

BUDD INLET TREATMENT PLANT
VULNERABILITY ASSESSMENT
ATTRIBUTED TO CLIMATE CHANGE



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OUTLINE

- Study Variables
- Combined system
- Flooding vulnerabilities
- Strategies to mitigate
- Summary



Prepared for: LOTT Clean Water Alliance
Project Title: LOTT Budd Inlet Treatment Plant Vulnerability Assessment
Project No.: 143957

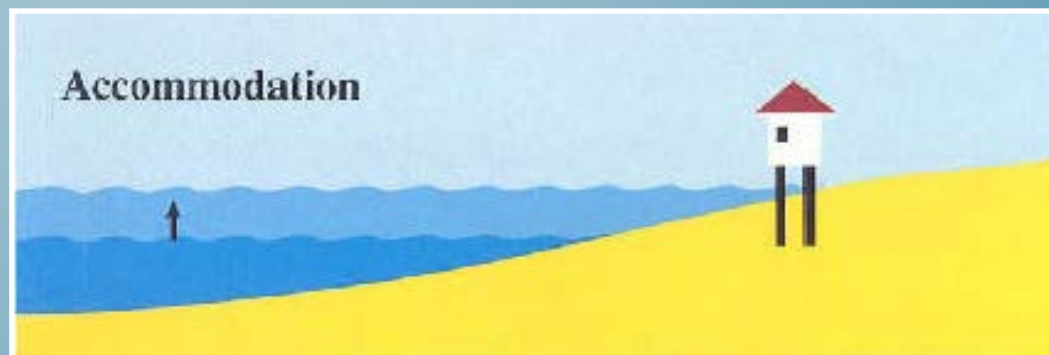
Technical Memorandum

Subject: Budd Inlet Treatment Plant Vulnerability Assessment Attributed to Climate Change
Date: September 12, 2014
To: LOTT Clean Water Alliance
From: Adam Klein
Copy to: Tyle Zuchowski

Prepared by: Ali Poldo, Brown and Caldwell

Reviewed by: Adam Klein, Brown and Caldwell

STRATEGIES



VARIABLES

- *Sea level rise (low, medium, high)*
 - *0.25, 0.50, 1.83 feet*
- *High tides (100-year return frequency)*
- *Waves (0.43 feet)*
- *Storm surge and precipitation runoff*

TIDAL ELEVATIONS

Modeled ranges

14.4
to
11.2

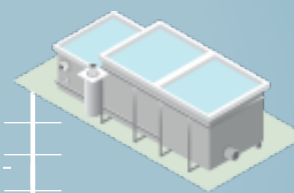


Olympia Flood Model (14.4)

UW very high SLR (12.8)

100-year tide (10.94)

15



**Treatment Plant Sits
at 12 to 20 Feet**

10

mean high high water (7.14)

mean high water (6.13)

5

mean sea level (0)

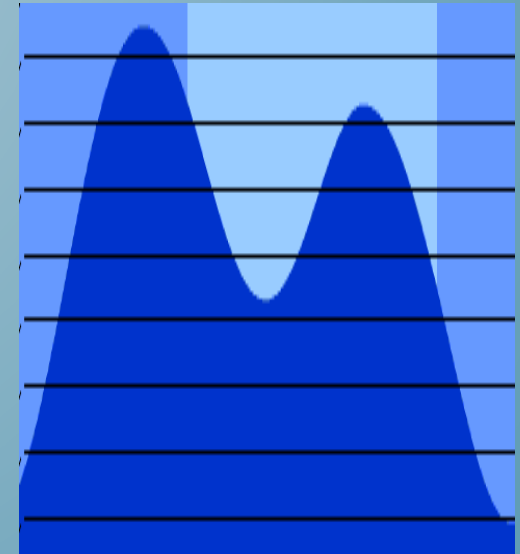
0

mean
tide
range

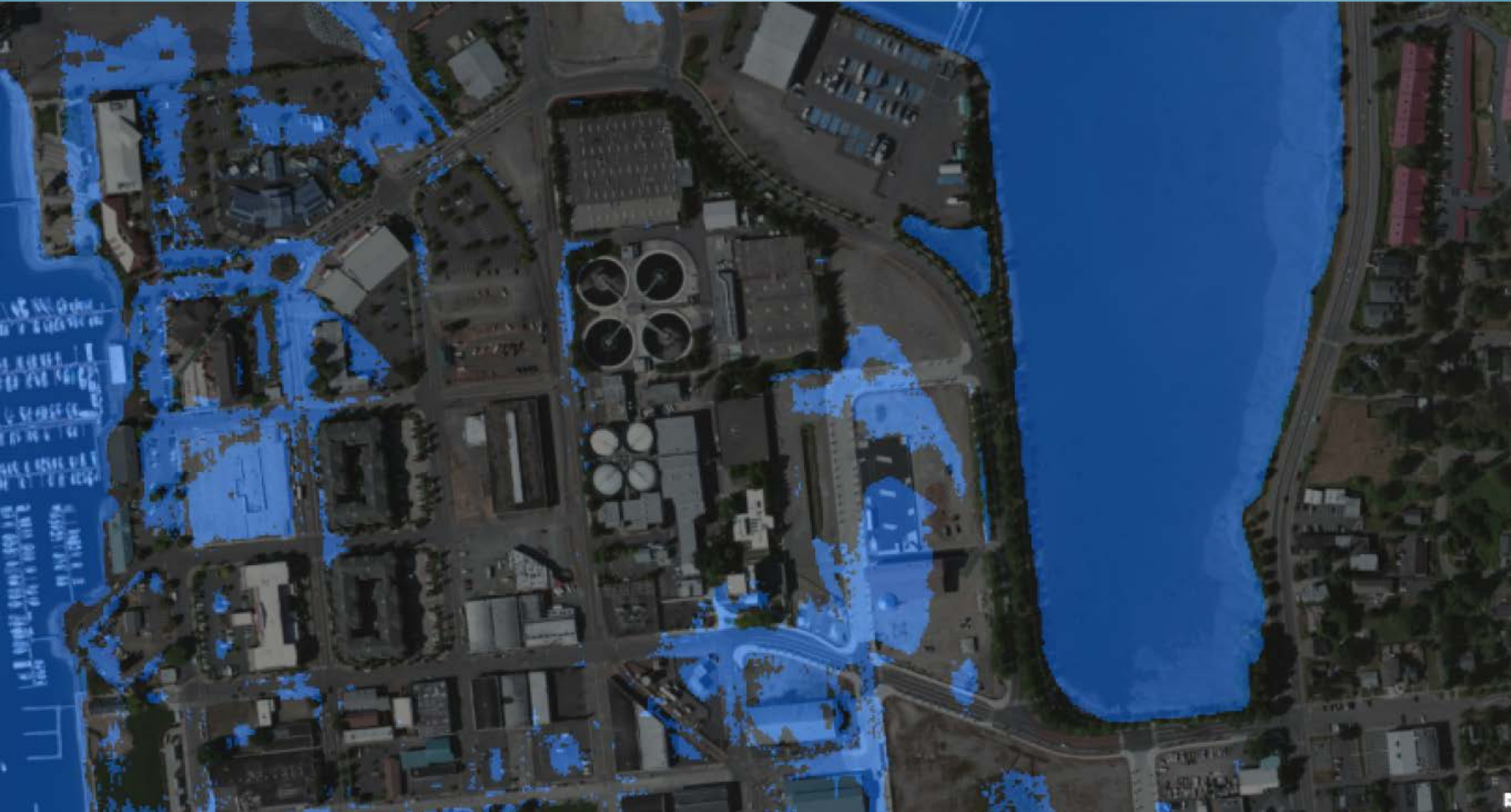
mean low water (-4.36)

mean low low water (-7.42)

Feet from mean
sea level

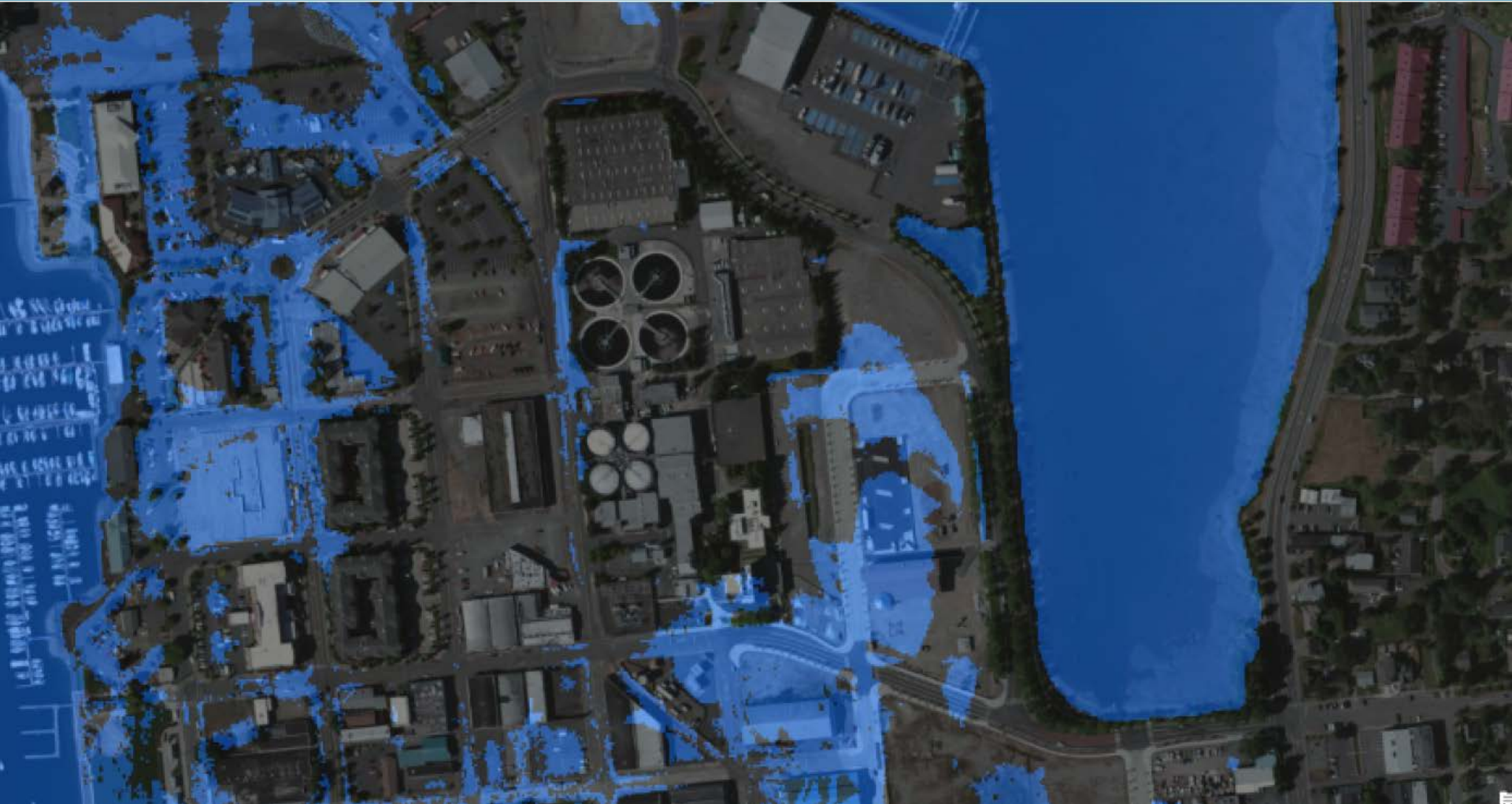


UW very low sea level rise (11.2 feet)



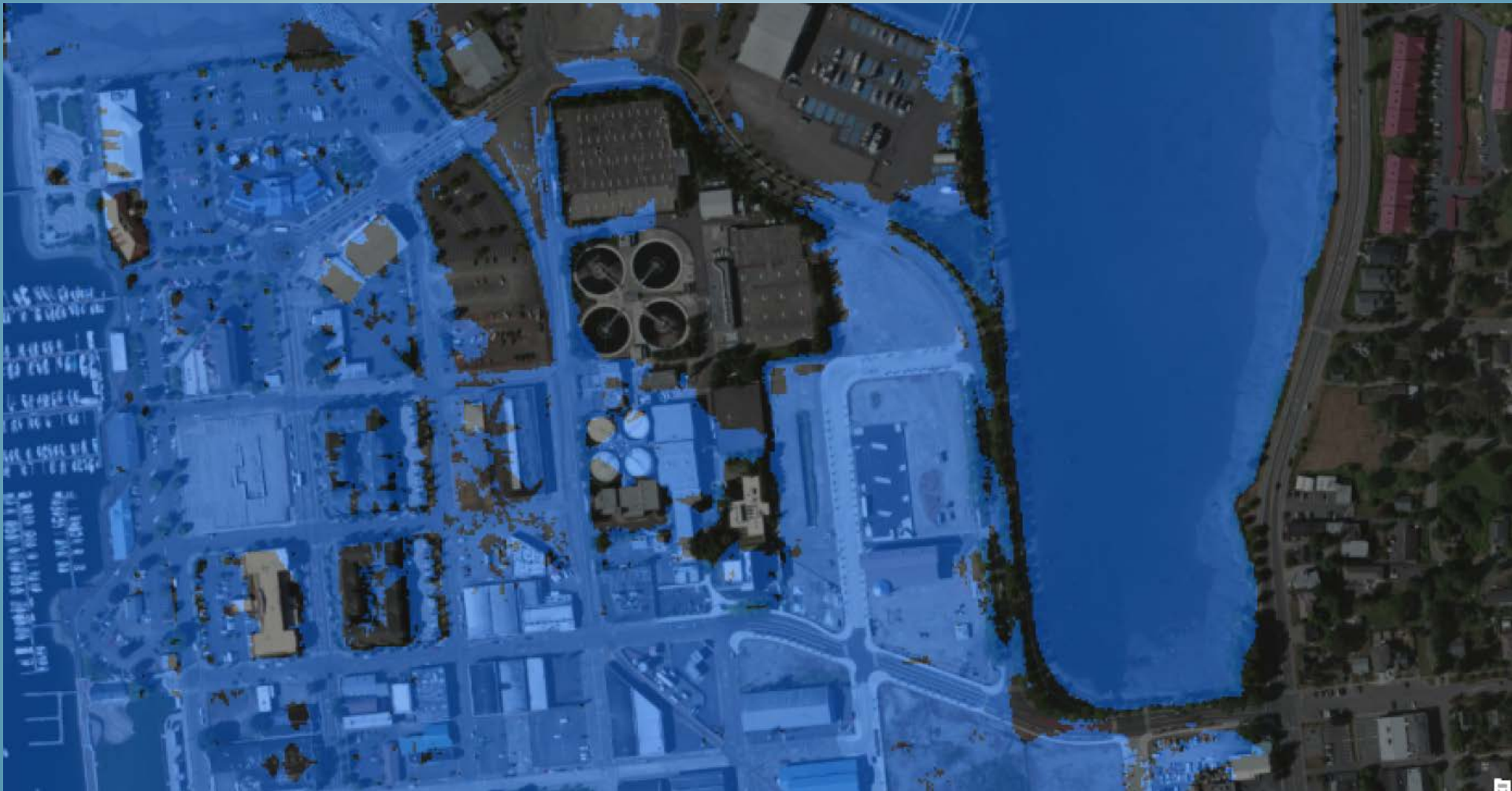
0.20 feet SLR

UW medium sea level rise (11.4 feet)



0.50 feet SLR

UW very high sea level rise (12.8 feet)



1.83 feet SLR

100-year tidal wave (13.4 feet)



2.00 feet SLR with 0.43 tidal wave

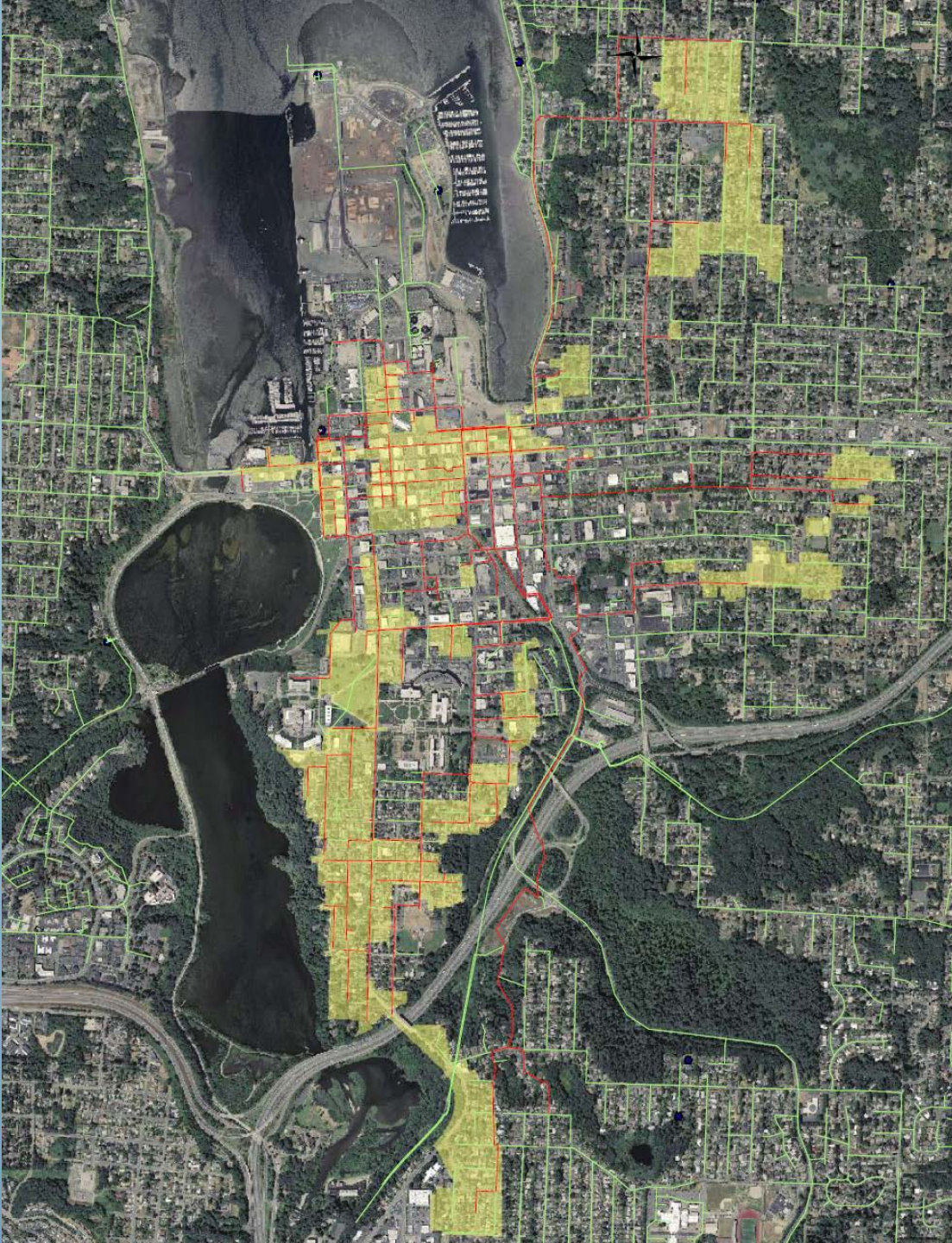
Olympia Flood Model (14.4 feet)



2.0 feet SLR with extreme 100-yr storm runoff

COMBINED STORM/SEWER SYSTEM

351 Acres



FLOW TO LOTT: AVERAGE OVER LAST 8 YEARS

Parameter	Flow (MGD)
Base Flow	8.8
Annual Average	11.3
Maximum Monthly Average	15.4
Maximum Day	35.8
Peak Hourly	56.5
Instantaneous	72

POTENTIAL FLOODING

Area	Ground elevation (ft)	UW very low SLR	UW medium SLR	UW very high SLR	100-year tidal wave	Olympia flood model
Projected flood elevation		111.2	111.4	112.8	113.4	114.4
Main utilidor	~100.5	Y	Y	Y	Y	Y
Puget Sound Energy electrical substation	~112	N	N	Y	Y	Y
Service entry switchgear	~112	N	N	Y	Y	Y
Maintenance building	112	N	N	Y	Y	Y
Solids handling building	112	N	N	Y	Y	Y
Digesters	112	N	N	Y	Y	Y
Effluent pump station	112.5	N	N	Y	Y	Y
Administration building	112.9	N	N	N	Y	Y
New primary clarifier substation	~113	N	N	N	Y	Y
Headworks building	113	N	N	N	Y	Y
Electrical substation A/B	113	N	N	N	Y	Y
Backup generators	113	N	N	N	Y	Y
UV building	114	N	N	N	N	Y
South RAS pump station	114.5	N	N	N	N	N
Secondary clarifiers	114.8	N	N	N	N	N
Electrical substation C/D	114.9	N	N	N	N	N
Electrical substation E/F	114.9	N	N	N	N	N
Electrical substation G/H	114.9	N	N	N	N	N
Blower building	115	N	N	N	N	N
Intermediate pump station	116	N	N	N	N	N
First aeration	116	N	N	N	N	N
Primary clarifiers (both)	118.2	N	N	N	N	N
First anoxic	119.2	N	N	N	N	N
Second anoxic	119.2	N	N	N	N	N

VULNERABILITIES

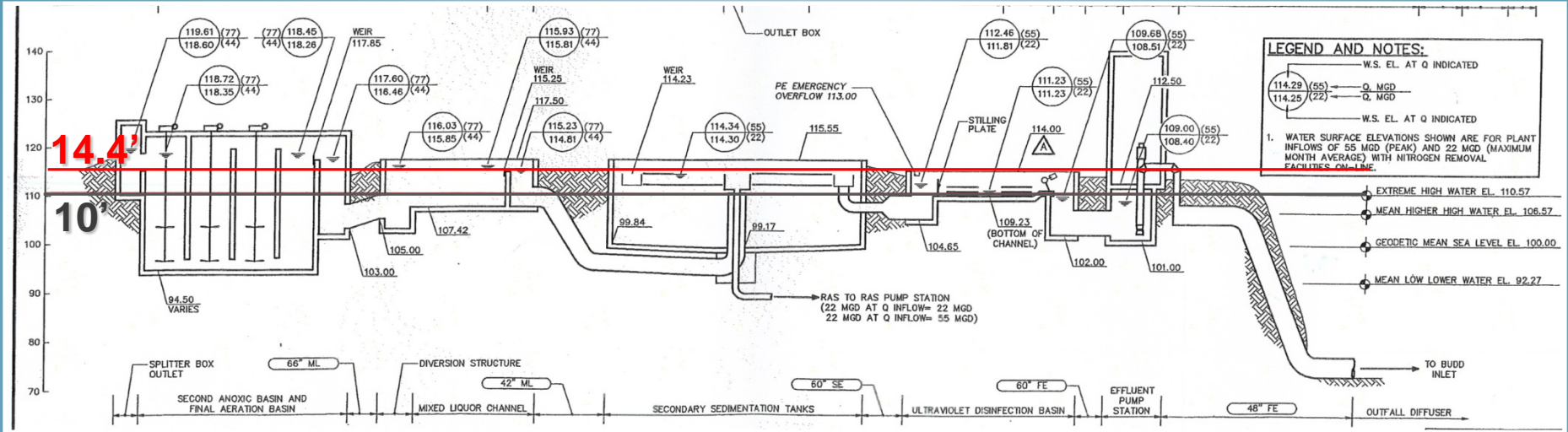
- *Utilidor (~0.5 feet)*
 - *Electrical equipment*
 - *Piping and appurtenances*
- *Headworks (13 feet)*
 - *Influent pumps (-19 feet)*
 - *Back up generator(13 feet)*
 - *Motor control centers (13 feet)*
- *Effluent pumping (12.5)*
 - *Pumps*
 - *Electrical*
- *Substations*
 - *Service entry switchgear (12 feet)*
 - *LOTT substations (13.0 to 14.9 feet)*
 - *PSE Substation (12 feet)*

2nd Anoxic

Secondary Clarifiers

UV

Effluent Pump Station

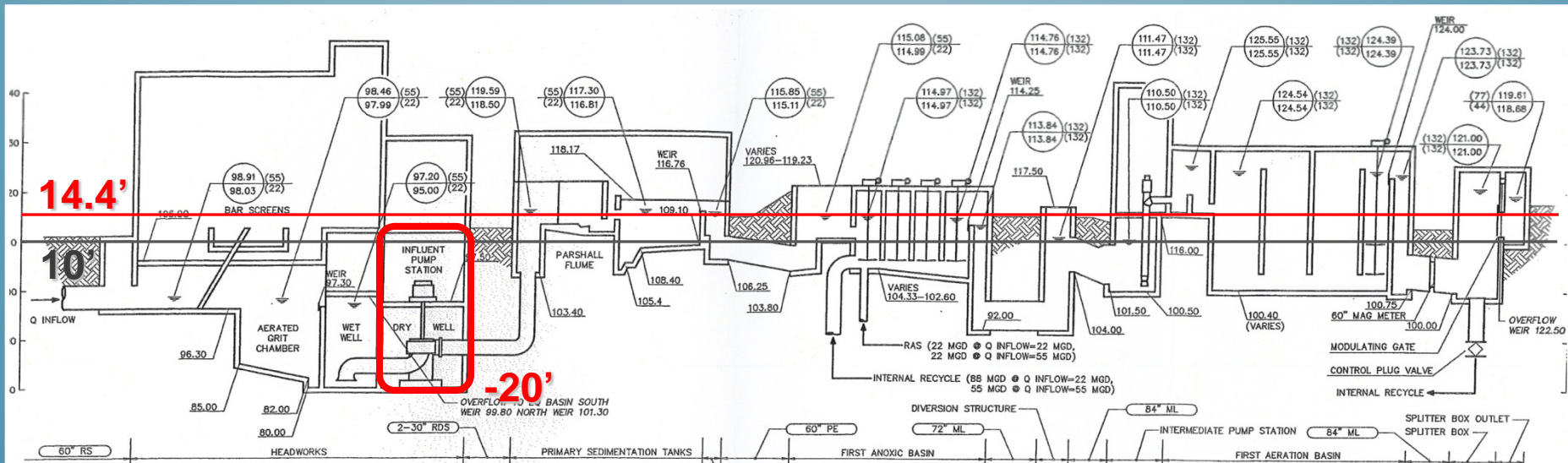


Head Works

West Primaries

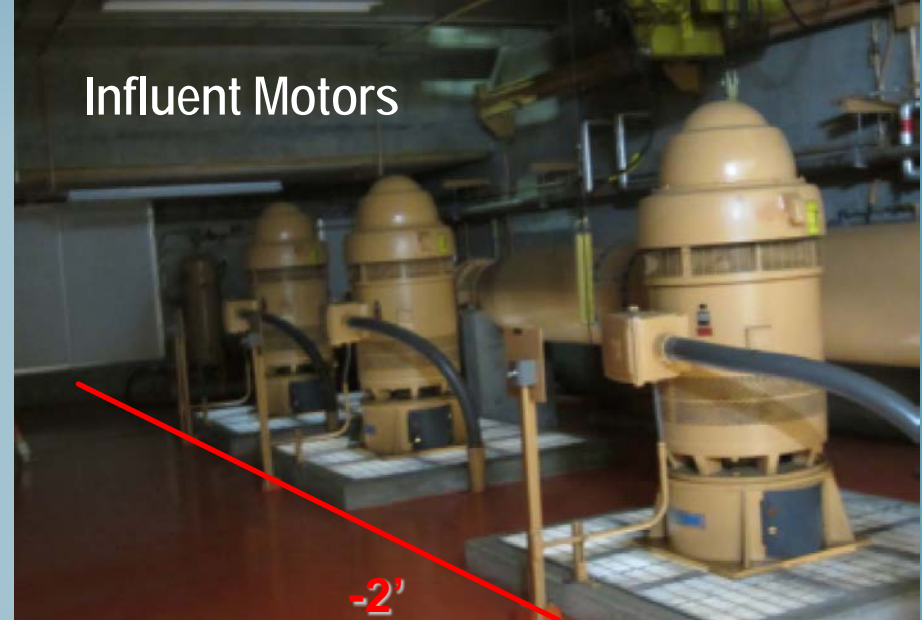
1st Anoxic

1st Aeration



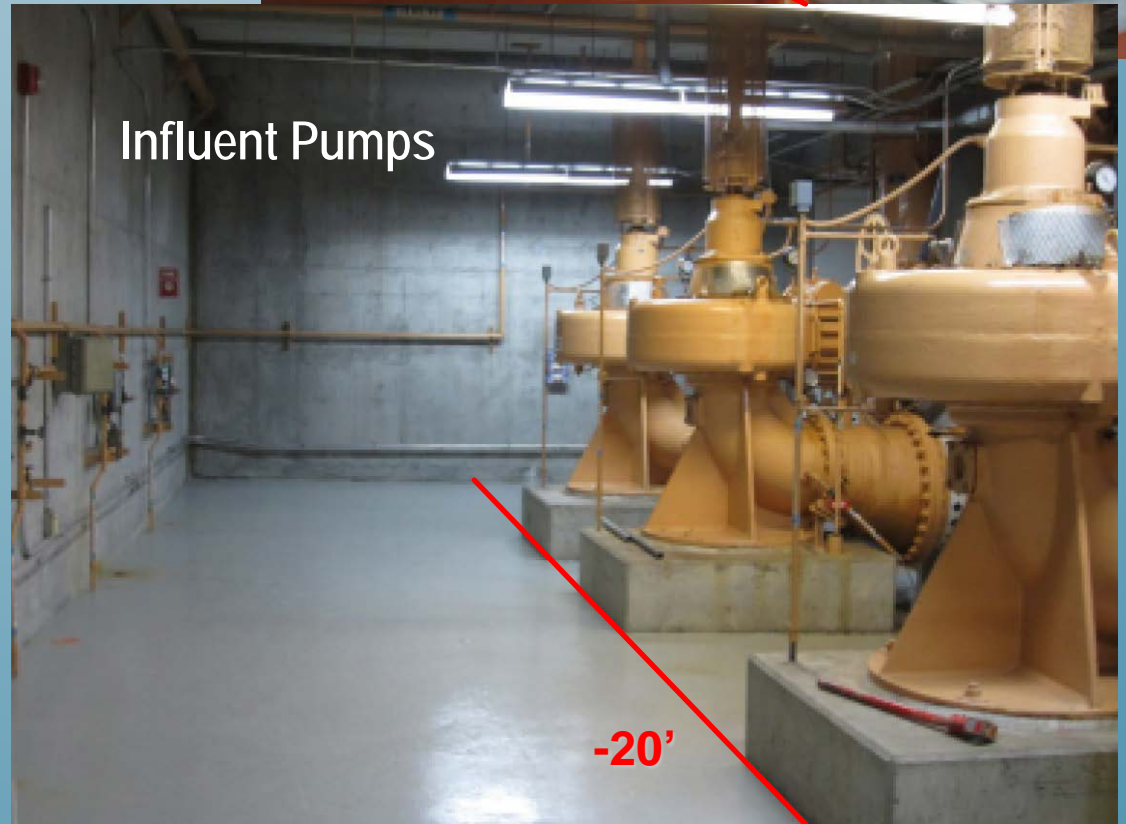
HEADWORKS

Influent Motors



-2'

Influent Pumps



-20'

The 80 Level

Motor Control Centers



Backup Generators



Backup Generators



13'

Backup Generator
Ventilation Fan Grill

EFFLUENT PUMPING





12'

Service Entry Switch Gear (12 feet)



PSE SUBSTATION (12 FEET)

RECOMMENDATIONS

- *Design standards*
- *Raise key electrical infrastructure*
- *Separate combined system*
- *Increase influent/effluent pumping*
- *Develop sandbagging protocols*
- *Continue to coordinate with City*

QUESTIONS?