PROTECTION REVIEW

WASHINGTON HARBOUR
DUE DILIGENCE
NUISANCE PROTECTION

Low flood wall along property line to mitigate nuisance flooding

RECOMMENDATION:
30” WALL REDUCES POTENTIAL ANNUAL GATE RAISING EVENTS FROM 5 TO 2*

* NO FREEBOARD
CASE BY CASE JUDGEMENT
1,600 SF IS PERMITTED BEYOND THE PROPERTY LINE PER EASEMENT.
WALL INTEGRATION

WALL OPTIONS

Design goals –
• Minimize impact on views of the river
• Enhance the pedestrian experience along the waterfront
• Provide multiple points of access to the boardwalk- not just at each end
• Accessible by all
• Materiality to complement Washington Harbour
• Code compliant but eliminate railings
• Minimize vagrancy options
CIVIC ART – BARCELONA STREET LIGHT BENCHES
CIVIC ART – HAVANA - MALECON
CIVIC ART – PHILADELPHIA WATERWORKS
CIVIC ART – AHILYA GHAT, VARANASI
CIVIC ART - PORTO DI RIPETTA, ROME
BULKHEAD EDGE
BULKHEAD EDGE

BENCH
SEATING STAIRS
SEATING WALL
BENCH
SEATING WALL
BULKHEAD EDGE

PROPOSED DESIGN DOES NOT ENCROACH ON THE BOARDWALK
DAYTIME VIEW NORTH

3’-0” WALL AT MIDPOINT
FLOOD STUDY

MAJOR OBSTRUCTIONS IN ROCK CREEK

- K Street Bridge
FLOOD STUDY

MAJOR OBSTRUCTIONS IN ROCK CREEK

- Rock Creek Channel and Pedestrian Bridge
FLOOD STUDY
SURVEY OF BATHYMETRY

- Survey Bathymetry of Rock Creek
FLOOD STUDY

MODEL

Existing FEMA HECRAS sections

Updated HECRAS sections
FLOOD STUDY

MODEL

• 3D model and surface created of surveyed topography
• Cross sections cut through the 3D model and input into HECRAS
FLOOD STUDY
COMPARING BATHYMETRY– FEMA VS. NEW MODEL

• Surveyed elevation of Rock Creek is 5.1 feet deeper than the FEMA flood model indicated.

• FEMA section stops and is cut off, as a result a “wall” feature is added which in effect raises the flood elevation.
FLOOD STUDY
COMPARING BATHYMETRY– FEMA VS. NEW MODEL

• Surveyed elevation of Rock Creek is **8.8 feet** deeper than the FEMA flood model indicated
FLOOD STUDY
COMPARING BATHYMETRY – FEMA VS. NEW MODEL

- Surveyed elevation of Rock Creek is **3.5 feet** deeper than the FEMA flood model indicated.
FLOOD STUDY
COMPARING FLOOD ELEVATIONS

Existing FEMA Flood Mapping

New Rock Creek Flood Mapping
- Rock Creek flood elevations lowered
- Peak flow in the Potomac occurs more slowly than in Rock Creek (≈2 days vs 2 hours)
FLOOD STUDY
SUMMARY OF FINDINGS

- Flood elevations lowered ~3 feet at the site.
- Current FEMA model uses a survey conducted in the 1970’s and is out-of-date.
- Actual bathymetry much deeper
- Current FEMA model has limited number and section extents
FLOOD STUDY
WATER LEVEL STATION

**Two** water level stations price estimate

- $40k (materials) + $15k (Langan Design+permitting) +$5k permit fees + ~$55k installation  
  = **$115k TOTAL**
New Rock Creek Flood Mapping
- 2 total water level sensors
  - 1 on Potomac and 1 on Rock Creek
FLOOD STUDY

NEXT STEPS

Permits likely required for Water Level Sensors

- US Army Corps of Engineers – National Permit 5 Scientific Measurement Devices
  - No Preconstruction Notification required unless specifically requested
  - Conversations with Steve Harman at USACE
- National Parks Service approval
  - Conversations with the Rock Creek Park Chief Ranger Nick Bartolomeo. Likely a Right-of-Way permit will be required. Currently in the process of getting direction from NPS headquarters
  - Collected data will be shared with NPS

Next steps/timeline:

- DOEE/FEMA coordination to update LOMR ~ 18 months
- Water level sensor permitting/ construction ~8 months
**BOARDWALK EDGE**

**RECOMMENDED ELEVATION: 6.36’ – 6.9’**

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<table>
<thead>
<tr>
<th>Water Elevations</th>
<th>Flood events in last 9 years</th>
<th>1 Foot Wall EL. 4.9’</th>
<th>2 Foot Wall EL. 5.9’</th>
<th>2.45’ Foot Wall EL. 6.36’</th>
<th>3 Foot Wall EL. 6.9’</th>
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**Total High Water Events per year:**

- 158
- 44
- 21.5
- 15.4
- 10
- 3.6

**Average High Water Events per year:**

- 17.56
- 4.89
- 2.39
- 1.71
- 1.11
- 0.40

**Gate Raising Events per Year:**

- 4.89
- 4.89
- 2.39
- 1.71
- 1.11
- 0.40

**Percent Reduction of Gate Raising Events:**

- 0.00%
- 51.14%
- 65.00%
- 77.27%
- 91.82%

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**RECOMMENDATION:**

30” WALL REDUCES POTENTIAL ANNUAL GATE RAISING EVENTS FROM 5 TO 2*

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CASE BY CASE JUDGEMENT
BOARDWALK EDGES

SURVEY ELEVATIONS

NO IMPACT TO EXISTING ELEVATIONS

USGS and FEMA

National Weather Service
BULKHEAD EDGE
WALL ELEVATION: 3'-0"

Extent of new wall at EL. 6.9’
Extent of required regrading

Slope 5%
BULKHEAD EDGE
EXISTING CONDITIONS & CONSTRAINTS

WEST BUILDING

EAST BUILDING

FOUNTAIN
SITE ANALYSIS

AREA OF INTEREST

- UPPER FOUNTAIN
- FOUNTAIN / ICE RINK
- CAFÉ SEATING
- CAFÉ SEATING
- ENTRY POINT
SITE ANALYSIS
TRAFFIC FLOW STUDY

INTERACTION WITH RETAIL AROUND FOUNTAIN

THROUGH PEDESTRIAN TRAFFIC

ENGAGING WATERFRONT
SITE ANALYSIS

INFRASTRUCTURE

EXISTING FLOOD PROTECTION GATES
AREA LIMITATION

1,600 SF ON SITE

1,600 SF IS PERMITTED BEYOND THE PROPERTY LINE PER EASEMENT.