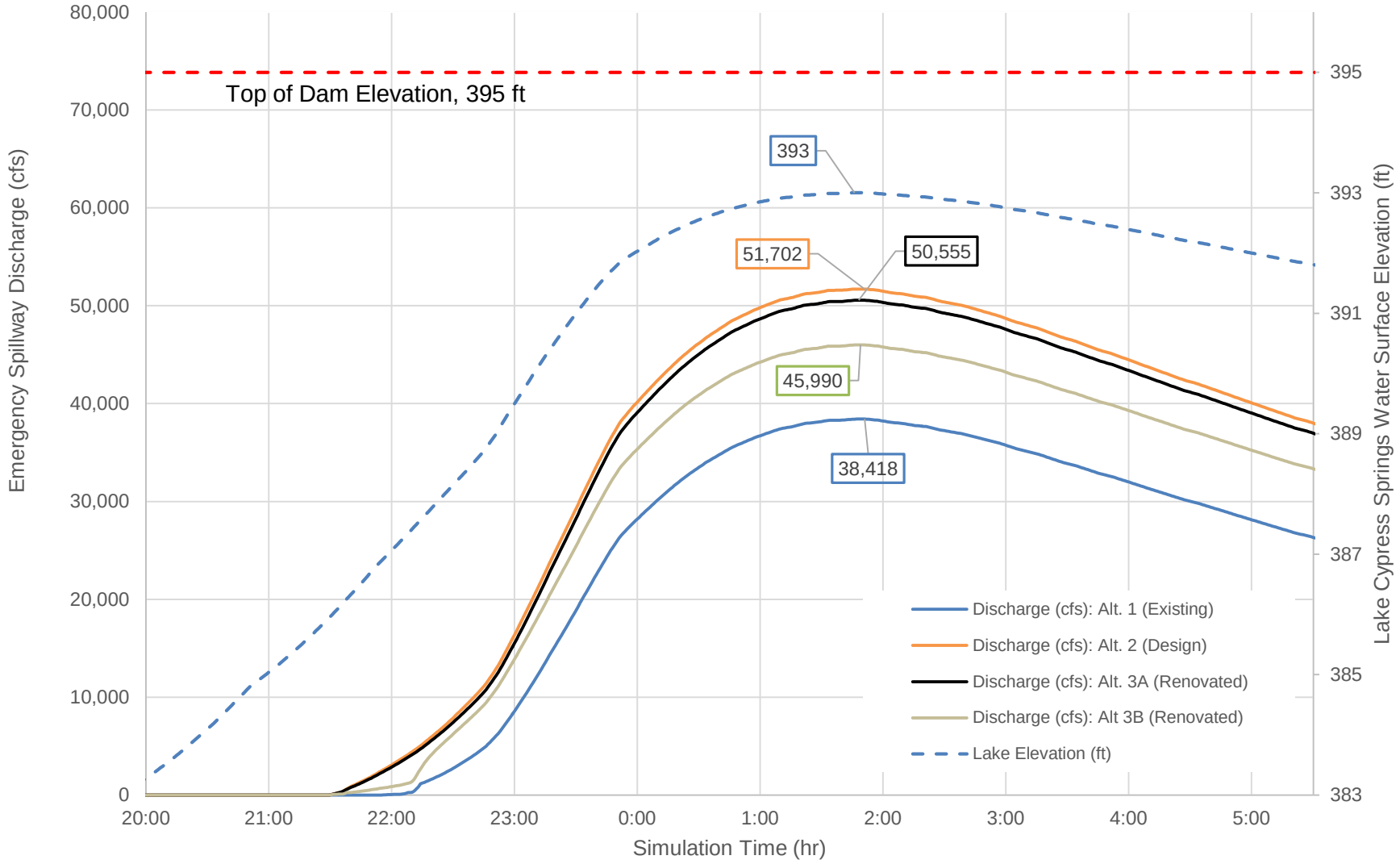
Alternative3B Timeseries Depth Aerial

Alternative3B Qpeak Velocity Aerial

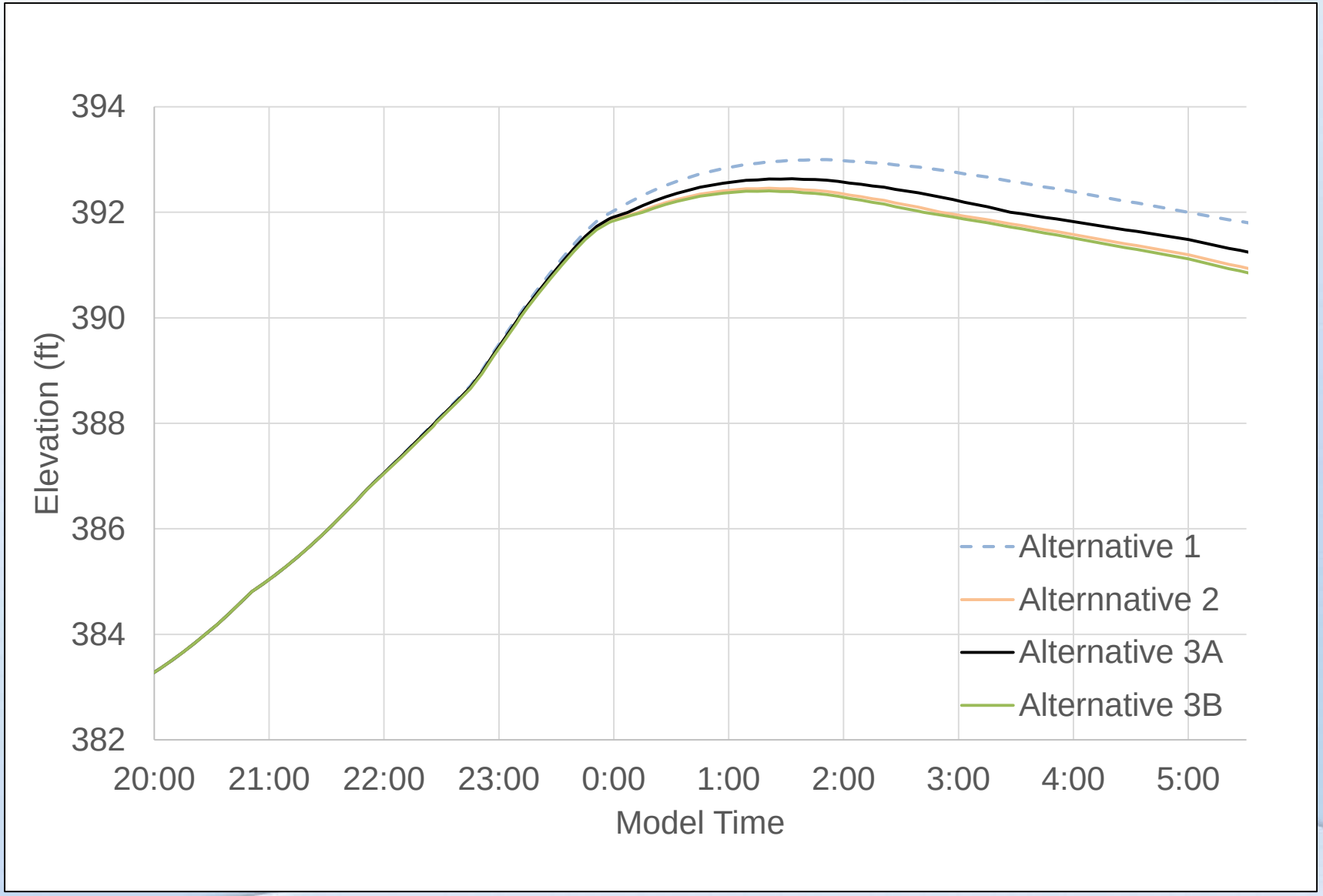
Alternative 1



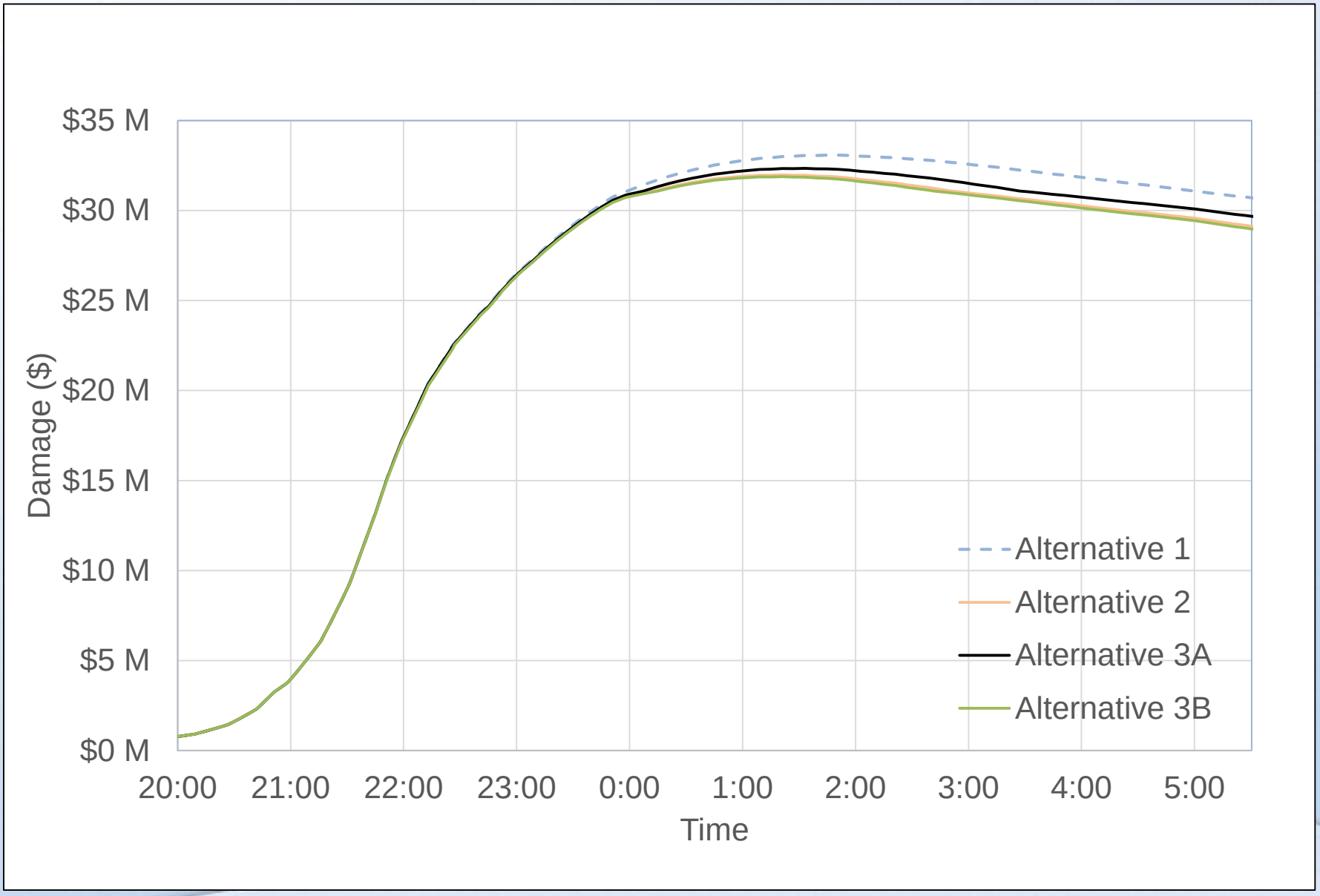
Discharge vs. Model Time



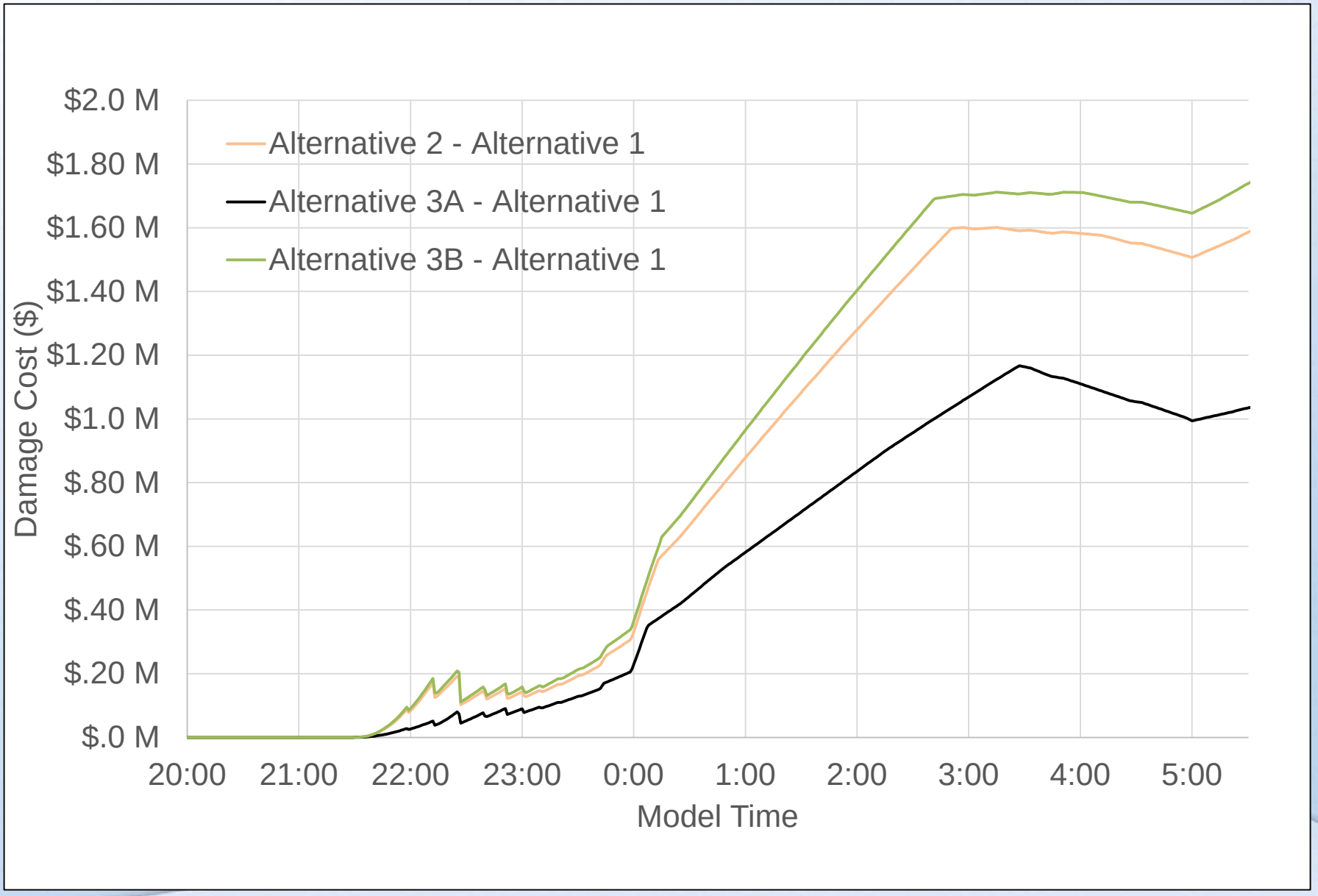
Elevation vs. Model Time



Damage Cost vs. Model Time



Damage Cost Differentials vs. Time



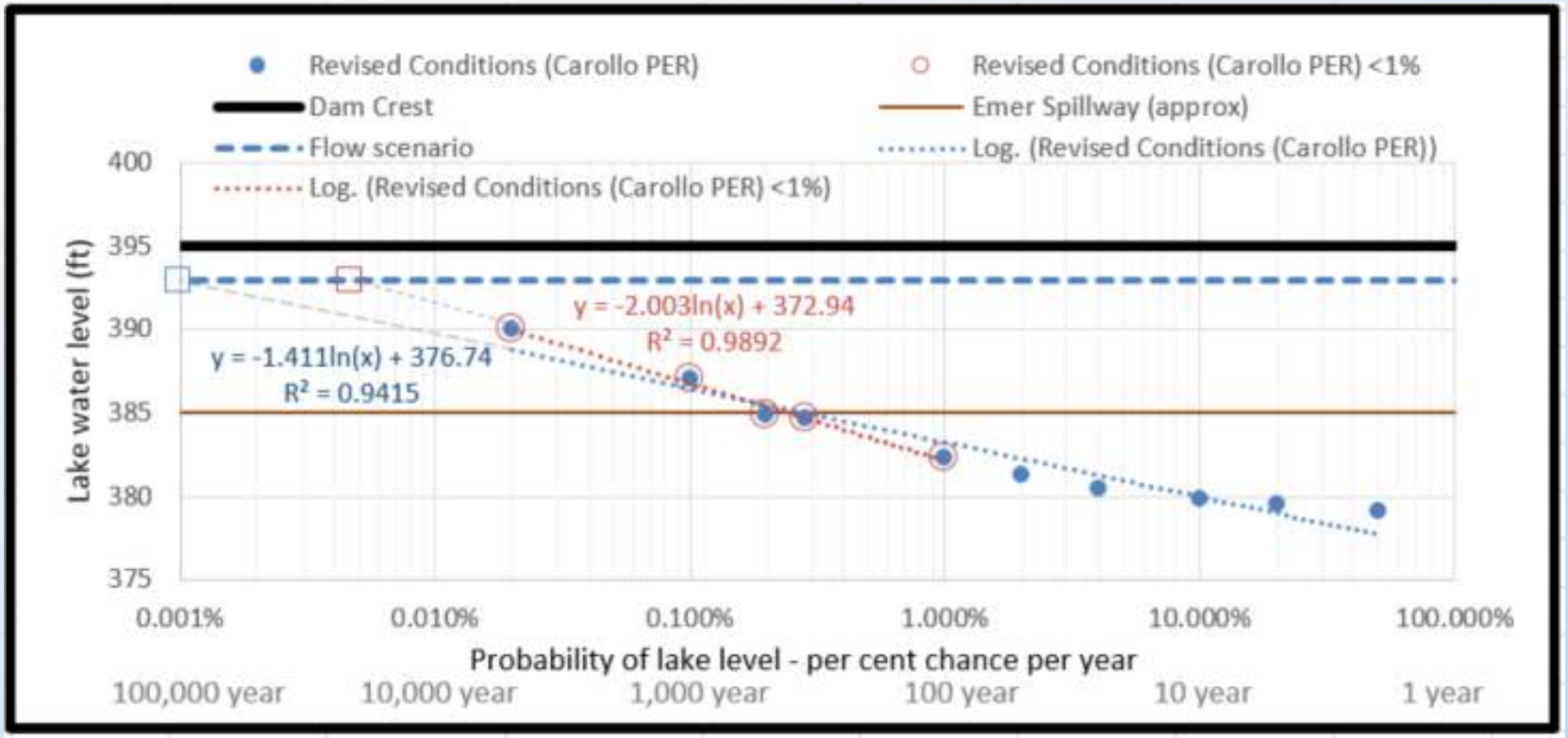
Timestep (hrs)	Water Surface Elevation (ft)				Notes
	Alternative No. 1 (Existing)	Alternative No. 2 (Design)	Alternative No. 3A (Renovated)	Alternative No. 3B (Renovated	
0.00	382.82	382.83 0.00	382.83 0.00	382.83 0.00	*No Engagement of Emergency Spillway*
1.00	384.39	384.39 0.00	384.39 0.00	384.39 0.00	
2.00	386.29	386.29 0.00	386.29 0.00	386.29 0.01	*Water Rising*
3.00	388.48	388.44 0.48	388.46 0.24	388.43 0.60	
4.00	391.39	391.27 1.44	391.31 0.96	391.25 1.68	
5.00	392.66	392.29 4.44	392.42 2.88	392.26 4.80	*Peak Timestep*
6.00	392.99	392.43 6.72	392.62 4.44	392.37 7.44	
7.00	392.86	392.10 9.12	392.37 5.88	392.02 10.08	*Water Falling*
8.00	392.52	391.71 9.72	391.94 6.96	391.65 10.44	
9.00	392.14	391.33 9.72	391.60 6.48	391.26 10.56	

Inches of Difference

ALTERNATIVE 2 PROPOSED COSTS		
START-UP, MOBILIZATION, SECURITY, & SW3P ITEMS	$85,050	
EMERGENCY SPILLWAY DIRT WORK ITEMS	$870,000	
FM 3122 ROAD RENOVATION ITEMS	$162,500	
DESIGN FEES (SURVEY, GEOTECH, ENGINEERING, ETC.)	$187,633	
CONTINGENCY	**20%**	$261,037
TOTAL:	**$1,566,000**	

ALTERNATIVE 3A PROPOSED COSTS		
START-UP, MOBILIZATION, SECURITY, & SW3P ITEMS	$74,288	
EMERGENCY SPILLWAY DIRT WORK ITEMS	$511,250	
FM 3122 ROAD RENOVATION ITEMS	$162,500	
DESIGN FEES (SURVEY, GEOTECH, ENGINEERING, ETC.)	$132,206	
CONTINGENCY	**20%**	$176,049
	$1,056,000	

ALTERNATIVE 3B PROPOSED COSTS		
START-UP, MOBILIZATION, SECURITY, & SW3P ITEMS	$69,150	
EMERGENCY SPILLWAY DIRT WORK ITEMS	$502,500	
FM 3122 ROAD RENOVATION ITEMS	$0	
DESIGN FEES (SURVEY, GEOTECH, ENGINEERING, ETC.)	$105,748	
CONTINGENCY	**20%**	$135,480
	$813,000	



Extrapolating the trendlines of probability results in a calculated probability of reaching 393' between 0.005% annual chance **(20,000-year)** and 0.001% annual chance **(100,000-year).**

Alternatives	OPCC Cost	Damage Difference at Peak Timestep = 10.77 hr.	BC-Ratio
Alternative 1 (Existing)	$0	N/A	N/A
Alternative 2 (Design)	$1,566,000	$1,104,445	0.71
Alternative 3A (Renovated)	$1,056,000	$741,397	0.70
Alternative 3B (Renovated)	$813,000	$1,203,963	1.48

* It takes between a 20,000-year and 100,000-year storm event to break even on the capital investment of the emergency spillway project

Lake Cypress Springs E-Spillway

Key Board-Decision Elements		
Project Cost	Storm Frequency (Risk)	Property Damages

Questions