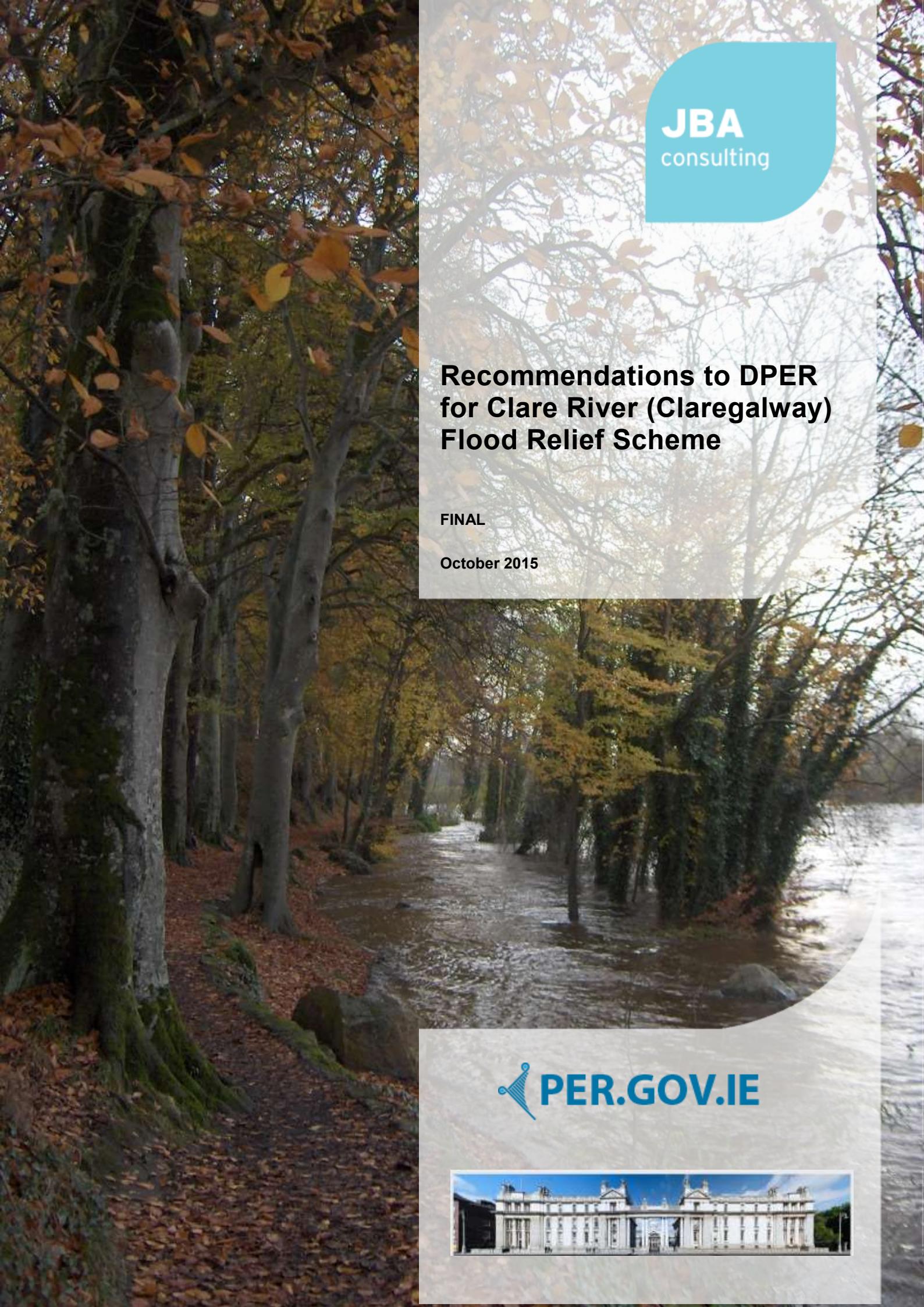

JBA consulting

Recommendations to DPER for Clare River (Claregalway) Flood Relief Scheme

FINAL

October 2015

PER.GOV.IE

JBA Project Manager

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Revision History

Revision Ref / Date Issued	Amendments	Issued to
16/10/2015		Jim Deane

Contract

This report describes work commissioned by Jim Deane, on behalf of the Department of Public Expenditure and Reform DPER, by a phone call with Jonathan Cooper. DPER's representative for the contract was Jim Deane. Declan Egan, Anne Murray, Mike McDonald and Jonathan Whitmore of JBA Consulting carried out this work.

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Purpose

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Contents

Contents

List of Tables

1 Introduction

JBA Consulting has been retained by the Department of Public Expenditure and Reform (DPER) to provide recommendations to the Minister in relation to the permitting of the Clare River (Claregalway) Flood Relief Scheme. This follows the JBA evaluation of the Environmental Impact Statement (EIS) that was prepared for the Clare River (Claregalway) Flood Relief Scheme in 2014. The EIS was prepared by the RPS Group. RPS have provided additional information JBA identified as absent from the EIS (and supporting documents), in a follow up report. JBA will review this additional information as part of this work.

1.1 Scope of Services

JBA propose to carry out the following tasks in order to provide the appropriate advice to the Minister:

- Review of RPS Response (dated 03/06/15) by JBA technical specialists;
- Provision of a list of any additional information/surveys if required;
- Provision of recommendations to the Minister to accept the EIA and for the Minister to prepare conditions for the granting of the proposed scheme and if relevant, to provide any recommendations regarding reasons for the refusal of the proposed scheme;
- Draft Report and final report;

1.2 Information made available to JBA Consulting for review

The following information was made available to JBA Consulting for review:

- MGE0262RP0016F01 RPS Response to JBA Review
- MGE0262RP0017F01- Construction and Environment Management Plan (CEMP)

1.3 Review Methodology

JBA Consulting has assessed all of the additional information provided to it by the DPER. The additional information has been assessed and reviewed by our in-house experts. The review was carried out through:

- A high level review to ensure compliance with the requirements of the EIA Directive;
- Identification of additional information, if required;
- A detailed appraisal of the assessment methodologies and their conclusions
- Provision of recommendations for conditions to the permit, where relevant.

JBA Consulting's review is structured to focus on the areas of deficiency only and does not comment on the results of any baseline assessment and/or modelling conducted as part of the additional information provided by RPS. It is not in our scope of work to comment upon the accuracy of the data or data sources/websites/literature.

1.4 Background to the Proposed Scheme

1.4.1 2010 Flood Studies Report

A report prepared in 2010 by Ryan Hanley Consulting Engineers identified a number of alleviation measures for the Clare River Flood Relief Scheme. These identified measures are shown in Table 1-1 below.

Table 1-1 Measures Identified in 2010 for Flood Relief in the Clare River

Area Name	Recommended Measures
Montiagh South	Raising of 1km of road, upsizing of an existing road culvert and cleaning/regarding of drains
Montiagh North	Montiagh North Raising of 1.3 km of road
Claregalway Village	Installation of an additional flood eye at Claregalway Bridge Regrade Clare River channel upstream of and under the Claregalway bridge, and regrade flood eye Address the gap in wall at An Mhainistir housing estate Provide local embankment at old Nine Arches bridge
Kiniska	Increase capacity of two culverts on OPW C3/5 stream Clean OPW stream C3/5
Lakeview	Provide surface water outlet through fields and along N17 to downstream of Claregalway Bridge
Caherlea/Lisheenavalla	Install 2 No. flood eyes at Crusheeny Bridge Channel widening from 0.9km upstream of Crusheeny Bridge to Claregalway Cleaning and regrading of Islandmore OPW C3/7 and F.799/1 arterial drains Raise local road in Caherlea/Lisheenavalla
Carmore/Cashla	Drainage of floodwater from the affected area via a new drainage pipeline/open drain to a local surface water stream at Islandmore

1.5 Additional Flood Alleviation Measures identified by RPS, 2011

The alleviation measures identified in 2010 and shown in Table 2-1 were later updated by RPS in 2011 in respect of the Constraints Report (2011) prepared by RPS, a revised model and the public consultations undertaken in 2011, as follows:

- The installation of the flood eye at Claregalway Bridge was undertaken as advance works by the OPW and completed in June 2011
- The relocation of the surface water outlet from the Lakeview estate and Claregalway Corporate Park to discharge upstream of the Claregalway Bridge rather than downstream which as originally proposed
- A new bridge to be provided at Crusheeny in lieu of flood eyes on the existing bridge
- A cost benefit analysis of the scheme identified the savings associated with the works in providing a two stage channel from Crusheeny Bridge to approximately 1.3km upstream of the bridge along with the construction of an embankment 750m upstream of the Islandmore Drain.

In addition a footbridge at Claregalway was proposed as part of the works.

1.5.1 The Preferred Scheme

A summary of the preferred scheme is shown in Table 1-2 below.

Table 1-2 Summary of the Preferred Scheme

Area		Proposed Measure
1	Lough Corrib to Curraghmore Bridge	No channel alteration measures proposed. See Item 10 for Channel Maintenance requirements.
2	Montiagh South	**2a** Raise approx. 1km of road **2b** Upsize existing road culvert **2c** Clean/Regrade Drains
3	Montiagh North	**3a** Raise approx. 0. 430 km of road **3b** Raise approx. 0. 830 km of road
4	Claregalway Village	**4a** Install flood eye at Claregalway Bridge (complete) **4b** Regrade Clare River channel upstream of and under the Claregalway bridge, and regrade flood eye **4c** Address gap in wall at An Mhainistir housing estate **4d** Provide local embankment at Nine Arches bridge and infill old Clare River channel.
5	Kiniska	**5a** Increase capacity of culverts on OPW C3/5 stream **5b** Clean OPW stream C3/5
6	Lakeview	**6a** Provide surface water outlet through fields (open channel and piped culvert) to Clare River at Claregalway Bridge
7	Gortatleva	No additional measures proposed (Measures for Area 4 apply)
8	Caherlea/Lisheenavalla	**8a** Replace Crusheeny Bridge (complete) **8b** Channel widening from 1.3km upstream of Crusheeny Bridge to immediately downstream of Crusheeny Bridge to form a two stage channel **8c** Cleaning and regrading of Islandmore OPW C3/7 and F.799/1 arterial drains 8d Raise local road in Caherlea/Lisheenavalla (Future Measure) **8e** Construction of an embankment along the southern bank of the Clare River from 1.3km upstream of Crusheeny Bridge to the Islandmore Drain and the installation of a non-return valve on the discharge from the Islandmore Drain
9	Carnmore/Cashla	Drainage of floodwater from the affected area via a new drainage pipeline/open drain to a local surface water stream at Islandmore
10	Channel Maintenance	Selective Channel Maintenance along the Clare River from Lough Corrib to Cregmore Bridge including localised rock removal downstream of Curraghmore Bridge

2 Review of RPS Response-Environmental Impact Statement

2.1 Introduction

The additional information provided in the response to JBA queries, in general supports the finding and conclusions of the EIS.

However our review did identify some information that was still missing to allow for a complete assessment of the findings of the EIS. For example the lack of supporting data for noise, information on groundwater and groundwater usage in the area should be fully addressed before the work commences. This additional work will facilitate additional mitigation measures, if necessary to be put in place.

2.2 Recommendations for EIS

The findings of these additional assessments has not impacted on the overall findings of the EIS. These findings have not identified any additional significant environmental impacts and as such has not made any changes to the scheme, the layout of the scheme or the footprint for the scheme. The following is recommended:

- It is recommended that when the Department is preparing the Environmental Impact Statement for the scheme that this additional information is used to support their findings.
- It is recommended that all of the conditions on the permission for the scheme are agreed in advance of the works commencing.
- The Environmental Manager for the works should be tasked with ensuring full environmental protection during all stages of the contract and that the public are consulted at all stages of the project.
- It is recommended that agreement should be sought will all competent authorities before commencement of the works, as should an issue arise it may impact on the programme of works.

2.3 Recommendations regarding conditions

1. The OPW shall make available to project staff and contractors, a single document containing all proposed mitigation measures outlined in the various documents, submitted as part of the planning application, including the; EIS, NIS, CEMP, Responses to consultations, Further Information and all responses to the independent assessment technical review of the EIS.

   Reason: To protect humans and the environment, including Natura 2000 sites.

3 Hydromorphology Appraisal

3.1 Introduction

The following review identifies the areas where the RPS response is inadequate in terms of information provided, the impact assessment and conclusions.

3.2 Further Information and Inadequacies of Assessment (relating to Section 4 of the RPS Response)

3.2.1.1 JBA Comment - Whilst the technique is satisfactory for mapping river channel form it has limited ability to look at and understand river channel and catchment wide processes.

The RPS response explains that RHAT is not applicable / useful to define catchment wide processes. It is not clear whether the river forms and processes within the reach in question have been set within the wider context of catchment processes to ensure they are aligned. Modification at a local scale can have implications at a wider scale and it needs to be demonstrated that this has been assessed / considered.

3.2.1.2 JBA Comment - Further investigations should be conducted and reported with regards to the impact of dredging and weir removal.

RPS have confirmed that no dredging / significant sediment removal is to be undertaken from the main channel.

It should be acknowledged that the presence of the weir provides an obstacle to fish passage and that the conditions created within the weir plunge pool are artificial. Removal would improve fish passage upstream. It is not clear whether investigation has been undertaken in terms of potential river response in terms of hydromorphology (e.g. increase in river bed or bank erosion potential as a result of higher energy flow conditions) following removal of the weir in the short, medium and long term. Reference only appears to be made to flow-type diversity and habitat etc. This could be done with a simple analysis of the model hydraulics (e.g. velocity) and linking these to potential for mobility of the characteristic bed sediments.

3.2.1.3 JBA Comment - Measure 4a – 1. Monitoring should be undertaken to assess the impact of silt accumulation and the impact upon spawning areas as a result of any reductions in velocity. 2. Some assessments have been undertaken in terms of the scheme impact upon model hydraulics. Links have been made to increased deposition in some areas (in particular silts), however further details could be provided, such as specific areas where deposition may occur and extent, along with the type of morphology expected.

This should be attached as a condition for the works.

A combination of the field survey, desk based analysis and HEC-RAS modelling (use of cross-section specific velocity information and linking this to sediment size transport potential, this would confirm risk of changes to the sediment regime and confirm the stability of proposed fishery enhancement measures) could provide a more localised understanding of the impact on the sediment regime (erosion, sediment transport and deposition). If there is limited impact then this should be documented with a cross sectional velocity comparison.

It should be demonstrated that the location of the fisheries enhancement measures are in locations where there could be impacts on the sediment regime if these are to be used to offset any negative changes to erosion and deposition patterns.

3.2.1.4 JBA Comment - Measure 4b - There is a strong risk that fine sediment will accumulate over any coarse material inserted in to the river. No fine sediment management measures are suggested.

Alongside the recommended condition for monitoring of fine sediment accumulation, mitigation measures for fine sediment accumulation should be detailed. With regards to the proposed fishery enhancement works using deflectors, the risk of bank erosion does not appear to have been quantified for those measures that are directing flow towards one bank.

3.2.1.5 JBA Comment - Measure 4b - Limited information is given regarding the impact of dredging and regarding this section of channel and no information is given about the proposed weir removal. This is critical as it could create higher energy conditions upstream.

See comments 3.1.2.2 and 3.1.2.3 point 2 above.

3.2.1.6 JBA Comment - Measure 4d - Likely to be fine sediment release into channel.

The cofferdam arrangement for Measure 4b should be designed to accommodate risk of increased fine sediment mobilisation from upstream maintenance works occurring simultaneously. Alternatively, it should be ensured that these works are scheduled to occur at a different date. This should be included as a condition to the proposed works.

3.2.1.7 JBA Comment - Measure 5a - Potential to have an impact on sediment dynamics as there will be increased sediment transport.

Based on the RPS response, our suggestion is to provide a table showing cross-section changes in velocity to quantify that the changes are insignificant in respect to changes in the flow and sediment regime. This should be considered in the short, medium and long term.

3.2.1.8 JBA Comment - Measure 6a – 1. Likely to be fine sediment release into channel, this should be reduced where possible through appropriate management measures. 2. Potential operational risk of fine sediment input through the surface water pipe.

Proposals for fine sediment mitigation measures should be included as conditions for the proposed works, including SuDs arrangements.

3.2.1.9 JBA Comment - Measure 8e - Embankment will be adjacent to the river and could act to reduce deposition thorough elevated in channel energy levels during floods and formation of gravel features and a good condition gravel bed. Further hydraulic model hydraulics interpretation is recommended.

If the embankment is influencing hydraulics during frequent moderate / high flow events or geomorphologically effective flows (i.e. around the 1 in 2yr event and above) then this influence needs to be considered over the short, medium and long term on channel forms and processes.

3.3 Recommendations for additional conditions

In areas where concern has been highlighted about the levels of fine sediment deposition a programme of monitoring should be carried out before and after any in channel works.

1. In areas where concern has been highlighted about the levels of fine sediment deposition, a programme of monitoring should be carried out before and after any in channel works. Any recommendations as a result of the monitoring will be implemented

   Reason: To protect water quality and also aquatic habitats and species.
2. The applicant will ensure that the EREP measures to be installed are morphologically stable and will continue to deliver their intended habitat improvement purpose in the medium and long term. This may be achieved through a hydraulic analysis using the existing model outputs.

   Reason: To demonstrate that the EREP measures achieve their intended habitat improvement aims.
3. The cofferdam arrangement for Measure 4b will be designed to accommodate risk of increased fine sediment mobilisation from upstream maintenance works occurring simultaneously. Alternatively, it will be ensured that these works are scheduled to occur at a different date.

   Reason: To protect water quality and also to aquatic habitats and species of the river.

3.4 Reasons for not permitting the scheme

No specific reasons for not permitting the scheme have been identified.

4 Soils, Geology and Hydrogeology

JBAs previous assessment of the RPS EIS chapter in relation to soils, geology and hydrogeology highlighted a number of areas where additional information, or assessment was required. Specifically, these included:

- Baseline Conditions (including details on GWDTEs surrounding the proposed development, further information on local shallow geological conditions, locations of nearby springs and borehole supplies and predicted zones of influence in relation to the proposals);
- Revision of the impact assessment based upon an updated review of the baseline conditions using applicable guidelines including completion of a hydrogeological risk assessment to establish potential impacts; and
- Identification of mitigation measures to deal with potential impacts.

4.1 Further Information

JBA's review has found that the following information is required to allow the competent authority to fully assess the impacts of the proposed scheme on the environment and provide conditions.

4.1.1 Baseline Conditions

A conceptual model of the key GWDTE (*Molinia* meadows at Islandmore along the southern bank of the River Claire) is presented. The model is presented in the form of cross sections and accompanying text and has been developed through a review of desk based information.

Additional information on soil and geological conditions has been obtained and presented through desk based review of available mapping data including soils mapping, bedrock geology, aquifer mapping and groundwater vulnerability mapping, together with a review of available ground investigation data. This has been used to establish that the underlying geology predominantly comprises bedrock comprising Visean Limestone overlain by Quaternary superficial deposits of Till, or Cut Peat. The bedrock is heavily karstified.

While this is an improvement on the original information presented within the EIS it would also have been beneficial to carry out field based reconnaissance in order to verify the conceptual model (e.g. verification that no continuous superficial aquifers are present near to, or adjacent to the development as suggested by RPS).

Information on the presence of nearby groundwater abstractions and spring supplies is limited, with no evidence of a systematic assessment of presence of such features. It is stated that a borehole supply is located at the Claregalway Hotel, some 250m from the river. It is the only supply in the area but no further details are provided on the nature of the borehole supply (e.g. depth, construction details, pump depth etc.). It is further stated that for in-channel works completed in 2011 “There was no reported impact on any groundwater supply users over the extent of these works”. While the zone of predicted impact (in groundwater terms) is relatively low (this is discussed further below) there is no information provided on how it was established as there are no abstractions surrounding the site. Ordinarily, a water features survey, or similar would be undertaken in order to verify and confirm that there are no such features in the surrounding area. This has not been undertaken in this case (or not evidence that it has been undertaken is demonstrated).

4.1.2 Impact Assessment

In order to assess the potential zones of influence over which there may be an impact a numerical model has been developed to predict the likely extent of any groundwater drawdown caused by changes in river stage elevations due to the planned works.

This is considered to be a reasonable approach and considers the potential changes in groundwater level away from the bank of the river based upon predicted future changes in river stage height under a range of flow conditions (Q5 to Q95). The model also makes a number of assumptions relating to the hydrogeological properties of the surrounding strata, which are also considered reasonable.

The model predicts a relatively narrow zone of impact in terms of a reduction of groundwater levels away from the river bank, with little impact in terms of a reduction in groundwater levels beyond a distance of 10 metres from the edge of the channel. A discussion of the potential mechanism of groundwater discharge into the river channel is also presented, which takes into account the conceptualisation developed within the baseline assessment and which is also considered reasonable.

The above methodology is considered appropriate and represents a significant improvement from the original assessment. However, it is noted that while criteria for rating the significance of impacts for EIAs are included in a series of tables 5.1 to 5.4 there is no systematic use of the assessment methodology to reach the overall conclusions that impacts upon the groundwater environment are negligible. The EIS should be updated to reflect this outcome.

The proposed works are stated to involve the excavation of approximately 89,000m3 of overburden and rock and approximately 37,000m3 of existing spoil, with a further 3,500m3 of material removed for channel deepening works (which it is assumed to comprise material from the base of the channel). The majority of this material is anticipated to comprise natural material, or re-worked natural material and a spoil management plan is presented within the Preliminary Construction Phase Environmental Management Plan (PCPEMP). The plan makes provision for avoidance of deposition of excavated materials away from any sensitive karst features across the surrounding area such as springs, depressions, swallow holes, turloughs and caves. However, the extent to which the location of features are known in detail is not presented. Therefore, prior to commencement of construction activities further field based investigation/surveys should be undertaken in order to identify these features in detail across the scheme area and therefore define "exclusion zones" where soil cannot be deposited.

It is also noted that testing of material removed from channel deepening works is also proposed in order to evaluate its suitability prior to deposition. This should include chemical testing for potential contamination and trigger levels should be set to determine acceptability. While no specific reference is made within the PCPEMP a watching brief should also be maintained during the excavation and deposition of soils and spoil by an environmental specialist in order to deal with any potential contamination that might be encountered during earthworks. Any material which is suspected to be contaminated should be subject to quarantine within a dedicated storage compound and confirmatory analysis prior to determining its fate.

4.1.3 Mitigation Measures

No specific mitigation measures are presented by RPS. This is considered to be an omission. While overall impacts upon surrounding groundwater users and GWDTEs are assessed by RPS to be negligible it should be noted that this is based largely on the basis of the outcome of desk based modelling which cannot currently be validated against field observation (which is accepted). In addition, no field based surveys appear to have been undertaken to confirm the presence/absence of the groundwater supplies (e.g. boreholes springs etc.) beyond the Claregalway Hotel.

It is therefore recommended that further surveys (i.e. a water features survey) are completed in advance of construction to verify that there are no additional groundwater abstractions, spring supplies or other sensitive groundwater features are present in the area beyond that identified at the Claregalway Hotel (the status of the supply at the hotel should also be established prior to commencement of construction).

If such supplies are identified then pre-construction baseline monitoring, or an assessment of the integrity of the supply is recorded in order to compare any pre and post works changes. It is also recommended that monitoring of the GWDTEs (water levels and flows) is undertaken during construction in order to monitor and record any potential changes in the condition of these features, during or following construction activities.

4.1.4 Inadequacies of assessment

The methodology used to carry out the hydrogeological impact assessment as presented in response provided by RPS is considered to be adequate (subject to the comments below). However, the original EIS should be updated in order to demonstrate compliance with the Environmental Impact Assessment Regulations.

Specifically, there should be clear evidence presented in the EIS that the following steps have been carried out in a systematic way:-

Step 1: Quantify the Importance of an environmental feature – while a limited number of groundwater related features are identified by RPS and are described there is limited discussion or systematic commentary on this aspect within Chapter 5 of the RPS response, particularly in relation to their relative importance, which is subsequently used to determine significance of impact. There is a substantial volume of information available, which should be used to establish relative importance and this should be presented in an update to the original EIS in order to demonstrate compliance with the Environmental Impact Assessment Regulations.

The regional karst aquifer should be considered as a receptor (environmental receptor) in its own right, particularly in relation to proposals for deposition of excavated materials. Furthermore, it is not sufficient to state that there is only a single groundwater abstraction in the surrounding area, without supporting evidence to demonstrate same.

Step 2: Estimate the Scale of the impact on the feature from the development proposals – the scale of the impact on key receptors has been assessed through the use of a numerical model which is considered a reasonable approach. However, a significant limitation in the assessment as presented is confirmation that there are no other potential groundwater users surrounding the development that could potentially be affected. It should also be noted that the scale of the impact cannot currently be validated and therefore monitoring should implemented prior to and during construction to verify the findings of the impact assessment.

Step 3: Determine the Significance of the impact – impact significance has been determined for key receptors including identified GWDTEs. However, this should be presented in a clear and consistent manner through update of the original EIS and should include: identified GWDTEs, the limestone aquifer beneath the site; and, any nearby springs and borehole supplies which may be utilised as sources of groundwater. A clear link between the receptor assessed and Tables 5.1 to 5.4 contained within the RPS response should also be presented.

4.2 Recommendations for additional conditions

The following condition is recommended:

1. The construction of the proposed development shall be appropriately supervised by suitably qualified and experienced environmental personnel to ensure that environmental monitoring and mitigation measures are implemented in full. Monitoring should include assessment of water levels in surrounding GWDTEs and other groundwater related features.

   Reason: In the interest of clarity and environmental protection.

4.3 Reasons for not permitting the scheme

No specific reasons for not permitting the scheme have been identified.

5 Terrestrial Ecology

5.1 Introduction

The following review identifies the areas where the RPS response is inadequate in terms of information provided, the impact assessment and recommendations regarding additional conditions are also provided.

5.2 Further Information

None required

5.3 Inadequacies of Assessment

5.3.1.1 Ecological Receptor 2: Clare River – Part of Lough Corrib SAC/pNHA - The old river channel

The RPS response discusses the provision of compensatory habitat but does not indicate if this has been agreed or discussed with National Parks and Wildlife Services (NPWS), in particular given that the old channel forms part of the SAC and may form a supporting function of the river ecosystem and therefore of the SAC. This has not been considered in the assessment or indeed has the impact of infilling the channel been considered on the geomorphology of the main channel and indirectly on ecology.

Consultation with NPWS is recommended.

5.3.1.2 Ecological Receptor 7: Qualifying Species of the SAC and also Annex I species of the EU Birds Directive

The effects of landspreading are not recognised in terms of the physical changes to topography, water sources (in particular for wetlands) and also the associated species including fauna that will be lost due to alterations in the functioning of wetland habitats as wetlands. The mitigation measures do not address changes to the physical attributes of a habitat such as a wetland and takes a very simplistic view to providing reseeding to recreate a wetland which is not based upon sound ecological principles.

A request for the detail of how the recreation of wetland is proposed in areas of landspreading is recommended.

5.4 Recommendations regarding additional conditions

1. The scheme shall be constructed and managed in accordance with an updated Construction and Environment Management Plan which shall be prepared by the OPW and agreed in writing prior to the commencement of development. This shall include all the proposed measures outlined in the Preliminary CEMP but with a greater level of detail to ensure that the environment will be protected during construction in consultation with a suitably qualified ecologist. **Reason**: In order to protect humans and the environment including Natura 2000 sites during construction.
2. There is a reliance on the contractor and the construction method statements, in order to protect the SAC, the river, its habitats and species during construction. The management of all these elements will be important in ensuring, no adverse impacts on the SAC and important habitats and species. Therefore, the implementation of the measures of the CEMP during construction will be supervised by a suitably qualified ecologist. The ecologist will report to the OPW on a weekly basis.

   Reason: In order to protect the Natura 2000 Site and important habitats and species.
3. Breeding sand martin and kingfisher are noted to occur within the proposed scheme. Their nests will be identified and marked for avoidance by a suitably qualified ornithologist prior to site clearance. If the nests cannot be avoided, then mitigation shall be provided by the creation of banks for nesting or provision of alternative suitable nesting areas to be provided in consultation with a suitably qualified ornithologist. The potential differences in bank composition requirements (e.g. soil particle size, vegetation cover etc.) between sand martin and kingfisher should also be considered along with other important biotic and abiotic factors.

A detailed plan for such habitat creation will be prepared on behalf of the OPW by a suitably qualified ecologist in consultation with the NPWS prior to development of the scheme.

Reason: In order to protect important bird species including Annex I species.

4. There will be partial hedgerow loss associated with other flood relief measures, mostly in relation to land spreading. Where flood relief works result in hedgerow removal or fragmentation, then these will be reinstated and enhanced. In addition, proximal relict and derelict hedgerows will be under-planted to re-establish hedgerow structure and functionality. A selection of hedgerow species that are native and local to County Clare will be selected and will reflect the surrounding hedgerow habitats within the zone of influence. Where possible, salvaged plants, cuttings or seedlings from the existing hedgerows will be used, in order to minimise the introduction of plant genotypes not local to the area.
5. **Reason:** To maintain hedgerow diversity and wildlife corridors in the vicinity.
6. The lands situated between the Clare River and the EU Annex I habitat '*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410)' in Grange West are proposed for landspreading. There is a field drain separating this landspreading area and the *Molinia* meadow. Measures **will** be put in place to avoid sediment or pollution entering the field drain. Prior to any associated activities including ground investigations/site clearance, this area **will** be fenced off prior to commencement of the scheme with signs indicating no access and access shall be prohibited by machinery and/or persons.
7. **Reason:** To protect the EU Annex Habitat - 6410 *Molinia* meadows on calcareous, peaty or clavey-silt-laden soils (*Molinion caeruleae*).

6 NIS

6.1 Further Information

None required

6.2 Inadequacies of Assessment

6.2.1.1 Ecological Receptor 2: Clare River – Part of Lough Corrib SAC/pNHA - The old river channel

The RPS response discusses the provision of compensatory habitat but does not indicate if this has been agreed or discussed with NPWS, in particular given that the old channel forms part of the SAC and may form a supporting function of the river ecosystem and therefore of the SAC.

Consultation with NPWS is recommended.

6.3 Recommendations regarding additional conditions

The following conditions overlap with those for Terrestrial Ecology

1. The scheme shall be constructed and managed in accordance with an updated Construction and Environment Management Plan which shall be prepared by the OPW and agreed in writing prior to the commencement of development. This shall include all the proposed measures outlined in the Preliminary CEMP but with a greater level of detail to ensure that the environment will be protected during construction in consultation with a suitably qualified ecologist.

   Reason: In order to protect humans and the environment including Natura 2000 sites during construction.

2. There is a reliance on the contractor and the construction method statements, in order to protect the SAC, the river, its habitats and species during construction. The management of all these elements will be important in ensuring, no adverse impacts on the SAC and important habitats and species. Therefore, the implementation of the measures of the CEMP during construction will be supervised by a suitably qualified ecologist. The ecologist will report to the OPW on a weekly basis and also to the Competent Authority should the need arise.

   Reason: In order to protect the Natura 2000 Site and important habitats and species.

3. Breeding sand martin and kingfisher are noted to occur within the proposed scheme. Their nests will be identified and marked for avoidance by a suitably qualified ornithologist prior to site clearance. If the nests cannot be avoided, then mitigation shall be provided by the creation of banks for nesting or provision of alternative suitable nesting areas to be provided in consultation with a suitably qualified ornithologist. The potential differences in bank composition requirements (e.g. soil particle size, vegetation cover etc.) between sand martin and kingfisher should also be considered along with other important biotic and abiotic factors. A detailed plan for such habitat creation will be prepared on behalf of the OPW by a suitably qualified ecologist in consultation with the NPWS prior to development of the scheme.

   Reason: In order to protect important bird species including Annex I species.

4. The lands situated between the Clare River and the EU Annex I habitat '*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410)' in Grange West are proposed for landspreading. There is a field drain separating this landspreading area and the *Molinia* meadow. Measures will be put in place to avoid sediment or pollution entering the field drain. Prior to any associated activities including ground investigations/site clearance, this area will be fenced off prior to commencement of the scheme with signs indicating no access and access shall be prohibited by machinery and/or persons.

   Reason: To protect the EU Annex Habitat - 6410 *Molinia* meadows on calcareous, peaty or clavey-silt-laden soils (*Molinion caeruleae*).

5. The EREP (Fisheries Plan) will be updated if necessary prior to commencement of works and will be implemented and monitored by the IFI.

   Reason: To protect EU Annex II species Atlantic Salmon.

6.4 Reasons for not permitting the scheme

The EREP is considered by RPS as part of the design of the project and DPER may wish to obtain clarification from the OPW that this is the case before permitting the scheme.

There is a lack of clarity over whether the proposed Flood Relief Scheme can legitimately consider works proposed under a different scheme (the EREP) to be considered mitigation against impacts arising as a result of the Flood Relief Scheme. The EREP is presented as a programme of works in its own right but the measures proposed in the Fishery Enhancement Plan are part of the EREP. The OPW, as the competent authority, should confirm that:

- the fishery enhancement measures designed under the EREP framework are an integral part of this scheme;
- there is no next phase of the EREP project in relation to this scheme and that all potential impacts of the flood scheme in combination with the fishery enhancement measures have been taken into account and addressed; and
- this is in line with the Habitats Directive.

7 Aquatic Ecology and Water Quality

7.1 Further Information & Inadequacies of Assessment

JBA's review of the EIS found the issues identified in Table 7-1 below with regard to robustness of the assessment of the impacts on fish receptors:

Table 7-1 - Summary of highlighted issues and associated response

Issue	RPS response	Outstanding issues
Not all recognised techniques for surveying for White-clawed Crayfish Austropotamobius pallipes were applied in determination of the baseline (specifically night time searching was not undertaken)	Additional justification for survey effort provided	None
Manual searching survey techniques White-clawed Crayfish were potentially compromised by moderately high river levels		None
No fish population survey data more recent than 2012 was available for the study area during development of the baseline	Confirmation that consultation with IFI (post-EIS submission) had concluded further baseline survey was unnecessary	None
The baseline for Freshwater Pearl Mussel Margaritifera margaritifera was seemingly based on limited data	Additional data, and justification for baseline survey effort, provided	None
There was no information in the EIS on the design of EREP measures mitigating against the impacts of the FRS on fish	'Fishery Enhancement Plan' provided	Lack of clarity on whether the proposed EREP measures are morphologically stable and represent appropriate long-term mitigation for the impacts of the FRS. Lack of clarity on whether the effect of the EREP measures to be installed have been considered on other receptors. Appropriateness of presenting EREP as mitigation for FRS.
No detail on mitigation associated with installation of non-return valve on the Islandmore Drain	Confirmation that consultation with IFI (post-EIS submission) concluded that Islandmore Drain was of limited importance with regard to maintenance of the integrity of the cSAC	Whilst the bottom section of the Islandmore Drain might not represent quality Brook Lamprey Lampetra planeri spawning or nursery habitat, it may provide high flow refuge habitat and therefore provide useful, useable habitat for the fish population of the waterbody as a whole. Complete isolation will compromise this utility.
No details given on maintenance to be undertaken on lower stretch of the Gortadooey tributary	Confirmation that consultation with IFI (post-EIS submission) concluded that Gortadoey tributary was of limited importance with regard to maintenance of the integrity of the cSAC	None

The following items would require further information/clarification:

- The applicant should ensure that the EREP measures to be installed are morphologically stable and will continue to deliver their intended habitat improvement purpose in the medium and long term.
- The applicant should ensure that the impacts of the proposed Fishery Enhancement Plan have been considered on all relevant receptors (not just in-channel ecology and morphology) and in particular, that all impacts associated with river stage have been assessed using the post-EREP installation conditions.
- If the installation of a non-return valve and subsequent complete isolation of the Islandmore Drain from the main river is required, the applicant should demonstrate in consultation with OPW and IFI that such works would not compromise achievement of Water Framework Directive objectives. If such a determination concludes that WFD objectives would be compromised, the structure should not be installed.

7.2 Recommendations for additional conditions

1. The EREP (Fisheries Plan) will be updated if necessary prior to commencement of works and will be implemented and monitored by the IFI.

   Reason: To protect EU Annex II species Atlantic Salmon

7.3 Reasons for not permitting the scheme

Fundamentally, there is a lack of clarity over whether the proposed FRS can legitimately consider works proposed under a different scheme (the EREP) to be mitigation against impacts arising as a result of the FRS. The EREP is presented as a programme of works in its own right but the measures proposed in the Fishery Enhancement Plan are part of the EREP. The OPW, as the competent authority, should confirm that:

- the fishery enhancement measures designed under the EREP framework are an integral part of this scheme;
- there is no next phase of the EREP project in relation to this scheme; and
- this is in line with the Habitats Directive.

8 Air Quality & Climate

8.1 Further Information Required

No additional information is required.

8.2 Inadequacies of assessment

In the initial response to JBA's review, RPS suggested that the construction and operation of the Flood Relief Scheme will not significantly impact on the ambient air quality. However the Preliminary Construction and Environmental Management Plan (CEMP) does recognise that dust emissions are a potential source of air pollution during the construction of the scheme. RPS has suggested a number of mitigation measures to reduce/eliminate the impacts on air quality. The levels of dust generation and consequences of these emissions on humans or the environment have not been fully addressed in the EIS. The impacts of PM10's on humans is not discussed in the EIS. JBA's review has found that any statements in relation to air quality and the impact of construction activities on same is not supported by any data. The CEMP suggests that the chosen Contractor establishes a Dust Management Plan during the works.

8.3 Recommendations for conditions

Based on the suggested Dust Management Plan it is recommended that the following conditions are incorporated into the permission for the flood scheme:

'As a minimum the Dust Management Plan will include:

1. Dust Deposition monitoring at nearby sensitive locations. Dust deposition monitoring will follow the VDI 2119 Standard for the Measurement of Dust Deposition using the Bergerhoff Gauge. The allowable limit is 350 mg/m2/d.

Reason: To avoid nuisance to nearby residents

2. Particulate monitoring (PM10) will be carried out at sensitive locations during the works. The allowable levels should be consistent with the levels given in the Clean Air for Europe (CAFÉ) Directive.

Reason: To avoid nuisance to nearby residents

3. The frequency and location of the dust and PM10 monitoring will be agreed with the OPW prior to the commencement of the works. Reporting arrangements to be agreed with the OPW.

Reason: To agree recording and reporting frequencies with the OPW.

4. Wheel wash facilities to be provided on all site roads leading on to a public road

Reason: To avoid nuisance to nearby residents

5. Wind breakers and barriers should be available during extended periods of dry and windy weather.

Reason: To avoid nuisance to nearby residents

8.4 Reasons for not permitting the scheme

No specific reasons for not permitting the scheme have been identified.

9 Noise and Vibration

9.1 Further Information Required

An ambient baseline noise survey in the area.

9.2 Inadequacies of assessment

JBA's review identified the lack of a baseline ambient noise survey in the area. While a number of mitigation measures have been proposed during construction, it will be difficult in the absence of baseline noise monitoring data to determine the effectiveness of the proposed mitigation measures. The lack of a baseline ambient noise monitoring data is an inadequacy in the EIS and should be addressed.

9.3 Recommendations for conditions

RPS has provided a table (Table 13.1 of the EIS Maximum Permissible Noise Levels at the Façade of Dwellings During Construction (NRA, 2004)) in the EIS. It is recommended that these levels are conditioned in the permission as reproduced in the table below.

Days & Times	LAeq (1 hr) dBA	LpA(max) slow dBA
Monday – Friday 07.00 – 19.00 hrs	70	80
Monday – Friday 07.00 – 22.00 hrs	60	65
Saturday 08.00 – 16.30 hrs	65	75

The mitigation measures cited in Section 13.5 of the EIS should be conditioned in the permission.

It is also recommended that a condition on the permission requires the Contractor to establish a Communication Plan with the public. This plan can be used as a source and transfer of information to the public at different stages of the project. The purpose of the Communication Plan would be to alert the residents, landowners and farmers to the upcoming activities with the potential for high noise. This would allow a farmer to move livestock etc. A Communications File should be established and available for review by the OPW any time.

1. A Communication Plan is prepared and agreed with the OPW before commencement of the works.

   Reason: To allow communication with the public regarding upcoming construction activities.

9.3.1 Reasons for not permitting the scheme

There are no reasons for not permitting the scheme.

10 Landscape and Visual

10.1 Further Information Required

No further information is required.

10.2 Inadequacies in the Assessment

No inadequacies have been identified in the assessment. A review of the responses prepared by RPS found that the Claregalway footbridge is not part of the OPW's flood relief scheme for Claregalway, and will be subject to a separate application.

However no landscape management plan has been prepared to demonstrate the species and planting regimes that will be carried out in areas where trees/vegetation and hedgerows may be removed during the works.

10.3 Recommendations for Conditions

The following conditions are recommended for landscape:

1. A Landscape Management Plan is prepared and agreed with the OPW before commencement of the works.

Reason: To protect the landscape in the area**.**

2. Where possible the removal of hedgerows is to be avoided.

Reason: To protect the wildlife corridors for species using the hedgerows for nesting and foraging.

3. In the event that trees/hedgerows are removed they should be replaced with similar species

Reason: To protect the landscape in the area.

4. A methodology should be prepared to control invasive species

Reasons: To control the dispersion of invasive species in the area

10.4 Reasons for not permitting the Scheme

There are no reasons for not permitting the scheme.

11 Human Beings

11.1 Further Information Required

No further information is required.

11.2 Inadequacies in the Assessment

With the exception of the lack of an ambient noise survey no inadequacies have been identified in the assessment. The Construction Environmental Management Plan has a number of procedures which will adequately address the controls of nuisances (traffic, dust and noise) on humans. An EMS is proposed and one of the procedures (ENV 5 Complaints Procedure) will afford the public opportunities to raise complaints during the work. While the produce has yet to be written it is recommended that the site Environmental Manager is responsible for investigating and closing out the complaints.

11.3 Recommended Conditions

The following conditions are recommended:

1. The Site Environmental Control Procedures are prepared by the Contractor and agreed with in advance of the commencement of the works with the OPW.

Reason: To avoid nuisance during the works

2. The site Environmental Manager will manage the Environmental Control Procedures and will maintain all records for examination by the OPW.

Reason: To ensure that all mitigation measures are carried out

3. Procedures will be put in place to ensure that the most up to date revision of the procedure is on file

Reason: To ensure that the Control Procedures are current.

4. Reporting frequencies to be agreed with the OPW before the start of the works

Reason: To ensure adequate frequent reporting to the OPW.

11.4 Reasons for not permitting the Scheme

There are no reasons for not permitting the scheme.

12 Archaeology & Cultural Heritage

12.1 Further Information Required

No further information is required.

12.2 Inadequacies of the Assessment

No inadequacies have been identified.

12.3 Recommended Conditions

The following conditions are recommended:

1. All of the mitigation measures proposed in Section 14.5 (Mitigation measures) of the EIS are put in place with the agreement of the National Monument Section of the Heritage and Planning Division, Department of Arts, Heritage and the Gaeltacht.

Reason: To protect the archaeology and cultural heritage of the area.

13 Summary

13.1 Introduction

This chapter summarises the findings of the JBA review. However, greater detail on these is given in the individual reviews of each chapter of the EIS in the preceding sections of the report.

13.2 EIS Overview - Recommendations regarding further information

The following recommendations are provided in relation to the EIS:

- The findings of the additional assessments outlined above have not impacted on the overall findings of the EIS. These findings have not identified any additional significant environmental impacts and as such have not resulted in any changes to the scheme, the layout of the scheme or the footprint for the scheme.
- It is recommended that when the Department is preparing the Environmental Impact Statement for the scheme, that this additional information, is used to support their findings.
- It is recommended that all of the conditions on the permission for the scheme are agreed in advance of the works commencing.
- It is recommended that Environmental Manager for the works will be tasked with ensuring full environmental protection during all stages of the contract and that the public are consulted at all stages of the project.
- It is recommended that agreement should be sought with the relevant statutory consultees before commencement of the works, in the light of additional assessments that are detailed in the RPS response document, as should an issue arise, it may impact on the programme of works.

13.3 Hydrogeological Recommendations

13.3.1 Further information

The following items will require further information/clarification

- The Preliminary CEMP makes provision for avoidance of deposition of excavated materials away from any sensitive karst features across the surrounding area such as springs, depressions, swallow holes, turloughs and caves. However, the extent to which the location of features are known in detail is not presented.

  Therefore, prior to commencement of construction activities further field based investigation/surveys should be undertaken in order to identify these features in detail across the development area and therefore define “exclusion zones” where soil cannot be deposited.
- It is also noted that testing of material removed from channel deepening works is also proposed in order to evaluate its suitability prior to deposition. This should include chemical testing for potential contamination and trigger levels should be set to determine acceptability. While no specific reference is made within the CEMP a watching brief should also be maintained during the excavation and deposition of soils and spoil by an environmental specialist in order to deal with any potential contamination that might be encountered during earthworks. Any material which is suspected to be contaminated should be subject to quarantine within a dedicated storage compound and confirmatory analysis prior to determining its fate.

  It is recommended that further surveys (i.e. a water features survey) are completed in advance of construction to verify that there are no additional groundwater abstractions, spring supplies or other sensitive groundwater features are present in the area beyond that identified at the Claregalway Hotel (the status of the supply at the hotel should also be established prior to commencement of construction). If such supplies are identified then pre-construction baseline monitoring, or an assessment of the integrity of the supply is recorded in order to compare any pre and post works changes.

- It is also recommended that monitoring of the GWDTEs (water levels and flows) is undertaken during construction in order to monitor and record any potential changes in the condition of these features, during or following construction activities.

13.4 Ecological Recommendations

13.4.1 Further information

The following items would require further information/clarification:

- The applicant should ensure that the EREP measures to be installed are morphologically stable and will continue to deliver their intended habitat improvement purpose in the medium and long term.
- The applicant should ensure that the impacts of the proposed Fishery Enhancement Plan have been considered on all relevant receptors (not just in-channel ecology and morphology) and in particular, that all impacts associated with river stage have been assessed using the post-EREP installation conditions.
- If the installation of a non-return valve and subsequent complete isolation of the Islandmore Drain from the main river is required, the applicant should demonstrate in consultation with OPW and IFI that such works would not compromise achievement of Water Framework Directive objectives. If such a determination concludes that WFD objectives would be compromised, the structure should not be installed.

13.4.2 Ecological Receptor 2: Clare River – Part of Lough Corrib SAC/pNHA - The old river channel

The RPS response discusses the provision of compensatory habitat but does not indicate if this has been agreed or discussed with NPWS, in particular given that the old channel forms part of the SAC and may form a supporting function of the river ecosystem and therefore of the SAC. This has not been considered in the assessment or indeed has the impact of infilling the channel been considered on the geomorphology of the main channel and indirectly on ecology.

Consultation with NPWS is recommended.

13.4.3 Ecological Receptor 7: Qualifying Species of the SAC and also Annex I species of the EU Birds Directive

The effects of landspreading are not recognised in terms of the physical changes to topography, water sources (in particular for wetlands) and also the associated species including fauna that will be lost due to alterations in the functioning of wetland habitats as wetlands. The mitigation measures do not address changes to the physical attributes of a habitat such as a wetland and takes a very simplistic view to providing reseeding to recreate a wetland which is not based upon sound ecological principles.

A request for the detail of how the recreation of wetland is proposed in areas of landspreading is recommended.

13.5 Recommendations regarding additional conditions

The following list of recommendations are intended to assist the Department of Public Expenditure (DPER) and their Minister with a recommendation as to whether he should make an order approving the scheme. These are additional conditions to those mitigation measures outlined in the various documents submitted to the DPER during the project application process:

1. The Office of Public Works (OPW) shall make available to project staff and contractors, a single document containing all proposed mitigation measures outlined in the various documents, submitted as part of the planning application, including the; Environmental Impact Statement (EIS), Natura Impact Statement (NIS), Construction and Environment Management Plan (CEMP), Responses to consultations, Further Information and all responses to the independent assessment technical review of the EIS.

   Reason: To protect humans and the environment, including Natura 2000 sites.

2. The scheme shall be constructed and managed in accordance with an updated Construction and Environment Management Plan which shall be prepared by the OPW and agreed in writing prior to the commencement of development. This shall include all the proposed measures outlined in the Preliminary CEMP but with a greater level of detail to ensure that the environment will be protected during construction in consultation with a suitably qualified ecologist.

   Reason: In order to protect humans and the environment including Natura 2000 sites during construction.

3. In areas where concern has been highlighted about the levels of fine sediment deposition, a programme of monitoring should be carried out before and after any in channel works. Any recommendations as a result of the monitoring will be implemented.

   Reason: To protect water quality and also aquatic habitats and species.

4. The OPW will ensure that the environmental river enhancement measures to be installed are morphologically stable and will continue to deliver their intended habitat improvement purpose in the medium and long term. This may be achieved through a hydraulic analysis using the existing model outputs.

   Reason: To demonstrate that the environmental river enhancement measures achieve their intended habitat improvement aims.

5. The cofferdam arrangement for Measure 4b will be designed to accommodate risk of increased fine sediment mobilisation from upstream maintenance works occurring simultaneously. Alternatively, it will be ensured that these works are scheduled to occur at a different date.

   Reason: To protect water quality and also to aquatic habitats and species of the river.

6. The OPW will ensure that all mitigation measures outlined in the environmental impact statement and the additional information submitted including the Environmental River Enhancement Programme (EREP)/Fisheries Plan shall be complied with in full.

   Reason: For clarity and to ensure that none of the mitigation measures are omitted.

7. There is a reliance on the contractor and the construction method statements, in order to protect the Special Area of Conservation (SAC), the river, its habitats and species during construction. The management of all these elements will be important in ensuring, no adverse impacts on the SAC and important habitats and species. Therefore, the implementation of the measures of the CEMP during construction will be supervised by a suitably qualified ecologist. The ecologist will report to the OPW on a weekly basis. The OPW shall take into consideration the ecologists recommendations and implement these, as appropriate.

   Reason: In order to protect the Natura 2000 Site and important habitats and species.

8. Breeding sand martin and kingfisher are noted to occur within the proposed scheme. Their nests will be identified and marked for avoidance by a suitably qualified ornithologist prior to site clearance. If the nests cannot be avoided, then mitigation shall be provided by the creation of banks for nesting or provision of alternative suitable nesting areas to be provided in consultation with a suitably qualified ornithologist. The potential differences in bank composition requirements (e.g. soil particle size, vegetation cover etc.) between sand martin and kingfisher should also be considered along with other important biotic and abiotic factors.

A detailed plan for such habitat creation will be prepared on behalf of the OPW by a suitably qualified ecologist in consultation with the NPWS prior to development of the scheme.

Reason: In order to protect important bird species including Annex I species.

9. There will be partial hedgerow loss associated with other flood relief measures, mostly in relation to land spreading. Where flood relief works result in hedgerow removal or fragmentation, then these **will** be reinstated and enhanced. In addition, proximal relict and derelict hedgerows **will** be under-planted to re-establish hedgerow structure and functionality. A selection of hedgerow species that are native and local will be selected and will reflect the surrounding hedgerow habitats within the zone of influence. Where possible, salvaged plants, cuttings or seedlings from the existing hedgerows will be used, in order to minimise the introduction of plant genotypes not local to the area.

   Reason: To maintain hedgerow diversity and wildlife corridors in the vicinity.

10. The lands situated between the Clare River and the EU Annex I habitat '*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410)' in Grange West are proposed for landspreading. There is a field drain separating this landspreading area and the *Molinia* meadow.

    Measures will be put in place to avoid sediment or pollution entering the field drain. Prior to any associated activities including ground investigations/site clearance, this area will be fenced off prior to commencement of the scheme with signs indicating no access and access shall be prohibited by machinery and/or persons.

    Reason: To protect the EU Annex Habitat - 6410 *Molinia* meadows on calcareous, peaty or clavey-silt-laden soils (*Molinion* caeruleae).

11. The environment river enhancement measures (Fisheries Enhancement Plan) will be updated if necessary prior to commencement of works and should be implemented by the OPW and monitored by the IFI.

    Reason: To protect EU Annex II species Atlantic Salmon.

12. Dust Deposition monitoring at nearby sensitive locations. Dust deposition monitoring will follow the VDI 2119 Standard for the Measurement of Dust Deposition using the Bergerhoff Gauge. The allowable limit is 350 mg/m2/d.

    Reason: To avoid nuisance to nearby residents.

13. Particulate monitoring (PM10) will be carried out at sensitive locations during the works. The allowable levels should be consistent with the levels given in the Clean Air for Europe (CAFÉ) Directive.

    Reason: To avoid nuisance to nearby residents.

14. The frequency and location of the dust and PM10 monitoring, including reporting arrangements will be agreed with the OPW prior to the commencement of the works.

    Reason: To agree recording and reporting frequencies with the OPW**.**

15. Wheel wash facilities to be provided on all site roads leading on to a public road

    Reason: To avoid nuisance to nearby residents**.**

16. Wind breakers and barriers should be available during extended periods of dry and windy weather.

    Reason: To avoid nuisance to nearby residents**.**

17. A Communication Plan will be prepared and agreed with the OPW before commencement of the works.

    Reason: To allow communication with the public regarding upcoming construction activities.

18. A Landscape Management Plan will be prepared and agreed with the OPW before commencement of the works.

    Reason: To protect the landscape in the area.

19. Where possible the removal of hedgerows is to be avoided.

    Reason: To protect the wildlife corridors for species using the hedgerows for nesting and foraging.

20. In the event that trees/hedgerows are removed they should be replaced with similar species

    Reason: To protect the landscape in the area.

21. There is a large number of potential and established non-native species on the island of Ireland and some of these are have damaging effects on native species and ecosystems. The most unwanted species in Ireland are listed on the following website - http://invasivespeciesireland.com/most-unwanted-species/.

    Although no invasive plant species were identified in the EIS, all staff including contractors will be made aware of the typical invasive species that may occur in riverine and adjacent habitats. A process for dealing with the discovery of invasive species during the project will be put in place by the OPW.

    Reason: To control the dispersion of invasive species in the area.

22. The Site Environmental Control Procedures are prepared by the Contractor and agreed with in advance of the commencement of the works with the OPW.

    Reason: To avoid nuisance during the works.

23. The Site Environmental Manager will manage the Environmental Control Procedures and will maintain all records for examination by the OPW.

    Reason: To ensure that all mitigation measures are carried out

24. Procedures will be put in place to ensure that the most up to date revision of the procedure is on file.

    Reason: To ensure that the Control Procedures are current.

25. Reporting frequencies to be agreed with the OPW before the start of the works.

    Reason: To ensure adequate frequent reporting to the OPW.

26. All of the mitigation measures proposed in Section 14.5 (Mitigation measures) of the EIS are put in place with the agreement of the National Monument Section of the Heritage and Planning Division, Department of Arts, Heritage and the Gaeltacht.

    Reason: To protect the archaeology and cultural heritage of the area.

13.6 Reasons for not permitting the scheme

The EREP is considered by RPS as part of the design of the project and DPER may wish to obtain clarification from the OPW that this is the case before permitting the scheme.

There is a lack of clarity over whether the proposed Flood Relief Scheme can legitimately consider works proposed under a different scheme (the EREP) to be considered mitigation against impacts arising as a result of the Flood Relief Scheme. The EREP is presented as a programme of works in its own right but the measures proposed in the Fishery Enhancement Plan are part of the EREP. The OPW, as the competent authority, should confirm that:

- the fishery enhancement measures designed under the EREP framework are an integral part of this scheme;
- there is no next phase of the EREP project in relation to this scheme and that all potential impacts of the flood scheme in combination with the fishery enhancement measures have been taken into account and addressed; and
- this is in line with the Habitats Directive.

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