Storm Hardening System Improvements

Post-Sandy Update

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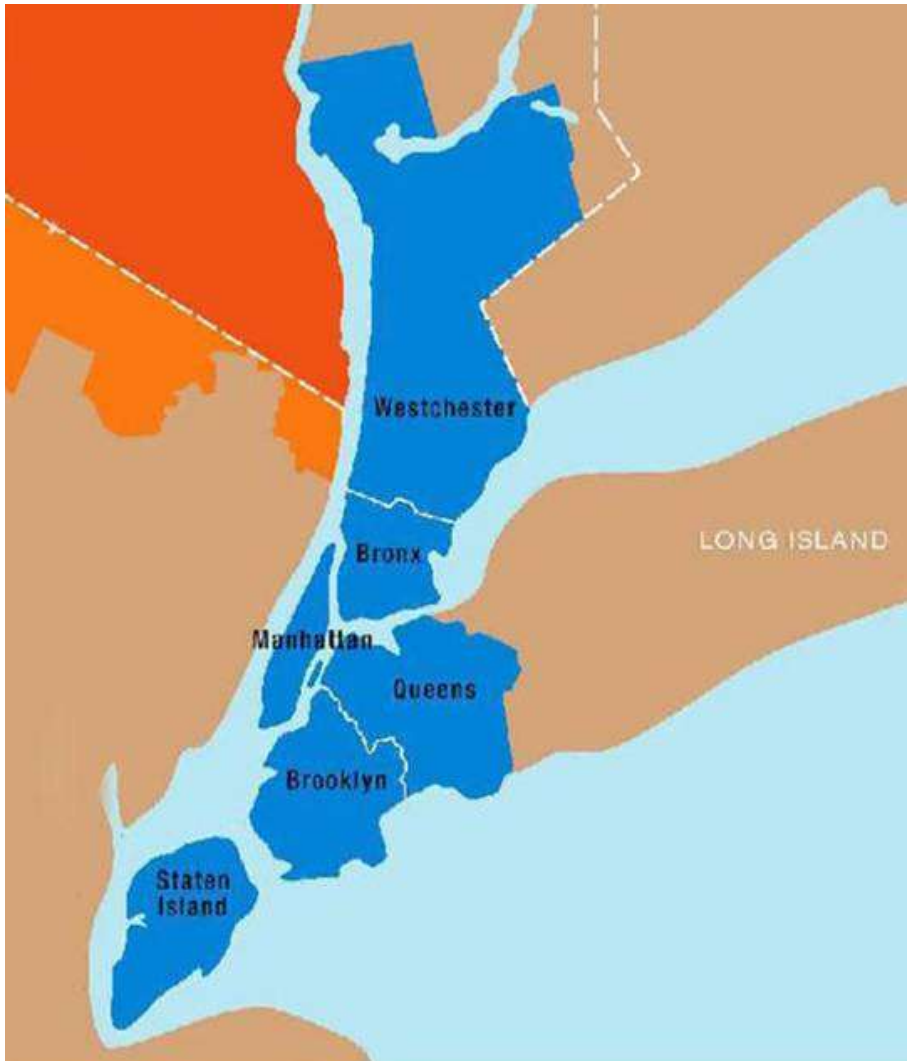
Con Edison Overview

- $12 Billion Annual Revenue
- Company Services
  - Electricity: Southern 2/3 of Westchester and all of NYC
  - Natural Gas: Bronx, Manhattan, portions of Queens, majority of Westchester
  - Steam: from the southern tip of Manhattan to 96th St on the west side and 89th St on the east side



Con Edison Steam Overview

- $680 Million Annual Revenue
- 1,700 Customers
- 6 Generating Stations
- ~20 Billion Pounds Annually (11,500Mlb Peak)
- Cogeneration (1/2 of Steam Demand)
- 105 Miles of Steam Pipe (Mains 8”-36”)
- 200/400 PSIG Mains

Recent Major Storms

Hurricane Irene – 8/2011

- Central Park Rainfall - 6.87”
- Sustained Winds - 52 mph
- Peak Gusts – 67 mph @ LGA
- Battery Storm Tide - 9.50'
- Main Shut Off’s – 15
- Customers Impacted – 51
- Electrical Networks Lost – 0
- Generating Capacity Lost – 0%
- Total Restoration – 3 Days

Hurricane Sandy – 10/2012

- Central Park Rainfall – 0.94”
- Sustained Winds – 64 mph
- Peak Gusts – 90 mph @ SI
- Battery Storm Tide – 14.06’
- Main Shut Off’s – 48
- Customers Impacted – 561
- Electrical Networks Lost – 11
- Generating Capacity Lost – 90%
- Total Restoration – 11 Days

Storm Impact

- Generating Station Flooding
- Equipment Damage
- Field Obstacles

Sandy Response & Customer Interruptions

- 561 Total Customers Impacted
  - (130) from Preemptive MSO's
  - (236) from Storm Loss
  - (142) from Electric Related
  - (53) from High Usage Load Shed

Storm Hardening - Overview

- Limit Damage to Assets & Facilitate Rapid Recovery
  - Prevent water intrusion into facility
  - Additional protection around critical equipment
  - Raise critical equipment to higher levels
- Reduce Customer Impact
  - Decrease the amount of customers impacted by Coastal Storms
  - Decrease restoration time required after a storm
  - Improve customer communications before, during, and after

Storm Hardening - Overview

- Rate case filed January 2013
- Immediate Storm Hardening
  - Completed by June 2013
- Storm Hardening Phase 2
  - $1 billion Company-wide
  - Projects span 2014 – 2017
- Storm Hardening Collaborative
  - Cooperation among all parties
  - Design Standards
  - Prioritization & Justifications

Storm Hardening - Collaborative

Nov/Dec 2012
- Immediate flood control levels
- Sandy, 2007 FEMA, 2010 SLOSH

February 2013
- FEMA ABFE maps
- Flexibility in flood control height

June 2013
- FEMA PWMs and rate case testimony
- New impacted stations (surge calculator)

July 2013
- Signed stipulation
- June 2013 FEMA 100yr flood plain + 3’

Design Basis – Immediate

- Strategy
  - Minimum protection level
  - Active flood control
  - Defense in depth
  - Avoid time-consuming construction activities
    - e.g. subsurface support structures, outages, etc.
  - Allowance for additional future measures/height
    - Feb 2013 FEMA ABFEs

Immediate Storm Hardening - Projects

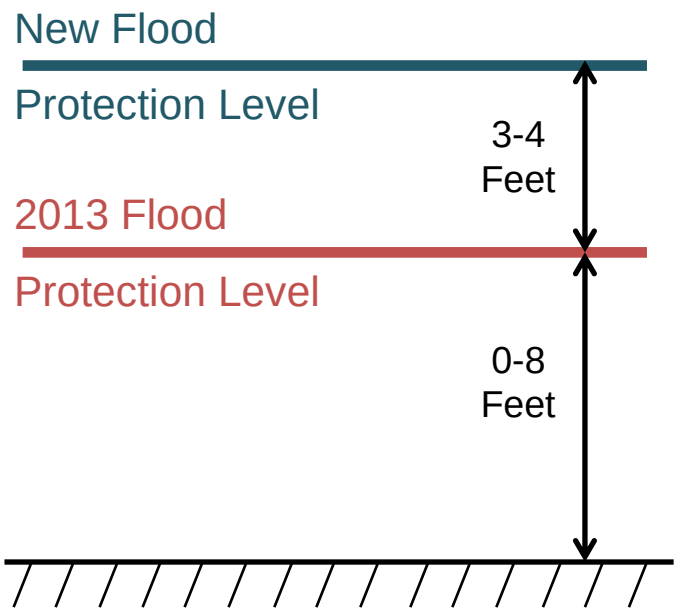
- Example Projects
  - New concrete moats around critical equipment
  - Raise existing moats
  - Watertight doors and flood gates
  - New flood pumps
  - Seal critical panels and cabinets
  - Seal conduits and cable trenches with expansive foam
  - Tunnel sealing

Immediate Storm Hardening - Quantities

- Work completed at 3 Generating Stations
  - (39) New Concrete Moats (2,800 LF)
  - (115) Flood Gates/Doors
  - (21) High Capacity Diesel Pumps
  - (12) Sealed Tunnels
  - (3,000+) Sealed Conduits/Troughs
  - Stack inspections
  - Portable Connections
  - Enlarged Sump Pits

Next Steps – Phase 2 Storm Hardening

- More robust walls, doors and barriers
- Additional pumps with redundant feeds
- Backup generators
- Raise or relocate critical equipment
- New control room and automation system

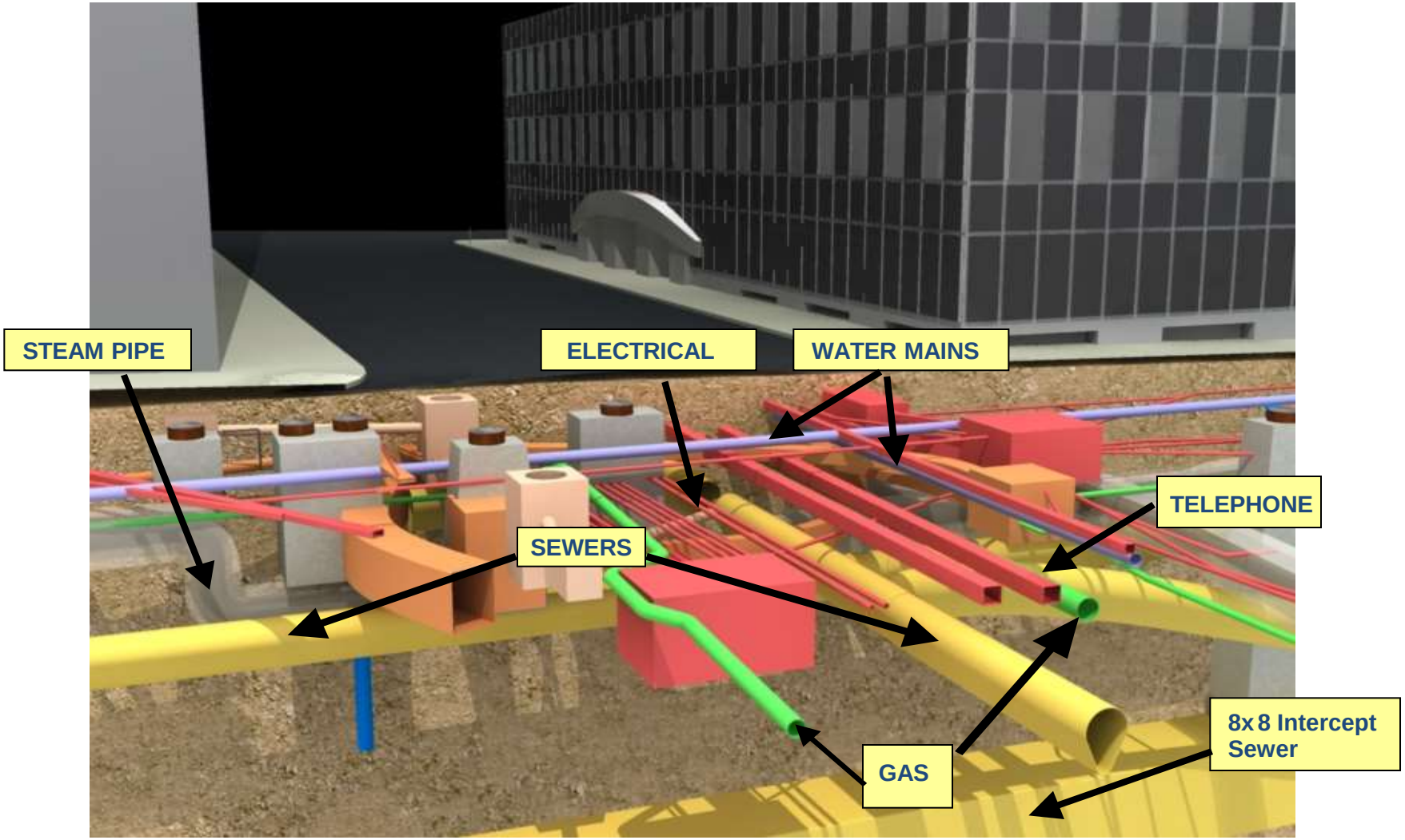


Design Standard: FEMA 100 year flood level + 3 feet

Steam Distribution - Storm Hardening

- Reduction in Preemptive Customer Outages
- Quicker Customer Restoration
- Accurate and Timely Restoration Information Provided to Customers

Steam Distribution – Finding Space



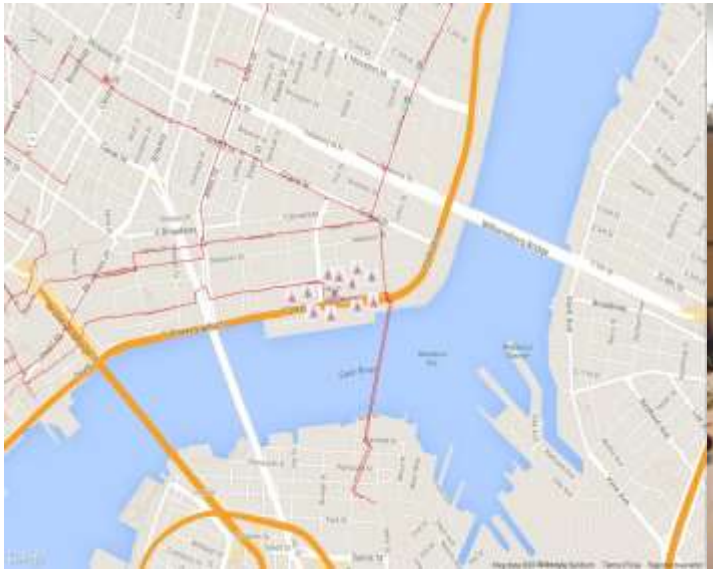
Remote Monitoring System (RMS)

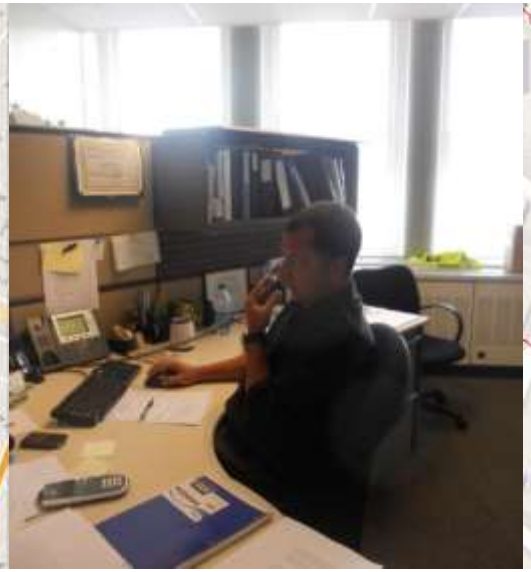
- Program started in 2008 with scheduled completion in 2015
- System Diagnostics (Communication, Box Temperature, System Data)
- Monitors & Alarms:
  - Real-time external water infiltration (680 manholes)
  - Trap functionality (1094 traps)

Steam System Status (3S)

Enhanced Customer Communications

- Prior to, During, and After the Storm
- Easy to visualize plan for scheduled main shut offs for all personnel
- Real-time updates for emergency isolations and service valve turn offs
- Real-time updates for estimated time of restoration for both steam mains and services





Steam Dispatcher – Current State

SOMIS:
Steam Assets and Status

RMS:
Manhole Monitored Data (Alerts)

ORM:
Customer Flows and Pressures and Send Out

JOB TRACKING:
Leak Jobs, Stack Jobs, Inspections etc

File Data:
Steam MV, Steam Plates, Meter Room, Looseleafs, etc

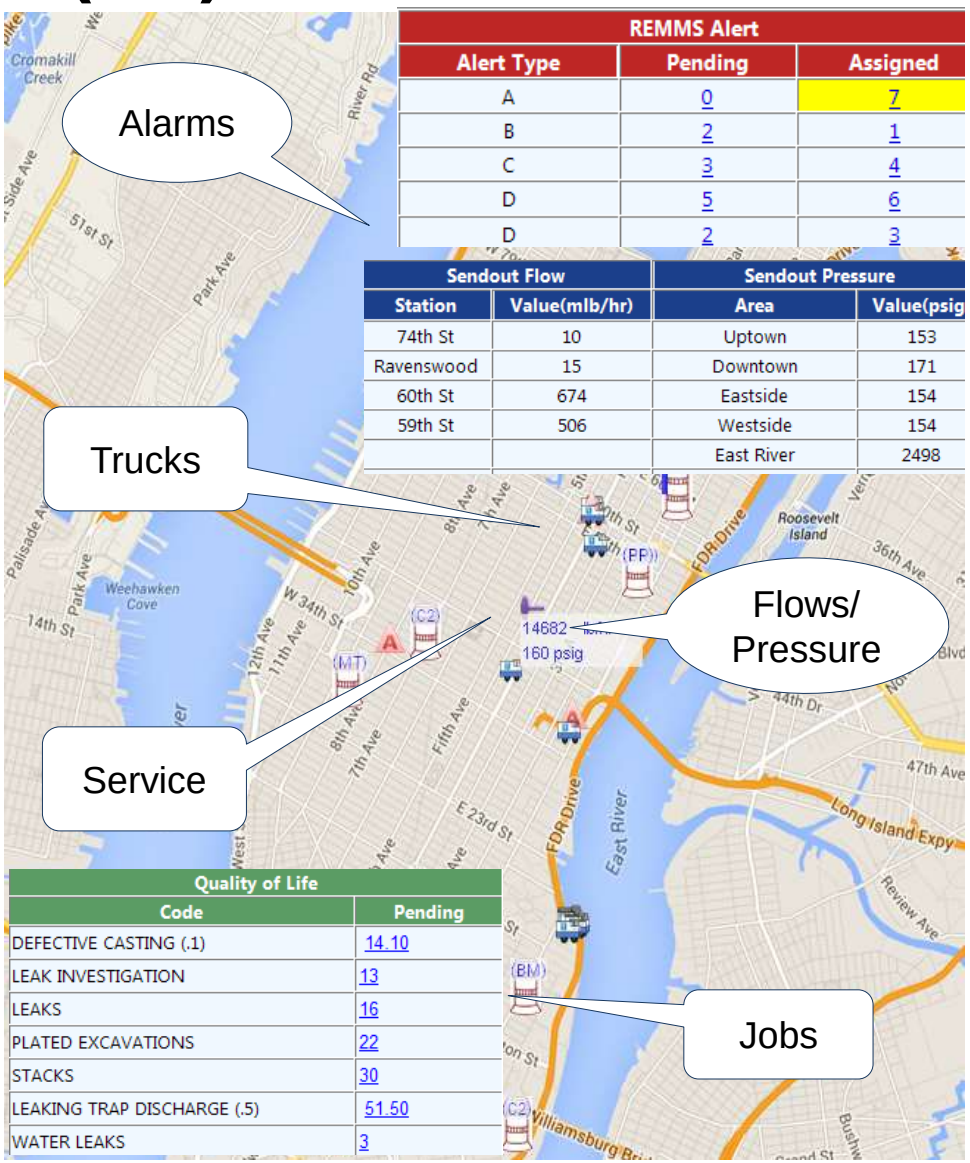
AVAIL:
Trucks

Steam Troubleshooter Dispatchers

PI: Plant Information

Steam System Status (3S)

- Intranet Application
- Steam Data Over Real World Map
  - SOMIS: Steam Assets and their Status
  - RMS: Manhole Monitored Data (Alerts)
  - ORM: Customer Flows and Pressures
  - AVAIL - Trucks
  - Job Tracking



REMMS Alert		
Alert Type	Pending	Assigned
A	0	7
B	2	1
C	3	4
D	5	6
D	2	3

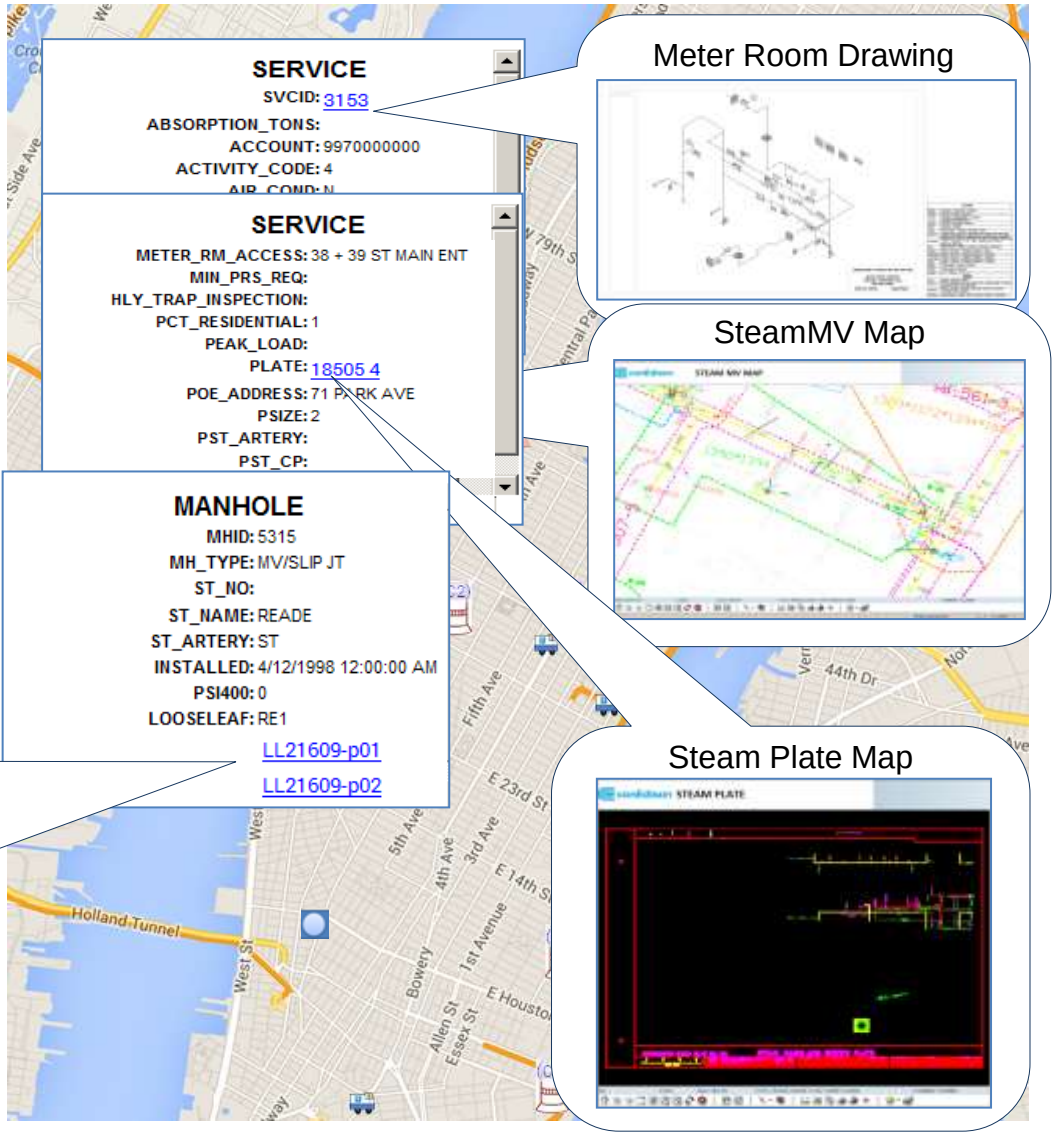
Sendout Flow		Sendout Pressure	
Station	Value(mlb/hr)	Area	Value(psig
74th St	10	Uptown	153
Ravenswood	15	Downtown	171
60th St	674	Eastside	154
59th St	506	Westside	154
		East River	2498

Quality of Life	
Code	Pending
DEFECTIVE CASTING (.1)	14.10
LEAK INVESTIGATION	13
LEAKS	16
PLATED EXCAVATIONS	22
STACKS	30
LEAKING TRAP DISCHARGE (.5)	51.50
WATER LEAKS	3

Steam System Status (3S)

Files Data

- Meter Room Drawings
- SteamMV Map
- Steam Plates
- Looseleaf Files



Reinforcement Considerations

- Add additional valves for greater flexibility and system segmentation
- Add motor operated valves in strategic areas to allow for load shedding
- Waterproof housing in strategic areas to allow steam mains to stay online
- Install new sections of main that bypass flood zones

Summary and Next Steps

- Immediate Storm Hardening was completed by June 2013 to protect against a Sandy level storm
- Coastal Storm Plans modified to reflect lessons learned and provide more flexibility to operating organizations
- Phase 2 of Storm Hardening scheduled for completion by 2017 to the FEMA 100 year Floodplain + 3’ level
- Strategic reinforcement and modification of the Distribution system in progress and scheduled for completion by 2017

Questions?