





# TOWN OF BRANFORD COASTAL RESILIENCE PLAN

#### **Presentation of Adaptation Options**

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#### Presentation Agenda

- Progress
- Resilience Review
- Approaches to Adaptation
- Adaptation Scales
- Branford Options
- Discussion



### Review: Project Steps

Done

Done

Nov

**Spring** 

Review Existing Capabilities

Coordinate with "Regional Framework"

• Data Collection

Vulnerability and Risk Assessment

Review of Adaptation Options

Public Information Meetings, Surveys

Select Sandy-Impacted Neighborhoods

Conceptual Designs

Coastal Resilience Plan

• Implementation Plan and Process

#### Review: Resilience

Reduce Recovery Time Resilience **Decrease Damage** Prepare **Increase Capacity** Adapt Withstand **Event!** Recovery Recover **Community Capacity Greatest Loss** 

Time →



#### Review: Resilience

Resilience

Prepare

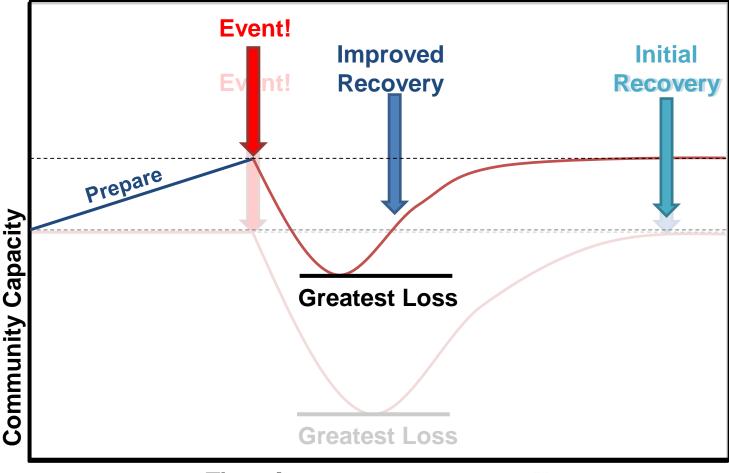
Adapt

Withstand

Recover

Reduce Recovery Time
Decrease Damage

Increase Capacity





#### Review: Resilience

#### Resilience

Prepare

Adapt

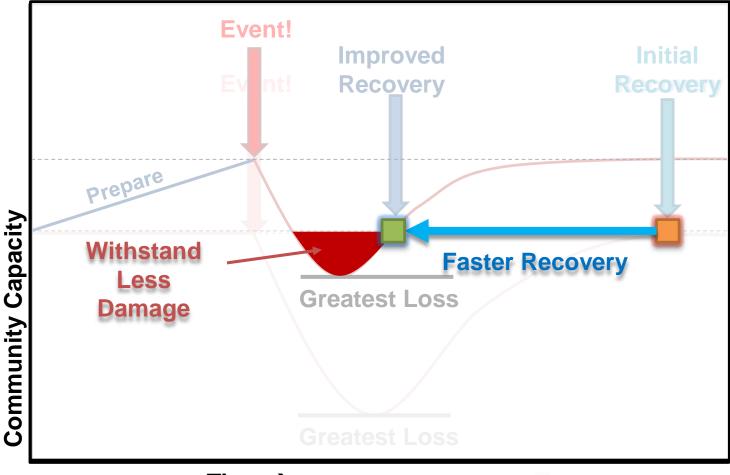
Withstand

Recover

Reduce Recovery Time

**Decrease Damage** 

**Increase Capacity** 





#### Review: Resilience

#### Resilience

Prepare

Adapt

Withstand

Recover

Reduce Recovery Time

**Decrease Damage** 

**Increase Capacity** 





Where we are now

Closing the gap



### **Options in Branford**

#### **Community Engagement**

# Online Survey www.surveymonkey.com/r/BRANFORDCRP

- What you care about:
  - Homes, Water Utilities, Drainage, Natural Systems
- What you're worried about:
  - Wind, water, waves, secondary hazards, failing drainage
- What you want:
  - Restore homes, water service, reopen roads, restore communications
  - Town projects, technical assistance and regulatory freedom



#### Adaptation: Approaches

#### **3 General Types of Adaptation** (IPCC, 1990)

- Retreat
  - No shoreline protection
  - Abandon vulnerable area

#### Accommodation

- No shoreline protection
- Remain in vulnerable area
- Adjust structures, infrastructure, land-use, preparation & response

#### Protection

- Shoreline protection
- Remain in vulnerable area
- No adjustment of structures, infrastructure, land-use, etc.



#### Adaptation: Approaches

#### 7 Updated Categories of Adaptation (NOAA, 2010)

1. Impact Identification and Assessment

Know the facts

2. Awareness and Assistance

Share the facts

3. Growth and Development Management

Prevent creation of new vulnerabilities

4. Loss Reduction

Decrease existing vulnerabilities

5. Shoreline Management

Protect natural, aesthetic, & economic benefits of beach & shore

6. Coastal Ecosystem Management

Protect natural, aesthetic, & economic benefits of coastal ecosystems

7. Water Resource Management

Decrease unique risks to drainage & water supply infrastructure

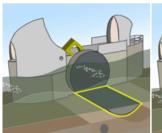


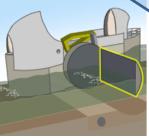


#### Adaptation: Scale

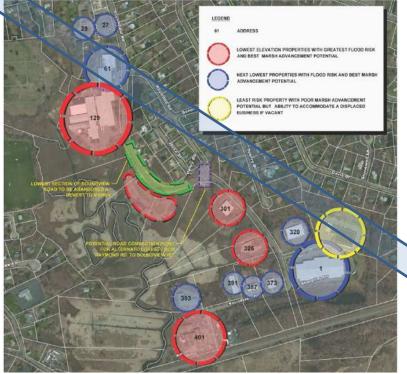












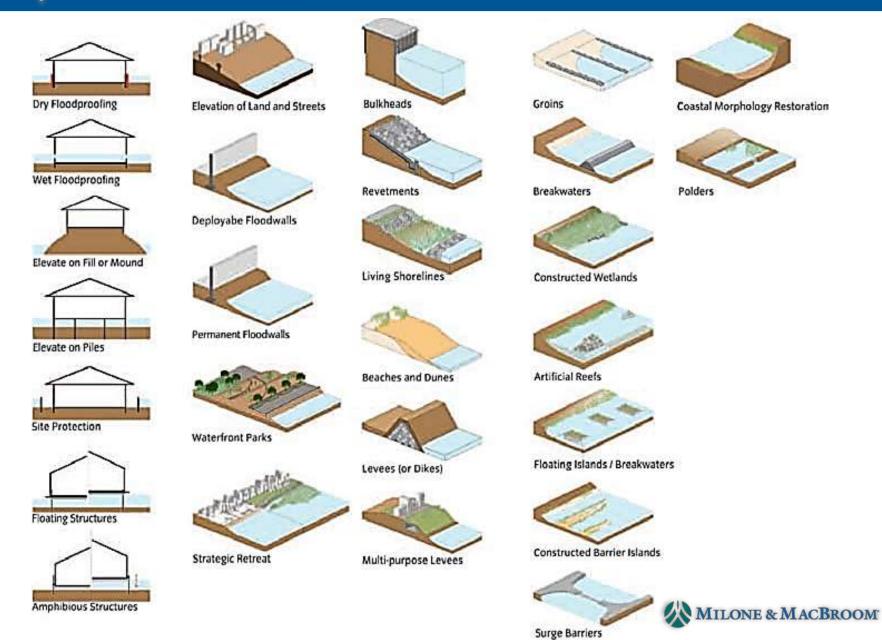




Site-Specific Scale



#### Adaptation: Scale

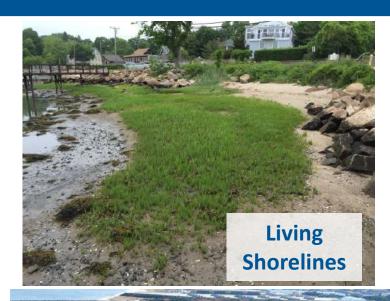


### Adaptation: Shoreline Scale





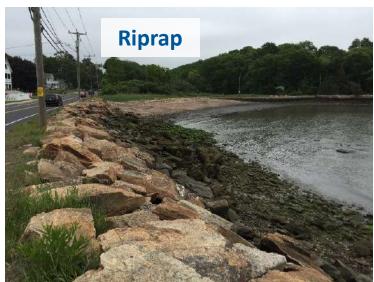


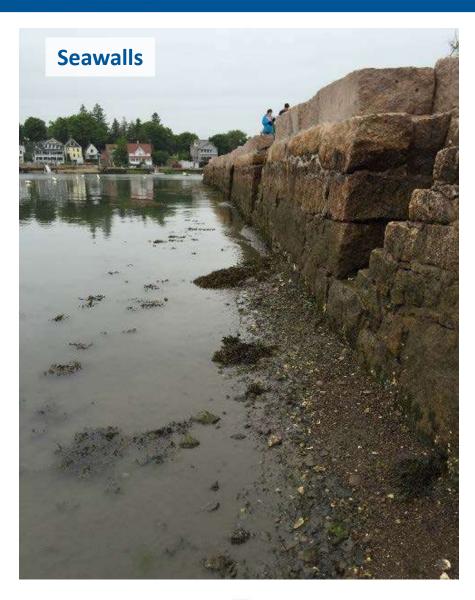




### Adaptation: Neighborhood Scale







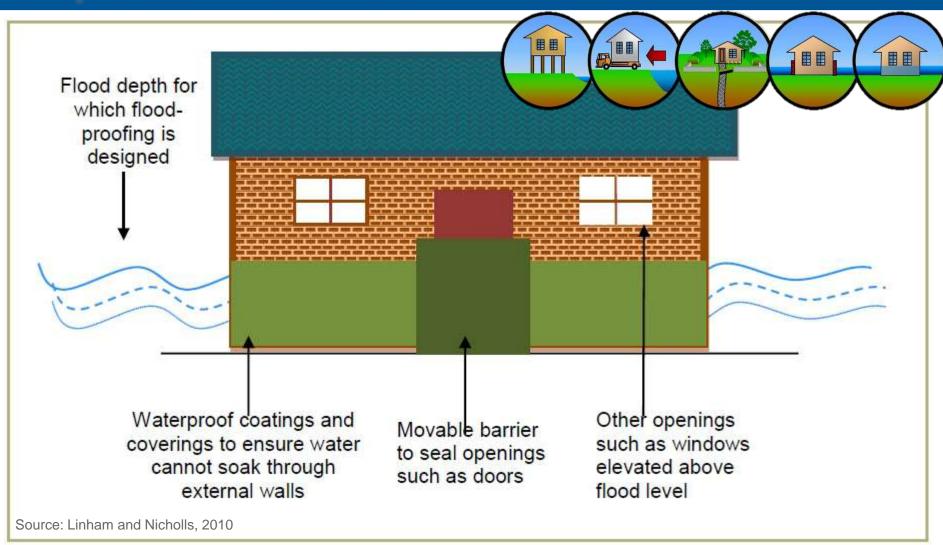


#### Adaptation: Neighborhood Scale





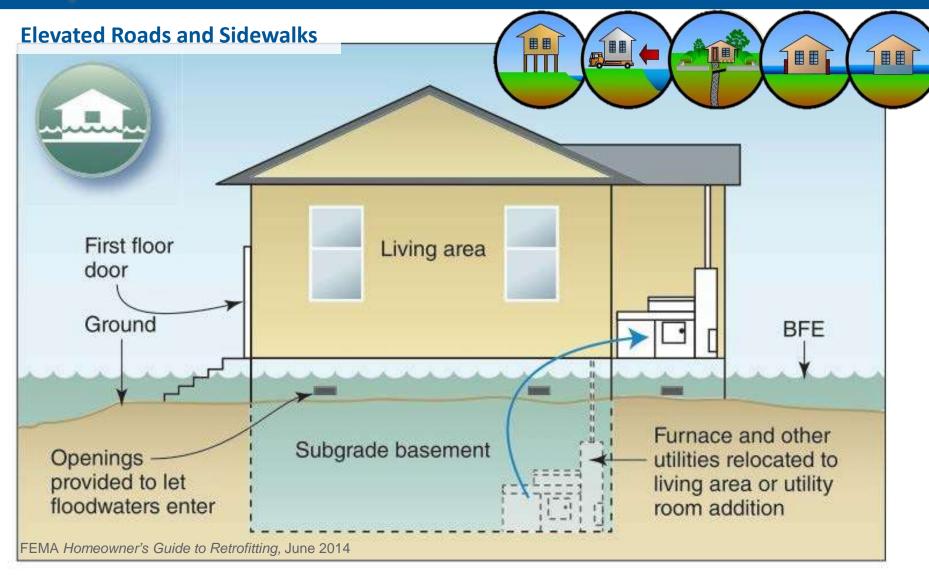
#### Adaptation: Site Scale



**Dry Floodproofing** 



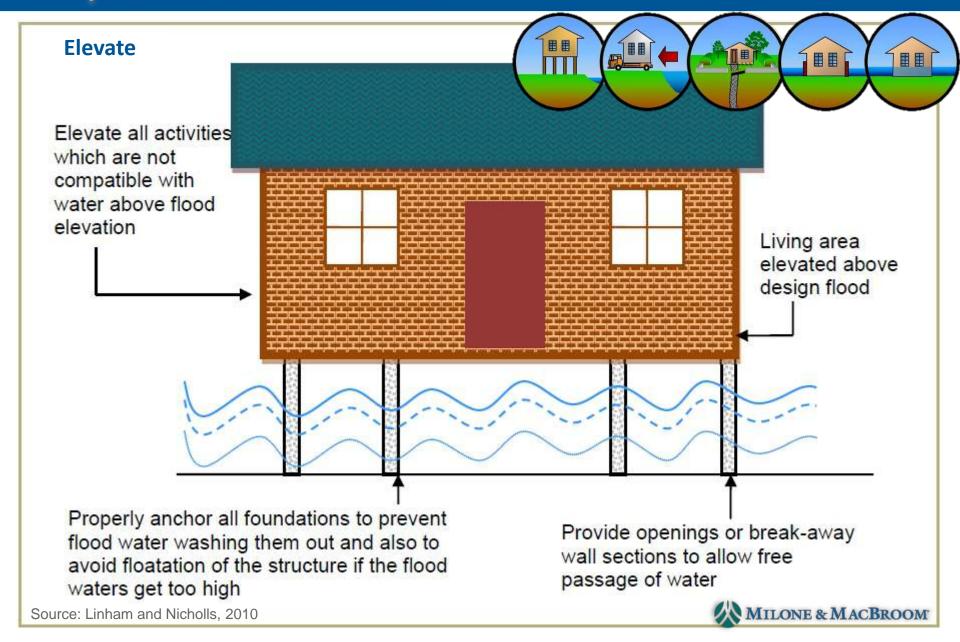
#### Adaptation: Site Scale



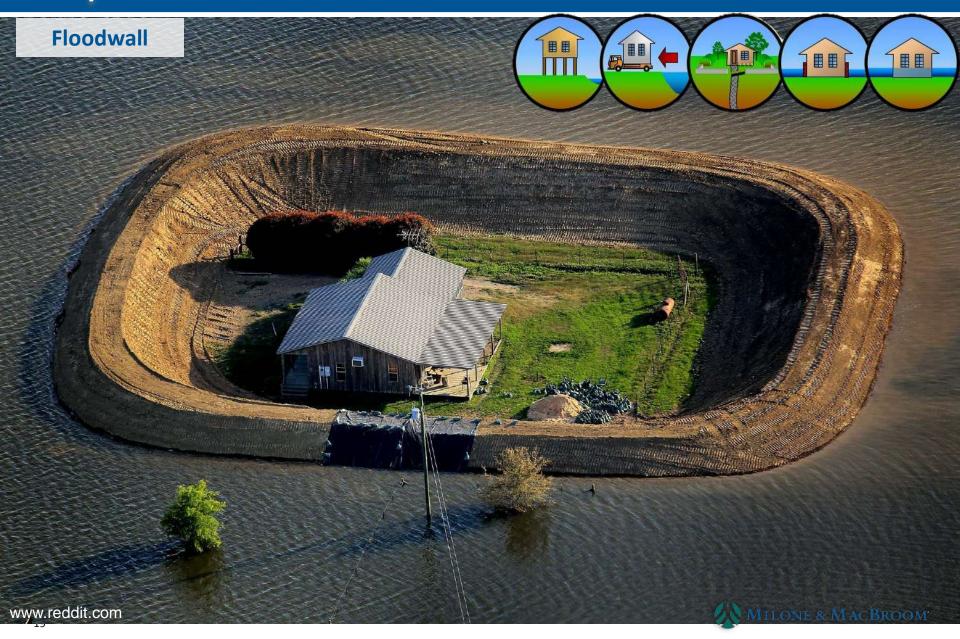
**Wet Floodproofing** 



#### Adaptation: Site Scale



### Adaptation: Site Scale



### Options in Branford

#### **Specific Options for Branford**



Transportation Options

**Elevate or Retire Roads** 



Living Shorelines, Beach Nourishment, Sediment Management, Dune-Management, Bioengineered Banks



#### **Protective Structures**





**Home Elevation** 

Critical Facilities

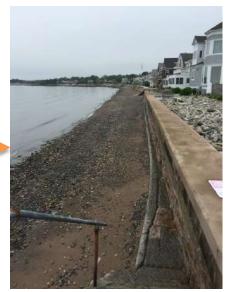
Relocation, Satellite Facilities



Drainage, Wastewater, Water Supply



**Acquisition and Retreat** 





#### **Options: Wastewater Systems**

#### **Collection Systems and Pumping Stations**

- Elevate
- Floodproof
- Use submersible pumps
- Standby power
- Set up for rapid repair
- Harden system components
- Convert gravity to pumped systems
- Install backflow prevention
- Alternate collection systems



A flooded pump-station in Warwick, RI, 2010 *Photo: Janine Burke* 



### **Options in Branford**

# Adapt

#### **Adapting WWTPs/WPCFs**

- Flood wall around facility
- Floodproof structures
- Elevate internal components
- Floodproof components
- Elevate electrical systems & controls
- Use corrosion-resistant materials
- Harden outfall
- Prevent sedimentation of outfall
- Prevent backflow
- Secure tanks that can float

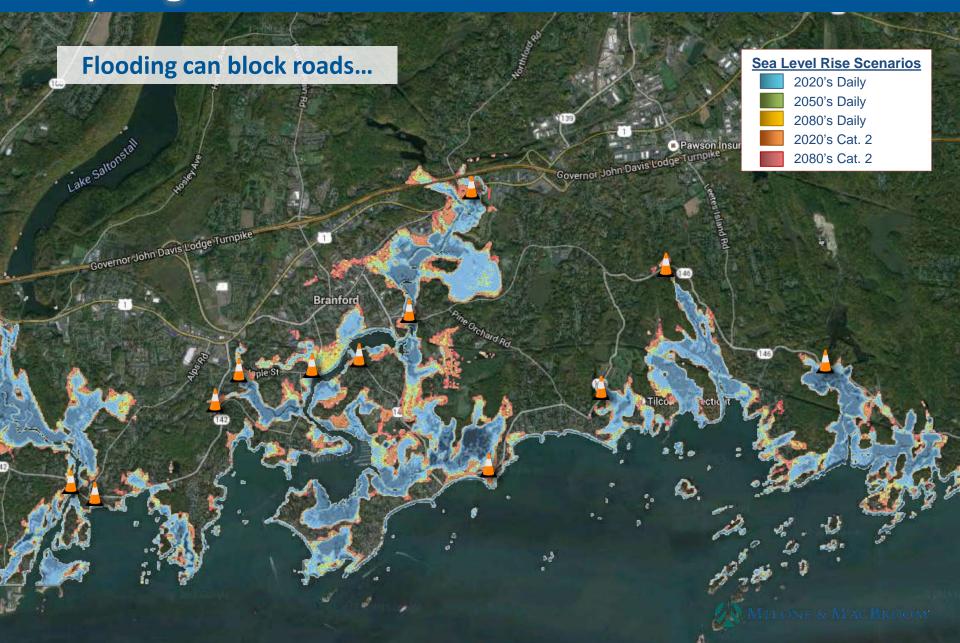
- Protect electric supply
  - Harden lines
  - Redundant lines
  - Standby power
- Protect access (elevate driveway)
- Backup records and files
- Move office to higher level
- Designate flood-safe spaces
- Remote access programs
- Train Personnell

or...

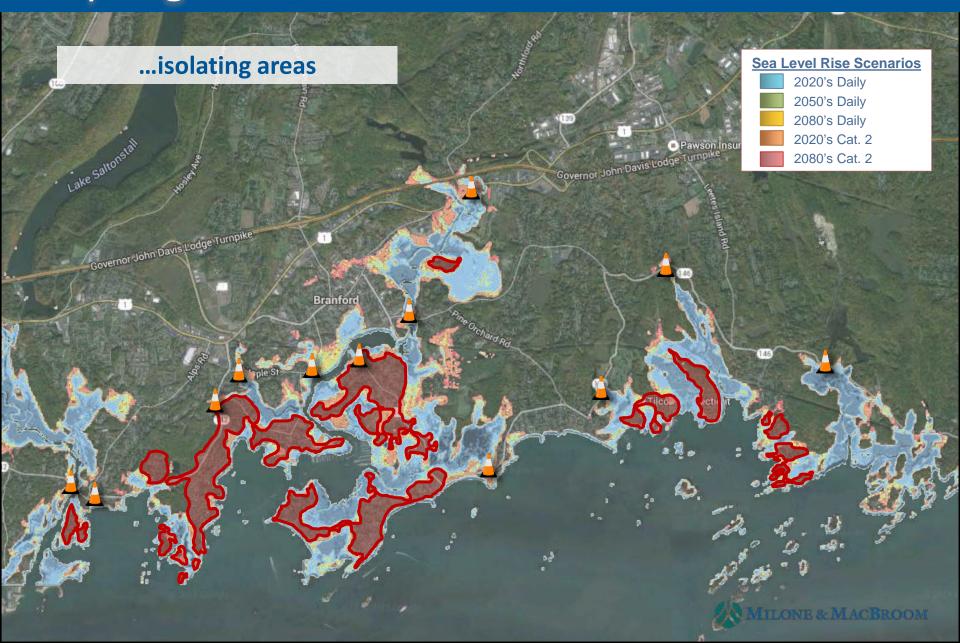
Relocate the entire treatment facility!



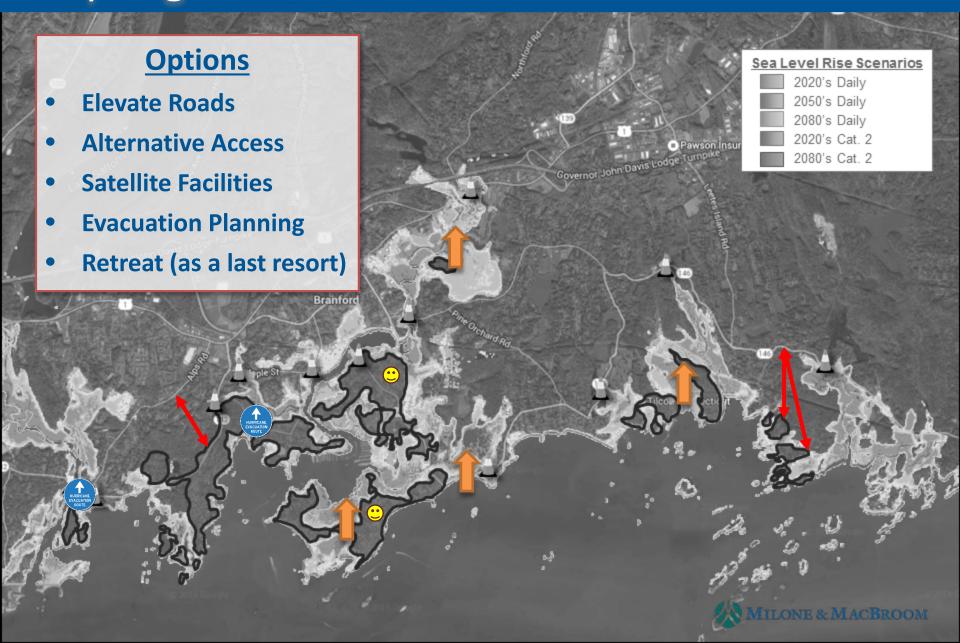
### Adapting to Isolation Risks



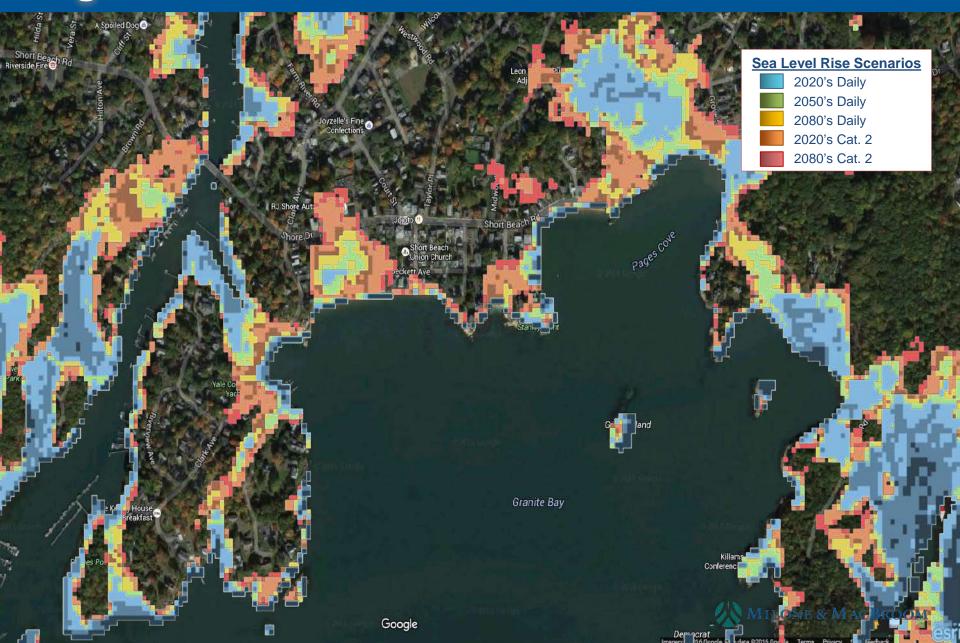
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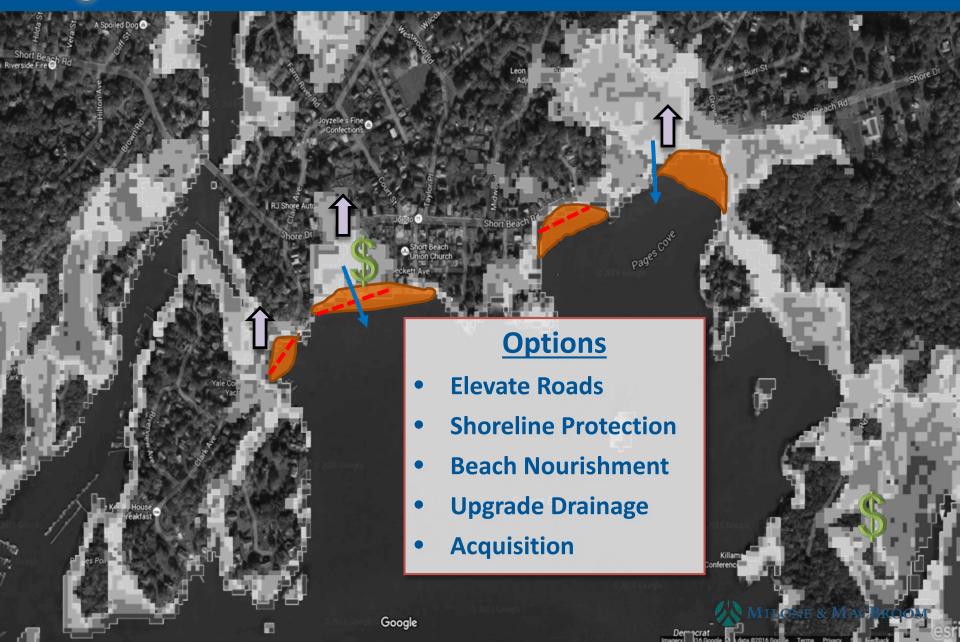
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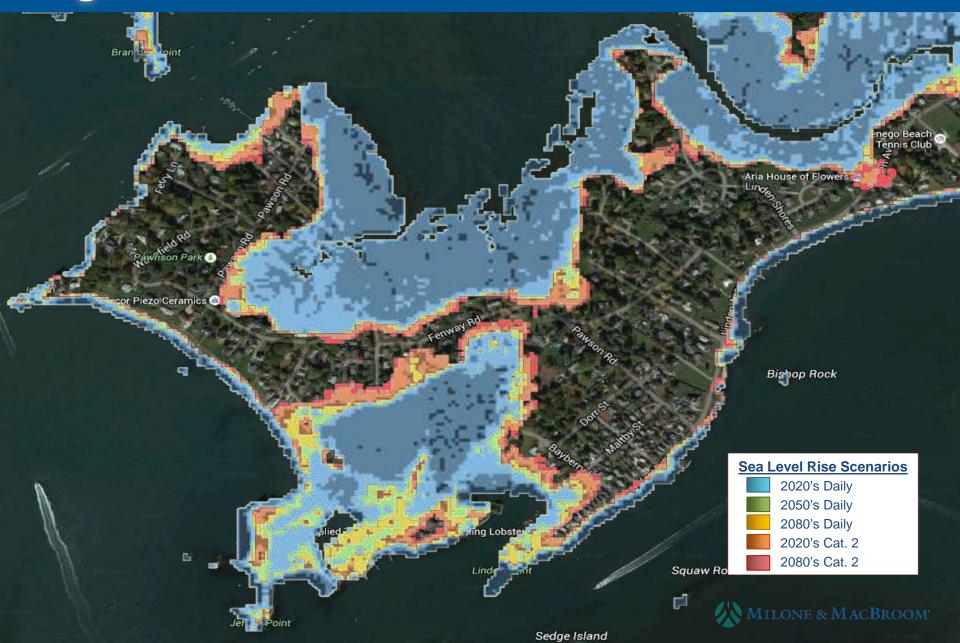
### Neighborhood: Short Beach



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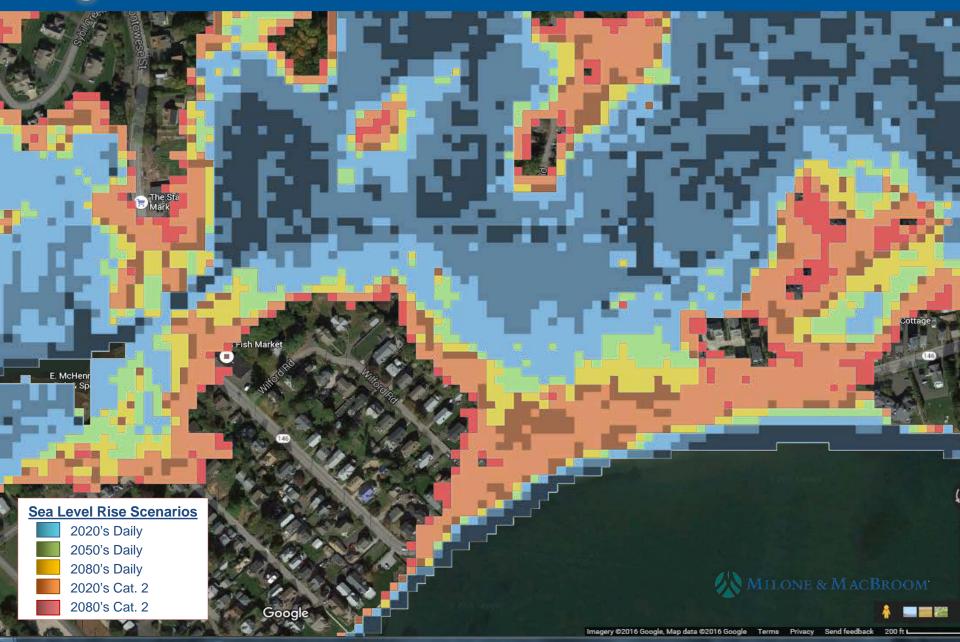
### Neighborhood: Pawson Park



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### Neighborhood: Limewood Beach



#### Neighborhood: Limewood Beach



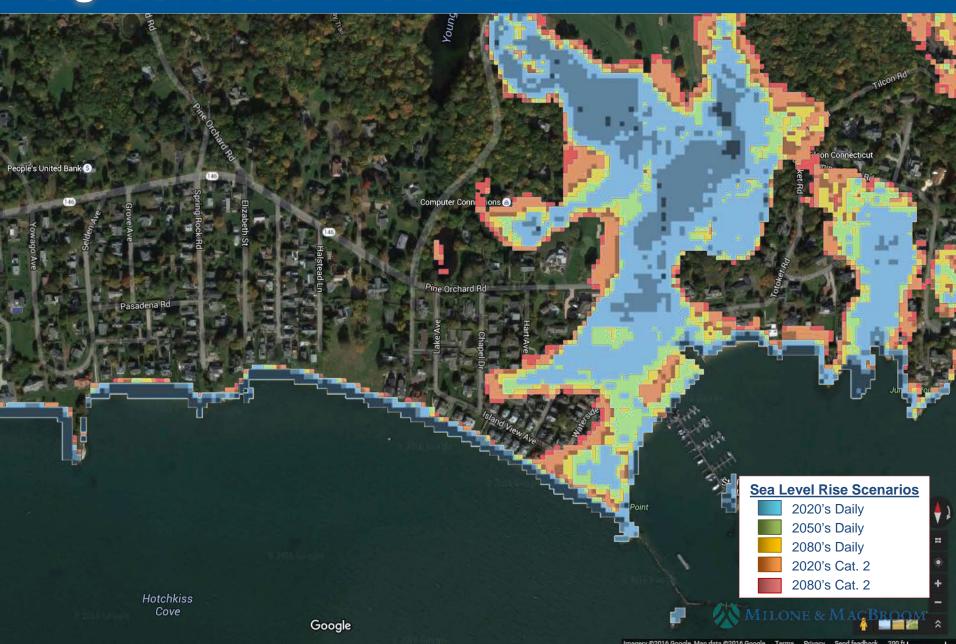
### Neighborhood: Hotchkiss Grove



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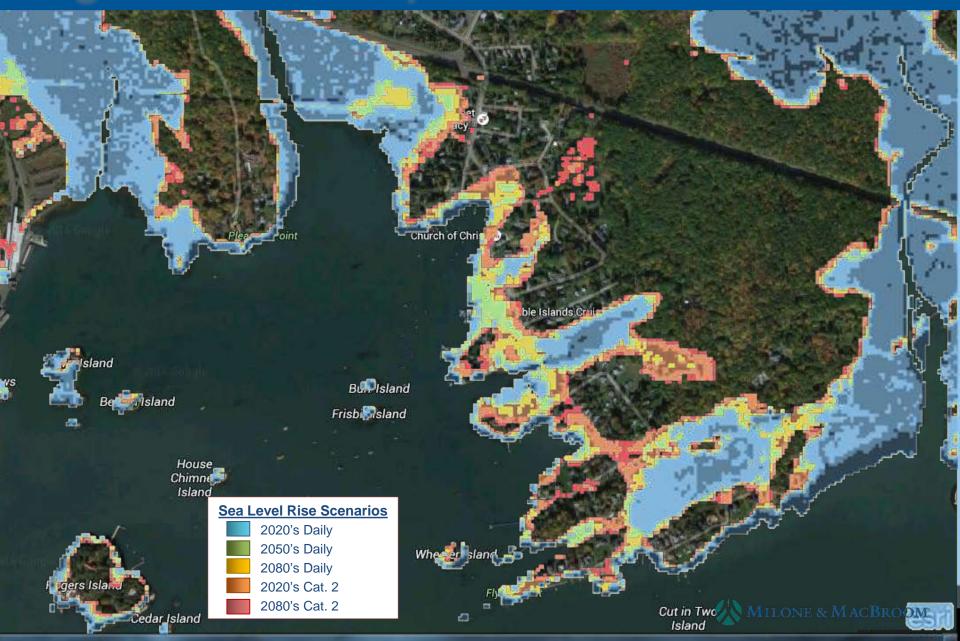
### Neighborhood: Pine Orchard



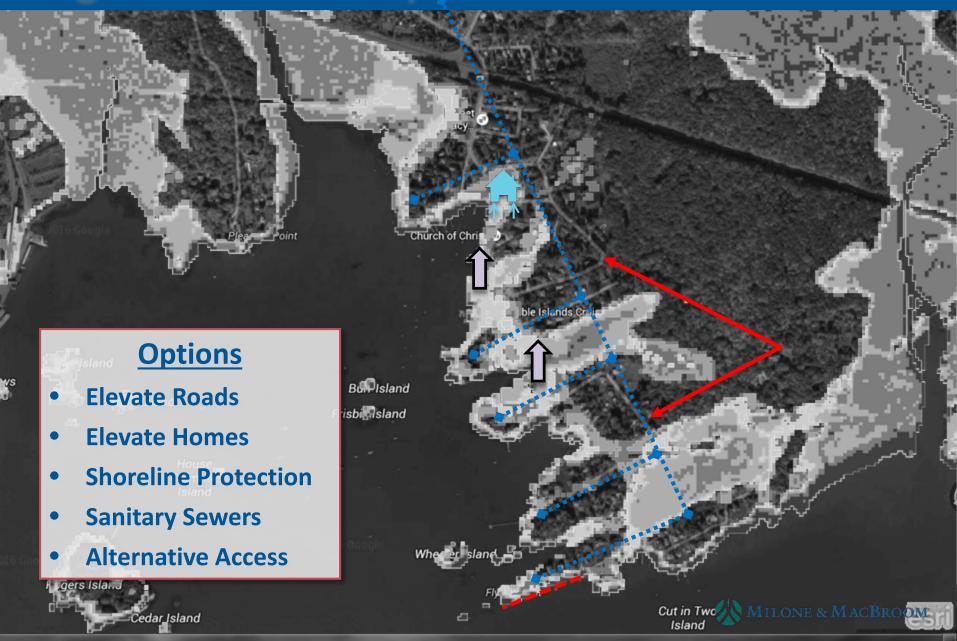
### Neighborhood: Pine Orchard



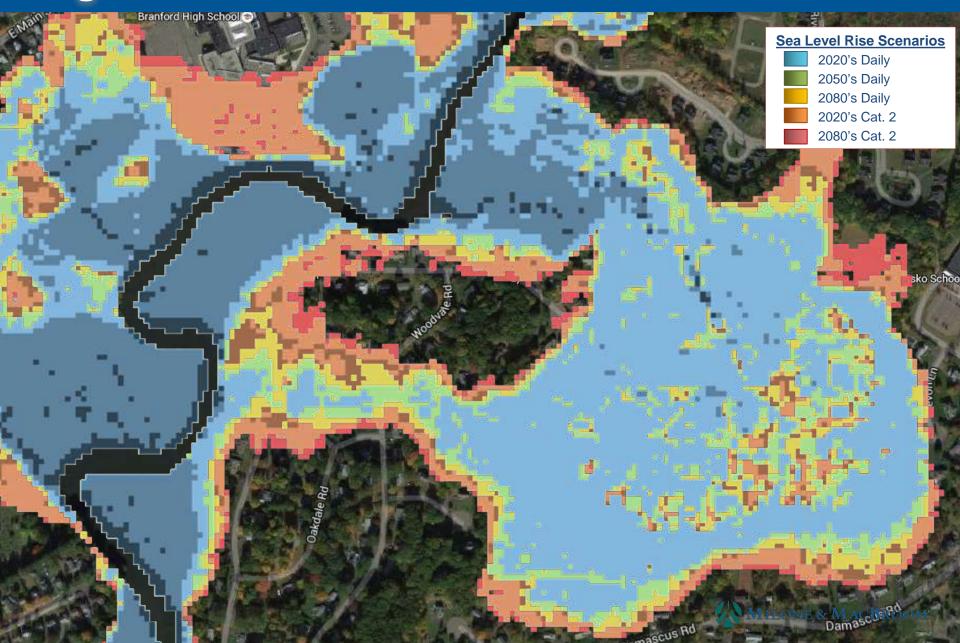
### Neighborhood: Stony Creek



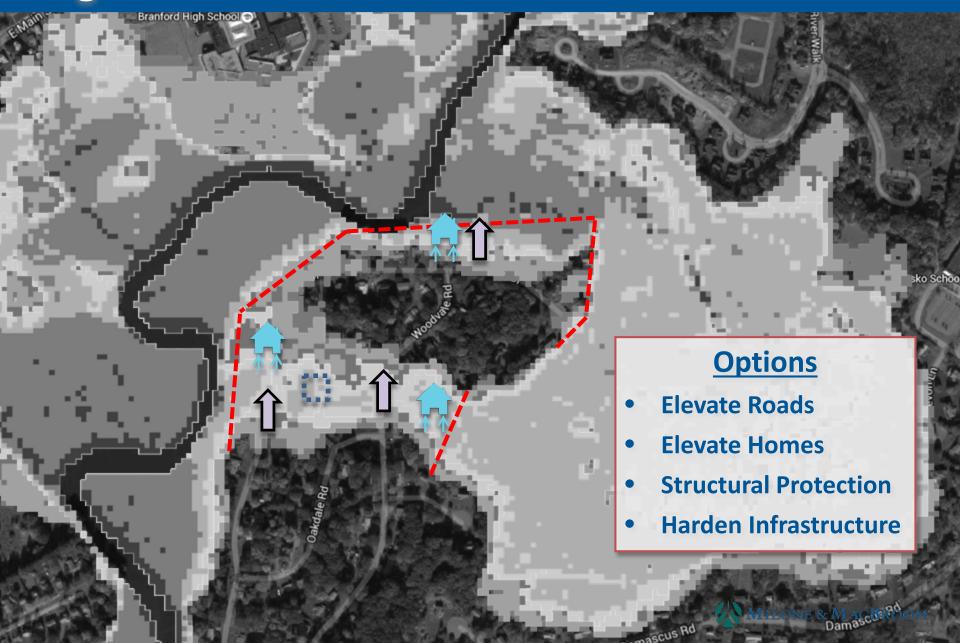
### Neighborhood: Stony Creek



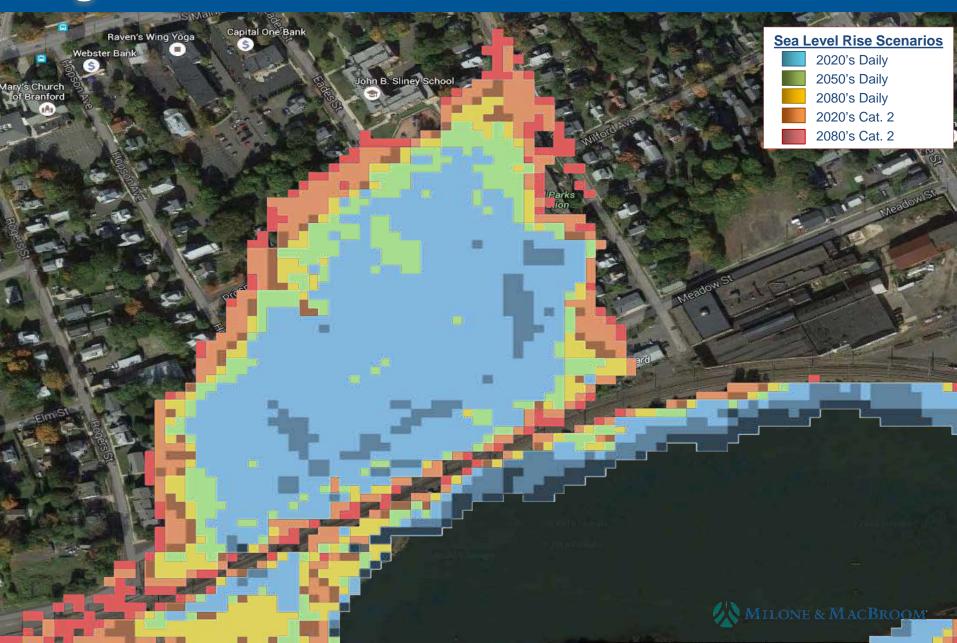
# Neighborhood: Blackstone Acres



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#### Neighborhood: Meadow Street



#### Neighborhood: Meadow Street



# Concepts: Examples for Planning



Branford Options Discussion

#### Concepts: Meadow Street



**Existing Conditions** 



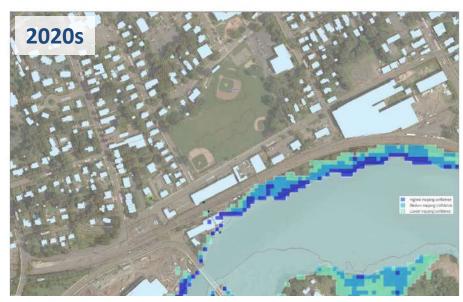


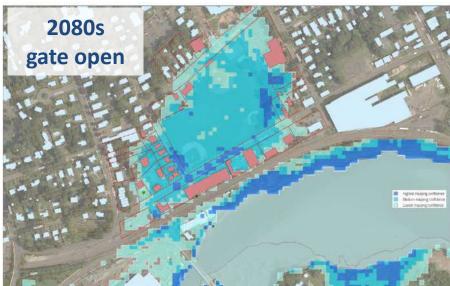


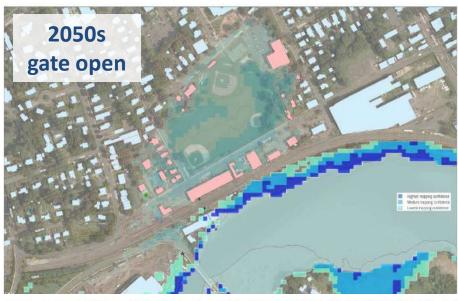


**Flood Gate Option 2** 

### Concepts: Meadow Street









#### Concepts: Meadow Street









# Concepts: Blackstone Acres



# Concepts: Blackstone Acres

2020s No Storm

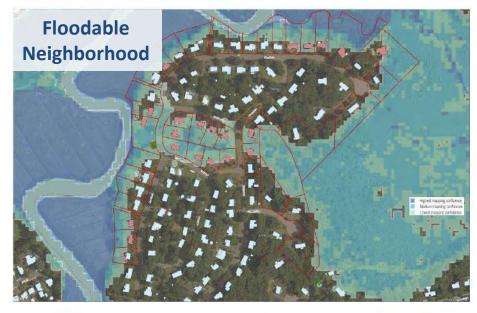


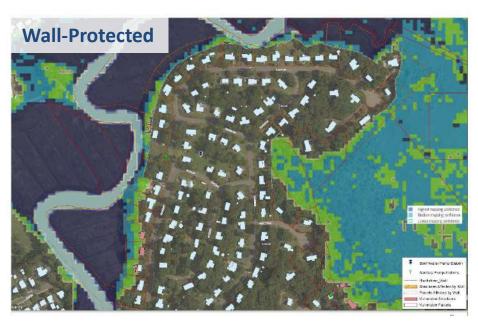




# Concepts: Blackstone Acres

2080s No Storm







#### **Concepts: Blackstone Acres**

#### **Present Day Category 2 Storm**







# Concepts: Blackstone Acres

#### 2080s Category 2 Storm

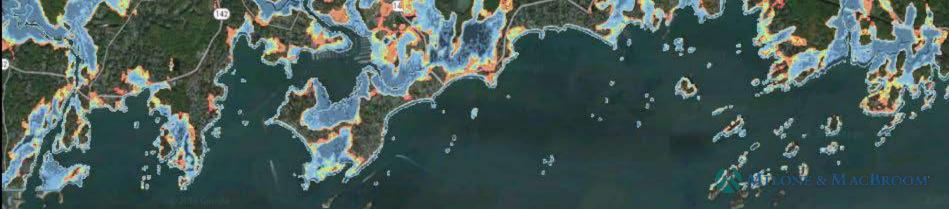






#### Summary

	Elevate Roads	Elevate Homes	Shoreline Protection	Beach Nourishment	Upgrade Drainage & Utilities	Acquisition & Retreat	Relocate Roads or Facilities
Isolation	Х					Х	Х
<b>Short Beach</b>	X		X	X	X	X	
Pawson Park	X	X	X				X
Limewood Beach	X	X				X	
<b>Hotchkiss Grove</b>	X	X	X	x	X	X	
Pine Orchard	X	X	X	X			
Stony Creek	Х	X	X		X		X
Blackstone Acres	Х	Х	X		X		
<b>Meadow Street</b>		X	X		X	X	X
				LA	Tilcol		



#### Resilience Discussion



