

Appendix 10 - Attachment K

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ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

OUTLINE CLOSURE PLAN (CP) FOR WASTE ACTIVITIES AS PART OF BANTRY INNER HARBOUR - PHASE 1 WORKS

PORT OF CORK COMPANY

MARCH 2016



OUTLINE CLOSURE PLAN (CP) FOR WASTE ACTIVITIES AS PART OF BANTRY INNER HARBOUR - PHASE 1 WORKS

PORT OF CORK COMPANY

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Abstract: This document presents a draft, outline closure plan (CP) to accompany a waste licence application for the Bantry Inner Harbour Phase 1 works and to inform further discussion in relation to financial provision for same.

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1 INTRODUCTION

A waste licence application is being made to the Environmental Protection Agency in Q1 2016 in relation to waste activities associated with the development of Phase 1 of the Bantry Inner Harbour Development works.

The waste activities associated with these works relate to the management of dredge spoil material from the dredging works in Bantry Inner Harbour. A portion of the dredge spoil will be solidified and stabilised prior to placement in specific locations within the works area, negating the need to import virgin fill material and applying a recovery benefit to the material. The principal waste activity associated with the works is therefore:

R5 Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.

The applicant for this application is the Port of Cork.

This document forms an outline closure plan (CP) to inform the identification of the financial commitments required by the Port of Cork to cover potential liabilities during the closure and aftercare period associated with the works.

This document is submitted as part of the application submission and has been prepared in accordance with two no. EPA guidance documents entitled:

- Guidance on assessing and costing environmental liabilities (2014)¹, hereafter referred to as the "Guidance" and
- Guidance on Financial Provision for Environmental Liabilities (2015)²

The Guidance outlines 3 steps in the completing a closure and restoration/aftercare plan:

- Step 1: Scoping
- Step 2: Closure
- Step 3: Restoration/aftercare

1.1 Status of Document

As part of the pre-application process for the waste licence application being made for the development of Phase 1 of the Bantry Inner Harbour Development works, some discussion has been undertaken with the Agency as a pre-cursor to the identification of closure and restoration requirements and financial provision for same. A meeting was held on Tuesday 23rd February 2016 at the EPA offices at Inninscarra.

It was confirmed based on these discussion that an outline closure plan would be submitted to accompany the waste licence application, and further discussions would be held, based on the information contained herein, as part of the overall waste licence application process.

Thus, this outline document aims to identify the closure and aftercare requirements as best as possible based on the current understanding of the development proposal and is submitted on the basis of further review of same potentially being required as the application process progresses.

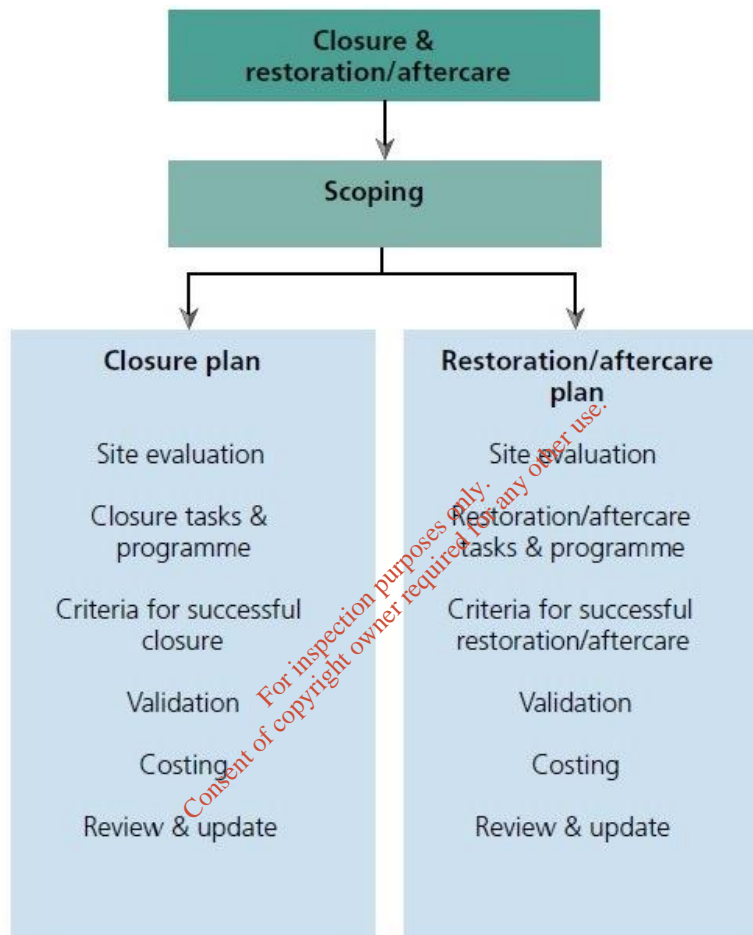
¹ as well as its accompanying document "Guidance on assessing and costing environmental liabilities – Unit cost rates for verification"

² Available online at <http://www.epa.ie/pubs/advice/licensee/financiaprovisionsreport.pdf>

2 STEP 1 - SCOPING

This section determines the extent of plan preparation required for the closure plan associated with the Bantry Inner Harbour Phase 1 works. As shown in Figure 2-1, the scoping process determines whether a closure plan alone or in combination with a restoration/aftercare plan is required – where combined, a closure and restoration/aftercare plan is referred to with the abbreviation CRAMP.

Figure 2-1: Closure & Restoration/aftercare requirements



2.1 Determination of Closure and/or Restoration/Aftercare

The Guidance identifies the difference between closure and restoration/aftercare as follows:

- **Closure and closure plan** refer to relatively short-term measures necessary to close a site satisfactorily including decommissioning and residuals management. For many sites, there will be no environmental liabilities once closure, decommissioning and residuals management are completed, and so only a closure plan is required.
- **Restoration/aftercare and restoration/aftercare plan** refer to longer term measures that are necessary where environmental liabilities remain following closure, e.g. contaminated soil and groundwater, landfills, extractive waste facilities, mines, quarries and soil recovery facilities. Measures may encompass activities such as remediation, rehabilitation, reinstatement, ongoing emissions control and monitoring.

The Guidance states that operators “*should refer to the conditions of the authorisation at the scoping stage.*”

At this juncture, given that this outline document accompanies the submission of the licence application, the conditions of the authorisation are not available for reference.

It is noted at this stage that it would be the intention of the applicant to surrender any licence within an appropriate timeline, agreed with the Agency and upon demonstration of no environmental impacts resulting from the placement of the solidified dredge spoil material.

12 -24 months after completion of the construction works associated with the Phase 1 Bantry Inner Harbour Development works may, at this stage, be considered an appropriate timeline for licence surrender.

Given the nature of the works, the waste activity will cease upon completion of placement of the treated dredge spoil material and an ongoing monitoring programme will be required to demonstrate that no environmental impact results. However, ongoing monitoring will be the only licence related activity required post completion of material placement.

As such there will be no clear ‘closure’ event, other than construction completion, and there will be no significant ‘aftercare management’ other than monitoring. Therefore, the proposed activity falls between two stools in terms of a clear delineation between closure and aftercare.

Considering the surrender timeline proposed, it is proposed that the closure element be viewed in terms of the aftercare requirements i.e. that a Closure Plan be prepared, which captures the activities related to aftercare (i.e. monitoring), over an identified period, such that the formal closure of the facility would coincide with the surrender of the facility licence.

To this end, this document is presented as a Closure Plan, which encapsulates the aftercare requirements over an extended and to be agreed timeline.

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3 STEP 2 - CLOSURE

This section provides the detail in relation to the Closure Plan proposed for the facility licence and follows closely the requirements outlined in Section 2.5 of the Guidance document.

3.1 Closure Plan Summary

Activity Name & Address

Bantry Inner Harbour Phase 1 Works
Bantry Harbour
Bantry
Co. Cork

Name of the Operator

Port of Cork

Licence/Permit Number

To Be Determined

Name, Address of organisation who prepared the Plan

Fehily Timoney & Company
J5 Plaza
North Park Business Park
North Road
Dublin 11
D11 PXT0

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Classes of activity (to be) licenced and carried out

Waste activities associated with these works, in accordance with the Fourth Schedule of the European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011) are as follows:

- R5** Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials
- R11** Use of waste obtained from any of the operations numbered R 1 to R 10
- R13** Storage of waste pending any of the operations numbered R 1 to R12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)".

Risk category

To Be Determined

Scope

Closure Plan (incorporating aftercare requirements)

Overall Closure Costs

€710,479

Details of Previous Closure Plans

Not applicable

Financial Provision mechanism

To be agreed with the Agency following agreement of Closure Plan costing.

Review period

As per the recommendation of the Guidance, this plan shall be reviewed annually.

3.2 Closure Plan Introduction**3.2.1 General description of activity and the site**

Bantry Inner Harbour is located in the heart of Bantry Town, which is located at the head of Bantry Bay, one of the deepest harbours in Europe and the longest Bay in Ireland. It is a major tourist attraction in Ireland in its own right and attracts large numbers of Irish and overseas visitors on an annual basis. The harbour itself makes up a substantial portion of the town and is a significant backdrop and focal point for the town.

Bantry Harbour is approximately 100 metres wide and 500 metres from its mouth to its head. Mean high water levels are approximately 3.4 metres above Chart Datum while the seabed is often exposed at low tide. Bantry Harbour is enclosed by steep slopes that provide natural shelter and a dramatic and attractive landscape setting for both the harbour and town.

The Harbour is currently constrained by the available water depths. At low water parts of the harbour dry out leaving exposed areas of mudflats and at present, it is not suitable for use by vessels at all states of the tide.

Figure 3-1: Site Location Map

Figure 3-2: Aerial View of Site



It is proposed to carry out, as part of the Phase 1 works at Bantry Inner Harbour, and shown in Figure 3-3, development of:

- a 20 berth marina (quayside pontoons)
- dredging to -4m CD and -3m CD to maximise water depth at all tides
- remedial works to Town pier (widening and extending)
- 7,000 m² of reclaimed landscaped amenity area
- 2,300 m² pier side Quayside reclamation for use as car parking

Figure 3-3: Proposed Development



Dredging will produce approximately 45,000 m³ of dredge spoil, comprising 25,000 m³ of 'fine' dredge material and 20,000 m³ of granular material, to be managed. This material will be stabilised using specialist plant and injected with cement, in order to solidify the material, and placed within the proposed amenity area and within the remedial works area as a fill material.

Solidification with cement is proposed in order to render dredge material suitable as engineering fill and also to 'bind' potential contaminants that have been identified in varying concentrations within the 'fine' dredge material, in order to mitigate potential impacts resulting from the placement of this material. The use of the material as a fill material assigns a 'recovery' status to the waste activity where a 'useful purpose .. replacing other materials' results.

3.2.2 [Date of commencement of operations](#)

Dredging activities are proposed to commence in November 2016 and continue to March 2017. This timeline has been influenced by consideration of minimising potential impacts to local aquaculture operation in the wider Bantry Harbour area.

3.2.3 [Date of First Authorisation](#)

No waste authorisations relate to the proposed activity site.

3.2.4 [Classes of activities licenced and operational at the site](#)

Waste activities associated with these works, in accordance with the Fourth Schedule of the European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011) are as follows:

Class R5 Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials

Class R11 Use of waste obtained from any of the operations numbered R 1 to R 10

Class R13 Storage of waste pending any of the operations numbered R 1 to R12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)".

3.2.5 [Detail of any closure requirements specified in the EPA authorisation](#)

As no EPA authorisations pertain to the site to date, no closure details have been specified.

3.2.6 [Detail of relevant requirements of planning permissions or other authorisations](#)

There are no other relevant requirements of planning permission or other authorisations pertaining to closure of the site.

3.3 Site Evaluation

3.3.1 [Operator Performance](#)

Environmental Management Systems

It is not proposed to develop a specific environmental management system for the facility, given the relatively short duration of the 'operational life' i.e. construction phase of the facility.

The appointed contractor for the works, BAM, is accredited under ISO 140001 and has developed a site specific Construction Environmental Management Plan (CEMP) in accordance with the principles and procedures of their company EMS. A copy of this CEMP is included in Appendix 1.

In addition, the proposed licensee, the Port of Cork, is ISO 14001 accredited and, as part of the auditing and review procedures and requirement of this accreditation, will review the CEMP prepared by BAM at the

beginning of the overall Bantry Inner Harbour Phase 1 works and again at the commencement of the dredge spoil placement element of the works.

3.3.2 Environmental Sensitivity

The environmental sensitivities in relation to the facility are presented under respective headings.

Geology/Hydrogeology

The site is located within Bantry Harbour, which comprises a large portion of Bantry Town

The geology of the area is characterised by the Reenagough Member, which is described as sandstone, which is composed of massive and flaser-bedding. The most recent published geological map identifies the bedrock occurring beneath the site as being of late Devonian sandstone.

The dominant sandstone rock types around Bantry are classified as aquifers but are have poor productivity. This means that where groundwater is present it will be present in low volumes with slow recharge if removed. The groundwater table was encountered during borehole drilling at the site during site investigation works, at a level of 7m bgl.

The overburden soils in the Bantry area comprise predominately "dry" soil types: typically well drained deep mineral soils (AminDW) and well drained shallow soils (AminSW), both acidic chemical derived from mainly acidic parent materials. There is also a significant area of "made ground" associated with Bantry village and Harbour.

Human Receptors

The waste activity location is within the confines of Bantry Inner Harbour and its two piers, the Railway Pier and Town Pier. The harbour is surrounded to the south by the N71 road ("The Quay"); to the east by a public carpark and to the north by the local Harbour View road. West of the site is the wider harbour area.

The nearest residential and commercial receptors are located within 20 - 50 m of the site boundaries, in the form of shops, a hotel, restaurants and private residences, while members of the public utilise the piers for launching vessels and recreation.

Natural Habitats

The development site is concrete paved pier and open harbour area and is classified in accordance with Fossitt 2000, 'A Guide to Habitats in Ireland', as:

- Buildings and Artificial surfaces (BL3)
- Estuaries (MW4)

Three Natura 2000 sites lies within an approximate 10 km radius of the development site:

- Glengarriff Harbour and Woodland cSAC (000090) – 7km north west
- Caha Mountains cSAC (000093) – 8.5 km north west
- Derrylogher (Knockboy) Bog cSAC (001873) – 9 km north

3.3.3 Facility Processes and Activities

The propose waste activity centres on the dredging activity and the subsequent placement and solidification/stabilisation of the dredge spoil material at the Railway Pier and Town Pier locations.

The methodology for the proposed dredging and solidification/stabilisation works is included in Method Statement MS02-3, included in Appendix 2.

Post completion of the dredging and stabilisation works, the Town Pier and Railway Pier areas will remain as amenity infrastructure for the locality, supporting sailing and other recreational activities.

Ongoing environmental monitoring, required as per the waste licence, should it be granted, will continue until such point as a licence may be surrendered.

3.3.4 Inventory of buildings, plant and equipment

The infrastructure onsite during the dredging stage of the construction phase will include:

- hoarding and herras fencing, gated
- hardstanding area at Railway Pier (on revetment)
- hardstanding area at Town Pier
- wheel washing area
- hazardous chemical stores (small quantities of fuel)
- waste quarantine & waste storage areas at site compound and on dump barges
- site compound area
- site cabins – welfare, office, drying rooms

The plant and equipment to be used during dredging and for the placement of the dredge spoil material will include:

- 2 no. 65ft long reach excavator with GPS system
- Aoibheen spudleg Dredger barge
- 2 no. dump barges
- 1 no. 35 ton excavator with clap shell grab
- 1 no. A25 dumper
- 1 no. work boat
- 1 no. safety boat
- 1 no. Allu PMX500 power mixer
- 1 no. Allu PF7 +7 power feeder
- 1 no. landing craft
- Cement storage silos of c 100 tonnes capacity

Post placement of dredge spoil material and completion of the construction phase works, the following amenity related infrastructure will have been provided as part of the Bantry Inner Harbour Phase 1 works:

- Landscaped amenity area of 7000 m² behind revetment structure at Railway Pier
- Widened pier area and Quayside Reclamation of 2,300 m² at Town Pier

Permanent monitoring bouys will remain in place, at locations agreed with the Agency, for the monitoring of potential impacts to surfacewaters at the frequency to be specified in the waste licence, should it be granted.

3.3.5 Drainage

Surfacewater controls will be put in place during the construction works as required, by the construction contractor. There will be no direct discharge of surfacewater to the adjacent waterbodies from the works. The Contractors environmental procedure EP-10 Surfacewater Controls is included in Appendix 3.

3.3.6 Inventory of raw materials, products and wastes

The following approximate quantities of raw materials are expected to be consumed at the facility over the construction period:

- Diesel
- Lubricating Oil

- Hydraulic Oil
- Sheet piles (600 tonnes)
- Precast concrete elements (100 units)
- Rock armour (20,000 m³)
- General imported rock fill (20,000 m³)
- Cement (3,000 tonnes)
- Concrete (1,000 m³)
- Steel reinforcement (250 tonnes)
- Electrical appliances and cables
- Block-work and masonry stone
- Timber formworks (400 m² of shuttering plywood)
- Rock anchors (900 m of double corrosion protection anchors)

Exact quantities of diesel and oils to be consumed are as yet unknown and annual usage will be reported as part of the annual environmental return.

3.3.7 Maximum Storage Capacity for Raw Materials, Products and Wastes

There is no significant storage capacity required for construction raw materials, as materials will be delivered on a 'just in time' basis to the site. Cement will be stored in one or two cement silos, each with a 100 tonne capacity.

Storage capacity for wastes will be provided as part of the overall development works, where the location where the solidified/stabilised dredge spoil is placed will be the final storage location for this material. The dredge spoil material will be temporarily stored in the dredge dump barges from when it is excavated until it is offloaded and placed within the stabilisation/solidification area and the dump barges have a capacity of 300 m³ each.

Construction wastes generated or encountered during dredging will be temporarily stored in skips of varying capacities prior to removal off site by a fully authorised waste management contractor.

3.4 Closure tasks and programmes

3.4.1 Introduction

As identified in Section 2.1, the closure of the facility corresponds to the cessation of construction works onsite but with ongoing monitoring being required until such time as the licence is surrendered.

The applicant is proposing that the closure phase be viewed in terms of the aftercare requirements i.e. that the activities related to aftercare be undertaken over an agreed timeline until such time as the licence may be surrendered, and that this period is the 'closure period'.

Tasks associated with the extended 'closure period' are essentially:

- those associated with completion of construction works and demobilisation of the construction contractor from site and
- ongoing monitoring in accordance with the requirements of the facility licence

3.4.2 Construction Demobilisation

Construction demobilisation is not an activity directly related to the licensable activity onsite i.e. dredge material placement and stabilisation, but is an activity that will be related to the overall process being undertaken within the wider works and it will occur during the closure period.

Activities to be undertaken during construction demobilisation are likely to include:

- Removal of plant and machinery off site

- Taking down of hoarding and security fencing
- Emptying of site accommodation and removal off site
- Removal of stores and any signage
- Removal of waste skips, chemical toilets and any remaining construction process and waste materials
- Disconnection of any services to the site compound

Construction demobilisation will be undertaken by the construction Contractor, BAM and overseen by the resident engineer for Port of Cork.

3.4.3 Ongoing Monitoring

Monitoring will continue for the duration of the closure period until such time as the facility licence may be surrendered, which the applicant understand will be a separate, formal procedure to be entered into with the Agency.

Post construction demobilisation, it is not proposed to continue air quality monitoring for dust, or noise and vibration monitoring, given that construction activities have ceased.

It will be necessary to continue to undertake surfacewater quality monitoring at the frequency and for the parameters and duration required by the licence.

3.4.4 Programme

The Agency will be informed throughout the construction period of the progress of works versus the construction programme. As previously identified, the dredging activity is proposed to occur between November 2016 and March 2017 and is influenced by the 'window' in relevant ecological time constraints.

The overall construction programme which encompasses licensable (dredging and placement) and non-licensable activities, commenced in February 2016 and is programmed to be completed by the end of June 2017.

Post June 2017, construction demobilisation will have been completed and monitoring will continue as per licence requirements until such time as the licence may be surrendered.

For the purposes of planning, an assumed overall closure period of 18 months is presented i.e. from completion of dredging works in March 2017 to the commencement of a formal surrender process by September 2018. The duration of this period will be agreed with the Agency.

An indicative closure programme is presented in Figure 3.4, overleaf.

It should be noted that, in the event of unforeseen circumstances that could impact on the construction programme e.g. inclement weather, with a knock on effect of dredging activities not being fully completed within the available ecological window, the construction and hence closure programme may be impacted and extended beyond the timeframe indicated. In such a circumstance, the Agency will be fully informed and kept up to date of applicable programmes and timelines.

Figure 3-4: Indicative Decommissioning programme

Activity	CLOSURE PERIOD																			
	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	
Completion of Dredging Activities																				
Remaining Construction Activities																				
Construction Demobilisation																				
Ongoing Monitoring																				
Beginning of Surrender Process																				

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3.5 Criteria for a successful closure

The following criteria will be used to determine whether successful closure of the facility has been achieved.

- Construction demobilisation has been achieved to the satisfaction of the Port of Cork and engineering representatives
- Construction works, including dredging, placement and stabilisation/solidification, have been completed in accordance with the requirements of the contract and all relevant authorisations, including the waste licence where relevant.
- All relevant records relating to waste transfer offsite and dredge spoil materials movement and placement onsite are retained and available for inspection during the closure period.
- No negative impact on surfacewater is demonstrated by the monitoring undertaken over the duration of the closure period.
- Verification through communication with the EPA that it is appropriate to commence entering into the licence surrender process.
- Sufficient funds have been provided and made available to complete each task identified in the closure plan.

3.6 Closure Plan Validation

Upon completion of the ongoing monitoring for an agreed duration, the licensee will retain the services of a suitably qualified independent auditor to certify the closure process to determine the success of the closure against the criteria identified in Section 3.5. The auditor will report their findings and certify same.

It is understood by the applicant that this validation relates solely to the 'close out' of the closure period of and that any formal acceptance of closure and ultimate surrender or transfer of a licence is a separate process that must be formally agreed with the EPA.

The preferred outcome of the submission of this validation report will be the verification by the Agency that it is appropriate to commence the formal surrender process.

3.7 Closure Plan Costing

The Guidance indicates that the Agency is required to ensure that "*necessary measures will be taken upon the permanent cessation of an activity (including such a cessation resulting from the abandonment of the activity) to avoid any risk of environmental pollution and return the site to a satisfactory state*", with a requirement to cost for these measures.

Given the licensable activity forms part of an overall construction project, the 'worst case' i.e. most expensive scenario to be costed would be the abandonment of the construction works by the licensee, at a point when dredging works are underway.

Were, for example, the works to be abandoned by the Contractor, the licensee (Port of Cork), would be required to enter another procurement process to procure a Contractor to complete the works to their design requirement, which would be funded by overall project funding.

However, were the licensee to abandon the overall works, the primary concern would be to undertake works to ensure the environmental projection of the area, which would not require the completion of the dredging works and other construction process, but rather the undertaking of activities to eliminate potential for environmental impacts, at whatever stage the licensable activity may be.

In order to determine the 'worst case' situation i.e. the scenario whereby it may be most costly to mitigate any remaining potential for environmental impacts, discussions with the construction project team and

construction Contractors were undertaken. Based on these discussions, it is considered that a worst case abandonment scenario would see:

- Cessation of construction activities onsite at a point where:
 - Amenity area (Railway Pier) would be 95% filled but uncapped with dredge spoil treatment cells full with approximately 1200 m³ of untreated dredge spoil material
 - Quayside area (Town Pier) would be 90% filled but uncapped with dredge spoil treatment cells full with 600 m³ of untreated dredge spoil material
 - 2 no. dump barges full of untreated dredge spoil material (800 m³)
 - Works then requiring
 - black top capping of Quayide
 - topsoil /geotech capping of amenity area
 - treatment of 2,600 m³ material
- Works to be completed by an alternative Contractor following a formal tendering process

Table 3.1 shows a matrix of an abandonment scenario and potential associated costs. It is considered that were any other scenario associated with the closure process to arise, this can be financially addressed with the extent of costs identified for this abandonment scenario.

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Table 3.1: Closure Plan (Abandonment Scenario) Costing

Task	Assumed Duration	Description	Quantity	Unit	Rate	Cost,€	Source	
Temporary Works post abandonment	1 month	Site Management (Situational assessment)	160	hr	75	12,000	Note 1	
		Site Works – operatives onsite	320	hr	35	11,200	Note 2	
		Allowance for construction waste material removal	1	cost	5,000	5,000	Note 3	
		<i>Environmental Monitoring in accordance with licence conditions</i>						
		Noise - weekly	4	per week	800	3,200	Note 4	
		Dust – per month	1	per sample	50	50		
		Daily manual surfacewater	30	per sample	150	4,500		
		Site security (12 hr shift)	1	month	5,000	5,000	Note 5	
Contractor Procurement	2 months	Procurement process – preparation of contract documents, tendering, appointment by consultancy	200	hr	75	15,000	Note 6	
		Ongoing site security	2	month	5,000	10,000	Note 7	
		Continued Environmental Monitoring	2	as per suite above	4,550	9,100	Note 8	
Civils Mitigation Works	2 months	<i>Amenity Area (Railway Pier)</i>						
		Treatment cell dig out	1,200	m ³	5	6,000	Note 9	
		Cell contents treated and placed	1,200	m ³	25	30,000	Note 10	
		Topsoil Amenity Area	2,000	m ³	32.61	65,220	Note 11	
		Geotextile top of amenity area	8,600	m ²	5	43,000	Note 12	
		Drainage	-	-	20,000	20,000	Note 13	
		<i>Quayside (Town Pier)</i>						
		Surfacing of quayside	1,850	m ²	98	181,300	Note 14	
		Drainage	-	-	50,000	50,000	Note 15	
		Treatment cell dig out	600	m ³	5	3,000	Note 16	
		Cell contents treated	600	m ³	25	15,000	Note 17	
		<i>Dredge Barges</i>						
		Emptying of barges	800	m ³	15	12,000	Note 18	
		Placement of contents in treatment cells	800	m ³	25	20,000	Note 19	
Prelims @ 10%	-	-	-	44,520	Note 20			

Task	Assumed Duration	Description	Quantity	Unit	Rate	Cost,€	Source
		Owners Engineer Provision	80	day	500	40,000	Note 21
		Ongoing site security	2	month	5,000	10,000	Note 22
		Continued Environmental Monitoring	2	as per suite above	7,750	15,500	Note 23
Environmental Monitoring	12 months (post mitigation works)	Monitoring in accordance with facility licence until licence surrender	1	per licence schedule		7,800	Note 24
Validation Audit	n/a	Independent Consultant costs	1	per event	5,000	5,000	Note 25
Licence Surrender	n/a	Surrender fee		per item	6,000	6,000	Note 26
		Consultancy costs	20	hr	75	1,500	
Subtotal						645,890	
<i>Contingency @ 10%</i>							64,589
Total						710,479	

<i>Note 1</i>	Allowance for 1 no. consultancy engineering staff to be assigned immediately for 1 month to determine situation, plan for works and oversee immediate works to be carried out
<i>Note 2</i>	General site activities to ensure H&S and environmental protection of site by 2 no. operative under guidance of consultancy engineering staff
<i>Note 3</i>	An allowance for removal of non-dredge construction waste materials from site (cannot be quantified at this juncture)
<i>Note 4, 23</i>	Ongoing monitoring in accordance with licence – noise, dust, daily surfacewater (manual) by external 3 rd party
<i>Note 5, 7, 22</i>	Unit cost rates, EPA – night time security only.
<i>Note 6</i>	Procurement undertaken by Consultant
<i>Note 8</i>	As per Note 4, less noise as no construction activity
<i>Notes 9 -12, 14, 16 - 19</i>	Rates informed by works tender, quantities as per proposed development
<i>Note 13, 15</i>	PC sum (informed by works tender)

Note 20	Prelims assumed at 10% of Civils works
Note 21	Resident engineer provision for 2 months at day rate
Note 24	Weekly surfacewater assumed
Note 25	Audit costs
Note 26	Surrender fee plus consultancy support time

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3.8 Future Proofing

3.8.1 Contingency

The Guidance recommends the application of an appropriate contingency to the identified closure costs. At this juncture, a contingency of **10%** is applied to reflect the uncertainty associated with the potential closure tasks.

3.8.2 Inflation/discounting

The Guidance recommends the application of an appropriate rate for future inflationary pressures that may apply to the costs identified. Using the 12 month historical CPI (consumer price index) inflation rate in Ireland at the time of writing (March 2016), little variations of c. +/- 0.5% has been observed. Therefore, the application of an inflation rate of 1% per annum is considered conservative to consider in future iterations of this plan.

3.9 Summary

The financial provision to cover an abandonment closure scenario at the Bantry Inner Harbour Works Phase 1 are identified as **€710,479**.

As identified, it is considered that these costs will more than cover any other scenario that may relate to closure of the facility in question.

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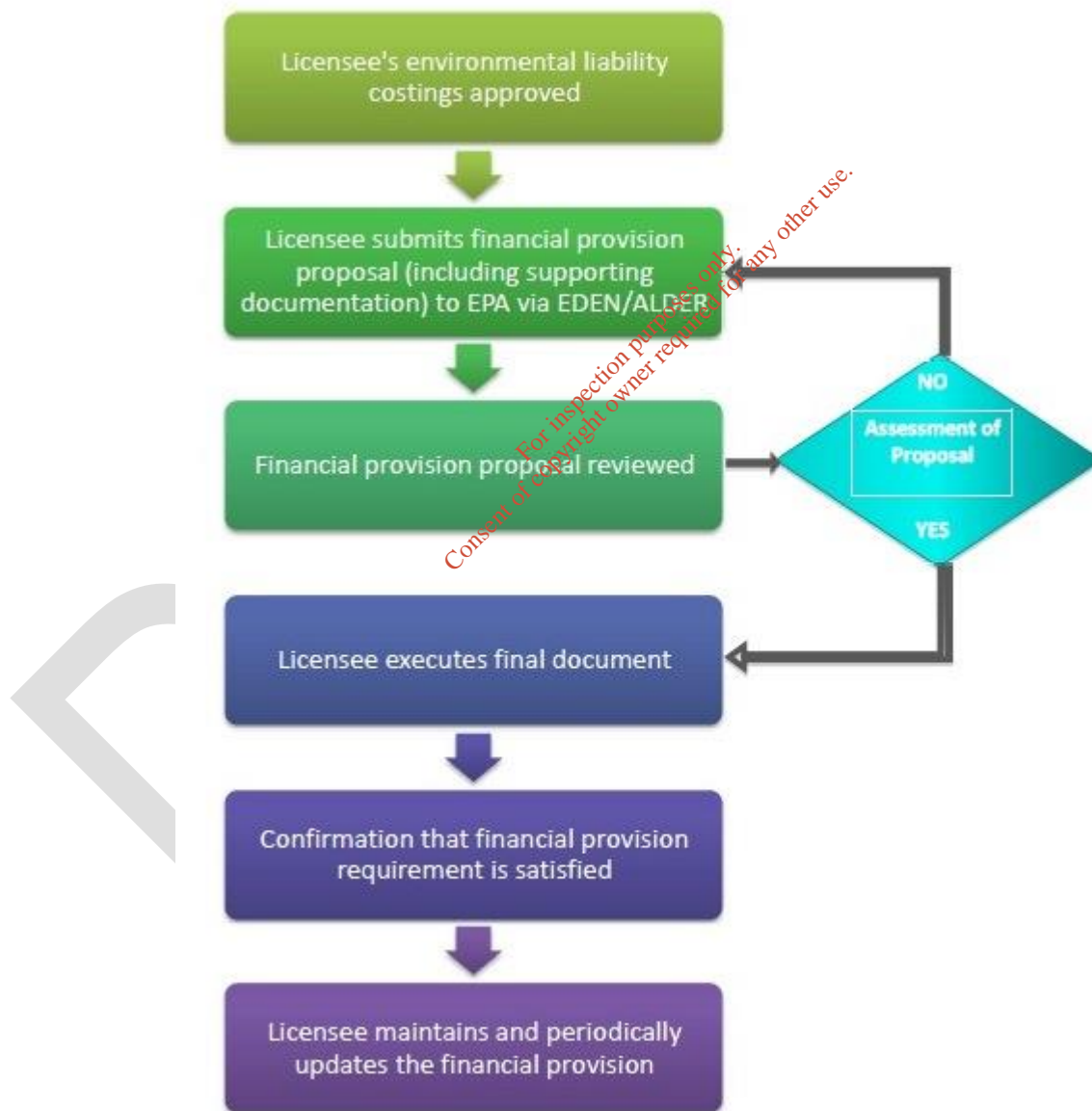
4 FINANCIAL PROVISION

Financial provision ensures that an available source of funding is maintained for:

- known environmental liabilities that will arise at the time of facility closure
- known environmental liabilities that are associated with the aftercare and maintenance of the facility until such a time as the facility is considered to no longer pose a risk to the environment
- unknown environmental liabilities that may occur during the operating life of the facility

The EPA has prepared guidance on the matter of financial provision in 2015, entitled “*Guidance on Financial Provision for Environmental Liabilities*”. The steps in the agreement of the financial provision assessment process are shown in Figure 4.1.

Figure 4-1: Steps in Financial Provision assessment process



Section 4 of the Guidance suggests the following appropriate measures as appropriate financial provision instruments for closure:

- Secured fund
- On-demand performance bond
- Parent Company guarantee
- Insurance
- Charge on Property

This document presents the likely costs to be associated with the closure of the facility, in a closure scenario. It is identified in the Guidance that a **Parent Company Guarantee** and **Insurances** are **not** suitable instruments to cover inevitable closure costs.

As per the first step shown in Figure 4-1, agreement of the environmental liability costings (including closure costings) with the EPA is required prior to identification of the appropriate financial provision instrument.

To this end, this closure plan document is submitted for agreement to facilitate the further stages in the financial provision assessment process.

It should be noted however, that the requirement to make financial provision for the value identified relates to the period of time during which the licensable activity (the placement and treatment of dredge spoil material) will be occurring i.e. November 2016 to mid-2017.

This differs considerably from a more typical waste installation where the potential for an abandonment scenario would exist over the operational lifetime of such a facility which may be 15 – 20 years.

The applicant considers this to be an important consideration in the context of future discussions regarding appropriate financial provision.

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ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

Appendix 1

Construction Environmental Management Plan



Environmental Management Plan

Bantry Inner Harbour Development Phase 1

Document Revision No: 02			
Reason For Issue: For client approval			Client Approval (if required)
Originator	Reviewer	Approver	
Brian Abbott	Seamus O'Sullivan	Seamus O'Sullivan	Port of Cork

Copy	Circulation:	Name	Company	Location
1	Contract Manager	Liam Collins	BAM	Site
2	Project Manager	Seamus O'Sullivan	BAM	Site
3	General Foreman	Jack Tuohy	BAM	Site
4	Site Health, Safety & Environmental Officer	Alan Mullins	BAM	Site
5	Co. Environmental Coordinator	Brian Abbott	BAM	Head Office, Kill

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1. General Project Details

Project Name	Bantry Inner Harbour Development Phase 1		
Project Location	Bantry , Co. Cork		
Client	Port of Cork (PoC)		
Contract Manager	Liam Collins		
Start Date	8 Feb 2016	Duration (Months)	16 months
Completion Date (Expected)	30 June 2017		
Primary Project Type	Marine project		

Project Description:

1.1 Introduction

This environmental Plan has been written in accordance with BAM Contractors Environmental Procedures. The controlled copy of all environmental procedures is hosted on Sharepoint.

This Plan is a working document, clearly stating the arrangements in place to manage the significant environmental aspects and legal requirements of this project. This Plan covers BAM Civil activities and that of its Subcontractors.

This Plan has been approved by the HSE Department at Kill and has the commitment of the Project Manager and Engineers to fulfil the requirements of the plan.

1.2 Description of the Works

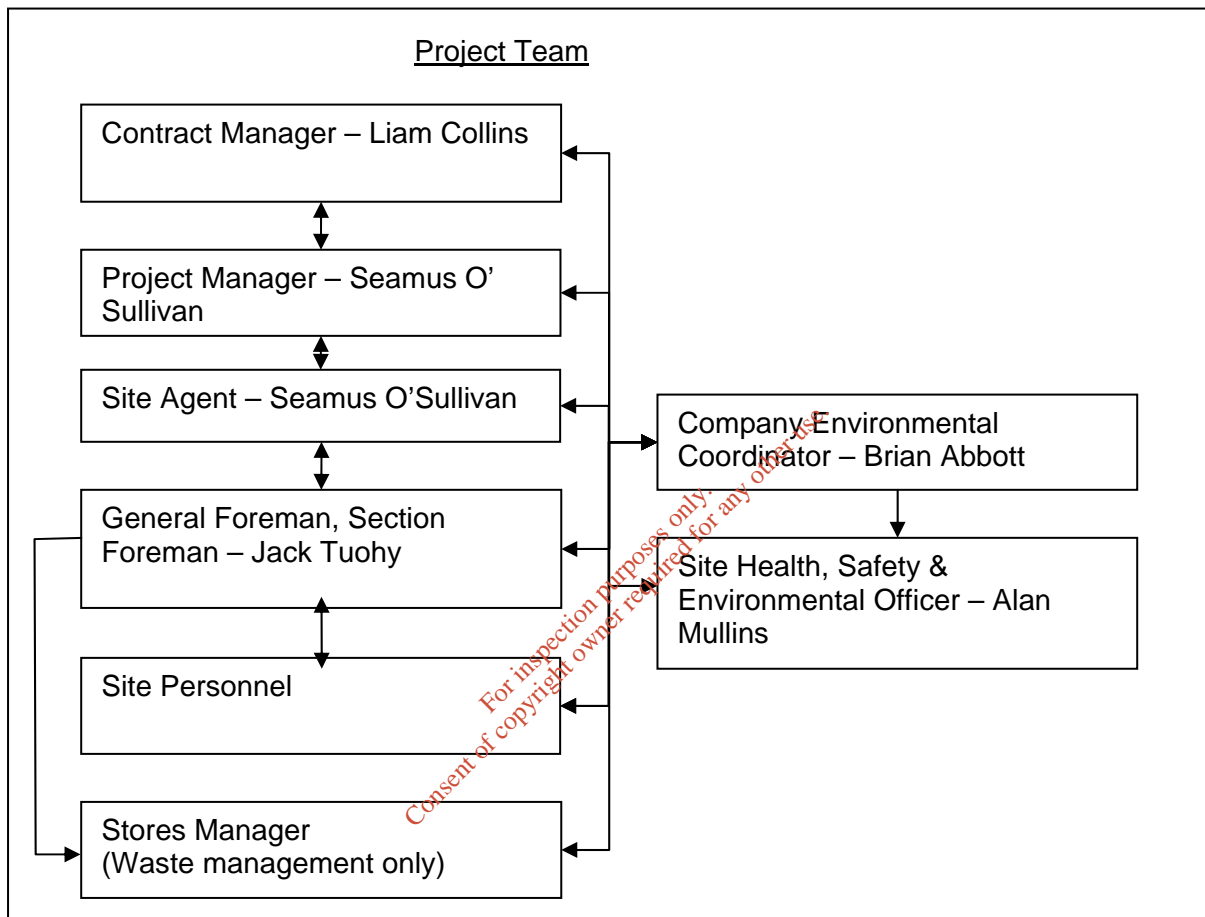
The purpose of the scheme is to provide a sheltered harbour environment and marina with increased water depth and improved pier facilities to promote fishing and tourism activities in the Bantry area. This will also provide additional and improved recreational and amenity areas at the inner harbour. As a means of making use of the dredged sediments it is intended to make beneficial re-use of clean dredged material at adjacent, and connected, locations for land reclamation. The main components of the proposed development at Bantry are as follows:

1. Dredging of Harbour Basin;
2. Fishing Docks and Quay Wall Improvements;
3. Revetment construction;
4. Fishing Pier Refurbishment;
5. Land Reclamation within Bantry Harbour;
6. Breakwater and Open Pile Quay Construction;
7. Installation of Pontoons and Marina Services;

2. Environmental Management System

Project Roles and Responsibilities

2.1 Organisation Chart



2.2 Communication

The principal lines of internal communication in relation to the EMP are shown above. Environmental issues are communicated to staff through the site induction, toolbox talks and monthly safety meeting.

Communication with other external parties will be in accordance with the consultation requirements (section 6) and in response to complaints (section 3).

2.3 Responsibilities

Company	Role (Job title)	Environmental Management Responsibilities
BAM Civil	Company Environmental Coordinator	Conducts Environmental Risk Assessment, advises on environmental issues and controls, and conducts internal environmental audits.
BAM Civil	Contract Manager	Approves and implements EMP
BAM Civil	Site / Project Manager	Monitors implementation of control measures, ensures that activities, including subcontractor activities, comply with the requirements of the relevant performance requirements.
BAM Civil	Site Safety, Health Environmental Officer	Conducts weekly environmental inspections; carries out toolbox talks on environmental issues. Coordinates emergency response, including spills. Checks spill kits and orders spill control materials when required
BAM Civil	Site Engineer	Ensures that works are carried out in accordance with the EMP and with the approved works method statement. Includes Environmental matters in weekly site inspections.
BAM Civil	Section Engineers / Foreman	Carry out toolbox talks; coordinates water/noise/dust monitoring and remedial actions; ensures that works are carried out in accordance with the EMP and with the approved works method statement. Performs environmental inspections.
BAM Civil	Quantity Surveyors	Tracks the costs associated with the implementation of environmental matters and forwards to the Company Environmental Coordinator as required.

3. Environmental Management Arrangements

3.1 Environmental Management

The environmental management system (EMS) complies with the ISO 14001:2004 standard. Those aspects of the EMS relevant to this project are outlined in this document which also contains references to specific procedures.

3.1.1 Planning

The environmental planning for the project is based on information from:-

- The clients project information and tender documentation
- Planning Permission register number 12/00735
- Bantry Inner Harbour Development Environmental Impact Statement; RPS 2012
- EPA waste licence for waste management activities at Bantry harbour (pending)

Such information has been used in the environmental assessment of the activities for this project.

3.1.2 Monitoring and checking

The significant environmental aspects of the project are monitored regularly by carrying out the following at the frequency stated below:-

Monitoring and Checking	Frequency
Environmental Inspections by Site Managers	Monthly
Environmental Inspection by Foremen	Weekly
Environmental Inspections by HSE Officer	Weekly
Environmental Audits by Env Co-ordinator	Quarterly
Surface Water Inspections (recorded)	Continuous & Daily
Surface water inspection (visual)	Daily
Noise and Vibration Monitoring	Weekly
Dust Monitoring (visual)	Daily
Dust deposition monitoring	Monthly
Marine Mammal Observer	Daily
Dredge material (WAC analysis)	1 sample per 1000m ³ of dredging
Slump testing on stabilised dredge material	5 sample per treated cell
Mussels in Inner Bay for Mercury and heavy metals	Immediately before, (ii) 2 weeks after and (iii) 3 months after dredging

3.1.3 Action Register

A record of environmental management actions is to be kept on site. The progress for all actions is reported regularly to the appropriate member of the Management Team and as per the EPA waste licence conditions. Such actions will include information taken from:-

- Environmental inspections
- Audit actions: non-conformances and observations
- Progress of actions following environmental incidents
- Significant communications with stakeholders
- Project issues requiring management action
- Complaints

These actions will be closed out, signed and dated by the appropriate person in the appropriate timeframe.

3.1.4 Performance

Environmental Performance of the project is monitored by:-

- Environmental review meetings as a part of the Monthly Safety Meetings
- Site inspections
- Audits conducted by the BAM HSE Department
- Audits conducted by the Port of Cork
- EPA inspections for compliance of the waste licence
- A review of the quantities of waste created
- External communications and feedback
- Review of objectives and targets (targets table section 7)
- Corporate Social Responsibility (CSR) reporting

3.2 Communications

3.2.1 Environmental Complaints

All environmental complaints will be recorded in the project Complaints Register. The Register is maintained on site by a nominated member of the Management Team who also allocates responsibility for resolving any issues and follows up complaints to ensure they are resolved. Any issues that are deemed to be significant will be reported to the Site Management Team and the relevant authorities as appropriate. Complaints are reviewed during internal audits by the Environmental Coordinator, where any additional measures to improve performance are discussed. Complaints are reported to Head Office also. See EP-24 Complaints and Incident Procedure for more details.

All complaints received from external sources and incidents must be reported to the Project Manager, the EPA (for waste management activities) and a representative of the Port of Cork.

All notifications, records and reports will be submitted to the EPA as per the sites waste licence.

3.2.2 Environmental Incidents

Environmental incidents related to activities controlled under the site's EPA waste licence, will be reported to the EPA as per waste licence conditions and the EPA's "Guidance to Licensees/COA holders on the Notification, Management and Communication of Environmental Incidents".

Under this reporting system the environmental impact assessment criteria is as follows:

Ranking	Classification	Impact on the environment
1	Minor	<p>No contamination, localised effects</p> <p>Minor effect on air quality as evidenced by dust or odour complaint(s) ELV breaches</p> <p>An emission which does not comply with the requirement of the licence/COA (A pattern of repeated minor incidents should be taken into account when considering the level of response)</p>
2	Limited	<p>Simple contamination, localised effects of short duration</p> <p>Local limited impact to water, land and air</p> <p>Notification to and short term closure of potable water extractors required</p>

3	Serious	Simple contamination, widespread effects of extended duration Significant effects on water quality Major damage to an ecosystem (e.g. significant impact on fish population) Longer term closure of potable water extractors Significant reduction in amenity value Significant Damage to agriculture or commerce Significant Impact on man
4	Very Serious	Heavy contamination, localised effects of extended duration
5	Catastrophic	Very heavy contamination, widespread effects of extended duration

The following shall be notified, as soon as practicable after the occurrence of any incident which relates to a discharge to water:

- i. Inland Fisheries Ireland / Department of Agriculture, Food and the Marine in the case of discharges to receiving waters
- ii. Marine Institute (MI), Sea Fisheries Protection Authority (SFPA), Food Safety Authority of Ireland (FSAI) and an Bord Iascaigh Mhara (BIM) in the case of discharges to or likely to impact a shellfish water.
- iii. Cork County Council, in the case of discharges to designated bathing waters
- iv. PoC, Cork County Council and Irish Water, in relation to discharges to sewer

Incident notification records shall include details of the nature, extent, and impact of, and circumstances giving rise to, the incident or accident. The record shall include all corrective actions taken to manage the incident or accident, minimise wastes generated and the effect on the environment, and avoid recurrence. In the case of a breach of the waste licence conditions, measures to restore compliance. The licensee shall, as soon as practicable following notification, submit to the Agency the record.

Environmental incidents relating to the all project works and not just those governed by the proposed EPA waste licence will be reported under the BAM HSE incident reporting system (see company environmental procedures EP-06 Environmental Incident procedure and EP-24 Complaints and Incident Procedure.

Actions with regard to specific incidents including water pollution and exceeding the limit levels for dust, noise and vibration, are detailed in Section 8.

Report all Environmental Incidents immediately to the HSE Department 045 886557.

3.3 Suppliers and Subcontractors

3.3.1 Subcontractors

All subcontractors will be required to work in accordance with BAM Civil site specific Environmental Management Plan. Works operations will be managed by the relevant Project Managers / Site Agents to ensure appropriate procedures are being followed. ISO 14001 states consideration should be given to aspects related to the organisations activities, products and services such as environmental performance and practices of contractors and suppliers. In order to achieve this, we ensure our subcontractors sign contracts which state they must comply with our environmental policy, our EMS and work within the Environmental Legal Framework while working for us on our projects.

During the recruitment stage, we would enquire as to whether they had been prosecuted with regard to breaching environmental legislation and this would also be considered. We would also enquire to the progress of their environmental management system (or equivalent) to ensure they were working in a responsible fashion and in a way which would be of a similar fashion to BAM Civil. Lines of communication would also be outlined during this recruitment stage to ensure they were aware of our environmental management system and how this will affect them and what they need to achieve in order to be suitable candidates for our projects.

A subcontractor appraisal form is in use and can be accessed through COINS. This document will be used to ensure subcontractors who are not sufficient are not permitted on any future BAM sites.

A list of subcontractors has been identified below:-

Contract	Company	Environmental Contact	Commencement Date	Duration
TBC				

3.3.2 Suppliers

All suppliers and sub-contractors are made aware of the company's environmental requirements where it is possible they could produce waste or pollution. An employee supervises all deliveries of environmental hazardous materials e.g. diesel fuel and oil drums.

4. Summary of Emergency Procedures

- Environmental Emergency Preparedness and Response Plan
- Containing and cleaning up spills (EP-15)
- Environmental Incident Procedure (EP-06)
- Environmental Complaints and Incidents Procedure (EP-24)
- Sharepoint online incident tracking system

5. Environmental Planning, Aspects and Controls

5.1 Environmental Risk Assessment

A number of site visits have been carried out by BAM staff where notes were produced which identified any significant environmental aspects. These notes were compared with the environmental information supplied by the client's representative and have been used as a basis for performing the environmental risk assessment.

5.2 Environmental Risk Assessment Report

The significance of all the environmental aspects for each activity on the project have been assessed. The assessment followed the method defined in EP-02 Environmental Risk Assessment.

Please see appendix 3 for the risk assessment report for this project.

5.3 Environmental Assessment and Management Controls

The management controls, which have been put in place, are appropriate to the nature, duration and scale of the activity on this project and the particular sensitivity of the local environment. They will be revised in the event of any significant changes to the scope of the activity during this project, especially when there is additional works, or a change in the method of works.

Additional management controls shall be adopted when there are changes to client requirements, stakeholder interests to a particular local environmental sensitivity.

The significant risks which are highlighted in the risk assessment and the management controls are communicated to the workforce by site inductions and toolbox talks.

5.4 Method Statements

The significant environmental aspects and the actions to apply the required controls are described in the method statement.

Method statements are produced in accordance with the contract requirements by the Site Management Team and reviewed by the Project Managers / Site Agents prior to submission for approval. When developing method statements, the EMP, Site Maps and any other relevant environmental management documents shall be reviewed to assess the potential impacts of the particular activity.

All method statements shall include a section entitled "Environmental & Waste Management". For activities that have significant potential to cause adverse environmental impacts reference will be made in this section of the M/S to the control measures in Section 8 of the EMP. Additional control measures may be included where those in Section 8 prove

inadequate to suit the local conditions at the site of the activity, and/or where specific measures are required by any of the authorities. The method statement must include:-

- Reference to the EMP and WMP
- The proposed method of construction and how impacts shall be mitigated
- Waste (storage, removal, end disposal sites where known)
- Hazardous Substances (storage, removal and end disposal sites where known)
- Works close to waterways (sediment controls if needed)
- Dust
- Noise and Vibrations
- Refuelling
- Fuel storage
- Drip trays/spill kits and other precautionary measures

Prior to the commencement of the works, all Method statements will be reviewed by a competent person by referring to Section 8 of the EMP. Following the review, improvements will be made to the method statements as required.

6. Environmental Compliance Requirements

In accordance with Environmental Procedure 01 (EP-01) Environmental Compliance Assessment, a review of all relevant literature and contractual requirements relevant to the contract will be completed.

- Planning Conditions
- Contract Documents
- Preliminary Health and Safety Plan
- EPA waste Licence (pending)
- All other contractual conditions and documents

These requirements have been tabulated in Appendix 2 (table of contractual requirements) to demonstrate how each of the requirements is addressed in the EMP.

Evaluation of Compliance

Compliance will be evaluated through inspections and audits and also reviewed at the regular site management meetings.

6.1 Consultation with Relevant Authorities

Consultation has been undertaken with the following authorities:

- Bantry Town Council
- Cork County Council
- EPA
- Inland Fisheries Ireland
- Port of Cork
- National Parks & Wildlife Service

6.2 Site Restrictions & Hold Points

In accordance with the contract clauses or notification from the Port of Cork the following environmental restrictions apply to the construction of the works:

Clause	Restriction – refer to Contract and planning conditions for complete details
--------	--

	Bantry Inner Harbour Development Phase 1, Works Requirements Specifications Oct 2015
	Bantry Inner Harbour Development; Environmental Impact Statement; RPS; Aug 2012
	Cork County Council Planning Register Number 12/00735
	EPA Waste Licence (pending)

6.3 Table of Environmental Licences, Permits and Permissions

6.3.1 Maintaining arrangements for environmental licence, permits and permissions

These are all legal documents associated with the work and may be from a contractor/supplier/client, or it may be an EPA or Local Authority Licences/Permit and will be maintained by the Manager Team on site.

6.3.2 Licences and Permits

PoC will be requested to supply information on the licences and permissions that are required for the project. The Port of Cork will have the responsibility for licence applications.

The relevant environmental regulator may be informed early in the project of the environmental aspects of the work. A meeting on site will be arranged where applicable.

N.B. a copy of all formal licences is to be sent to the HSE Department, Kill.

The following table indicates the licences and permissions that may be required:-

Licence / Permission	Regulator	Operations
Discharge consent into watercourse or sewer	Irish Water	Any solid or liquid entering controlled waters (river, pond, stream, ditch) unless it is clean water
Consent for work near a watercourse	Inland Fisheries Ireland	Any work which include work over or under the water
Derogation Licences	National Parks and Wildlife Services	Cutting of protected trees, protected species (bats, badgers, frogs etc), work in or near any SPA, SAC, NHA) Derogation licences for protection species and removal of invasive species
Permissions / Licences	Department of Environmental, Communities and Local Government	Excavation work in any site containing archaeological remains or natural habitat, protected Monument.
Waste Licence	EPA	Waste facility licence for storage and treatment of contaminated dredge material at Bantry pier
Waste Collection Permit	NWCPO	Waste collection permit for haulage of waste offsite
Waste facility licence/permit	EPA/LA	Appropriate facility licence, permit or COR for the disposal of all waste offsite
Planning Permissions	Cork County Council	All works to be carried out as per Planning Register Number 12/00735

6.4 Company Policy & Procedures

A copy of the Company Environmental Policy is displayed at the project site offices. The policy determines the company's overall approach to environmental management, which is developed through the EMS. This EMP has been developed taking into account the:

- Company Environmental Policy;
- Objectives and targets as specified in the Yearly Environment Plan; and

- Requirements of relevant specific procedures as contained in the Environmental Procedures Manual

6.5 Relevant Statutory Provisions

A library of environmental legislation, relevant codes of practice, standards and best practice guidance documents is maintained at the BAM Head office in Kill, Co. Kildare. This library is updated by the Company Environmental Coordinator through regular reviews or as required by changes in legislation and standards and developments in industry best practice. Legal Register is on sharepoint for general viewing.

6.6 Design Requirements

The environmental requirements for design are reviewed by Malachy Walsh and Partners and incorporated into the design as appropriate. The design requirements are reviewed by the Project Managers and Engineers to ensure that the environmental considerations relevant to the construction works are incorporated into the works.

6.7 Control of Documents

All documents relevant to the construction works shall be kept and stored in accordance with the below table. Documents that are part of the site environmental management system, including inspection reports, monitoring records and meeting minutes shall be kept for the duration of the project as per UKAS (United Kingdom accreditation scheme).

No.	Document	Raised By	Retained By	Statute or UKAS	Currently Held	Retention times (years)
1	Register of Environmental Aspects	Env Co-ordinator	Env Co-ordinator	UKAS	Head Office and Sites	3
2	Waste Transfer notes (where applicable)	External	Env Co-ordinator Site	Statute	Sites	3
3	Hazardous waste transfer notes	External	Env Co-ordinator Site	Statute	Sites	5
4	Waste Collection Permits	Local Authority	Env Co-ordinator	UKAS	Sites	Period of validity +1
5	Waste Facility Permits/Licences	Local Authority/EPA	Env Co-ordinator	UKAS	Sites	Period of validity +1
6	Energy Monitoring Records	Env Co-ordinator	Env Co-ordinator	UKAS	Head Office and Sites	3
7	Water Monitoring Records	Env Co-ordinator	Env Co-ordinator	UKAS	Sites	3
8	Local Authority / Environmental Protection Agency Licences	Local Authority / EPA	Env Co-ordinator Site	UKAS	Sites	Period of validity + 1
9	Environmental communication from external sources	External	Env Co-ordinator	UKAS	Sites	3
10	Audit Reports	Env Co-ordinator	Env Co-ordinator Head Office	UKAS	Head Office and Sites	3
11	Corrective Action Forms	Env Co-ordinator	Env Co-ordinator Head Office	UKAS	Head Office and Sites	3
12	Env N/C or Env	Any member of	Env Co-ordinator	UKAS	Head	3

	Incident Report	staff	Head Office		Office	
13	Water treatment log sheets	Site Staff	Site Staff	UKAS	Site	3
14	Calibration Certificates	External testers	Site Staff/ Env Co-ordinator	Statue	Site	3
15	Environmental Management Plans	Site Staff	Site Staff	UKAS	Sites	3
16	Waste Management Plans	Site Staff	Site Staff	UKAS	Sites	3
17	Environmental Risk Assessment	Env Co-ordinator	Env Co-ordinator and HSE Officer	Best Practice	Head Office	3
18	Department of Arts Heritage and Gaeltacht	Env Co-ordinator	Env Co-ordinator Site	Best Practice	Sites	3

Controlled documents will be:

- Reviewed at least annually and updated as appropriate;
- Marked as superseded once obsolete or destroyed;
- Dated and marked with dates of revisions.

7.0. Environmental Objectives & Targets

The objectives and targets are set in relation to the aspects identified from each site in order to reduce our significant aspects. As a minimum they should include:-

- The prevention of pollution, including emissions to air, water and land
- Nuisance impacts including dust, noise and vibration
- Protection of habitat areas and individual species, if applicable
- Storage and use of fuels and hazardous substances, including spills
- Waste management

7.1 Environmental Management Targets

The environmental management targets for the Bantry Inner Harbour project are as follows.

Targets	Measurable	Methodology	Responsibility	Timescale
Ensure no incidents of pollution to water.	Water monitoring (TTS, Turbidity, TBT etc), Slump testing of stabilised dredge material. No of Environmental Incidents. Quarterly audits, No of complaints reported	Sediment controls to be used (environmental bucket, silt curtain, lined cells for stabilisation methods. No contaminated waters to be discharged to the harbour waters. Work with CIRIA guidelines, site EPA waste licence conditions and apply BAM precautionary measures	Site Management Team	Start to completion
Ensure sediment on roads is cleared.	Raise needs for road cleaning duties during wet or busy periods	Ensure roads are swept and cleaned on a regular basis. Road conditions within the site should be kept clean at all times.	Site Management Team	Start to completion

Minimise waste production	Lean Construction Techniques, segregation more, reuse more (waste hierarchy)	Purchase less, ensure packaging is removed by supplier where possible and other materials reused & recycled	Site Management Team	Start to completion
Minimise fuel and oil spillages from site activities. Bunds to be used with all fuels and oils	Environmental Incidents, spills contained in bunds	Ensure that drip trays are used at all times under static plant, when refilling, & storing, ensure fuel storage areas are bunded.	Site Management Team	Start to completion
Ensure correct disposal of all hazardous wastes e.g aerosol cans	Waste segregation, waste costs	All hazardous wastes to be disposed as per Irish Legislation and BAM requirements	Site Management Team	Start to completion
Lower consumption of materials and fuel on monthly basis (relative to project revenue)	Smart meters, energy bills, service costs	Ensure all energy using equipment is switched off when not in use. Select best value for money providers where possible	Site Management Team	Start to completion
Reduce site electricity by 2.5% on monthly basis (relative to project revenue)	Smart meters, energy bills, service costs	Ensure all energy using equipment is switched off when not in use. Select best value for money providers where possible	Site Management Team	Start to completion
Lower emissions of dust, smoke and fumes during works	Air quality, dust particle increase	Ensure all equipment is well serviced and maintained. Switch of equipment when not in use. Use dust suppression techniques when applicable	Site Management Team	Start to completion
Minimise amount of Public complaints	Complaints received to Site Management Team	Ensure when works which will impede public access are taking place, all residents are informed for the timescale (where applicable) and all restrictions are kept to a minimum	Site Management Team	Start to completion
Minimise water usage consumption	Water charges, waste water disposal (discharge volumes)	All grey water to be reused on site where possible. 'Fresh' water supply to be kept to a minimum where possible. TBT-12 Water on Construction Sites	Site Management Team	Start to completion
Minimise airborne & groundbourne noise	Noise triggers breached (where applicable)	All construction noise limits set out in the requirements will be adhered to.	Site Management Team	Start to completion
Minimise vibration	Vibration triggers breached (where applicable)	All vibration limits set out in the works requirements will be adhered to.	Site Management Team	Start to completion
Ensure no vehicle movement and material placement does not cause damage to flora and fauna	Correct habitat protection used. Wildlife surveys where applicable	All fauna/animal species to be untouched where possible. Professional advice to be sought on removal procedures	Site Management Team	Start to completion

The standard environmental management measures for the project are to:

- Conduct all activities in accordance with the:
 - Company environmental policy and procedures;
 - Relevant statutory regulations and provisions;

- Contractual requirements with the client; and
- Requirements of relevant authorities;
- Minimise adverse environmental impacts during construction;
- Enhance natural environments during the course of construction, where practical
- Reduce the significance of our aspects and impacts through our working methods

The standard environments objectives and targets which must be met on all sites as part of our EMS system:

- Conduct all operations within the limit levels set out for noise, dust and vibration (i.e. Zero exceedences);
- Zero water pollution incidents;
- Zero cross contamination of inert or non-hazardous materials with hazardous substances or contaminated soil;
- Hazardous substances including fuels and oils to be banded at all times.
- Compliance regarding waste management i.e. licensed waste contractors, permits etc.
- All contaminated materials to be managed in manner which prevents further contamination and to be disposed to appropriately licensed facilities.

In order to help achieve these targets, the below table highlights compliance tools.

7.2 Initiatives to ensure compliance with BAM Targets

Sites	Area	Objectives & Targets	Method for achieving	Assistance by HSE Dept. (method)	Responsibility
All sites and offices	Waste	Reduce waste sent to landfill by 2%	Adhere to the waste hierarchy. Lean construction techniques	EA-30 Excavated materials on site (<i>Article 27 Notification Forms</i>). CIRIA documents on Lean Construction	Site Teams and HSE Dept.
		Increase site segregation of construction waste by 2%	Additional recycling skips on site Increase staff knowledge and participation	EP-16 waste definitions and classifications, TBT-03 Managing Waste, TBT-02 Environmental Awareness, EB-11 Site Set up	Site Teams and HSE dept.
		Increase recycling rates	Increase site awareness of improved waste management practices	Waste posters, environmental alerts and bullets to be issued focusing on new waste strategies	Site Teams and HSE Dept.
All sites and offices	Energy	SMART Meters for all sites	SMART meters installed in cabins	Advice on installation and data collected	Site Teams and HSE Dept
		Reduce CO ₂ emissions by 2%	Implement an energy reduction initiative in sites and offices	Environmental information to be issued focusing on new waste strategies	Site Teams and HSE Dept
		Temperature control in cabins	Thermostats installed	Advice on installation and data collected	Site Teams and HSE Dept
		Energy initiatives	SEAI Initiatives	<ul style="list-style-type: none"> ● Online calculation tools (energy) ● Energy posters ● Relatively paperless sites 	HSE Dept IT Dept.

Sites	Area	Objectives & Targets	Method for achieving	Assistance by HSE Dept. (method)	Responsibility
		Reduction in fuel usage / air emissions	Car Purchasing	Procurement of low emissions vehicles by Plant Department. Video conferencing capabilities in Offices to cut down on travel times, emissions.	Site Teams and HSE Dept
All sites and offices	Env Auditing & Performance	All sites to achieve 'Pass' mark from quarterly audits	Quarterly audits	Regular environmental information and directions to be issued to the sites	Sites Teams and HSE Dept.
		Appraisal system for environmental performance	Subcontractor appraisal system (COINS)	Detailed information of the systems and scores circulated to all.	Sites Teams and HSE Dept.

8.0. Environmental Control Measures

Control measures will be implemented both on an activity specific basis for the area of works, and independently of any specific activities as part of the general site management. Throughout this section reference may be made to standard procedures contained in the Environmental Procedures Manual that shall be adopted on site. The Environmental Procedures are available on sharepoint.

The project shall be developed in accordance with the control measures and with reference to the following guidance documents:-

- BRE (2003) Control of dust from construction and demolition activities;
- BS 5228-1: 2009 + A1: 2014 : CoP for Noise and vibration control on construction and open sites: Part 1: Noise
- BS 5228-2: 2009 + A1: 2014: CoP for Noise and vibration control on construction and open sites: Part 2: Vibration
- BS 5837: 2012 Trees in relation to design, demolition and construction works
- BS8895-1:2013 Designing material efficiency in building projects Part 1: CoP for strategic definition
- CIRIA 650 (2005) Environmental Good Practice On Site (Second Edition);
- CIRIA 532 (2001) Control of Water Pollution from Construction Sites – Guidance for consultants and contractors;
- Inland Fisheries Ireland (2016) Guidelines on the protection of fisheries during construction in and adjacent to waters
- Fisheries Guidelines for Local Authority Works (Department of Marine and Natural Resources, 1998).
- Dept Arts, Heritage & Gaeltacht (2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters

Other guidance documents may be referenced for specific issues throughout this section. Copies of these documents are held by the Company Environmental Coordinator and on Sharepoint.

The control measures and monitoring requirements listed in this section must be implemented throughout the project.

8.1 Water Pollution Control

All watercourses that are potentially impacted by the works are identified on the site maps included in Appendix 4.

8.1.1 Water Pollution Control Measures

The potential for the construction and dredging works to have an impact on the water quality in the harbour and nearby shellfish waters shall be minimised through the implementation of the following control measures, which have been developed with reference to the guidance contained in EP-10 Surface Water Control, EP-13 Bulk Fuel & Oil Storage, EP-14 Storage & Handling of Hazardous Substances and EP-15 Containing & Cleaning Up Spills.

Mitigation measures during the dredging process will include the use of environmental dredging buckets fitted to the dredging excavators and the use of a 'Dig Master' system which facilitates for specific positioning of the dredge bucket. A silt curtain will also be used if required to minimise any sedimentation from the dredge material.

Once the material is excavated from the dump barge it will be placed in cells behind the Amenity area revetment where the water collected during the dredging operation can drain prior to the material being stabilised. The water draining from the dredge material will naturally filter through the geotextile and rock revetment of the Amenity area.

Analysis of the sediment sampling undertaken for the project in 2015 has classified the contaminated dredged material as non-hazardous (EWC Code 17 05 04) according to the HazWasteOnline Classification Tool. Based on the QRA undertaken by the project designers, it is not considered that there is a significant contamination potential from the movement and placement of the dredge spoil material.

Once the material has dewatered it will be treated using cement stabilisation. The stabilisation treatment is a remediation technology that reduces the mobility of contaminants. Immobilisation is achieved by reaction of contaminants with reagents to promote sorption, precipitation or incorporation into crystal lattices, and/or by physically encapsulating the contaminants. The method produces a high strength monolithlike product that physically reduces the mobility and chemically binds contaminants to the produced matrix. The treated mass can then be incorporated into the permanent works as engineered fill.

All treated materials will be tested as per Appendix 1/73 and dredging, treatment and disposal records maintained as per Appendix 6/71 of the Works Requirement Specification.

To mix the cement through the wet dredge material, BAM will mount an Allu PMX500 power mixer to a 35 ton excavator. This is a rotating agitator mixing which will feed and mix the cement from Allu PF7+7 power feeder with Allu DAC system into the dredge material, the attachment is powered by the hydraulics of the excavator. The agitator will be lowered into the cell of dredge material and the cement added through the agitator. The agitator then mixes the cement through the dredge material ensuring the mix is homogeneous throughout. The material is then for a sufficient period for the chemical reaction between the water and cement to take place. Once the moisture content of the material is reduced to the required levels it will be placed and compacted into the permanent works.

Any other wastes such as tyres, trolleys, traffic cones found in the dredge material will be collected in site skips and removed to a licenced/ permitted waste facility by an appropriately permitted waste contractor. These wastes will be identified when loading onto the dredging

barge or at the waste treatment area. In either situation, the waste will be manually separated from the dredge material and placed in quarantine area prior to removal offsite.

Dredging of the harbour will be limited to periods between November to March so as to reduce the potential to pollute or disturb any nearby spawning and shellfish areas.

8.1.2 Water Quality Monitoring

Water monitoring will be carried out through automatic sampler buoys which will be located externally to the harbour and supplied by PoC. These samplers will measure total suspended solids and water turbidity.

In addition to this BAM will take one water sample daily for laboratory analysis. These samples will be analysed for

- Suspended sediment concentration;
- Turbidity;
- TBT

Samples will be taken at the mouth of the harbour and at the higher of mid depth or 3m below the water surface. Water samples will be collected and stored in accordance with the testing laboratory's instructions. The water samples will be transported to the lab every Friday in cooled sample boxes. Consultation will be held with the environmental laboratory to ensure that all testing takes place within recommended timeframes.

Results from this environmental monitoring shall be reviewed by the Site Management team upon receipt to verify that operations are within the limits specified. Limit levels will be set based on background levels. These levels will be determined by the Client prior to works commencing. The limit levels shall not exceed 30% above background levels. Results will be provided by Tuesday of the following week and supplied to the Resident Engineer.

8.1.3 Water Pollution Incidents

Should any monitoring or inspections indicate that pollution of the Bantry Inner Harbour Development Phase 1 project has occurred then the site management team shall immediately inspect the waste treatment area and sediment control facilities to ascertain whether they are operating effectively. All operations may be stopped and/or additional control measures installed to prevent further pollution to the harbour. Appropriate action shall be taken in consultation with the Site Agent. Water sampling with additional parameters will be tested to ensure all pollutants are identified. As described in section 3.2.2, incidents will be reported to the EPA and other relevant authorities immediately, and logged on the BAM Incident Register as per EP-24 Complaints and Incidents Procedure.

8.2 Noise & Vibration Control

The primary sources of noise and vibration associated with the contract have been identified in the project EIS as follows:

- Construction plant

Activity	Plant	Noise Level (dB L _{Aeq}) at 10m
Demolition / Site clearance / Excavation / Removal of waste/rubble	Bulldozer	80
	Excavator	82
	Lorries (drive by)	70
	HGV and tippers	84
Rock Breaking	The Noise level generated during rock breaking, possibly using explosives, will depend on the type and amount of explosive and / or the machinery used. The resultant noise would also be modified by water depth although to what degree is unknown.	
Piling	Hydraulic Piling	89
	Vibratory Piling	88
	Large Rotary Bored Piling	83
	Continuous Flight Auger Piling	79
Dredging	Ship chain bucket	96
	Digging out river bed: Tracked Excavator Water Pump	85
	Loading dredged aggregates: Wheeled Loader	84
Foundations	Compressor	81
	Water Pump	80
	Concrete Pour	86
	Place and vibrate concrete cycle	80
	Cement Mixers	74
Steel Erection	Large crane operations	86
	Articulated lorry	70
Concrete Frame	Large crane operations	86
	Place and vibrate	80
General Construction Works	Surfacing	85
	Internal fit/ bricklaying	70
Road works/landscaping	Surfacing/rolling	76 - 86
Infilling/ Levelling	Dump truck	82
	Wheeled excavator/ Loader	78
	Dozer	80

Activity	Predicted "Worst - Case" Construction Noise Level dB L _{Aeq, 1 hour} at noise sensitive receivers			
	@ 50m	@ 100m	@ 150m	@ 200m
Demolition / Site clearance / Excavation / Removal of waste/rubble	72	64	60	57
Dredging	73	65	61	57
Hydraulic Piling <u>or</u>	74	66	62	58
Vibratory Piling <u>or</u>	73	65	61	57
Large Rotary Bored Piling <u>or</u>	68	60	56	52
Continuous Flight Auger Piling	64	56	52	48
Foundations	73	66	61	58
Steel Erection	71	63	59	56
Concrete Frame	71	64	60	56
General Construction Works	70	62	58	55
Road works/landscaping	64	56	52	48
Infilling/ Levelling	69	62	57	54

Noise limits outside of the normal working hours are as follows:

Period	Hours	Permitted Ambient Noise Level, Leq, measured at Building Facades [dB(A)]	Period of Hours over which Leq, is applicable.	Maximum Sound Level (see note (iv) below) measured at Building Facades [dB(A)]
Monday to Friday	20.00hrs to 06.00hrs	70	1 hour	80
Saturday	-	70	1 hour	80
Sunday and Public Holidays (following PoC and EPA approval)	-	60	1 hour	65
All unattended plant outside normal working hours.		60	18 hours	65

The noise levels (see Note (i) below) for periods outside the normal working hours will only be permitted when consent has been given to exceptional working

Schedule of Total Noise Levels at Building Facades

Notes:

- (i) Noise levels relate to free field conditions. Where noise control stations are located 1 metre from façades of buildings, the permitted noise levels can be increased by 3dB(A).
- (ii) The ambient noise level, Leq, at a noise control station is the total Leq from all the noise sources in the vicinity over the specified period.
- (iii) The existing ambient noise level, Leq, at a control station is the total Leq from all the noise sources in the vicinity over the specified period prior to the Commencement of the Works.

(iv) Maximum sound level is the highest value indicated on a sound level meter which meets the requirements of BS 5969 Type 1 or 2 set to SLOW response, and frequency weighting A

Operating limits for vibration are as follows:

Frequency	Vibration Limit	Location
<10 Hz	5mm/s	A.C Watermains
<10 Hz	8.5mm/s	Any occupied property
10 to 50 Hz	10mm/s	Residential property
50 to 100 Hz	20mm/s	At completed structures

All works are scheduled to be completed within the working hours as specified in the contract.

Working Hours	
Monday to Friday	08:00-1800hrs
Saturday	08:00-1300hrs
Sunday and Bank Holidays	No Working

Best practicable means should be employed to minimise noise levels, in accordance with the British Standard BS 5228 Noise and vibration control on construction and open sites (Parts 1 and 2) for basic information and procedures for noise and vibration control. A copy of this standard is available at the site or from sharepoint.

In accordance with other construction sites and with common local authority guidance the following noise criteria as shown in Table 6.10 taken from the EIS will be implemented throughout the project.

Table 6.10: Noise criteria for construction sites

Day of Week / Times	Maximum L_{Aeq} at Nearest Noise Sensitive Receiver / Site Boundary
<u>Monday to Friday</u>	
07:00 - 19:00	75 dB $L_{Aeq, 12hr}$
19:00 - 22:00	65 dB $L_{Aeq, 1hr}$
22:00 - 07:00	No noise audible
<u>Saturday</u>	
08:00 - 13:00	75 dB $L_{Aeq, 5hr}$
13:00 - 22:00	65 dB $L_{Aeq, 1hr}$
22:00 - 07:00	No noise audible
<u>Sunday</u>	No noise audible

8.2.1 Noise & Vibration Control Measures

Noise reduction measures will be undertaken in accordance with the Procedure EP-09 Noise and Vibration Control, which has been developed taking into account the requirements of BS 5528, particularly Section 10, and include:

- Good communication with landowners and residents in the proximity of the harbour shall be maintained.
- Plan the working hours and duration of work with consideration for the effects of noise/vibration on any noise sensitive receiver;
- The normal working hours shall be Monday to Friday between 0800 and 1900 hours and Saturday between 0800 and 1330 hours, with no working on Sundays or public holidays, except where consent is granted to work outside of these hours.
- Any plant such as generators and pumps which is required to work outside the hours of 0800 hours to 1900 hours, Monday to Friday shall be surrounded by an acoustic enclosure.
- Traffic management proposals shall include measures to minimise journey times during the construction period.
- All vehicles and mechanical plant shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order for the duration of the works in compliance with BS 5228.
- Any item of plant, which is ineffectively silenced, shall be removed from the site.
- Noise barriers (in combination with low surfacing) will be used where necessary.
- All compressors shall be “sound reduced” models fitted with mufflers or silencers of the type recommended by the manufacturers.
- Pumps and mechanical static plant shall be enclosed by acoustic sheds or screens where appropriate.
- Use of hoarding and other noise baffling equipment

8.2.2 Noise & Vibration Monitoring

- Noise and vibration monitoring will take place on a weekly basis at agreed locations via the use of calibrated monitoring equipment.

8.2.3 Noise & Vibration Incidents

Should any monitoring indicate that noise or vibration levels have exceeded the intervention values then the plant or equipment causing the noise / vibration shall be powered down immediately. Appropriate action shall be taken in consultation with the Site Agent to reduce the noise and/or vibration levels. Actions may include:

- Servicing and or modifying the plant / equipment;
- Replacing the plant / equipment;
- Moving the operation away from sensitive receptors;
- Rescheduling the activity;
- Erecting noise barriers where other measures are not practical

When noise and vibration monitoring is taking place, all monitors should take into account the background noise and situation when monitoring. External noise and vibration reports to reference to this fact also.

The incident shall be logged in the Incident Register if levels have been breached and background noise was deemed not a factor at the time of the occurrence.

8.3 Air Pollution Control

The main types of air pollution that will result from the works are dust and exhaust emissions from combustion engines, and plant machinery and vehicles. Activities with the potential to produce dust are:

- Plant and vehicle movement;
- Bulk materials handling;
- Stockpiles;
- Vehicle movement off site.

8.3.1 Dust Minimisation Plan

Dust shall be minimised on site through the implementation of the following control measures developed in accordance with the Procedure EP-08 Air Pollution Control:

- A mechanical road sweeper will be in operation at all time to clean the site hard-standing, roads or footpaths in the vicinity of the site.
- Material handling system and site stockpiling of materials shall be designed and laid out to minimise exposure to wind.
- Mandatory speed limits will be enforced within the harbour area particularly in weather conditions which are conducive to dust generation.
- Dust suppression systems will be used during dredge stabilisation operations.
- Vehicles either delivering or removing material from site which have a dust potential will be covered with tarpaulin to minimise the release of dust.
- Exhaust emissions where practical shall be minimised by ensuring that all plant, equipment and vehicles are in good working order and regularly serviced to ensure efficient running, by using the smallest engine-sized plant and equipment suitable for the task and by ensuring that engines are not left idling unnecessarily.
- Provision of easily cleaned hard-standings for vehicles entering, parking and leaving the site.

8.3.2 Other Air Quality Control Measures

- Exhaust emissions where practical shall be minimised by ensuring that all plant, equipment and vehicles are in good working order and regularly serviced to ensure efficient running, by using the smallest engine-sized plant and equipment suitable for the task and by ensuring that engines are not left idling unnecessarily.
- Burning of materials on site shall not be permitted.

8.3.3 Dust Monitoring

- Daily visual dust monitoring will take place on site.
- The foreman will include formal dust monitoring in his weekly inspection
- Dust deposition monitoring with a threshold limit of 350mg/m²/day will be carried out at the Amenity area as per the site EPA waste licence.

8.4 Habitat (Flora & Fauna) Protection

General ecological mitigation measures have been incorporated into the project design from the project EIS and the requirement during the construction stage is to ensure that these measures are implemented. Any additional mitigation measures will be implemented during construction as required to limit additional habitat and fauna disturbance outside the area of works.

All work activities will comply with the Environmental Protection Agency Act 1992 and amendments and Wildlife Act 1976 and amendments 2000 to 2010 and the European Communities (Birds and Natural Habitats) Regulations 2011.

8.4.1 Construction Mitigation Measures

General habitat control measures shall be implemented in accordance with EP-12 Habitat, Flora and Fauna Protection. Additional site specific controls will also include:

- A qualified and experienced marine mammal observer (MMO) shall be appointed to monitor for marine mammals and to log all relevant events
- Dredging activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.- Note once normal operations commence, there is no requirement to halt or discontinue the activity at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500m radial distance of the sound source, i.e., within the Monitored Zone.
- In waters up to 200m deep, the MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Where operations occur in waters greater than 200m depth (i.e., >200m), pre-start-up monitoring shall be conducted at least 60 minutes before the sound-producing activity is due to commence
- If there is a break in sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down or location change) then all pre-start marine mammal monitoring must be undertaken in accordance with the above conditions prior to the recommencement of dredging activity
- Construction works to be avoided during breeding seasons where possible. Controls on noise, lighting, pollution and speed restrictions in certain areas may also be required.

8.4.2 Fish and Fisheries Habitat Mitigation Measures

In addition to the mitigation measures referred to in section 8.1 for water pollution, the following measures will be implemented to reduce the impacts from dredging to include:

- Dredging activities will take between November to March to prevent any potent negative effects during the mussel spawning and shrimp settlement seasons.
- All excavators will be fitted with a "Dig Master" system. The system is run from a global positioning system, from this operator is aware of the location x, y & z respectively and also the orientation of the bucket of the machine. This ensure only the designated areas are dredged.
- All excavators carrying out the dredging works will be fitted with environmental dredging buckets which will minimise the loss of any dredge spoil into the harbour.
- A silt curtain will be put in place in liaison with the Harbour Master on marine traffic.

8.5 Waste Management

A Waste Management Plan will be instituted during the works and the waste management measures for the project are detailed in this separate document, which includes:

- Waste management targets
- The potential waste materials produced during the project;
- Waste handling procedures;

- Waste Permits required;
- Waste reuse, recycling and disposal techniques; and
- A map showing designated waste handling areas.

The Waste Management Plan also covers the handling and disposal of hazardous wastes such as fuels and used absorbent materials.

With regard to potential nuisance from temporary site offices and canteen, the following measures shall be observed:

- Site offices shall be maintained in a tidy condition.
- Litter shall be cleaned up daily, particularly around skip bins, in accordance with EP-19 Litter Management.

8.6 Hazardous Materials Handling & Storage

During the works there will be a requirement for the use of hazardous substances, including:

- | | |
|-----------------|-------------------------|
| • Fuel oil | • Shuttering Oil |
| • Diesel | • Liquid cement |
| • Hydraulic Oil | • Concrete Curing Agent |

The management of such substances shall be carried out in accordance with the procedures for:

- Bulk Fuel and Oil Storage (EP-13);
- Storage and Handling of Hazardous Substances (EP-14);
- Containing and Cleaning Up Spills (EP-15).

All chemicals not covered by EP13, EP14 and EP15 shall be managed in accordance with the requirements of the relevant safety data sheet (SDS) and the Health and Safety Plan.

- Hazardous materials are kept in lockable stores at site compound locations. Spill kits are also kept at these locations. Any hazardous materials must be returned to the stores at the end of each day and not left on site.
- Oil and fuel will be stored in bunded areas and shall be stored well away from any water discharge point or, where not possible, the discharge point will be adequately protected to prevent spills from entering.
- Diesel pumps, generators or similar shall be placed on impervious drip trays to capture minor spills and leaks and located at least 10m from any water discharge point.
- Tools and equipment shall not be washed in or near any watercourses and if undertaken on site wash water shall be directed to appropriate retention controls and not allowed to directly enter any watercourse.

Fuels, lubricants and hydraulic fluids for equipment used on the construction site shall be carefully handled to avoid spillage, properly secured against unauthorised access and provided with spill containment. Fuelling and lubrication of equipment shall not be carried out in the vicinity of water discharge points. Waste oils and hydraulic fluids shall be collected in leak-proof containers and transported off-site for disposal or recycling at appropriately licensed facilities.

8.7 Vermin Control

Control measures associated with are as follows:

- Cabins and offices will be kept clean on a daily basis and formally cleaned at least once per week.
- Bins will be provided to dispose of food waste and other waste which may attract vermin.
- Office doors to remain closed where possible, in particular canteen doors.
- Regular inspection of the offices will be carried out to ensure vermin are not present.
- Where all control measures are implemented and vermin are still found to be present, a vermin removal company shall be contacted.

8.8 Landscape

Any landscape measures shall be implemented in accordance with the Landscape Design required by the contract, to be prepared by the Designer.

8.9 Archaeology

An archaeologist experienced in maritime archaeology will be retained for the duration of the relevant works.

In the event of archaeologically significant features or material being uncovered during the construction phase, machine work should cease in the immediate area to allow the archaeologist/s to inspect any such material.

Once the presence of archaeologically significant material is established, full archaeological recording of such material will be carried out. If it is not possible for the construction works to avoid the material, full excavation would be recommended. The extent and duration of excavation would be a matter for discussion between PoC and the licensing authorities.

It is recommended that an archaeological dive team is retained for the duration of any in-water disturbance works on the basis of a twenty-four or forty-eight hour call-out response schedule, to deal with any archaeologically significant/potential material that is identified in the course of the ground disturbance activities.

9. Management Review

The implementation of the EMP is reviewed monthly on site at the internal site meetings. These meetings are attended by site management and by personnel responsible for the implementation of the EMP. During the meeting all aspects of the environmental management are considered, including:

- Upcoming work
- Environments risks foreseen
- Control measures for the protection of the environment
- Internal and external audit results
- Inspection and monitoring results;
- Environmental alerts and bullet-ins
- Any issues raised by site staff or in relation to environmental management
- Site goals and targets
- Control measures for protection of the environment
- Any other significant issues;

Changes are made to the on-site management as required to achieve a continual improvement in environmental performance.

Environmental issues will be brought to the attention of the workforce through toolbox talks and through the Monthly HSE Meeting.

The EMP itself shall be reviewed at least every three months by the Site Management Team to ensure that it continues to be adequate and effective and changes made as required. Any changes shall be made by the Site HSE Officer and a new revision of the EMP issued to all personnel on the circulation list on page 1 of this document. Site audits carried out by the PoC will also include a review of the project EMP, changes made as required.

10. Training & Competence

The environmental management goals and strategy shall be communicated to all staff and contractors at the safety and environmental induction. All employees and contractors are required to undertake a site induction prior to conducting any work on site (for further details refer to the Health and Safety Plan) and employees shall be made aware of their responsibilities in accordance with this management plan. A record of inductions shall be kept by the Safety, Health & Environmental Officer.

Toolbox talks will be conducted with relevant employees on various aspects of the environmental management plan, activity control measures and environmental procedures. Three toolbox talks on environmental or waste issues must be conducted per quarter.

Toolbox talks shall be conducted by the Site HSE Officer, Section Engineers or others nominated by the Site HSE Officer. The schedule for toolbox talks shall be at the discretion of the Site Management Team and additional toolbox talks will be given in response to complaints, or where the particular environmental risks have been identified.

10.1 Recommended Toolbox Talks

Toolbox Talk Topic	Reference Material	When*	Recipients
Environmental Management	Environmental Policy, EMP, Environmental Procedures Manual	Commencement of site activities	All site crews
TBT 01	Hazardous Substances	Regular Intervals	All site crews
TBT 02	Environmental Awareness	Regular Intervals	All site crews
TBT 03	Managing Waste	Regular Intervals	All site crews
TBT 04	Spill Control	Regular Intervals	All site crews
TBT 05	Waste Pollution Prevention (Fuel & Oil)	Regular Intervals	All site crews
TBT 06	Silt Management	Regular Intervals	All site crews
TBT 07	Fire	Regular Intervals	All site crews

TBT 08	Storage of Hazardous Waste on Site	Regular Intervals	All site crews
TBT 10	Chemical & Fuel on site	Regular Intervals	All site crews
TBT 12	Water on Construction Sites	Regular Intervals	All site crews
TBT 13	Dust and Air Quality	Regular Intervals	All site crews
TBT 14	Noise and Vibration	Regular Intervals	All site crews
TBT 15	Archaeology	Regular Intervals	All site crews
TBT 16	Working in previous developed areas	Regular Intervals	All site crews
TBT 17	Pumping and over pumping	Regular Intervals	All site crews
TBT 18	Water pollution - cement and concrete	Regular Intervals	All site crews
TBT 19	Material handling and housekeeping	Regular Intervals	All site crews
TBT 20	Washing down plant and equipment	Regular Intervals	All site crews
TBT 21	Energy conservation - electricity and fuel	Regular Intervals	All site crews
TBT 22	Bentonite	Regular Intervals	All site crews
TBT 23	Be a good neighbour	Regular Intervals	All site crews
TBT 24	Sustainability	Regular Intervals	All site crews
TBT 25	Bantry Harbour environmental issues	Prior to commencement and at regular intervals there after	All site crews

Appendix 1:

Table of Requirements for ISO14001

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Table of Requirements for ISO14001

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Appendix 2:

Table of Contractual Requirements for Environmental Management

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Table of Contractual Requirements for Environmental Management
(From Project Specific Construction Requirements)

EMP Section	Section / Clause
	TBC

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Appendix 3:

Environmental Risk Assessment Report

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Appendix 4:

Site Maps

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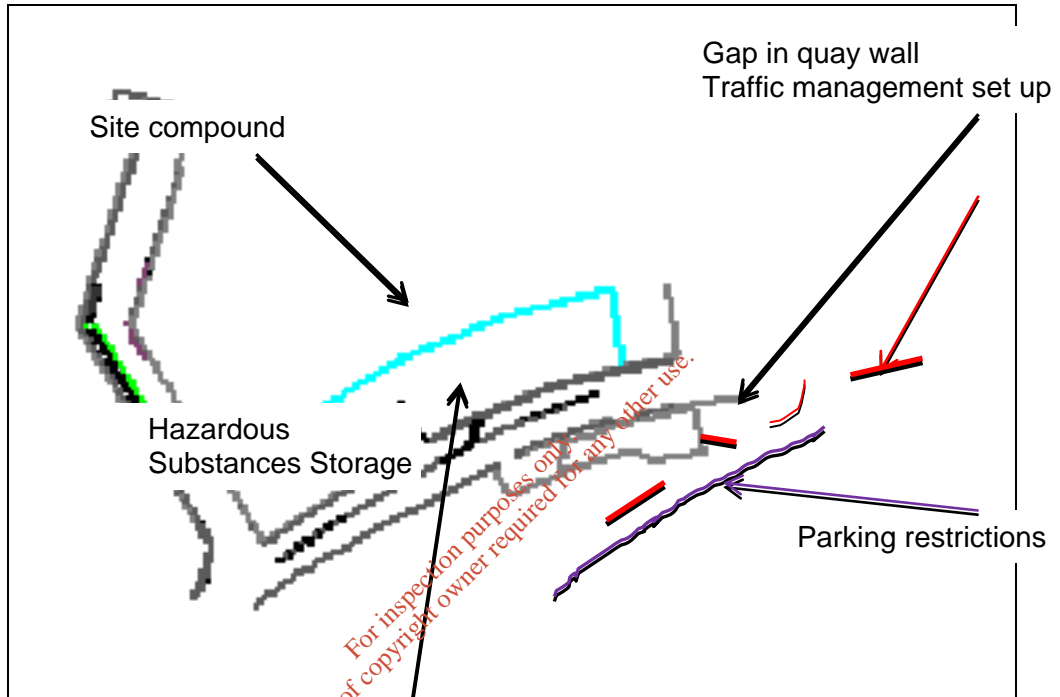
Location of the Works



Proposed access routes for the project and site location

- 1) – Pier
- 2) – Amenity Area
- 3) – Cove Works Area

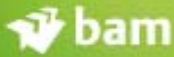
Proposed Works Area



Appendix 5:

Environmental Policy

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Environmental Policy

BAM Civil, one of Ireland's largest construction organisations, provides services in design, civil engineering, building, facilities management, project management and property development, across a wide range of construction projects.

The organisation promotes a responsible and proactive approach to environmental and waste management at every level of the business and on all sites of operation.

BAM Civil recognise that business aims must be balanced against environmental considerations. We are committed to continually improving our environmental performance and managing our operations to minimise potentially adverse impacts on the environment.

Specifically, where it is within the organisation's control or influence, BAM Civil will:

- Identify the significant environmental aspects of our activities by assessing their potential impact on the environment.
- Based on our significant environmental aspects, set specific objectives and targets, against which we shall monitor and review our performance.
- Comply with legal and other compliance obligations that are applicable to our activities and relevant to the environmental aspects of the business.


- Develop management processes and procedures that prevent pollution, protect native species and habitat, minimise waste generation, promote recycling and the use of recyclable materials, and maximise the efficient use of material and energy resources.
- Implement strategies to communicate our environmental commitments and requirements to employees, customers, suppliers, subcontractors and other interested parties.
- Provide training and support to employees, so they understand and can fulfil their responsibilities with regard to environmental impact and performance.
- It is the individual responsibility of all persons working for or on behalf of BAM Civil to support and apply the Environmental Policy and Environmental Management System as it pertains to their activities.



T. Cullinane, CEO

Date: February 2016



EP-19	Litter Management			
Note: Always print or copy to double-sided pages	PROC. NO: EP-19	REV: 02	DATE: 26.03.2013	PAGE: 1/1

Purpose:	To provide a guideline for the procedures to be implemented for the management of litter in accordance with the regulatory requirements and Environmental Policy.
Scope:	All sites and activities
Responsibility:	Contract/Project Manager, General Foreman, Area Supervisors
<p>Regulatory / Management Requirement:</p> <p>Under the Litter Pollution Act 1997 and Regulations 1999 there are a number of requirements with regard to littering. The primary obligation (Section 6) placed upon the owner or occupier of a property that can be seen from a public place is to keep the premises litter free. Where litter has accumulated the local authority can issue a notice requiring its removal. If the owner or occupier does not comply with the notice the local authority can do whatever is necessary to clean up the site and require the owner / occupier to pay all costs involved.</p> <p>The Litter Pollution Regulations 1999 make the following activities offences under the Act:</p> <ul style="list-style-type: none"> • Depositing a substance or object so as to create litter in a public place or litter that is visible to any extent from a public place. <i>Section 3 (1)</i>; • Depositing for collection by or on behalf of a local authority a substance, material or thing, or <ul style="list-style-type: none"> ○ Loading, transporting, unloading or otherwise handling or processing anything, or ○ Carrying on a business, trade or activity; in a manner that creates or tends to create litter in a public place or litter that is visible to any extent from a public place. <i>Section 3 (2)</i> • Placing municipal waste into or near a litter receptacle. <i>Section 3 (3)</i> • Failing to take measures in using a vehicle to transport goods or materials to prevent the creation of litter on a public road or in a public place. <i>Section 4 (1)</i> • Failing to take measures to prevent the creation of litter in the vicinity of a skip. <i>Section 4 (2)</i> • Failing to keep a footpath or margin adjoining a public road free of litter. <i>Section 6 (4)</i> • Removing litter from a footpath or margin onto a road. <i>Section 6 (5)</i> <p>The penalty for persons found guilty of an offence is a fine not exceeding €3000 upon summary conviction in the District Court, or €130,000 on conviction on indictment.</p>	
<p>Management Procedure:</p> <p>During site inductions and pre-start meetings ensure that all personnel and contractors are aware of the requirement to keep the site and any surrounding public places free of litter.</p> <p>Ensure security measures are put in place to prevent fly tipping on the site.</p> <p>At the commencement of site activities designate responsibility for checking work areas, and particularly the area around skips, and ensuring they are kept free of litter and that waste is placed into the appropriate skip or bin.</p> <p>Any personnel involved in the transport of materials around the site or off-site must ensure that such transport does not cause litter to be deposited on a public road or place.</p> <p>Undertake regular inspections (as part of the Environmental Inspection – refer to EP-05) to ensure compliance with the above requirements.</p> <p style="text-align: center;">For further information or advice contact the Environmental Coordinator, on 045 886536</p>	
<p>References:</p> <p>Litter Pollution Act 1997 and Regulations 1999 & EPA Acts 1992-2003</p> <p>FAS & CIF (2004) Construction & Demolition Waste Management – A Training Programme for Contractors & Site Managers (Course Notes)</p>	

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ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

Appendix 2

Method Statement MS02-3

Works Proposals – Option 3

Part 1 Site Specific Method Statements – MS02-3

Dredging Works

Introduction

Prior to any works commencing on site Site Specific Method Statements will be prepared for all the major elements of the work. These method statements will outline precisely how Bam will approach and carry out the works associated with the Bantry Inner Harbour Development – Phase 1 Contract. These method statements will be submitted to the Employers Representative for approval, work will not commence prior to the relevant method statements being approved.

The method statements will be prepared by the Project Manager Collins Connolly and the Site Agent Seamus O’Sullivan, however the various other members of the site management team will be asked to contribute to the relevant sections of the method statements as required. The method statements will be prepared in line with the Works Requirements, Specifications, Guidance Documents and Consultations meetings with various other stakeholders.

While the more specific in-depth method statements will be prepared once we get to site, below are the overall method statements which will outline our general approach and methodology to the Bantry Inner Harbour Development – Phase 1 Contract.

Dredging Works

Introduction

This method statement incorporates Bam overall approach for the Dredging Works, option 3-variant. Prior to any works commencing on site more comprehensive and detailed, task specific method statements will be prepared by Bam for each element of the works.

Scope of Works

The works will consist of the following:

- **Proposed Plant**
- **Dredging Methodology**
- **Transport of Spoil**
- **Processing of Spoil**
- **Deposition of Spoil**
- **Surveying**

Location of the Works



Figure 1: Site Location Map

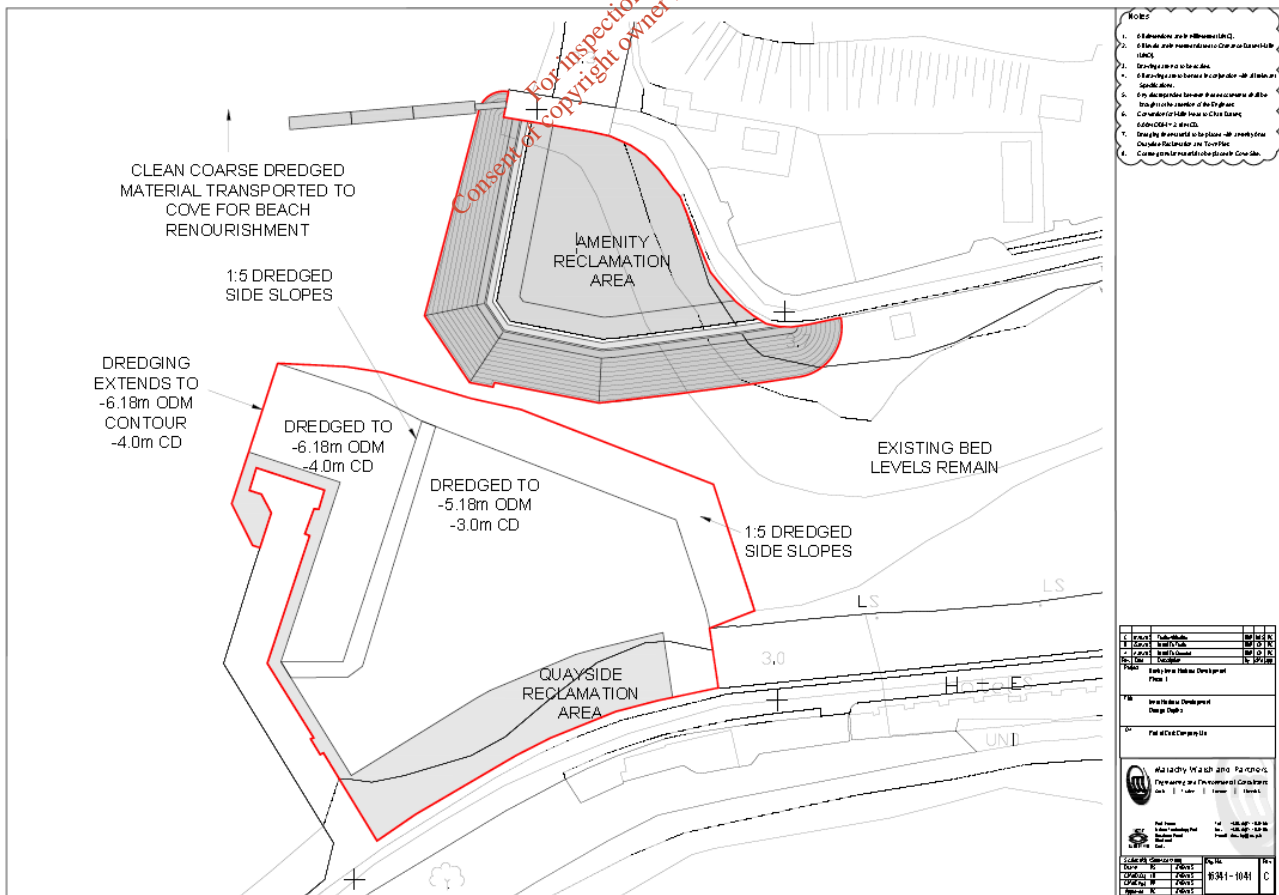


Figure 2: Dredging layout drawing

Proposed Plant

Details are listed below of plant and equipment to be utilized in the Inner Harbour Dredging works, including access and egress support to be used in the works.

The details provided are specific to the project. All floating plant, dredging equipment, transportation plant and equipment relating to dredging, treatment, transportation and disposal are detailed.

Most of the equipment is BAM owned or will otherwise be hired/ subcontracted.

Item	Activity/ Roles	Quantity [nos.]
65t long reach excavator with GPS system & 4t breaker	Dredging of silts from causeway	1
Aoibheen spudleg Dredger barge	Dredging inner harbour	1
2 no dump barges	Dredging inner harbour	2
35 ton excavator with clamp shell grab	Managing dredge materials	1
A25 Dumper	Managing dredge materials	2
Work boat	Managing dump barge	1
Safety boat	Managing safety in the harbour	1
Allu PMX500 Power mixer	Dredge stabilisation	1
Allu PF7+7 power feeder	Dredge stabilisation	1
Landing craft	Transport machinery	1

Further equipment is also available from our subcontractors and sister companies in the BAM group.

All mechanical plant will be in good working order and subject to a regular maintenance regime. Only suitably qualified and experienced personnel will be allowed to operate plant and equipment.

All Vehicles will be fitted with reversing beacons and a flashing light and will be directed by a banksman. All plant certification will be checked by the BAM Civil Safety Officer prior to commencing works on site. A register of all plant and equipment checks will be kept on site for the duration of the project.



Figure 4: Bam Plant dredging in Dublin Port

Dredging Methodology

It is the intention of BAM to carry out the dredging of the material using a combination our own long reach excavator (CAT 365) which will work from the shore and the Aoibheann Dredger mounted on floating barge (ACN 5) as per the photograph below. It has been identified that the dredged materials will be used on site as fill in the following locations.

- Quayside Reclamation area
- Amenity Area
- Town Pier Widening



Figure 5: The Aoibheann Dredger which will be utilized for the dredging works

In order to dredge the material the following steps will be followed:

Note: Prior to dredging operations commencing, a marine mammal survey will be carried out, a silt curtain will be put in place in liaison with the Harbour Master on marine traffic.

- The dredging design will be input into a monitor control box in the excavator as described in the surveying section below.
- The dredged area will be plotted out and broken into grids so as to allow a controlled methodical approach to the dredging operations.
- The Aoibheann will be moved into position over the first grid section to be excavated.
- A dump barge will be tied alongside the Aoibheann, the dredged material will be deposited into this dump barge which will then transport it to the temporary offloading quay in the Amenity area and the Quayside Reclamation area.
- The excavator will dredge the top 0.85 to 1.8m of the silt material, the GPS dig system will be used to verify the depths. The material will also be visually monitored during the excavation to ensure the silty materials and gravels are segregated.

- All excavators carrying out the dredging works will be fitted with environmental dredging buckets which will minimise the loss of any dredge spoil into the harbour.
- Additionally a silt curtain will be erected across the mouth of the harbour during dredging operations.



Figure 6: Environmental Dredging Buckets & Silt Curtains will be used for the dredging operations

- Once the material has been loaded into the dump barge it will be transferred to the Amenity area or the Quayside Reclamation area where it will be off loaded and treated. Treatment will be covered further in the Processing section below.
- The silt material will be stabilised by adding cement using the Allu Stabilisation System which will be attached to the end of a long reach excavator and will ensure that the material is stable enough to be incorporated into the permanent works. See Processing of Spoil section.
- The material will be sampled and tested in accordance with the Works Requirements continuously throughout the dredging operation. Furthermore daily water samples will be taken and tested to ensure that the dredging operations are not having an adverse effect on the environment.
- At all times communication will be maintained with the Marine Mammal Observe, if in the event of marine mammals being observed within the influence zone then the dredging works will be suspended immediately and will only recommence once the Marine Mammal Observer gives the go ahead.
- As the top layer of silt is excavated, the underlying inert gravels will be available for excavation. The material will be dredged in the same manner outlined above and will also be stabilised if required in the manner outlined above. The material will also be tested to ensure that it is inert. These gravels will be used in the permanent works as engineered fill.
- Dredging tolerances shall be that as outlined in appendix 6/71.

- Working hour restrictions as per Appendix 1/9 and it is understood that the dredging window is November to March inclusive.
- Note: materials will also be dredged from land, this is covered in the Quayside reclamation works and the Town pier construction work.

Transport of Spoil

- All material will be handled in such a way as to minimise the impacts on water quality, the environment and other harbour users. Material handling and storage areas will be monitored to ensure that there is no surface water run off which could cause damage to the environment.



Figure 7.a: Environmental Silt Cutains used for the dredging operations

- All dredged materials will be moved to its permanent deposition/treatment area over water, as per appendix 6/71. If during the works hazardous materials are identified this will have to be transported off site by land transport to an appropriately licenced facility.
- As covered above the excavated dredged material will be transported to a temporary loading quay at the Amenity area or the Quayside Reclamation area by a dump barge here it will be excavated from the barge by a 30 ton tracked excavator using a clamp shell grab into a 25ton dump truck where it will be in a holding cell for treatment. All transport of dredge material is local within the site boundary and will not be transported outside the site boundary on land.
- All dredge material will have quantities, times etc recorded and made available for inspection to the Engineer.

Processing of Spoil

- As mentioned above once the material is excavated from the dump barge it will be placed in cells behind the Amenity area revetment where the water collected during the dredging operation can drain prior to the material being stabilised. The water draining from the dredge material will naturally filter through the geotextile and rock revetment of the Amenity area.
- As per appendix 6/71 it is estimated that the ratio required for treatment and stabilisation is between 10 to 12%, the actual ratio will be determined on site by trial mixes. The stabilisation design mix will be offered to the engineer for approval prior to the full scale dredging programme proceeding. Bam have engaged the services of AGL consulting to review all geotechnical matters.

- Once the material has dewatered it will be treated using cement stabilisation. Stabilisation is required so that the material can be incorporated into the permanent works as engineered fill. All treated materials will be tested as per Appendix 1/73 and dredging, treatment and disposal records maintained as per Appendix 6/71.
- To mix the cement through the wet dredge material, Bam will mount an Allu PMX500 power mixer to a 35 ton excavator. This is a rotating agitator mixing which will feed and mix the cement from Allu PF7+7 power feeder with Allu DAC system into the dredge material, the attachment is powered by the hydraulics of the excavator. The agitator will be lowered into the cell of dredge material and the cement added through the agitator. The agitator then mixes the cement through the dredge material ensuring the mix is homogeneous throughout. The material is then for a sufficient period for the chemical reaction between the water and cement to take place. Once the moisture content of the material is reduced to the required levels it will be placed and compacted into the permanent works.



Figure 8: Dredge material being treated using the Allu treatment system

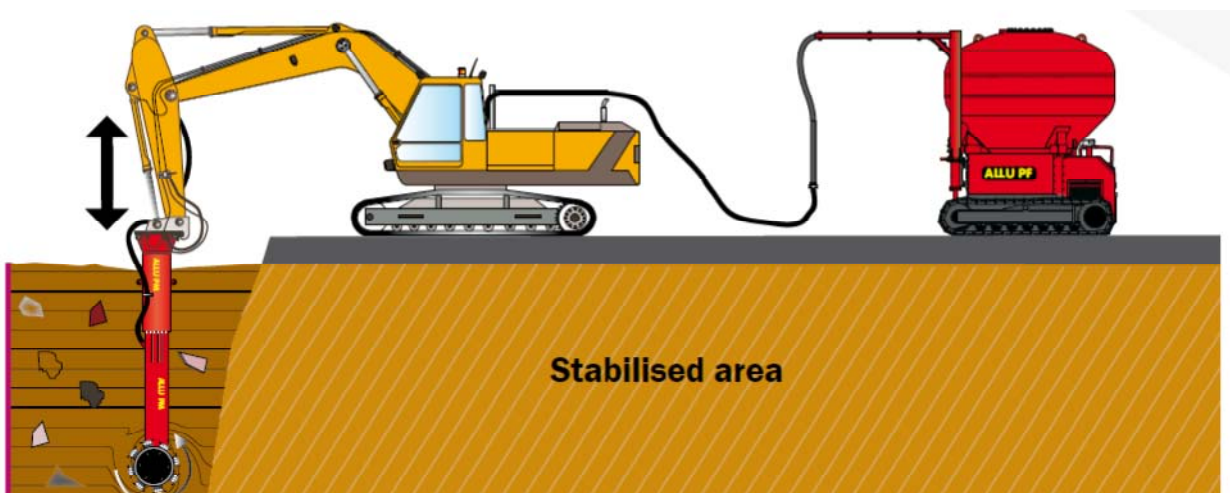


Figure 9: Allu Stabilisation System

Deposition of Spoil

- As mentioned above it is the intention of Bam to incorporate all the dredge materials into the permanent works in the Harbour works.
- The material will be deposited into its permanent location and treated in-situ. All run off will be filtered through the revetment of the Amenity area which will have a geotextile screen to ensure no sediments are displaced into the watercourse. Additionally this will be the case at the Quayside reclamation area.

Surveying

- Prior to dredging works commencing, an “in bathometric” survey will be carried out in order to determine the most up to date existing bed profile. The surveying will be carried out in accordance with the specification as outlined in Appendix 1/12 of the Works Requirements. The information from the survey will be made available to the Employer. The information will also be used to determine the total quantity of material to be dredged. Throughout the dredging works, numerous interim surveys will be carried out on a grid basis for checking purposes and interim measurements. Finally, once the dredging works are complete, an “out” survey will be carried. All information will again be made available and requested drawings, survey reports etc. will be submitted for final acceptance and approval by the Employers Representative.
- Notification will be given for the “in” and “out” survey and the Employer and or the Employers Representative will be invited to witness. During interim surveys, this invitation is also there should the ER wish to attend.
- In order to dredge to the requirements of the Contract drawings, the Works will need to be set out. It is the intention of BAM to utilise a long reach excavator on a floating barge to carry out the excavation. The excavator will be fitted with a “Dig Master” system. The system is run from a global positioning system, from this operator is aware of the location x,y & z respectively and also the orientation of the bucket of the machine. The system is set up by taking the dredge design information and creating a surface model of the design. This is then inputted into the machine control box. The required design is then visible on a monitor in the cab in both plan and section view relevant to the XYZ position of the excavator bucket.

Safety

- Risk assessments have been carried out and are included in the Health and Safety Plan. The Health and Safety Plan is included in section 3 of the submission.
- All work will be carried out in accordance with the Health and Safety Plan for the site.
- The site operates an induction procedure for personnel prior to commencing work on site.
- P.P.E. will be worn by everyone involved on this project at all times to include a minimum of high visibility vest, hard hat, safety glasses and safety boots.
- All plant will be in good working order and equipped with yellow flashing beacons

Programme of Works

Refer to construction program as included in section 2 of this submission

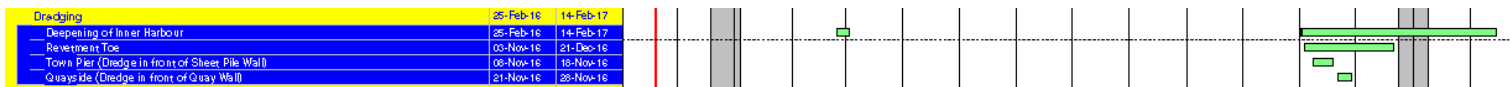


Figure 10: Screenshot of dredging programme from main programme

Quality an Environmental management

The project Quality Plan will be implemented after being approved by the ER and the inspection and test plan will be adhered to rigidly. A copy of the Quality Management Plan will be kept on site. Seamus O'Sullivan will be the person with responsibility for quality control. Site audits will be carried out to ensure compliance with the Quality Plan. Periodic company audits will be carried out to ensure QA standards are being maintained on the project.

All works will be undertaken in accordance with the Site Specific Environmental Management Plan and the Waste Management Plan. These plans have been included in section 5 of the submission. The main environmental impacts and considerations associated with the works are as follows:

- Waste Management: Waste management will be as specified in the site WMP
- Water Pollution: No contaminated water to be discharged into the harbour.
- Noise: All plant and machinery used on site will be serviced regularly to avoid excessive noise. Noise levels on site are not expected to exceed the legal but where necessary, mandatory warnings signs shall be erected informing all when ear protection is required to be worn.
- Protection of Watercourse: The water course shall be protected from pollution, by ensuring that generators, pumps etc are placed in drip trays. Spill kits shall be located adjacent to the watercourse and clearly identified. Spill kits shall also be placed in all machines. Details of procedure for dealing with oil spillages and procedure for protecting water courses are contained in BAM Environmental Management Plan
- Hazardous Substances: All hazardous substance will be stored in the hazardous store and all generators will be placed on a drip tray at all times.



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ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

Appendix 3

EP-10 Surfacewater Controls



Environmental Management Plan

Bantry Inner Harbour Development Phase 1

Document Revision No: 02			
Reason For Issue: For client approval			Client Approval (if required)
Originator	Reviewer	Approver	
Brian Abbott	Seamus O'Sullivan	Seamus O'Sullivan	Port of Cork

Copy	Circulation:	Name	Company	Location
1	Contract Manager	Liam Collins	BAM	Site
2	Project Manager	Seamus O'Sullivan	BAM	Site
3	General Foreman	Jack Tuohy	BAM	Site
4	Site Health, Safety & Environmental Officer	Alan Mullins	BAM	Site
5	Co. Environmental Coordinator	Brian Abbott	BAM	Head Office, Kill

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1. General Project Details

Project Name	Bantry Inner Harbour Development Phase 1		
Project Location	Bantry , Co. Cork		
Client	Port of Cork (PoC)		
Contract Manager	Liam Collins		
Start Date	8 Feb 2016	Duration (Months)	16 months
Completion Date (Expected)	30 June 2017		
Primary Project Type	Marine project		

Project Description:

1.1 Introduction

This environmental Plan has been written in accordance with BAM Contractors Environmental Procedures. The controlled copy of all environmental procedures is hosted on Sharepoint.

This Plan is a working document, clearly stating the arrangements in place to manage the significant environmental aspects and legal requirements of this project. This Plan covers BAM Civil activities and that of its Subcontractors.

This Plan has been approved by the HSE Department at Kill and has the commitment of the Project Manager and Engineers to fulfil the requirements of the plan.

1.2 Description of the Works

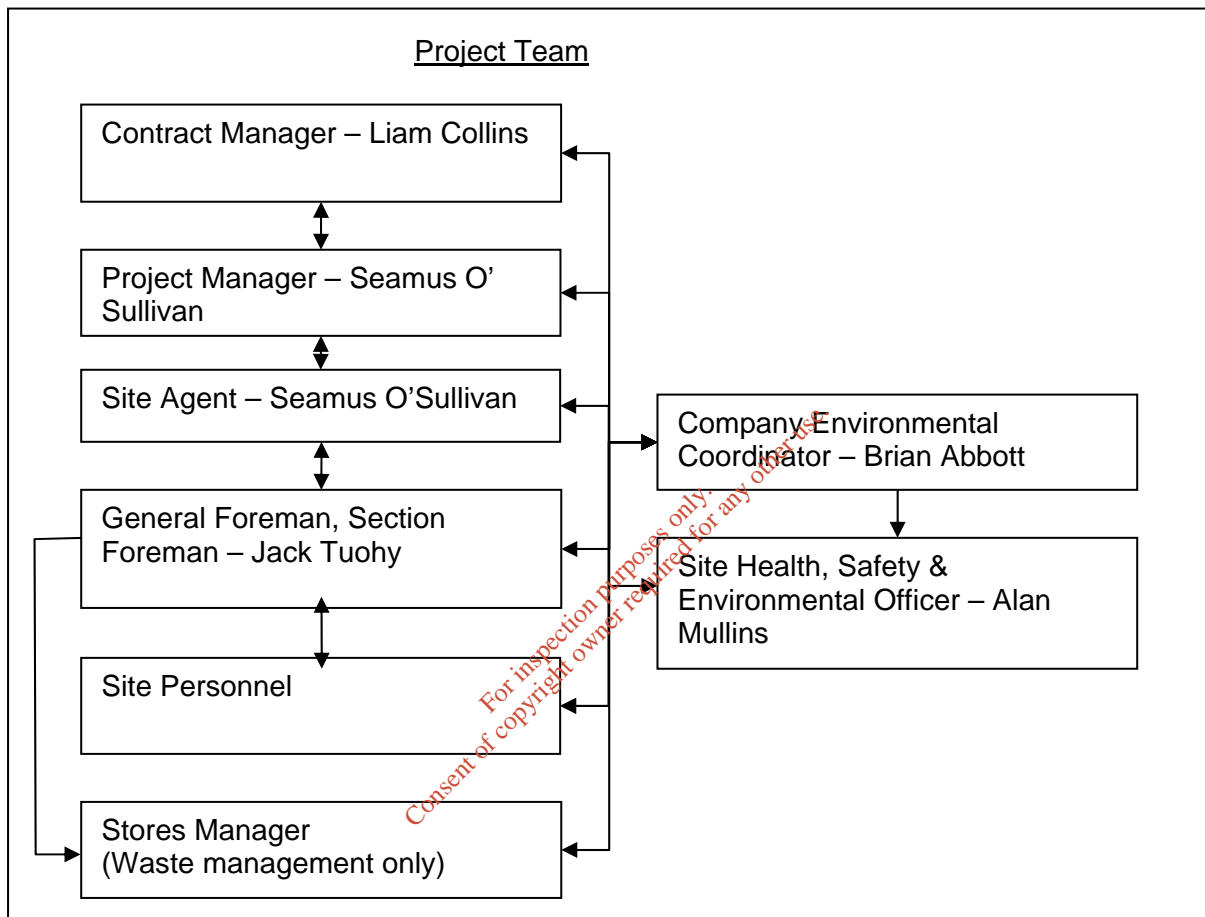
The purpose of the scheme is to provide a sheltered harbour environment and marina with increased water depth and improved pier facilities to promote fishing and tourism activities in the Bantry area. This will also provide additional and improved recreational and amenity areas at the inner harbour. As a means of making use of the dredged sediments it is intended to make beneficial re-use of clean dredged material at adjacent, and connected, locations for land reclamation. The main components of the proposed development at Bantry are as follows:

1. Dredging of Harbour Basin;
2. Fishing Docks and Quay Wall Improvements;
3. Revetment construction;
4. Fishing Pier Refurbishment;
5. Land Reclamation within Bantry Harbour;
6. Breakwater and Open Pile Quay Construction;
7. Installation of Pontoons and Marina Services;

2. Environmental Management System

Project Roles and Responsibilities

2.1 Organisation Chart



2.2 Communication

The principal lines of internal communication in relation to the EMP are shown above. Environmental issues are communicated to staff through the site induction, toolbox talks and monthly safety meeting.

Communication with other external parties will be in accordance with the consultation requirements (section 6) and in response to complaints (section 3).

2.3 Responsibilities

Company	Role (Job title)	Environmental Management Responsibilities
BAM Civil	Company Environmental Coordinator	Conducts Environmental Risk Assessment, advises on environmental issues and controls, and conducts internal environmental audits.
BAM Civil	Contract Manager	Approves and implements EMP
BAM Civil	Site / Project Manager	Monitors implementation of control measures, ensures that activities, including subcontractor activities, comply with the requirements of the relevant performance requirements.
BAM Civil	Site Safety, Health Environmental Officer	Conducts weekly environmental inspections; carries out toolbox talks on environmental issues. Coordinates emergency response, including spills. Checks spill kits and orders spill control materials when required
BAM Civil	Site Engineer	Ensures that works are carried out in accordance with the EMP and with the approved works method statement. Includes Environmental matters in weekly site inspections.
BAM Civil	Section Engineers / Foreman	Carry out toolbox talks; coordinates water/noise/dust monitoring and remedial actions; ensures that works are carried out in accordance with the EMP and with the approved works method statement. Performs environmental inspections.
BAM Civil	Quantity Surveyors	Tracks the costs associated with the implementation of environmental matters and forwards to the Company Environmental Coordinator as required.

3. Environmental Management Arrangements

3.1 Environmental Management

The environmental management system (EMS) complies with the ISO 14001:2004 standard. Those aspects of the EMS relevant to this project are outlined in this document which also contains references to specific procedures.

3.1.1 Planning

The environmental planning for the project is based on information from:-

- The clients project information and tender documentation
- Planning Permission register number 12/00735
- Bantry Inner Harbour Development Environmental Impact Statement; RPS 2012
- EPA waste licence for waste management activities at Bantry harbour (pending)

Such information has been used in the environmental assessment of the activities for this project.

3.1.2 Monitoring and checking

The significant environmental aspects of the project are monitored regularly by carrying out the following at the frequency stated below:-

Monitoring and Checking	Frequency
Environmental Inspections by Site Managers	Monthly
Environmental Inspection by Foremen	Weekly
Environmental Inspections by HSE Officer	Weekly
Environmental Audits by Env Co-ordinator	Quarterly
Surface Water Inspections (recorded)	Continuous & Daily
Surface water inspection (visual)	Daily
Noise and Vibration Monitoring	Weekly
Dust Monitoring (visual)	Daily
Dust deposition monitoring	Monthly
Marine Mammal Observer	Daily
Dredge material (WAC analysis)	1 sample per 1000m ³ of dredging
Slump testing on stabilised dredge material	5 sample per treated cell
Mussels in Inner Bay for Mercury and heavy metals	Immediately before, (ii) 2 weeks after and (iii) 3 months after dredging

3.1.3 Action Register

A record of environmental management actions is to be kept on site. The progress for all actions is reported regularly to the appropriate member of the Management Team and as per the EPA waste licence conditions. Such actions will include information taken from:-

- Environmental inspections
- Audit actions: non-conformances and observations
- Progress of actions following environmental incidents
- Significant communications with stakeholders
- Project issues requiring management action
- Complaints

These actions will be closed out, signed and dated by the appropriate person in the appropriate timeframe.

3.1.4 Performance

Environmental Performance of the project is monitored by:-

- Environmental review meetings as a part of the Monthly Safety Meetings
- Site inspections
- Audits conducted by the BAM HSE Department
- Audits conducted by the Port of Cork
- EPA inspections for compliance of the waste licence
- A review of the quantities of waste created
- External communications and feedback
- Review of objectives and targets (targets table section 7)
- Corporate Social Responsibility (CSR) reporting

3.2 Communications

3.2.1 Environmental Complaints

All environmental complaints will be recorded in the project Complaints Register. The Register is maintained on site by a nominated member of the Management Team who also allocates responsibility for resolving any issues and follows up complaints to ensure they are resolved. Any issues that are deemed to be significant will be reported to the Site Management Team and the relevant authorities as appropriate. Complaints are reviewed during internal audits by the Environmental Coordinator, where any additional measures to improve performance are discussed. Complaints are reported to Head Office also. See EP-24 Complaints and Incident Procedure for more details.

All complaints received from external sources and incidents must be reported to the Project Manager, the EPA (for waste management activities) and a representative of the Port of Cork.

All notifications, records and reports will be submitted to the EPA as per the sites waste licence.

3.2.2 Environmental Incidents

Environmental incidents related to activities controlled under the site's EPA waste licence, will be reported to the EPA as per waste licence conditions and the EPA's "*Guidance to Licensees/COA holders on the Notification, Management and Communication of Environmental Incidents*".

Under this reporting system the environmental impact assessment criteria is as follows:

Ranking	Classification	Impact on the environment
1	Minor	No contamination, localised effects Minor effect on air quality as evidenced by dust or odour complaint(s) ELV breaches An emission which does not comply with the requirement of the licence/COA (A pattern of repeated minor incidents should be taken into account when considering the level of response)
2	Limited	Simple contamination, localised effects of short duration Local limited impact to water, land and air Notification to and short term closure of potable water extractors required

3	Serious	Simple contamination, widespread effects of extended duration Significant effects on water quality Major damage to an ecosystem (e.g. significant impact on fish population) Longer term closure of potable water extractors Significant reduction in amenity value Significant Damage to agriculture or commerce Significant Impact on man
4	Very Serious	Heavy contamination, localised effects of extended duration
5	Catastrophic	Very heavy contamination, widespread effects of extended duration

The following shall be notified, as soon as practicable after the occurrence of any incident which relates to a discharge to water:

- i. Inland Fisheries Ireland / Department of Agriculture, Food and the Marine in the case of discharges to receiving waters
- ii. Marine Institute (MI), Sea Fisheries Protection Authority (SFPA), Food Safety Authority of Ireland (FSAI) and an Bord Iascaigh Mhara (BIM) in the case of discharges to or likely to impact a shellfish water.
- iii. Cork County Council, in the case of discharges to designated bathing waters
- iv. PoC, Cork County Council and Irish Water, relation to discharges to sewer

Incident notification records shall include details of the nature, extent, and impact of, and circumstances giving rise to, the incident or accident. The record shall include all corrective actions taken to manage the incident or accident, minimise wastes generated and the effect on the environment, and avoid recurrence. In the case of a breach of the waste licence conditions, measures to restore compliance. The licensee shall, as soon as practicable following notification, submit to the Agency the record.

Environmental incidents relating to the all project works and not just those governed by the proposed EPA waste licence will be reported under the BAM HSE incident reporting system (see company environmental procedures EP-06 Environmental Incident procedure and EP-24 Complaints and Incident Procedure.

Actions with regard to specific incidents including water pollution and exceeding the limit levels for dust, noise and vibration, are detailed in Section 8.

Report all Environmental Incidents immediately to the HSE Department 045 886557.

3.3 Suppliers and Subcontractors

3.3.1 Subcontractors

All subcontractors will be required to work in accordance with BAM Civil site specific Environmental Management Plan. Works operations will be managed by the relevant Project Managers / Site Agents to ensure appropriate procedures are being followed. ISO 14001 states consideration should be given to aspects related to the organisations activities, products and services such as environmental performance and practices of contractors and suppliers. In order to achieve this, we ensure our subcontractors sign contracts which state they must comply with our environmental policy, our EMS and work within the Environmental Legal Framework while working for us on our projects.

During the recruitment stage, we would enquire as to whether they had been prosecuted with regard to breaching environmental legislation and this would also be considered. We would also enquire to the progress of their environmental management system (or equivalent) to ensure they were working in a responsible fashion and in a way which would be of a similar fashion to BAM Civil. Lines of communication would also be outlined during this recruitment stage to ensure they were aware of our environmental management system and how this will affect them and what they need to achieve in order to be suitable candidates for our projects.

A subcontractor appraisal form is in use and can be accessed through COINS. This document will be used to ensure subcontractors who are not sufficient are not permitted on any future BAM sites.

A list of subcontractors has been identified below:-

Contract	Company	Environmental Contact	Commencement Date	Duration
TBC				

3.3.2 Suppliers

All suppliers and sub-contractors are made aware of the company's environmental requirements where it is possible they could produce waste or pollution. An employee supervises all deliveries of environmental hazardous materials e.g. diesel fuel and oil drums.

4. Summary of Emergency Procedures

- Environmental Emergency Preparedness and Response Plan
- Containing and cleaning up spills (EP-15)
- Environmental Incident Procedure (EP-06)
- Environmental Complaints and Incidents Procedure (EP-24)
- Sharepoint online incident tracking system

5. Environmental Planning, Aspects and Controls

5.1 Environmental Risk Assessment

A number of site visits have been carried out by BAM staff where notes were produced which identified any significant environmental aspects. These notes were compared with the environmental information supplied by the client's representative and have been used as a basis for performing the environmental risk assessment.

5.2 Environmental Risk Assessment Report

The significance of all the environmental aspects for each activity on the project have been assessed. The assessment followed the method defined in EP-02 Environmental Risk Assessment.

Please see appendix 3 for the risk assessment report for this project.

5.3 Environmental Assessment and Management Controls

The management controls, which have been put in place, are appropriate to the nature, duration and scale of the activity on this project and the particular sensitivity of the local environment. They will be revised in the event of any significant changes to the scope of the activity during this project, especially when there is additional works, or a change in the method of works.

Additional management controls shall be adopted when there are changes to client requirements, stakeholder interests to a particular local environmental sensitivity.

The significant risks which are highlighted in the risk assessment and the management controls are communicated to the workforce by site inductions and toolbox talks.

5.4 Method Statements

The significant environmental aspects and the actions to apply the required controls are described in the method statement.

Method statements are produced in accordance with the contract requirements by the Site Management Team and reviewed by the Project Managers / Site Agents prior to submission for approval. When developing method statements, the EMP, Site Maps and any other relevant environmental management documents shall be reviewed to assess the potential impacts of the particular activity.

All method statements shall include a section entitled "Environmental & Waste Management". For activities that have significant potential to cause adverse environmental impacts reference will be made in this section of the M/S to the control measures in Section 8 of the EMP. Additional control measures may be included where those in Section 8 prove

inadequate to suit the local conditions at the site of the activity, and/or where specific measures are required by any of the authorities. The method statement must include:-

- Reference to the EMP and WMP
- The proposed method of construction and how impacts shall be mitigated
- Waste (storage, removal, end disposal sites where known)
- Hazardous Substances (storage, removal and end disposal sites where known)
- Works close to waterways (sediment controls if needed)
- Dust
- Noise and Vibrations
- Refuelling
- Fuel storage
- Drip trays/spill kits and other precautionary measures

Prior to the commencement of the works, all Method statements will be reviewed by a competent person by referring to Section 8 of the EMP. Following the review, improvements will be made to the method statements as required.

6. Environmental Compliance Requirements

In accordance with Environmental Procedure 01 (EP-01) Environmental Compliance Assessment, a review of all relevant literature and contractual requirements relevant to the contract will be completed.

- Planning Conditions
- Contract Documents
- Preliminary Health and Safety Plan
- EPA waste Licence (pending)
- All other contractual conditions and documents

These requirements have been tabulated in Appendix 2 (table of contractual requirements) to demonstrate how each of the requirements is addressed in the EMP.

Evaluation of Compliance

Compliance will be evaluated through inspections and audits and also reviewed at the regular site management meetings.

6.1 Consultation with Relevant Authorities

Consultation has been undertaken with the following authorities:

- Bantry Town Council
- Cork County Council
- EPA
- Inland Fisheries Ireland
- Port of Cork
- National Parks & Wildlife Service

6.2 Site Restrictions & Hold Points

In accordance with the contract clauses or notification from the Port of Cork the following environmental restrictions apply to the construction of the works:

Clause	Restriction – refer to Contract and planning conditions for complete details
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	Bantry Inner Harbour Development Phase 1, Works Requirements Specifications Oct 2015
	Bantry Inner Harbour Development; Environmental Impact Statement; RPS; Aug 2012
	Cork County Council Planning Register Number 12/00735
	EPA Waste Licence (pending)

6.3 Table of Environmental Licences, Permits and Permissions

6.3.1 Maintaining arrangements for environmental licence, permits and permissions

These are all legal documents associated with the work and may be from a contractor/supplier/client, or it may be an EPA or Local Authority Licences/Permit and will be maintained by the Manager Team on site.

6.3.2 Licences and Permits

PoC will be requested to supply information on the licences and permissions that are required for the project. The Port of Cork will have the responsibility for licence applications.

The relevant environmental regulator may be informed early in the project of the environmental aspects of the work. A meeting on site will be arranged where applicable.

N.B. a copy of all formal licences is to be sent to the HSE Department, Kill.

The following table indicates the licences and permissions that may be required:-

Licence / Permission	Regulator	Operations
Discharge consent into watercourse or sewer	Irish Water	Any solid or liquid entering controlled waters (river, pond, stream, ditch) unless it is clean water
Consent for work near a watercourse	Inland Fisheries Ireland	Any work which include work over or under the water
Derogation Licences	National Parks and Wildlife Services	Cutting of protected trees, protected species (bats, badgers, frogs etc), work in or near any SPA, SAC, NHA) Derogation licences for protection species and removal of invasive species
Permissions / Licences	Department of Environmental, Communities and Local Government	Excavation work in any site containing archaeological remains or natural habitat, protected Monument.
Waste Licence	EPA	Waste facility licence for storage and treatment of contaminated dredge material at Bantry pier
Waste Collection Permit	NWCPO	Waste collection permit for haulage of waste offsite
Waste facility licence/permit	EPA/LA	Appropriate facility licence, permit or COR for the disposal of all waste offsite
Planning Permissions	Cork County Council	All works to be carried out as per Planning Register Number 12/00735

6.4 Company Policy & Procedures

A copy of the Company Environmental Policy is displayed at the project site offices. The policy determines the company's overall approach to environmental management, which is developed through the EMS. This EMP has been developed taking into account the:

- Company Environmental Policy;
- Objectives and targets as specified in the Yearly Environment Plan; and

- Requirements of relevant specific procedures as contained in the Environmental Procedures Manual

6.5 Relevant Statutory Provisions

A library of environmental legislation, relevant codes of practice, standards and best practice guidance documents is maintained at the BAM Head office in Kill, Co. Kildare. This library is updated by the Company Environmental Coordinator through regular reviews or as required by changes in legislation and standards and developments in industry best practice. Legal Register is on sharepoint for general viewing.

6.6 Design Requirements

The environmental requirements for design are reviewed by Malachy Walsh and Partners and incorporated into the design as appropriate. The design requirements are reviewed by the Project Managers and Engineers to ensure that the environmental considerations relevant to the construction works are incorporated into the works.

6.7 Control of Documents

All documents relevant to the construction works shall be kept and stored in accordance with the below table. Documents that are part of the site environmental management system, including inspection reports, monitoring records and meeting minutes shall be kept for the duration of the project as per UKAS (United Kingdom accreditation scheme).

No.	Document	Raised By	Retained By	Statute or UKAS	Currently Held	Retention times (years)
1	Register of Environmental Aspects	Env Co-ordinator	Env Co-ordinator	UKAS	Head Office and Sites	3
2	Waste Transfer notes (where applicable)	External	Env Co-ordinator Site	Statute	Sites	3
3	Hazardous waste transfer notes	External	Env Co-ordinator Site	Statute	Sites	5
4	Waste Collection Permits	Local Authority	Env Co-ordinator	UKAS	Sites	Period of validity +1
5	Waste Facility Permits/Licences	Local Authority/EPA	Env Co-ordinator	UKAS	Sites	Period of validity +1
6	Energy Monitoring Records	Env Co-ordinator	Env Co-ordinator	UKAS	Head Office and Sites	3
7	Water Monitoring Records	Env Co-ordinator	Env Co-ordinator	UKAS	Sites	3
8	Local Authority / Environmental Protection Agency Licences	Local Authority / EPA	Env Co-ordinator Site	UKAS	Sites	Period of validity + 1
9	Environmental communication from external sources	External	Env Co-ordinator	UKAS	Sites	3
10	Audit Reports	Env Co-ordinator	Env Co-ordinator Head Office	UKAS	Head Office and Sites	3
11	Corrective Action Forms	Env Co-ordinator	Env Co-ordinator Head Office	UKAS	Head Office and Sites	3
12	Env N/C or Env	Any member of	Env Co-ordinator	UKAS	Head	3

	Incident Report	staff	Head Office		Office	
13	Water treatment log sheets	Site Staff	Site Staff	UKAS	Site	3
14	Calibration Certificates	External testers	Site Staff/ Env Co-ordinator	Statue	Site	3
15	Environmental Management Plans	Site Staff	Site Staff	UKAS	Sites	3
16	Waste Management Plans	Site Staff	Site Staff	UKAS	Sites	3
17	Environmental Risk Assessment	Env Co-ordinator	Env Co-ordinator and HSE Officer	Best Practice	Head Office	3
18	Department of Arts Heritage and Gaeltacht	Env Co-ordinator	Env Co-ordinator Site	Best Practice	Sites	3

Controlled documents will be:

- Reviewed at least annually and updated as appropriate;
- Marked as superseded once obsolete or destroyed;
- Dated and marked with dates of revisions.

7.0. Environmental Objectives & Targets

The objectives and targets are set in relation to the aspects identified from each site in order to reduce our significant aspects. As a minimum they should include:-

- The prevention of pollution, including emissions to air, water and land
- Nuisance impacts including dust, noise and vibration
- Protection of habitat areas and individual species, if applicable
- Storage and use of fuels and hazardous substances, including spills
- Waste management

7.1 Environmental Management Targets

The environmental management targets for the Bantry Inner Harbour project are as follows.

Targets	Measurable	Methodology	Responsibility	Timescale
Ensure no incidents of pollution to water.	Water monitoring (TTS, Turbidity, TBT etc), Slump testing of stabilised dredge material. No of Environmental Incidents. Quarterly audits, No of complaints reported	Sediment controls to be used (environmental bucket, silt curtain, lined cells for stabilisation methods. No contaminated waters to be discharged to the harbour waters. Work with CIRIA guidelines, site EPA waste licence conditions and apply BAM precautionary measures	Site Management Team	Start to completion
Ensure sediment on roads is cleared.	Raise needs for road cleaning duties during wet or busy periods	Ensure roads are swept and cleaned on a regular basis. Road conditions within the site should be kept clean at all times.	Site Management Team	Start to completion

Minimise waste production	Lean Construction Techniques, segregation more, reuse more (waste hierarchy)	Purchase less, ensure packaging is removed by supplier where possible and other materials reused & recycled	Site Management Team	Start to completion
Minimise fuel and oil spillages from site activities. Bunds to be used with all fuels and oils	Environmental Incidents, spills contained in bunds	Ensure that drip trays are used at all times under static plant, when refilling, & storing, ensure fuel storage areas are bunded.	Site Management Team	Start to completion
Ensure correct disposal of all hazardous wastes e.g aerosol cans	Waste segregation, waste costs	All hazardous wastes to be disposed as per Irish Legislation and BAM requirements	Site Management Team	Start to completion
Lower consumption of materials and fuel on monthly basis (relative to project revenue)	Smart meters, energy bills, service costs	Ensure all energy using equipment is switched off when not in use. Select best value for money providers where possible	Site Management Team	Start to completion
Reduce site electricity by 2.5% on monthly basis (relative to project revenue)	Smart meters, energy bills, service costs	Ensure all energy using equipment is switched off when not in use. Select best value for money providers where possible	Site Management Team	Start to completion
Lower emissions of dust, smoke and fumes during works	Air quality, dust particle increase	Ensure all equipment is well serviced and maintained. Switch of equipment when not in use. Use dust suppression techniques when applicable	Site Management Team	Start to completion
Minimise amount of Public complaints	Complaints received to Site Management Team	Ensure when works which will impede public access are taking place, all residents are informed for the timescale (where applicable) and all restrictions are kept to a minimum	Site Management Team	Start to completion
Minimise water usage consumption	Water charges, waste water disposal (discharge volumes)	All grey water to be reused on site where possible. 'Fresh' water supply to be kept to a minimum where possible. TBT-12 Water on Construction Sites	Site Management Team	Start to completion
Minimise airborne & groundbourne noise	Noise triggers breached (where applicable)	All construction noise limits set out in the requirements will be adhered to.	Site Management Team	Start to completion
Minimise vibration	Vibration triggers breached (where applicable)	All vibration limits set out in the works requirements will be adhered to.	Site Management Team	Start to completion
Ensure no vehicle movement and material placement does not cause damage to flora and fauna	Correct habitat protection used. Wildlife surveys where applicable	All fauna/animal species to be untouched where possible. Professional advice to be sought on removal procedures	Site Management Team	Start to completion

The standard environmental management measures for the project are to:

- Conduct all activities in accordance with the:
 - Company environmental policy and procedures;
 - Relevant statutory regulations and provisions;

- Contractual requirements with the client; and
- Requirements of relevant authorities;
- Minimise adverse environmental impacts during construction;
- Enhance natural environments during the course of construction, where practical
- Reduce the significance of our aspects and impacts through our working methods

The standard environments objectives and targets which must be met on all sites as part of our EMS system:

- Conduct all operations within the limit levels set out for noise, dust and vibration (i.e. Zero exceedences);
- Zero water pollution incidents;
- Zero cross contamination of inert or non-hazardous materials with hazardous substances or contaminated soil;
- Hazardous substances including fuels and oils to be banded at all times.
- Compliance regarding waste management i.e. licensed waste contractors, permits etc.
- All contaminated materials to be managed in manner which prevents further contamination and to be disposed to appropriately licensed facilities.

In order to help achieve these targets, the below table highlights compliance tools.

7.2 Initiatives to ensure compliance with BAM Targets

Sites	Area	Objectives & Targets	Method for achieving	Assistance by HSE Dept. (method)	Responsibility
All sites and offices	Waste	Reduce waste sent to landfill by 2%	Adhere to the waste hierarchy. Lean construction techniques	EA-30 Excavated materials on site (<i>Article 27 Notification Forms</i>). CIRIA documents on Lean Construction	Site Teams and HSE Dept.
		Increase site segregation of construction waste by 2%	Additional recycling skips on site Increase staff knowledge and participation	EP-16 waste definitions and classifications, TBT-03 Managing Waste, TBT-02 Environmental Awareness, EB-11 Site Set up	Site Teams and HSE dept.
		Increase recycling rates	Increase site awareness of improved waste management practices	Waste posters, environmental alerts and bullets to be issued focusing on new waste strategies	Site Teams and HSE Dept.
All sites and offices	Energy	SMART Meters for all sites	SMART meters installed in cabins	Advice on installation and data collected	Site Teams and HSE Dept
		Reduce CO ₂ emissions by 2%	Implement an energy reduction initiative in sites and offices	Environmental information to be issued focusing on new waste strategies	Site Teams and HSE Dept
		Temperature control in cabins	Thermostats installed	Advice on installation and data collected	Site Teams and HSE Dept
		Energy initiatives	SEAI Initiatives	<ul style="list-style-type: none"> ● Online calculation tools (energy) ● Energy posters ● Relatively paperless sites 	HSE Dept IT Dept.

Sites	Area	Objectives & Targets	Method for achieving	Assistance by HSE Dept. (method)	Responsibility
		Reduction in fuel usage / air emissions	Car Purchasing	Procurement of low emissions vehicles by Plant Department. Video conferencing capabilities in Offices to cut down on travel times, emissions.	Site Teams and HSE Dept
All sites and offices	Env Auditing & Performance	All sites to achieve 'Pass' mark from quarterly audits	Quarterly audits	Regular environmental information and directions to be issued to the sites	Sites Teams and HSE Dept.
		Appraisal system for environmental performance	Subcontractor appraisal system (COINS)	Detailed information of the systems and scores circulated to all.	Sites Teams and HSE Dept.

8.0. Environmental Control Measures

Control measures will be implemented both on an activity specific basis for the area of works, and independently of any specific activities as part of the general site management. Throughout this section reference may be made to standard procedures contained in the Environmental Procedures Manual that shall be adopted on site. The Environmental Procedures are available on sharepoint.

The project shall be developed in accordance with the control measures and with reference to the following guidance documents:-

- BRE (2003) Control of dust from construction and demolition activities;
- BS 5228-1: 2009 + A1: 2014 : CoP for Noise and vibration control on construction and open sites: Part 1: Noise
- BS 5228-2: 2009 + A1: 2014: CoP for Noise and vibration control on construction and open sites: Part 2: Vibration
- BS 5837: 2012 Trees in relation to design, demolition and construction works
- BS8895-1:2013 Designing material efficiency in building projects Part 1: CoP for strategic definition
- CIRIA 650 (2005) Environmental Good Practice On Site (Second Edition);
- CIRIA 532 (2001) Control of Water Pollution from Construction Sites – Guidance for consultants and contractors;
- Inland Fisheries Ireland (2016) Guidelines on the protection of fisheries during construction in and adjacent to waters
- Fisheries Guidelines for Local Authority Works (Department of Marine and Natural Resources, 1998).
- Dept Arts, Heritage & Gaeltacht (2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters

Other guidance documents may be referenced for specific issues throughout this section. Copies of these documents are held by the Company Environmental Coordinator and on Sharepoint.

The control measures and monitoring requirements listed in this section must be implemented throughout the project.

8.1 Water Pollution Control

All watercourses that are potentially impacted by the works are identified on the site maps included in Appendix 4.

8.1.1 Water Pollution Control Measures

The potential for the construction and dredging works to have an impact on the water quality in the harbour and nearby shellfish waters shall be minimised through the implementation of the following control measures, which have been developed with reference to the guidance contained in EP-10 Surface Water Control, EP-13 Bulk Fuel & Oil Storage, EP-14 Storage & Handling of Hazardous Substances and EP-15 Containing & Cleaning Up Spills.

Mitigation measures during the dredging process will include the use of environmental dredging buckets fitted to the dredging excavators and the use of a 'Dig Master' system which facilitates for specific positioning of the dredge bucket. A silt curtain will also be used if required to minimise any sedimentation from the dredge material.

Once the material is excavated from the dump barge it will be placed in cells behind the Amenity area revetment where the water collected during the dredging operation can drain prior to the material being stabilised. The water draining from the dredge material will naturally filter through the geotextile and rock revetment of the Amenity area.

Analysis of the sediment sampling undertaken for the project in 2015 has classified the contaminated dredged material as non-hazardous (EWC Code 17 05 04) according to the HazWasteOnline Classification Tool. Based on the QRA undertaken by the project designers, it is not considered that there is a significant contamination potential from the movement and placement of the dredge spoil material.

Once the material has dewatered it will be treated using cement stabilisation. The stabilisation treatment is a remediation technology that reduces the mobility of contaminants. Immobilisation is achieved by reaction of contaminants with reagents to promote sorption, precipitation or incorporation into crystal lattices, and/or by physically encapsulating the contaminants. The method produces a high strength monolithlike product that physically reduces the mobility and chemically binds contaminants to the produced matrix. The treated mass can then be incorporated into the permanent works as engineered fill.

All treated materials will be tested as per Appendix 1/73 and dredging, treatment and disposal records maintained as per Appendix 6/71 of the Works Requirement Specification.

To mix the cement through the wet dredge material, BAM will mount an Allu PMX500 power mixer to a 35 ton excavator. This is a rotating agitator mixing which will feed and mix the cement from Allu PF7+7 power feeder with Allu DAC system into the dredge material, the attachment is powered by the hydraulics of the excavator. The agitator will be lowered into the cell of dredge material and the cement added through the agitator. The agitator then mixes the cement through the dredge material ensuring the mix is homogeneous throughout. The material is then for a sufficient period for the chemical reaction between the water and cement to take place. Once the moisture content of the material is reduced to the required levels it will be placed and compacted into the permanent works.

Any other wastes such as tyres, trolleys, traffic cones found in the dredge material will be collected in site skips and removed to a licenced/ permitted waste facility by an appropriately permitted waste contractor. These wastes will be identified when loading onto the dredging

barge or at the waste treatment area. In either situation, the waste will be manually separated from the dredge material and placed in quarantine area prior to removal offsite.

Dredging of the harbour will be limited to periods between November to March so as to reduce the potential to pollute or disturb any nearby spawning and shellfish areas.

8.1.2 Water Quality Monitoring

Water monitoring will be carried out through automatic sampler buoys which will be located externally to the harbour and supplied by PoC. These samplers will measure total suspended solids and water turbidity.

In addition to this BAM will take one water sample daily for laboratory analysis. These samples will be analysed for

- Suspended sediment concentration;
- Turbidity;
- TBT

Samples will be taken at the mouth of the harbour and at the higher of mid depth or 3m below the water surface. Water samples will be collected and stored in accordance with the testing laboratory's instructions. The water samples will be transported to the lab every Friday in cooled sample boxes. Consultation will be held with the environmental laboratory to ensure that all testing takes place within recommended timeframes.

Results from this environmental monitoring shall be reviewed by the Site Management team upon receipt to verify that operations are within the limits specified. Limit levels will be set based on background levels. These levels will be determined by the Client prior to works commencing. The limit levels shall not exceed 30% above background levels. Results will be provided by Tuesday of the following week and supplied to the Resident Engineer.

8.1.3 Water Pollution Incidents

Should any monitoring or inspections indicate that pollution of the Bantry Inner Harbour Development Phase 1 project has occurred then the site management team shall immediately inspect the waste treatment area and sediment control facilities to ascertain whether they are operating effectively. All operations may be stopped and/or additional control measures installed to prevent further pollution to the harbour. Appropriate action shall be taken in consultation with the Site Agent. Water sampling with additional parameters will be tested to ensure all pollutants are identified. As described in section 3.2.2, incidents will be reported to the EPA and other relevant authorities immediately, and logged on the BAM Incident Register as per EP-24 Complaints and Incidents Procedure.

8.2 Noise & Vibration Control

The primary sources of noise and vibration associated with the contract have been identified in the project EIS as follows:

- Construction plant

Activity	Plant	Noise Level (dB L _{Aeq}) at 10m
Demolition / Site clearance / Excavation / Removal of waste/rubble	Bulldozer	80
	Excavator	82
	Lorries (drive by)	70
	HGV and tippers	84
Rock Breaking	The Noise level generated during rock breaking, possibly using explosives, will depend on the type and amount of explosive and / or the machinery used. The resultant noise would also be modified by water depth although to what degree is unknown.	
Piling	Hydraulic Piling	89
	Vibratory Piling	88
	Large Rotary Bored Piling	83
	Continuous Flight Auger Piling	79
Dredging	Ship chain bucket	96
	Digging out river bed: Tracked Excavator Water Pump	85
	Loading dredged aggregates: Wheeled Loader	84
Foundations	Compressor	81
	Water Pump	80
	Concrete Pour	86
	Place and vibrate concrete cycle	80
	Cement Mixers	74
Steel Erection	Large crane operations	86
	Articulated lorry	70
Concrete Frame	Large crane operations	86
	Place and vibrate	80
General Construction Works	Surfacing	85
	Internal fit/ bricklaying	70
Road works/landscaping	Surfacing/rolling	76 - 86
Infilling/ Levelling	Dump truck	82
	Wheeled excavator/ Loader	78
	Dozer	80

Activity	Predicted "Worst - Case" Construction Noise Level dB L _{Aeq, 1 hour} at noise sensitive receivers			
	@ 50m	@ 100m	@ 150m	@ 200m
Demolition / Site clearance / Excavation / Removal of waste/rubble	72	64	60	57
Dredging	73	65	61	57
Hydraulic Piling <u>or</u>	74	66	62	58
Vibratory Piling <u>or</u>	73	65	61	57
Large Rotary Bored Piling <u>or</u>	68	60	56	52
Continuous Flight Auger Piling	64	56	52	48
Foundations	73	66	61	58
Steel Erection	71	63	59	56
Concrete Frame	71	64	60	56
General Construction Works	70	62	58	55
Road works/landscaping	64	56	52	48
Infilling/ Levelling	69	62	57	54

Noise limits outside of the normal working hours are as follows:

Period	Hours	Permitted Ambient Noise Level, Leq, measured at Building Facades [dB(A)]	Period of Hours over which Leq, is applicable.	Maximum Sound Level (see note (iv) below) measured at Building Facades [dB(A)]
Monday to Friday	20.00hrs to 06.00hrs	70	1 hour	80
Saturday	-	70	1 hour	80
Sunday and Public Holidays (following PoC and EPA approval)	-	60	1 hour	65
All unattended plant outside normal working hours.		60	18 hours	65

The noise levels (see Note (i) below) for periods outside the normal working hours will only be permitted when consent has been given to exceptional working

Schedule of Total Noise Levels at Building Facades

Notes:

- (i) Noise levels relate to free field conditions. Where noise control stations are located 1 metre from façades of buildings, the permitted noise levels can be increased by 3dB(A).
- (ii) The ambient noise level, Leq, at a noise control station is the total Leq from all the noise sources in the vicinity over the specified period.
- (iii) The existing ambient noise level, Leq, at a control station is the total Leq from all the noise sources in the vicinity over the specified period prior to the Commencement of the Works.

(iv) Maximum sound level is the highest value indicated on a sound level meter which meets the requirements of BS 5969 Type 1 or 2 set to SLOW response, and frequency weighting A

Operating limits for vibration are as follows:

Frequency	Vibration Limit	Location
<10 Hz	5mm/s	A.C Watermains
<10 Hz	8.5mm/s	Any occupied property
10 to 50 Hz	10mm/s	Residential property
50 to 100 Hz	20mm/s	At completed structures

All works are scheduled to be completed within the working hours as specified in the contract.

Working Hours	
Monday to Friday	08:00-1800hrs
Saturday	08:00-1300hrs
Sunday and Bank Holidays	No Working

Best practicable means should be employed to minimise noise levels, in accordance with the British Standard BS 5228 Noise and vibration control on construction and open sites (Parts 1 and 2) for basic information and procedures for noise and vibration control. A copy of this standard is available at the site or from sharepoint.

In accordance with other construction sites and with common local authority guidance the following noise criteria as shown in Table 6.10 taken from the EIS will be implemented throughout the project.

Table 6.10: Noise criteria for construction sites

Day of Week / Times	Maximum L_{Aeq} at Nearest Noise Sensitive Receiver / Site Boundary
<u>Monday to Friday</u>	
07:00 - 19:00	75 dB $L_{Aeq, 12hr}$
19:00 - 22:00	65 dB $L_{Aeq, 1hr}$
22:00 - 07:00	No noise audible
<u>Saturday</u>	
08:00 - 13:00	75 dB $L_{Aeq, 5hr}$
13:00 - 22:00	65 dB $L_{Aeq, 1hr}$
22:00 - 07:00	No noise audible
<u>Sunday</u>	No noise audible

8.2.1 Noise & Vibration Control Measures

Noise reduction measures will be undertaken in accordance with the Procedure EP-09 Noise and Vibration Control, which has been developed taking into account the requirements of BS 5528, particularly Section 10, and include:

- Good communication with landowners and residents in the proximity of the harbour shall be maintained.
- Plan the working hours and duration of work with consideration for the effects of noise/vibration on any noise sensitive receiver;
- The normal working hours shall be Monday to Friday between 0800 and 1900 hours and Saturday between 0800 and 1330 hours, with no working on Sundays or public holidays, except where consent is granted to work outside of these hours.
- Any plant such as generators and pumps which is required to work outside the hours of 0800 hours to 1900 hours, Monday to Friday shall be surrounded by an acoustic enclosure.
- Traffic management proposals shall include measures to minimise journey times during the construction period.
- All vehicles and mechanical plant shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order for the duration of the works in compliance with BS 5228.
- Any item of plant, which is ineffectively silenced, shall be removed from the site.
- Noise barriers (in combination with low surfacing) will be used where necessary.
- All compressors shall be “sound reduced” models fitted with mufflers or silencers of the type recommended by the manufacturers.
- Pumps and mechanical static plant shall be enclosed by acoustic sheds or screens where appropriate.
- Use of hoarding and other noise baffling equipment

8.2.2 Noise & Vibration Monitoring

- Noise and vibration monitoring will take place on a weekly basis at agreed locations via the use of calibrated monitoring equipment.

8.2.3 Noise & Vibration Incidents

Should any monitoring indicate that noise or vibration levels have exceeded the intervention values then the plant or equipment causing the noise / vibration shall be powered down immediately. Appropriate action shall be taken in consultation with the Site Agent to reduce the noise and/or vibration levels. Actions may include:

- Servicing and or modifying the plant / equipment;
- Replacing the plant / equipment;
- Moving the operation away from sensitive receptors;
- Rescheduling the activity;
- Erecting noise barriers where other measures are not practical

When noise and vibration monitoring is taking place, all monitors should take into account the background noise and situation when monitoring. External noise and vibration reports to reference to this fact also.

The incident shall be logged in the Incident Register if levels have been breached and background noise was deemed not a factor at the time of the occurrence.

8.3 Air Pollution Control

The main types of air pollution that will result from the works are dust and exhaust emissions from combustion engines, and plant machinery and vehicles. Activities with the potential to produce dust are:

- Plant and vehicle movement;
- Bulk materials handling;
- Stockpiles;
- Vehicle movement off site.

8.3.1 Dust Minimisation Plan

Dust shall be minimised on site through the implementation of the following control measures developed in accordance with the Procedure EP-08 Air Pollution Control:

- A mechanical road sweeper will be in operation at all time to clean the site hard-standing, roads or footpaths in the vicinity of the site.
- Material handling system and site stockpiling of materials shall be designed and laid out to minimise exposure to wind.
- Mandatory speed limits will be enforced within the harbour area particularly in weather conditions which are conducive to dust generation.
- Dust suppression systems will be used during dredge stabilisation operations.
- Vehicles either delivering or removing material from site which have a dust potential will be covered with tarpaulin to minimise the release of dust.
- Exhaust emissions where practical shall be minimised by ensuring that all plant, equipment and vehicles are in good working order and regularly serviced to ensure efficient running, by using the smallest engine-sized plant and equipment suitable for the task and by ensuring that engines are not left idling unnecessarily.
- Provision of easily cleaned hard-standings for vehicles entering, parking and leaving the site.

8.3.2 Other Air Quality Control Measures

- Exhaust emissions where practical shall be minimised by ensuring that all plant, equipment and vehicles are in good working order and regularly serviced to ensure efficient running, by using the smallest engine-sized plant and equipment suitable for the task and by ensuring that engines are not left idling unnecessarily.
- Burning of materials on site shall not be permitted.

8.3.3 Dust Monitoring

- Daily visual dust monitoring will take place on site.
- The foreman will include formal dust monitoring in his weekly inspection
- Dust deposition monitoring with a threshold limit of 350mg/m²/day will be carried out at the Amenity area as per the site EPA waste licence.

8.4 Habitat (Flora & Fauna) Protection

General ecological mitigation measures have been incorporated into the project design from the project EIS and the requirement during the construction stage is to ensure that these measures are implemented. Any additional mitigation measures will be implemented during construction as required to limit additional habitat and fauna disturbance outside the area of works.

All work activities will comply with the Environmental Protection Agency Act 1992 and amendments and Wildlife Act 1976 and amendments 2000 to 2010 and the European Communities (Birds and Natural Habitats) Regulations 2011.

8.4.1 Construction Mitigation Measures

General habitat control measures shall be implemented in accordance with EP-12 Habitat, Flora and Fauna Protection. Additional site specific controls will also include:

- A qualified and experienced marine mammal observer (MMO) shall be appointed to monitor for marine mammals and to log all relevant events
- Dredging activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.- Note once normal operations commence, there is no requirement to halt or discontinue the activity at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500m radial distance of the sound source, i.e., within the Monitored Zone.
- In waters up to 200m deep, the MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Where operations occur in waters greater than 200m depth (i.e., >200m), pre-start-up monitoring shall be conducted at least 60 minutes before the sound-producing activity is due to commence
- If there is a break in sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down or location change) then all pre-start marine mammal monitoring must be undertaken in accordance with the above conditions prior to the recommencement of dredging activity
- Construction works to be avoided during breeding seasons where possible. Controls on noise, lighting, pollution and speed restrictions in certain areas may also be required.

8.4.2 Fish and Fisheries Habitat Mitigation Measures

In addition to the mitigation measures referred to in section 8.1 for water pollution, the following measures will be implemented to reduce the impacts from dredging to include:

- Dredging activities will take between November to March to prevent any potent negative effects during the mussel spawning and shrimp settlement seasons.
- All excavators will be fitted with a "Dig Master" system. The system is run from a global positioning system, from this operator is aware of the location x, y & z respectively and also the orientation of the bucket of the machine. This ensure only the designated areas are dredged.
- All excavators carrying out the dredging works will be fitted with environmental dredging buckets which will minimise the loss of any dredge spoil into the harbour.
- A silt curtain will be put in place in liaison with the Harbour Master on marine traffic.

8.5 Waste Management

A Waste Management Plan will be instituted during the works and the waste management measures for the project are detailed in this separate document, which includes:

- Waste management targets
- The potential waste materials produced during the project;
- Waste handling procedures;

- Waste Permits required;
- Waste reuse, recycling and disposal techniques; and
- A map showing designated waste handling areas.

The Waste Management Plan also covers the handling and disposal of hazardous wastes such as fuels and used absorbent materials.

With regard to potential nuisance from temporary site offices and canteen, the following measures shall be observed:

- Site offices shall be maintained in a tidy condition.
- Litter shall be cleaned up daily, particularly around skip bins, in accordance with EP-19 Litter Management.

8.6 Hazardous Materials Handling & Storage

During the works there will be a requirement for the use of hazardous substances, including:

- | | |
|-----------------|-------------------------|
| • Fuel oil | • Shuttering Oil |
| • Diesel | • Liquid cement |
| • Hydraulic Oil | • Concrete Curing Agent |

The management of such substances shall be carried out in accordance with the procedures for:

- Bulk Fuel and Oil Storage (EP-13);
- Storage and Handling of Hazardous Substances (EP-14);
- Containing and Cleaning Up Spills (EP-15).

All chemicals not covered by EP13, EP14 and EP15 shall be managed in accordance with the requirements of the relevant safety data sheet (SDS) and the Health and Safety Plan.

- Hazardous materials are kept in lockable stores at site compound locations. Spill kits are also kept at these locations. Any hazardous materials must be returned to the stores at the end of each day and not left on site.
- Oil and fuel will be stored in bunded areas and shall be stored well away from any water discharge point or, where not possible, the discharge point will be adequately protected to prevent spills from entering.
- Diesel pumps, generators or similar shall be placed on impervious drip trays to capture minor spills and leaks and located at least 10m from any water discharge point.
- Tools and equipment shall not be washed in or near any watercourses and if undertaken on site wash water shall be directed to appropriate retention controls and not allowed to directly enter any watercourse.

Fuels, lubricants and hydraulic fluids for equipment used on the construction site shall be carefully handled to avoid spillage, properly secured against unauthorised access and provided with spill containment. Fuelling and lubrication of equipment shall not be carried out in the vicinity of water discharge points. Waste oils and hydraulic fluids shall be collected in leak-proof containers and transported off-site for disposal or recycling at appropriately licensed facilities.

8.7 Vermin Control

Control measures associated with are as follows:

- Cabins and offices will be kept clean on a daily basis and formally cleaned at least once per week.
- Bins will be provided to dispose of food waste and other waste which may attract vermin.
- Office doors to remain closed where possible, in particular canteen doors.
- Regular inspection of the offices will be carried out to ensure vermin are not present.
- Where all control measures are implemented and vermin are still found to be present, a vermin removal company shall be contacted.

8.8 Landscape

Any landscape measures shall be implemented in accordance with the Landscape Design required by the contract, to be prepared by the Designer.

8.9 Archaeology

An archaeologist experienced in maritime archaeology will be retained for the duration of the relevant works.

In the event of archaeologically significant features or material being uncovered during the construction phase, machine work should cease in the immediate area to allow the archaeologist/s to inspect any such material.

Once the presence of archaeologically significant material is established, full archaeological recording of such material will be carried out. If it is not possible for the construction works to avoid the material, full excavation would be recommended. The extent and duration of excavation would be a matter for discussion between PoC and the licensing authorities.

It is recommended that an archaeological dive team is retained for the duration of any in-water disturbance works on the basis of a twenty-four or forty-eight hour call-out response schedule, to deal with any archaeologically significant/potential material that is identified in the course of the ground disturbance activities.

9. Management Review

The implementation of the EMP is reviewed monthly on site at the internal site meetings. These meetings are attended by site management and by personnel responsible for the implementation of the EMP. During the meeting all aspects of the environmental management are considered, including:

- Upcoming work
- Environments risks foreseen
- Control measures for the protection of the environment
- Internal and external audit results
- Inspection and monitoring results;
- Environmental alerts and bullet-ins
- Any issues raised by site staff or in relation to environmental management
- Site goals and targets
- Control measures for protection of the environment
- Any other significant issues;

Changes are made to the on-site management as required to achieve a continual improvement in environmental performance.

Environmental issues will be brought to the attention of the workforce through toolbox talks and through the Monthly HSE Meeting.

The EMP itself shall be reviewed at least every three months by the Site Management Team to ensure that it continues to be adequate and effective and changes made as required. Any changes shall be made by the Site HSE Officer and a new revision of the EMP issued to all personnel on the circulation list on page 1 of this document. Site audits carried out by the PoC will also include a review of the project EMP, changes made as required.

10. Training & Competence

The environmental management goals and strategy shall be communicated to all staff and contractors at the safety and environmental induction. All employees and contractors are required to undertake a site induction prior to conducting any work on site (for further details refer to the Health and Safety Plan) and employees shall be made aware of their responsibilities in accordance with this management plan. A record of inductions shall be kept by the Safety, Health & Environmental Officer.

Toolbox talks will be conducted with relevant employees on various aspects of the environmental management plan, activity control measures and environmental procedures. Three toolbox talks on environmental or waste issues must be conducted per quarter.

Toolbox talks shall be conducted by the Site HSE Officer, Section Engineers or others nominated by the Site HSE Officer. The schedule for toolbox talks shall be at the discretion of the Site Management Team and additional toolbox talks will be given in response to complaints, or where the particular environmental risks have been identified.

10.1 Recommended Toolbox Talks

Toolbox Talk Topic	Reference Material	When*	Recipients
Environmental Management	Environmental Policy, EMP, Environmental Procedures Manual	Commencement of site activities	All site crews
TBT 01	Hazardous Substances	Regular Intervals	All site crews
TBT 02	Environmental Awareness	Regular Intervals	All site crews
TBT 03	Managing Waste	Regular Intervals	All site crews
TBT 04	Spill Control	Regular Intervals	All site crews
TBT 05	Waste Pollution Prevention (Fuel & Oil)	Regular Intervals	All site crews
TBT 06	Silt Management	Regular Intervals	All site crews
TBT 07	Fire	Regular Intervals	All site crews

TBT 08	Storage of Hazardous Waste on Site	Regular Intervals	All site crews
TBT 10	Chemical & Fuel on site	Regular Intervals	All site crews
TBT 12	Water on Construction Sites	Regular Intervals	All site crews
TBT 13	Dust and Air Quality	Regular Intervals	All site crews
TBT 14	Noise and Vibration	Regular Intervals	All site crews
TBT 15	Archaeology	Regular Intervals	All site crews
TBT 16	Working in previous developed areas	Regular Intervals	All site crews
TBT 17	Pumping and over pumping	Regular Intervals	All site crews
TBT 18	Water pollution - cement and concrete	Regular Intervals	All site crews
TBT 19	Material handling and housekeeping	Regular Intervals	All site crews
TBT 20	Washing down plant and equipment	Regular Intervals	All site crews
TBT 21	Energy conservation - electricity and fuel	Regular Intervals	All site crews
TBT 22	Bentonite	Regular Intervals	All site crews
TBT 23	Be a good neighbour	Regular Intervals	All site crews
TBT 24	Sustainability	Regular Intervals	All site crews
TBT 25	Bantry Harbour environmental issues	Prior to commencement and at regular intervals there after	All site crews

Appendix 1:

Table of Requirements for ISO14001

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Table of Requirements for ISO14001

	ISO14001	EMP	Section
4.2	Environmental Policy	Company Environmental Policy	Appendix 5
4.3.1	Environmental aspects	Site Environmental Risk Assessment	5
4.3.2	Legal and other requirements	Relevant Statutory Provisions	6.5
		Contract Requirements	Appendix 2
4.3.3	Objectives, targets and programmes	Environmental Management Goal	7
4.4	Implementation and operation	Strategy to Achieve this Goal	1.1
4.4.1	Resources, roles, responsibility and authority	Organisation & Responsibilities	2.1
4.4.2	Competence, training and awareness	Training and competence	10
4.4.3	Communication	Environmental Management Strategy	3.2
4.4.4	Documentation	Environmental Management Documents	8
4.4.5	Control of documents	Control of Documents	6.7
4.4.6	Operational control	Environmental Control Measures	8
4.4.7	Emergency preparedness and response	Environmental Control Measures	4
4.5	Checking	Monitoring and Audit	3.1.2
4.5.1	Monitoring and measurement	Monitoring	3.1.2
4.5.2	Evaluation of compliance	Evaluation of compliance	6
4.5.3	Nonconformity, corrective action and preventative action	Inspections	3.1.2
4.5.4	Control of records	Control of Documents	6.7
4.5.5	Internal audit	Audit	3.2.1
4.6	Management review	Management Review	9

Appendix 2:

Table of Contractual Requirements for Environmental Management

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Table of Contractual Requirements for Environmental Management
(From Project Specific Construction Requirements)

EMP Section	Section / Clause
	TBC

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Appendix 3:

Environmental Risk Assessment Report

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Appendix 4:

Site Maps

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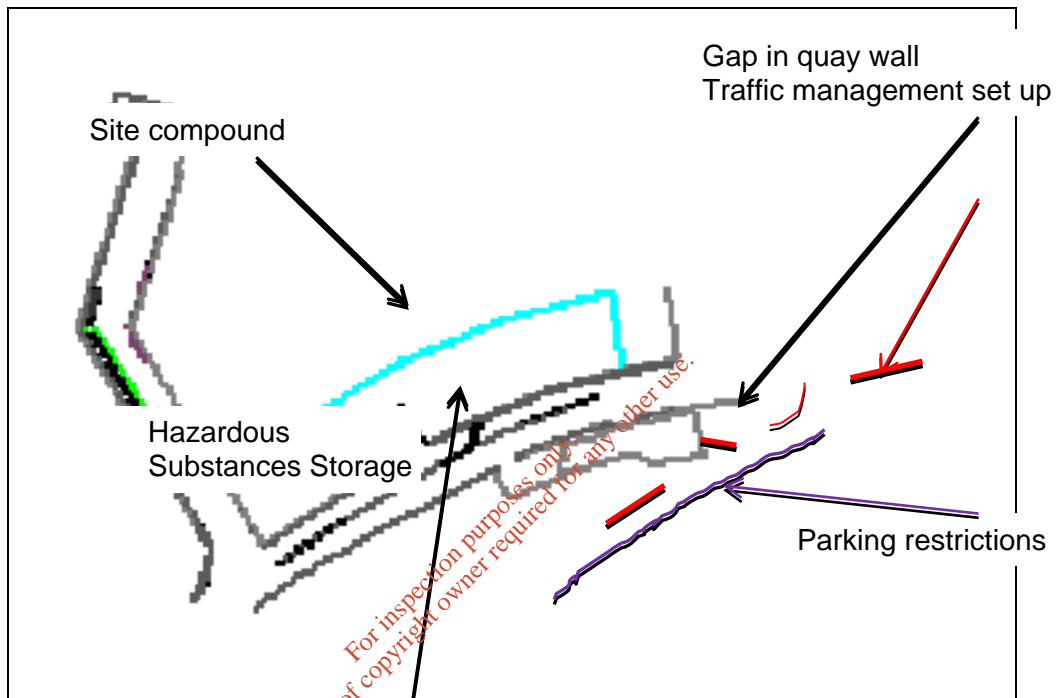
Location of the Works



Proposed access routes for the project and site location

- 1) – Pier
- 2) – Amenity Area
- 3) – Cove Works Area

Proposed Works Area



Appendix 5:

Environmental Policy

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Environmental Policy

BAM Civil, one of Ireland's largest construction organisations, provides services in design, civil engineering, building, facilities management, project management and property development, across a wide range of construction projects.

The organisation promotes a responsible and proactive approach to environmental and waste management at every level of the business and on all sites of operation.

BAM Civil recognise that business aims must be balanced against environmental considerations. We are committed to continually improving our environmental performance and managing our operations to minimise potentially adverse impacts on the environment.

Specifically, where it is within the organisation's control or influence, BAM Civil will:

- Identify the significant environmental aspects of our activities by assessing their potential impact on the environment.
- Based on our significant environmental aspects, set specific objectives and targets, against which we shall monitor and review our performance.
- Comply with legal and other compliance obligations that are applicable to our activities and relevant to the environmental aspects of the business.


- Develop management processes and procedures that prevent pollution, protect native species and habitat, minimise waste generation, promote recycling and the use of recyclable materials, and maximise the efficient use of material and energy resources.
- Implement strategies to communicate our environmental commitments and requirements to employees, customers, suppliers, subcontractors and other interested parties.
- Provide training and support to employees, so they understand and can fulfil their responsibilities with regard to environmental impact and performance.
- It is the individual responsibility of all persons working for or on behalf of BAM Civil to support and apply the Environmental Policy and Environmental Management System as it pertains to their activities.



T. Cullinane, CEO

Date: February 2016



EP-19	Litter Management			
Note: Always print or copy to double-sided pages	PROC. NO: EP-19	REV: 02	DATE: 26.03.2013	PAGE: 1/1

Purpose:	To provide a guideline for the procedures to be implemented for the management of litter in accordance with the regulatory requirements and Environmental Policy.
Scope:	All sites and activities
Responsibility:	Contract/Project Manager, General Foreman, Area Supervisors
<p>Regulatory / Management Requirement:</p> <p>Under the Litter Pollution Act 1997 and Regulations 1999 there are a number of requirements with regard to littering. The primary obligation (Section 6) placed upon the owner or occupier of a property that can be seen from a public place is to keep the premises litter free. Where litter has accumulated the local authority can issue a notice requiring its removal. If the owner or occupier does not comply with the notice the local authority can do whatever is necessary to clean up the site and require the owner / occupier to pay all costs involved.</p> <p>The Litter Pollution Regulations 1999 make the following activities offences under the Act:</p> <ul style="list-style-type: none"> • Depositing a substance or object so as to create litter in a public place or litter that is visible to any extent from a public place. <i>Section 3 (1)</i>; • Depositing for collection by or on behalf of a local authority a substance, material or thing, or <ul style="list-style-type: none"> ○ Loading, transporting, unloading or otherwise handling or processing anything, or ○ Carrying on a business, trade or activity; in a manner that creates or tends to create litter in a public place or litter that is visible to any extent from a public place. <i>Section 3 (2)</i> • Placing municipal waste into or near a litter receptacle. <i>Section 3 (3)</i> • Failing to take measures in using a vehicle to transport goods or materials to prevent the creation of litter on a public road or in a public place. <i>Section 4 (1)</i> • Failing to take measures to prevent the creation of litter in the vicinity of a skip. <i>Section 4 (2)</i> • Failing to keep a footpath or margin adjoining a public road free of litter. <i>Section 6 (4)</i> • Removing litter from a footpath or margin onto a road. <i>Section 6 (5)</i> <p>The penalty for persons found guilty of an offence is a fine not exceeding €3000 upon summary conviction in the District Court, or €130,000 on conviction on indictment.</p>	
<p>Management Procedure:</p> <p>During site inductions and pre-start meetings ensure that all personnel and contractors are aware of the requirement to keep the site and any surrounding public places free of litter.</p> <p>Ensure security measures are put in place to prevent fly tipping on the site.</p> <p>At the commencement of site activities designate responsibility for checking work areas, and particularly the area around skips, and ensuring they are kept free of litter and that waste is placed into the appropriate skip or bin.</p> <p>Any personnel involved in the transport of materials around the site or off-site must ensure that such transport does not cause litter to be deposited on a public road or place.</p> <p>Undertake regular inspections (as part of the Environmental Inspection – refer to EP-05) to ensure compliance with the above requirements.</p> <p style="text-align: center;">For further information or advice contact the Environmental Coordinator, on 045 886536</p>	
<p>References:</p> <p>Litter Pollution Act 1997 and Regulations 1999 & EPA Acts 1992-2003</p> <p>FAS & CIF (2004) Construction & Demolition Waste Management – A Training Programme for Contractors & Site Managers (Course Notes)</p>	