



Wetlands/Coastal Dune Board

Reconvened Meeting

Civic Center
August 25, 2016
6:00 p.m.

At approximately 6:00 p.m., Chairwoman Ann Hayward Walker, having established a quorum, called to order the Wetlands/Coastal Dune Board Meeting. Board members Russ Dunton, Joe Fehrer, Bill Prickett and Bob Roche were in attendance. Also present were Town Planner Larry DiRe, Town Clerk Libby Hume, Mr. Hank Badger from the Virginia Marine Resources Commission, applicants Mr. John Calder and Mrs. Beth Calder, and Mr. Wayne McCoy from Mid-Atlantic Environmental. There was one member of the public in attendance.

The Pledge of Allegiance was recited by all in attendance.

CONSENT AGENDA

Russ Dunton requested that discussion regarding next week's beach management meeting be added as Item 2A.

Motion made by Bill Prickett, seconded by Russ Dunton, to approve the agenda as amended. The motion was approved by unanimous vote.

ORDER OF BUSINESS:

JPA 16-0860 3 Bay Vistas Way – 184 Linear Feet of Revetment Stone and Beach Access Steps

Town Planner Larry DiRe summarized the activity regarding the Joint Permit Application (JPA) stating that an advertisement ran for two weeks in the newspaper and a public hearing was held on July 25, 2016. The only comments received was a report submitted by the Virginia Institute of Marine Science (VIMS). At the July meeting, the Board requested a supplemental VIMS report and recessed the meeting until such report had been received. The report was received on August 16 and distributed to the Board for review. In the interim, the applicants prepared a presentation which was also distributed to the Board prior to this meeting. The applicants were invited to speak.

Mr. Wayne McCoy thanked the Board for the continuance which allowed the applicants to coordinate with VIMS and Mr. Hank Badger for a site visit which was not done prior to the last VIMS report.

Mrs. Calder reviewed her presentation with the Board detailing the history of their efforts to protect their property from erosion. (Please see attached.) Mrs. Calder concluded by asking the Board for their approval of the proposed revetment to protect their property from future storms.

There was much discussion regarding the August 16, 2016 VIMS report (attached) and the Calder's revised plans increasing the size of the rock, increasing the depth of the toe and changing the slope of the revetment as recommended in the VIMS report.

Motion made by Russ Dunton, seconded by Bill Prickett, to approved the plans with the proposed changes as discussed. The motion was approved by unanimous vote.

Beach Management Discussion

The next meeting to discuss beach management was confirmed for Wednesday, August 31, 2016, from 3:00 p.m. – 5:00 p.m., in the Town Hall conference room.

There was much discussion regarding the following: i) Public Works Foreman John Lockwood was communicating daily with the contractor for the U.S. Army Corps of Engineers' (USACE) dredge project; ii) The contractor would be installing fencing on the beach after the dredging was completed and sprigging should be done in November; iii) The drawings did not show fence openings at the beach access walkways. The Board suggested "wing openings" at the walkways as suggested by Mr. Lee Perkins, Manager of Environmental Services for Beach and Sand Dune Management for the City of Norfolk, during his site visit on July 26. The fencing at Monroe Avenue was already done in this manner and could be shown to the contractor as an example; iv) Ann Hayward Walker and Larry DiRe had a conference call with the USACE on August 10 regarding specifications in the dredge contract. Methods of work were not specified and could possibly be changed as long as it did not result in a cost increase; v) The town should have reached out to Mr. Ryan Young of East Carolina University who had completed much work regarding the coast. The USACE had experts who were all engineers but trying to engineer a beach was different than a natural beach; vi) There was a lot of sand around the fishing pier that needed to be pushed out before the fencing was installed. The opening for equipment, which was closed up by the town, needed to be reopened; vii) The Board's concerns needed to be written down for review by the USACE and contractor; viii) After the contractor had completed the project with the installation of fencing and sprigging, the town would need to run a couple rows of fencing to trap the sand to keep it from blowing everywhere. There was much discussion regarding placement of the fencing; ix) The dunes needed to be wider and lower; x) John Lockwood already talked to the contractor regarding the installation of extra sand in the low area at Madison Avenue. It needed to be backed up by the elected officials to talk to the contractor and the USACE; xi) The Board needed to present a "wish list" to the town and the town needed to approach the USACE with the list; xii) The immediate need was the south end of the beach by the fishing pier; and xiii) Ann Hayward Walker would send an email to Larry DiRe and Town Manager Brent Manuel with the items that needed to be done in working with the USACE and contractor.

Motion made by Joe Fehrer, seconded by Bill Prickett, adjourn the Wetlands/Coastal Dune Board Meeting. The motion was approved by unanimous vote. The meeting adjourned at 7:11 p.m.

Chairwoman Ann Hayward Walker

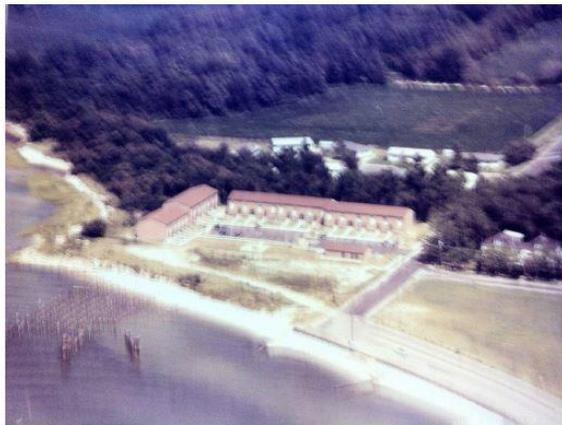
Town Clerk

Revetment Request VMRC #16-0860

For the Consideration of the Cape Charles
Wetlands Board
Overview of the Calder's bay front lots

1985

Significant land has eroded behind the buildings since the Seabreeze was built, perhaps 200 feet where Bay Vistas is now located.



2

November 2010

The Calders purchased the lot next to the Seabreeze, last of the lots to be purchased. Escarpment was 4-5 feet high. This photo is low tide. In high tide the water reached the escarpment. Beach had eroded to its clay foundation. Scouring was evident at the Seabreeze end due to hardening of shore with riprap. Erosion is greatest on Calder's lot although significant erosion of entire beach began after installation of the Bay Creek breakwaters to the northeast.

The 3 lot owners sought approval for a stone breakwater. Approval granted in 2011 but the construction bid received was not affordable.



3

September 2012

Mid Atlantic Environmental was employed to find an affordable solution for the 3 lot owners plus the Seabreeze. The Wave Attenuation Device (WAD) was selected. The cost to build was 1/3 of the previously quoted stone breakwater. The Seabreeze's share, based on the linear footage, was approximately 1/2 and the 3 lot owners shared the remaining one half. WAD installation began in August.

To southwest, before WAD installation



To northeast. Bay Creek lot, which has a breakwater, also eroded.



4

November 3, 2012

a few days after Sandy. Water breached the escarpment and tore into the foundation of the Seabreeze. Notice all bushes and most of riprap in front of Seabreeze were washed away.



5

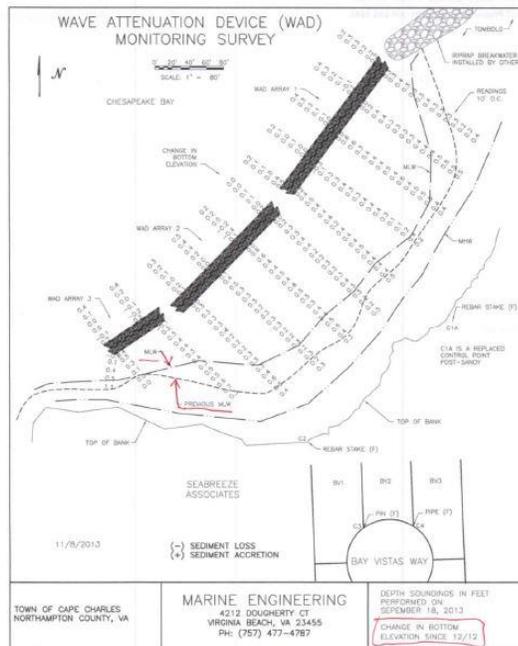
WAD Survey Sep. 2013

9/2012 compared to 9/2013

In one year:

>MLW moved seaward as much as 40 feet (compare the two MLW lines).

>Sand accreted as much as .7 feet.



6

November 2013

One year after Sandy and WAD installation. We noted that the beach had accreted a lot because it was deeper. Much of the riprap (see the Sept. 2012 photo) had become buried in sand. Per the marine survey (previous page) MLW had moved seaward significantly. The Seabreeze installed a concrete retaining wall.



7

June 2014

Beach was nourished.

June 2014, immediately after beach nourishment



Nov. 2015, after the October 2-5 storm. Retaining wall is exposed.



8

2015

American beach grass was planted in February and October of 2015. Beach had settled with a slight slope.



October 2-5, 2015 storm

Storm lingered 3 days, eating away at the escarpment. Water reached top of concrete retaining wall. 12-15 feet of beach grass lost. The strongest waves and greatest erosion are from the Seabreeze end where the WADs end. Waves are not broken at this end because the owner to the southwest of the Seabreeze did not participate in the WAD project.



Photo taken during break in storm. Water reached top of Seabreeze retaining wall.



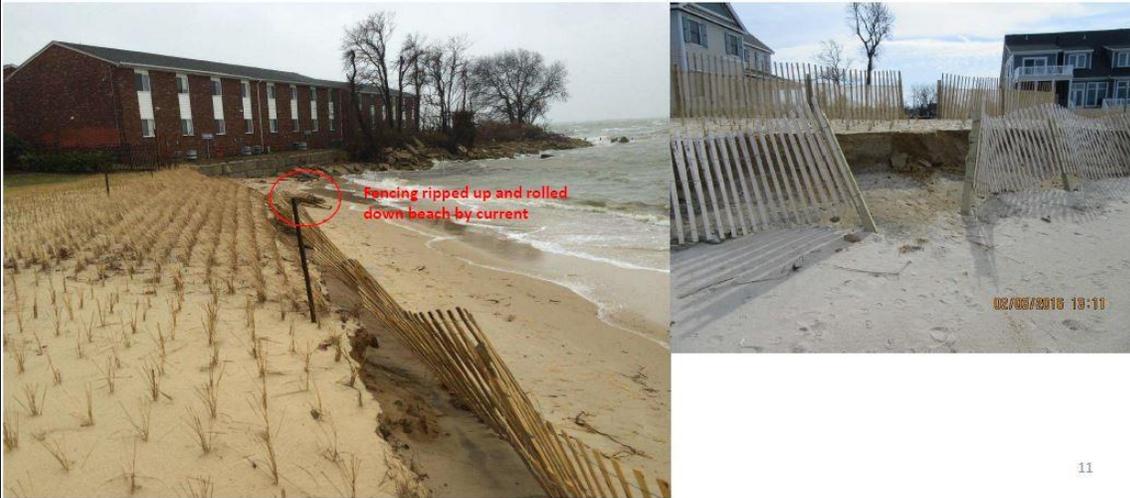
Escarpment moved 12-15 feet landward, 12-15 feet of beach grass lost.



Photo taken during break in storm. Waves strongest near Seabreeze.

Effect of January 22-23, 2016 storm

Sand fencing (double wrapped, with 4x4 posts) had been installed in October. It was completely ripped up on the lot next to the Seabreeze during the January storm. 2-3 more feet of beach grass was lost.



11

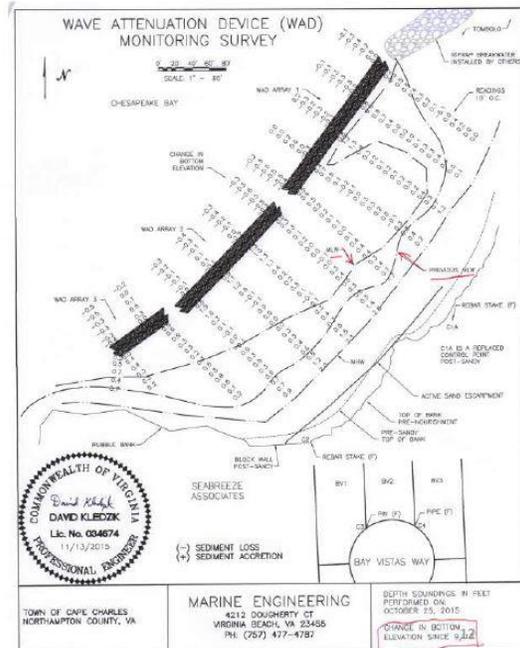
WAD Survey

9/2012 installation date compared to 9/2015.
Survey is after 2014 beach nourishment.

>MLW had moved seaward further in the southwestern side (compare 2 MLW lines).

>Additional sand accretion on southwestern side.

>A sort of tombolo has formed on the side near the stone breakwater where there is sand accretion as much as .9 feet.



VIMS report to Wetlands Board July 2016

Their recommendations are based on a 2012 photo (our house was not yet built) and do not consider our particular site challenges.

Recommendations:

- *add beach nourishment (done in 2014)
- *add marsh buffer: wave action is very strong due to north facing beach and vortex currents entering the beach from the southwestern most point of the WADs. A marsh area would be washed away in a minor storm.
- *America beach grass was added in 2015 and as much as 18 feet was lost in the Oct. 2015 and Jan. 2016 storms.

Sand fencing was installed in 2015 and much of it was ripped up or undermined.

Coastal Ecosystem Based Recommendation Details (16-0860)



If active erosion is occurring along this shoreline, the preferred approach for erosion control to preserve and maintain tidal wetland ecosystems is to:

- Maintain Beach OR Offshore Breakwaters w/ Beach Nourishment
- Enhance Riparian/Marsh Buffer

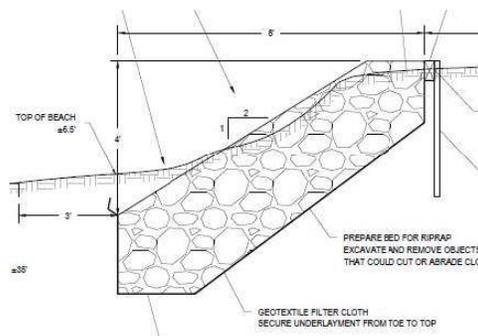
On-shore revetments sever the connection between the upland and intertidal area interrupting and/or eliminating natural functions to the detriment of the shoreline ecosystem. It would be beneficial to the tidal shoreline environment to maintain the connection between the upland and the intertidal area by not installing riprap and enabling the natural processes and connections dependent upon the water/sand continuum to occur, increasing the probability that tidal shoreline ecosystems will be sustained in the future.

VIMS Site Assessment August 2016

- Assessment
 - Calder property is in a geological transition zone, with breakwaters to the north and a vertical retaining wall and riprap to the south. These will continue to alter sand transport on the Bay Vistas lots such that the sand supply will be limited or even exhausted.
- Recommendation for a revetment
 - "Based on the current shoreline situation and recent events, a revetment is a reasonable alternative to additional beach nourishment. Since there are no coastal primary dunes on the Calder property, a revetment would have minimal impact to natural shoreline processes."

Revetment request

The side of our lot next to the Seabreeze is now only 30 ft. from escarpment.



15

Conclusion

We need a revetment to protect our property during a storm. Although the WADs break the waves they cannot provide protection from a high tide during a storm.

Our challenges:

- *the wave action is severe because we are north facing with a fetch all the way to Baltimore.
- *the wave currents are much stronger on the Seabreeze end of our beach. The waves enter our beach with force where the WADs end.
- *the storm waves swirl in a vortex in front of the Seabreeze due to the curve in the land which is armored with riprap and a vertical retaining wall. Our lot next to the Seabreeze is much more eroded than the other 2 lots.
- *the beach is not very wide, approx. 40 ft. to MHW. This is much less wide than that in front of the Bay Creek Marina beach, which also suffered erosion of its escarpment during recent storms.

Efforts and results to date:

- *WADs installed in 2012. There was significant movement seaward of the MLW and sand accretion on beach.
- *Beach nourished in June 2014. Most of the sand has been washed away.
- *In 2015 beach grass was planted, ½ has been washed away. Sand fencing was installed and ripped up in the January 2016 storm.

We hope with the WADs plus a revetment that the beach would remain stable. The escarpment has moved as much as 18 feet landward after the 2 recent storms. It is now 30 feet from our house. We need to be protected during storm tides. The revetment will protect our property from further erosion.

16

August 16, 2016

Mr. Hank Badger
Environmental Engineer, Sr.
Habitat Management Division
Virginia Marine Resources Commission
2600 Washington Avenue
Newport News, VA 23607

Dear Mr. Badger:

The Virginia Institute of Marine Science has completed the requested assessment of a proposed riprap revetment along a sandy Bay shoreline within the Town of Cape Charles (John Calder, VMRC #16-0860). Personnel from the Office of Research and Advisory Services and the Department of Physical Sciences Shoreline Studies Program contributed to this review. Our assessment involved a site visit, review of past shoreline stabilization projects at the Calder property and along this shoreline reach, analyses of natural and man-influenced historical shoreline dynamics, and analyses of appropriate alternative approaches to current and future shoreline stabilization.

The Calder property is located in a geological transition zone. Coastal primary sand dunes are located along the northern section of this shoreline, with a transition to sandy clay-based uplands at, and near, the Calder shoreline. The Calder shoreline was sprigged with American beachgrass (*Ammophila breviligulata*) after sand nourishment, which created a vegetated berm channelward of the upland scarp that functioned to control shoreline erosion (in conjunction with the offshore sill) that resulted mostly from storm waves and high water events. This feature was compromised by recent storms that contributed high amounts of wave energy and/or tidal inundation to Bay shorelines (these include three hurricanes (Irene of 2011, Sandy of 2012, and Joaquin of 2015), two tropical storms (Lee of 2011 and Andrea of 2013), and six other events of significant high waves and surge). A portion of the original American beachgrass plantings remain along the upland scarp, but appear stressed and are likely not contributing significantly to shoreline stabilization. The optimum environment for American beachgrass is semi-consolidated sand and therefore the sandy clay substrate under the thin layer of sand fill upon the scarp may be inhibiting growth and spreading.

The current local shoreline situation includes nourished breakwater fields north and south of the Calder property, an adjacent riprap revetment and concrete block bulkhead, and a sill constructed of WAD (Wave Attenuation Devices) units directly channelward of the Calder shoreline. These structures have influenced the shoreline and nearshore dynamics of this entire reach. Prior to the placement of most of these structures the Calder shoreline was consistently stable, containing small marsh headlands (similar to other sections of the shoreline north of the Calders) and a generally stable upland margin until at least late 2008. The eleven storms since then have contributed to the erosion of the upland scarp and (based on nearshore surveys) has deflated the shoreline and depleted the nearshore sand supply.

We understand that the WAD units were placed in their permitted location and configuration a few weeks prior to hurricane Sandy. Therefore, these offshore structures were in-place for six of the eleven storm events of significance since 2008. Hurricane Joaquin and winter storm Jonas were the only two storm events that occurred post-beach nourishment. Evidence provided by the applicant and the agent shows significant upland erosion occurring post-construction of the WAD units and also after the beach was nourished.

For typical Bay wave conditions and low- to mid- level storm events we foresee the combination of WADs and beach nourishment working effectively to control shoreline erosion. The continuing and significant erosion along the Calder shoreline is evidence that the WAD units and beach nourishment are not providing sufficient erosion control during larger storm events. Although it is not reasonable to expect any residential-level erosion control approach situated on the Chesapeake Bay mainstem to fully abate all levels of marine storm energy without consequence, a large proportion of the limitations of the current approach can be attributed to the low elevation of the WAD units coupled with their distance offshore. The ability for a substrate (sand, concrete, rock) to attenuate wave energy is primarily based on the elevation of the substrate in relation to the height of the storm tide and also the width of the substrate at the effective height. Most of the recent storm events that have affected this shoreline reach produced tide levels between five and seven feet above mean lower low water, significantly higher than the mean tidal range for Cape Charles of approximately two feet.

Based on the current shoreline situation and recent events, a revetment is a reasonable alternative to additional beach nourishment. Since there are no coastal primary dunes on the Calder property, a revetment would have minimal impact to natural shoreline processes. We do not expect the WADs (in their current configuration) to effectively trap sand that may move onshore or along the shoreline. Additionally, the structures north and south of the Calder property will continue to alter longshore sand transport to the degree that they greatly limit or exhaust any significant natural sand supply to the area landward of the WADs.

The current lack of beach sand due to losses of the nourishment material resulting from storm events is problematic even if a revetment is constructed due to the proposed design of the riprap toe. Cross-section plans show the toe above the elevation of mean high water, which creates a situation promoting the likelihood of toe scour and revetment failure during high water and wave events. If a revetment is deemed appropriate, we recommend the following modifications for consideration to improve function and reduce potential environmental impacts:

- (1) The stability of the revetment would be enhanced by significantly increasing the depth of the toe. It is common to place the toe below the mean low water elevation. If a clay substrate is located above mean low water, the toe can be situated a reasonable depth below the clay surface. For this shoreline situation, with a four- to five- foot scarp, a depth of at least one foot into a clay layer is recommended.
- (2) The revetment is proposed to be constructed of Class I stone at a 1.5:1 slope. For open Bay exposures we recommend either using Class II stone at the proposed slope and/or increasing the slope to 2:1.
- (3) To reduce the loss of beach habitat we recommend placing the toe of the revetment landward of the beach.

(4) Each of the above recommendations will result in a further encroachment into and upon the upland scarp and thus the planted American beachgrass community. However, since this community appears to be contributing little to the stability of the scarp we do not consider impacts to this area to be detrimental from a marine environmental perspective.

(5) The northeast end of the proposed revetment, which adjoin a neighboring property, may create conditions during high water and wave events that affect the stability of the neighboring shoreline adjacent to the revetment. The likely effects to the adjacent shoreline cannot be reasonably anticipated and are heavily dependent upon the nature of the storm event(s). There are limited remedial design and construction approaches, beyond those proposed, that can address the potential effects that a hardened shoreline may have on an adjacent natural shoreline.

Alternatively, the applicant's may wish to consider modifications to the WAD units that would increase their effectiveness against storm events. Shoreline protection would be enhanced by moving the WAD sills closer to the shoreline, reworking them into shorter features of higher elevation, and placing enough sand of appropriate grain size landward of the structures so that they (1) have the robust elevation necessary to absorb storm waves and (2) form a functional connection with the beach and upland.

Please contact me if you have questions or require additional information.

Sincerely,



Lyle Varnell
Associate Director for Advisory Services