In Partnership with:
New Orleans Stormwater Strategic Pathways
Workshop 1 - Follow-up

Level of Service (% Chance of Occurrence /Year)

• 1.5 – year storm (67%)
• 5 – year storm (20%)
• 10 – year storm (10%)

Other LOS

• 25 year Storm (4%)
• 50-year (2%)
• 100 year storm (1%)
• 500 year storm (0.2%)
Looking back…

- **May 3-4, 1978**
  - Total Rainfall: 6.8" – 11.7"
  - 2-day with intense 8hr period

- **Throughout April, 1980**
  - Total Rainfall: 5" – 11.8"
  - 2x 5in 1-day events. First storm was 2yr event. Second storm sustained further damage due to proximity to the first storm event

- **April 24-25, 1982**
  - Total Rainfall: 7" – 12.9"

- **April 7, 1983**
  - Total Rainfall: 10" – 16.9"
  - 10in in 8hr; 16.9 in for day

- **Oct 25-31, 1985 (Hurricane Juan)**
  - Total Rainfall: 10.16"
  - 6 day Hurricane Juan with storm surge issues

- **April 1-4, 1988**
  - Total Rainfall: 12" – 19.8"
  - 12hr+; storm system 4 day duration

- **Nov 7-8, 1989**
  - Total Rainfall: 12" – 19"
  - 2-day with intense 8hr period

- **June 9-11, 1991**
  - Total Rainfall: 12" – 15.5"
  - 3-day, but intense middle day

- **May 8-9, 1995**
  - Total Rainfall: 12" – 24"
  - 2-day with intense 3-6hr block

- **Sept 10-14, 1998 (TS Francis)**
  - Total Rainfall: 29" – 31"
  - 6 day Hurricane Juan with storm surge issues

- **June 5-7, 2001 (Hurricane Allison)**
  - Total Rainfall: 16"
  - Significant damage due to rainfall on already saturated ground

- **Sept 24-26, 2002**
  - Total Rainfall: 10.1" – 16.8"
  - 3-day, with intense middle day

- **July 22 & Aug 5, 2007**
  - Total Rainfall: July unclear but Aug reports 2-5" – 10"-16"
  - Gauge disagreement on totals

- **Aug 29, 2005 (Hurricane Katrina)**
  - Total Rainfall: 7.2" – 19"
  - Flooding primarily due to flood wall breaches (1-day rainfall?)

- **Sept 11, 2008 (Hurricane Gustav)**
  - Total Rainfall: 7.34"
  - Uptown area flooding. 1-day

- **Dec 12, 2009**
  - Total Rainfall: 7.22"

- **Aug 29-31, 2012 (Hurricane Isaac)**
  - Total Rainfall: 10.3"
1.5-Year Rainfall Event (67%)

Est. Structures Impacted
780

Est. Monetary Damages
$23 million
2-Year Rainfall Event (50%)

Est. City-wide Structures Impacted
1,200

Est. City-wide Monetary Damages
$28 million

24-Hour Modeled Flood Depth

- 0 - 0.5
- 0.5 - 2
- > 2

Stantec
5-Year Rainfall Event (20%)

Est. City-wide Structures Impacted 2,600

Est. City-wide Monetary Damages $51 million

24-Hour Modeled Flood Depth
Feet
0 - 0.5
0.5 - 2
> 2
10-Year Rainfall Event (10%)

Est. City-wide Structures Impacted: 4,800

Est. City-wide Monetary Damages: $90 million

24-Hour Modeled Flood Depth

- 0 - 0.5
- 0.5 - 2
- > 2
100-Year Rainfall Event (1%)

Est. City-wide Structures Impacted
15,000

Est. City-wide Monetary Damages
$380 million

24-Hour Modeled Flood Depth
Feet
- 0 - 0.5
- 0.5 - 2
- > 2
Define Strategic Pathways Priorities

Flood Risk Reduction
- Restore / Reliability
- Upgrade / Redundancy
- Optimize / Expand

Risk ~ % of Residences Impacted
Define Strategic Pathways Priorities

1. Restore / Reliability / Maintain
   - Achieve Nameplate Capacity
   - Achieve power grid reliability
   - Achieve Pumping system reliability
   - Gain limited capacity
   - Ongoing funded GI projects

![Diagram showing strategic pathways over time with a focus on 2018-2118]
Strategic Pathways

Restore / Reliability – Immediate Risk

Scenario 1 – Revised Estimated Capital Costs

- Collection / Transmission $160 M
- Green Infrastructure / Storage $100 M
- PS Upgrades and retrofits $450 M
- Power Upgrades* $250 M

Total All Basin Cost - $960 M

* Total costs for power upgrades for stormwater (1/3 of total Cost)
Ongoing Funded Programs HMGP and NDRC $300 Million+

Benefits:
- Flood Mitigation
- Social
- Environmental
- Public Health
- Quality of Life

Stantec Vision of Gentilly District: Maximize community benefits • Agreed / Strongly Agreed ~ 70%
Ongoing Funded Green / Grey Solutions

Hagan-Lafitte Drainage and Green Infrastructure
Project Area

Location:
Bayou St. John Neighborhood
Total Budget $7 Million
HMGP funded $5.35 Million for Construction

Purpose – reduce flooding in Hagan-Lafitte neighborhood

Benefit / Cost Ratio – 1.67
Project Goal
Neighborhood Resiliency

- Utilize Green Infrastructure to slow, retain, and absorb storm water
- Improved Water Quality
- Recharge Aquifer
- Reduce subsidence
- Mix of green and gray infrastructure
- Strategic Peak Storage
Drainage Solutions

Easton Park
• Strategic underground storage – reserved for peak of storm with weir system
• Retains functionality of park
• Improves fields with drainage
Drainage Solutions

Easton Park Underground Storage System
Drainage Solutions
Pervious Sidewalks

Replace sidewalks in project area with pervious concrete
• Potential to retain/return flow to ground instead of converting it to runoff
• Intercept flows from roof leaders, driveways
• Create a recharge grid to address subsidence
Drainage Solutions

Green Infrastructure

Rain gardens at key locations
• Around existing catch basins
• As a street corner landscape improvement / parking deterrent
• Connected to pervious sidewalk grid to form an integrated system
Drainage Solutions

Green Infrastructure – Rain Gardens
Drainage Solutions

Green Infrastructure – Rain Gardens
Results – 2 Year – 24 Hour Storm - Before

Hagan-Lafitte Project
2yr, 24hr Proposed Flood
Flood Depth (ft)
- 0
- 0.01 - 0.25
- 0.26 - 0.5
- 0.51 - 0.75
- 0.76 - 1
- 1.1 - 2
- 2.1 - 3
- 3.1 - 5

Pervious Sidewalk
Underground Storage
Results – 2 Year – 24 Hour Storm - After
Results – 10 Year – 24 Hour Storm – Extent of Benefit
Extent of Benefits – Beyond Project
Define Strategic Pathways Priorities

1. Restore / Reliability

2. Upgrade / Redundancy / Maintain
   • Upgrade LOS
   • New green / blue infrastructure
   • New Regional Storage solutions
   • New grey infrastructure

[Graph showing timelines and priorities]
Strategic Pathways
Upgrade and Redundancy – High Risk

Scenario 2 - Estimated Capital Costs

- Collection / Transmission $1,200 M
- Green Infrastructure / Storage $700 M
- PS Upgrades and retrofits $850 M
- Power Upgrades* $250 M

Total All Basin Cost - $3,000 M
Strategic Pathways
Upgrade and Redundancy – High Risk

- Strategic Surface Storage
  Blueways and Greenways
  - Large areas designed to store / equalize peak storm flows
  - Cost effective

Maximize Green Infrastructure
- Agreed / Strongly Agreed ~ 70%
  Maximize community benefits
- Agreed / Strongly Agreed ~ 70%
Strategic Pathways

Upgrade and Redundancy – **High Risk**

**Basin Risk**
- Immediate: 7, 12
- High: 3, 4, 13 and 1
Define Strategic Pathways Priorities

1. Restore / Reliability
2. Upgrade / Redundancy
3. Optimize / Expand / Maintain
   • Further upgrade LOS
   • Add further pumping redundancy
   • Add Inter-connectivity
   • Hydraulically off-load – redefine basins
   • Add new off-line (green basin) storage
   • Automate controls (SCADA)
Strategic Pathways
Optimize and Expand – Medium Risk

Scenario 3 – Estimated Capital Costs
- Collection / Transmission $1,500 M
- Green Infrastructure / Storage $1,350 M
- Capacity Increases and PS Upgrades $1,700 M
- Power Upgrades $250 M

Total All Basin Cost - $4,800 M
Regional Solutions - Opportunities

Basin Reconfiguration

• Re-direct flow to Mississippi River or canals
• Off-load from existing canals and pump stations to free up capacity

Examples:

• Monticello Pump to River
• DPS 4 West
• Bayou St. John Pumps
• DPS 3 to Florida Canal
Permanent Canal Closures and Pumps Project

Assets for the Future Plan
17th Street Outfall Canal

- 12,600 cfs capacity
- 39 MW power generation
Orleans Ave. Outfall Canal
- 2,700 cfs capacity
- 10 MW power generation
London Ave. Outfall Canal
- 9,000 cfs capacity
- 29 MW power generation
Generator Capacities

<table>
<thead>
<tr>
<th>Site</th>
<th>Power Output (Installed)</th>
<th>Number of Generators</th>
<th>Fuel Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>17th Street</td>
<td>44.2 MVA</td>
<td>17</td>
<td>300,000 Gallons</td>
</tr>
<tr>
<td>Orleans Avenue</td>
<td>10.4 MVA</td>
<td>4</td>
<td>80,000 Gallons</td>
</tr>
<tr>
<td>London Avenue</td>
<td>28.6 MVA</td>
<td>11</td>
<td>250,000 Gallons</td>
</tr>
<tr>
<td></td>
<td><strong>83.2 MVA</strong></td>
<td><strong>32</strong></td>
<td><strong>630,000 Gallons</strong></td>
</tr>
</tbody>
</table>

- Grid independence – operates on diesel power in a hurricane
- N+1 redundancy through a swing bus
- 15 kV rated equipment for future 13.2 kV pump motors
- Two permanently VFD driven pumps at each station
- Remainder are VFD start only with bypass
- Two MVA of HVAC and miscellaneous load
• Compartmentalization
  - Each storm pump and generator designed as a compartment for independent control and coordination

• Redundancy
  - Redundant PLCs, networks, and instrumentation clusters
Control System

- PLC based SCADA system with redundant master PLCs and compartment PLCs
- Ethernet based communications
- PLC based paralleling switchgear
- Coordination between generation – paralleling switchgear – and pumping through storm pump PLCs
Telemetry and Remote Monitoring

- Communications with Operating Stakeholders
  - Sewerage and Water Board
  - Upstream DPS
  - Adjacent Parishes
Strategic Pathway

What are the next steps?

1. Continue the Dialogue
2. Comprehensive Stormwater Plan – Projects, costs and priorities
   • Continue ongoing projects and system improvements
   • Identify Priority Projects
   • Define Desired Level of Service
   • Capital Improvement Plan – Power / Green / Grey
3. Stormwater Rate Study
4. Secure Dedicated Funding
5. Apply for matching Grant Funding
6. Implement the Vision