ASSESSING CLIMATE VULNERABILITIES OF FOOD DISTRIBUTION CENTER SITES IN GREATER BOSTON: CLIMATE ADAPTATION PLANNING IN PRACTICE

THE SITE

PROJECT OBJECTIVES

• Build upon existing analyses of the region’s food system and climate vulnerabilities to identify flood risk exposure to the food distribution centers in Chelsea and Everett, Massachusetts

• Inform the Metropolitan Area Planning Council’s (MAPC) and the Metro Boston Climate Preparedness Task Force’s understanding of this critical regional food distribution infrastructure and potential strategies for addressing its flooding vulnerabilities

THE VULNERABILITY

Vulnerability: Function (exposure, sensitivity, adaptive capacity)

• Exposure: Estimated from BH-FRM results expanded for City of Chelsea

• Sensitivity: Assumption all structures are NOT flood proof => highly sensitive to flooding

• Adaptive Capacity: Assume low or zero adaptive capacity

Therefore, Vulnerability is solely a function of exposure

EXPOSURE:

Coastal flooding 2030

Coastal flooding 2070

SENSITIVITY:

Adaptive capacity

CONCLUSIONS

• Significant coastal flooding of site and adjacent neighborhoods and roadways in near term (by ~2030) – green infrastructure and elevation options

• Extensive flooding in future – local protection options more limited (by ~2070)

• Regional protections are the most viable solutions

• Long term (2100 and beyond) – river restoration may be necessary

PROJECT TEAM

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AGU’s Thriving Earth Exchange (TEX) Program

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METHODOLOGY

• Based on results from the Massachusetts Department of Transportation’s Boston Harbor Flood Risk Model (BH-FRM)

• Dynamic modeling techniques that incorporate storm surge, wave action and sea level rise projections under different climate scenarios

• Aligned with methodologies from other regional analyses

• Leveraged both the results of a complementary study performed by Stantec/Woods Hole Group for the City of Chelsea and a design study by Climate Creatives to expand project to include adaptation options

POTENTIAL ADAPTATION STRATEGIES: 2030/2070

GREEN INFRASTRUCTURE AND ELEVATION ELEMENTS

2030/2070 - Island End River Vulnerability Zone Adaptation Measures

2100 AND BEYOND

RIVER RESTORATION AND REVITALIZATION

2100 - Island End River Revitalization