

Climate Resilience Design Standards Tool Project Report

Town of Northbridge - Whitinsville Social Library

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Project Summary

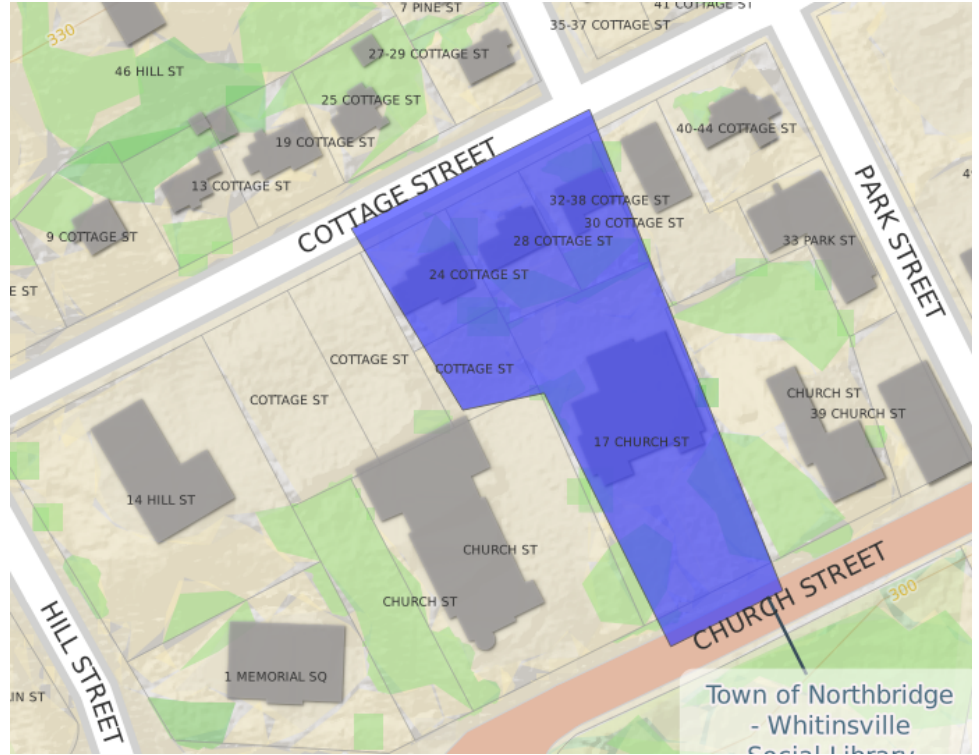
[Link to Project](#)

Estimated Capital Cost: \$1.00

End of Useful Life Year: 2079

Project within mapped Environmental Justice neighborhood: No

Ecosystem Service	Scores
Benefits	
Project Score	Moderate
Exposure	
Sea Level Rise/Storm Surge	Not Exposed
Extreme Precipitation - Stormwater Flooding	High
Extreme Precipitation - Riverine Flooding	Moderate
Extreme Heat	High



Asset Preliminary Climate Risk Rating

Number of Assets: 1

Summary

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Stormwater Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
Public Library Building	Low Risk	High Risk	Moderate Risk	High Risk

Climate Resilience Design Standards Summary

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
Public Library Building					
Extreme Precipitation					
Public Library Building	2070			10-yr (10%)	Tier 2
Extreme Heat					
Public Library Building	2070		50th		Tier 2

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 "Not Exposed" because of the following:

- Not located within the predicted mean high water shoreline by 2030
- No historic coastal flooding at project site
- Not located within the Massachusetts Coast Flood Risk Model (MC-FRM)

Extreme Precipitation - Stormwater Flooding

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

- Increased impervious area
- 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

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:

- 30+ days increase in days over 90 deg. F within project's useful life
- Not located within 100 ft of existing water body
- Increased impervious area
- Existing trees are being removed as part of the proposed project
- Existing impervious area of the project site is greater than 50%

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 - Public Library Building

Primary asset criticality factors influencing risk ratings for this asset:

- Asset may be inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have impacts limited to the site only
- Some alternative programs and/or services are available to support the community
- Cost to replace is between \$10 million and \$30 million
- There are no hazardous materials in the asset

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: Public Library Building

Building/Facility

Sea Level Rise/Storm Surge

Low Risk

Applicable Design Criteria

Projected Tidal Datums: NOT APPLICABLE

Projected Water Surface Elevation: NOT APPLICABLE

Projected Wave Action Water Elevation: NOT APPLICABLE

Projected Wave Heights: NOT APPLICABLE

Projected Duration of Flooding: NOT APPLICABLE

Projected Design Flood Velocity: NOT APPLICABLE

Projected Scour & Erosion: NOT APPLICABLE

Extreme Precipitation

High Risk

Target Planning Horizon: 2070

Return Period: 10-yr (10%)

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 2

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
Public Library Building	2070	10-Year (10%)	7.0	Downloadable Methodology PDE

Projected Riverine Peak Discharge & Peak Flood Elevation: APPLICABLE

[Methodology to Estimate Projected Values](#) : Tier 2

Target Planning Horizon: 2070
 Percentile: 50th Percentile

LIMITATIONS: The recommended standards are determined by the user-drawn polygon and relationships as defined in the supporting Section Documents. The guidance provided within this Tool may be used to inform plans and designs, but does not provide guarantees for resilience. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence. One avenue to seek more information would be to access the comprehensive temperature and precipitation projections including additional return periods, time horizons, and seasons at the [Climate Projections Dashboard](#).

Applicable Design Criteria

Projected Annual/Summer/Winter Average Temperatures: APPLICABLE

Asset Name	Recommended Planning Horizon	Recommended Percentile	Projected Annual Average Temperature [°F]	Projected Summer Average Temperature [°F]	Projected Winter Average Temperature [°F]
Public Library Building	2070	50th	57.12	76.62	36.66

LIMITATIONS: The recommended Standards for Projected Average Annual/Summer/Winter Temperature are determined by the user-drawn polygon and relationships as defined in the supporting Section Documents. The guidance provided within this Tool may be used to inform plans and designs, but is not comprehensive and does not provide guarantees for resilience. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence. One avenue to seek more information would be to access the comprehensive temperature and precipitation projections including additional return periods, time horizons, and seasons at the [Climate Projections Dashboard](#).

Projected Growing Degree Days: NOT APPLICABLE

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

Asset Name	Recommended Planning Horizon	Recommended Percentile	Projected Days with Max Temp >95°F (days)	Projected Days with Max Temp >90°F (days)	Projected Days with Max Temp <32°F (days)
Public Library Building	2070	50th	13	42	77

LIMITATIONS: The recommended Standards for Projected Days per Year with Max Temp >95°F, >90°F, <32°F are determined by the user-drawn polygon and relationships as defined in the supporting Section Documents. The guidance provided within this Tool may be used to inform plans and designs, but is not comprehensive and does not provide guarantees for resilience. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence. One avenue to seek more information would be to access the comprehensive temperature and precipitation projections including additional return periods, time horizons, and seasons at the [Climate Projections Dashboard](#).

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

Asset Name	Recommended Planning Horizon	Recommended Percentile	Projected Number of Heat Waves Per Year (events)	Projected Average Heat Wave Duration (days)
Public Library Building	2070	50th	0	3

LIMITATIONS: The recommended Standards for Projected Number of Heat Waves Per Year and Average Heat Wave Duration are determined by the user-drawn polygon and relationships as defined in the supporting Section Documents. The guidance provided within this Tool may be used to inform plans and designs, but is not comprehensive and does not provide guarantees for resilience. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence. One avenue to seek more information would be to access the comprehensive temperature and precipitation projections including additional return periods, time horizons, and seasons at the [Climate Projections Dashboard](#).

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

Asset Name	Recommended Planning Horizon	Recommended Percentile	Projected Cooling Degree Days (base = 65°) (degree days)	Projected Heating Degree Days (base = 65°) (degree days)
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Asset Name	Recommended Planning Horizon	Recommended Percentile	Projected Cooling Degree Days (base = 65°) (degree days)	Projected Heating Degree Days (base = 65°) (degree days)
Public Library Building	2070	50th	1467	4345

LIMITATIONS: The recommended Standards for Projected Cooling Degree Days and Heating Degree Days are determined by the user-drawn polygon and relationships as defined in the supporting Section Documents. The guidance provided within this Tool may be used to inform plans and designs, but is not comprehensive and does not provide guarantees for resilience. The guidance provided within this Tool is intended to be general and users are encouraged to do their own due diligence. One avenue to seek more information would be to access the comprehensive temperature and precipitation projections including additional return periods, time horizons, and seasons at the [Climate Projections Dashboard](#).

Projected Heat Index: APPLICABLE
[Methodology to Estimate Projected Values](#) : Tier 2

Project Inputs

Core Project Information

Name:	Town of Northbridge - Whitinsville Social Library
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)?	2079
Location of Project:	Northbridge
Estimated Capital Cost:	\$1
Who is the Submitting Entity?	City/Town Northbridge Rebecca Sasseville (rsasseville@cwmars.org)
Is this project identified as a priority project in the Municipal Vulnerability Preparedness (MVP) plan or the local or regional Hazard Mitigation Plan (HMP)?	No
Is this project being submitted as part of a state grant application?	No
Which grant program?	
What stage are you in your project lifecycle?	Design
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:	The Whitinsville Social Library project includes the renovation and expansion of the historic 1913 library building. Major spaces within the existing structure will be preserved and comprehensively renovated, including exterior envelope upgrades and new mechanical, electrical, plumbing, and fire protection systems. The renovated area totals approximately 9,000 square feet. The addition, totaling approximately 18,000 square feet, provides a new accessible entrance, reading areas and book stacks, staff workspaces, and community meeting rooms. A primary project goal is to preserve and enhance the historic building, which remains a valued civic asset capable of serving the community well into the future with appropriate upgrades. The project incorporates all-electric building systems and a roof-mounted photovoltaic array, with no planned use of fossil fuels. The site design includes stormwater management and attenuation strategies to reduce runoff and mitigate environmental impacts.

Project Ecosystem Service Benefits

Factors Influencing Output

- ✓ Project protects public water supply
- ✓ Project promotes decarbonization
- ✓ Project recharges groundwater
- ✓ Project improves water quality
- ✓ Project improves air quality
- ✓ Project prevents pollution
- ✓ Project provides cultural resources/education

Factors to Improve Output

- ✓ Incorporate green infrastructure to filter stormwater

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	Yes
Protects public water supply	Yes
Filters stormwater using green infrastructure	Maybe
Improves water quality	Yes
Promotes decarbonization	Yes
Enables carbon sequestration	No
Provides oxygen production	No
Improves air quality	Yes
Prevents pollution	Yes
Remediates existing sources of pollution	No

Protects fisheries, wildlife, and plant habitat	No
Protects land containing shellfish	No
Provides pollinator habitat	No
Provides recreation	No
Provides cultural resources/education	Yes

Project Climate Hazard 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?	Yes
Are existing trees being removed as part of the proposed project?	Yes

Project Assets

Asset: Public Library Building
 Asset Type: Typically Occupied
 Asset Sub-Type: Library
 Construction Type: New Construction
 Construction Year: 2029
 Useful Life: 50

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

Building may be inaccessible/inoperable for more than a day, but less than a week after natural hazards events without consequences

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

Impacts limited to site only

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

Less than 100 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 not be expected to result in injuries

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

There are no hazardous materials in the building/facility

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

Minor – Inoperability will not likely affect other facilities, assets, or buildings

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?

Some 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?

No impact on surrounding natural resources is expected

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)?

No Impact

Report Comments

N/A