Dunkellin River and Aggard Stream Flood Relief Scheme

Response to Marine Institute

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INTRODUCTION

RPS was commissioned by Galway County Council in 2011 to prepare an Environmental Impact Statement (EIS) for the Dunkellin River and Aggard Stream Flood Relief Scheme, hereafter called the "scheme", in south County Galway. The Dunkellin River and the Aggard Stream form part of the Dunkellin Drainage District which was constructed in or around 1857 and Galway County Council has a statutory maintenance responsibility for these works.

The scheme was submitted to An Bord Pleanála (ABP) in October 2014 for planning approval in line with Section 175 of the Planning and Development Act 2000, as amended. In February 2015, the Board, in accordance with Section 175(5)(a) of the Planning and Development Act, 2000, as amended, requested further information in relation to the proposed development.

Item 7 of the Board's letter stated that, "*The applicant is invited to respond in detail to the written submissions made by parties including local residents, prescribed bodies and others.*"

The purpose of this document is to provide a response to the issues raised by the Marine Institute in their submission.

1 ITEM 1: HABITATS

1.1 Although the marine habitats of Galway SAC are considered in the EIS these are dated and do not include maps of marine communities now available and which are subject to conservation objective by NPWS. Marine communities in inner Galway Bay SAC/SPA were mapped by NPWS in 2013 and show the presence of seagrass and maerl (coralline algae) habitats that are sensitive to changes in salinity and in particular increased turbidity and siltation. Native oyster (Ostrea edulis) is listed as a constituent species of sedimentary habitats in the areas. Development led changes in environmental conditions that would detrimentally affect native oyster (or other marine species in these habitats) and the structure and function of these marine communities would be contrary to the conservation objectives for these communities.

The role of the native oyster and oyster beds in the ecology of marine communities has led to it being considered a keystone (OSPAR). Functions provide by native oyster include provision of a solid surface for settlement by other species, provision of cryptic habitat that serves as a nursery ground for small fish and other species, stabilising sediments which may in turn provide some protection from shoreline erosion and filtration of large quantities of water thereby maintaining good light penetration to the seabed. The role of oyster in the structure and functioning of estuarine marine communities should be considered by the EIS; a high degree of certainty with respect to avoidance of risk of native oyster is appropriate given the unique distribution of the species in the marine communities that are now subject to conservation objectives.

The marine community map for inner Galway Bay SAC is shown in Fig 1 below [see page 2 of submission]. Change in salinity and siltation following drainage of the Dunkellin should be assessed in relation to the distribution of marine communities.

All the habitats outlined in the comment above were fully considered as part of the EIS. The modelling conducted indicated that there was no significant interaction with any of these habitats as a result of the proposed scheme.

The numerical modelling report (included in the application), which examined the extent and magnitude of the potential change in salinity and flow due to the proposed works, shows the variation in seabed and within the water column salinity (in excess of 10 PSU) across the entire Bay. Presenting modelling results for the entire bay allowed changes in salinity and flow to be identified for all relevant features including sensitive receptors and designated protected and licenced areas. During the most critical phase of the modelled event (i.e. when the salinity is the lowest) the proposed scheme was shown to result in short-term change in salinity of less than 0.5PSU.

As stated in Section 10.5 (Conclusions), p.113, of the NIS: "*The timing and sequencing of upstream flood relief scheme measures coupled with mitigation applied with respect to each measure will reduce the potential for silt generation at source and stem the potential for losses*."

Table 9.2, pp.99-103, of Section 9 (Mitigation Measures) of the NIS shows extensive mitigation measures for each flood alleviation area. Furthermore, as outlined in Section 9.2.2 (Mitigation Measures for the control of Waterborne Pollutants during Construction Activities), p.92, of the NIS: "*A detailed design and method statement should be drawn up by the contractor indicating what standard measures will be taken to avoid (i) sediment or soil loss and (ii) cement and hydrocarbon* *release, associated with all aspects of the construction phase*." Therefore, a detailed construction management plan (CMP) addressing details of construction methods and all recommendations for mitigation presented in the EIS and the NIS will be presented to statutory bodes for consideration prior to commencement of works.

2 ITEM 2: OYSTER DISTRIBUTIONS

2.1 The EIS report makes no comment on the possible effects of changes in salinity or other environmental conditions on naturally occurring native oyster populations. The area has a long history of commercial fishing for native oyster. Currently the fishery provides seasonal employment for over 30 people. The oyster beds are mapped annually by the Marine Institute and the Clarinbridge oyster fisherman's co-operative. The main beds are distributed between Eddy Island and the Dunbulcaun estuary. The distribution of oyster in the inner Bay area in 2011, 2012 and 2013 is shown in Figure 2 below [see pages 2 and 3 of submission].

Changes in salinity and siltation following drainage of the Dunkellin should be assessed in relation to the distribution of native oyster.

As stated in the Section 4.3.3 (Salinity Modelling), p.24, of the NIS:

"*A comparative study was carried out to examine the impact if any of the scheme on shellfish in the receiving marine waters. The objective of completing this modelling was to conclude if the scheme could cause decreases in salinity in the receiving shellfish waters that would prove detrimental to the shellfish population in times of flood such as the 2009 event.*

The modelling demonstrated that, for the 2009 event, the salinity levels at the shellfish beds would experience minimal effects due to the scheme."

The numerical modelling report (included in the application), which examined the extent and magnitude of the potential change in salinity and flow due to the proposed works, shows the variation in seabed and within the water column salinity (in excess of 10 PSU) across the entire Bay. Presenting modelling results for the entire bay allowed changes in salinity and flow to be identified for all relevant features including sensitive receptors and designated protected and licenced areas. No changes were identified in normal conditions. During extreme flood events (the most critical phase of the modelled event for shellfish beds, i.e. when the salinity is the lowest) the proposed scheme was shown to result in short-term change in salinity of less than 0.5PSU.

Other environmental conditions, such as sediment and water quality are not affected by the proposed scheme. The hydraulic modelling demonstrated that even during times of extreme flood (e.g. the 2009 flood event) water would be effectively restricted to the main river channel. This in effect would reduce the risk of contamination of waters by land based diffuse sources of pollution including septic tanks. Reducing interaction of waters with diffuse contamination sources has the potential to decrease E. coli levels in the receiving waters of Galway Bay and thereby improve water quality, these factors are also controlled during construction (refer to Section 9.2.2 (Mitigation Measures for the control of Waterborne Pollutants during Construction Activities), pp.91-95, of the NIS.

Section 16.7 (Conclusion on impacts on Human Beings & Material Assets), p.317, of the EIS states: "*The mitigation put in place for the shellfish industry will minimise any possible impacts during construction. Under normal operating conditions there will be no discernible changes. In extreme flood events (such as the 2009 flood), the increased flow from the Dunkellin River as a result of the works would have a minor effect on salinity in the receiving waters, this effect has been modelled* *and would result in a change of less than 1 PSU. As the water quality of the flood water is likely to be improved as a result of the works, this minor change in itself is highly unlikely to cause any impact."*

Furthermore, it was concluded in Section 8.2.2.4, p90, of the NIS (Impacts on Inner Galway Bay SPA) that "*increase in peak discharge by 1% and reduction in time to peak flow is not likely to cause the transport of significant additional quantities of suspended sediment and nutrients to the Dunkellin Estuary.*"

As stated in Section 10.5 (Conclusions), p.113, of the NIS: *The timing and sequencing of upstream flood relief scheme measures coupled with mitigation applied with respect to each measure will reduce the potential for silt generation at source and stem the potential for losses*". Table 9.2, pp.99-103, in Section 9 (Mitigation Measures) of the NIS shows extensive Mitigation Measures for Each Flood Alleviation Area.

3 ITEM 3: NATIVE OYSTER STATUS

3.1 ***Native oyster is in decline in throughout its Europe range. It is listed as a priority species in the UK Biodiversity Action Plan. In Ireland its main strongholds are in Tralee Bay, Galway Bay, Lough Swilly and to a lesser extent in other Bays on the west coast. Approximately 90% of the national biomass of native oyster occurs in Tralee Bay. Given this limited distribution the species is at risk of further decline and even extinction in Irish territorial waters.***

The species is exposed to a number of risks given its distribution in estuarine environments. Annual recruitment to oyster stock could already be said to be on a knife edge; temperature, salinity and substrate conditions are not suitable every year for recruitment and oyster populations survive from periodic recruitment events. Any change in conditions (temperature, salinity, siltation) that would reduce the frequency of recruitment would put these populations at further risk.

For oysters the critical issues are:

a. The change in duration of exposure to critically low salinity or sub-optimal salinities resulting from increase in freshwater discharge rates not only during exceptional flood events but generally.

b. increase siltation resulting from increases in suspended solid loads in freshwater discharge waters. These solids will settle out when reaching lower flow conditions in the inner Bay.

The scientific literature on these parameters, in relation to oyster recruitment, is not considered in the [EIS] report other than a letter from Rachel Cave at NUIG. This letter mentions a critical level of 12 ppt. for salinity for shellfish but is not specific bout native oyster.

The lack of critical risk analysis of the effect of changes in salinity and siltation in relation to the sensitivity of oyster to such changes is significant. Additional analysis should be undertaken.

As stated in Section 4.5.1 (Impact on Flow Velocities), p.28, of the NIS: "*Examination of the channel velocities in the mathematical model (HEC-RAS) for the existing channel and Preferred Scheme scenario shows that expected changes in flow velocities is minimal.*"

The potential Impact on flow velocities is further discussed in the NIS, Appendix A, Section 4.3. In addition it states in the NIS, Appendix A, Section 4.4, that:

"The time to peak (Tp) is estimated to be reduced from 95 hours to 93 hours.

It is expected that implementation of the Preferred Scheme will result in a marginal increase (less than 1%) in the rate at which water is discharged to Galway Bay during a similar November 2009 *flood event and on balance the volume of flood water passing Killeely Beg Bridge will not change significantly."*

In other words, the scheme conveys the freshwater discharge slightly more quickly but the total discharge is not increased over the course of the event.

It was concluded in Section 8.2.2.4 (Impacts on Inner Galway Bay SPA), p90, of the NIS that: "*increase in peak discharge by 1% and reduction in time to peak flow is not likely to cause the transport of significant additional quantities of suspended sediment and nutrients to the Dunkellin Estuary*."

As stated in Section 10.5 (Conclusions), p.113, of the NIS: "*The timing and sequencing of upstream flood relief scheme measures coupled with mitigation applied with respect to each measure will reduce the potential for silt generation at source and stem the potential for losses.*"

Table 9.2, pp.99-103, in Section 9 (Mitigation Measures) of the NIS shows extensive Mitigation Measures for Each Flood Alleviation Area.

Section 9.2.2 (Mitigation Measures for the control of Waterborne Pollutants during Construction Activities), p.92, of the NIS also demonstrates there will be no effects to the critical issues during construction.

4 ITEM 4: SALINITY MODELLING

4.1 The salinity modelling is limited to a single scenario; the Nov 2009 flood event and the profile of such an event after drainage. The EIS report itself notes this "it should be noted that each particular flood event will have a different potential impact on the shellfish beds depending on the phasing of tidal cycle at the time of each flood event. Correspondingly, the effect of impact of the scheme may vary; this comparative study examine only one such event. Prevailing winds conditions may also be of significance during such events". Additional scenarios, in particular the salinity distribution during annual flow conditions before and after drainage, should be considered. One off events are not the issue.

Modelling scenario under different meteorological forcing conditions should be undertaken.

As outlined in the Environmental Modelling Report, contained in Appendix E of the EIS, the selection of the 2009 flood event was specifically made to take into consideration the impacts on shellfish stocks, impacts on flow and salinity which would have been most apparent during and immediately after this extreme flood event. During normal operation periods, no changes were anticipated.

The 2009 event is identified as the 'worst case scenario' for the model because - as well as the extra volumes of water - the peak discharge rate was observed during low water and when a flooding tide was acting to reduce this significant volume of fresh water from leaving the Bay. These factors meant that the shellfish communities were at their most vulnerable.

The model compared the 'before' and 'after' scenarios of this extreme event in relation to the proposed scheme. It was seen that the changes were minor then no further modelling was required or undertaken. The validity of this modelling approach was agreed under auditing by the NUI Galway.

5 ITEM 5: MODELLING OF SILTATION IN MARINE HABITATS

5.1 No modelling of changes in suspended solids transport resulting from increased discharge rates is considered. Increased transport of solids is probable if the flow rates are increased post drainage.

Modelling of changes in siltation of marine habitats should be undertaken.

Section 10.5 (Conclusions), p.113, of the NIS states that the scheme model:

"*… predicts that there will be an increase in the peak discharge rate into Galway Bay by 1% and the time to peak flow (Tp) was also estimated to be reduced from 95 hours to 93 hours. The scheme conveys the freshwater discharge slightly more quickly but the total discharge is not increased over the course of the event. Any slight increase in peak discharge by 1% and reduction in time to peak flow is not likely to cause the transport of significant additional quantities of suspended sediment and nutrients to the Dunkellin Estuary."*

No increase in solid transportation is anticipated therefore no modelling of siltation was deemed to be required.