

Sea Level Rise Adaptation for a Portfolio of Assets

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Disclaimer

- This presentation is my personal research
- Information presented here is not an official position of the U.S. Navy

Why does a little bit of sea level rise matter?

- Higher “baseline” for flood events
 - High tide w/ strong onshore winds
 - Hurricanes
 - Heavy intensity, short duration rain
- More nuisance flood events per year
- Greater likelihood of exceeding past flood heights



Source: USA Today

Why does a little bit of sea level rise matter?

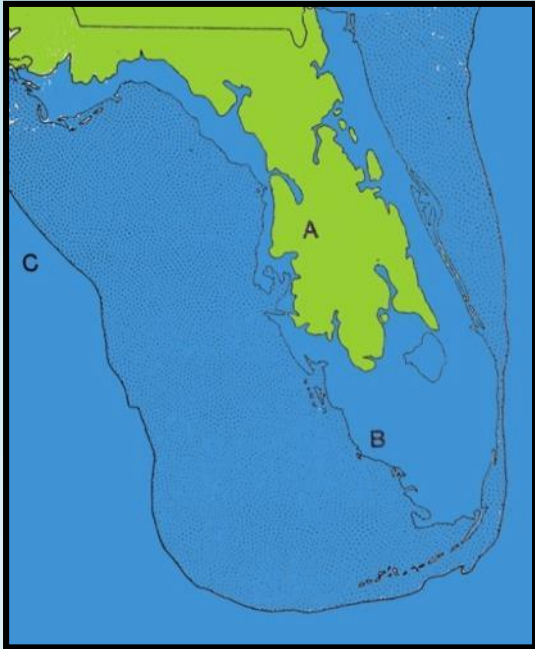
- Increased risk to low-lying coastal property
- Property damage due to flooded structures
- Beach and dune damage due to floods
- Economic losses beyond physical flood damage
 - Lost workdays / business revenue
 - Less beach / fewer visitors
 - Inaccessible roads / parking



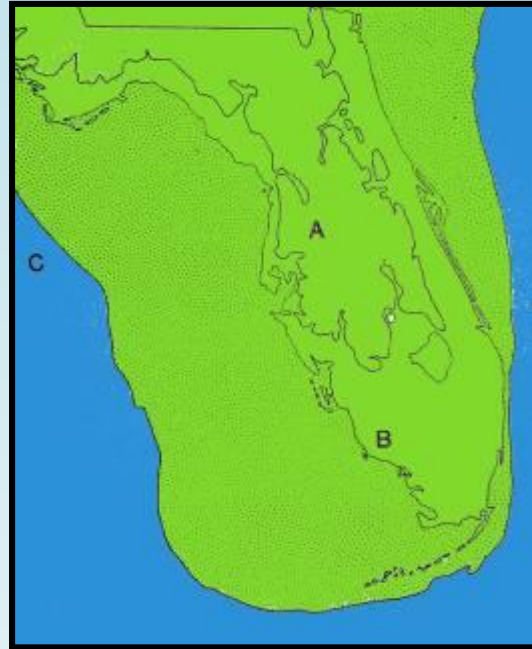
Source: U.S. Navy

Why does a little bit of sea level rise matter?

★ 120,000 yrs ago
20 ft higher



★ 18,000 yrs ago
420 ft lower

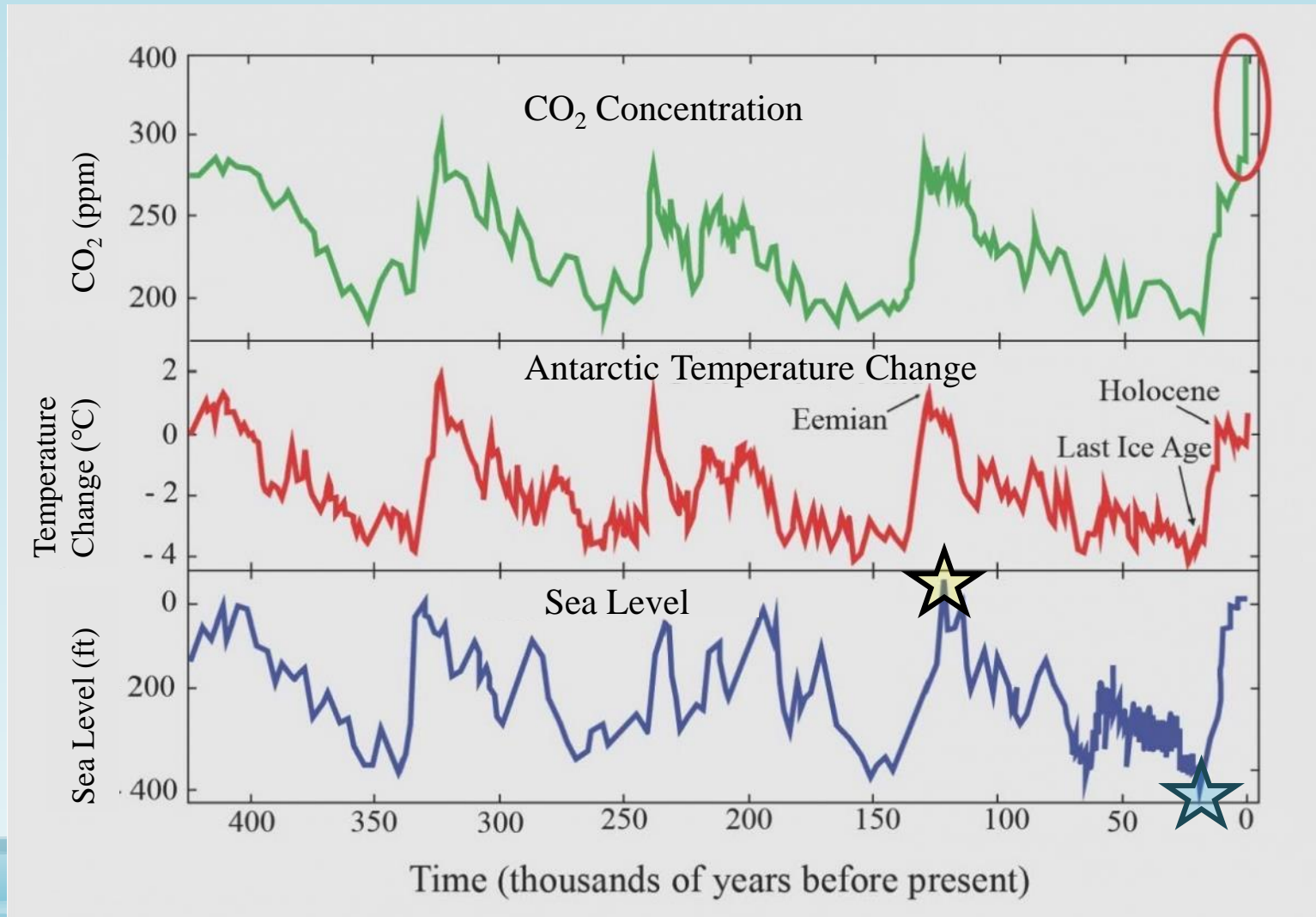


Today



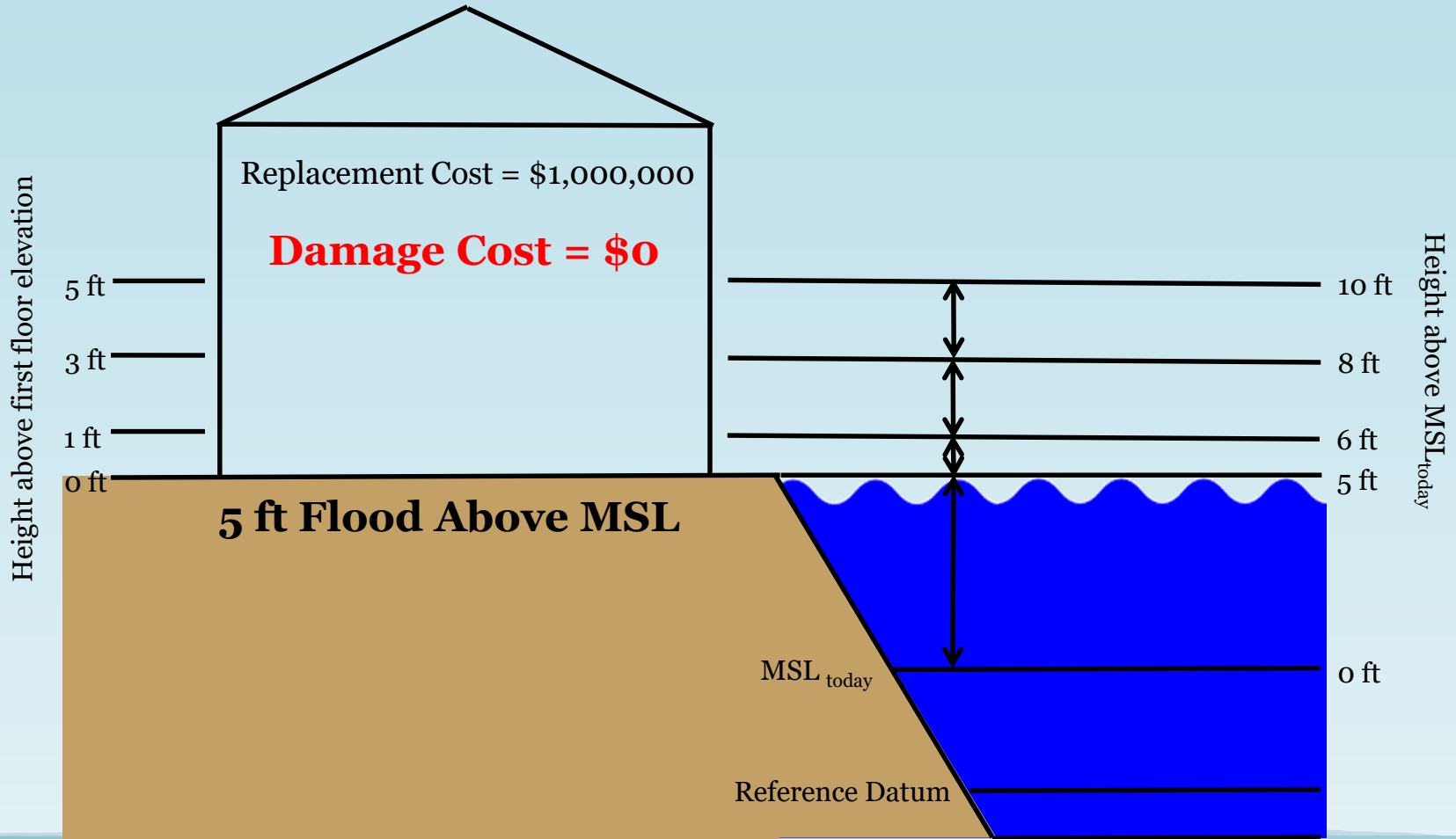
Source: Adapted from Dr. Wanless presentation to Miami-Dade County Board of Commissioners (2008)

Why does a little bit of sea level rise matter?

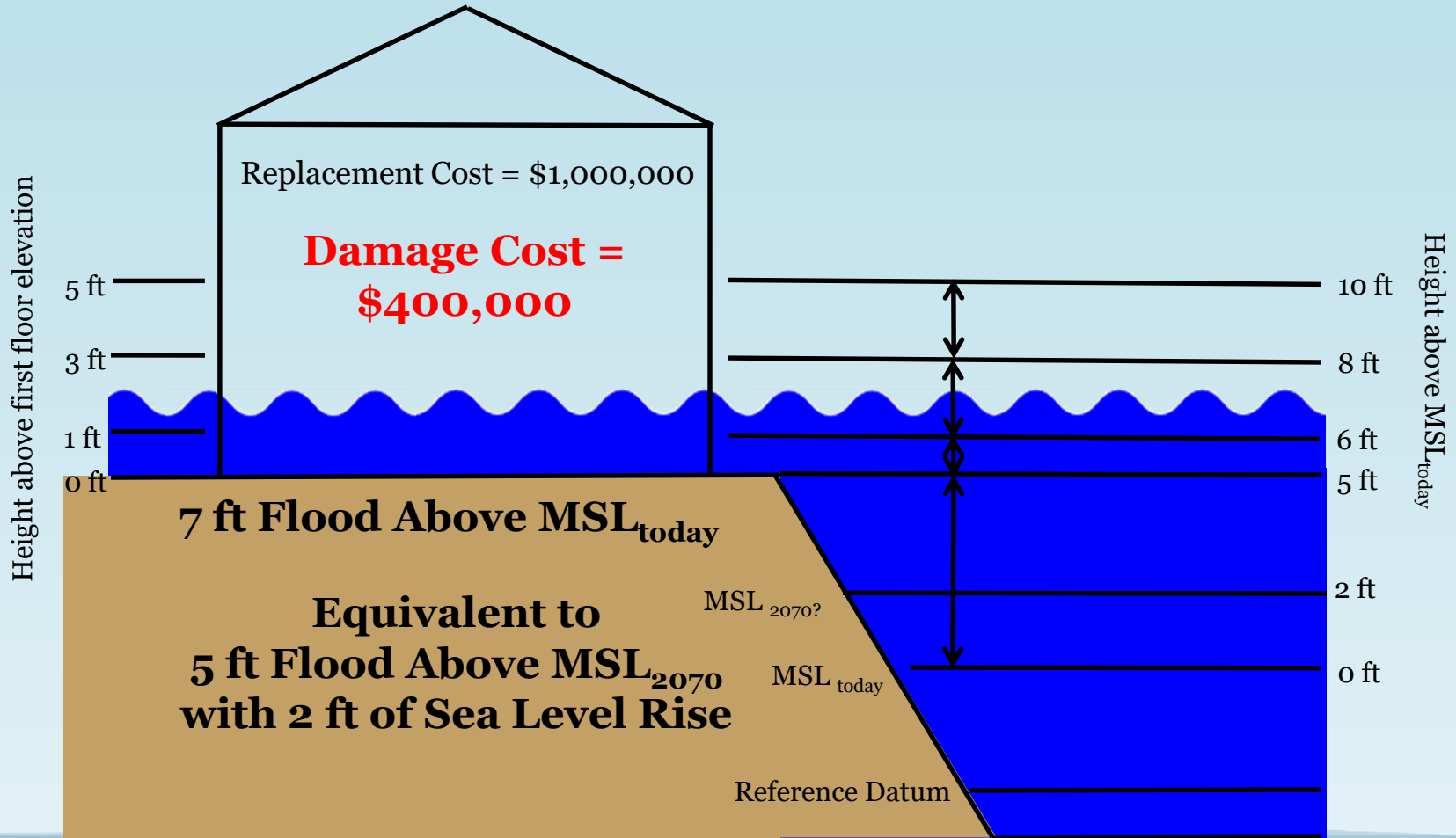


Source: Adapted from Hansen et al. (2008)

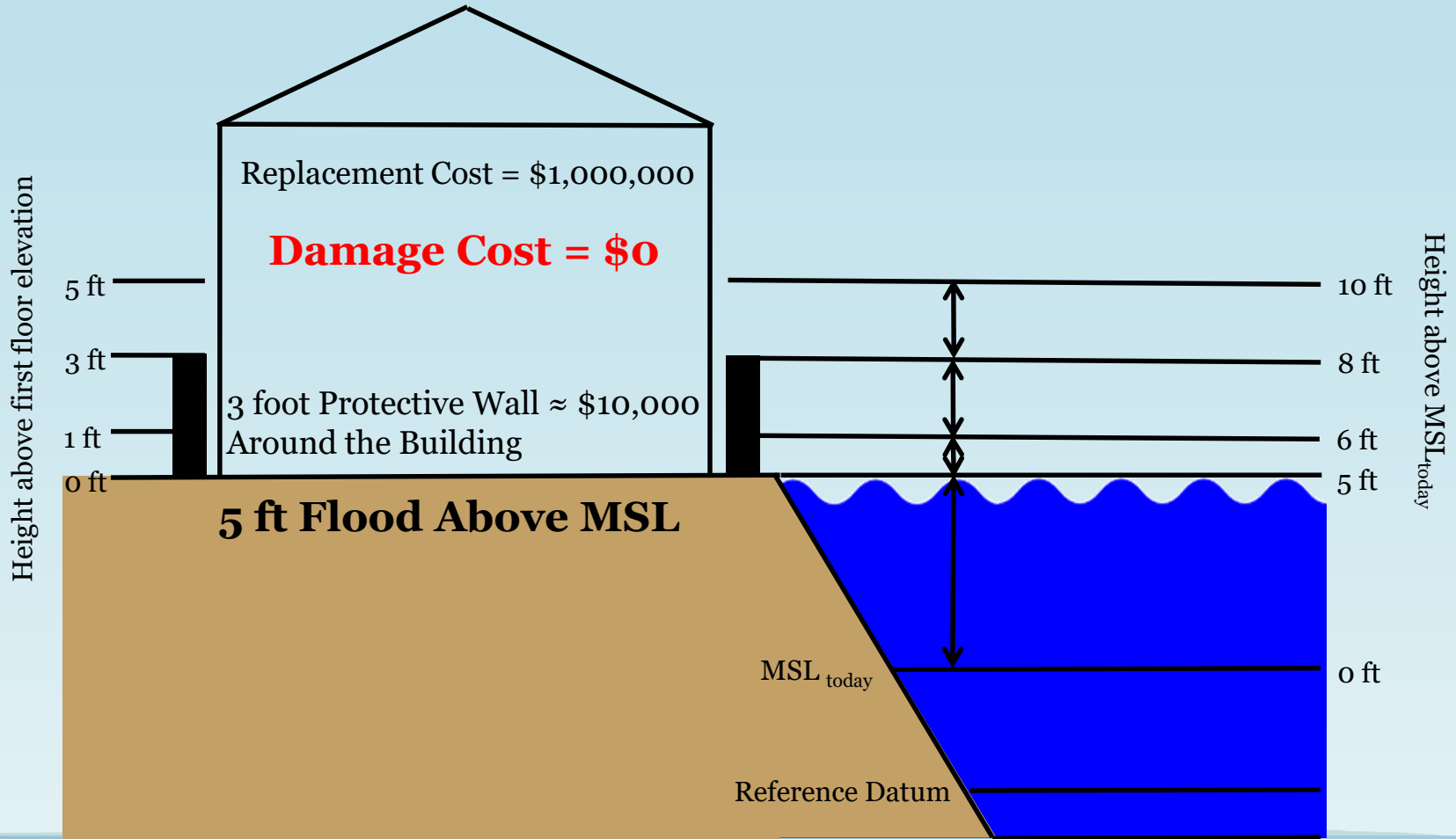
Should we adapt?



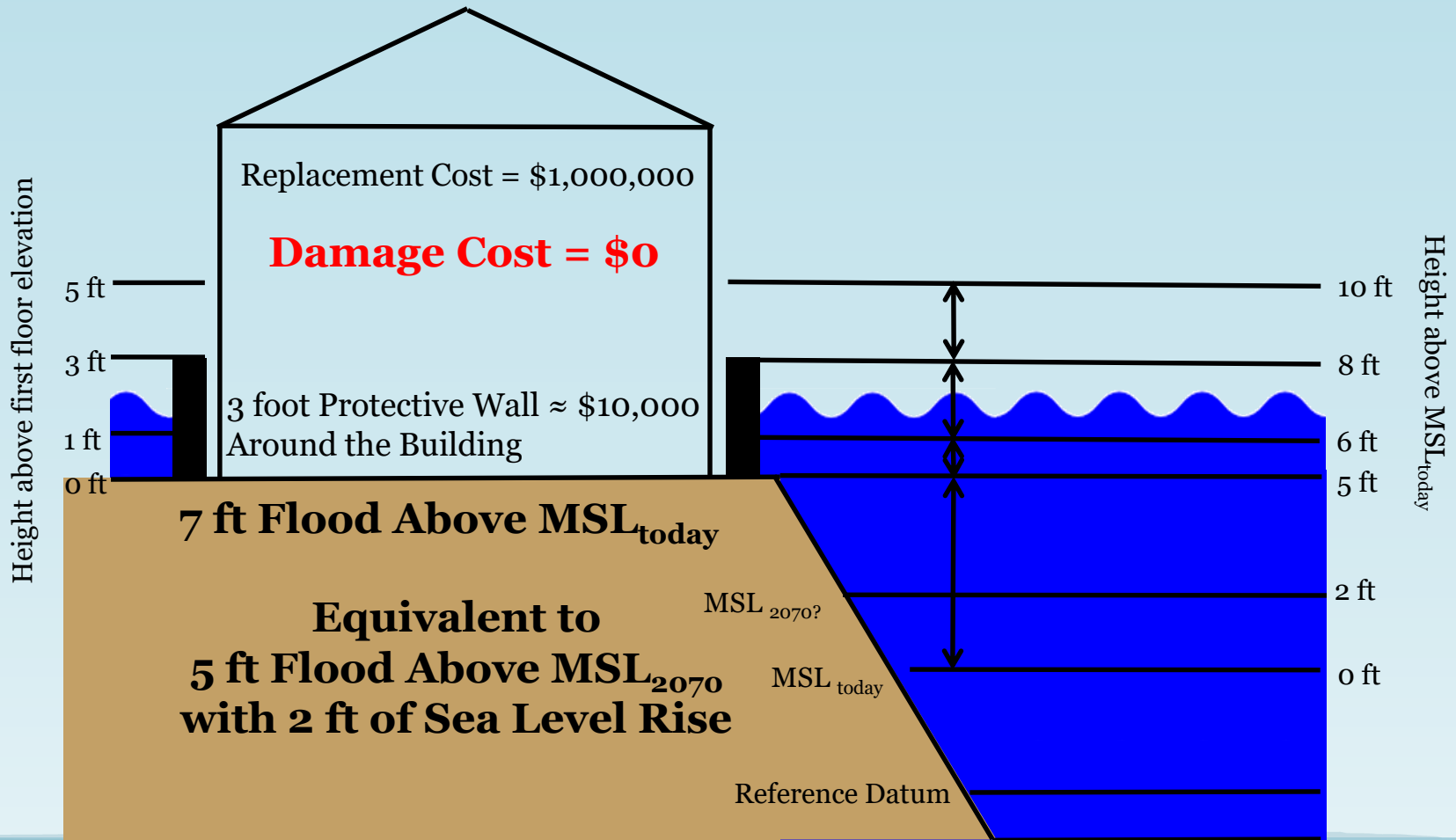
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Should we adapt?



Should we adapt?

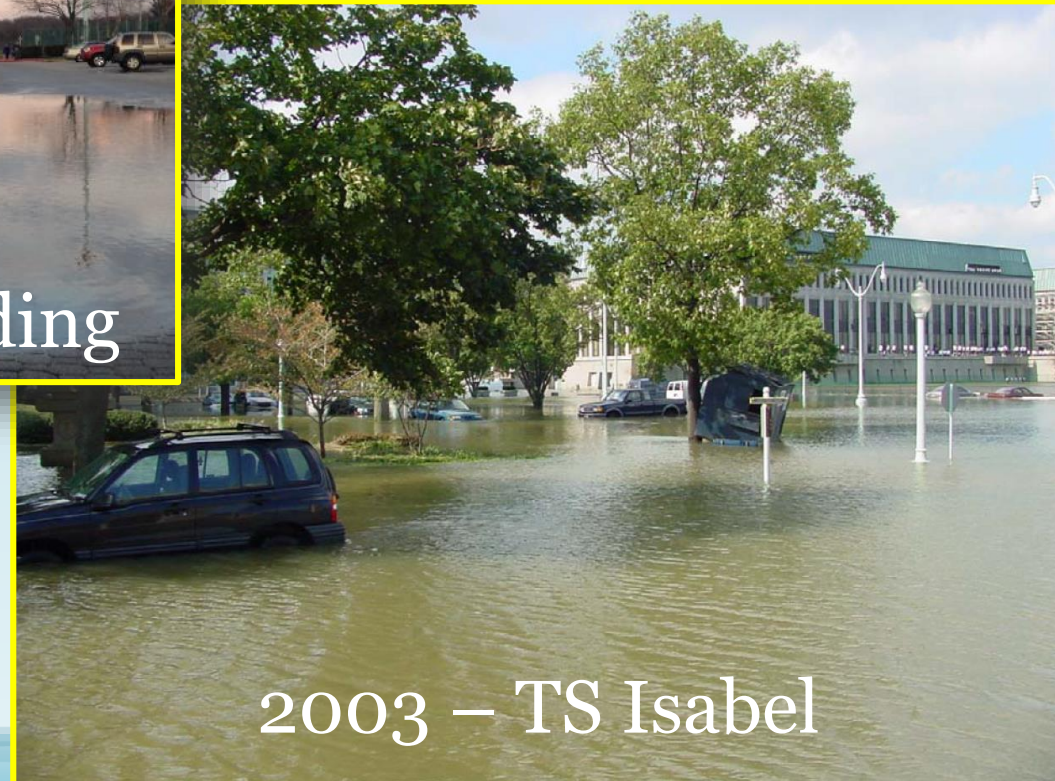
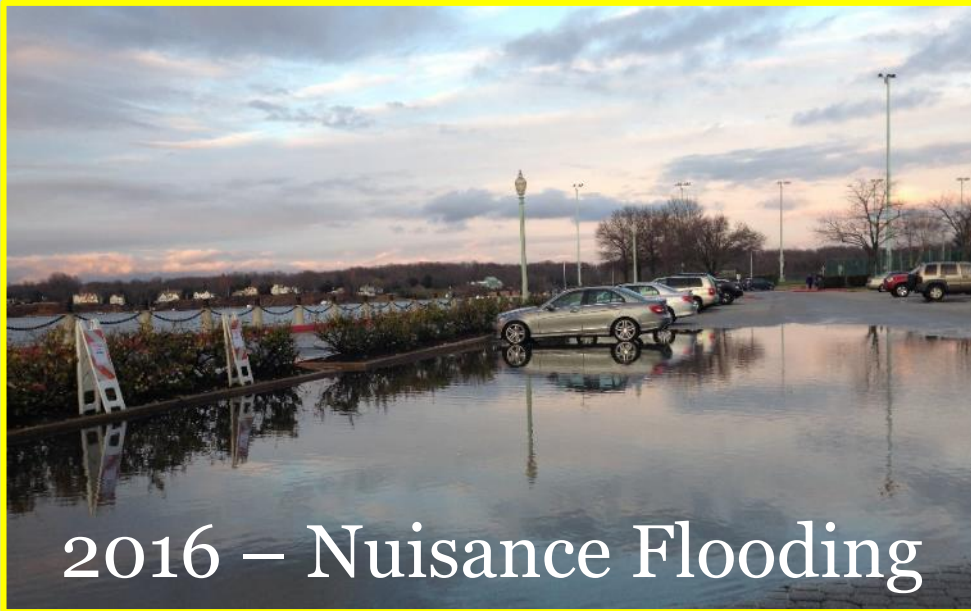


Nuisance Floods in Annapolis



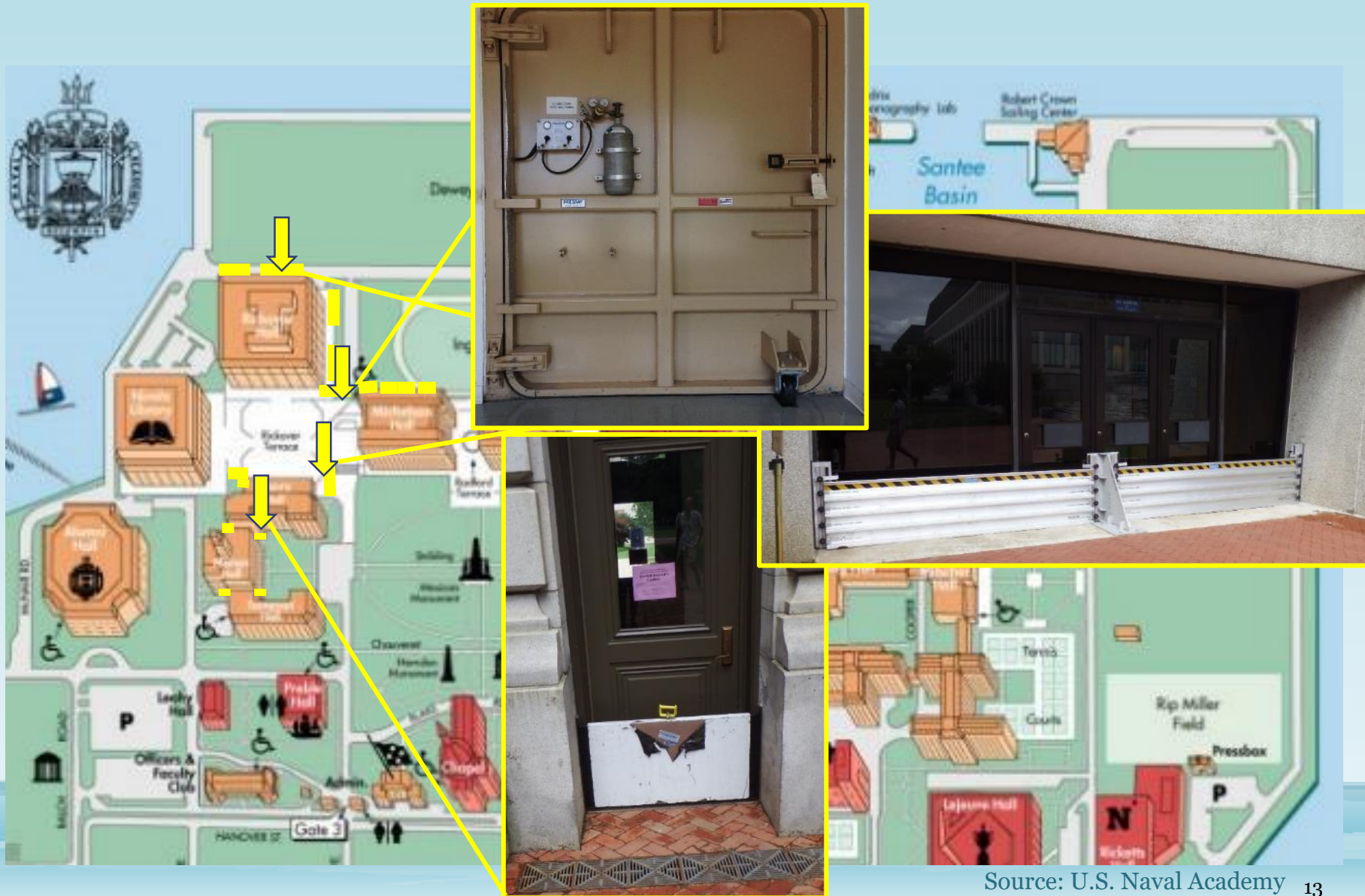
Source: www.kintehaley.org, www.bayjournal.com

Nuisance Floods at USNA



Source: U.S. Army Corps of Engineers

Individual Asset Protection

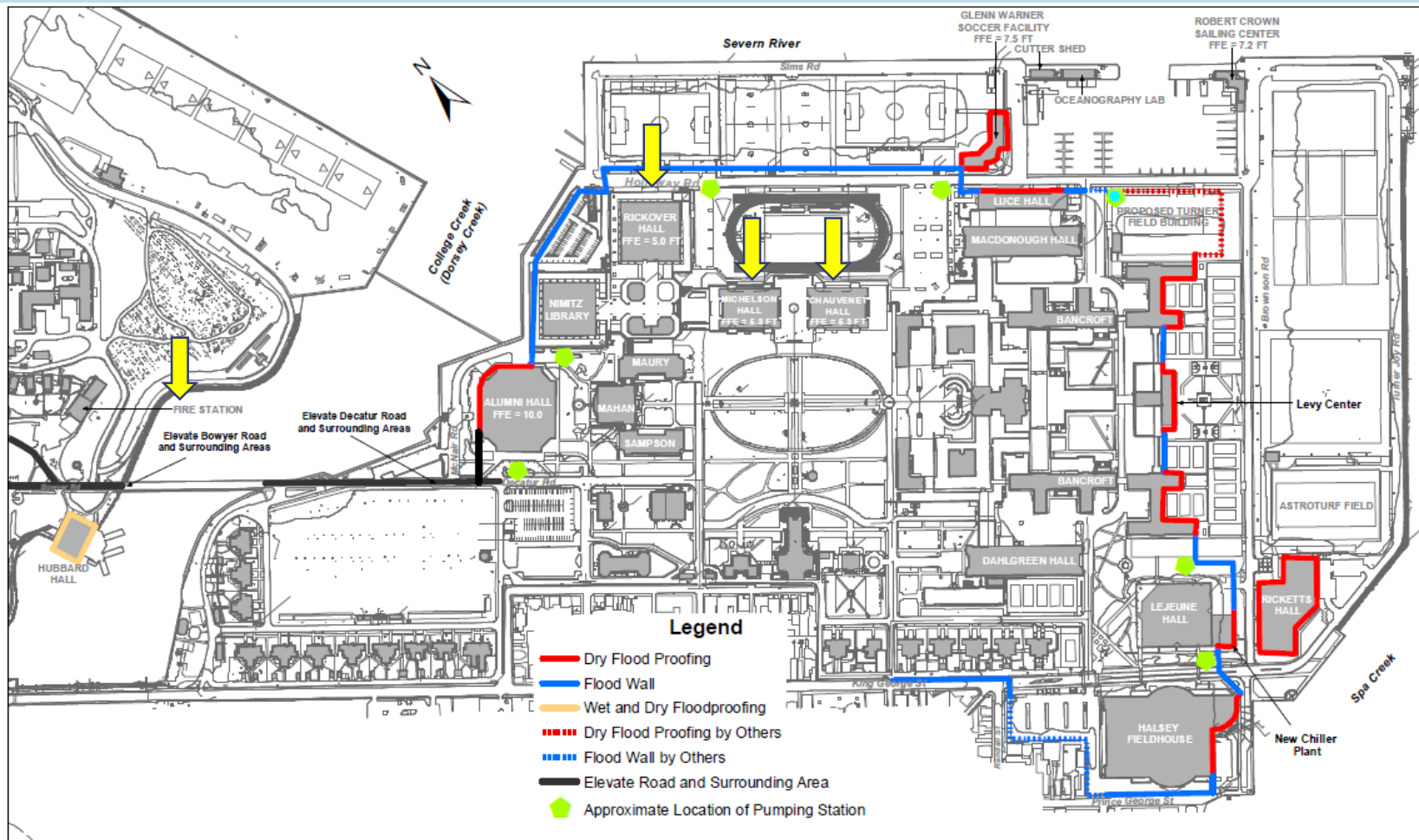


Some Assembly Required

Significant labor cost to deploy and remove stoplogs



Portfolio Protection at USNA



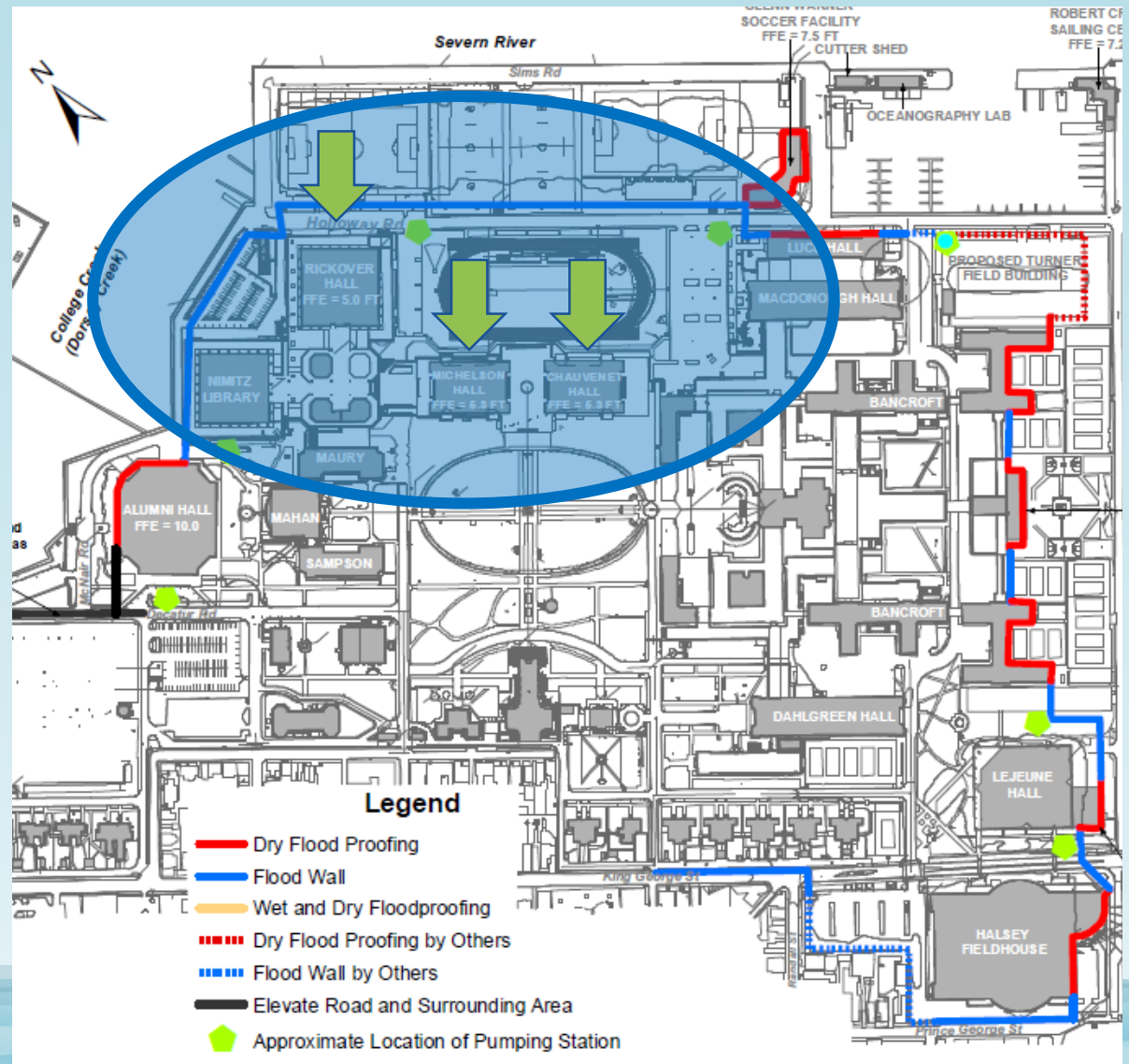
U.S. Naval Academy Flood Damage Reduction Study

Figure 5-1: Selected Plan for Flood Damage Reduction



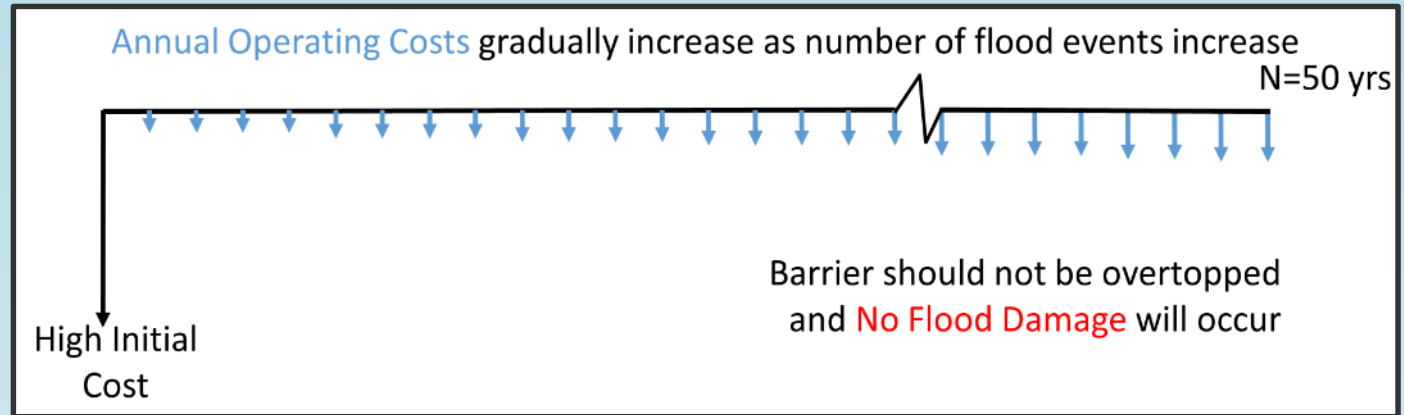
Portfolio Protection at USNA

- Estimated total protection cost \approx \$23M
- Protection proposed to be built in phases
- North /NE phase approx. cost \approx \$11M



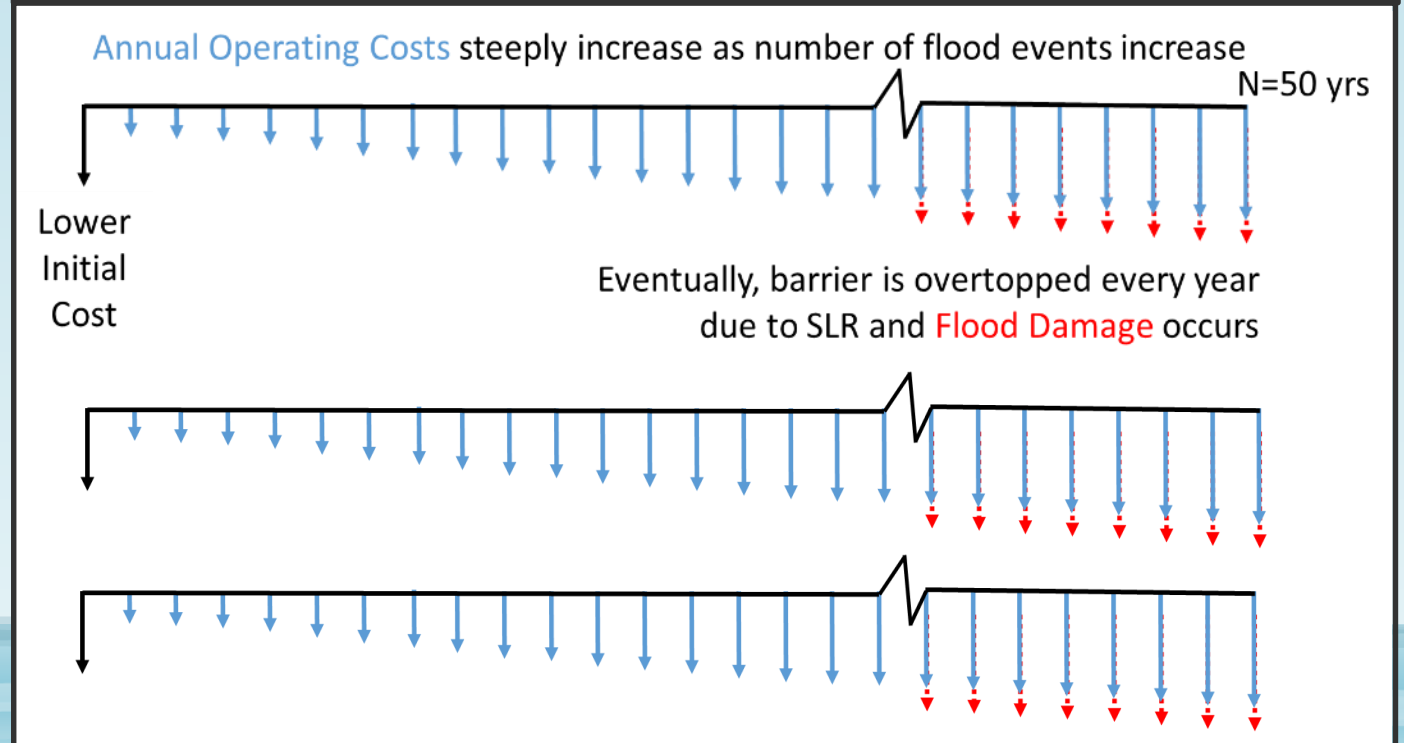
Portfolio vs. Individual Protection

Portfolio
Protection
for all



VS

Individual
Protection
for 3
assets



Which options to choose?

Economics is a driving factor, also consider:

- Practicality – does it make sense to protect it?
- Timeline – now or later?
- Modular – can we start small and build higher later?
- Risk Calculus – how much risk are you willing to take?
- Economy of Scale – it may be advantageous to build it bigger or higher

How to implement adaptation?

- Be informed about sea level rise and tell others
- Learn from other region's experiences
- Look for your vulnerabilities
- Take action, as needed, to study potential solutions
- Consider who the collective solution may benefit
 - Future commerce and visitors?
 - Current businesses and residents?

Questions?

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