ADVANCED EROSION CONTROL, INC.

October 17, 1989

Maryland Department of Natural Resources
Capital Programs Administration
2012 Industrial Drive
Annapolis, Maryland 21401

Attention: Mr. Jordan R. Loran

Dear Mr. Loran:

Pursuant to certain questions posed in your letter to David Wilson dated October 2, 1989 concerning the Terrapin Park BEACH BEAM Project, we respond as follows:

PARAGRAPH 3:

QUESTION:

Has a foundation analysis been done to determine bottom conditions along the proposed alignment of the BEAMS? Under what conditions would preparatory work have to be done before the BEAMS could be set in place?

ANSWER:

A foundation analysis was performed by the writer during several on-site/in-water surveys. The entire length of the proposed alignment of the BEAMS was checked and bottom conditions were found to be sandy and firm, except for the northern-most end from the aluminum bulkhead, southward approximately forty lineal feet, where peat bottom conditions were found.

Since the foundation pressure exerted by the four foot BEACH BEAM is 1.25 P.S.I., the BEAMS cannot be placed in this area and as shown on the design plan, terminate before the peat layer with several sections oriented landward to act as flanking sections. These flanking sections serve to prevent north/northwest generated wave energy from scouring out any sediment, which may be accreted in back of the proposed alignment axis.

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Under normal conditions, such as firm bottom conditions and soil conditions, other than peat, foundation preparation work is not required prior to setting the BEACH BEAMS. Possible exception to this would be conditions where sand or sediment bars have been created by current and/or wave action, as debris or other obstructions in way of the desired alignment axis would result in the BEAMS being out of vertical alignment upon placement. In cases such as this, debris and obstructions should be removed and where underwater bars exist, these should be leveled.

Where peat soil conditions exist, placement of the BEAMS is not recommended, unless careful consideration is given to providing a proper foundation, such as vertically-driven piling.

QUESTION:
Against what level of storm will the four foot BEAMS provide protection against?

ANSWER:
The four foot high BEAMS (8,800 pounds/ module) were designed to provide protection against ten year type storms, wherein four to five foot high waves may be experienced along with a storm surge set-up of two to three feet. Due to the weight of the individual modules, displacement of the BEAMS from the set-in place axis by waves, debris, or ice should not be experienced.

The Wiseman/Love Point Project installed in April, 1988 on Kent Island has experienced such storm conditions during the spring and fall months of 1989. Sediment accreted, beach planform, and salient have experienced little change as a result of these storm conditions, resulting in no degradation of the fastland behind the structures.

QUESTION:
Are four foot BEAMS adequate at this site to attennate sufficient wave energy and thereby protect the shoreline? What is the porosity of the units and as deployed, what will be the percentage of wave energy transmission through and over the BEAMS?

ANSWER:
Four foot BEACH BEAMS are considered adequate for the Terrapin Park site based upon performance to date of the Wiseman installation approximately 1½ miles northward, which has the same wind ray exposure ie., four mile over water fetch from the west, 18 plus miles from the north/northwest, and 12 plus miles from the southwest.

The porosity of the units is 29% of the vertical surface area of the structure as viewed from the side elevation.

The percentage of wave energy transmission through and over the structure has not been recorded as of this date, except for video and historical photographs, which were taken over the past seventeen months at the Wiseman site.

The Terrapin Park installation would provide an excellent opportunity for Maryland Department of Natural Resources and/or the U. S. Army Corps of Engineers to record such data using a wave gauge device.

QUESTION:
What is the critical wave height expected to impact the BEAMS?

ANSWER:
Based upon observation during storm conditions at the Wiseman site, waves approximately four feet in height have impacted the BEAMS.

QUESTION:
What is the anticipated wave height in the lee of the BEAMS?

ANSWER:
Again, based upon observation during storm conditions at the Wiseman site where wave heights of three to four feet were observed channelward of the BEAMS, waves in the lee of the BEAMS appeared to be one foot high or less.

QUESTION:
How much sand is expected to accrete landward of the BEAMS in the first year and the second year?

ANSWER:
The amount of sand/sediment expected to accrete landward of the BEAMS is a function of wind and wave energy and direction combined with the amount of sand/sediment available for transport shoreward.

Only time and the whims of nature can provide the answer as to how much sand is expected to accrete landward of the BEAMS. However, once the BEAMS have been installed, further erosion of the fastland and beach area should be brought to a halt.

QUESTION:
Will there be a problem with undermining of the ends of the individual BEAMS due to jetting between the structures? Should the ends of the individual BEAMS be in contact with each other rather than gapped? Will the BEAMS eventually align themselves perpendicular to the project axis?

ANSWER:

To date, we have not experienced undermining of the ends of individual BEAMS due to jetting of water between structures, which have been installed with two, three, four, and five foot gaps on the Chesapeake Bay and which have been in service upwards of seventeen months. This absence of undermining caused by higher velocity water or jetting is most likely due to several factors and the design of the BEACH BEAM module.

First, due to the permeability of the structure, the mass of water available to pass through the gapped openings is decreased considerably, since it passes through the structures losing its energy through the process of refraction and turbulence and is, therefore, not reflected around the ends.

Second, the flat ends of the module castings present surface normally perpendicular to high velocity wave energy, whereupon, it is highly unlikely that the BEAMS will align themselves perpendicular to the project unless they are impacted by hurricane-force storm conditions.

Third, unlike ocean beaches, soil conditions underwater on the Chesapeake Bay are more firm and experience less fluidization during any given twenty-four hour tidal period.

We feel it is a combination of the above factors, as well as the limited fetch length over water and water depth, which has resulted in the development of a stable beach planform and beach salient parallel to the shoreline for all of the BEACH BEAM projects installed on the Chesapeake Bay to date.

We thank you for the opportunity to answer your technical questions and should you have others as the project matures, please feel free to contact us.

Sincerely,

ADVANCED EROSION CONTROL, INC.

Ronald E. Martinsen
PRESIDENT

REM/y

cc: David Wilson
Tom Ryder
James Wright