

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

VCAP Living Shoreline Design Review Checklist

VCAP Implementation and Design Manual, Specification 3.12, Part C, requires that all Design Plans for Living Shoreline shall be reviewed and approved by DCR-SEAS and/or VIMS prior to construction, and preferably before permitting.

Project Name/Site Address _____

Design Version/Date _____

Design Review Conducted **Name/Entity** _____ **Date** _____

I have conducted a thorough design review of the proposed VCAP living shoreline project based upon the statutory responsibility of my agency.

Does the design satisfactorily address each question below (Y/N), or is the question not applicable to this project and design (N/A)? Certain sections below may be not applicable to this design.

Overall Design Components

- Y N N/A Does the narrative describe installation requirements including construction sequence/timeline, and site stabilization?
- Y N N/A Does the narrative describe any site constraints (e.g., public underground utilities, right-of-way, on-site sewage disposal systems and associated drain fields, drinking water well) and construction access?
- Y N N/A Is a Plan View Drawing (overhead) of the project site and footprint/layout included?
- Y N N/A Is an aerial photo and/or Vicinity Map with an outline of practice location and fetch included?
- Y N N/A Are Section View Drawings (typical cross-sectional profiles, side-view) of the project included? If yes, are there an adequate number of cross sections to accurately represent a) the varied shoreline profiles along the length of the project (e.g., bank height, existing marsh width), and b) significant differences in the living shoreline design or construction requirements?
- Y N N/A Are locations of cross-sectional profiles shown on plan view drawing?
- Y N N/A Do all drawings include a title, legend, scale, north arrow, waterway names, ebb/flow tide directions, and waterway labels?
- Y N N/A Are drawings (plan view and cross sections) clear, accurate, and to an appropriate and uniform scale? If yes, is the scale included on all project drawings? If a scale is not used, are all dimensions clearly depicted in all project drawings?

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

- Y N N/A If available, is a plat of the property included, with the existing and proposed structures clearly indicated?
- Y N N/A Are existing shoreline erosion control structures identified and labelled, and existing delineated wetlands identified and labelled (including sq-ft) on all project drawings (plan view and cross sections, as appropriate)?
- Y N N/A Are MLW and MWH identified and enumerated on all project drawings (plan view and cross sections, as appropriate) and clearly labeled?
- Y N N/A Is MLW utilized as the tidal datum, or base reference elevation from which to reckon all heights and depths (MLW = 0 ft)?
- Y N N/A Are the tidal wetland-riparian transition elevation and the upper limits of tidal wetlands jurisdiction (1.5 times the mean tide range, above MLW) clearly labeled, to include high marsh zone above MHW?
- Y N N/A Is feasible construction access delineated on the project drawings?
- Y N N/A Are limits of proposed impacts to surface waters (e.g., fill areas, riprap placement), and the amount of such impacts (sq-ft), included on all project drawings (plan view and cross sections, as appropriate)?
- Y N N/A Are adjacent property lines and owners' name included on all project drawings (plan view and cross sections, as appropriate)?
- Y N N/A Are erosion and sediment controls, if applicable, described in narrative and shown on drawings?
- Y N N/A Is the 100-ft landward RPA buffer shown on plan view drawing?
- Y N N/A Do structural drawings adequately describe the construction requirements?
- Y N N/A Do plan view and cross-section dimensions match?
- Y N N/A If SAV is present and/or historically documented (5-yr period most recently published by VMRC) in the nearshore, does the plan view drawing delineate the SAV footprint?
- Y N N/A If private oyster ground leases and/or public grounds are in the nearshore, does the plan view drawing indicate if BMP footprint encroaches on oyster grounds?
- Y N N/A Are horizontal benchmarks established and locations indicated on plan view?
- Y N N/A Is a vertical elevation benchmark established and location indicated on plan view?
- Y N N/A Does the narrative describe type of construction (e.g., access by land, installation by hand or skid steer, barge) and materials stockpile location?
- Y N N/A Do cross sections show the existing slope of the marsh fringe and upland bank (e.g., undercutting along the base of bank)?
- Y N N/A Is the overall length of shoreline being protected enumerated (ft)?

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

Y N N/A Does the design avoid adverse effects to known archeological, historic, and traditional cultural resources, whenever possible?

Y N N/A Is the design appropriate for the site conditions (e.g., impinging wave climate)?

Stormwater Management

Y N N/A If stormwater from upland sources is contributing, or may reasonably be expected to contribute, to erosion of a) top of bank, b) vegetated wetlands, or c) shoreline, does the plan include methods to intercept or re-direct stormwater in order to reduce impacts on living shoreline?

This may include: un-mowed vegetative buffer, conservation landscaping, dry

Riparian Buffer

Y N N/A If there is shade from overhanging canopy that negatively impacts sunlight availability for existing wetlands vegetation or the proposed planting area, does the plan address pruning overhanging vegetation?

Y N N/A If construction access or land disturbance will impact existing riparian vegetation or wetlands vegetation, does narrative describe measures/methods that will be taken to minimize site impacts (e.g., use of wooden logging mats) and/or restore impacted areas after construction?

Y N N/A If there are dead, dying, or severely leaning or undercut trees at the top of bank or on the bank face or at the base of bank, does the plan address tree removal and/or pruning branches with weight bearing load over the water?

Y N N/A If tree removal is proposed, have any CBPA and WQIA requirements or mitigation measures been addressed?

Bank Grading

Y N N/A Does the narrative provide a bank stability analysis which demonstrates a) the bank is stable with a minimum risk of erosion, or b) bank grading (or an alternative) is needed and is a component of the shoreline erosion control project, or c) the living shoreline is designed such that sediment from the ungraded bank may reasonably be not expected to enter the nearshore waters?

Y N N/A Will the new slope of the graded bank be 2:1 (H:V) or flatter?

Y N N/A Is areal extent (ac) of bank to be graded enumerated?

Y N N/A Will the new graded slope receive at least 6 hrs of direct sunlight each day during the primary growing season? If no, are compelling factors described in the narrative?

Y N N/A After bank grading, will vegetative cover of native grasses or other low-growing vegetation, suited to wind, salt, and wave run-up conditions at the site, be established to stabilize the graded slope?

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

- Y N N/A If there is evidence of groundwater actively weeping out of the bank – particularly along the sand-clay interface of the slope – has a geotechnical review been conducted to determine the stability of the soil types and hydrology of the site? If yes, does any strategy to stabilize the bank slope address groundwater seeps that occur along the sand-clay interface of the slope?
- Y N N/A Does the plan discuss how irregularities in slope between the graded bank and adjoining properties, or existing shoreline structures, will be minimized?
- Y N N/A Does the plan discuss if bank sediments to be removed during grading might be suitable for beneficial shoreline use (i.e., as sand fill)?
- Y N N/A Is new graded slope shown on cross section drawings?
- Y N N/A If bank instability is a concern, but grading the entire bank is not practical due to identified conditions (e.g., location of infrastructure, bank height), have any of the following alternatives been considered: a) selectively grading portions of the bank, b) grading only the top or toe of the slope to minimize land disturbance, c) terraced banks where a uniform grade cannot be achieved, or d) a properly designed and constructed tiered retaining wall system, or other geotechnical product?

Sand Fill/Nourishment

- Y N N/A Is the sand source, method of placement, volume (cu-yds) and nature of the sand (clean, of good quality, medium- to course-grained (0.4-0.7mm), less than 10% very fine material passing a #100 sieve, no less than the same grain size of the native sand material and) detailed in the narrative?
- Y N N/A Are dimensions of sand nourishment area (sq-ft) shown and enumerated, demonstrating the fill area is less than 10:1 (H:V) on all project drawings (plan view and cross section)?
- Y N N/A Is the total area of sand nourishment no greater than 1 acre? If no, are compelling factors described in the narrative?
- Y N N/A Is a containment structure (e.g., sill, temporary edging) proposed channelward of sand fill area? If no, does the narrative discuss how the sand nourishment and planted wetlands vegetation will persist over the VCAP 10-year practice lifespan?
- Y N N/A Is placing sand fill on SAV avoided?
- Y N N/A Is the elevation of the sand fill against the landward side of the containment structure enumerated and included on cross section drawings? If yes, is that target elevation at least the mid-tide elevation?
- Y N N/A Is the elevation of the sand fill at the toe of bank enumerated and included on cross section drawings? If yes, is that target elevation such that MHW no longer reaches the base of the bank?

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

- Y N N/A Does the narrative describe a sand fill settling period of at least two weeks to allow for the sand to acclimate to local tidal conditions before any planting is conducted?
- Y N N/A Will final construction grade and tidal elevations be re-checked after the settling period? Additional sand may be needed prior to planting if target elevations and slope are not achieved.
- Y N N/A If sand fill is applied over existing wetlands vegetation, does the narrative describe why this is necessary to improve wetland habitat or resiliency?
- Y N N/A Will the project result in a “no net loss” or a “net gain” in areal coverage of wetlands vegetation?
- Y N N/A Do target sand fill elevations avoid raising the elevation of any existing tidal wetlands above the elevation of jurisdictional vegetated tidal wetlands (1.5 times the mean tide range, above MLW)?

Vegetative Components (Tidal Wetlands)

- Y N N/A Does the design include the protection or enhancement of existing tidal vegetated wetland or creation of new tidal vegetated wetland, with a minimum width of 8 ft? Is the width enumerated on all project drawings?
- Y N N/A Does the wetlands vegetation (and/or dune and beach vegetation) to be planted only include those species 1) listed in the tidal wetlands ordinance (Va. Code §28.2-1300 and §28.2-1400) 2) native according to the Flora of Virginia and 3) that are anticipated to survive at the project site elevation and normal salinity regime?
- Y N N/A Are dimensions of marsh vegetation planting area (sq-ft) shown and enumerated on all project drawings?
- Y N N/A Does the marsh planting area receive at least 6 hrs of direct sunlight each day during the primary growing season? If no, are compelling factors described in the narrative?
- Y N N/A Does the planting plan include all the following: species (scientific name), rate of seeding if applicable, number of plants/plugs needed, source of vegetation (e.g., nursery stock), minimum quality of planting stock, method of establishment?
- Y N N/A Does the planting plan indicate application of slow-release fertilizer (e.g., Osmocote®) at time of marsh planting at rate of 1 ounce per plug? If no, are compelling factors described in the narrative?
- Y N N/A Does the planting plan indicate spacing of marsh plugs in offset grid at 18-inches on center? If no, are compelling factors described in the narrative?
- Y N N/A Does the planting plan indicate optimum time of year planting schedule for vegetation establishment for those species listed?

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

- Y N N/A Does the planting plan address plant survival/mortality if planting schedule is outside optimum time of year for vegetative species listed?
- Y N N/A Does the planting plan indicate appropriate planting location (tidal frame/zone) for vegetative species listed? If yes, are the different planting zones delineated and enumerated (sq-ft) on all project drawings (plan view and cross sections, as appropriate)?
- Y N N/A Is temporary grazing protection (e.g., wooden stakes, string lines, netting) (AKA waterfowl exclusion fencing) utilized to protect planted wetlands vegetation from predation until they become established? If yes, does the narrative describe when the temporary grazing protection is to be removed?
- Y N N/A If invasive plant species (e.g., phragmites) are within footprint of the BMP, is an invasive species removal plan described? Invasive or noxious species are identified by the DCR-NH Virginia Invasive Plant Species List and/or the USDA Federal Noxious Weed List.
- Y N N/A If source of vegetation to be planted is nursery stock, will project site salinity be given to nursery in advance so plants can be hardened to the target salinity?
- Y N N/A If source of vegetation to be planted is wild harvest from a local, "donor" marsh (i.e., not nursery stock), does the narrative discuss harvesting protocols, including size of plugs extracted, number and spacing of plugs extracted, and restoration of source area?
- Y N N/A If a pier or other structure extends through/over marsh planting area, does the planting plan address likelihood of marsh establishing under the shade of the pier and erosion exposure/risk if not vegetated (i.e., height of pier over marsh, some form of open pier decking)?

Temporary Edging

- Y N N/A Is temporary edging incorporated with marsh management techniques?
- Y N N/A Is temporary edging needed and being utilized in other project footprint areas, such as upland stormwater management, tree removal areas, bank grading areas?
- Y N N/A If used at any location of the project site, is temporary edging material identified (e.g., coir fiber log, coir fiber mat, biodegradable woven containment bag), described (length, width, diameter, thickness, fill material, anchoring mechanism) and labeled (with overall height/elevation, encroachment/footprint) all project drawings (plan view and cross sections, as appropriate)?
- Y N N/A Is placing temporary edging on existing vegetated wetlands avoided? If no, are compelling factors described in the narrative?
- Y N N/A When utilized within the jurisdictional tidal wetlands area (except along the landward limits of wetlands), is the maximum overall height/elevation of any temporary edging no more than MHW?

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

- Y N N/A Does the plan describe whether or not vegetation will be planted in the temporary edging product?
- Y N N/A After temporary edging materials degrade, does the narrative describe whether or not staking is to be removed and if sand nourishment and vegetation is reasonably expected to persist for the practice lifespan (10-years)?

Sill General Components

- Y N N/A Is the sill incorporated with marsh management techniques? [also applicable to **Marsh Toe Revetment** section below]
- Y N N/A Does the wave-energy environment warrant the additional protection of the sill? [also applicable to **Marsh Toe Revetment** section below]
- Y N N/A Is the sill designed and placed to match the impinging wave climate? [also applicable to **Marsh Toe Revetment** section below]
- Y N N/A Are sills channelward of, and generally linear and parallel to, the eroding shoreline? If no, are compelling factors described in the narrative?
- Y N N/A Are suitable construction materials identified? If yes, are construction materials acceptable for use in aquatic environments? [also applicable to **Marsh Toe Revetment** section below]
- Y N N/A Are distances from proposed structure(s) to fixed points of reference (horizontal benchmarks) and adjacent property lines included on all project drawings (plan view and cross sections, as appropriate)? At a minimum, measurements should be provided from two benchmarks to each end/turning point on the sill. [also applicable to **Marsh Toe Revetment** section below]
- Y N N/A Are proposed shoreline erosion control structures, labeled as such, included on all project drawings (plan view and cross sections, as appropriate)? [also applicable to **Marsh Toe Revetment** section below]
- Y N N/A Are dimensions of proposed structures (i.e., sills) explicitly enumerated on all project drawings (plan view and cross sections, as appropriate)? Dimensions include sill length, sill base width, sill footprint/encroachment, sill crest elevation, sill crest width, overall sill height, and sill side slopes.
- Y N N/A Is each individual sill no more than 500 ft in length?
- Y N N/A Is placing sill on SAV or existing vegetated wetlands avoided? [also applicable to **Marsh Toe Revetment** section below]
- Y N N/A For every 100 linear ft of sill, is there at least one 5-ft wide gap (i.e., opening, window, drop down, offset overlap, cobble-lined)? If yes, for every parcel, is there at least one 5-ft wide gap? If no, has the LWB and VMRC authorized such deviation?
- Y N N/A Is the location and width of each gap shown on plan view drawings? If yes, is the width of each gap enumerated on plan view drawings?

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

- Y N N/A For each gap in the sill, is the maximum height no more than MHW and no more than one-half the overall height of the sill? If yes, is this shown on cross section drawings?
- Y N N/A Are gaps strategically placed accounting for shoreline orientation and impinging wave climate, upland drainages, and recreation access?
- Y N N/A Is a layer of nonwoven geotextile fabric (AKA filter cloth) shown underneath the sill and extended up the landward side of the sill to the top elevation of sand nourishment?
- Y N N/A Is the sill crest elevation no more than 1 ft above MHW and at least equal to MHW?
- Y N N/A Is the sill base width no wider than 15 ft?
- Y N N/A If any portion of the sill footprint is channelward of MLW on subaqueous bottom, is the maximum water depth at the sill location no more than 2 ft, as measured at MLW? If yes, is this water depth at sill base enumerated on cross section drawings? If yes, is this water depth accounted for in overall sill height?
- Y N N/A Is encroachment on the subaqueous bottom minimized by locating the landward edge of the sill no more than 30 ft channelward of MLW?
- Y N N/A Does at least one cross section run through a gap in the sill?
- Y N N/A Are sills open-ended and not tied into the upland bank? If no, are compelling factors described in the narrative?
- Y N N/A Does the narrative discuss nearshore bottom stability? If yes, will the substrate support weight-bearing load of selected type of sill to avoid undesirable settlement below target design heights? [also applicable to **Marsh Toe Revetment** section below]

Riprap Sill

- Y N N/A Is sill construction material identified as angular quarry stone (riprap)? If yes, is the type of stone identified (e.g., granite)? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A If broken concrete will be utilized for the core of the structure, will it be broken into angular chunks, clean and free of debris, free of protruding, exposed rebar, and covered with a layer of riprap armor? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Does the sill have a generally trapezoidal cross section?
- Y N N/A Are the sill side slopes (channelward and landward) no steeper, and no flatter, than 2:1 (H:V)? If no, are compelling factors described in the narrative?
- Y N N/A If necessary given the impinging wave climate, does the sill have an appropriately sized buried toe or apron on the channelward side? [may be applicable to **Marsh Toe Revetment** section below]

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

- Y N N/A Are two layers of armor stone indicated for the sill? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Are the armor stone type (i.e., riprap) and core stone type (i.e., riprap, concrete), minimum weight (pd per stone), and average weight (pd per stone) identified? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Is sill crest width consistent with armor stone size?
- Y N N/A Is armor stone minimum weight sufficient to prevent being dislodged by impinging wave climate (i.e., design wave)? [may be applicable to **Marsh Toe Revetment** section below]

Oyster Shell Bag Sill

- Y N N/A Is the establishment of oysters incorporated into the project design, secondary to erosion control? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Is sill construction material identified as mesh bags filled with shucked oyster shells (i.e., oyster shell bags)? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Is the project site conducive to oyster recruitment and growth? If yes, is there evidence of healthy native shellfish population in the vicinity of the site (e.g., oyster beds, ribbed mussels, spat set on structures) to support the viability of natural oyster spat set on the proposed structures? If no, is the salinity generally always above 8 ppt? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Are the average dimensions (length, width, height) and weight of each shell bag identified and are they adequate weight to prevent being dislodged by the design wave OR anchored? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Is the shell bag average weight sufficient to prevent being dislodged by impinging wave climate (i.e., design wave)? If no, is adequate anchoring of shell bags described? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Is the type of containment bag identified (e.g., plastic, nontoxic, UV-stabilized)? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Does the sill have a generally triangular cross section? If yes, is the number of rows of stacked shell bags clearly depicted in cross section drawings?
- Y N N/A Are individual shell bags placed/oriented such that the longest dimension is generally parallel to the shoreline? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A Is the number of rows of stacked shell bags reasonably stable given the impinging wave climate?
- Y N N/A Does the plan indicate optimum time of year for substrate placement, in order to maximize natural recruitment during spat set season? [may be applicable to **Marsh Toe Revetment** section below]

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

- Y N N/A Is the source of shell bags identified (e.g., commercially purchased, assembled on-site)? [may be applicable to **Marsh Toe Revetment** section below]
- Y N N/A To avoid spreading shellfish disease or introducing invasive species, is shell material clean, dried, and sun-cured from a local source? [may be applicable to **Marsh Toe Revetment** section below]

Artificial Reef Foundation Sill

- Y N N/A Is the establishment of oysters incorporated into the project design, secondary to erosion control?
- Y N N/A Is sill construction material identified as commercially available pre-cast concrete structures (e.g., Oyster Castles®, Reef Balls™, Ready Reef, QuickReef®)? If yes, is the specific type of structure (i.e., product) identified? If yes, is the product generally suitable for oyster spat settlement and growth?
- Y N N/A Is the project site conducive to oyster recruitment and growth? If yes, is there evidence of healthy native shellfish population in the vicinity of the site (e.g., oyster beds, ribbed mussels, spat set on structures) to support the viability of natural oyster spat set on the proposed structures? If no, is the salinity generally always above 8 ppt?
- Y N N/A Are the average dimensions and weight of each pre-cast concrete structure enumerated?
- Y N N/A If the specific type of pre-cast concrete structure is stackable, is the number of stacked rows needed to achieve target sill crest elevation clearly depicted in cross section drawings?
- Y N N/A Is the pre-cast concrete structure average weight sufficient to prevent being dislodged by impinging wave climate (i.e., design wave)?
- Y N N/A Does the plan indicate optimum time of year for substrate placement, in order to maximize natural recruitment during spat set season?
- Y N N/A Given the unique characteristics (e.g., shape, size) of the selected specific type of pre-cast concrete structure (i.e., product) and the arranged orientation/pattern along the shoreline, will artificial reef foundation sill adequately retain sand nourishment allowing the planted wetlands vegetation to persist over the VCAP 10-year practice lifespan?

Marsh Toe Revetment

- Y N N/A Is marsh toe revetment construction material identified as either angular quarry stone (riprap) or mesh bags filled with shucked oyster shells (oyster shell bags)?
- Y N N/A Is the marsh toe revetment designed as a wedge against the face of the eroding marsh scarp? If yes, is this shown on cross section drawings?
- Y N N/A Are dimensions of proposed marsh toe revetment explicitly enumerated on all project drawings (plan view and cross sections, as appropriate)? Dimensions

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

include length, base width, footprint/encroachment, overall height/elevation, and side slope.

- Y N N/A Is a layer of nonwoven geotextile fabric (AKA filter cloth) shown underneath the marsh toe revetment and extended up the landward side of the marsh toe revetment to the top of the eroding marsh scarp?
- Y N N/A Is the overall height/elevation of the marsh toe revetment no more than 1 ft above MHW?
- Y N N/A Is the overall height/elevation of the marsh toe revetment no higher than the existing marsh peat surface?
- Y N N/A If the construction material is riprap, is the marsh toe revetment side slope (channelward) no steeper, and no flatter, than 2:1 (H:V)? If no, are compelling factors described in the narrative?
- Y N N/A If the construction material is riprap, can maximum overall height of marsh toe revetment be feasibly installed given the dimensions of the armor stone?
- Y N N/A Is the marsh toe revetment extended inland, or properly connected to neighboring structures, to prevent erosional flanking?
- Y N N/A Other questions in **Sill General Components**, **Riprap Sill**, and **Oyster Shell Bag Sill** sections above may be applicable to this marsh toe revetment.

Coastal Resiliency

- Y N N/A Is the NOAA/FEMA 10-yr storm event water level included on the plan view and/or cross sections? If yes, does the narrative discuss how this design parameter is addressed (i.e., adaptive management strategies) in order for the project to be designed and constructed to mitigate coastal hazards including storm-level hydrological energy that may reasonably be expected over the VCAP 10-year practice lifespan?
- Y N N/A Is the 2017 NOAA intermediate-high SLR projection included on the plan view and/or cross sections? If yes, does the narrative discuss how this design parameter is addressed (i.e., adaptive management strategies) in order for the project to be functionally resilient and structurally designed to endure the impacts of SLR over the VCAP 10-year practice lifespan?

Monitoring and Maintenance

- Y N N/A Does the design include a monitoring and maintenance plan to assess the structural effectiveness, functional success, and overall stability of the project over the VCAP 10-year practice lifespan? If yes, does the plan aid in assessing deficiencies that require remedial action? If yes, does the plan aid in adaptively managing the living shoreline for resiliency over the life of the system?
- Y N N/A Does the plan indicate who is responsible (e.g., landowner, designated contracted agent of the landowner) for conducting periodic inspections and implementing

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

remedial actions? If the project was installed by a contractor, does the plan indicate whether or not the contractor warranties planted vegetation?

- Y N N/A Does the plan include a schedule for monitoring and reporting, including frequency of inspections (e.g., following significant storm events)? If yes, does the plan at least include an annual survey of the planted wetlands vegetation area conducted from June through September?
- Y N N/A Does the plan at least indicate a report 1) at the end of the first full growing season following planting, and 2) after the second year of establishment of vegetation?
- Y N N/A Does the plan indicate that any reports will include representative photos of the site (including all planting zones) and a brief statement concerning observed performance of the project and any remedial actions undertaken?
- Y N N/A Does the plan establish strategic permanent photo stations to consistently document observed performance of the project?
- Y N N/A Does the annual survey of the planted wetlands vegetation area at least evaluate survival/success of planted vegetation? If yes, does the plan include remedial actions if planted vegetation does not maintain a cover of at least 90%? If yes, does the plan include remedial actions to ensure a “no net loss” in areal coverage of wetlands vegetation within the project area?
- Y N N/A Does the annual survey of the wetlands vegetation planted area at least evaluate presence of invasive species? If yes, does the plan include remedial actions if invasive species density is not maintained to less than 5% cover?
- Y N N/A Does the plan include periodic surveys of other planted areas, including riparian buffer and graded bank?
- Y N N/A Does the plan indicate trash and debris should be periodically removed (at least annually) to prevent smothering of the planted vegetation? If yes, does the plan indicate accumulated dead vegetative debris and detritus (i.e., wrack) should be periodically removed if it is adversely affecting the planted vegetation?
- Y N N/A Does the plan include remedial actions if shade from overhanging canopy negatively impacts sunlight availability for planted wetlands vegetation? If yes, does the plan include remedial actions to limit encroachment of trees and shrubs into the planted marsh grasses? If yes, does the plan include remedial actions to limit dead, dying, or severely leaning trees at the top of bank, on the bank face, or at the base of bank?
- Y N N/A Does the plan include assessment of changes in elevation of sand fill/nourishment(e.g., periodically recording exposed height of strategically-placed stakes driven into substrate)? If yes, does the plan include remedial actions to address rapid changes in substrate elevation and/or sand loss that might indicate design flaws or deleterious conditions leading to inordinate plant mortality? If

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

remedial actions include placement of additional sand, does the plan ensure the elevation of the originally proposed grade is not exceeded?

- Y N N/A Does the plan include assessment of proposed structures (e.g., sills) for stability and structural integrity, settlement below target design heights, displaced material (e.g., riprap, oyster shell bags), shifting and displacement of artificial reef foundations, and damage from debris and wave/storm action? If yes, does the plan include remedial actions to address identified deficiencies?
- Y N N/A Does the plan include remedial actions if temporary edging becomes displaced, unanchored, or unexpectedly damaged? If stabilization of marsh has not been achieved before temporary edging degrades, does the plan indicate replacement of temporary edging?
- Y N N/A If the establishment of oysters is incorporated into the project design (e.g. oyster shell bags, artificial reef foundation sill), does the plan include assessment of the settlement and growth of oysters on proposed structures? If yes, does the plan include remedial actions to address identified deficiencies?

This is guidance for living shoreline installations receiving Virginia Conservation Assistance Program (VCAP) cost share. Completing this checklist does not guarantee cost share, nor does it constitute application approval.

Projects are ineligible to receive cost share if construction begins before application approval. Please contact your local Soil and Water Conservation District for local application procedures.

Technical Resources

- *Living Shoreline Design Guidelines for Shore Protection in Virginia's Estuarine Environment* (version 3.0). VIMS Shoreline Studies Program. 2021. DOI 10.25773/sfgj-3d24. <https://scholarworks.wm.edu/reports/2863/>
- *Leesylvania State Park Living Shoreline Project Monitoring Protocol*. VIMS Shoreline Studies Program. 2019. DOI 10.25773/znwn-qd37. <https://scholarworks.wm.edu/reports/2070/>
- *Living Shoreline Sea-Level Resiliency: Performance and Adaptive Management of Existing Sites Year 3 Summary Report*. VIMS Shoreline Studies Program. 2021. DOI 10.25773/sfsv-bc33. <https://scholarworks.wm.edu/reports/2487/>
- Tidewater Joint Permit Application. August 2023. <https://www.nao.usace.army.mil/Missions/Regulatory/JPA.aspx>
- Tidal Wetlands Guidelines. VMRC. 05/25/2021. <https://www.mrc.virginia.gov/regulations/#habitat>
- 4 VAC 20-1300-10 *et seq.* Pertaining to Living Shoreline Group 1 General Permit for Certain Living Shoreline Treatments Involving Tidal Wetlands. VMRC. 09/01/2015. <https://www.mrc.virginia.gov/regulations/#habitat>
- 4 VAC 20-1330-10 *et seq.* Pertaining to Living Shoreline Group 2 General Permit for Certain Living Shoreline Treatments Involving Submerged Lands, Tidal Wetlands, or Coastal Primary Sand Dunes and Beaches. VMRC. 11/01/2017. <https://www.mrc.virginia.gov/regulations/#habitat>
- Code of Virginia §28.2-1300. "Wetlands vegetation." <https://law.lis.virginia.gov/vacode/title28.2/chapter13/section28.2-1300/>
- Code of Virginia §28.2-1400. "Dune and beach vegetation." <https://law.lis.virginia.gov/vacode/title28.2/chapter14/section28.2-1400/>
- State Programmatic General Permit 23-SPGP-PASDO (Piers, Aquaculture, Shoreline, Dredging, Other). USACE Norfolk District. Effective 09/05/2023. <https://www.nao.usace.army.mil/Missions/Regulatory/RBregional/>
- *Recommendations of the Expert Panel to Define Removal Rates for Shoreline Management Projects*. USEPA Chesapeake Bay Program. 2019 (as amended; revised 2017; originally approved 2015). https://www.chesapeakebay.net/who/publications-archive/bmp_expert_panels