Coastal Resiliency Challenges and Planning in Fairfield, Connecticut

October 25, 2017

Jonathan Richer, P.E., Project Manager, Tighe & Bond, Inc.
Outline

- Background
- Hurricane Sandy
- Repair & Recovery
- Planning for the Future
- Questions
Background
Background

881 acres historically flood prone

Beach Area Structures:
2,771 Residential Buildings
264 Commercial Buildings
212 Residential Condominiums
Total = 3,247 Structures

Town of Fairfield Flood and Erosion Control Board
How does Fairfield flood?

---

Town of Fairfield Flood and Erosion Control Board
How does Fairfield flood?
Hurricane Sandy
Hurricane Sandy

Hurricane Sandy

FEMA Grants Secured for Immediate Repair Projects

- Penfield Pavilion
- South Benson Marina Fishing Pier
- Southport Beach Seawall/Breakers
- Pine Creek Navigational Channel Re-establishment
- Fairfield Beach Road Seawall & Timber Bulkhead
- Pine Creek Dike
- Southport Beach Concession Foundation
- Sasco Beach Concession Foundation
- Ye Yacht Yard Restroom/Storage Building Foundation
- Pequot Avenue Bridge Scour Protection
Planning for the Future

- HUD/CT DOH CDBG-DR Construction Grants
- Pine Creek Dike Culvert Repair
- Wastewater Treatment Plant (WWTP) Outfall Repair
- WWTP Hardening Project
- WWTP Microgrid Project
- Penfield Pavilion Repairs
- Shoreline Resiliency at Penfield Beach
Pine Creek Dike Culvert
- 48-inch CMP culvert
- 310-Acre watershed
- Culvert partially collapsed during Hurricane Sandy
- Vastly undersized for drainage area
- Contributing area was flooded for more than a week even with emergency pumping
- 36” main outfall from Fairfield WWTP approximately 12” below existing culverts
Planning for the Future

**Pine Creek Dike Culvert**
- Solution was two 48-inch culverts, two 60-inch “emergency” culverts
- Self-Regulating Tide Gates on 48-inch culverts
- Manual sluice gates on emergency culverts
- Triple Wall Polypropylene pipe for corrosion protection
Planning for the Future

But First…

- HUD Environmental Permitting
  - NEPA Checklist
  - 8 Step Process for Work in Floodplain
  - Environmental Assessment
  - Several rounds of notices
- CTDEEP OLISP Structures, Dredging & Fill, Tidal Wetlands & 401 Water Quality Certificate
- ACOE General Permit
- CTDEEP IWRD Flood Management Certification
Planning for the Future

**WWTP Hardening Project**
- 9.0 MGD WWTP
- Adjacent critical facilities include Fairfield County Fire Training School, Conservation Building and Animal Control
- Plant was partially inundated during Hurricane Sandy, nearly catastrophic
- Entire Town affected if plant incapacitated
Planning for the Future

**WWTP Hardening Project**

- 2,300 LF of sheet pile wall, 600 LF of earthen berm proposed
- Two pump stations sized for 100-Year storm
- Flood barrier at 500-Year flood elevation (more than 3’ above 100-Year)
- Microgrid will allow facilities to operate in “island mode”
- Application being reviewed for CTDEEP Dam Safety Permit
Planning for the Future

- **HUD/CT DOH CDBG-DR Planning Grants**
  - South Benson Pump Station Study
  - Riverside Drive Flood Mitigation Study
  - Downtown Flooding and Drainage Study
  - Engineered Beaches
  - Pine Creek Dike Elevation Study
South Benson Pump Station Study
- 170-Acre watershed
- Existing storm drainage system very flat
- Surcharges in rainfall events greater than 1-Year Storm
- Lacks capacity to discharge storm surge flooding
Planning for the Future

South Benson Pump Station Study
- 80 MGD Pump Station
- Discharge two feet of storm surge flooding in 24 hours
- (2) 60 HP pumps for smaller storms, (4) 200 HP major pumps for 25-Year storm and storm surge
- Relay approx. 2 Miles of storm main to 0.5% slope
- New outfall to Ash Creek
Planning for the Future

- **FEMA – Pre-Disaster Mitigation Grant Program**
  - WWTP Generator Replacement
  - Mill River Pump Station Generator Replacement
Planning for the Future

- **Flood Prevention Master Plan**
  - New dikes and flood walls, raising of existing dikes
  - Estimated project cost of $27M
  - Creates continuous physical barrier against 100-Year storm
Questions?

Jonathan Richer, P.E.
Project Manager
Tighe & Bond, Inc.
1000 Bridgeport Avenue
Shelton, CT 06484
jaricher@tighebond.com