

Record of Environmental Considerations (EA12)

Project engineer ← Sections to be completed by → Conservation officer

This form is to be used for:

- Flood Alleviation Works over £25k
- Drainage Improvement Works over £25k
- Asset Repair/Refurbishment Schemes over £100k
- All other works over £100k
- Smaller schemes where there is a need for more specialist advertising and consultants

Project Name: Belfast Tidal Flood Risk Study

Unit: CPU

Project Sponsor/Engineer: Alan Reddick

Checklist:

FORM	Included within consultant docs Y/N	Initial	Date
EC 12 – environmental considerations	Y	JW	17/09/15
PO 12 – options report	Y	JT	16/07/15
WF 12 – work characteristics	Y	JT	16/07/15
SA12 – site assessment	Y	JW	17/09/15
EI 12 – environmental impacts	Y	JW	17/09/15

Where an EIA is carried out for a scheme, the content of these forms should be contained within the EIA document. As such, there is no need to repeat the recording of this information, but simply to refer to the section within the EIA document. EC12 must be completed for ALL proposed schemes

Environmental Statement Recommendation	CEEQUAL proposal
YES/NO	NO

Project Sponsor -

Date –

Environmental Manager – Judith Bankhead

Date – 9 11 15

Step 1 **Pre scheme Environmental Considerations** **EC 12**
(to be filled in by Env Section and should form part of the pre feasibility study)

Project Name: Belfast Tidal Flood Risk Study

Watercourse Name: River Lagan		Comments
Current WFD Classification	Bad	<p>The study area lies within the North Eastern River Basin District and waterbodies within it are referenced in the North Eastern River Basin Management Plan (RBMP) developed under the requirements of the Water Framework Directive.</p> <p>The River Lagan is noted as a Transitional Water Body and is currently classified as being of overall 'Bad' Ecological Potential. It has an objective of meeting 'Moderate Ecological Potential' by 2021 and 'Good Ecological Potential' by 2021.</p> <p>Belfast Lough is classified as a Coastal Water Body and is currently classified as being of overall 'Moderate' Water Quality status. It has an objective of meeting 'Moderate Water Quality' Status by 2021 and 'Good' Water Quality Status by 2027.</p>
Fisheries Interest – At site	N	While the River Lagan (in particular the impounded area) is not noted as a favoured fishing site, it is nonetheless a Designated Salmon River and is designated as year round course fishery by DCAL. The local Club is East Belfast Coarse Angling Club. It is however noted that the main fishing occurs upstream of Stranmillis Weir which is an area not subject to these proposals and no work is planned on tributaries.
Fisheries Interest – receiving waters	Y	Belfast Lough receiving waters – note that there are commercial Shellfish beds in Belfast Lough. There are also adhoc angling sites around the shores of Belfast Lough – in particular toward the mouth of the lough.
Within Protected site – ASSI/Natura 2000	Y	<p>The study area is hydrologically connected with the following N2K sites:</p> <ul style="list-style-type: none"> • Belfast Lough Special Protection Area (SPA) • Belfast Lough Open Water Special

		<p>Protection Area (SPA).</p> <p>Belfast Lough SPA qualifies under Article 4.2 of EC Directive 79/409 on the Conservation of Wild Birds by regularly supporting internationally important numbers of redshank in winter. The site also regularly supports nationally important numbers of shelduck ,oystercatcher, purple sandpiper, dunlin, black-tailed godwit, bartailed godwit, curlew and turnstone. Belfast Lough as a whole is also used by several other waterfowl species including great crested grebe , scaup, eider, goldeneye and red-breasted merganser.</p> <p>Belfast Lough Open Water SPA qualifies under Article 4.2 of the Directive (79/409/EEC) as it supports an internationally important wintering population of great crested grebe.</p> <p>It is recommended that an HRA Stage 1 Screening (under the terms of the Habitats Directive) is undertaken to identify any potential significant effects on the identified SPA's.</p> <p>Construction work within the study area has the potential to impact on the following ASSIs:</p> <ul style="list-style-type: none"> • Inner Belfast lough ASSI • Outer Belfast Lough ASSI <p>Inner Belfast Lough ASSI is of Special Scientific Interest primarily because of its fauna. It includes areas of intertidal foreshore, comprising of mudflats and lagoons, and land, both reclaimed and being reclaimed which form important feeding/roosting sites for significant numbers of wintering waders and wildfowl. Of particular note are redshank and oystercatcher. Of similar proportional significance are the on-shore feeding populations of goldeneye and scaup which feed in the area at high water. Several other species of wildfowl – including wigeon,</p>
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		<p>mallard and teal and waders, including dunlin, ringed plover and bar-tailed godwit are also found in large numbers throughout much of the ASSI. In addition, Victoria Park Lake, although artificial in origin, is a good example of a brackish lagoon with some associated characteristic plant and animal species. Inner Belfast Lough ASSI also contains a number of Earth Science Conservation Review (ESCR) sites exhibiting a range of Ordovician, Carboniferous and Permian features of national geological interest.</p> <p>Outer Belfast Lough ASSI is important for the Ordovician series of spilitic lavas, black shales and greywackes. The Carboniferous series of the Holywood group are also of significance and the Permian rocks are the best exposed series of rocks of this age in Ireland. The habitat range includes open mud flats, boulder and rock shore, extensive mussel beds and a narrow shoreline strip of semi-natural vegetation including small, isolated pockets of beach-head saltmarsh. Associated terrestrial habitats are represented in a few places. Notable plants include spring squill and Ray's knotgrass. Birds from Inner Belfast Lough ASSI regularly use Outer Belfast Lough for feeding, and the populations of the two areas are closely linked. However, in its own right, the area supports important numbers of great crested grebe and nationally important wintering populations of oystercatcher, ringed plover, redshank and turnstone.</p> <p>It is recommended that NIEA are notified of the proposed works by submitting an Application form for Assent/ Notice of Intent to carry out works which may impact on the identified ASSI'</p>
Within 3km of Natura 2000 site	Y	As noted above, Belfast Lough is subject to a number of nature conservation designations including those termed Natura 2000.
Archaeological Interest	Y	<p>Sites of Significant Archaeological Interest</p> <p>There are no sites of significant archaeological interest noted within the</p>

		<p>study area. However the nature of archaeological features means that unknown features can be uncovered at any location.</p> <p>Industrial Heritage Features There are 367 Industrial heritage features which are protected under Policy BH 2 of PPS 6 within the study area, as seen in the attached map. When potential scheme options have been developed further a more focused investigation would be required to determine fully features potentially impacted by the proposals.</p> <p>Sites and Monuments Record There are 37 records noted on NIEA's Sites and Monument Register within the Study area. Of these there are 7 which are designated as scheduled Monuments. When a monument is scheduled, written consent is required for works that would alter or break the ground surface or disturb the historic fabric of the monument within its statutorily protected area. Under Article 4 of the Historic Monuments and Archaeological Objects (NI) Order 1995, it is an offence to carry out or to permit the carrying out the above works without scheduled monument consent. When potential scheme options have been developed further a more focused investigation would be required to determine fully features potentially impacted by the proposals.</p> <p>Listed Buildings Due to the urban nature of the study area there are a large number of listed buildings (638) within the study area. When potential scheme options have been developed further a more focused investigation would be required to determine fully features potentially impacted by the proposals.</p>
Annex II Species	Y	As noted above, there is a range of Annex II species potentially impacted as noted on the Natura 2000 designations.
Protected Species	Y	All bird life noted under Natura 2000 designations is protected by that designation.

		The extent to which there are protected species in the study area is unclear at present but it is known that species such as Seal have utilised the harbour and the tidal stretch of the River Lagan. Species such as Otter are also likely to be present.
Biodiversity Interest	Med	The study area has a number of distinct components of differing Biodiversity interest such as the Harbour area, to the impounded River Lagan – this area has been subject to a Biodiversity Strategy. Further areas which are not directly impacted but which are hydrologically connected have strong biodiversity interest as evidenced by their nature conservation designations. Note that the study area falls within a Biodiversity Action Plan as developed by Belfast City Council, with input from Belfast Harbour.
Rivers Trust Catchment	Y	The River Lagan is subject to the Lagan Trust and also the Belfast Lough & Lagan Catchment Stakeholder Group as convened under the terms of the Water Framework Directive RBMP's.
Invasive Species	Y	The extent to which invasive species are present in the study area is unclear at present but it is considered that there is a strong potential along river banks and in former industrial areas.
Site Specific Interest	It is noted that the study area is concentrated on the River Lagan and Harbour areas within which significant sums of money have been invested (and continue to be) in improving the environmental setting / biodiversity interest. Examples of the improvements made include the return of Salmon to the River Lagan.	

Conservation Officer: Judith Bankhead Date: 9 11 15

Notes:

- **WFD Classification** – Scheme should not lower status of watercourse.
- **Fisheries interest** – If yes working methods should include sediment / habitat management. Consultation with Inland Fisheries/Loughs Agency will be required.
- **Within Protected Site** – If yes then NIEA consult and assent required and / or Article 6 assessment.
- **Within 3km of Natura 2000 site** – If yes then Article 6 scoping required.
- **Archaeological Interest** – scheduled monument consent may be required. Consultation with Built Heritage will be required.
- **Annex II species** - If present or likely then working methods / design should take into account.

- **Protected Species** – a licence may be required for the movement of any such species.
- **Biodiversity Interest** – scheme should aim to protect high sites and improve medium / low sites. Scheme should also take cognisance of Local Biodiversity Action Plans. Opportunities to increase biodiversity value should be sought.
- **Site Specific Interest** – Should be taken into account in scheme design.
- **Rivers Trust catchment** – Should highlight the need to consult with local Rivers Trust
- **Invasive Species** – If present, an invasive species management plan will be required.

Flood Risk Management should, in all considerations, be based on a catchment wide assessment. Options should consider the requirements of Water Framework Directive, and the potential for mutually beneficial measures.

Options should include sustainable flood management options, including those at distance from the site of the scheme. Options should also include potential solutions which employ a range of different measures, and should include both structural and non-structural measures. This list is not definitive, and consideration of a mosaic of measures is encouraged.

Options	Pros and Cons
Option 1 – do nothing	Cons - Tidal flood risk to people and property along River Lagan
Options at source: Measures to reduce run-off – woodland; drain blocking; landuse; soil management Upstream storage – on line; off line	Not applicable to tidal flood risk. Cannot reduce at source.
Options on pathway: Floodplain measures – reconnection; storage; f/plain woodland Channel management measures – constriction management; restoration/naturalisation; maintenance Flow diversion – overflow channels; secondary channels; remeandering	Limited options to pathway. Strategic solution of improvement to Lagan Weir as tidal barrier and prevents pathway of tidal flood upstream.
Options at receptor: Floodplain measures – f/bank removal; flood storage; set back flood defences Channel management measures – restoration/naturalisation; maintenance Flow diversion – Overflow channels; secondary channels; cross watershed measures; Engineered options – Floodbanks/walls; channel works	Flood Plain measures = set back flood defences at harbour / city centre, Ravenhill etc. No channel management measures or flow diversion measures for tidal event. Engineered options = temporary / demountable barriers, flood walls/bank/railings, alterations to existing structures. In absence of tidal barrier option, significant local flood defences would be required on both banks of the River Lagan in the future design event.

Step 3 Selection of Preferred option.

Shortlisted Options

River Flood Cells

- Option 0 – Status Quo
- Option 2 – Strategic – Use Lagan Weir as formal tidal barrier and defer permanent defences / raised gates until further assessment completed.
- Option 3 – Localised – provide permanent riverside defences in key flood risk areas.
- Option 4 – Localised – provide riverside temporary barriers in key flood risk areas.

Harbour / City Centre Flood Cell

- Option 0 – Status Quo
- Option 3 – Localised – provide permanent riverside defences. Two routes considered “a” and “b”, within Belfast Harbour Commissioner boundary and outside BHC boundary respectively.
- Option 4 – Localised – provide riverside temporary barriers in key flood risk areas. Two routes considered “a” and “b”, within Belfast Harbour Commissioner boundary and outside BHC boundary respectively.

Review of Options

- Option 0 would not provide the required 1 in 200 year AEP SoP.
- Option 2 could provide improved SoP upstream of the weir assuming there is no fluvial event coinciding with the tidal event and that a formal operating regime can be documented. This option would reduce the works required upstream of the weir but relies heavily on the viability of the existing structure to accommodate bigger gates in the future to maintain a SoP with sea level rise. This would be the preferred long term solution for the upstream flood protection but is subject to joint probability assessment with fluvial flood risk and detailed analysis of the existing weir structure to determine technical viability.
- Option 3 would provide local defences in areas of flood risk and would be phased to intervene when the SoP is below 1 in 200 year AEP. 50 years of sea level rise would be added to any local defence and adaptability of the defence for further sea level rise would be considered.
- Option 4 would provide temporary barriers in areas of flood risk where barriers are purchased when the SoP is below 1 in 200 year AEP. 50 years of sea level rise would be added to local defence levels.

Preferred Option:

River Flood Cells

- Option 3 – Localised – provide permanent riverside defences in key flood risk areas.

Harbour / City Centre Flood Cell

- Option 3a – Localised – provide permanent riverside defences within BHC Boundary.

Reason for Selection:

Technical viability of increasing gates at Lagan Weir cannot be proved at time of feasibility study and would require detailed assessment and design calculations. Therefore, the fall back option of localised defences along the River Lagan is the preferred technical solution.

This option would require no / very little works in or near the river as most defences are stepped back from the river, therefore, with the exception of working near mature trees, this option would be acceptable from an environmental impact perspective.

EIA recommended:

Under Schedule 2 of the Planning (EIA) Regulations (Northern Ireland) 2015, criteria 10(h) “in-land waterway construction, canalisation and flood-relief works” may be applicable should the area of works exceed 1 hectare. “Area of works” includes any area occupied by apparatus, equipment, machinery, plant, spoil heaps or other facilities or stores required for construction or installation.

Project Engineer - Julie Templeton Date - 16/07/15

Conservation Officer - Judith Bankhead Date - 9 11 15

Step 4 Characteristics of Works (preferred option) WF12
(to be completed by Project Engineer in conjunction with Conservation Officer).

Physical characteristics of the works:

Localised construction of combination of flood walls / flood railings, soft embankments, landscaped dwarf walls, demountable defence fittings, flap valves etc. from Belfast Harbour to Stranmillis Weir on existing river banks, both banks.

Landuse requirements during construction and operation:

Localised working areas and compounds for construction works. Should be easily found within urban areas.

No land use requirements for operation – passive defences. Access for inspection / maintenance.

Use of natural resources:

Stone, sand and cement in the concrete for wall foundations / cores. Also steel reinforcement and wood in the shuttering. Quarry stone for backfilling and bitmac reinstatement. Metals for flood railing manufacture and flap valves.

Waste production (expected residues and emissions):

Spoil as would be expected from Civil Engineering works.

Nuisances and pollutants:

As with any construction project there is a potential for pollution to occur and nuisance to be caused. These issues can be addressed through the careful implementation of an Environmental Management Plan that will provide Method Statements for control of pollution. This will be based on pollution prevention guidance – in particular for that working in or near to watercourses.

Similarly the EMP should detail how any appointed contractor will ensure that nuisance to sensitive receptors will be minimised e.g. control of noise, reduction of impact on traffic.

Technical difficulties or lack of knowledge requiring redress:

- Ground conditions to be confirmed during detailed design.
- Stability / condition of existing river frontage features.
- Capacity of Lagan Weir to accommodate / carry bigger gates for future design level event.
- Ground raise across Titanic Quarter as part of development works – need updated DTM for this area to assess flood risk in the future. Assumed to be adequate for current day 200 year SoP.

Likely effects of works (direct/indirect; cumulative; secondary; short/medium/long term; positive/negative):

- Some localised disruption from construction works / site traffic.

- Works proposed for short/medium and long term to maintain SoP.
- Positive opportunity for education for city centre premises on emergency planning.
- Indirect – works to flap outfalls to the Lagan to prevent backflow behind flood defences in tidal event should resolve some surface water flooding issues but may also exacerbate surface water flooding in problem areas such as Lockview. Back drainage / surface water should be considered in tidal defence solution as public perception of flooding tends to ignore source.
- Potential for more joined up working / cooperation between stakeholders involved in scheme and partnership funding approach.
- Potential impact on environment from construction works (direct and indirect impacts) can be mitigated by careful planning e.g. development of an effective Environmental Management Plan (EMP).
- It is anticipated that impacts will be to the construction phase only.
- Effective flood protection will aid environmental protection by reducing potential losses / damage that would lead to remedial works – this will be a long term positive impact of the scheme.

Project Engineer - Julie Templeton

Date - 16/07/15

Interdisciplinary Meeting.

Attendees – Judith Bankhead and Julie Templeton

Date - 20/4/15

Step 5 Site assessment of works location
(to be completed by Environment Section)

SA 12

Existing landuse	The landuse of the study area is a mixed use urban area. Types include industrial, residential, commercial, transport related and open space. The study area is concentrated on a river corridor and its immediate environs.
Relative abundance, quality and regenerative capacity of natural resources (incl habitats) in the area.	The main area to be impacted by the preferred option is concentrated on the river corridor. There is a mix of land use along this area, with some areas of hard standing e.g. quay walls and other areas of river embankment sown out with grass and other vegetation (including wild flower). Habitat types are therefore mixed and are of mixed value. Sensitive detailed design of the preferred option could afford the opportunity for habitat enhancement.
Absorption capacity of the natural environment to include:	This area has the capacity to absorb such a development as this area is heavily impacted by the urban landscape within which it is placed. Sensitive design will afford the opportunity to enhance the natural environment.
<ul style="list-style-type: none"> Wetlands 	See above for details of areas such as Belfast Lough Ramsar Site.
<ul style="list-style-type: none"> Coastal Zones 	The study area is connected hydrologically to Belfast Lough, though note that the preferred option is confined within the Belfast urban area.
<ul style="list-style-type: none"> Mountain and forest 	n/a
<ul style="list-style-type: none"> Designated sites 	There are a number of sites designated for nature conservation purposes that are hydrologically connected to the study area. See above for further detail.
<ul style="list-style-type: none"> Damaged lands 	As to be expected in any urban area, particularly those areas which were formerly subject to heavy industry, there are likely to be issues relating to areas of contamination etc. This issue should be addressed in any Environmental Management Plan (EMP).
<ul style="list-style-type: none"> Densely populated sites 	The preferred option is located within an urban area. Population density varies throughout this area due to the variance of landuse e.g. industrial areas such as the harbour have a lower population (though note this area has a growing residential sector).
<ul style="list-style-type: none"> Lands of historical, cultural or 	There are numerous sites of historic and cultural heritage throughout the study area. There is also

archaeological value	always the potential for unknown features of archaeology to be discovered during the course of the work. At present due to the lack of detailed design it is unclear precisely how these features will be impacted, but this issue should be addressed in any Environmental Management Plan (EMP).
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Conservation Officer – Judith Bankhead

Date – 9 11 15

Step 6 Environmental Impact Form EI 12
(to be completed by Environment Section). This can be omitted if a full EIA has been carried out.

This assesses the impact of the preferred option.

To include consideration of the following impact characteristics:

- Extent of the impact (include whether permanent or temporary)
- Short, medium and long term impacts.
- Probability of the impact.
- Direct and indirect impacts, and whether positive or negative.

The above should be considered at pre, during and post works.

Significant environmental effects and proposed mitigation measures		
Environmental Impacts (EA Regulations Schedule 12A)	Characteristics of Impact	Mitigation Measures
Human Beings	<p>Impact on human beings is likely and could be caused by a number of issues such as:</p> <ul style="list-style-type: none"> • Dust / Air Quality • Noise • Traffic Disruption • Visual Impact <p>It is considered that impacts will be limited to the construction phase and therefore short term only.</p> <p>Impacts could be both direct and indirect and likely negative during the construction phase.</p>	<p>Mitigation measures to be detailed in a comprehensive Environmental Management Plan (EMP). Measures to be in accordance with appropriate guidance and standards / Best Practice. Impacted communities / individuals / businesses etc to be contacted as appropriate – this is particularly the case for sensitive receptors e.g. schools, churches, care providers etc.</p>
Flora	<p>Impact on flora is likely to be direct – particularly in areas along the impounded River Lagan. This area has soft landscaping and has been enhanced in recent years through biodiversity enhancement such as the planting of wildflowers.</p> <p>Impact will be during the construction phase and likely to be negative but may provide the opportunity for enhancement (positive impact) in the long term.</p>	<p>Any areas of lost flora to be replaced (where possible) as part of remediation following the construction phase.</p> <p>Opportunities for enhancement to be examined as part of any detailed design phase.</p>
Fauna	<p>Potential impact (direct & indirect) through pollution and disturbance on a range of fauna. Of particular note would be those protected species – it is known that these are present in the study area but it is unclear as to the extent.</p> <p>Negative impacts to be confined to the construction phase, though there could be a potential long term negative impact on animal movement if the flood defences are a continuous barrier through an area.</p>	<p>Mitigation measures to be developed as part of detailed scheme design and detailed in a comprehensive EMP – these measures will take account of all applicable Wildlife protection legislation.</p> <p>Potential impact on animal pathways to be examined during detailed design phase and appropriate mitigation developed.</p>

<p>Soil</p>	<p>Impact on soil is likely to be limited due to the nature of the study area i.e. an urban area with a mix of residential, commercial and industrial / former industrial areas. A large part of this landscape is hard standing and likely to be 'made ground' (in particular the harbour area) and as such the soil in this area will not be natural to that area. There is also a strong potential that soil in a number of areas could be contaminated – this issue is not quantified at present, but it has been noted from the NIEA database that there are 415 areas of potential concern relating to contamination in the study area, including railway land, chemical and engineering works, docklands, sewage works, fuel storage, petrol filling stations, gas works and power stations.</p> <p>Note there are areas of soil (currently planted with a mix of grass, wildflower and other vegetation) along the banks of the impounded River Lagan. It is unlikely that this is the original soil and could be replaced if negatively impacted.</p> <p>Impacts likely to be direct but limited to the construction phase.</p>	<p>As noted it is unlikely that any areas of 'virgin' soil will be impacted. Any lost soil can be replaced with fresh imports, but as good practice, soil should be stored to one side for the duration of the construction works. This stored soil can then be reused on site (subject to issues such as contamination etc.).</p>
<p>Water</p>	<p>There exists a potential for water pollution to occur (direct negative impact) during the construction phase (temporary impact).</p> <p>Pollution could be through Suspended solids due to washing of fines into the watercourse from exposed earthworks, hydrocarbons via fuel leaks / accidents, use of cement, poor working practices, poor storage of materials etc.</p>	<p>Mitigation measures to be detailed in a comprehensive Environmental Management Plan (EMP). Measures to be in accordance with appropriate pollution prevention guidance – in particular 'working in and adjacent to watercourses' and relevant standards / Best Practice.</p> <p>Use of Spill Kits, oil booms, settlement tanks etc to be detailed in EMP and their requirement incorporated into any contract documents.</p>

Air	<p>Negative impacts could be caused by dust or emissions during the construction phase and would be direct negative but limited to that phase.</p> <p>There will be no long term impacts – positive or negative.</p>	<p>Dust can be controlled by good working practices such as wetting of surfaces (note the potential for causing water pollution) – methods to be detailed in EMP.</p> <p>Emissions can be controlled by careful plant / vehicle maintenance etc – measures to be detailed in EMP.</p>
Climate	<p>It is inevitable that emissions during the construction phase will add to greenhouse gases with the potential for this to contribute to a changing climate – the level of this is not quantified.</p> <p>Emissions will be during construction phase only.</p> <p>It is a potential that the scheme could reduce the potential for future emissions of greenhouse gases / material use through a reduced need for future construction works / repair / remedial works following a flood event.</p>	<p>Emissions can be controlled by careful plant / vehicle maintenance etc – measures to be detailed in EMP.</p> <p>Use of a carbon calculator by the designer / contractor to be considered – this will help identify areas where carbon emissions could be reduced through design or working practices.</p>
Landscape	<p>The scheme is to be developed in an urban area. Large parts of this area have suffered negative visual impacts previously due to the uses of these areas e.g. former industrial areas, though it is recognised that many parts have also been successfully landscaped in recent years e.g. Laganside area.</p> <p>The scheme offers the potential for landscape enhancement in some areas through sensitive design.</p> <p>Sensitive design can also be used in areas such as Laganside to ensure that the scheme does not cause a detriment to the landscape.</p> <p>Impacts therefore will be long term but potentially positive.</p>	<p>Design of the scheme is to be in keeping with an urban area and all opportunities for enhancement of the existing landscape to be taken.</p>
Biodiversity (genetics, species and ecosystems)	<p>See responses above relating to fauna and flora.</p>	<p>See responses above relating to fauna and flora.</p>

Interaction between any of the foregoing	None of the above elements will act in isolation e.g. the sensitive design required in this urban area is likely to require recognition of the needs to enhance biodiversity etc. Similarly this will require a commitment to avoid water pollution.	During the design phase opportunities to incorporate measures which mitigate a number of potential impacts are to be explored. For example, the use of earth bunds may provide the opportunity for sensitive design, biodiversity enhancement and be a low carbon solution.
Material Assets	There are wide ranging existing material assets in this urban area. The scheme is designed to protect these from flooding events and as such represents a likely positive, long term impact.	No mitigation proposed.
Cultural Heritage	<p>There are a large number of known cultural heritage features in this urban area. Of particular note are the large number of Industrial Heritage features, which is a reflection of the urban nature of the study area and its past dominant land use types. The scheme could potentially impact on cultural heritage features in a negative fashion with long term consequences e.g. by damaging features, impacting on their setting or preventing access to these.</p> <p>Alternatively, the scheme may allow, through sensitive design the enhancement of some features e.g. of industrial heritage by allowing access to previously abandoned areas, enhancing their setting etc.</p> <p>The potential likelihood for these impacts are not quantified at present and are a matter for the detailed design stage.</p> <p>Note that there is a known Scheduled Monument Zone in the vicinity of Lockview Park (Cutters Wharf). This is noted as being the old Lagan Navigation. Potential impact on this Scheduled Monument Zone to be considered at detailed design stage.</p>	<p>All design and construction teams to be made aware of requirements under Heritage legislation to protect cultural heritage features and to report the finding of any previously unknown feature.</p> <p>The potential for the finding of a previously unknown feature to lead to excavation / recording by a licensed archaeologist is to be recognised in contract documents.</p>

	Environmental Manager - Judith Bankhead	Conservation Officer - Judith Bankhead
	Date - 9 11 15	Date - 9 11 15

Pre works consultation requirements. (Include water quality considerations) –

Consultation to take place with all relevant statutory agencies e.g. NIEA Water Management Unit, DSD, DCAL Inland fisheries, Belfast City Council etc.

Consultation to take place with a select list of non-statutory bodies such as Ulster Wildlife Trust and the Belfast Lough & Lagan Catchment Stakeholder Group to examine the potential for environmental (e.g. Biodiversity) enhancement.

Consultation to take place as appropriate with impacted communities / individuals – in particular those deemed to be sensitive receptors e.g. churches, schools etc.

NIEA Marine should be consulted regarding the possibility of a marine licence being required.

Survey/monitoring requirements (this should include both pre and post work monitoring –

- Survey prior to construction is required in relation to Invasive Species such as Japanese Knotweed and note made of the requirements for treating / disposal of these species. These requirements to be detailed in an EMP.
- Survey prior to construction to be undertaken in respect of protected species e.g. Otter. The implications of findings in relation to applicable Wildlife protection legislation to be addressed in EMP.
- HRA Stage 1 Screening to be undertaken in respect of areas designated as Natura 2000 (SPA's)
- Potential requirement for Marine Licence to be discussed with DoE Marine Division as part of detailed design stage
- NIEA to be notified of proposed works by submitting an application form for Assent / Notice of Intent to carry out works

that may impact on identified ASSI's

- Construction Environmental Management Plan (EMP) to be developed – this is to address all potential environmental issues
- Potential for contaminated land to be examined through survey work as part of the design phase – this may include the need for a Preliminary Risk Assessment as outlined in CLR11 Model Procedures for the Management of Contaminated Land. Results (if applicable) to be addressed in EMP.
- During construction phase, monitoring is to be undertaken to ensure that there are no pollution incidents that may impact on the fauna of the study area or any areas hydrologically connected – in particular those designated for nature conservation purposes.
- Post construction surveys are to be undertaken of any biodiversity enhancements in order to ascertain their success – where it appears these are failing, remedial action to be taken.

Sustainability of project (this should include partnership working options) –

The project is sustainable in that it protects valuable built assets from potential flooding incidents. This will reduce the potential need to replace / repair damaged assets and as such will represent a reduction in future construction activities and therefore reduce the need for future energy, material and resource use.

Enhancement opportunities (mention should be made of links with other plans and measures such as WFD PoM and LBAPs) –

There are clear opportunities for enhancement of features such as Biodiversity e.g. through planting schemes. Discussion to take place with various statutory and non-statutory bodies as part of any detailed design phase.

Detailed design to take account of Biodiversity Action Plans etc. Discussion to take place with Planning Service / Local council to consider other development schemes / wider planning policy applicable to the area that may allow a 'joined up' approach to enhancement opportunities.

Is the project going forward for CEEQUAL Assessment?

NO

Environmental Statement (ES) recommended –

NO

Environmental Statement (ES) undertaken –

NO

Step 7. Administration

Administration Section – advertisement & display of scheme (Drainage Order).

Advertise ES decision (STET)	Date Advertised	Signature	Date forwarded to Project Manager
Journals used	1. Belfast Gazette	2.	3.

Handling of ES Responses (instigated by Project Engineer)

Actions	Dates
Interdisciplinary meeting (incl. Consultant)	n/a
Meeting with respondents (if necessary)	n/a
Agreed reply(s) to respondents issued	n/a

Record of Environmental Considerations (EA12)

Project engineer ← Sections to be completed by → Conservation officer

This form is to be used for:

- Flood Alleviation Works over £25k
- Drainage Improvement Works over £25k
- Asset Repair/Refurbishment Schemes over £100k
- All other works over £100k
- Smaller schemes where there is a need for more specialist advertising and consultants

Project Name: Belfast Tidal Flood Risk Study

Unit: CPU

Project Sponsor/Engineer: Alan Reddick

Checklist:

FORM	Included within consultant docs Y/N	Initial	Date
EC 12 – environmental considerations	Y	JW GR	17/09/15 03/10/17
PO 12 – options report	Y	JT	16/07/15
WF 12 – work characteristics	Y	JT	16/07/15
SA12 – site assessment	Y	JW GR	17/09/15 03/10/17
EI 12 – environmental impacts	Y	JW GR	17/09/15 03/10/17

Where an EIA is carried out for a scheme, the content of these forms should be contained within the EIA document. As such, there is no need to repeat the recording of this information, but simply to refer to the section within the EIA document. EC12 must be completed for ALL proposed schemes

Environmental Statement Recommendation	CEEQUAL proposal
YES	YES

Project Sponsor -
Environmental Manager – Judith Bankhead
Andrew Hitchenor

Date –
Date – 9 11 15
Date -05/10/17

Step 1 Pre scheme Environmental Considerations EC 12
(to be filled in by Env Section and should form part of the pre feasibility study)

Project Name: Belfast Tidal Flood Risk Study

Watercourse Name: River Lagan		Comments
Current WFD Classification	Bad	<p>The study area lies within the North Eastern River Basin District and waterbodies within it are referenced in the North Eastern River Basin Management Plan (RBMP) developed under the requirements of the Water Framework Directive.</p> <p>The River Lagan is noted as a Transitional Water Body and is currently classified as being of overall 'Moderate' Ecological Potential. It has an objective of meeting 'Good Ecological Potential' by 2021.</p> <p>Belfast Lough is classified as a Coastal Water Body and is currently classified as being of overall 'Moderate' Water Quality status. It has an objective of meeting 'Moderate Water Quality' Status by 2021 and 'Good' Water Quality Status by 2027.</p>
Fisheries Interest – At site	N	While the River Lagan (in particular the impounded area) is not noted as a favoured fishing site, it is nonetheless a Designated Salmon River and is designated as year round course fishery by DCAL. The local Club is East Belfast Coarse Angling Club. It is however noted that the main fishing occurs upstream of Stranmillis Weir which is an area not subject to these proposals and no work is planned on tributaries.
Fisheries Interest – receiving waters	Y	Belfast Lough receiving waters – note that there are commercial Shellfish beds in Belfast Lough. There are also adhoc angling sites around the shores of Belfast Lough – in particular toward the mouth of the lough.
Within Protected site –	Y	The study area is hydrologically connected

ASSI/Natura 2000		<p>with the following N2K sites:</p> <ul style="list-style-type: none"> • Belfast Lough Special Protection Area (SPA) • Belfast Lough Open Water Special Protection Area (SPA). <p>Belfast Lough SPA qualifies under Article 4.2 of EC Directive 79/409 on the Conservation of Wild Birds by regularly supporting internationally important numbers of redshank in winter. The site also regularly supports nationally important numbers of shelduck ,oystercatcher, purple sandpiper, dunlin, black-tailed godwit, bartailed godwit, curlew and turnstone. Belfast Lough as a whole is also used by several other waterfowl species including great crested grebe , scaup, eider, goldeneye and red-breasted merganser.</p> <p>Belfast Lough Open Water SPA qualifies under Article 4.2 of the Directive (79/409/EEC) as it supports an internationally important wintering population of great crested grebe.</p> <p>It is recommended that an HRA Stage 1 Screening (under the terms of the Habitats Directive) is undertaken to identify any potential significant effects on the identified SPA's.</p> <p>Construction work within the study area has the potential to impact on the following ASSIs:</p> <ul style="list-style-type: none"> • Inner Belfast lough ASSI • Outer Belfast Lough ASSI <p>Inner Belfast Lough ASSI is of Special Scientific Interest primarily because of its fauna. It includes areas of intertidal foreshore, comprising of mudflats and lagoons, and land, both reclaimed and being reclaimed which form important feeding/roosting sites for significant numbers of wintering waders and wildfowl. Of particular note are redshank and oystercatcher. Of similar proportional</p>
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		<p>significance are the on-shore feeding populations of goldeneye and scaup which feed in the area at high water. Several other species of wildfowl – including wigeon, mallard and teal and waders, including dunlin, ringed plover and bar-tailed godwit are also found in large numbers throughout much of the ASSI. In addition, Victoria Park Lake, although artificial in origin, is a good example of a brackish lagoon with some associated characteristic plant and animal species. Inner Belfast Lough ASSI also contains a number of Earth Science Conservation Review (ESCR) sites exhibiting a range of Ordovician, Carboniferous and Permian features of national geological interest.</p> <p>Outer Belfast Lough ASSI is important for the Ordovician series of spilitic lavas, black shales and greywackes. The Carboniferous series of the Holywood group are also of significance and the Permian rocks are the best exposed series of rocks of this age in Ireland. The habitat range includes open mud flats, boulder and rock shore, extensive mussel beds and a narrow shoreline strip of semi-natural vegetation including small, isolated pockets of beach-head saltmarsh. Associated 4terrestrial habitats are represented in a few places. Notable plants include spring squill and Ray's knotgrass. Birds from Inner Belfast Lough ASSI regularly use Outer Belfast Lough for feeding, and the populations of the two areas are closely linked. However, in its own right, the area supports important numbers of great crested grebe and nationally important wintering populations of oystercatcher, ringed plover, redshank and turnstone.</p> <p>It is recommended that NIEA are notified of the proposed works by submitting an Application form for Assent/ Notice of Intent to carry out works which may impact on the identified ASSI'</p>
Within 3km of Natura 2000 site	Y	As noted above, Belfast Lough is subject to a number of nature conservation designations

		including those termed Natura 2000.
Archaeological Interest	Y	<p>Sites of Significant Archaeological Interest There are no sites of significant archaeological interest noted within the study area. However the nature of archaeological features means that unknown features can be uncovered at any location.</p> <p>Industrial Heritage Features There are 367 Industrial heritage features which are protected under Policy BH 2 of PPS 6 within the study area, as seen in the attached map. When potential scheme options have been developed further a more focused investigation would be required to determine fully features potentially impacted by the proposals.</p> <p>Sites and Monuments Record There are 37 records noted on NIEA's Sites and Monument Register within the Study area. Of these there are 7 which are designated as scheduled Monuments. When a monument is scheduled, written consent is required for works that would alter or break the ground surface or disturb the historic fabric of the monument within its statutorily protected area. Under Article 4 of the Historic Monuments and Archaeological Objects (NI) Order 1995, it is an offence to carry out or to permit the carrying out the above works without scheduled monument consent. When potential scheme options have been developed further a more focused investigation would be required to determine fully features potentially impacted by the proposals.</p> <p>Listed Buildings Due to the urban nature of the study are there are a large number of listed buildings (638) within the study area. When potential scheme options have been developed further a more focused investigation would be required to determine fully features potentially impacted by the proposals.</p>
Annex II Species	Y	As noted above, there is a range of Annex II

		species potentially impacted as noted on the Natura 2000 designations.
Protected Species	Y	All bird life noted under Natura 2000 designations is protected by that designation. The extent to which there are protected species in the study area is unclear at present but it is known that species such as Seal have utilised the harbour and the tidal stretch of the River Lagan. Species such as Otter are also likely to be present.
Biodiversity Interest	Med	The study area has a number of distinct components of differing Biodiversity interest such as the Harbour area, to the impounded River Lagan – this area has been subject to a Biodiversity Strategy. Further areas which are not directly impacted but which are hydrologically connected have strong biodiversity interest as evidenced by their nature conservation designations. Note that the study area falls within a Biodiversity Action Plan as developed by Belfast City Council, with input from Belfast Harbour.
Rivers Trust Catchment	Y	The River Lagan is subject to the Lagan River Trust and also the Belfast Lough & Lagan Catchment Stakeholder Group as convened under the terms of the Water Framework Directive RBMP's.
Invasive Species	Y	The extent to which invasive species are present in the study area is unclear at present but it is considered that there is a strong potential along river banks and in former industrial areas.
Site Specific Interest	It is noted that the study area is concentrated on the River Lagan and Harbour areas within which significant sums of money have been invested (and continue to be) in improving the environmental setting / biodiversity interest. Examples of the improvements made include the return of Salmon to the River Lagan.	

Conservation Officer: Judith Bankhead Date: 9 11 15
Gail Ritchie Date: 03/10/17

Notes:

- **WFD Classification** – Scheme should not lower status of watercourse.
- **Fisheries interest** – If yes working methods should include sediment / habitat management. Consultation with Inland Fisheries/Loughs Agency will be required.
- **Within Protected Site** – If yes then NIEA consult and assent required and / or Article 6 assessment.

- **Within 3km of Natura 2000 site** –If yes then Article 6 scoping required.
- **Archaeological Interest** – scheduled monument consent may be required. Consultation with Built Heritage will be required.
- **Annex II species** - If present or likely then working methods / design should take into account.
- **Protected Species** – a licence may be required for the movement of any such species.
- **Biodiversity Interest** – scheme should aim to protect high sites and improve medium / low sites. Scheme should also take cognisance of Local Biodiversity Action Plans. Opportunities to increase biodiversity value should be sought.
- **Site Specific Interest** – Should be taken into account in scheme design.
- **Rivers Trust catchment** – Should highlight the need to consult with local Rivers Trust
- **Invasive Species** – If present, an invasive species management plan will be required.

Flood Risk Management should, in all considerations, be based on a catchment wide assessment. Options should consider the requirements of Water Framework Directive, and the potential for mutually beneficial measures.

Options should include sustainable flood management options, including those at distance from the site of the scheme. Options should also include potential solutions which employ a range of different measures, and should include both structural and non-structural measures. This list is not definitive, and consideration of a mosaic of measures is encouraged.

Options	Pros and Cons
Option 1 – do nothing	Cons - Tidal flood risk to people and property along River Lagan
Options at source: Measures to reduce run-off – woodland; drain blocking; landuse; soil management Upstream storage – on line; off line	Not applicable to tidal flood risk. Cannot reduce at source.
Options on pathway: Floodplain measures – reconnection; storage; f/plain woodland Channel management measures – constriction management; restoration/naturalisation; maintenance Flow diversion – overflow channels; secondary channels; remeandering	Limited options to pathway. Strategic solution of improvement to Lagan Weir as tidal barrier and prevents pathway of tidal flood upstream.
Options at receptor: Floodplain measures – f/bank removal; flood storage; set back flood defences Channel management measures – restoration/naturalisation; maintenance Flow diversion – Overflow channels; secondary channels; cross watershed measures; Engineered options – Floodbanks/walls; channel works	Flood Plain measures = set back flood defences at harbour / city centre, Ravenhill etc. No channel management measures or flow diversion measures for tidal event. Engineered options = temporary / demountable barriers, flood walls/bank/railings, alterations to existing structures. In absence of tidal barrier option, significant local flood defences would be required on both banks of the River Lagan in the future design event.

Step 3 Selection of Preferred option.

Shortlisted Options

River Flood Cells

- Option 1 – Status Quo
- Option 2 – Strategic – Use Lagan Weir as formal tidal barrier and defer permanent defences / raised gates until further assessment completed.
- Option 3 – Localised – provide permanent riverside defences in key flood risk areas.
- Option 4 – Localised – provide riverside temporary barriers in key flood risk areas.

Harbour / City Centre Flood Cell

- Option 1 – Status Quo
- Option 3 – Localised – provide permanent riverside defences. Two routes considered “a” and “b”, within Belfast Harbour Commissioner boundary and outside BHC boundary respectively.
- Option 4 – Localised – provide riverside temporary barriers in key flood risk areas. Two routes considered “a” and “b”, within Belfast Harbour Commissioner boundary and outside BHC boundary respectively.

Review of Options

- Option 1 would not provide the required 1 in 200 year AEP SoP.
- Option 2 could provide improved SoP upstream of the weir assuming there is no fluvial event coinciding with the tidal event and that a formal operating regime can be documented. This option would reduce / remove the works required upstream of the weir but relies heavily on the viability of the existing structure to accommodate bigger gates in the future to maintain a SoP with sea level rise. This would be the preferred long term solution for the upstream flood protection but is subject to joint probability assessment with fluvial flood risk and detailed analysis of the existing weir structure to determine technical viability.
- Option 3 would provide local defences in areas of flood risk and would be phased to intervene when the SoP is below 1 in 200 year AEP. 50 years of sea level rise would be added to any local defence and adaptability of the defence for further sea level rise would be considered.
- Option 4 would provide temporary barriers in areas of flood risk where barriers are purchased when the SoP is below 1 in 200 year AEP. 50 years of sea level rise would be added to local defence levels.

Preferred Option:

River Flood Cells

- Option 3 – Localised – provide permanent riverside defences in key flood risk areas.

Harbour / City Centre Flood Cell

- Option 3a – Localised – provide permanent riverside defences within BHC Boundary.

Reason for Selection:

Technical viability of increasing gates at Lagan Weir cannot be proved at time of feasibility study and would require detailed assessment and design calculations. Therefore, the fall back option of localised defences along the River Lagan is the preferred technical solution.

This option would require no / very little works in or near the river as most defences are stepped back from the river, therefore, with the exception of working near mature trees, this option would be acceptable from an environmental impact perspective.

EIA recommended:

Under Schedule 2 of the Planning (EIA) Regulations (Northern Ireland) 2015, criteria 10(h) “in-land waterway construction, canalisation and flood-relief works” may be applicable should the area of works exceed 1 hectare. “Area of works” includes any area occupied by apparatus, equipment, machinery, plant, spoil heaps or other facilities or stores required for construction or installation.

Project Engineer -	Julie Templeton	Date - 16/07/15
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Conservation Officer -	Judith Bankhead	Date - 9 11 15
	Gail Ritchie	Date - 03/10/17

Step 4 Characteristics of Works (preferred option) WF12
(to be completed by Project Engineer in conjunction with Conservation Officer).

Physical characteristics of the works:

Localised construction of combination of flood walls / flood railings, soft embankments, landscaped dwarf walls, demountable defence fittings, flap valves etc. from Belfast Harbour to Stranmillis Weir on existing river banks, both banks.

Landuse requirements during construction and operation:

Localised working areas and compounds for construction works. Should be easily found within urban areas.

No land use requirements for operation – passive defences. Access for inspection / maintenance.

Use of natural resources:

Stone, sand and cement in the concrete for wall foundations / cores. Also steel reinforcement and wood in the shuttering. Quarry stone for backfilling and bitmac reinstatement. Metals for flood railing manufacture and flap valves.

Waste production (expected residues and emissions):

Spoil as would be expected from Civil Engineering works.

Nuisances and pollutants:

As with any construction project there is a potential for pollution to occur and nuisance to be caused. These issues can be addressed through the careful implementation of an Environmental Management Plan that will provide Method Statements for control of pollution. This will be based on pollution prevention guidance – in particular for that working in or near to watercourses.

Similarly the EMP should detail how any appointed contractor will ensure that nuisance to sensitive receptors will be minimised e.g. control of noise, reduction of impact on traffic.

Technical difficulties or lack of knowledge requiring redress:

- Ground conditions to be confirmed during detailed design.
- Stability / condition of existing river frontage features.
- Capacity of Lagan Weir to accommodate / carry bigger gates for future design level event.
- Ground raise across Titanic Quarter as part of development works – need updated DTM for this area to assess flood risk in the future. Assumed to be adequate for current day 200 year SoP.

Likely effects of works (direct/indirect; cumulative; secondary; short/medium/long term; positive/negative):

- Some localised disruption from construction works / site traffic.

- Works proposed for short/medium and long term to maintain SoP.
- Positive opportunity for education for city centre premises on emergency planning.
- Indirect – works to flap outfalls to the Lagan to prevent backflow behind flood defences in tidal event should resolve some surface water flooding issues but may also exacerbate surface water flooding in problem areas such as Lockview. Back drainage / surface water should be considered in tidal defence solution as public perception of flooding tends to ignore source.
- Potential for more joined up working / cooperation between stakeholders involved in scheme and partnership funding approach.
- Potential impact on environment from construction works (direct and indirect impacts) can be mitigated by careful planning e.g. development of an effective Environmental Management Plan (EMP).
- It is anticipated that impacts will be to the construction phase only.
- Effective flood protection will aid environmental protection by reducing potential losses / damage that would lead to remedial works – this will be a long term positive impact of the scheme.

Project Engineer - Julie Templeton

Date - 16/07/15

Interdisciplinary Meeting.

Attendees – Judith Bankhead and Julie Templeton

Date -

Step 5 Site assessment of works location
(to be completed by Environment Section)

SA 12

Existing landuse	The landuse of the study area is a mixed use urban area. Types include industrial, residential, commercial, transport related and open space. The study area is concentrated on a river corridor and its immediate environs.
Relative abundance, quality and regenerative capacity of natural resources (incl habitats) in the area.	The main area to be impacted by the preferred option is concentrated on the river corridor. There is a mix of land use along this area, with some areas of hard standing e.g. quay walls and other areas of river embankment sown out with grass and other vegetation (including wild flower). Habitat types are therefore mixed and are of mixed value. Sensitive detailed design of the preferred option could afford the opportunity for habitat enhancement.
Absorption capacity of the natural environment to include:	This area has the capacity to absorb such a development as this area is heavily impacted by the urban landscape within which it is placed. Sensitive design will afford the opportunity to enhance the natural environment.
<ul style="list-style-type: none"> Wetlands 	See above for details of areas such as Belfast Lough Ramsar Site.
<ul style="list-style-type: none"> Coastal Zones 	The study area is connected hydrologically to Belfast Lough, though note that the preferred option is confined within the Belfast urban area.
<ul style="list-style-type: none"> Mountain and forest 	n/a
<ul style="list-style-type: none"> Designated sites 	There are a number of sites designated for nature conservation purposes that are hydrologically connected to the study area. See above for further detail.
<ul style="list-style-type: none"> Damaged lands 	As to be expected in any urban area, particularly those areas which were formerly subject to heavy industry, there are likely to be issues relating to areas of contamination etc. This issue should be addressed in any Environmental Management Plan (EMP).
<ul style="list-style-type: none"> Densely populated sites 	The preferred option is located within an urban area. Population density varies throughout this area due to the variance of landuse e.g. industrial areas such as the harbour have a lower population (though note this area has a growing residential sector).
<ul style="list-style-type: none"> Lands of historical, cultural or 	There are numerous sites of historic and cultural heritage throughout the study area. There is also

Step 6 Environmental Impact Form EI 12
(to be completed by Environment Section). This can be omitted if a full EIA has been carried out.

This assesses the impact of the preferred option.

To include consideration of the following impact characteristics:

- Extent of the impact (include whether permanent or temporary)
- Short, medium and long term impacts.
- Probability of the impact.
- Direct and indirect impacts, and whether positive or negative.

The above should be considered at pre, during and post works.

Significant environmental effects and proposed mitigation measures		
Environmental Impacts (EA Regulations Schedule 12A)	Characteristics of Impact	Mitigation Measures
Human Beings	<p>Impact on human beings is likely and could be caused by a number of issues such as:</p> <ul style="list-style-type: none"> • Dust / Air Quality • Noise • Traffic Disruption • Visual Impact <p>It is considered that impacts will be limited to the construction phase and therefore short term only.</p> <p>Impacts could be both direct and indirect and likely negative during the construction phase.</p>	<p>Mitigation measures to be detailed in a comprehensive Environmental Management Plan (EMP). Measures to be in accordance with appropriate guidance and standards / Best Practice. Impacted communities / individuals / businesses etc to be contacted as appropriate – this is particularly the case for sensitive receptors e.g. schools, churches, care providers etc.</p>
Flora	<p>Impact on flora is likely to be direct – particularly in areas along the impounded River Lagan. This area has soft landscaping and has been enhanced in recent years through biodiversity enhancement such as the planting of wildflowers.</p> <p>Impact will be during the construction phase and likely to be negative but may provide the opportunity for enhancement (positive impact) in the long term.</p>	<p>Any areas of lost flora to be replaced (where possible) as part of remediation following the construction phase.</p> <p>Opportunities for enhancement to be examined as part of any detailed design phase.</p>
Fauna	<p>Potential impact (direct & indirect) through pollution and disturbance on a range of fauna. Of particular note would be those protected species – it is known that these are present in the study area but it is unclear as to the extent.</p> <p>Negative impacts to be confined to the construction phase, though there could be a potential long term negative impact on animal movement if the flood defences are a continuous barrier through an area.</p>	<p>Mitigation measures to be developed as part of detailed scheme design and detailed in a comprehensive EMP – these measures will take account of all applicable Wildlife protection legislation.</p> <p>Potential impact on animal pathways to be examined during detailed design phase and appropriate mitigation developed.</p>

<p>Soil</p>	<p>Impact on soil is likely to be limited due to the nature of the study area i.e. an urban area with a mix of residential, commercial and industrial / former industrial areas. A large part of this landscape is hard standing and likely to be 'made ground' (in particular the harbour area) and as such the soil in this area will not be natural to that area. There is also a strong potential that soil in a number of areas could be contaminated – this issue is not quantified at present, but it has been noted from the NIEA database that there are 415 areas of potential concern relating to contamination in the study area, including railway land, chemical and engineering works, docklands, sewage works, fuel storage, petrol filling stations, gas works and power stations.</p> <p>Note there are areas of soil (currently planted with a mix of grass, wildflower and other vegetation) along the banks of the impounded River Lagan. It is unlikely that this is the original soil and could be replaced if negatively impacted.</p> <p>Impacts likely to be direct but limited to the construction phase.</p>	<p>As noted it is unlikely that any areas of 'virgin' soil will be impacted. Any lost soil can be replaced with fresh imports, but as good practice, soil should be stored to one side for the duration of the construction works. This stored soil can then be reused on site (subject to issues such as contamination etc.).</p>
<p>Water</p>	<p>There exists a potential for water pollution to occur (direct negative impact) during the construction phase (temporary impact).</p> <p>Pollution could be through Suspended solids due to washing of fines into the watercourse from exposed earthworks, hydrocarbons via fuel leaks / accidents, use of cement, poor working practices, poor storage of materials etc.</p>	<p>Mitigation measures to be detailed in a comprehensive Environmental Management Plan (EMP). Measures to be in accordance with appropriate pollution prevention guidance – in particular 'working in and adjacent to watercourses' and relevant standards / Best Practice.</p> <p>Use of Spill Kits, oil booms, settlement tanks etc to be detailed in EMP and their requirement incorporated into any contract documents.</p>

Air	<p>Negative impacts could be caused by dust or emissions during the construction phase and would be direct negative but limited to that phase.</p> <p>There will be no long term impacts – positive or negative.</p>	<p>Dust can be controlled by good working practices such as wetting of surfaces (note the potential for causing water pollution) – methods to be detailed in EMP.</p> <p>Emissions can be controlled by careful plant / vehicle maintenance etc – measures to be detailed in EMP.</p>
Climate	<p>It is inevitable that emissions during the construction phase will add to greenhouse gases with the potential for this to contribute to a changing climate – the level of this is not quantified.</p> <p>Emissions will be during construction phase only.</p> <p>It is a potential that the scheme could reduce the potential for future emissions of greenhouse gases / material use through a reduced need for future construction works / repair / remedial works following a flood event.</p>	<p>Emissions can be controlled by careful plant / vehicle maintenance etc – measures to be detailed in EMP.</p> <p>Use of a carbon calculator by the designer / contractor to be considered – this will help identify areas where carbon emissions could be reduced through design or working practices.</p>
Landscape	<p>The scheme is to be developed in an urban area. Large parts of this area have suffered negative visual impacts previously due to the uses of these areas e.g. former industrial areas, though it is recognised that many parts have also been successfully landscaped in recent years e.g. Laganside area.</p> <p>The scheme offers the potential for landscape enhancement in some areas through sensitive design.</p> <p>Sensitive design can also be used in areas such as Laganside to ensure that the scheme does not cause a detriment to the landscape.</p> <p>Impacts therefore will be long term but potentially positive.</p>	<p>Design of the scheme is to be in keeping with an urban area and all opportunities for enhancement of the existing landscape to be taken.</p>
Biodiversity (genetics, species and ecosystems)	<p>See responses above relating to fauna and flora.</p>	<p>See responses above relating to fauna and flora.</p>

Interaction between any of the foregoing	None of the above elements will act in isolation e.g. the sensitive design required in this urban area is likely to require recognition of the needs to enhance biodiversity etc. Similarly this will require a commitment to avoid water pollution.	During the design phase opportunities to incorporate measures which mitigate a number of potential impacts are to be explored. For example, the use of earth bunds may provide the opportunity for sensitive design, biodiversity enhancement and be a low carbon solution.
Material Assets	There are wide ranging existing material assets in this urban area. The scheme is designed to protect these from flooding events and as such represents a likely positive, long term impact.	No mitigation proposed.
Cultural Heritage	<p>There are a large number of known cultural heritage features in this urban area. Of particular note are the large number of Industrial Heritage features, which is a reflection of the urban nature of the study area and its past dominant land use types. The scheme could potentially impact on cultural heritage features in a negative fashion with long term consequences e.g. by damaging features, impacting on their setting or preventing access to these.</p> <p>Alternatively, the scheme may allow, through sensitive design the enhancement of some features e.g. of industrial heritage by allowing access to previously abandoned areas, enhancing their setting etc.</p> <p>The potential likelihood for these impacts are not quantified at present and are a matter for the detailed design stage.</p> <p>Note that there is a known Scheduled Monument Zone in the vicinity of Lockview Park (Cutters Wharf). This is noted as being the old Lagan Navigation. Potential impact on this Scheduled Monument Zone to be considered at detailed design stage.</p>	<p>All design and construction teams to be made aware of requirements under Heritage legislation to protect cultural heritage features and to report the finding of any previously unknown feature.</p> <p>The potential for the finding of a previously unknown feature to lead to excavation / recording by a licensed archaeologist is to be recognised in contract documents.</p>

	Environmental Manager - Judith Bankhead Date - 9 11 15 Andrew Hitchenor Date – 05 10 17	Conservation Officer - Judith Bankhead Gail Ritchie Date - 9 11 15 03/10/17
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Pre works consultation requirements. (Include water quality considerations) –

Consultation to take place with all relevant statutory agencies e.g. NIEA Water Management Unit, DSD, DCAL Inland fisheries, Belfast City Council etc.

Consultation to take place with a select list of non-statutory bodies such as Ulster Wildlife Trust and the Belfast Lough, Lagan Rivers Trust & Lagan Catchment Stakeholder Group to examine the potential for environmental (e.g. Biodiversity) enhancement.

Consultation to take place as appropriate with impacted communities / individuals – in particular those deemed to be sensitive receptors e.g. churches, schools etc.

NIEA Marine should be consulted regarding the possibility of a marine licence being required.

Survey/monitoring requirements (this should include both pre and post work monitoring –

- Survey prior to construction is required in relation to Invasive Species such as Japanese Knotweed and note made of the requirements for treating / disposal of these species. These requirements to be detailed in an EMP.
- Survey prior to construction to be undertaken in respect of protected species e.g. Otter. The implications of findings in relation to applicable Wildlife protection legislation to be addressed in EMP.

- HRA Stage 1 Screening to be undertaken in respect of areas designated as Natura 2000 (SPA's)
- Potential requirement for Marine Licence to be discussed with DoE Marine Division as part of detailed design stage
- NIEA to be notified of proposed works by submitting an application form for Assent / Notice of Intent to carry out works that may impact on identified ASSI's
- Construction Environmental Management Plan (EMP) to be developed – this is to address all potential environmental issues
- Potential for contaminated land to be examined through survey work as part of the design phase – this may include the need for a Preliminary Risk Assessment as outlined in CLR11 Model Procedures for the Management of Contaminated Land. Results (if applicable) to be addressed in EMP.
- During construction phase, monitoring is to be undertaken to ensure that there are no pollution incidents that may impact on the fauna of the study area or any areas hydrologically connected – in particular those designated for nature conservation purposes.
- Post construction surveys are to be undertaken of any biodiversity enhancements in order to ascertain their success – where it appears these are failing, remedial action to be taken.

Sustainability of project (this should include partnership working options) –

The project is sustainable in that it protects valuable built assets from potential flooding incidents. This will reduce the potential need to replace / repair damaged assets and as such will represent a reduction in future construction activities and therefore reduce the need for future energy, material and resource use.

Enhancement opportunities (mention should be made of links with other plans and measures such as WFD PoM and LBAPs) –

There are clear opportunities for enhancement of features such as Biodiversity e.g. through planting schemes. Discussion to take place with various statutory and non-statutory bodies as part of any detailed design phase.

Detailed design to take account of Biodiversity Action Plans etc. Discussion to take place with Planning Service / Local council to consider other development schemes / wider planning policy applicable to the area that may allow a 'joined up' approach to enhancement opportunities.

Is the project going forward for CEEQUAL Assessment?

Yes

CEEQUAL Assessor -

Environmental Statement (ES) recommended –

YES

Environmental Statement (ES) undertaken –

Step 7. Administration

Administration Section – advertisement & display of scheme (Drainage Order).

Advertise ES decision (STET)	Date Advertised	Signature	Date forwarded to Project Manager
Journals used	1. Belfast Gazette	2.	3.

Handling of ES Responses (instigated by Project Engineer)

Actions	Dates
Interdisciplinary meeting (incl. Consultant)	n/a
Meeting with respondents (if necessary)	n/a
Agreed reply(s) to respondents issued	n/a

Belfast Flood Alleviation

Habitats Regulation Assessment: Stage 1 Screening and Stage 2 Appropriate Assessment

Department for Infrastructure (DfI) Rivers

May 2019



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This document has 62 pages including the cover.

Document history

Revision	Purpose description	Origin-ated	Checked	Reviewed	Author-ised	Date
Rev 1.0	Draft	CG/N C	LMN	MML	JT	May 2019
Rev 2.0	For Issue	CG/N C	LMN	MML	JT	May 2019

Client signoff

Client	Department for Infrastructure (DfI) Rivers
Project	Belfast Flood Alleviation
Job number	5163476
Client signature / date	

Contents

Chapter	Page
Executive Summary	4
1. Introduction	6
1.1. Belfast Flood Alleviation	6
1.2. Background to Habitat Regulations Assessment	6
1.3. Outline of this Report	7
2. Methodology	8
2.1. Determination of the International Sites included in the HRA	8
2.2. Obtaining Information on International Sites with the Potential to be Affected	8
2.3. Other Projects and Plans	8
2.4. Assessing the Impacts of the Proposed Scheme	8
3. Belfast Lough SPA Screening Matrix	10
4. Belfast Lough Open Water SPA Screening Matrix	14
5. Belfast Lough RAMSAR Screening Matrix	18
6. The Maidens SAC Screening Matrix	22
7. The North Channel SAC Screening Matrix	27
8. East Coast Marine pSPA	31
9. Other Considerations	36
9.1. Belfast Harbour Seal Colony	36
10. Screening Conclusion	37
11. Appropriate Assessment	38
11.1. Qualifying Features subject to Appropriate Assessment	38
11.2. Information for Appropriate Assessment	41
11.3. Will the Proposed Scheme Adversely Affect the Integrity of the Site?	44
Appendix A. Site Location Plans	46
A.1. Scheme Overview	46
A.2. Ravenhill Quay Wall	48
Appendix B. Ravenhill Reach Photos	50
B.1. Ravenhill Quay Wall	50
Appendix C. Location of International Sites	55
Appendix D. Planning Applications	57
Appendix E. JNCC report – Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise	61

Tables

Table 1 – Belfast Lough SPA	10
Table 2 – Belfast Lough Open Water SPA	14
Table 3 – Belfast Lough Ramsar	18
Table 4 – The Maidens SAC	22
Table 5 – North Channel SAC	27
Table 6 - East Coast Marine pSPA	31
Table 7 – Qualifying Features for an Appropriate Assessment	38
Table 8 – Pollution Prevention Guidelines	42
Table 9 - Plans and Projects	57

Executive Summary

The following document details the information required to complete a Habitat Regulations Assessment (HRA) Stage 1 'Screening' and Stage 2 'Appropriate Assessment'. This has been prepared in support of the Marine Construction Licence required for the construction of a new sheet-piled flood wall along the Ravenhill Reach area.

HRA's are required under the European Habitats Directive (Directive 92/43/EEC) when a plan or project under consideration could have a significant effect on a Natura 2000 (N2K) sites. N2K sites are those identified as sites of community importance designated under the Habitats Directive (Special Area of Conservation (SACs)) or the Birds Directive (Special Protection Area (SPAs)). According to Planning Policy Statement 2: Natural Heritage (PPS2), in such assessments, consideration is also given to sites designated as Wetlands of International Importance (Ramsar sites) and Sites of Community Importance (candidate SACs). Collectively, within this report, these are referred to as 'International Sites'.

The proposed scheme is not located within or adjacent to any International Sites, however it is hydrologically connected to a number of International Sites.

This Screening assessment identified that there are six possible International Sites that could potentially be impacted:

- Belfast Lough Open Water SPA, (within 5km of the scheme);
- Belfast Lough SPA, (within 5km of the scheme);
- Belfast Lough Ramsar, (within 5km of the scheme);
- The Maidens SAC, (within 33km of the scheme);
- The North Channel SAC (within 22km of the scheme); and
- East Coast Marine pSPA, (within 5km of the scheme).

The entirety of Belfast Flood Alleviation work stretches over an 8km long reach, adjacent to the banks of the Impounded River Lagan and through Belfast Harbour Estate, integrating defence types into the existing landscape as seamlessly as possible. The Ravenhill Reach area will be the only section that involves in-river works which will require a DAERA Marine Construction Licence. The in-river works have been assessed due to the potential impacts on Natura 2000 sites.

The proposed in-river works along the Ravenhill Reach stretch involve placing steel/concrete piles along a 215m stretch from the end of the existing pathway to the corner of no.17 Ravenhill Road. These piles will be stepped out 5-10m from the existing quay wall and the area behind these piles will then be backfilled. This will hold up the existing boundary wall which is considered to be at high risk of failure.

At Stage 1 (Screening) it was considered that the scheme would have a likely significant effect on the following features of the international sites:

- Redshank Tringa, Common Tern, Artic Tern, Bar-tailed Godwit and Black-tailed Godwit populations of the **Belfast Lough SPA** due to disturbance of habitats as a result of construction processes;
- Redshank Tringa population of the **Belfast Lough Ramsar** due to disturbance of habitats as a result of construction processes;
- Great Crested Grebe population of the **Belfast Lough Open Water SPA** due to disturbance of habitats as a result of construction processes;
- Harbour Porpoise population of **The North Channel SAC** due to disturbance of habitats as a result of construction processes;
- Reefs and/or Sandbanks, Grey Seal, Common Seal and Harbour Porpoise of **The Maidens SAC** due to disturbance of habitats as a result of construction processes;
- Great crested Grebe, Red-throated Diver, Sandwich Tern, Common Tern, Artic Tern, Manx Shearwater and Eider Duck populations of the **East Coast Marine pSPA** due to disturbance of habitats as a result of construction processes.

Also considered was the impact that construction activities could have on the Harbour Seal population within Musgrave Channel and East Twin Island.

Stage 2 (Appropriate Assessment) determined that the scheme would have no effect on the integrity of the International Sites for the following reasons:

- Construction activities will not be carried out within the boundaries of these designated sites. Although these sites are hydrologically connected to the construction area, embedded mitigation will be employed during the construction works to prevent pollution e.g. to avoid fuel spillages/ hydrocarbon pollution; and
- The appointed contractor is required to prepare and adhere to a Construction Environmental Management Plan (CEMP). The CEMP will contain a series of mitigation measures designed to prevent any accidental pollution incidents occurring and to prevent any adverse impact on marine mammals, particularly Seals. As with any construction activity, the risk of pollution can never be fully eradicated and as such the CEMP also provides detail on procedures to follow in the event of an incident occurring.

It is important to note that piles are being placed in front of the quay wall as the existing wall is structurally unsafe and at risk of collapse. It is anticipated that the collapse of the quay wall into the Impounded River Lagan would be more detrimental than any proposed construction impacts.

In conclusion, it is considered that there will be no detrimental impact on any Conservation Objective or Component Objective on Belfast Lough Open Water SPA, Belfast Lough SPA, Belfast Lough Ramsar Site, the Maidens SAC, the North Channel cSAC and East Coast Marine pSPA and as such the proposed scheme will not have a significant effect on any of the noted International Sites.

1. Introduction

1.1. Belfast Flood Alleviation

The entirety of the Belfast Flood Alleviation work stretches over an 8km long reach, adjacent to the banks of the Impounded River Lagan and through Belfast harbour estate, integrating defence types into the existing landscape as seamlessly as possible. A 215m section along the existing quay wall at Ravenhill is the only stretch that will include in-river works. Therefore, this area will require a Habitat Regulation Assessment due to the potential impact on Natura 2000 sites.

Atkins has been commissioned by DfI Rivers to provide environmental consultancy services. As part of the wider project, Atkins is required to provide advice and support on environmental issues concerning the management of the Lagan Impoundment, as and when required.

This information for a Habitat Regulations Assessment (HRA) Stage 1 'Screening' and Stage 2 'Appropriate Assessment' has been prepared in support of the Marine Construction Licence required for the in-river works that will/may be required along certain extents of the Impounded River Lagan.

The existing quayside and quay wall at the Ravenhill section of the river have visible structural impairments and are considered structurally unsafe. As such, the strategic placement of steel/concrete piles 5-10m in front of the existing quay wall have been proposed with the area behind these to be backfilled. The sheet piles are being stepped out from the existing wall to provide future capacity to continue the towpath along this stretch of the river, which is currently the only section of the Impounded Lagan without a towpath.

For the purposes of this assessment, the placement of the steel/concrete piles and backfilling behind these will be referred to as 'the proposed scheme'. The location of the proposed scheme is shown on the Site Location Plan in Appendix A.

1.2. Background to Habitat Regulations Assessment

In Northern Ireland, the European Habitats Directive (Directive 92/43/EEC) has been transposed into national legislation through the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended) (referred to hereafter as the Habitat Regulations). Under this legislation, assessment is required to meet the requirements of Article 6.3 of the Directive for Habitats Regulations Assessment (HRA) of a project or plan. Such an assessment is required where a plan or project under consideration could have a significant effect on a Natura 2000 (N2K) sites. N2K sites are those identified as sites of community importance designated under the Habitats Directive (Special Area of Conservation (SACs)) or the Birds Directive (Special Protection Area (SPAs)). According to Planning Policy Statement 2: Natural Heritage (PPS2), in such assessments, consideration is also given to sites designated as Wetlands of International Importance (Ramsar sites) and Sites of Community Importance (candidate SACs). Collectively, within this report, these are referred to as 'International Sites'.

An HRA must be completed by the Competent Authority (in this case DAERA Marine as they grant marine licences). This report comprises the information required by DAERA Marine, as Competent Authority, to determine whether the proposed scheme, either alone or in combination with other plans and projects, is likely to have a significant effect on these International Sites.

This HRA is being carried out due to the hydrological connection of the proposed scheme with a number of International Sites.

1.2.1. Background

Belfast is at risk of flooding from a number of sources, notably tidal, fluvial and surface water. In economic terms the 200-year Annual Exceedances Probability (AEP) predicted extreme tidal event is of most concern; potentially affecting up to 560 residential and 460 non-residential properties. There would also be serious disruption to commerce, the transportation network, and the social fabric of the city.

The flooding envelope in a 200-year AEP tidal flood scenario encompasses 2 sq. km of the Belfast City Centre, and areas at Lower Ravenhill Reach Road, Ormeau Embankment and Stranmillis.

Flood protection measures are proposed to mitigate potential flood impacts through the use of defence options such as concrete flood walls, flood gates, glass flood walls and demountable barriers.

However, flood protection measures will involve in-river works taking place along the 215m stretch of existing Quay Wall in the Ravenhill Reach area of the Impoundment. (See Appendix A.2 for location map).

1.2.2. Current Proposal

The proposed scheme involves the installation of a new sheetpile wall.

Through visual inspection of the existing boundary wall at Ravenhill Reach, it was determined that the wall was structurally unsafe. Noticeable damage to the quay wall was evident as obvious cracks in the bricks were observed (see photos in Appendix B). Steel/concrete piles will be placed along the 215m stretch of existing quay wall but will be stepped out 5-10m from this. The area behind the new wall will then be infilled. This will provide structural support for the existing quay wall but also provides future capability for a tow path to be placed along this stretch of the river.

Construction work for the entire scheme (terrestrial and in-river works) is proposed to commence January 2020 and take approximately one year to complete. The in-river works should take approximately 12 weeks to complete (this includes mobilisation onto and away from site). A commitment will be made by the contractor to follow good practice construction guidelines, with particular reference to preventing pollution of the Impounded River Lagan. A Construction Environmental Management Plan (CEMP) outlining the specific measures to control potentially harmful releases to air and water will be a requirement of the appointed Contractor.

1.3. Outline of this Report

Following this introduction:

- Section 2 outlines the methodology used for this HR screening;
- Section 3 to 8 contains the HRA Screening Matrices;
- Section 9 provide details of other considerations within the assessment, i.e. the Belfast Harbour Seal Colony;
- Section 10 provides the conclusions of the HRA Screening; and
- Section 11 contains the Appropriate Assessment.

2. Methodology

2.1. Determination of the International Sites included in the HRA

An initial review of the proposed scheme in light of the Habitat Regulations has been undertaken as part of the HRA process. This initial review looked at the geographic extent or zone of influence of any impacts which could arise as a result of the proposed scheme. In order to ensure a robust coverage of all sensitive environmental receptors/designated sites, identification of such sites within 10 km of the proposed development was made.

There are four International Sites within 10km of the proposed scheme:

- Belfast Lough Open Water SPA;
- Belfast Lough SPA; and
- Belfast Lough RAMSAR site.
- East Coast Marine pSPA

The location of the International Sites in relation to the proposed scheme is shown in Figure C.1 in Appendix C.

It is important to note that the proposed scheme is not located within any of the above-named International Sites. All four sites are however hydrologically connected, located approximately 5 km downstream of the proposed scheme.

It was advised through consultations with DAERA Marine Conservation and Reporting Team that SAC's which have seals as a site selection feature should also be included in the HRA based on the following criteria:

- SAC's with Grey Seals within 135km of the project;
- SAC's with Harbour Seals within 50km of the project.

As such The Maidens SAC (located approximately 35km from the project), and North Channel SAC (located approximately 22km from the project) are also included in the HRA.

2.2. Obtaining Information on International Sites with the Potential to be Affected

Gathering the information on the International Sites to be included in the HRA involved a desk-based review of the Joint Nature Conservation Committee (JNCC) data sheets¹ as well as a review of information available on the DAERA website².

2.3. Other Projects and Plans

As part of the HRA screening process, information on other projects and plans has been collected where that have been subject to HRA in relation to designated sites discussed previously. An HRA is required to allow an assessment of any 'in combination' effects of the proposed scheme with other projects that may affect the International Sites. Details of plans and projects sourced from the NI online planning portal are provided in Appendix D. Other projects considered include those identified by DAERA Marine Division through the consultation process.

2.4. Assessing the Impacts of the Proposed Scheme

The assessment of likely significant effects is based on the conservation objectives of the International Site. If any plan or project causes the qualifying features of an International Site to fall into unfavourable condition, they can be considered to have had a significant adverse effect upon the International Site.

Plans or projects can adversely affect an International Site by:

¹ <http://jncc.defra.gov.uk/Default.aspx>

² <https://www.daera-ni.gov.uk/topics/biodiversity-land-and-landscapes/protected-areas>

- Causing delays in progress towards achieving the conservation objectives of the site;
- Interrupting progress towards achieving the conservation objectives of the site;
- Disrupting those factors that help to maintain the favourable conditions of the site; and/or
- Interfering with the balance, distribution and density of key species that are the indicators of the favourable condition of the site.

This Stage 1 Screening HRA:

- Provides information on the reasons for designation and on the conservation objectives and the sensitivities of the International Sites;
- Identifies the elements of the proposed scheme that could give rise to impacts on the International Sites, or result in changes to the sites;
- Includes information on other projects and plans in the area that could give rise to cumulative effects – information about any other plan or project that has also undergone assessment under the Habitat Regulations, for potential impacts on the same International Sites have been requested. Whereupon receiving this information, an assessment of likely in-combination effects is made by virtue of distance, timing, severity etc.;
- Determines whether the proposed works will lead to likely significant effects on the International sites, either alone or in combination with other plans or projects.

The Appropriate Assessment:

- Outlines the elements of the proposed scheme that were identified as having a likely significant effect on one or more qualifying features of an International Site;
- Obtains additional desk study data as necessary and characterises the likely significant impacts, e.g. whether short/long term, reversible or irreversible, and in relation to the proportion/importance of the interest affected, and the overall effect on the site's conservation objectives. This has been done in sufficient detail to ensure all impacts have been considered and sufficiently appraised;
- Assesses the effects of the proposed scheme on the conservation objective of the relevant qualifying features; and,
- Determines whether or not the integrity of the International Site(s) will be affected. At this stage, avoidance and mitigation measures are taken into account.

3. Belfast Lough SPA Screening Matrix

Table 1 – Belfast Lough SPA

Site Designation Status	Belfast Lough SPA
Location of International Site	Belfast Lough SPA covers a total of 432.14 ha and is located at the mouth of the River Lagan on the east coast of Northern Ireland ³ . The proposed scheme is not located within or adjacent to the SPA, however the site is hydrologically connected, located approximately 5 km upstream.
Brief Description of the International Site	Belfast Lough is a large intertidal sea lough situated at the mouth of the River Lagan. The inner part of the lough comprises a series of mudflats, shell dominated banks and artificial lagoons. The outer lough is mainly rocky shores with a number of sandy bays on the southern shore with more extensive mixed sediment intertidal areas on the northern side. The SPA boundary is entirely coincident with that of the Belfast Lough Ramsar Site. The principal interests are the breeding colony of Common and Arctic Tern and the wintering populations of Redshanks, Bar-tailed Godwit and Black-tailed Godwit.
Qualifying Features and Conservation Objectives ⁴	<p>At the time of classification in 1998, the site initially qualified under Article 4.2 of the Directive (2009/147/EEC) by regularly supporting internationally important populations of the following species:</p> <ul style="list-style-type: none"> Over winter the area regularly supports: Redshank <i>Tringa tetanus</i> 1.6% of the international biogeographical population 5-year mean, 1991/2-1995/6. <p>The current reassessment of the bird populations occurring within Belfast Lough SPA identifies the following species which additionally meet the qualifying criteria under Article 4.1 of the Directive (2009/147/EC) by regularly supporting internationally important populations of the following species:</p> <ul style="list-style-type: none"> Common Tern <i>Sterna hirundo</i>, 5.8% of the all-Ireland population 5-year mean, 2010 – 2014; Arctic Tern <i>Sterna paradisaea</i>, 1.5% of the all-Ireland population 5-year mean, 2010 – 2014; Bar-tailed Godwit <i>Limosa lapponica</i>, 1.2% of the all-Ireland population 5-year mean, 2010/11 – 2014/15. <p>The site also qualifies under Article 4.2 of the Directive (2009/147/EC) by regularly supporting internationally important populations of the following species:</p> <ul style="list-style-type: none"> Black-tailed Godwit <i>Limosa limosa</i>, 2.2% of the international biogeographical population and 9.6% of the all-Ireland population 5-year mean (2010/11 – 2014/15). <p>The Conservation Objectives for this site are:</p> <ul style="list-style-type: none"> To maintain each feature in favourable condition. <p>In addition, there are a number of component objectives, including:</p> <ul style="list-style-type: none"> To maintain or enhance the area of natural and semi-natural habitats used or potentially usable by Feature bird species (X ha intertidal area), subject to natural processes; Maintain the extent of main habitat components subject to natural processes; and Maintain or enhance sites utilised as roosts.
Sensitivities of the International Site	The site is vulnerable to:

³ <https://www.daera-ni.gov.uk/sites/default/files/publications/doe/belfast-lough-spa-citation-documents-map.pdf>

⁴ <http://jncc.defra.gov.uk/pdf/SPA/UK9020101.pdf>

	<ul style="list-style-type: none"> • Outdoor sports and leisure activities, recreational activities (G01); • Shipping lanes, ports, marine constructions (D03); • Fishing and harvesting aquatic resources (F02); • Changes in biotic conditions (M02); • Airports, flightpaths (D04); • Marine water pollution (H03); • Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01); • Changes in abiotic conditions (M01); and • Invasive non-native species (I01).
Describe the individual elements of the Project likely to give rise to impacts on the International Site	<p>The following elements have been considered and are discussed in detail below:</p> <p>During construction</p> <ul style="list-style-type: none"> • Decline in water quality – specifically occurring from pollution as a result of construction practices including piling activities; • Introduction and spread of invasive non-native species. <p>During operation</p> <ul style="list-style-type: none"> • It is considered that there are no elements of the proposed scheme that are likely to give rise to impacts on the International Site.
<p>Describe any likely direct, indirect or secondary impacts of the Project on the International Site by virtue of:</p> <ul style="list-style-type: none"> • Size and scale; • Land take; • Resource requirements; • Emissions (disposal to land, water or air); • Excavation requirements; and, • Duration of construction, operation, decommissioning etc. 	<p>Size and scale</p> <p>The size and scale of the project does not give rise to impacts on the SPA. The total length of the proposed scheme is 8km but areas requiring in-river works will account for a small proportion of this. The new sheetpile wall will be 215m in length. All works will be confined to an estimated footprint/working area of less than one hectare.</p> <p>Land take</p> <p>No land-take or disturbance is required within the International Site, so there will be no reduction in extent as a result of the proposed scheme. The closest part of the SPA is located approximately 5 km downstream of the proposed scheme. Any land affected by the proposed works (i.e. the quay wall) is outside the SPA.</p> <p>Resource requirements</p> <p>Resources utilised during the proposed scheme will include fuel for plant, electricity and water mains supply. Piles and fill material will also be required.</p> <p>Emissions</p> <p>During operation, given the nature of the proposed scheme, there are expected to be localised increases in suspended sediments that will be observed for short intermittent durations. Plant exhaust emissions will also be observed similar to those on vessels already utilising the impoundment and harbour area. No direct or indirect impact on the international site will be observed despite the hydrological connection.</p> <p>Excavation</p> <p>No excavations will be undertaken within the International Site. Excavations will be limited to quay wall foundations. These are unlikely to result in indirect hydrological impacts on the International Site due to the distance from the International Site and scale of the project and will be controlled by measures outlined in the CEMP.</p> <p>Duration</p> <p>Construction work for the scheme is proposed to commence January 2020, dependent on funding. It is estimated that the in-river portion of works will take 12 weeks.</p> <p>It is not considered that the operation of the proposed scheme, including any routine maintenance (e.g. minor dredging which is required approximately every 5-7 year to maintain access along the Impounded Lagan) and management measures, will have any impact on qualifying features of the SPA site.</p>

<p>Describe any likely changes to the International Site arising as a result of:</p> <ul style="list-style-type: none"> • Reduction of habitat area; • Disturbance to key species; • Habitat or species fragmentation; • Reduction in species density; • Changes in key indicators of conservation value (e.g. water quality); and • Climate change. 	<p>Reduction of habitat area</p> <p>There will be no land take or loss of habitat within the Belfast Lough SPA as the proposed scheme is located outside the International Site boundary.</p> <p>Disturbance to key species</p> <p>There will be no disturbance to key species within the SPA.</p> <p>Habitat or species fragmentation</p> <p>The proposed scheme is outside the International Site and is not predicted to cause any habitat or species fragmentation to the SPA.</p> <p>Reduction in species density</p> <p>A reduction in density of the qualifying species is not anticipated as a result of the proposed scheme.</p> <p>Changes in key indicators of conservation value</p> <p>The works are not predicted to cause changes to water quality due to the hydrological distance of the proposed scheme (approximately 5 km upstream of the SPA) and the fact that the work will be undertaken following a CEMP, which will establish measures to ensure water quality will be maintained.</p> <p>Local air quality is unlikely to be altered once the proposed scheme is operational. It is also noted, aquatic habitats are not vulnerable to changes in air quality and in any case, changes in air quality are not likely to affect habitats within the SPA habitats 5 km away, that qualifying features rely on.</p> <p>During construction, a 'clean-in, clean out' policy shall be adopted for site plant and personnel. Working methods shall be developed by the contractor to avoid the introduction and spread of aquatic invasive species, with reference to latest best practice control guidance available via the GB non-native species secretariat (http://www.nonnativespecies.org/home/index.cfm).</p> <p>Climate change</p> <p>It is highly unlikely that climate change of the degree required to alter habitats, can be attributed to the construction of the proposed scheme.</p>
<p>Describe whether the Project will lead to likely significant effects on the international site alone or in combination</p>	<p>The proposed scheme alone will not result in any likely significant effects on the conservation objectives of the SPA.</p> <p>Information about other plans and projects was obtained from the Northern Ireland Planning Portal website⁵. DfC informed us of the Lagan Gateway Project and we are also aware of the Impounded Lagan Dredging. Details of the plans subject to HRA, that may cumulatively impact on the qualifying features of the SPA are discussed below.</p> <p>Queens Quay Wall Replacement</p> <p>The construction of a new quay wall (44.35m) between the Queens and Queen Elizabeth Bridges on the County Down side of the Impounded River Lagan. The existing quay wall has been condemned as structurally unsafe and in need of replacement.</p> <p>Lagan Gateway Project – Stranmillis Weir</p> <p>As part of the Lagan Gateway Project, Belfast City Council sought and received permission (December 2015) for the construction of a new boat lock, pedestrian footbridge and pathways at Stranmillis, Belfast. This development forms Phase 1 of the Lagan Gateway Project which aims to open up a gateway to the Lagan Valley Regional Park. The scheme includes the provision of a new boat lock to allow the passage of boats past the existing weir; a new footbridge linking Annadale Embankment with Stranmillis; and the refurbishment of the existing weir and fish pass owned by the Department of Infrastructure (DfI).</p> <p>The scheme was scheduled to be completed over an 18-month period beginning October 2017, with 6 months allowed for the proposed river works. Construction</p>

⁵ <http://epicpublic.planningni.gov.uk/publicaccess/>

works have however been delayed (start date unknown) therefore there is potential for the scheme to run concurrently with construction of the quay wall.

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site (s).

East Bank Development Strategy

The East Bank refers to the area alongside the river Lagan which runs from the SSE Arena car park at its northern end to the Sirocco Works site to the south and is bounded by the Short Strand to the east. The overall area is approximately 28 hectares with a river frontage of 1.1 km. The Strategy contains proposals for how the area might be developed and better connected to the city centre and the communities adjacent to it. The aim is to inform planning and investment decisions that will impact the long-term development of the area. An HRA was carried out to assess the plan as it will promote development with potential to impact on designated sites.

The HRA concluded that the strategy promotes some additional development in the East Bank that could have a significant effect on designated sites and their selection features. It was however further noted that there is too little detail to assess the potential impacts, it is therefore relevant for the competent authorities to ensure compliance with the Habitats Regulations for each individual scheme. As such, the HRA was not progressed to Stage 2 Appropriate Assessment.

Lagan Pedestrian and Cycle Bridge

This scheme involves the construction of a pedestrian and cycle bridge (5.0m between parapets) with combined foot and cycle ramps from close to railway underpass on west bank to quay on east bank; pedestrian and cycle links to existing routes, car park, storm drainage, lighting and landscaping at the Lower Ormeau Embankment and River Terrace. The HRA concluded that, with appropriate mitigation in place, there are not likely to be any significant effects, either during construction or operation, as a result of the scheme, either alone, or in combination with other schemes.

Impounded Lagan Dredging and Disposal Project

This project involves dredging of material from the Impounded Lagan to maintain navigational use of the river. DfC have the responsibility of maintain navigation within the Impoundment and aspire to provide a -1.2m AOD navigational channel and -2.5m AOD incised channel. To achieve this aim dredging of an estimated 55,235m³ of material will occur over an expected 9-month period beginning September 2019. The HRA concluded after a Stage 2 Appropriate Assessment that should the embedded mitigation be put incorporated within the CEMP then there would be no likely significant effects either during construction or operation of the scheme.

Based on information available, the proposed scheme has the potential to result in likely significant effects on the conservation objectives of the SPA in-combination with any other scheme.

4. Belfast Lough Open Water SPA Screening Matrix

Table 2 – Belfast Lough Open Water SPA

Site Designation Status	Belfast Lough Open Water SPA
Location of International Site	Belfast Lough Open Water SPA covers a total of 5,592.99 ha and is located at the mouth of the River Lagan on the east coast of Northern Ireland. The proposed scheme is not located within or adjacent to the SPA, however the site is hydrologically connected, located approximately 5 km upstream.
Brief Description of the International Site	<p>Belfast Lough Open Water is a large intertidal sea lough situated at the mouth of the River Lagan. The inner part of the lough comprises a series of mudflats and lagoons. The outer lough is restricted to mainly rocky shores with some small sandy bays.</p> <p>The Belfast Lough open water area comprises the marine area below the mean low water mark. Seawards it extends to a notional boundary between the eastern limits on the north and south shores of the Outer Belfast Lough Area of Special Scientific Interest at Kilroot and Horse Rock respectively.</p> <p>Water depths within the site are generally between 1m and 10m. Shallow waters, less than 5m in depth, dominate the area with deeper waters confined to the central area of the lough, east of a line between Greenisland and Cultra.</p> <p>The open water supports the main part of the internationally important wintering population of Great Crested Grebe. While the main roosting area for this species is in the Inner Lough area, the entire site is of importance for feeding and loafing activities.</p>
Qualifying Features and Conservation Objectives ⁶	<p>The site was classified in 2009. The site qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting internationally important populations of the following species:</p> <ul style="list-style-type: none"> Great Crested Grebe wintering population, <i>Podiceps cristatus</i>, 0.35% of NW Europe population 5-year peak mean, 1996/97 - 2000/01. <p>The Conservation Objectives for this site are:</p> <ul style="list-style-type: none"> To maintain each feature in favourable condition. <p>In addition, there are a number of component objectives, including:</p> <ul style="list-style-type: none"> No significant decrease in population against national trends; Maintain the extent of main habitat components subject to natural processes; and Maintain all locations of sites.
Sensitivities of the International Site	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> Outdoor sports and leisure activities, recreational activities (G01); Marine water pollution (H03); Fishing and harvesting aquatic resources (F02); Shipping lanes, ports, marine constructions (D03); Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01); Changes in abiotic conditions (M01); and Changes in biotic conditions (M02).
Describe the individual elements of the Project likely to	<p>The following elements have been considered and are discussed in detail below:</p> <p>During construction</p>

⁶<http://jncc.defra.gov.uk/pdf/SPA/UK9020290.pdf>

<p>give rise to impacts on the International Site</p>	<ul style="list-style-type: none"> Decline in water quality – Specifically resulting from pollution caused by construction or piling activities; Introduction and spread on invasive non-native species. <p>During operation</p> <ul style="list-style-type: none"> It is considered that there are no elements of the proposed scheme that are likely to give rise to impacts on the International Site.
<p>Describe any likely direct, indirect or secondary impacts of the Project on the International Site by virtue of:</p> <ul style="list-style-type: none"> Size and scale; Land take; Resource requirements; Emissions (disposal to land, water or air); Excavation requirements; and, Duration of construction, operation, decommissioning etc. 	<p>Size and scale</p> <p>The size and scale of the project does not give rise to impacts on the SPA. The total length of the proposed scheme is 8km but areas requiring in-river works will account for a small proportion of this. The new sheetpile wall will be 215m in length. All works will be confined to an estimated footprint/working area of less than one hectare.</p> <p>Land take</p> <p>No land-take or disturbance is required within the International Site, so there will be no reduction in extent as a result of the proposed scheme. The closest part of the SPA is located approximately 5 km downstream of the proposed scheme. Any land affected by the proposed works (i.e. the quay wall) is outside the SPA.</p> <p>Resource requirements</p> <p>Resources utilised during the proposed scheme will include fuel for plant, electricity and water mains supply. Piles and fill material will also be required.</p> <p>Emissions</p> <p>During operation, given the nature of the proposed scheme, there are expected to be localised increases in suspended sediments that will be observed for short intermittent durations. Plant exhaust emissions will also be observed similar to those on vessels already utilising the impoundment and harbour area. No direct or indirect impact on the international site will be observed despite the hydrological connection.</p> <p>Excavation</p> <p>No excavations will be undertaken within the International Site. Excavations will be limited to quay wall foundations. These are unlikely to result in indirect hydrological impacts on the International Site due to the distance from the International Site and scale of the project and will be controlled by measures outlined in the CEMP.</p> <p>Duration</p> <p>Construction work for the scheme is proposed to commence January 2020, dependent on funding. It is estimated that the in-river portion of works will take 12 weeks.</p> <p>It is not considered that the operation of the proposed scheme, including any routine maintenance (e.g. minor dredging which is required approximately every 5-7 year to maintain access along the Impounded Lagan) and management measures, will have any impact on qualifying features of the SPA site.</p>
<p>Describe any likely changes to the International Site arising as a result of:</p> <ul style="list-style-type: none"> Reduction of habitat area; Disturbance to key species; Habitat or species fragmentation; Reduction in species density; 	<p>Reduction of habitat area</p> <p>There will be no land take/reduction of habitat area within the International Site.</p> <p>Disturbance to key species</p> <p>There will be no disturbance to key species within the SPA.</p> <p>Habitat or species fragmentation</p> <p>The proposed scheme is outside the International Site and is not predicted to cause any habitat or species fragmentation to the SPA.</p> <p>Reduction in species density</p> <p>A reduction in density of the qualifying species is not anticipated as a result of the proposed scheme.</p> <p>Changes in key indicators of conservation value</p> <p>The works are not predicted to cause changes to water quality due to the hydrological distance of the proposed scheme (approximately 5 km upstream of</p>

<ul style="list-style-type: none"> • Changes in key indicators of conservation value (e.g. water quality); and • Climate change. 	<p>the SPA) and the fact that the work will be undertaken following a CEMP, which will layout measures to ensure water quality will be maintained.</p> <p>Local air quality is unlikely to be altered once the proposed scheme is operational. It is also noted, aquatic habitats are not vulnerable to changes in air quality and in any case, changes in air quality are not likely to affect habitats within the SPA habitats 5 km away, that qualifying features rely on.</p> <p>During construction, a 'clean-in, clean out' policy shall be adopted for site plant and personnel. Working methods shall be developed by the contractor to avoid the introduction and spread of aquatic invasive species, with reference to latest best practice control guidance available via the GB non-native species secretariat (http://www.nonnativespecies.org/home/index.cfm). These procedures will be contained within the CEMP.</p> <p>Climate change</p> <p>It is highly unlikely that climate change of the degree required to alter habitats, can be attributed to the construction of the proposed scheme.</p>
<p>Describe whether the Project will lead to likely significant effects on the international site alone or in combination</p>	<p>The proposed scheme alone will not result in any likely significant effects on the conservation objectives of the SPA.</p> <p>Information about other plans and projects was obtained from the Northern Ireland Planning Portal website⁷. DfC informed us of the Lagan Gateway Project. Details of the plans subject to HRA, that may cumulatively impact on the qualifying features of the SPA are discussed below.</p> <p>Queens Quay Wall</p> <p>The construction of a new quay wall between the Queens and Queen Elizabeth Bridges on the County Down side of the Impounded River Lagan. The existing quay wall has been condemned as structurally unsafe and in need of replacement.</p> <p>Lagan Gateway Project – Stranmillis Weir</p> <p>As part of the Lagan Gateway Project, Belfast City Council sought and received permission (December 2015) for the construction of a new boat lock, pedestrian footbridge and pathways at Stranmillis, Belfast. This development forms Phase 1 of the Lagan Gateway Project which aims to open up a gateway to the Lagan Valley Regional Park. The scheme includes the provision of a new boat lock to allow the passage of boats past the existing weir; a new footbridge linking Annadale Embankment with Stranmillis; and the refurbishment of the existing weir and fish pass owned by the Department of Infrastructure (DfI).</p> <p>The scheme was scheduled to be completed over an 18-month period beginning October 2017, with 6 months allowed for the proposed river works. Construction works have however been delayed (start date unknown) therefore there is potential for the scheme to run concurrently with construction of the quay wall.</p> <p>The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site (s).</p> <p>East Bank Development Strategy</p> <p>The East Bank refers to the area alongside the river Lagan which runs from the SSE Arena car park at its northern end to the Sirocco Works site to the south and is bounded by the Short Strand to the east. The overall area is approximately 28 hectares with a river frontage of 1.1 km. The Strategy contains proposals for how the area might be developed and better connected to the city centre and the communities adjacent to it. The aim is to inform planning and investment decisions that will impact the long-term development of the area. An HRA was carried out to assess the plan as it will promote development with potential to impact on designated sites.</p> <p>The HRA concluded that the strategy promotes some additional development in the East Bank that could have a significant effect on designated sites and their selection features. It was however further noted that there is too little detail to</p>

⁷ <http://epicpublic.planningni.gov.uk/publicaccess/>

assess the potential impacts, it is therefore relevant for the competent authorities to ensure compliance with the Habitats Regulations for each individual scheme. As such, the HRA was not progressed to Stage 2 Appropriate Assessment.

Lagan Pedestrian and Cycle Bridge

This scheme involves the construction of a pedestrian and cycle bridge (5.0m between parapets) with combined foot and cycle ramps from close to railway underpass on west bank to quay on east bank; pedestrian and cycle links to existing routes, car park, storm drainage, lighting and landscaping at the Lower Ormeau Embankment and River Terrace. The HRA concluded that, with appropriate mitigation in place, there are not likely to be any significant effects, either during construction or operation, as a result of the scheme, either alone, or in combination with other schemes.

Impounded Lagan Dredging and Disposal Project

This project involves dredging of material from the Impounded Lagan to maintain navigational use of the river. DfC have the responsibility of maintain navigation within the Impoundment and aspire to provide a -1.2m AOD navigational channel and -2.5m AOD incised channel. To achieve this aim dredging of an estimated 55,235m³ of material will occur over an expected 9-month period beginning September 2019. The HRA concluded after a Stage 2 Appropriate Assessment that should the embedded mitigation be put incorporated within the CEMP then there would be no likely significant effects either during construction or operation of the scheme.

Based on information available, the proposed scheme has the potential to result in likely significant effects on the conservation objectives of the SPA in-combination with any other scheme.

5. Belfast Lough RAMSAR Screening Matrix

Table 3 – Belfast Lough Ramsar

Site Designation Status	Belfast Lough Ramsar Site
Location of International Site	Belfast Lough Ramsar site covers a total of 432.14 ha and is located at the mouth of the River Lagan on the east coast of Northern Ireland. The proposed scheme is hydrologically connected to the Ramsar site, located approximately 5 km upstream.
Brief Description of the International Site	<p>The Ramsar site includes areas of intertidal foreshore, comprising of mudflats and lagoons, and land, both land-claimed and being land-claimed, which form important feeding/roosting sites for significant numbers of wintering waders and wildfowl. The Ramsar site boundary is entirely coincident with that of the Belfast Lough SPA.</p> <p>Semi-natural vegetation is confined to a narrow shoreline strip which is fragmented, particularly along the inner reaches of the lough. The sheltered bays and inlets of the south eastern shore contain pockets of beach-head saltmarsh. Shores with harder rocks support vegetation typical of maritime cliff ledges giving way to maritime grassland. Notable plant species found include spring squill <i>Scilla verna</i> and Ray's knotgrass <i>Polygonum oxyspermum</i>.</p>
Qualifying Features and Conservation Objectives	<p>This site qualifies under Criterion 3c by regularly supporting internationally important populations of the following species:</p> <ul style="list-style-type: none"> Over winter the area regularly supports: Redshank <i>Tringa tetanus</i> 1.6% of the international biogeographical population 5-year peak mean, 1991/2-1995/6. <p>The site also regularly supports nationally important numbers of Shelduck, Oystercatcher, Purple Sandpiper, Dunlin, Black-Tailed Godwit, Bar-Tailed Godwit, Curlew and Turnstone. Belfast Lough as a whole is also used by several other waterfowl species including Great Crested Grebe, Scaup, Eider, Goldeneye and Red-Breasted Merganser.</p> <p>The Conservation Objectives for this site are:</p> <ul style="list-style-type: none"> To maintain each feature in favourable condition. <p>In addition, there are a number of component objectives, including:</p> <ul style="list-style-type: none"> To maintain or enhance the area of natural and semi-natural habitats used or potentially usable by Feature bird species (X ha intertidal area), subject to natural processes Maintain the extent of main habitat components subject to natural processes; and Maintain or enhance sites utilised as roosts.
Sensitivities of the International Site	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> Outdoor sports and leisure activities, recreational activities (G01); Marine water pollution (H03); Fishing and harvesting aquatic resources (F02); Shipping lanes, ports, marine constructions (D03); Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01); Changes in abiotic conditions (M01); and Changes in biotic conditions (M02).
Describe the individual elements	<p>The following elements have been considered and are discussed in detail below:</p> <p>During construction</p>

of the Project likely to give rise to impacts on the International Site	<p>Decline in water quality – specifically resulting from pollution caused by construction and piling activities;</p> <p>Introduction and spread on invasive non-native species.</p> <p>During operation</p> <p>It is considered that there are no elements of the proposed scheme that are likely to give rise to impacts on the International Site.</p>
<p>Describe any likely direct, indirect or secondary impacts of the Project on the International Site by virtue of:</p> <ul style="list-style-type: none"> • Size and scale; • Land take; • Resource requirements; • Emissions (disposal to land, water or air); • Excavation requirements; and, • Duration of construction, operation, decommissioning etc. 	<p>Size and scale</p> <p>The size and scale of the project does not give rise to impacts on the Ramsar Site. The total length of the proposed scheme is 8km but areas requiring in-river works will account for a small proportion of this. The new sheetpile wall will be 215m in length. All works will be confined to an estimated footprint/working area of less than one hectare.</p> <p>Land take</p> <p>No land-take or disturbance is required within the International Site, so there will be no reduction in extent as a result of the proposed scheme. The closest part of the Ramsar site is located approximately 5 km downstream of the proposed scheme. Any land affected by the proposed works (i.e. the quay wall) is outside the Ramsar site.</p> <p>Resource requirements</p> <p>Resources utilised during the proposed scheme will include fuel for plant, electricity and water mains supply. Piles and fill material will also be required.</p> <p>Emissions</p> <p>During operation, given the nature of the proposed scheme, there are expected to be localised increases in suspended sediments that will be observed for short intermittent durations. Plant exhaust emissions will also be observed similar to those on vessels already utilising the impoundment and harbour area. No direct or indirect impact on the international site will be observed despite the hydrological connection.</p> <p>Excavation</p> <p>No excavations will be undertaken within the International Site. Excavations will be limited to quay wall foundations. These are unlikely to result in indirect hydrological impacts on the International Site due to the distance from the International Site and scale of the project and will be controlled by measures outlined in the CEMP.</p> <p>Duration</p> <p>Construction work for the scheme is proposed to commence January 2020, dependent on funding. It is estimated that the in-river portion of works will take 12 weeks.</p> <p>It is not considered that the operation of the proposed scheme, including any routine maintenance (e.g. minor dredging which is required approximately every 5-7 year to maintain access along the Impounded Lagan) and management measures, will have any impact on qualifying features of the Ramsar site.</p>
<p>Describe any likely changes to the International Site arising as a result of:</p> <ul style="list-style-type: none"> • Reduction of habitat area; • Disturbance to key species; • Habitat or species fragmentation; • Reduction in species density; 	<p>Reduction of habitat area</p> <p>There will be no land take or loss of habitat within the Belfast Lough Ramsar Site as the proposed scheme is located outside the International Site boundary.</p> <p>Disturbance to key species</p> <p>There will be no disturbance to key species within the Ramsar site.</p> <p>Habitat or species fragmentation</p> <p>The proposed scheme is outside the International Site and is not predicted to cause any habitat or species fragmentation to the Ramsar site.</p> <p>Reduction in species density</p> <p>A reduction in density of the qualifying species is not anticipated as a result of the proposed scheme.</p> <p>Changes in key indicators of conservation value</p>

<ul style="list-style-type: none"> • Changes in key indicators of conservation value (e.g. water quality); and • Climate change. 	<p>The works are not predicted to cause changes to water quality due to the hydrological distance of the proposed scheme (approximately 5 km upstream of the SPA) and the fact that the work will be undertaken following a CEMP, which will layout measures to ensure water quality will be maintained.</p> <p>Local air quality is unlikely to be altered once the proposed scheme is operational. It is also noted, aquatic habitats are not vulnerable to changes in air quality and in any case, changes in air quality are not likely to affect habitats within the Ramsar Site habitats 5 km away, that qualifying features rely on.</p> <p>During construction, a 'clean-in, clean out' policy shall be adopted for site plant and personnel. Working methods shall be developed by the contractor to avoid the introduction and spread of aquatic invasive species, with reference to latest best practice control guidance available via the GB non-native species secretariat (http://www.nonnativespecies.org/home/index.cfm). These procedures will be included within the CEMP.</p> <p>Climate change</p> <p>It is highly unlikely that climate change of the degree required to alter habitats, can be attributed to the construction of the proposed scheme.</p>
<p>Describe whether the Project will lead to likely significant effects on the international site alone or in combination</p>	<p>The proposed scheme alone will not result in any likely significant effects on the conservation objectives of the Ramsar Site.</p> <p>Information about other plans and projects was obtained from the Northern Ireland Planning Portal website⁸. DfC informed us of the Lagan Gateway Project. Details of the plans subject to HRA, that may cumulatively impact on the qualifying features of the Ramsar Site are discussed below.</p> <p>Queens Quay</p> <p>The construction of a new quay wall between the Queens and Queen Elizabeth Bridges on the County Down side of the Impounded River Lagan. The existing quay has been condemned as structurally unsafe and in need of replacement.</p> <p>Lagan Gateway Project – Stranmillis Weir</p> <p>As part of the Lagan Gateway Project, Belfast City Council sought and received permission (December 2015) for the construction of a new boat lock, pedestrian footbridge and pathways at Stranmillis, Belfast. This development forms Phase 1 of the Lagan Gateway Project which aims to open up a gateway to the Lagan Valley Regional Park. The scheme includes the provision of a new boat lock to allow the passage of boats past the existing weir; a new footbridge linking Annadale Embankment with Stranmillis; and the refurbishment of the existing weir and fish pass owned by the Department of Infrastructure (DfI).</p> <p>The scheme was scheduled to be completed over an 18-month period beginning October 2017, with 6 months allowed for the proposed river works. Construction works have however been delayed (start date unknown) therefore there is potential for the scheme to run concurrently with construction of the quay wall.</p> <p>The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site(s).</p> <p>East Bank Development Strategy</p> <p>The East Bank refers to the area alongside the river Lagan which runs from the SSE Arena car park at its northern end to the Sirocco Works site to the south and is bounded by the Short Strand to the east. The overall area is approximately 28 hectares with a river frontage of 1.1 km. The Strategy contains proposals for how the area might be developed and better connected to the city centre and the communities adjacent to it. The aim is to inform planning and investment decisions that will impact the long-term development of the area. An HRA was carried out to assess the plan as it will promote development with potential to impact on designated sites.</p> <p>The HRA concluded that the strategy promotes some additional development in the East Bank that could have a significant effect on designated sites and their</p>

⁸ <http://epicpublic.planningni.gov.uk/publicaccess/>

selection features. It was however further noted that there is too little detail to assess the potential impacts, it is therefore relevant for the competent authorities to ensure compliance with the Habitats Regulations for each individual scheme. As such, the HRA was not progressed to Stage 2 Appropriate Assessment.

Lagan Pedestrian and Cycle Bridge

This scheme involves the construction of a pedestrian and cycle bridge (5.0m between parapets) with combined foot and cycle ramps from close to railway underpass on west bank to quay on east bank; pedestrian and cycle links to existing routes, car park, storm drainage, lighting and landscaping at the Lower Ormeau Embankment and River Terrace. The HRA concluded that, with appropriate mitigation in place, there are not likely to be any significant effects, either during construction or operation, as a result of the scheme, either alone, or in combination with other schemes.

Impounded Lagan Dredging and Disposal Project

This project involves dredging of material from the Impounded Lagan to maintain navigational use of the river. DfC have the responsibility of maintain navigation within the Impoundment and aspire to the provide a -1.2m AOD navigational channel and -2.5m AOD incised channel. To achieve this aim dredging of an estimated 55,235m³ of material will occur over and expected 9-month period beginning September 2019. The HRA concluded after a Stage 2 Appropriate Assessment that should the embedded mitigation be put incorporated within the CEMP then there would be no likely significant effects either during construction or operation of the scheme.

Based on information available, the proposed scheme has the potential to result in likely significant effects on the conservation objectives of the SPA in-combination with any other scheme.

6. The Maidens SAC Screening Matrix

Table 4 – The Maidens SAC

Site Designation Status	The Maidens SAC Site
Location of International Site	The Maidens SAC is a group of rocky reefs detached from the coast, north east of Larne, Northern Ireland. The proposed scheme is within 33km of the site and is hydrologically connected to the SAC.
Brief Description of the International Site	<p>The Maidens (or Hulin Rocks) are identified on the Admiralty Charts as a group of small rocky reefs either awash or just emergent. In only two cases are they large enough to be termed islands and to carry buildings, namely the West Maiden, which has a disused lighthouse and the East Maiden, which supports the present lighthouse. As well as the main reef plateau of East and West Maiden, there are also four other reef areas that form a part of the proposed SAC: North Klondyke Shoal which is a large submerged reef or shoaling, approximately 9 km north of West Maiden; Outer Klondyke Pinnacle, a submerged pinnacle 6km east of West Maidens; an unnamed small deep reef 8km north west of West Maiden; and Hunter Rock 5km to the south of West Maiden.</p> <p>In addition to protection offered under designated sites, marine mammals are also afforded protection throughout their range through the following nature conservation legislation:</p> <ul style="list-style-type: none"> • The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended); and • The Wildlife (Northern Ireland) Order 1995 (as amended). <p>This includes marine mammals such as cetaceans, basking shark and most applicable to the proposed scheme would be seals. Under this legislation it is an offence to disturb, injure or harm marine protected species, however the offences that apply will depend on the species, activity and location. This legislation related to the individual animal, rather than the population.</p>
Qualifying Features and Conservation Objectives	<p>The primary reason for the proposed designation of The Maidens as a SAC is for the Annex I habitat Reef. Most of the reef area of The Maidens is bedrock reef with a smaller proportion of stony reef. From the multibeam echo sounding (MBES) survey analysis, combined with video tow ground truthing, some of the area has been classified as 'rock with sand infill'. It is suggested that most of this 'rock with sand infill' should be classed as Annex I Reef as the ground truthing suggests that the mobile sand veneer would cover and uncover that reef area.</p> <p>This SAC also has populations of grey seals (<i>Halichoerus grypus</i>) as a secondary site selection feature</p> <p>The Conservation Objectives for this site are:</p> <ul style="list-style-type: none"> • To maintain each feature in favourable condition <ul style="list-style-type: none"> - Reefs - Sandbanks which are slightly covered by sea water all the time; and - Grey Seal (<i>Halichoerus grypus</i>) <p>In addition, there are a number of component objectives, including:</p> <ul style="list-style-type: none"> • To maintain or enhance, as appropriate the extent of the reefs, sandbanks and population numbers of Grey Seal, subject to natural processes • Maintain the extent of main habitat components subject to natural processes; • Maintain and enhance, as appropriate, the viability, distribution and diversity of typical species within this habitat; and • Maintain and enhance, as appropriate, physical features used by Grey Seals within the site.

Sensitivities of the International Site	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> • Agriculture and Forestry Operations • Aquaculture including finfish and shellfish farming • Coastal and Marine Development and Infrastructure Maintenance • Discharge of Commercial effluent or sewage • Commercial fishing including mobile gear, pelagic mid-water trawling and static gear • Marine traffic • Marine renewables • Geological surveys and military exercises
Describe the individual elements of the Project likely to give rise to impacts on the International Site	<p>The following elements have been considered and are discussed in detail below:</p> <p>During construction</p> <p>Decline in water quality which could impact upon on Grey Seal populations – specifically resulting from pollution caused by construction and piling activities</p> <p>During operation</p> <p>It is considered that there are no elements of the proposed scheme that are likely to give rise to impacts on the International Site.</p>
<p>Describe any likely direct, indirect or secondary impacts of the Project on the International Site by virtue of:</p> <ul style="list-style-type: none"> • Size and scale; • Land take; • Resource requirements; • Emissions (disposal to land, water or air); • Excavation requirements; and, • Duration of construction, operation, decommissioning etc. 	<p>Size and scale</p> <p>The size and scale of the project does not give rise to impacts on the SAC. The total length of the proposed scheme is 8km but areas requiring in-river works will account for a small proportion of this. The new sheetpile wall will be 215m in length. All works will be confined to an estimated footprint/working area of less than one hectare.</p> <p>Land take</p> <p>No land-take or disturbance is required within the International Site, so there will be no reduction in extent as a result of the proposed scheme. The closest part of the SAC is located approximately 33 km downstream of the proposed scheme. Any land affected by the proposed works (i.e. the quay wall) is outside the SAC.</p> <p>Resource requirements</p> <p>Resources utilised during the proposed scheme will include fuel for plant, electricity and water mains supply. Piles and fill material will also be required.</p> <p>Emissions</p> <p>During operation, given the nature of the proposed scheme, there are expected to be localised increases in suspended sediments that will be observed for short intermittent durations. Plant exhaust emissions will also be observed similar to those on vessels already utilising the impoundment and harbour area. No direct or indirect impact on the international site will be observed despite the hydrological connection.</p> <p>Excavation</p> <p>No excavations will be undertaken within the International Site. Excavations will be limited to quay wall foundations and work on revetments. These are unlikely to result in indirect hydrological impacts on the International Site due to the distance from the International Site and scale of the project and will be controlled by measures outlined in the CEMP.</p> <p>Duration</p> <p>Construction work for the scheme is proposed to commence January 2020, dependent on funding. It is estimated that the in-river portion of works will take 12 weeks.</p> <p>It is not considered that the operation of the proposed scheme, including any routine maintenance (e.g. minor dredging which is required approximately every 5-7 year to maintain access along the Impounded Lagan) and management measures, will have any impact on qualifying features of the SAC site.</p>

<p>Describe any likely changes to the International Site arising as a result of:</p> <ul style="list-style-type: none"> • Reduction of habitat area; • Disturbance to key species; • Habitat or species fragmentation; • Reduction in species density; • Changes in key indicators of conservation value (e.g. water quality); and • Climate change. 	<p>Reduction of habitat area</p> <p>There will be no land take or loss of habitat within the Maidens SAC as the proposed scheme is located outside the International Site boundary.</p> <p>Disturbance to key species</p> <p>There will be no disturbance to key species within the SAC boundary or to those species that transverse outside.</p> <p>Habitat or species fragmentation</p> <p>The proposed scheme is outside the International Site and is not predicted to cause any habitat or species fragmentation to the SAC.</p> <p>Reduction in species density</p> <p>A reduction in density of the qualifying species is not anticipated as a result of the proposed scheme.</p> <p>Changes in key indicators of conservation value</p> <p>The works are not predicted to cause changes to water quality due to the hydrological distance of the proposed scheme (approximately 33km away of the SAC) and the fact that the work will be undertaken following a CEMP, which will layout measures to ensure water quality will be maintained.</p> <p>Local air quality is unlikely to be altered once the proposed scheme is operational. It is also noted, aquatic habitats are not vulnerable to changes in air quality and in any case, changes in air quality are not likely to affect habitats within the SAC habitats 33 km away, that qualifying features rely on.</p> <p>During construction, a 'clean-in, clean out' policy shall be adopted for site plant and personnel. Working methods shall be developed by the contractor to avoid the introduction and spread of aquatic invasive species, with reference to latest best practice control guidance available via the GB non-native species secretariat (http://www.nonnativespecies.org/home/index.cfm).</p> <p>Climate change</p> <p>It is highly unlikely that climate change of the degree required to alter habitats, can be attributed to the construction of the proposed scheme.</p>
<p>Describe whether the Project will lead to likely significant effects on the international site alone or in combination</p>	<p>The proposed scheme alone will not result in any likely significant effects on the conservation objectives of the SAC.</p> <p>Information about other plans and projects was obtained from the Northern Ireland Planning Portal website. DfC informed us of the Lagan Gateway Project. Details of the plans subject to HRA, that may cumulatively impact on the qualifying features of the SAC are discussed below.</p> <p>Queens Quay Wall Replacement</p> <p>The construction of a new quay wall between the Queens and Queen Elizabeth Bridges on the County Down side of the impounded River Lagan. The existing quay wall has been condemned as structurally unsafe and is in need of replacement.</p> <p>Lagan Gateway Project – Stranmillis Weir</p> <p>As part of the Lagan Gateway Project, Belfast City Council sought and received permission (December 2015) for the construction of a new boat lock, pedestrian footbridge and pathways at Stranmillis, Belfast. This development forms Phase 1 of the Lagan Gateway Project which aims to open up a gateway to the Lagan Valley Regional Park. The scheme includes the provision of a new boat lock to allow the passage of boats past the existing weir; a new footbridge linking Annadale Embankment with Stranmillis; and the refurbishment of the existing weir and fish pass owned by the Department of Infrastructure (DfI).</p> <p>The scheme was scheduled to be completed over an 18-month period beginning October 2017, with 6 months allowed for the proposed river works. Construction works have however been delayed (start date unknown) therefore there is potential for the scheme to run concurrently with construction of the quay wall.</p>

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site (s).

East Bank Development Strategy

The East Bank refers to the area alongside the river Lagan which runs from the SSE Arena car park at its northern end to the Sirocco Works site to the south and is bounded by the Short Strand to the east. The overall area is approximately 28 hectares with a river frontage of 1.1 km. The Strategy contains proposals for how the area might be developed and better connected to the city centre and the communities adjacent to it. The aim is to inform planning and investment decisions that will impact the long-term development of the area. An HRA was carried out to assess the plan as it will promote development with potential to impact on designated sites.

The HRA concluded that the strategy promotes some additional development in the East Bank that could have a significant effect on designated sites and their selection features. It was however further noted that there is too little detail to assess the potential impacts, it is therefore relevant for the competent authorities to ensure compliance with the Habitats Regulations for each individual scheme. As such, the HRA was not progressed to Stage 2 Appropriate Assessment.

Lagan Pedestrian and Cycle Bridge

This scheme involves the construction of a pedestrian and cycle bridge (5.0m between parapets) with combined foot and cycle ramps from close to railway underpass on west bank to quay on east bank; pedestrian and cycle links to existing routes, car park, storm drainage, lighting and landscaping at the Lower Ormeau Embankment and River Terrace. The HRA concluded that, with appropriate mitigation in place, there are not likely to be any significant effects, either during construction or operation, as a result of the scheme, either alone, or in combination with other schemes.

West Twin Wharf

This scheme involves the essential concrete repair work at West Twin and Stormont Wharfs. This work starts at the extreme north end of West Twin and is proceeded southwards. Section One of the first phase has been completed with section 2 commencing June 2018. The work in Section 2 (110 metres), between bollards 7 and 11 on West Twin will restrict the movement of cranes and hoppers to the north end of the West Twin berth and may require vessels to move along the quay to facilitate discharge operations. The majority of the work will take place underneath the quay and will be undertaken around Low Water times.

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site(s).

D3 Cruise Terminal

This scheme involves a new cruise terminal located near the RSPB wildlife reserve and close to Holywood Exchange. This facility will accommodate both cruise ships and cargo ships with a construction cost of around £12-14 million.

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site (s).

Impounded Lagan Dredging and Disposal Project

This project involves dredging of material from the Impounded Lagan to maintain navigational use of the river. DfC have the responsibility of maintain navigation within the Impoundment and aspire to provide a -1.2m AOD navigational channel and -2.5m AOD incised channel. To achieve this aim dredging of an estimated 55,235m³ of material will occur over an expected 9-month period beginning September 2019. The HRA concluded after a Stage 2 Appropriate Assessment that should the embedded mitigation be put incorporated within the CEMP then there would be no likely significant effects either during construction or operation of the scheme.

Based on information available, the proposed scheme has the potential to result in likely significant effects on the conservation objectives of the SAC in-combination with any other scheme.

7. The North Channel SAC Screening Matrix

Table 5 – North Channel SAC

Site Designation Status	North Channel SAC
Location of International Site	North Channel SAC comprises an area of 160,367ha, located on the east coast of the Northern Ireland. The proposed scheme is hydrologically connected to the SAC site approximately 22km away.
Brief Description of the International Site	Habitats within the site consist mainly of coarse or sandy sediments, with patches of rock and mud. Water depths reach a maximum of 150m along the eastern boundary, but much of the site lies between 10m and 40m. The site covers important winter habitat for harbour porpoise and extends from the coast into offshore waters, overlapping with Pisces Reef Complex SAC.
Qualifying Features and Conservation Objectives	<p>The qualifying feature of the North Channel site is the Habitats Directive Annex II species:</p> <ul style="list-style-type: none"> Harbour porpoise (<i>Phocoena phocoena</i>) <p>The analyses of Heinänen and Skov (2015) show that harbour porpoise occur in elevated densities in the site, particularly during the winter months (October – March).</p> <p>The Conservation Objectives for this site are:</p> <p>To avoid deterioration of the habitats of the harbour porpoise or significant disturbance to the harbour porpoise, thus ensuring that the integrity of the site is maintained, and the site makes an appropriate contribution to maintaining Favourable Conservation Status (FCS) for the UK harbour porpoise.</p> <p>To ensure for harbour porpoise that, subject to natural change, the following attributes are maintained or restored in the long term:</p> <ul style="list-style-type: none"> The species is a viable component of the site. There is no significant disturbance of the species. The supporting habitats and processes relevant to harbour porpoises and their prey are maintained.
Sensitivities of the International Site	<p>The site is vulnerable to:</p> <ul style="list-style-type: none"> Aquaculture – fishing activities; Marine water pollution (H03); Fishing and harvesting aquatic resources (F02); Shipping lanes, ports, marine constructions (D03); Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01); Changes in abiotic conditions (M01); and Changes in biotic conditions (M02).
Describe the individual elements of the Project likely to give rise to impacts on the International Site	<p>The following elements have been considered and are discussed in detail below:</p> <p>During construction</p> <ul style="list-style-type: none"> Noise impact on Harbour porpoise populations due to piling Impact on water quality – specifically resulting from pollution caused by construction and piling activities. <p>During operation</p> <ul style="list-style-type: none"> It is considered that there are no elements of the proposed scheme that are likely to give rise to impacts on the International Site.

<p>Describe any likely direct, indirect or secondary impacts of the Project on the International Site by virtue of:</p> <ul style="list-style-type: none"> • Size and scale; • Land take; • Resource requirements; • Emissions (disposal to land, water or air); • Excavation requirements; and, • Duration of construction, operation, decommissioning etc. 	<p>Size and scale</p> <p>The size and scale of the project does not give rise to impacts on the SAC. The total length of the proposed scheme is 8km but areas requiring in-river works will account for a small proportion of this. The new sheetpile wall will be 215m in length. All works will be confined to an estimated footprint/working area of less than one hectare.</p> <p>Land take</p> <p>No land-take or disturbance is required within the International Site, so there will be no reduction in extent as a result of the proposed scheme. The closest part of the SAC is located approximately 22 km downstream of the proposed scheme. Any land affected by the proposed works (i.e. the quay wall) is outside the SAC.</p> <p>Resource requirements</p> <p>Resources utilised during the proposed scheme will include fuel for plant, electricity and water mains supply. Piles and fill material will also be required.</p> <p>Emissions</p> <p>During operation, given the nature of the proposed scheme, there are expected to be localised increases in suspended sediments that will be observed for short intermittent durations. Plant exhaust emissions will also be observed similar to those on vessels already utilising the impoundment and harbour area. No direct or indirect impact on the international site will be observed despite the hydrological connection.</p> <p>Excavation</p> <p>No excavations will be undertaken within the International Site. Excavations will be limited to quay wall foundations. These are unlikely to result in indirect hydrological impacts on the International Site due to the distance from the International Site and scale of the project and will be controlled by measures outlined in the CEMP.</p> <p>Duration</p> <p>Construction work for the scheme is proposed to commence January 2020, dependent on funding. It is estimated that the in-river portion of works will take 12 weeks.</p> <p>It is not considered that the operation of the proposed scheme, including any routine maintenance (e.g. minor dredging which is required approximately every 5-7 year to maintain access along the Impounded Lagan) and management measures, will have any impact on qualifying features of the SAC site.</p>
<p>Describe any likely changes to the International Site arising as a result of:</p> <ul style="list-style-type: none"> • Reduction of habitat area; • Disturbance to key species; • Habitat or species fragmentation; • Reduction in species density; • Changes in key indicators of conservation value (e.g. water quality); and • Climate change. 	<p>Reduction of habitat area</p> <p>There will be no land take or loss of habitat within the North Channel SAC as the proposed scheme is located outside the International Site boundary.</p> <p>Disturbance to key species</p> <p>There will be no disturbance to key species within the SAC.</p> <p>Habitat or species fragmentation</p> <p>The proposed scheme is outside the International Site and is not predicted to cause any habitat or species fragmentation to the SAC.</p> <p>Reduction in species density</p> <p>A reduction in density of the qualifying species is not anticipated as a result of the proposed scheme.</p> <p>Changes in key indicators of conservation value</p> <p>The works are not predicted to cause changes to water quality due to the hydrological distance of the proposed scheme (approximately 22km away of the SAC) and the fact that the work will be undertaken following a CEMP, which will layout measures to ensure water quality will be maintained.</p> <p>Local air quality is unlikely to be altered once the proposed scheme is operational. It is also noted, aquatic habitats are not vulnerable to changes in air quality and in any case, changes in air quality are not likely to affect habitats within the SAC habitats 22 km away, that qualifying features rely on.</p>

	<p>During construction, a 'clean-in, clean out' policy shall be adopted for site plant and personnel. Working methods shall be developed by the contractor to avoid the introduction and spread of aquatic invasive species, with reference to latest best practice control guidance available via the GB non-native species secretariat (http://www.nonnativespecies.org/home/index.cfm).</p> <p>Climate change</p> <p>It is highly unlikely that climate change of the degree required to alter habitats, can be attributed to the construction of the proposed scheme.</p>
Describe whether the Project will lead to likely significant effects on the international site alone or in combination	<p>The proposed scheme alone will not result in any likely significant effects on the conservation objectives of the SAC.</p> <p>Information about other plans and projects was obtained from the Northern Ireland Planning Portal website. DfC informed us of the Lagan Gateway Project. Details of the plans subject to HRA, that may cumulatively impact on the qualifying features of the SAC are discussed below.</p> <p>Queens Quay Wall Replacement</p> <p>The construction of a new quay wall between the Queens and Queen Elizabeth Bridges on the County Down side of the Impounded River Lagan. The existing quay wall has been condemned as structurally unsafe and in need of replacement.</p> <p>Lagan Gateway Project – Stranmillis Weir</p> <p>As part of the Lagan Gateway Project, Belfast City Council sought and received permission (December 2015) for the construction of a new boat lock, pedestrian footbridge and pathways at Stranmillis, Belfast. This development forms Phase 1 of the Lagan Gateway Project which aims to open up a gateway to the Lagan Valley Regional Park. The scheme includes the provision of a new boat lock to allow the passage of boats past the existing weir; a new footbridge linking Annadale Embankment with Stranmillis; and the refurbishment of the existing weir and fish pass owned by the Department of Infrastructure (DfI).</p> <p>The scheme was scheduled to be completed over an 18-month period beginning October 2017, with 6 months allowed for the proposed river works. Construction works have however been delayed (start date unknown) therefore there is potential for the scheme to run concurrently with construction of the quay wall.</p> <p>The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site (s).</p> <p>East Bank Development Strategy</p> <p>The East Bank refers to the area alongside the river Lagan which runs from the SSE Arena car park at its northern end to the Sirocco Works site to the south and is bounded by the Short Strand to the east. The overall area is approximately 28 hectares with a river frontage of 1.1 km. The Strategy contains proposals for how the area might be developed and better connected to the city centre and the communities adjacent to it. The aim is to inform planning and investment decisions that will impact the long-term development of the area. A HRA was carried out to assess the plan as it will promote development with potential to impact on designated sites.</p> <p>The HRA concluded that the strategy promotes some additional development in the East Bank that could have a significant effect on designated sites and their selection features. It was however further noted that there is too little detail to assess the potential impacts, it is therefore relevant for the competent authorities to ensure compliance with the Habitats Regulations for each individual scheme. As such, the HRA was not progressed to Stage 2 Appropriate Assessment.</p> <p>Lagan Pedestrian and Cycle Bridge</p> <p>This scheme involves the construction of a pedestrian and cycle bridge (5.0m between parapets) with combined foot and cycle ramps from close to railway underpass on west bank to quay on east bank; pedestrian and cycle links to existing routes, car park, storm drainage, lighting and landscaping at the Lower Ormeau Embankment and River Terrace. The HRA concluded that, with</p>

appropriate mitigation in place, there are not likely to be any significant effects, either during construction or operation, as a result of the scheme, either alone, or in combination with other schemes.

West Twin Wharf

This scheme involves the essential concrete repair work at West Twin and Stormont Wharfs. This work starts at the extreme north end of West Twin and is proceeded southwards. Section One of the first phase has been completed with section 2 commencing June 2018. The work in Section 2 (110 metres), between bollards 7 and 11 on West Twin will restrict the movement of cranes and hoppers to the north end of the West Twin berth and may require vessels to move along the quay to facilitate discharge operations. The majority of the work will take place underneath the quay and will be undertaken around Low Water times.

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site (s).

D3 Cruise Terminal

This scheme involves a multi-purpose quay for use as a cruise terminal located near the RSPB wildlife reserve and close to Holywood Exchange. This facility will accommodate both cruise ships and cargo ships with a construction cost of around £12-14 million.

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site(s).

Impounded Lagan Dredging and Disposal Project

This project involves dredging of material from the Impounded Lagan to maintain navigational use of the river. DfC have the responsibility of maintain navigation within the Impoundment and aspire to provide a -1.2m AOD navigational channel and -2.5m AOD incised channel. To achieve this aim dredging of an estimated 55,235m³ of material will occur over an expected 9-month period beginning September 2019. The HRA concluded after a Stage 2 Appropriate Assessment that should the embedded mitigation be put incorporated within the CEMP then there would be no likely significant effects either during construction or operation of the scheme.

Based on information available, the proposed scheme has the potential to result in likely significant effects on the conservation objectives of the SPA in-combination with any other scheme.

8. East Coast Marine pSPA

Table 6 - East Coast Marine pSPA

Site Designation Status	East Coast Marine pSPA
Location of International Site	The East Coast Marine pSPA comprises an area of 967km ² , located on the east coast of the Northern Ireland. The proposed scheme is hydrologically connected to the pSPA site approximately 5km away.
Brief Description of the International Site	<p>The East Coast (Northern Ireland) Marine pSPA includes coastal and near shore waters from Ringfad near Carnlough, Co. Antrim in the north, the marine area of Larne Lough, the marine area of Belfast Lough, waters around the Copeland Islands and offshore of the Ards Peninsula to Cloghan Head, near Ardglass in the south.</p> <p>The pSPA covers a diverse range of seabed habitats, from extensive coastal fringing reefs of various lithologies to the fine silt of inner Belfast Lough.</p>
Qualifying Features and Conservation Objectives	<p>The site qualifies under Article 4.2 of the Directive (2009/147/EC) by regularly supporting internationally important populations of the following species:</p> <ul style="list-style-type: none"> Great Crested Grebe <i>Podiceps cristatus</i>, 1.6% of the international biogeographical population 5-year mean (1991/92- 1995/96); <p>The site also qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting internationally important populations of the following species:</p> <ul style="list-style-type: none"> Red-throated Diver <i>Gavia stellate</i>, 7.1% of the all-Ireland population 5year mean (2006/07 – 2008/08); Sandwich Tern <i>Thalasseus</i>, 44.8% of the all-Ireland population 5-year mean (2010- 2014); Common Tern <i>Sterna hirundo</i>, 21.6% of the all-Ireland population 5-year mean (2010-2014); Artic Tern <i>Sterna paradisaea</i>, 38.6% of the all-Ireland population 5-year mean (2010-2014). <p>This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting internationally important populations of the following species;</p> <ul style="list-style-type: none"> Manx Shearwater <i>Puffinus puffinus</i>, 1.7% of the international biogeographical population, (2000- 2002); and Eider Duck <i>Somateria mollissima</i>, 0.30% of the international biogeographical population >90% of the all-Ireland population. <p>The Conservation Objectives for this site are:</p> <ul style="list-style-type: none"> To maintain each feature in favourable condition; <p>In addition, there are a number of component objectives, including:</p> <ul style="list-style-type: none"> To maintain or enhance the population of the qualifying species; To maintain or enhance the range of habitats utilised by the qualifying species; To ensure that the integrity of the site is maintained; To ensure there is no significant disturbance of the species; To ensure that the following are maintained in the long term: <ul style="list-style-type: none"> Population of the species as a viable component of the site; Distribution of the species within the site; Distribution and extent of habitats supporting the species; and

	<ul style="list-style-type: none"> - Structure, function and supporting processes of habitats supporting the species. • Maintain the extent of main habitat components subject to natural processes; and • Maintain all locations of sites.
Sensitivities of the International Site	<p>The site is vulnerable to</p> <ul style="list-style-type: none"> • Aquaculture – fishing activities; • Marine water pollution (H03); • Fishing and harvesting aquatic resources (F02); • Shipping lanes, ports, marine constructions (D03); • Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01); • Changes in abiotic conditions (M01); and • Changes in biotic conditions (M02).
Describe the individual elements of the Project likely to give rise to impacts on the International Site	<p>The following elements have been considered and are discussed in detail below:</p> <p>During construction</p> <ul style="list-style-type: none"> • Impact on water quality – specifically resulting from pollution caused by construction and piling activities. <p>During operation</p> <ul style="list-style-type: none"> • It is considered that there are no elements of the proposed scheme that are likely to give rise to impacts on the International Site.
<p>Describe any likely direct, indirect or secondary impacts of the Project on the International Site by virtue of:</p> <ul style="list-style-type: none"> • Size and scale; • Land take; • Resource requirements; • Emissions (disposal to land, water or air); • Excavation requirements; and, • Duration of construction, operation, decommissioning etc. 	<p>Size and scale</p> <p>The size and scale of the project does not give rise to impacts on the pSPA. The total length of the proposed scheme is 8km but areas requiring in-river works will account for a small proportion of this. The new sheetpile wall will be 215m in length. All works will be confined to an estimated footprint/working area of less than one hectare.</p> <p>Land take</p> <p>No land-take or disturbance is required within the International Site, so there will be no reduction in extent as a result of the proposed scheme. The closest part of the pSPA is located approximately 5km downstream of the proposed scheme. Any land affected by the proposed works (i.e. the quay walls) is outside the pSPA.</p> <p>Resource requirements</p> <p>Resources utilised during the proposed scheme will include fuel for plant, electricity and water mains supply. Piles and fill material will also be required.</p> <p>Emissions</p> <p>During operation, given the nature of the proposed scheme, there are expected to be localised increases in suspended sediments that will be observed for short intermittent durations. Plant exhaust emissions will also be observed similar to those on vessels already utilising the impoundment and harbour area. No direct or indirect impact on the international site will be observed despite the hydrological connection.</p> <p>Excavation</p> <p>No excavations will be undertaken within the International Site. Excavations will be limited to quay wall foundations and work on revetments. These are unlikely to result in indirect hydrological impacts on the International Site due to the distance from the International Site and scale of the project and will be controlled by measures outlined in the CEMP.</p> <p>Duration</p> <p>Construction work for the scheme is proposed to commence January 2020, dependent on funding. It is estimated that the in-river portion of works will take 12 weeks.</p>

	<p>It is not considered that the operation of the proposed scheme, including any routine maintenance (e.g. minor dredging which is required approximately every 5-7 year to maintain access along the Impounded Lagan) and management measures, will have any impact on qualifying features of the pSPA site.</p>
<p>Describe any likely changes to the International Site arising as a result of:</p> <ul style="list-style-type: none"> • Reduction of habitat area; • Disturbance to key species; • Habitat or species fragmentation; • Reduction in species density; • Changes in key indicators of conservation value (e.g. water quality); and • Climate change. 	<p>Reduction of habitat area</p> <p>There will be no land take or loss of habitat within the East Coast Marine pSPA as the proposed scheme is located outside the International Site boundary.</p> <p>Disturbance to key species</p> <p>There will be no disturbance to key species within the pSPA.</p> <p>Habitat or species fragmentation</p> <p>The proposed scheme is outside the International Site and is not predicted to cause any habitat or species fragmentation to the pSPA.</p> <p>Reduction in species density</p> <p>A reduction in density of the qualifying species is not anticipated as a result of the proposed scheme.</p> <p>Changes in key indicators of conservation value</p> <p>The works are not predicted to cause changes to water quality due to the hydrological distance of the proposed scheme (approximately 5km away from the pSPA) and the fact that the work will be undertaken following a CEMP, which will layout measures to ensure water quality will be maintained.</p> <p>Local air quality is unlikely to be altered once the proposed scheme is operational. It is also noted, aquatic habitats are not vulnerable to changes in air quality and in any case, changes in air quality are not likely to affect habitats within the pSPA habitats 5km away, that qualifying features rely on.</p> <p>During construction, a 'clean-in, clean out' policy shall be adopted for site plant and personnel. Working methods shall be developed by the contractor to avoid the introduction and spread of aquatic invasive species, with reference to latest best practice control guidance available via the GB non-native species secretariat (http://www.nonnativespecies.org/home/index.cfm).</p> <p>Climate change</p> <p>It is highly unlikely that climate change of the degree required to alter habitats, can be attributed to the construction of the proposed scheme.</p>
<p>Describe whether the Project will lead to likely significant effects on the international site alone or in combination</p>	<p>The proposed scheme alone will not result in any likely significant effects on the conservation objectives of the pSPA.</p> <p>Information about other plans and projects was obtained from the Northern Ireland Planning Portal website. DfC informed us of the Lagan Gateway Project. Details of the plans subject to HRA, that may cumulatively impact on the qualifying features of the pSPA are discussed below.</p> <p>Queens Quay Wall Replacement</p> <p>The construction of a new quay wall between the Queens and Queen Elizabeth Bridges on the County Down side of the Impounded River Lagan. The existing quay wall has been condemned as structurally unsafe and in need of replacement.</p> <p>Lagan Gateway Project – Stranmillis Weir</p> <p>As part of the Lagan Gateway Project, Belfast City Council sought and received permission (December 2015) for the construction of a new boat lock, pedestrian footbridge and pathways at Stranmillis, Belfast. This development forms Phase 1 of the Lagan Gateway Project which aims to open up a gateway to the Lagan Valley Regional Park. The scheme includes the provision of a new boat lock to allow the passage of boats past the existing weir; a new footbridge linking Annadale Embankment with Stranmillis; and the refurbishment of the existing weir and fish pass owned by the Department of Infrastructure (DfI).</p> <p>The scheme was scheduled to be completed over an 18-month period beginning October 2017, with 6 months allowed for the proposed river works. Construction</p>

works have however been delayed (start date unknown) therefore there is potential for the scheme to run concurrently with construction of the quay wall.

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site(s).

East Bank Development Strategy

The East Bank refers to the area alongside the river Lagan which runs from the SSE Arena car park at its northern end to the Sirocco Works site to the south and is bounded by the Short Strand to the east. The overall area is approximately 28 hectares with a river frontage of 1.1 km. The Strategy contains proposals for how the area might be developed and better connected to the city centre and the communities adjacent to it. The aim is to inform planning and investment decisions that will impact the long-term development of the area. An HRA was carried out to assess the plan as it will promote development with potential to impact on designated sites.

The HRA concluded that the strategy promotes some additional development in the East Bank that could have a significant effect on designated sites and their selection features. It was however further noted that there is too little detail to assess the potential impacts, it is therefore relevant for the competent authorities to ensure compliance with the Habitats Regulations for each individual scheme. As such, the HRA was not progressed to Stage 2 Appropriate Assessment.

Lagan Pedestrian and Cycle Bridge

This scheme involves the construction of a pedestrian and cycle bridge (5.0m between parapets) with combined foot and cycle ramps from close to railway underpass on west bank to quay on east bank; pedestrian and cycle links to existing routes, car park, storm drainage, lighting and landscaping at the Lower Ormeau Embankment and River Terrace. The HRA concluded that, with appropriate mitigation in place, there are not likely to be any significant effects, either during construction or operation, as a result of the scheme, either alone, or in combination with other schemes.

West Twin Wharf

This scheme involves the essential concrete repair work at West Twin and Stormont Wharfs. This work starts at the extreme north end of West Twin and is proceeded southwards. Section One of the first phase has been completed with section 2 commencing June 2018. The work in Section 2 (110 metres), between bollards 7 and 11 on West Twin will restrict the movement of cranes and hoppers to the north end of the West Twin berth and may require vessels to move along the quay to facilitate discharge operations. The majority of the work will take place underneath the quay and will be undertaken around Low Water times.

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site(s).

D3 Cruise Terminal

This scheme involves a multi-purpose quay for use as a cruise terminal located near the RSPB wildlife reserve and close to Holywood Exchange. This facility will accommodate both cruise ships and cargo ships with a construction cost of around £12-14 million.

The HRA concluded that the proposed works, either individually or in combination with other plans or projects, would not have likely significant effects on any Natura site(s).

Impounded Lagan Dredging and Disposal Project

This project involves dredging of material from the Impounded Lagan to maintain navigational use of the river. DfC have the responsibility of maintain navigation within the Impoundment and aspire to provide a -1.2m AOD navigational channel and -2.5m AOD incised channel. To achieve this aim dredging of an estimated 55,235m³ of material will occur over and expected 9-month period beginning September 2019. The HRA concluded after a Stage 2 Appropriate

Assessment that should the embedded mitigation be put incorporated within the CEMP then there would be no likely significant effects either during construction or operation of the scheme.

Based on information available, the proposed scheme has the potential to result in likely significant effects on the conservation objectives of the pSPA in-combination with any other scheme.

9. Other Considerations

9.1. Belfast Harbour Seal Colony

Through consultation with DAERA Marine (on a separate project within the Impoundment, i.e. Queens Quay Wall Replacement) it has been determined that a significant Harbour Seal colony has become established in recent years at Musgrave Channel, on the shore of East Twin Island. A few Grey Seals have also been reported from within the Belfast Harbour area.

The potential for noise disturbance to seals during in river works, particularly piling activities has been considered and mitigation measures highlighted in the Joint Nature Conservation Committee (JNCC) report will be incorporated into the CEMP.

Seal numbers generally build up in spring, with peak numbers in summer and then there is a decline into autumn. In-river works are expected to be restricted between October 2020 and March 2021 which will be outside the main peak season of this seal colony.

10. Screening Conclusion

Six International Sites were considered in the screening assessment comprising:

- Belfast Lough SPA;
- Belfast Lough Open Water SPA;
- Belfast Lough Ramsar;
- East Coast Marine pSPA
- The Maidens SAC; and
- North Chanel SAC.

It is important to note that none of the identified International Sites are located within or adjacent to the proposed scheme, however they are hydrologically connected. Harbour Seal colonies have also been considered.

Potential likely significant effects are predicted on the qualifying features of all International Sites as a result of the proposed scheme, alone or in combination with any other plans or projects. There is the potential for impacts relating to the construction of the proposed scheme resulting in reduced water quality or the introduction and spread of invasive species in these sites. These impacts have been subject to Appropriate Assessment (AA), as described in Section 11 below.

11. Appropriate Assessment

11.1. Qualifying Features subject to Appropriate Assessment

This section presents information required for an Appropriate Assessment of the likely significant effects on the International Sites in view of their conservation objectives and to make a decision, based on evidence, whether the integrity of the International Sites will be adversely affected.

The HRA Screening showed that there is potential for the proposed scheme to have likely significant effects on qualifying features within the six International Sites: Belfast Lough SPA; Belfast Lough RAMSAR; Belfast Lough Open Water SPA; The North Channel SAC; The Maidens SAC; and East Coast Marine pSPA.

The International Site, qualifying feature of the International Site affected, and the cause of the potential impact are outlined in Table 6 below. Only conservation objectives relevant to the impact are listed.

Table 7 – Qualifying Features for an Appropriate Assessment

International Site / Protected Species	Qualifying Feature(s)	Conservation Objectives	Cause of Potential Impact
Belfast Lough SPA	Redshank Tringa; Common Tern; Arctic Tern; Bar-Tailed Godwit; and Black-Tailed Godwit.	To maintain each feature in favourable condition;	Potential for likely significant effect (LSE) due to disruption of habitat through reduced water quality or introduction of invasive species
		To maintain or enhance the area of natural and semi-natural habitats used or potentially usable by feature bird species (X ha intertidal areas), subject to natural processes;	
		Maintain the extent of main habitat components subject to natural processes;	
		Maintain or enhance sites utilised as roosts.	
Belfast Lough RAMSAR Site	Redshank Tringa	To maintain each feature in favourable condition;	Potential for LSE due to disruption of habitat through reduced water quality or introduction of invasive species
		To maintain or enhance the area of natural and semi-natural habitats used or potentially usable by Feature bird species (X ha intertidal area), subject to natural processes;	
		Maintain the extent of main habitat components subject to natural processes;	
		Maintain or enhance sites utilised as roosts.	
Belfast Lough Open Water SPA	Great Crested Grebe	To maintain each feature in favourable conditions;	Potential for LSE due to disruption of habitat through reduced water quality or introduction of invasive species
		No significant decrease in population against national trends;	

International Site / Protected Species	Qualifying Feature(s)	Conservation Objectives	Cause of Potential Impact
		Maintain the extent of main habitat components subject to natural processes;	
		Maintain all locations of sites.	
The North Channel SAC	Harbour Porpoise	<p>To avoid deterioration of the habitats of the harbour porpoise or significant disturbance to the harbour porpoise, thus ensuring that the integrity of the site is maintained, and the site makes an appropriate contribution to maintaining Favourable Conservation Status (FCS) for the UK harbour porpoise.</p> <p>To ensure for harbour porpoise that, subject to natural change, the following attributes are maintained or restored in the long term:</p> <ul style="list-style-type: none"> - The species is a viable component of the site; - There is no significant disturbance of the species; - The supporting habitats and processes relevant to harbour porpoises and their prey are maintained. 	Potential for LSE due to disruption of habitat through reduced water quality, introduction of invasive species or piling operations on mammals.
The Maidens SAC	<p>Reefs;</p> <p>Sandbanks (slightly covered by sea water at all times)</p> <p>Grey Seal <i>Halichoerus grypus</i></p>	<p>Reefs:</p> <ul style="list-style-type: none"> - To maintain or enhance, as appropriate the extent of the reefs; - Allow the natural processes which determine the development, structure, function and distribution of the habitats associated with the reefs, to operate appropriately; - Maintain and enhance, as appropriate, the viability, distribution and diversity of typical species within this habitat. <p>Sandbanks:</p> <ul style="list-style-type: none"> - Maintain the extent and volume of sandbanks which are slightly covered by sea water all the time, subject to natural processes; - Allow the natural processes which determine the development, structure and extent of sandbanks which are slightly covered by sea water all 	Potential for LSE due to disruption of habitat through reduced water quality, introduction of invasive species or piling operations on mammals.

International Site / Protected Species	Qualifying Feature(s)	Conservation Objectives	Cause of Potential Impact
		<p>the time, to operate appropriately;</p> <ul style="list-style-type: none"> - Maintain and enhance, as appropriate, the viability, distribution and diversity of typical species within this habitat. 	
		<p>Seals:</p> <ul style="list-style-type: none"> - Maintain (and if feasible enhance) population numbers and distribution of Grey Seal; - Maintain and enhance, as appropriate, physical features used by Grey Seals within the site. 	
East Coast Marine pSPA	Great Crested Grebe; Red-throated Diver; Sandwich Tern; Common Tern; Arctic Tern; Manx Shearwater; And Eider Duck.	<p>To maintain each feature in favourable condition</p> <p>To maintain or enhance the population of the qualifying species</p> <p>To maintain or enhance the range of habitats utilised by the qualifying species</p> <p>To ensure that the integrity of the site is maintained</p> <p>To ensure there is no significant disturbance of the species</p> <p>To ensure that the following are maintained in the long term:</p> <ul style="list-style-type: none"> - Population of the species as a viable component of the site; - Distribution of the species within the site; - Distribution and extent of habitats supporting the species; and - Structure, function and supporting processes of habitats supporting the species. <p>Maintain the extent of main habitat components subject to natural processes; and</p> <p>Maintain all locations of sites.</p>	Potential for LSE due to disruption of habitat through reduced water quality or introduction of invasive species

The HRA Screening also showed that there is potential for the proposed scheme to have likely significant effects on the Harbour Seal Colony located around Musgrave Channel and East Twin Island in Belfast Harbour due to piling activities along the Ravenhill quay wall section of the Impounded Lagan and potential reduced water quality or invasive species disrupting their habitat.

11.2. Information for Appropriate Assessment

In response to the potential LSE that could arise from the proposed scheme, embedded mitigation has been included as part of the works programme to prevent disruption of areas outside of the works area during dredging or disposal activities.

11.2.1. Construction Environmental Management Plan

Any construction scheme has the potential to impact on the environment. The appointed contractor is therefore required to prepare and adhere to a Construction Environmental Management Plan (CEMP). The CEMP will promote the delivery of the environmental management for the proposed scheme and will describe how construction activities will be carried out. The CEMP will also have a series of mitigation measures designed to prevent any accidental pollution incidents occurring. As with any construction activity, the risk of pollution can never be fully eradicated and as such the CEMP also provides detail on procedures to follow in the event of an incident occurring. These procedures include informing the relevant authorities of the intended construction operations. The CEMP will also detail procedures for the control of invasive species such as Zebra Mussels. The CEMP will cover mitigation measures for piling activities and other in-river works including procedures for protecting mammals within the vicinity of the site as recommended in the JNCC report (Appendix E) and protecting water quality of the river from pollution risks.

The CEMP is a “living document” and will be developed by the appropriate contractor once specifics regarding the exact works process are known e.g. required plant and construction activities.

Key water protection measures to be covered within the CEMP include:

- Pollution Prevention Guidelines (PPGs)/ Guidance for Pollution Prevention (GPPs) and consents;
- Suspended Solids;
- Heavy Metals and Hydrocarbons;
- Use of Cement;
- Stored materials; and
- Poor Working Practices.

The appointed contractor will assess the site-specific construction processes and any associated supporting service facilities that will take place on-site and adopt an appropriate pollution prevention strategy accordingly. The contractor will then identify the best working practices that will minimise the potential impacts on the local aquatic environment. Adopting these construction practices that are sympathetic to the natural aquatic environment will greatly reduce the risk of water pollution.

In planning to prevent and minimise water pollution on the construction site it is important that the contractor establishes the likely water sources which could be encountered before beginning construction work on the site. Identification of any sources, pathways, potential receptors and the significance that pollution may have on them could either avoid pollution or again greatly reduce the risk.

Consultation with relevant statutory authorities e.g. DAERA (NIEA) Water Management Unit (WMU) will take place following appointment of the contractor, prior to works commencing, to discuss the contractor's method statements and approve the prepared CEMP.

Among the guidelines to be followed by the appointed contractor are those contained within DoE Standing Advice Note No. 4 - Pollution Prevention Guidelines - Issue 02 (June 2016). These note that Pollution Prevention should be a primary consideration during all stages of a development's lifecycle, from planning, construction, operation and maintenance all the way through to decommissioning or reinstatement of a site and it is the aim of this CEMP to aid in this process.

The above advice note provides direction to a series of Pollution Prevention Guidelines (PPGs) some of which have been subsequently updated with Guidance for Pollution Prevention (GPPs). These guidelines have been produced in association with Northern Ireland Environment Agency, the Scottish Environmental Protection Agency (SEPA) and the Environment Agency (EA) for England and Wales. The guidelines that will be considered in relation to protecting water quality at this proposed development site are:

Table 8 – Pollution Prevention Guidelines

PPG	Name	Description
1 (PPG)	Understanding your environmental responsibilities - good environmental practices	A basic introduction to pollution prevention, with signposts to other PPGs and publications. (July 2013)
2 (GPP)	Above ground oil storage tanks	For above ground oil storage, excluding oil refineries and distribution depots. (January 2018)
3 (PPG)	Use and design of oil separators in surface water drainage systems	For identifying where an oil separator is required and, if so, what size and type of separator is appropriate. (April 2006)
4 (GPP)	Treatment and disposal of wastewater where there is no connection to the public foul sewer	For selecting the correct sewage disposal, treatment and disposal options, and maintenance and legal requirements. (November 2017)
5 (GPP)	Works and maintenance in or near water	For construction or maintenance works near, in, or over water. (January 2017)
6 (PPG)	Working at construction and demolition sites	For the construction and demolition industry. (2012)
7 (PPG)	Safe storage - The safe operation of refuelling facilities	For operators of liquid fuel refuelling facilities; it applies to all types of fixed refuelling facilities. (July 2011)
8 (GPP)	Safe Storage and disposal of used oils	For storing and disposing of used oils. Applies to activities ranging from a single engine oil change to those of large industrial users. (July 2017)
18 (PPG)	Managing Fire Water and Major Spillages	For identifying equipment and techniques available to prevent damage to the water environment caused by fires and major spillages. (June 2000)
21 (GPP)	Pollution Incident Response Planning	For producing emergency pollution incident response plans to deal with accidents, spillages and fires. (July 2017)
22 (GPP)	Dealing with spills	For anyone who is responsible for storing and transporting materials that could cause pollution if they spill. (October 2018)
27 (PPG)	Installation, decommissioning and removal of underground Storage tanks	For installing, removing and decommissioning all underground storage tanks (USTs), including those containing petroleum, diesel, fuel oil, aviation fuel, waste oil,

domestic heating oil and other potentially polluting materials such as organic solvents.
(April 2002)

Note that the development of a CEMP will not replace the need to obtain any legislative or regulatory requirements - rather it will be seen as an additional aid to help define environmental issues and the best course of action to address these.

11.2.2. Works Information

As part of the tendered contract the following information will be included and must be adhered to by the appointed contractor:

- The River Lagan is a salmonid river and as such works can only be carried out between 01st September and 31st March to avoid salmon and smolt migration;
- Monitoring of Dissolved Oxygen (DO) will be required for the duration of the contract. DO shall be monitored at the surface and the bottom of the water column. If DO levels fall below 4mg/l operations will cease;
- The contractor shall as a minimum be expected to buoy off his working area and create a 15m wide lane along each bank for the exclusive use of rowing clubs;
- The contractor will not be allowed to work on those days when a rowing race is planned in the river;
- At the end of each working day the contractor must leave all plant securely moored, adequately lighted and buoyed off to the satisfaction of the Project Manager and River Manager;
- The contractor must ensure that all river users are kept informed as to where plant is moored;
- All floating vessels and plant must be fitted with a VHF radio, a horn and be suitably lit in accordance with the rules of the river; and
- All dredging and disposal operations will be in strict accordance with relevant Marine Licences. The contractor will be expected to undertake the role of the licensee and be responsible for meeting all requirements and aspects of the licence.

11.2.3. Piling Activities

The JNCC report (available in Appendix E) outlines measures that are employed to reduce to negligible levels the potential risk of injury or death to marine mammals during piling activities for the installation of offshore windfarms. This report indicated that piling activities can have adverse impacts at considerable distances from the source, therefore, appropriate caution is required before construction starts.

Appropriate measures include the use of Best Available Technique (BAT), seasonal restrictions for activities, employment of an appropriately trained Marine Mammal Observer (MMO) and/or Passive Acoustic Monitoring (PAM), and establishment of a "mitigation zone" (recommended to be 500m circumference or larger).

The following advice regarding piling activity is also laid out:

- Piling should not occur at night;
- A pre-piling search should be carried out for a minimum of 30 minutes;
- A delay in commencement of piling activities by 20 minutes from the last sighting of a marine mammal;
- Gradual ramping up of piling power during a soft-start over a period of 20 minutes or greater should be considered where possible;
- For breaks in activities greater than 10 minutes the pre-piling search should begin again; and
- Consideration should be given to the use of Acoustic Deterrent Devices (ADDs) but only in conjunction with visual and / or acoustic monitoring.

These protocols are considered to be current best practice for typical off-shore windfarm piling operations but can easily be adopted to the piling activities along the Ravenhill Quay Wall and two embankment areas. In addition to this, the Harbour Seal Colony is located approx. 2km from the closest of these construction areas and whilst seals have occasionally been spotted entering the impounded section of the River Lagan, this is considered to be a rare occurrence. Seal numbers build up in the spring, with peak numbers in summer and then there is a decline into autumn.

Given the distance between the seal colonies location and the closest area where piling activities will occur, it is considered that impacts on seals would only potentially occur at the construction place due to noise and vibration and water quality impacts. This potential is further reduced considering the low probability of marine mammals being present within the Impounded Lagan and that the works are scheduled to take place in the autumn months. In addition to this, any remaining potential risks will be controlled by procedures contained within the CEMP. These control measures will take into consideration the appropriate mitigation outlined by the JNCC report.

Therefore, it is considered that the construction works carried out alongside Ravenhill Quay wall, will not have an impact on the seal colonies located within Belfast Harbour area.

11.3. Will the Proposed Scheme Adversely Affect the Integrity of the Site?

With due consideration given to the information provided above for the Appropriate Assessment, it is considered that the proposed scheme **will not** adversely affect the integrity of the Belfast Lough SPA, Belfast Lough Ramsar, Belfast Lough Open Water SPA, The Maidens SAC, The North Channel SAC and East Coast Marine pSPA sites or the Harbour Seal Colony population within the Belfast Harbour area.

It is considered that there are no potential impacts associated with the operation of the proposed scheme, with the exception of minor maintenance dredging (every 5-7 years) that will occur within the Impounded Lagan. As such, any potential impacts relate to the construction of the proposed scheme, however these will be controlled by procedures included within the CEMP.

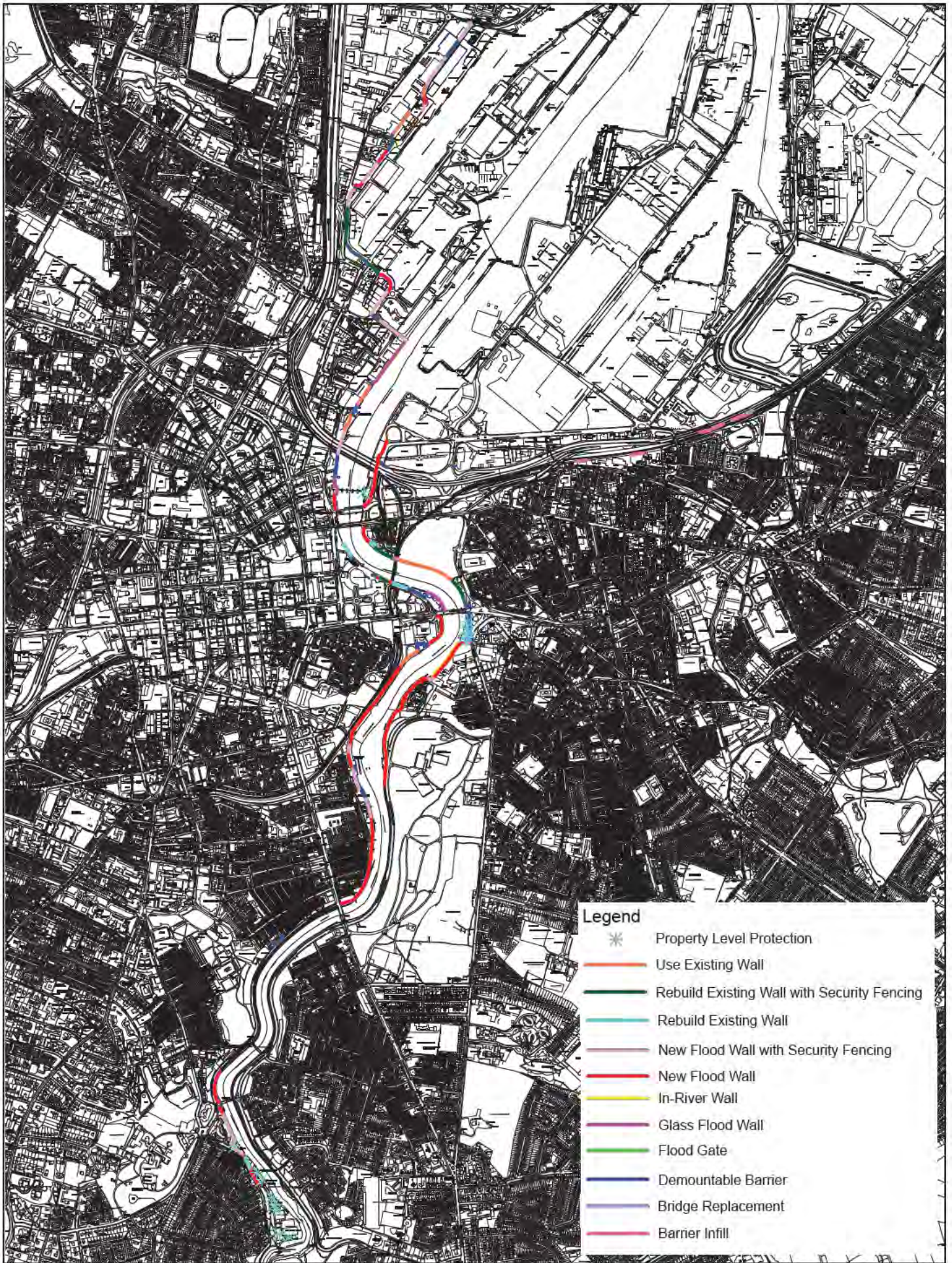
It is important to note that steel/concrete piles are being placed in front of the quay wall as the existing wall is structurally unsafe and at risk of collapse. The collapse of the quay wall into the Impounded River Lagan would be more detrimental than any proposed construction impacts..

Therefore, a conclusion of 'No AESI' (Adverse Effect on Site Integrity) is given at Appropriate Assessment. This conclusion is dependent on the mitigation measures outlined in 11.2 above in the CEMP and works information. If any of these measures, or a suitable alternative, are not included, this assessment may change.

Appendices

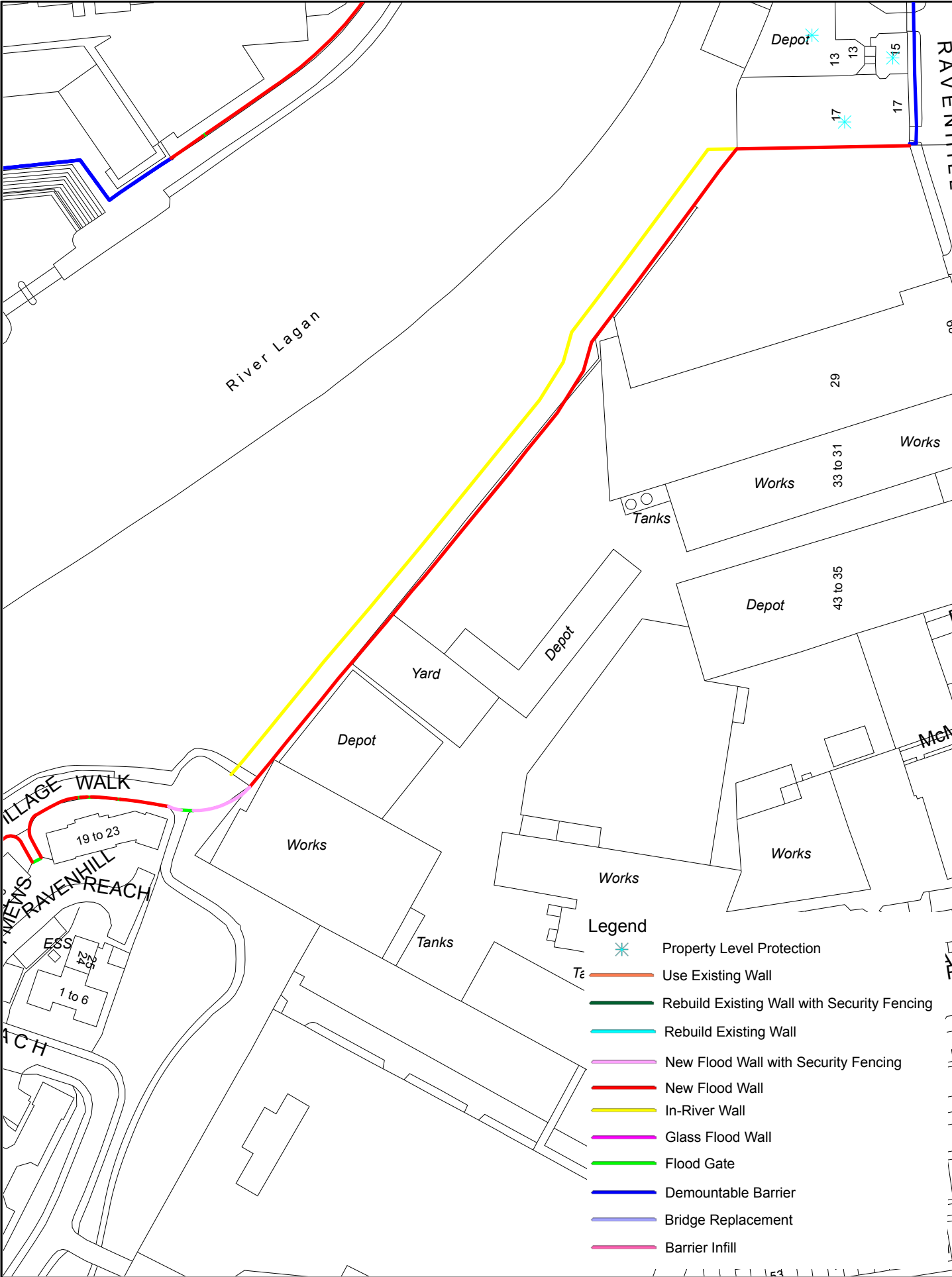
Appendix A. Site Location Plans

A.1. Scheme Overview



<p>Client</p>	<p>Scheme Overview- Draft (Scheme boundary subject to change)</p> <p>71 Old Channel Road Belfast BT3 9DE Tel. (028) 90788600 Fax (028) 90788688</p>	<p>Project Name</p> <p>Belfast Tidal Flood Alleviation Scheme</p> <table border="1"> <tr> <td>Drawn</td><td>Reviewed</td><td>Checked</td></tr> <tr> <td>NC</td><td></td><td></td></tr> <tr> <td>Date</td><td>Date</td><td>Date</td></tr> <tr> <td>May 19</td><td></td><td></td></tr> </table>	Drawn	Reviewed	Checked	NC			Date	Date	Date	May 19		
Drawn	Reviewed	Checked												
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Date	Date	Date												
May 19														

A.2. Ravenhill Quay Wall



<p>Client</p>	<p>Ravenhill Quay Wall Overview- Draft (Scheme boundary subject to change)</p> <p>71 Old Channel Road Belfast BT3 9DE Tel. (028) 90788600 Fax (028) 90788688</p>	<p>Project Name</p> <p>Belfast Tidal Flood Alleviation Scheme</p> <table><tr><td>Drawn</td><td>Reviewed</td><td>Checked</td></tr><tr><td>NC</td><td></td><td></td></tr><tr><td>Date</td><td>Date</td><td>Date</td></tr><tr><td>May 19</td><td></td><td></td></tr></table>	Drawn	Reviewed	Checked	NC			Date	Date	Date	May 19		
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Appendix B. Ravenhill Reach Photos

B.1. Ravenhill Quay Wall











Appendix C. Location of International Sites

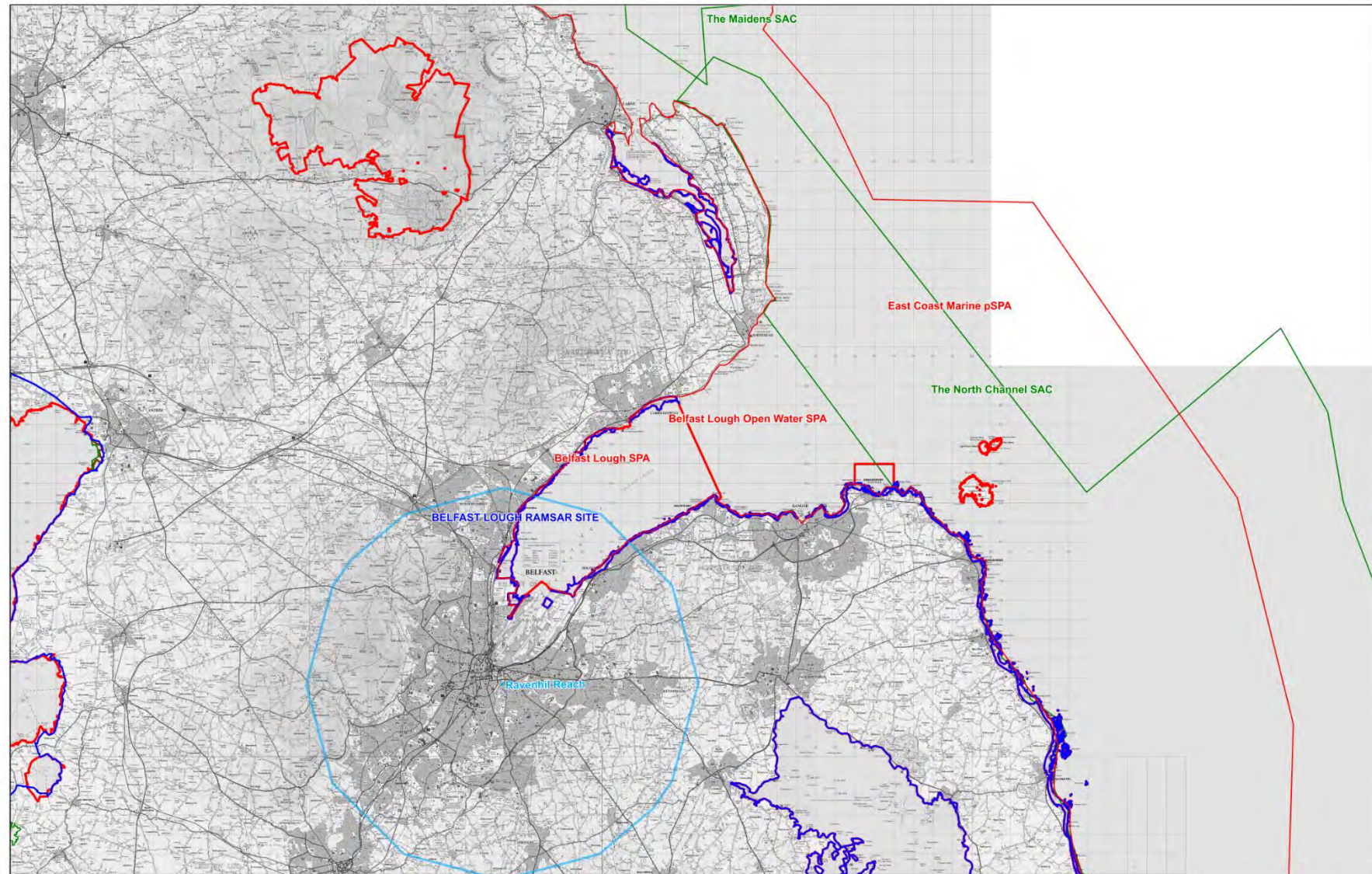


Figure C.1: Location of International Sites

Appendix D. Planning Applications

Table 9 - Plans and Projects

Project Code	Project Address	Project proposal	Application received / status	HRA Required
N/A	Various	Belfast Tidal: Construction of new flood defence structures to protect against existing tidal flood risk and to mitigate against future sea level rise caused by climate change for Belfast Harbour and the extents of the tidal influence of the River Lagan.	N/A	No
LA04/2016/0041/F	Site located at the weir at Stranmillis near Belfast Boat Club BT9 5FJ	Lagan Gateway Project: Project includes the provision of a new boat lock at Stranmillis to allow the passage of boats past the weir, new footbridge and path linking Annadale embankment with Stranmillis and paths to Belvoir Park. Works involve working in the river Lagan near an existing weir and fish pass and constructing a footbridge near a scheduled monument area (historical lock).	15 Dec 2015 / Permission Granted	Yes
N/A	Area (approx. 28 ha) alongside the river Lagan which runs from the SSE Arena car park at its northern end to the Sirocco Works site to the south and is bounded by the Short Strand to the east.	East Belfast Development Strategy: The Strategy contains proposals for how the area might be developed and better connected to the city centre and the communities adjacent to it. The aim is to inform planning and investment decisions that will impact the long-term development of this area. The East Bank area has, and is in receipt of, major outline planning applications for mixed use development of land at the Odyssey Quays (6.9 ha) and at the former Sirocco Works (6.5 ha). Some roadworks associated with Odyssey Quays have been approved as reserved matters and work has commenced. The DfC also has Masterplan proposals for Queen's Quay (1.3 ha).	N/A	Yes
LA04/2015/0405/F	Lower Ormeau Embankment and River Terrace.	Lagan pedestrian and Cycle Bridge - Pedestrian and cycle bridge (5.0m between parapets) with combined foot and cycle ramps from close to railway underpass on west bank to quay	28 May 2015 / Permission Granted	Yes

		on east bank; pedestrian and cycle links to existing routes, car park, storm drainage, lighting and landscaping.		
LA04/2016/0421/F	Land at D3 adjacent to the RSPB Reserve Airport Road West Belfast BT3 9DY	D3-Construction of a new multi-purpose facility at D3 for berthing of cruise ships, and for lay-by and transient storage of project cargo, break bulk and dry bulk during cruise ship off season. Development comprises the construction of 340m long solid quay with mooring dolphins, dredging of the berthing pocket and infilling behind the new quay wall using imported clean fill materials, construction of a 25m wide piled relieving slab along the quay length, with heavy duty paving surfacing on the quay/slab hinterland, access road, security gates, access barrier and kiosk at Airport Road West, modular terminal building, shore side facilities, lighting, fencing, screen bund and landscaping.	1 March 2018 Under Construction	Yes
LA04/2016/1450/F	Lands at the former Dargan Road landfill site to the north of Dargan Road Belfast	Construction of surface water drainage system to convey runoff water to Belfast lough. The system includes a headwall structure subject to marine construction licence.	29 Jun 2016 / Permission Granted	No
LA04/2017/2361/F	The Odyssey Pavilion 2 Queens Quay Belfast BT3 9QQ	Reconfiguration of interior to provide 16 No. bar/restaurant units, health club, arena hospitality suite, climbing wall, refurbishment of Pavilion interior, new foyer, access deck bridge, new front façade & building access strategy under separate planning permission refurbishment of reception & other ancillary works.	09 Oct 2017 / Permission Granted	No
LA04/2018/0448/F	Lands at former Sirocco Works Short Strand and adjacent to Bridge End and the River Lagan Belfast	Erection of 13 storey Grade A office building with ground floor and mezzanine café/bar/restaurant uses (sui generis), lobby/reception area, basement and deck car parking, servicing (refuse/recycling/cycle storage/changing facilities), landscaping/public realm works, introduction of temporary pedestrian/cycle access to riverfront, associated access arrangements to Short Strand and Bridge End and other associated infrastructural works.	16 Feb 2018 / Application Received	No

LA04/2018/0371/F	40-60 Ormeau Embankment Belfast BT6 8LU	Part replacement boundary with blockwork walls and palisade fencing.	13 Feb 2018 / Under Consideration	No
LA04/2017/1459/F	Land between Stewart Street and Railway Line (opposite 41-55 Stewart Street) Belfast BT7	Additional Lighting to playground and pathway to modular building.	19 Jun 2017 / Permission Granted	No
LA04/2017/1278/A	Allstate HQ Office Mays Meadow Belfast BT7 2DS	Two No. signs mounted on office building façade. One on entrance elevation and one on Riverside elevation. Both signs consist of Allstate individual letters and logo mounted on white support rail with halo illumination.	06 Jun 2017 / Permission Granted	No
LA04/2018/0152/A	Riverside Walk / East Bridge Street Adjacent to Central Station and Maysfield Belfast BT7 2DS	4No. "Coffee Shop" signs mounted on existing posts.	22 Jan 2018 / Application Received	No
LA04/2017/0779/F	93-95 Ann Street Belfast BT1 3HH	Refurbishment of office building and 4 storey rear extension and first and second floor rear extension. Elevation changes.	31 Mar 2017 / Permission Granted	No
LA04/2018/0377/A	City Quays Hotel 90 Donegall Quay Belfast BT1 3FE	Hotel restaurant brand signature to the east (river) side of the Hotel at 1) ground level externally and 2) above the entrance lobby door.	14 Feb 2018 / Consultations Issued	No
LA04/2017/1090/RM	Lands approximately 100m north of M3 Cross Harbour Bridge and bounded by the River Lagan to the east. Donegall Quay and Clarendon Dock to the north. Corporation Square and Clarendon Quay to the west.	City Quays 3 - erection of 16 storey office accommodation (74 metres maximum height) comprising 23,976 sq metres of gross floorspace, associated access, public realm and other ancillary development.	15 May 2017 / Consultations Issued	No

LA04/2017/2561/F	Ground Floor City Quays 2 Clarendon Road Belfast	Amalgamation of ground floor coffee shop & office to single unit & change of use to retail unit with associated hot food bar for the sale of hot food and drink for consumption on the premises and for distribution off the premises.	07 Nov 2017 / Under Consideration	No
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Appendix E. JNCC report – Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise

Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise

August 2010

Introduction

This document, which has been produced by Natural England, the Countryside Council for Wales and the Joint Nature Conservation Committee, outlines a protocol for the mitigation of potential underwater noise impacts arising from pile driving during offshore wind farm construction. This protocol may also be useful to other industries in the marine environment which use pile driving. The agencies recommend that all operations that include pile driving should consider producing an Environmental Management Plan (EMP), or an equivalent document that meets the requirements of the relevant regulator.

The nature conservation agencies' policies support appropriately sited offshore renewable energy developments because they can provide environmental benefits to species of conservation concern, including marine mammals, by reducing greenhouse gas emissions and mitigating adverse climate change impacts. However, these developments can adversely affect species and features of conservation importance, including those protected by European and domestic Law. Mitigation of such impacts forms an intrinsic part of the Environmental Impact Assessment (EIA) process required as part of the consenting process for offshore windfarms.

The installation of driven piles in the marine environment without mitigation is likely to produce noise levels capable of causing injury and disturbance to marine mammals. Such effects, although incidental to consented activities, have the potential to conflict with the legislative provisions of The Conservation of Habitats and Species Regulations 2010 (the 'Habitats Regulations', HR), which applies to English and Welsh waters inside 12 nautical miles (nm), and the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (the 'Offshore Marine Regulations', OMR, as amended 2009 and 2010), which apply on the United Kingdom Continental Shelf.

JNCC, NE and CCW have produced guidance on 'the protection of marine European protected species from injury and disturbance'. The piling protocol forms part of that more general guidance and the recommendations should be considered as 'best practice' for piling operations.

JNCC notes that other protected fauna, for example turtles, occur in waters where these guidelines may be used, and would suggest that, whilst the appropriate mitigation may require further investigation, the protocols recommended for marine mammals would also be appropriate for marine turtles and basking sharks¹.

Scientific understanding of the issues discussed in this piling protocol is incomplete, but improving. It is therefore important to note that the piling protocol is not considered to be static policy and will be subject to regular revision following on from experience of its use, and the development of a better understanding of the efficacy of certain mitigation measures recommended in the protocol.

Pile driving in the marine environment without mitigation is likely to produce noise levels capable of inducing adverse avoidance reactions at a considerable distance from the activity, which could constitute disturbance under the Regulations (HR and OMR depending on the area). Pile driving is also likely to cause injuries (e.g. hearing impairment) and there remains the possibility of causing death in marine mammals that are in very close proximity.

This protocol does not document measures to mitigate disturbance effects, but has been developed to reduce to negligible levels the potential risk of injury or death to marine mammals in close proximity to piling operations.

If the risk of disturbance cannot be avoided or reduced to negligible levels, the developers need to obtain a licence under regulations 53/49 (HR/OMR respectively) in order to avoid the application of regulations 41(1)(b) and 39(1)(b) of the HR/OMR.

¹ Basking sharks are protected from intentional capture or disturbance in British waters (up to 12 miles offshore) under a 1998 listing on the Wildlife and Countryside Act (1981), Schedule 5.

Index

Section 1 - The Standard Piling Protocol

- 1.1 The planning stage
 - 1.1.1 Developer to demonstrate Best Available Technique (BAT) is being used
 - 1.1.2 Consideration of the local environment
- 1.2 Role of the Marine Mammal Observer (MMO)
 - 1.2.1 Training requirements for MMOs
 - 1.2.2 Equipment needed by the MMO
- 1.3 Passive Acoustic Monitoring (PAM) and PAM operatives
- 1.4 Communication
- 1.5 Mitigation Zone

Section 2 - Advice during the piling activity

- 2.1 Piling at night or poor visibility
- 2.2 Pre-piling Search
- 2.3 Delay if marine mammals detected within mitigation zone
- 2.4 Soft-start
- 2.5 Break in piling activity
- 2.6 Acoustic Deterrent Devices (ADDs)

Section 3 - After the piling activity

- 3.1 Reporting Requirements

Section 4 - Variation of standard piling protocol

Section 5 - Securing of mitigation package through Food and Environment Protection Act (FEPA) conditions and Environmental Management Plan (EMP)

Section 6 - References

Terminology

Marine European Protected Species: These are marine species in Annex IV(a) of the Habitats Directive that occur naturally in the waters of the United Kingdom. These consist of several species of cetaceans (whales, dolphins and porpoises), turtles, and the Atlantic Sturgeon.

Marine Mammal Observer (MMO): Individual responsible for conducting visual watches for marine mammals. It may be requested that observers are trained, dedicated and/or experienced. The MMO may also be a PAM operative.

- **Trained MMO:** Has been on a JNCC recognised course

- **Dedicated MMO:** Trained observer whose role on board is to conduct visual watches for marine mammals (although it could double up as a PAM operative)
- **Experienced MMO:** Trained observer with 3 years of field experience observing for marine mammals, and practical experience of implementing the JNCC guidelines
- **PAM Operative:** Person experienced in the use of PAM software and hardware and marine mammal acoustics

Mitigation Zone: The area where a Marine Mammal Observer keeps watch for marine mammals (and delays the start of activity should any marine mammals be detected).

Passive Acoustic Monitoring (PAM): Software system that utilises hydrophones to detect the vocalisations of marine mammals.

Section 1 - The Standard Piling Protocol

The standard protocol should be recommended to developers as a minimum level of good practice to mitigate the potential for causing injury or death to marine mammals in close proximity to piling operations.

Many of the techniques in the standard piling protocol have their origins in the 'JNCC seismic guidelines'. As the levels of noise associated with seismic survey can, in some cases, be similar to those likely to arise from piling operations, it is appropriate to adopt comparable mitigation measures. Additionally, many of the elements of the protocol have already been incorporated as FEPA licence conditions for Round 1 and 2 offshore windfarms, following advice provided by the statutory nature conservation agencies (Section 5).

1.1 The planning stage

The developer should consult JNCC, NE and CCW guidance on '*the protection of marine European Protected Species from injury and disturbance*' to assist in environmental impact assessment.

The recommendations detailed below should be considered by the developer during the planning stage and be incorporated into the project's Environmental Management Plan or the equivalent document required by the relevant regulator.

1.1.1 Developer to demonstrate that Best Available Technique (BAT) is being used

BAT, which incorporates the previous concept of BATNEEC (Best Available Technique Not Entailing Excessive Cost), is an established approach in environmental management. It seeks to balance the highest level of environmental protection against commercial affordability and practicality.

The demonstration of BAT may require developers to submit commercially sensitive information to the agencies. For example, the costing of different pile construction

techniques is likely to be confidential. There may, understandably, be concerns about this process and, in such cases, the agencies will agree an approach with the developers and the regulators (currently the MMO for offshore windfarm developments covered by this protocol) to regulate this process.

Techniques such as hammer modifications, sleeving or muffling, the use of vibratory hammers and gravity based piling may all reduce noise levels. The developer may be able to demonstrate that certain installation approaches do not amount to BAT, and this can be achieved by submitting a detailed business case involving analysis of cost and impact on margins. The use of gravity base piles is particularly notable, because potential noise impacts are likely to be much reduced. In contrast, the COWRIE work has gone some way to demonstrate that the use of unenclosed bubble curtains, bubble trees² or enclosure coffer dams³ is currently ineffective or uneconomical.

1.1.2 Consideration of the local environment

The developer must determine what marine mammal species are likely to be present in the area and assess if there are any seasonal considerations that need to be taken into account. Seasonal restrictions on piling operations may be necessary. For example this may be appropriate during periods of seal pupping, and when there is clear seasonal demarcation in animal occurrence and seasonal restrictions would have practical application⁴. The interaction with other potential spatial and temporal restrictions on construction times (for example in spring to mitigate impacts on commercial fish spawning or during winter to reduce impacts on certain seabirds) would also need to be considered.

1.2 Role of the Marine Mammal Observer (MMO)

Operators should seek to provide dedicated MMOs and Passive Acoustic Monitoring (PAM) operatives. Piling activities should be monitored by MMOs and PAM operatives whose primary role is to detect marine mammals and to potentially recommend a delay in the commencement of piling activity if any marine mammals are detected. In addition, the MMO / PAM operatives should be able to advise the crew on the implementation of the procedures set out in the agreed mitigation protocol, to ensure compliance with those procedures.

1.2.1 Training requirements for MMOs

MMOs should be appropriately trained and understand the mitigation procedures within the piling protocol. MMOs should be present in sufficient numbers to ensure that monitoring is not compromised by fatigue. They should ensure they receive a copy of the mitigation procedures requested by the regulating authority as they may

² Bubble curtains and bubble trees release streams of bubbles into the water column - because of tidal flows such bubbles are likely to dissipate in the environments associated with offshore windfarms.

³ Not commercially feasible currently because of the time taken to install them, particularly in the offshore environment.

⁴ Seasonal restrictions which would restrict piling for large parts of the year and which might therefore make a project uneconomic may not be welcomed by the operator. In such cases where the impact assessments showed risk of a disturbance offence, the operator may wish to consider alternative methods, for example such as the use of gravity piles.

vary between activities. JNCC has approved a number of MMO course providers⁵ – although the courses they run deal primarily with the seismic guidelines, the skills are easily transferable to the monitoring of piling activities.

1.2.2 Equipment required by the MMO

MMOs should be equipped with binoculars, a copy of the agreed monitoring protocol and the 'Marine Mammal Recording Form', which is an Excel spreadsheet containing embedded worksheets named 'Cover Page', 'Operations', 'Effort' and 'Sightings'. A Word document named 'Deck forms' is also available, and MMOs may prefer to use this when observing before transferring the details to the Excel spreadsheets. Although these forms were developed for seismic surveys, they can be used for piling operations, although many columns will not be applicable.

The ability to determine range of marine mammals is a key skill for MMOs, and a useful tool is a range finding stick. All MMO forms, including a guide to completing the forms, and instructions on how to make and use a range finding stick, are available on the JNCC website.

1.3 Passive Acoustic Monitoring (PAM) and PAM operatives

PAM systems consist of hydrophones that are deployed into the water column, and the detected sounds are processed using specialised software. PAM operatives are needed to set up and deploy the equipment, and to interpret the detected sounds. A PAM operative could also be a trained MMO, and this would allow them to switch roles, if required, between acoustic and visual monitoring (providing that there is another trained PAM operative available). Switching roles between acoustic and visual monitoring could help alleviate observer fatigue.

In its current state of development, PAM systems are particularly useful in detecting harbour porpoises within a 500 metre mitigation zone, although the systems have their limitations and can only be used to detect vocalising species of marine mammals.

PAM can provide a useful supplement to visual observations undertaken by MMOs and the agencies may recommend that it is used as a mitigation tool when commenting on applications for piling consents. However, in many cases it is not as accurate as visual observation for determining range, and this will mean that the mitigation zone will reflect the range accuracy of the system. For example, if the range accuracy of a system is estimated at +/-300 metres, animals detected and calculated to be within 500 metres from the source could, in reality, be $500 + 300 = 800$ metres, but their detection would still lead to a delay in the soft-start. Although, at present it is not possible to express the range accuracy of most PAM systems in numerical terms, this example serves to illustrate that it is in the developer's best interests to use the most accurate system available, and for the PAM operative to factor in a realistic estimate of the range accuracy.

⁵ The JNCC website has a list of MMO course providers: <http://www.jncc.gov.uk/page-4703>

1.4 Communication

At the planning stage the communication channels between those providing the mitigation service and the crew working on the piling are to be established. The MMO and PAM operatives also have to ensure there is a workable communication procedure in place so that any visual and acoustic detections can be corroborated by both. In addition, a formal chain of communication from the MMO or PAM operative to the person who can start/stop piling operations must be established. This is important, because construction contractors working to a tight timetable may not fully appreciate the roles and responsibilities of the MMO and PAM operatives. In order to establish the chain of communication and command MMOs and PAM operatives should attend any relevant pre-mobilisation meetings.

1.5 Mitigation zone

It is necessary to establish a “mitigation zone” of a pre-agreed radius around the piling site prior to any piling. This is an area in which the MMO / PAM operative will monitor either visually and/or acoustically for marine mammals before piling commences. The extent of this zone should be considered during the environmental impact assessment and agreed with the regulatory authority.

The extent of this zone represents the area in which a marine mammal could be exposed to sound that could cause injury and will be determined by factors such as the pile diameter, the water depth, the nature of the activities (for example whether drilling will also take place) and the effect of the substrate on noise transmission. The radius of the mitigation zone should be no less than 500 metres, and this is measured from the pile location (figure 1). The MMO and PAM operative should be located on the most appropriate viewing platform (e.g. vessel) to ensure effective coverage of the mitigation zone. The MMO will also require a platform that provides a good all-round view of the sea.

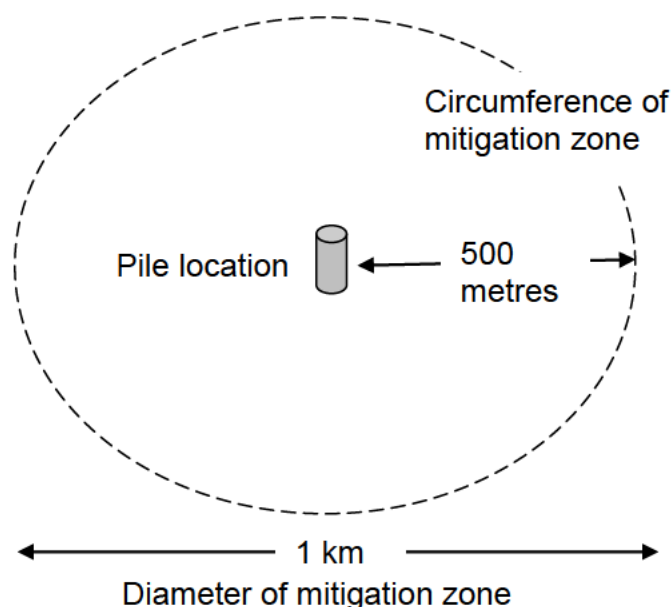


Figure 1: A representation of the mitigation zone, this is measured from the location of the pile to be installed out to a distance of 500 metres.

Section 2 – Advice during the piling activity

The following recommendations are relevant during piling operations.

2.1 Piling at night or poor visibility

Piling should not be commenced during periods of darkness or poor visibility (such as fog), or during periods when the sea state is not conducive to visual mitigation (above Sea State 4⁶), as there is a greater risk of failing to detect the presence of marine mammals. Variations to this restriction on commercial grounds are discussed in section 4.

2.2 Pre-Piling Search

The mitigation zone should be monitored visually by MMOs and/or acoustically using PAM for an agreed period prior to the commencement of piling. It is recommended that the pre-piling search duration should be a minimum of 30 minutes⁷.

2.3 Delay if marine mammals detected within mitigation zone

Piling should not be commenced if marine mammals are detected within the mitigation zone or until 20 minutes⁸ after the last visual or acoustic detection. The MMO and PAM operative should track any marine mammals detected and ensure they are satisfied the animals have left the mitigation zone before they advise the crew to commence piling activities.

2.4 Soft-Start of pile driver

The soft-start is the gradual ramping up of piling power, incrementally over a set time period, until full operational power is achieved. The soft-start duration should be a period of not less than 20 minutes⁹. It is believed that by initiating piling at a lower power this will allow for any marine mammals to move away from the noise source, and reduce the likelihood of exposing the animal to sounds which can cause injury. Soft-start noise levels will vary according to hammer and pile design and other factors, and should be assessed as part of the environmental impact assessment process. Developers might want an alternative soft-start duration depending upon the

⁶ Detection of marine mammals, particularly porpoises, will decrease as sea-state increases. While ideally sea-states of 2 or less, are required for optimal visual detection the risks of not detecting individuals within the MZ should be reduced by the combined use of visual monitoring and PAM.

⁷ This 30 minute period is used in the JNCC seismic survey guidance

⁸ A 20 minute period is adopted by the JNCC seismic survey guidance. Issues of swimming speed and noise dosage are considered in the Thame Developer report - it is considered that twenty minutes is a sufficient period of time to allow individuals to be at a distance where risk of injury or death is minor.

⁹ The details of soft-start will vary according to substrate type, pile design and the hammer utilised. Measurements from the Lynn and Inner Dowsing test pile suggest that while “soft-start” levels are considerably lower than those occurring during full power piling they are still capable of giving rise to injury. Details of the soft-start procedure should be obtained for each project (see draft FEPA conditions Section 5).

specifics of the project and outcomes of the EIA process; any requested variation from a 20 minute soft-start should be agreed with the relevant agency and regulator.

If a marine mammal enters the mitigation zone during the soft-start then, whenever possible, the piling operation should cease, or at the least the power should not be further increased until the marine mammal exits the mitigation zone, and there is no further detection for 20 minutes. The feasibility of this approach should be agreed with the relevant agency and regulator as part of the approval process. It is recognised that the ability to cease operations may be constrained by the substrate type or pile design.

When piling at full power, there is no requirement to cease piling or reduce the power if a marine mammal is detected in the mitigation zone (it is deemed to have entered “voluntarily”¹⁰). It is also acknowledged that, for engineering reasons, it may not be possible to stop piling at full power until the pile is in final position.

2.5 Break in piling activity

If there is a pause in the piling operations for a period of greater than 10 minutes, then the pre-piling search and soft-start procedure should be repeated before piling recommences. If a watch has been kept during the piling operation, the MMO or PAM operative should be able to confirm the presence or absence of marine mammals, and it may be possible to commence the soft-start immediately. However, if there has been no watch, the complete pre-piling search and soft-start procedure should be undertaken.

2.6 Acoustic Deterrent Devices (ADDs)

The use of devices that have the potential to exclude animals from the piling area should be considered. Acoustic Deterrent Devices (ADDs) should only be used in conjunction with visual and / or acoustic monitoring.

In theory, ADDs have the potential to reduce the risk of causing injury to marine mammals, and are relatively cost effective. However, evidence relating to the efficacy of acoustic deterrents such as “scrammers” or “pingers” is currently limited and there is a need for studies to quantify the efficacy of candidate devices to determine their applicability as suitable mitigation measures.

When planning to use ADDs, the potential effectiveness of candidate devices on the key marine mammal species likely to be present in the area should be assessed as part of the EIA process for the activity. This assessment should feed into the site specific Environmental Management Plan (EMP) or equivalent. It is expected that these devices would always be used in accordance with recommended conditions that would prevent the exposure of animals to disturbance that would constitute an offence under regulations 41 and 39 of the Habitats Regulations and the Offshore Marine Regulations, respectively. It should be noted that a wildlife licence under the

¹⁰ Please note that there is no scientific evidence for this “voluntary” hypothesis, instead it is based on a common sense approach. Note, however, that other factors, such as food availability, may result in marine mammals approaching piling operations. In particular, the availability of prey species stunned by loud underwater noise may attract seals into the vicinity of piling operations.

Wildlife and Countryside Act 1981 (within 12nm) might be required to authorise a potential intentional disturbance.

The use of ADDs will be subject to a number of recommended conditions, for example:

- ADDs should be positioned in the water in close proximity to the pile to be installed; the vessel with the MMOs and PAM operatives may not necessarily be a suitable mooring location for these devices.
- ADDs should be switched on throughout the pre-piling search and turned off immediately after the piling activity has started.

Section 3 – After the piling activity

3.1 Reporting Requirements

Reports detailing the piling activity and marine mammal mitigation, the ‘MMO and PAM reports’, should be sent to the relevant conservation agency after the end of the piling activity. Reports should include:

- Completed Marine Mammal Reporting Forms
- Date and location of the piling operations
- A record of all occasions when piling occurred, including details of the duration of the pre-piling search and soft-start procedures, and any occasions when piling activity was delayed or stopped due to presence of marine mammals
- Details of watches made for marine mammals, including details of any sightings, details of the PAM equipment and detections, and details of the piling activity during the watches
- Details of any Acoustic Deterrent Devices (ADDs) used, and any relevant observations on their efficacy
- Details of any problems encountered during the piling process including instances of non-compliance with the agreed piling protocol
- Any recommendations for amendment of the protocol

Section 4 - Variation of standard piling protocol

The above protocol is considered to represent current best practice for a typical windfarm piling operation. Developers may, however, feel that the protocol is unduly restrictive, particularly in respect of restrictions on night-time/low visibility piling. In such cases, the burden of proof lies with the developer to demonstrate that effective mitigation can be delivered using an amended protocol.

A distinction should be made here between piling which commences during times of good visibility (and subject to the above provisions) and continues into a period of poor visibility/ night-time, and piling that commences during times of poor visibility (including night-time conditions).

Assuming that the operations are continuous the first scenario would not need additional mitigation. The second, scenario would, however, require enhanced

mitigation measures. For example, a developer wishing to commence piling at night might need to demonstrate that:

- Such piling is essential for commercial viability.
- The developer will provide enhanced detection of marine mammals (e.g. increased number of PAM systems and PAM operatives for commencement of piling during night-time).

Each request for variations from the protocol should be considered on its merits and, to ensure consistency across projects and other marine industries, in close liaison with JNCC and other statutory nature conservation agencies.

Section 5 - Securing of mitigation package through legally-binding consent conditions and Environmental Management Plan (EMP)

Under current arrangements the mitigation package relating to windfarm developments is likely to be secured under FEPA conditions, rather than under the Electricity Act s.36 consent. Conditions drafting is likely to vary according to project specific issues and will evolve as our understanding of the issues improves. Conditions imposed by the MMO (formerly MFA, formerly MCEU Defra) in respect of the Thames windfarms are set out below as an example of possible consent requirements only.

9.20 Conditions 9.20 to 9.22 shall only apply where driven or drilled pile foundations are to be installed.

9.21 Construction activities shall not commence until the Licence Holder has agreed with the Licensing Authority and [insert relevant nature conservation agency name] a scheme for the mitigation of potential impacts on marine mammals. The scheme must be submitted to the Licensing Authority by the date specified in the timetable required under condition 9.35. Such a scheme shall include, inter alia:

- *A requirement on the Licence Holder to ensure that suitably qualified and experienced Marine Mammal Observers are appointed and [insert relevant nature conservation agency name(s)] notified of their identity and credentials before any construction work commences.*
- *A requirement on the Licence holder must ensure that piling activities do not commence until half an hour has elapsed during which marine mammals have not been detected in or around the site. The monitoring should be undertaken both visually (by Marine Mammal Observers) and acoustically appropriate passive acoustic monitoring equipment. Both the observers and equipment must be deployed at a reasonable time before piling is due to commence.*
- *A requirement on the Licence Holder to ensure that at times of poor visibility (night-time, foggy conditions, sea state greater than that associated with force*

4 winds, etc.) enhanced acoustic monitoring¹¹ of the zone is carried out prior to commencement of relevant construction activity.

- A requirement that piling may only commence using an agreed soft start procedure. The duration and nature of this procedure must be discussed and agreed prior to commencement of operations¹².*
- A requirement that the Licence Holder must make provision for a reporting methodology to be in place before works commence to enable efficient communication between the MMOs and the skipper of the piling vessel.*

9.22 *Piling activities shall not take place other than in accordance with the scheme agreed at 9.21 above*

In addition to be involved in the drafting of such conditions, it is likely that statutory nature conservation agencies will want to check that a project's Environmental Management Plan contains appropriate protocols relating to the pile driving operations, such as how the MMOs will interact with the piling crew. Drafting of a potential template condition requiring approval of the EMP following consultation with the agencies is set out below:

X: The Licence Holder must submit a copy of a project Environmental Management Plan for the approval of the Licensing Authority, in consultation with CEFAS, and the [insert relevant nature conservation agency name(s)], at least 4 months prior to the proposed commencement of construction works. To ensure that satisfactory arrangements are in place for liaison on environmental issues. Construction shall not commence until such time as the Environmental Management Plan has been approved by the Licensing Authority.

Y: The Licence Holder must ensure that a suitably qualified and experienced liaison officer, Marine Mammals Observer(s) and other officers are appointed (for fisheries and environmental liaison) and that the Licensing Authority is notified of their identity and credentials before any construction work commences, to establish and maintain effective communications between the Licence Holder, contractors, fishermen, conservation groups and other users of the sea during the course of the project.

Z: The Licence Holder must ensure that the liaison officer's environmental remit includes:

- i) Monitoring compliance with the commitments made in the Environmental Statement and the Environmental Management Plan (as agreed under condition Y above).*

¹¹ The details of any enhanced acoustic monitoring scheme would need to be agreed in advance with the regulator as advised by the relevant nature conservation agency however they might include the provision of additional hydrophones and/or T-Pods together with extra PAM operators

¹² As discussed at footnote 9 above there is potential for "soft-start" levels to be of a sufficient volume to give rise to injury or significant disturbance. Information on possible noise levels will therefore need to be provided as part of the EIA and the process will need to be agreed with the regulator as advised by the relevant nature conservation agency. An excessive level for soft-start procedures might be that capable of giving rise to TTS to an individual in close proximity (metres) to the piling operation

- ii) Providing a central point of contact for the Monitoring Programme and Ornithological Monitoring Programmes required under relevant conditions*
- iii) Liaison with fishermen, conservation groups and other users of the sea concerning any amendments to the method statement and site environmental procedures.*
- iv) Inducting site personnel on site / works environmental policy and procedures.*

Section 6 - References

Collaborative Offshore Wind Research into the Environment (COWRIE):

<http://www.offshorewindfarms.co.uk>

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