

COAST SMART ASSESSMENT AND CERTIFICATE

This document is intended to help Maryland state agency personnel and others understand and apply the Coast Smart Construction Program guidelines for various phases of their project to prevent or minimize the future impacts of coastal and riverine flooding, storm surge and sea level rise. It consists of three parts: I. Glossary and Useful Web-based Resources; II. Project Screening Checklist; and III. Coast Smart Construction Certificate.

I. Glossary and Useful Web-Based Resources

The following glossary of terms and links to web-based resources are provided to help state agency personnel and others become familiar with concepts and terminology used in the questions in Part II. Project Screening Checklist.

Base Flood: A flood having a one-percent chance of being equaled or exceeded in any given year; the base flood also is referred to as the 1-percent annual chance (100-year) flood.

Base Flood Elevation: The water surface elevation of the 100-year base flood in relation to the datum specified on Flood Insurance Rate Maps. In areas of shallow flooding, the base flood elevation is the highest adjacent natural grade plus the depth number specified in feet on the Flood Insurance Rate Map, or at least four (4) feet if the depth number is not specified.

Climate Change: Any change in climate over time, whether due to natural variability or as a result of human activity. Climate refers to long-term trends in weather that extend multi-decadal periods.

Coast Smart: A construction practice in which preliminary planning, siting, design, construction, operation, maintenance, and repair of a structure avoids or, in the alternative, minimizes future impacts associated with coastal flooding and sea level rise. “Coast Smart” includes design criteria and siting guidelines that are applicable throughout the entire life cycle of a project.

Coastal Barrier Resources System (CBRS): The Coastal Barrier Resources Act (COBRA) of 1982 and later amendments, removed the Federal government from financial involvement associated with building and development in undeveloped portions of designated coastal barriers (including the Great Lakes). These areas were mapped and designated as Coastal Barrier Resources System units or "otherwise" protected areas. They are colloquially called COBRA zones. COBRA banned the sale of NFIP flood insurance for structures built or substantially improved on or after a specified date. For the initial COBRA designation, this date is October 1, 1983. For all subsequent designations, this date is the date the COBRA zone was identified. COBRA zones and their identification dates are shown on Flood Insurance Rate Maps (FIRMs). Communities may permit development in these areas even though no Federal assistance is available, provided that the development meets NFIP requirements.

Critical and Essential Facilities: Buildings and other structures that are intended to remain operational in the event of extreme environmental loading from flood, wind, snow or earthquakes [Note: See Maryland Building Performance Standards, Sec. 1602 and Table 1604.5]. Critical and essential facilities typically include hospitals, fire stations, police stations, storage of critical records, facilities that handle or store

hazardous materials, drinking water and sewage treatment facilities, airports, transit and highway access and other essential transportation, and similar facilities.

Design Criteria: Structural specifications related to the shape, size, or form of a construction practice.

Design Life: The period of time during which, the item is expected by its designers to work within its specified parameters; in other words, the life expectancy of the item. It is the length of time between placement into service of a single item and that item's onset of wear-out, that is, where additional maintenance is no longer sufficient to prolong its life expectancy.

Enclosure Below the Lowest Floor: An unfinished or flood-resistant enclosure that is located below an elevated building, is surrounded by walls on all sides, and is usable solely for parking of vehicles, building access or storage, in an area other than a basement area, provided that such enclosure is built in accordance with the applicable design requirements specified in these regulations. Also see "Lowest Floor."

Erosion Vulnerability: The susceptibility of a given stretch of shoreline to future change in shoreline position due to erosion.

Flood or Flooding: A general and temporary condition of partial or complete inundation of normally dry land areas from: (1) the overflow of inland or tidal waters, and/or (2) the unusual and rapid accumulation or runoff of surface waters from any source.

Flood Insurance Rate Map (FIRM): An official map on which the Federal Emergency Management Agency has delineated *special flood hazard areas* to indicate the magnitude and nature of flood hazards, to designate applicable flood zones, and to delineate floodways, if applicable. FIRMs that have been prepared in digital format or converted to digital format are referred to as Digital FIRMs (DFIRM).

Flood Opening: A flood opening (non-engineered) is an opening that is used to meet the prescriptive requirement of 1 square inch of net open area for every square foot of enclosed area. An engineered flood opening is an opening that is designed and certified by a licensed professional engineer or licensed architect as meeting certain performance characteristics, including providing automatic entry and exit of floodwaters; this certification requirement may be satisfied by an individual certification for a specific structure or issuance of an Evaluation Report by the ICC Evaluation Service, Inc. [Note: See NFIP Technical Bulletin #1, "Openings in Foundation Walls and Walls of Enclosures."]

Freeboard: A factor of safety that compensates for uncertainty in factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, obstructed bridge openings, debris and ice jams, climate change, and the hydrologic effect of urbanization in a watershed.

Habitat Adaptation Areas: Areas that may serve as wildlife habitat, wildlife corridors or support high priority aquatic and terrestrial living resources in the future. These include, but are not limited to areas with hydric soils suitable for future tidal wetland establishment and marsh-dependent breeding bird habitat, as well as species and habitat representation areas, ecosystem and habitat type replication areas, and refugia or relocation areas for climate-sensitive species.

Historic Structure: Eligibility or designation as a historic structure as defined by the U.S. Department of the Interior and/or the Maryland Historical Trust.

Infrastructure: Built infrastructure, including roads, bridges, sewer and water systems, drainage systems, and essential public utilities.

Inundation: The condition of formerly dry areas becoming permanently submerged, such as when the annual average elevation of Mean Lower Low Water (MLLW) rises relative to land (SERDP 2013).

Fullest Extent Practicable: Actions or practices capable of being effected, done, or put into practice.

Letter of Map Change (LOMC): Letter of Map Change (LOMC) is a general term used to refer to the several types of revisions and amendments to FEMA maps that can be accomplished by letter. They include Letter of Map Amendment (LOMA), Letter of Map Revision (LOMR), and Letter of Map Revision based on Fill (LOMR-F).

Limit of Moderate Wave Action (LiMWA): The LiMWA identifies areas that will be affected by waves with a 1.5 foot wave height or greater within the coastal A zone. While FEMA currently does not require special floodplain management standards or flood insurance purchase requirements based on LiMWA delineations, it is likely that properties and structures within the LiMWA will receive substantial damage from wave action during a one-percent-annual-chance flood event.

Lowest Floor: The lowest floor of the lowest enclosed area (including basement) of a building or structure; the floor of an enclosure below the lowest floor is not the lowest floor provided the enclosure is constructed with proper flood openings. The lowest floor of a manufactured home is the bottom of the lowest horizontal supporting member (longitudinal chassis frame beam).

Natural and Nature-Based Features: Natural Features are created and evolve over time through the actions of physical, biological, geologic, and chemical processes operating in nature. Natural coastal features take a variety of forms, including reefs (e.g., coral and oyster), barrier islands, dunes, beaches, wetlands, and maritime forests. The relationships and interactions among the natural and built features comprising the coastal system are important variables determining coastal vulnerability, reliability, risk, and resilience. Nature-Based Features are those that may mimic characteristics of natural features but are created by human design, engineering, and construction to provide specific services such as coastal risk reduction. The combination of both natural and nature-based features is referred to collectively as natural and nature-based features (NNBF) (USACE 2014).

Non-State Structure and Infrastructure Projects: Structures and built infrastructure, including roads, bridges, sewer and water systems, drainage systems, and essential public utilities, used primarily for non-State purposes.

Otherwise Protected Area: Otherwise Protected Areas (OPAs) are a category of coastal barriers within the Coastal barrier Resources System (CBRS). OPAs are undeveloped coastal areas established under Federal, State, or local law, or held by a qualified organization, primarily for wildlife refuge, sanctuary, recreational, for natural resource conservation purposes. Flood insurance is restricted in OPAs, though OPAs may receive other forms of Federal assistance. OPAs are identified on FEMA FIRMs.

Permanent Structure: A structure, as defined herein, installed, used, or erected for a period of greater than 180 days.

Replacement Cost: The current replacement cost of property is the amount it would cost to replace the property today using materials of the same kind and quality, with no deduction for depreciation, and does not include the value of land. At the time of reconstruction, the cost of reconstructing a structure and its surrounding property to full use with materials of the same kind and quality as the original materials. Replacement cost does not include the value of the land on which a structure is located or for tax purposes, a deduction for depreciation.

Resilience: Capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well being, the economy, and the environment (NRC 2011).

Risk: Combination of the magnitude of the potential consequence(s) of climate change impact(s) and the likelihood that the consequences(s) will occur (NRC 2010).

Sea Level Rise Vulnerability: The susceptibility of a coastal area to seasonally high-tides or prolonged or permanent inundation or submergence due to a combination of land subsidence and future rise in water level.

Siting Criteria: Specifications related to the location of a structure or use on a lot or parcel or within a larger geographic area.

Special Flood Hazard Areas: Land in the floodplain subject to a one-percent or greater chance of flooding in any given year and are designated by the Federal Emergency Management Agency in Flood Insurance Studies and on Flood Insurance Rate Maps as Zones A, AE, AH, AO, A1-30, and A99, and Zones VE and V1-30.

Storm Surge: An abnormal and significant rise of water generated by a storm, over and above the predicted astronomical tides. Storm surge is produced by water being pushed toward the shore by the force of the winds moving cyclonically around the storm. The impact on surge of the low pressure associated with intense storms is minimal in comparison to the water being forced toward the shore by the wind.

State-Funded: Partially or fully funded with State of Maryland monies.

Stillwater: The 100-year floodplain elevation on a FIRM or DFIRM before wave heights and wave runups are added. Stillwater elevations should match the 100-year floodplain elevations in all coastal A-zones, but in areas where wave heights are included (LIMWA's and V-zones), stillwater elevations do not include wave heights. For regulatory purposes, the 100-year elevation must include wave heights.

Structure: That which, is built or constructed; specifically, a walled or roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home. A structure, whether permanent or temporary, is not intended to include roads, bridges, rail tracks, dredge material containments facilities or other transportation infrastructure that are not roofed buildings.

State Structure and Infrastructure Projects: Structures and built infrastructure, including but not limited to roads, bridges, sewer and water systems, drainage systems, and essential public utilities, planned and built by Maryland State agencies, used primarily for State purposes.

Substantial Damage: Damage of any origin sustained by a structure whereby the cost of restoring the structure to before damaged condition would equal or exceed 50 percent of the replacement cost of the structure before the damage occurred.

Substantial Improvement: Any reconstruction, rehabilitation, addition, or other improvement of a building or *structure*, the cost of which equals or exceeds 50 percent of the *market value* of the building or *structure* before the *start of construction* of the improvement. The term includes *structures* which have incurred *substantial damage*, regardless of the actual repair work performed. The term does not, however, include either:

- (1) Any project for improvement of a building or *structure* to correct existing violations of State or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official prior to submission of an application for a permit and which are the minimum necessary to assure safe living conditions; or
- (2) Any alteration of a *historic structure*, provided that the alteration will not preclude the *structure's* continued designation as a *historic structure*.

Tax Map/Grid/Parcel or SDAT Account Number: Tax maps, also known as assessments, property or parcel maps, are a graphic representation of real property showing and defining individual property boundaries in relationship to contiguous real property. The primary purpose of these maps is to help State tax assessors locate properties for assessments and taxation purposes. Tax maps are also used by federal, State and local government agencies as well as private sector firms for a variety of analyses and decision making processes.

Temporary Structures: Structures or uses intended to be in place for 180 consecutive days or less in any given calendar year or will be removed at the end of a construction project.

Vulnerability Assessment: Practice of identifying and evaluating the effects of climate change and climate variability on natural and human systems, so as to understand system sensitivity, exposure, and adaptive capacity (SERDP 2013).

Water Dependent Use: A use which, cannot perform its intended purpose unless it is located or carried out in close proximity to water; the term includes docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

Wetland Migration: Long-term inland and upward movement of tidal wetlands, limited by human and geological barriers, in response to changes in sea level.

II. Project Screening Checklist

1. *General Project Information.*

- a. Project name: _____
- b. Location (Address, [Community Name](#), Zip Code):

- c. Contact person: _____ Email: _____
Phone: _____
- d. Brief project description: _____

- e. [Tax Map/Grid/Parcel or SDAT Account Number](#): _____
- f. [Flood Insurance Rate Map \(FIRM\) Panel No.](#): _____
- g. FIRM effective date: _____
- h. Is the project area revised by a [Letter of Map Change \(LOMC\)](#) from FEMA?
a. Yes b. No c. Not Sure
- i. If yes, include the FEMA Case No. and new Flood Zone and/or Base Flood Elevation _____
- j. Identify (circle) Flood Zone(s) present (Most restrictive to be used for design purposes):
Zone A, Zone AE, Zone AH, Zone AO, Zone AR, Zone A99, Zone V, Zone VE, Zone X (shaded or unshaded) or Zone D
- k. Is the project located in a [Coastal Barrier Resources System \(CBRS\) Area or Otherwise Protected Area \(OPA\)](#)? (Can be found on the FIRM)
a. Yes b. No
- l. If available, what is Base Flood Elevation (BFE)?: _____
- m. [Elevation datum](#) used? (ex. North American Vertical Datum of 1988, or NAVD 88): _____

If structures are involved, please attach a completed FEMA Elevation Certificate.

2. **Project Design Life.** What is the timescale for project planning, design, construction, maintenance and operation? Select one.
 - a. Short-term project (design life < 25 years)
 - b. Medium-term project (design life between 25-50 years)
 - c. Long-term project (design life between 50 – 100 years)
 - d. Very long-term project (design life > 100 years)

3. **Project Vulnerability Assessment.** What are the proposed project’s vulnerabilities to sea level rise impacts (i.e., future inundation, flooding and storm surge) over the course of the project’s design life?

Note:

When planning new state structures and public infrastructure projects with a design life that is not expected to extend beyond 2100 (short- to medium-term projects) or where there is a relatively high risk tolerance limit (e.g., rare flooding is tolerable), assess vulnerability using current “medium range” or “best estimate” relative sea level rise projections. When new state structures and public infrastructure projects with a design life that is expected to extend beyond 2100 (long- to very long-term projects) or where there is a very low acceptance of any flooding risk, apply current “high” end relative sea level rise scenarios or projections.

Using Agencies should consult the latest guidance on sea level rise projections for the State of Maryland from the Maryland Commission on Climate Change, Scientific and Technical Working Group.¹

- a. Applying the above standard, is the proposed project within a 50- or 100- year sea level rise inundation zone?
 - a. 50-year b. 100-year c. Neither

- b. Is the project within a mapped Special Flood Hazard Area?
 - a. Yes b. No

- c. If available, what is the 100-year flood elevation for the project’s location?
 _____ feet

- d. How much freeboard does the first floor elevation of the structure have above 100-year Base Flood Elevation? _____ feet

¹ Boesch, D.F., et.al, 2013. Updating Maryland’s Sea Level Rise Projections. Special Report of the Scientific and Technical Working Group to the Maryland Climate Change Commission, 22 pp. University of Maryland Center for Environmental Sciences, Cambridge, MD.

_____ feet

e. Is the project located within a Coast A Zone as defined by the Limit of Moderate Wave Action (LiMWA) line on the FIRM?

- a. Yes b. No

e. Is the project within a storm surge inundation zone (Category 1-4)?

- a. Yes b. No

f. Is the project a critical or essential facility?

- a. Yes b. No

g. Explain any additional risk of heightened storm surge due to future sea level rise:

4. **Ecosystem Resiliency.** Circle all ecological features on site that may serve to buffer the project from the impacts of future sea level rise, coastal flooding or storm surge:

- a. Vegetated or forested buffers
- b. Dunes
- c. Beaches
- d. Wetland or marsh system
- e. Oyster beds or reefs
- f. Barrier island(s)
- g. Potential wetland migration on site
- h. Habitat adaptation areas on site
- i. Natural features that could be enhanced, restored or created to provide additional protection against future sea level rise and coastal storm impacts

Explanation/Others:

5. **Resiliency Measures.** Identify Coast Smart Siting and Design Criteria incorporated into project siting, design, construction, maintenance and operational planning, or other measures included in state or local climate adaptation plans (e.g., flood gates) that are scientifically feasible and with a likelihood of construction within the needed timeframe. These may include:

a. Is the project sited outside areas vulnerable to sea level rise within the project's anticipated design life? a. Yes b. No, because _____

b. Does the project incorporate ecosystem resiliency measures?
a. Yes b. No

Explain:

c. Will there be any external electrical or mechanical systems servicing the building?

a. Yes b. No

d. If yes, will they be elevated?

a. Yes b. No

e. Will there be external fuel tanks (ex. propane)?

a. Yes b. No Describe type: _____

f. If yes, will they be anchored and/or elevated?

a. Anchored? b. Elevated? c. Anchored and Elevated?

g. Will there be any enclosures below the lowest floor?

- a. Yes
- b. No

h. If yes, will the enclosure have flood openings?

- a. Yes
- b. No

i. Other siting considerations:

j. What building materials will be used to increase resiliency?

k. What type of construction will be used (e.g., relocatable, portable, expendable in the event of storm damage)?

l. Will there be any functional use restrictions placed on the project (e.g., temporary)?

m. Other design considerations:

n. Is there adequate shoreline protection at the proposed project's site?

6. **Cost/Benefit Analysis.** Assess anticipated benefits and costs of the proposed project with the following factors:

a. *Risk v. Time.* What is the potential future financial and other losses associated with sea level rise, coastal flooding and storm surge over the project's anticipated design life? How does this cost compare to inaction?

b. *Risk Tolerance*. What is the risk tolerance for the proposed project?

i. Low

ii. Medium

iii. High

Explain: _____

c. *Socio-economic Considerations*. What are the short and long term costs associated with the project?

i. What costs are associated with the need for additional shore protection?

ii. What types of emergency responses will there be during extreme events?

iii. What is the possible need for the repair or rebuilding of damaged structures?

d. *Environmental Impacts*. Are there increased impacts of the project to the environment due to the incorporation of resiliency measures (e.g., increasing the height of a bridge may necessitate need for larger bridge abutments with greater impact to waterway and nearby wetland areas)?

III. Coast Smart Construction Certificate

- a. **Project Name:** _____
 - b. **Location:** _____
 - c. **Brief Project Description:** _____
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Chapter 415 of the 2014 laws of Maryland House (Bill 615) established the [Coast Smart Council](#) to develop a Coast Smart Construction Program with [Coast Smart Siting and Design Criteria](#). These criteria address sea level rise and coastal flood impacts on state-funded capital projects. State-funded capital projects planned and built by units of state government that include the construction of a new structure, or reconstruction of a structure with substantial damage, must be in compliance with the established criteria. The Criteria include guidelines and directives applicable to the preliminary planning and construction of a proposed capital project; require the lowest floor elevation of each structure located within a Special Flood Hazard Area to be built at least 2 feet above the base flood elevation; and establish a process for a unit of state government to be waived from compliance. The intent of these criteria is to ensure that fiscally wise decisions are made by avoiding or minimizing unnecessary damage to state capital assets. This form was created to ensure that projects coming before the Board of Public Works considered and complied with the Coast Smart guidelines during various phases of the project development and multi-year approval process. If your project is located in a tidally-influenced coastal area of Maryland, please answer and initial or sign the appropriate section below:

I. Initial Siting/Property Acquisition

A Vulnerability Assessment has been conducted during the siting and property acquisition process and the following determination has been made (please circle appropriate answer & initial with date):

Selected property (is/ is not) vulnerable to coastal and riverine flooding, storm inundation, and sea level during its design life.

II. Siting and Design of Structure (Both New and Major Reconstruction)

If your property is vulnerable, please select below (with check mark) the best answer that describes the extent to which your project complies with the Coast Smart Siting and Design Criteria (Initial & date next to your answer):

- Project is eligible for Categorical Exception, but incorporates guidelines where practicable.
- Project fully complies with Siting and Design Criteria
- Project received one or more Criteria Waivers, but otherwise complies with Siting and Design Criteria.

III. Pre-Construction Certification

I, Name of Agency Representative , certify on behalf of Name of agency that best professional judgment and currently available knowledge and practices were applied to ensure that the identified project complies with the Coast Smart Construction Program.

Signed _____

Date _____