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Formerly of The Murrough

January 1, 2016

Dear Friends of The Murrough,

I am deeply saddened by the recent photos and reports I have seen of the continued and worsening erosion of my home turf. I grew up on the Murrough, and remember vividly the wide strip of grassland between the beach and the railway – enough room for an inside road and an outside road with long natural grasses and gorse bushes in between. I always remember hearing that a golf course and a race course existed there at some point but that has all long since washed into the sea, literally.

I currently live in the US, and I regret not being more aware of this problem earlier. However, I am a marine/civil engineer and I work in the marine construction business, having built numerous shoreline protection structures, so I hope that I can contribute in some way to tackling this problem. I would like to offer my insight and opinion on both emergency remediation action, and on long term solutions to address this serious issue, as well as participate in any community review that may be afforded the public.

I realize that this is a sore topic among Wicklow people and there is a lot of finger pointing and blame going around over inaction by the leadership (or lack thereof) that has allowed the situation to reach this point. I am also fully aware of the tens of millions of Euro that will be required to properly address the problem. However as an exile, I will try to remain technical and objective in my opinion.

So, budget and politics aside here's my two cents/pence:

Unfortunately, it appears the opportunity has passed to rescue the Murrough with simple bank protection or by simply extending the existing armor stone revetment northward due to the severe loss of beach and upland soils. In fact, there is little upland remaining to protect east of the railway line. This should no longer be treated as a long term problem, rather as an emergency condition that threatens both a valuable natural resource, and the safety of the public and rail commuters. It is my opinion that a bulkhead or seawall should be constructed on an emergency basis, using emergency government funds, to protect the railway and restore upland fill along the most severely eroded section of the Murrough (approximately 250 m). It is mostly in Irish Rail's interest that this work should happen immediately, but it will be a huge loss to the people of Wicklow if the Murrough becomes permanently inaccessible. Below is my proposed concept for emergency remediation. It is only one of a variety of possible solutions but some quick decision making will be required over the coming weeks to save what remains.

Emergency Remediation Concept

1. **Immediately** place erosion control measures along the exposed bank in the most severely eroded section (approximately 250 m). Options include manufactured articulated concrete erosion

mattresses, rock filled gabion mattresses, a combination of geotextile fabric and small riprap (rock). These measures are primarily sacrificial and would not be expected to survive multiple NE storms, but would at least curtail the current severe rate of erosion while the authorities procure the emergency construction work.

2. As a means of protecting the railway and restoring access to the Murrough, install a steel sheet pile (or equivalent) bulkhead/seawall the entire length of the most severely eroded section, providing enough width between the Irish Rail property line and the bulkhead line to allow a traffic lane for emergency/maintenance vehicles, a pedestrian walkway, and restoration of a strip of natural vegetation (gorse/natural grasses). I estimate that 15 m should be sufficient width, but that could be confirmed by regulatory authorities. This design will require some expedited and conservative engineering.
3. Install a concrete cap on the bulkhead/seawall and tie back with soil anchors to an angle and depth sufficient to support the lateral soil load on the bulkhead. The cap, which can also serve as a curb should be large enough to accommodate the soil anchor bearing plates and safety railings along the offshore edge.
4. Backfill and compact with imported rock/fill.
5. The armor stone to the south should be extended north and tapered at maximum 30 degree angle to protect the corner at the seawall/revetment transition.
6. Place smaller riprap (rock) along the toe of the bulkhead/seawall to absorb wave energy and limit scour to maintain the required embedment depth of the sheet piles.
7. Similarly, install rock armor at the north end of the bulkhead/seawall extending northward along the beach and tapered at 30 degrees at both ends.

The attached figure shows the general concept, as well as long term coastal protection to the north or the remediation area. (Photo credit: Skycam Ireland)

Long Term Coastal Erosion Protection

On a priority basis, a thorough coastal engineering study should be conducted for the Murrough from Six Mile Point to the New Pier, including hydrographic survey, beach survey, longshore drift and sediment analysis, and wave and current modelling. This is the only way to establish a comprehensive coastal erosion protection program. It has been demonstrated clearly that although the existing armor stone revetment north of the New Pier is extremely effective in absorbing wave energy and preventing erosion, it has apparently exacerbated the erosion problem to the immediate north. It also limits access to the beach/water, which is a major consideration for the Murrough as a recreational amenity.

There are several alternative options for long term coastal protection, including beach replenishment/nourishment, groins, artificial headlands, detached breakwaters, to name a few. However, the applicability, configuration, and extent of any of these measures can only be determined through the engineering study described above. There are also major permitting, environmental and other regulatory factors that need to be considered, most of which are beyond my area of expertise.

One of the biggest questions that has to be answered is how far up the Murrough can coastal defense works extend? Irish Rail obviously has an interest all the way to Greystones but what is the limit of the Murrough as an amenity to the people of Wicklow? Some people walk to Killoughter and beyond but is it realistic to extend coastal defense structures that far north? This of course will be mainly budget-driven. Perhaps the overall objective should be to protect the entire Broad Lough, which would require almost 5 KM (total) of protection.

Coastal Defense Options to Consider

The "Do Nothing" Approach

Coastal erosion is a natural process, and just as the Murrough was created by natural processes, it will eventually erode to the point where the Vartry/Broad Lough will breach, and the Leitrim will transition from being an estuary to a tidal strait, as long as nothing is done to stop it. It appears the "Do Nothing" approach has been the preferred option over the years but I think there is now consensus among Wicklow people that there needs to be some serious investment in coastal defense works along the Murrough, especially given the natural resource, recreational amenity, and transportation infrastructure that is at risk.

Extension of the Existing Revetment

A continuous rock armor revetment has been installed in phases over the years from the New Pier extending approximately 1 KM (?) to the north. As mentioned before, it has proven extremely effective in absorbing wave energy, and because it is installed from below low tide to above storm high tides, it prevents scour underwater and soil erosion upland. However, because the revetment terminates abruptly at the north end, it has resulted in a concentration of erosion of the unprotected beach and bank immediately to the north during NE storms. Theoretically, the revetment could be extended all the way to Greystones, but that would be undesirable on a number of levels, including budget, environment, vehicle/machinery access, but most of all it would entirely eliminate the beach, which is one of the main attractions of the Murrough as a natural amenity.

Installation of Groins

Groins have proven effective worldwide in limiting longshore drift of beach sediments and replenishing beach sand/shingles. In fact I remember there used to be remnants of old groins at the south end of the Murrough beach in the area of the old shelters. Another advantage of groins is that they allow for beach access in between, although some sort of bank protection may still be needed to curtail erosion since it would still be exposed to wind, rain and sea spray. The disadvantages of groins include discontinuous beach access, localized erosion on the downstream side of the structure, difficulty of construction due to being performed both from the beach in the wave breaking zone and from the water (barges), requiring transport and stockpiling of material upland. These challenges typically result in higher construction costs.

Detached Breakwaters

Depending on permitting and environmental restrictions, detached breakwaters can be designed to limit erosion of an existing beach, increase the longevity of beach fill, and maintain a wide beach for storm

damage reduction and recreation. Detached breakwaters are generally shore-parallel structures that reduce the amount of wave energy reaching the protected area by dissipating, reflecting, or diffracting incoming waves. The structures dissipate wave energy similar to a natural offshore bar, reef, or nearshore island. The reduction of wave action results in deposit of sediment inshore of the detached breakwater. Although large breakwaters with graded core extending above the storm wave height are more effective and therefore preferable, low crested breakwaters may be sufficient. An added advantage of this type of structure is that it can be installed entirely from the water using barges, loaded at say Roadstone in Arklow and bottom-dumped or loaded directly into place without stockpiling. Similar to groins this approach may require some sort of bank protection to limit erosion since it will always be exposed to wind, rain and sea spray.

The attached figure shows the detached breakwater concept in the far background north of the proposed bulkhead/seawall. (I will follow up with additional sketches showing better detail.)

Without the findings from a coastal engineering study, it is difficult to say what measures/structures would be most effective, feasible, and cost-effective. However, I feel the detached break waters may be the best option. The water depths are relatively shallow (<4 M), there are no navigational restrictions, and I think that it is the most effective way of preserving the natural beauty of the Murrough itself, while maintaining full-length beach access, and as a bonus, creating new fish habitat.

Whatever approach turns out to be the most suitable, I believe it is important that the community is fully involved and represented. Whether this becomes a Government, County Council, or Irish Rail project a local task force should be formed and allowed to oversee and participate in the process from initiation to completion. Perhaps that task force already exists in Friends of The Murrough.

Please feel free to share this letter with your members and the general public and let me know if I can be of technical assistance with your campaign. I hope that the Powers That Be will listen to the people of Wicklow, and treat this matter with the urgency it deserves. I only wish I still lived locally and was more available to get involved. Regardless, I would be more than happy to volunteer my services in whatever capacity possible.

Sincerely,

Shane Beacom

Murrough Native


MURROUGH EMERGENCY REMEDIATION CONCEPT
Detached breakwaters or groins beyond (Long term coastal protection)
Steel sheet pile bulkhead/seawall with concrete cap and soil anchor tie-backs (Approx. 250 M long)
Provide riprap (smaller armor stone) entire length
Provide sufficient width for emergency/maintenance vehicles and recreational use
Extend and taper armor stone to bulkhead (30 deg.)
Restore natural vegetation
Assumed Irish Rail property line
SKYCAM IRELAND
aerial imagery