

SCADA / Electrical Refurbishment Construction Contract

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Operations & Maintenance



- Supervisory Control And Data Acquisition
- LWDD “Interbasin Study” (c. 1992) concluded with the recommendation for installation of water control structure automation
 - Several sites were subsequently automated, but currently are not functional
- District began initial work on full-scale SCADA implementation in 2013

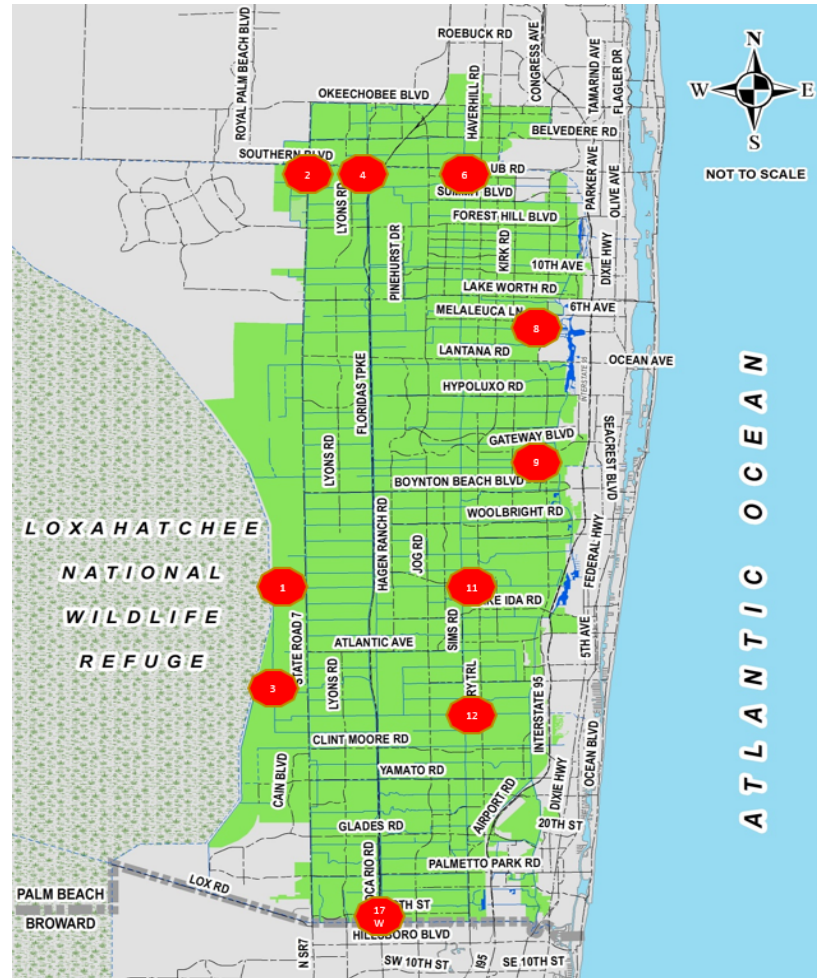


Telemetry (SCADA)

- Provides capability to automate water control operations
- Provide 'real time' data to make instant water supply and flood control decisions
- Enable staff to communicate in the field using software specifically designed for LWDD operations
- Provide security notification for control structures
- Provide backup power for emergency operations
- Improve communication with other flood control first responders including SFWMD and Palm Beach County to better coordinate efforts



Existing Major Control Structures



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Water Control Operations Summary



13' Basin

HW (ft. NGVD) **13.51**

Site Alarms

CS#4



CS#6



CS#8



Gate Summary

Pump Summary

16' Basin

HW (ft. NGVD) **15.31**

Site Alarms

CS#9



CS#11



CS#12



Gate Summary

Pump Summary

CS#2



CS#1



CS#3



Gate Summary

Pump Summary

Boca

HW (ft. NGVD) **7.31**

Site Alarms

CS#X



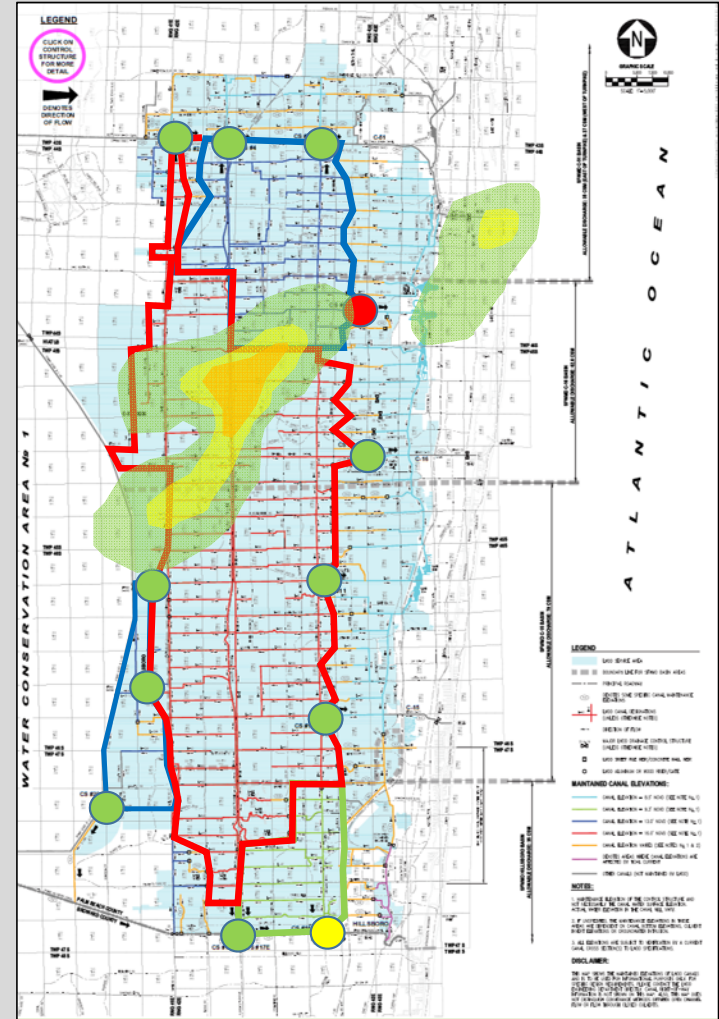
CS#x



Gate Summary

Pump Summary

- Gate Open
- Gate Closed
- Communication
- Failure
- Good
- In Range
- Near Range
- Exceed Range



Water Control Operations Basin Summary



Elevation 13' Basin

Control No. 4

HW (ft. NGVD)	13.41	North Gate	Center Gate	South Gate	Pump
TW (ft. NGVD)	7.78				
		Site Alarms			

Control No. 6

HW (ft. NGVD)	13.51	North Gate	Center Gate	South Gate	Pump
TW (ft. NGVD)	7.78				
		Site Alarms			

Control No. 8

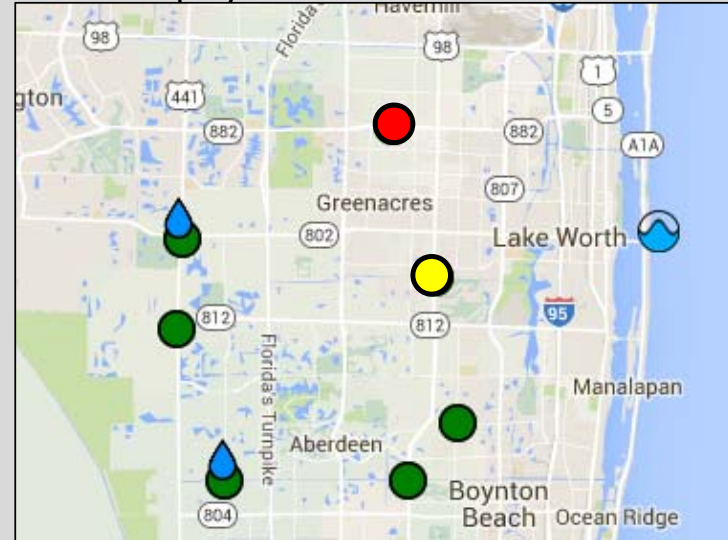
HW (ft. NGVD)	13.46	North Gate	Center Gate	South Gate	Pump
TW (ft. NGVD)	7.78				
		Site Alarms			

Control No. X

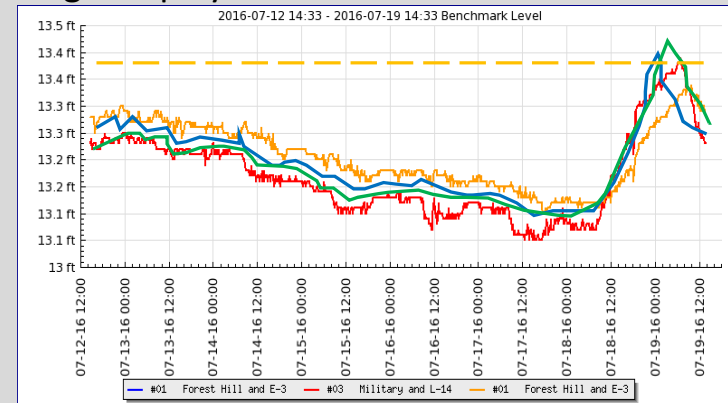
HW (ft. NGVD)	15.41	North Gate	Center Gate	South Gate
TW (ft. NGVD)	7.78			
		Site Alarms		

- Gate Open Gate Closed Communication Failure Good
- In Range Near Range Exceed Range

Alarm Display



Stage Display



Water Control Operations Structure Summary

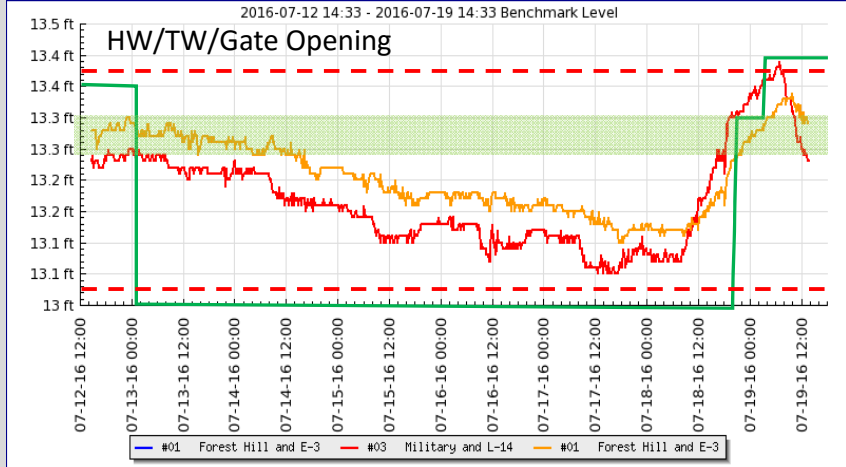


Elevation 13' Basin (Page No. 1) [Next Page](#) [Previous Page](#)

Control No. 4

HW (ft. NGVD)	13.41
TW (ft. NGVD)	7.78
High Alarm	14.00
Gate Open	13.10
Gate Close	12.40
Low Alarm	12.00

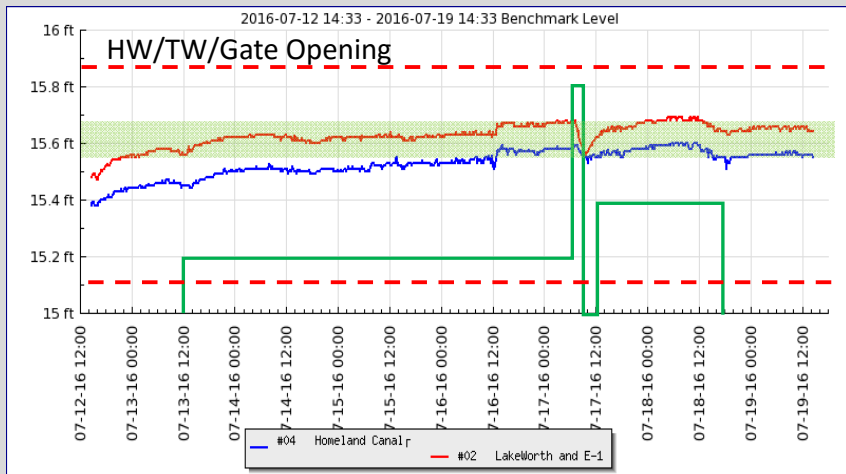
North Gate	Center Gate	South Gate	Pump
8 ft. 6.5 0 ft.	8 ft. 6.5 0 ft.	8 ft. 0 0 ft.	Gate Open (ft.)
Stage Alarm	Gate Alarm		
Power Alarm	Door Alarm		
Gen. Alarm	Well Alarm		



Control No. 6

HW (ft. NGVD)	13.51
TW (ft. NGVD)	7.78
High Alarm	14.00
Gate Open	13.10
Gate Close	12.40
Low Alarm	12.00

North Gate	Center Gate	South Gate	Pump
8 ft. 6.0 0 ft.	8 ft. 6.0 0 ft.	8 ft. 0 0 ft.	Gate Open (ft.)
Stage Alarm	Gate Alarm		
Power Alarm	Door Alarm		
Gen. Alarm	Well Alarm		



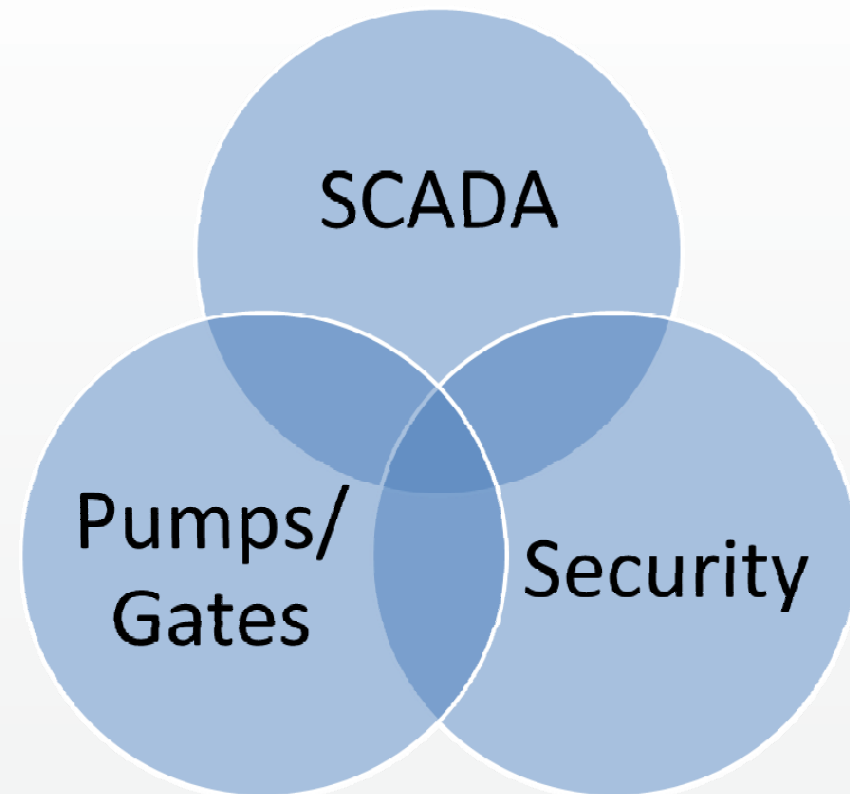
Structure Refurbishment Program

- Improvements to Aging Gates and Control Buildings
- New and/or Refurbished Water Control Gates
- New Gate Lifting Mechanisms (Actuators)
- New Electrical Systems
 - Power systems
 - Control Panels
- Site Lighting
- Fencing / Security

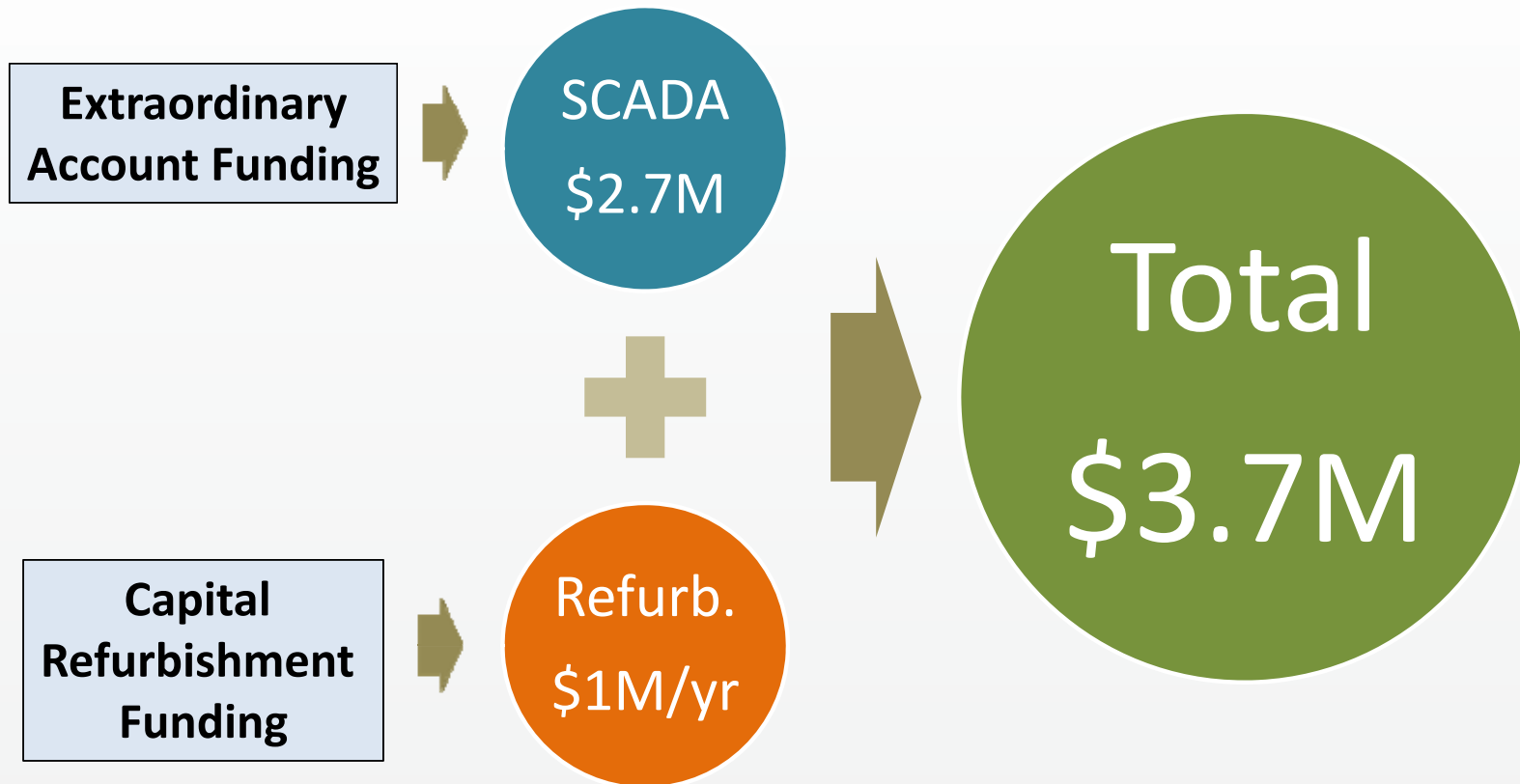


SCADA / Electrical Refurbishment Relationship

- SCADA System Implementation
- Refurbishment of Existing Water Control Structures
- Separate but interrelated activities...
- Both are related to the need for *consistent and reliable electrical power*



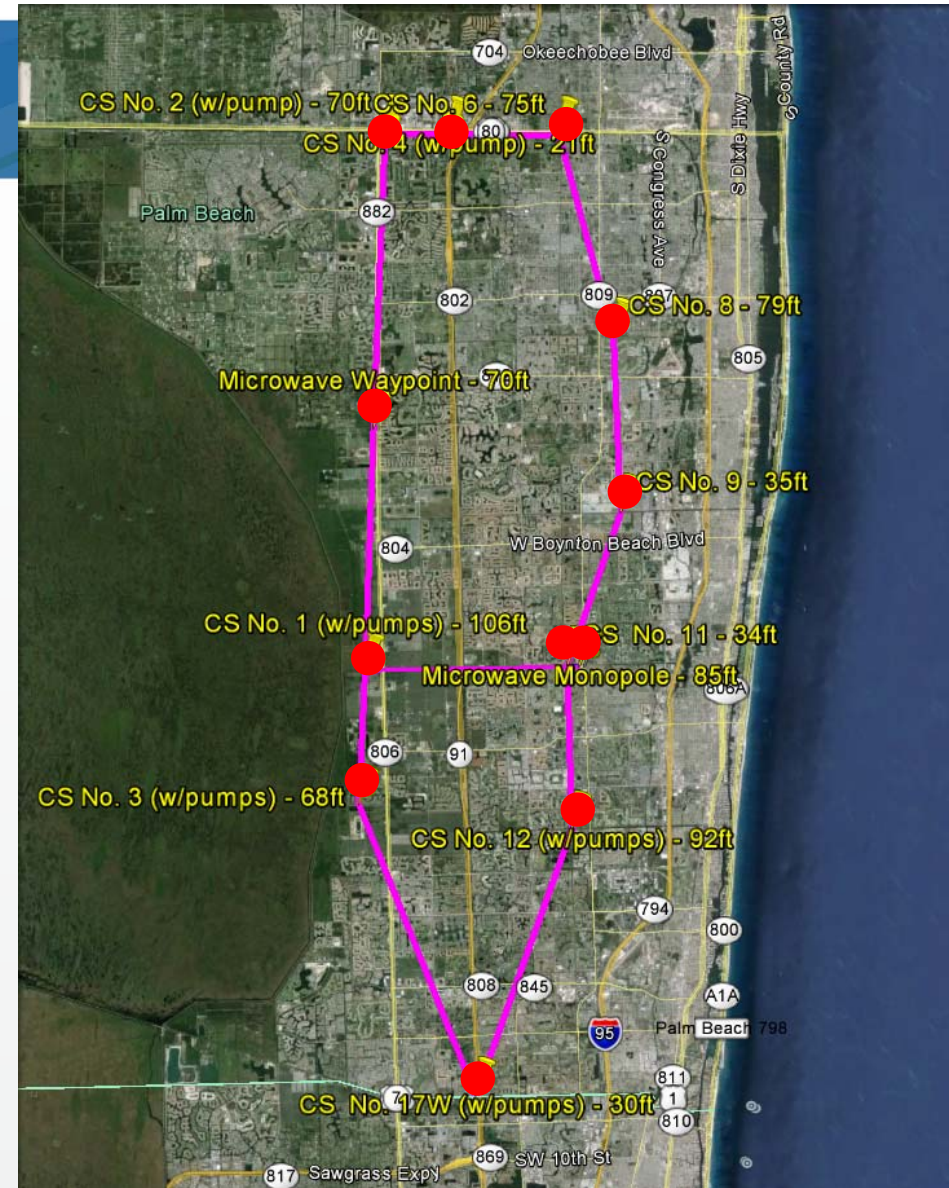
Budget



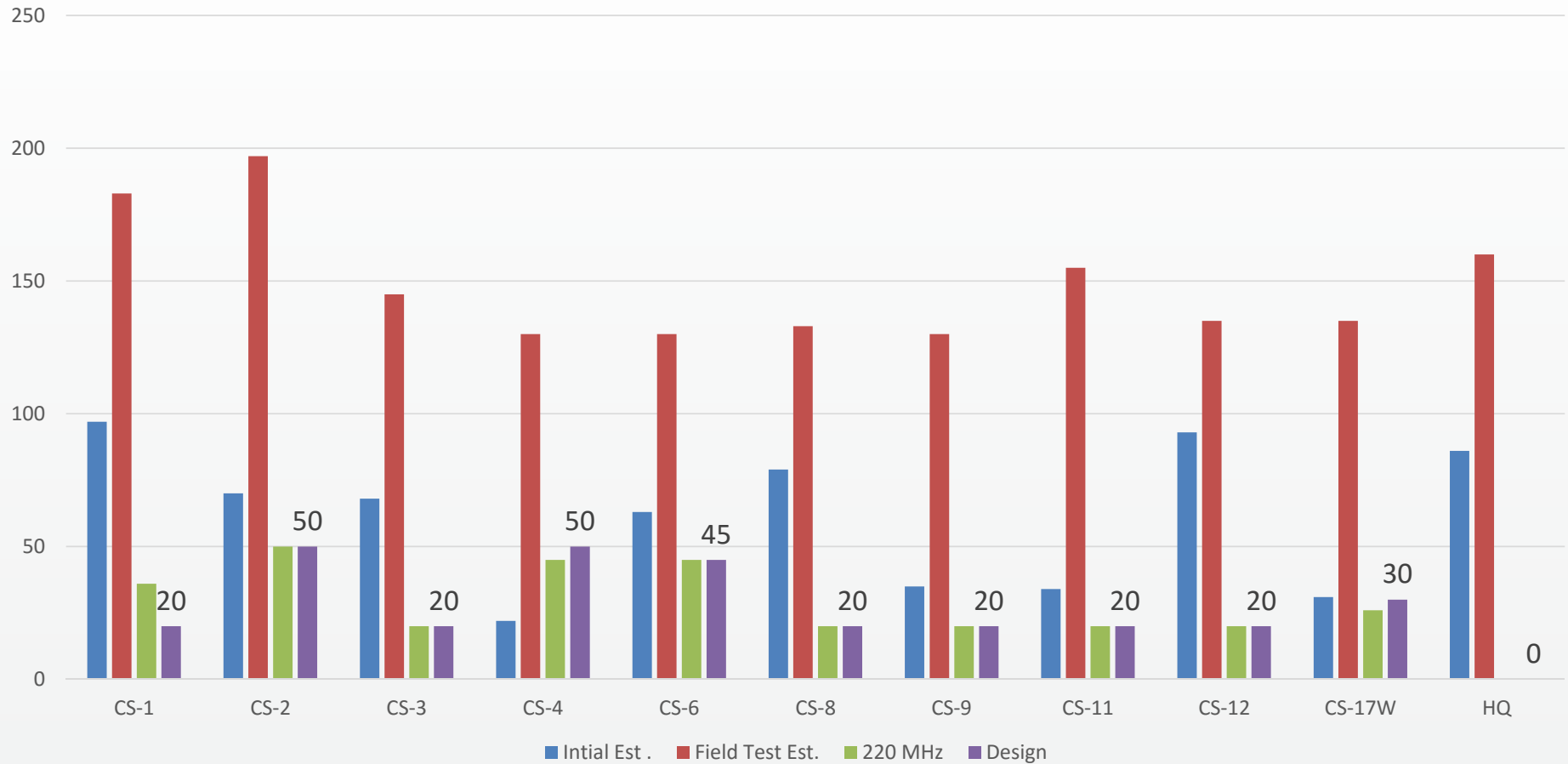
Original Conceptual Layout

Proposed microwave communication system for LWDD

- Remote/automated control of LWDD flood control gated spillways
- 12 hurricane hardened microwave communication towers
 - 10 major control structures
 - 1 microwave waypoint
 - 1 LWDD main campus location

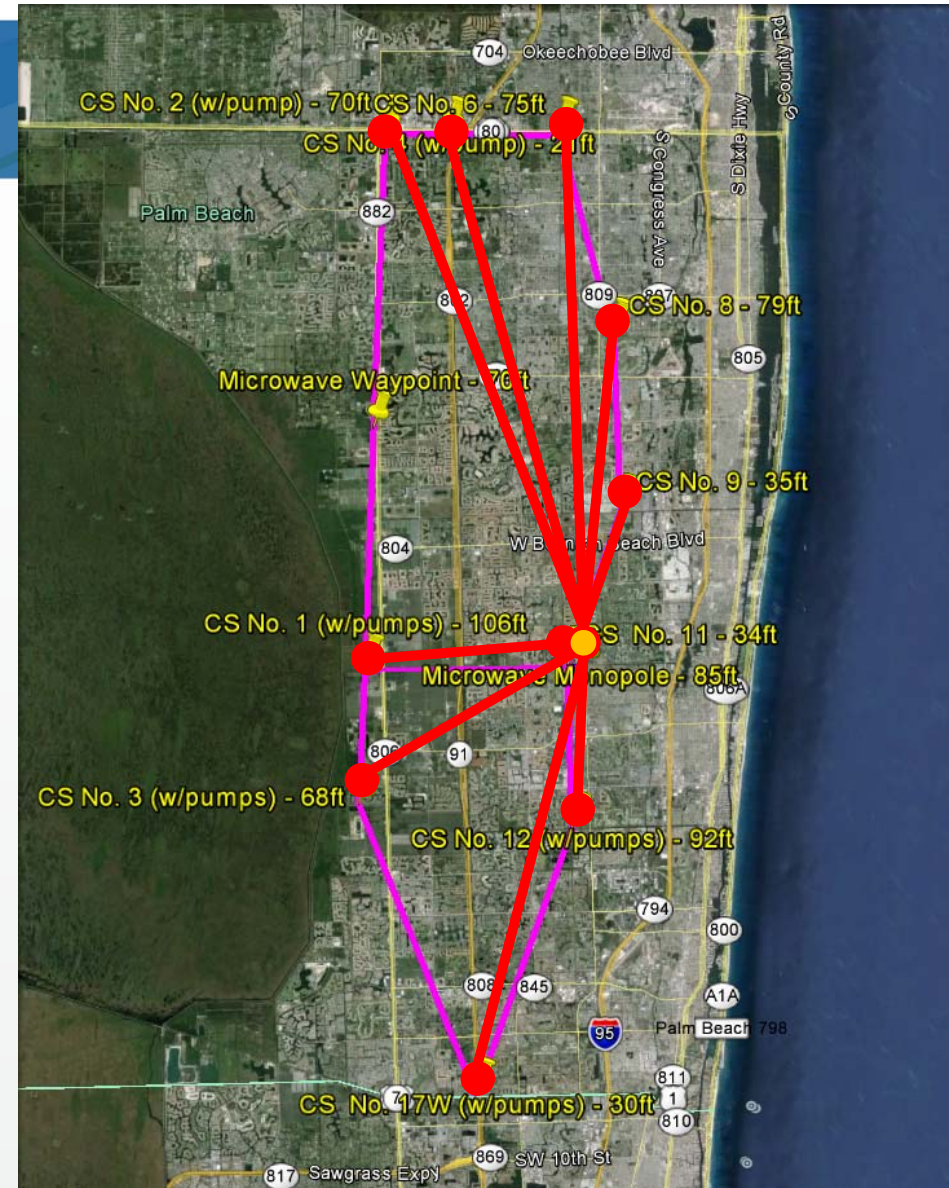


Tower Height Design Issues

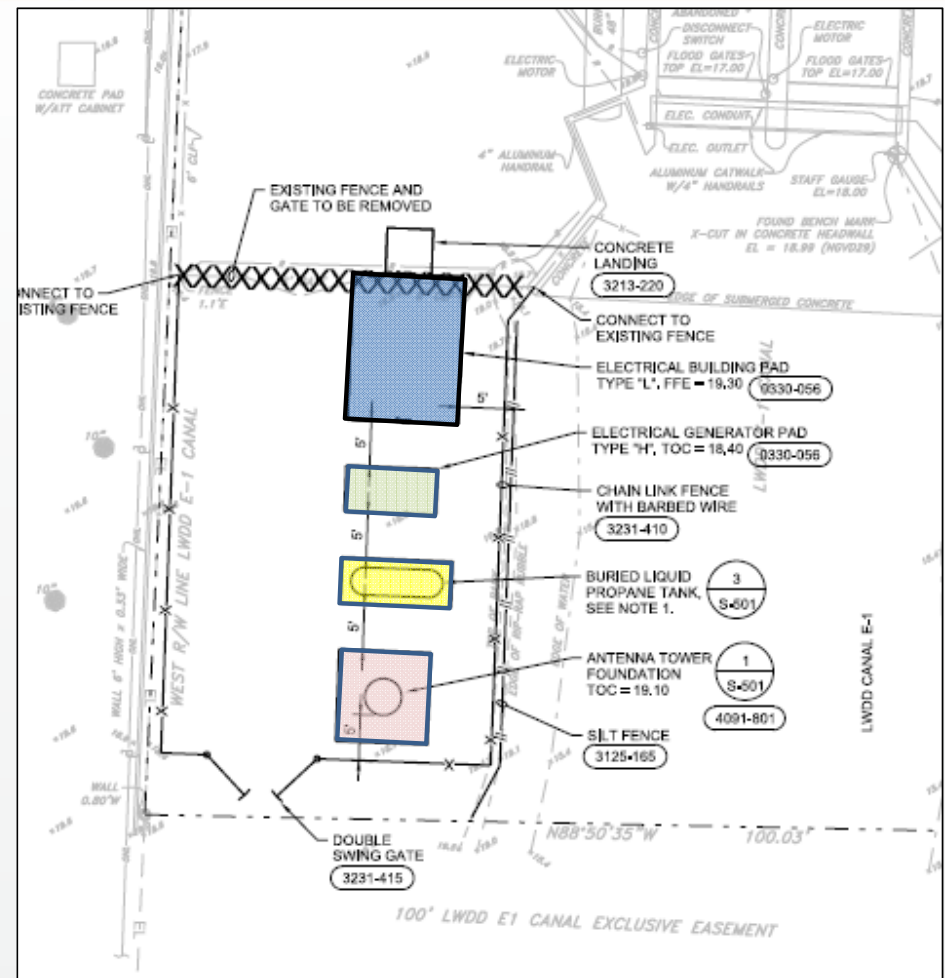
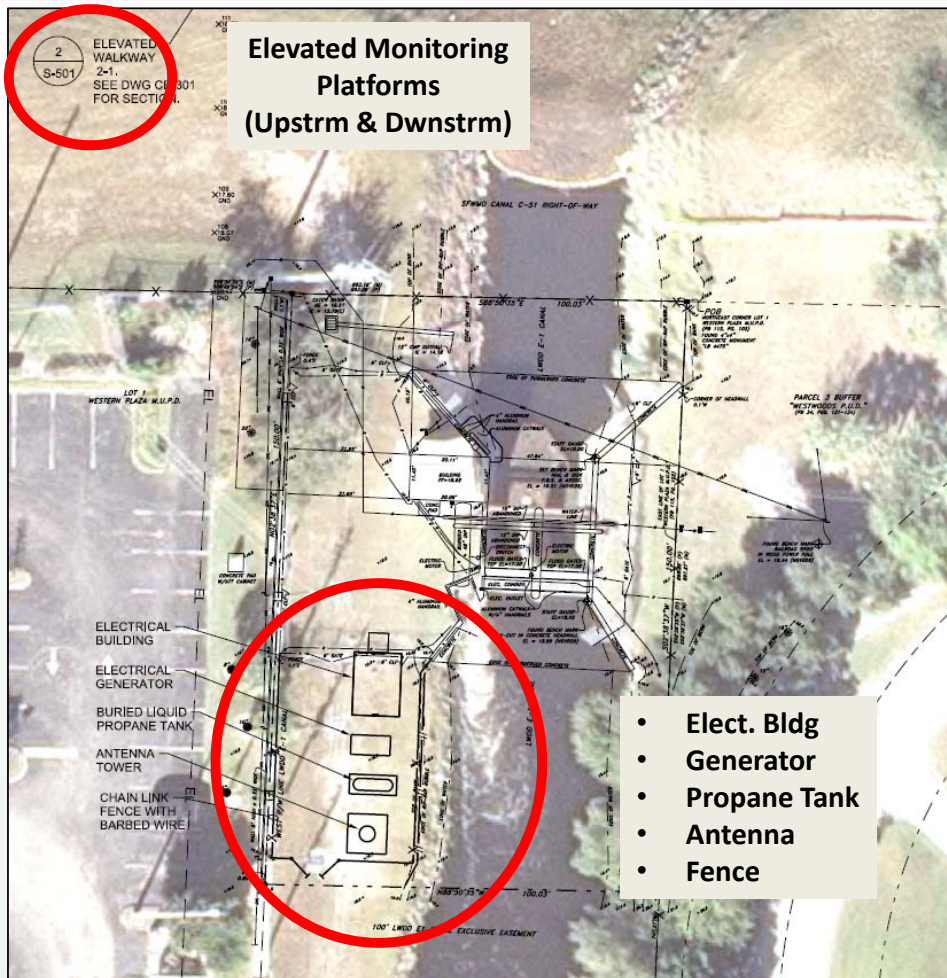


Revised Conceptual Layout

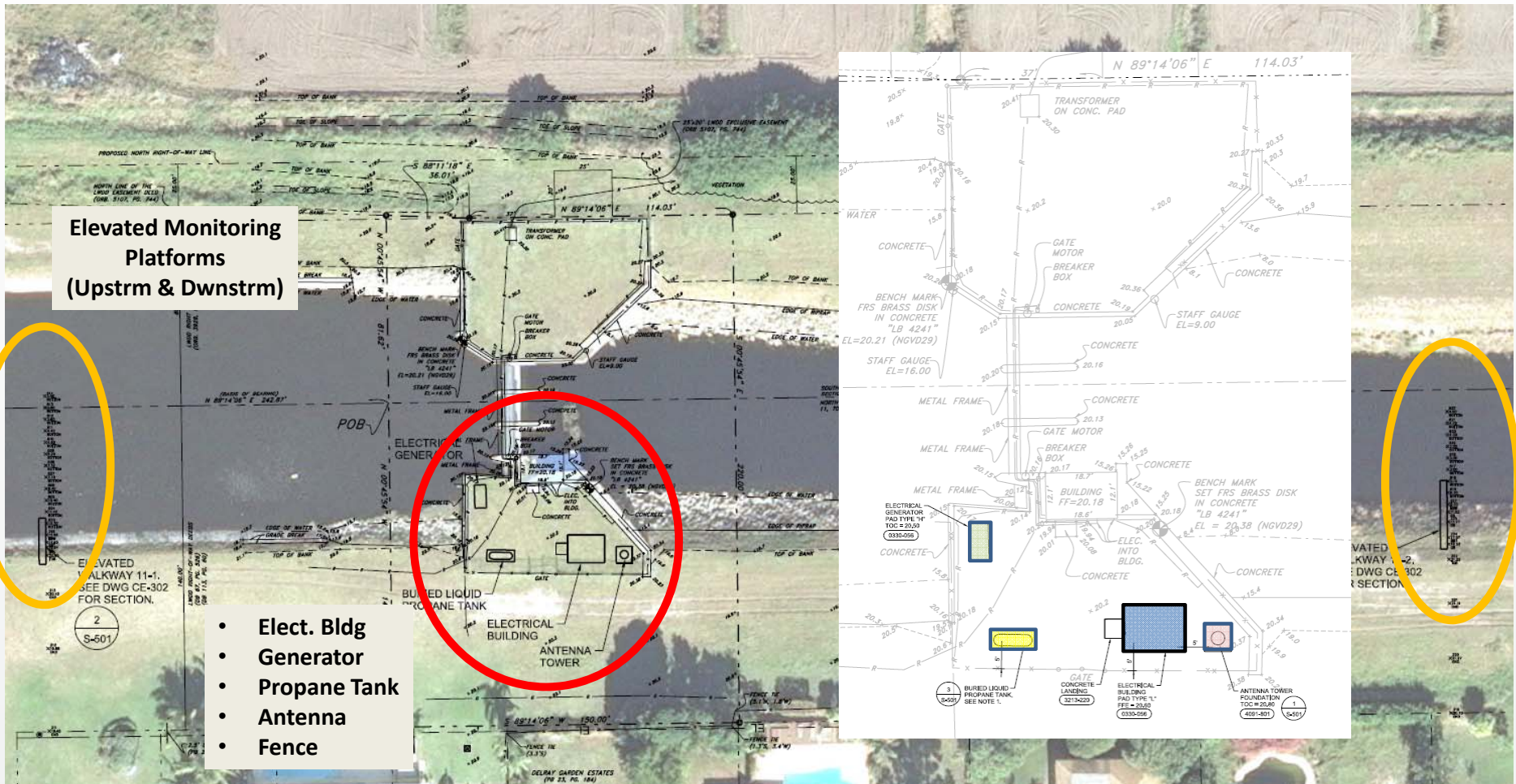
- **Revised microwave communication system for LWDD**
- Remote/automated control of LWDD flood control gated spillways
- 10 hurricane hardened microwave communication towers
 - No Network Bandwidth
 - Use existing main campus tower



Example Site Plan (CS# 2)



Example Site Plan (CS# 11)



Control Structure #8 – SCADA Visualization



Control Structure #8 – SCADA Visualization



SCADA Construction Elements



Site No.	New Building	Generator	Controllers	Monitoring Platforms	Antennas
CS#1		✓	✓	✓	✓
CS#2	✓	✓	✓	✓	✓
CS#3	✓	✓	✓	✓	✓
CS#4		✓	✓	✓	✓
CS#6		✓	✓	✓	✓
CS#8		✓	✓	✓	✓
CS#9		✓	✓	✓	✓
CS#11	✓	✓	✓	✓	✓
CS#12	✓	✓	✓	✓	✓
CS#17W		✓	✓	✓	✓
Headquarters					

Electrical Refurbishment Construction Elements



Site No.	Pump Control Panel	Motor Starters	Distb. Panel	Lighting
CS#1	✓	✓	✓	✓
CS#2		✓	✓	✓
CS#3				✓
CS#4				✓
CS#6			✓	✓
CS#8			✓	✓
CS#9			✓	✓
CS#11		✓	✓	✓
CS#12		✓	✓	✓
CS#17W		✓	✓	✓
Headquarters				

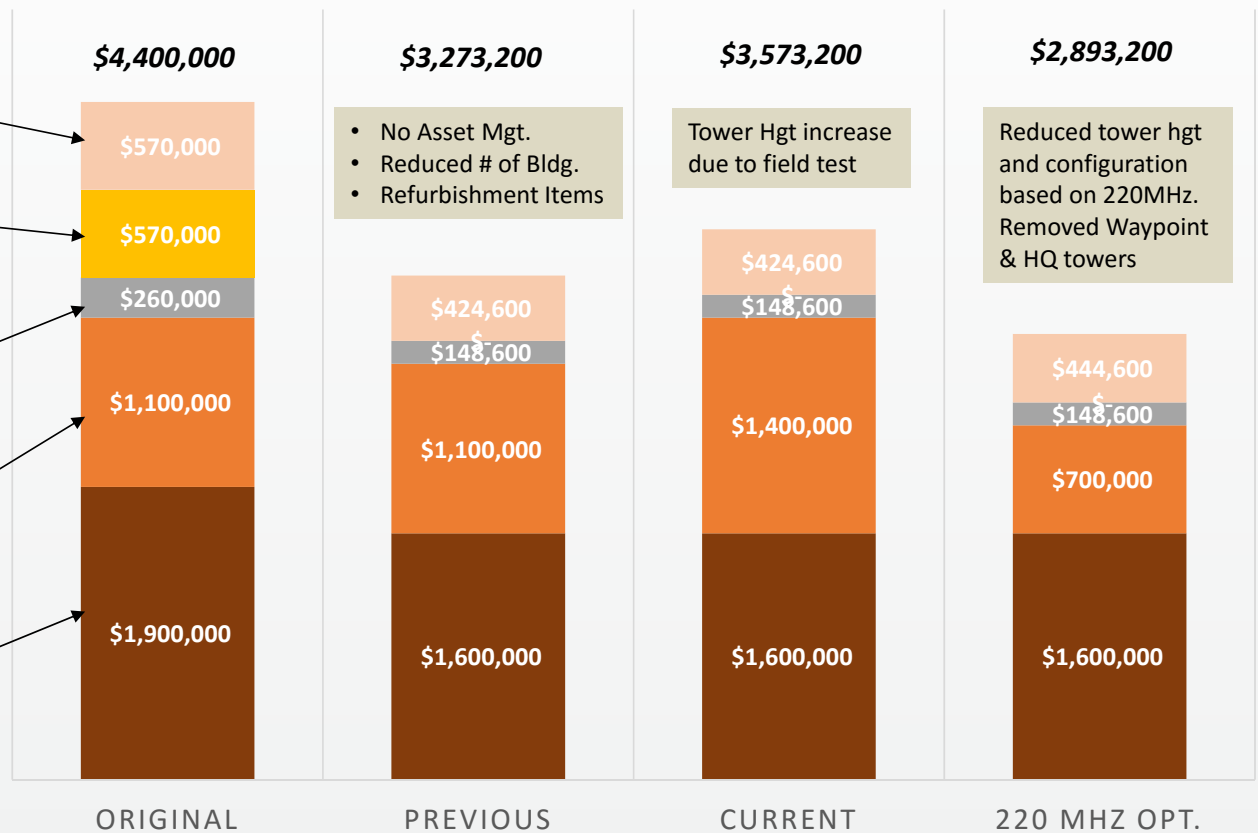
SCADA Project Cost Estimate History



SCADA PROJECT COST ESTIMATE HISTORY

■ General Construction Cost
 ■ Tower Construction Cost
 ■ SCADA Integration
■ Asset Management Integration
 ■ Related Project Costs

- Engineering Fees
- Asset Management (Phase 2)
- Post Construction SCADA Integration
- Tower Construction
- General Construction

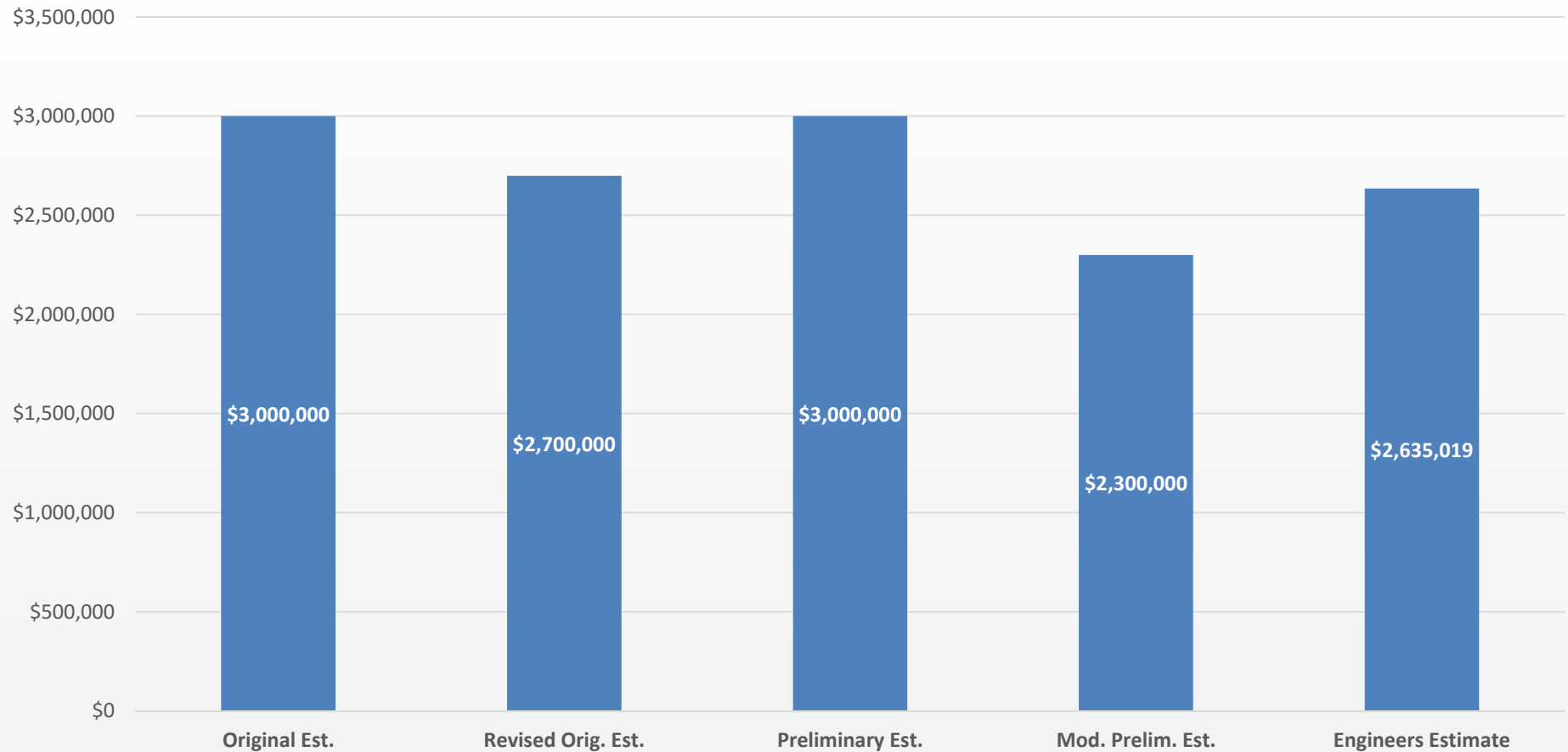


• No Asset Mgt.
 • Reduced # of Bldg.
 • Refurbishment Items

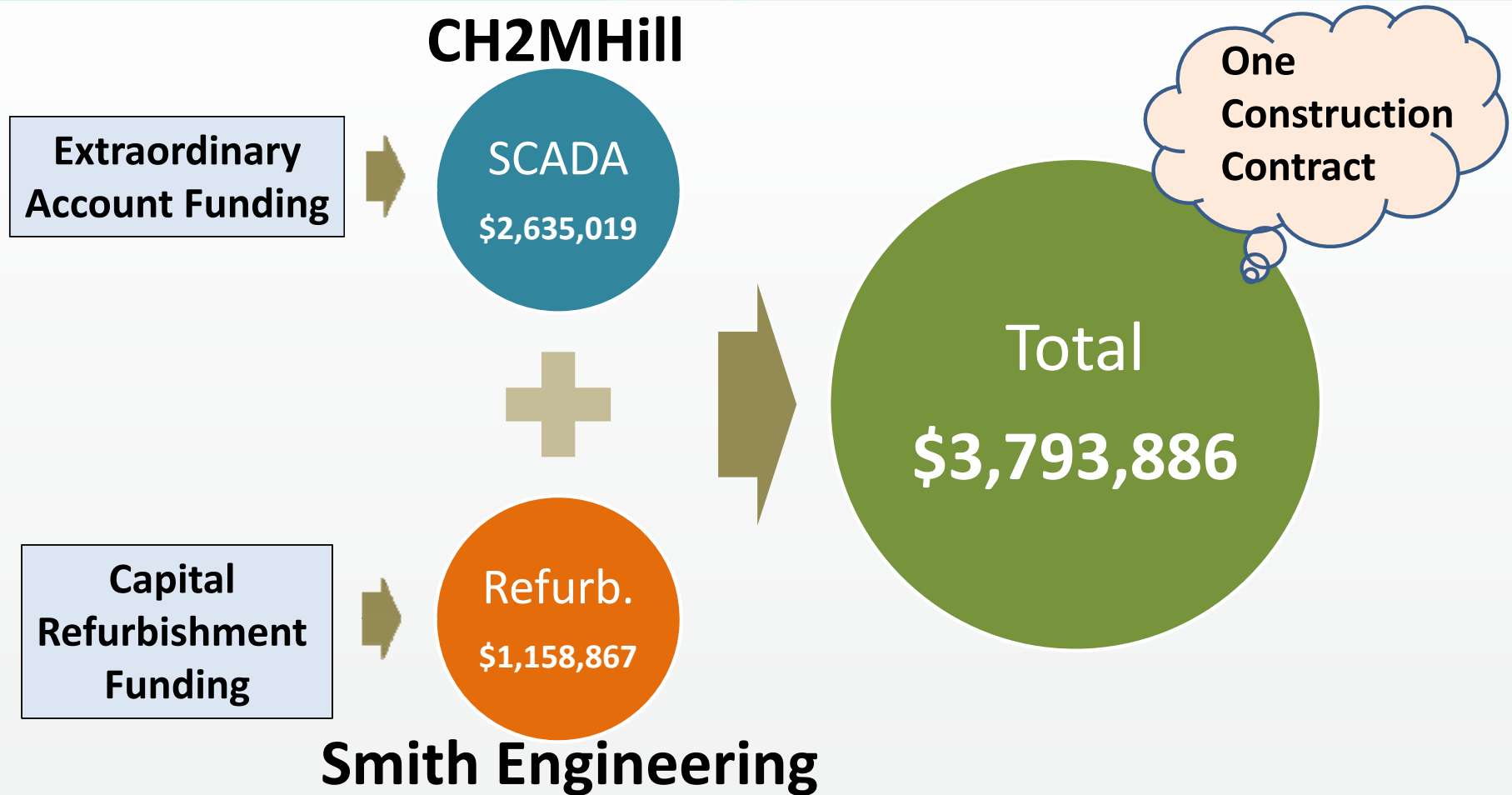
Tower Hgt increase due to field test

Reduced tower hgt and configuration based on 220MHz. Removed Waypoint & HQ towers

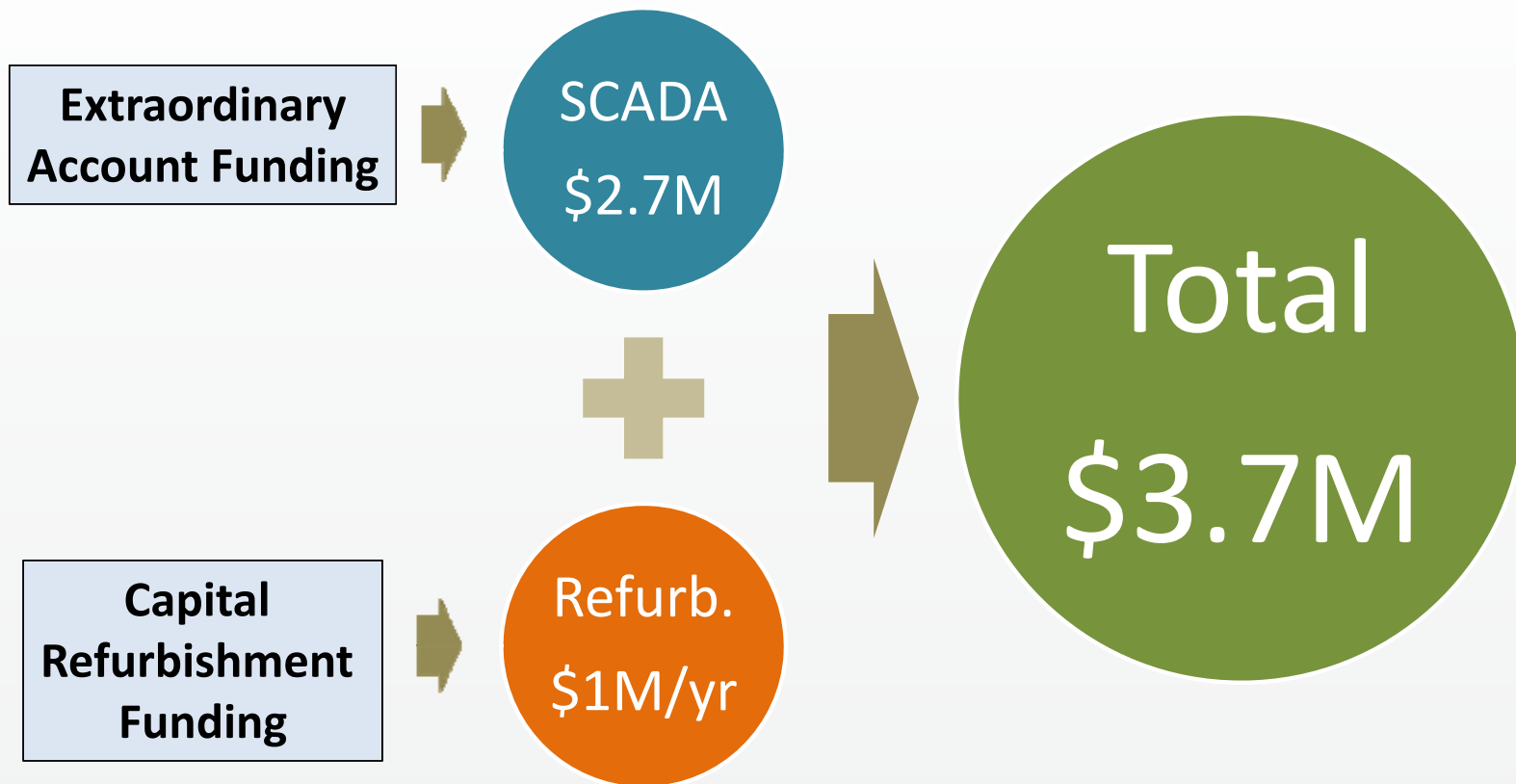
SCADA Construction Cost Estimate History



Engineers Estimate of Probable Const. Costs



Original Budget



Timeline

- Feb, 2014 – Request for SCADA RFQ
- May, 2014 – Initiated SCADA Design Contract Negotiations
- June, 2014 – Presented Capital Improvement Plan to Board
- August, 2014 – Contract for SCADA Design Services
- February, 2015 – Authorization to Procure Gate Actuators
- March, 2015 – SCADA Design Contract; Amendment No. 1 (Actuators/Geo-Tech)
- April, 2015 – Request for Electrical Design RFQ
- May 2015 – Board discussion of SCADA 220 Mhz Re-Design
- June, 2015 – Initiated Electrical Design Contract Negotiations
- July, 2015 – Contract for Prelim. Electrical Engineering Services
- July, 2015 – SCADA Design Contract; Amendment No. 2 (220 KMZ)
- November, 2015 – Contract for Electrical Design & Const. Serv.
- August, 2016 – Request for SCADA/Electrical RFB

Bid Timeline



Date	Notice
Request for Authorization	August 17 th
1 st Advertisement	August 19 th
2 nd Advertisement	August 28 th
Pre-Bid Meeting	September 5 th
Site Access Available to Bidders	September 6 th
Bidder Request For Information (RFI)	September 8 th
RFI Response	September 18 th
Bid Opening	October 4 th
Bid Review	October 5 th
Contract Award	October 12 th
Notice To Proceed	November 9 th

Estimated Construction Schedule



Project Phase	2014		2015										2016														
	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	
<i>Engineering Design & Construction Documents</i>	█	█	█	█	█	█	█	█	█																		
<i>FCC Frequency License</i>	█	█	█	█																							
<i>Bids</i>										█	█	█															
<i>Construction</i>													█	█	█	█	█	█	█	█	█	█					
<i>Start-Up & Training</i>																					█	█	█	█			



CH2MHill Proposed Contract Amendment No. 3



- Two Previous Amendments to Original Contract Authorization
 - Tech Services for Actuator Installation / Geo-tech Services for SCADA design
 - Redesign based revised 220 MHz microwave frequency
- Proposed 3rd Amendment (Not-To-Exceed \$24,000)
 - Existing Gate Control Panel Replacement
 - Automation of Center “Hurricane” Gates
 - Technical coordination with electrical design

Contract Item	Fee	Total Fee	Scope
Original Authorization	\$ 478,800	\$ 478,800	SCADA Design, Programming, Construction Engineering
Amendment No. 1	\$ 128,433	\$ 607,233	Actuator Technical Services, Geotech Services
Amendment No. 2	\$ 19,112	\$ 626,345	Redesign w/ 220MHz Frequency
Amendment No. 3	\$ 24,000	\$ 650,345	Control Panel, Center Gate Automation, Elect. Coord.

SCADA / Electrical Installations



On-Site SCADA Control
CH2MHill Contract



Existing Gate Control Panel



Existing Electrical Power Controls
Smith Engineering Contract

SCADA / Electrical Installations



On-Site SCADA Control
CH2MHill Contract



Existing Gate Control Panel



Existing Electrical Power Controls
Smith Engineering Contract

DISCUSSION