Pine Whiff Beach Living Shoreline Project

Design & Permitting Phase
Community Packet

Arundel Rivers FEDERATION

SELECTED ENGINEERING FIRM

BayLand Consultants & Designers, Inc.

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ArundelRivers.org

PO Box 760, Edgewater, MD 21037
410-224-3802 ◊ ArundelRivers.org

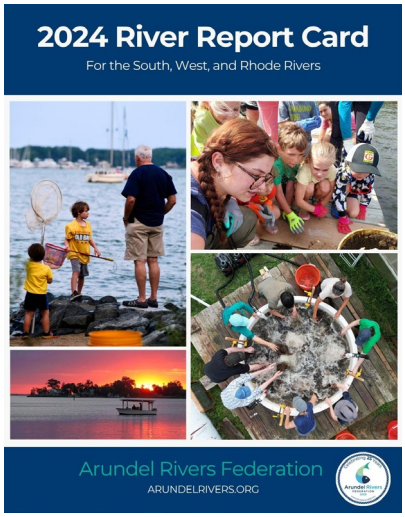
Who is the Arundel Rivers Federation?

We are the watershed organization representing the South, West, and Rhode rivers. Our three program areas include **Riverkeeper**, **Restoration**, and **Education & Outreach**.

South, West, Rhode Riverkeeper

Your South, West, Rhode Riverkeeper works to protect our rights to clean water! This is done through monitoring, advocacy, and enforcement. Twice a month from April-October, you can expect your Riverkeeper to be out patrolling our rivers and taking water quality monitoring samples along the way. Want to learn more? Check out our 2024 River Report Card!

Weekly throughout prime swimming months, we facilitate a bacteria testing program that tests for *enterococci*. Humans and pets can contract illnesses from contact with this bacterium in the water, so check our website, social media platforms, and SwimGuide.org for weekly bacteria results around the watershed before you dive in!



Restoration

The Arundel Rivers' Restoration program works with communities, funders, and other partners to restore our land and waterways. These projects, both small and large in scale, actively trap and filter pollutants from stormwater, slow erosion, create habitat for creatures in and around our rivers while making our lands and communities more resilient.

Education & Outreach

The Arundel Rivers Education and Outreach program focuses on engaging and educating everyone in the South, West, and Rhode River watersheds. Our goal is to take community members from curiosity to awareness to action; everyone deserves to know what challenges our local environment faces and what each of us can do to help. This is where one can find our volunteer opportunities, Marylanders Grow Oysters program, and SAV Watchers (a program for reporting sightings of submerged aquatic vegetation).

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410-224-3802 ♢ ArundelRivers.org

Dear Pine Whiff Beach community,

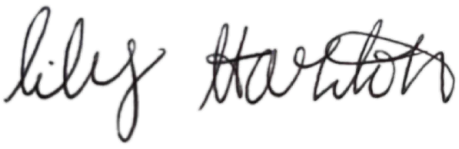
I hope you are having a wonderful summer full of rest, fun in the sun, and time well spent with loved ones! It has been quite a bit since the last time we've spoken, which was at a community meeting toward the beginning of this summer, so I wanted to share a bit about where we're at for our project.

We have hired BayLand Consultants & Designers, Inc. to be our engineer! This firm, founded in 1995, has worked with Arundel Rivers on many projects throughout the years. We've made this project packet for you to share where we are in the process, (hopefully) answer any lingering questions, and to help you feel confident in our partnership. This packet includes a portfolio of BayLand's past shoreline projects and frequently asked questions.

Right now, our restoration team is finalizing our engineer's contract. The next step will be for the engineer to conduct onsite surveys. These surveys will inform their designs and ensure their work is tailored to the property's exact specifications. The engineer's project profiles were included in this packet not only to demonstrate their extensive experience, but to display how living shoreline projects can vary based on their individual needs.

Arundel Rivers and BayLand are both very excited for this project and look forward to working with the Pine Whiff Beach community. Thank you for your time and partnership!

Sincerely,



Lily Hariton
Community Outreach Assistant

Frequently Asked Questions

What is the purpose of this project?

*The goal of this project is to **protect** the community's property from further erosion and ensure all community members have **safe access** to the creek for years to come. The living shoreline will ensure the community is more **resilient** in the face of increasingly frequent and intense storm surges.*

*This project will better support our environment by safeguarding **water quality** through the marsh's absorption of excess nutrients (like nitrogen & phosphorus) before they can pollute our waters. We will create marsh **habitat** to support local wildlife, giving them a safe place to rest, nest, and hunt for their next meal.*

How is this project being funded?

*The design & permitting of this project is funded through the **Pine Whiff Beach Property Owners Association (PWBPOA)** and the **Chesapeake Bay Trust's** Watershed Assistance Grant Program with supplemental funding provided by **Maryland Department of Natural Resources (MDNR)** and the **U.S. Environmental Protection Agency (EPA)**.*

Why is the shoreline going to be planted with grasses?

These native grasses will act as glue to hold the shoreline and sand in place. They help protect against storm surges by dissipating wave energy and will also provide a great habitat area for shorebirds, turtles, horseshoe crabs, and many more species of local wildlife.

The design grants we've been awarded are specifically for 'living shorelines.' The National Oceanic & Atmospheric Administration (NOAA) defines them as "a shoreline management practice that provides erosion control benefits; protects, restores, or enhances natural shoreline habitat; and maintains coastal processes through the strategic placement of plants, stone, sand fill, and other structural organic materials (e.g. biologs, oyster reefs, etc)." Similarly, all implementation grants (that we're still seeking) will only fund

projects with plants. Grass planting throughout the shoreline is a requirement of this project.

Will I be able to access the water?

Yes! Once the project is completed, there will be designated walking paths throughout the grasses in the sand to ensure the community is able to comfortably access the water. Once the grasses are fully rooted (typically 1 year after planting), they will be able to withstand some foot traffic, but we highly encourage using the paths as primary access routes.

Will this attract snakes or mosquitos?

This question is asked often about the majority of our restoration projects! Snakes and mosquitos are currently a part of our ecosystem and this project will not change that. If there is interest, our staff would be happy to recommend environmentally-conscious mosquito control methods.

Can I walk through the marsh grass?

After 1 year of being planted, the grasses will be able to withstand some foot traffic. Before that 1 year mark, we kindly ask that community members (human & pets) use the ***walking paths*** *between the grasses as much as possible to avoid damaging the plants. To ensure the longevity of the grasses, please use the walking paths as your primary route to the water — especially when transporting kayaks/paddlesport equipment.*

Will there be access for the community to rebuild the pier in the future?

Yes! At the very beginning of the design & permitting phase of the project, community members shared that they hope to eventually rebuild the pier that had washed away. The engineers are aware of this wish and will design a shoreline that will not impede that future project.

How will the community be involved in the design?

As a project partner, you will be part of the approval process. When Arundel Rivers receives the preliminary design from the engineer, we will review it internally. If it reflects both the community's and environmental goals, we will share it with the PWBPOA for review. If all partners are satisfied with the direction of the design, the engineer will fine tune it more and more until it is more complete. Then we will go through the reviews again – this will continue until we have a final design.

*In the interest of everyone's valuable time, Arundel Rivers will only share a design with PWBPOA once our staff finds that the design meets all goals. If it does not reflect the community/environmental goals, we will send it back to the engineer and they will tweak the design until we approve of it. We only move forward with the design when **all** partners are pleased with the direction of it.*

When will the construction start?

We do not have a specific date for the implementation of the living shoreline at this point. The design & permitting phase can last up to 2 years, and we officially started in June 2025. Arundel Rivers has begun seeking grant funding for the project's implementation and we will not be able to provide tentative construction dates until that funding is secured.

Who will be responsible for maintenance?

A Memorandum of Understanding (MOU) will be executed between the county, Arundel Rivers, and PWBPOA. In short, this document protects the project from being removed or altered while outlining responsibilities. It will come into play once the design is almost complete and will not be signed until all parties are content with the project. It is a contingency of any grant funding for construction. The main takeaways of the MOU are that Arundel Rivers will be responsible to maintain at least 85% of plant survival for the first 5 years after construction is completed. It will also state that maintenance such as clearing the shoreline of trash and debris should be

done by the community as needed. Finally, the county will have access to the property for inspection and maintenance.

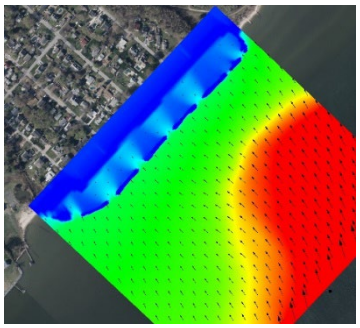
Who should I contact with questions?

First, please check the PWBPOA's website and "Community Beaches" page. If your question remains unanswered, please contact Gloria Shannon (gjshannonx@yahoo.com), who will serve as our project's Community Liaison.

Beverly Triton Nature Park Shoreline Protection: Anne Arundel County, MD

The Beverly Triton Nature Park has approximately 6,150 feet of shoreline along the Chesapeake Bay with portions experiencing erosion between 2 to 9 feet/year. The beach was originally protected by a groin system that captures longshore sediment transport in the public beach area and deprived other areas of natural sand nourishment. Over time, the groin system was removed, resulting in high coastal erosion. In the early 2000's, an offshore breakwater protection system was constructed to help mitigate these impacts; however, the erosion has continued over the past 20 years, escalating in recent years as the shoreline moves farther away from the breakwaters and reduces their ability to retain sand along the shoreline.

In 2017, BayLand was tasked with assessing the shoreline to determine the most vulnerable areas to prioritize for shoreline protection. The assessment included a site reconnaissance documenting characteristic features and visual observations. The shoreline was then divided into multiple reaches grouped based on similar characteristics. A review of existing data, including but not limited to, breakwater and beach nourishment as-builts, littoral drift maps, Maryland Department of Natural Resources (DNR) erosion rate estimates, previous erosion control design reports and coastal analyses, archaeological investigations and Maryland Department of the Environment (MDE) issued wetlands licenses were examined to further characterize the areas of shoreline. The reaches were prioritized based on vulnerability.



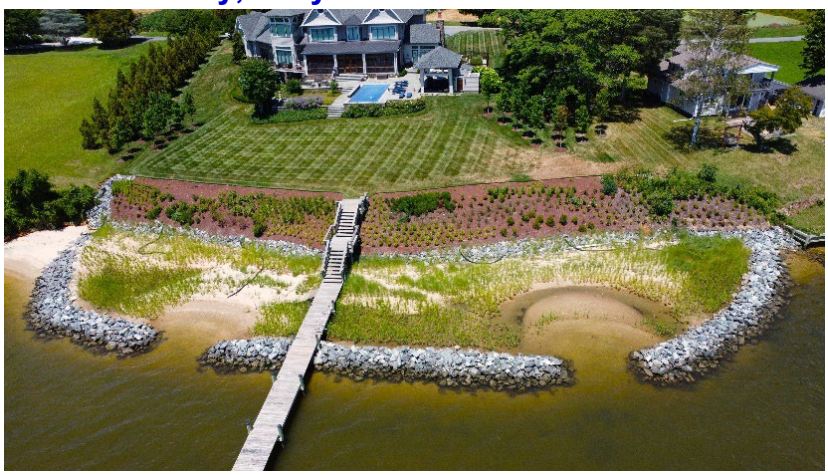
In 2019, BayLand continued this effort with the design of a breakwater retrofit and living shoreline to address the erosion along the prioritized reaches. The first of these reaches consists of a sandy beach protected by offshore breakwaters. BayLand conducted a coastal engineering analysis to define the wave climate and sediment transport patterns. Methodologies described in the U.S. Army Corps of Engineers Coastal Engineering Manual (CEM) were utilized to determine the optimal retrofit of the breakwaters to increase their efficiency in sand capture and retention. Additionally, empirical models based on other functioning breakwater systems with similar exposure in the Chesapeake Bay were evaluated. Numerical modeling was performed to assess the performance of different design alternatives in reducing the wave height behind the structures. Another reach of the shoreline consists of a thin strip of beach separating the Bay from an ecologically sensitive brackish pond. Erosion has threatened to breach the pond, resulting in significant saltwater intrusion that will threaten existing species. BayLand designed a living shoreline consisting of an attached stone breakwater protecting sand fill and marsh plantings. The living shoreline created will provide shallow water habitat and wetlands to support horseshoe crabs and other sensitive species. The final reach is currently experiencing an erosion rate of 9 feet/year. This remedial design consists of an attached stone breakwater, sand fill and marsh plantings. The living shoreline designs have incorporated a 'marsh migration area' to allow the marsh to move inland to mitigate for sea level rise. Construction bids came in within budget and construction was completed in June 2021.

Construction Cost:	$1,600,000
Firm's Responsibility:	$1,600,000
Date Completed:	2021

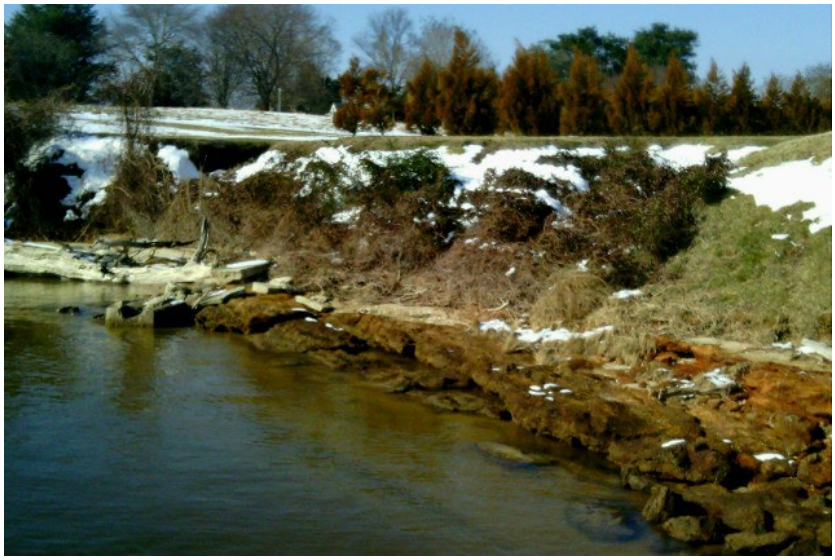
Owner/Reference: Mel Harlinski
Anne Arundel County Department of Public Works
2662 Riva Road, Annapolis, MD 21401
(410) 222-7540; pwharl45@aacounty.org

Briscoe Road Shoreline Protection, Calvert County, Maryland

BayLand Consultants & Designers, Inc. (BayLand) was engaged, in the winter of 2021, by private property owners Sherrie Jones and Per Jensen to deliver design and permitting services aimed at protecting approximately 240 linear feet (LF) of eroding shoreline along the banks of the Patuxent River. BayLand's role encompassed developing the concept plan and final design, preparing, submitting, and securing all necessary regulatory permits, and providing ongoing technical support and meeting participation throughout the project.



Once the design and permitting phases were completed, Environmental Quality Resources, LLC (EQR) was selected as the construction contractor. The construction scope included 188 LF of stone revetment, 58 LF of stone sill structure, 26 LF of stone groin structure, 1,150 square feet (SF) of sand fill, 432 SF of high marsh planting, and 309 SF of shrub plantings.



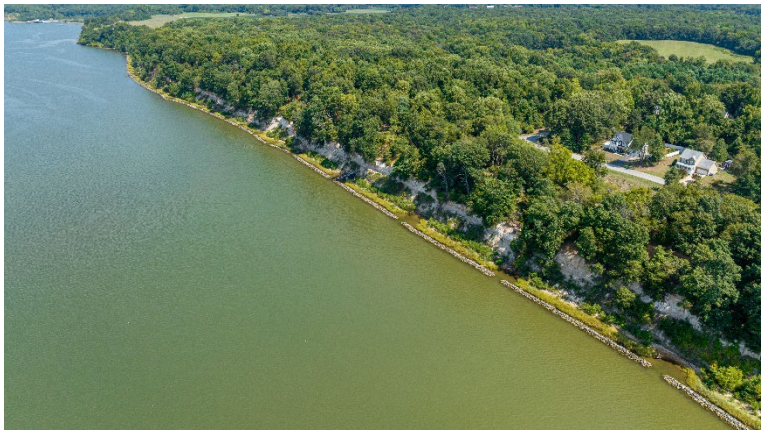
BayLand continued to support the project during the construction phase and was contracted by EQR to provide technical support during construction, stakeout and as-built services.

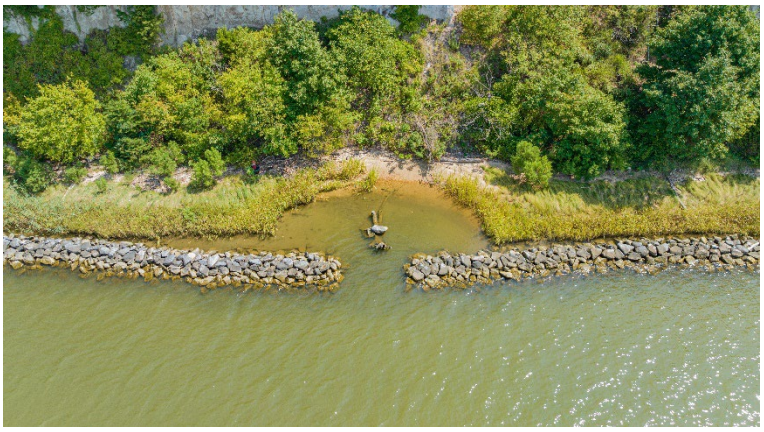
Construction Cost: $305,000
Firms Responsibility: $39,000
Date Completed: September 2023

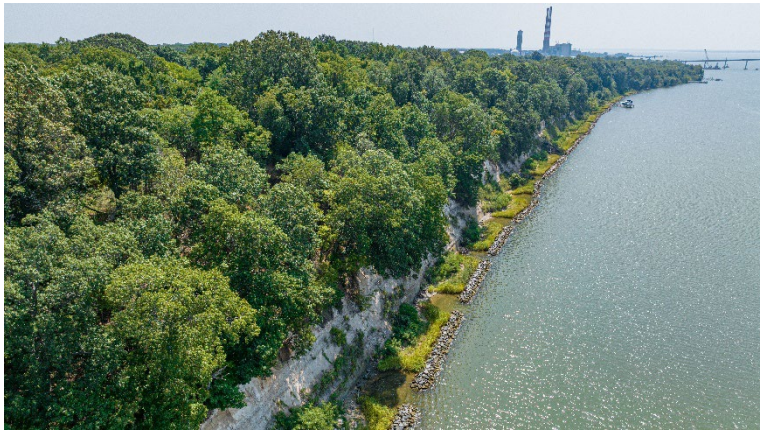
Owner/Reference: Private Property Owner
4844 Briscoe Road, St. Leonard, MD 20685
Sherrie Jones & Per Jensen
(703)244-2056;
sherrie@psstudios.org

Cliffton on the Potomac Shoreline Stabilization: Newburg, Charles County, MD

In 2014, BayLand performed a shoreline assessment for multiple locations around Charles County to identify shorelines experiencing significant erosion where stabilization efforts could be used to obtain MS4 credits. The 4,375 linear foot shoreline along Cliffton on the Potomac was identified where construction of a living shoreline would reduce the rate of erosion of the 80 to 100+ foot bluffs and create marsh habitat while helping the County achieve its target MS4 goals and protecting 21 contiguous single-family lots and 2 larger parcels. The shallow water and relatively low flow velocities made this an attractive location for a living shoreline. The shorelines is exposed to westerly winds with a fetch of approximately 6 miles, which would required a hybrid living shoreline approach using stone structures and a marsh terrace.







The size of the stone structures and vents between the sills was determined by examining wave heights and tidal fluctuations that influenced flow velocities. Sand fill was added behind the stone sills to act as a buffer between river flow and wave action at the toe of the bluff. Existing cobble along beach was salvaged and placed adjacent to open vents to provide added protection for the create a diverse beach habitat. Wetland plantings were added to further retard the flow and waves and help anchor the sand in place. The creation of this marsh area not only reduces the erosion of the bluffs but has the added benefit of creating habitat for turtles and other shallow water species.

Services provided by BayLand included hydrographic and topographic surveys; GIS desktop and field-run site assessments; geotechnical assessment; coastal analysis; habitat and cultural resources assessments; Federal, State and local permitting; design development, final design, construction plans and specifications; bidding support; construction management; as-built plans and pollutant load reduction certification.

Construction began in Fall 2019 and was concluded in Spring 2020. Total length of living shoreline created was approximately 4,375 LF with over 2.7 acres of marsh created. In addition to significantly reducing the erosion at the toe of the bluffs, the construction of the project resulted in 173 equivalent acre credits towards the County's MS4 permit. The project was completed on time and on budget and proved to be an effective means to reduce pollutant loadings by decreasing the rate of erosion while also providing opportunities to create new shoreline wetland habitat.

Firm's Responsibility: $4.4 million
Construction Cost: $4.4 million
Date Completed: 2020

Reference: Art Swann, Program Manager, Charles County DPW
1001 Radio Station Rd, La Plata, MD 20646
(301) 885-1314; swannA@charlescounty.org

Colley Bay Living Shoreline, City of Norfolk, Virginia

BayLand Consultants & Designers, Inc. developed detailed designs and specifications for a living shoreline project along two separate reaches in Colley Bay in the Lafayette River. The purpose of the shoreline restoration project was to enhance the acreage and function of natural ecosystems in Colley Bay, as well as to provide waterfront access and educational opportunities for the public in a residential neighborhood. The site included approximately 1,100 linear feet of shoreline with denuded marsh habitats, moderate shoreline erosion rates, extensive concrete debris deposition, invasive species encroachment, tidal marsh subsidence, narrow riparian buffers, and upland storm water management issues.

The design included wetland restoration and enhancement for both low and high tidal marsh habitats, using rip-rap sills and coir fiber logs for marsh toe stabilization. Pocket beaches were added to the area to allow public access for recreation, and the improvements were designed around the City's planning for a future public pier and walking path around Colley Bay.

Construction of the North Shore (completed in 2013) included removal of debris along the shoreline, tree clearing and stump removal, mulching, re-grading, installation of coir fiber logs and a rip-rap sill, and backfill with clean sand. The restoration also involved participation by local citizen groups who were actively involved with the plantings of upland trees and wetlands vegetation along the shoreline. This shoreline restoration has not only had a successful environmental outcome, but it has also served as a living "classroom" example for students, citizens, and academians who are interested in ecological restoration projects.

In 2014, the design team of Clark-Nexsen/BayLand was awarded the Engineering Excellence Honor Award from the American Council of Engineering Companies (ACEC) of Virginia.

Construction Cost:	$240,000
Firm's Responsibility:	$240,000
Date Completed:	2013
Owner/Reference:	Kevin Du Bois, Environmental Manager City of Norfolk, Department of Public Works (757) 621-2564; kevin.dubois@norfolk.gov

Dennis Point Living Shoreline, Anne Arundel County, MD

In February 2009, an economic stimulus package was enacted by Congress titled the American Recovery and Reinvestment Act of 2009 (ARRA). One purpose of the stimulus was to invest in environmental protection and other infrastructure that will provide long-term economic benefits, preserve and create jobs and promote economic recovery.

The Dennis Point Homeowners' Association (HOA) sought and obtained grant funding from the ARRA for the construction of a living shoreline project in Shady Side, Maryland. The project was expedited and close coordination with the Maryland Department of the Environment (MDE) was required to meet mandatory benchmarks for projects financed through an ARRA grant. BayLand was responsible for providing expedited permitting, design, construction procurement, construction management and inspection services.

BayLand was hired to complete permitting and design services for the Association. The project consisted of stabilizing approximately 1,200 feet of low marshy shoreline at two different areas along the community owned property. Structural elements of the living shoreline included 355 linear feet of stone sill, approximately 400 linear feet of stone breakwater, 245 linear feet of stone marsh edging and clean sand fill, marsh grass plantings and terminal groins. Sand fill would be placed behind the stone structures to provide for a marsh planting terrace and areas of open pocket beaches. Provisions to the design of the South Marsh were developed to address offsite drainage. The height of the stone structures and size of stone was designed based on analytical coastal models and BayLand's experience with similar projects in the Chesapeake Bay. BayLand developed the design to ensure it was consistent with the available ARRA grant budget of approximately $525,000.

BayLand worked closely with the client and MDE regulatory agents to obtain federal and State tidal wetlands permits. BayLand also prepared, submitted and obtained the required County permit and prepared the final design and construction bid documents expeditiously.

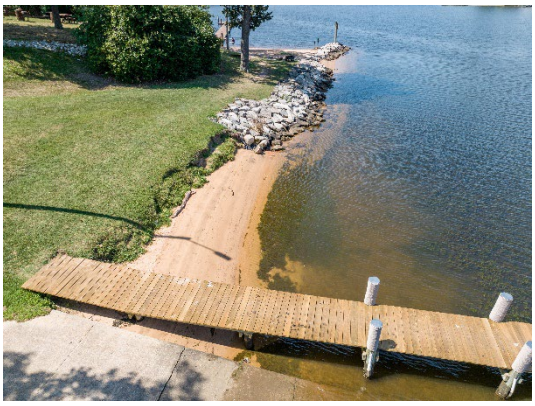
Following design, BayLand provided construction procurement services. These services included bid advertisement; pre-bid conference; bid package addendums; formal bid opening; bid tabulations and analysis; grant compliance and contractor assurances; and bid recommendation to the client and MDE.

BayLand provided construction inspection services and managed all construction activities for compliance with project design, schedule, regulatory requirements and work quality. The construction and marsh grass plantings were completed in May 2010. The Dennis Point Living shoreline project is excelling already and its growth has only just begun.

Construction Cost:	$550,000
Firm's Responsibility:	$550,000
Date Completed:	2010
Owner/Reference:	Dennis Point Homeowners' Association 128 Lafayette Avenue, Annapolis, MD 21401 Sandra Cohen, Contract Officer (443) 926-6633; s_jc@yahoo.com

Elizabeth's Landing Shoreline Protection, Anne Arundel County, MD

Since late 2022, BayLand has been working with the leadership of Elizabeth's Landing Community Association to develop a nature-based solution to their shoreline erosion adjacent to their boat ramp to preserve critical habitat along Stoney Creek in Pasadena, Anne Arundel County, Maryland. BayLand's scope of work included technical services needed to perform topographic and hydrographic survey; develop a concept design; obtain federal, state, and local permits; and provide technical services during construction and long-term monitoring post construction.



BayLand partnered with Environmental Quality Resources, LLC (EQR) and Green Trust Alliance (GTA) to identify appropriate grant opportunities, meet with grant agencies and apply for numerous grants for construction funding. The project was recently awarded a grant for construction by the Chesapeake Bay Trust (CBT) in their partnership with Anne Arundel County to protect eroding shorelines and meet their TMDL requirements.

Construction of the project began in March 2025 and is anticipated to be completed in June 2025. The design included shoreline protection using individual stones and a marsh terrace. Along the steep and eroding bank, a coir log was placed to allow the bank to naturally stabilize over time. Upon completion, the project will have protected 240 linear feet of shoreline with 135 LF of segmented low-profile stones and the creation of 4,000 square feet of tidal marsh. 500 sf of coastal shrubs and trees will be installed as part of the project to further protect and enhance the Chesapeake Bay Critical Area and buffer habitat.

Construction Cost: $850,000
Firm's Responsibility: $850,000
Date Completed: 2025
Owner/Reference: Elizabeth's Landing Homeowners' Association
P.O. Box 656, Pasadena, MD 21123
Lisa Phipps
Phipps9202@comcast.net

Essex Skypark Living Shoreline, Baltimore County, MD

Baltimore County Department of Environmental Protection and Sustainability (DEPS) completed a Shoreline Enhancement Feasibility Report in 1998 and the Back River Rural Legacy Ecological Assessment Report in 2005. Both reports identified portions of the shoreline at Essex Skypark along the east shore of Back River as an area that would significantly benefit from shoreline stabilization and enhancement. In 2009, DEPS initiated the project to protect and enhance 2,610 linear feet of severely eroded shoreline. Many trees along the shoreline had toppled over exposing the clay soils and causing bank recession. The project included off-shore stone sills and breakwaters to dissipate wave energy combined with bioengineering and tidal wetland creation. The project helped to achieve sediment and nutrient reduction goals for Back River and ultimately the Chesapeake Bay. Funding partners for this project included the Chesapeake Bay Trust, the National Oceanic and Atmospheric Administration and the Maryland Department of the Environment.

BayLand Consultants & Designers, Inc. (BayLand) was hired to collect necessary field information: obtain Federal, State and County permits; provide a complete and functional design including construction plans and bid documents; and provide construction management services. The permitting and design phases of the project included topographic and hydrographic survey; geotechnical investigation; Federal and State permits; preliminary, prefinal and final design; and construction documents.

Following the permitting and design phase of the project, BayLand was hired to provide construction management services during the 210-calendar day (30 weeks) construction contract duration. BayLand provided the following services:

- Attended pre-construction meeting.
- Reviewed shop drawings, submittals and certification.
- Attended 12 progress meetings during the estimated 24-week active construction period. Prepared and distributed meeting minutes.
- Performed an additional 18 site visits during active construction periods to review progress and quality of work.
- Performed inspection of 50-foot sample sections for segmented sill and breakwater sections and note any deficiencies.
- Performed check survey of stakeout for stone structures using RTK-GPS.
- Performed check shots with a laser level to verify grades of sand fill.
- Reviewed contractor requests for information.
- Coordinated key activities and actions with DEPS.
- Attended Conditional Acceptance and Final Completion meeting.

This project was showcased by the Expert Panel to define Total Maximum Daily Loads Pollutant Removal Rates for Shoreline Management Projects. The pollutant load reduction for this project was calculated to be 755, 193 and 462,596 pounds per year removal of Total Nitrogen, Total Phosphorous and Total Suspended Solids respectively.

Firm's Responsibility:	$1,100,000
Construction Cost:	$1,100,000
Date Completed:	2012

Owner/Reference: Baltimore County DEPS
111 W. Chesapeake Ave., Room 319, Towson, MD 21202
David Riter, Program Supervisor
(410) 887-2904; driter@baltimorecountymd.gov

Fort Smallwood Park Shoreline Stabilization, Anne Arundel County, MD

In 2016, BayLand was awarded the design of a shoreline stabilization and a water access project at the popular, scenic, and nationally historic Fort Smallwood Park under an existing On-Call Contract with Anne Arundel County. The work included the assessment and design of critical shoreline features to protect 4,645 LF of shoreline subject to severe coastal erosion and storm damage, protection of a low-lying perimeter road and freshwater pond, and the creation/enhancement of coastal marshes and ecosystem at Fort Smallwood Park in Pasadena, MD.

AWARD

- Winner of the 2023 ENR Project of the Year for Water & Environment
- Winner of the 2024 American Shore and Beach Preservation Association Best Restored Shore

An array of shoreline management strategies were developed to protect, nourish, and enhance the diverse coastal and shoreline features that existed along various project reaches. Phase 1, completed in 2019, constructed a living shoreline to replace the dilapidated rubble toe protection using offshore stone breakwaters, sand fill, marsh plantings, coastal shrubs, and an afforestation area. Phase 2, completed in 2022, included construction of headland breakwaters, beach nourishment, marsh creation and additional afforestation plantings. The final phase, Phase 3, also completed in 2022, involved the replacement of a dilapidated seawall with an elevated revetment to protect against flooding and washout due to wave overtopping. In total, the project included the protection of approximately 4,650 LF of shoreline, the placement of almost 20,000 cubic yards of sand of which 7,000 cubic yards was beneficial use of dredged material, creation of 2.2 acres of coastal marshes, addition of 2.7 acres of shrubs and trees, beach nourishment of a public swim beach, addition of recreational features including a kayak launch and three fishing piers, one with ADA accessibility.

The design incorporated multiple shoreline management strategies to provide the necessary protection and resiliency against sea level rise; created a variety of coastal ecosystems including protected shallow water habitat, tidal marshes, open beach, coastal dunes and grasses; improved public access and recreation through fishing piers, swim beach, canoe soft launch area; enhanced the appearance of the park; and created dramatic improvement in the transition of natural habitats that stretch from higher ground down to the shoreline.

Services provided by BayLand included hydrographic and topographic surveys; GIS desktop and field-run site assessments; geotechnical assessment; coastal analysis and numerical modeling; habitat and cultural resources assessments; Federal, State and local permitting; design development, final design, construction plans and specifications; bidding support; construction management; as-built plans and pollutant load reduction certification.

BayLand also provided planning, coordination, design, and permitting of activities needed to allow dredged material from multiple nearby navigation channels to be beneficially used for Phase 1 and 2. Extensive coordination was required between Federal, State and County regulatory and funding agencies along with several local citizen interest groups, to allow implementation of both projects under two different construction contracts and funding source. BayLand provided construction management and oversight of all activities. This effort resulted in significant cost savings to the County and diverted dredged material from occupying much needed capacity at the County owned Dredged Material Placement (DMP) Site.

The project provides for coastal hurricane and storm damage reduction through structural and non-structural features; coastal ecosystem restoration; improved public safety and water access for recreational use; and decreased erosion and runoff into Rock Creek, the Patapsco River, and the Chesapeake Bay.

Firm's Responsibility: $4.5 million
Construction Cost: $4.5 million
Date Completed: 2022

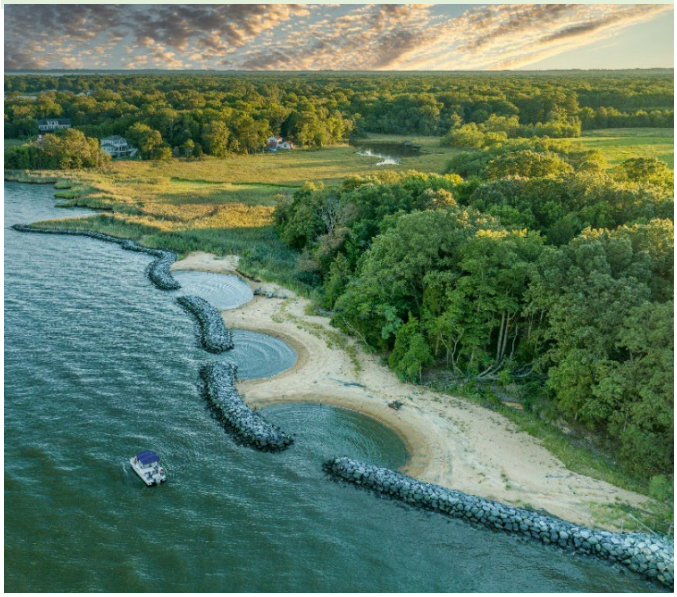
Reference: Melissa Harlinski, Anne Arundel County DPW
2662 Riva Road, Annapolis, MD 21401
(410) 222-4126; pwharl45@aacounty.org

Jack Creek Park Shoreline Improvements: Shady Side, Anne Arundel County, MD

Jack Creek Park is a 58-acre County-owned Park with over 3,000 feet of shoreline along Jack Creek and the Chesapeake Bay. The Park provides public access to the shoreline through walking trails and a soft launch area for launching of kayaks, canoes, and other small watercrafts. The Park shoreline is experiencing significant erosion due to the wave exposure that is resulting in the deterioration of the Park assets.

AWARDS

- 2021: Maryland Quality Initiative (MdQI) Award of Excellence
- 2021: MdQI Project of the Year under $5 Million
- 2020: County Engineers Association of Maryland (CEAM) Project of the Year Award



In 2016, the Anne Arundel County DPW tasked BayLand to develop a project design to reduce the shoreline erosion, estimated to be more than 17 feet/year in certain areas, provide increased public access to the Chesapeake Bay, and improve water quality through pollutant reduction as part of the MS4 program. Additionally, dredged material from the Idlewilde DMP Site was beneficially reused to raise ground elevations along low laying area of the Jack Creek Park that was vulnerable to flooding due to sea level rise. This would improve the Park's coastal resiliency while restoring capacity at the DMP site for future dredging projects.

The design developed by BayLand to combat the severe erosion consisted of living shoreline components included stone sills and headland breakwaters, sand fill, and marsh plantings. Services provided by BayLand during the design development and construction included bathymetric and topographic surveys; GIS desktop and field-run site assessments; geotechnical and coastal assessments; wave climate analysis; habitat and cultural resources assessments; federal, state, and local permitting; conceptual design development, construction plans and specifications; bidding support; construction management; as-built plans, and pollutant load reduction certification.

The shoreline component of the project began construction in June 2019. Because of the extreme erosion occurring on site, areas of the shoreline had retreated up to 30 feet since the field investigations and conceptual design were developed. In a matter of weeks, BayLand redesigned components of the project and obtained the approvals necessary to ensure the project would stay on schedule.

The project was completed in November 2019, six months ahead of schedule, for $1.6 M. The living shoreline at Jack Creek Park includes 850 feet of rock structures, 8,400 CY of sand fill, and 1.2 acres of marsh plantings. Approximately 1,600 LF of living shoreline was constructed with enough pollutant reduction credits to treat 64 acres of impervious area. The objective of increasing public access to the water was achieved by constructing substantial improvements to the access road, re-vamping the soft launch area, and construction of a 20-vehicle parking area using pervious pavers. Additionally, an ADA accessible pervious pathway was constructed from the parking area to the improved soft launch. Finally, 15,000 CY of dry dredged material from Idlewilde DMP Site was placed to enhanced approximately 3 acres of Jack Creek Park and an additional half-acre of forested area was planted as mitigation for Critical Area Buffer impacts.

Firm's Responsibility:	$1.6 million	Owner/Reference:	Masoud Ghatineh, PE (Retired), Anne Arundel County DPW
Construction Cost:	$1.6 million		2662 Riva Road, 3rd Floor, Annapolis, MD 21401
Date Completed:	2019		410-222-7575; mghatineh@aacounty.org

Kent Narrows Dredging and Beneficial Use at Eastern Neck Island Wildlife Refuge to Create Dune System and Living Shoreline: Queen Anne's County, MD

BayLand was awarded a contract by Queen Anne's County through competitive qualifications and cost solicitation process to provide A/E services to design, permit and provide construction oversight for the dredging of Kent Narrows – Chester River entrance channel and placement of material at the Eastern Neck Island Wildlife Refuge to create a dune system and living shoreline.

In 2017, Queen Anne's County received funding through the DNR Waterway Improvements Program to dredge the U.S. Army Corps of Engineers federal channel at the Kent Island Narrows entrance channel extents. Because the material within the channel was sand consisting of minimal fines, BayLand recognized the opportunity to beneficially use the material to re-nourish the shoreline at the Eastern Neck Island Wildlife Refuge. Though all stakeholders involved agreed that beneficial use of dredged material (BUDM) was the preferred alternative, extensive coordination was required between USACE, USFWS, MD DNR, MDE, and Queen Anne's County to obtain the required regulatory approval, which included a Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act with additional coordination with the Navigation Section to obtain a 33 USC Section 408 approval. BayLand expedited the project design and implementation and completed the project from initial planning to final acceptance in less than 15 months.

Approximately 16,000 CY of sandy dredged material was beneficially used for beach nourishment and dune creation along approximately 1,000 LF of the Eastern Neck National Wildlife Refuge shoreline that was vulnerable to coastal erosion and severely lacked shoreline habitat. The beach was constructed to an elevation of +5 feet above MLW, and the dune was increased to +7 feet MLW to function as a surge barrier for the forested area behind the dune. The project created 33,000 SF of new marsh and dune grasses along previously hardened (stone-lined) shorelines. Coir logs were constructed to protect areas of shoreline not protected by the breakwater system already in place. The beach and dune profile were designed to allow for natural adjustment of the beach for the seasonal variation in coastal climate. Coastal resiliency was built into the project by including marsh migration areas to allow adjustment of marsh elevations in response to sea level rise and sand dunes planted with beach grasses to aid in sand retention.

Firm's Responsibility: $950,000
Construction Cost: $950,000
Date Completed: 2019

Owner/Reference: James Wood, Queen Anne's County DP
1945 4-H Park Road, Centreville, MD 21617
(410) 758-0835, ext 2505; jwood@qac.org

Mayo Beach Park Shoreline Improvements, Anne Arundel County, MD

Mayo Beach shoreline is a County-owned Park located on the Mayo Peninsula in Edgewater, Anne Arundel County, Maryland. The beach was once protected by a groin field that had deteriorated and was no longer providing the necessary coastal protection, resulting in over 100 feet of shoreline recession between 1994 and 2010. In 2011, the County undertook a shoreline protection project replacing the groins with headland breakwaters and beach nourishment. The project reduced the erosion to approximately 1 – 2 feet/year. In early 2021, Anne Arundel County tasked BayLand with the enhancement of the current shoreline protection system which completed construction in May 2024.

The recently completed Mayo Beach Park Shoreline Improvements Project showcases a nature-based solution to combat coastal erosion along 1,400 feet of shoreline. The project incorporated several key improvements aimed at both preservation and public accessibility. Among the highlights are the retrofit of approximately 265 feet of breakwater and the construction of 50 feet of elevated stone groin, designed to stabilize the shoreline. Additionally, 270 feet of living shoreline with sand fill was created, along with the nourishment of 800 feet of County-owned beach using over 5,000 CY of sand, enhancing the area for public recreation. Over 10,000 SF of Spartina Patens were planted, contributing to the ecological restoration. New trees and shrubs were also planted, further improving the natural landscape. Importantly, the project includes ADA-compliant permeable paver parking and access path, ensuring the shoreline is accessible to everyone while preserving the beauty of the area for future generations.

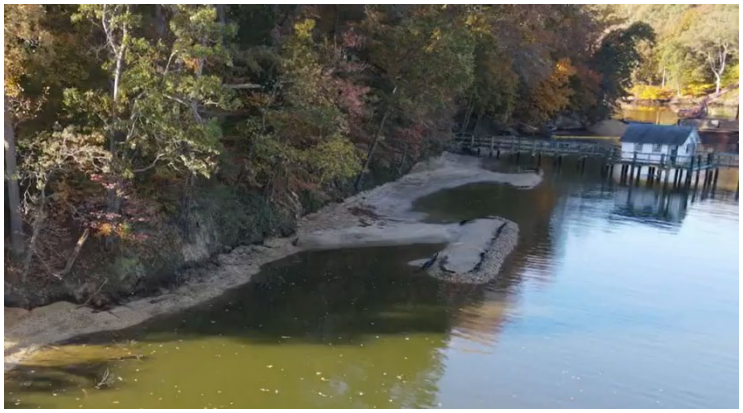
Services provided by BayLand included hydrographic and topographic surveys; GIS desktop and field-run site assessments; geotechnical assessment; coastal analysis; habitat and cultural resources assessments; Federal, State and local permitting; design development, final design, construction plans and specifications; bidding support; construction management; as-built plans and pollutant load reduction certification.

The project provides for coastal hurricane and storm damage reduction through structural and non-structural features; coastal ecosystem restoration; improved public safety and water access for recreational use; and decreased erosion and runoff into Rock Creek, the Patapsco River, and the Chesapeake Bay.

Construction Cost: $1.5 million
Firm Responsibility: $1.5 million
Date Completed: 2024

Reference: Anne Arundel County DPW
2662 Riva Road, Annapolis, MD 21401
Melissa Harlinski, Project Manager
(410) 222-4126; pwharl45@aacounty.org

Pickering Creek Audubon Center Living Shoreline: Easton, Talbot County, MD



Pickering Creek Audubon Center, located at 11450 Audubon Dr in Easton, Talbot County, Maryland, is a 450-acre working farm on Maryland's Eastern Shore, featuring diverse habitats like hardwood forests, marshes, meadows, and wetlands along Pickering Creek in Talbot County. The Center is owned and operated by the Chesapeake Audubon Society, Inc and is dedicated to conservation education, inspiring thousands each year to protect birds, wildlife, and the natural environment. The Center has an approximate 680 linear foot shoreline with portions protected by a severely dilapidated bulkhead that has not prevented erosion in recent years. The shoreline consists of tall, unvegetated banks directly adjacent to the bulkhead.

In 2019, the Chesapeake Audubon Society was awarded a grant from the Maryland Department of Natural Resources (DNR) to design and construct a living shoreline in place of the dilapidated bulkhead. The living shoreline was to provide protection to the eroding shoreline for a life expectancy of 15 years or more, considering sea level rise and storm predictions for Maryland. BayLand was competitively chosen to provide design services for the living shoreline.

Services provided by BayLand included hydrographic and topographic surveys; GIS desktop and field-run site assessments; coastal analysis; habitat and cultural resources assessments; Federal, State and local permitting; design development, final design, construction plans and specifications; bidding support; construction management; and as-built plans.

The design developed by BayLand utilized a hybrid approach to protecting the shoreline. Firstly, approximately 395 linear feet of existing bulkhead was removed as it was no longer containing the steep slopes located landward of the shoreline. Stone groins were constructed on either end of the shoreline limits. Protection structures were designed using four living breakwaters, which consisted of a perimeter cobble slope protecting a marsh terrace containing a sand and gravel mix and planted with marsh vegetation. Logs found on-site where also anchored to serve as shoreline protection. Directly landward of the living breakwaters is an additional marsh platform with both low and high marsh plantings.

Construction, conducted by Shoreline Design, LLC, began in October 2024 and was completed in early November. The project provides approximately 290 linear feet of living breakwater and 14,000 square feet of marsh habitat. The project will serve as a pilot project to show how living breakwaters, which utilize plantable materials such as cobbles, sand and gravel will provide coastal resiliency for up to 15 years given the projected future conditions at the site.

Firm's Responsibility: $200k
Construction Cost: $200k
Date Completed: 2024

Reference: Mark Scallion, Chesapeake Aud
11450 Audubon Dr, Easton, MD 21601
(410) 822-4903; mark.scallion@audubon.org

Sherwood Forest Club Shore Erosion Control – Anne Arundel County, MD

Sherwood Forest is a private, exclusive waterfront community on the Severn River in Anne Arundel County, Maryland. BayLand Consultants & Designers, Inc. (BayLand) and the Sherwood Forest Club, Inc. began a working relationship in early 2005 and BayLand continues to provide a multitude of services today.

In 2005, BayLand provided the Sherwood Forest community with engineering and permitting services for stabilization of approximately 2,000 linear feet of shoreline along Beach Drive on Severn River. The Sherwood Forest community planned to replace the existing deteriorating bulkhead and stone revetments with new timber bulkhead with stone reinforcing. BayLand completed field surveys and State and federal permitting for the entire project length. Items of work included:

- **Preliminary Design**
  - Established benchmark and traverse stations for topographic and hydrographic survey.
  - Performed topographic and hydrographic survey of the project area and 50' beyond both ends of the shoreline. The survey extended from 25' inland from the shoreline to 50' seaward of the shoreline.
  - Developed preliminary plan and typical sections for bulkhead and stone reinforcing.
- **State and Federal Permits**
  - Prepared detailed permit plans based on preliminary design plans.
  - Obtained property and boundary information including adjacent properties ownership information.
  - Prepared, submitted, tracked and obtained Joint Federal/ State Permit.
- **County Building Permit**
  - Prepared Standard Grading Plan Application and Building Permit Application for submittal to Anne Arundel County.
  - Addressed County comments and obtained building permit.

In 2006, BayLand provided the Sherwood Forest community with engineering and permitting services for the stabilization of an additional 400 linear feet of shoreline along Beach Drive on Brewer Creek. The Sherwood Forest community planned to replace the existing deteriorating bulkhead with a new bulkhead approximately 2-feet higher and 18-inches in front of the existing bulkhead. To minimize disturbance to the existing Beach Drive, a batter pile support system was designed for the proposed bulkhead. Similar to the previous stabilization, BayLand completed field surveys, geotechnical borings, design plans, State and Federal wetland permits and the County building permit.

In 2009, BayLand provided the Sherwood Forest community with engineering and permitting services for the stabilization of an additional 850 linear feet of shoreline along Beach Drive on Brewer Creek. Similar to the previous stabilization, BayLand completed field surveys, geotechnical borings, design plans, State and Federal wetland permits and the County building permit. Subsequently in 2010, BayLand performed construction stakeout and inspection services for the project.

In 2011, BayLand provided permitting services to obtain County approval for the Standard Sediment and Erosion Control Plan for beach replenishment of the community beach along Beach Drive in the Severn River. A limited amount of clean sand fill was placed outside the tidal wetland jurisdiction.

Again in 2011, BayLand provided Federal and State permitting for a living shoreline along Beach Drive adjacent to the Community Beach near the confluence of Brewer Creek and the Severn River. Project elements included the repair of 100 LF of existing stone jetty, installation of 50 LF of new sand containment structure, sand fill and marsh plantings. BayLand also obtained the Anne Arundel County building permit, standard grading plan approval and buffer mitigation plan approval. The work included construction stakeout, inspection and permit compliance services.

Construction Cost: $1,500,000
Firm's Responsibility: $1,500,000
Completed: On-going

Owner/Reference: Sherwood Forest Club, Inc., Mr. Bart Key
134 Sherwood Forest Drive, Sherwood Forest, MD 21401Date
(410) 841-6491; MDKeys@aol.com

Smith Island (Fishing Creek Farms Community) Living Shoreline: Annapolis, MD

BayLand was competitively selected for a unique entrepreneurial program used by Anne Arundel County to implement new water quality improvement practices. As part of this full delivery – turnkey program, the BayLand -Shoreline Design team identified the project location, coordinated with landowners, obtained easements, designed, permitted, constructed, financed, and is currently monitoring the 3,625 feet of living shoreline created as part of this project.

The Smith Island Living Shoreline plan was devised to restore and enhance the eroding shoreline back to its 1995 location. The living shoreline provides the level of protection needed to minimize shoreline erosion and sustain new and existing wetland, open water, and upland habitats. The plan utilized three living shoreline strategies that are congruent with the shoreline characteristics and coastal conditions for the area.

Armor stone was appropriately sized to the fetch with sand fill placed behind the stone to create a planting terrace in the form of tombolos. The gaps were sized to allow some wave energy to pass between the structures to provide small protected shallow water embayments and maintain a beach habitat in the tidal zone, providing critical beach habitat for an emerging diamondback terrapin population in Cherry Tree Cove. Marsh plantings were installed to provide a natural transition to the adjacent existing forest and non-tidal wetlands with marsh migration areas provided to accommodate sea level rise. This combination of protected shallow water, beach and marsh provides a diverse habitat for wildlife including small mammals, birds, turtles, crabs, fish and waterfowl. The shallow embayments also provide protected areas which promote establishment of submerged aquatic vegetation (SAV). Pocket beaches were constructed to function as a wildlife corridor from open water to shallow marsh and inland. The concept plan incorporated the use of existing fallen trees along the shoreline as habitat by salvaging large trees and stumps and installing them as large woody debris habitat in certain marsh areas.

Due to the lack of landside access to the project site, Shoreline Design was able to construct the entire project by water. The waterside access allowed efficient transport of the large magnitude of stone and sand fill required without impacting County roads and adjacent natural areas and reducing disturbance to the community. The living shoreline was constructed and delivered to the County three months ahead of the ambitious 20-month project schedule.

Reference: Erik Michelsen, Deputy Director
Anne Arundel County DPW Bureau of Watershed Protection and Restoration
2662 Riva Road, Annapolis, MD 21401
(410) 222-7520 ◆ pwmich20@aacounty.org

Solley Cove Park Boat Launch Facility and Living Shoreline, Curtis Bay, MD

In 2018, The Anne Arundel County DPW, in conjunction with the Anne Arundel County DRP tasked BayLand with the development of a design for a new public boat launch facility at Solley Cove Park in Curtis Bay, Maryland. The project aimed to rejuvenate the County park for public enjoyment and provide water access to the Chesapeake Bay and its tributaries. The Park was comprised of a dilapidated concrete boat ramp, riprap, a degraded wharf and pier, and eroding shoreline and unimproved access and parking. BayLand provided engineering services including a natural resource inventory, topographic and hydrographic surveys, design, permitting, bidding, and construction management. The new park facility includes an upgraded concrete boat ramp; kayak/canoe launch; permeable paver parking lot; and paved road, ramp approach and drive aisles. Because the boat ramp and kayak/canoe launch will result in impacts to tidal waters, BayLand has added the construction of a living shoreline to mitigate for these impacts. SWM best practices and mitigation planting for impacts to the Critical Area Buffer are also elements of the design.

The project removed the existing structures and constructs a new concrete boat launch with floating dock to facilitate launching. A cartop soft launch was incorporated into 550 LF of living shoreline with new marsh habitat designed to mitigate for the tidal impacts. The park improvements include bituminous paved drive aisles, turnaround and tie-down area, and an unloading area. The parking areas accommodates up to 12 vehicle-trailer parking, 10 dual parking (10 vehicle-trailer or 20 vehicle parking), and three designated ADA accessible spots (two vehicle-trailer and one vehicle parking).

SWM for the new impervious areas was addressed by implementing ESD alternative surfaces and structural practices to treat the full water quality volume required. ESD practices included permeable pavements, grass swale, bio-swale, and submerged gravel wetland. Runoff from the impervious areas sheet flows to the ESD practices and discharges to tidal waters via a proposed storm drain network. Miscellaneous park amenities include the design of an access gate, split rail fence and gate, dumpster enclosure, portable restroom enclosure, and park signage. The park improvements also included the planting of approximately 275 trees and 150 shrubs to restore the forested area.

BayLand facilitated timely permitting and approvals for the project. Permitting efforts included approvals from the USACE, MDE, County grading and building permits, and Critical Area Commission approval for disturbance and mitigation within the Critical Area.

BayLand also provided bidding and construction management services. Bidding services included participation in a pre-bid meeting, review of proposals and bid analysis, and recommendation for contract award. Construction of the boat launch facility is scheduled for completion in March 2021. Construction management services include full- time inspection of all construction activities with daily inspection reports and the conduction of regular progress meetings, review of Contractor submittals, response to RFIs, tracking the work completed and pay item quantities, review of invoicing, and recommended payment.

Construction Cost: $1.5 million
Firm Responsibility: $1.5 million
Date Completed: 2021

Reference: Anne Arundel County DPW
2662 Riva Road, Annapolis, MD 21401
David Braun, PE, Engineering Administrator
(410) 222-7544; pwbrau78@aacounty.org

Stoney Beach Condo Association Living Shoreline, Anne Arundel County, MD

Since early 2022, BayLand has been working with the leadership of the Stoney Beach Condo Association to develop a nature-based solution to their shoreline erosion along 800 LF of community property along Stoney Creek and Patapsco River in Pasadena, Anne Arundel County, Maryland. BayLand's scope of work included technical services needed to perform survey; develop a concept design; obtain federal, state, and local permits; and provide technical services during construction.

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BayLand produced performed a survey of the community property and developed a concept for a nature based solution to curb erosion and begin to investigate eligibility for construction grants. BayLand worked extensively with the Stoney Beach Condo Association Board to refine the concept and gain buy-in from the 200+ stakeholders. BayLand applied for and acquired Federal, State and Local permits while meeting with granting agencies and contractors to identify funding for implementation.

BayLand and the Stoney Beach Condo Association partnered with Environmental Quality Resources, LLC (EQR) and Green Trust Alliance (GTA) to identify appropriate grant opportunities, meet with grant agencies and apply for numerous grants for construction funding. The project was recently awarded funding through the Maryland DNR Grant for Resilience through Restoration.

Construction will protect ~800 LF of shoreline including a 820 LF of segmented stone sill and the creation of 25,675 square feet of tidal marsh. BayLand coordinated extensively with the Maryland Port Authority (MPA) and their beneficial reuse team to retrieve and reuse material placed at the Hawkins Point Dredge Material Containment Facility (DMCF). Material had been previously dredge from the community, as part of a small navigation channel dredging project. BayLand tested this material and coordinated with the Maryland Department of the Environment (MDE) to evaluate its use as beneficial use material suitable for marsh creation and living shoreline creation. Upon MDE's approval of the material BayLand coordinated with the community to share the results and educate residents during the process to alleviate concerns related to safety and contamination.

During construction BayLand is providing the following services:

- Community outreach and meetings.
- Review shop drawings, submittals and certification.
- Perform periodic site visits during active construction periods to review progress and quality of work.
- Perform inspection of 50-foot sample sections for segmented sill and breakwater sections and note any deficiencies.
- Provide digital models of 3D drawings for use by machine
- Perform check shots with a laser level to verify grades of sand fill.
- Review contractor requests for information.
- Coordinate key activities and actions with non-profit partners.
- Attended Conditional Acceptance and Final Completion meeting.

Construction Cost: $675,000
Firm's Responsibility: $675,000
Date Completed: Spring 2025

Owner/Reference: Stoney Beach Condo Association c/o Darrel Abed
1379 Cluster Court
Stoney Beach, Maryland 21226
d_abed@hotmail.com

Swan Point Wastewater Treatment Plant (WWTP) Shoreline Stabilization: Swan Point, Charles County, MD

In 2014, BayLand performed a shoreline assessment for multiple locations around Charles County to identify sites where construction of a living shoreline would reduce the rate of erosion and create marsh habitat while helping the County achieve its target MS4 goals. The following year, BayLand was tasked by the Charles County Department of Public Works, Capital Services Division to design, permit and provide construction oversight at Swan Point Wastewater Treatment Plant (WWTP) in Swan Point, MD to stabilize approximately 1,740 LF of shoreline along a spray irrigation field in the Swan Point WWTP using living shoreline techniques to reduce pollutant loadings entering Bay water, reduce the on-going shoreline erosion that could lead to exposure of the spray irrigation field, and creating new shoreline marsh habitat. The orientation of the shoreline as well as the presence of Submerged Aquatic Vegetation (SAV) required multiple shoreline protection strategies to be implemented along different reaches.

Services provided by BayLand included hydrographic and topographic surveys; GIS desktop and field-run site assessments; geotechnical and coastal assessment; Federal, State and local permitting; design development, final design, construction plans and specifications; bidding support; construction management; as-built plans and pollutant load reduction certification. Additionally, invasive species were encountered within the Critical Area Buffer, so an invasive species management plan was developed as part of the Buffer Management Plan to replace the invasive species with native plants.

The project was constructed in 2018 and included 990 LF of stone revetment and stone sill and 750 LF of low-profile coir log with a stone toe protection. The area behind the coir log was planted to create 13,460 square feet (SF) of new tidal wetland marsh habitat. The tall banks along the shoreline were graded back to create a gentle slope and planted with 56,425 SF of upland planting. MS4 credits for treatment of over 70 acres of impervious area treated was achieved.

Within two years of construction, the coir log was no longer visible with marsh vegetation propagating throughout the marsh. The stone toe has continued to provide protection to the marsh which, in turn, has prevented further erosion of the shoreline along the Swan Point WWTP.

Firm's Responsibility: $1.25 million
Construction Cost: $1.25 million
Date Completed: 2018

Reference: Art Swann, Program Manager, Charles County DPW
1001 Radio Station Rd, La Plata, MD 20646
(301) 885-1314; swannA@charlescounty.org

Water Street Living Shoreline Phase III, Havre de Grace, MD

The City of Havre de Grace (the City), located in Harford County, Maryland on the shoreline of the Susquehanna River, south of the Conowingo Dam, and at the headwaters of the Chesapeake Bay, is battling multiple significant threats to its coastal infrastructure and natural resources. Rising sea levels and an increasing frequency of intense precipitation events have caused flooding and greater volumes of stormwater runoff.

To combat these challenges, the City has continued to update its Comprehensive Plan (CP) to incorporate enhanced stormwater management and hazard mitigation strategies throughout the municipality. The 2010 CP amendment identified the Water Street area as a high-priority revitalization site due to its vulnerability to storm surges and flooding. In 2023, the City was awarded a grant from the National Wildlife Federation (NWF) to develop multi-phase, nature-based plan aimed at restoring the shoreline, improving stormwater management, converting gray space to green space, expanding public waterfront access, and protecting natural resources within this Chesapeake Bay Critical Area. The Water Street Living Shoreline Phase III project (the Project) specifically focuses on replacing a failing bulkhead with a diverse and resilient living shoreline located on a private property within the City.

Phase III was completed in partnership with the Maryland Department of Natural Resources (DNR), the City of Havre de Grace (the City), NWF, Cianelli Construction, Inc. (Cianelli), and several community organizations using funds obtained through a Fish and Wildlife Foundation (NFWF) grant. In 2025, BayLand provided Cianelli the construction phase services, including but not limited to: surveys, construction inspection, and technical & regulatory support for Phase III. BayLand also provided fine-tuning to the design during construction to ensure that all the design goals and objectives, as well as compliance with regulatory requirements, were achieved. BayLand will continue to provide post-construction monitoring and technical services as needed.

In addition to the contracted construction phase services, BayLand is working with the City under the Harford County Water Resources Design and Assessment Contract No. 21-097 to provide engineering services that will improve stormwater drainage along Water Street. The engineering services include, but are not limited to, the following:

Alley Drainage Improvements:

- Conduct field investigations for an existing gravel alley between Pearl Street and Water Street.
- Develop two concept plans: 1) restore in-kind with gravel; and 2) a green-street alley design.
- Determine any applicable NPDES MS4 credits for the designs.
- Identify permitting requirements and environmental & community considerations for each concept.
- Create concept plans and cost estimates for the City.

Storm Drain Repairs:

- Perform assessments to determine the condition & functionality of the existing stormwater infrastructure around the intersection of Water Street and Ostego Street and the step-pool storm conveyance (SPSC) weirs.
- Develop a design to repair the SPSC with a bubbler inlet to facilitate drainage of runoff.
- Conduct site visits during the repair to monitor the work and make adjustments as needed.

Construction Cost: $1,700,000
Firm's Responsibility: $1,700,000
Date Completed: June 2025

Reference:
City of Havre de Grace
711 Pennington Avenue, Havre de Grace, MD 21078
Patrick Sypolt, Capital Projects & Grant Management
(443) 807-0092; patricks@havredegracemd.com