



Waterfront Implementation Program

Flood Mitigation Project Update to Old Town Civic Association

June 8, 2022

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Department of Project Implementation, Director

A Variety of Flooding Sources in Old Town...

BACKFLOW

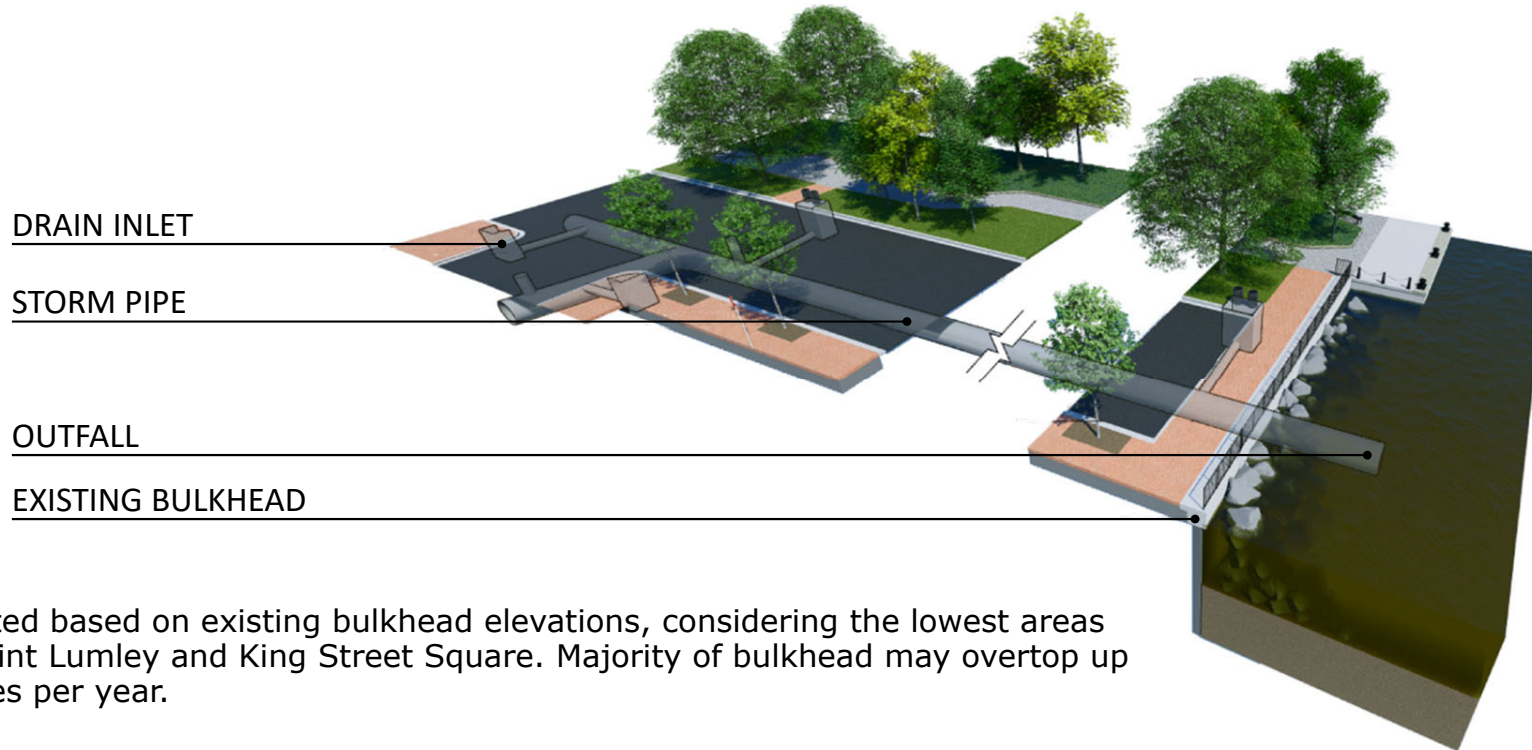
of River Outfalls
60+ times per year

OVERTOPPING

of Bulkhead
30 times per year*

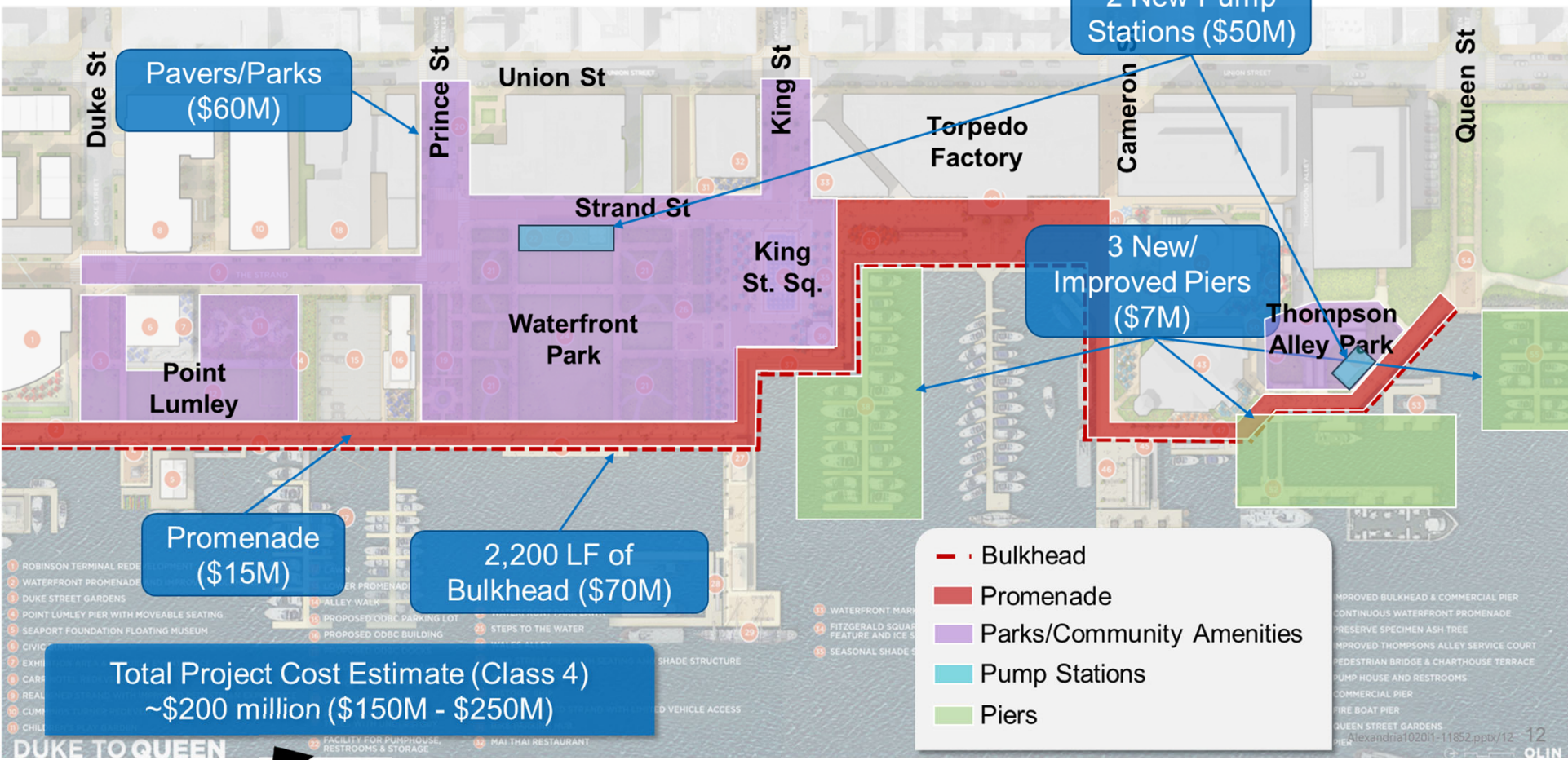
INUNDATION

of Storm Sewers
10+ times per year



*Estimated based on existing bulkhead elevations, considering the lowest areas along Point Lumley and King Street Square. Majority of bulkhead may overtop up to 2 times per year.

// Baseline Project

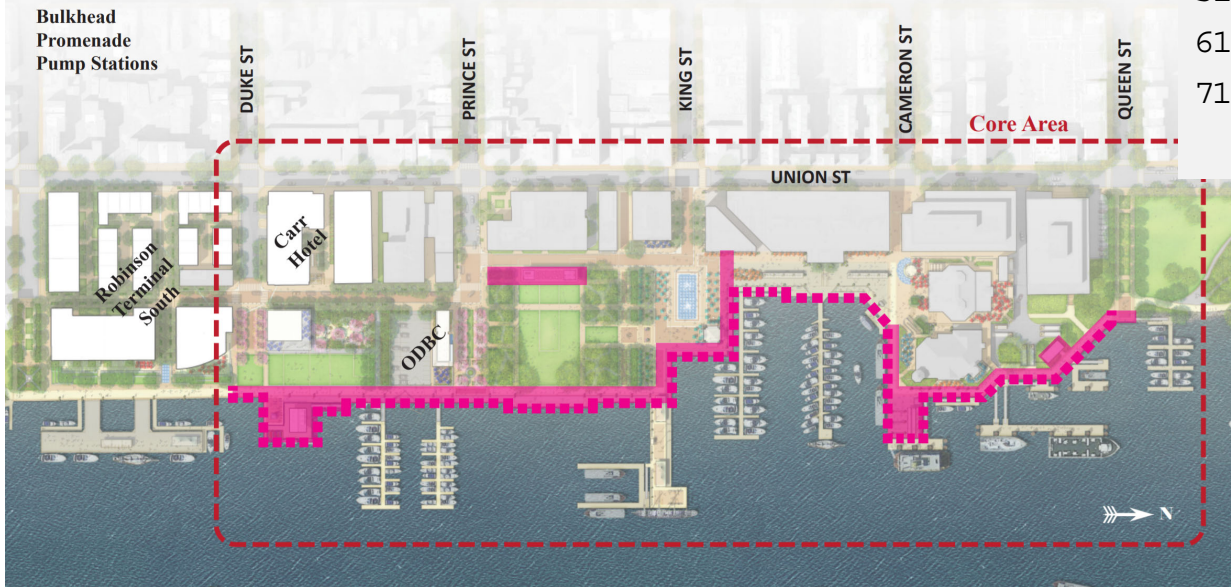


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Phasing Plan and Budget adopted by Council (2015)

Phase 1



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41 Iorrg p |wj|dwrg

51 U|yhuiurqwsurp hqdg

61 Sol|#b|wh|#r|w|#|N|bj Vwhhw

71 Sdn |p suryhp hqw

Option A

Flood Mitigation & Promenade Priority

Current Project Alternative

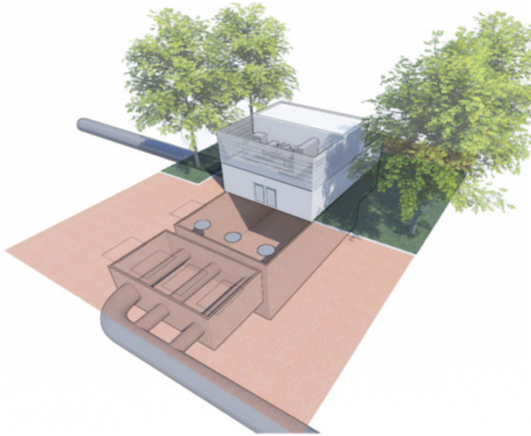
Goals and Objectives

- Mitigate stormwater flooding:
 - New civil infrastructure (inlets, pipes, storage, pumps, etc.):
 - Size based on a conservative baseline storm
 - Reasonably account for climate change projections through 2100
 - Eliminate capacity issues
- Eliminate backflow of Potomac River into streets
- Address most frequent overtopping of bulkhead/shoreline – but not all
- Policy and Regulatory Compliance
- Deliver on goals of Waterfront Small Area Plan / Public Amenity
- Replace aging/failed bulkhead/shoreline (where feasible and affordable)

// Project Elements to address:

BACKFLOW
of River Outfalls

INUNDATION
of Storm Sewers



2x PUMP STATIONS

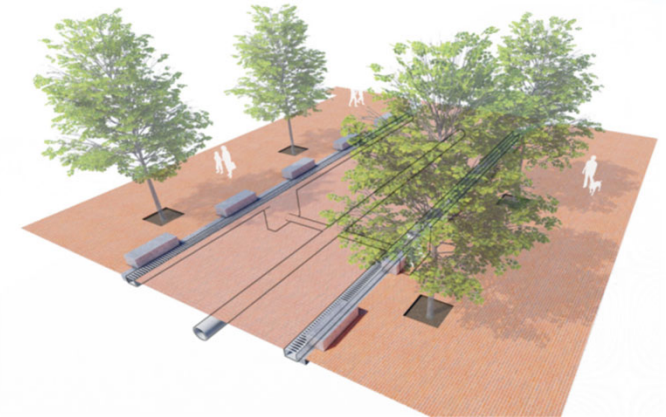
- Utilitarian structure housing stormwater pumps and associated mechanical and electrical equipment
- No city storage or amenity space
- Thompsons Alley PS capacity reduced by 95%



UNDERGROUND DETENTION

Stormwater storage chambers
sited under existing park spaces

Receiving community opposition



STREETSCAPE AND STORMWATER INFRASTRUCTURE IMPROVEMENTS

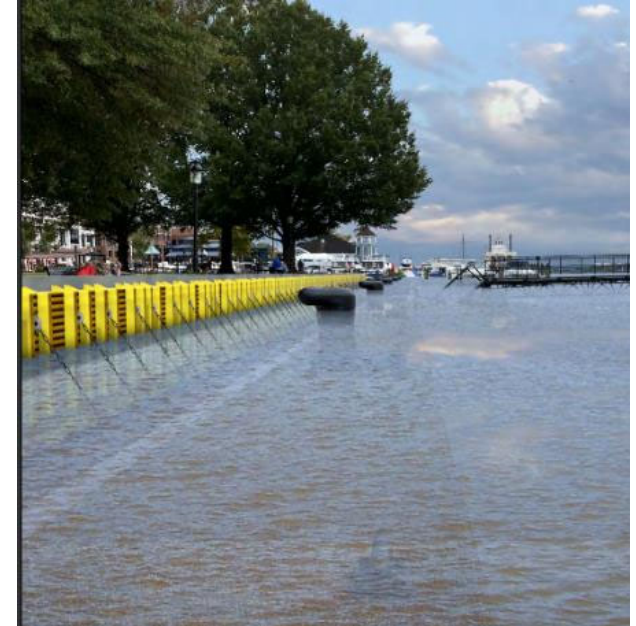
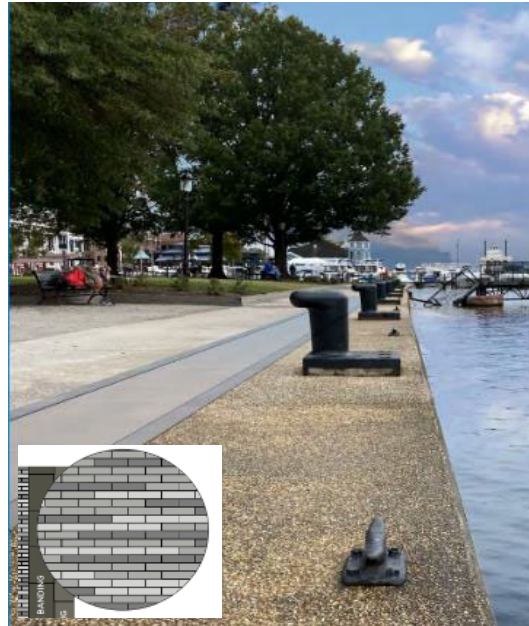
- New and upsized stormwater inlets and conveyance pipes
- Common elements paving for streets and promenade de-prioritized by community

// Project Elements to address: **OVERTOPPING** of Bulkhead



LANDSCAPE-BASED FLOOD PROTECTION

- Stabilized bulkhead
- Landscape seat walls or planters as flood barriers
- Alternative paving and finish materials likely required based on escalating costs



DEPLOYABLE BARRIERS COULD BE ADDED IN FUTURE, AS FUNDING IS AVAILABLE

- Hidden when not needed
- Maintains experience and connection to water
- Prevents visual disruption when not needed

// Phase 1 – Scope to \$100M Budget Hybrid Bulkhead & Landscape Based Flood Protection

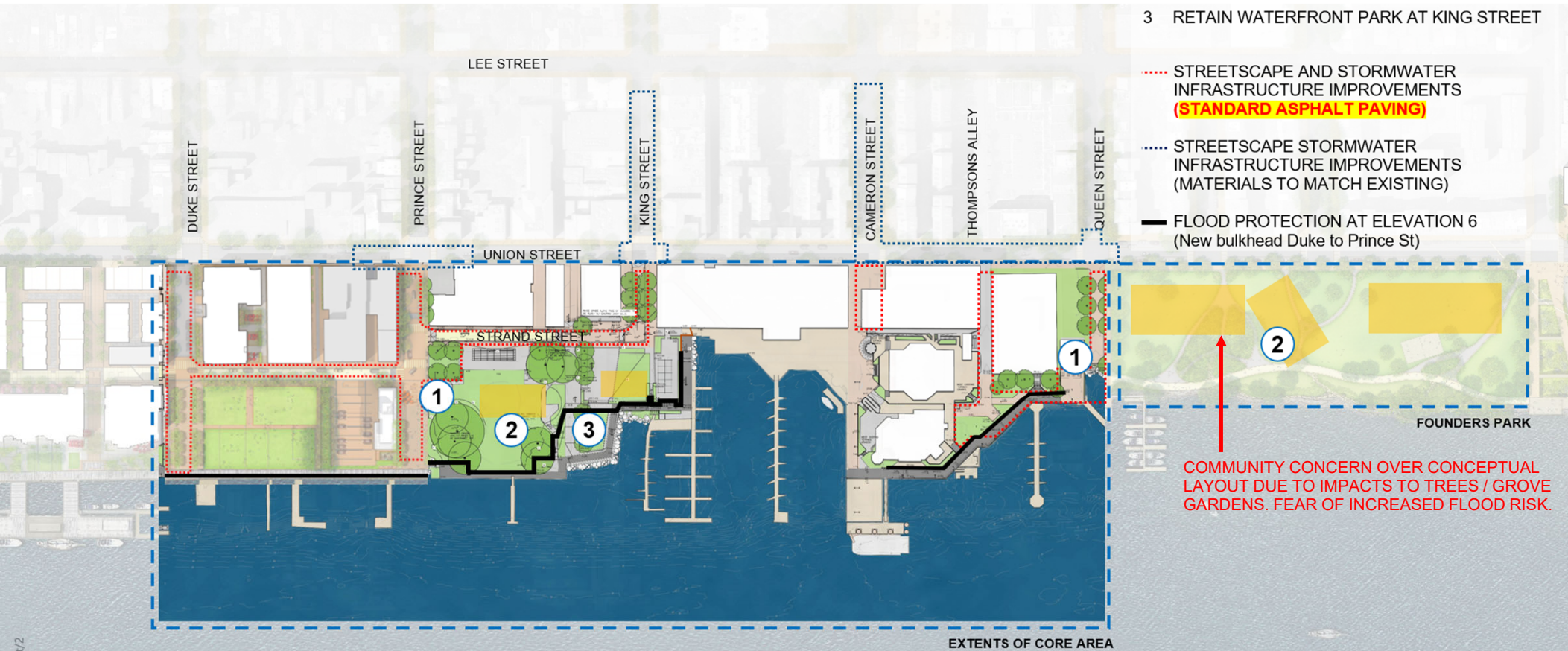
LEGEND

- 1 PUMP STATION
- 2 UNDERGROUND STORMWATER DETENTION CHAMBERS
- 3 RETAIN WATERFRONT PARK AT KING STREET

..... STREETScape AND STORMWATER INFRASTRUCTURE IMPROVEMENTS (STANDARD ASPHALT PAVING)

..... STREETScape STORMWATER INFRASTRUCTURE IMPROVEMENTS (MATERIALS TO MATCH EXISTING)

— FLOOD PROTECTION AT ELEVATION 6 (New bulkhead Duke to Prince St)



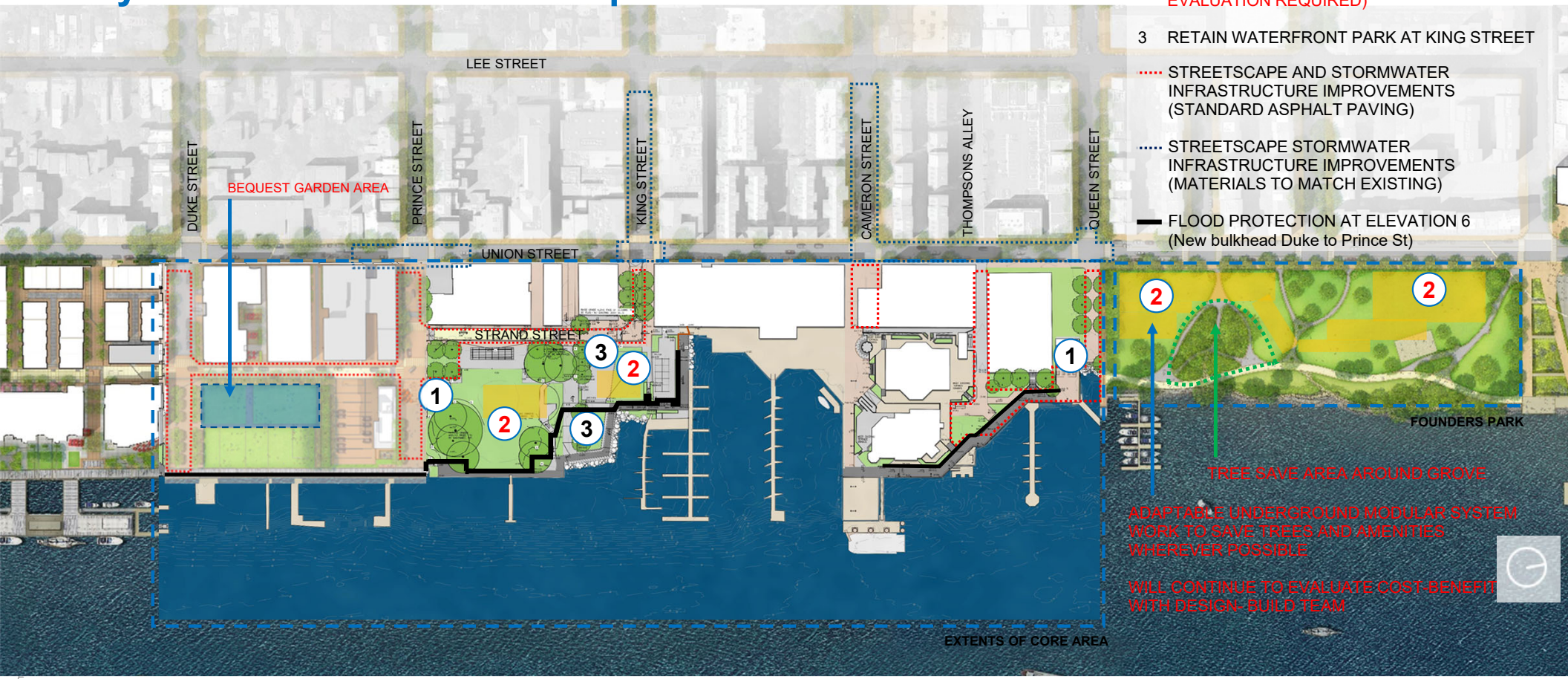
COMMUNITY CONCERN OVER CONCEPTUAL LAYOUT DUE TO IMPACTS TO TREES / GROVE GARDENS. FEAR OF INCREASED FLOOD RISK.

REFINED IN RESPONSE TO ONGOING CIVIC ENGAGEMENT

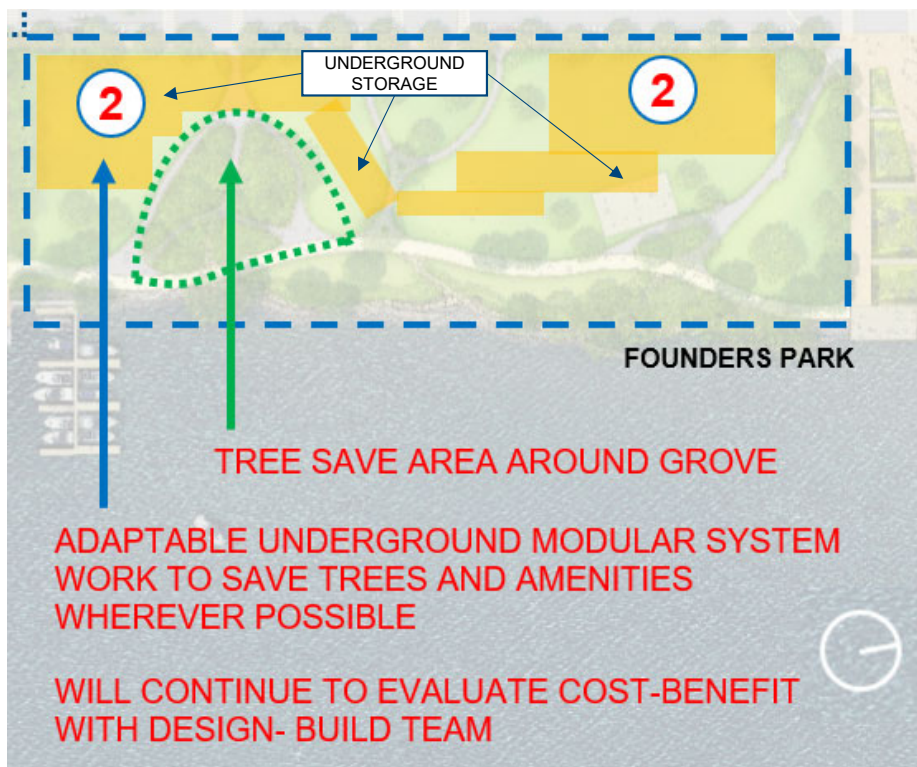
// Phase 1 – Scope to \$100M Budget Hybrid Bulkhead & Landscape Based Flood Protection

LEGEND

- 1 PUMP STATION
- 2 **POTENTIAL** UNDERGROUND STORMWATER DETENTION CHAMBERS (**FURTHER EVALUATION REQUIRED**)
- 3 RETAIN WATERFRONT PARK AT KING STREET
- STREETScape AND STORMWATER INFRASTRUCTURE IMPROVEMENTS (STANDARD ASPHALT PAVING)
- STREETScape STORMWATER INFRASTRUCTURE IMPROVEMENTS (MATERIALS TO MATCH EXISTING)
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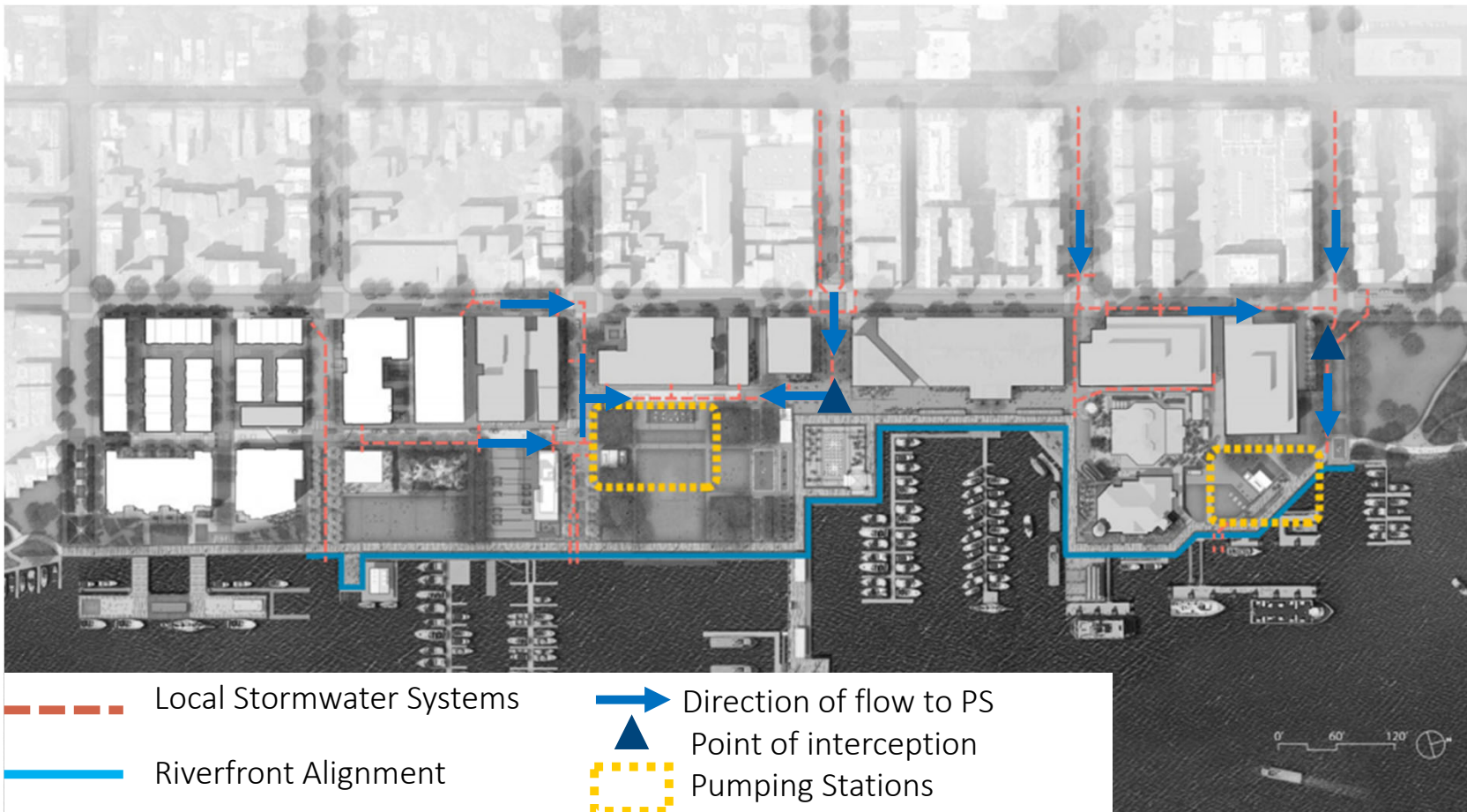


If used, Underground stormwater chambers could offer an opportunity to attenuate stormwater and restore park to existing condition



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Sources:
<https://www.youtube.com/watch?v=-PZ9P2NyD44>
<https://www.triumphgeo.com/product/3-stormtech-treatment-systems/>

Park spaces are an opportunity to manage water differently through delay and store strategies



Phase 1 – Cost Breakdown of included elements:

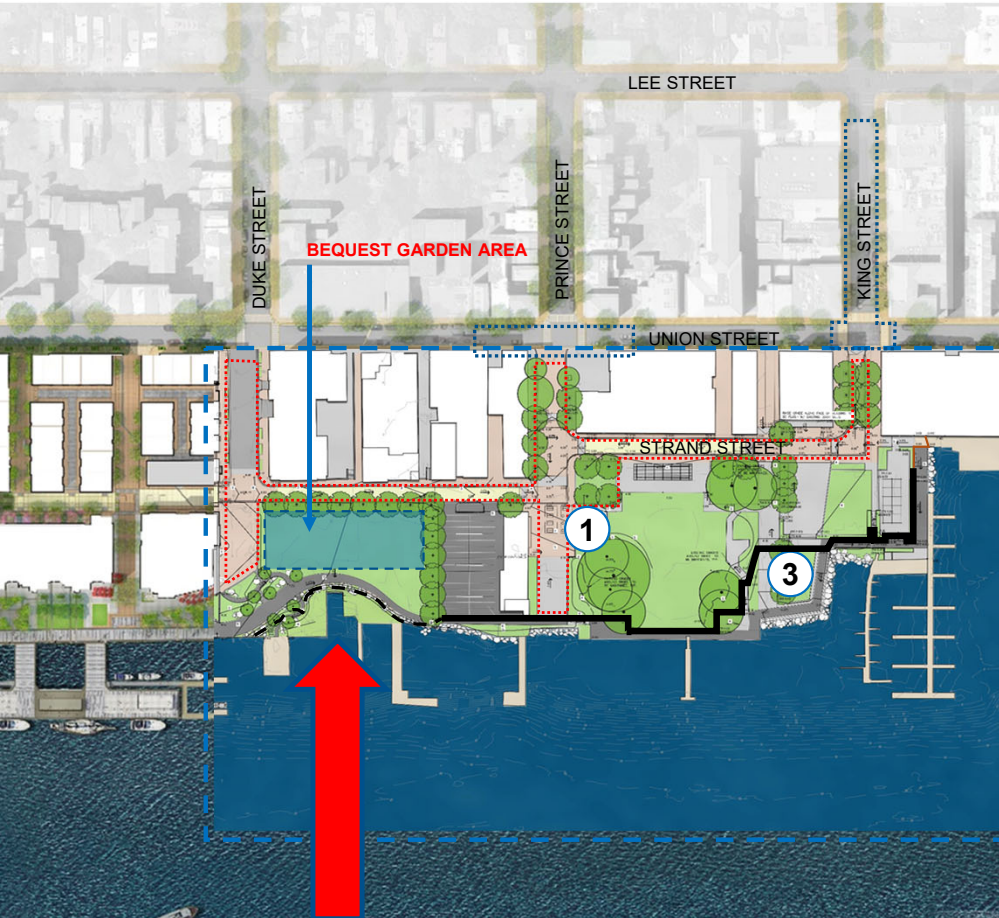
Community Priorities	Estimated Total Cost	Project Elements
Flood Mitigation <ul style="list-style-type: none"> Storm Sewer Upgrades Pump Stations Riverine Protection 	\$20M \$55M \$18M	<ul style="list-style-type: none"> Interim tide gate at King and Prince Street New and upsized inlets and stormwater piping Two stormwater pumping stations Underground stormwater detention chambers New bulkhead from Duke to Prince; ha-ha wall in Waterfront Park + King St Square and Cameron to Queen St; no upgrades to Torpedo Factory
Riverfront Promenade	\$2M	<ul style="list-style-type: none"> 10-20ft wide promenade from Duke to Queen St with a lower-cost finished material (asphalt, or crushed stone)
Plaza at the foot of King Street	\$2M	<ul style="list-style-type: none"> Material upgrades to make permanent park Actual improvements worth ~\$600K
Park Improvements	<\$1M \$2M	<ul style="list-style-type: none"> Restore all streets with asphalt pavement Waterfront Park and Founders Park restoration
Total Estimated Project Cost	\$100M	AACE Cost 4 - Low: \$80M - High: \$120M

Notes:

- Subsurface conditions under parks are unknown and ongoing field investigations will inform the Class 3 Cost Estimate at the next iteration.
- Evaluation, review, and cost estimating for the riverine protection option is contingent upon ongoing field investigations.

Potential Alternatives:
Options for additional investigation

// Phase 1 – Point Lumley Shoreline Alternate Hybrid Shoreline & Landscape Based Flood Protection

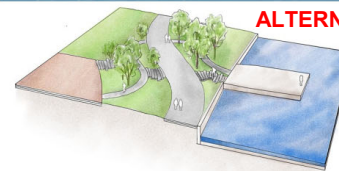
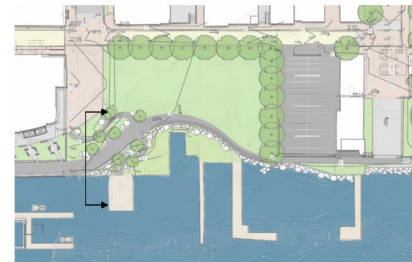


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- FLOOD PROTECTION AT ELEVATION 6 (Stabilized Shoreline-no bulkhead Duke to Prince St)

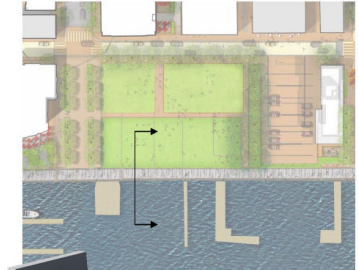
Duke to Prince Strategies – Point Lumley

LANDSCAPE \$7M



ALTERNATIVE OPTION

BULKHEAD \$28M

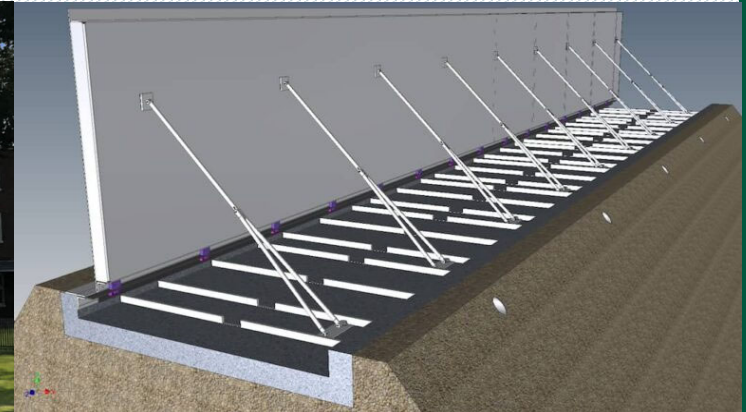
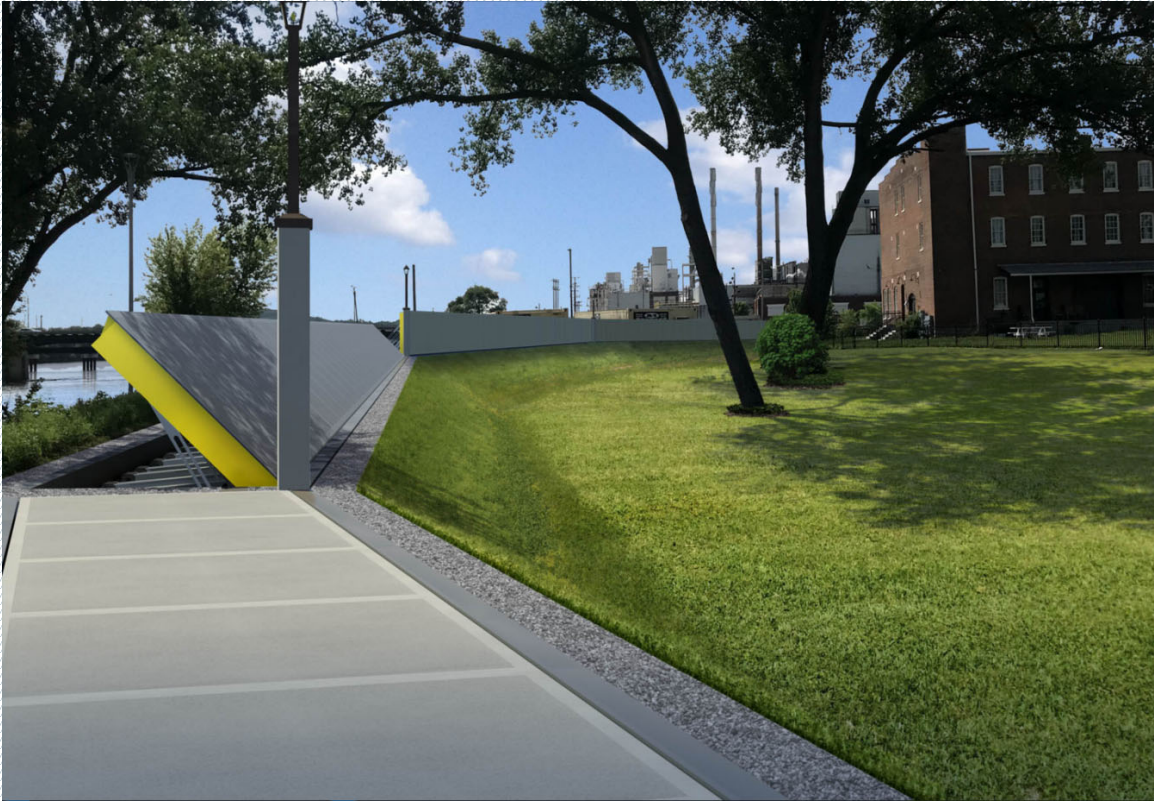


RECOMMENDED ALTERNATIVE

Included but not shown:
 - Hardscape + landscape allowances
 - Baseline Plan furnishings

****NO NEGATIVE IMPACT OR ADDITIONAL RISK TO PROPOSED BEQUEST AREA ****

Flood Gates



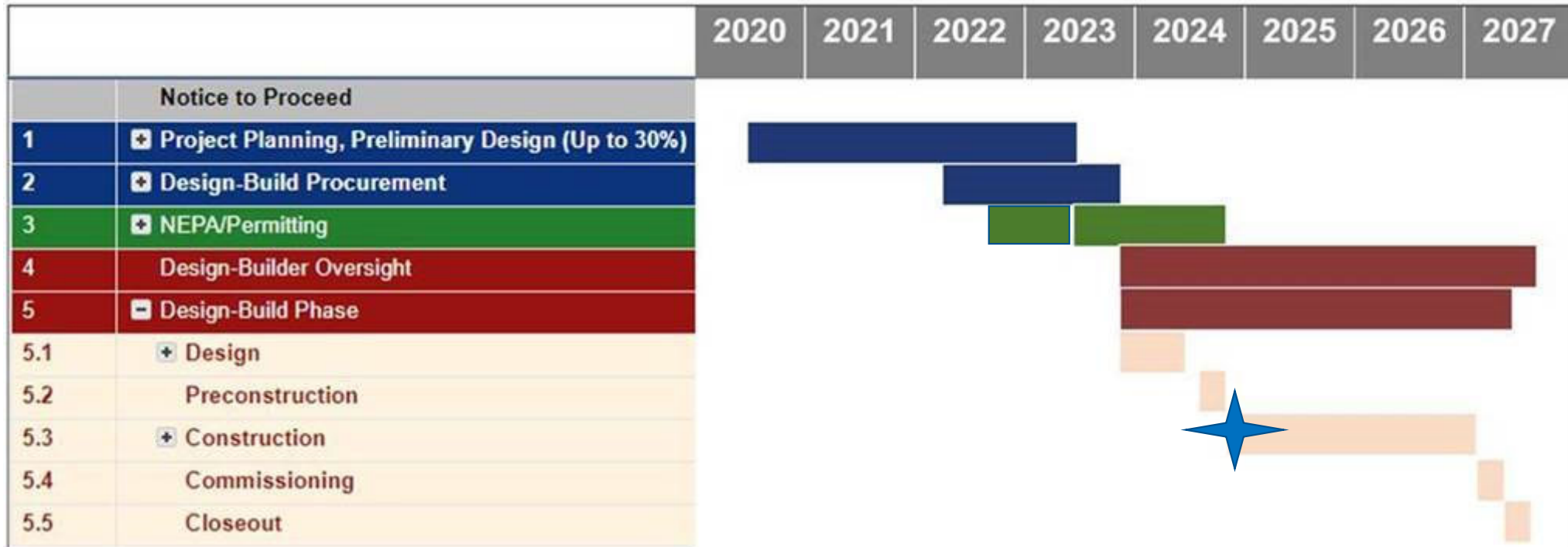
To install product along the entire bulkhead, material cost is ESTIMATED to be ~\$5M for a 3.5-ft self-deploying wall.

Photos courtesy of FloodBreak
<http://floodbreak.com/products/freeview-flood-barriers/>

Milestone Summary

- Finalize Procurement Plan – June 10
- Industry outreach – Meeting with potential Vendors - June 6 – 24
- Development of procurement documents (RFQ / RFP) – June-August
- **FEMA notice of BRIC Grant Awards anticipated – July 2022**
- NEPA jurisdictional determination (post BRIC award)
- **Advertise Design-Build Contract – late August/September 2022**
- Commence NEPA, as applicable per regulator guidance (EA / EIS)
- **Award Design-Build Contract / Start design – Summer/Fall 2023**
- Design complete late 2024 (could be impacted by regulatory and grantor reviews)
- Construction late 2024/early 2025 – likely after City’s annual birthday celebration

Timeline



Construction will commence AFTER City's 275th birthday celebration

Discussion