

Appendix 3 - Attachment D

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Bantry Inner Harbour Development Phase 1

Construction Waste Management Plan

Env. Dept. Revision No: 05				
Reason For Issue:				Client Approval (if required)
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Date:				

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1. General Details

Project Name	Bantry Inner Harbour Development Phase 1		
Project Location	Bantry, Co. Cork		
Client	Port of Cork		
Contracts Manager	Liam Collins		
Start Date	07/03/16	Duration (Months)	15
Completion Date (Expected)	June 2017		
Primary Project Type	Marine Project		

Project Description:

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 locations. 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;

Waste Management Strategy

2.1 Introduction

The purpose of this plan is to ensure that all waste materials arising from the Bantry Inner Harbour Development Phase 1 works are managed and disposed of in accordance with the:

- provisions of the Waste Management Acts 1996 – 2011 and associated regulations;
- Project Specific Construction Requirements (Contract Documents); and
- the Company Environmental Management System
- Best Practice Guidelines on the preparation of waste management plans for construction and demolition waste projects

The plan will detail:

- Wastes arising from the Substructure Works
- Methods and locations used for their handling and storage on site, including a site map showing waste management areas (in Appendix 1)
- Waste Collection Permits required for the removal of waste from site
- The disposal facilities for the waste streams and their associated Waste License or Permit

2.2 Recycling/Waste Management Goal

The recycling / waste management goal for the project is to manage all waste in accordance with the relevant statutory provisions and the waste hierarchy:

The waste management strategy for the project will follow the accepted waste hierarchy.

Minimise	Reuse	Recycle	Recover	Landfill
<ul style="list-style-type: none"> • Whenever possible materials for construction activities shall be ordered as to prevent the minimum storage time and kept in the storage area before release to site for use. • Materials shall be ordered, where possible, in sizes to prevent wastage e.g. in form of offcuts and waste to be able to be returned to the original supplier e.g. plastic pipe. • Materials delivered to the project will be received and controlled by the Stores Manager (or similar). Materials will be stored to minimise the potential of damage or wastage. Measures will include off-ground storage e.g. on pallets, remaining in original packaging, protection from rain damage or collision by plant or vehicles. • The materials storage area will be secured during out of hours to prevent unauthorised access. • A waste management compound shall be set up to handle incoming waste from construction activities. This will be designed to facilitate the segregation of key waste streams to maximise the opportunity to re-use, recycle and return wastes generated on site. • The segregated waste will be placed in skip containers. Waste will be placed in the skips in such a way to minimise 'empty' space. 				

The skips will be labelled to clearly highlight waste stream for each skip. As a minimum skips and containers will be provided for segregating of the following key waste streams:

Mixed Metal	Timber	General	Packaging (cardboard)	Hazardous
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- Hazardous waste will be kept in a secure area away from other wastes to ensure no contamination takes place.
- Separate areas within the waste compound shall also be allocated for the storage of plastic piping awaiting return to supplier, waste tyres and WEEE (where applicable). The layout of the waste compound will be provided in Appendix 1 of the contract-stage version of this Plan.

Waste & Recycling Targets:

- 100% recycling of surplus reinforcement where possible
- Reuse of all earthworks materials on site – Zero export where possible (excluding contaminated materials)
- No contamination of skips – No additional costs due to inappropriate materials being placed in skips designated for particular waste streams

2.3 Strategy to Achieve the Goal

The waste management goal shall be achieved through the implementation of several guiding principles in accordance with the waste hierarchy, namely:

- Giving preference to the purchase of materials with minimum packaging;
- Storing materials in designated areas and separate from wastes to minimise damage;
- Returning packaging to the producer where possible;
- Maximising the reuse of soils and rock on site during the construction of the project;
- Segregating construction and demolition wastes into reusable, recyclable and non-recyclable materials;
- Reusing and recycling materials on site during construction where practicable;
- Recycling other recyclable materials through appropriately permitted / licensed contractors and facilities; and
- Disposing of non-recyclable wastes to licensed landfills.

2.4 Waste License / Permit Requirements

The following statutory restrictions apply with regard to the collection and treatment of waste in Ireland:

Waste Management (Collection Permit) Regulations 2008

- All types of waste may only be collected and transported from site by a contractor who holds a Waste Collection Permit for the type of waste being collected.
- Waste shall only be disposed of or recovered at a site which holds a Licence or Permit under the Waste Management (Facility, Permit and Registration) (amend) Regs 2008.
- We must obtain a copy of the 'end disposal site' Licence or Permit for the waste we are disposing of.
- Copies of all relevant licenses and permits shall be kept on site and attached to this plan in Appendix 2

Waste Management (Hazardous Waste) Regulations 1998

- Hazardous waste removed from site must be accompanied by a Waste Transfer Form (WTF) as per European Communities (Shipments of Hazardous Waste Exclusively within Ireland) Regulations 2011.
- Hazardous waste to be removed from Ireland for treatment elsewhere must be accompanied by a Transfrontier Shipment Form in accordance with the Waste Management (Shipment of Waste) Regulations 2007.

2.5 Hazardous Wastes Management

Hazardous wastes pose a risk to the health and safety of personnel as well as the environment. The Site Safety, Health & Environmental Officer should be notified of any hazardous waste or suspected hazardous waste, and consulted for assistance with handling procedures. Under the health and safety plan risk assessments and procedures are available for:

- Excavating in Contaminated Ground (PRA31-1)
- Buried asbestos in landfill (JSRA 31-2)
- Removing asbestos from existing buildings (PRA24-1)
- Environmental Bullet-In 19 'Asbestos Removal' to be adhered to

2.6 Duty of Care

Responsibility for waste management lies with the principal contractor unless a contractual agreement with sub-contractors to manage their own waste arisings exists.

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2. Waste Identification & Management Techniques

Waste Management Set Up & General Procedures

BAM will provide a dedicated waste handling and segregation area.

Waste segregation should occur where possible. Small sites with low percentage of waste may not need to apply.

The Office Manager will:

- Oversee all waste handling operations;
- Ensure the compound is kept tidy and in good appearance at all times; and
- Order and change skips as required.

Each waste skip and bin will be clearly labelled as to the type of waste contained.

Waste areas are shown on the site map in Appendix 1.

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3. Waste Contractors

Type of Waste Contractor	Name of waste Contractor	National Waste Collection Permit (NWCP) Number	Waste Facility Permit No./Waste License No./COR No.
General Waste Contractor(s)	Bantry Skip Hire	WCP-CK-09-0613-02	WFP-CK-08-0002-01
C&D Waste Contractors(s)			
Hazardous Waste Contractors(s)			
Excavated Materials Waste Contractors(s)			
Recyclables/ Mixed Waste Contractor(s)	Paper		
	Plastic		
	Timber		
	Metal		
	Gypsum		
	Mixed		
	Other (specify)		

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4. Waste Volumes

Waste reports from individual waste contractors are used throughout the company to fulfil our Corporate Social Responsibility (CSR) requirements with regard to identifying and recording waste, energy emissions and CO₂ production. Each quarter, waste contractor for all sites are asked to issue report detailing the volumes of waste generated and the waste destination for their sites.

However, the following information should be added to a Waste Matrix (see EB-16) on a **monthly** basis to ensure all movements are recorded on site for Local Authority Inspections:-

- Waste codes for all waste streams
- Waste streams (as per the European Waste Catalogue (EWC)*)
- Waste collectors
- Waste disposal sites
- Tonnages
- Site specific details

Waste Matrix Documentation

Waste Stream	Site Name and No	Date of Collection	EWC Code	Tonnes cu3	Waste Collection Company name, address and Permit no.	Final Disposal Site name, address and License no
Mixed metals			17 04 07			
Other construction & demolition wastes			17 09 04			
Construction materials containing asbestos			17 06 05* (hazardous)			
Dredging spoils containing dangerous substances			17 05 05* (hazardous)			
Soil and stone containing dangerous substances			17 05 03* (hazardous)			
Wood			17.02.01			
Soil and stone other than those mentioned in 17 05 03*			17 05 04			

5. Communication and Responsibility

6.1 Communications

All employees and contractors are required to undertake a site induction prior to conducting any work on site. At this induction the waste management goals and strategy shall be made clear and the employees shall be made aware that they are responsible for ensuring the management of waste in accordance with this management plan. 3 Toolbox talks on environmental and waste issues shall be conducted quarterly. For further details refer to the Site Environmental Management Plan.

Progress on the implementation of the waste management plan will be communicated to staff at the monthly safety meeting and at internal progress meetings.

6.2 Cost Tracking

The Site Agent (or similar) is responsible for tracking the costs associated with the implementation of the waste management plan. It is essential that waste costs are communicated back to personnel, particularly if additional charges are incurred due to contamination of skips with other wastes.

6.3 Responsibilities:

The Project Manager is responsible for the implementation of this Waste Management Plan and for ensuring that activities on site comply with the requirements of the Waste Management Acts, 1996 to 2011 and associated regulations.

All site engineers and foreman shall be responsible for monitoring the implementation of this management plan through regular site inspections. Monitoring should be recorded on the relevant checklists (refer to Section 7).

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Task	Frequency	Responsible	Name & Number
Waste Management Plan Implementation	Ongoing	Site Agent or Foreman	SoS/
Tracking costs	Ongoing (updated monthly)	Site Agent	SoS
Notification of skip contamination	At least weekly	General Foreman	JT
Inspections of skips, maintenance of skip area	At least weekly	General Foreman	JT
Order and exchange skips	As required	General Foreman	JT
Monitoring waste management implementation	Ongoing	General Foreman/ Site Safety, Health & Environmental Officer	JT
Issuing warning for illegal dumping in skips	As required	General Foreman	JT
Liaising with Client, Neighbours, other contractors and regulatory bodies	As required	Site Agent	SoS
Return printer / copier cartridges	As required	Site Administrator / Receptionist	TBC
Provide advice on hazardous waste handling and disposal	Ongoing	Environmental Coordinator	TBC
Undertaking toolbox talks on waste procedures	3 per quarter	Site Safety, Health & Environmental Officer	TBC
Keeping records (eg checklists)	Weekly	Site Safety, Health & Environmental Officer	TBC
Completing hazardous waste consignment note	As required	Specialist Hazardous Waste Contractor	TBC
Internal audit	Quarterly	BAM Environmental Coordinator & Site Safety, Health & Environmental Officer	Brian Abbott

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6. Monitoring and Audit

Monitoring of the waste management plan will be undertaken at various levels. The Project Manager (or similar) is responsible for tracking quantities of material sent for recycling, recovery or disposal and costs associated with each waste stream.

Monitoring the on site implementation of waste handling procedures shall be undertaken by the General Foreman on an ongoing basis and should be reported weekly as part of the Foreman's Weekly Safety & Environment checklist. Monitoring of the skips in the main compound is undertaken by the Stores Manager or General Foreman as detailed before, and this is checked by the Safety, Health & Environmental Officer once a week as part of the general environmental inspection. Inspection reports are kept in a file on site by the Site Safety, Health & Environmental Officer. In consultation with the Site Safety, Health & Environmental Officer the General Foreman shall be responsible for any action required as a result of the weekly inspection to ensure compliance with the waste management procedures.

An audit of the waste management plan and procedures will be conducted by the Environmental Coordinator at three to six month intervals, as specified in the Site EMP.

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Appendix 1:

Site Map

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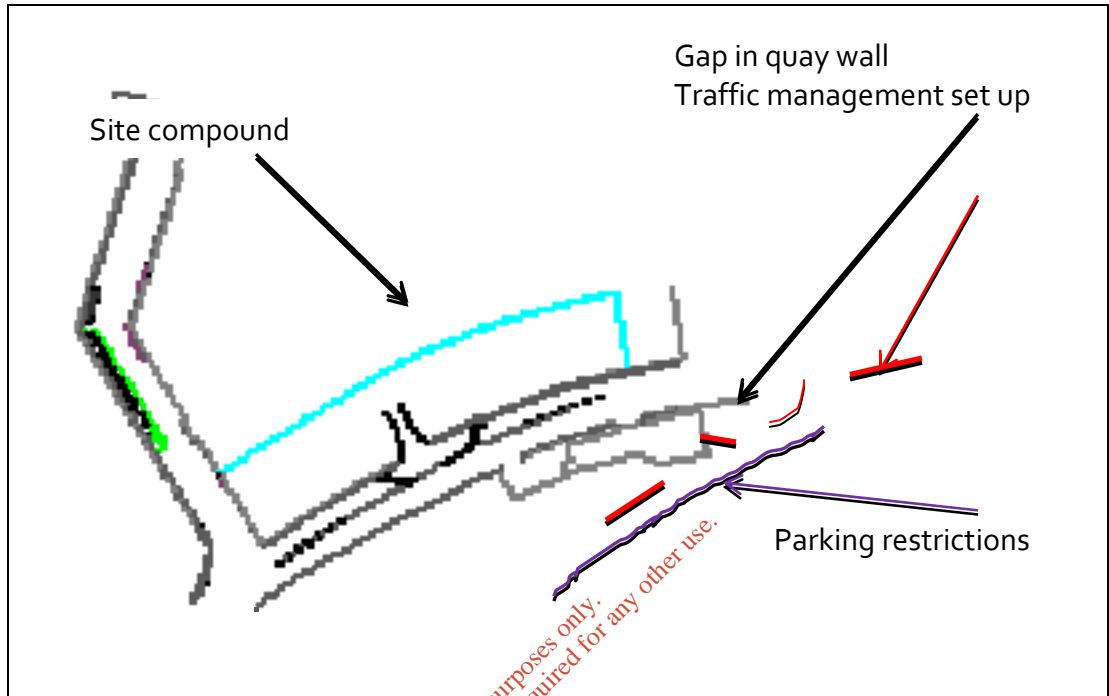
Location of the Works





Proposed access routes for the project

Proposed Works Area



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Appendix 2:

Waste Licenses & Permits –

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Appendix 3:

Waste Contractor Checklist

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Waste Contractor Checklist

- | | Yes | No |
|---|-----|----|
| 1. Do you have a Waste Collection Permit (WCP) for EVERY Waste Contractor that collects ANY waste from the site (full copies) | | |
| 2. Is the waste contractor permitted to collect the type of waste in question? Is the specific waste type being collected detailed in the waste collection permit? | | |
| 3. Have you contacted the waste contractor and asked what licensed / permitted facility our waste is being brought to? | | |
| 4. Is this licensed / permitted facility stated in the waste collection permit? If not, the waste contractor should be contacted and asked. | | |
| 5. Have you checked the waste facility permit / license to see if they can accept the waste in question? (It is very important to check this if the waste is hazardous) | | |
| 6. Have you checked the waste transfer notes comply with EA-20 Waste Transfer Notes | | |
| • Environmental Alert 25 'Waste Collection Permits, Waste Permits and Waste Licences' to be adhered to | | |

Appendix 4:

Definitions

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Definitions

Re-use

products or components that are not waste are used again for the same purpose for which they were conceived;

Recycling

any recovery operation by which waste materials are reprocessed into products, materials or substances.

Recovery

any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfill a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

Disposal

any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I sets out a non-exhaustive list of disposal operations.

Inert Waste

waste that -

- does not undergo any significant physical, chemical or biological transformations,
- will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter, or be adversely affected by other matter, including waters, with which it comes into contact in a way that causes or is likely to cause environmental pollution, or
- will not endanger the quality of surface water or groundwater;

Hazardous Waste

waste which displays one or more of the hazardous properties listed below:-

- Explosive
- Oxidizing
- Highly flammable (liquids, substance, solid liquid, gaseous substance)
- Flammable liquid substances
- Irritant
- Harmful
- Toxic
- Carcinogenic
- Corrosive
- Infectious
- Toxic for reproduction
- Mutagenic
- Waste which releases toxic or very toxic gases in contact with water, air or an acid
- Sensitizing substances
- Eco-toxic
- Waste capable by any means, after disposal, of yielding another substance, e.g. a leachate, which possesses any of the characteristics listed above

Works Proposals – Option 3

Part 4 Traffic Management Plan

Traffic Management

Introduction

Prior to any works commencing on site a 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 statement for the Traffic Management plans will be prepared by 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 traffic Management Plan 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 is the overall traffic Management Plan which will outline our general approach and methodology to the Bantry Inner Harbour Development – Phase 1 Contract and will be in keeping with E.I.S/ Works requirements.

Traffic Management Plan

Introduction

This Traffic Management Plan (TMP) incorporates Bam overall approach to the project and will serve to outline our methodology for carrying out the Traffic management plan. Prior to any works commencing on site a more comprehensive and detailed, Traffic Management Plan will be prepared by Bam taking into account the discussions with the relevant stakeholders.

The plan defines arrangements which must be complied with to meet the requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, the Safety, Health and Welfare at Work Act, 2005, DOE Traffic Signs Manual - Chapter 8 - Temporary Traffic Measures (DOE Chapter 8) and Signs for Road works and Guidance for the Control and Management of Traffic at Road Works.

All the constraints and requirements that are discussed/ listed in the Works Requirements Appendix 1/17 & 1/19 will be adhered to for all traffic management considerations for this project.

Project Background

The project consists of improvements to the Town Pier, Quayside reclamation adjacent to the town pier, construction of amenity area adjacent to Railway Pier, rock armour groynes to Cove site along with beach renourishment, dredging and treating of seabed material for re-use. There is also the installation of marina pontoons along the quayside reclamation as well as floating breakwater at the head of the Railway pier.

Location of the Works



Location Map

Scope of Works

The Traffic Management works will consist of the following:

- Main Site Works.
- Traffic Management Plan Objectives.
- Communications.
- Phasing of the works at each location.
- Drawings showing traffic management layout for roads.
- Drawings showing traffic management for water based vessels.
- Timing of operations.
- Road / Site lighting.

Main Site Entrances

There are three work locations for this project:

1. Town Pier / Quayside reclamation area – the main route for access to this site will be by the N71 which passes the entrance to the Pier.
2. Railway Pier – N71 and Harbour road will be utilised to access the railway pier.
3. Cove site - Beach nourishment and Groyne construction – no construction traffic – all construction traffic is to be over water.



Proposed access routes for the project

Traffic management Plan Objectives

This construction phase traffic management plan has a number of objectives as follows.

The objective is to identify the issues to address and provide solutions; the key issues to be addressed are as follows:

- Notify Road users of upcoming works.
- Access for fishermen and pier users.
- Safe work environment for workers.
- Safe road environment for the public.
- Material delivery to the project.
- Traffic in and out of harbour.

Communications

The Traffic Safety and Control Officer (TSCO) will be in contact with the traffic Manager for the Local Authority, the Garda Síochána, and the Harbour Master once the contract has been awarded to have initial discussions regarding the TMP.

Once the project is started the TSCO will arrange for regular meetings to take place to discuss the upcoming traffic management works, the TM in place, signage and road maintenance with representatives of the following organisations:

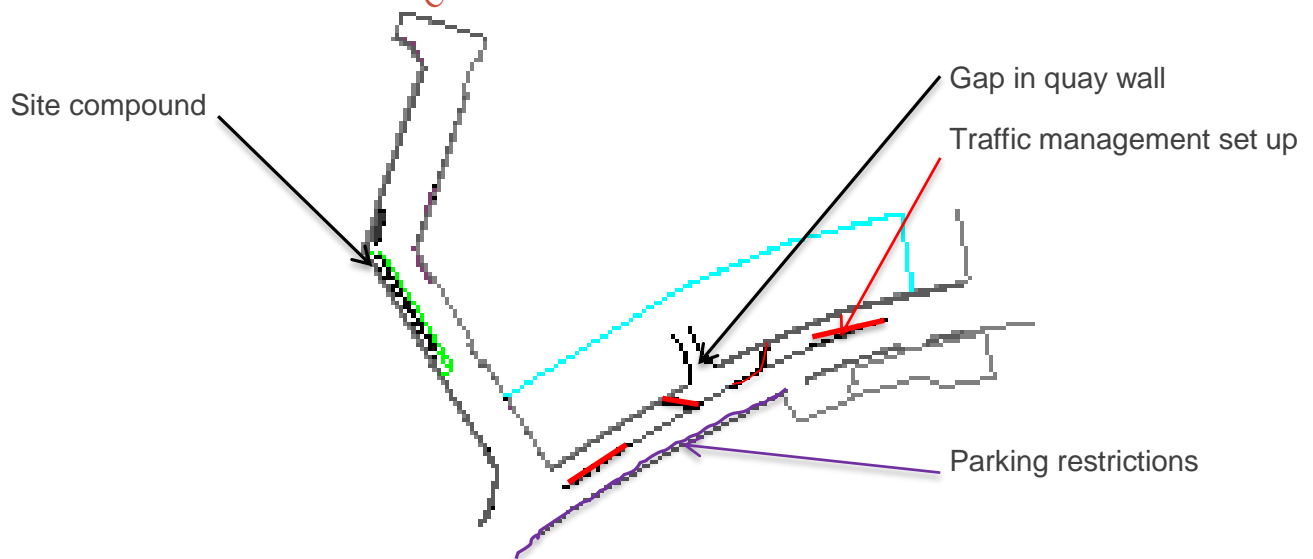
- The Engineer
- The Area Engineer
- The Harbour Master
- An Garda Síochána
- TSCO
- Other interested parties

Phasing of the Works at each Location

The Town Pier / Quayside Reclamation works

The works at the above location will start with the site compound set up including preparation for the quayside reclamation works. This will entail signage along the N71 to warn motorists of a site entrance ahead, this will be a combination of road signs and VMS signs.

The next phase will be to open a gap in the quay wall to allow the temporary causeway to be constructed; this will require single lane traffic controlled by three way Traffic lights and restriction of parking along the verge. A laydown and turning area will be constructed to allow trucks to turn and exit without reversing. Once this is in place the single lane traffic management will be removed, with access being controlled by a gateman.



The new sewer line in the Quayside reclamation area will require traffic management for final connection to existing sewers along the N71. This will consist of single lane traffic controlled with traffic lights.

The works to the pier will start at the southern end and work north in sections – 20m sections of work which will require 30m sections of traffic management for each section. A section will be complete to a

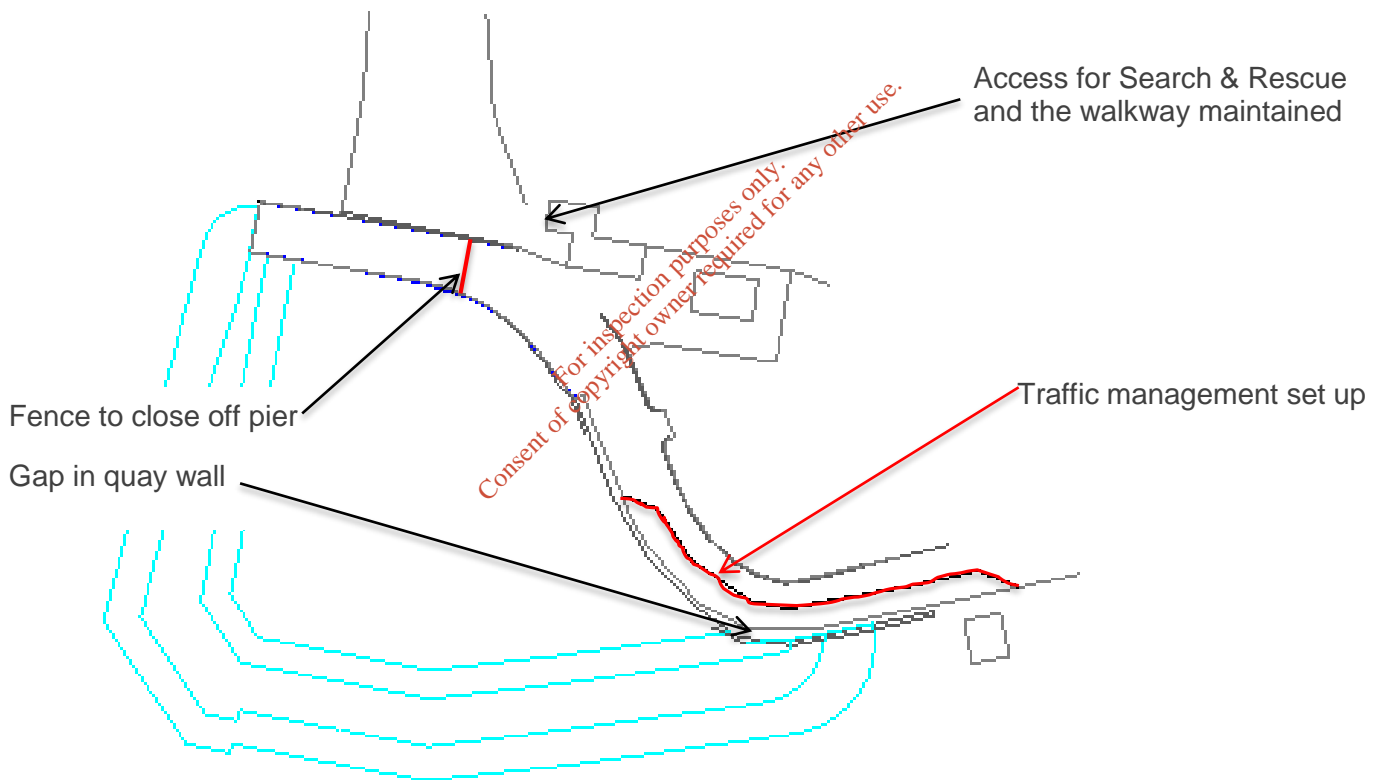
stage where it can be trafficked before moving on to the next section north. This is to make sure we keep 1/3 of the pier available for use by fishing vessels.

Access past our works will be maintained at all times to allow access to the pier and pontoon at end of pier.

Amenity Area

The amenity area works will start with some advance signage along Harbour road for the site entrance which will be used to construct the revetment.

The first section of works will be to remove the existing statue and street furniture in the area to storage, this will be done by closing of part of the pier with fencing, access will be maintained for walkway and also for the Bantry Inshore Search & Rescue facility.



The revetment construction will commence with fill material starting at the east side of proposed revetment, this material will be brought by Harbour Road and a gap in the quay wall will be opened. Traffic management will consist of single lane traffic controlled by Flagmen. This will be in effect until a big enough area for a turning area is filled out, allowing trucks to turn and to drive out without reversing. Once this has been achieved the traffic management will be adjusted to signage and a gateman controlling access/ egress from site.

Cove site

There will be no requirement for traffic management at this location as all construction traffic is to be over water as per App. 1/19 of the Works Requirements.

Marine works

The dredging and pontoon installation will be part of the marine works. The movements will be planned out in advance and discussed and agreed with the Harbour Master and the Engineer with weekly programmes provided, outlining any possible interferences with shipping or fishing vessels.

All marine plant on the project will be fitted with VHF radios which will allow them to be contacted at all times. All marine plant will be fitted with the internationally recognised display lights and signals as required by International Collision Regulations as per Appendix 1/19.

The routes that the barges will take will be the most direct route available, taking into account the seabed, and the weekly discussions with the Harbour Master and the fishing vessels using the pier and immediate vicinity.

The radio frequency for the dredge vessel will be given to the Harbour Master and fishing vessel captains, so that the dredging supervisor is made aware of and can stop operations if required while a fishing vessel is passing.

It is intended to place buoys along the route to the Cove Beach area – in agreement with Harbour Master and fishing vessels, this will help to keep everyone informed of the main routes.

Drawings showing Traffic Management layout for roads.

Please see Appendix A of this document for Traffic Management drawings for:

- Quayside Reclamation works.
- Amenity Area/ Revetment construction
- Town Pier Works

Drawings showing Traffic Management for water based vessels.

Please refer to Appendix B of this document for Traffic Management drawings for:

- Water Based Vessels - Marine Works.

Timing of operations.

The site hours will be as per the Works requirements appendix 1/9.

Site deliveries will be timed so that they will be made at off peak traffic times.

All traffic management set ups will be done in a controlled manner at off peak traffic times.

The timing of all water based traffic management will be agreed in advance with the Harbour Master.

Road / Site lighting.

There is already street lighting in place on the N71 which lights the road which passes alongside the entrance to the town pier. The harbour road is also fitted with street lighting.

It is our intention to maintain this lighting and supplement it only where needed for road users, such as when the modification to the lighting along the quayside reclamation works are taking place.

There will be task lighting required at all work locations including the site compound, which will be agreed in advance with the Resident Engineer. This lighting will be a combination of mobile light towers and flood lights. The specific locations will be assessed individually and the lighting will take into account road users (making sure not to interfere with driver's sight) and other stakeholders.

Duties and Responsibilities

Traffic co-ordinator /designer (TMC)	Seamus O'Sullivan
Traffic Safety and Control Officer (TSCO)	Seamus O'Sullivan
General Foreman	Jack Tuohy
Site Safety & Environmental Officer	Martin O'Connor
Temporary Traffic Operations Supervisor	Nick Creed / Patrick Healy Rae

The Traffic Management Coordinator (TMC)

The Traffic Management Coordinator (TMC) will be trained in sign, lighting & guarding for road works and will be responsible for setting up and engaging in the liaison system with the client, local authority and the local Gardaí.

He is also responsible for planning the traffic management scheme, getting layouts drawn up and for seeking approval from the various authorities. He will seek to establish what, if any, vulnerable groups need to be accommodated by the plan and ensure that their needs are met by the scheme.

The Temporary Traffic Operations Supervisor

The Temporary Traffic Operations Supervisor will have direct responsibility for the implementation of the temporary traffic management plan during construction, including, installing, maintaining, modifying and removing the temporary traffic management arrangements. Temporary Traffic Operations Supervisor will liaise with the Temporary Traffic Management Designer/PSDP with regard to the effectiveness of the temporary traffic management arrangements. The PSCS is responsible for ensuring the appointment and co-ordination of the Temporary Traffic Operations Supervisor

Design, Implementation and Removal of Temporary Traffic Measures

The traffic management plan defines arrangements which must be complied with to meet the requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, the Safety, Health and Welfare at Work Act, 2005, DOE Traffic Signs Manual - Chapter 8 - Temporary Traffic Measures (DOE Chapter 8) and Signs for Roadworks and Guidance for the Control and Management of Traffic at Road Works.

It is the responsibility of the designer of temporary traffic measures to apply the guidelines described in Chapter 8 of the DOE's traffic signs manual to use relevant road design principles, where appropriate, to provide a safe working area and a safe and efficient flow of traffic through the works.

It is recognised that, in a great many situations (particularly on roads which have evolved rather than been designed to a standard as is this case), it may be necessary for the temporary traffic management designer to deviate from the exact detail provided in this Chapter. Bearing in mind the designer's obligations pursuant to health and safety legislation etc, BAM have studied carefully the characteristics of the site, and by the application of the guidelines described in DOE Chapter 8, devised a traffic management plan which best addresses the site constraints in a safe manner, in so far as is reasonably practicable.

In designing, and when implementing, safe temporary traffic measures, and subsequently removing them, the following aspects have been considered where applicable:

Design:

- a) Clarification of the working area requirements for carrying out the work – the site works area requires road warning signage on the approach to the site from both traffic directions.
- b) Identification of any particular hazards to the workforce or road user and, by using the DOE Chapter 8 guidelines, minimising the risks – pedestrians and traffic passing the works area.
- c) Design of the temporary traffic measures to provide a safe environment, so far as is reasonably practicable, for both road users and workers and to keep traffic flowing as freely as possible. The typical layouts shown in Section 8.8 of DOE Chapter 8 have been adhered to as closely as possible and only signs contained in the Traffic Signs Manual used, to maintain consistency for road users when encountering the temporary traffic measures.
- d) Consultation with all relevant parties such as Cork County Council Traffic dept, the Harbour master, The Garda Síochána and the Users of the Pier (fishing vessels and Whiddy Island pontoon).
- e) Consideration of how the implementation and removal of temporary traffic measures will be carried out.

Implementation and Removal:

- a) The temporary traffic measures will be implemented in accordance with the traffic management design.
- b) The temporary traffic measures will be maintained during the works. Due to the nature of construction work, dust and mud may be generated and hence regular cleaning of signs, reflectors and road surfaces is required. Also signs that can be knocked over or displaced and will be regularly checked and rectified.
- c) All temporary traffic measures will be removed once the works are completed. In order to encourage the road users to take notice of temporary traffic measures it is important that all signs, etc. be removed or covered when not required. If road users pass signs and cones in place with no operation being carried out, they may disregard the signs and cones when the operation is underway.

Pedestrian Activity

At all times pedestrian activity will be catered for during the works.



Picture: Temporary Walkway Provided on Previous BAM Marine Project

Advance Warning Signs

The signs are to set out as per table 8.3.2 and 8.3.3 of chapter 8. These will be checked regularly to see that they are still in place especially after periods of high winds and after weekends. They are to be positioned in such a way that they do not cause any reduction in driver visibility.

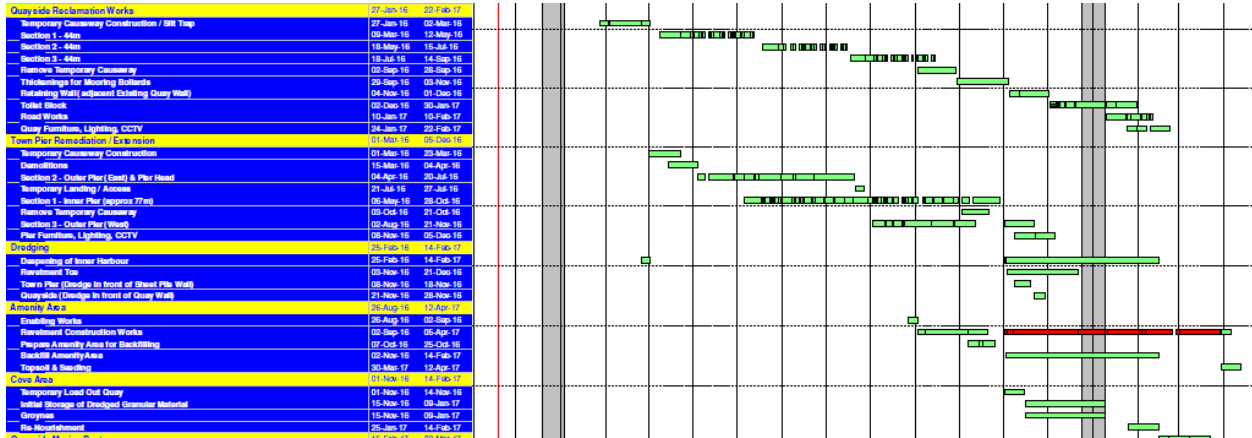
Harbour traffic management – green and red buoys will be deployed in the harbour to facilitate traffic in/traffic out manoeuvres. All marine plant will be fitted with the internationally recognised display lights and signals as required by International Collision Regulations as per Appendix 1/19.

Safety

- Risk assessments have been carried out and are included in the Health and Safety Plan. The Health and Safety Plan is included in Part 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 Part 2 of this submission



Picture: Screenshot of Quayside Reclamation, Town Pier Remediation, Dredging, Amenity filling & Cove nourishment operations from the 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 Part 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. In addition silt curtains will be deployed in the harbor, while dredging works are ongoing. Harbour traffic will be accommodated by opening and closing silt curtains as required.
- 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.
- Washing of concrete trucks to take place at a designated concrete wash out area.

Plant Equipment and Certification Required

The following resources will be utilized for the works described in this method statement:

- Excavators
- Barges
- Roller
- Mobile crane
- Concrete pump
- Teleporter/35 ton crane

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.

All cranes will be fully certified, and all lifting gear will also be fully certified.

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APPENDIX A

Traffic management plans for:

- Quayside Reclamation works.
- Amenity Area/ Revetment construction.
- Town Pier Works

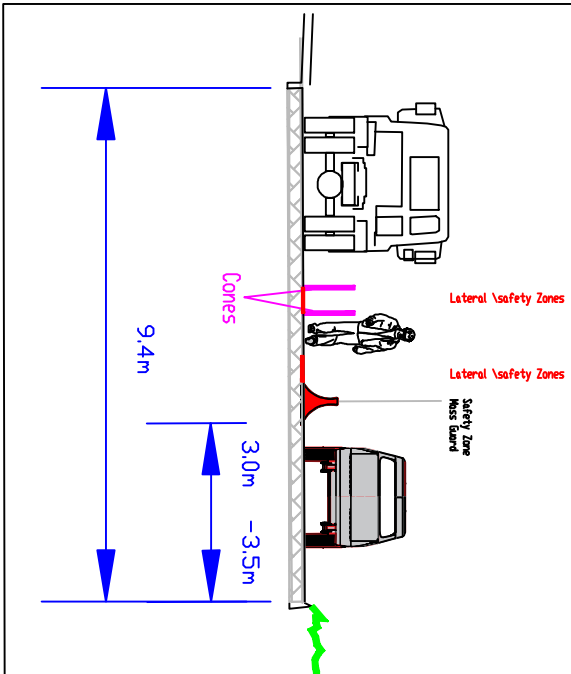
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CROSS SECTION

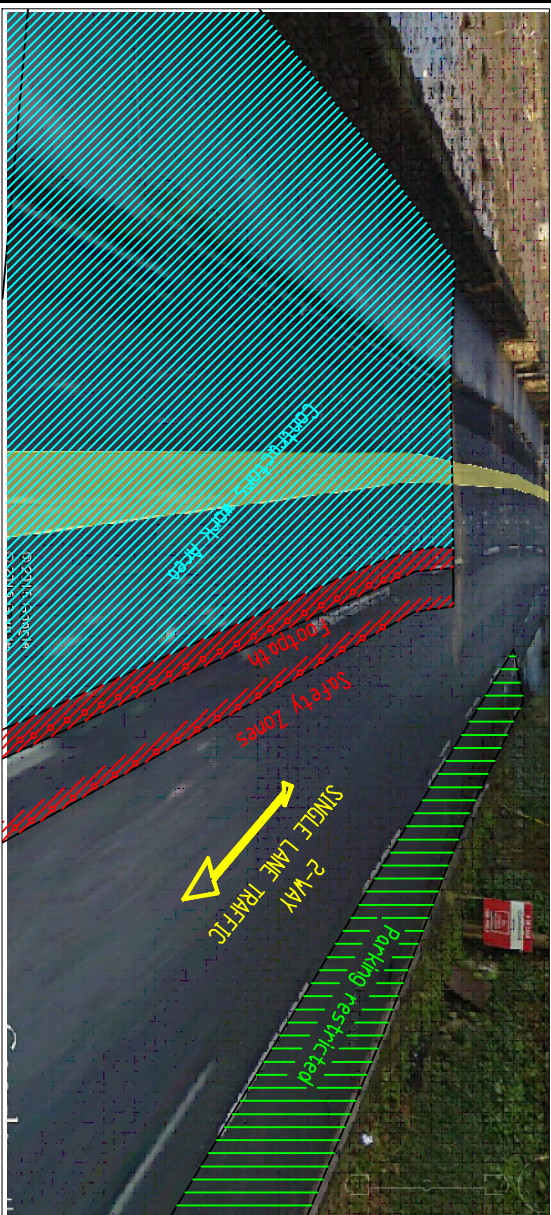
Single Lane Traffic Management

CONTRACTOR'S WORKS AREA




SINGLE LANE TRAFFIC



N71 Bantry Road – Quayside Reclamation Works



LEGEND

-  Contractors Work Area
-  Lateral Safety Zone
-  Longitudinal Safety Zone

NOTES

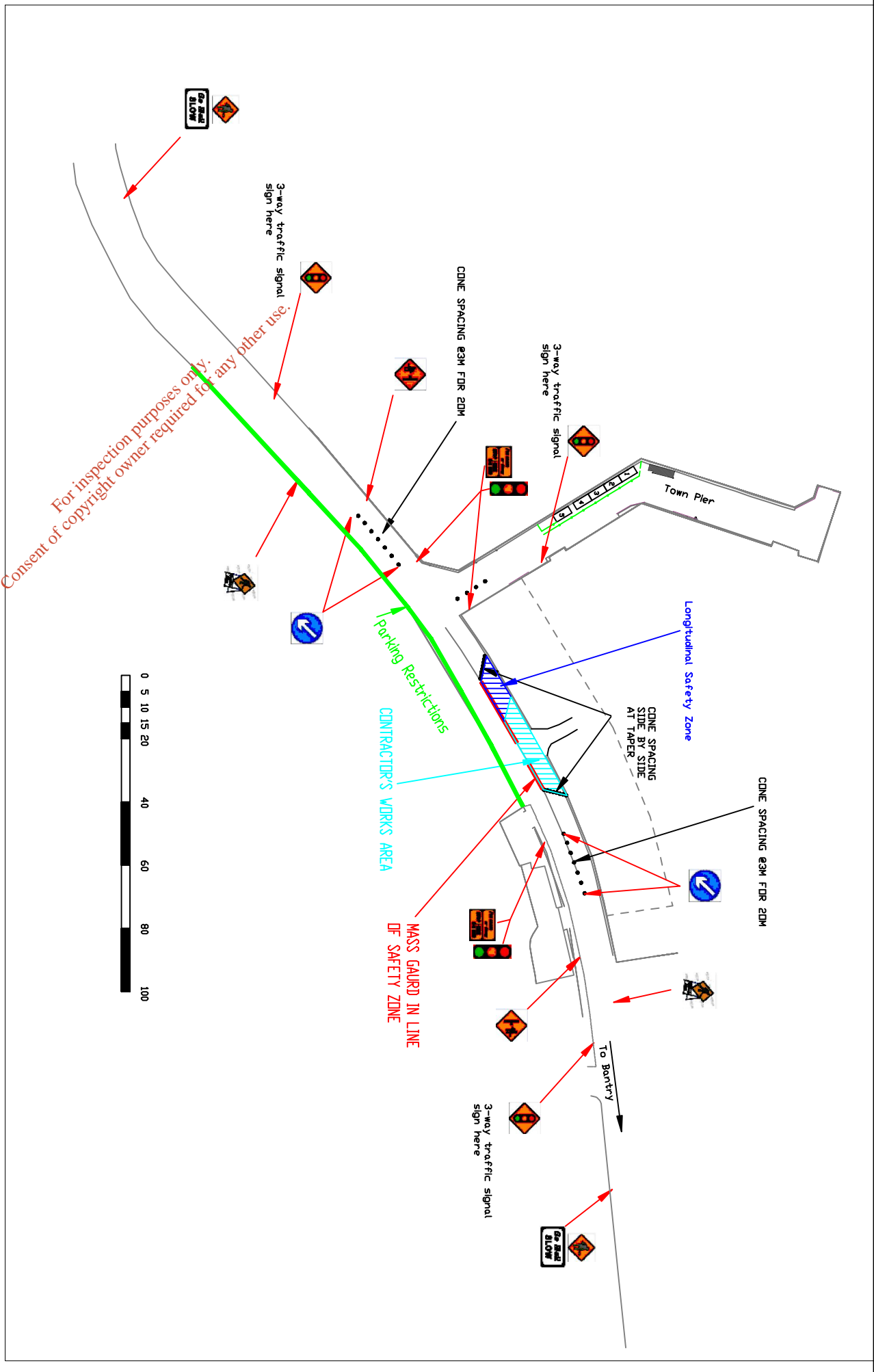
- All signage will be as per Chapter 8 of the Traffic signs Manual.
- Side Safety Zone of 0.5m will be maintained throughout the Works.
- Access to properties effected by the works to be maintained as required.
- Alternative pedestrian and cycle routes to be maintained as required.
- Temporary road markings and signage to direct traffic, pedestrians and cyclists will be installed, and returned to original when works complete.
- Site construction Traffic will wait for flow in traffic when exiting site.
- Additional site lighting will be erected to illuminate work areas.

Design Parameters

- Nature of works - Type A
- Road Classification - Level 2
- Speed on N71 at work location 50km/hr
- Minimum Lane width of 3m Maximum
- Lane width of 3.5m
- Length of Lane closure <100m

Additional Information

- Site entrance at town Pier.
- Flagman/men to be utilised at site entrance when lights are removed.
- Additional Signs to be utilised to aid Pedestrians & cyclists.
- Overhead Line Protection System to be utilised, (Goal Post System)



Drawing Title

Bantry Inner Harbour Development: Phase 1 -Traffic Management
Traffic Management - Quayside Reclamation

Drawn By: DG

Checked: SCS

Date: 5/11/15

Drawing No. X000000000X

Rev: 0

Scale: —

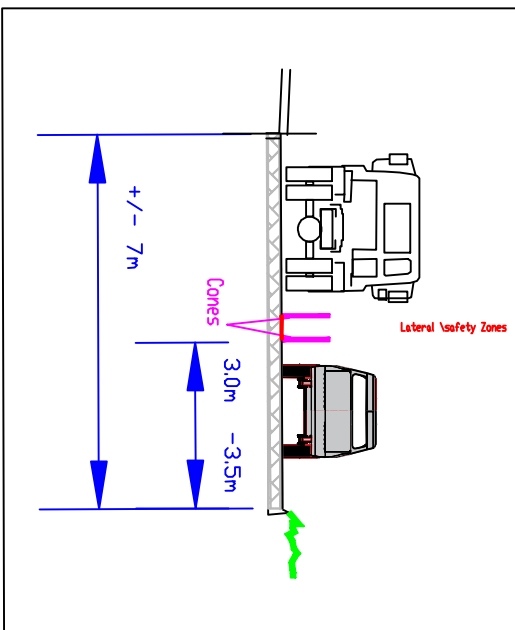
Status: 1

CROSS SECTION

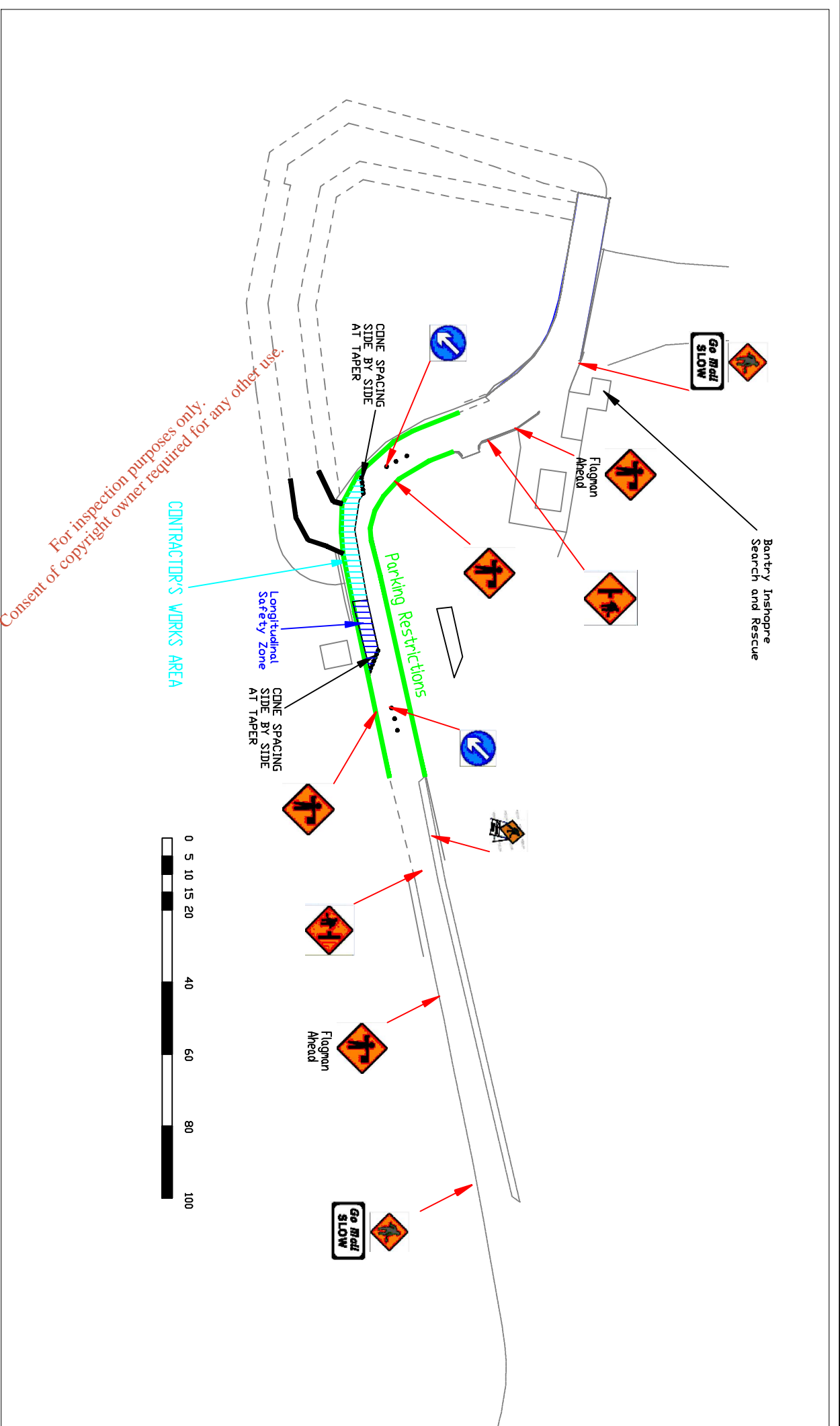
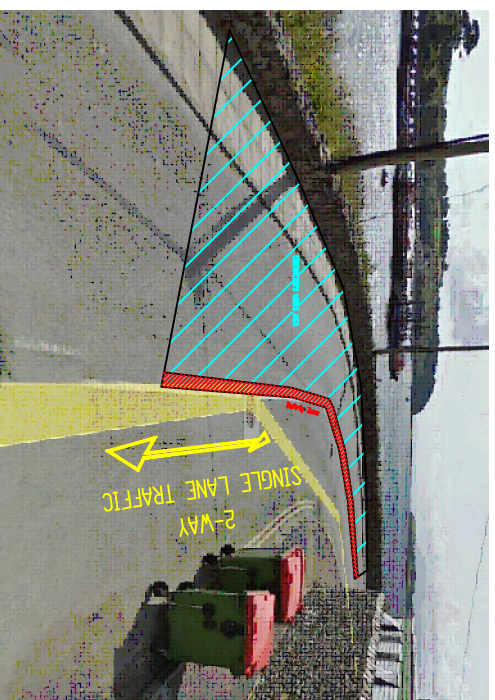
Single Lane Traffic Management with Flagmen

CONTRACTOR'S WORKS AREA

SINGLE LANE TRAFFIC



Harbour Road – Amenity/revetment Works



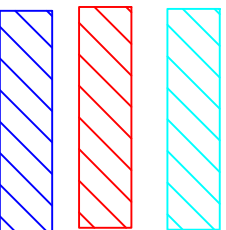
Additional Information

- TM set up & removed checked daily.
- Flagman/men to be utilised.
- Hours of TM operations 8am to 6pm.
- Additional Signs to be utilised to aid Pedestrians.
- Overhead Line Protection System to be utilised, (Goal Post System)

Design Parameters

- Nature of works - Type A
- Road Classification - Level 2
- Speed on harbour road at work location 30km/hr
- Minimum Lane width of 3m Maximum Lane width of 3.5m
- Length of Lane closure <50m

LEGEND



Contractors Work Area

Lateral Safety Zone

Longitudinal Safety Zone

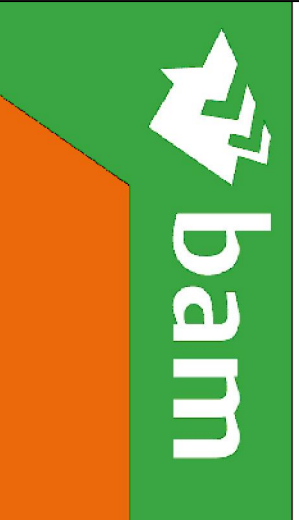
NOTES

- All signage will be as per Chapter 8 of the Traffic signs Manual.
- Side Safety Zone of 0.5m will be maintained throughout the Works.
- Access to properties effected by the works to be maintained as required.
- Alternative pedestrian and cycle routes to be maintained as required.
- Site construction Traffic will wait for flow in traffic when exiting site.
- All road markings will be reinstated on completion of the works.

Drawing Title

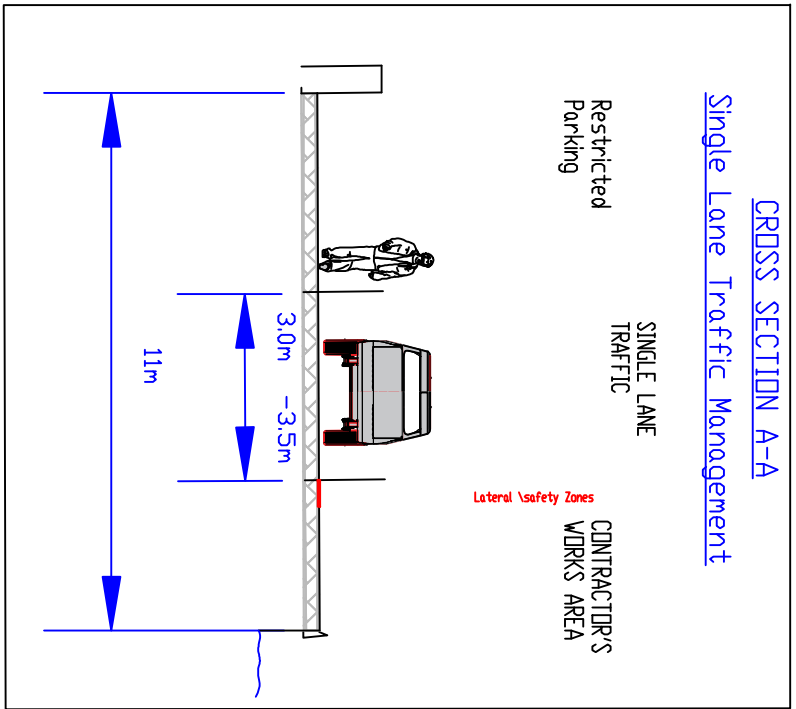
Bantry Inner Harbour Development: Phase 1 -Traffic Management
Traffic Management - Amenity/ Revetment Construction

Drawn By: DG	Checked: SCS
Date: 5/11/15	Drawing No. XXXXXXXXXX
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	Rev: 0



CROSS SECTION A-A

Single Lane Traffic Management



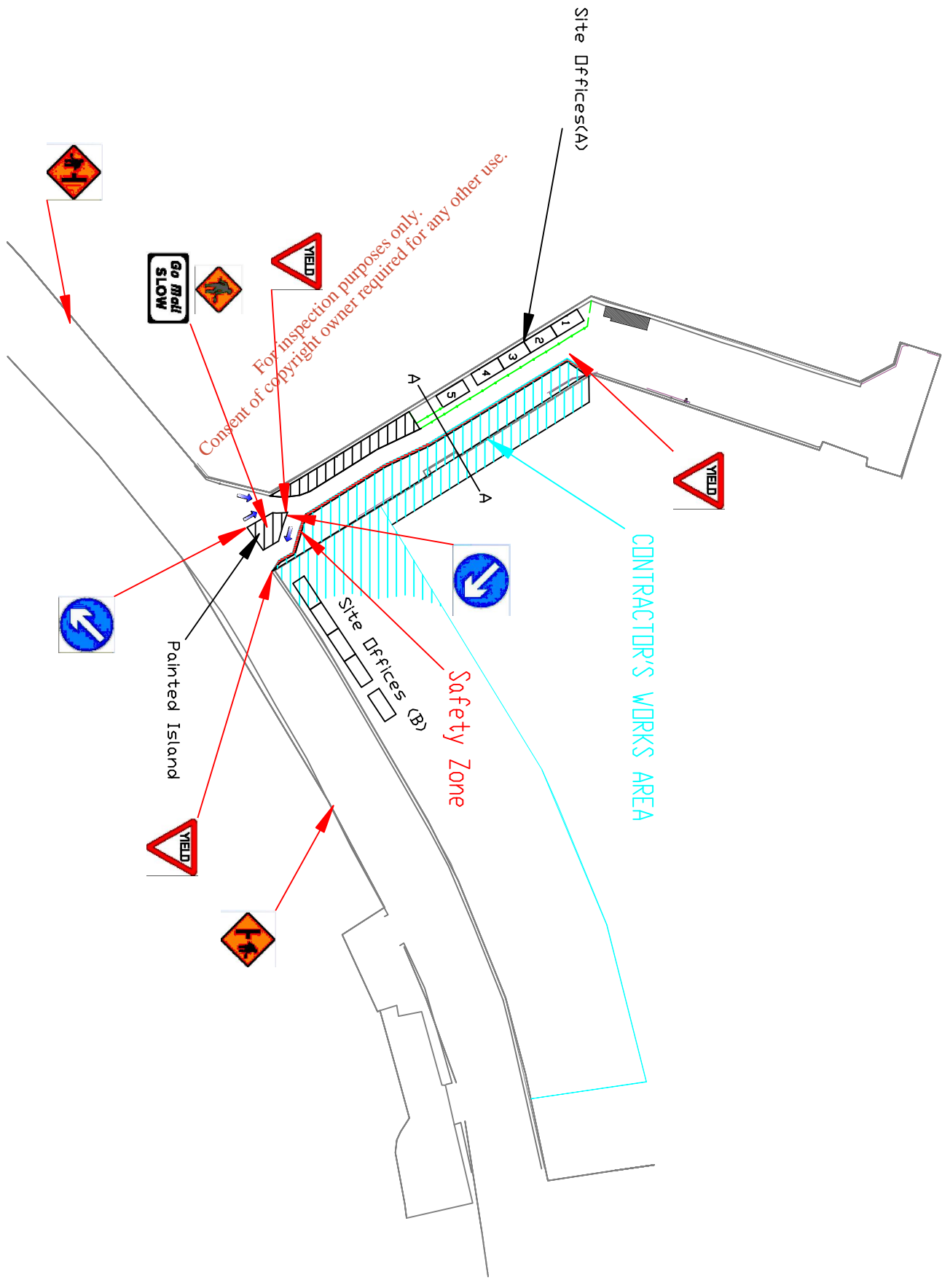
- Additional Information**
- TM set up checked daily
 - Flagman/men to be utilised when moving plant/ equipment.
 - This TM set-up will move as work progresses.
 - Additional Signs to be utilised to aid Pedestrians.
 - Overhead Line Protection System to be utilised. (Goal Post System)
 - Site office compound will change to location B as work progresses.

LEGEND

- Contractors Work Area
- Lateral Safety Zone
- Restricted Parking Zone

NOTES

- All signage will be as per Chapter 8 of the Traffic signs Manual.
- Side Safety Zone of 0.5m will be maintained throughout the Works.
- Access to pier head & Whiddy pontoon to be maintained.
- Temporary road markings to direct traffic, painted island direction arrows etc.
- Site construction Traffic will be escorted if crossing throughways.
- Additional site lighting will be erected to illuminate work areas.

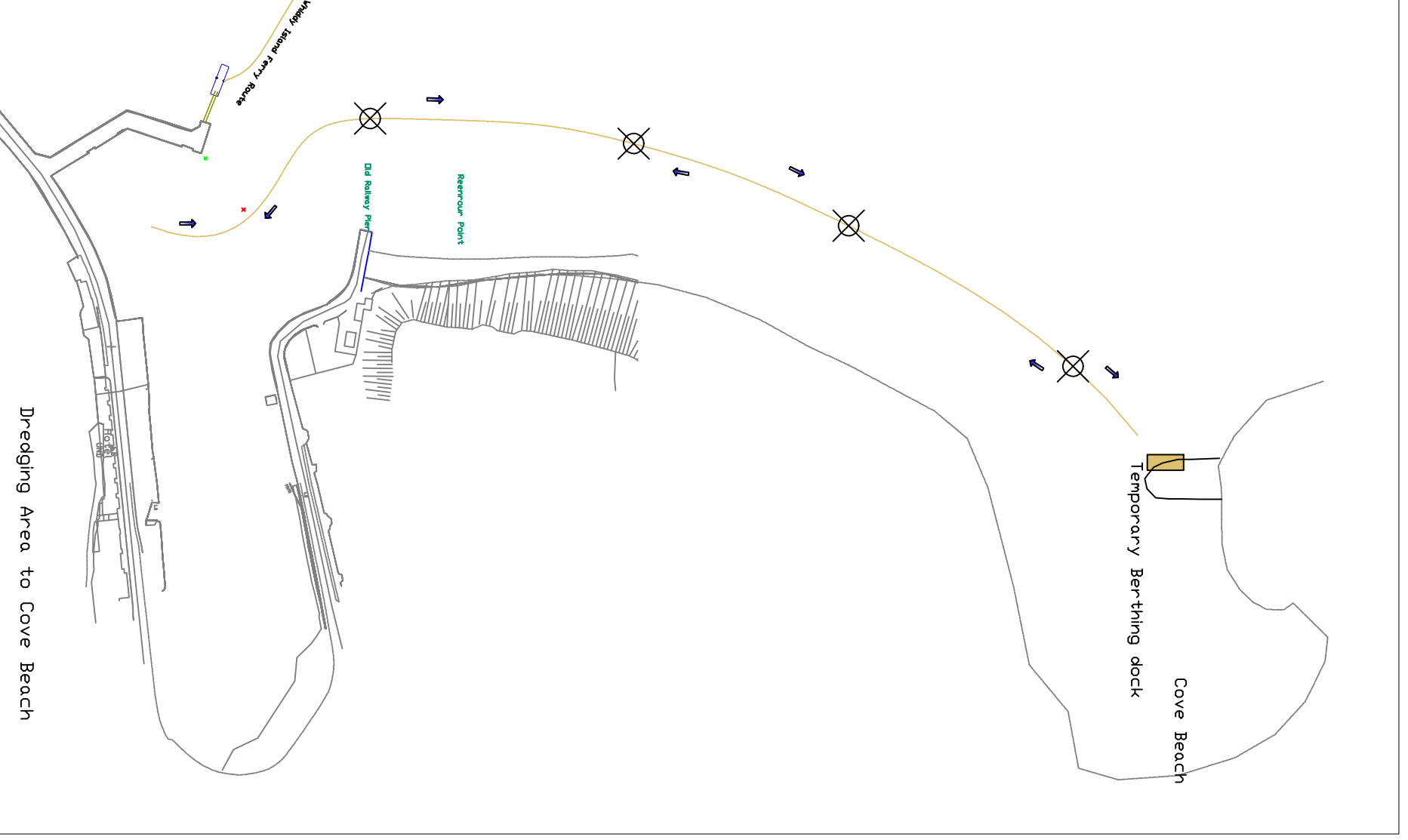
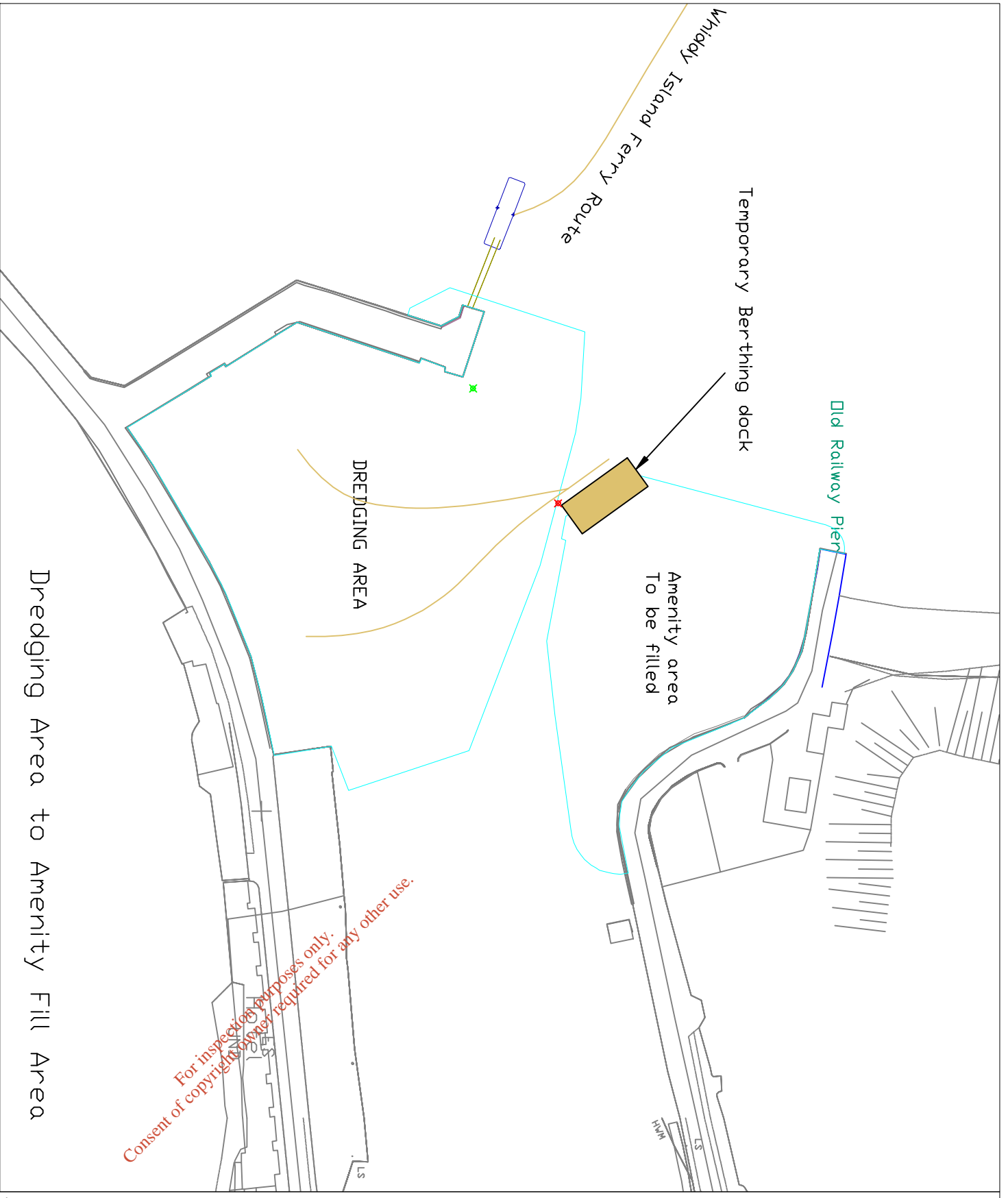


APPENDIX B

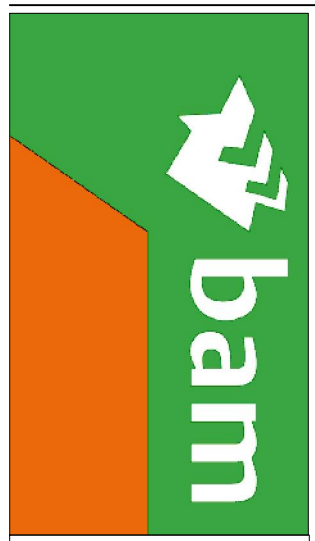
Traffic management plans for:

- Water Based Vessels - Marine Works.

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- Additional Information**
- Silt curtain to be opened/ closed as required to suit fishing vessels.
 - Harbour Master to be informed if anything changes.
 - Weather conditions to be monitored.
 - Mooring buoys to be moved when required with consent of Harbour Master.
 - Proposed Buoy locations for route to Cove beach will be agreed with Harbour Master and Fishing vessel before being placed.
 - Exact routes between dredge area and amenity area will be agreed with Harbour Master and Fishing vessels on a weekly basis depending on progress.




LEGEND

For existing Harbour

- Red 'X' symbol: Area Port Buoy - should be on the route/able when passing
- Green 'X' symbol: Green Buoy - should be on right hand side when passing
- Blue arrow symbol: Direction of Buoy
- Black circle with 'X' symbol: Proposed Buoy location

- NOTES**
- All Marine plant will be fitted with VHF radios with channels 12 & 14 for contact with Harbour Authority.
 - Weekly communicators with Harbour Master and fishing vessels to coordinate works.
 - All marine plant will be fitted with the Internationally recognised display lights and signals (International Collision Regulations).
 - Marine plant will fly the International code signal flag.
 - Marine plant will be secured and moored only at the locations as agreed with the Engineer and Harbour Master.
 - A rescue boat and life saving equipment will be immediately available at all time marine plant is manned.

Drawing Title	
Barty Inner Harbour Development: Phase 1 -Traffic Management	
Traffic Management - Water Based Vessels - Marine Works	
Drawn By: DG	Checked: SOS
Date: 5/11/15	Drawing No. 20000000000X
Scale: —	Rev: 0
	Status: 1

EP-10	Surface Water Control			
Note: Always print or copy to double-sided pages	PROC. NO: EP-10	REV: 04	DATE: 10.03.2016	PAGE: 1/6

Purpose:	To provide guidance on control measures to minimise the adverse impacts on watercourses caused by sediment release during construction activities.
Scope:	Control of surface water on all sites
Responsibility:	Contract/Project Manager, Foreman, HSE Officer, All site personnel
<p>Regulatory Requirements:</p> <ul style="list-style-type: none"> • Inland Fisheries Ireland Acts, 1959 - 1980 and Fisheries (Amendment) Acts 1983 - 2003 • Local Government (Water Pollution) Acts, 1977 – 1990 • Planning and Development Act, 2000 and Amendment Act, 2002 • Local Government (Water Pollution) Regulations, 1978 – 2001 • European Communities (Quality of Salmonid Waters) Regulations 1998 • European Communities (Quality of Shellfish Waters) Regulations 2006 • European Communities (Water Policy) Regulations 2003 • Environmental Protection Acts 1992-2003 • Bathing Water Quality Regulations 2008 • Inland Fisheries Ireland Act 2010 <p>Under the Water Pollution And Fisheries Acts allowing polluting matter to enter any waters is an offence. Under the Local Government (Water Pollution) Act, 1977, a licence is required for the discharge of trade effluent or sewage effluent (see definitions below) to waters or for the discharge of trade effluent or other matter to a sewer. Such a license would specify the quality of the water that may be discharged.</p>	
<p>Definitions – from Local Government (Water Pollution) Act, 1977</p> <p>"polluting matter" includes any poisonous or noxious matter and any substance (including any explosive, liquid or gas) the entry or discharge of which into any waters is liable to render those or any other waters poisonous or injurious to fish, spawning grounds or the food of any fish, or to injure fish in their value as human food, or to impair the usefulness of the bed and soil of any waters as spawning grounds or their capacity to produce the food of fish or to render such waters harmful or detrimental to public health or to domestic, commercial, industrial, agricultural or recreational uses;</p> <p>"trade effluent" means effluent from any works, apparatus, plant or drainage pipe used for the disposal to waters or to a sewer of any liquid (whether treated or untreated), either with or without particles of matter in suspension therein, which is discharged from premises used for carrying on any trade or industry (including mining), but does not include domestic sewage or storm water;</p> <p>"waters" includes—</p> <p>(a) any (or any part of any) river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial,</p> <p>(b) any tidal waters, and</p> <p>(c) where the context permits, any beach, river bank and salt marsh or other area which is contiguous to anything mentioned in paragraph (a) or (b), and the channel or bed of anything mentioned in paragraph (a) which is for the time being dry,</p> <p>but does not include a sewer.</p>	
<p>Trade effluent can include:</p> <ul style="list-style-type: none"> • Water from dewatering operations, which may or may not contain sediment; • Water from cutting or blasting operations; • Waste chemicals, including oils and fuels; • Plant wash down water, including wheel washes; • Concrete washout water; • Cleaning water, which may contain detergents and/or other chemicals; • Liquid wastes discharged from sinks, basins and toilets. <p>The only effluents that is not classed as trade effluent is clean, uncontaminated surface water (i.e. that has not been contaminated when running over or through the site).</p>	

Common pollutants from construction sites and their effects on aquatic life are given below.

Pollutant	Affect on Aquatic Life
Silt or sediment	Reduces water quality, clogs fish gills causing suffocation, covers aquatic plants stunting their growth and reducing fish shelter, destroys riverbed insect habitat and thus fish food source.
Coarse sediments	Can physically injure fish through abrasive action.
Cement or concrete wash water	Are highly alkaline and change the pH and chemical balance of the water.
Oil, diesel & other hydrocarbons	Form a film on the water surface that reduces oxygen and can suffocate aquatic life.
Detergents	Remove dissolved oxygen from the water
Heavy metals & metalloids	May be present in contaminated ground and can be toxic to aquatic life such as tadpoles, frogs, minnows and trout at low concentrations.

Protection of Watercourses and Bodies

A river, stream, estuary or lake may be afforded additional protection in national legislation by being designated:

- A Natural Heritage Area (NHA) under the Wildlife (Amendment) Act, 2000
- A Special Area Of Conservation (SAC) under the European Communities (Natural Habitats) Regulations 1997/8:
- Salmonid Waters under the European Communities (Quality of Salmonid Waters) Regulations 1998
- Shellfish Waters under the European Communities (Quality of Shellfish Waters) Regulations 2006-2009
- Inland Fisheries Ireland Act 2010

A watercourse may be protected by more than one, or all, of these statutory instruments. For further information on NHAs and SACs refer to EP-12.

Management Requirements:

Water pollution as a result of construction activities usually occurs as result of the release of silt / sediment or spillage of hazardous substances. To prevent such impacts control measures must be implemented from the commencement of site activities and will be required for the duration of construction. The procedure outlined below is for surface water control (often referred to as erosion and sediment control) to minimise the release of sediment to waterways. For control measures to minimise fuel and hazardous substance releases refer to EP-13 Bulk Fuel & Oil Storage, EP-14 Storage & Handling of Hazardous Substances and EP-15 Containing & Cleaning Up Spills.


Sediment control measures are designed to minimise the transport of sediment and other pollutants into watercourses, either by providing a physical barrier (filtering) or by slowing the flow rate of water so that suspended pollutants 'drop out' (settling). Filtering measures include sediment fences and inlet filters, whilst settling measures include sediment ponds and check dams.

The type and capacity of control measure required is dependent on a number of factors, including the volume and duration of flow, and the particle size of the sediment. Fine sediments (clay & silt) are harder to remove as they will take longer to settle than coarse sediments (sand & gravel). Methods for calculating the capacity of the sediment control can be found in the CIRIA publication *C648 Control of water pollution from linear construction projects – technical guidance*. The different types of control measures are described below.

For any activities that have the potential to impact on fisheries habitat the Inland Fisheries Ireland documents *Guidelines on the protection of fisheries during construction in and adjacent to waters* and/or document *Maintenance and Protection of the Inland Fisheries Resource During Road Construction and Improvement Works* must be consulted.

For all NRA contracts the NRA *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes* must be consulted.


All guidance documents are available from the HSE Department.

EP-10	Surface Water Control			
Note: Always print or copy to double-sided pages	PROC. NO: EP-10	REV: 04	DATE: 10.03.2016	PAGE: 3/6

Surface Water Management Procedure:

This procedure and the associated control measures may be attached to or included in method statements.

1. Prior to any work that may affect a watercourse the environmental sensitivity and level of protection of the waterways must be established by **consulting the appropriate authority** – either Inland Fisheries Ireland, Irish Water, the Local Authority, NRA, Waterways Ireland (for any canals), National Parks and Wildlife Service (NPWS).
2. The relevant authority(ies) may specify requirements for design or construction and must be kept informed through regular liaison during the works.
3. Wherever possible surface water flowing onto the site should be diverted around, over or under the construction area to prevent clean water entering excavations and becoming contaminated and avoid the movement of vehicles through watercourses. Water should be diverted using pipes or temporary **culvert / stream diversions** (lined with clean stone or geotextile material) and discharged downstream of the work area. All affected watercourses should be diverted prior to the commencement of earthworks.
4. Where possible it is preferable to direct sediment-laden water to a vegetated area, particularly grass, which will provide a physical barrier to improve filtration and also slow water flow, thus increasing infiltration. This is often more effective than other built control measures. Areas of vegetation that may be used for this purpose should be identified prior to site stripping and retained. In particular, maintaining stream bank vegetation will provide an effective filter strip for surface water containing sediment.
5. Any sediment-laden water that accumulates within the work area either through surface water runoff or groundwater ingress must be channelled and intercepted at regular intervals, or mechanically pumped, to appropriate **surface water controls** prior to discharge to any watercourse. Details of different control measures are given below.
6. It is better to install control measures nearest to the source of sediment and as far as possible from the discharge point (i.e. where the water enters the waterway). This allows more opportunities to install additional measures should further treatment of the water be required.
7. **Drainage** must be designed or altered so that all contaminated or sediment laden water from the construction site, including any water pumped out of excavations, flows to the control measures and not directly to any watercourse or stormwater inlet.
8. Where site water is being pumped into catchment areas such as v-ditches or sediment ponds, ensure the capacity of the structure can contain the volume of water being pumped
9. Ensure that the discharge from sediment traps, tanks or ponds outflows to a vegetated filter strip or through clean stone and not directly into a waterway. Overflow will usually occur when the capacity of the control measure has been exceeded so the additional filtering will assist to minimise pollution.
10. Where work is being conducted in, over, or directly adjacent to sensitive or protected watercourses surface water control measures may need to be specifically designed by a specialist consultant. Such measures may include in-stream controls such as floating sediment curtains, and drainage and sediment pond systems designed to particular flow capacities.
11. The type of surface water controls to be used and their location, including drainage changes, must be specified in the **activity specific method statement** for the work to be undertaken.
12. **Regular inspection** and maintenance of any surface water control measures is required to ensure they remain effective. For example sediment must be removed from sediment tanks to ensure they continue to operate effectively and filtering measures checked to ensure no breaks.
13. **Routine water quality monitoring** may be specified as a requirement by the client and/or regulatory authority, to ensure water pollution does not result from site activities. In such cases, waters which encroach or run through the site would be checked on a regular basis for signs of pollution – if anything is noticed photos must be taken and areas and sign recorded. Additional monitoring would be undertaken up and downstream of the discharge point to determine what impact the discharge is having on the watercourse. Water samples must be analysed by an accredited laboratory. A specialist consultant can assist in setting up the sampling regime and may also undertake

EP-10	Surface Water Control			
Note: Always print or copy to double-sided pages	PROC. NO: EP-10	REV: 04	DATE: 10.03.2016	PAGE: 4/6

ongoing sampling.

For any further advice contact the Company Environmental Coordinator, HSE Department.

Surface Water Control Measures:

When designing and constructing sediment controls always ensure they are of a sufficient capacity to effectively treat the volume of water expected and identify additional overflow areas.

References given are for further information, including design drawings, cases studies and example photographs

Diversion Drain (CIRIA 648 - 18.6.8)

Diversion drains are simple linear ditches used to channel water to a desired location, such as a sediment pond or discharge point. They may be used to divert runoff around disturbed areas, away from slopes or to a slope drain. If there is a risk that the diversion drain itself will erode it should be lined with geotextile fabric and/or clean stone and check dams may be installed.

Slope drain (CIRIA 648 - 18.6.10)

A slope drain is a pipe or lined channel used to drain runoff from the top of a slope to the bottom without causing erosion. It is used in conjunction with other controls, such as diversion drains, to confine flow to the designated slope drain.

Filter strip / buffer (CIRIA 648 - 18.6.1 & MDOT 4)

A filter strip or buffer is an existing vegetated area. When overland sheet flow is carried across the vegetation suspended solids are removed and water infiltrates into the ground. Filter strips are suitable for smaller volumes of water with small suspended solid loads. They can become smothered by high sediment loads and eroded by high flows of water and are normally used in conjunction with other control measures.

Grass swale

Swales are open grassed or vegetated channels that slow water flow, increasing infiltration and filtering out pollutants. They depend on well established vegetation and can be eroded by large volumes of water. Treatment performance can be increased by the construction of weirs and check dams to slow the flow of water.

Filter ("French") drain

A filter drain is a narrow linear drain containing granular material such as stone or gravel that filters out sediment prior to discharge. The drain may also contain a perforated pipe and is best suited to small sites or limited runoff areas where sediment loads and water volume are small. May also be installed adjacent haul roads.

Sediment / silt trap or sump (CIRIA 648 - 18.6.11 & MDOT 8)

Small excavation for low flows of diverted or pumped water, usually allowing infiltration into the ground. May be lined with geotextile material or clean stone to prevent scouring. Such traps are often placed near watercourses and it is important to ensure that any overflow is directed over a vegetated filter strip or through clean stone prior to entering the watercourse.

Sediment / silt tank


A prefabricated tank, usually containing a number of separate chambers, allowing sediment to settle out of the water. These are most effective when treating low flows and coarser sediments, although a flocculant may be used to assist the settlement of finer material. A number of tanks may be used together to increase capacity. Must be regularly inspected and sediment will have to be removed to remain effective.

Sediment Pond / Basin

A sediment pond is used when high volumes of water and sediment loads are expected, typically on large projects where there is a large disturbed area. Sediment ponds may be part of the permanent works on such projects. A number of ponds may be used, allowing flow between them, thus increasing capacity and retention time.

Check dams (CIRIA 648 - 18.6.11 & MDOT 14)

A check dam is usually constructed from clean stone placed in a grass swale or existing drainage line to slow the flow of water and increase infiltration. When using check dams always ensure that they are level across the channel so that water does not scour the banks on one or both sides of the check dam. Geotextile fabric may be placed on banks to

EP-10	Surface Water Control			
Note: Always print or copy to double-sided pages	PROC. NO: EP-10	REV: 04	DATE: 10.03.2016	PAGE: 5/6

prevent scour and over check dams to further reduce flow, if required.

Surface Water Control Measures (cont.):

Sediment fence & Straw Bale filter (CIRIA 648, 18.6.12, MDOT 9)

Sediment fences and straw bale filters are permeable barriers used to remove the sediment from, and break the flow of, sheet flow runoff. They should be placed as close as practical to the work area and can also be used in filter strips to reduce water flows. They can also be placed around stockpiles to prevent loss of material. Geotextile fabric is usually used to construct sediment fences and can also be wrapped around straw bales to increase their effectiveness.

Riprap (MDOT 5)

Riprap is a layer of stone laid over an exposed surface to provide a non-erodible cover, dissipate flow and prevent erosion. A geotextile liner is usually installed under the stone. May also be installed in stream beds and culverts.

For assistance in implementing any control measures or further information contact the Environmental Coordinator.

Other Measures

Additional measures that assist surface water controls and should also be considered include:

- vegetation and topsoil retention – by reducing the area of exposed surfaces, the potential for erosion is minimised. This also assists dust control (refer to Procedure EP-08);
- stabilised site access – either using aggregate, tarmac or concrete, providing an area to wash vehicle wheels before leaving site and minimise sediment loads on public roads;
- truck wash and wheel wash facilities – as above;
- Control of potentially polluting substances such as fuels and oils by providing storage areas that are bunded and isolated from the drainage system (refer to Procedure EP-14 and EP-15).
- Providing drip trays for all water pumps and other static equipment and ensuring the use of drip trays when refuelling mobile equipments, which should be undertaken in a designated area away from watercourses.

For further advice or information contact the Environmental Coordinator, on 045 886557

References:

CIRIA C532 (2001) Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors

CIRIA C648 & C649 (2006) Control of water pollution from linear construction projects – technical guidance & site guide

CIRIA C650 (2005) Environmental Good Practice on Site

Inland Fisheries Ireland (2016) Guidelines on the protection of fisheries during construction in and adjacent to waters

MDOT (Michigan Department of Transportation) - Construction Site Soil Erosion and Pollution Prevention Pocket Guide

NRA (2006) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

Inland Fisheries Board (2007) Maintenance and Protection of the Inland Fisheries Resource During Road Construction and Improvement Works – Requirements of the Inland Fisheries Board.

Irish Statute Book – www.irishstatutebook.ie

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

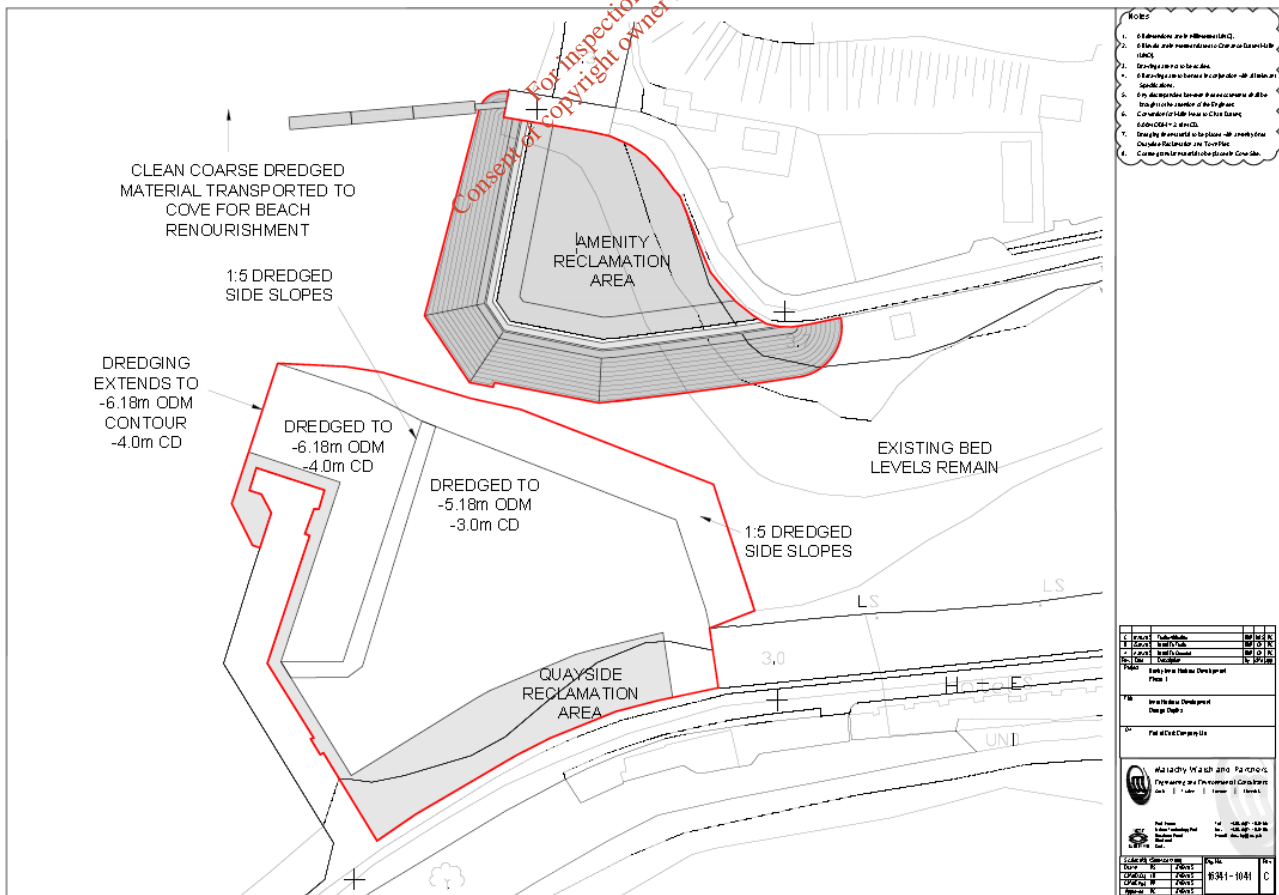


Figure 2: Dredging layout drawing

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

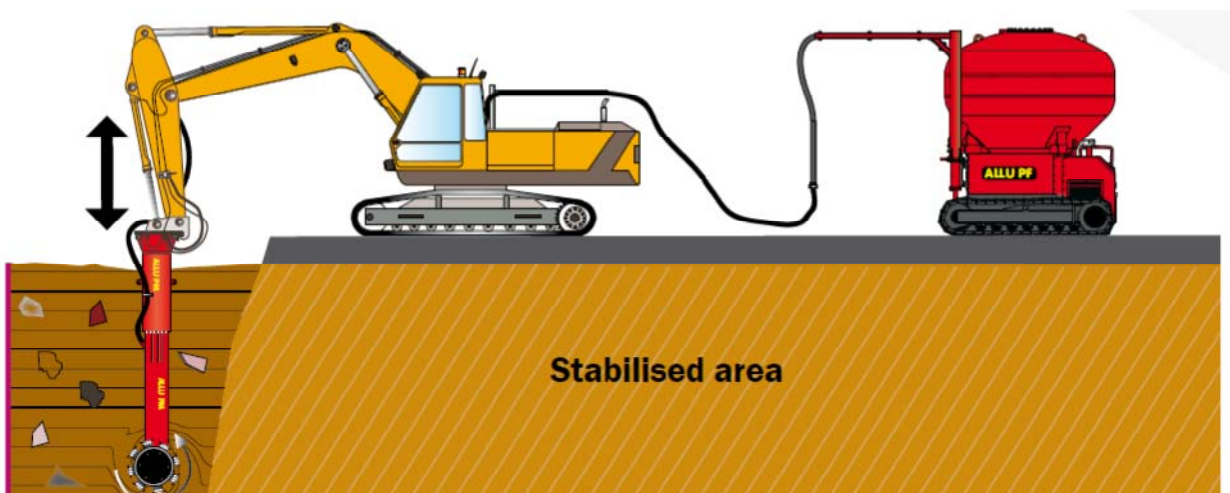


Figure 9: Allu Stabilisation System

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

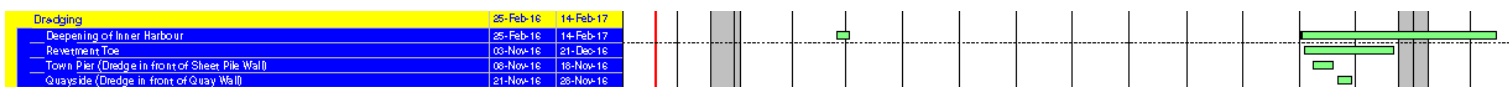


Figure 10: Screenshot of dredging programme from main programme

Quality and 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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