IMPORTANT NOTES ON HARD STRUCTURAL MEASURES

REVETMENTS: Properly designed and installed sloped revetments, such as those outlined in USACE's Design Manual, are typically more resilient than vertical seawalls due to their ability to better absorb and dissipate wave energy and provide shoreline habitat. The maximum recommended slope of an armor stone revetment is 1.5 horizontal to 1 vertical. Where possible, revetment slopes should match the existing bluff/bank slope's stable angle of repose.

SEAWALLS AND BULKHEADS: Adequate toe protection should be included in the design to prevent sliding failures, scour, and undermining at the base of a seawall or bulkhead. New or expanded seawalls and bulkheads are generally discouraged over other effective alternatives such as sloped revetments.

GROINS: By design, groins and breakwaters trap sediment and prevent it from further transport. This can result in negative impacts on downdrift properties. Due to the impacts, this strategy often requires a costly and extensive analysis, as well as permitting through the New York State Office of General Services (OGS).

PERMITTING AND REGULATORY STANDARDS

Before initiating design or construction of a project, contact your local DEC Regional Permit Administrator (RPA) to determine what DEC permits are required. If you are proposing complex, multi-permit projects, you are strongly encouraged to schedule a pre-application conference with your DEC RPA. A meeting will allow you to provide details about your project and obtain feedback from DEC, often shortening the application process. Permits may be required from your local municipality, DOS, USACE, or other agencies depending on the project's location and planned activities. State building codes should also be considered during development.

IMPORTANT NOTE ON FEMA REQUIREMENTS

Local communities that participate in the National Flood Insurance Program regulate development in Special Flood Hazard Areas (SFHA), also known as the 100-year floodplain. Development within an SFHA is subject to local floodplain development permits issued by your local floodplain administrator. New or substantially damaged buildings must have the lowest floor and utilities elevated at least 2 feet above the published base flood elevation (BFE) or at least 3 feet above the highest adjacent grade when there is no published BFE. BFEs are identified on FIRMs prepared by FEMA. If there are no published BFEs for your area, please contact your local floodplain administrator or DEC to determine if an approximate BFE has been developed. Approximate BFEs should be used as best available data when designing your project. In some areas along the Great Lakes, there may be draft FIRMs available. These draft FIRMs are not regulatory but can be considered best available data to ensure your project is as resilient as possible. Your local community can assist with questions you may have regarding development within an SFHA.

On September 22, 2014, Governor Andrew Cuomo signed the Community Risk and Resiliency Act (CRRA). As part of CRRA, there is additional guidance for the construction of buildings within the SFHA. These recommended standards can be found in the "Additional Guidance" section at https://on.ny.gov/rediguidance.

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LAKE ONTARIO REDI
Resiliency & Economic Development Initiative

Great Lakes and St. Lawrence River

COASTAL DEVELOPMENT


Town of Sandy Creek

BUILDING RESILIENCE IN RECOVERY

To build resilience, reduce the risk of future property damage, and minimize habitat impacts, the New York State Department of Environmental Conservation (DEC) has compiled general guidelines for coastal design and development projects. The goal of these guidelines is to share technical and regulatory requirements, best practices, and available resources for efficiently and effectively rebuilding along the dynamic shorelines of the Great Lakes and St. Lawrence River. For an electronic version of this document and numerous links to additional information, data, and guidance, please visit https://on.ny.gov/rediguidance.

GENERAL DESIGN GUIDANCE

ENLIST EXPERTS: At a minimum, DEC recommends hiring a Professional Engineer (PE) experienced in coastal development. In addition, you may want to consider expertise from surveyors, ecologists, biologists, and landscape architects.

ASSESS EXISTING CONDITIONS: Evaluate ground elevations, erosion, utilities, current water levels, flooding risk, and land use characteristics.

KNOW THE SITE-SPECIFIC FEATURES: Consider physical conditions such as upland, shoreline, and nearshore slopes, geology, offshore depth, wetlands, soil bearing capacity, drainage conditions, vegetation, and structural integrity.

EVALUATE WATER LEVEL ELEVATIONS: There is no single design elevation that is appropriate for every shoreline location or type of project. In determining the appropriate design elevation, you should work with a PE to evaluate Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), local geology, water elevations, and wave heights at the project location.

EVALUATE SEDIMENT: Sediment transport systems should be evaluated to minimize impact to properties adjacent to the project area. Data can be found through the USACE Sediment Budget Mapper or other sources.

COMPARE COSTS: Some shoreline management strategies may have comparable costs. Those that incorporate natural or nature-based features may cost less in materials than structural strategies, but may require additional yearly maintenance. Costs vary with materials, location, and level of designed protection.

ASSESS CONSTRUCTABILITY: Factors such as water depth, wave energy, distance from shore, slope, site access, permitting requirements, utilities, contractor selection, and available equipment will factor into design and its constructability. A PE can assist you in evaluating these factors.

INCORPORATE MAINTENANCE AND MANAGEMENT: All shoreline management strategies require periodic maintenance and adaptive management, particularly after storms. Consider the time and resources necessary to maintain the solution throughout a project's life span.

BUILD IN CLIMATE RESILIENCY MEASURES: Incorporate resiliency measures, such as additional elevation and watershed runoff management to adapt to future flood risks. Please see the "Additional Guidance" section at https://on.ny.gov/rediguidance. For resources that can assist in this process.

USE BEST AVAILABLE DATA: The best available data should be evaluated during the design process to help ensure a resilient and sustainable project. This includes data currently under development or review, such as draft FEMA FIRMs. For additional information, visit https://on.ny.gov/rediguidance.


Town of Webster

OPTIONS TO CONSIDER IN AN ALTERNATIVES ANALYSIS

NO ACTION ALTERNATIVE: Describe the outcome if the proposed project is not undertaken.

NON-STRUCTURAL MEASURES: Describe options that adjust the land use, footprint, and/or site design to avoid or minimize risks. Examples include relocating, elevating, or flood proofing a structure.

NATURAL AND NATURE-BASED FEATURES: Describe at least one alternative that restores natural features or processes to the project site or uses nature-based features that mimic natural features and processes. These features are preferred to hard structural measures.

HARD STRUCTURAL MEASURES: If none of the above alternatives are feasible, identify a hard structural measure that minimizes detrimental impacts, such as those discussed in USACE's Coastal Engineering Manual.

SHORELINE EROSION PROTECTION GUIDANCE

When evaluating a site for shoreline erosion protection, first identify what is at risk from erosion and determine how much erosion control is needed to reduce that risk, which will guide all other factors in the design. Hard structural measures, such as seawalls, bulkheads, revetments, and groins, can have negative impacts on adjacent and downdrift properties and scour out the beaches. For this reason, while hard structures are sometimes necessary, they should be avoided unless there are no other options.

NATURAL AND NATURE-BASED FEATURES (NNBF):

NNBFs can provide shore protection and flood risk management while producing additional economic, environmental, and/or recreational benefits. Types of NNBFs include edging or toe protection, vegetated slope stabilization with structural toe protection, bioengineering, low-profile sills with vegetation, beach nourishment, and coir rolls or natural fiber blankets.

Erosion protection along most shoreline areas may require a permit from your local community, DEC, New York State Department of State (DOS) or the U.S. Army Corps of Engineers (USACE). At the beginning of the design process, evaluate the need for erosion protection. If protection is warranted, determine the desired level of protection and conduct an alternatives analysis. This analysis needs to identify the type of erosion protection that will prevent or minimize detrimental impacts while still achieving the necessary level of protection. You should identify what is at risk, indicate the preferred alternative, and describe why it is preferred. Please see the permitting section for more details.

PLEASE NOTE: This is not an exhaustive list of design criteria or erosion control structures. The proposal of the recommended techniques will not guarantee permit approval.