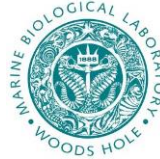


Woods Hole Village: Climate Change Vulnerability Assessment and Adaptation Plan



Kirk F. Bosma, P.E.
kbosma@woodsholegroup.com

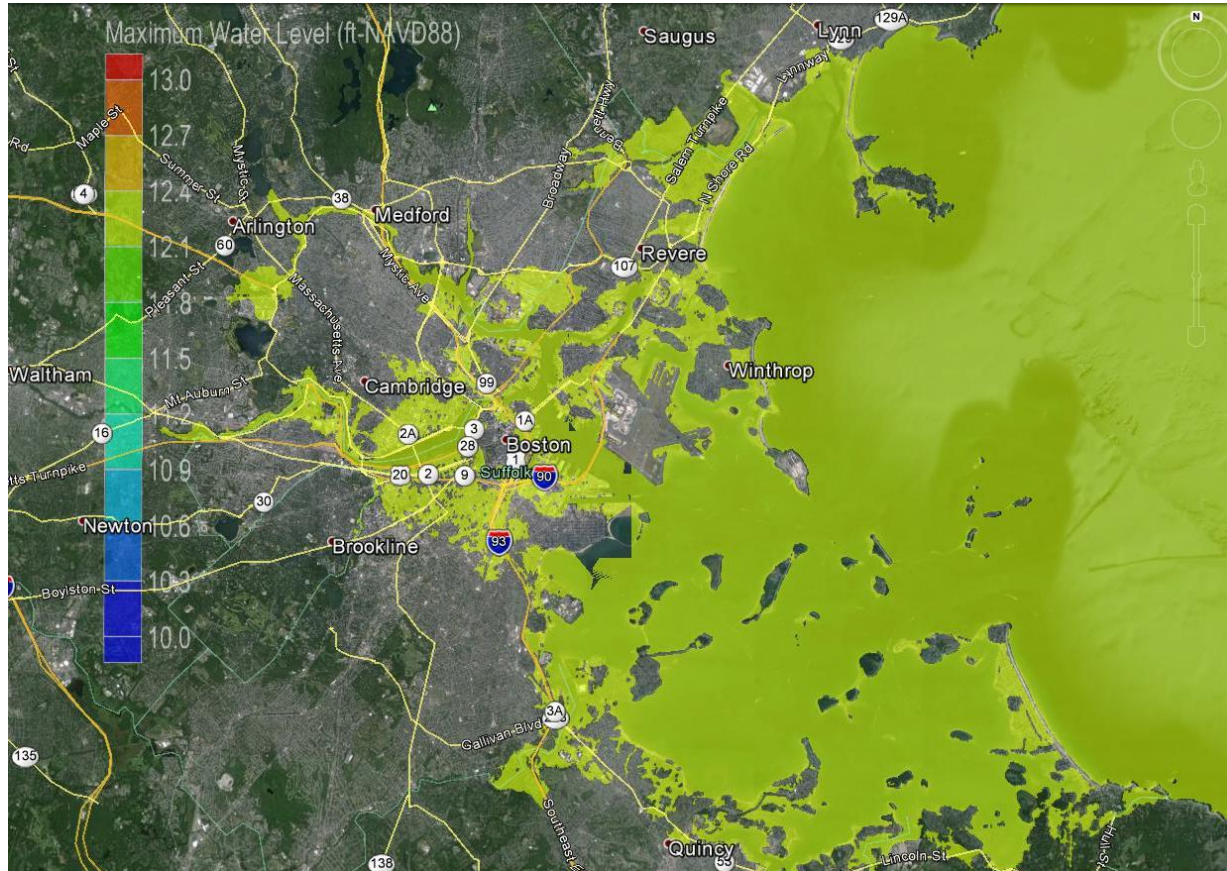


Vulnerability Assessment and Adaptation Planning

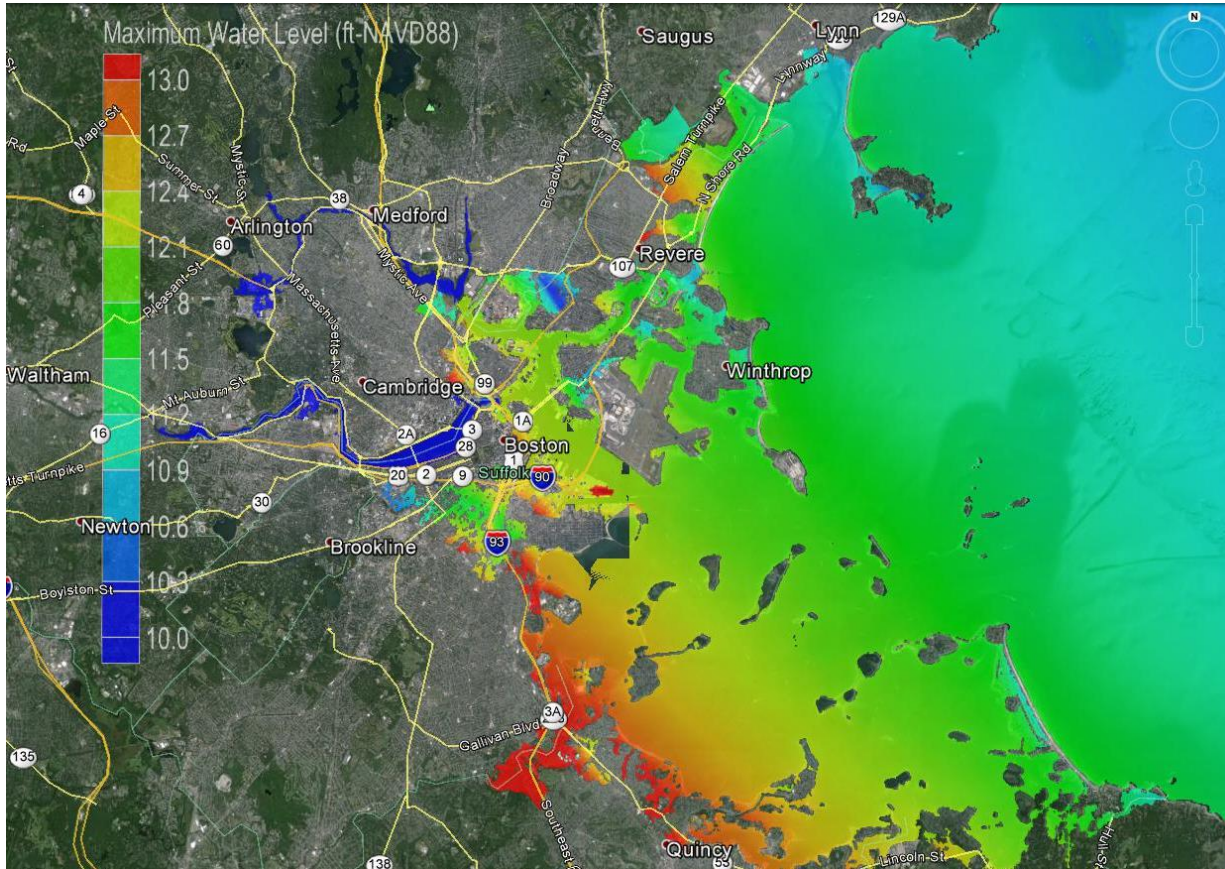
- What is the probability of flooding?
- What is vulnerable and what is the priority?
- What is the plan?



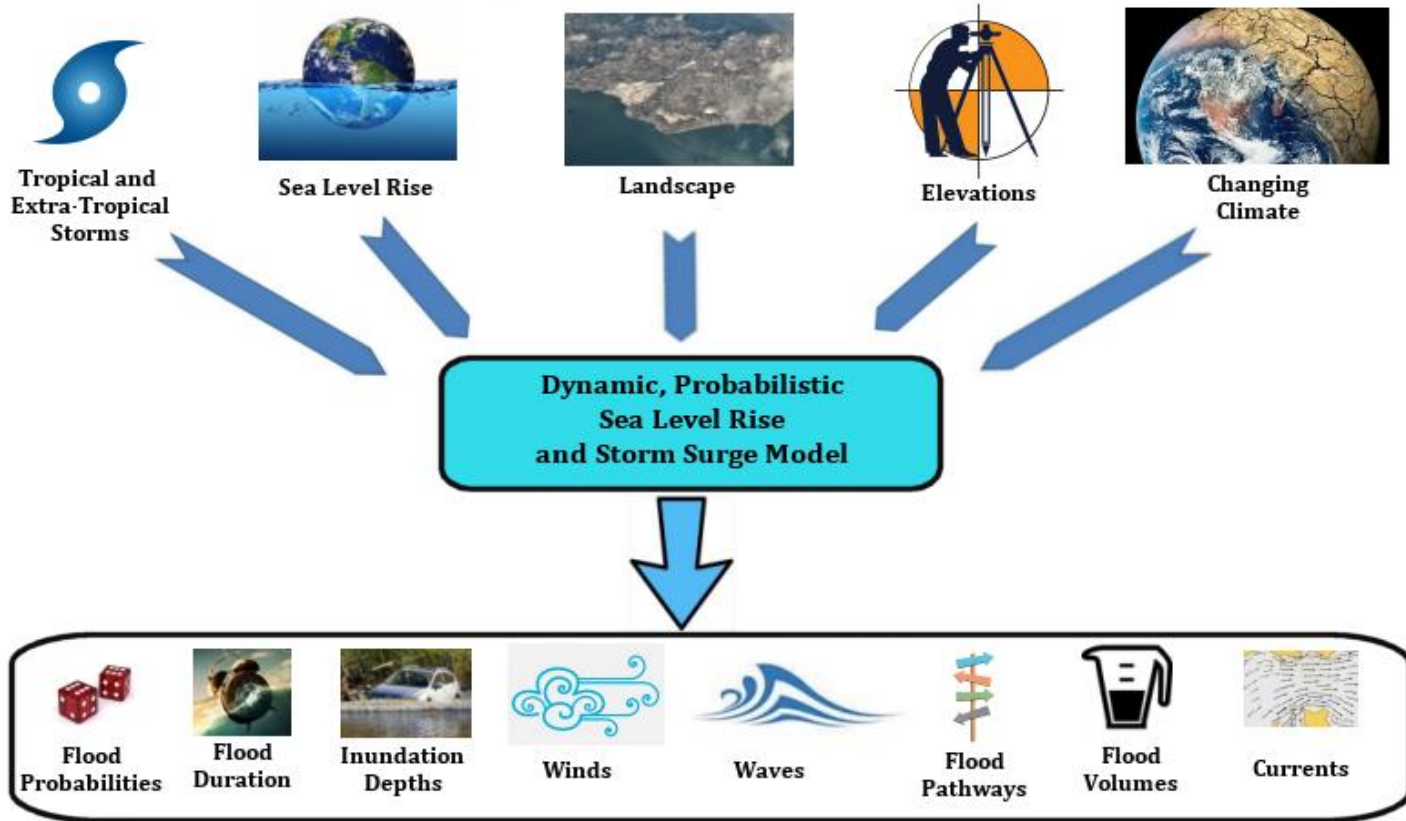
MassDOT SLR and Storm Surge Flood Risk Modeling



MassDOT SLR and Storm Surge Flood Risk Modeling



Massachusetts Coast Flood Risk Model (MC-FRM)



High Resolution Grid

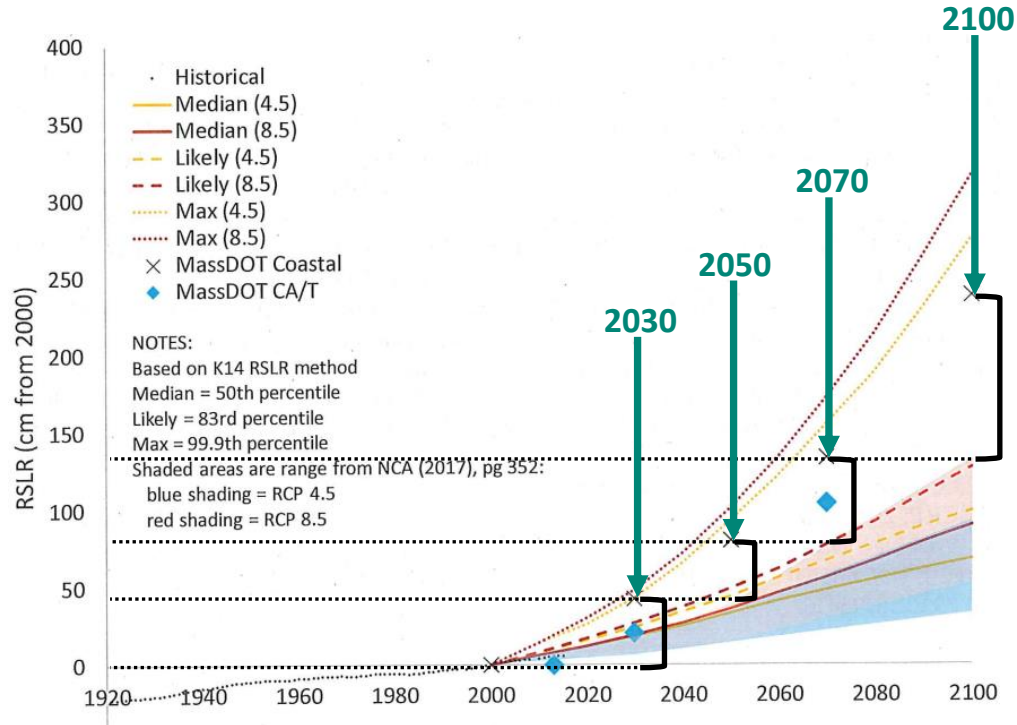


High Resolution Grid



MC-FRM Parameterization and Capabilities

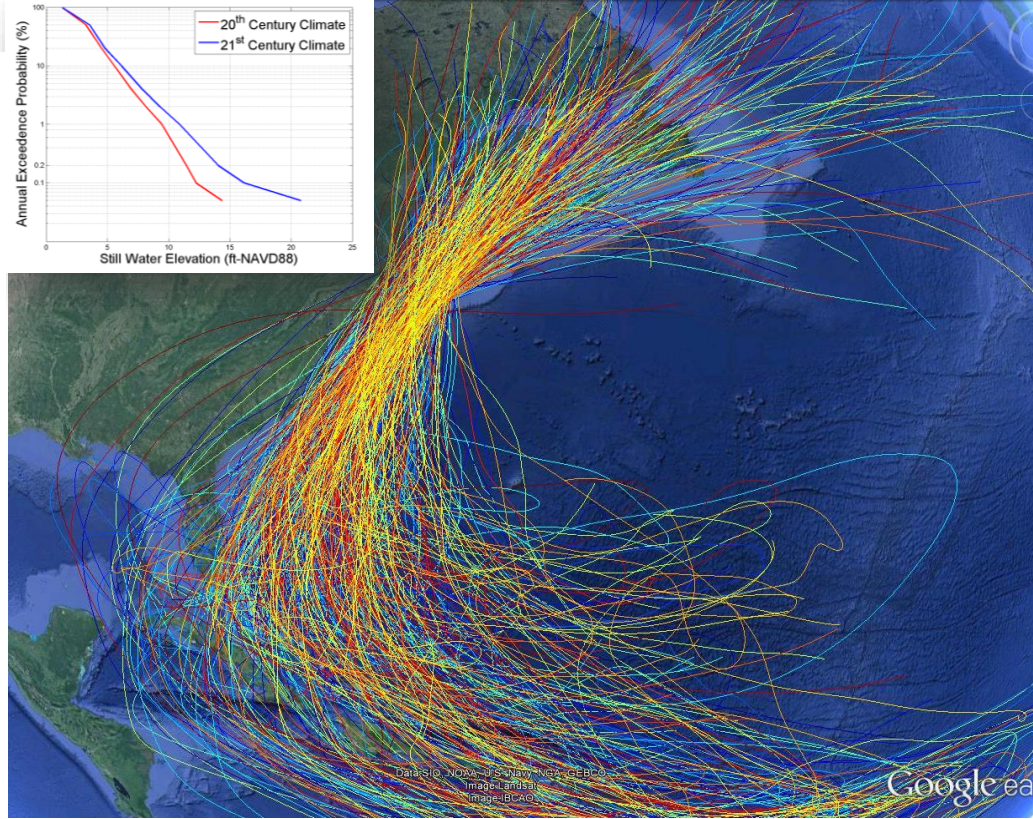
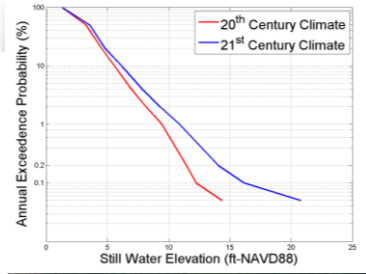
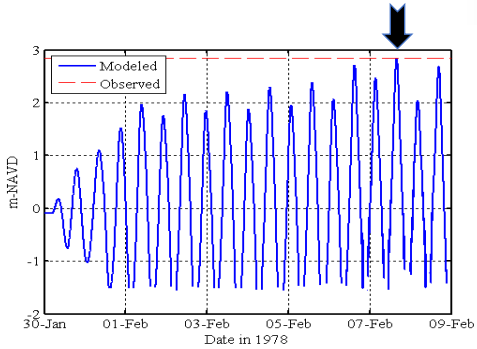
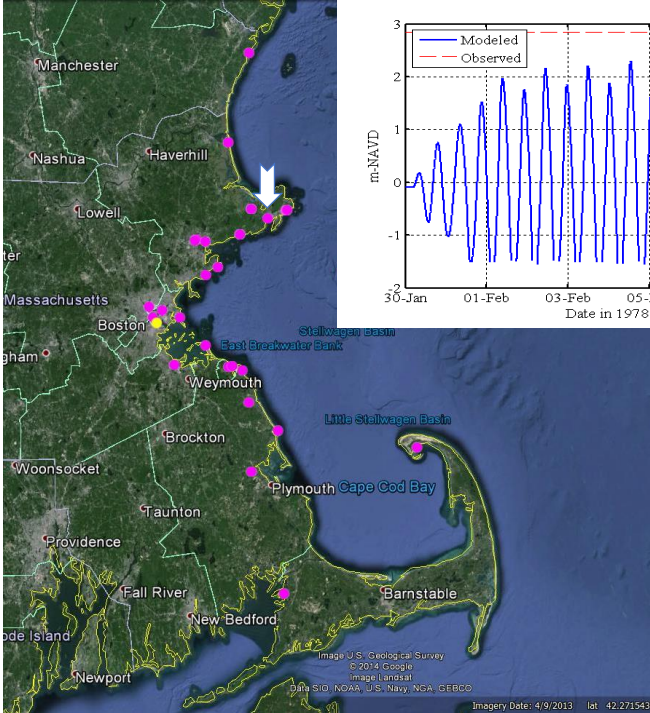
Using Projections to Bracket Risk



Time-variable wave run-up and overtopping

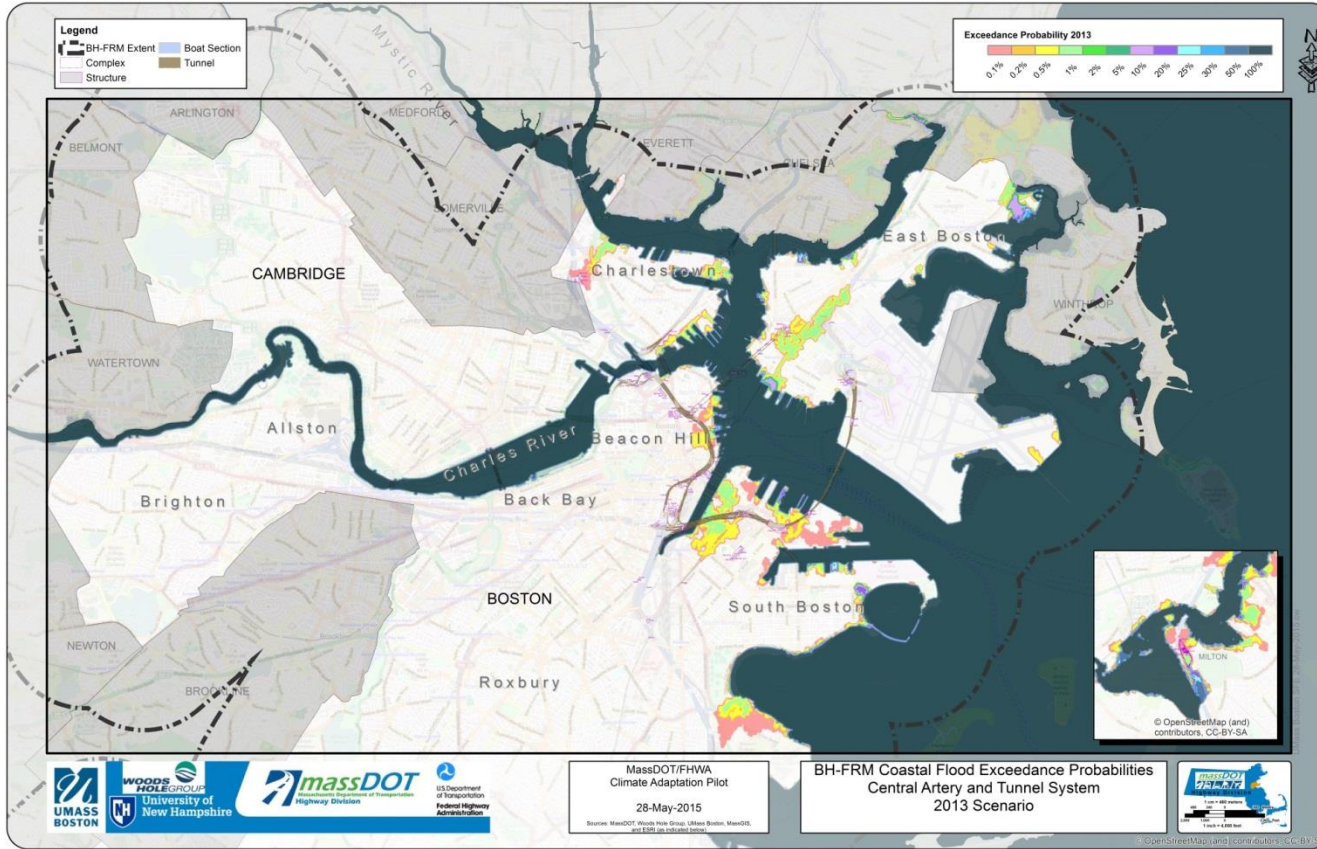


Monte Carlo Approach



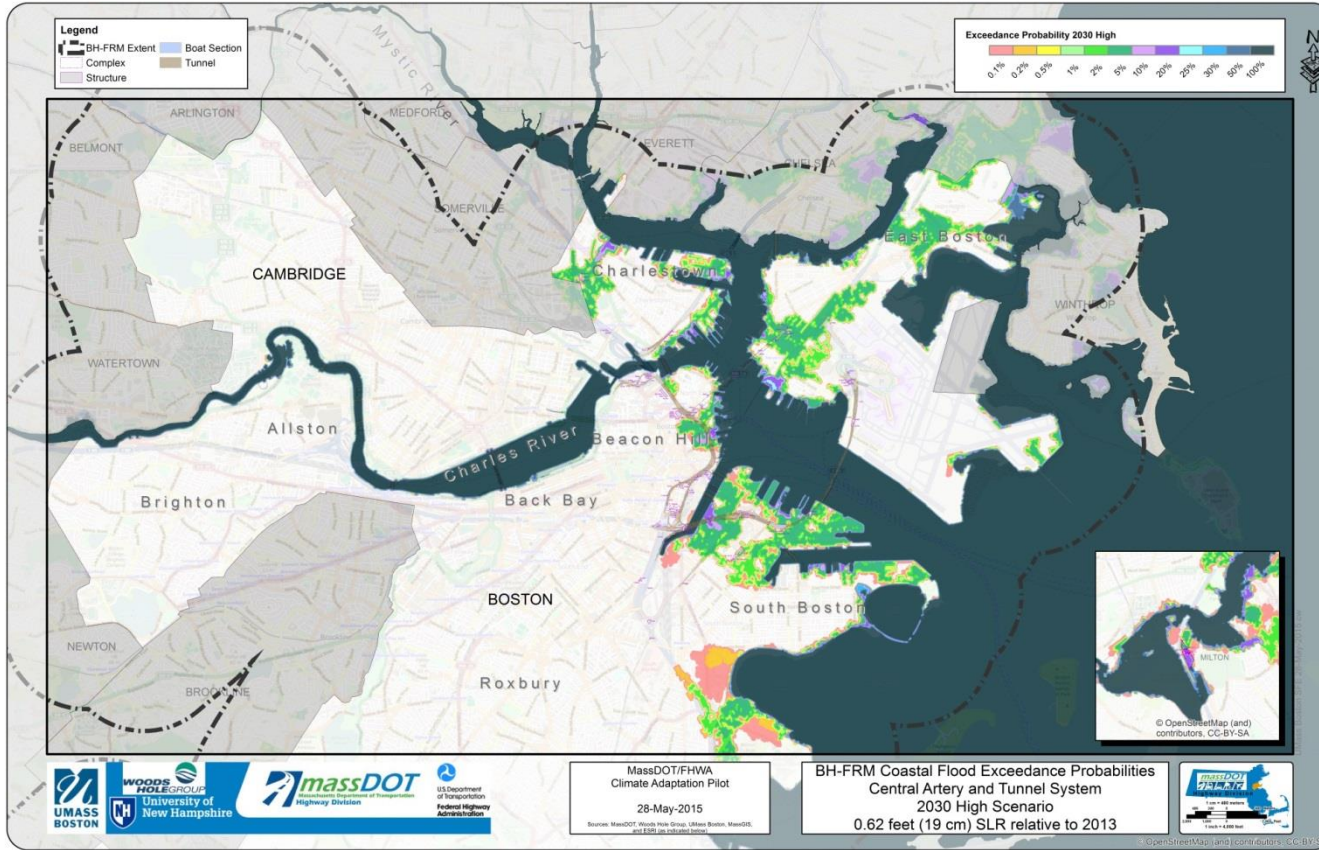
Exceedance Probability Maps

Coastal Flood Exceedance Probability



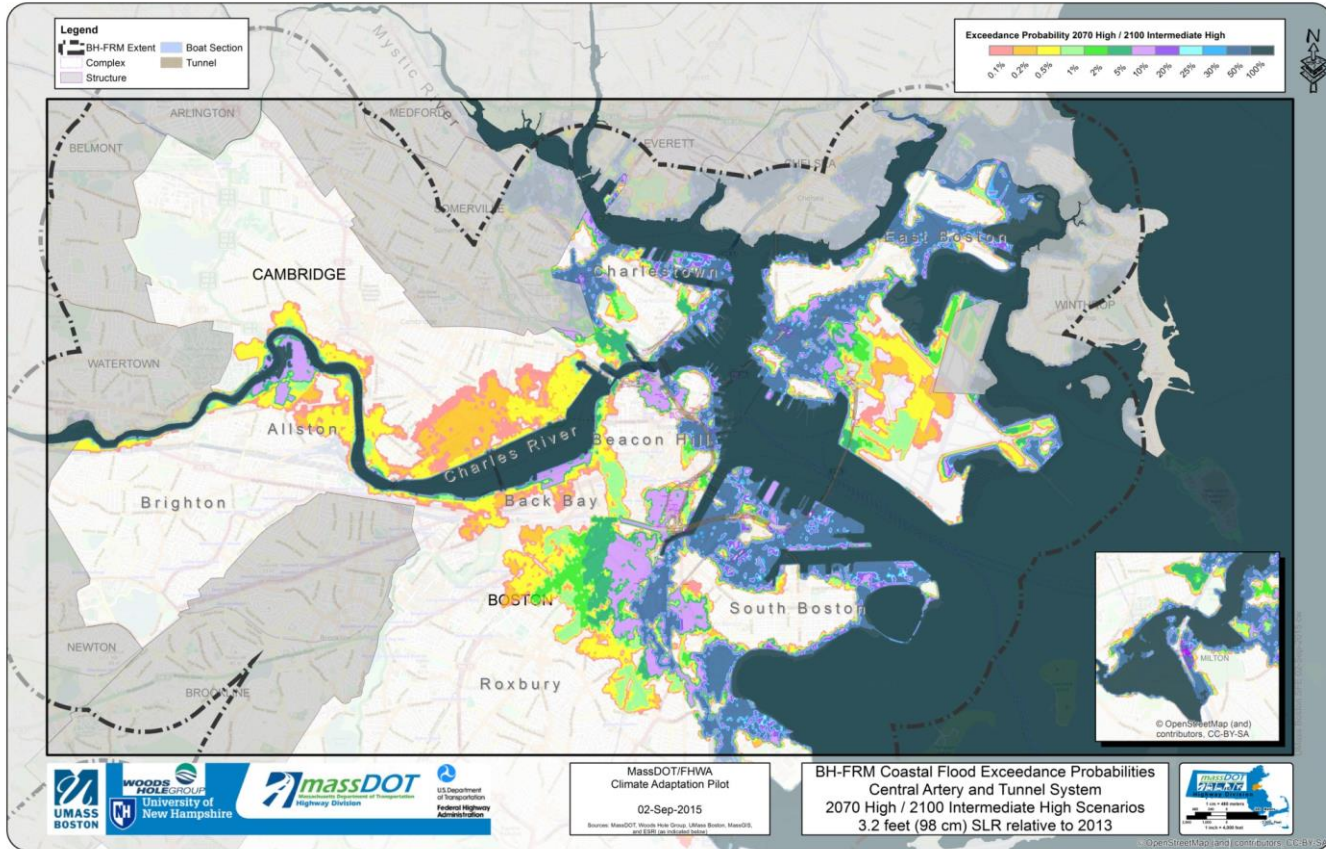
Exceedance Probability Maps

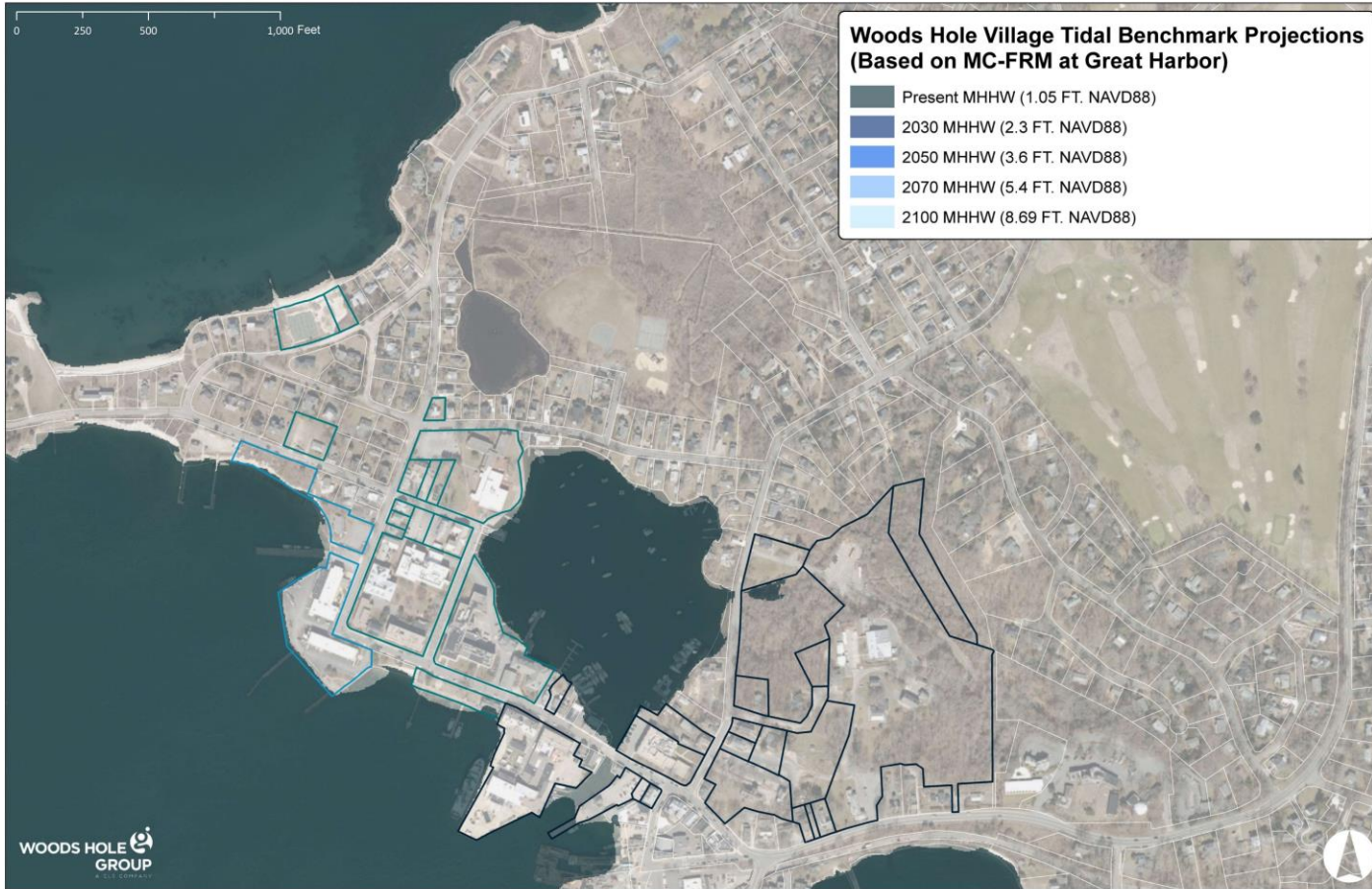
Coastal Flood Exceedance Probability

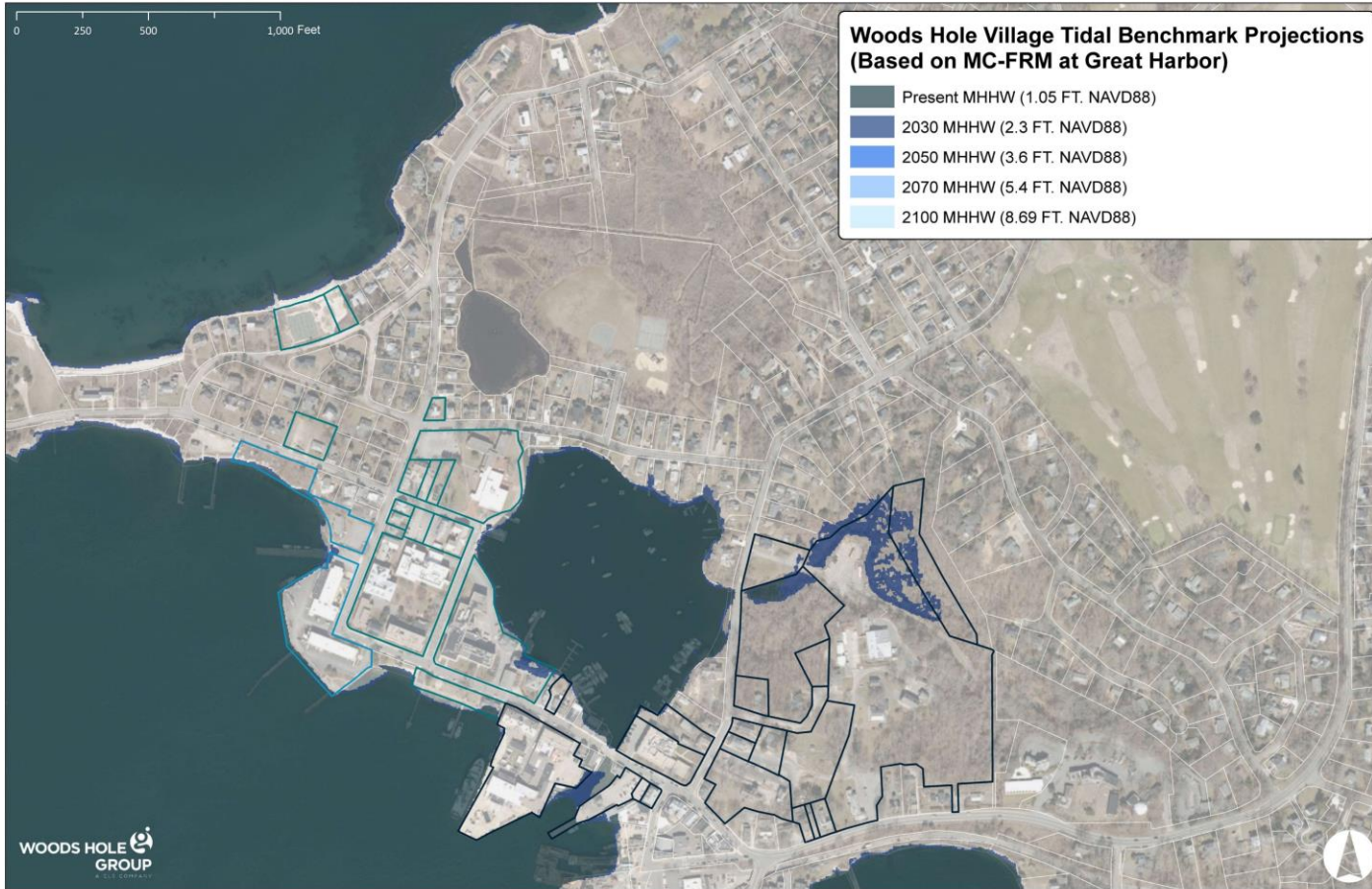


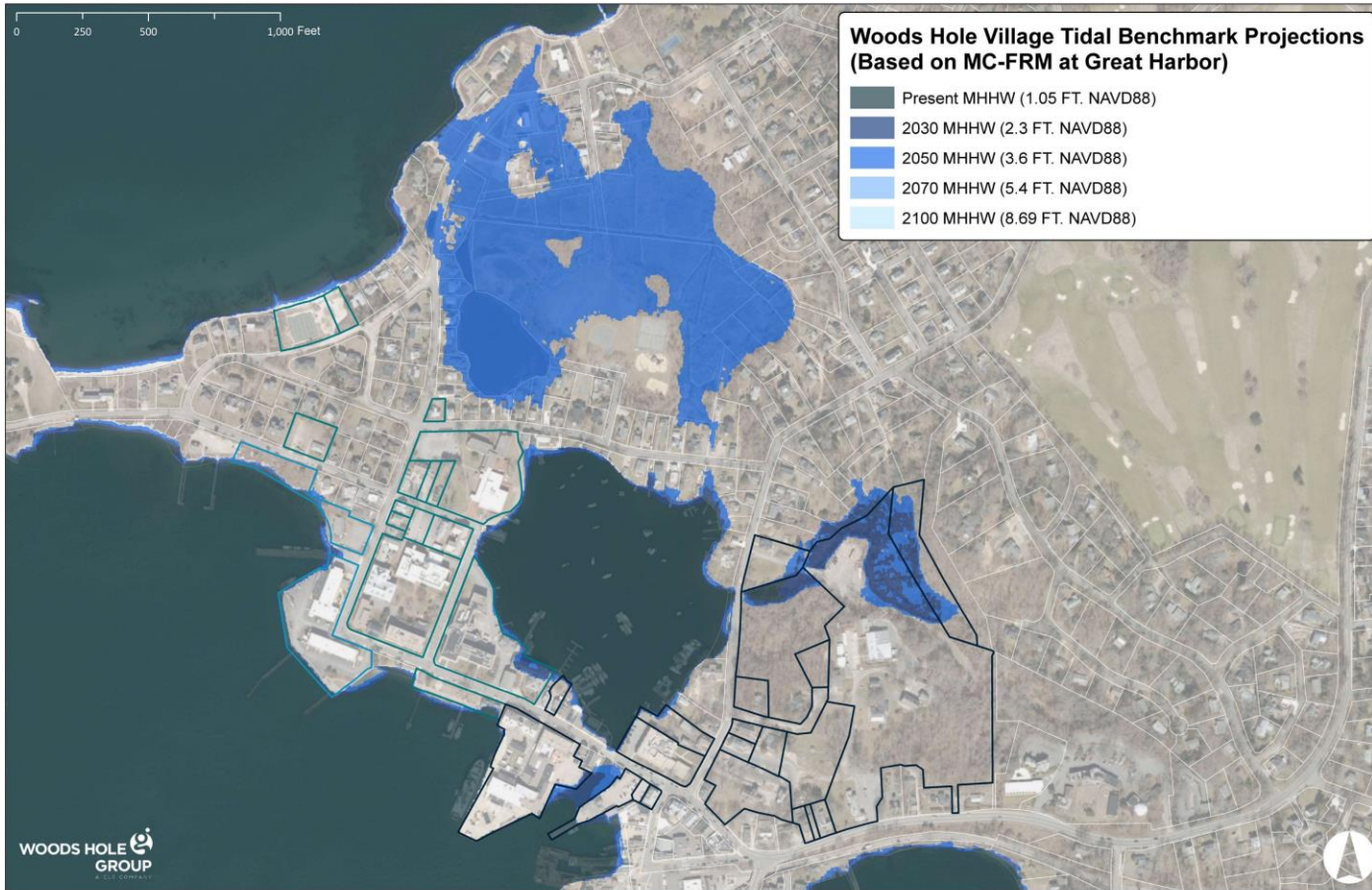
Exceedance Probability Maps

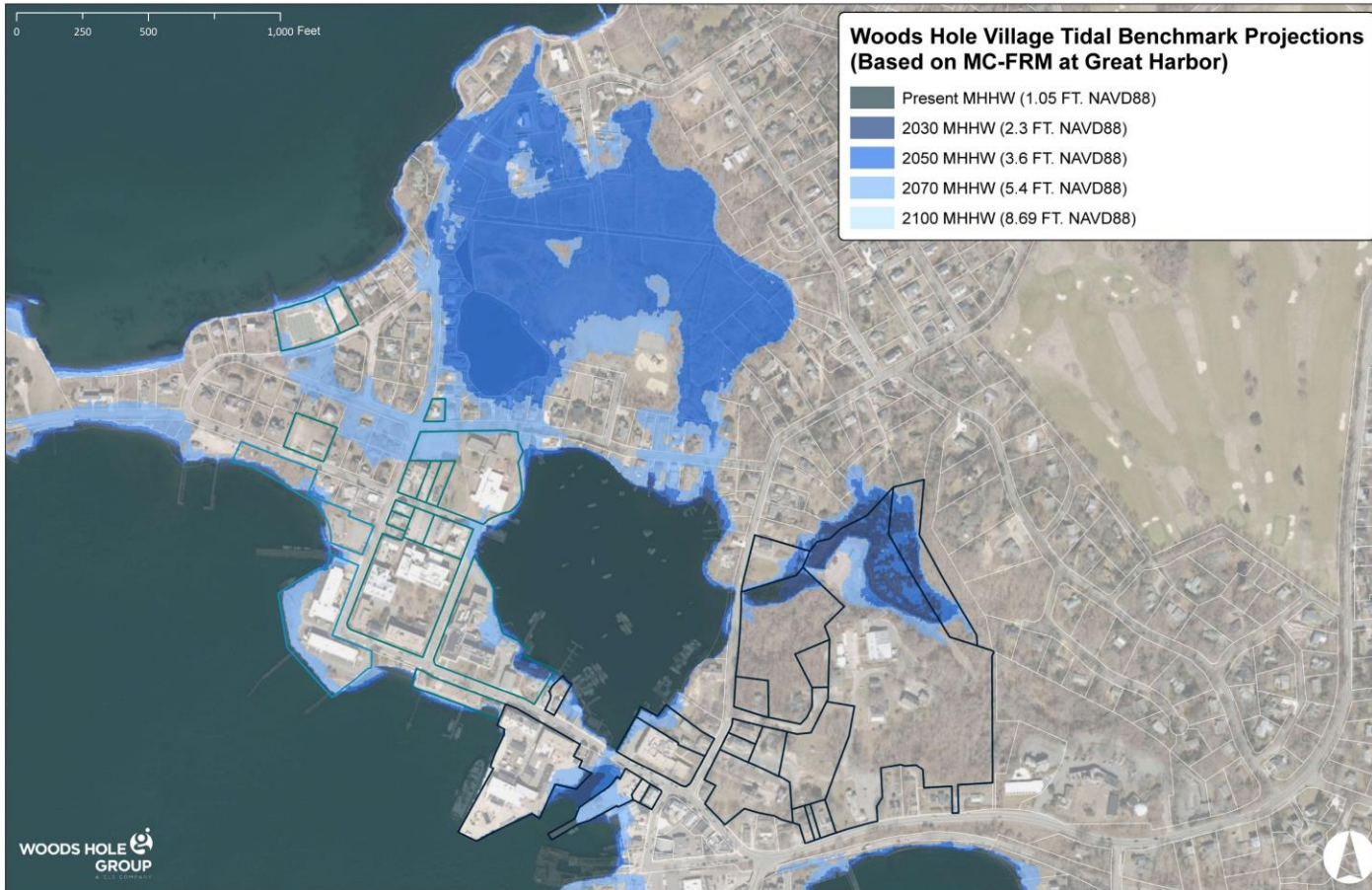
Coastal Flood Exceedance Probability

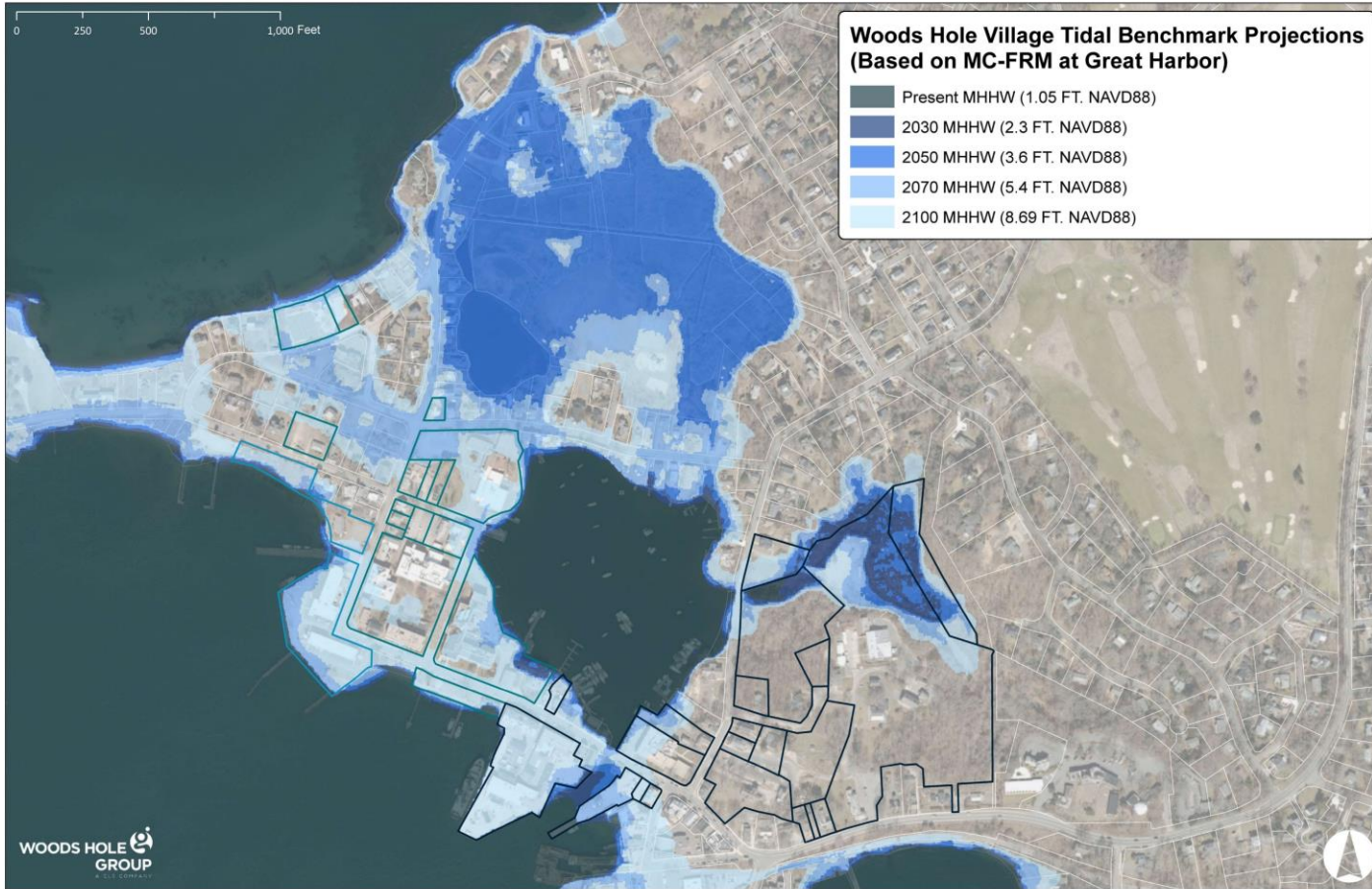




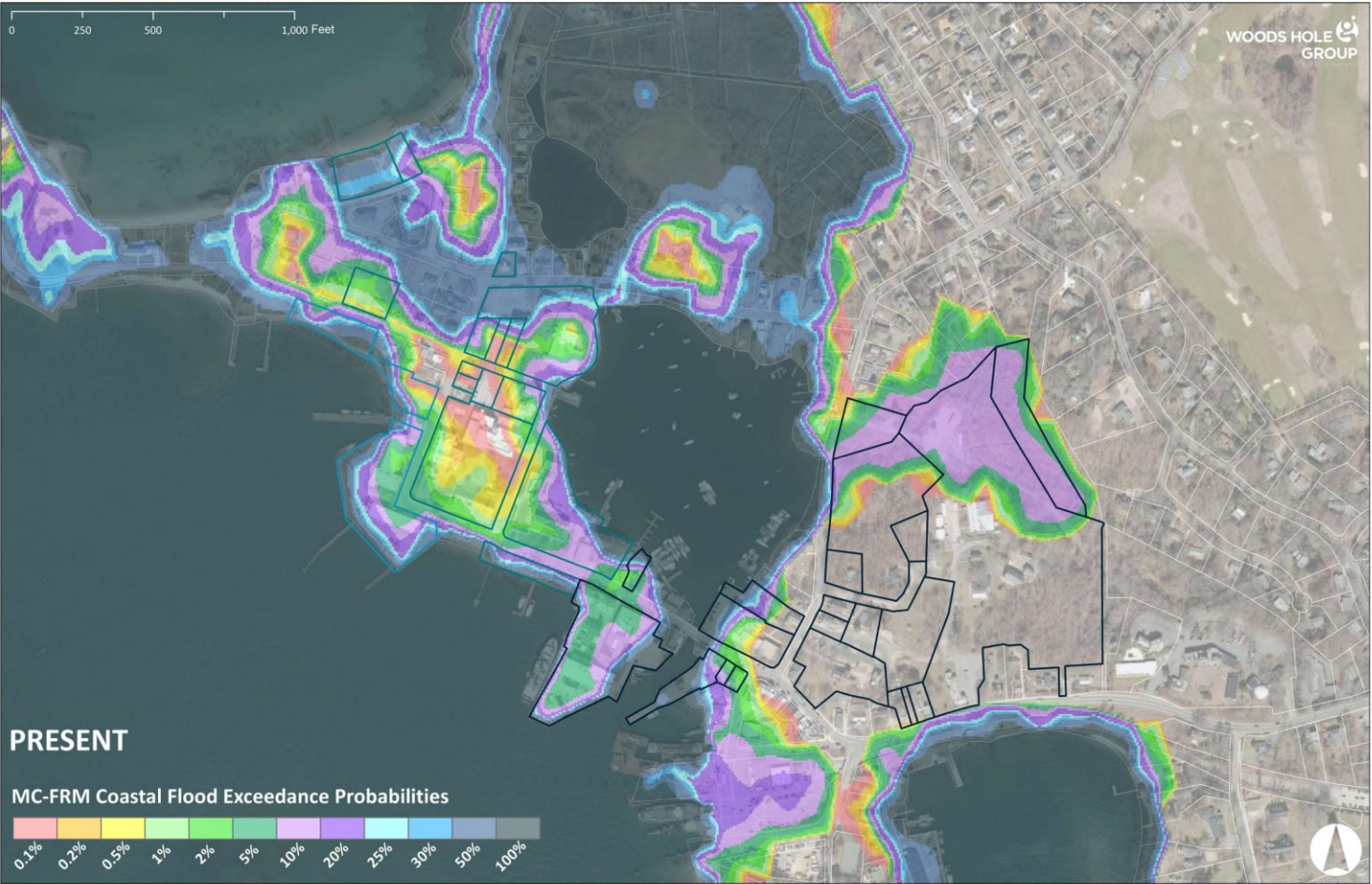




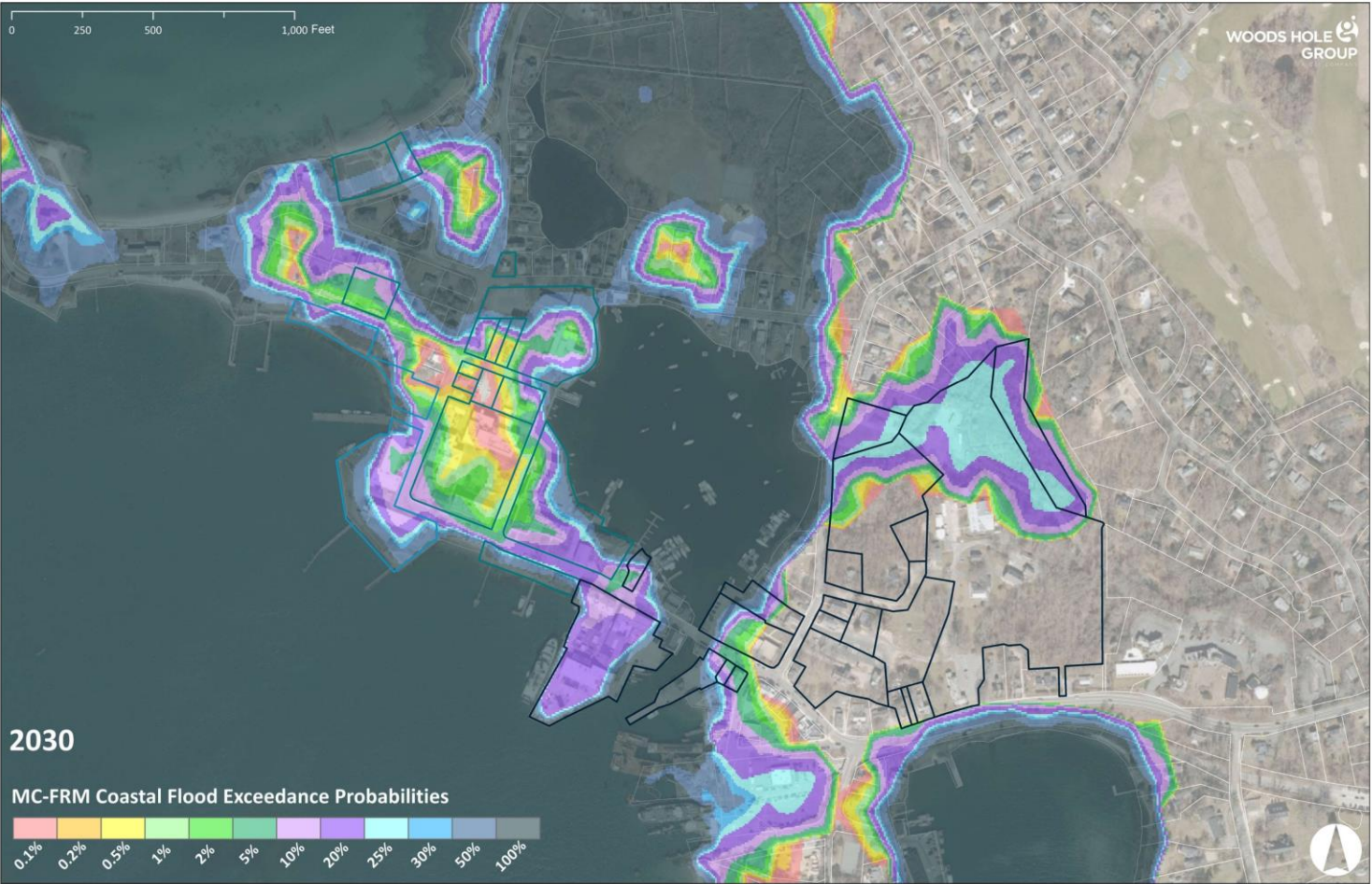




0 250 500 1,000 Feet



0 250 500 1,000 Feet

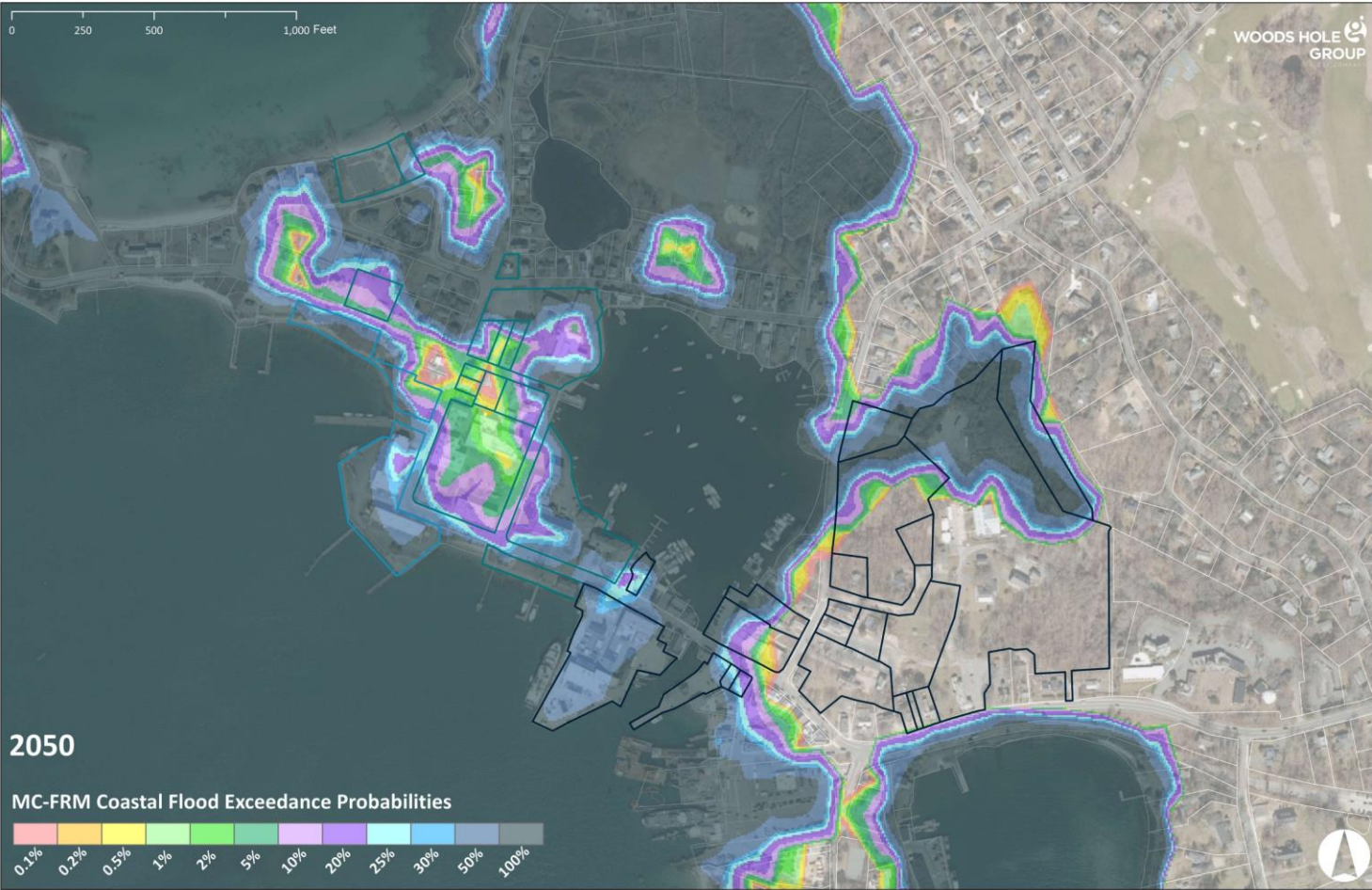


2030

MC-FRM Coastal Flood Exceedance Probabilities



0 250 500 1,000 Feet



0 250 500 1,000 Feet

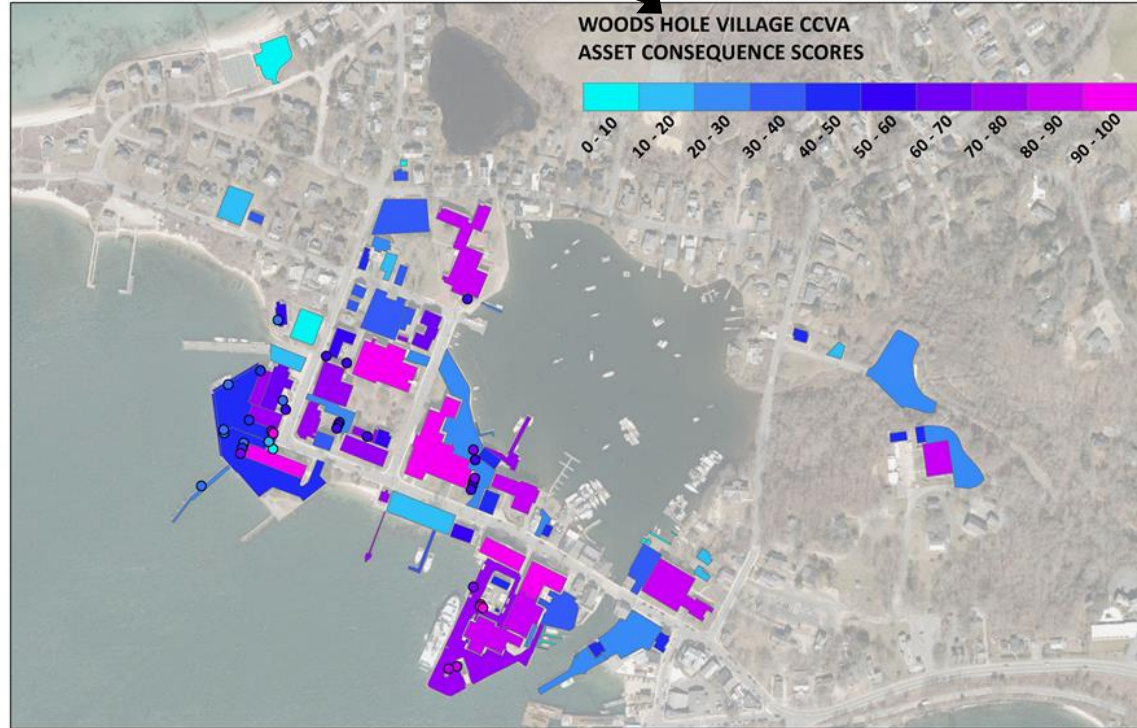
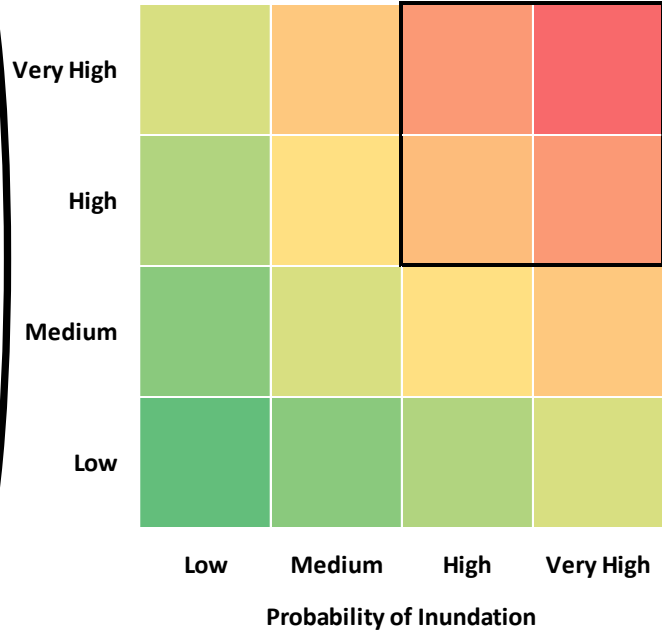
2070

MC-FRM Coastal Flood Exceedance Probabilities

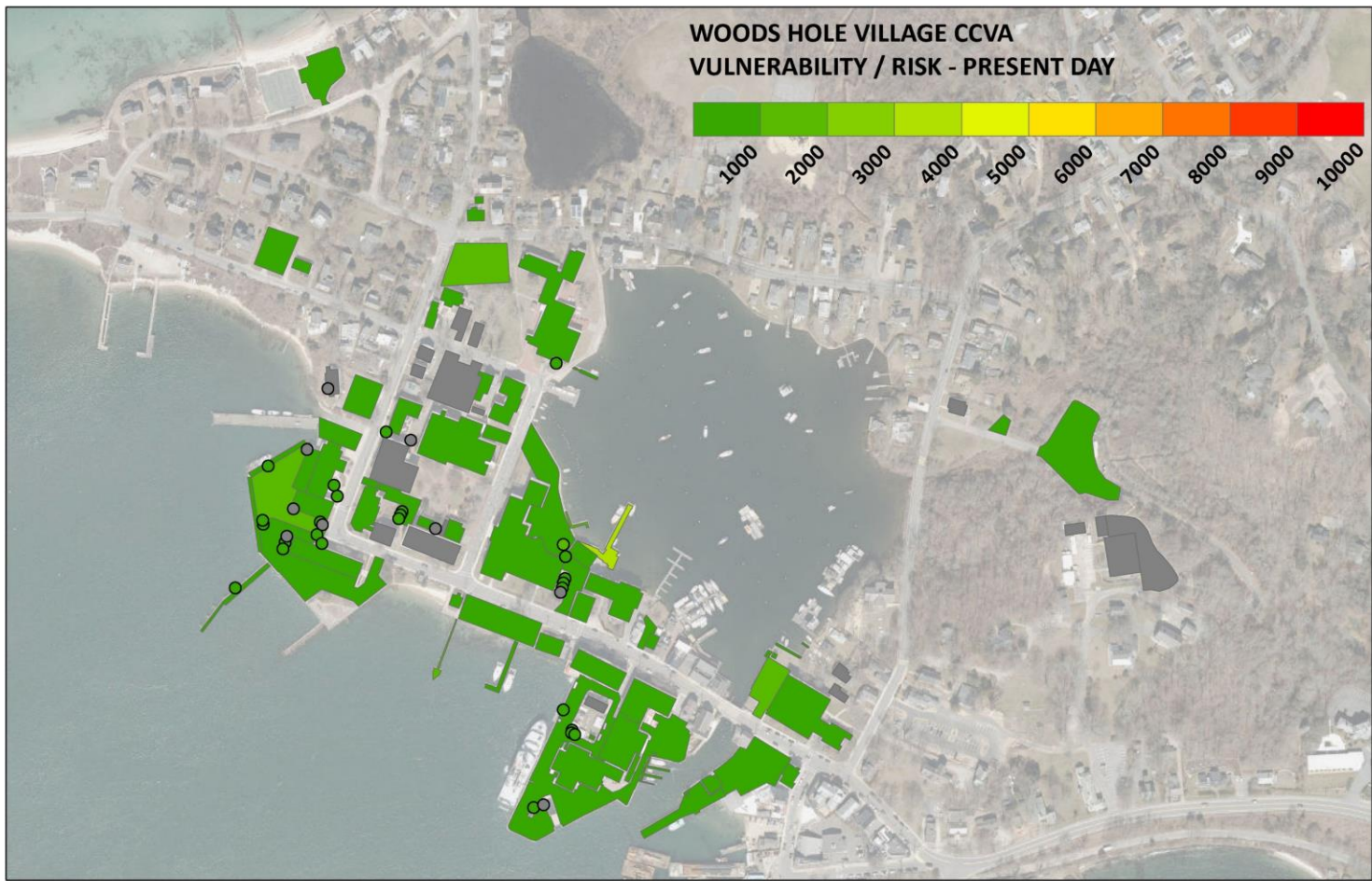


Vulnerability Assessment Framework

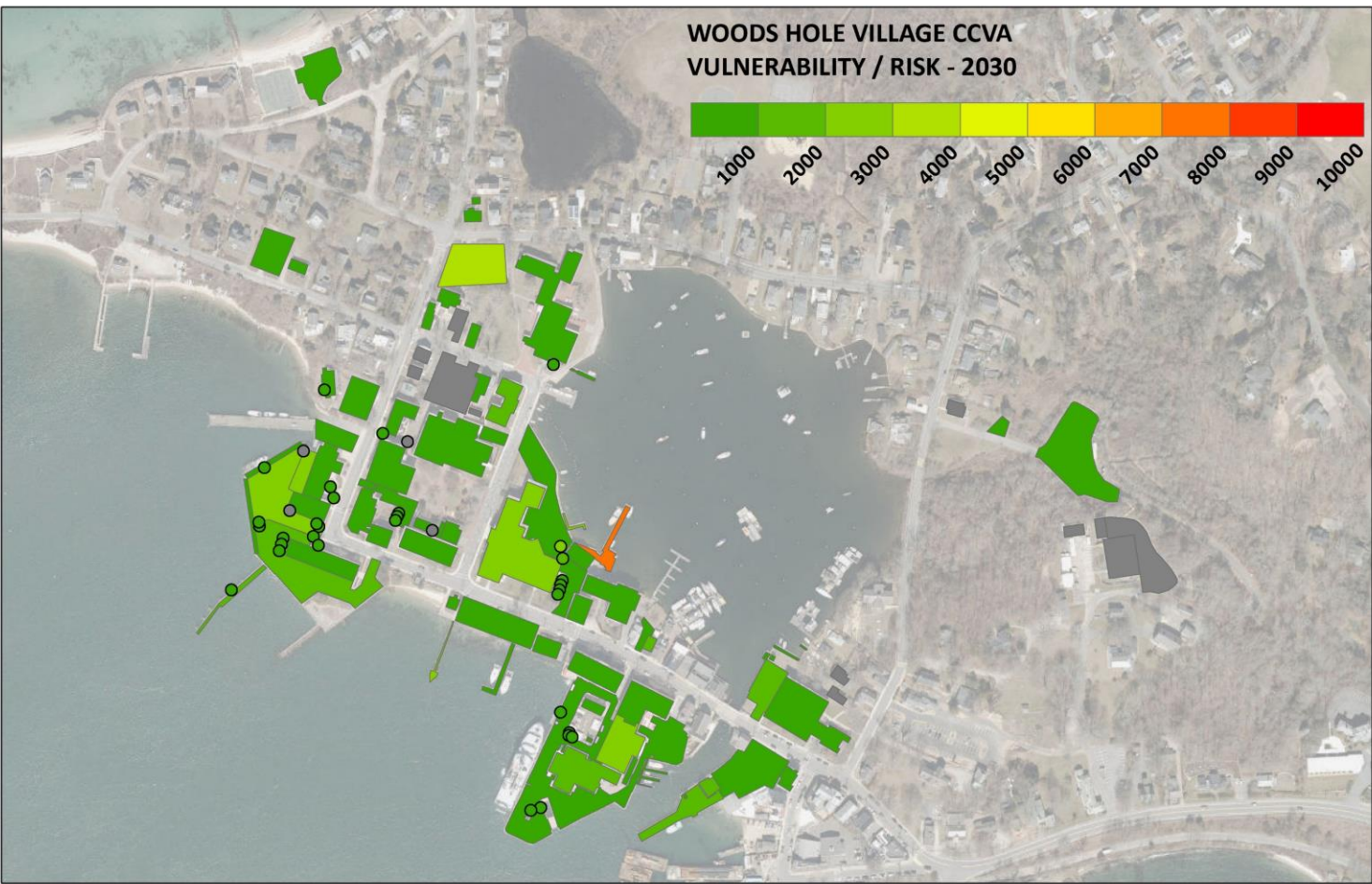
Consequence of Inundation



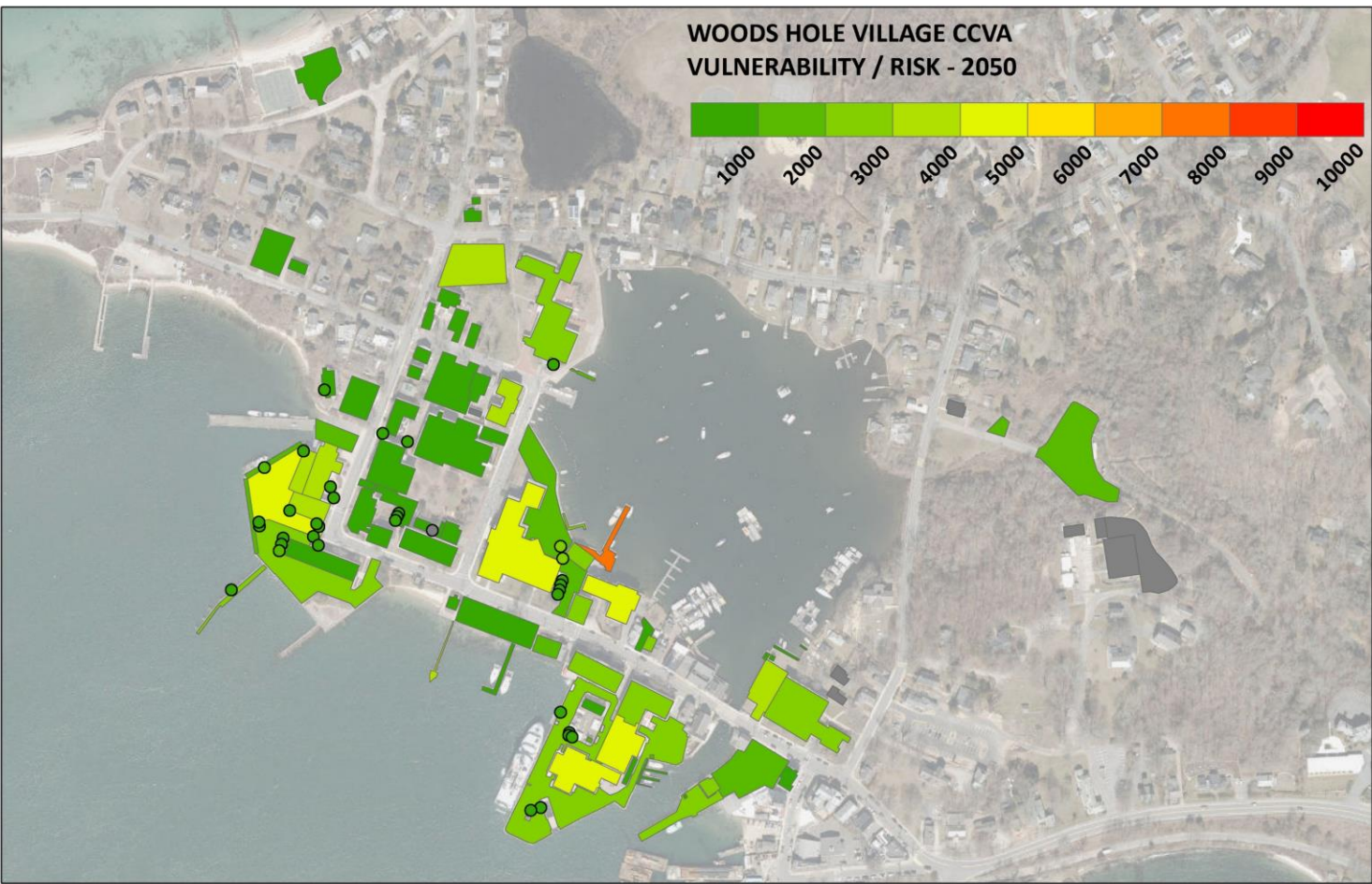
WOODS HOLE VILLAGE CCVA
VULNERABILITY / RISK - PRESENT DAY



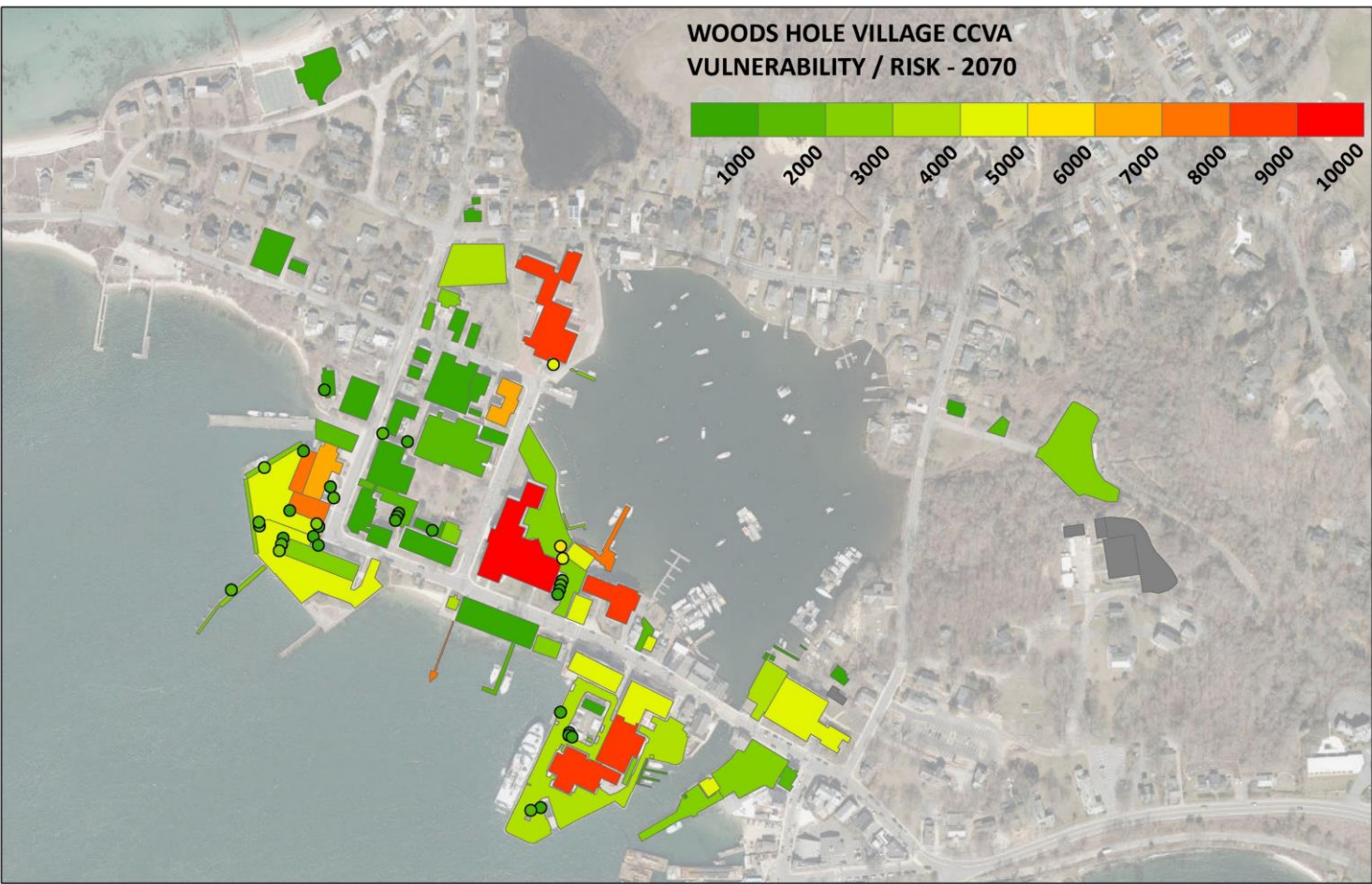
WOODS HOLE VILLAGE CCVA
VULNERABILITY / RISK - 2030



WOODS HOLE VILLAGE CCVA
VULNERABILITY / RISK - 2050

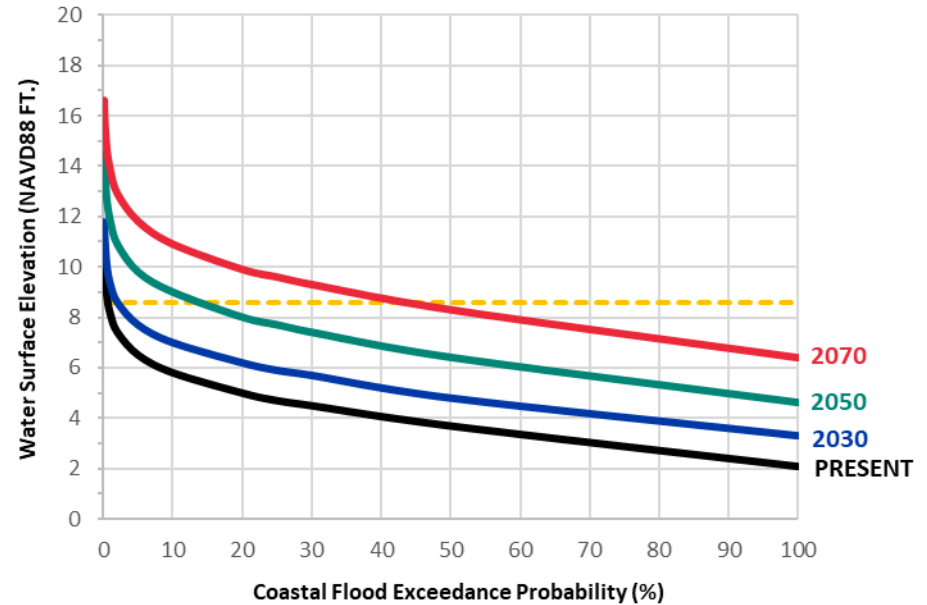


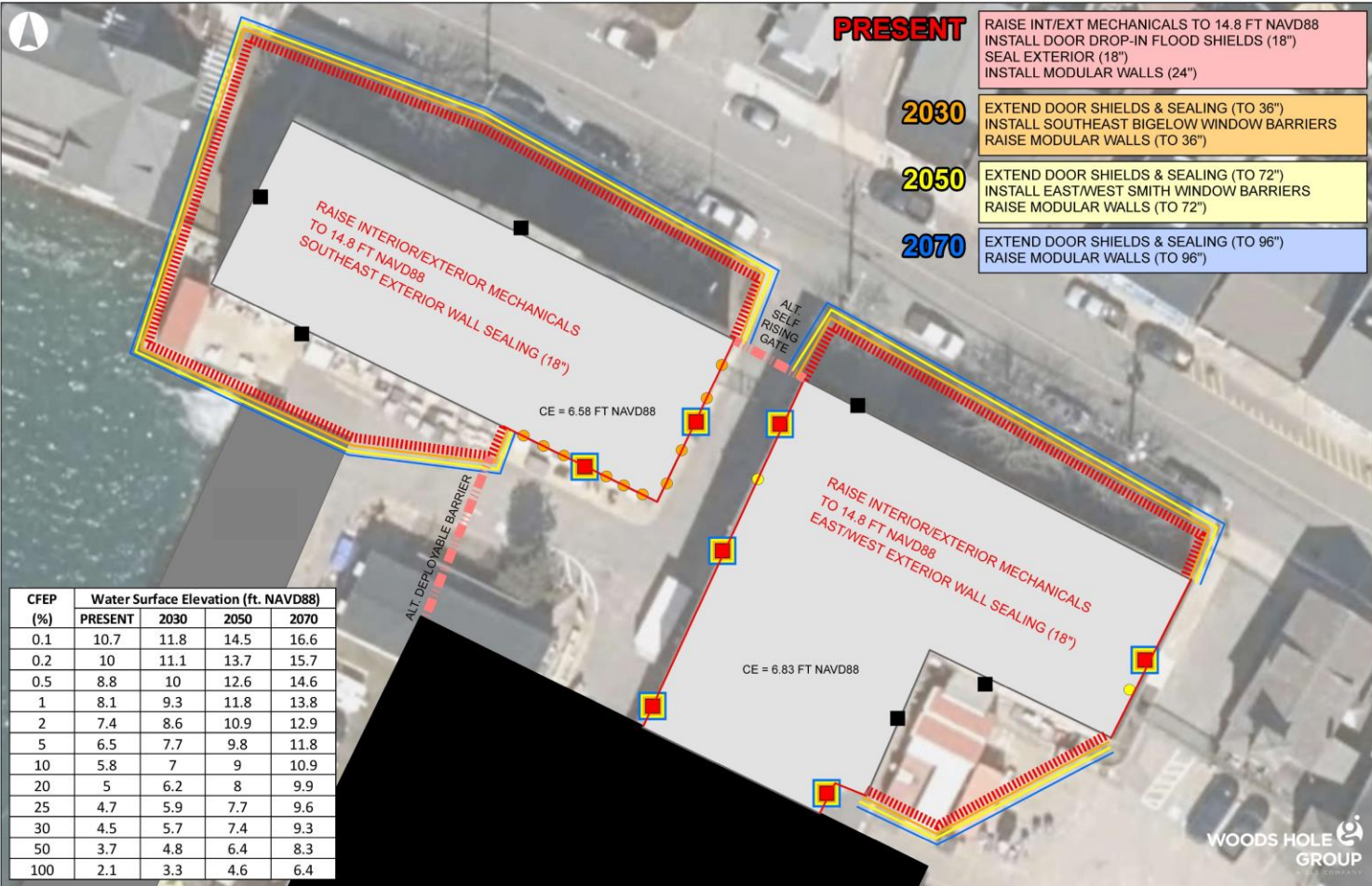
WOODS HOLE VILLAGE CCVA
VULNERABILITY / RISK - 2070



Asset-specific

38 Water Street (Marine Operations & Coffee O)





PRESENT

RAISE INT/EXT MECHANICALS TO 14.8 FT NAVD88
 INSTALL DOOR DROP-IN FLOOD SHIELDS (18")
 SEAL EXTERIOR (18")
 INSTALL MODULAR WALLS (24")

2030

EXTEND DOOR SHIELDS & SEALING (TO 36")
 INSTALL SOUTHEAST BIGELOW WINDOW BARRIERS
 RAISE MODULAR WALLS (TO 36")

2050

EXTEND DOOR SHIELDS & SEALING (TO 72")
 INSTALL EAST/WEST SMITH WINDOW BARRIERS
 RAISE MODULAR WALLS (TO 72")

2070

EXTEND DOOR SHIELDS & SEALING (TO 96")
 RAISE MODULAR WALLS (TO 96")

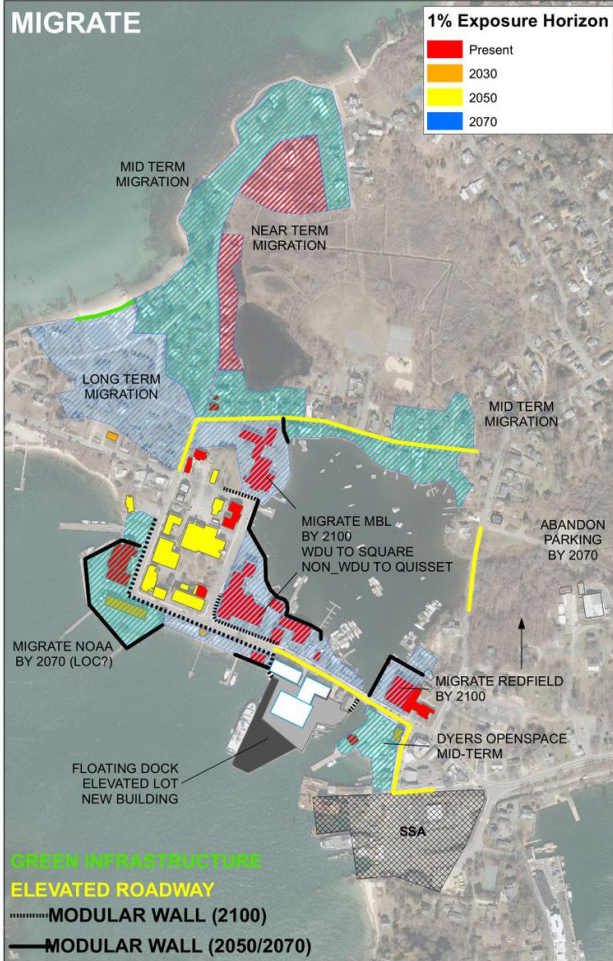
CFEP (%)	Water Surface Elevation (ft. NAVD88)			
	PRESENT	2030	2050	2070
0.1	10.7	11.8	14.5	16.6
0.2	10	11.1	13.7	15.7
0.5	8.8	10	12.6	14.6
1	8.1	9.3	11.8	13.8
2	7.4	8.6	10.9	12.9
5	6.5	7.7	9.8	11.8
10	5.8	7	9	10.9
20	5	6.2	8	9.9
25	4.7	5.9	7.7	9.6
30	4.5	5.7	7.4	9.3
50	3.7	4.8	6.4	8.3
100	2.1	3.3	4.6	6.4



PROTECT



MIGRATE



TRANSFORM

