October 13, 2014

Town Committee on Squibnocket - Town Hall
POB 119, 401 Middle Road
Chilmark, M\A 02535-0119
Attn: James Malkin

Re: Town Committee on Squibnocket

Dear Jim:

As mentioned the letter I sent to you on September 22, 2014 on behalf of the Squibnocket Farms Homeowners Association, enclosed is a memorandum from our consulting team responding to the dune-based access alternative that has been promoted by Friends of Squibnocket Pond (FOS) ("Dune Alternative").

As also mentioned in my prior letter, the technical memo reflects the outcome of a meeting between the two technical teams. Some areas of general agreement were reached at the meeting. For example, there does not seem to be any significant gap between the teams with respect to the delineation of wetland resources at the project site, or with respect to the identification of permits that will be required for the initial construction of the Dune Alternative. Further, and vital to an understanding of the enclosed memo, each team agrees that the Dune Alternative will provide secure access to Squibnocket Farm for a relatively short period of time (~5-10 years) during which extensive efforts will be required to hold it in place; then, the artificial dune and roadway will need to be relocated landward, towards and into the Great Pond and its associated wetlands.

These basic facts about the Dune Alternative – first, that it will require extensive maintenance in the early years and then, in the not too distant future, a physical relocation into sensitive wetland resources – appear to be insurmountable. The FOS team has not cogently explained how these problems can be solved. They were not able to explain to our experts what the near-term maintenance program would include and what it would cost. They have not explained what the future relocation events would cost, or whether they could be permitted. I must remind you that they also have not convincingly explained what the original installation of the Dune Alternative would cost. Cost estimates shared with the Committee when FOS presented the Dune Alternative on September 16th were later revealed to be based on very old and anecdotal information.

Moreover, both in their presentations to the Committee and at their meeting with our experts, the FOS team has offered no solution to the issue of public access. They are no closer now than they were in January of this year to securing other sites on which to locate a town parking facility. They have not indicated where the public beach would be located, either. Would it be at the existing beach, restored in place after removal of the revetment? This seems unlikely, because FOS's experts agree that the Dune Alternative would last a bit longer if the revetment were

retained. Would there be a new beach extended onto the VOLF land, as we and the Selectmen had proposed? FOS does not seem to have solutions or answers to any of these questions.

The enclosed memo contains a lot of dense technical and regulatory information. It explains the geological forces that the Dune Alternative will have to withstand (through aggressive intervention) in order to remain serviceable even for a short period of time. It explains the regulatory difficulties or impossibilities to be encountered when the dune and road need to be relocated into the wetlands and Pond on the landward side of the initial installation. It explains how the Dune Alternative compares in functionality and permitting terms to the Association's proposal to construct an elevated roadway.

FOS's expert team has conceded that FOS's objections to the elevated roadway are primarily if not exclusively aesthetic. This is no surprise. The FOS team suggested that a hybrid approach consisting of a lower elevated roadway with its structural members concealed behind smaller artificial dunes might be acceptable. Our experts say that a lower structure would be more prone to overwash in small storms and may need to be engineered differently to withstand wave action. They also say that the dunes used to hide the structure would require continuous maintenance in order to serve their purpose. This sounds like a more expensive and less serviceable outcome for the Association. If it were viable as an engineering matter, then, at a minimum, FOS would have to agree to pay any added costs incurred in an effort to satisfy its aesthetic concerns. If FOS agrees to that concept, then I would ask my experts to further consider this concept.

The Committee has met nearly 20 times dating back to June of this year. You and your fellow Committee members are to be commended for your patience and perseverance. The Association has met several times, both personally and through our experts, with FOS. We have given serious consideration to the Dune Alternative. The enclosed memo reveals it to be unworkable as a solution to the Association access problem and unresponsive to the Town's public facility problem.

Regards,

Larry Lasser

Encl.

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HALEY & ALDRICH

MEMORANDUM

13 October 2014
File No. 38638-000

TO: Town Committee on Squibnocket
Attn: Jim Malkin, Chairman

FROM: Mark X. Haley, P.E., Russell A. Schuck, P.G. (Haley & Aldrich, Inc.)
Daniel Padien (Vanasse Hangen Brustlin, Inc.)
Dr. Peter Rosen (GeoPlan Associates)

SUBJECT: Response to the Friends of Squibnocket (FOS) Presentations
Squibnocket Road Improvements
Chilmark, Massachusetts

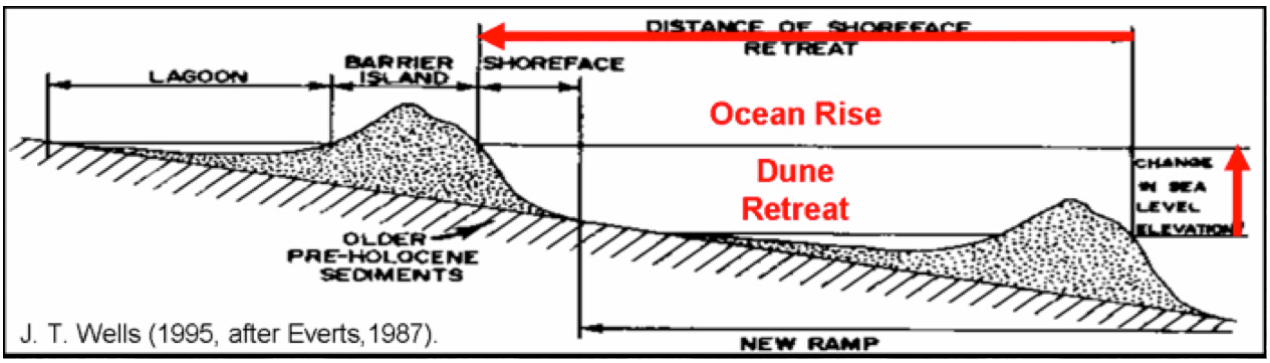
CC: Lawrence Lasser

The purpose of this memorandum is to respond on behalf of the Squibnocket Farm Homeowners Association (SFHA) to a proposal presented to the Town Committee on Squibnocket by the Friends of Squibnocket (FOS). The FOS proposal calls for the construction of an engineered dune with a roadway on the landward side at the location of the existing Town beach parking lot (the "Dune Alternative"). The Dune Alternative is intended to provide access to the Squibnocket Farm subdivision. It does not address the related issue of access to the Town Beach. The proposal anticipates that the artificial dune and the roadway would at some future time be intentionally moved landward to respond to ongoing retreat of the shoreline and artificially mimic the barrier beach migration that occurs at this site. Below we present the background on the geomorphological processes associated with barrier beach migration, review the elements of the Dune Alternative, and explain why the Dune Alternative has inherent flaws that make it unworkable from SFHA's perspective and presumably also from the Town's perspective given the Town's interest in maintaining access to public amenities at Squibnocket and in preserving the Squibnocket Farms tax base.

We are aware that the Committee to date has not engaged consulting experts of its own, and that the continuous submission of competing opinions from competing consulting teams may be confusing and frustrating. At SFHA's direction, and in an effort to minimize differences in opinion where possible and avoid misunderstandings about the Dune Alternative, we met with the FOS technical team on 6 October 2014. That meeting was very informative and constructive. The statements in this memo about the Dune Alternative are not simply reactions to the written materials that FOS has submitted to the Committee, but are based on information obtained and impressions formed at our in-person meeting. We have a comprehensive understanding of the Dune Alternative (to the extent FOS has been able to provide details about it) and are confident in the conclusions we present in this memo.

BARRIER BEACH PROCESSES

Squibnocket Beach is a transgressive barrier beach, which is common for barrier beaches in this area. Transgressive barrier beaches maintain stability in rising sea levels by migrating landward over time (see J.T. Wells figure from FOS presentation below). They migrate landward by sediment being carried from the seaward side and deposited on the landward side by wind, storm overwash, and tidal inlet processes. In general, the greatest volume of sediment is transported landward by inlets, then overwash, then wind. On Squibnocket Beach, like most of the barrier beaches on the south coast of Martha's Vineyard, most landward transport is by storm overwash.



As the seaward side retreats, the lagoon shoreline is extended landward through deposition of storm overwash sand lobes. As well, the elevation of the barrier is increased by these overwash deposits. Sand dunes also develop and can further increase the elevation of the barrier surface.

This type of shoreline is typical for the south coast of Martha's Vineyard. The south-facing coasts of Martha's Vineyard and Nantucket show the highest rates of shoreline retreat in Massachusetts. This high erosion is due to a combination of factors, including the steepness of the nearshore and offshore, which limit landward movements of nearshore sand, and the susceptibility of coasts to hurricane impacts and their exposure to southern winter swell, which augments localized storm impacts.

Most of the barrier beaches along the southern coasts of Martha's Vineyard and Nantucket are short barriers anchored on both sides to glacial deposits. Both the barrier beaches and the glacial deposits tend to erode at similar rates, so the overall shore tends to be straight.

Squibnocket Beach is a narrow barrier beach similar to others along the shore, and most of the exposed area is coastal wetlands. However, since the glacial deposits in this area are more complex, comprised of glacial till (as compared to outwash) mixed with Cretaceous clays, the shoreline is not straight and barriers may retreat faster than glacial headlands.

DUNE ALTERNATIVE

FOS presented the Dune Alternative to the Squibnocket Beach Committee on 16 September 2014. In general the proposal consists of a "mega" dune that is intended to be large enough to prevent overwashing during extreme events. A road, presumably consisting of a sand base, would be located on the landward side of the dune. In the original iteration of the Dune Alternative, the road would be

sited partially in wetlands. Over time the dune will erode to an extent that will require the periodic relocation of the dune and road to a more landward alignment ("Relocation Events"). Before the first Relocation Event is necessary routine operations and maintenance (O&M) will be necessary to keep the original installation serviceable for as long as practicable. Relocation Events are inevitable regardless of how aggressive the O&M program may be. The first and each successive Relocation Event would involve the transfer of the dune and roadway landward (i.e., toward Squibnocket Pond) in a manner that would artificially mimic the natural migration that would occur if the area were allowed to overwash during storm events. FOS has not described the specifics of the O&M required prior to the first Relocation Event. FOS has not provided any detail about the Relocation Event itself, such as how it could be permitted or what it would cost.

Based on our review of the proposal and our discussions with the FOS team, we have concluded that the Dune Alternative is flawed and should not be pursued for the following reasons:

- The dune as proposed eliminates overwash completely, thus halting any migration of the barrier beach toward the pond on the landward side and resulting in a condition where the barrier beach simply gets narrower as the dune erodes and the shore retreats on the seaward side.
- To move the dune and road landward at the Relocation Event would require additional wetland filling beyond the 5,000 square foot threshold established under the state Wetlands Protection Act. Exceeding the 5,000 SF threshold would trigger variance requirements. The Relocation Event would require numerous additional permits beyond the wetlands variance, and extensive mitigation, if the Relocation Event is permittable at all.
- Moving the dune and road landward would encumber other properties not owned by SFHA. The Relocation Event would require the consent and cooperation of third parties that SFHA does not control.
- The Dune Alternative assumes wetland mitigation for the project would occur on private property currently owned by others and not available for use by SFHA. Therefore, the initial construction of the Dune Alternative also will require the consent and cooperation of third parties that SFHA does not control.

These reasons are expanded upon below.

In its written submission and at our in-person meeting, the FOS team was not clear as to whether or not the revetment should stay in place and whether or not the constructed dune should be allowed to overwash. The FOS technical team says it is not responsible for carrying the project through the permitting or construction processes, or for designing or implementing maintenance efforts, and therefore has not been charged with thinking about these details. (This reflects the point that this is SFHA's access at stake and SFHA's project to execute; SFHA's position is that anyone coming forward with a suggested alternative does have the burden of showing how the alternative will work, be implemented, and be funded.) FOS has provided a cost estimate, but that estimate does not include utility management, roadway maintenance, roadway relocation, or wetlands mitigation. In general, the FOS proposal is incomplete and vague.

If the proposed dune in fact meets what is known as the "540 Rule," the dune should for a period of time withstand a 100-year storm without breaching. The FOS team has not been clear about whether the 540 Rule is satisfied in the Dune Alternative. The 540 rule provides that the cross sectional area of

the dune front above the 100 year flood elevation should beat least 540 square feet in size. FOS has not specified the frequency storm the dune would be able to withstand. Under the Dune Alternative, the dune and the shoreline would continue to erode, but the barrier would not overwash. The dune would protect the landward road in the short term, but the dune would be maintained to eliminate storm overwash, and therefore prevent migration of the barrier beach. In the Dune Alternative, the already-narrow barrier beach would get narrower over time as the shoreline retreats, and the natural migration of the barrier landward would be eliminated, to be replaced by an artificial "migration" process at the first and successive Relocation Events. As demonstrated by the history of failed soft solution attempts just west of the existing revetment, the area is very high energy and will quickly wash away sand and dune material from the seaward side of the system in a storm event, requiring frequent reconstruction of the dune within a diminishing footprint. We estimate that within five to ten years, the land area necessary to maintain the initial installation simply will not exist.

In order to address this situation, which will arise from the lack of natural barrier migration and land to rebuild the dune and roadway, FOS has proposed that the dune and road from time to time be artificially moved by adding more fill into the wetlands along Squibnocket Pond and eventually into the Pond itself. The details of this significant aspect of the dune proposal – the Relocation Events as defined above -- including their frequency, have not been offered. The bottom line is that during the first Relocation Event, a new road will need to be constructed either within portions of Squibnocket Pond, or by filling coastal wetlands. Neither of these outcomes is consistent with sound principles of environmental management, "managed retreat" from sea level rise, or with applicable law, including foremost federal and state wetlands protection laws.

The Dune Alternative seems to assume removal of both the town causeway and SFHA revetment, although this has not been made clear. This will cause an immediate shore retreat up to 50 feet, followed by an increased rate of erosion, possibly up to double the current rate. This increased erosion rate increases the likelihood that the barrier will not migrate landward at a rate high enough to allow the eventual re-engineering of the crossing at the first Relocation Event. This increases scope and cost of the O&M required retaining the original dune and road installation in service for the longest period possible. If this rigorous O&M program is not implemented, then the use of the road would be susceptible to interruption from storms. The use of the road would be subject to severe disruption during a Relocation Event. If the revetment were to remain, a dune constructed landward of this revetment would erode less in more-frequent small storms, while essential overwash from major storms should continue. While sand could cover the revetment and nourish the existing beach, the life of that sand is short, and would require frequent and costly renourishing to replace the sand washed out to sea. While FOS has not been clear about its intentions with respect to the retention or removal of the existing revetment system, FOS's technical team recognizes that the Dune Alternative would benefit from retention of the revetment because that likely would forestall the first Relocation Event.

The FOS team also stated during our meeting that the Dune Alternative would be more effective if the revetment not only remains in place and is maintained, but also is extended and enlarged, particularly at the western side. Keeping the revetment in place will require continuous maintenance, particularly keeping it anchored to the eroding bluff on the west end. Extending it would require a difficult and likely impossible permitting process for reasons that have been explained to the Committee on many occasions. Ultimately, even an extended and well-maintained revetment will breach in a future major storm, but this approach would buy a number of years of protection for the shoreline position, which

increases the life of the initial dune and road installation. It is vital to stress, however, that regardless of whether the revetment is retained in connection with the Dune Alternative, Relocation Events will be required in the foreseeable future. The retention of the revetment may delay the first Relocation Event by a few years.

Relocation Events will involve extensive filling activities in a Great Pond and coastal and inland wetland resources, and will be difficult if not impossible to permit as explained below. In contrast, because the elevated roadway alternative proposed by SFHA (the "Elevated Roadway") is designed on piles with a small cross-sectional area, and the endpoints of the Elevated Roadway will be tipping slabs with small footings on the ground surface to avoid construction of abutments in the Pond, SFHA's proposal has virtually no impacts to the wetland resource areas and is no impediment to natural barrier beach migration. It has significant regulatory and environmental advantages over the Dune Alternative.

PERMITTING IMPLICATIONS

The Dune Alternative will require local and state permits and approvals for work in wetland resource areas and for the substantial restructuring of the land forms between the existing Squibnocket Beach and the edge of Squibnocket Pond. For the initial installation of the Dune Alternative, the set of required permits and approvals are similar to those required for the construction of the Elevated Roadway. One notable exception is that the Dune Alternative, because it involves wetland filling, will require a variance under the Chilmark Wetlands Protection Bylaw. But the difficulty of obtaining these permits varies. The initial permitting of the Dune Alternative will be more difficult than the initial permitting of the Elevated Roadway because the former involves more filling and more land alteration. But the most significant regulatory and permitting differences between the two approaches arise in the future. The Elevated Roadway, once constructed, will remain in place for many decades without the need for any further permitting. The Dune Alternative will require periodic Relocation Events. The Relocation Events will be difficult or impossible to permit.

Each permit required for each project will require compliance with numerous performance standards depending on the footprint of work within resource areas and buffer zones. FOS's team has not explained how the Dune Alternative complies with these standards. That demonstration will require further documentation, presumably to be prepared as part of a more advanced engineering design.

In connection with the Dune Alternative, FOS has submitted a wetland delineation and concept plan prepared by LEC. It appears from LEC's delineation work that the original construction of the Dune Alternative could be designed such that it could be permitted under applicable local and state requirements. In fact, the basic concept of shoreline restoration by dune construction is likely to be well received by MassDEP and the Office of Coastal Zone Management.

But the Dune Alternative encounters daunting regulatory problems when a Relocation Event becomes necessary, and also in connection with the extensive O&M efforts that will be required to forestall the first Relocation Event (not to mention the possibility that part of the forestalling strategy might be to extend the existing revetment, a regulatory impossibility). The practicability of permitting the long-term maintenance of the Dune Alternative as it has been presented is questionable, is based on unreasonable assumptions, and is unlikely to be successful for the intended 50-year life of the project. The FOS team assumes that Relocation Events could be authorized through the inclusion of long-term

maintenance provisions in the permits issued for the original installation. But FOS also assumes that the initial installation is permissible because it involves just under 5,000 SF of wetland fill. FOS does not explain how initial permits could be obtained on the theory that the fill is under 5,000 SF yet still be issued in a way that pre-authorizes the future filling of extensive wetland and great pond areas during Relocation Events. Nor does FOS explain how and where mitigation will be provided for the initial filling activities. MassDEP regulations at 310 CMR 10.53 require that fills of up to 5,000 SF are allowed only if the filled area is replicated at a 1:1 ratio.

No project may alter more than 5,000 SF of BVW without a variance under the Massachusetts Wetlands Protection Act. The only exception to this limitation on BVW fill is for a so-called "Limited Project" under the provisions of 310 CMR 10.53(3)(e). FOS has suggested that the Dune Alternative qualifies as a Limited Project. We disagree. An access project qualifies as a "limited project" only if there exists no "reasonable alternative" means of access from a public way to an upland area of the same owner. Reasonable alternative means of access may include any previously or currently available alternatives such as realignment or reconfiguration of the project to confirm with 310 CMR 10.54 through 310 CMR 10.58 or otherwise minimize adverse impacts on resource areas.

The "reasonable alternative" in this case is Elevated Roadway, which will require no placement of fill within BVW and allows for the natural movement of water and sand by wind and wave action. The existence of the Elevated Roadway concept – and the desire of the project proponents (SFHA) to build it – defeats any possibility that the Dune Alternative can be treated as a "limited project."

The coastal wetland regulations at 310 CMR 10.24(7)(c) similarly allow limited projects within coastal wetland resource areas. However, the Dune Alternative would not, in our opinion, meet any of the following applicable regulatory standards for a limited project in coastal wetlands:

- Maintenance and improvement of *existing public roadways*, but limited to widening less than a single lane, adding shoulders, correcting substandard intersections and improving drainage systems;
- Maintenance, repair and improvement of structures…*which existed on November 1, 1987.*
- The routine maintenance and repair of road drainage structures including culverts and catch basins, drainage easements, ditches, watercourses and artificial water conveyances in insure flow capacities *which existed on November 1, 1987.*

(Emphasis added). The structures and artificial landforms contemplated in the Dune Alternative are not "public" infrastructure and (obviously) do not exist now and did not exist in 1987. Furthermore, the placement of fill in Squibnocket Pond for any purpose would require a license under M.G.L. c. 91. MassDEP's regulations implementing the Chapter 91 licensing program (310 CMR 9.00) categorically exclude the placement of fill in great ponds for non-water dependent uses where alternative means of access are available – such as pile supported structures. 310 CMR 9.32(1)(c). Because the Dune Alternative relies, in the Replacement Event scenario, on the placement of fill in the Squibnocket Pond, the Replacement Event will be categorically prevented from receiving a Chapter 91 license. If the Dune Alternative were pursued, one or several Replacement Events would be both inevitable, and they each would inevitably be very difficult or impossible to permit under both Chapter 91 and the Wetlands Protection Act.

REGULATORY COMPARISON OF DUNE ALTERNATIVE AND ELEVATED ROADWAY

We provided descriptions of each relevant type of wetland resource area regulated under local, state and federal law in our prior (24 July 2014) submission to the Committee, and summarized the regulatory standards applicable to these resources in that submission. The following narrative describes how the Dune Alternative and the Elevated Roadway are likely to be evaluated under each rule.

Massachusetts Wetlands Protection Act and Local Wetlands Bylaw

We generally agree with how the FOS team has delineated the location and extent of wetland resource areas present at the site, notably:

- Squibnocket Pond's status as a *salt pond* is subject to interpretation due to the low salinity and limited influx of salt water.
- The vegetated wetlands adjacent to Squibnocket Pond are *Bordering Vegetated Wetlands* and not Salt Marsh because of a lack of salt tolerant species.
- The limits of *coastal and/or inland bank* as interpreted by each team vary slightly but not in a significant way that would preclude the construction of either alternative.
- There is general agreement on the limits of *coastal beach* and the *coastal flood plain* defined as Land Subject to Coastal Storm Flowage.
- Money Hill is likely of glacial origin rather than deposition through dune formation processes, meaning that it is not a wetland resource.

The most significant permitting limitations under the Act and local bylaw may be generally stated:

- No project may be permitted which will adversely affect existing coastal dunes or the natural processes which create and maintain such dunes.
- No project may alter greater than 5,000 SF of BVW, except a limited project, a concept that includes an access project for which no alternatives are reasonably available that would comply with the applicable regulations.

The Elevated Roadway alternative has been designed to minimize impacts to coastal processes. It involves placing the roadway on piles, which will allow the natural movement of sand and water by wind and wave action. It will involve essentially no filling or alteration of any wetland resources.

The Dune Alternative involves extensive wetland fills initially, and more extensive fills during Replacement Events. The roadway will not be able to be replaced on naturally accreting land because of the efforts undertaken to prevent for many years the natural deposition of sand adjacent to Squibnocket Pond. This will effort would be undertaken (at unspecified expense) in order to maintain the continuous utility of the roadway. But it impedes a natural process, and leads inevitably to artificial Replacement Events that likely can not be permitted.

The Dune Alternative will require, at minimum, a variance under Chilmark's Wetlands Protection Bylaw for the placement of fill in Vegetated Wetlands. To issue this variance, the Conservation Commission must find that the Dune Alternative is adequately protective of the public interests in the affected resource areas. If the project site is determined to contain coastal dune, a much more rigorous

standard would apply to the issuance of this variance, potentially preventing approval of the Dune Alternative under the local bylaw. While the delineations prepared thus far have not been definitive on the presence of coastal dune at the existing parking lot and adjacent land, MassDEP mapping describes this as "barrier beach-dune." If the Conservation Commission affirms this preliminary MassDEP mapping, such designation would also trigger the need for a local variance for work on a coastal dune. The local bylaw does not allow a variance for projects that prevent the natural migration of barrier beaches landward. The Dune Alternative as presented would prevent such migration and therefore would not be eligible for a local wetlands variance if dune is present.

M.G.L. Chapter 91

Chapter 91 and its implementing regulations do not allow the placement of fill within a great pond when a reasonable alternative exists that would avoid such fill. While the initial dune construction would not require work within the Great Pond, the further relocation of the road at the end of the first maintenance interval (the first Relocation Event) would likely require such fill. At that time, the alternative of an elevated roadway would presumably still exist and would be compelled in lieu of filling.

The Elevated Roadway has few impacts on the wetland resources present at Squibnocket Beach, as explained in our 24 July 2014 memo to this Committee. Most importantly, unlike the Dune Alternative, the Elevated Roadway does not impede ongoing transgression – landward migration of sand by natural processes. In the Elevated Roadway scenario, the seaward side of the barrier beach will continue to erode, and the landward side will gradually accrete, maintaining the integrity of the barrier over time. Additionally, with an Elevated Roadway, vegetation can stabilize the barrier surface without inhibition as there would be no areas of consistent shadow, and a range of coastal vegetation can flourish without full sunlight.

In time, the proposed Elevated Roadway will eventually be near the beach, and may need to be moved. We estimate that the relocation scenario for the Elevated Roadway will not arrive for at least 50 years. At that time, the Elevated Roadway can be moved landward to lie over the accreted lagoon shoreline. Although this will require re-permitting and redesign, and may require the consent of third parties who might have an ownership claim to some of the accreted land, this is a problem not to be encountered for at least half a century. By contract, the Dune Alternative will encounter its first Relocation Event after each major storm event or at the end of each maintenance cycle, in our opinion every 5-10 years. Relocation Events will require the project to be re-designed and re-permitted. The Dune Alternative is fraught with regulatory risk and does not offer a long-term reliable and predictable solution to SFHA's access problem.

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