CITY OF ALEXANDRIA
Project Implementation

# Waterfront Flood Mitigation Project Discussion

September 3, 2025

Draft, Deliberative, Pre-Decisional

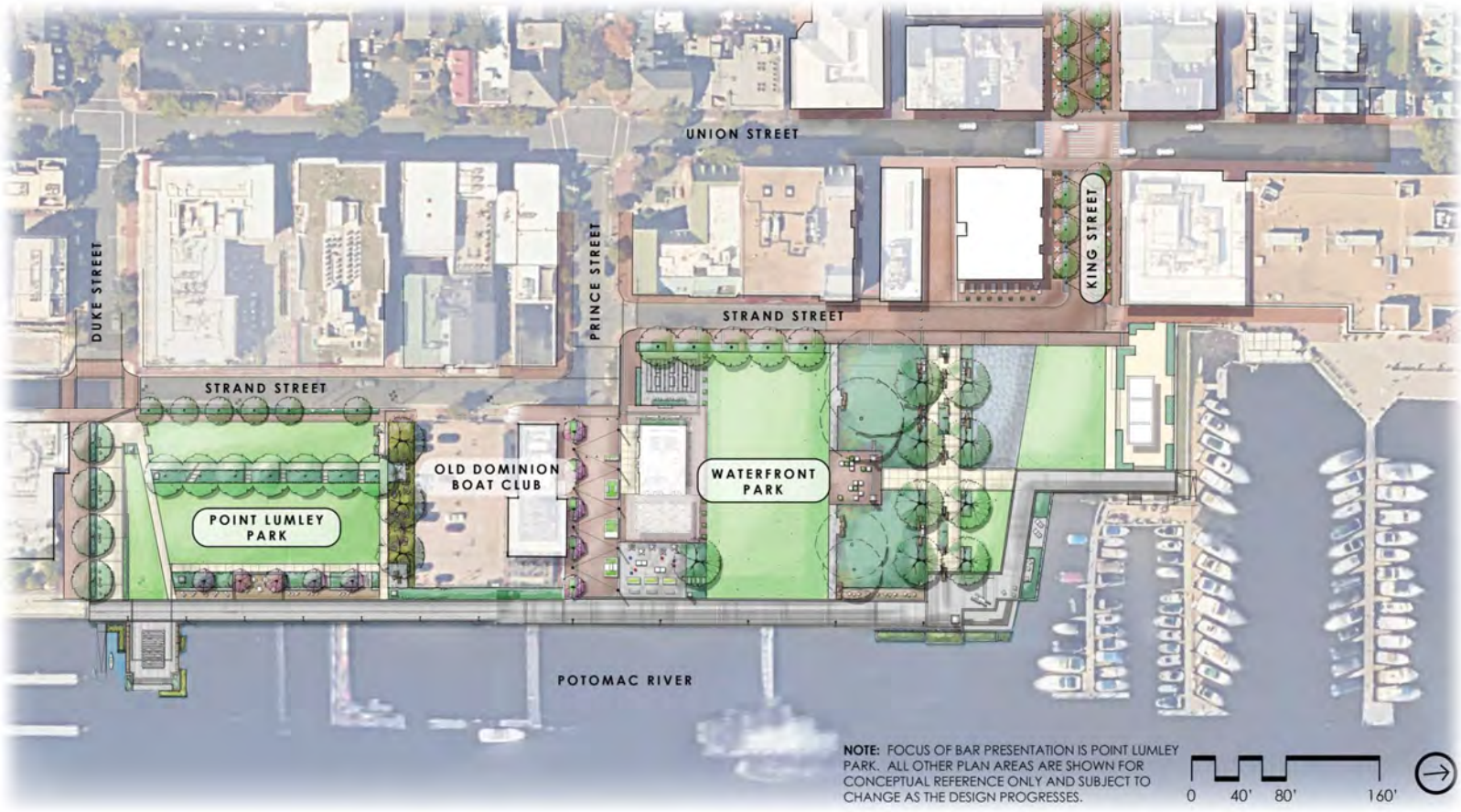
# Why are we here?

- Outreach Update
- Project Goals & Objectives
- Project Design Updates & Response to Feedback to Date
- Constructive Feedback Requested:
  - Specific Landscape Features
  - Pump Station Design & Materials
- Consideration During Construction
  - Avoidance, Minimization, and Mitigation
- Share your Questions and Concerns!

# Outreach Opportunities

- **Outreach Events – September**
  - Old Dominion Boat Club
  - Alexandria Waterfront Alliance
  - Old Town Civic
  - Waterfront/Parks and Recreation Commissions
  - Individual Stakeholders
- **Outreach Events – October**
  - Waterfront/Parks and Recreation Commissions
  - Stakeholder Groups
  - Individual Stakeholders
- **Door-to-Door Outreach and Survey (Business/Residential)**
- **Business/General Stakeholder Newsletters**
- **Public Event Pop-Ups – Fall**
  - Old Town Farmers Markets
  - Arts Festival
- **Construction Impact Mitigation Meetings – October/November**
  - Average Duration of Construction Phases / Closures
  - Maintenance of Access
  - Potential for Trolley and Bus Routing to Strand Street / Businesses
  - Activation of Spaces

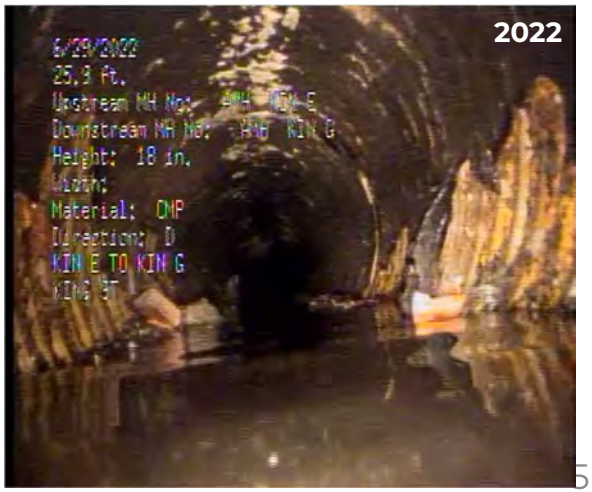
# Public Space and Amenities



# Aging & Failing Infrastructure





# Flooding Sources & City Impacts

## OVERTOPPING
of Bulkhead

**Ranges of Cost*/City Impacts:**

***$20,000 - $50,000 annually for major debris**
***~$300k-500k – sandbag mobilization (annual)**
***$500k-$1M – Inlet & Street Cleanup (annual)**
***Events and Festivals Impacted = Lost Revenue**
***Tourism Impacted**

**Solution:**

**Raised bulkhead/flood barrier(s) & pump station.**

## BACKFLOW
into River Outfalls

**Ranges of Cost*/City Impacts:**

***Increased sewer inspection required**
***$500k-$1M/yr river sediments removal**
***Street Closures**
***Pedestrian safety/closed crosswalks**
***Businesses impacted = lost revenue**

**Solution:**

**New outfall structure and pump station.**

## INUNDATION
of Storm Sewers

**Ranges of Cost*/City Impacts:**

***~$300k-$500k – sandbag mobilization (annual)**
***$100K-$250K– Street Cleanup (annual)**

**Solution:**

**Replace aging (50+ years old) and undersized storm pipes.**

***Costs vary year to year & figures and ranges are estimated averages. Figures do not include secondary/unquantified costs of impacts, negative PR, cancelled events, etc., lost sales, etc.**

# Riverine Overtopping & Flooding

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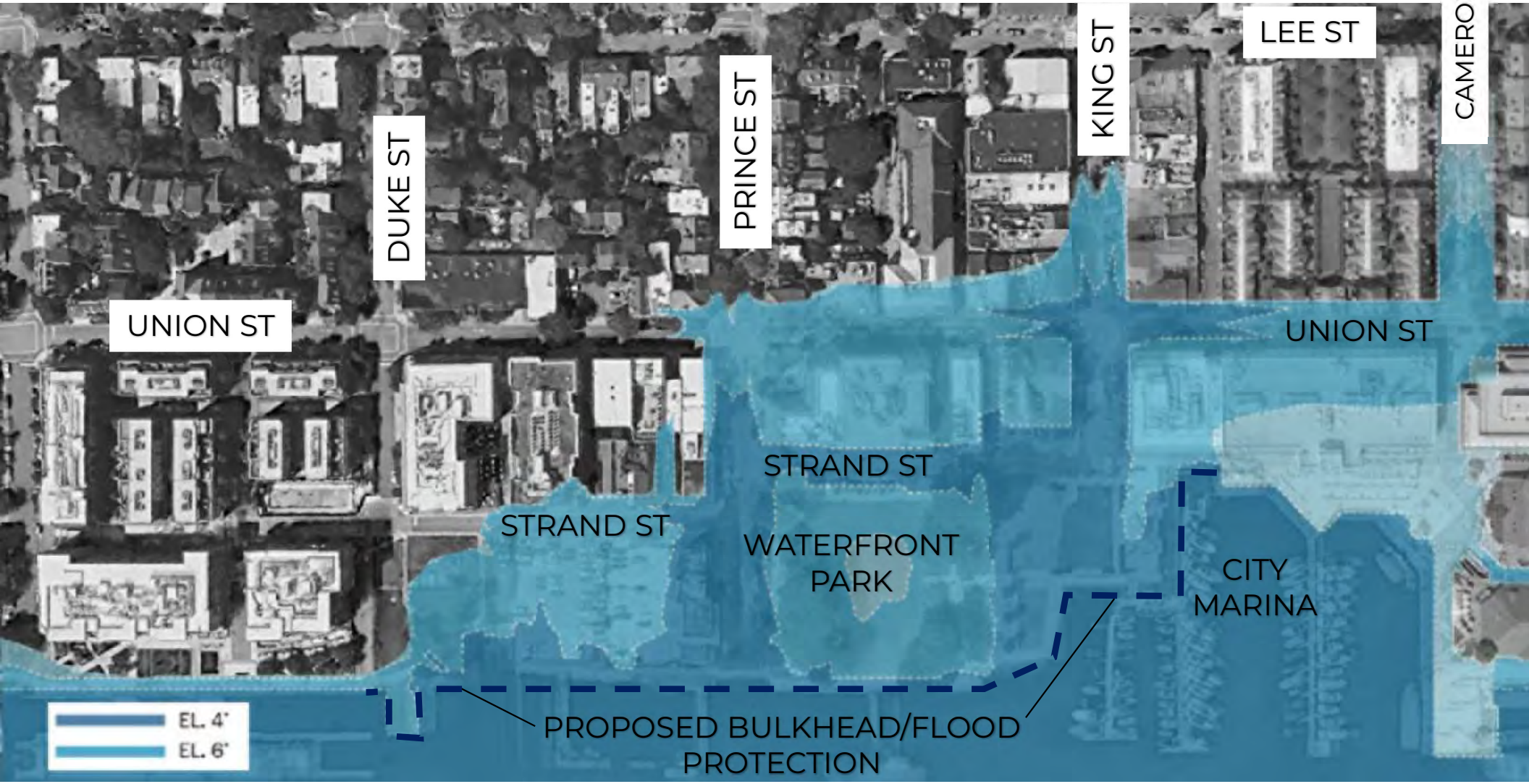

# The Number of Overtopping Events Continues to Increase

| Potomac River Surface Elevation<br>Flooding Analysis Over Time At Prince Street/Waterfront | Prince Street-End<br>(Elev. 2.4) | Bulkhead at Waterfront<br>(Elev. 3.0) |
|---|---|---|
| In the Last 20 Years, we've seen an average of .... | 145 events/yr | 37 events/yr |
| In the Last 5 Years, we've seen an average of .... | 185 events/yr | 48 events/yr |
| In the Last 2 Years, we've seen an average of .... | 194 events/yr | 54 events/yr |
| In the Last 1 Year, we've seen... | 227 events/yr | 93 events/yr |
| By Year 2100, we anticipate... | 353 events/yr | 341 events/yr |

# Pump Station Design Progression:

## Initial Concept of Single Station:
**(Presented in summary/fall 2024)**

## Revised Concept:
**(Presented spring 2025):**

**- Smaller footprint, elevated design & increased public amenities**

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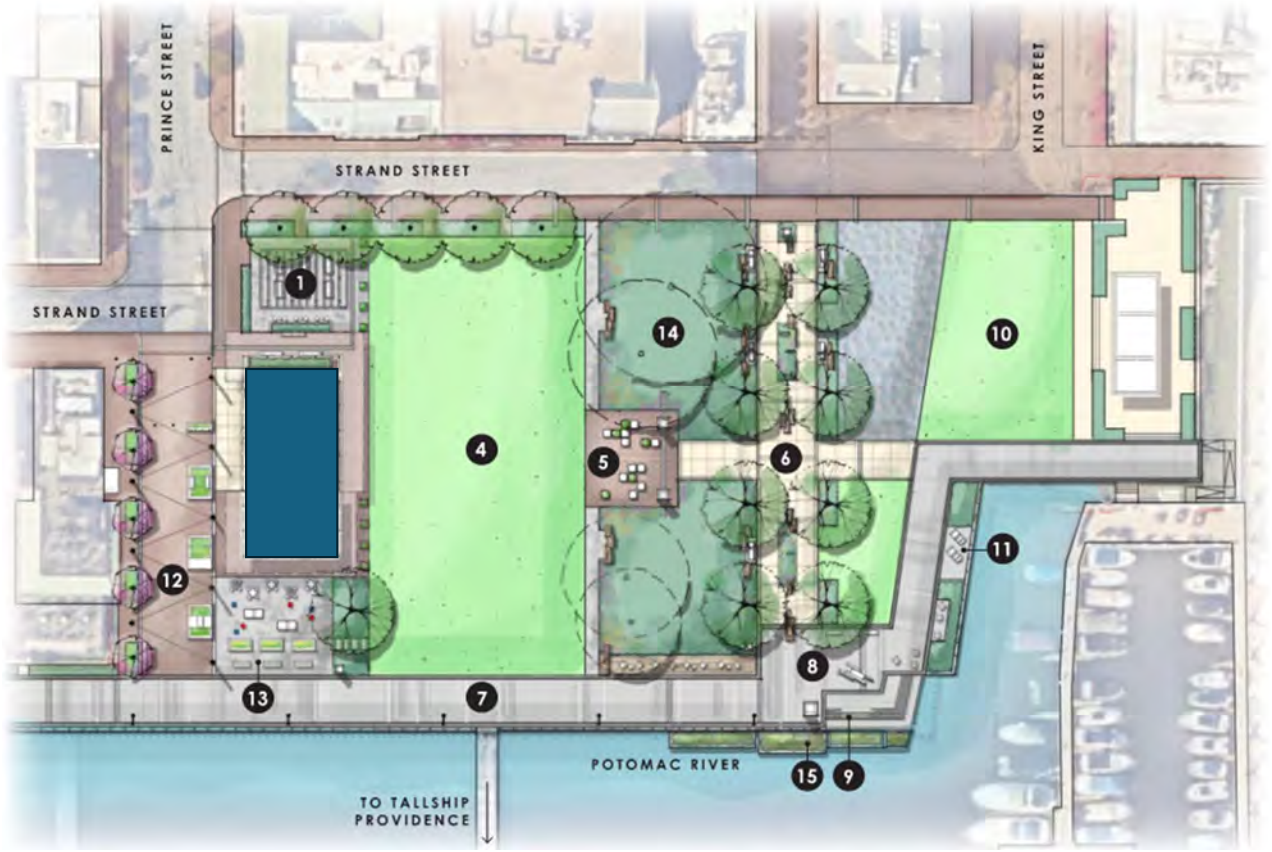
# Site Plan: Prior Building Footprint

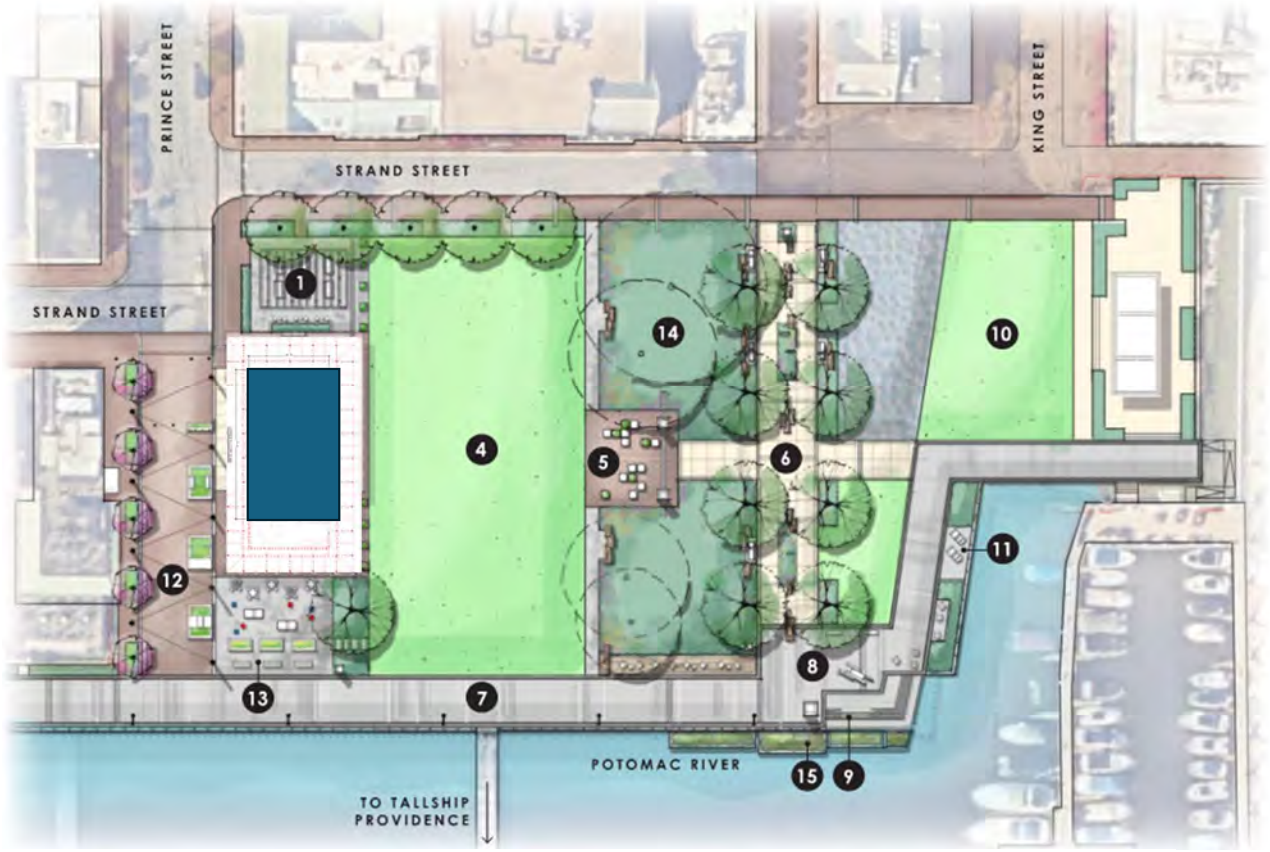



The proposed site plan uses a rectilinear framework as an homage to the historic wharfs and 1845 shoreline layout. This simple framework also aims to maximize programmable space, integrate the existing context, and create direct connections to the Potomac River that engage the waterfront and reinforce views.

## LEGEND:

1. Trellis structure with picnic tables and catenary lighting
2. Pump station
3. Covered plaza / venue space
4. Multi-use lawn
5. Arrival plaza with crate-inspired seating
6. Wales Alley River Gateway
7. Promenade
8. Promenade plaza with seating / art / signage
9. Waterfront steps / seat wall
10. N. Waterfront area - to be replaced in kind
11. Boatyard overlook
12. Pedestrianized Prince Street / plaza with catenary lighting
13. Flexible game / waterfront seating space
14. Preserved existing trees (understory to be determined with arborist)
15. Floating wetlands attached to bulkhead

# Site Plan: Reduced Station Size

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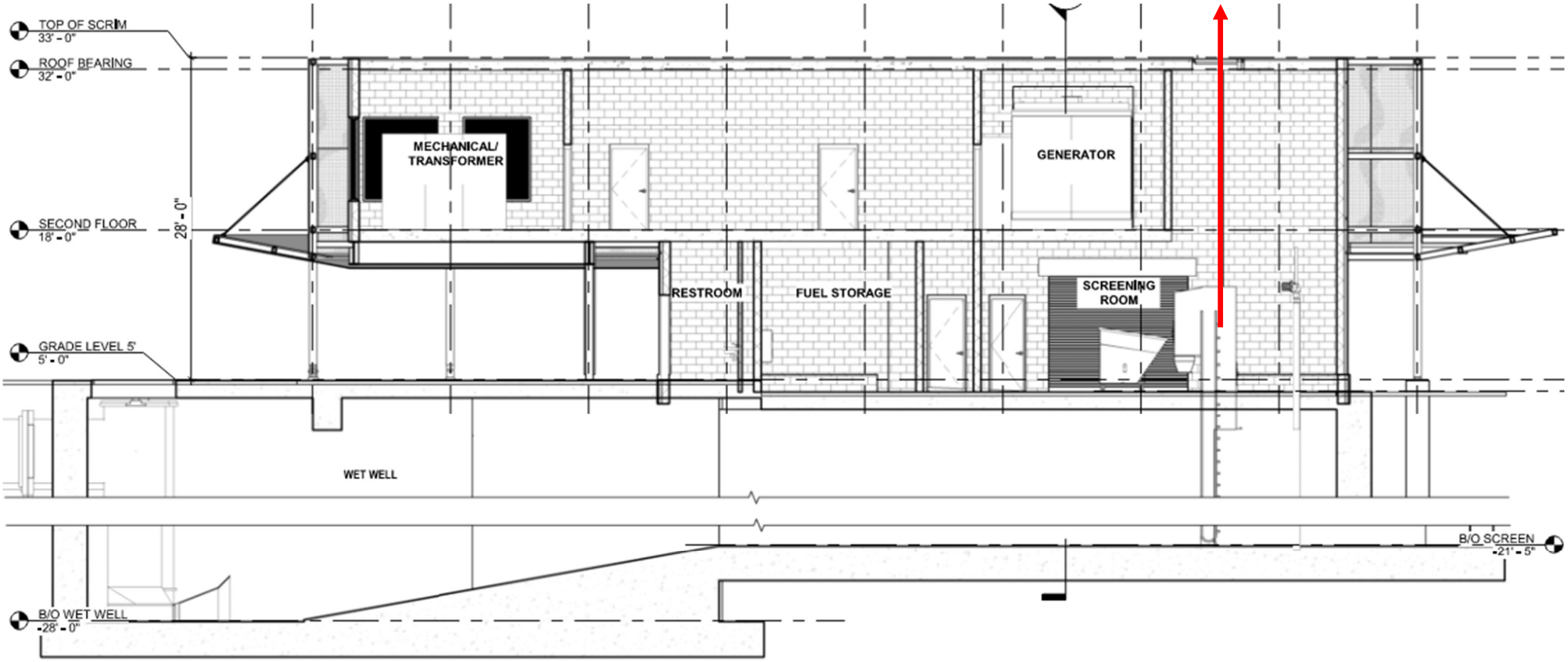
**(Building length reduced 18-22’ (55’ total if canopy eliminated)**

# Prior Pump Station Cross Section



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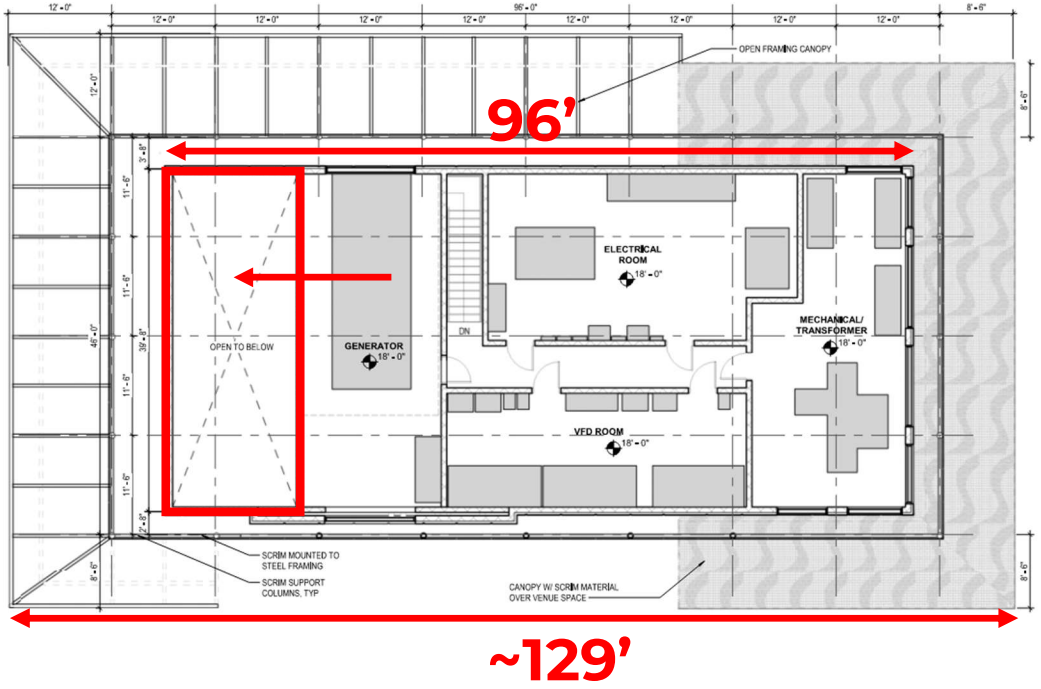
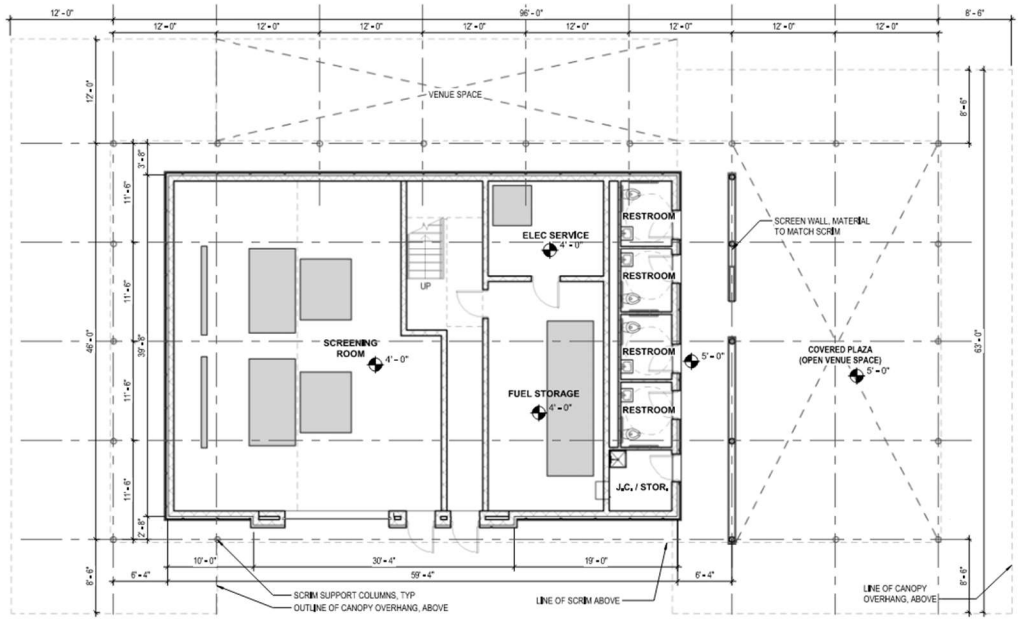
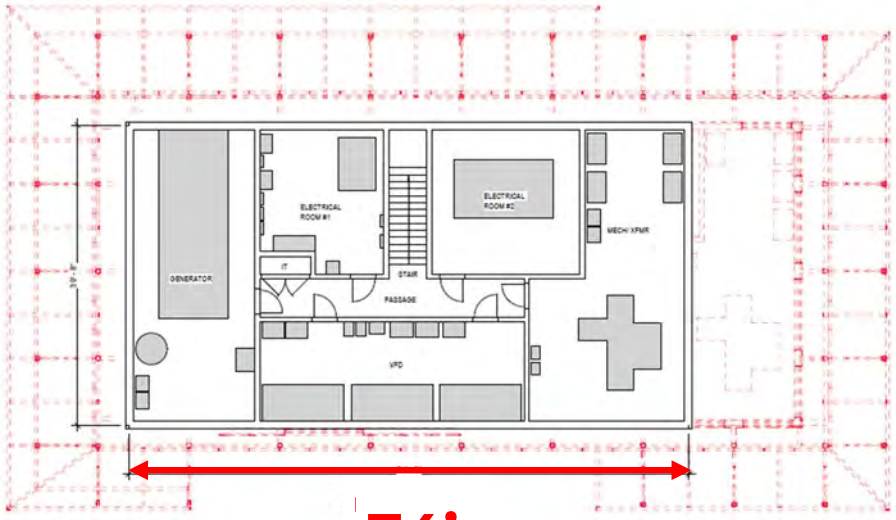
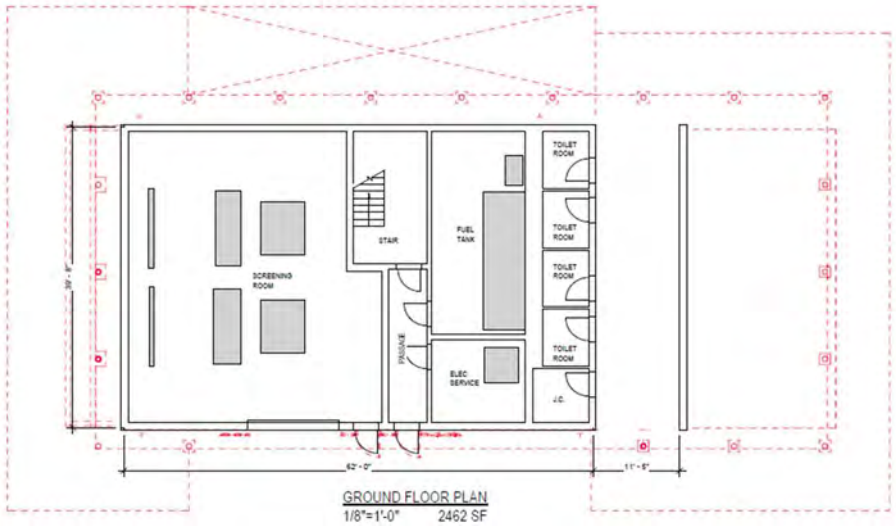
# Prior Pump Station Floor Plan



# Pump Station Floorplan Reduced




**Building length reduced ~18-22'**
**(~55' total if canopy eliminated)**

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# Pump Station Prior Design

# Pump Station Reduced

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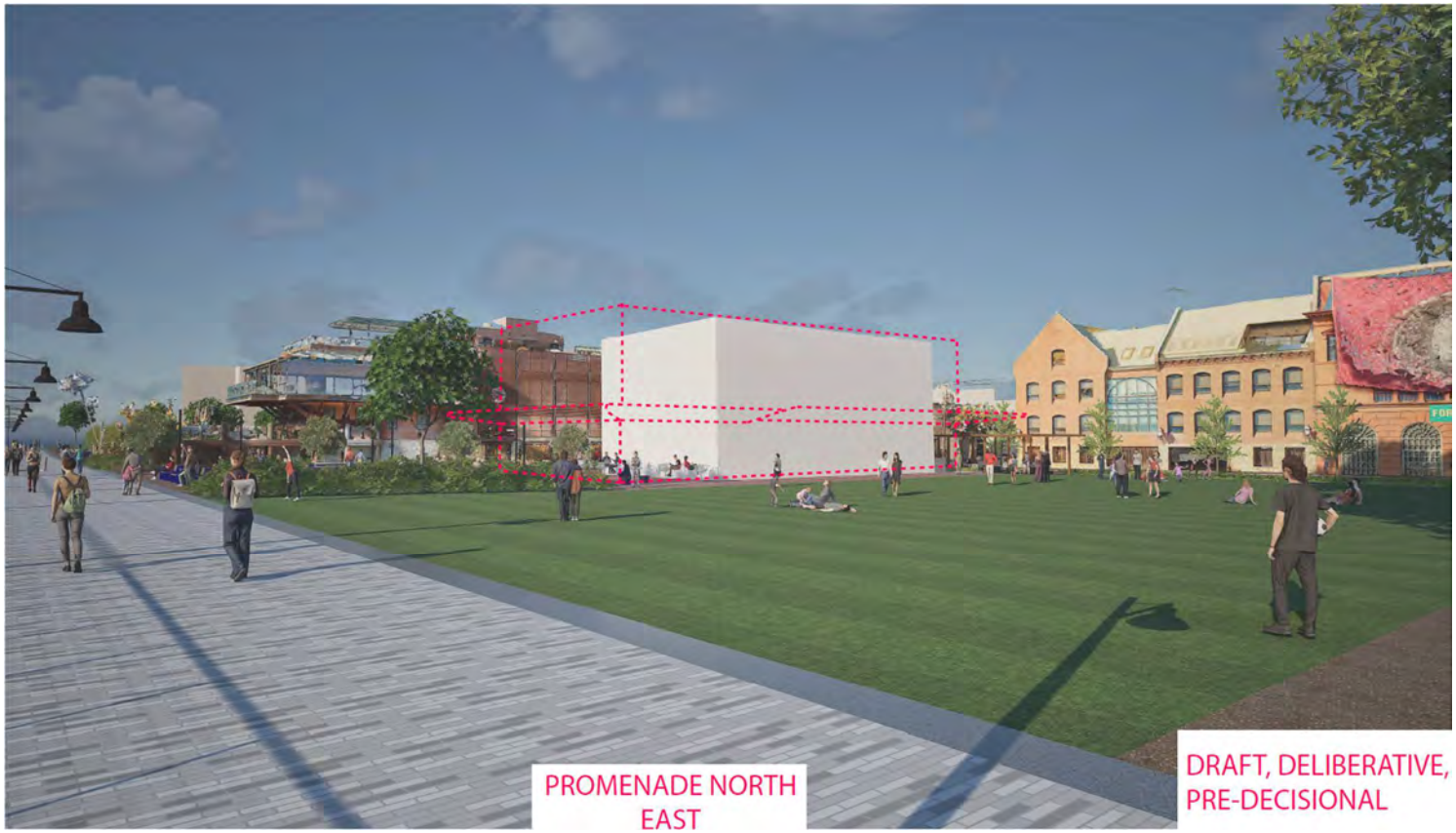


# Current Pump Station Materials

COLUMNS AS A DEVICE TO REPRESENT NAUTICAL SURROUNDS

STRUCTURAL TECHTONICS AND RELATIONSHIP TO SAIL BOATS

VIEW FROM BASE OF KING STREET

SCRIM MATERIAL INSPIRATION

BOARD-FORMED CONCRETE PANEL TO REFERENCE HISTORIC CRIBBING

# Open to Revisit Architecture

# Green Walls




Adjacent trees and sky are reflected in the scrim to blend building and environment.





Green walls integrate planting into the facade, softening building massing while offering environmental benefits such as insulation, air filtration, and stormwater management. They can be adapted to complement both modern and historic architectural contexts.

Alternative to planter walls, a reflective material can be used to create a 'green' facade reflecting the adjacent canopy trees. (Image #2)

1. **Vertical Living Gallery** | Bangkok, Thailand
2. **Hayes Primary School** | Kenley, UK
3. **17 Glen Avenue** | Cape Town, South Africa
4. **Musée du Quai Branly** | Paris, France
5. **Park Plaza** | Santa Fe, Mexico City
6. **New Street Square** | London, UK
7. **Ion Orchard Residences** | Singapore

# Vines







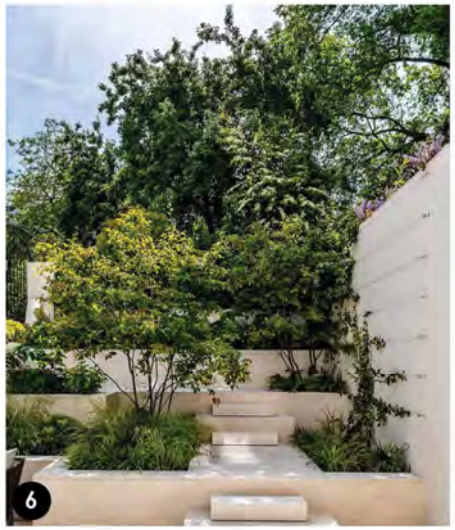
Vine-covered trellises add texture and seasonal interest to building walls, reducing visual impact and increasing air filtration and shade as a flexible, low-profile green infrastructure strategy.

1. **MFO Park** | Zürich, Switzerland
2. **Swiss RE Headquarters** | Munich, Germany
3. **Tan's Garden Villa** | Singapore
4. **The Base** | Bangkok, Thailand
5. **Biomedical Research Center** | Granada, Spain
6. **Freiburg Office Complex** | Munich, Germany

# Integral Planters






Integral planters can enhance architectural storytelling, incorporate seating, and offer environmental benefits such as rainwater collection, conveyance, and filtration opportunities.

1. **Coulée verte René-Dumont** | Paris, France
2. **The Highline Spur** | New York, NY
3. **Ecological Living Module** | New York City
4. **Hooper Street** | San Francisco, CA
5. **Hilgard Garden** | Berkley, CA
6. **Townhouse** | West London, UK

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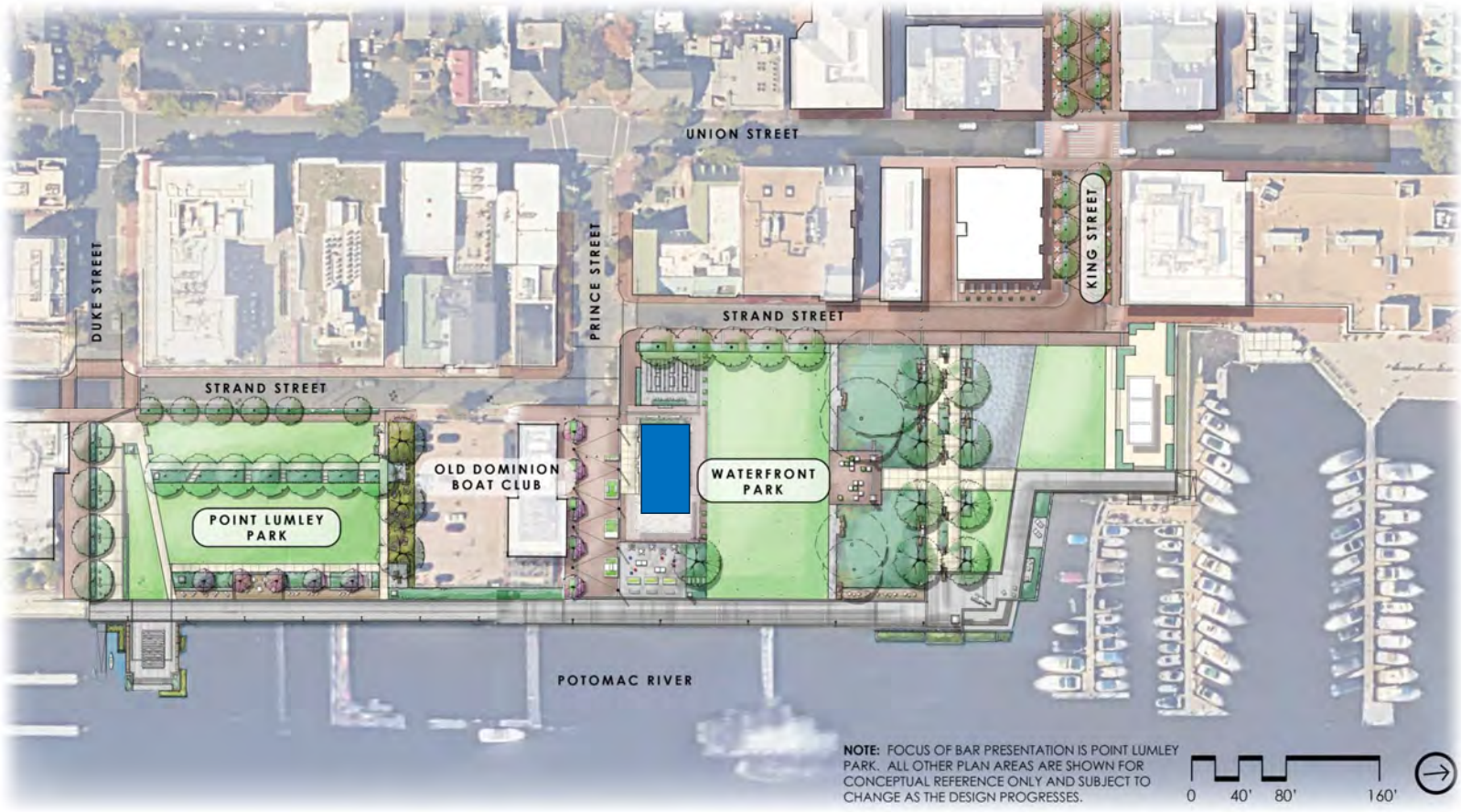

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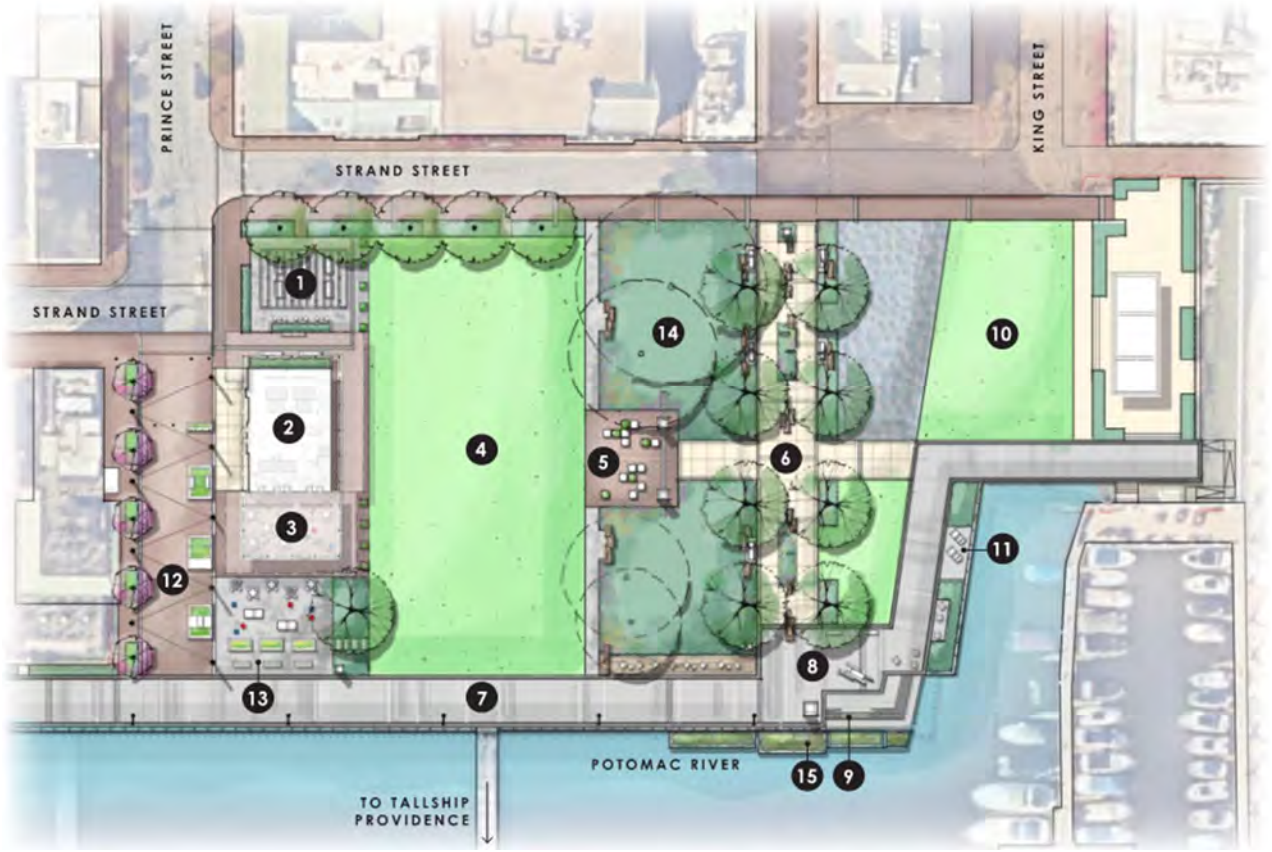


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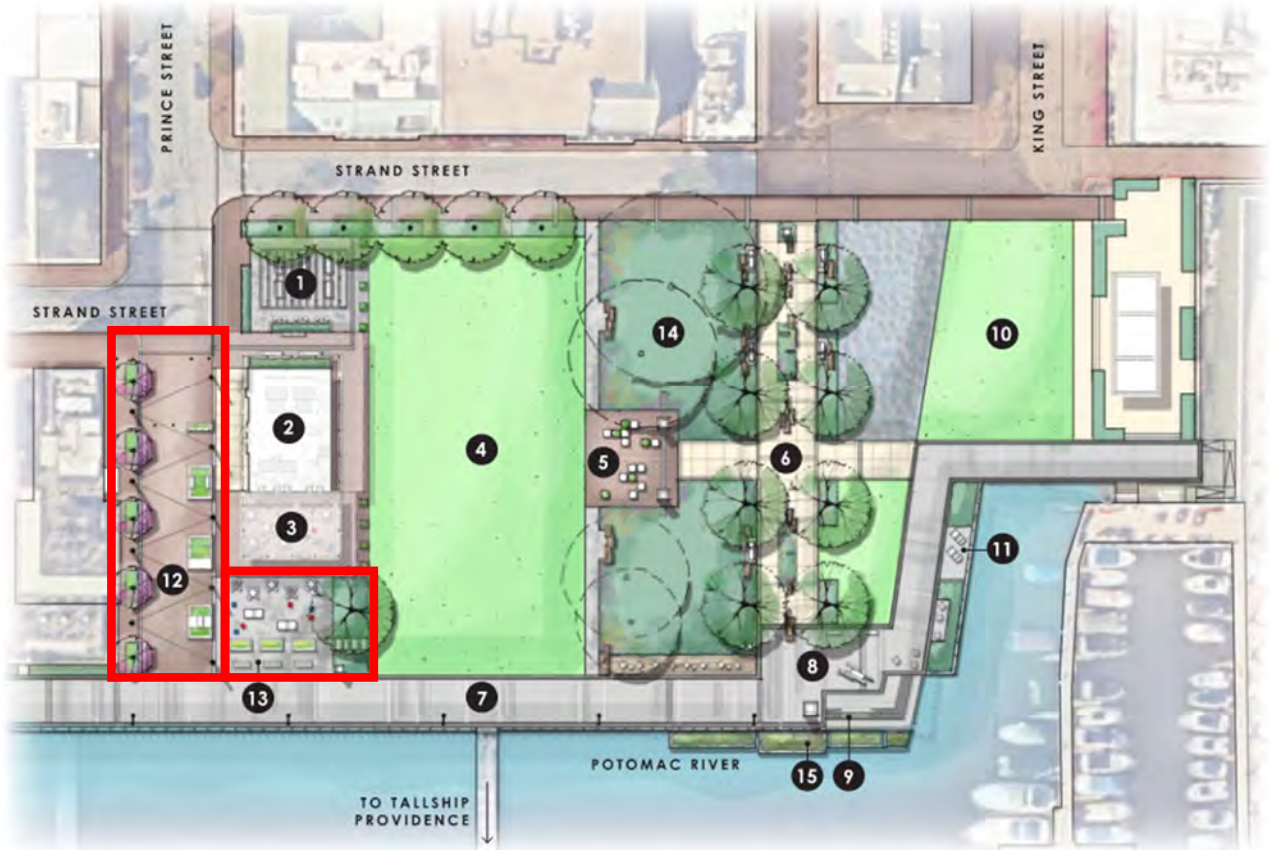


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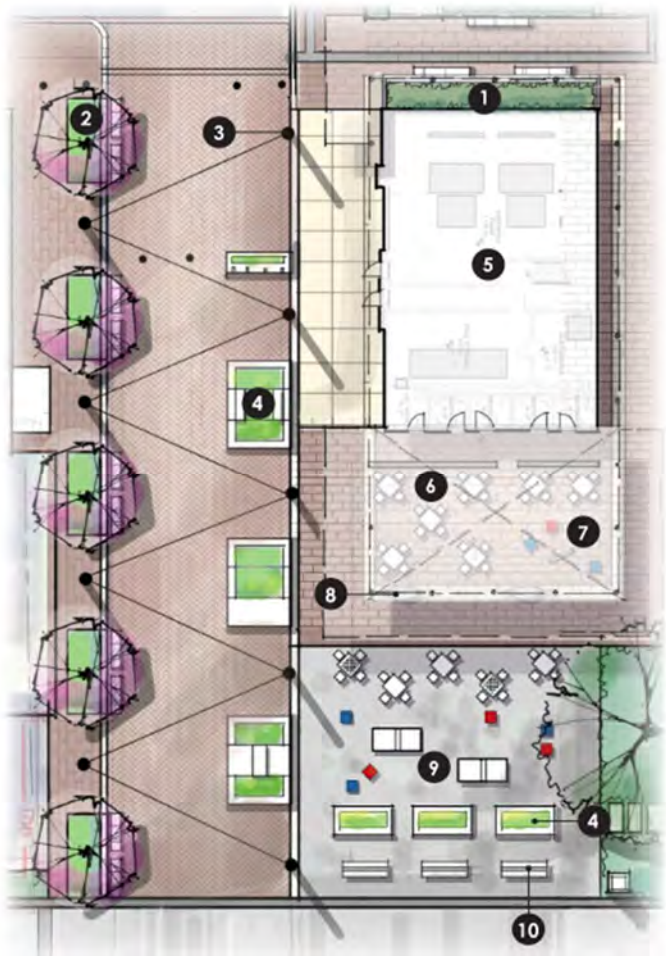
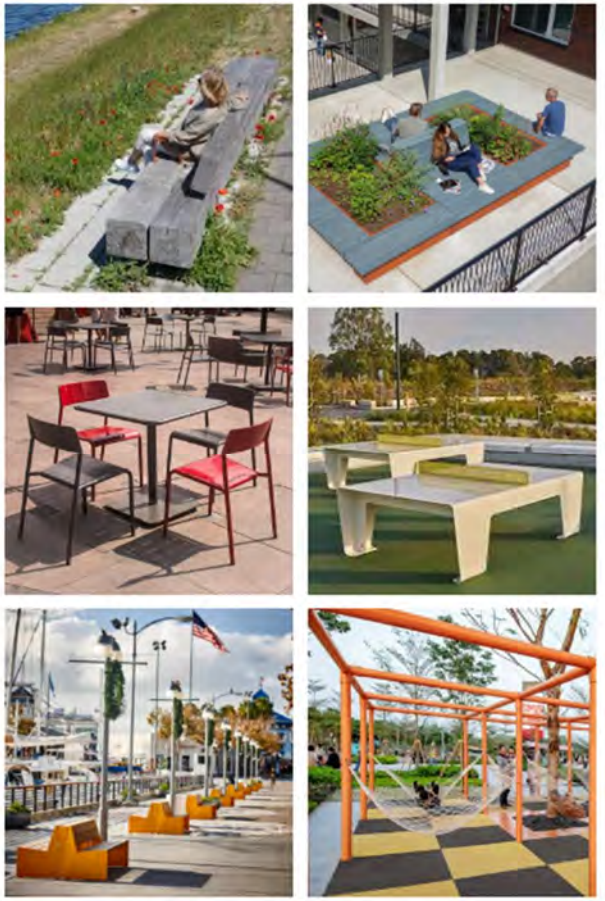
# Prince Street and East Plaza




**LEGEND:**

1. Raised bioretention planter
2. In-ground planters + benches
3. Poles with catenary lighting
4. Movable planters with seating
5. Pump Station
6. Covered plaza / venue space with movable tables and chairs
7. Movable Connect Four game or similar with movable cube seating
8. Hammocks / swing attached to canopy (removable for events)
9. Ping pong tables
10. Specialty double-sided promenade seating

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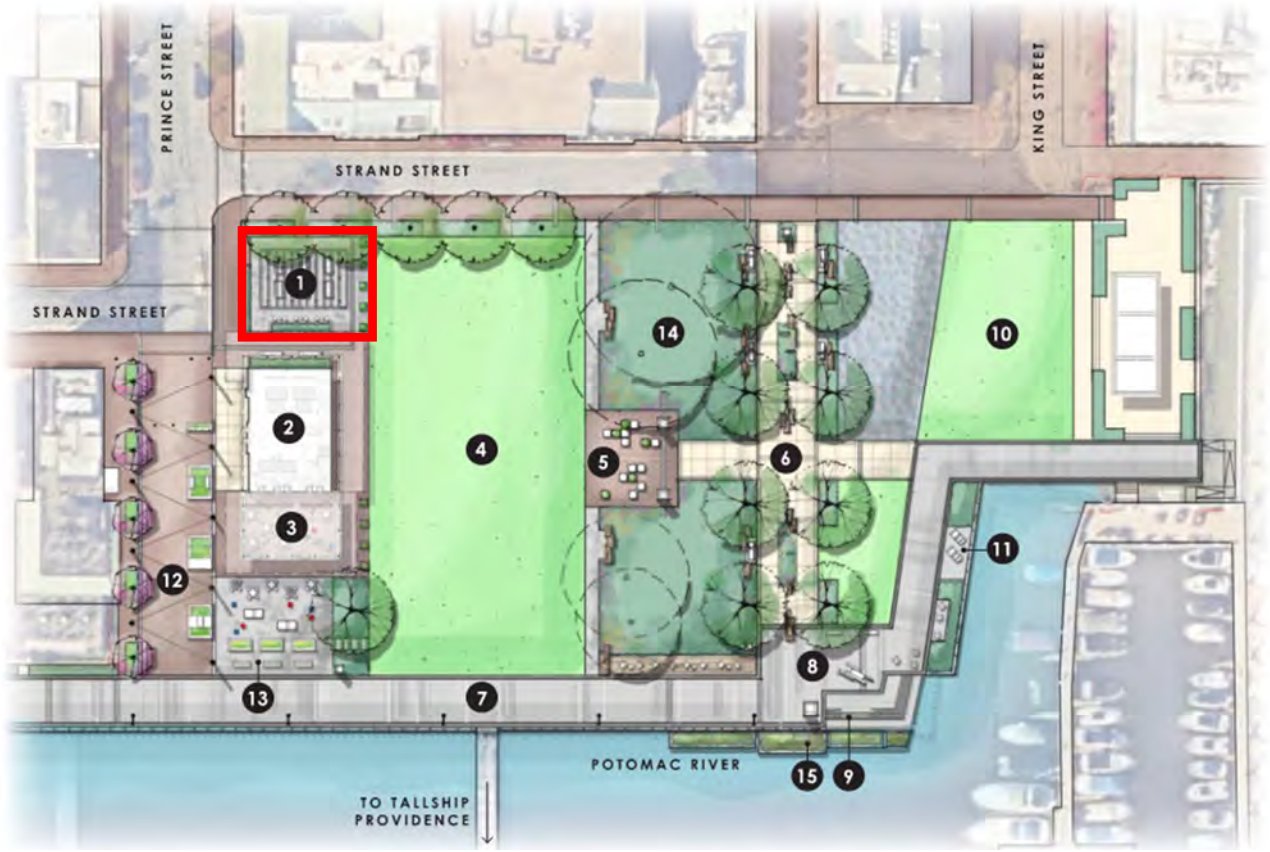


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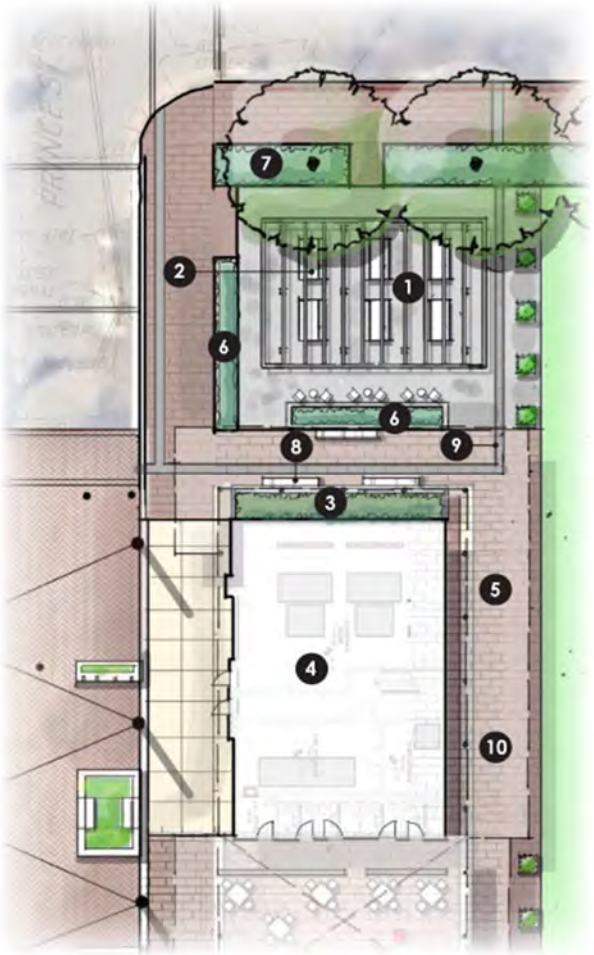
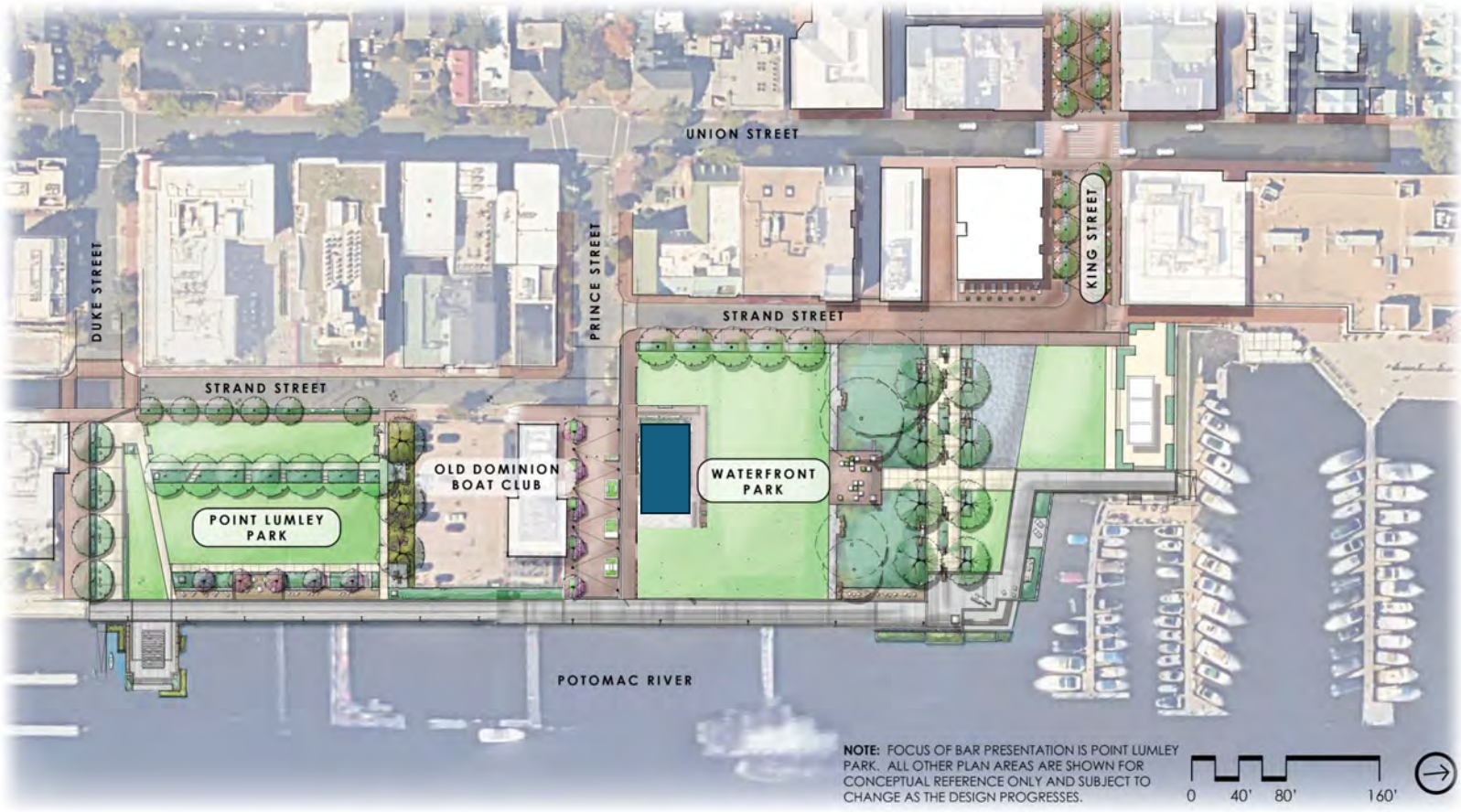
# Strand Street West Plaza




**LEGEND:**

1. Trellis with catenary lighting; columns to align with pump station building canopy grid
2. Picnic tables
3. Raised bioretention planter
4. Pump station
5. Pump station canopy
6. Raised planting areas
7. Planting areas at grade
8. Seating along planter walls
9. Historic 1845 shoreline banding
10. Stage / performance area


# Revisit Concept Plan?



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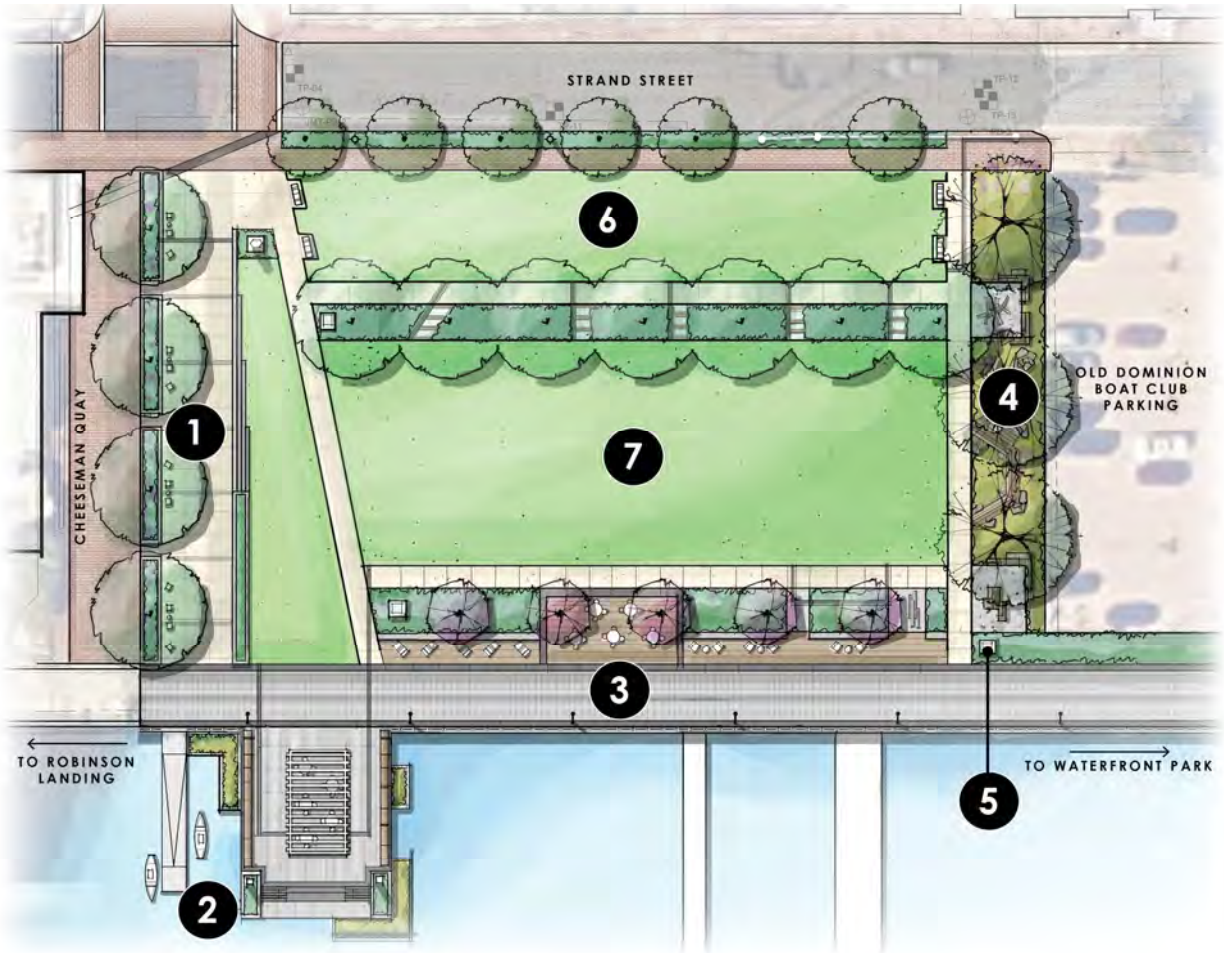



In keeping with the **Alexandria Small Area Waterfront Plan**, art, history, and storytelling will be woven throughout the park's function zones to create **unique and memorable experiences unique to Alexandria, Virginia.**

**LEGEND:**

1. **Shipbuilding/River Gateway walk** and lawn with feature stairs and relocated Shipbuilder statue
2. **Wharf** with signature shade structure, waterfront steps, floating wetlands, and kayak launch
3. **20' Promenade** with seating and plaza
4. **Bioretention** with boardwalk and children's play/learning nodes
5. **African American Heritage Trail** signage
6. Future **Rosenbaum bequest garden** location
7. Grand event lawn

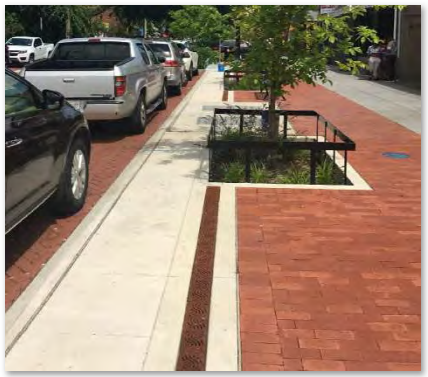
0 15' 30' 60'

# Construction Considerations and Planning

- Minimize Impact to ODBC
  - Maintain access to piers to max extent practicable
  - Replace any impacted facilities in kind
  - Ensure clear and transparent communication
- Avoid & Minimize Impacts (where feasible)
  - Sidewalks remain open
  - Thoughtful phasing of work
  - Maximum Pedestrian & Delivery Access
  - Parking Mitigation
  - Reduce construction duration (multi-shift work)
- Options for potential phased park closure/opening
- Transit Planning/Rerouting Options
- Direct Collaboration & Communication:
  - Business-Focused Stakeholder Group
  - Business Survey and Data Collection
  - Direct outreach to individual businesses
  - Clear communication as planning continues

# Other ideas considered?

- Green Infrastructure
- Pervious Pavement (brick pavers – streets and sidewalks)
- Bioretention & Raingardens
- Stormwater Ponds in Parks
- Underground Storage (stormwater)
- Multiple pump stations
- Allow parks & streets to flood / Floodproof Buildings
- Deep dredging of Potomac River
- Flood barriers without a pump station
- Levee system (Army Corps)



## AWA Alternative Concept:

# Stated Objectives

**1) Reduce the size & footprint of the pump station**

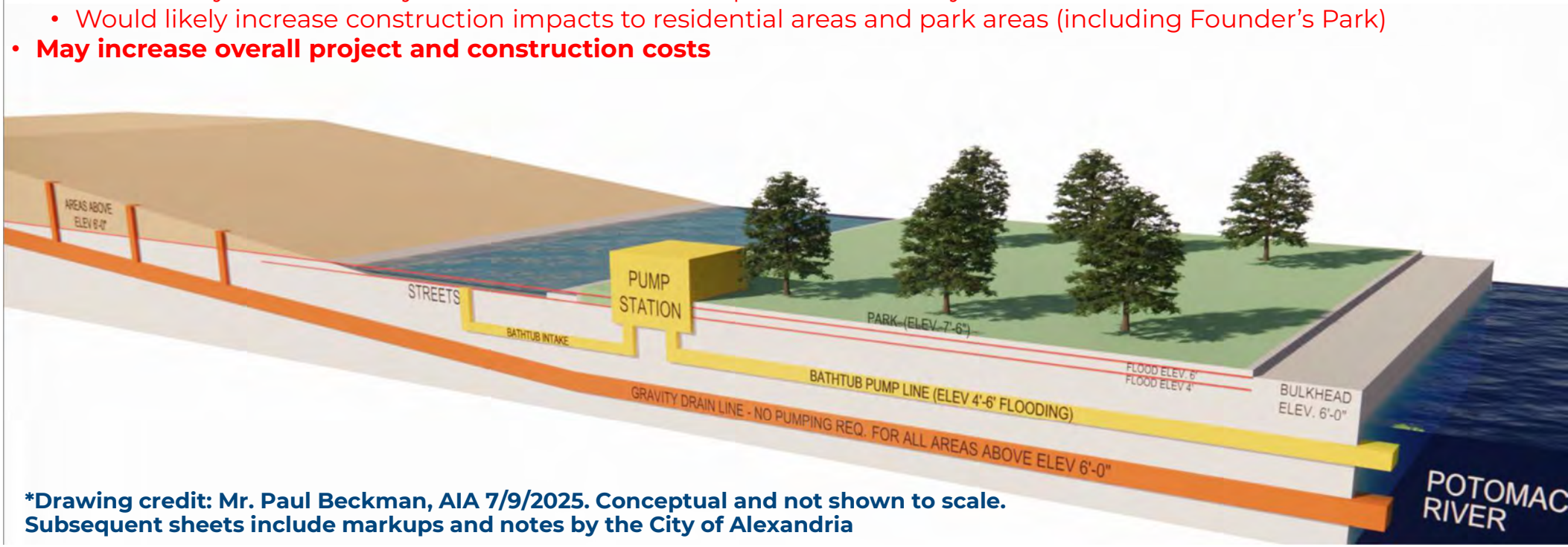
**2) Reduce community impacts**


*** Conceptual Drawing credit: Mr. Al Cox, AIA 7/3/2025. Subsequent sheets include markups and notes by the City of Alexandria**

# AWA Alternative Concept

This theoretical concept proposes a dual stormwater system which, after evaluation by engineering analysis and modeling:

- **Does not substantially reduce the footprint/size of the pump station**
- **Increases construction impacts as compared to the City's current proposal:**
  - Would require deep excavations and deeper outfall structures than is feasible/sustainable
  - Would still require phased street closures and significant pipe replacement/installation
  - Would likely increase utility conflicts and street disruption due to utility relocations
  - Would likely increase construction impacts to residential areas and park areas (including Founder's Park)
- **May increase overall project and construction costs**



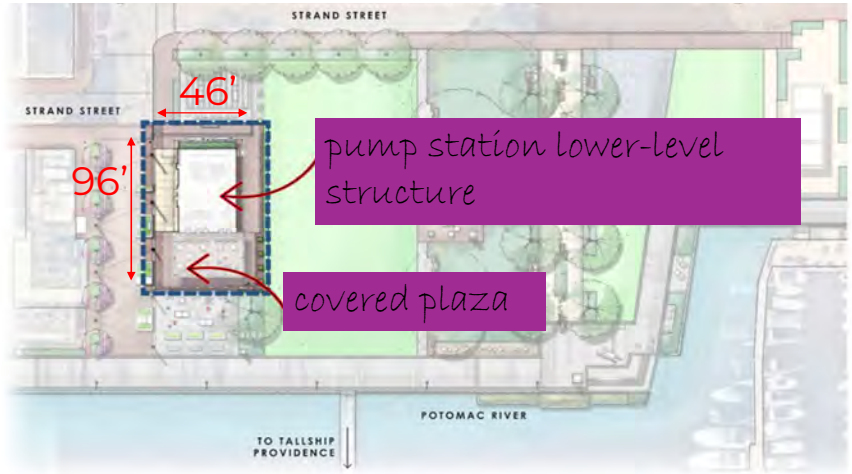

***Drawing credit: Mr. Paul Beckman, AIA 7/9/2025. Conceptual and not shown to scale.**
**Subsequent sheets include markups and notes by the City of Alexandria**

AWA Alternative Concept:

# Pump Station Size Constraints

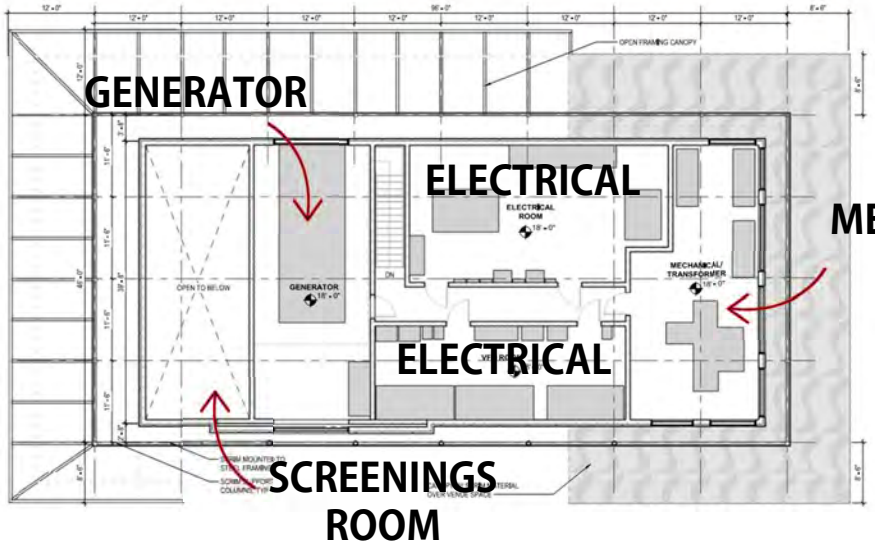
## Waterfront Park Pump Station

**Explaining the Numbers**




*The Pump Station footprint is approx. 96' x 46' (4,420 SF).*

*On the lower level, the footprint includes a covered plaza supporting a portion of the second story.*




**MECHANICAL/HVAC**

*The second floor sets the building footprint.*

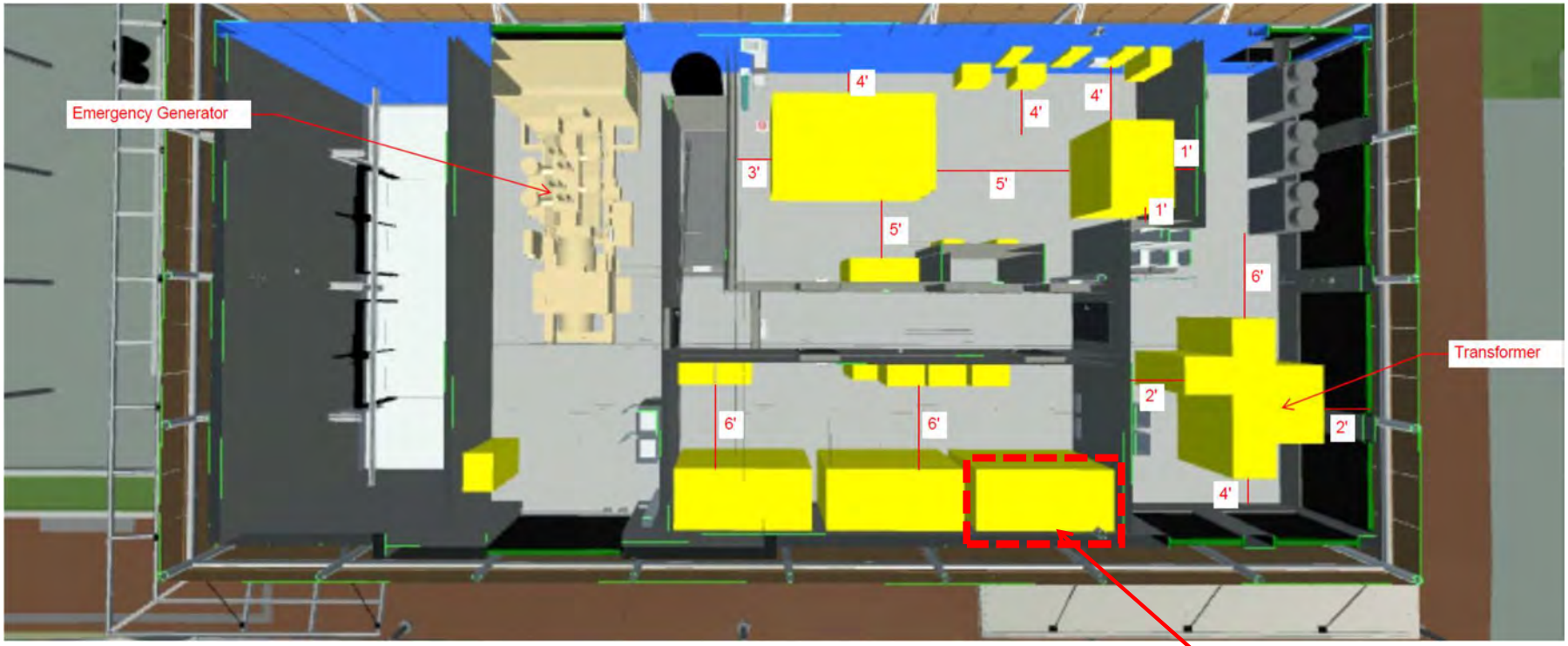
*These rooms are fundamental to the operation of any pump station, regardless of flow/capacity.*

## AWA Alternative Concept:

# Pump Station Size Constraints

**Minimum Clearance Requirements per NEC and/or Equipment Manufacturer**

**Meeting the requirements prevents the 2nd floor from being reduced, even with the elimination of a VFD Pump Controller.**

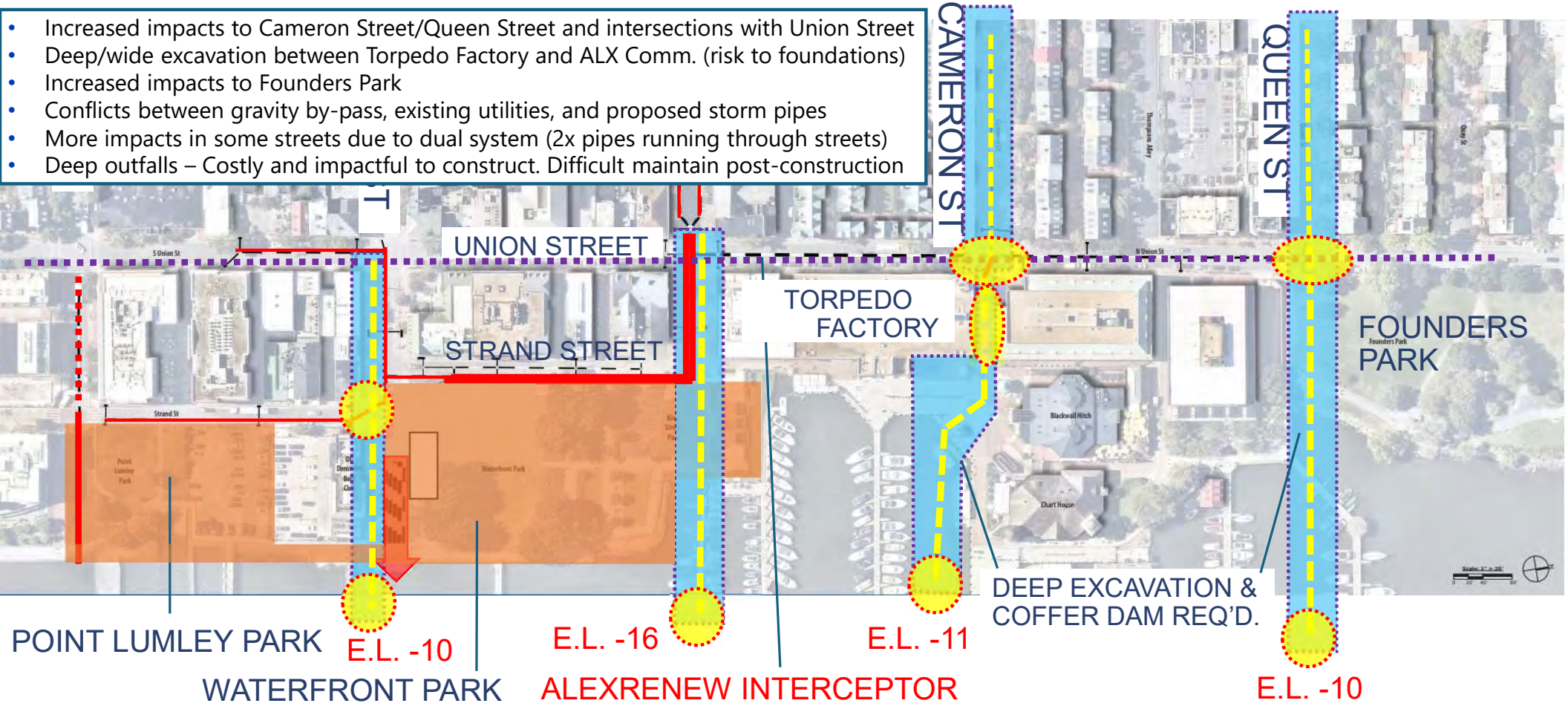



Even if we could reduce pump station pumping capacity by 50% (to ~ 115 MGD) - only one Pump/**VFD Pump Controller** would be eliminated.
**This will not substantially reduce the size of the pump station as suggested by AWA.**

# Impacts of AWA Alternate Concept

This approach would be more impactful than the City's proposal.
Would still require deep excavation, long-term street closures, and additional impacts to street ends and park areas (including Founder's Park)

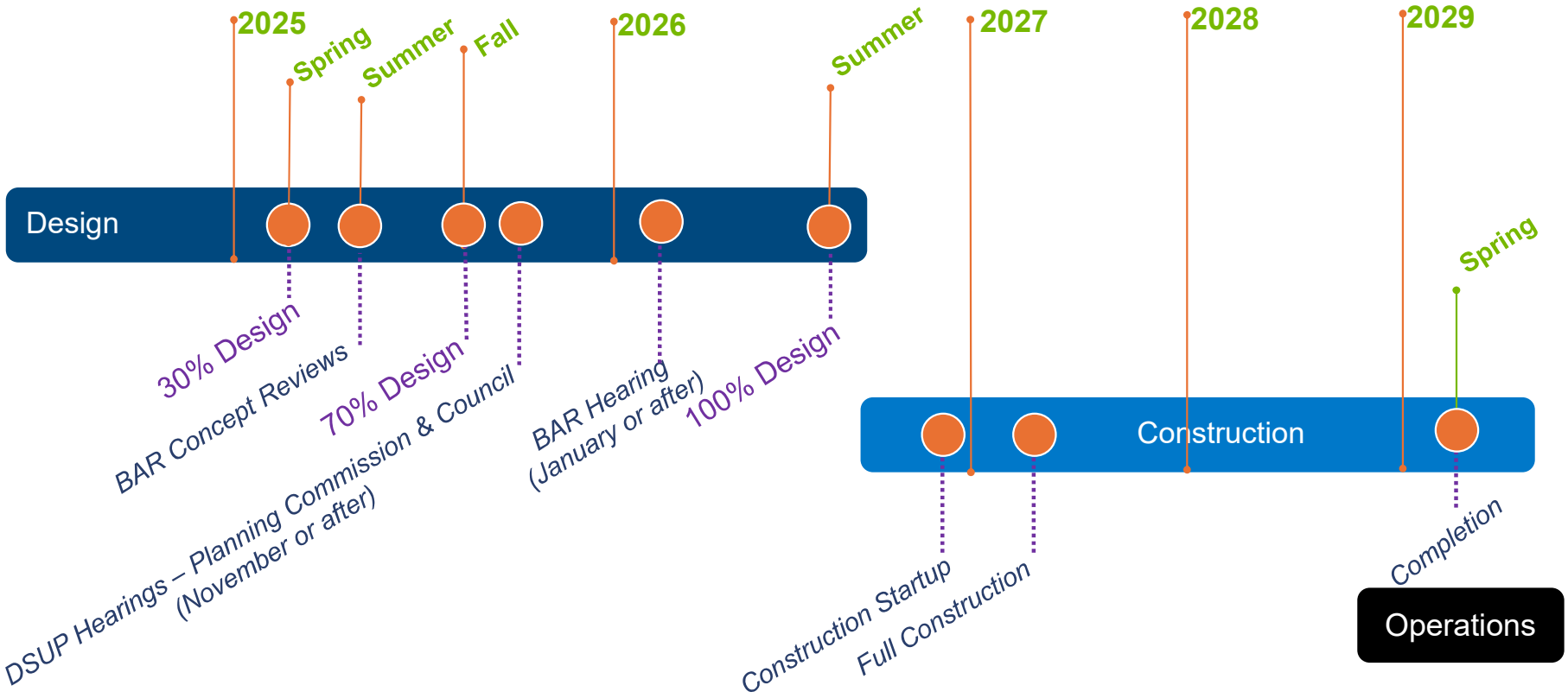
- Increased impacts to Cameron Street/Queen Street and intersections with Union Street
- Deep/wide excavation between Torpedo Factory and ALX Comm. (risk to foundations)
- Increased impacts to Founders Park
- Conflicts between gravity by-pass, existing utilities, and proposed storm pipes
- More impacts in some streets due to dual system (2x pipes running through streets)
- Deep outfalls – Costly and impactful to construct. Difficult maintain post-construction



# Impacts of AWA Alternate Concept: Deep Excavation and Coffer Dam (example)

*The required trench would be narrower than the example shown as only one pipe segment would be required.

# Anticipated Schedule

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# Discussion:

- How can we be successful together?
- What ways can we best communicate, collaborate, and share info?
- What concerns haven't we heard or addressed yet?

# Project Information & Updates

- Participate in upcoming Business-Owner Stakeholder Meetings
- https://www.alexandriava.gov/Waterfront
- Email Project Manager: Matthew.Landes@AlexandriaVA.gov

- Signup for Updates and Newsletter:

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