

ATTACHMENT 8

RMAT Climate Resilience Design Standards Tool Report

Climate Resilience Design Standards Tool Project Report

Phinney's Harbor Core Sewer Area

Date Created: 10/2/2024 2:38:21 PM

Created By: klr@envpartners.com

Date Report Generated: 10/2/2024 8:01:12 PM

Tool Version: Version 1.2

Project Contact Information: Kathryn Roosa, PE (kathryn.roosa@apexcos.com)

Project Summary

[Link to Project](#)

Estimated Capital Cost: \$37497000.00

End of Useful Life Year: 2062

Project within mapped Environmental Justice neighborhood: No

Ecosystem Service	Scores
Benefits	
Project Score	Low
Exposure	
Sea Level Rise/Storm Surge	High
Surge	Exposure
Extreme Precipitation - Urban Flooding	High
Extreme Precipitation - Riverine Flooding	Moderate
Extreme Heat	High



Asset Preliminary Climate Risk Rating

Number of Assets: 3

Summary

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
Phinney's Harbor Core Sewer Area	High Risk	High Risk	High Risk	High Risk
Bourne Schools Pump Station	High Risk	High Risk	High Risk	High Risk
Bourne Schools WWTF	High Risk	High Risk	High Risk	High Risk

Climate Resilience Design Standards Summary

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
Phinney's Harbor Core Sewer Area	2070	2050		200-yr (0.5%)	
Bourne Schools Pump Station	2050			200-yr (0.5%)	
Bourne Schools WWTF	2050			200-yr (0.5%)	
Extreme Precipitation					
Phinney's Harbor Core Sewer Area	2070			50-yr (2%)	Tier 3
Bourne Schools Pump Station	2050			50-yr (2%)	Tier 3
Bourne Schools WWTF	2050			50-yr (2%)	Tier 3
Extreme Heat					
Phinney's Harbor Core Sewer Area	2070		90th		Tier 3

Bourne Schools Pump Station	2050	90th	Tier 3
Bourne Schools WWTF	2050	90th	Tier 3

Scoring Rationale - Project Exposure Score

The purpose of the Exposure Score output is to provide a preliminary assessment of whether the overall project site and subsequent assets are exposed to impacts of natural hazard events and/or future impacts of climate change. For each climate parameter, the Tool will calculate one of the following exposure ratings: Not Exposed, Low Exposure, Moderate Exposure, or High Exposure. The rationale behind the exposure rating is provided below.

Sea Level Rise/Storm Surge

This project received a "High Exposure" because of the following:

- Located within the predicted mean high water shoreline by 2030
- Exposed to the 1% annual coastal flood event as early as 2030
- Located within the 0.1% annual coastal flood event within the project's useful life

Extreme Precipitation - Urban Flooding

This project received a "High Exposure" because of the following:

- Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life
- Existing impervious area of the project site is greater than 50%
- No historic flooding at project site
- No increase to impervious area

Extreme Precipitation - Riverine Flooding

This project received a "Moderate Exposure" because of the following:

- Part of the project is within 500ft of a waterbody and less than 20ft above the waterbody
- No historic riverine flooding at project site
- The project is not within a mapped FEMA floodplain [outside of the Massachusetts Coast Flood Risk Model (MC-FRM)]
- Project is not likely susceptible to riverine erosion

Extreme Heat

This project received a "High Exposure" because of the following:

- Existing impervious area of the project site is greater than 50%
- 10 to 30 day increase in days over 90 deg. F within project's useful life
- Located within 100 ft of existing water body
- No increase to the impervious area of the project site
- No tree removal

Scoring Rationale - Asset Preliminary Climate Risk Rating

A Preliminary Climate Risk Rating is determined for each infrastructure and building asset by considering the overall project Exposure Score and responses to Step 4 questions provided by the user in the Tool. Natural Resource assets do not receive a risk rating. The following factors are what influenced the risk ratings for each asset.

Asset - Phinney's Harbor Core Sewer Area

Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Loss/inoperability of the asset would have impacts limited to local area and/or municipality
- Inoperability of the asset would be expected to result in minor impacts to people's health, including minor injuries or minor impacts to chronic illnesses
- Inoperability is likely to significantly impact other facilities, assets, or buildings and will likely affect their ability to operate
- Spills and/or releases of hazardous materials would be moderately difficult to clean up

Asset - Bourne Schools Pump Station

Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Less than 10,000 people would be directly affected by the loss/inoperability of the asset
- Inoperability of the asset would result in moderate or severe injuries or moderate or severe impacts to chronic illnesses
- Inoperability is likely to significantly impact other facilities, assets, or buildings and will likely affect their ability to operate
- Spills and/or releases of hazardous materials are expected with difficult remediation and pose a severe threat to public health or safety

Asset - Bourne Schools WWTF

Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Less than 10,000 people would be directly affected by the loss/inoperability of the asset
- Inoperability of the asset would result in moderate or severe injuries or moderate or severe impacts to chronic illnesses
- Cost to replace is between \$30 million and \$100 million
- Spills and/or releases of hazardous materials are expected with difficult remediation and pose a severe threat to public health or safety

Project Climate Resilience Design Standards Output

Climate Resilience Design Standards and Guidance are recommended for each asset and climate parameter. The Design Standards for each climate parameter include the following: recommended planning horizon (target and/or intermediate), recommended return period (Sea Level Rise/Storm Surge and Precipitation) or percentile (Heat), and a list of applicable design criteria that are likely to be affected by climate change. Some design criteria have numerical values associated with the recommended return period and planning horizon, while others have tiered methodologies with step-by-step instructions on how to estimate design values given the other recommended design standards.

Asset: Phinney's Harbor Core Sewer Area

Infrastructure

Sea Level Rise/Storm Surge

High Risk

Target Planning Horizon: 2070

Intermediate Planning Horizon: 2050

Return Period: 200-yr (0.5%)

LIMITATIONS: The recommended Climate Resilience Design Standards for the Sea Level Rise / Storm Surge Design Criteria are based on the user drawn polygon and relationships as defined in the Supporting Documents. The projected values provided through the Tool are based on the Massachusetts Coast Flood Risk Model (MC-FRM) outputs as of 9/13/2021, which included GIS-based data for three planning horizons (2030, 2050, 2070) and six return periods (0.1%, 0.2%, 0.5%, 1%, 2%, 5%). These values are projections based on assumptions as defined in the model and the LiDAR used at the time. For additional information on the MC-FRM, review the additional resources provided on the Start Here page.

The projected values, Standards, and Guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence.

Applicable Design Criteria

Projected Tidal Datums: APPLICABLE

Planning Horizon	MHHW	MHW	MTL	MLW	MLLW
	(ft - NAVD88)				
2050	4.9	4.7	2.8	0.9	0.9
2070	6.8	6.5	4.7	2.8	2.7

This project is located in an area with uncertainty for future tidal datums. These uncertain zones are either dynamic in terms of geomorphology or are restricted by manmade features (i.e., culverts, tide gates, etc.) that should be evaluated in more detail at the site-scale.

Projected Water Surface Elevation: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Phinney's Harbor Core Sewer Area	2050	0.5% (200-Year)	16.5	15.8	16.0
	2070		19.2	18.4	18.7

Projected Wave Action Water Elevation: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Phinney's Harbor Core Sewer Area	2050	0.5% (200-Year)	19.9	15.8	17.6
	2070		22.9	18.4	20.7

Projected Wave Heights: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(Feet)		
Phinney's Harbor Core Sewer Area	2050	0.5% (200-Year)	5.0	0.0	2.1
	2070		6.0	0.0	2.7

Projected Duration of Flooding: APPLICABLE

[Methodology to Estimate Projected Values](#)

Projected Design Flood Velocity: APPLICABLE

[Methodology to Estimate Projected Values](#)

Projected Scour & Erosion: APPLICABLE

[Methodology to Estimate Projected Values](#)

Extreme Precipitation

High Risk

Target Planning Horizon: 2070

Return Period: 50-yr (2%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

While Total Precipitation Depth & Peak Intensity for 24-hour Design Storms are useful to inform planning and design, it is recommended to also consider additional longer- and shorter-duration precipitation events and intensities in accordance with best practices. Longer-duration, lower-intensity storms allow time for infiltration and reduce the load on infrastructure over the duration of the storm. Shorter-duration, higher-intensity storms often have higher runoff volumes because the water does not have enough time to infiltrate infrastructure systems (e.g., catch basins) and may overflow or back up during such storms, resulting in flooding. In the Northeast, short-duration high intensity rain events are becoming more frequent, and there is often little early warning for these events, making it difficult to plan operationally. While the Tool does not provide recommended design standards for these scenarios, users should still consider both short- and long-duration precipitation events and how they may impact the asset.

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Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
Phinney's Harbor Core Sewer Area	2070	50-Year (2%)	8.8	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Extreme Heat

High Risk

Target Planning Horizon: 2070

Percentile: 90th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Heat Index: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): NOT APPLICABLE

Asset: Bourne Schools Pump Station

Building/Facility

Sea Level Rise/Storm Surge

High Risk

Target Planning Horizon: 2050
 Intermediate Planning Horizon: Not Applicable
 Return Period: 200-yr (0.5%)

LIMITATIONS: The recommended Climate Resilience Design Standards for the Sea Level Rise / Storm Surge Design Criteria are based on the user drawn polygon and relationships as defined in the Supporting Documents. The projected values provided through the Tool are based on the Massachusetts Coast Flood Risk Model (MC-FRM) outputs as of 9/13/2021, which included GIS-based data for three planning horizons (2030, 2050, 2070) and six return periods (0.1%, 0.2%, 0.5%, 1%, 2%, 5%). These values are projections based on assumptions as defined in the model and the LiDAR used at the time. For additional information on the MC-FRM, review the additional resources provided on the Start Here page.

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Applicable Design Criteria

Projected Tidal Datums: APPLICABLE

Planning Horizon	MHHW	MHW	MTL	MLW	MLLW
	(ft - NAVD88)				
2050	4.9	4.7	2.8	0.9	0.9

This project is located in an area with uncertainty for future tidal datums. These uncertain zones are either dynamic in terms of geomorphology or are restricted by manmade features (i.e., culverts, tide gates, etc.) that should be evaluated in more detail at the site-scale.

Projected Water Surface Elevation: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Bourne Schools Pump Station	2050	0.5% (200-Year)	16.5	15.8	16.0

Projected Wave Action Water Elevation: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Bourne Schools Pump Station	2050	0.5% (200-Year)	19.9	15.8	17.6

Projected Wave Heights: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(Feet)		
Bourne Schools Pump Station	2050	0.5% (200-Year)	5.0	0.0	2.1

Projected Duration of Flooding: APPLICABLE

[Methodology to Estimate Projected Values](#)

Projected Design Flood Velocity: APPLICABLE

[Methodology to Estimate Projected Values](#)

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation

High Risk

Target Planning Horizon: 2050
 Return Period: 50-yr (2%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic

Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

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Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
Bourne Schools Pump Station	2050	50-Year (2%)	8.3	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Extreme Heat

High Risk

Target Planning Horizon: 2050

Percentile: 90th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Heat Index: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Asset: Bourne Schools WWTF

Building/Facility

Sea Level Rise/Storm Surge

High Risk

Target Planning Horizon: 2050

Intermediate Planning Horizon: Not Applicable

Return Period: 200-yr (0.5%)

LIMITATIONS: The recommended Climate Resilience Design Standards for the Sea Level Rise / Storm Surge Design Criteria are based on the user drawn polygon and relationships as defined in the Supporting Documents. The projected values provided through the Tool are based on the Massachusetts Coast Flood Risk Model (MC-FRM) outputs as of 9/13/2021, which included GIS-based data for three planning horizons (2030, 2050, 2070) and six return periods (0.1%, 0.2%, 0.5%, 1%, 2%, 5%). These values are projections based

on assumptions as defined in the model and the LiDAR used at the time. For additional information on the MC-FRM, review the additional resources provided on the Start Here page.

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Applicable Design Criteria

Projected Tidal Datums: APPLICABLE

Planning Horizon	MHHW	MHW	MTL	MLW	MLLW
	(ft-NAVD88)				
2050	4.9	4.7	2.8	0.9	0.9

This project is located in an area with uncertainty for future tidal datums. These uncertain zones are either dynamic in terms of geomorphology or are restricted by manmade features (i.e., culverts, tide gates, etc.) that should be evaluated in more detail at the site-scale.

Projected Water Surface Elevation: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Bourne Schools WWTF	2050	0.5% (200-Year)	16.5	15.8	16.0

Projected Wave Action Water Elevation: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Bourne Schools WWTF	2050	0.5% (200-Year)	19.9	15.8	17.6

Projected Wave Heights: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period	Max	Min	Area Weighted Average
			(Feet)		
Bourne Schools WWTF	2050	0.5% (200-Year)	5.0	0.0	2.1

Projected Duration of Flooding: APPLICABLE

[Methodology to Estimate Projected Values](#)

Projected Design Flood Velocity: APPLICABLE

[Methodology to Estimate Projected Values](#)

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation

High Risk

Target Planning Horizon: 2050

Return Period: 50-yr (2%)

LIMITATIONS: The recommended Standards for Total Precipitation Depth & Peak Intensity are determined by the user drawn polygon and relationships as defined in the Supporting Documents. The projected Total Precipitation Depth values provided through the Tool are based on the climate projections developed by Cornell University as part of EEA's Massachusetts Climate and Hydrologic Risk Project, GIS-based data as of 10/15/21. For additional information on the methodology of these precipitation outputs, see Supporting Documents.

While Total Precipitation Depth & Peak Intensity for 24-hour Design Storms are useful to inform planning and design, it is recommended to also consider additional longer- and shorter-duration precipitation events and intensities in accordance with best practices. Longer-duration, lower-intensity storms allow time for infiltration and reduce the load on infrastructure over the duration of the storm. Shorter-duration, higher-intensity storms often have higher runoff volumes because the water does not have enough time to infiltrate infrastructure systems (e.g., catch basins) and may overflow or back up during such storms, resulting in flooding. In the Northeast, short-duration high intensity rain events are becoming more frequent, and there is often little early warning for these events, making it difficult to plan operationally. While the Tool does not provide recommended design standards for these scenarios, users should still consider both short- and long-duration precipitation events and how they may impact the asset.

The projected values, standards, and guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for

construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
Bourne Schools WWTF	2050	50-Year (2%)	8.3	Downloadable Methodology PDF

Projected Riverine Peak Discharge & Peak Flood Elevation: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Extreme Heat

High Risk

Target Planning Horizon: 2050

Percentile: 90th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Heat Index: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Growing Degree Days: NOT APPLICABLE

Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Number of Heat Waves Per Year & Average Heat Wave Duration: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Projected Cooling Degree Days & Heating Degree Days (base = 65°F): APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 3

Sea Level Rise/Storm Surge Project Maps

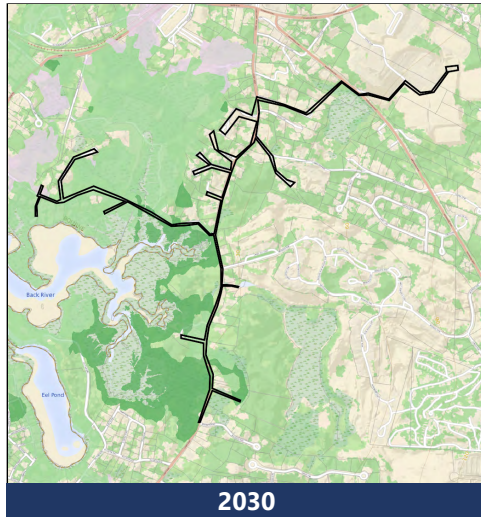
The following three maps illustrate the Projected Water Surface Elevation for the 2030, 2050, and 2070 planning horizons corresponding to the lowest return period (largest design storm) recommended across the assets identified for this project in the Tool. For projects that only have Natural Resource assets, the maps will show the Projected Water Surface Elevations corresponding to the 5% (20-year) return period. Refer to the Climate Resilience Design Standards Output - Sea Level Rise/Storm Surge Section for additional values associated with other assets. The maps include the project area as drawn by the user with a 0.1 mile minimum buffer, but do not reflect the location of specific assets on the site.

LIMITATIONS: The recommended Climate Resilience Design Standards for the Sea Level Rise / Storm Surge Design Criteria are based on the user drawn polygon and relationships as defined in the Supporting Documents. The projected values and maps provided through the Tool are based on the Massachusetts Coast Flood Risk Model (MC-FRM) outputs as of 9/13/2021, which included GIS-based data for three planning horizons (2030, 2050, 2070) and six return periods (0.1%, 0.2%, 0.5%, 1%, 2%, 5%). These values are projections based on assumptions as defined in the model and the LiDAR used at the time. For additional information on the MC-FRM, review the additional resources provided on the Start Here page.

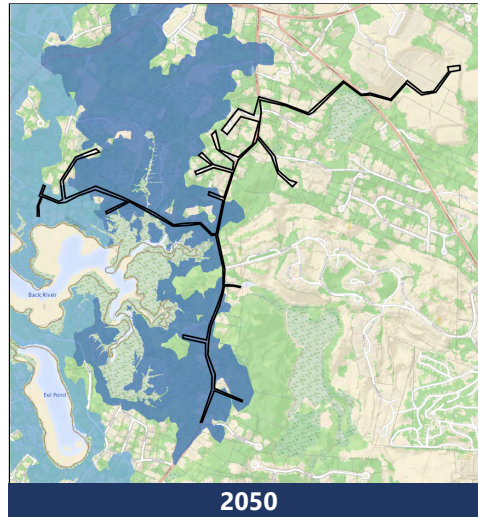
The projected values, maps, Standards, and Guidance provided within this Tool may be used to inform plans and designs, but they do not provide guarantees for future conditions or resilience. The projected values are not to be considered final or appropriate for construction documents without supporting engineering analyses. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence.

Legend

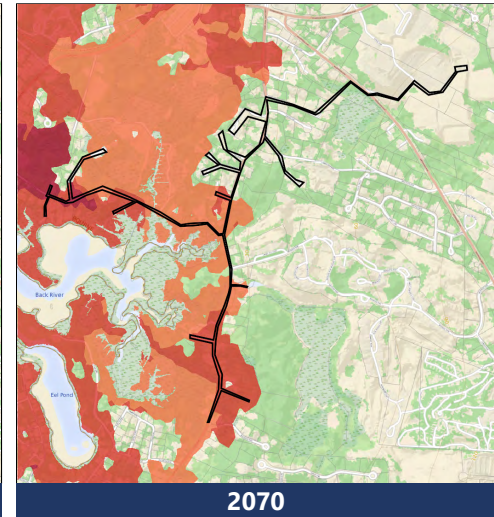
- Project Boundary
- Projected Water Surface Elevation (ft-NAVD88)
- ≤ 12.4
- 12.4 - 12.7
- 12.7 - 13.2
- 13.2 - 13.7
- 13.7 - 14.2
- 14.2 - 14.7
- 14.7 - 15.2
- 15.2 - 15.7
- 15.7 - 16.2
- 16.2 - 16.7
- 16.7 - 17.2
- 17.2 - 17.7
- 17.7 - 18.2
- 18.2 - 18.7
- 18.7 - 19.2
- ≥ 19.2



2030



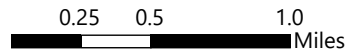
2050



2070

**Climate Resilience Design Standards Tool:
Sea Level Rise/Storm Surge Design Criteria
Projected Water Surface Elevation Map: 0.5% (200-yr)**

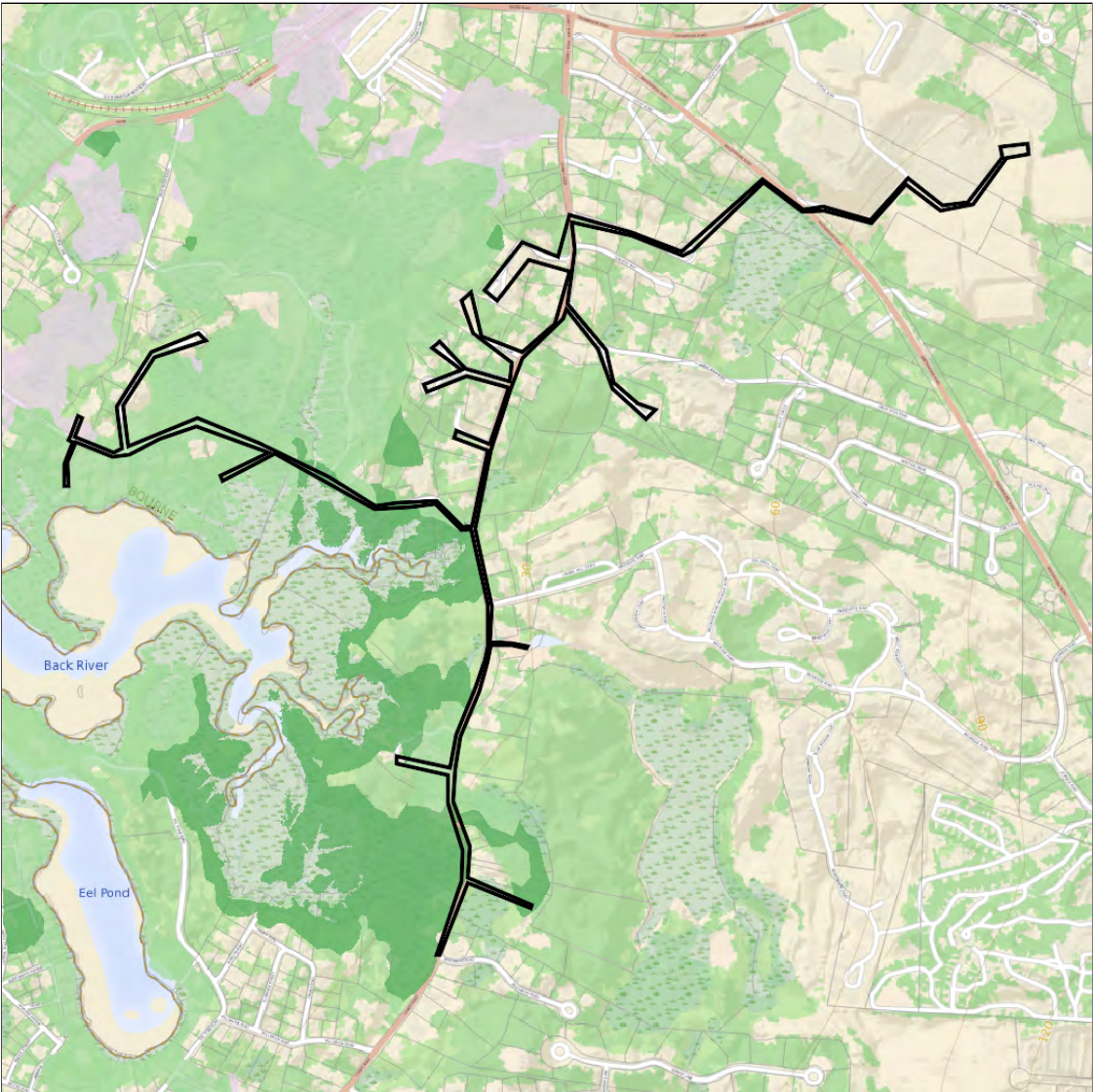
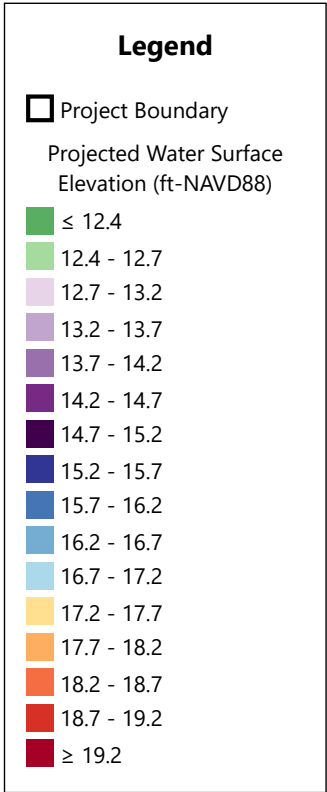
Project Name: Phinney's Harbor Core Sewer Area
Location (Town): Bourne



Created by: klr@envpartners.com
Date Created: 10/2/2024
Tool Version: 1.3



Asset Name	Planning Horizon	Return Period	Max Min		Area Weighted Average
			(ft-NAVD88)		
Phinney's Harbor Core Sewer Area, Bourne Schools Pump Station, Bourne Schools WWTF	2030	0.5% (200-yr)	12.8	12.4	12.5
	2050	0.5% (200-yr)	16.5	15.8	16.0
	2070	0.5% (200-yr)	19.2	18.4	18.7



**Climate Resilience Design Standards Tool:
Sea Level Rise/Storm Surge Design Criteria
Projected Water Surface Elevation Map: 2030, 0.5% (200-yr)**

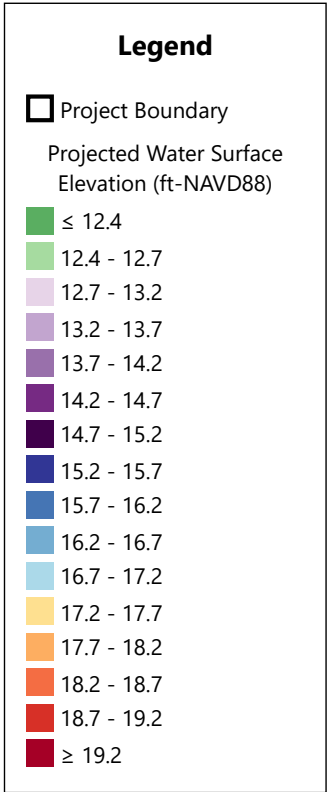
Project Name: Phinney's Harbor Core Sewer Area
Location (Town): Bourne



Created by: klr@envpartners.com
Date Created: 10/2/2024
Tool Version: 1.3



Asset Name	Planning Horizon	Return Period	Max	Min	Area Weighted Average (ft-NAVD88)
			(ft-NAVD88)		
Phinney's Harbor Core Sewer Area, Bourne Schools Pump Station, Bourne Schools WWTF	2030	0.5% (200-yr)	12.8	12.4	12.5



**Climate Resilience Design Standards Tool:
Sea Level Rise/Storm Surge Design Criteria
Projected Water Surface Elevation Map: 2050, 0.5% (200-yr)**

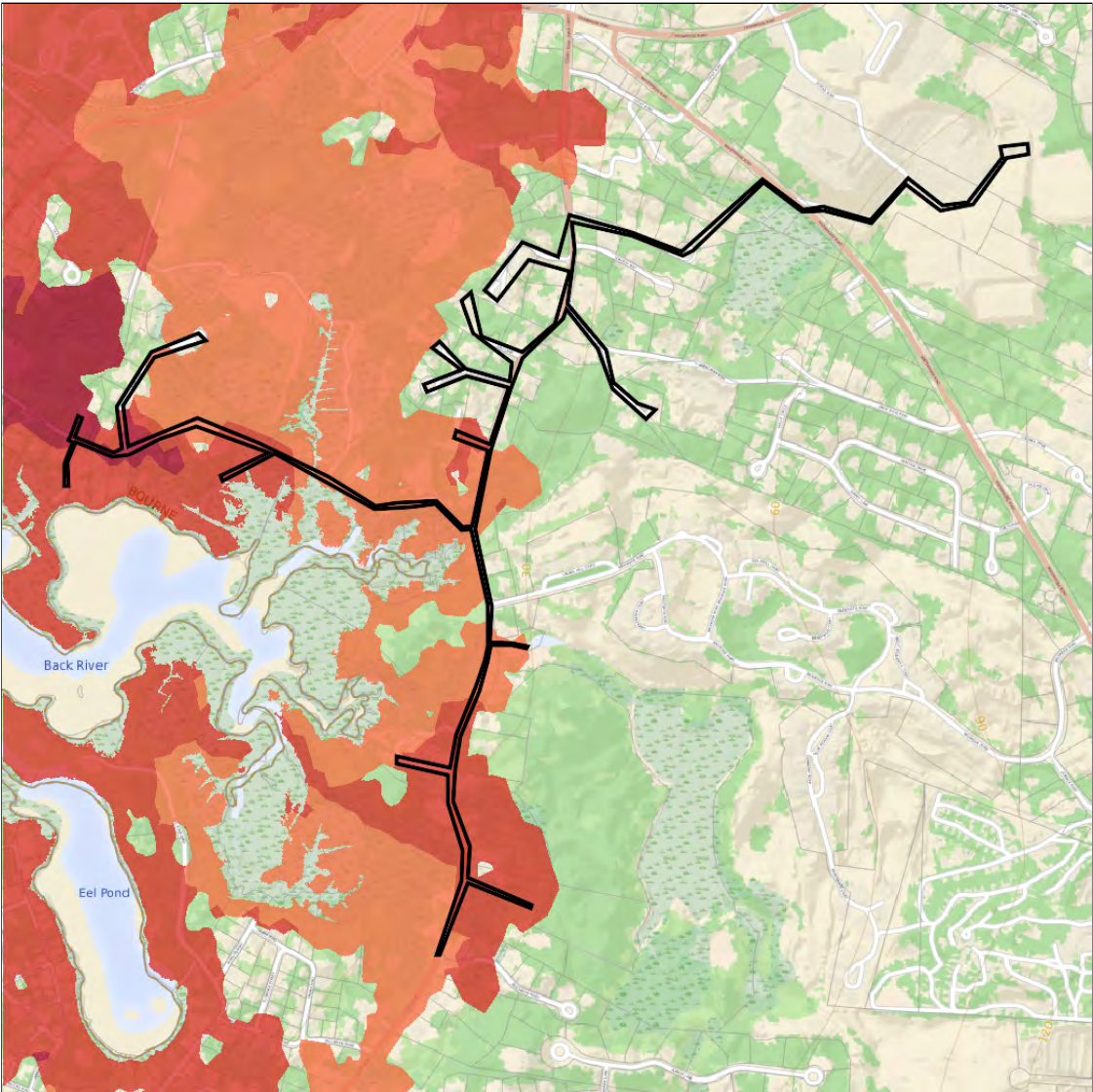
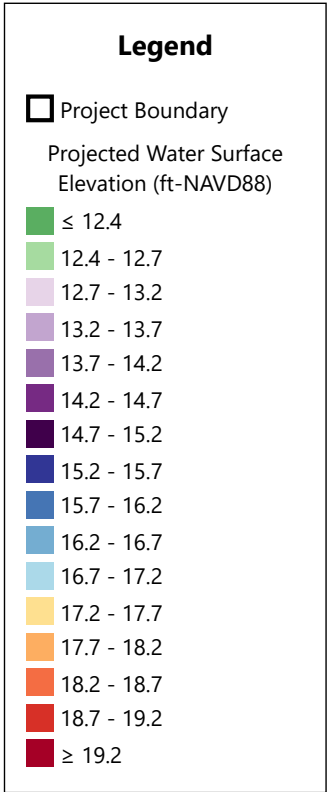
Project Name: Phinney's Harbor Core Sewer Area
Location (Town): Bourne



Created by: klr@envpartners.com
Date Created: 10/2/2024
Tool Version: 1.3



Asset Name	Planning Horizon	Return Period	Max	Min	Area Weighted Average (ft-NAVD88)
			(ft-NAVD88)		
Phinney's Harbor Core Sewer Area, Bourne Schools Pump Station, Bourne Schools WWTF	2050	0.5% (200-yr)	16.5	15.8	16.0



**Climate Resilience Design Standards Tool:
Sea Level Rise/Storm Surge Design Criteria
Projected Water Surface Elevation Map: 2070, 0.5% (200-yr)**

Project Name: Phinney's Harbor Core Sewer Area
Location (Town): Bourne



Created by: klr@envpartners.com
Date Created: 10/2/2024
Tool Version: 1.3



Asset Name	Planning Horizon	Return Period	Max	Min	Area Weighted Average (ft-NAVD88)
			(ft-NAVD88)		
Phinney's Harbor Core Sewer Area, Bourne Schools Pump Station, Bourne Schools WWTF	2070	0.5% (200-yr)	19.2	18.4	18.7

Project Inputs

Core Project Information

Name:	Phinney's Harbor Core Sewer Area
Given the expected useful life of the project, through what year do you estimate the project to last (i.e. before a major reconstruction/renovation)?	2062
Location of Project:	Bourne
Estimated Capital Cost:	\$37,497,000
Who is the Submitting Entity?	Private Other Environmental Partners/Apex Companies, LLC Kathryn Roosa, PE (kathryn.roosa@apexcos.com)
Is this project being submitted as part of a state grant application?	No
Which grant program?	
What stage are you in your project lifecycle?	Pre-Planning
Is climate resiliency a core objective of this project?	Yes
Is this project being submitted as part of the state capital planning process?	No
Is this project being submitted as part of a regulatory review process or permitting?	Yes
Brief Project Description:	As part of the Town of Bourne Comprehensive Wastewater Management Plan, the Phinney's Harbor Core Sewer Area addresses nitrogen removal associated with Cape Cod Commission 208 Plan and Massachusetts Estuaries Project (MEP) water quality goals. This project is part of Phase 1 of CWMP Implementation Plan and includes new sewer collection of residential and commercial areas to be conveyed to the existing Bourne Public Schools Wastewater Treatment Facility (Waterhouse Road).

Project Submission Comments:

Project Ecosystem Service Benefits

Factors Influencing Output

- ✓ Project improves water quality
- ✓ Project protects fisheries, wildlife, and plant habitat
- ✓ Project remediates existing sources of pollution
- ✓ Project prevents pollution

Factors to Improve Output

- ✓ Protect public water supply by reducing the risk of contamination, pollution, and/or runoff of surface and groundwater sources used for human consumption
- ✓ Incorporate green infrastructure or nature-based solutions that recharge groundwater

Is the primary purpose of this project ecological restoration?

No

Project Benefits

Provides flood protection through nature-based solutions	No
Reduces storm damage	No
Recharges groundwater	Maybe
Protects public water supply	Maybe
Filters stormwater using green infrastructure	No
Improves water quality	Yes
Promotes decarbonization	No
Enables carbon sequestration	No
Provides oxygen production	No
Improves air quality	No
Prevents pollution	Yes
Remediates existing sources of pollution	Yes
Protects fisheries, wildlife, and plant habitat	Yes
Protects land containing shellfish	No
Provides pollinator habitat	No
Provides recreation	No
Provides cultural resources/education	No

Project Climate Exposure

Is the primary purpose of this project ecological restoration?	No
Does the project site have a history of coastal flooding?	No
Does the project site have a history of flooding during extreme precipitation events (unrelated to water/sewer damages)?	Unsure
Does the project site have a history of riverine flooding?	No
Does the project result in a net increase in impervious area of the site?	No

Are existing trees being removed as part of the proposed project?

No

Project Assets

Asset: Phinney's Harbor Core Sewer Area

Asset Type: Utility Infrastructure

Asset Sub-Type: Wastewater

Construction Type: New Construction

Construction Year: 2032

Useful Life: 30

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.

Infrastructure must be accessible/operable at all times, even during natural hazard event.

Identify the geographic area directly affected by permanent loss or significant inoperability of the infrastructure.

Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss or significant inoperability of the infrastructure.

Less than 10,000 people

Identify if the infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

The infrastructure does not provide services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

Will the infrastructure reduce the risk of flooding?

No

If the infrastructure became inoperable for longer than acceptable in Question 1, how, if at all, would it be expected to impact people's health and safety?

Inoperability of the infrastructure would be expected to result in minor impacts to people's health, including minor injuries or minor impacts to chronic illnesses

If there are hazardous materials in your infrastructure, what are the extents of impacts related to spills/releases of these materials?

Spills and/or releases of hazardous materials are expected with moderately difficult cleanup

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?

Significant – Inoperability is likely to impact other facilities, assets, or buildings and result in cascading impacts that will likely affect their ability to operate

If the infrastructure was damaged beyond repair, how much would it approximately cost to replace?

Less than \$10 million

Does the infrastructure function as an evacuation route during emergencies? This question only applies to roadway projects.

No

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?

Impact on natural resources will require remediation/rehabilitation

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the infrastructure is not able to serve or operate its intended users or function)?

Loss of infrastructure may reduce the ability to maintain some government services, while a majority of services will still exist

What are the impacts to loss of confidence in government resulting from loss of infrastructure functionality (i.e. the infrastructure asset is not able to serve or operate its intended users or function)?

Reduced morale and public support

Asset: Bourne Schools Pump Station

Asset Type: Typically Unoccupied

Asset Sub-Type: Pump Station - Sanitary

Construction Type: New Construction

Construction Year: 2030

Useful Life: 20

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.

Building must be accessible/operable at all times, even during natural hazard event

Identify the geographic area directly affected by permanent loss or significant inoperability of the building/facility.

Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss of use or inoperability of the building/facility.

Less than 10,000 people

Identify if the building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

The building/facility does not provide services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

If the building/facility became inoperable for longer than acceptable in Question 1, how, if at all, would it be expected to impact people's health and safety?

Inoperability of the building/facility would result in moderate or severe injuries or moderate or severe impacts to chronic illnesses

If there are hazardous materials in your building/facility, what are the extent of impacts related to spills/releases of these materials?

Spills and/or releases of hazardous materials are expected with difficult remediation and pose a severe threat to public health or safety (E.g. wastewater treatment plant; biohazard laboratory)

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets,

and/or infrastructure?

Significant – Inoperability is likely to impact other facilities, assets, or buildings and will likely affect their ability to operate

If this building/facility was damaged beyond repair, how much would it approximately cost to replace?

Between \$10 million and \$30 million

Is this a recreational facility which can be vacated during a natural hazard event?

No

If the building/facility became inoperable for longer than acceptable in Question 1, what are the public and/or social services impacts?

No alternative programs and/or services are available to support the community

If the building/facility became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?

Impact on natural resources will require remediation/rehabilitation

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the building is not able to serve or operate its intended users or function)?

Loss of building may reduce the ability to maintain some government services, while a majority of services will still exist.

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts to loss of confidence in government (i.e. the building is not able to serve or operate its intended users or function)?

Reduced morale and public support

Asset: Bourne Schools WWTF

Asset Type: Typically Unoccupied

Asset Sub-Type: Wastewater treatment plant

Construction Type: Major Repair/Retrofit

Construction Year: 2030

Useful Life: 20

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.

Building must be accessible/operable at all times, even during natural hazard event

Identify the geographic area directly affected by permanent loss or significant inoperability of the building/facility.

Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss of use or inoperability of the building/facility.

Less than 10,000 people

Identify if the building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

The building/facility does not provide services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.

If the building/facility became inoperable for longer than acceptable in Question 1, how, if at all, would it be expected to impact people's health and safety?

Inoperability of the building/facility would result in moderate or severe injuries or moderate or severe impacts to chronic illnesses

If there are hazardous materials in your building/facility, what are the extent of impacts related to spills/releases of these materials?

Spills and/or releases of hazardous materials are expected with difficult remediation and pose a severe threat to public health or safety (E.g. wastewater treatment plant; biohazard laboratory)

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?

Significant – Inoperability is likely to impact other facilities, assets, or buildings and will likely affect their ability to operate

If this building/facility was damaged beyond repair, how much would it approximately cost to replace?

Between \$30 million and \$100 million

Is this a recreational facility which can be vacated during a natural hazard event?

No

If the building/facility became inoperable for longer than acceptable in Question 1, what are the public and/or social services impacts?

No alternative programs and/or services are available to support the community

If the building/facility became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?

Impact on natural resources will require remediation/rehabilitation

If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the building is not able to serve or operate its intended users or function)?

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If the building/facility became inoperable for longer than acceptable in Question 1, what are the impacts to loss of confidence in government (i.e. the building is not able to serve or operate its intended users or function)?

Reduced morale and public support

Report Comments

N/A