

# REGIONAL WASTEWATER UTILITY RESPONSE AND RECOVERY FROM HURRICANE SANDY



OCEAN COUNTY UTILITIES AUTHORITY

**Presented By:**

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OCEAN COUNTY UTILITIES AUTHORITY

**The 2013 NJWEA Winter  
Technology Transfer Seminar  
March 4 - March 7, 2013**

**Eatontown, NJ**

# Acknowledgements

- Fred Auermuller, Director, OCUA Central Division
- Countless other operations, maintenance, electricians, mechanics, engineers, managers, and administrative staff
- Contractors, consultants, service providers
- Emergency response, various agencies

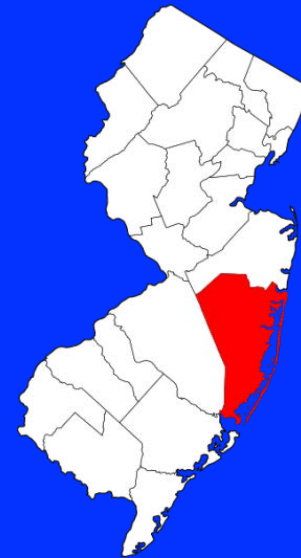
**REGIONAL WASTEWATER UTILITY RESPONSE AND  
RECOVERY**

**FROM HURRICANE SANDY**

**Ocean County Utilities Authority  
(OCUA) Service Territory**

- Ocean County and Southern Monmouth County**
- 37 municipal and private/governmental participants**
- Approximately 600,000 people served**

Ocean County  
= Tourism  
= Water  
Quality





## **3 Secondary Wastewater Treatment Plants**

- 40 Pump Stations**
- 160 Miles of Interceptor**
- 11 Miles of Barnegat Bay Crossings**
- 4 Miles of Atlantic Ocean Outfalls**

# Northern Water Pollution Control Facility

- Brick Twp.
  - Design Capacity  
32 mgd  
Annual  
Average Daily  
Flow (AADF)
  - 2012 AADF  
= 21.4 mgd



# Central Water Pollution Control Facility

- Bayville, Berkeley Twp.
  - Design Capacity = 32 mgd AADF
  - 2012 AADF = 20.8 mgd





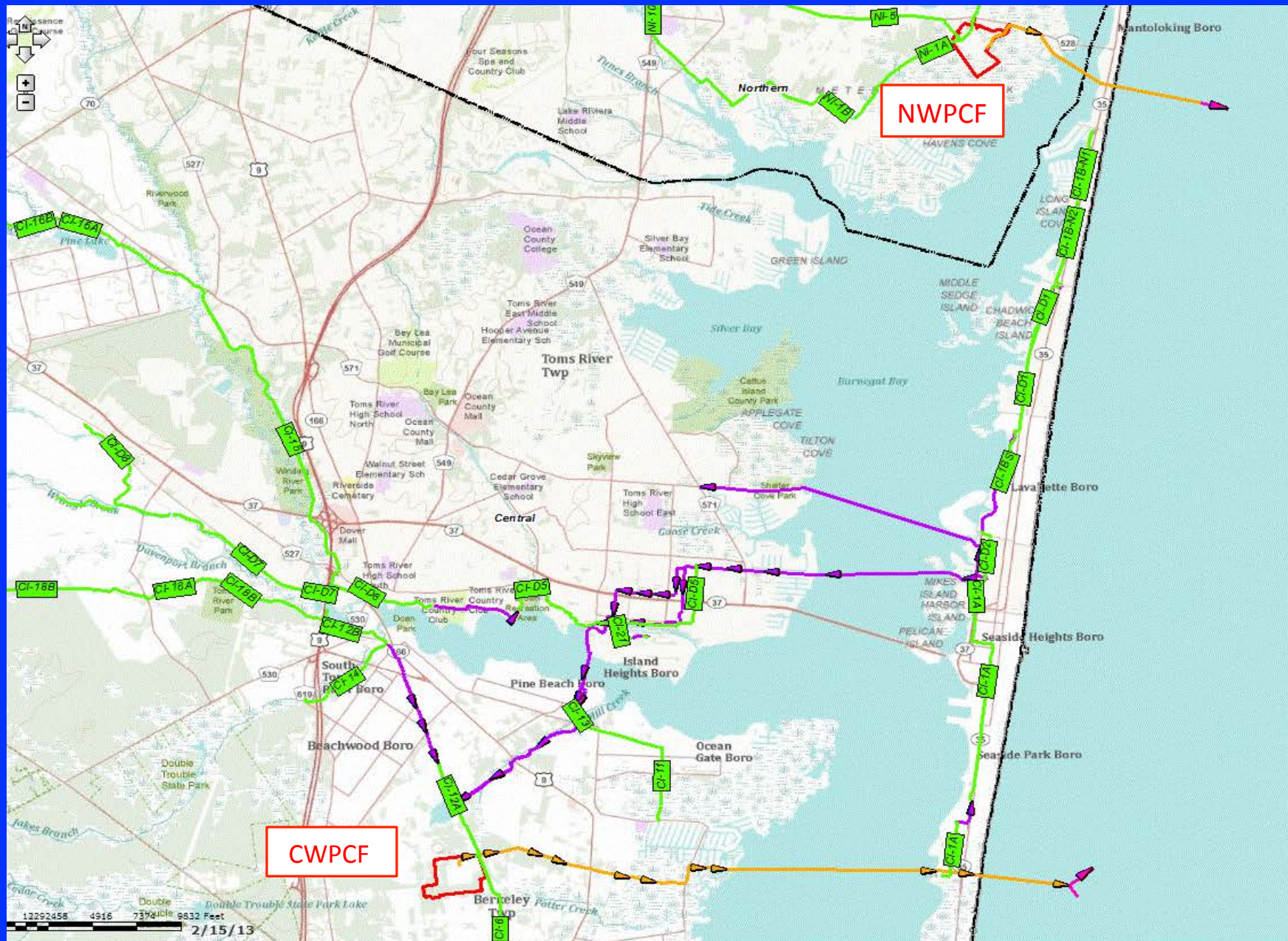
# Southern Water Pollution Control Facility

- Stafford Twp.
  - **Design Capacity**  
= 20 mgd  
AADF
  - **2012 AADF**  
= 7.2 mgd



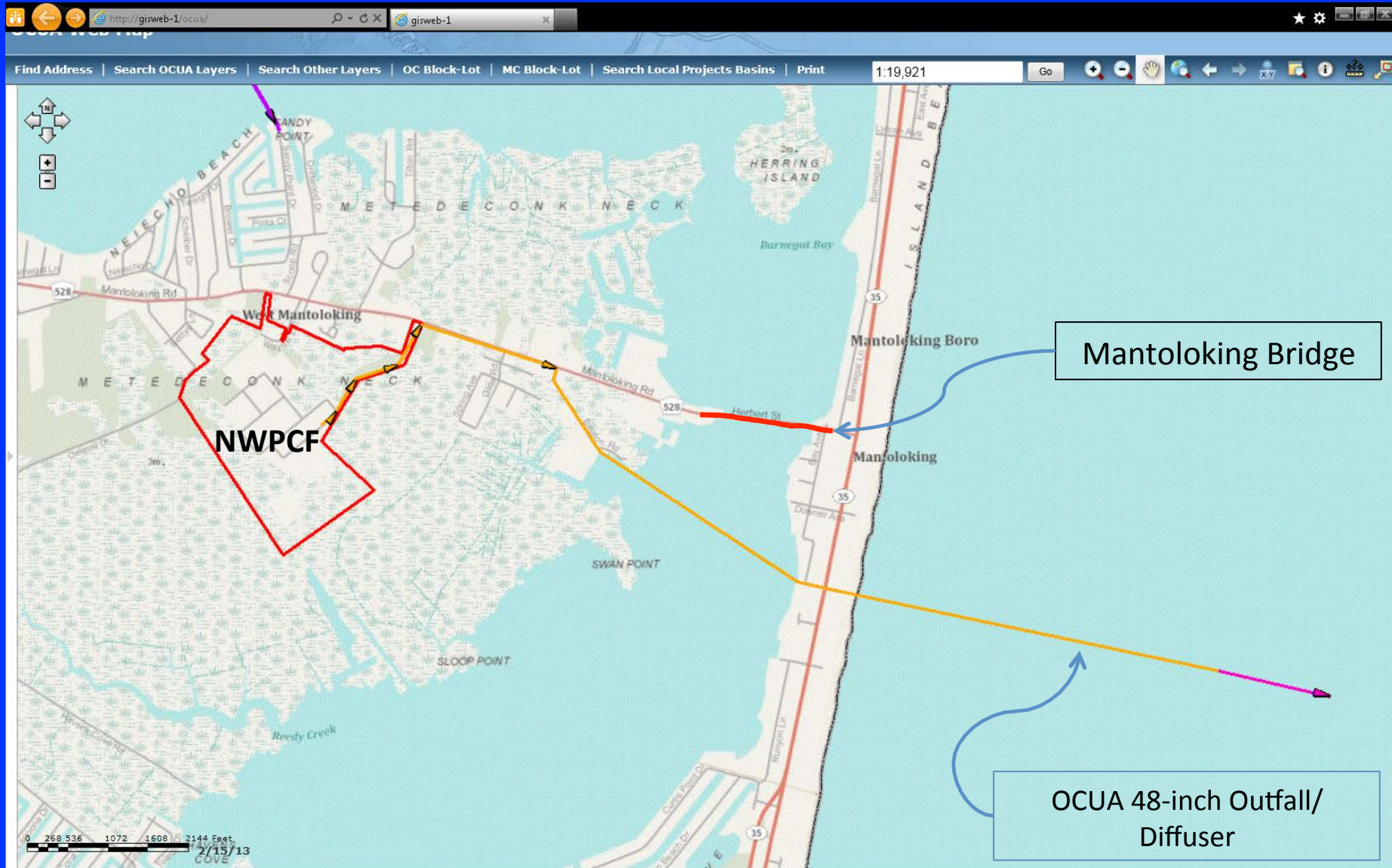


# OCUA Central Service Area





# NWPCF, Effluent Outfall: Bay Crossing, Ocean Diffusers





# Pre-Storm Preparations

- Previous storm flooding in NJ:
  - Annual Nor'easters
  - Hurricane Irene
  - October 1991 “Frankenstorm” (the perfect storm)
  - December 1992 Nor'easter – widespread flooding
- Personnel and shift planning, food, water
- Trucks and drivers on-call or on-site (sludge)
- Review and Distribute Emergency Contacts
- FUEL ... PUMPS ... GENERATORS

# Pre-Storm Preparations

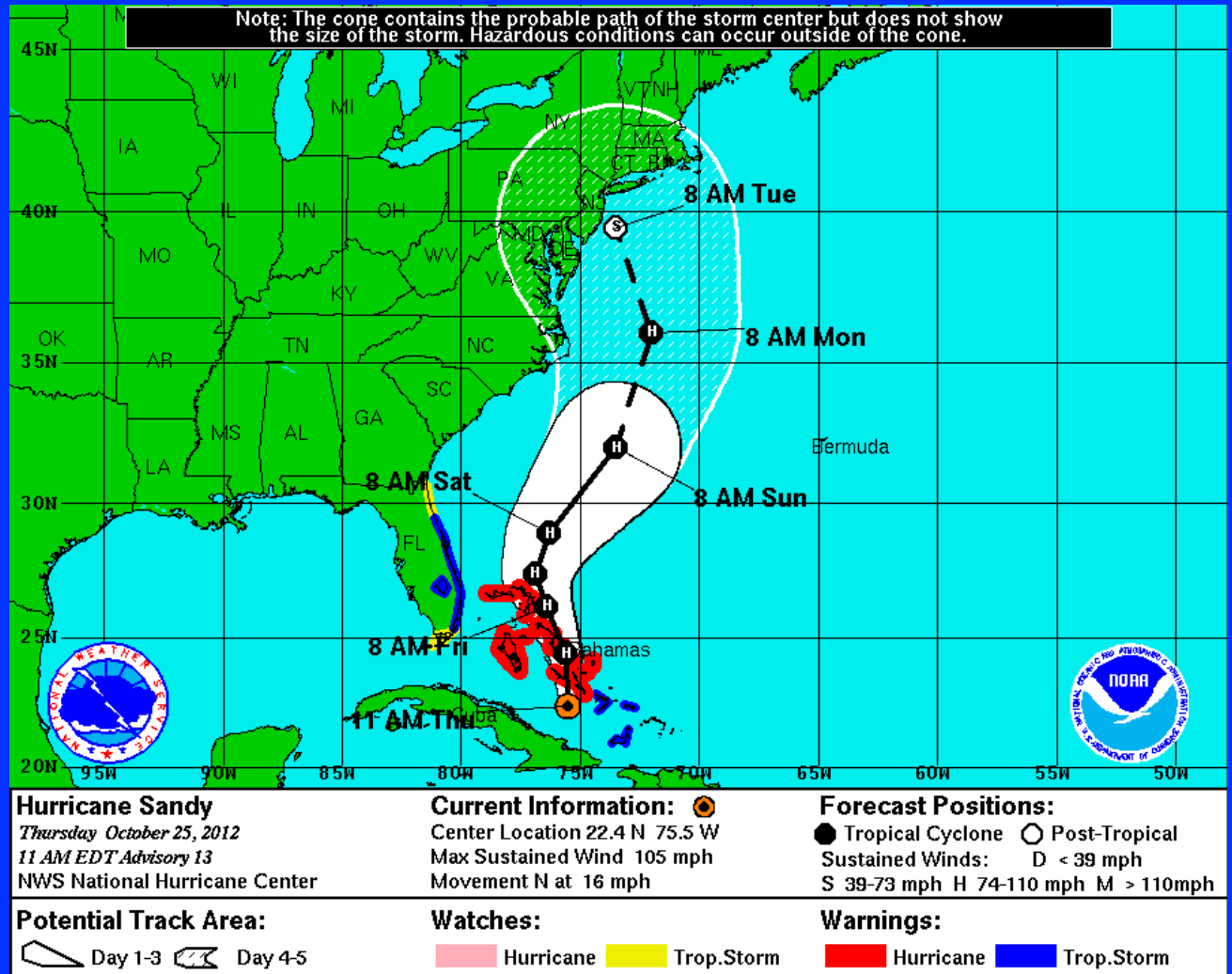
- Secure loose items from high winds
- Top off fuel and Hypo tanks
- Shutdown island-area stations odor control and chemical feed systems



**CPS-18 Wrangle Brook Lift Station  
Transformer (Toms River)**

# Pre-Storm Preparations

- Meetings begin about October 24
- Thursday, October 25<sup>th</sup>: NHC projects “Left-Turn”



# What Happened ?

- *October 29, 2012:*
- Two additional Nor'easters
- 2<sup>nd</sup> Costliest Hurricane in US History
- 32 foot high waves off Sandy Hook
- 89 mph wind gusts – Surf City
- Immense Storm Surge



# Before / After (Ortley Beach, Toms River Township)



# Ortley Beach, Toms River Township





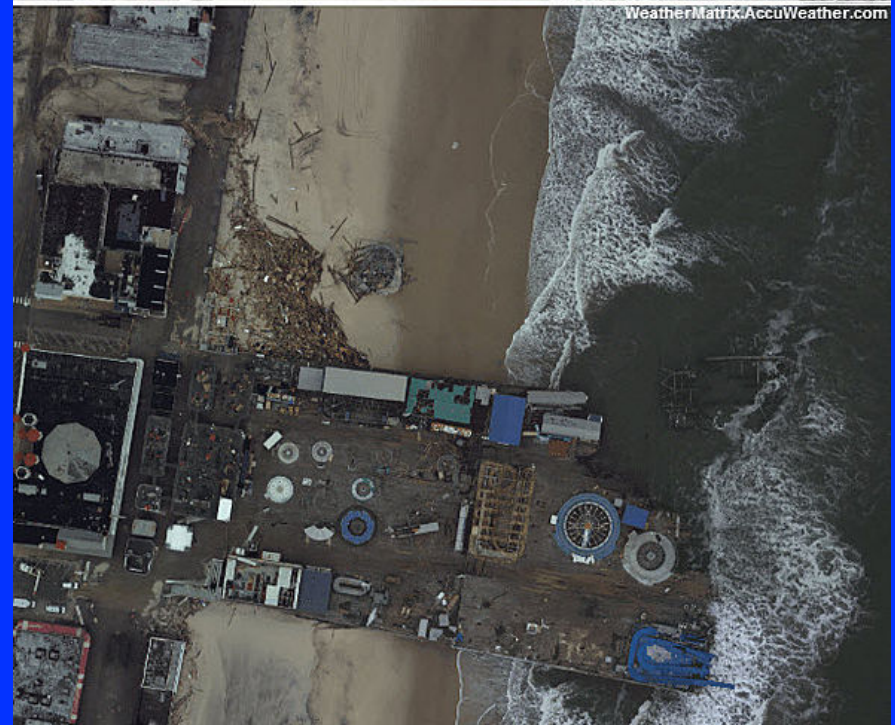
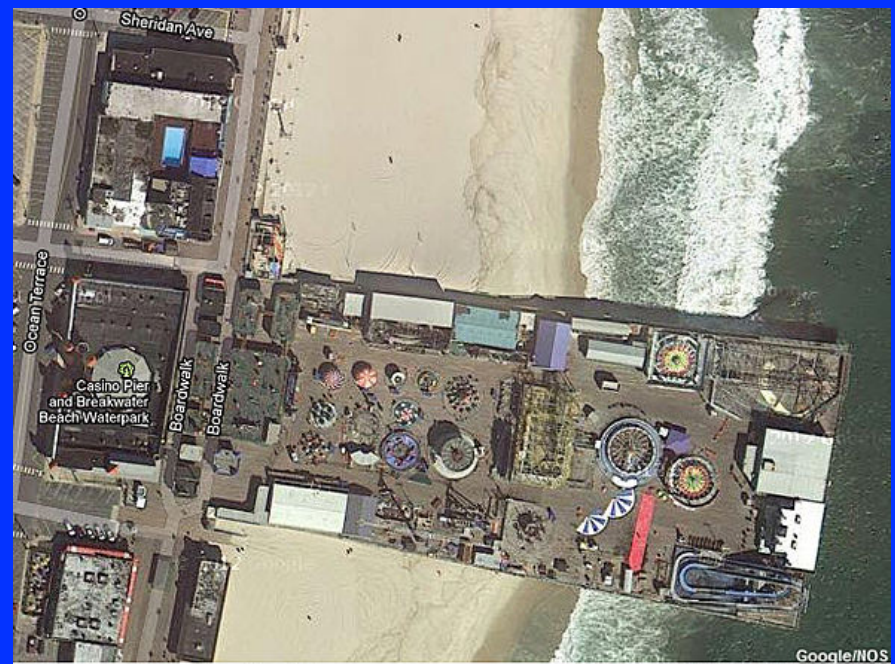






# Before / After

(Seaside Heights  
Amusement Pier)







# Before / After (Mantoloking Bridge)



# Mantoloking Bridge / North Barrier Island Breach





# Mantoloking Borough



# NWPCF Ocean Outfall Manhole, Mantoloking

Before Sandy



After Sandy





# NWPCF Ocean Outfall Manhole, Mantoloking

December 13, 1992  
Nor'easter



# What Happened To OCUA ?

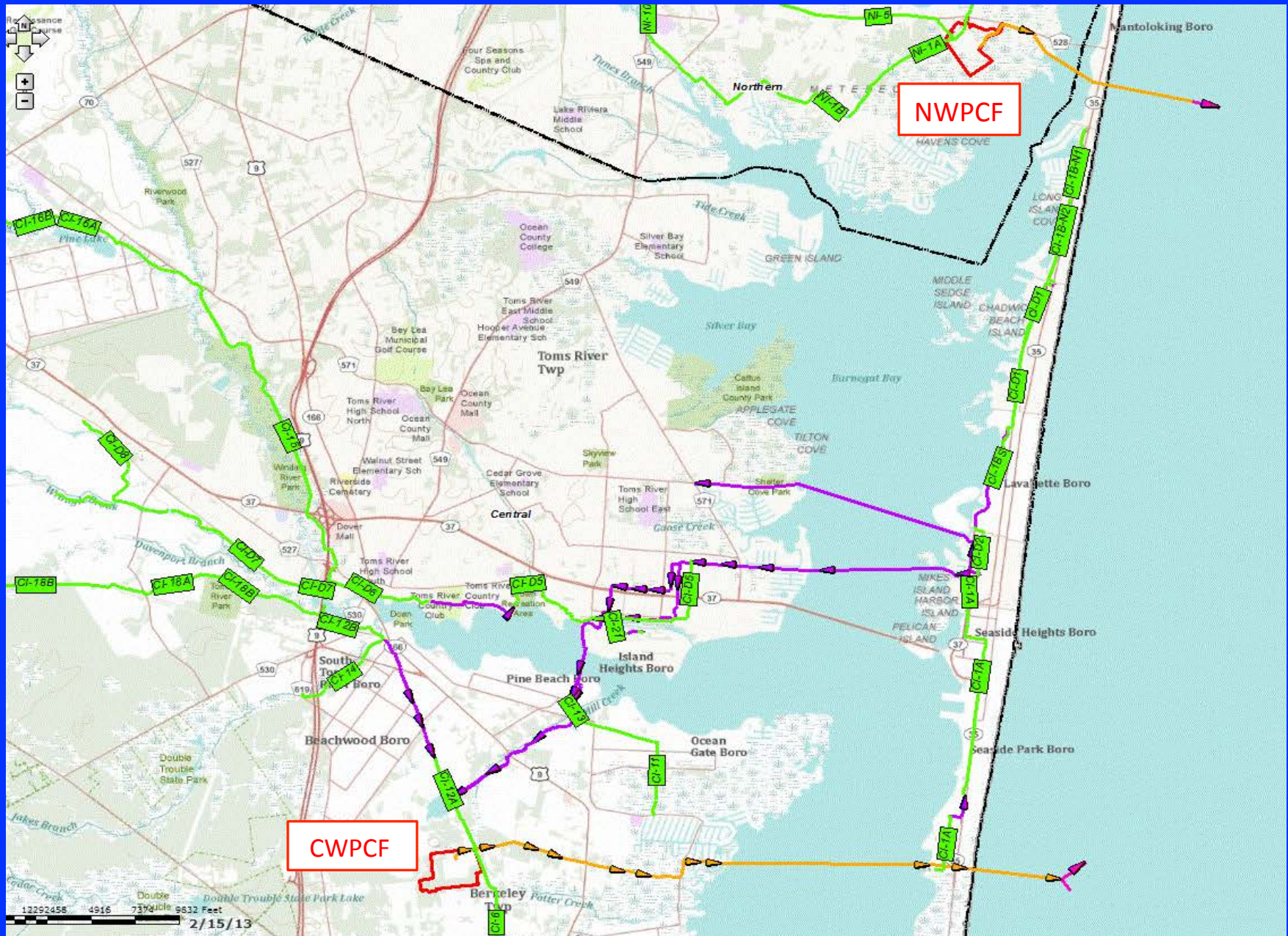
- Minimal damage/impact to all three WWTPs
- Flooding close to NWPCF property
- 27 of 40 pump/lift stations damaged
  - Average \$108,000 per station
  - Almost \$3.0 Million in damages
  - Bayhead to Beach Haven
- Several stations out of operation
- 22 Metering and 16 Cathodic Protection Stations impacted

# What Happened To OCUA ?

- Typical Pump/Lift Station damages:
  - Pump Rebuilds/Rehab – bearings, mech. seals
  - Electric Motors: Dimminutors, screw pump
  - Light fixtures, receptacles
  - Circuit Breakers, Contactors, Starters
  - Control Panels
  - Valve and gate actuators
  - Metering equipment
  - Conduit/Wire



# OCUA Central Service Area

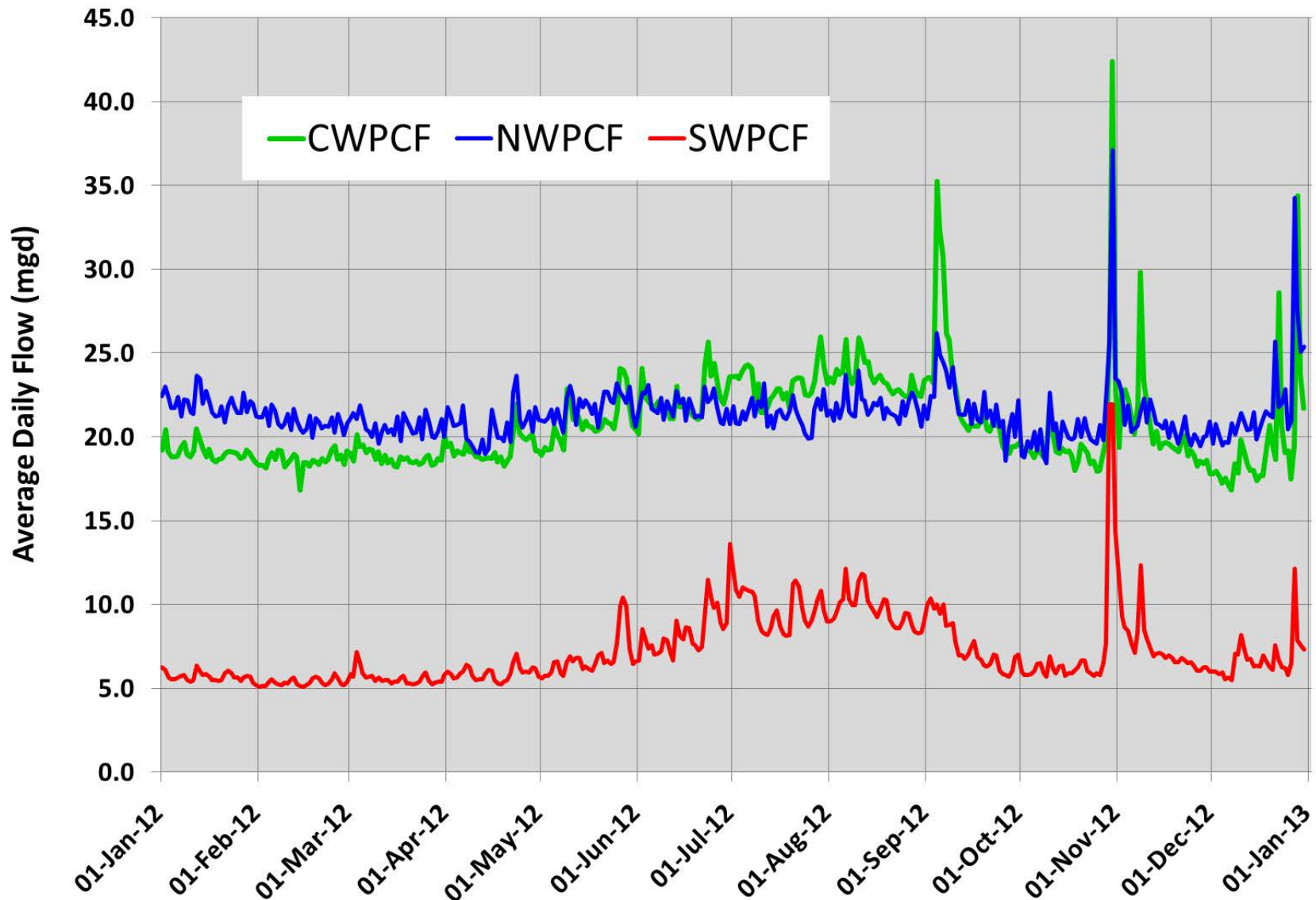




# OCUA Central Service Area



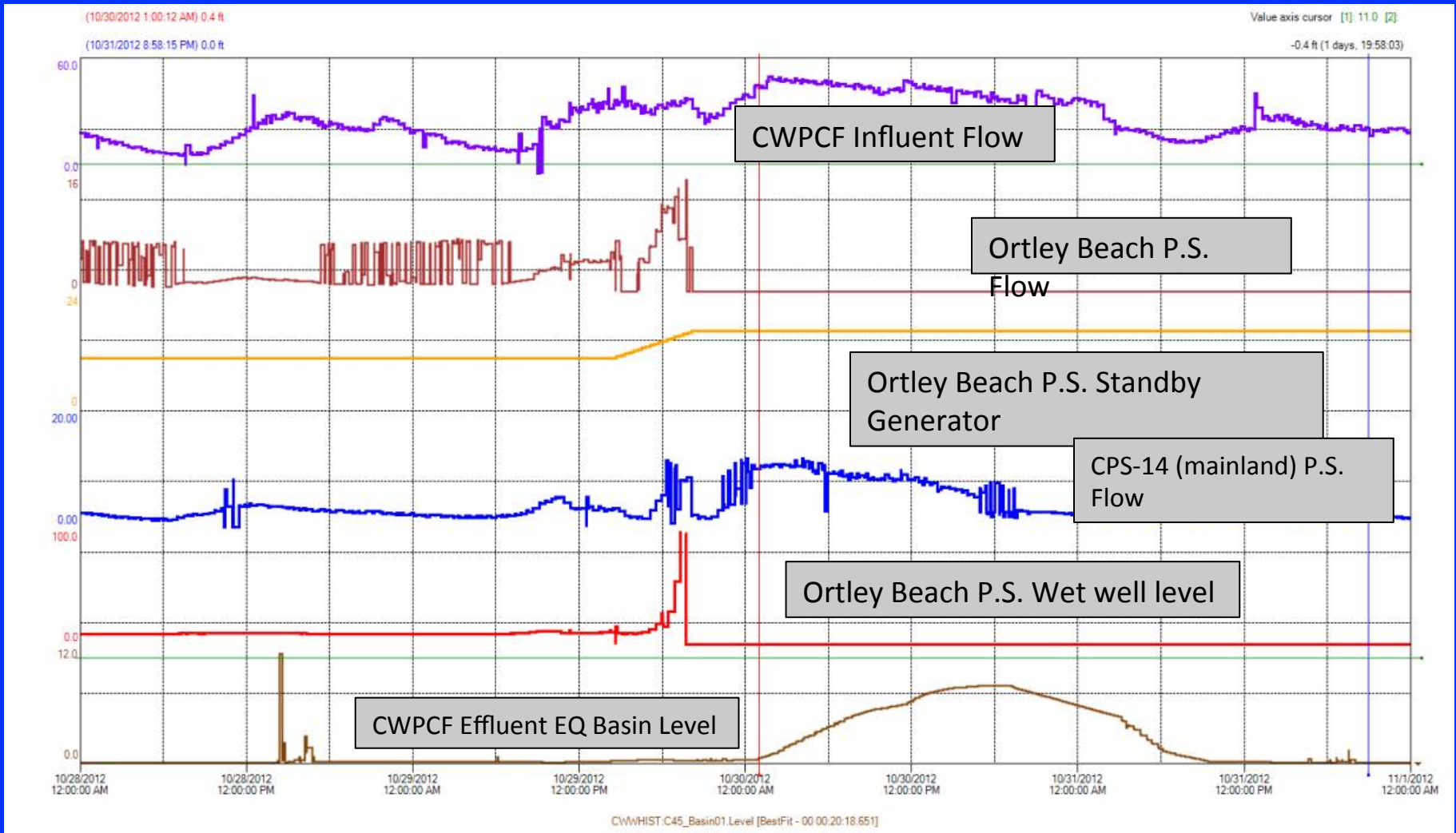
# O.C.U.A. 2012 Plant Influent Flow





# What Happened to OCUA ?

## SCADA system analysis: 10/28 through 11/1



## SCADA system analysis: 10/28 through 11/1

- 10/29/12, 8:00 pm: CPS-19 lost pumping capacity last recorded flow = 12 + mgd
- 10/30/12, 2:00 am:
  - CWPCF influent flows maxed at ~50 mgd
  - CWPCF Effluent EQ Basin gates opened to buffer peak influent flow
- What IF ?

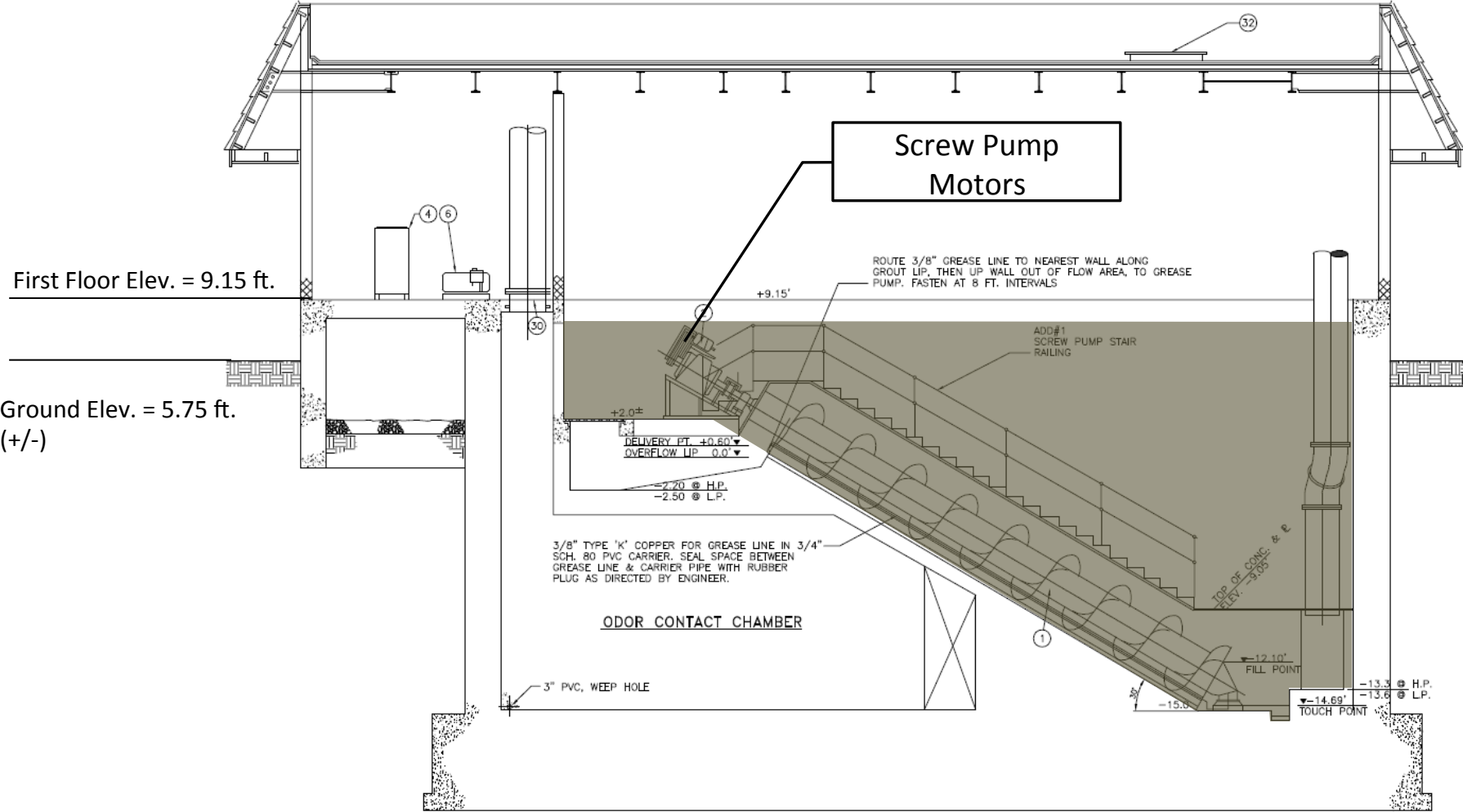




## **CPS-2 Lift Station, Seaside Heights**

**Screw Pump Motors in wet well, one removed pre-storm**

# CPS-2 Lift Station, Seaside Heights







## **CPS-17 Lift Station, Brick Bayway - Island Region**

Screw Pump wet well

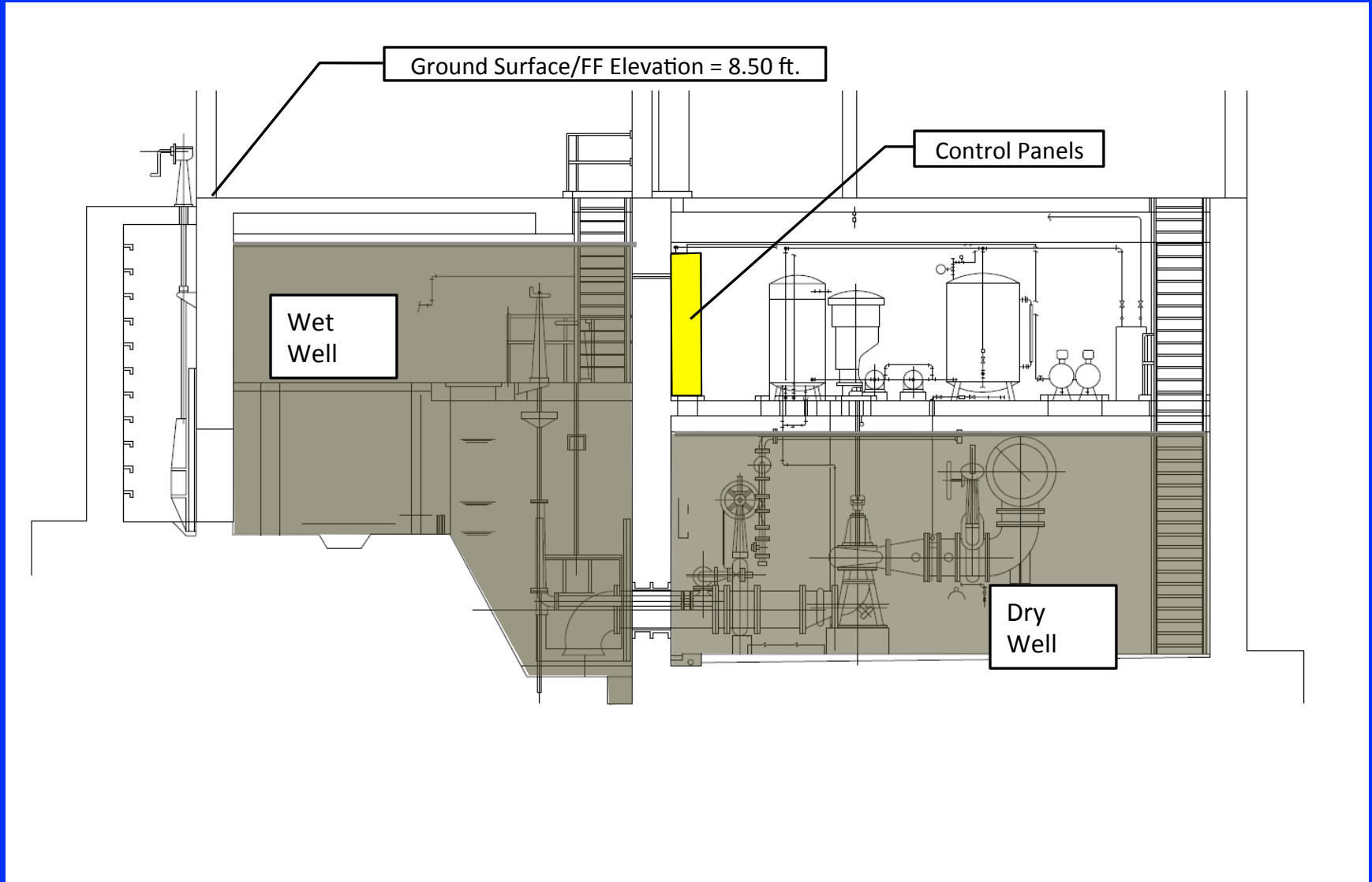
# CPS-19 Pump Station, Ortley Beach

Dry Well (Pump  
Room) fully  
submerged





# CPS-19 Ortley Beach P.S. Flooded Areas



# CPS-19 Pump Station, Ortle Beach

- Subgrade Motor Room, at sea level (+/-)
- 4 centrifugal pump motors: 100 hp - 125 hp
- Motor Control Centers
- Distribution Panels
- Switchgear
- Control Panels
- Flomatcher controls





# CPS-19 Pump Station, Ortle Beach

Damaged  
Electrical  
Control  
Panels,  
Breakers, etc.



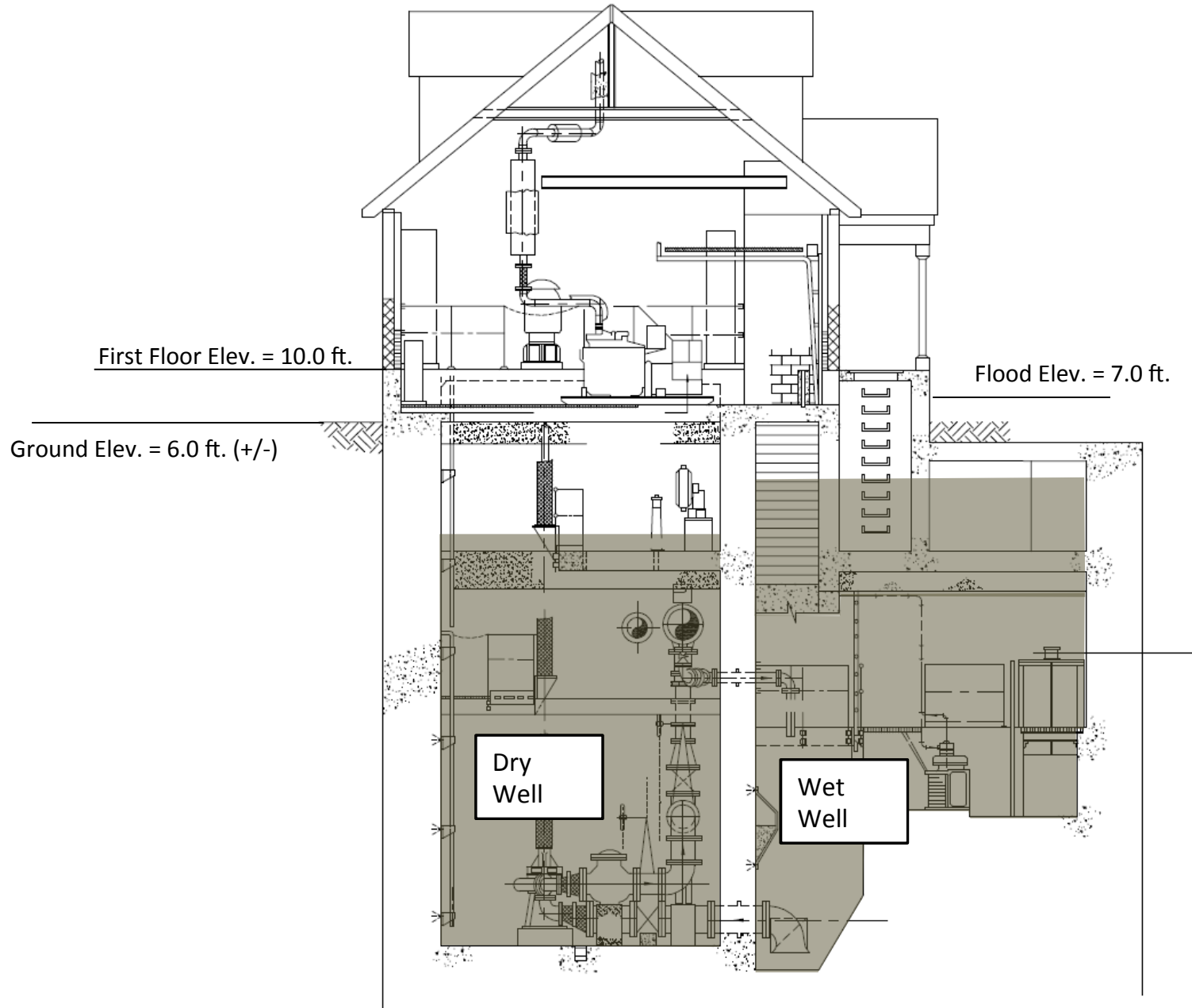
# CPS-19 Pump Station, Ortleby Beach

Unsealed conduits from station exterior and from upstairs generator room

= sources of dry well flooding



# CPS-1 Lavallette Pump Station





# Damaged Equipment









# Vapor Phase GAC unit shifted





# Collection System Conditions



# WHY did this happen?

- Most wet wells flooded due to extreme flows, compromised collection systems
- Wet wells impacted Dry wells
  - Unsealed wall penetrations, conduits
  - Sump pump check valves
- Limited overland flow above first floor into stations
  - CPS-19 Ortleby: FF elevation= 8.50 (1929 N.G.V.D.)
  - CPS-19 Dry well water level = -4.5 ft. (1929 N.G.V.D.)

# WHY did this happen?

- Commercial power failures
- Standby Generator failures
  - Fuel supplies
  - High temperature alarms
  - Radiator Cooling water supply failed
    - First time local water supply failed in 30+ years
    - No power to run private wells



# WHAT did we do?

- Form small initial assessment teams
  - Operations
  - Maintenance
  - Electricians
  - Engineers
- Prioritize Locations
- Evaluate Needs
- Evaluate Available Resources
- Operational status updates
  - Restore at least one pump at each station
  - Coordination
  - Communication
- Update to NJDEP and other agencies, NJOEM, NJSP
- Agency resource coordination:
  - Generators
  - Fuel

# CPS-1 Lavallette Pump Station Clean-up efforts





**CPS-1 Lavallette  
Pump Station  
Clean-up efforts**

**Date: 11/4/12**





# CPS-1 Lavallette Pump Station



# WHAT do we need to do?

- REPAIR and RESTORE to pre-Sandy condition
  - Procure and Install
  - Major repairs contracts to be advertised
  - Simple steps:
    - seal penetrations
    - closed loop radiators on roof
    - Secure loose items...
    - Check valve operation
- Insurance Claim
- FEMA Claim

# WHAT do we need to do?

- Future Mitigation Steps ???
- Standby generator reliability
  - Water sources
  - Closed-loop radiators
  - Fuel Deliveries, staging
- Portable generator purchase - Trailers
- Bypass pumping equipment
- Submersible pumps



# WHAT do we need to do?

- Stock spare motors, equipment
- Vulnerable pump stations:
  - Raise electrical equipment to above grade  
(Losses vs. Mitigation Cost vs. Public Impacts)
  - Flood proofing?
- Remove threatened equipment pre-storm
  - Metering panels
- Flow Isolation and Operational Status ???

# WHAT do we need to do?

- FEMA Advisory Base Flood Elevations
  - First Floor Elevations vs. ABFE
- Approximately ½ of damaged stations first floor are below ABFE “1%” elevation
- Evaluate Capital Plan, Budgets, FEMA and Financing Options
- Another SANDY ???



# Questions ?

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