

St. Michaels Maryland

Harbor Flooding & Stormwater Mitigation Project

Chesapeake Bay Maritime Museum & Sea Level Rise Commission
Coordination Meeting, January 31, 2024



RAUCH
INC.

ANNAPOLIS
LANDSCAPE
ARCHITECTS



OPPORTUNITIES:

- ❖ **Innovative Civic Infrastructure:**
Prepare for Sea Level Rise strategically with an emphasis on civic green infrastructure
- ❖ **Creative Flood Adaptation:**
Allow for resiliency flooding in locations where green shoreline uses exist or can be planned
- ❖ **Economic Expansion:**
Create new waterfront connections, destinations, and event spaces to benefit the entire community

St. Michaels Maryland Harbor Flooding & Stormwater Mitigation Project



ANNAPOLIS
LANDSCAPE
ARCHITECTS



CONSTRAINTS:

- ❖ **Complicated Edge Conditions:** Establish a bulkhead/vertical edge where needed; landside fill is required to establish positive overland drainage
- ❖ **Property Lines:** Focus efforts on public land and/or public easements
- ❖ **Flood Protection from Flanking:** Continual flood control grade (Elev, 5.0) to prevent inundation from ends or backside



RAUCH
INC.

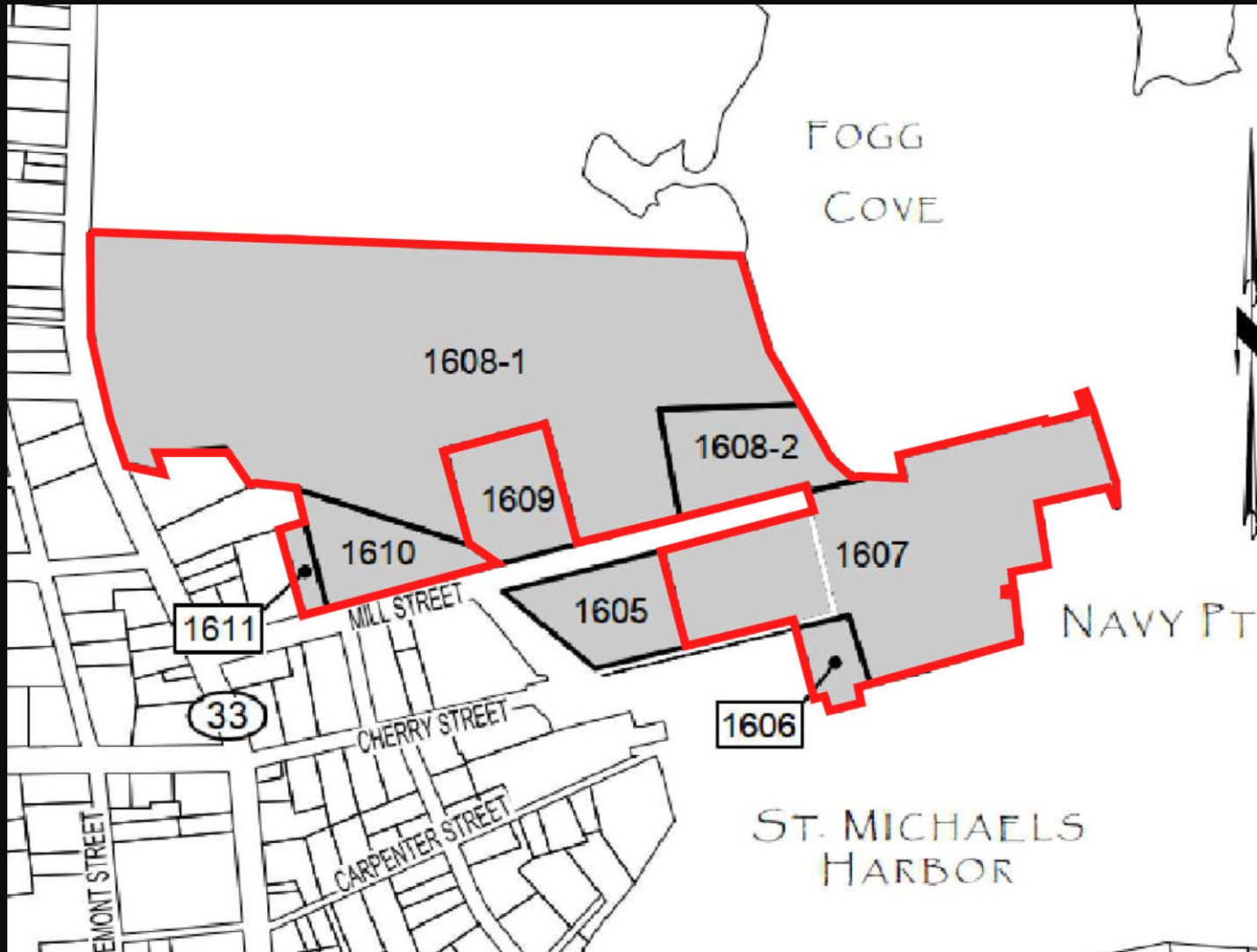
Chesapeake Bay Maritime Museum (CBMM) Campus





RAUCH
INC.

Chesapeake Bay Maritime Museum (CBMM) Owned Parcels



St. Michaels Maryland

Elevation Review – Raising harbor infrastructure to elevation 5 is becoming the Town standard to provide a conservative safety factor for SLR projections



RAUCH
INC.



NOAA Datum Listing – Cambridge Tide Station

All elevations in feet are relative to NAVD88

- MHHW = 0.93
- MHW = 0.72
- NAVD88 = 0
- MSL = -0.09
- MLW = -0.90
- MLLW = -1.11

KEY TAKEAWAY:

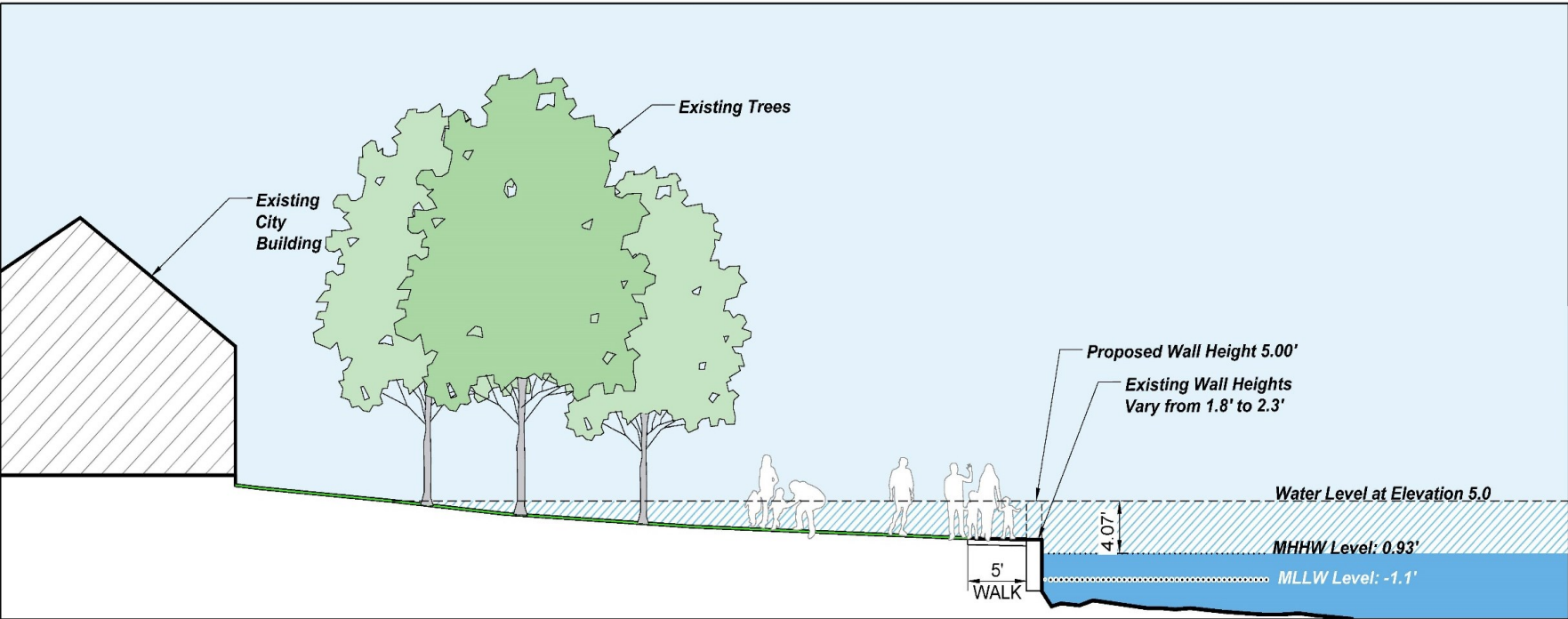
Raising flood protection measures to elevation 5 will protect harbor infrastructure and assets from most SLR scenarios and storm events.

1.02' is the difference between MSL and MHHW and reflects the average elevation potential of the tide

Depicted Event	SLR	Tide	Surge	Top Elev.
50% SLR Projection by 2050	1.3'	1.02'		2.32'
1% SLR Projection by 2050	2.4'	1.02'	1.28'	4.7'
FEMA Elev. 6.0'	-	-	6.0'	6.0'

See Harbor & Stormwater Infrastructure Study for more information

St. Michaels Maryland Existing Condition Section



SECTION - EXISTING CONDITIONS 2023
AT CITY BUILDING

SCALE: 1/8" = 1'-0"

SCENARIO 1

CHERRY STREET REGRADED TO EXTEND ELEVATION 5.0 TOWARD WATER
MAINTAIN ACCESS TO PRIVATE PARKING

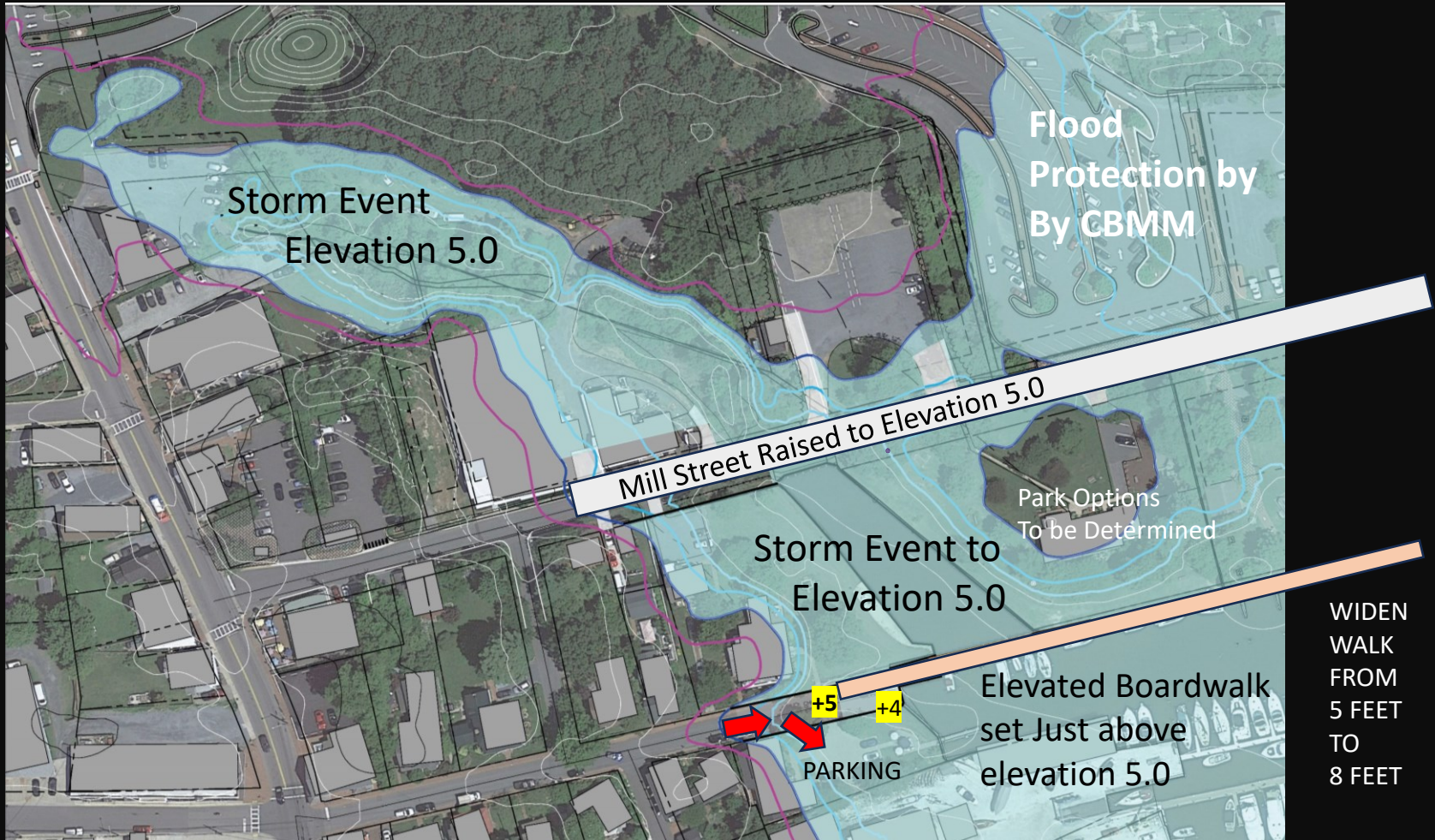
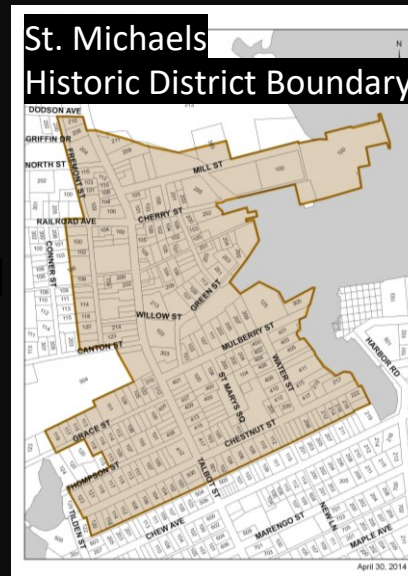


DIAGRAM – NORTH OF MILL STREET AND CHERRY STREET OPTION 1

St. Michaels Maryland Historic and Cultural Landscape

- Honeymoon Bridge



- Integrated landscape showing restraint and elegance respecting the history of the St. Michaels Historic District
- Character of bulkhead, railings walkways, paving, and pilings appropriate to the historic context



Historic District
Design Review Guidelines
Town of St. Michaels

St. Michaels Maryland Maritime Museum



- Thoughtful coordination Required to maintain Positive drainage to water
- Grades to be resolved



St. Michaels
Maryland
Harbor Promenade



2024

Looking East

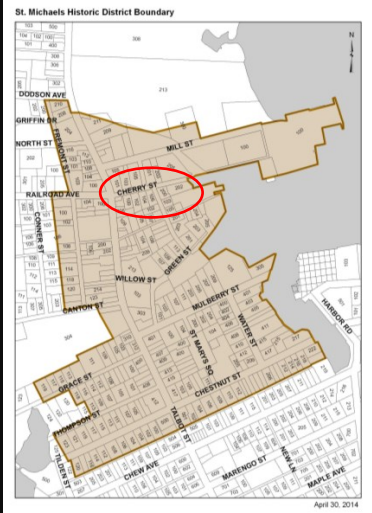
St. Michaels Maryland Harbor Promenade



Looking West



St. Michaels Maryland Historic Streetscape – Cherry Street



St. Michaels Maryland Quiet Water at Proposed Park



- Consider programming the park with Remote Control boat rentals
 - Potential Kayak Launch
-

St. Michaels Maryland Hollis Park

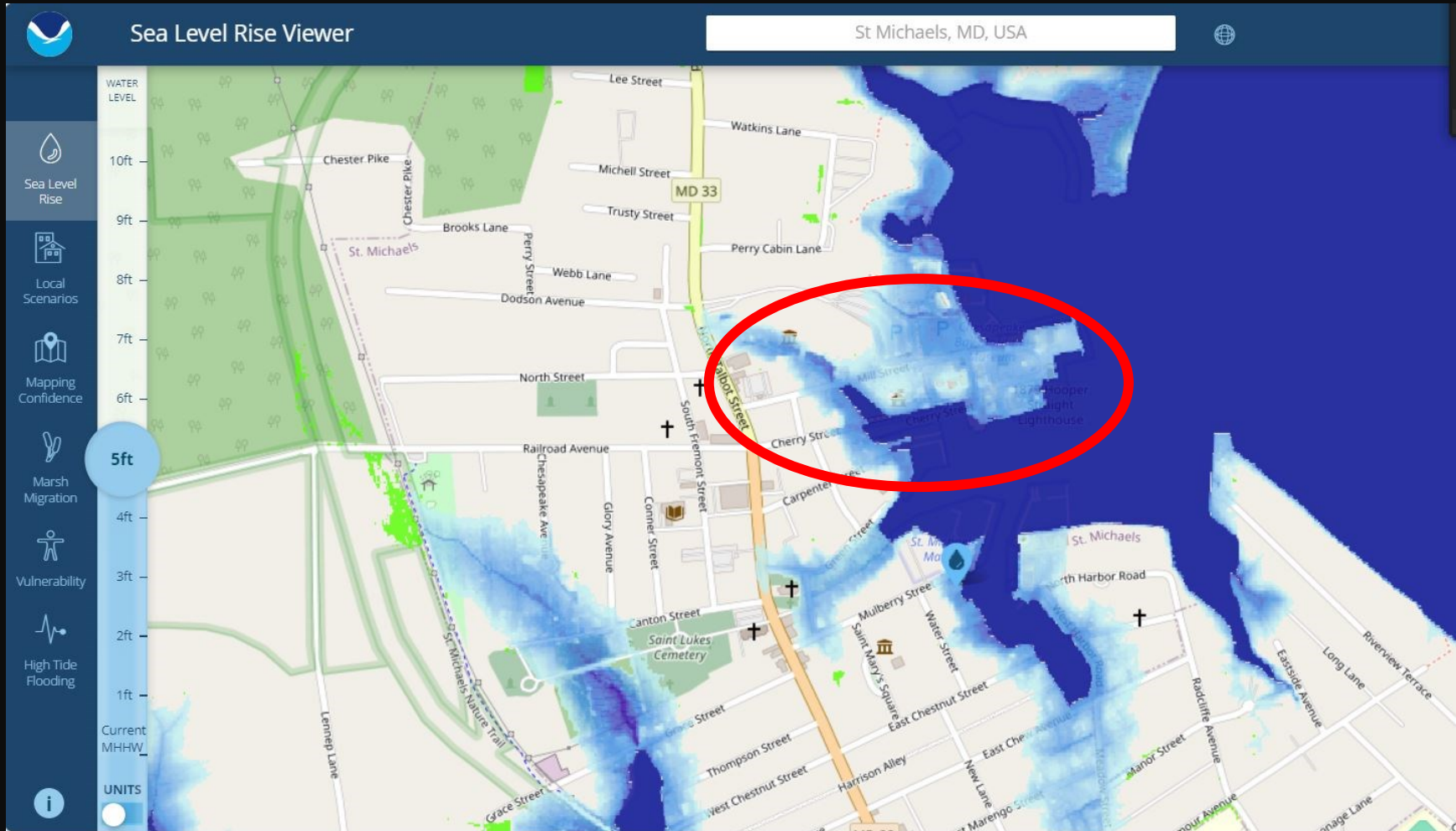


- Public Open Space Land Acquisition Funding
- Approximately One Acre
- Central Location





St. Michaels Maryland Harbor Flooding & Stormwater Mitigation Project



NOAA interactive mapping tools [Sea Level Rise and Coastal Flooding Impacts \(noaa.gov\)](https://www.noaa.gov/sea-level-rise)



St. Michaels Maryland Mill Street Flooding



St. Michaels Maryland Mill Street Phase 1 – Raise to Elevation 5.0 ±



St. Michaels Maryland Mill Street Existing Conditions

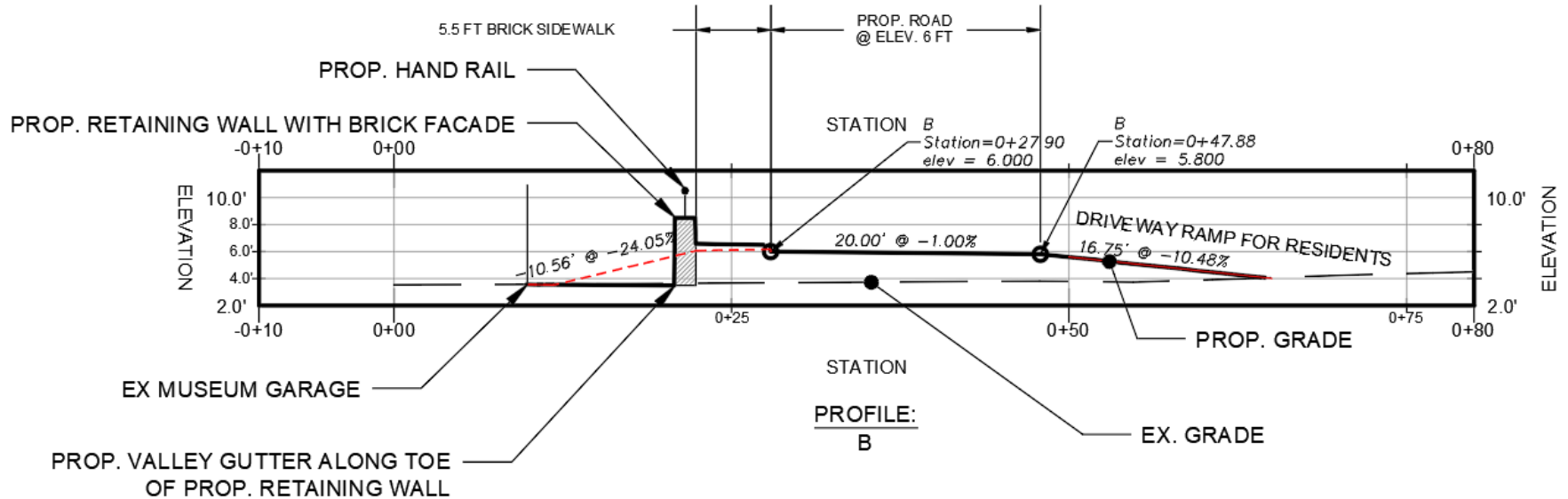




St. Michaels Maryland

Mill Street Phase 1 – Raise to Elevation 6.0 + - Cross Sections at CBMM Garage

24.05% Ramp Slope

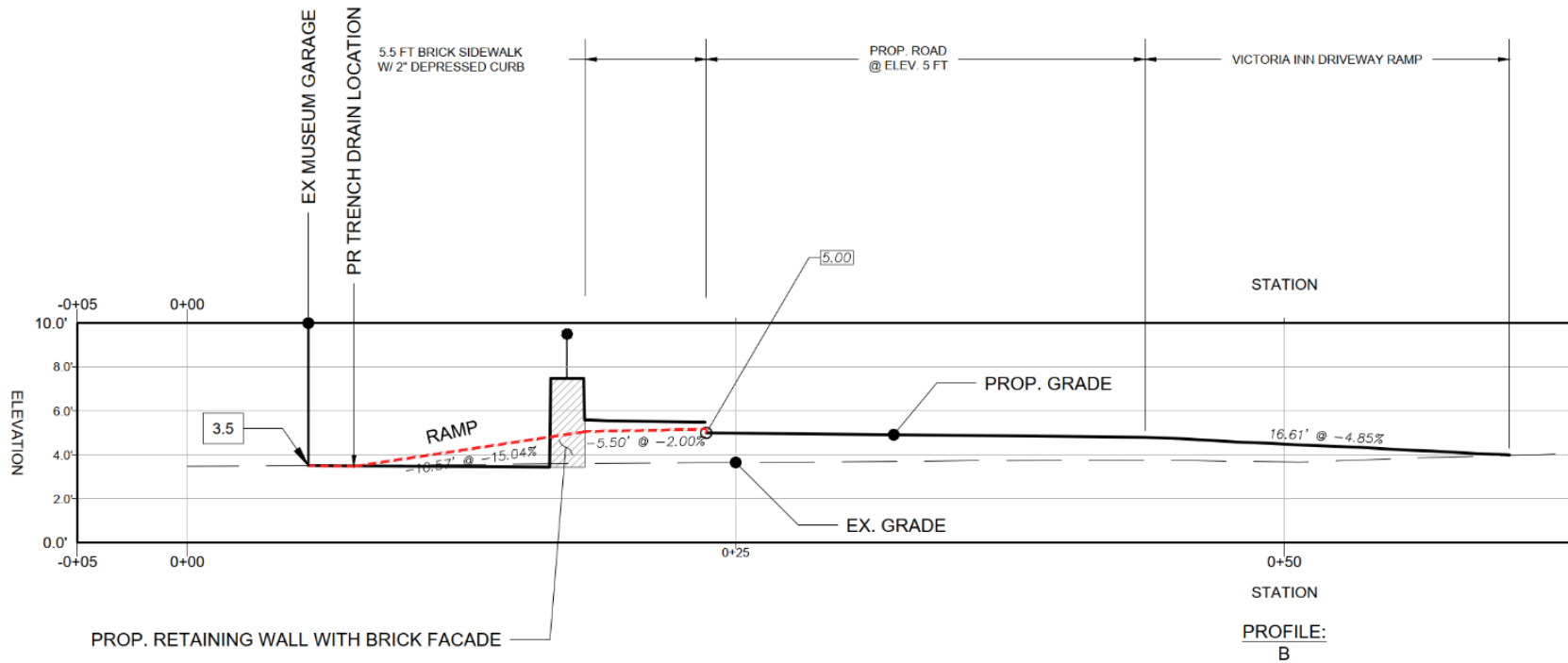




St. Michaels Maryland

Mill Street Phase 1 – Raise to Elevation 5.0 + - Cross Sections at CBMM Garage

15.04% Ramp Slope

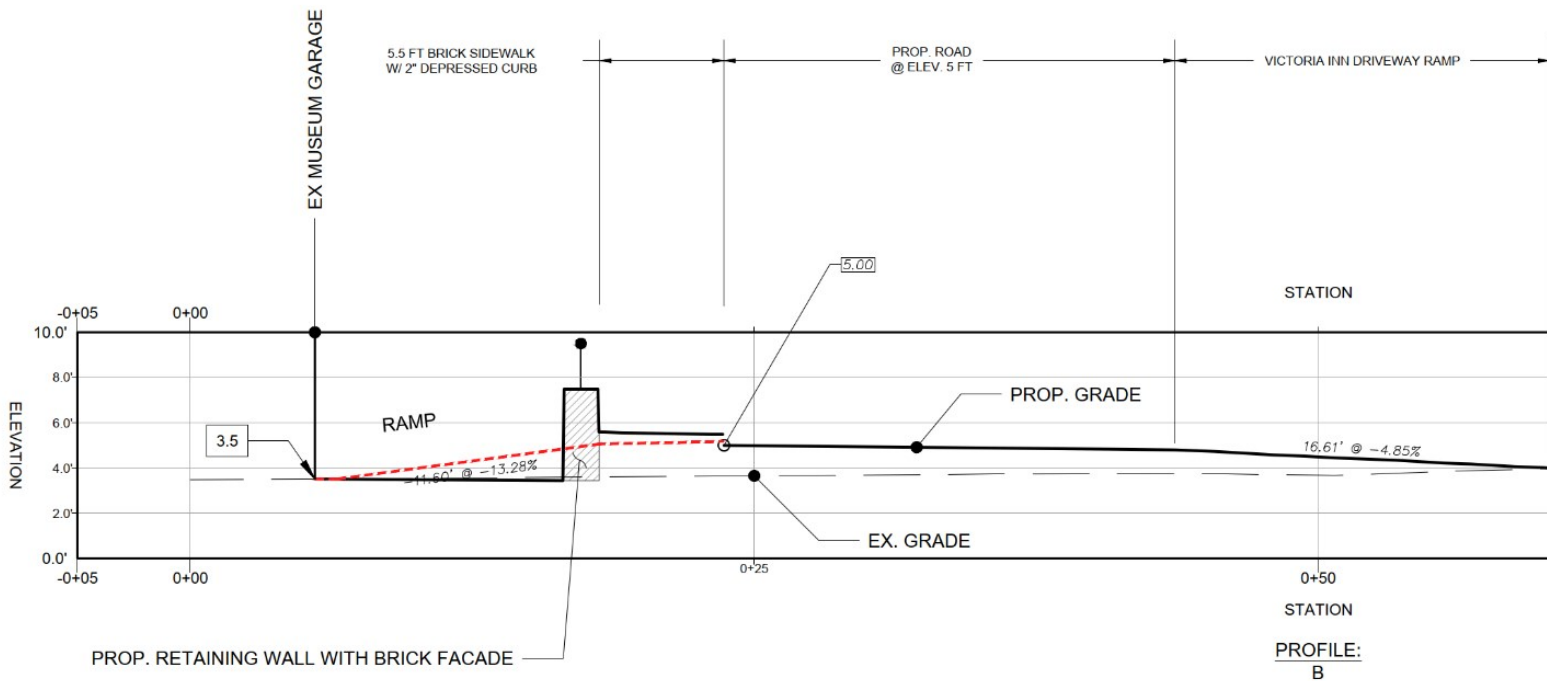








St. Michaels Maryland

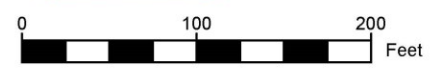
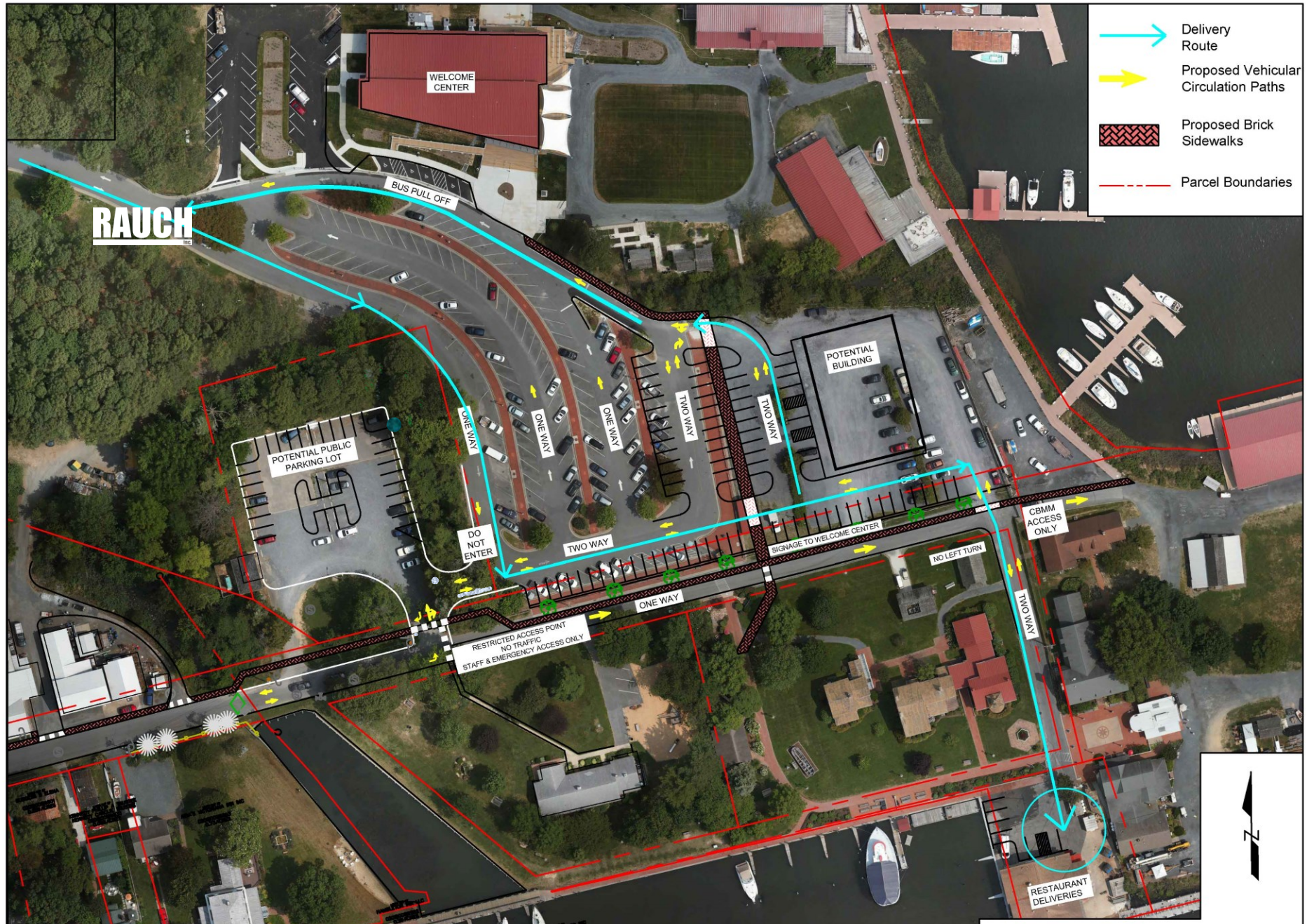
Mill Street Phase 1 – Raise to Elevation 5.0 + - Cross Sections at CBMM Garage

13.26% Ramp Slope - A 10.90% can be achieved if the sidewalk was flush with road, then sloped 2% away from road toward garage, and the ramp was connected directly with garage entrance. 10% and less could be achieved if the CBMM garage FFE was raised slightly.



-  Delivery Route
-  Proposed Vehicular Circulation Paths
-  Proposed Brick Sidewalks
-  Parcel Boundaries

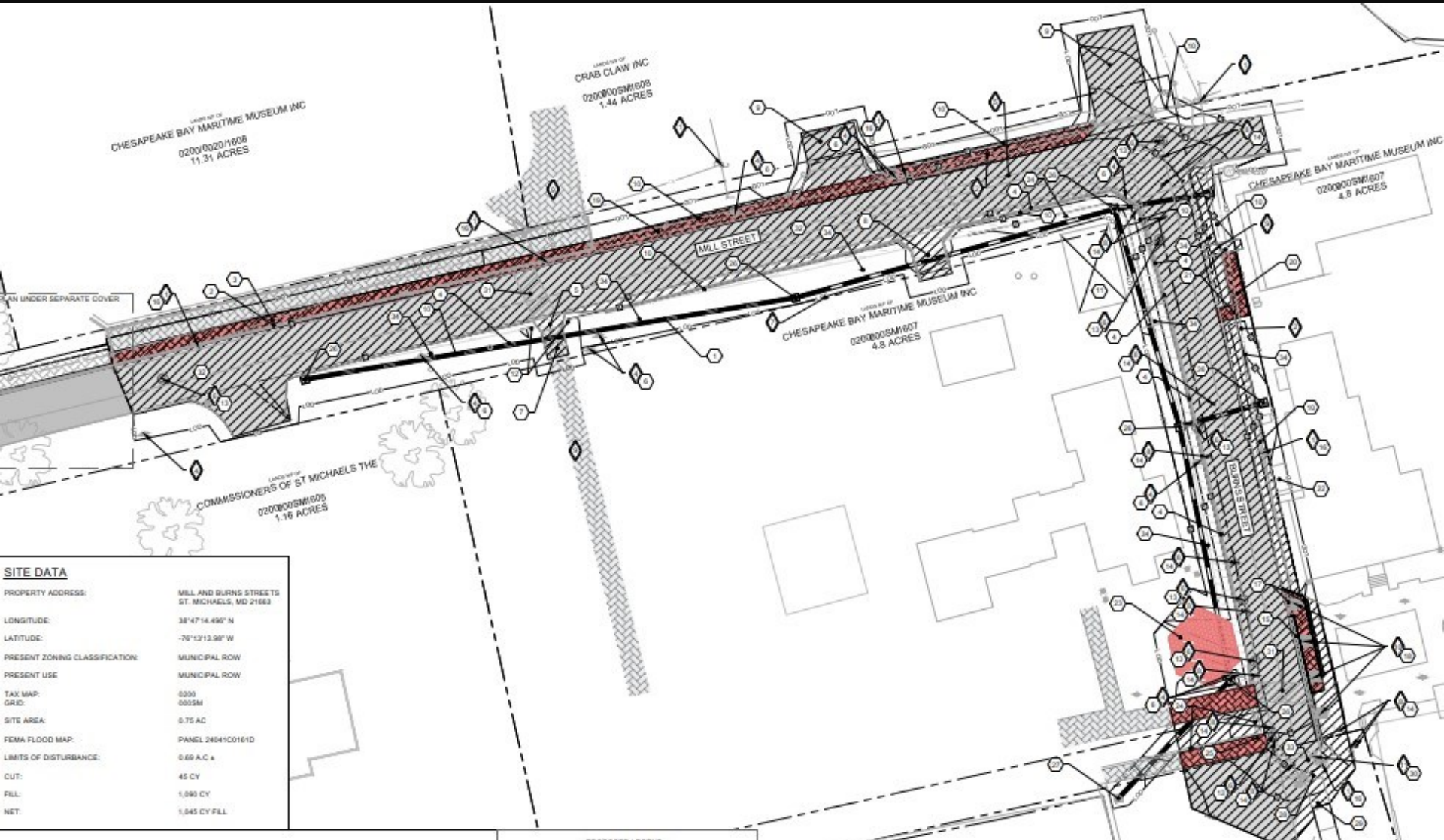
RAUCH





St. Michaels Maryland

Phase 2 - Mill Street Sidewalk and Burns Street – Raise to Elevation 5.0 ±



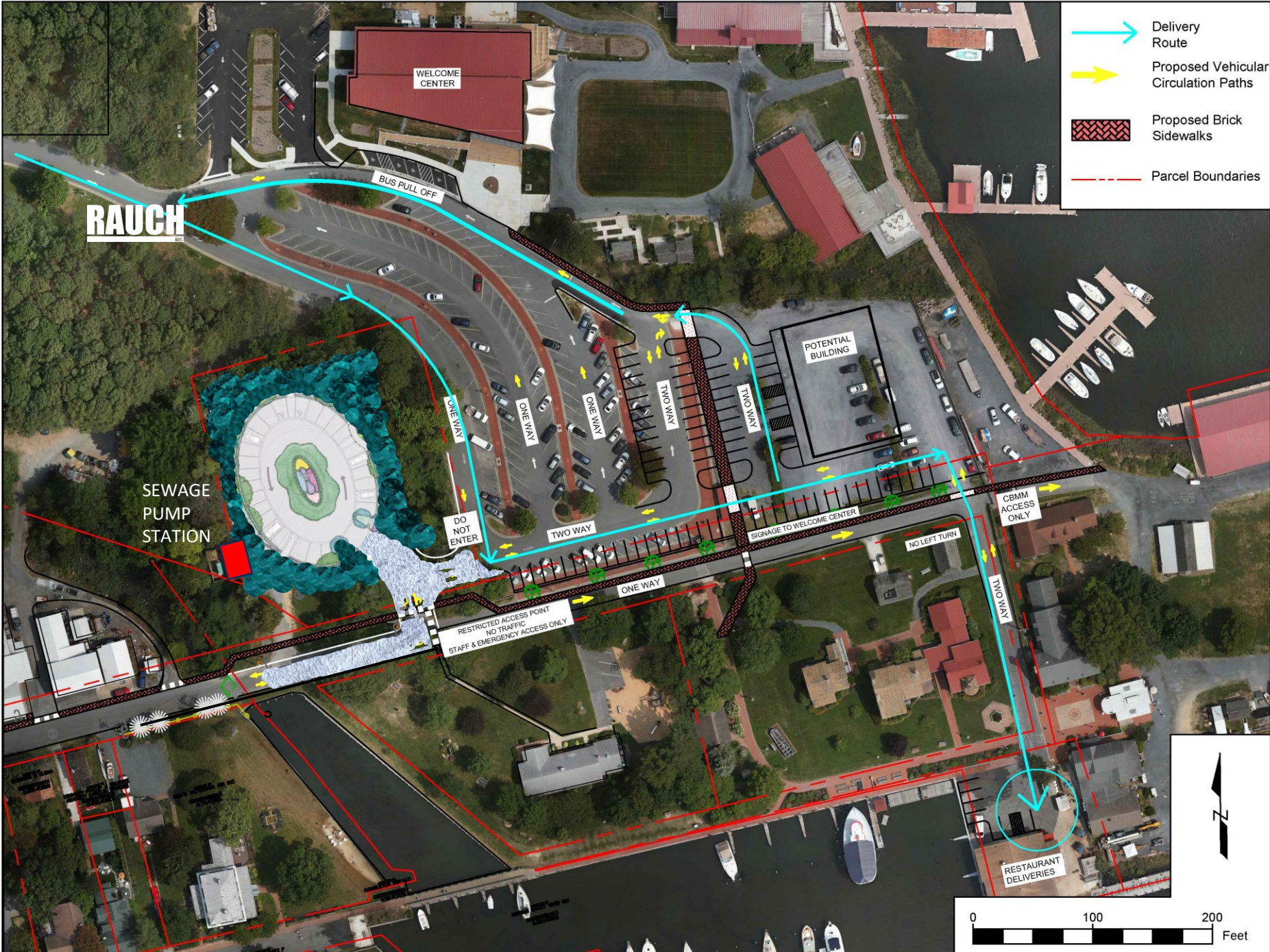
SITE DATA	
PROPERTY ADDRESS:	MILL AND BURNS STREETS ST. MICHAELS, MD 21663
LONGITUDE:	38°47'14.490" N
LATITUDE:	-76°12'13.98" W
PRESENT ZONING CLASSIFICATION:	MUNICIPAL ROW
PRESENT USE:	MUNICIPAL ROW
TAX MAP:	0200
GRID:	0025M
SITE AREA:	0.75 AC
FEMA FLOOD MAP:	PANEL 24045C0161D
LIMITS OF DISTURBANCE:	0.66 A.C ±
CUT:	45 CY
FILL:	1,090 CY
NET:	1,045 CY FILL



St. Michaels Maryland

Phase 2 - Mill Street Sidewalk and Burns Street – Raise to Elevation 5.0 ±

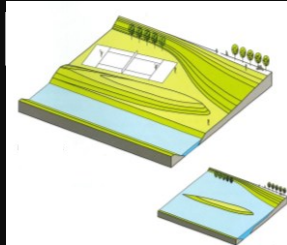
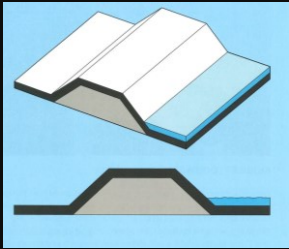




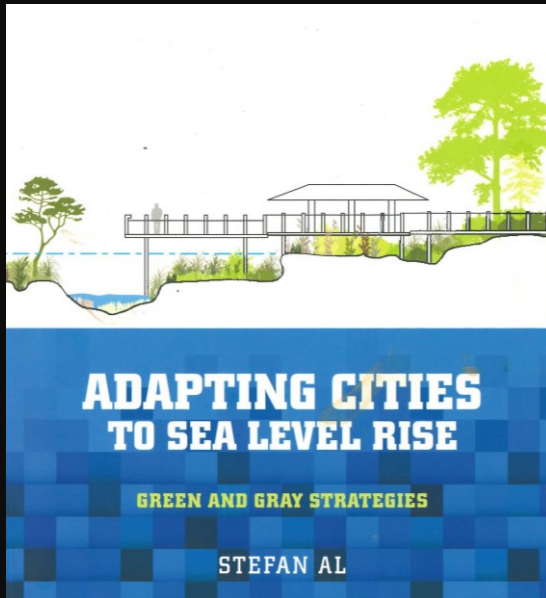
FLOOD PROTECTION OPTIONS

☐ STRATEGIES

☐ POTENTIAL GRANT FUNDING



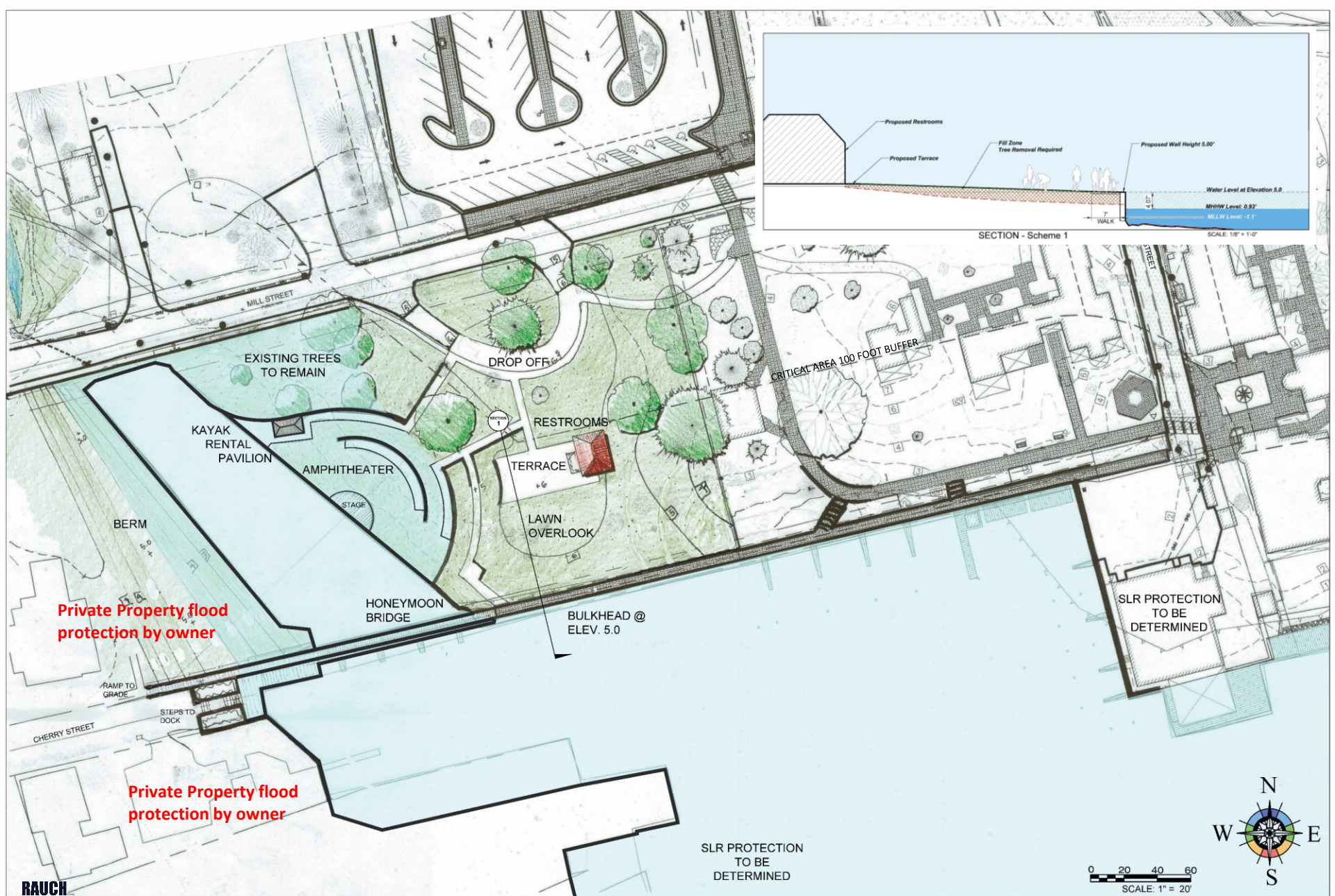
Resources Available



LAND
SIDE

- ❖ No action – anticipate flooding
- ❖ *Fill – prevent flooding, plan for overland drainage
- ❖ *Berm/Dike/Levee with tide gates
- ❖ *Bulkhead/Seawall
- ❖ Strategic Retreat
- *Where funding, engineering design and permit process allow

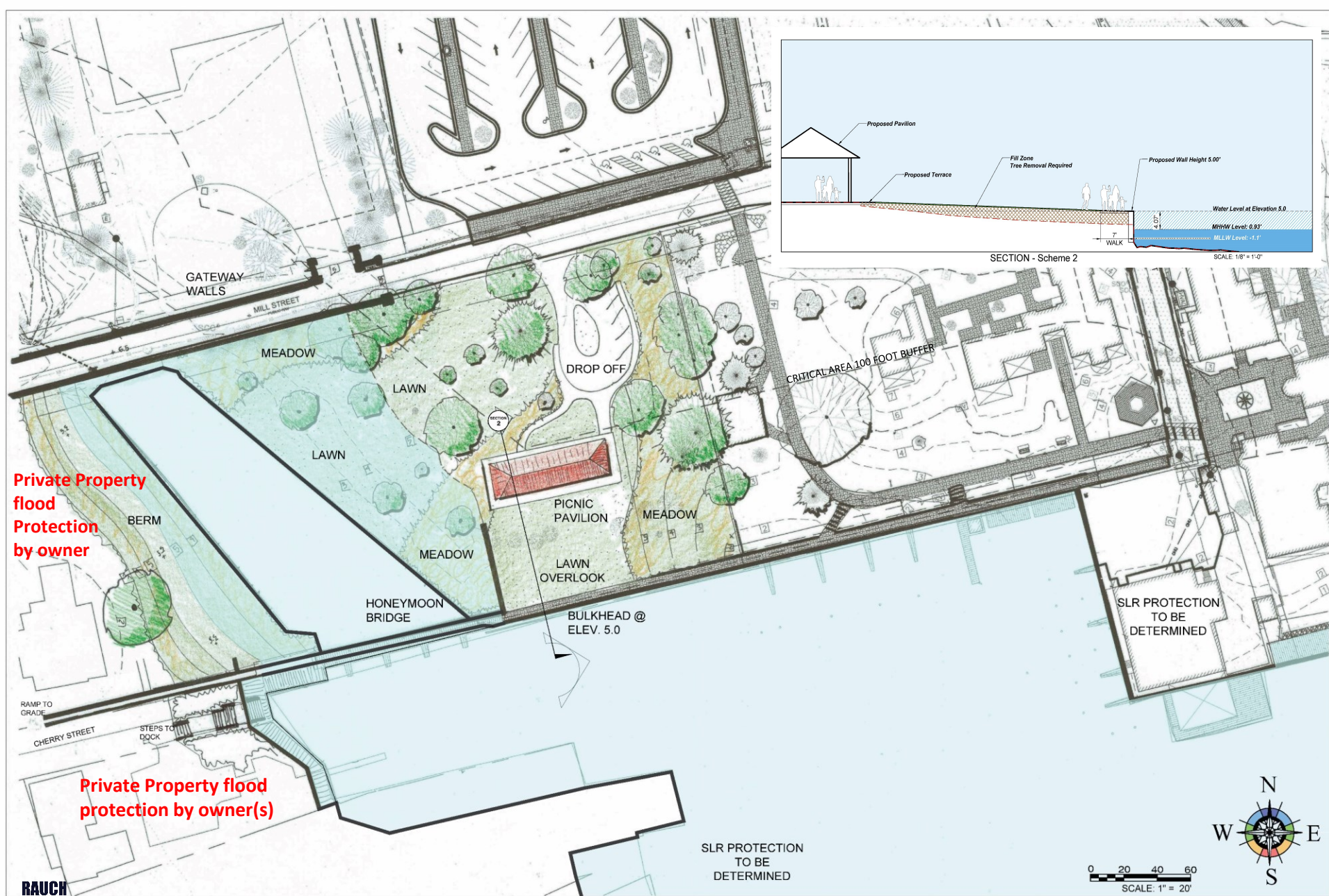
PARKING
TIDE GATE
CLOSED



St. Michaels Maryland Amphitheater



- Detailed park Design is a future task but understanding potential concepts is required to design the water's edge thoughtfully



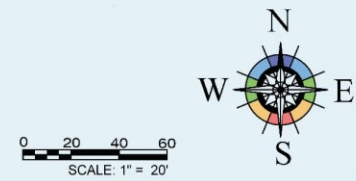
Private Property
flood
Protection
by owner

Private Property flood
protection by owner(s)

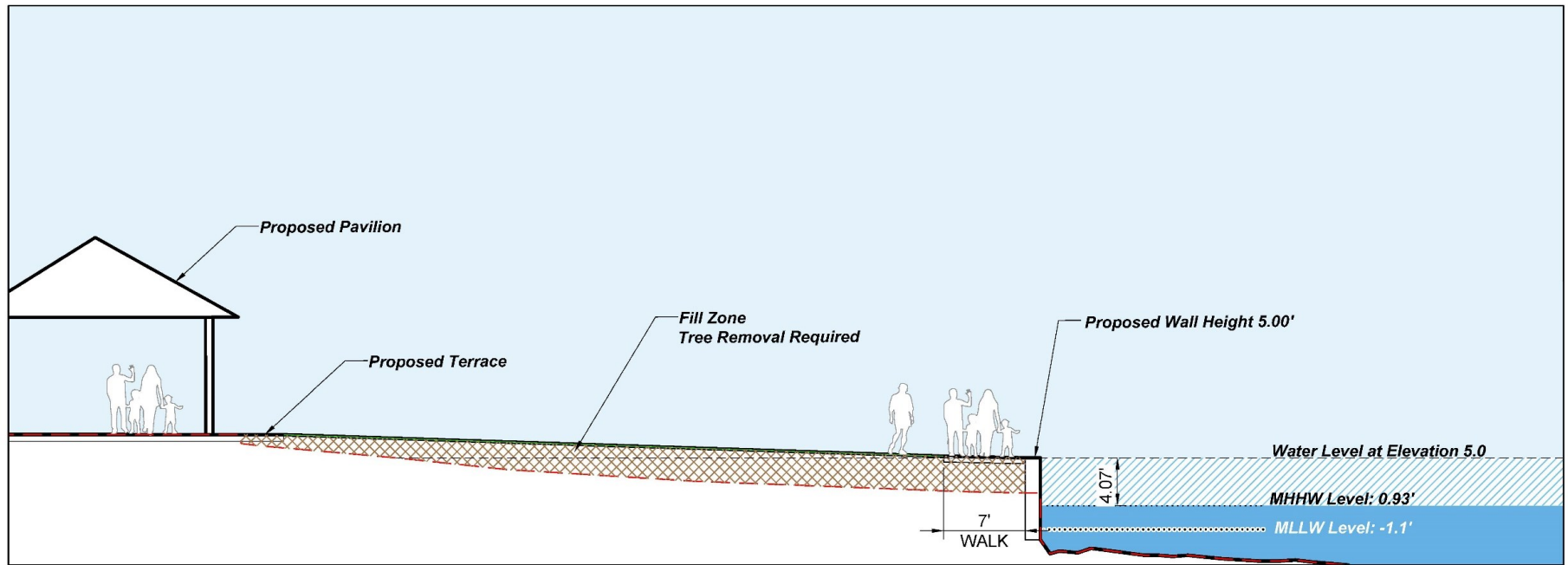
SLR PROTECTION
TO BE
DETERMINED

SLR PROTECTION
TO BE
DETERMINED

**PARK CONCEPT 2
PAVILION OVERLOOK**



St. Michaels Maryland Scheme 2 Section



SECTION - Scheme 2

SCALE: 1/8" = 1'-0"

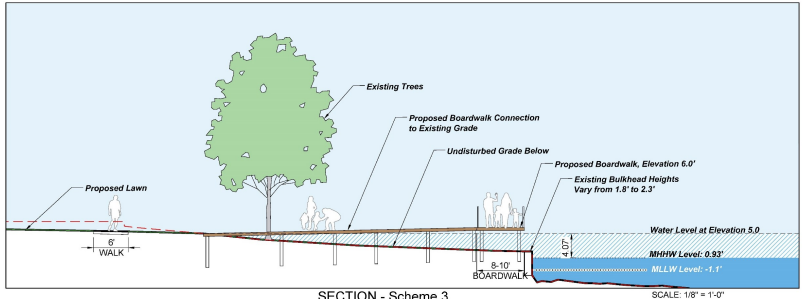
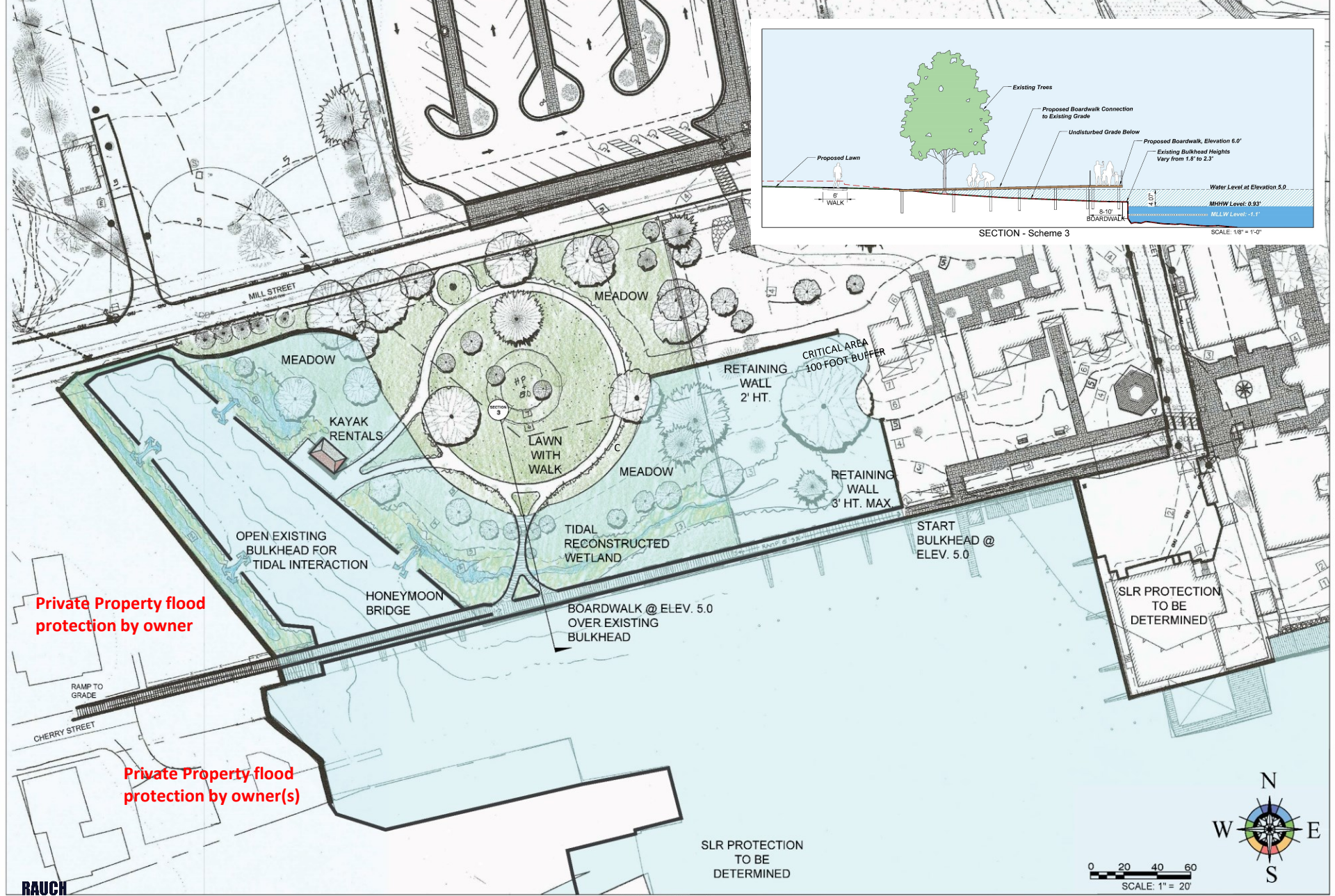
St. Michaels Maryland Pavilion



024

Picnic Shelter Pavilion

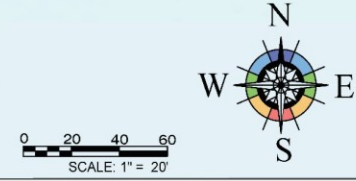
AtlantaAreaParks.com



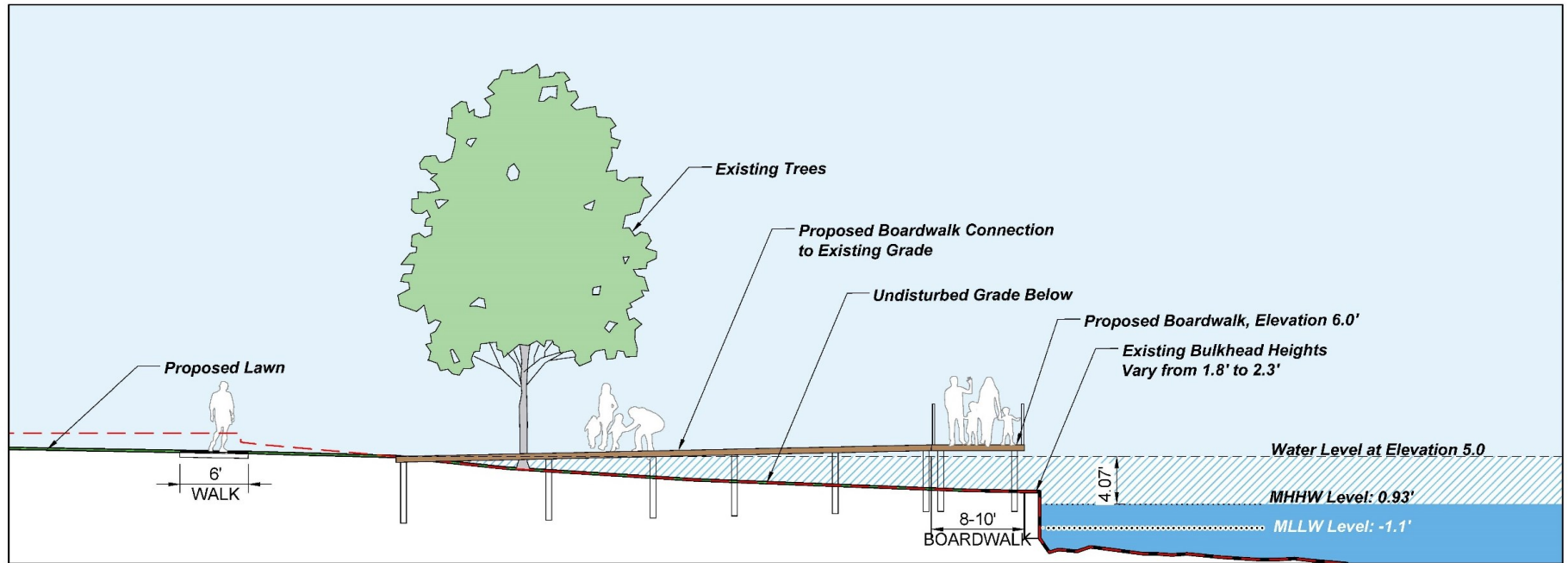
Private Property flood protection by owner

Private Property flood protection by owner(s)

**SCHEME 3
OPEN SPACE & NATURAL SYSTEMS**

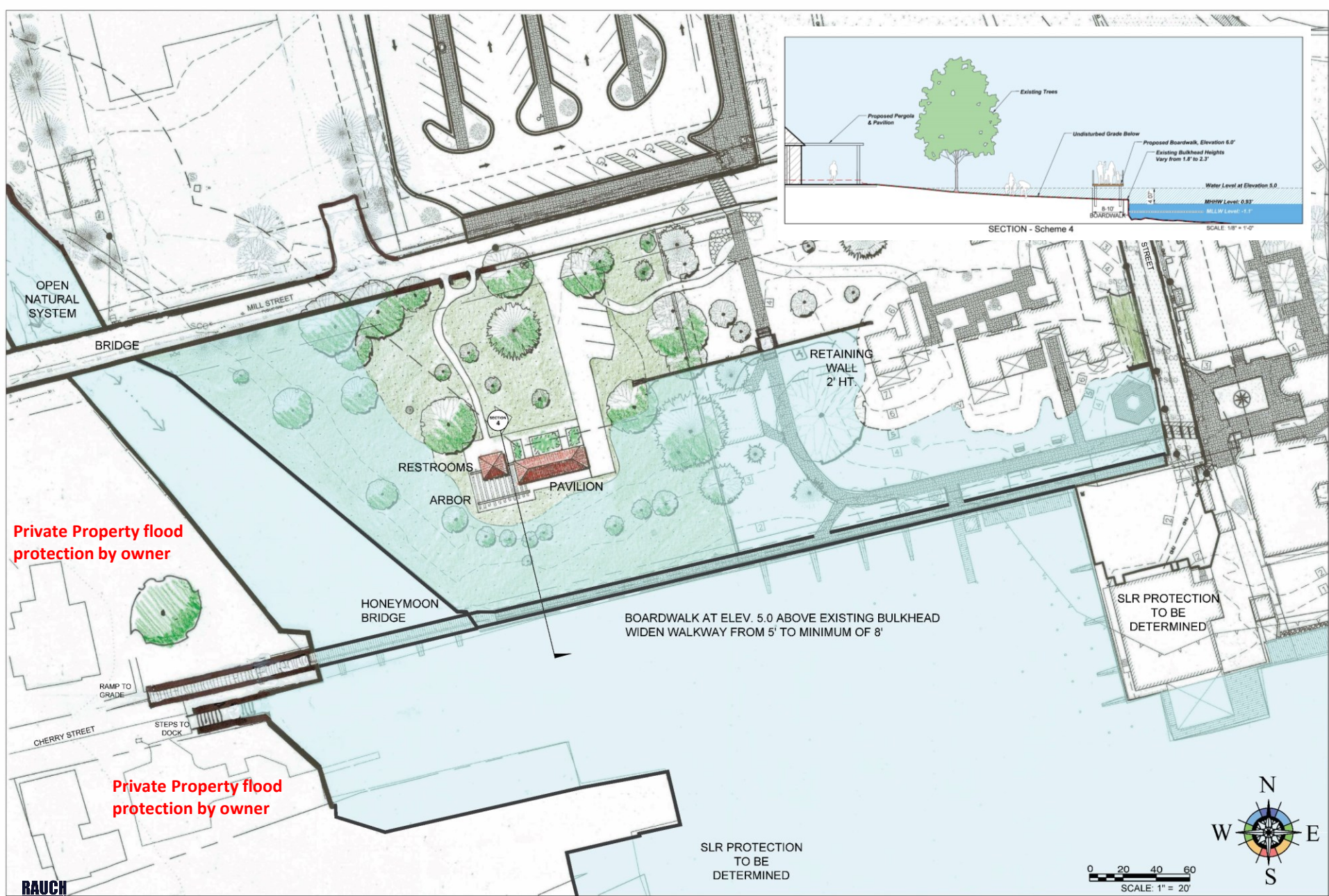


St. Michaels Maryland Scheme 3 Section



SECTION - Scheme 3

SCALE: 1/8" = 1'-0"

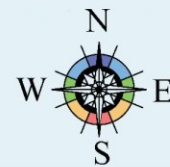
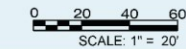


RAUCH

ANNAPOLIS

LANDSCAPE ARCHITECTS
 54 Southgate Avenue, Annapolis, Maryland 21401
 Tel 410.610.7212, contact@annapolisra.com, www.annapolisra.com

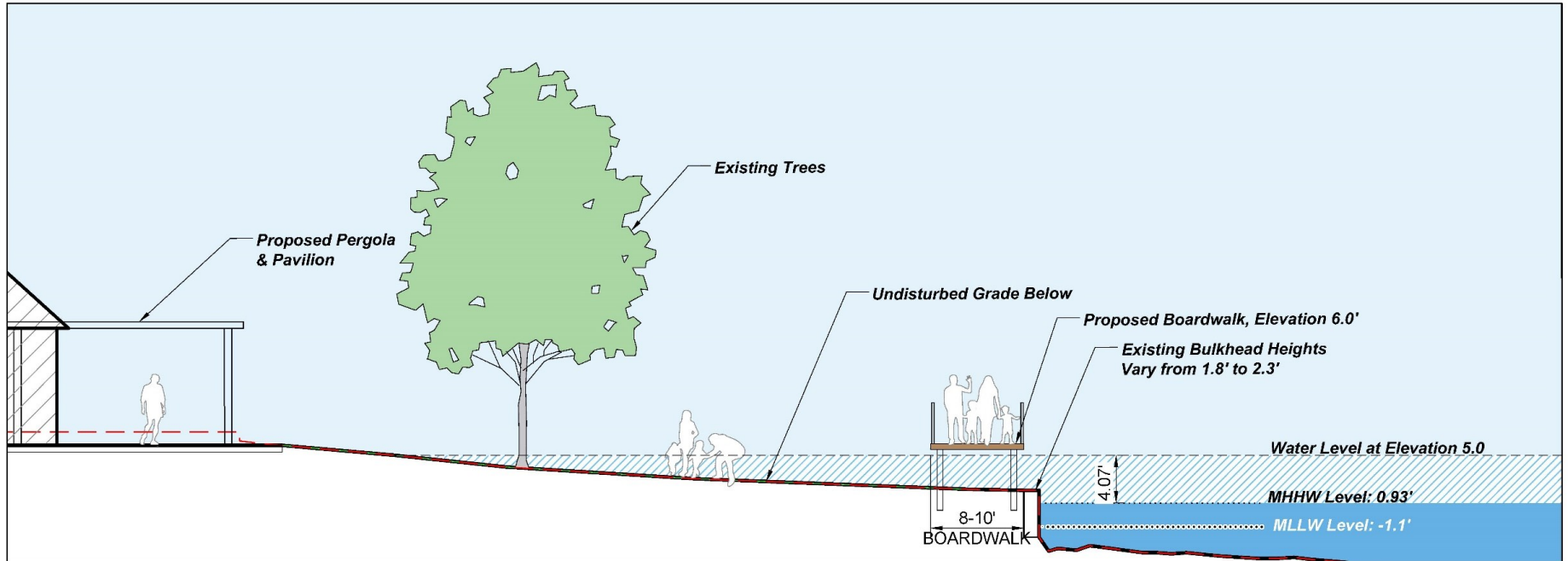
PARK CONCEPT 4
MILL STREET BRIDGE & PARK FACILITIES



FLOODING AND STORMWATER MITIGATION PROJECT

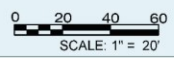
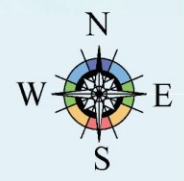
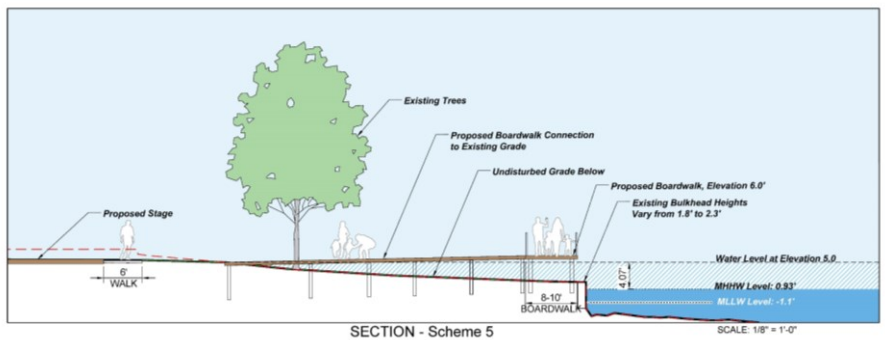
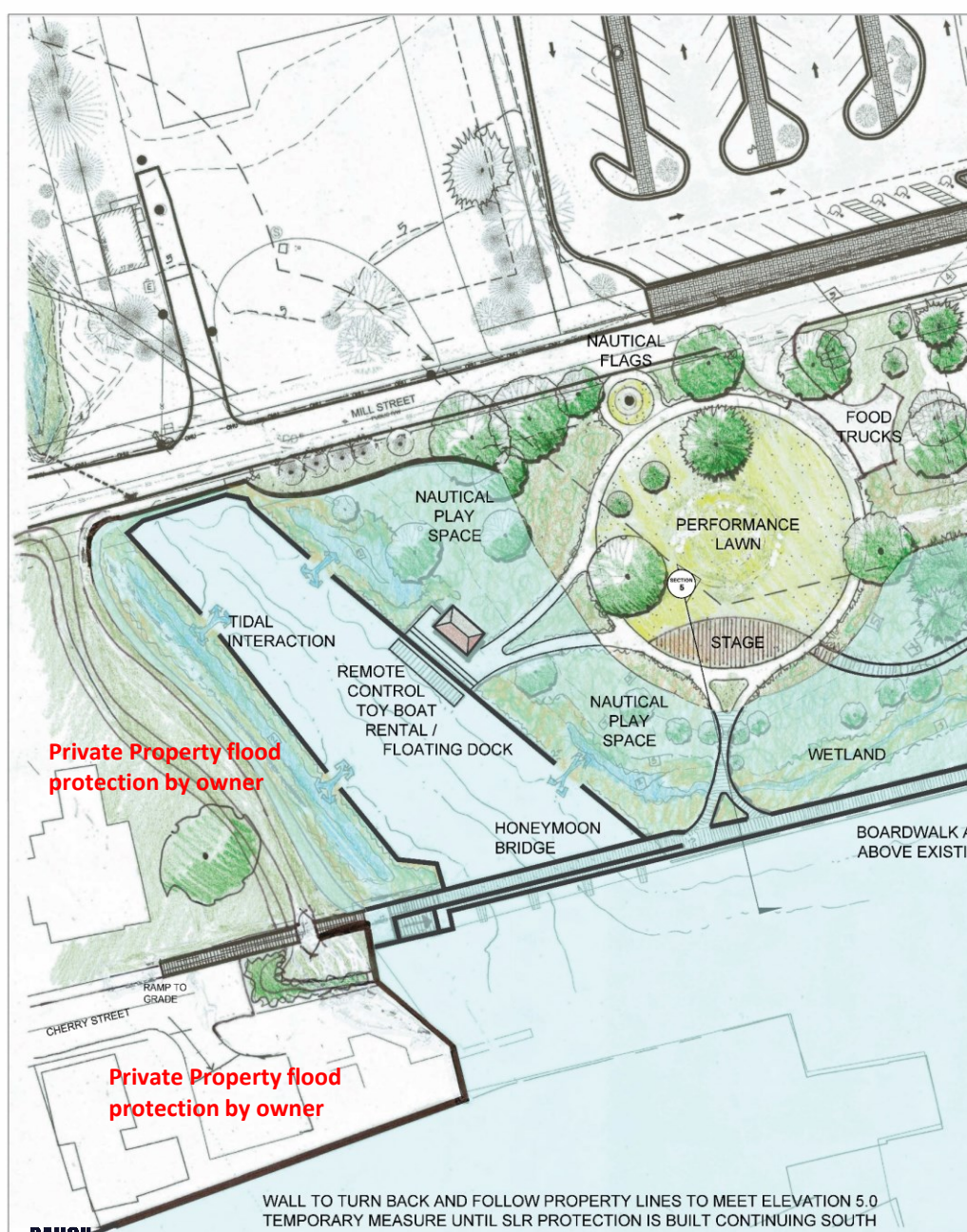
ST. MICHAEL'S, MARYLAND

St. Michaels Maryland Scheme 4 Section



SECTION - Scheme 4

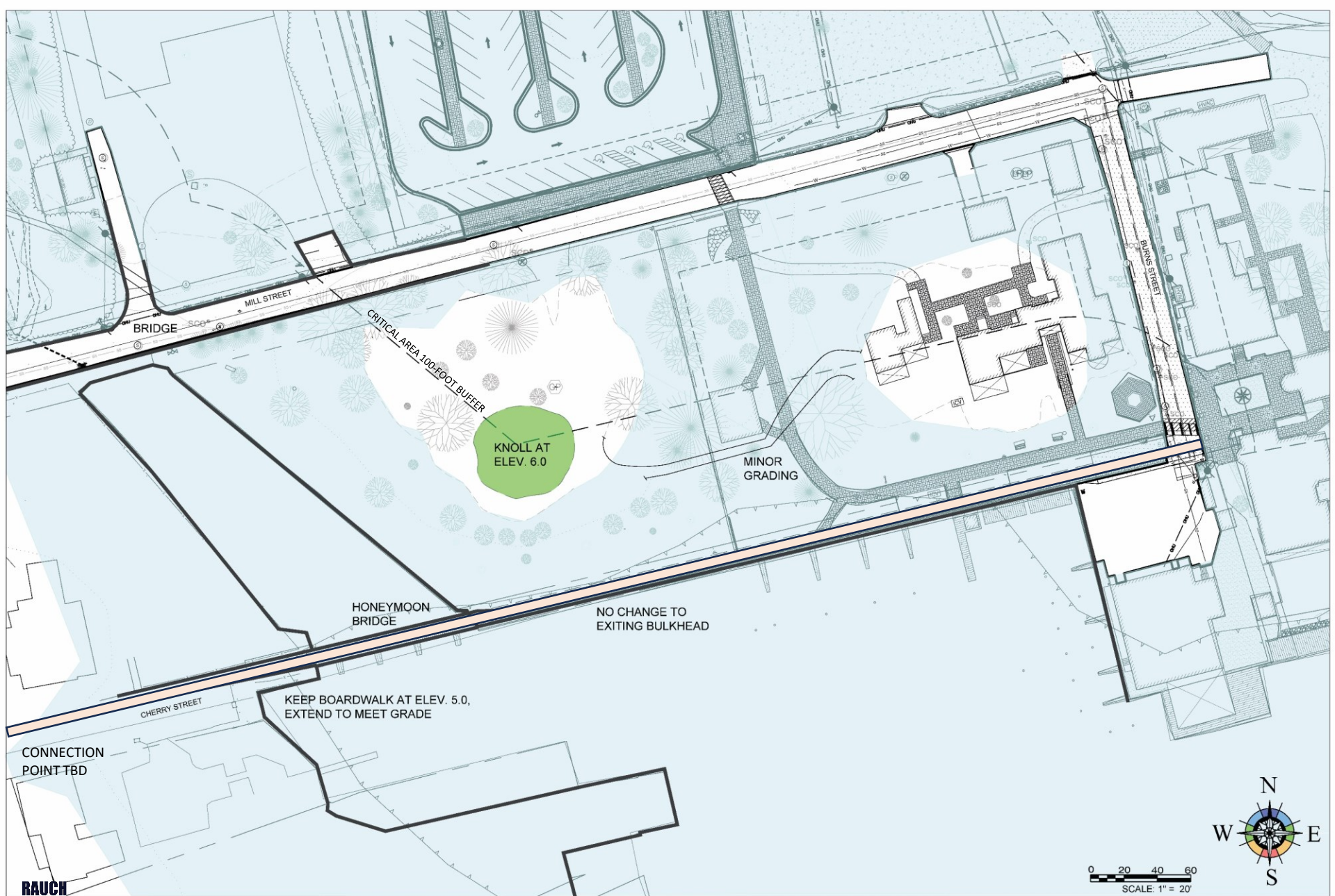
SCALE: 1/8" = 1'-0"



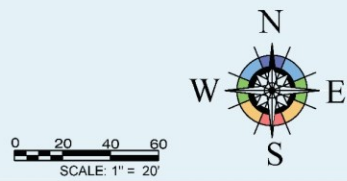
RAUCH
ANNAPOLIS
LANDSCAPE ARCHITECTS
54 Southgate Avenue - Annapolis, Maryland 21401
Tel: 410-670-7242, contact@annapolisia.com, www.annapolisia.com

**PARK CONCEPT 5
PLAY PARK - NAUTICAL THEME**

**FLOODING AND STORMWATER
MITIGATION PROJECT**
ST. MICHAEL'S, MARYLAND



PARK CONCEPT 6



St. Michaels Maryland Harbor Flooding & Stormwater Mitigation Project



RAUCH
INC.

ANNAPOLIS
LANDSCAPE
ARCHITECTS



QUESTIONS?

- ❖ Where should the design and engineering team focus efforts moving forward?
- ❖ Possible approaches have been discussed – the goal is to quickly focus on fewer options; does the group have a leaning toward a particular scenario(s)?