STORMTOOLS Design Elevation (SDE) Map Training Session

Department of Administration
Providence, RI.
November 9, 2018

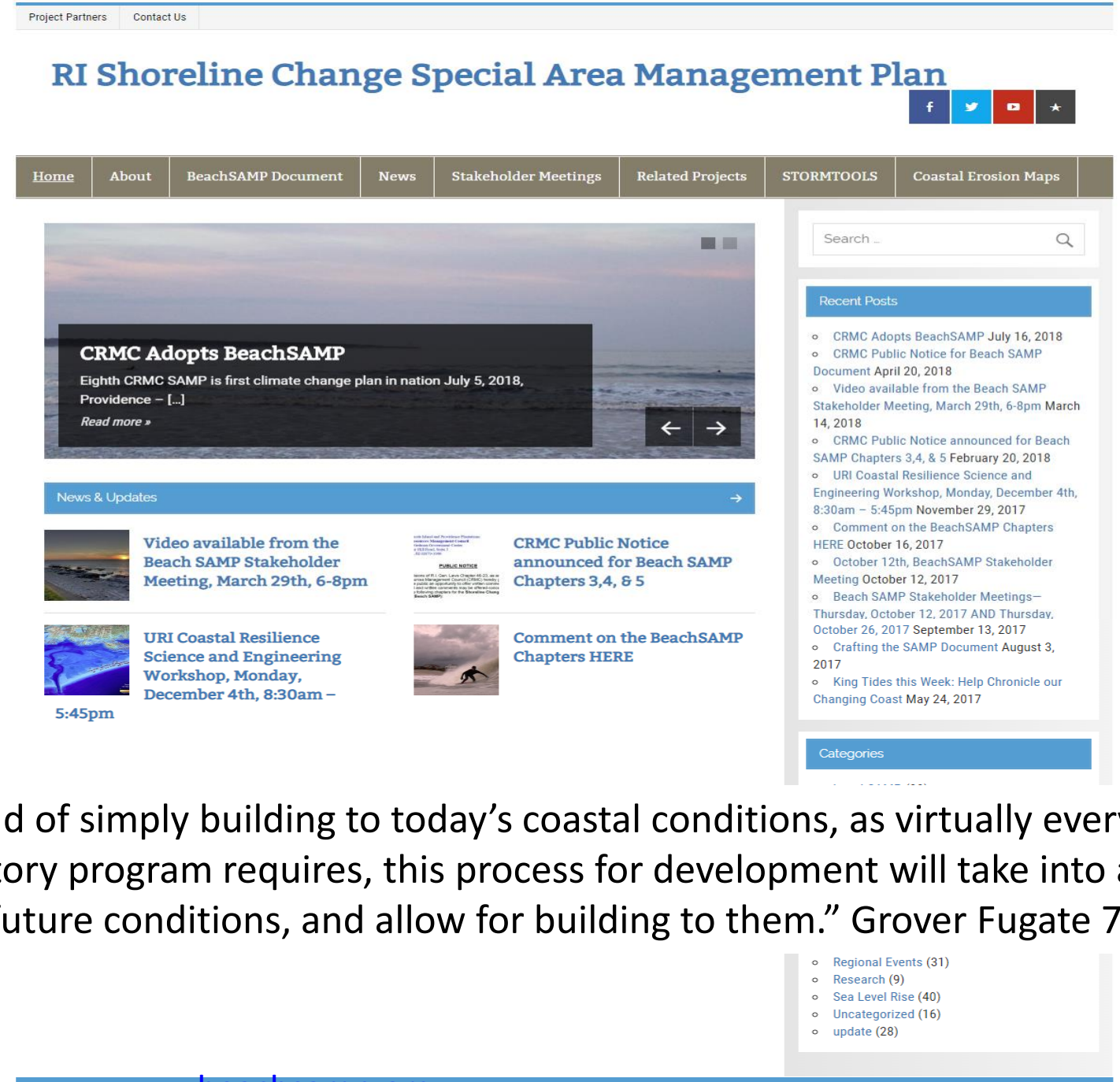
Tidal Flooding

Sea water coming through stormwater infrastructure

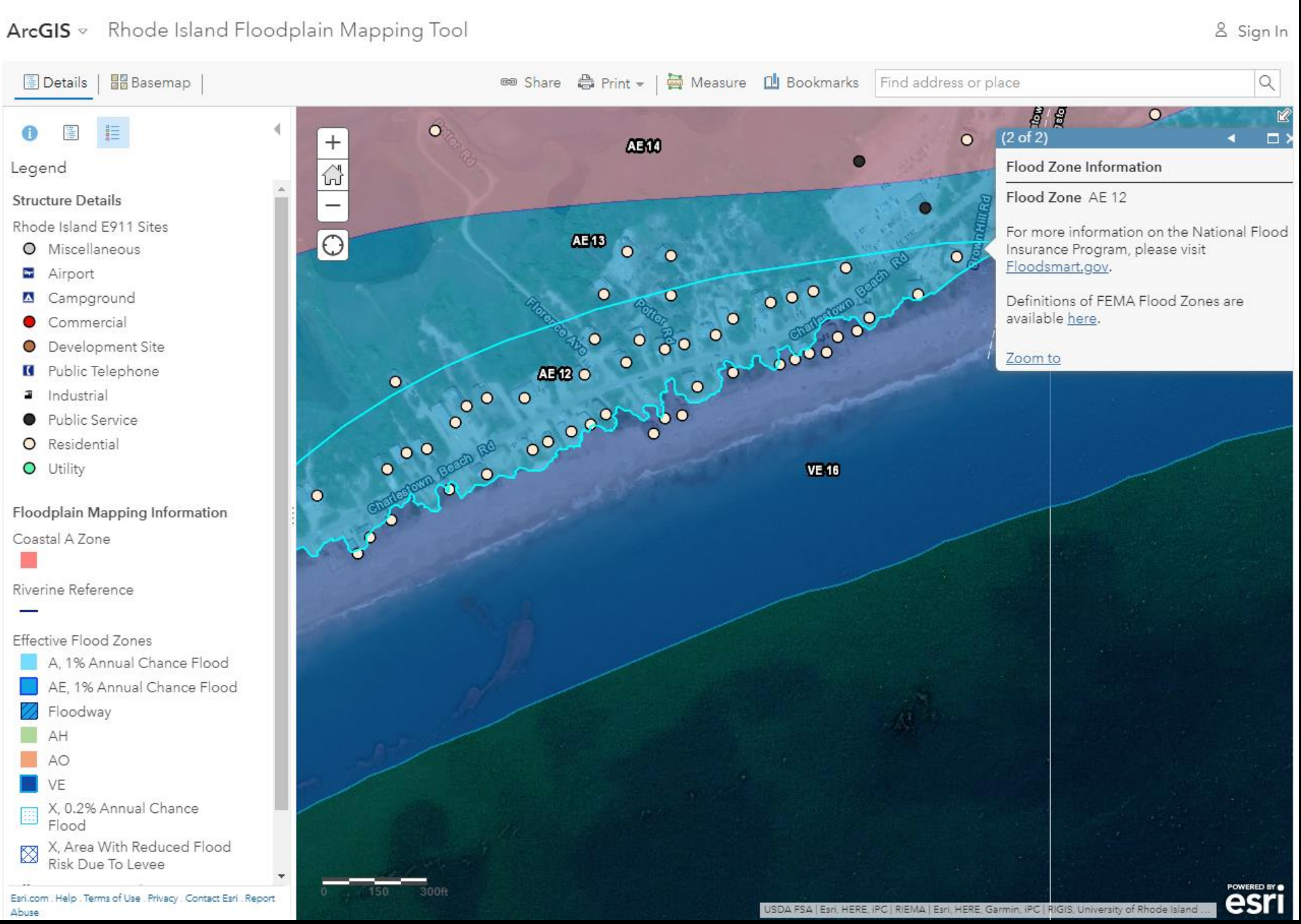
1.49 ft MHHW


Combination of tidal flooding ,
flooding through stormwater infrastructure,
no stormwater infiltration or discharge
Conimicut Tide Station
11-1-17 to 10-31-18
(88 nuisance tides)
1.0-1.49 ft MHHW = 61
1.5-1.99 ft MHHW = 18
2.0 + ft MHHW = 9
1.71 ft MHHW

Higher storm surges



"Instead of simply building to today's coastal conditions, as virtually every other regulatory program requires, this process for development will take into account those future conditions, and allow for building to them." Grover Fugate 7-5-18



http://www.riema.ri.gov/

Superstorm Sandy ~25 year recurrence interval storm in Charlestown, RI

East Beach Barrier
after Hurricane Carol (1954)

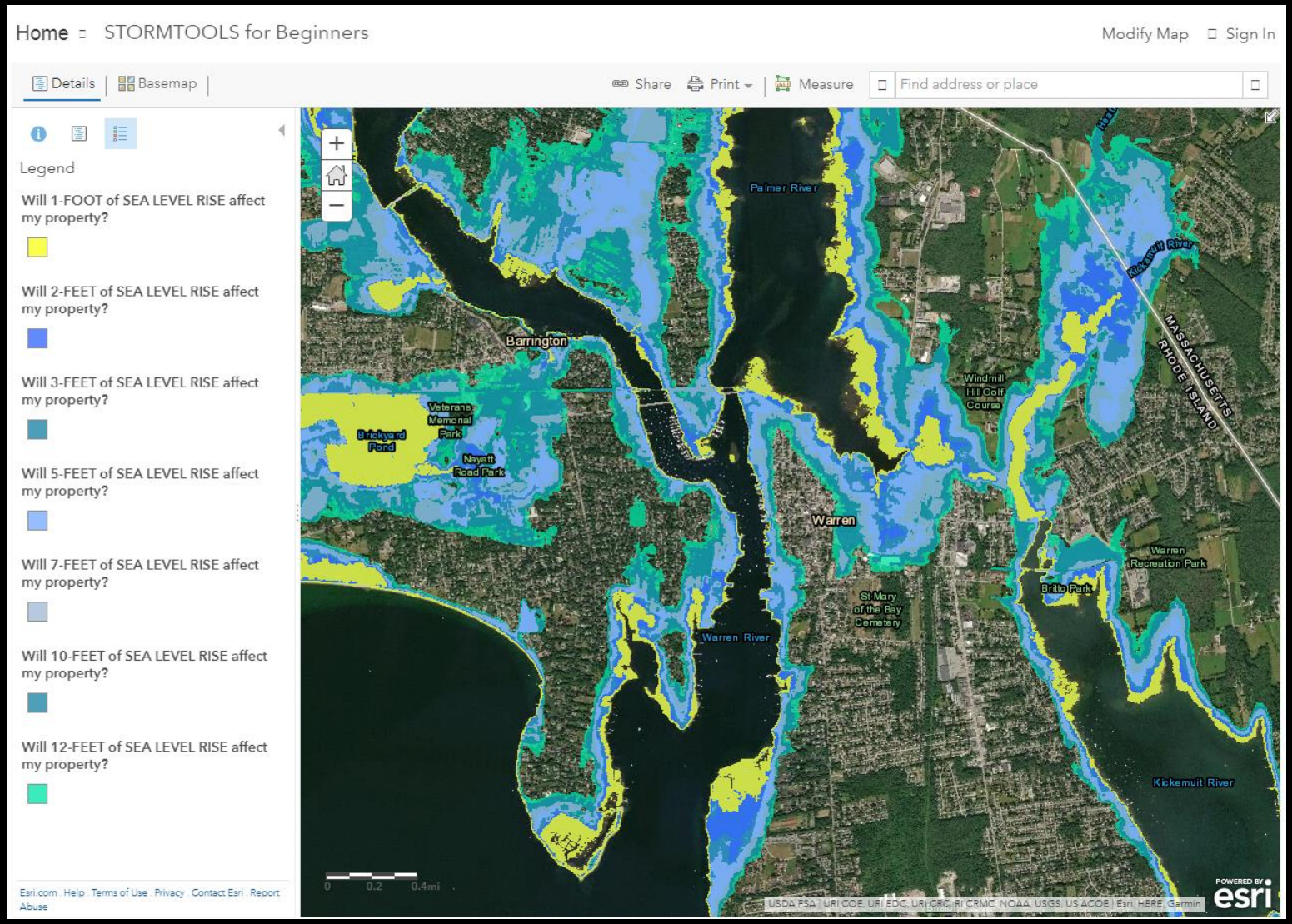
Overview of RI Coastal Resource Management Council Risk Based Permitting System

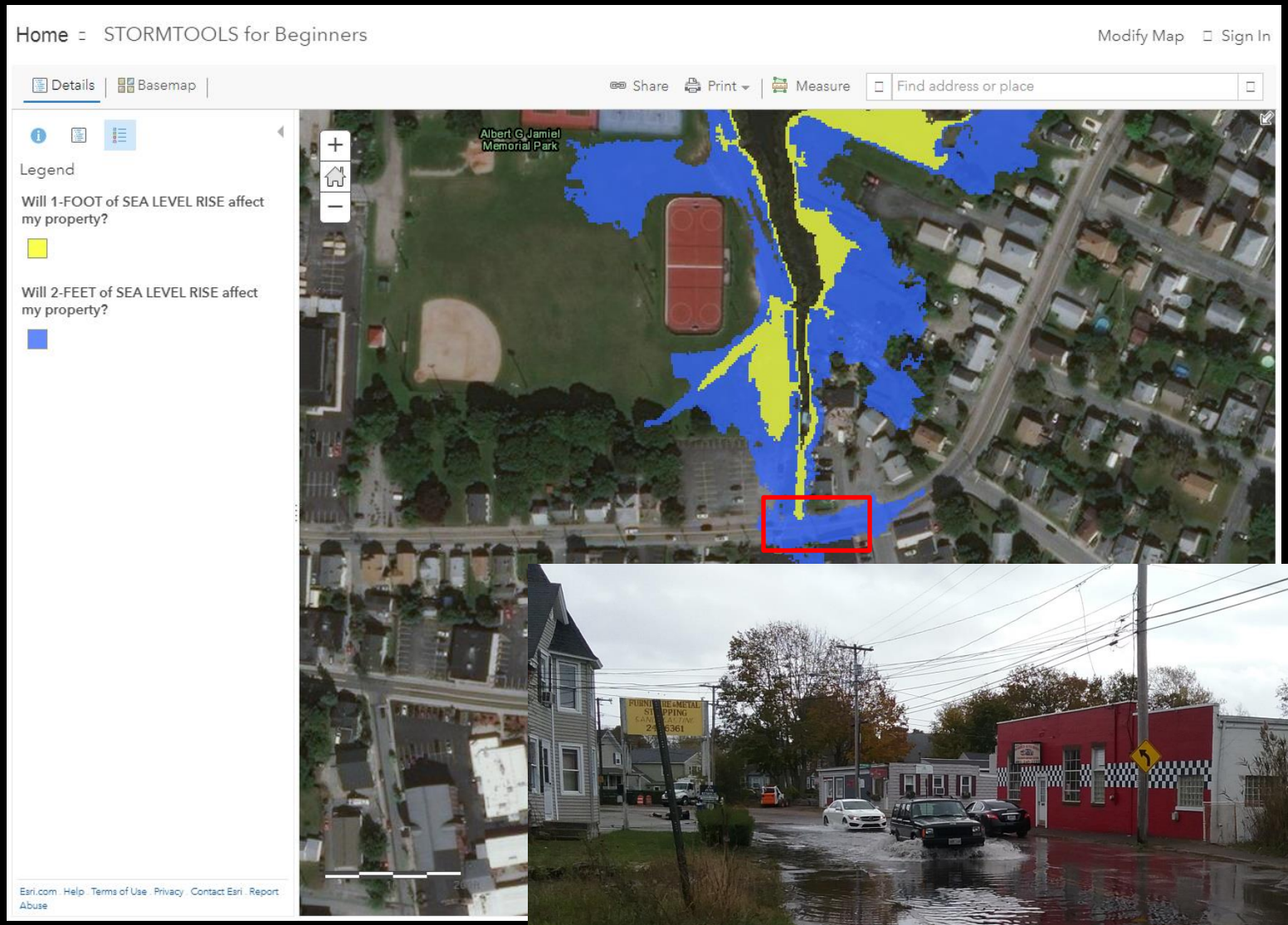
5.1 Overview of Process

The steps presented below provide guidance for applicants to address Coastal Hazards for selected projects in the design and permitting process for the Rhode Island Coastal Resources Management Council (CRMC).

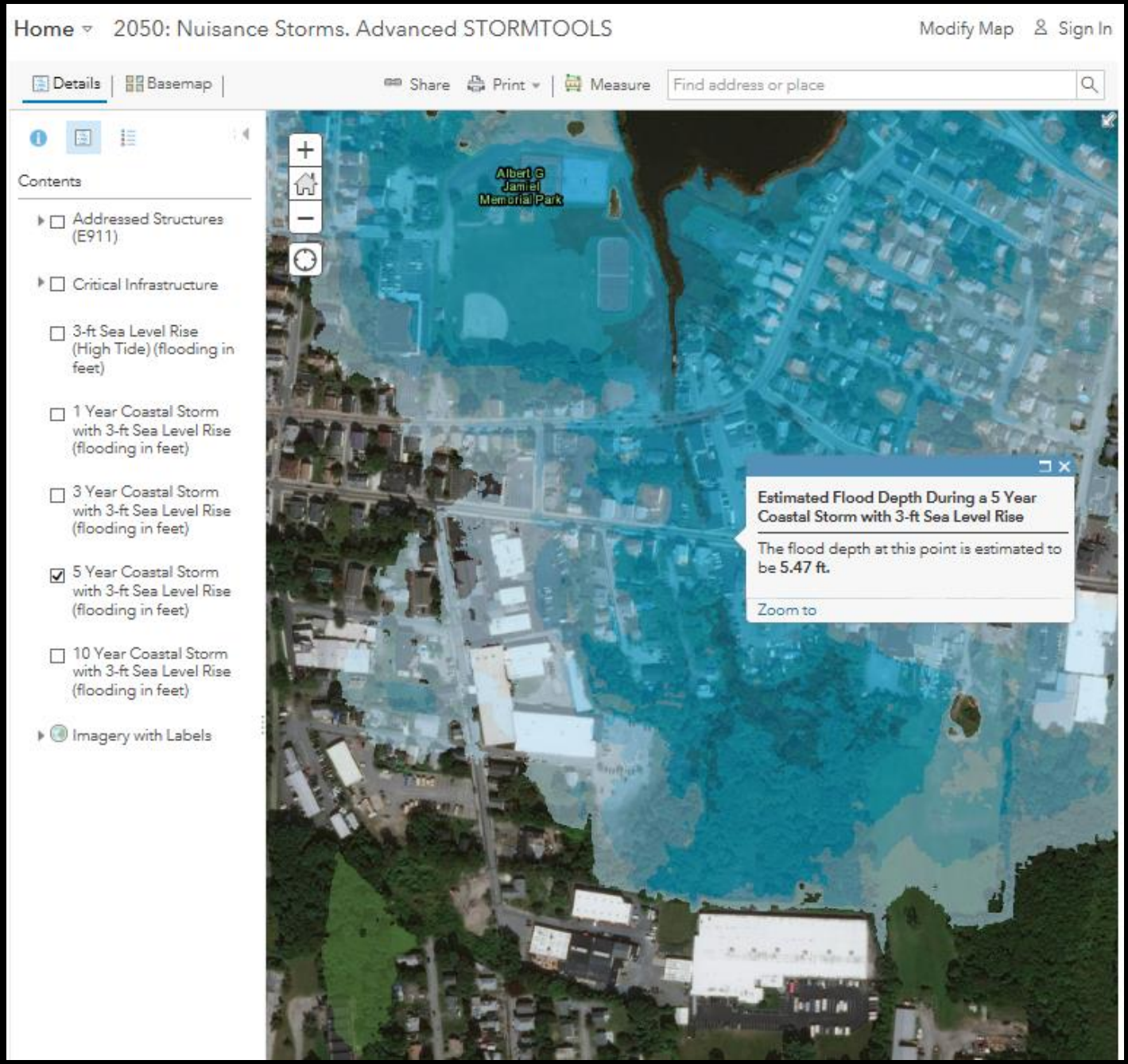
STEP 1: PROJECT DESIGN LIFE	In this step, the applicant will choose an appropriate design life, or lifespan, for the project, and identify a projected sea level for the project site based on the selected design life.
STEP 2: SITE ASSESSMENT & BASE FLOOD ELEVATION	In this step the applicant will review specified maps and tools to assess the exposure and potential risk from coastal hazards at the project site.
STEP 3: LARGE PROJECTS	This step is for Large Projects and Subdivisions only. If not such a project, this step may be skipped.
STEP 4: DESIGN EVALUATION	The applicant will identify, document, and assess the feasibility of design techniques that could serve to avoid or minimize risk of losses.
STEP 5: SUBMIT AN APPLICATION	The applicant will submit the permit application and include the assessment from the previous steps in the application package to the CRMC.

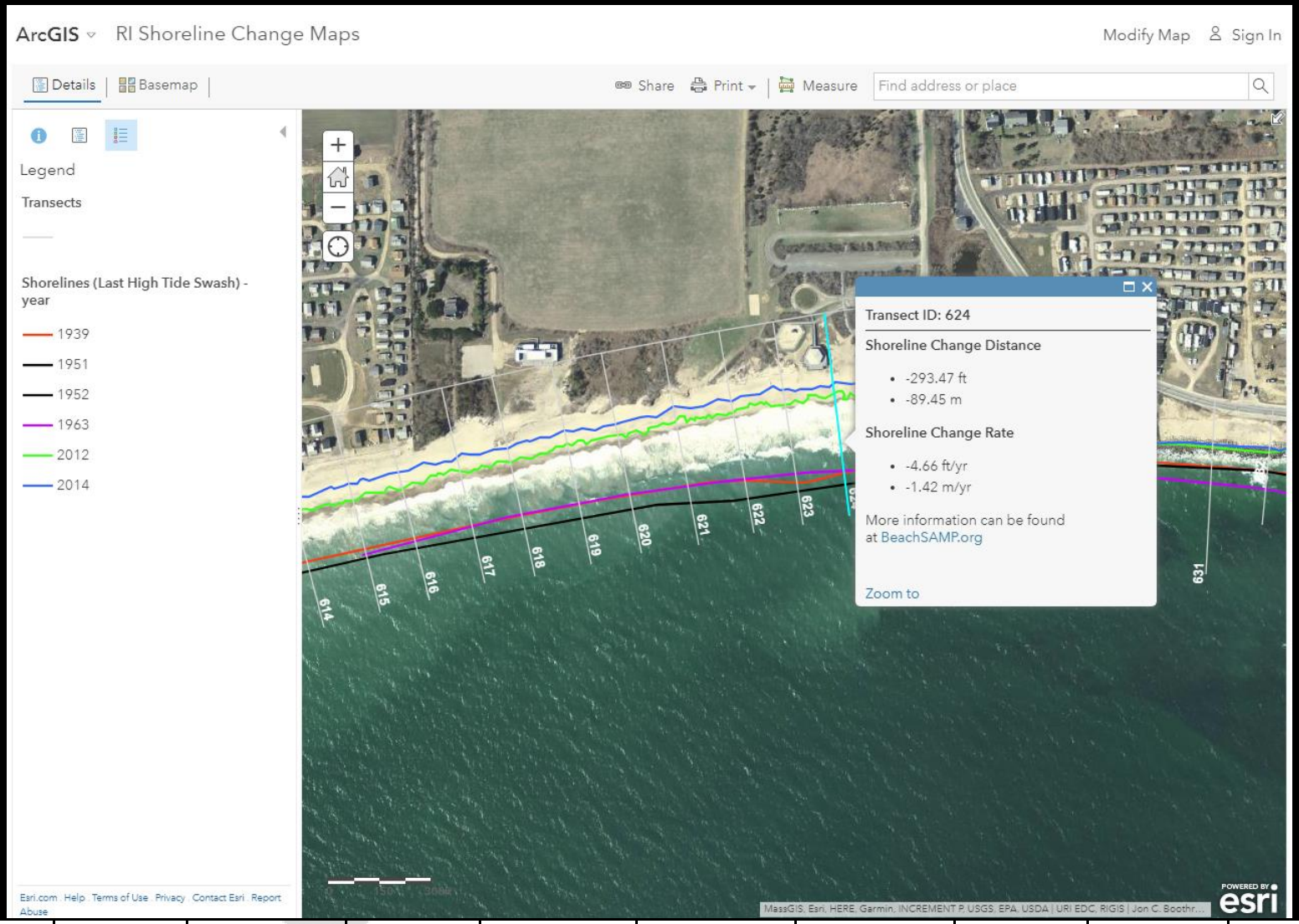
STORMTOOLS


Home = STORMTOOLS for Beginners
Modify Map
Sign In
Details
Basemap
Share
Print
Measure
Find address or place
Legend
Will 1-FOOT of SEA LEVEL RISE affect my property?
Will 2-FEET of SEA LEVEL RISE affect my property?
Will 3-FEET of SEA LEVEL RISE affect my property?
Will 5-FEET of SEA LEVEL RISE affect my property?
Will 7-FEET of SEA LEVEL RISE affect my property?
Will 10-FEET of SEA LEVEL RISE affect my property?
Will 12-FEET of SEA LEVEL RISE affect my property?
Esri.com Help Terms of Use Privacy Contact Esri Report Abuse
Palmer River
Barrington
Veterans Memorial Park
Brickyard Pond
Nayatt Road Park
Warren
Warren River
Windmill Hill Golf Course
MASSACHUSETTS
RHODE ISLAND
Warren Recreation Park
Britto Park
St Mary of the Bay Cemetery
Kickemuit River
0 0.2 0.4mi
USDA FSA | URI COE, URI EDC, URI CRC, RI CRMC, NOAA, USGS, US ACOE | Esri, HERE, Garmin
POWERED BY esri



Water level 2 feet above MHHW


Home
2050: Nuisance Storms. Advanced STORMTOOLS
Modify Map
Sign In
Details
Basemap
Share
Print
Measure
Find address or place
Contents
Addressed Structures (E911)
Critical Infrastructure
3-ft Sea Level Rise (High Tide) (flooding in feet)
1 Year Coastal Storm with 3-ft Sea Level Rise (flooding in feet)
3 Year Coastal Storm with 3-ft Sea Level Rise (flooding in feet)
5 Year Coastal Storm with 3-ft Sea Level Rise (flooding in feet)
10 Year Coastal Storm with 3-ft Sea Level Rise (flooding in feet)
Imagery with Labels
Albert G Jamiel Memorial Park
Estimated Flood Depth During a 5 Year Coastal Storm with 3-ft Sea Level Rise
The flood depth at this point is estimated to be 5.47 ft.
Zoom to



Year	2020	2030	2040	2050	2060	2070	2080	2090	2100
Projected Future Erosion Multiplier	1.05	1.14	1.23	1.34	1.45	1.57	1.70	1.84	2.00

STEP 2 *(Please see Page 12 for background information.)*

Step 2A: What does SLR do to my site (plus access roads)?

- Go to STORMTOOLS for CRMC Permit Applicants. This online Map Journal will provide interactive maps that assist applicants in addressing the requirements of this Step.
- Select the SLR Map Layer that comes closest to the SLR value you derived from STEP 1 to see how SLR impacts your project site and access roads. If your SLR value is between two values, round up to the higher SLR Map Layer.
- Type in or Zoom to your project site address in the address field.
- Identify the roads that connect to your project site and if they show exposure to SLR.

Step 2B: STORMTOOLS Design Elevation (SDE)

- Determine your recommended STORMTOOLS Design Elevation (SDE) using (xxx.xxxx.xxx) ***NOTE: SDE maps are currently under development and are expected to be online and available for the entire Rhode Island coastline by mid-2018.***
- Reference State Law Elevation Allowances. ***NOTE: 1-foot of freeboard (elevation) is required, above BFE is required but up to 5-feet of additional freeboard may be provided voluntarily.***
- Applicant should coordinate with the design engineer on this issue.

Step 2C: Erosion

- See Erosion Maps in RICRMP and meet the Regulatory setbacks (Section 140).
- To calculate projected erosion at the project site, select the multiplier in the Table 2 below that corresponds to the design life year you selected in STEP 1. Multiply the historic erosion rate you identified in STEP 1.2 by the multiplier in the Table 2 to determine projected future erosion for the project site.

Year	2020	2030	2040	2050	2060	2070	2080	2090	2100
Projected Future Erosion Multiplier	1.05	1.14	1.23	1.34	1.45	1.57	1.70	1.84	2.00

Table 2 – Projected Erosion Rate multipliers. (Oakley et al., 20161)

RI CRMC Coastal Hazard Application Guidance - Web Map DRAFT, 06-19-18

A story map

Introduction & Tutorial

Welcome to the RICRMC Coastal Hazard Application Guidance Mapping Tool!

The steps presented below provide guidance for applicants to address Coastal Hazards for selected projects in the design and permitting process for the Rhode Island Coastal Resources Management Council (CRMC).

Chapter 5 of the Shoreline Change Special Area Management Plan (BeachSAMP), can be found online at http://www.crmc.ri.gov/samp_beach.html

Please download and print the RICRMC Coastal Hazard Application Guidance WORKSHEET, and fill in the blanks using the following tabs outlined below:

Step 1: Project Design Life

Step 2A: What does SLR do to my site (plus access roads)?

Step 2B: STORMTOOLS Design Elevation (SDE) - South Coast

Step 2B: STORMTOOLS Design Elevation - Narragansett Bay

Step 2C: Erosion

https://crc-uri.maps.arcgis.com/apps/MapSeries/index.html?appid=b80ede46086c4b30809c0d8066fc2b9d

Draft

RICRMC Coastal Hazard Application Guidance WORKSHEET

Applicant Name: _____ **Proposed Project Site Address:** _____

Step 1. Project Design Life (See Step 1, page 5-5 of Beach SAMP Chapter 5, for details)

___ Open *RICRMC Coastal Hazard Application Guidance Mapping Tool* (https://arcg.is/OWaGu), enter project site address (or zoom in to project site)

___ Choose an expected design life for your project. (CRMC recommends a minimum of 30 years) _____

___ **Circle** the sea level rise (SLR) projection from the table below that match or come closest to your selected project design life.

Year	2020	2030	2040	2050	2060	2070	2080	2090	2100
SLR	1.05	1.67	2.33	3.25	4.20	5.35	6.69	8.14	9.61

Table 1 – Sea Level Rise (SLR) Projections (Feb. 2017). NOAA High Curve, 83% Confidence Interval. Newport, RI Tide Gauge. All values are expressed in feet relative to NAVD88. http://www.corpsclimate.us/ccaceslcurves.cfm

Step 2. Site Assessment and Base Flood Elevation (See Step 2, page 5-6 of Beach SAMP Chapter 5, for details)

___ Indicate base flood elevation (BFE) for your project location from FEMA FIRM (Step 2B) _____

___ Select the STORMTOOLS SLR map layer that comes closest to the SLR value you circled in the table above. If the value falls between the available STORMTOOLS SLR map layers, round up to the next higher level. _____

___ Indicate your STORMTOOLS Design Elevation (SDE) from the pop up box by clicking on the project location. Consider adding 1.5 to 2 feet to account for astronomical high tides (Step 2B). _____

___ Determine historic CRMC erosion rate for the project site here: http://www.crmc.ri.gov/maps/maps_shorechange.html (Step 2C) _____

___ Using the CRMC Projected Erosion Rates map that shows the "Exponential Low" rate of change, identify if your property intersects with any erosion or setback layers and list them. _____

___ List any roads or access routes identified in Step 1 that are potentially inundated from SLR and storms. For example, find and list your nearest coastal evacuation route using the maps available at RIEMA's website: _____

http://www.riema.ri.gov/resources/business/prepare/evacuation.php

___ Consider and discuss with your design consultant other forces or factors that might impact the development, such as coastal habitats, shoreline features, public access, wastewater, storm water, depth to water table/groundwater dynamics, saltwater intrusion, or other issues not listed above. In addition, pressure from rising sea levels will result in rising subsurface groundwater levels ultimately effecting wells and septic systems. _____

NEXT STEP: Investigate mitigation options for the exposure identified above and include that in the final application.

This design sheet must accompany the application.

Owners' Signature: _____ Date: _____

Coastal hazard analysis application requirements (650-RICR-20-00-1-1.1.6.I)

- Amendments to the Red Book – Council approval on September 25, 2018
- Filed with the Office of Regulatory Reform (ORR) for post-adoption review on October 4, 2018
- The effective date will depend on ORR review and final filing with Secretary of State, but should be by December of this year