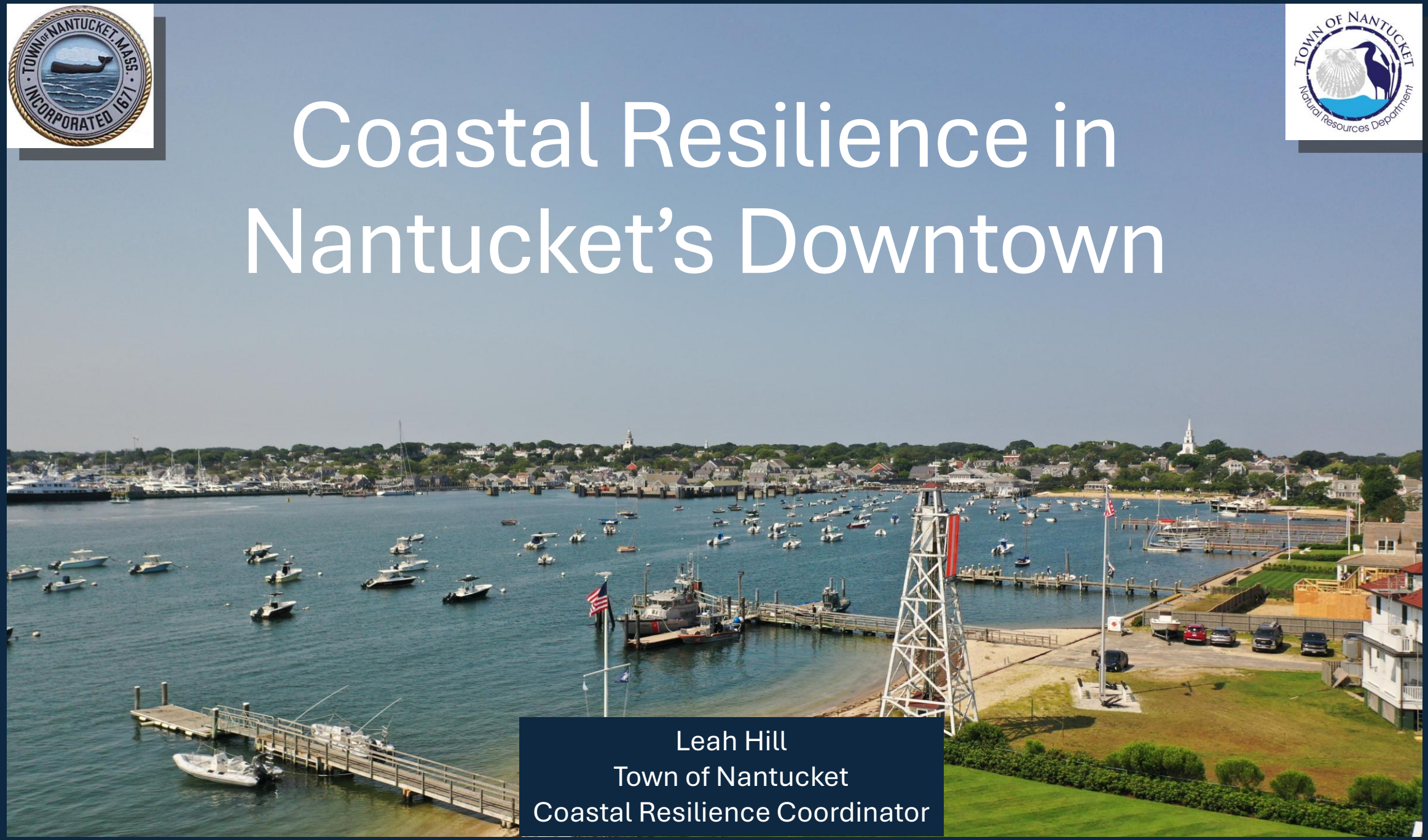
Coastal Resilience in Nantucket's Downtown



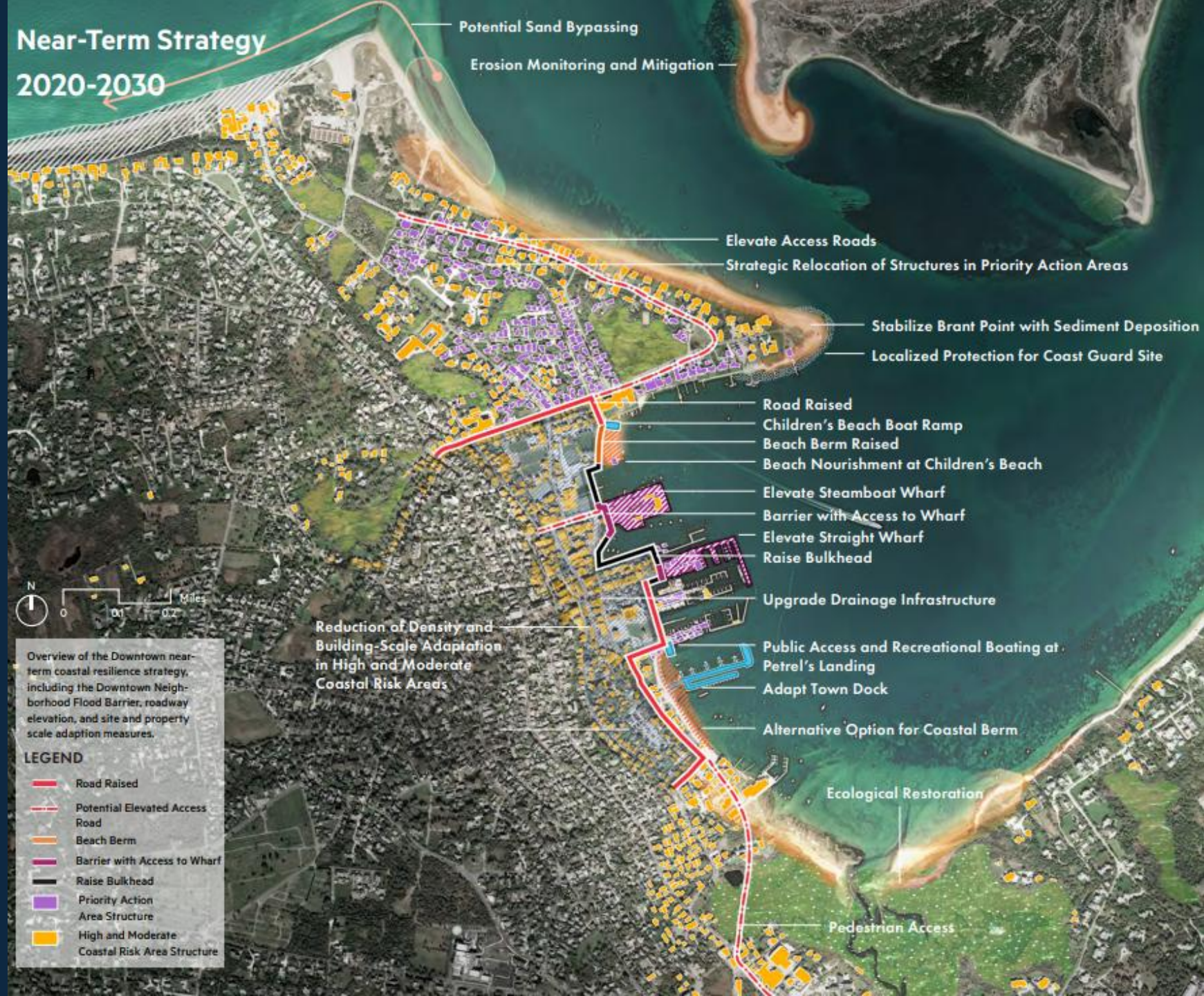
Leah Hill
Town of Nantucket
Coastal Resilience Coordinator

Agenda

- Downtown Neighborhood Flood Barrier
  - Short term and long-term strategies
- Easy Street Flood Mitigation Project
- Francis Street Beach Improvement Project

Downtown Neighborhood Flood Barrier

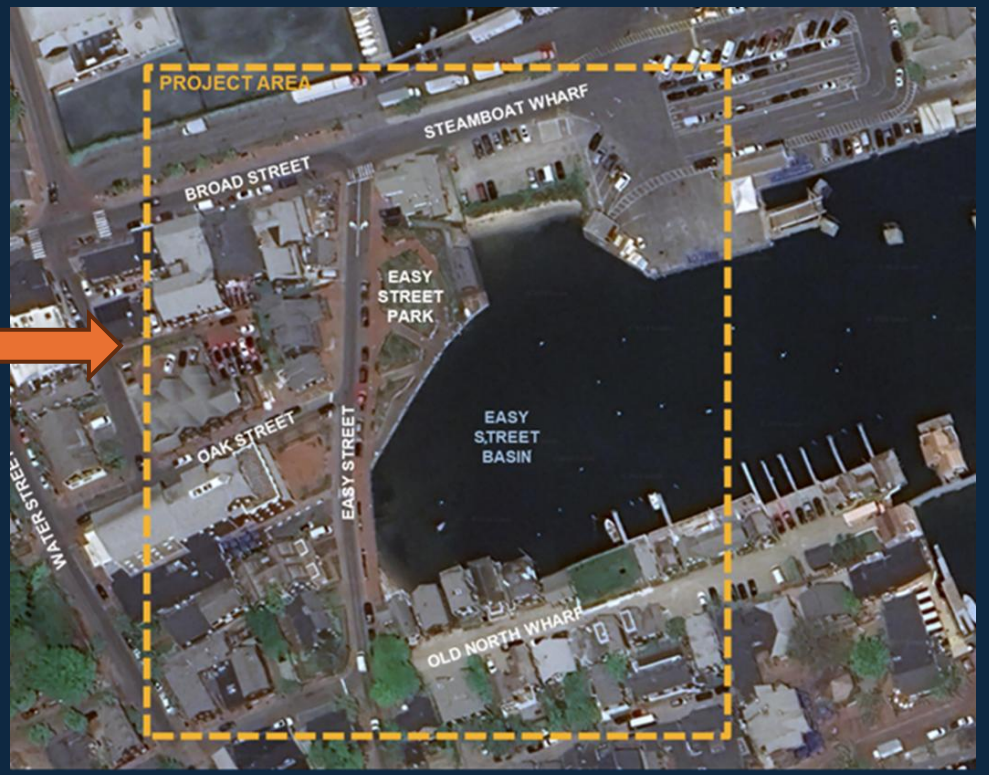
- Protect Downtown from high tide flooding out to 2070
- Concept alignment- further study on actual alignment needed
- Partner with private property owners to reduce flood risk



Downtown Neighborhood Flood Barrier Alignment Alternatives

Easy Street Flood Mitigation Project

- Highest priority recommendation in the CRP
- Goals:
  - Develop feasible project to mitigate stormwater and coastal flood risk along Easy St.
  - Inclusively engage the community and stakeholders island-wide in the design development process
  - Seek co-benefits that improve access, mobility, and the environment as part of the design development process



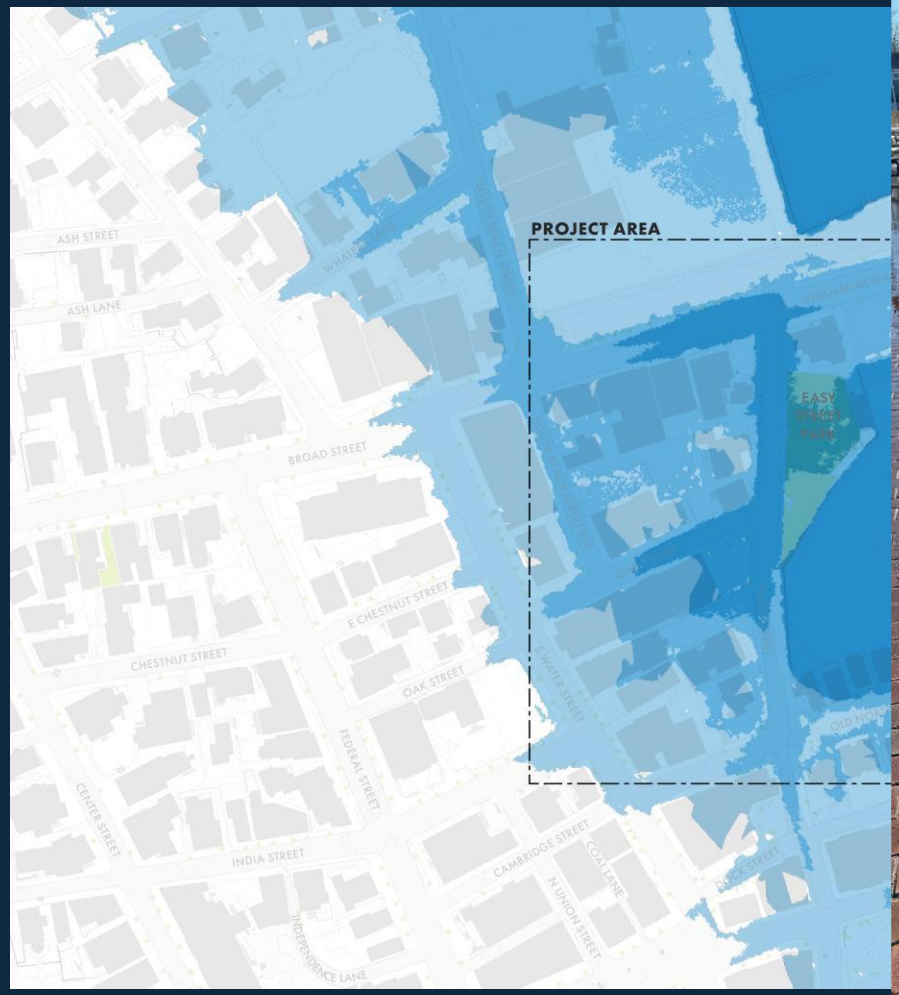
Previous Work

Flood Risk Assessment

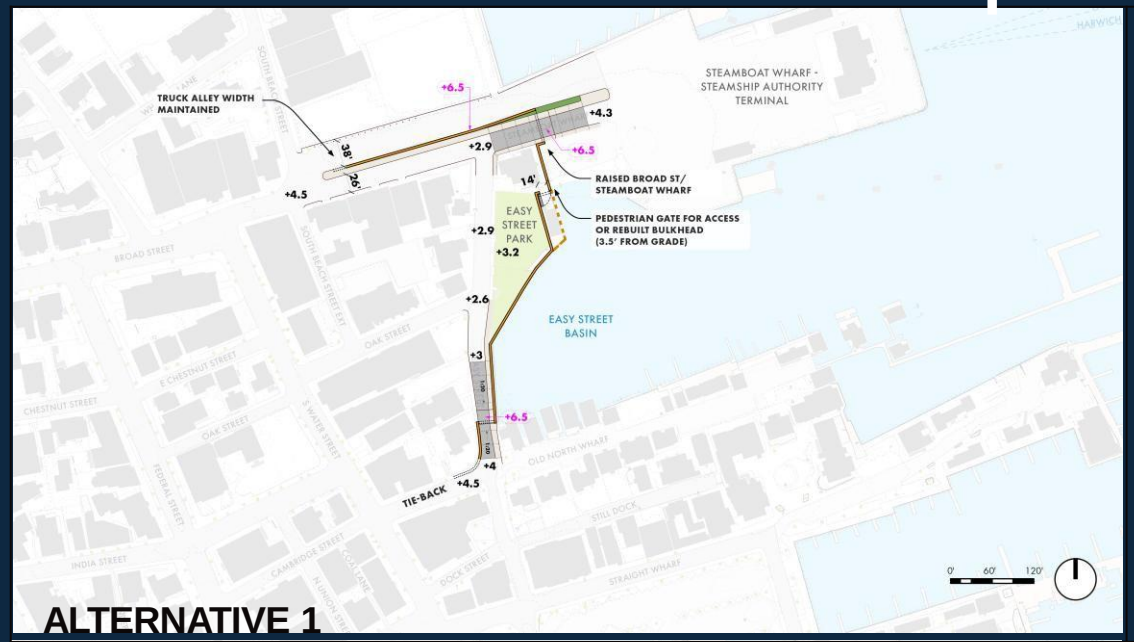
*What were **key takeaways** of the flood risk assessment?*

- Sea level rise will contribute to sunny-day flooding caused by monthly and daily high tides as soon as 2030
- Future storm surge can cause damage to the Downtown core of Nantucket
- The existing bulkhead structures are not designed to protect against coastal flood risks

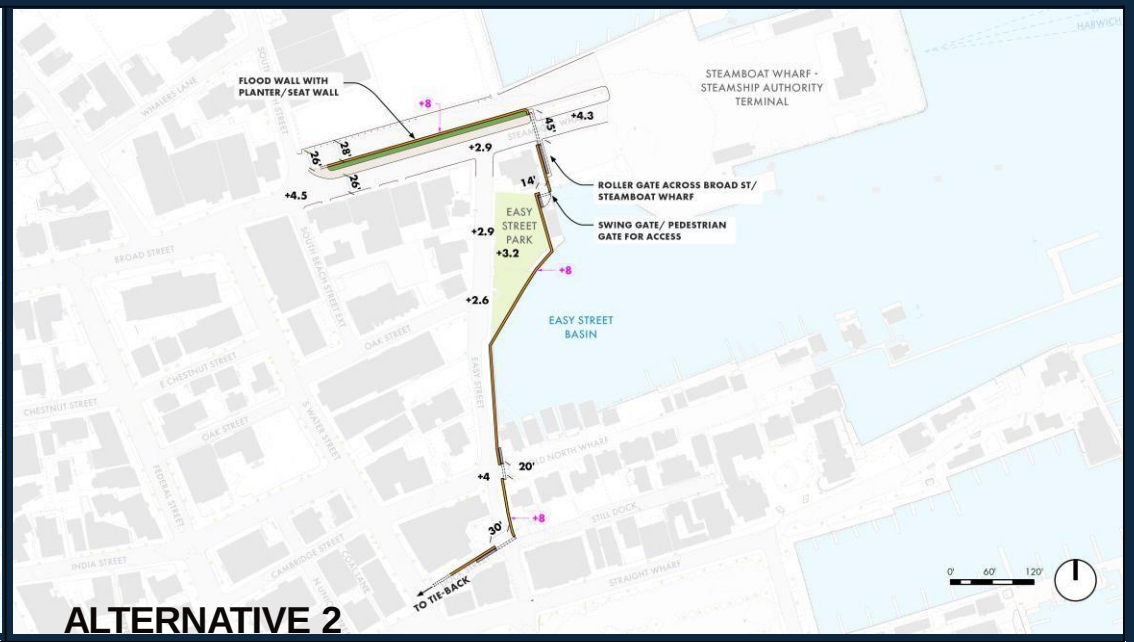
From now through 2070, cumulative expected losses from coastal flooding can total up to
$1.2 Billion



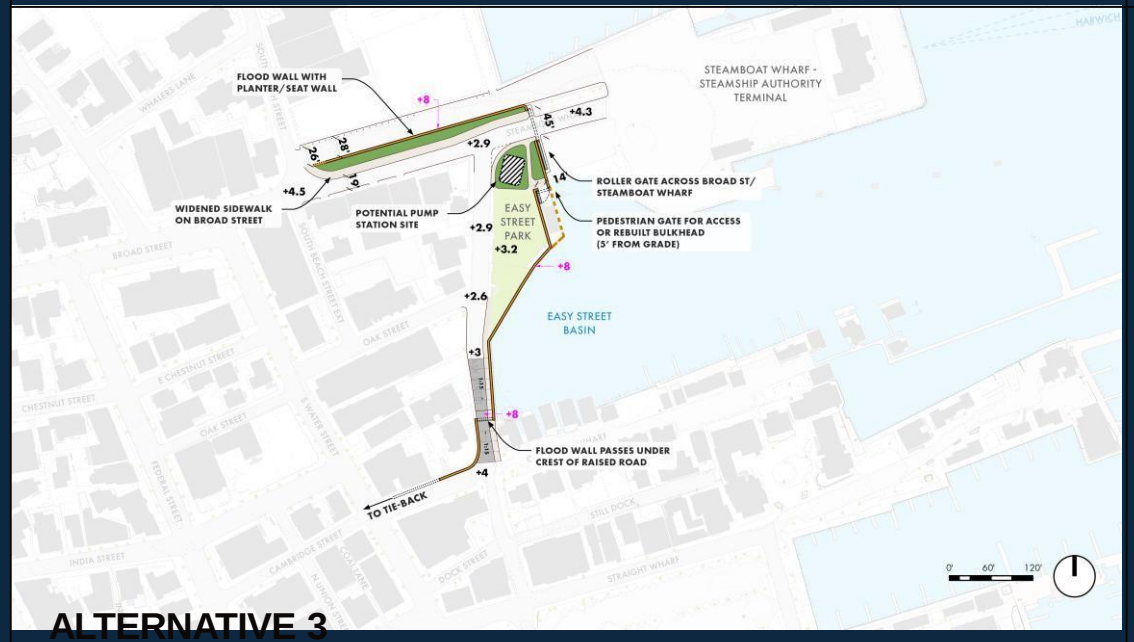
Initial Conceptual Alternatives



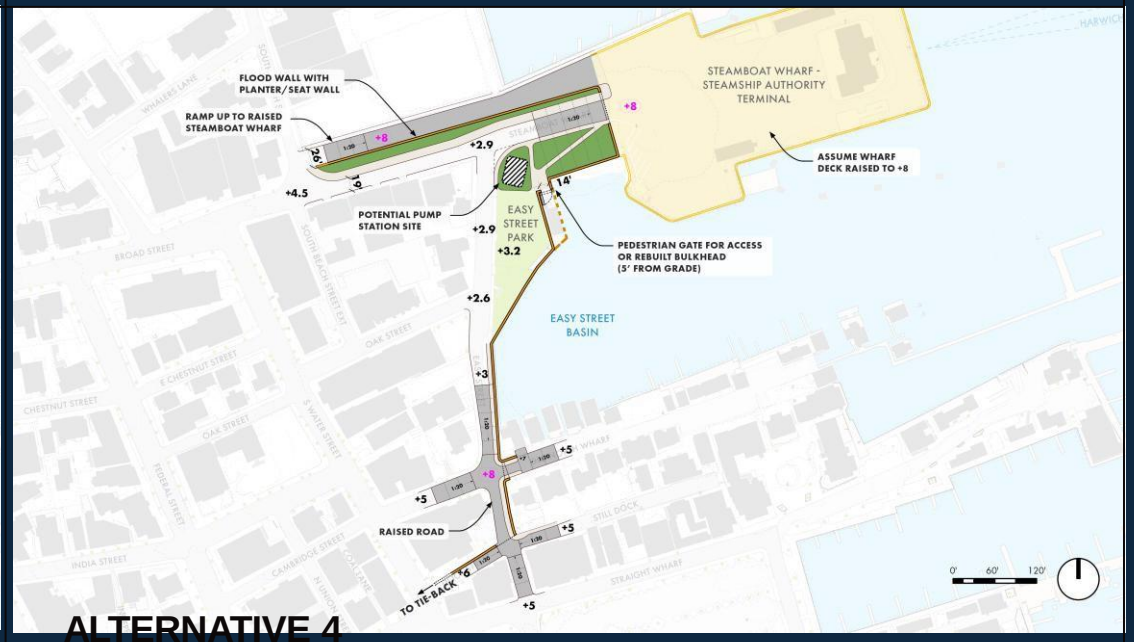
ALTERNATIVE 1



ALTERNATIVE 2



ALTERNATIVE 3



ALTERNATIVE 4

Levels of Flood Protection

What does the top of wall elevation protect against?

- *Long-term over-topping and flooding from high tides*
- *Near-term over-topping and flooding from storms and waves*

Protect against high-tide flooding expected as soon as 2070*
Level of Protection, Elevation = 8.0 ft. NAVD88

Top of Existing Timber Bulkhead Cap, Elevation = 6.4 ft. NAVD88

Halloween Storm (Oct. 30, 1991) Storm of Record
Nantucket Harbor Tidal Station 8449130 Elevation = 5.78 ft. NAVD88

Deck, Approximate Elevation = 3.7 ft. NAVD88

*High tide flooding elevations are based on MC-FRM (Massachusetts Coast Flood Risk Model) which includes sea level rise (SLR) projections using a HIGH scenario, as adopted by the Commonwealth of Massachusetts. All elevations reference NAVD88.

Alternatives Summary

Bulkhead Expansion & Elevation

- Replace existing bulkhead with floodwall to be higher and wider
- Slight road raising (similar to a longer speed hump) at Steamboat Wharf entrance, on Easy St. near Old North Wharf, and South Beach St.

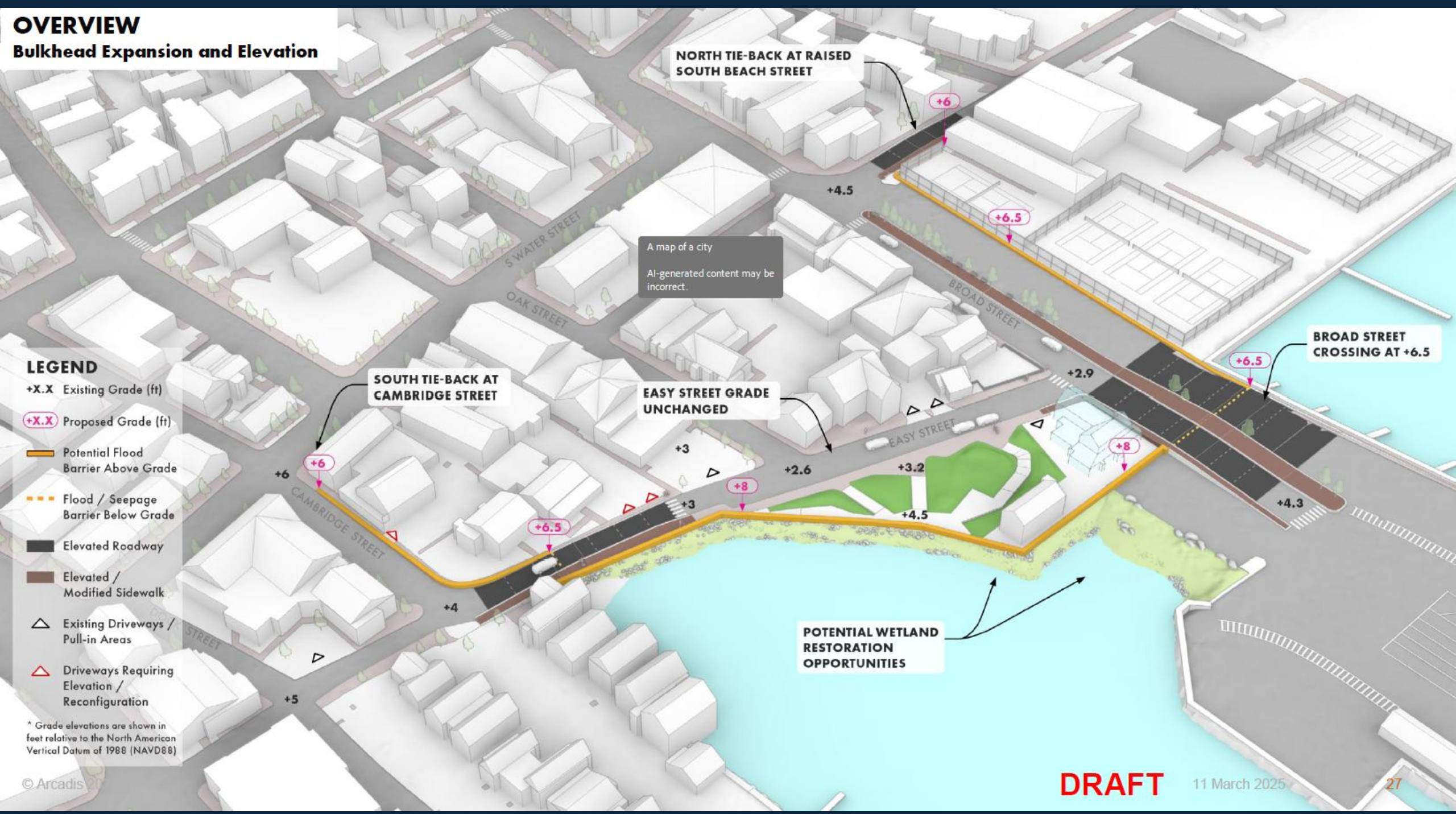
Adaptable Road Raising to 6.5 feet NAVD88

- Raise Easy Street to 6.5 feet elevation today and 8ft at a later date, including portions of Broad and surrounding streets
- Small walls along sidewalks in Easy St/Old North Wharf area and in the middle of Broad Street

Road Raising to 8.0 feet NAVD88

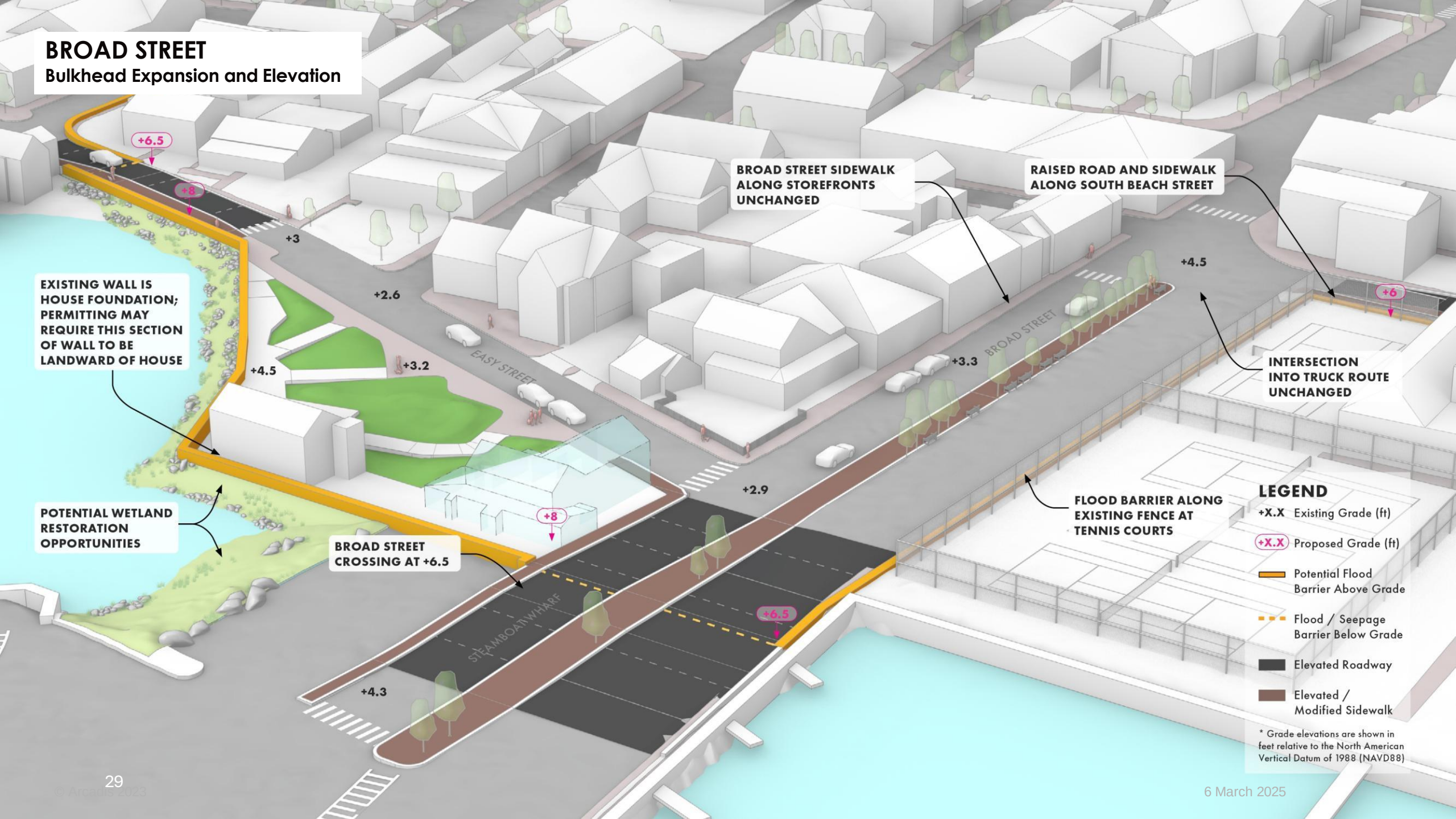
- Raise Easy Street to 8.0 feet elevation, including portions of Broad and surrounding streets
- Larger walls along sidewalks in Easy St/Old North Wharf area and in the middle of Broad Street

OVERVIEW
Bulkhead Expansion and Elevation



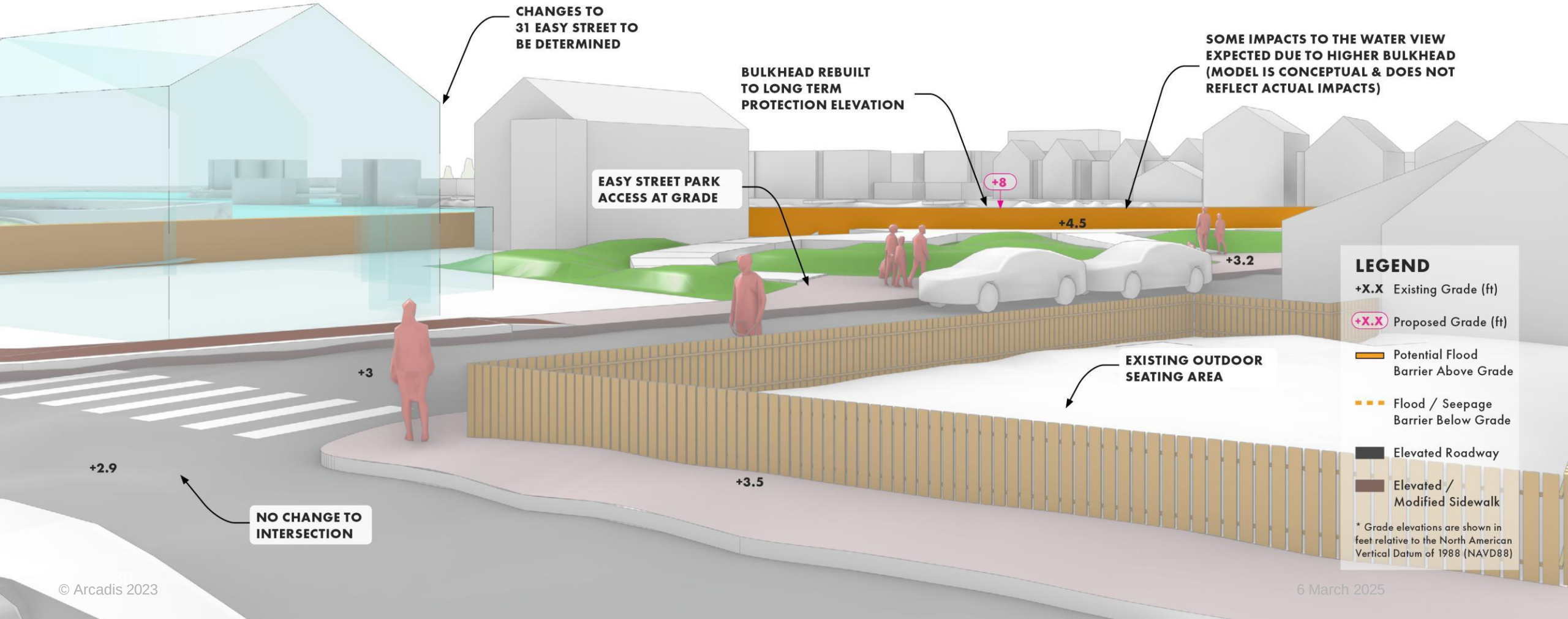
DRAFT

BROAD STREET
Bulkhead Expansion and Elevation

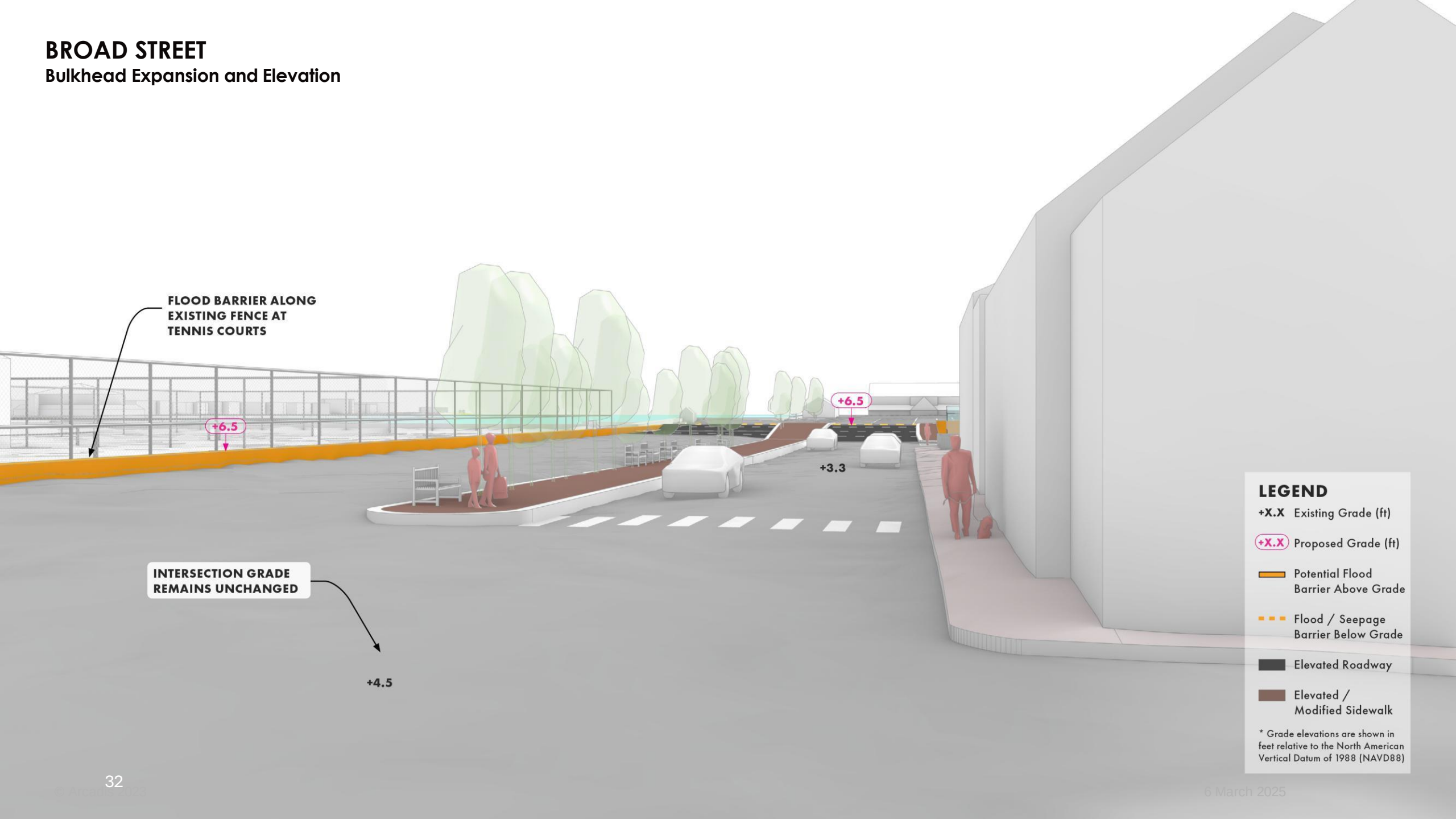


EASY STREET

Bulkhead Expansion and Elevation

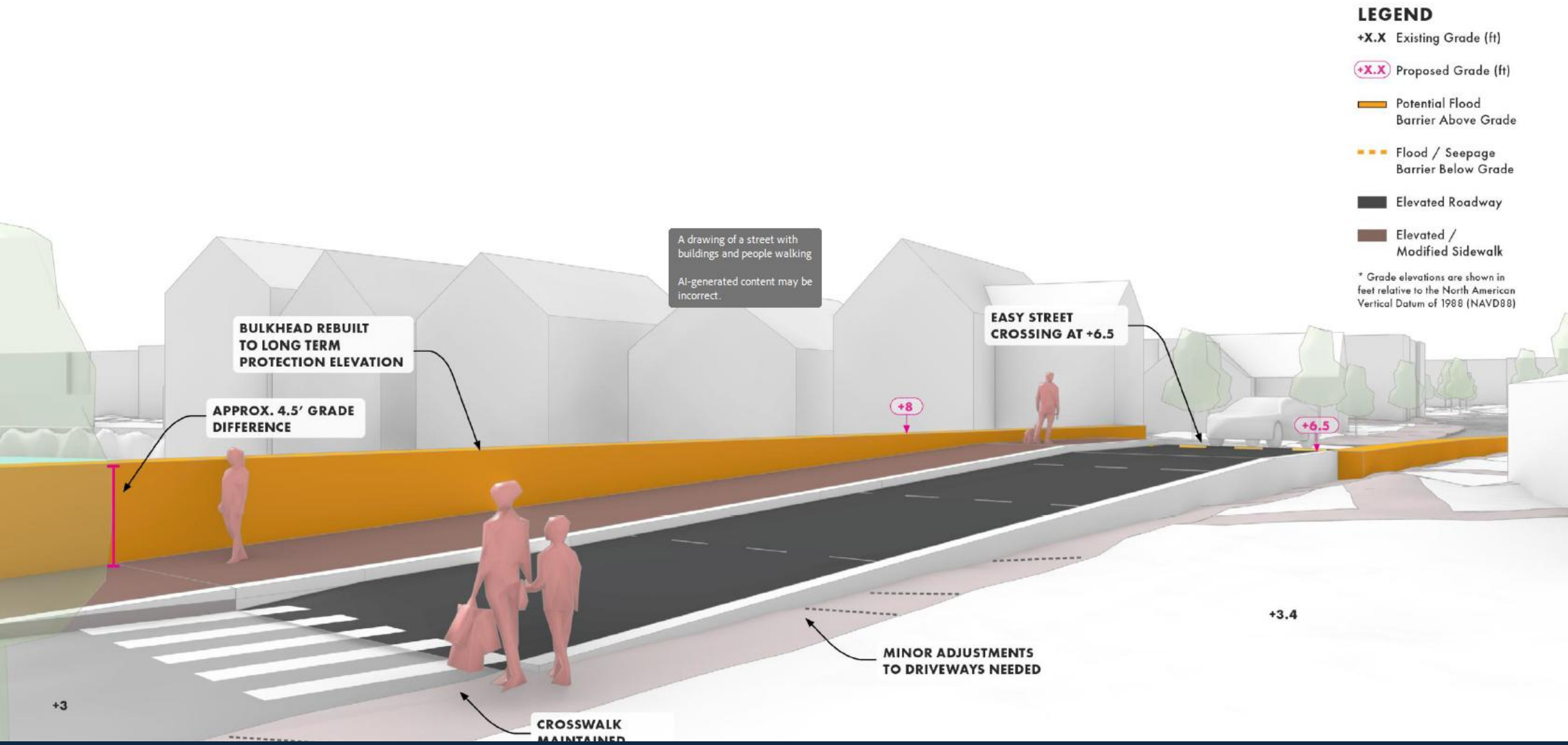


BROAD STREET
Bulkhead Expansion and Elevation



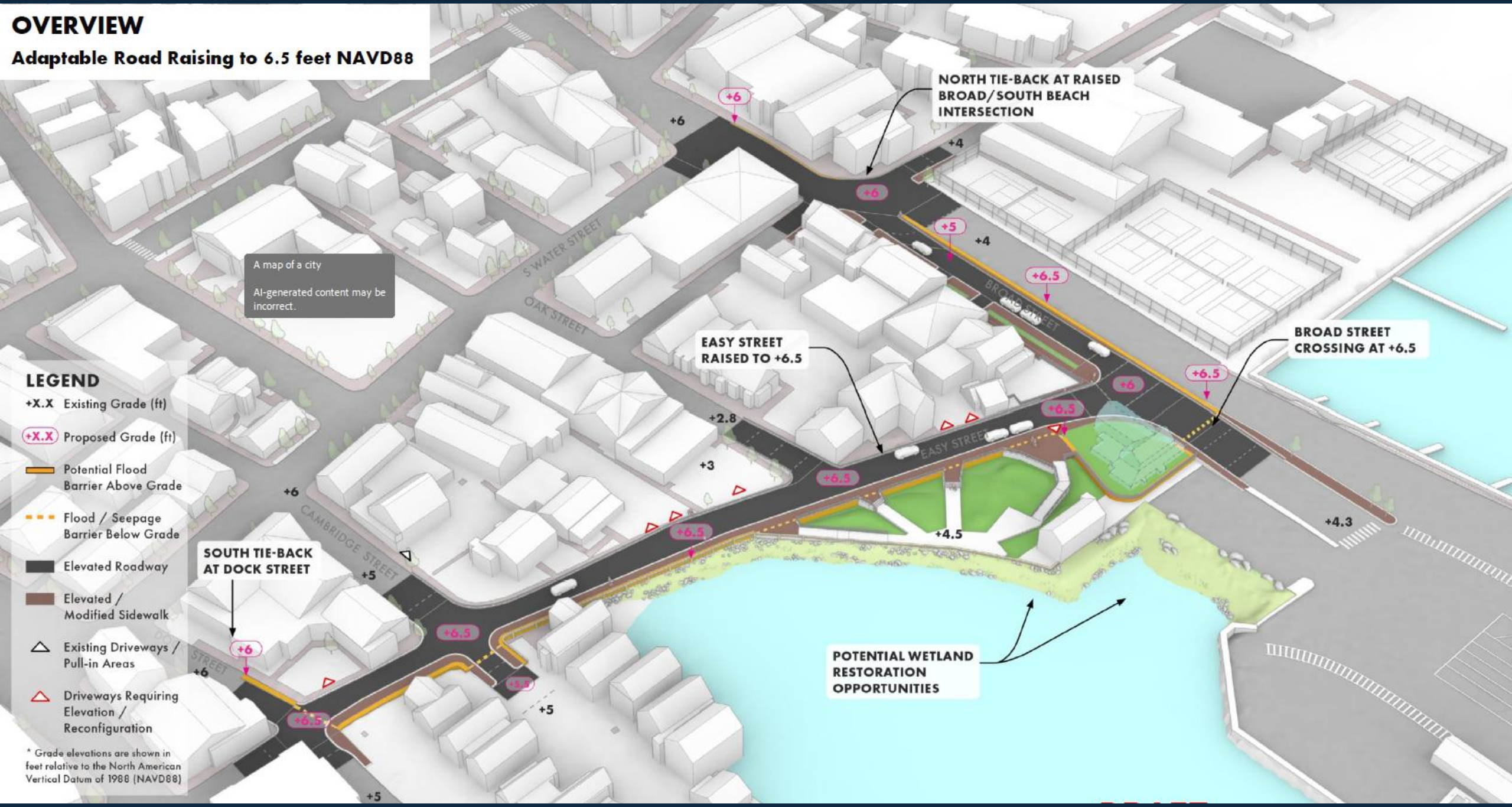
EASY STREET

Bulkhead Expansion and Elevation



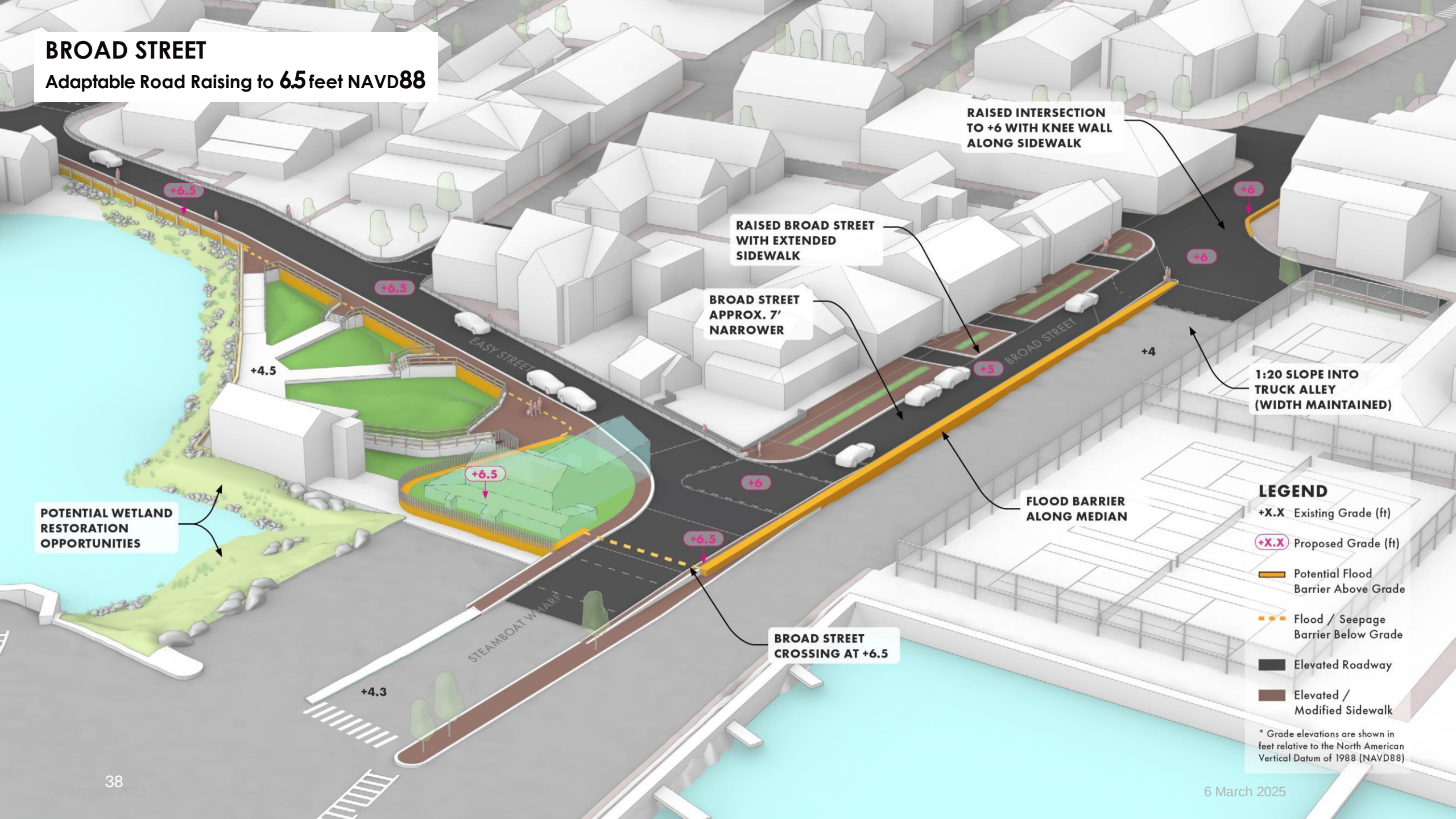
OVERVIEW

Adaptable Road Raising to 6.5 feet NAVD88



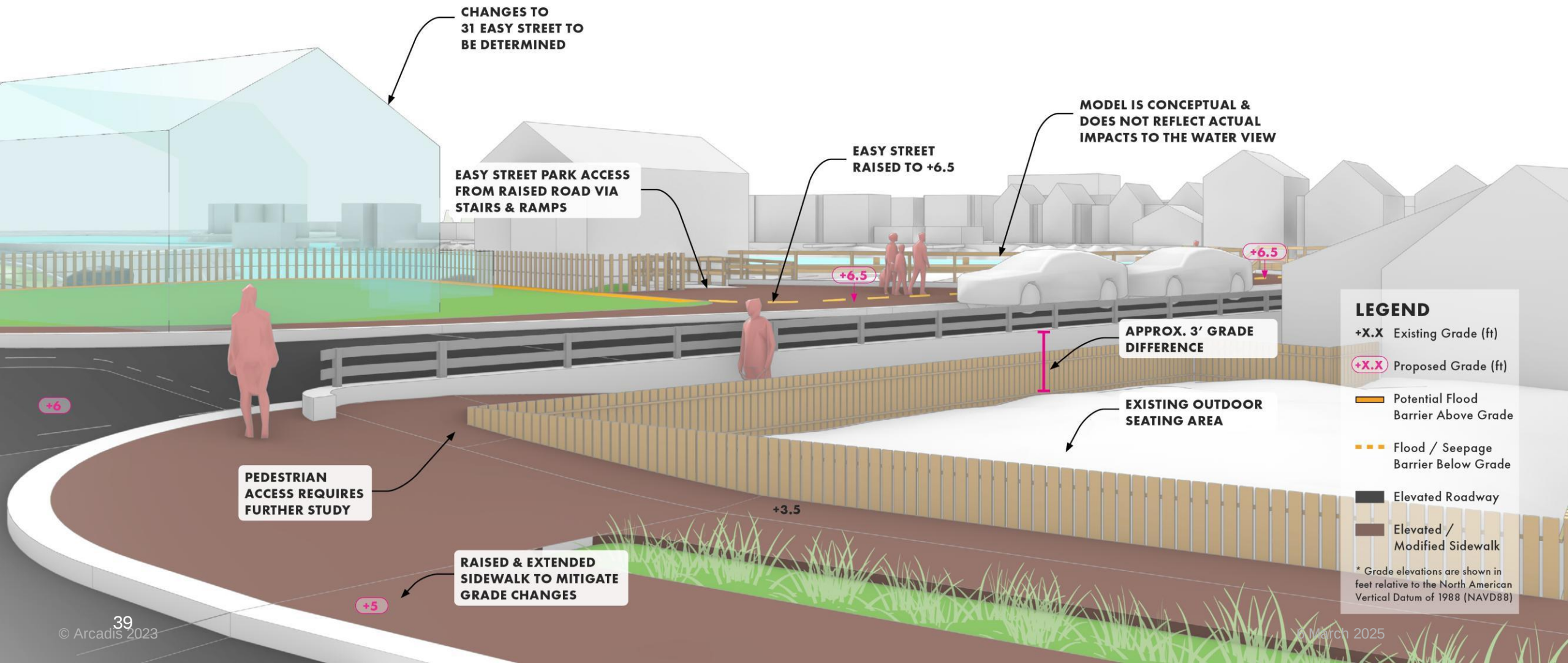
BROAD STREET

Adaptable Road Raising to 6.5 feet NAVD88



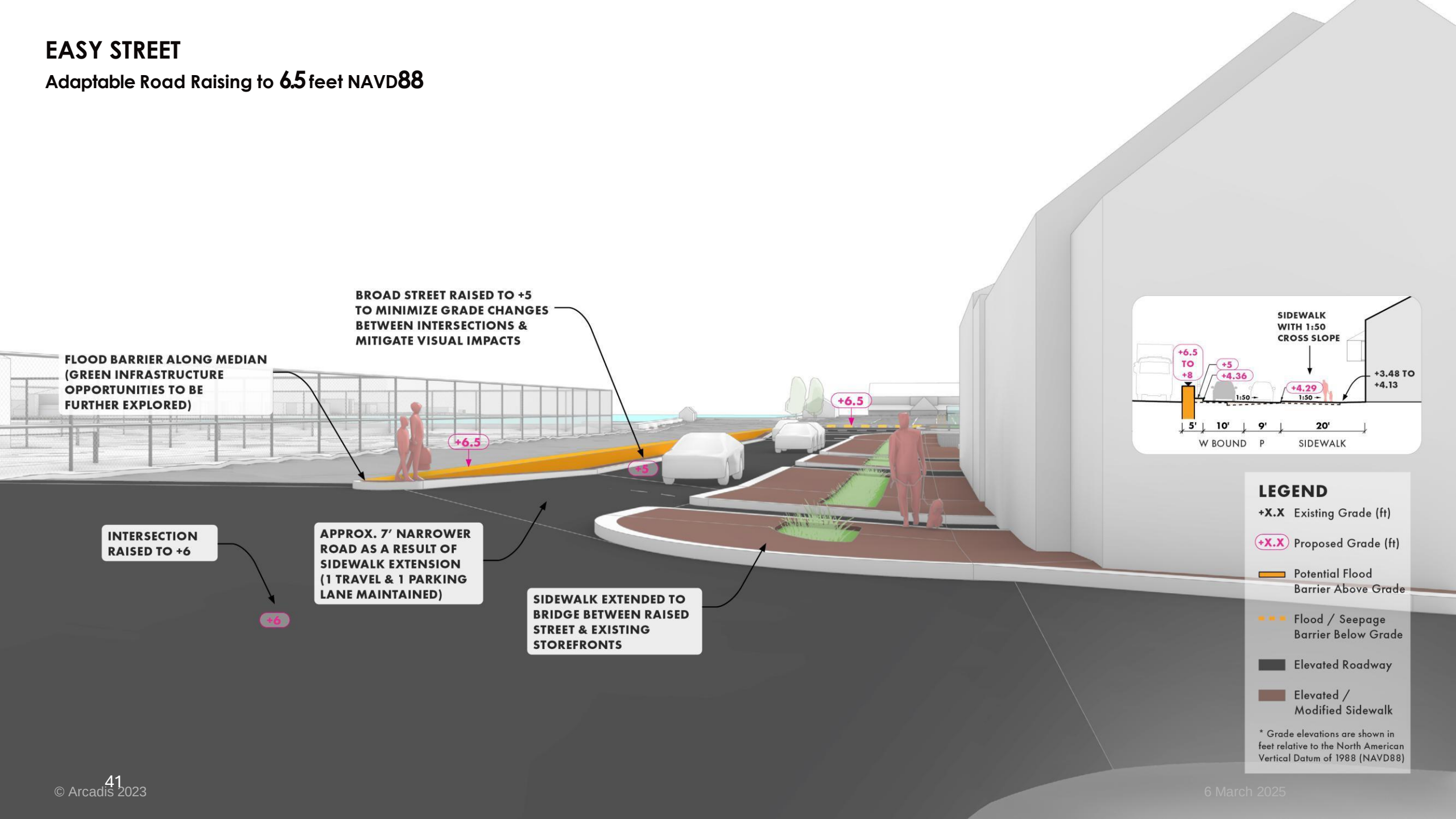
EASY STREET

Adaptable Road Raising to 6.5 feet NAVD88



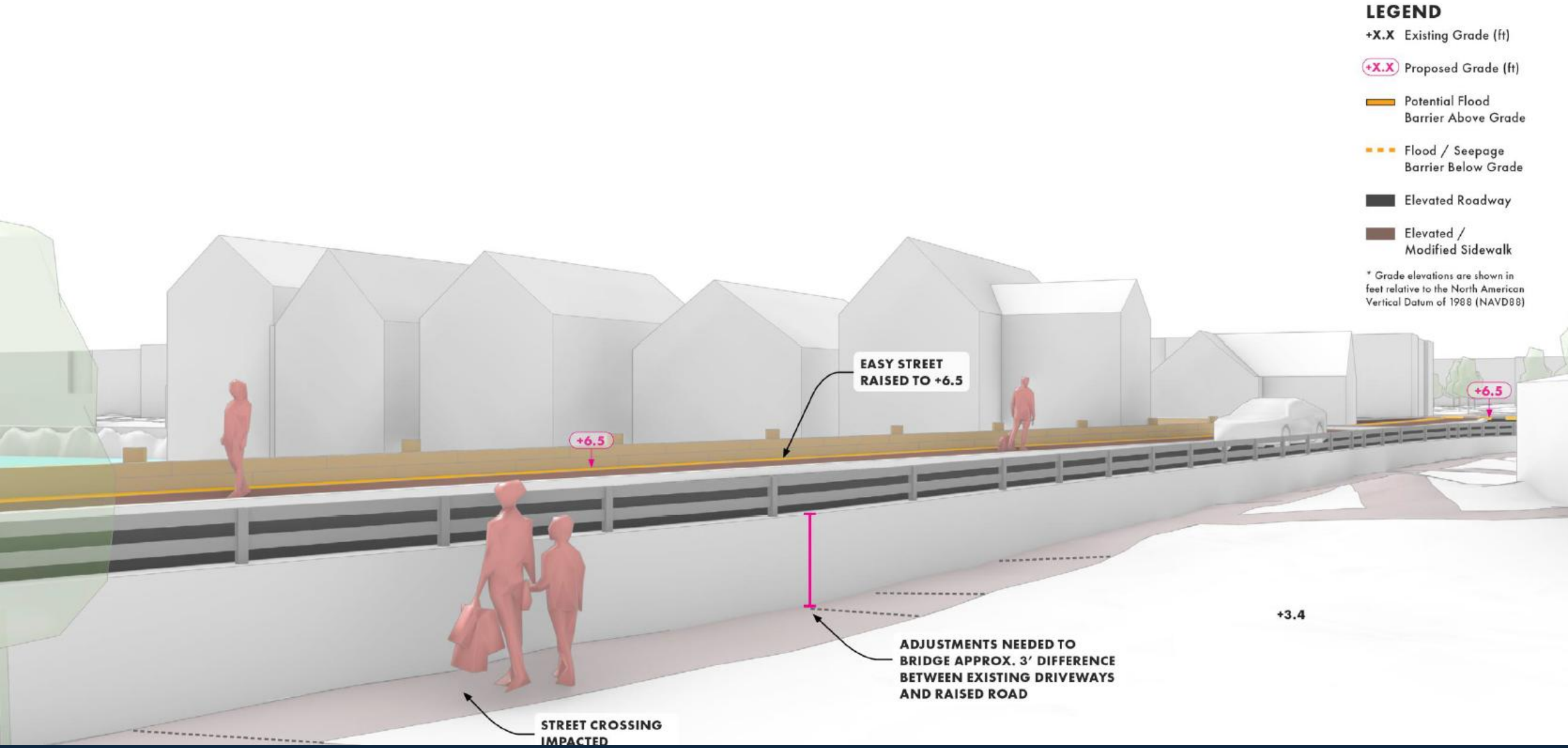
EASY STREET

Adaptable Road Raising to 6.5 feet NAVD88



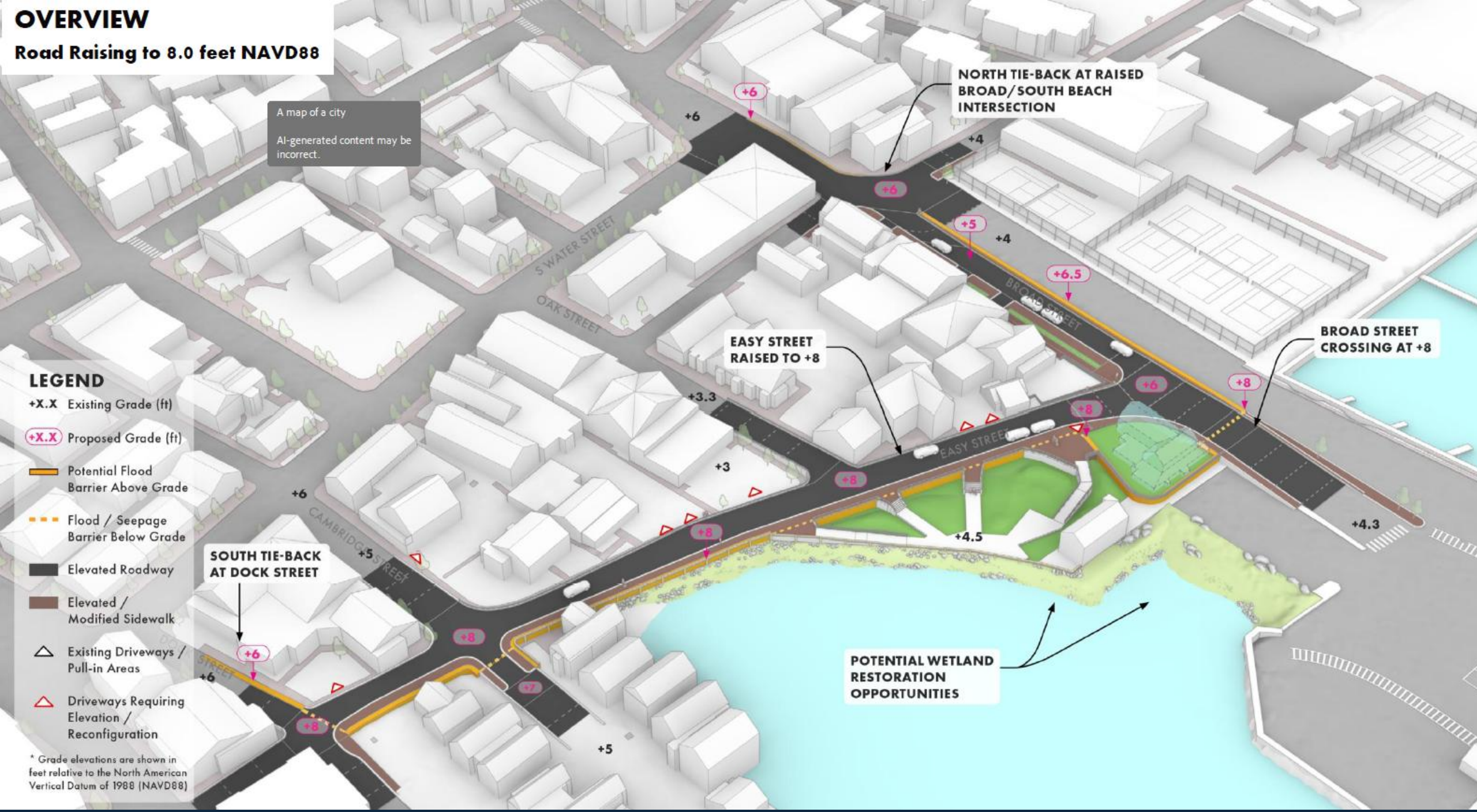
EASY STREET

Adaptable Road Raising to 6.5 feet NAVD88



OVERVIEW

Road Raising to 8.0 feet NAVD88

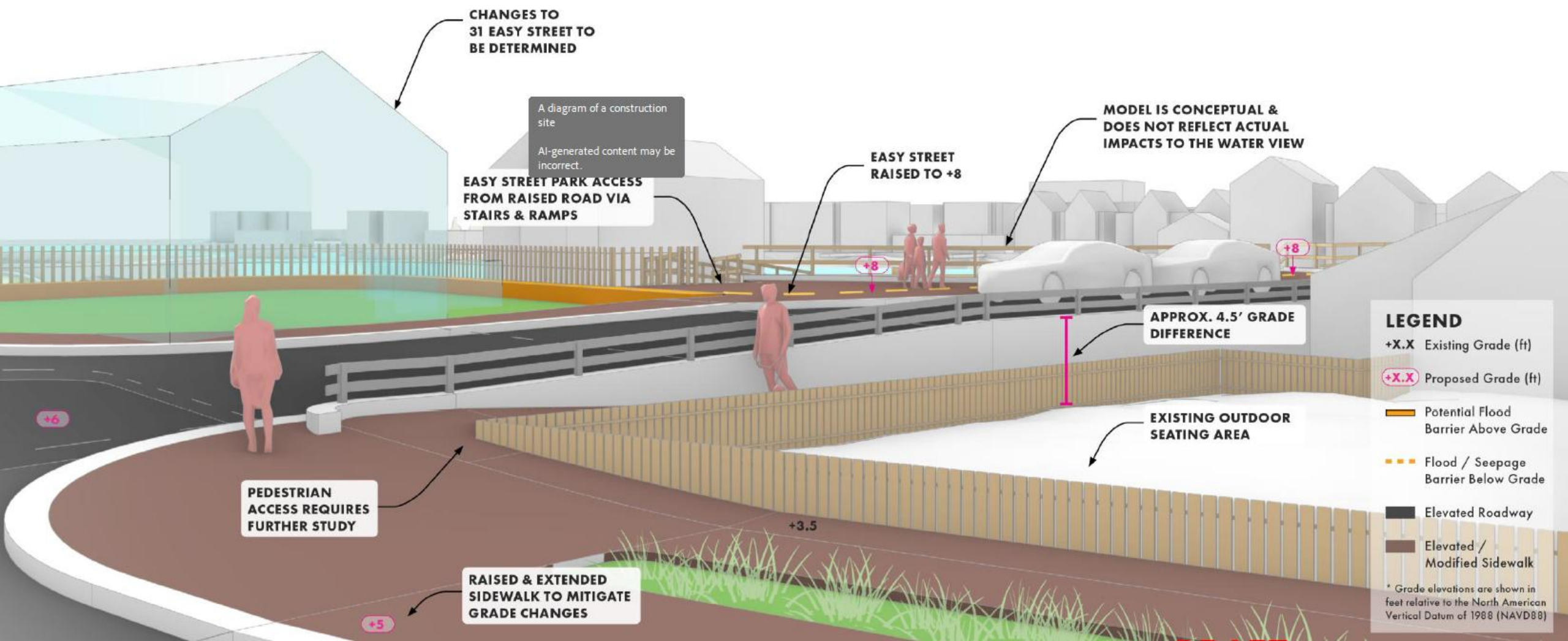


BROAD STREET

Road Raising to 8.0 feet NAVD88

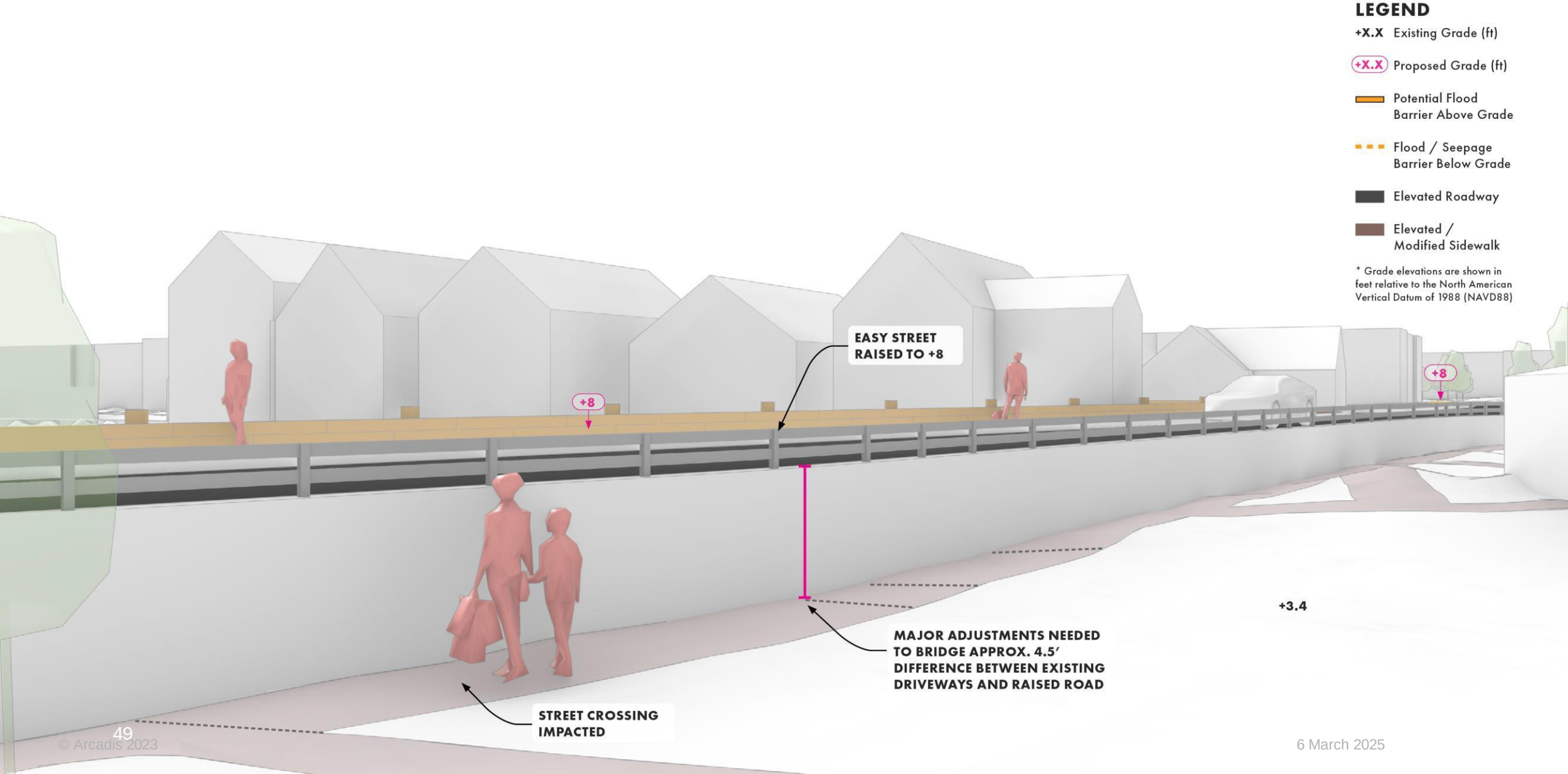
EASY STREET

Road Raising to 8.0 feet NAVD88



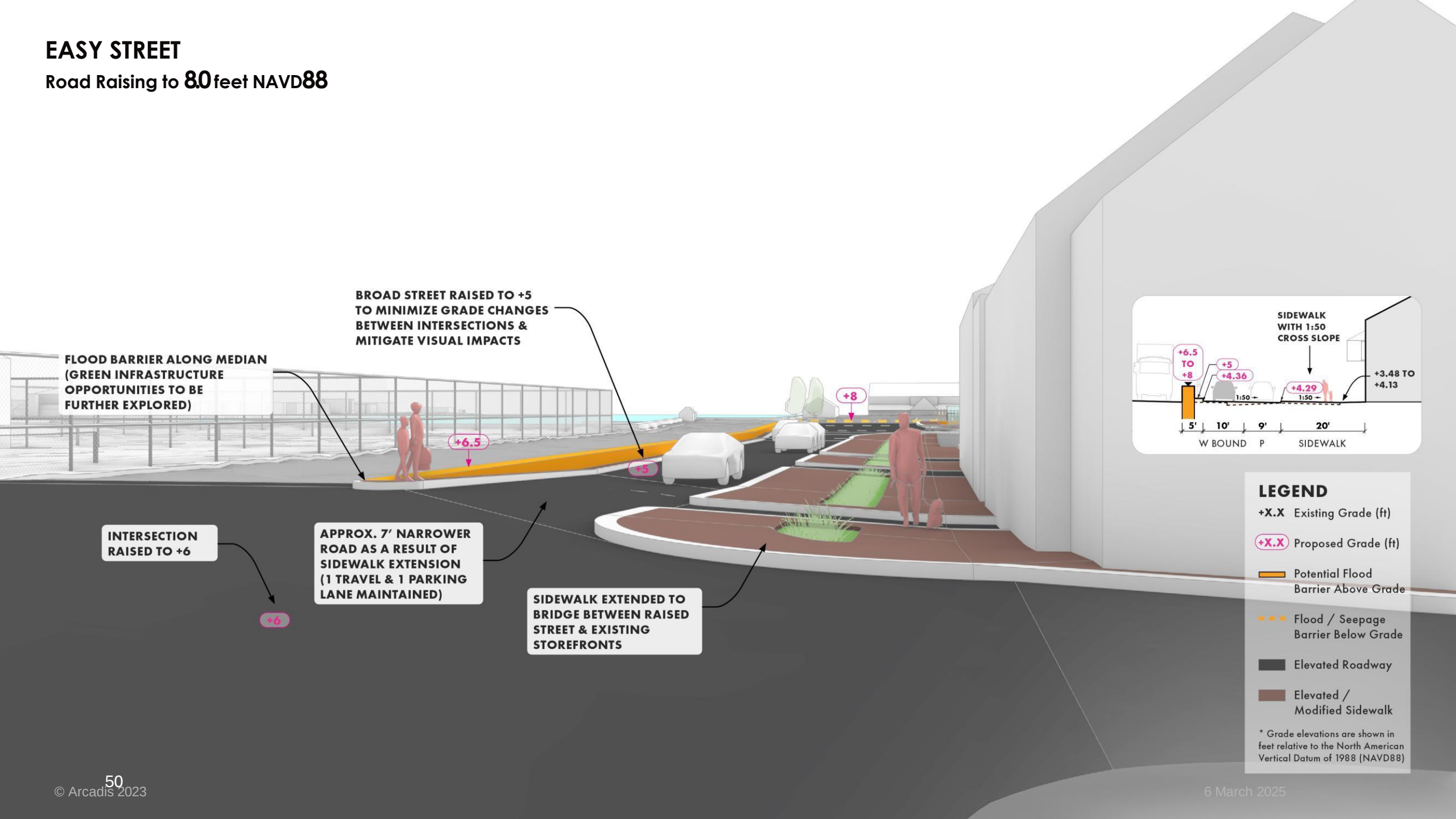
EASY STREET

Road Raising to 8.0 feet NAVD88



EASY STREET

Road Raising to 8.0 feet NAVD88



Engagement Themes

Open House #1 (in person)

- Broad support for addressing flooding issues on Easy Street
- Concerns for stormwater flooding during heavy rain events, in addition to tidal flooding
- Desire to incorporate nature-based solutions into design
- Interest in exploring new alternatives including a raised Easy Street

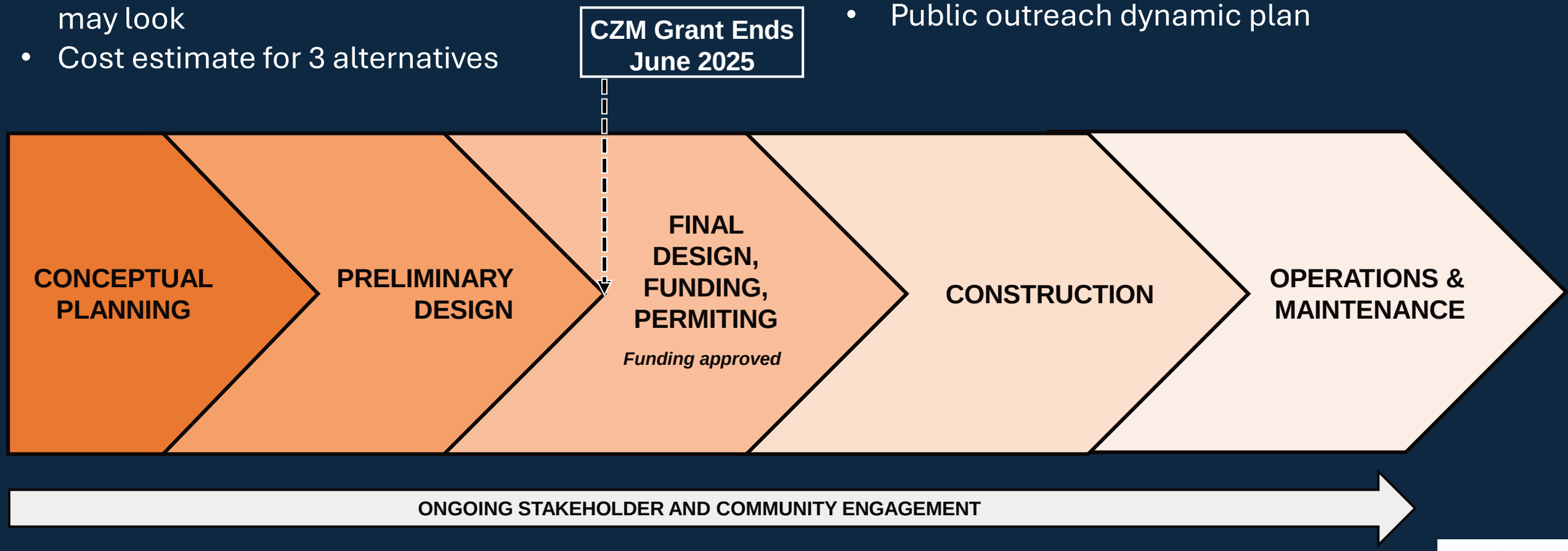
Open House # 2 (virtual)

- Goal: Reduce flood risk to places critical to Nantucket's long-term vitality
- Groundwater is a significant issue Downtown
- The higher the level of protection, the better
- Road raising is too dangerous or out of character for Nantucket
- Pumping is needed Downtown to avoid flooding private properties
- Concerns about impacts to historic character and setting; access to private properties

Thank you NHA!!!

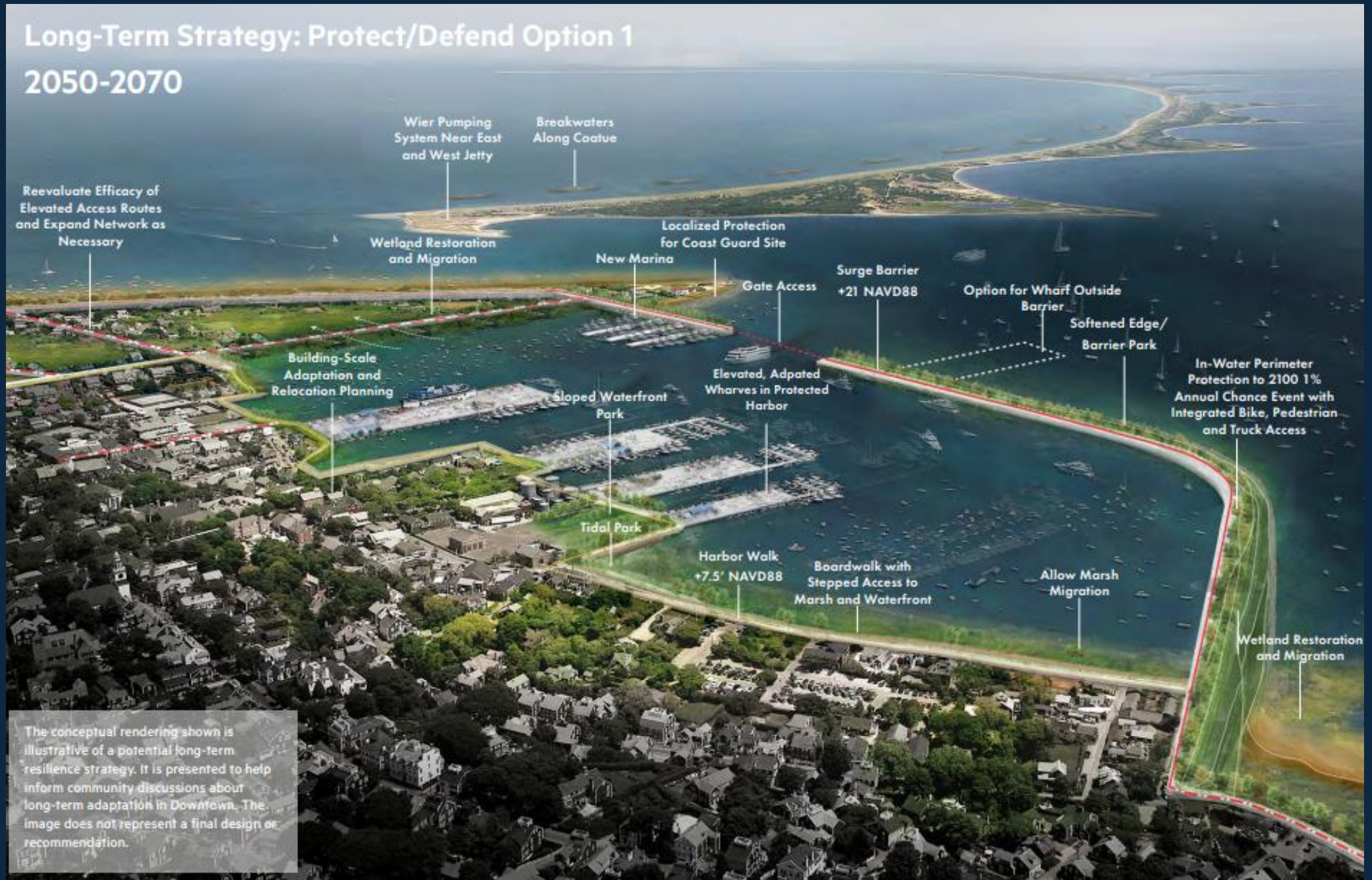
Next Steps

- Update modeling
- Groundwater data collection & modeling
- Enhance graphics to picture how project area may look
- Cost estimate for 3 alternatives
- Pump station study
- Updates on stormwater data
- Historic structures review
- Public outreach dynamic plan



Learn more!

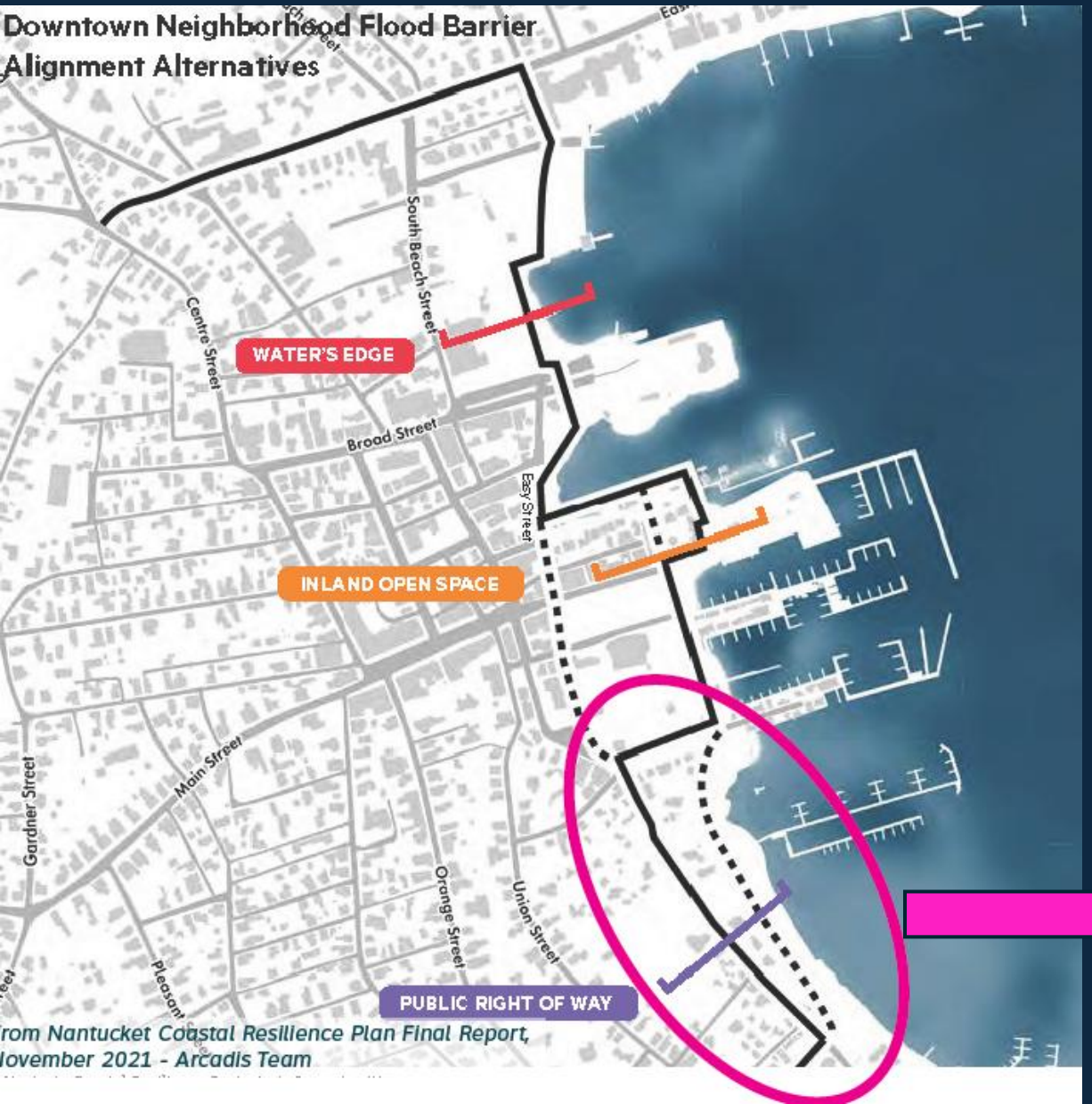
Long- Term Adaptation Pathway 1: PROTECT



Long- Term Adaptation Pathway 2: LIVE WITH WATER

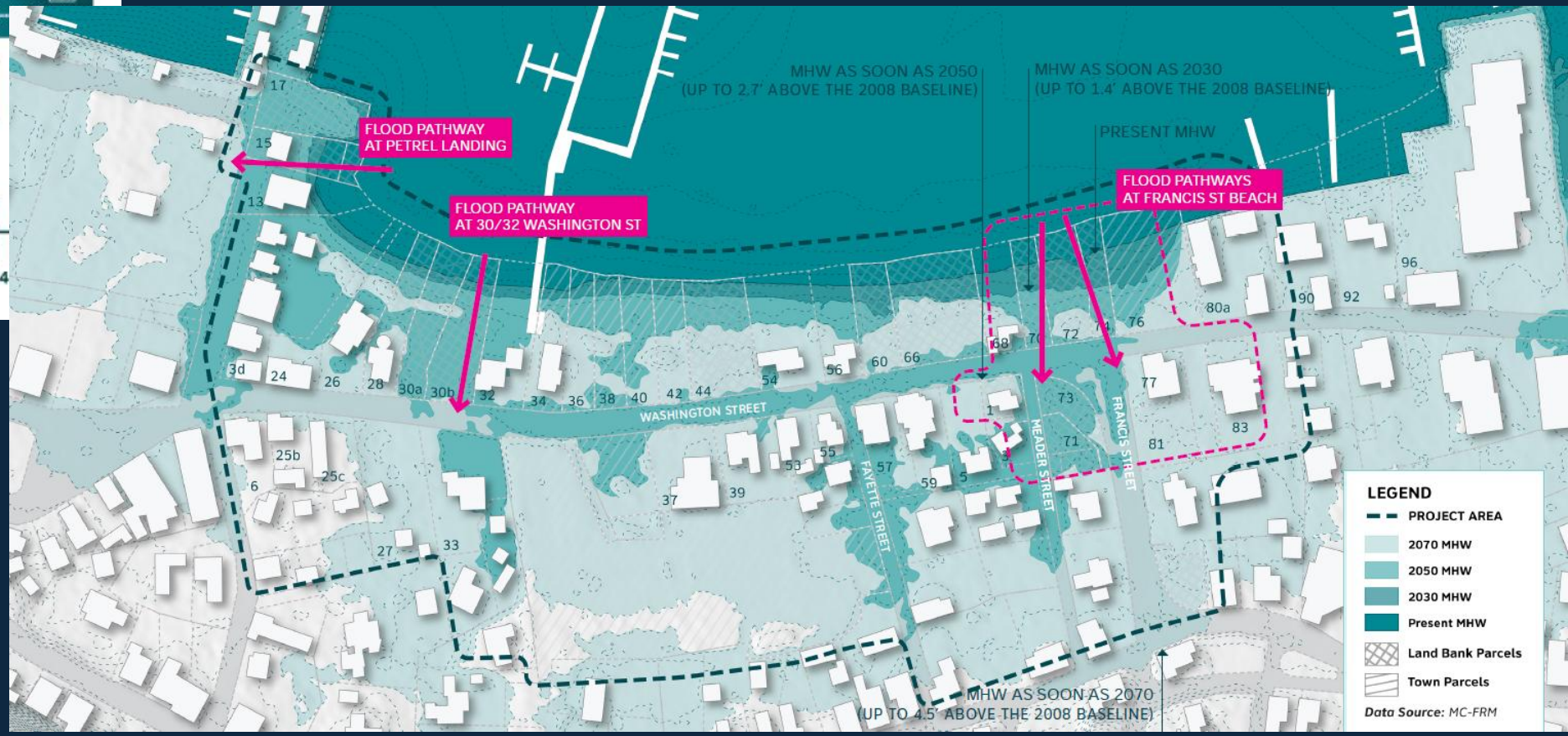
Long- Term Adaptation Pathway 3: RELOCATE

Francis St. Beach Improvement Project



ENVIRONMENTAL GOALS	SOCIAL GOALS	OPERATIONAL GOALS
• Improve the capacity of natural ecosystems to adapt to sea level rise and reduce adverse impacts to them • Absorb, buffer, and manage water	• Reduce flood risk to cultural and community assets • Create public, universally accessible waterfront experiences for people • Engage in dialogue with community members about climate risks and adaptation pathways	• Reduce flood risk to sustain the long-term use of Washington Street • Enhance multi-modal transportation infrastructure, critical to mobility and safety • Develop feasible, adaptable, maintainable, and permittable solutions • Clearly communicate economic benefits and anticipated project costs

Previous Work by Land Bank and Remain



Previous Work Continued

A CATALYTIC PROJECT: PRELIMINARY CONCEPT FOR FRANCIS STREET

BEACH DECK RENDERING

RAIN GARDEN OVERLOOK

Alternatives Summary

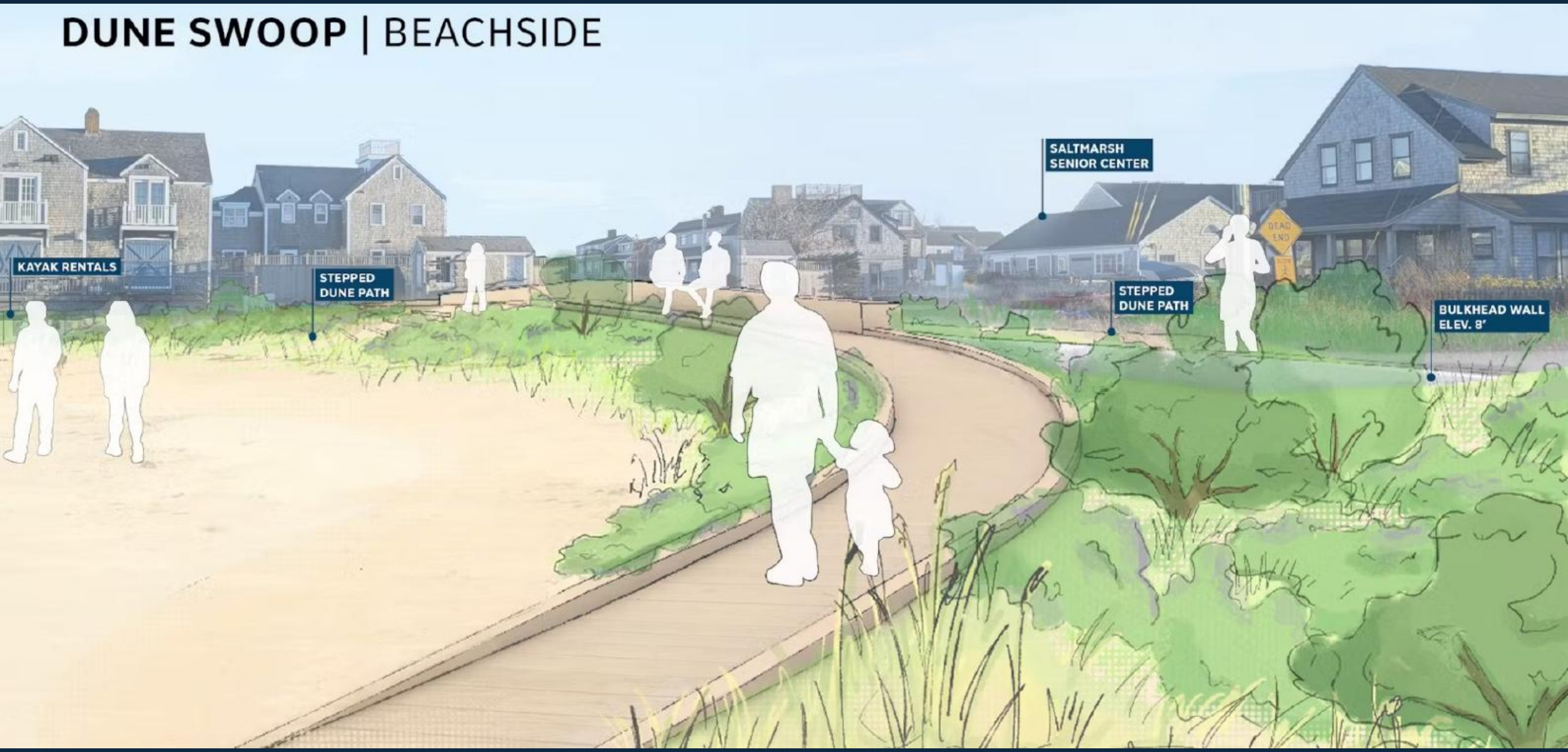
ALTERNATIVE 1 | DUNE SWOOP

ALTERNATIVE 2 | BEACH OVERLOOK

Form	Curvilinear, organic	Angular, maritime port
Program	Integrated seated edges along boardwalk extents	Overlook bumpout with stand-alone benches along boardwalk extents
Materiality	Boardwalk + Natural Paths	More extensive boardwalk
Floodwall	Mostly concealed by dune vegetation	Mostly concealed by dune vegetation
Adaptable	Yes	Yes

DUNE SWOOP | BIRD'S EYE

DUNE SWOOP | BEACHSIDE

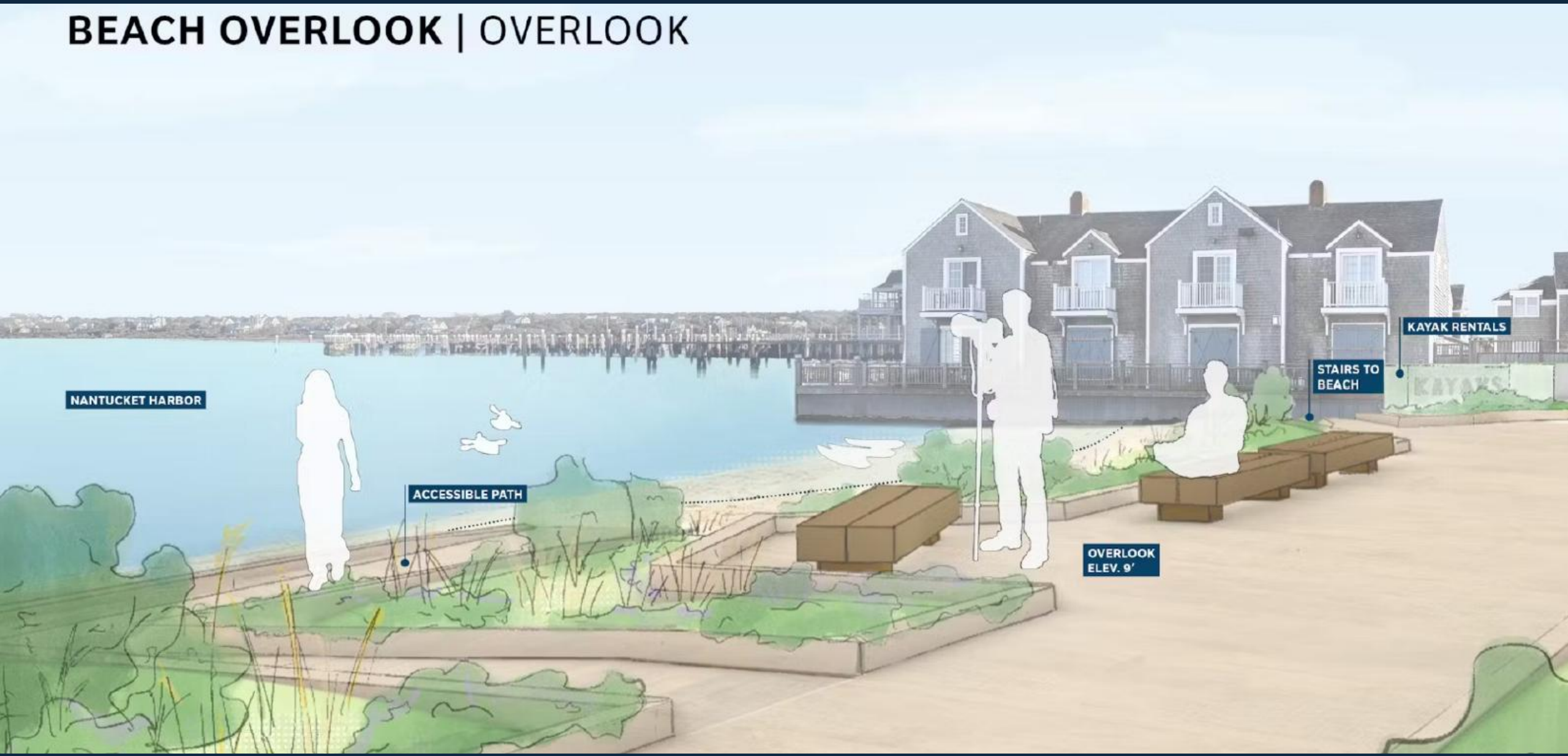


DUNE SWOOP | OVERLOOK

BEACH OVERLOOK | BIRD'S EYE

BEACH OVERLOOK | BEACHSIDE

BEACH OVERLOOK | OVERLOOK



Next Steps

- Hiring waterfront structural engineer
- Workgroup decide which alternative to move to 30% design
- Update modeling to determine flood risk for neighbors based on 2 concept designs
- Benefit/cost analysis
- Operation and maintenance plan

Learn more

QUESTIONS?

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508-228-7200 ext. 7603