Appendix A; Marine Traffic Management Plan

Iona Breakwater, Slipways and Public Toilet Block Project

CONTROL SHEET	
Report Title	Appendix A; Marine Traffic Management Plan: Iona Breakwater, Slipways and Public Toilet Block Project
Document ID	FMD-MP-003 CEMP - Appendix A
Revision	1
Author	Foyle & Marine Dredging Ltd.
Date of Issue	05/03/2025
Client	Argyll and Bute Council
File Path	

Revision	Purpose Description	Originated	Reviewed	Approved	Date
0	Preliminary Issue	BC	TR	TR	05.03.2025
1	Amended with MCA/ABC Comments	TR	TR	SmcC	22.05.2025
2	Further Amendments	TR	TR	SMcC	26.05.2025

TABLE OF CONTENTS

1 Marine Traffic Management Plan Introduction

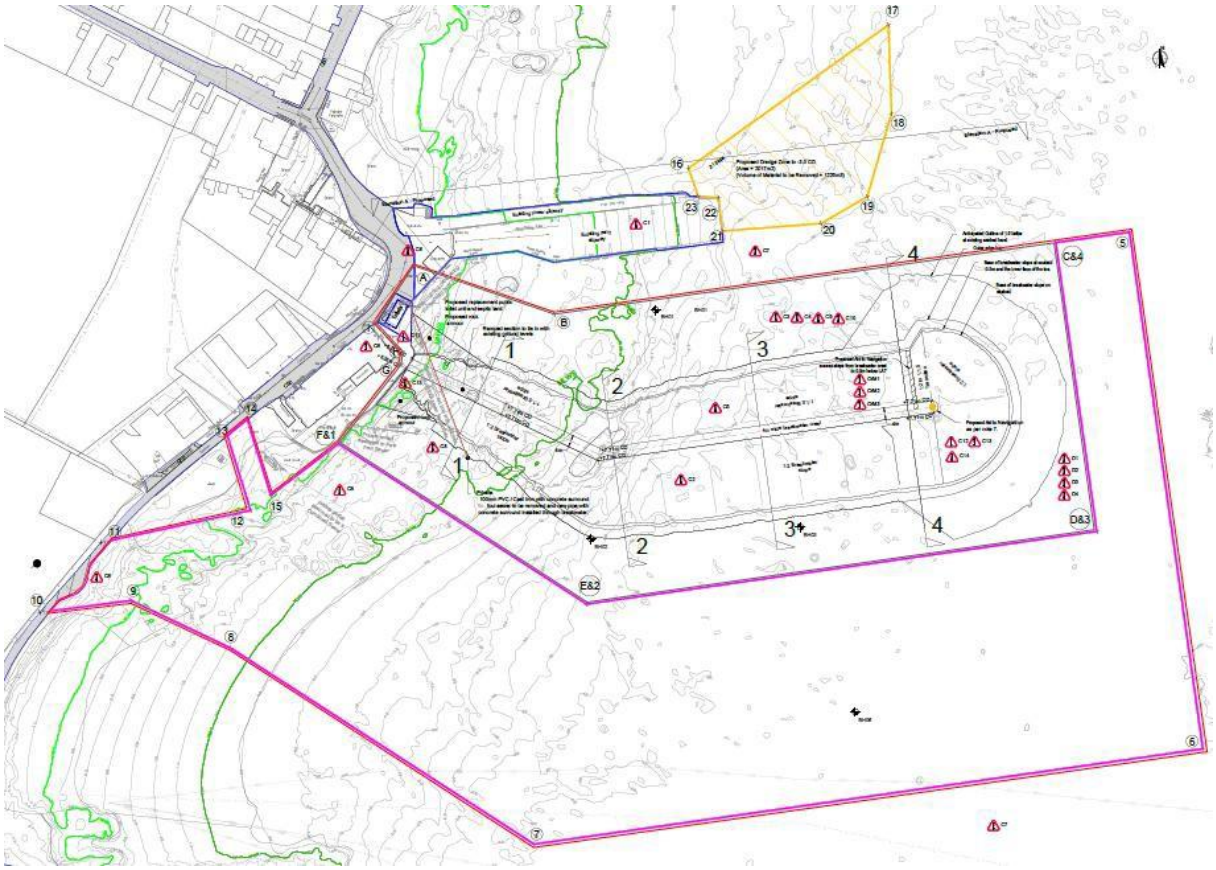
This MTMP has been specifically tailored for the Iona Breakwater, Slipways and Public Toilet Block Project. The project involves the construction of a new breakwater, repairs to existing slipways, and the replacement of a public toilet block at Iona Harbour, Isle of Iona, Scotland. This project is being undertaken by Foyle & Marine Dredging Ltd. for Argyll and Bute Council. Given the sensitive marine environment and the importance of the ferry service to the local community, this MTMP places particular emphasis on minimising disruption to ferry operations, the arrangements for the compound situated below the Mean High-Water Springs (MHWS), and the procedures for barge transshipment

1.1.1 Maintaining Ferry Service to Iona Slipway

As per construction drawing 0040-33_003H Proposed GA (red line), the site boundary, including the temporary working area, will be identified using marker buoys. The overall area measures 5.2ha, which includes the permanent works (breakwater) construction zone of 2.2ha.

The marker buoys will identify the most easterly & southerly lines of the site boundary, which will ensure that the construction plant operators see the boundary and can manoeuvre the equipment to stay within the zone. Particular attention will be given to the easterly boundary line as this is adjacent to the ferry route as it approaches/departs the Iona Slipway. For the position of a temporary maker buoys, FMD will consult and agree with Northern Lighthouse Board prior to installation.

For the dredging work zone to the northeast of the Slipway structure, it is planned to complete these works on a late evening shift (1830 to 2200hrs), which is after the last daily ferry sailing. The dredging works will take approximately 3 to 4 late evening shifts. Permit will be requested for out of hour works.



Snapshot of 0040-33_003H Proposed GA.

1.1.2 Compound Below Mean High Water Springs (MHWS)

As shown in the above snapshot, the MHWS line is shown in green, closest to the land and the compound below the MHSW is the site boundary lines seaward of the MHWS line.

The activities which will be undertaken within this compound are;

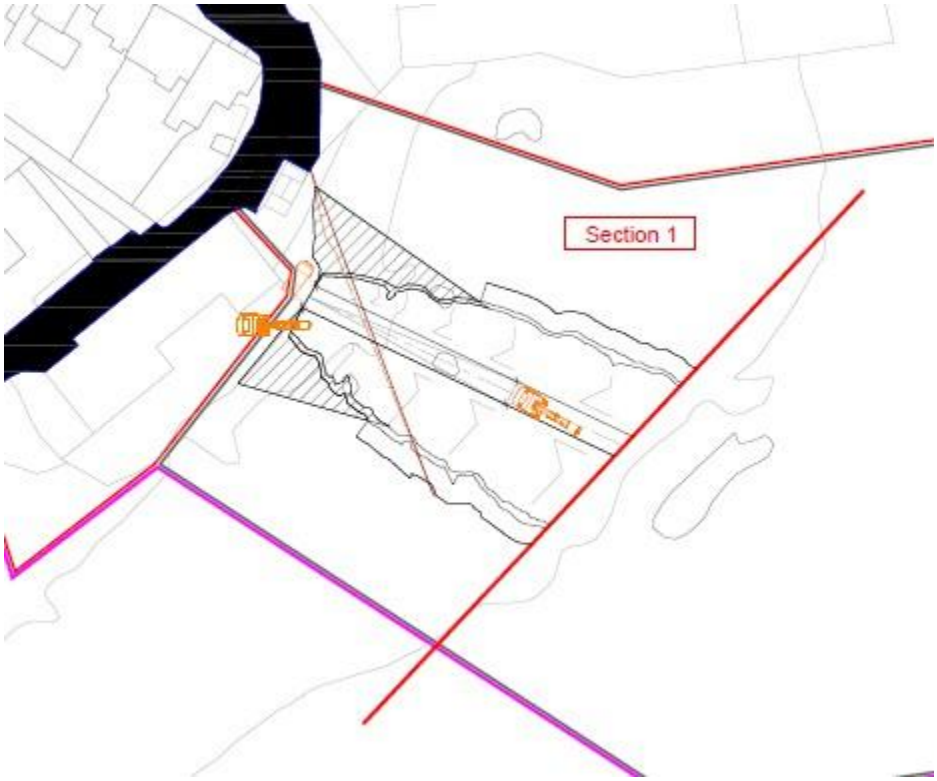
1) Dredging & rock breaking,
2) breakwater construction,
3) storage of rock materials,
4) marine equipment manoeuvring.

A bathymetric survey will be conducted prior to marine plant commencing the works, and this information will be installed into the primary dredging barge so the operator is aware of the existing seabed profile.

Dredging

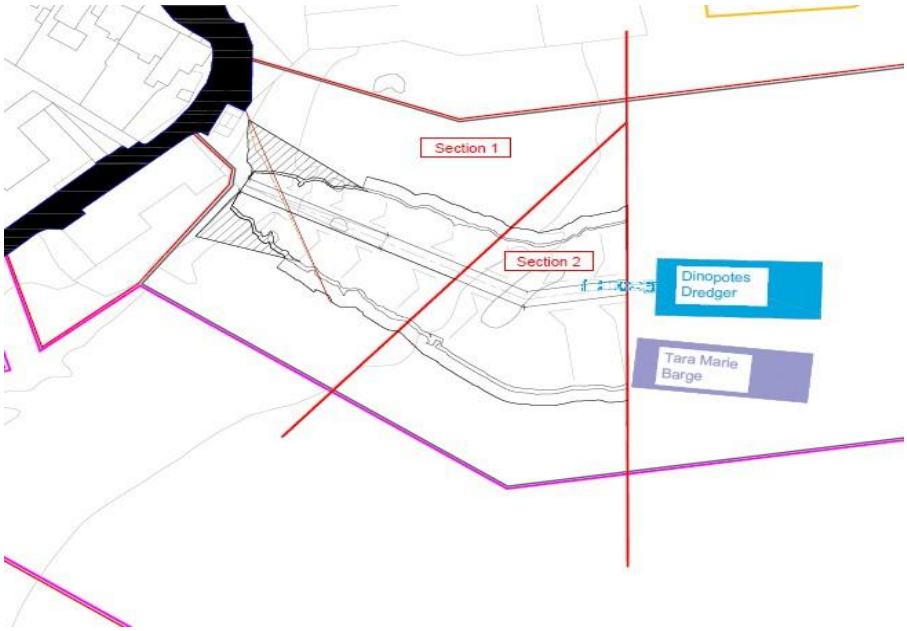
The intention is to complete the dredging works in Section 1 with terrestrial excavators. This material will be mostly rock material, and rock breaking will need to be undertaken. The lower part (towards the MLWS line) will be conducted on low tides, which will allow the long-reach excavator to safely

reach the area. All dredged materials will be recovered to land and loaded into an articulated dump truck. It will be stockpiled at our temporary site compound area to the south west corner of the site boundary.



Section 1;

Section 2 will be profiled by our primary dredger called Dinopotes. The breakwater cut/dredge design will be loaded to the dredger's dig system, and the operator will profile accordingly. The material from section 2 will be loaded into a split hopper barge and transported to the approved sea disposal site as per the licencing requirements. Once section 2 is dredged to level, this will allow safe access for the delivery and placement of rock for sections 1 & 2.



Section 2;

Breakwater Construction

Once sections 1 & 2 are cut/dredged to the design requirements, this will allow safe access for our marine equipment to deliver and off-load the rock materials for these sections.
The Marine equipment we are planning to use for the rock delivery and off-loading are;

- MV Mary – which is a self-offloading side-tipping carrier
- Forth Guardsman – which will self-off-load using an excavator onboard the deck of the vessel or can come alongside the dredger and it can off-load from the deck.

The vessel specifications are attached within this MTMP.
As the materials are off-loaded around the MLWS line (between section 1 & 2) our long reach excavator will recover them from this location and move them to their permanent location within the breakwater structure.

It is noted that a long-reach excavator will always be available from the land side/on top of the breakwater to receive and place the rocks to their final location.
Specifications for our selected land-based long reach excavators are attached within this MTMP.

The above process is repeated for the remaining sections 3 to 6 of the breakwater structure.

Storage of Rock Materials

The southern area of the breakwater structure, within the temporary site boundary is present of two reasons, 1) storage of rock materials (in water) & 2) plant manoeuvring.

It is our intention to deliver the rock materials to the site and place them directly into the breakwater structure; however, if the rock deliveries are being delivered to fast for the final placement activity, we will need to store the materials at this temporary storage area.

The licencing conditions only allow rock to be stored to a high of Mean High Water Springs level.

If this wet storage option is used, the rock material will be recovered at a later date by utilising our Forth Guardsman vessel, which will have an appropriate capacity excavator on board.

Marine Equipment Manoeuvring

Vessel manoeuvring within the temporary works zone will be in line with our navigational procedure and risk assessment.

1.1.3 Transhipment of Rock Materials to Barge/Vessel

As mentioned above in section 1.1.2, it is our intention to deliver all rock materials to the project with our MV Mary and Forth Guardsman vessels. These vessels are planned to run to & from the approved aggregate supplier.

In the event that the project's rock delivery needs to be accelerated or rock materials need to be scoured from a quarry location outside the UK, we may need to charter a self-discharging rock carrier vessel, which can transport rock cargo between 4000 and 7,000 tonnes per load.

As the self-discharging rock vessel will be to large to navigate through the Sound of Iona, it would need to stay positioned in deeper waters, as identified on diagrams provided within the MTMP document.

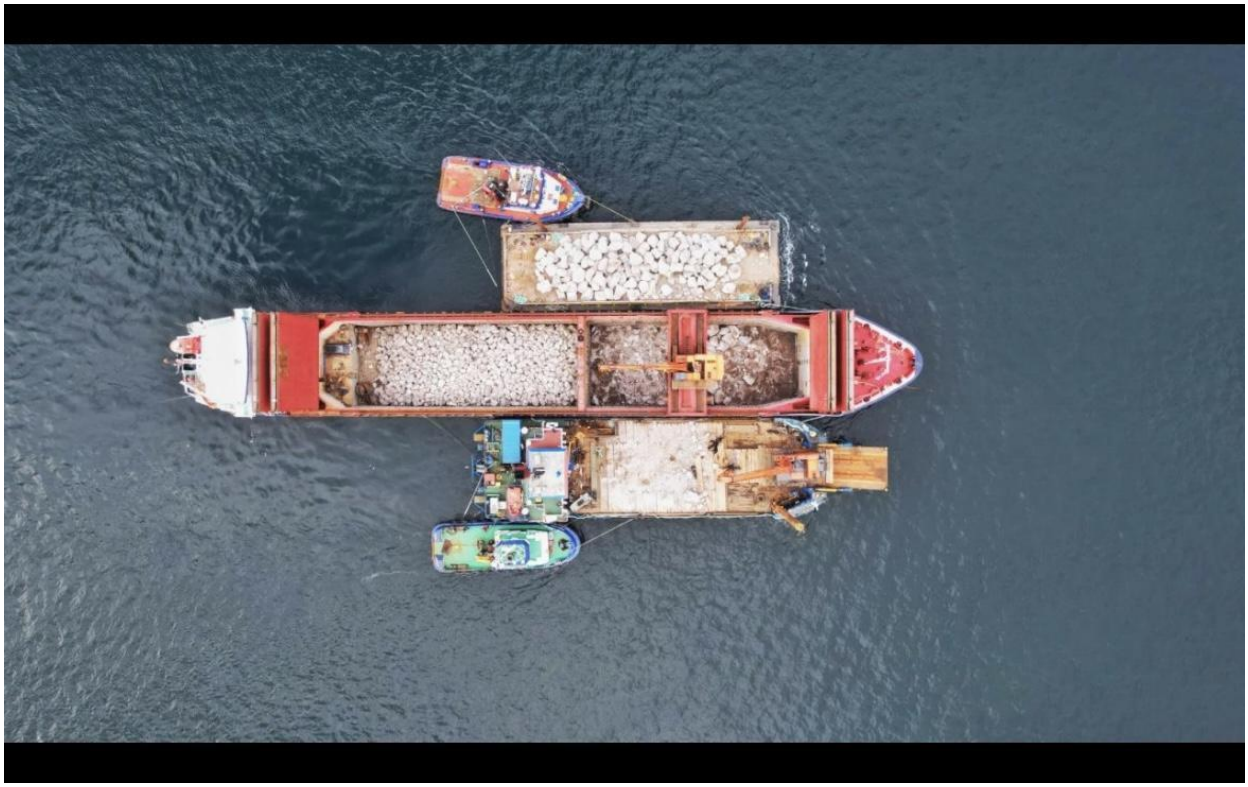
The process of transhipping the material from the carrier to FMD’s vessel will be highly dependent on sea state and weather conditions. All sea state and wind condition limitations would be assessed by the Masters involved in this operation, and a mutual agreement would be made on whether to proceed or not.

When the Rock Carrier has dropped anchor at either of the locations identified in this MTMP, FMD’s transfer vessel can come along either side of the carried and Moore against. Appropriate fendering would be arranged between the Carrier and transfer vessels.

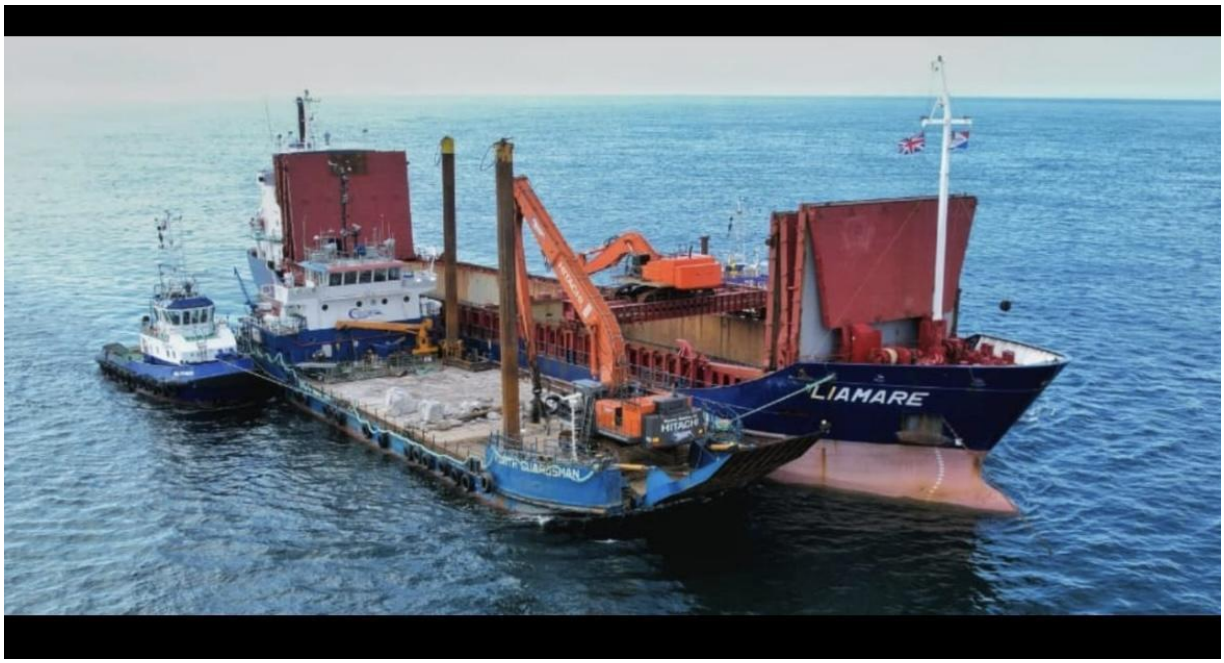
The Carriers excavator will discharge directly to the deck of the transfer vessels, usually at a rate between 200 to 300 tonnes per hour. The transfer vessels will shuttle between the site for off-loading and the Carrier until the load is completed.

Pictures are provided below which show the arrangements utilised on previous projects.

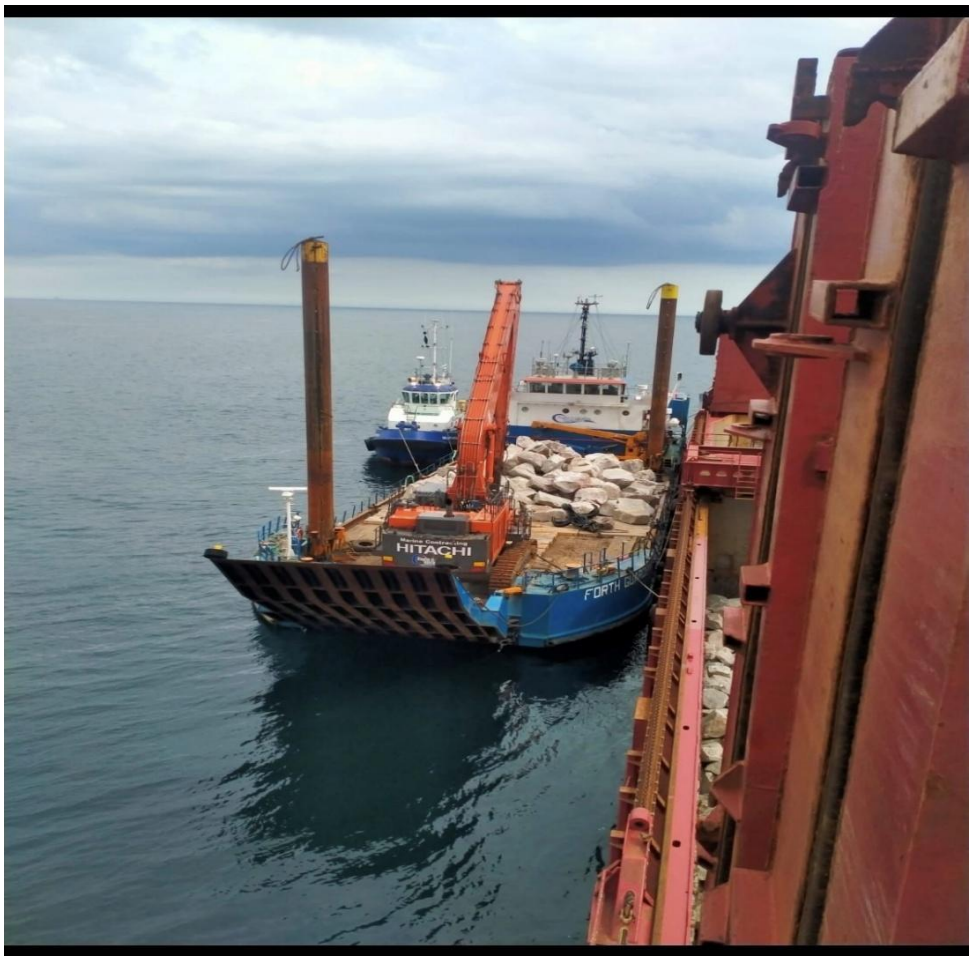
Tara Marie Barge loaded with Rock Alongside Rock Carrier



Areial Shot of Carrier, Forth Guardsman, Tara Marie, Chloe May & Willpower Tugs



Forth Guardsman getting loaded with Rock from Carrier vessel



Forth Guardsman Loaded with rock alongside Rock Carrier.

Forth Guardsman offloading Rock to Beach

1.1.4 Communications

At this project location, various interested parties & stakeholders use the existing slipway and waters surrounding the new breakwater structure. These parties are identified but not limited to the list below;

- Calmac Ferries
- Denholm Port Services
- Coastal – Connection
- Hebrides Cruises
- Scotland Sailing
- GAC UK – Invergordon
- The Majestic Line
- Hebridean Whale & Dolphin Trust
- Northern Light – UK
- Mull Charters

- Staffa Trips
- Cruise Ops – Inchcape Shipping Services
- Bessie Ellen – sailing
- Oban Yacht Charaters
- Basking Shark Scotland
- Sthildasea Adventures
- Steady Sailing
- Ground Coastguard Operational Centre – Stornoway
- Argyll & Bute Council
- UK Hydrographic Office
- Harbour Master – Oban
- Shaerwater Marine Sercives
- TSL Contractors
- Along with a handful of residents on the Island of Iona

All of the above contact emails have been provided to Foyle & Marine Dredging by the area Harbour Master.

It is Foyle & Marine Dredgings' intent to provide all listed interested parties/stakeholders with a quarterly update bulletin of the project status, so that they are aware of the progress and any changes to the project, which will include new risk identifications and mitigation measures.

A Notice to Mariners (NtM) will be circulated at the commencement of the works for this project to inform all interested parties/stakeholders (as listed above) of the commencement, and will include topics regarding

- Start dates
- Targeted completion dates
- Direct communication methods with the site management
- Vessel interaction, speed awareness and safe distances.
- Other topics as required.

Further Notices to Mariners will be circulated as required throughout the life of the project.

These NtM’s will be prepared and issued by Foyle & Marine Dredging Ltd, in consultation with Argyll & Bute Council.

1.1.5 Safety Vessel & Marine Liaison

For all marine operations, a safety vessel will be on site and deployed for each shift. The Dive team working on the Iona Slipway will have their own designated safety boat, and the Breakwater team will have their own safety boat.

FMD's Safety Boat on site at Iona.

The designated Marine Liaison Office on the project will always be the FMD Site Manager on shift. They will be aware of all project-related works & vessel movements on a daily basis, and will have the ability to communicate with the various existing users/organisations of the existing facilities, as and when required.

The goal is always to streamline user & project operations, resolve any issues which may occur and ensure that a positive relationship is maintained between all parties involved.

2 Document Control

An electronic copy of the MTMP will be maintained and updated, as required, to reflect any changes in circumstances, including changes in the construction phase.

It is the Project Manager's responsibility to ensure the personnel are aware of the location of the most recent version of this document.

Given the unique challenges of the Iona Breakwater project, including its remote location and sensitive environment, any updates to this MTMP will be promptly communicated to all relevant parties as required by the project specifications.

3 Plan Review

This MTMP is a live document and will be reviewed and updated where necessary to reflect the Plan of Construction, relevant legislation and policy, and any recommendations arising from site inspections, audits, meetings, or non-conformances.

Triggers for MTMP review include:

- Identification of new environmental risks;
- Changes in legislation and best practice environmental management standards; and
- Changes in the approach and methodology (including changes as a result of the construction process).

Any revisions to the MTMP will be approved by the Project Manager. In addition, all construction staff will be informed of any important changes to the MTMP during Toolbox Sessions. A hard copy of the CSEMP will be kept onsite at all times and at the Project Manager's Office, where it can be viewed upon request.
A record of review/updates to the MTMP will be maintained for audit purposes.

4 Appendix

1. **Project Navigational Risk Assessment (includes nautical charts for the project)**
2. **Vessel Navigational Risk Assessment**
3. **Overview Maps of General Marine Navigational Routes and Zones**
4. **Breakwater Construction Sequence Drawings**
5. **Vessel Information (not limited)**
6. **Bathymetric Survey of Works Area – Feb 2025**

1. Project Navigational Risk Assessment (includes nautical charts for the project)

Construction Hazard Scenarios

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
1	Accidents to personnel	Man overboard during dredge/construction works	Man overboard (MoB) during the dredge/construction works, MoB hits head on the vessel leading to drowning. No pollution, minor delay to construction works.	25	3	0	0	3	MoB recovered to shore and treated for cold water immersion. No pollution, minor delay to construction works.	5	1	0	0	1	4.40	Mod	1	Human error/fatigue - Vessel Personnel
																	3	Human error/fatigue - Construction personnel
																	7	Inadequate procedures in place onboard vessel
																	25	Communication failure - Personnel
																	26	Adverse weather conditions
																	37	Failure to comply with safe systems of work
																	59	Inadequate marine procedures - Project
																	76	Inadequate training/competence - Personnel

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
26	Communications equipment	To request shore assistance	5%	0%	3.98	Low	28	AIS/Radar coverage	All construction craft to carry AIS	0%	5%	2.73	Low
44	Safe systems of work (H&S)	specific to each of the construction activities	15%	0%			116	Weather forecasting	Monitored by construction personnel with weather limits for activities identified	10%	0%		
62	Emergency services equipment - shore side	Ambulance services	0%	10%			117	Operational weather limits	Maximum wind/wave limits for construction activities	15%	0%		
116	Weather forecasting	Monitored to indicate periods of adverse weather conditions	5%	0%			135	Safety boat	Available on site and appropriate for the wind and wave conditions in the area	0%	20%		
130	Vessel's emergency response procedures	Actions to be taken in a MoB emergency	5%	0%			136	Marine liaison officer	Central point of contact to coordinate activities	10%	5%		
140	Contractor risk assessment method statement (RAMS)	to be approved by the client before construction begins	15%	0%									

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
2	Accidents to personnel	Diving operations associated with the marine works	Dredge/construction vessel unaware of divers in the water. Diver caught in propellers or umbilical severed, loss of life, operations cease, national adverse publicity.	50	3	1	0	4	Dredge/Construction vessel approaches diving area and does not see 'A' flag. Vessel is warned of underwater operations and alters course. Divers taken out of water, disruption to activities.	5	0	0	0	1	4.90	Mod	1	Human error/fatigue - Vessel Personnel
																	3	Human error/fatigue - Construction personnel
																	6	Inadequate bridge resource management
																	23	Communication failure - Operational/procedural
																	28	Restricted visibility
																	37	Failure to comply with safe systems of work
																	59	Inadequate marine procedures - Project
																	87	Notice to Mariners failure to observe

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
26	Communications equipment	To warn vessels of ongoing diving operations	10%	0%	3.94	Low	28	AIS/Radar coverage	All construction craft to carry AIS	10%	0%	3.36	Low
44	Safe systems of work (H&S)	Required for permit/permission to work process	15%	0%			41	Notices to mariners	Issued on the Council website prior to diving operations	10%	0%		
97	Visual observation (clear line of sight)	Identification of 'A' flag	10%	0%			135	Safety boat	Available and manned during diving operations	20%	5%		
140	Contractor risk assessment method statement (RAMS)	to be approved by the client before construction begins	15%	0%			136	Marine liaison officer	Central point of contact to coordinate activities	10%	0%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
3	Allision	Dredge/construction plant impact with marine works during construction phase	Dredge/construction vessel slow speed impact with structures during the marine works dredge/construction phase, leading to minor damage to vessel, serious injury to crew, minor pollution (Tier 1). Delay to marine works.	25	2	4	2	2	Slow speed impact results in no damage to vessel hull, minor injury to crew, no pollution. Minor delay to marine works.	1	0	0	0	1	5.00	Sig	3	Human error/fatigue - Construction personnel
																	11	Vessel breakdown or malfunction
																	16	Unplanned interaction with recreational/fishing craft
																	20	Towing equipment failure
																	26	Adverse weather conditions
																	28	Restricted visibility
																	61	Incorrect assessment of tidal flow
																	110	Reduction in safe navigable space
																	112	Unplanned interaction with ferry/tour boat
																	113	Manoeuvre misjudged

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
21	Oil spill contingency plans	Covers all A&B Council facilities	0%	5%	5.00	Sig	28	AIS/Radar coverage	All construction craft to carry AIS	10%	0%	4.45	Mod
24	Tier 2 contractor	Provides personnel and equipment during oil spill response	0%	10%			57	Aids to navigation, Provision & maintenance of	Illumination of marine works at night	10%	0%		
130	Vessel's emergency response procedures	Actions to be taken in a contact/allision emergency	0%	5%			136	Marine liaison officer	Central point of contact to coordinate activities	10%	0%		
140	Contractor risk assessment method statement (RAMS)	Details the methods used to complete the construction	10%	0%			116	Weather forecasting	Monitored by construction personnel with weather limits for activities identified	10%	0%		
							117	Operational weather limits	Maximum wind/wave limits for construction activities	10%	0%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
4	Allision	Recreational or fishing vessel allision with marine works	Recreational or fishing vessel transiting past the marine works allides with temporary or part build structures. Impact causes vessel to be holed leading to flooding and the vessel sinking, multiple fatalities, delay to the construction programme, national adverse publicity, limited pollution (Tier 1).	25	4	3	2	4	Slow speed impact causes vessel damage, leading to minor injury to crew, no delay to construction programme, no pollution.	1	1	1	0	1	5.91	Sig	1	Human error/fatigue - Vessel Personnel
																	11	Vessel breakdown or malfunction
																	16	Unplanned interaction with recreational/fishing craft
																	26	Adverse weather conditions
																	28	Restricted visibility
																	34	Limited area for manoeuvring
																	36	Failure of Aid to Navigation (out of position/unlit)
																	61	Incorrect assessment of tidal flow
																	87	Notice to Mariners failure to observe
																	105	Navigation equipment failure
																	110	Reduction in safe navigable space
																	112	Unplanned interaction with ferry/tour boat
																	113	Manoeuvre misjudged

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
					5.91	Sig	41	Notices to mariners	Issued on the Council website containing details about construction activities	10%	0%	4.96	Mod
							57	Aids to navigation, Provision & maintenance of	Illumination of marine works at night	10%	0%		
							136	Marine liaison officer	Central point of contact to coordinate activities	5%	5%		
							36	Availability of pollution response equipment	Contractor to have tier 1 pollution equipment	0%	5%		
							48	Promulgation of information	Information on activities shared with local communities	10%	0%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
5	Allision	Ferry or tour boat allision with marine works	Ferry or Tour Boat transiting past the marine works allides with temporary or part build structures. Impact causes vessel to be holed leading to flooding, multiple fatalities, operations cease during investigation and recovery, pollution (Tier 2), international adverse publicity.	50	4	3	3	4	Slow speed impact causes minor vessel damage, leading to minor injury to crew/passengers, no delay to construction programme, no pollution, adverse publicity from passengers.	10	1	1	0	2	6.98	Hig	1	Human error/fatigue - Vessel Personnel
																	6	Inadequate bridge resource management
																	11	Vessel breakdown or malfunction
																	16	Unplanned interaction with recreational/fishing craft
																	26	Adverse weather conditions
																	28	Restricted visibility
																	36	Failure of Aid to Navigation (out of position/unlit)
																	61	Incorrect assessment of tidal flow
																	72	Failure to follow passage plan
																	103	Excessive vessel speed
																	110	Reduction in safe navigable space
																	111	Scheduling conflicts
																	113	Manoeuvre misjudged

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
26	Communications equipment		0%	5%	5.69	Sig	10	Passage planning	CFL ferry to update passage planning based on the works	5%	0%	4.70	Mod
21	Oil spill contingency plans		0%	5%			36	Availability of pollution response equipment	Contractor to have tier 1 pollution equipment	0%	10%		
95	Standing Orders/SOPs		5%	0%			41	Notices to mariners	Issued on the Council website containing details about construction activities	5%	0%		
130	Vessel's emergency response procedures		0%	5%			57	Aids to navigation, Provision & maintenance of	Illumination of marine works at night	10%	0%		
							136	Marine liaison officer	Central point of contact to coordinate activities and provide safety information	0%	5%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
6	Collision	Dredge/construction plant collision with recreational/fishing vessel	Collision of a recreational/fishing craft with a dredge/construction vessel. Vessels do not identify each other and do not take avoiding action. Recreational/fishing vessel holed and sinks, multiple fatalities, small scale pollution (Tier 1), construction activities cease until investigation and recovery of vessel complete.	25	4	4	2	4	Vessels take avoiding action resulting in minor collision. Recreational/fishing vessel receives minor damage, no damage to dredge/construction plant, minor injuries, no pollution. No delay to construction activities.	10	1	1	0	0	5.31	Sig	1	Human error/fatigue - Vessel Personnel
																	3	Human error/fatigue - Construction personnel
																	6	Inadequate bridge resource management
																	7	Inadequate procedures in place onboard vessel
																	11	Vessel breakdown or malfunction
																	16	Unplanned interaction with recreational/fishing craft
																	25	Communication failure - Personnel
																	26	Adverse weather conditions
																	28	Restricted visibility
																	72	Failure to follow passage plan
																	76	Inadequate training/competence - Personnel
																	82	AIS failure
																	87	Notice to Mariners failure to observe
																	103	Excessive vessel speed
																	105	Navigation equipment failure
																	110	Reduction in safe navigable space

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
62	Emergency services equipment - shore side	Ambulance services	0%	5%	5.31	Sig	28	AIS/Radar coverage	All dredge/construction vessels, including barges to carry AIS	15%	0%	4.06	Mod
130	Vessel's emergency response procedures	Actions to be taken following a collision	0%	5%			41	Notices to mariners	Issued on the Council website containing details about construction activities	10%	0%		
140	Contractor risk assessment method statement (RAMS)	Details the risks and mitigations for specific construction activities	10%	0%			48	Promulgation of information	Information on activities shared with local communities	10%	0%		
							135	Safety boat	Available and manned during construction activities	0%	10%		
							136	Marine liaison officer	Central point of contact to coordinate activities and provide safety information	10%	5%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
7	Collision	Dredge/construction plant collision with ferry/tour boat	Collision of a ferry/tour boat with a dredge/construction vessel when manoeuvring. Damage to both vessels requires survey and repair, minor injuries from impact, no pollution, delays to construction activities.	25	1	3	0	2	Minor collision at slow speed during manoeuvring results in minor damage to vessels. No injuries, no pollution, no delay to activities.	5	0	1	0	0	3.95	Low	1	Human error/fatigue - Vessel Personnel
																	3	Human error/fatigue - Construction personnel
																	6	Inadequate bridge resource management
																	7	Inadequate procedures in place onboard vessel
																	11	Vessel breakdown or malfunction
																	23	Communication failure - Operational/procedural
																	26	Adverse weather conditions
																	28	Restricted visibility
																	34	Limited area for manoeuvring
																	61	Incorrect assessment of tidal flow
																	68	Interaction with passing vessel
																	72	Failure to follow passage plan
																	82	AIS failure
																	87	Notice to Mariners failure to observe
																	103	Excessive vessel speed
																	107	Equipment failure (bridge)
																	110	Reduction in safe navigable space
																	111	Scheduling conflicts
																	113	Manoeuvre misjudged

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
62	Emergency services equipment - shore side	Ambulance services	5%	0%	3.82	Low	1	Operational planning	Dredging scheduled to avoid ferry timings	5%	0%	3.26	Low
130	Vessel's emergency response procedures	Actions to be taken after a collision	0%	5%			10	Passage planning	CFL ferry to update passage planning based on the works	5%	0%		
140	Contractor risk assessment method statement (RAMS)	Details the risks and mitigations for specific construction activities	10%	0%			28	AIS/Radar coverage	All dredge/construction vessels, including barges to carry AIS (A or B).	10%	0%		
							41	Notices to mariners	Issued on the Council website containing details about construction activities	10%	0%		
							48	Promulgation of information	Information on activities shared with local communities	10%	0%		
							136	Marine liaison officer	To provide safety information to vessels navigating in the area and to local authorities	10%	5%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
8	Collision	Tug and tow collision with recreational/fishing vessel	Tug and tow (transporting material by barge) on transit in the Sound of Iona collision with recreational/fishing vessel. Recreational/fishing vessel holed and sinks in deep water. Multiple fatalities, pollution (Tier 2). Disruption to marine works meaning temporary suspension of operations.	50	4	4	3	4	Vessels make contact whilst taking avoiding action, glancing blow resulting in minor damage to both vessels. Vessels proceed to nearest suitable berth to assess damage. Minor injury to crew, no pollution, minor disruption to operations.	10	1	1	0	1	5.87	Sig	1	Human error/fatigue - Vessel Personnel
																	7	Inadequate procedures in place onboard vessel
																	11	Vessel breakdown or malfunction
																	20	Towing equipment failure
																	23	Communication failure - Operational/procedural
																	26	Adverse weather conditions
																	28	Restricted visibility
																	72	Failure to follow passage plan
																	76	Inadequate training/competence - Personnel
																	82	AIS failure

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
10	Passage planning	Required by the SOLAS convention	10%	0%	5.16	Sig	28	AIS/Radar coverage	All dredge/construction vessels, including barges to carry AIS (A or B).	10%	0%	4.98	Mod
62	Emergency services equipment - shore side	Ambulance services	0%	5%									
130	Vessel's emergency response procedures	Actions to be taken after a collision	0%	5%									

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
9	Collision	Tug and tow collision with ferry/tour boat	Tug and tow (transporting material by barge) on transit in the Sound of Iona collision with ferry/tour boat. Ferry/tour boat (carrying passengers) holed and sinks in deep water. Loss of life, pollution (Tier 2). Disruption to marine works meaning temporary suspension of operations, and international adverse publicity.	50	4	4	3	4	Collision occurs in deep water within Sound of Iona. Vessels make contact whilst taking avoiding action, glancing blow resulting in minor damage to both vessels. Vessels proceed to nearest suitable berth to assess damage. Minor injury to crew/passengers, no pollution, no disruption to operations.	10	1	1	0	2	5.84	Sig	1	Human error/fatigue - Vessel Personnel
																	6	Inadequate bridge resource management
																	7	Inadequate procedures in place onboard vessel
																	11	Vessel breakdown or malfunction
																	16	Unplanned interaction with recreational/fishing craft
																	20	Towing equipment failure
																	23	Communication failure - Operational/procedural
																	25	Communication failure - Personnel
																	26	Adverse weather conditions
																	28	Restricted visibility
																	68	Interaction with passing vessel
																	72	Failure to follow passage plan
																	76	Inadequate training/competence - Personnel
																	82	AIS failure
																	112	Unplanned interaction with ferry/tour boat

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
10	Passage planning	Required by the SOLAS convention	10%	0%	5.78	Sig	28	AIS/Radar coverage	All dredge/construction vessels, including barges to carry AIS (A or B).	20%	0%	5.23	Sig
							41	Notices to mariners	Issued on the Council website containing details about construction activities	10%	0%		
							136	Marine liaison officer	To provide safety information to vessels navigating in the area and to local authorities	5%	0%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
10	Fire/Explosion	Dredge/construction plant on-board fire	Fire on-board the dredge/construction vessel. Fire makes the vessel inoperative, multiple fatalities, minor pollution (Tier 1) from fire fighting products and run off, vessel laid up or removed from service. Disruption to the marine works.	50	4	4	2	3	Fire is contained by ship's crew, resulting in localised damage to vessel on-board equipment. Minor injury, no pollution, vessel operational capability unaffected. Minor disruption to the marine works.	10	1	1	0	0	5.23	Sig	3	Human error/fatigue - Construction personnel
																	7	Inadequate procedures in place onboard vessel
																	8	Fire/Explosion
																	11	Vessel breakdown or malfunction

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
62	Emergency services equipment - shore side	Fire and ambulance services	0%	10%	4.72	Mod	136	Marine liaison officer	To coordinate emergency response with shore side resources	0%	5%	4.50	Mod
95	Standing Orders/SOPs	Vessel's procedures for undertaking operations	10%	0%									
130	Vessel's emergency response procedures	Actions to be taken for a fire	0%	10%									
140	Contractor risk assessment method statement (RAMS)	Details the risks and mitigations for specific construction activities	5%	0%									

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
11	Flooding	Dredger flooding whilst engaged in operations	Ingress of water due to weld failure, sea valve failure, hatches/ramps not secure, affects vessel stability leading to vessel sinking. Loss of life, pollution (Tier 2), navigation hazard disrupting operations, major adverse publicity.	50	4	4	3	4	Ingress of water controlled before vessel stability affected. Operations delayed until investigation/repairs completed.	10	0	2	0	2	6.25	Hig	1	Human error/fatigue - Vessel Personnel
																	7	Inadequate procedures in place onboard vessel
																	9	Loss of watertight integrity
																	11	Vessel breakdown or malfunction
																	25	Communication failure - Personnel
																	57	Vessel Ramps or Hatches not secure
																	75	Inadequate maintenance/inspection

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
95	Standing Orders/SOPs	Standard vessel operating procedures	5%	5%	5.66	Sig	136	Marine liaison officer	To coordinate emergency response with shore side resources	0%	5%	5.44	Sig
118	Vessel maintenance	Maintenance schedule part of the vessel SMS	15%	10%									
119	Vessel inspection/survey	Port and flag state inspections and survey by classification society	15%	10%									

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
12	Grounding	Dredger grounding whilst engaged in operations	Dredger grounds whilst dredging. Drag head and pipe damaged, hull holed causing ingress of water, pollution (Tier 2), disruption to marine works and adverse publicity.	25	0	2	0	3	Dredger grounds, minor damage to drag head and pipe, plus damage to vessel hull from contact with the seabed. Vessel requires hull survey causing delay to marine works.	5	0	1	0	1	3.89	Low	1	Human error/fatigue - Vessel Personnel
																	7	Inadequate procedures in place onboard vessel
																	9	Loss of watertight integrity
																	11	Vessel breakdown or malfunction
																	14	Vessel has unreported defect
																	25	Communication failure - Personnel
																	61	Incorrect assessment of tidal flow

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
21	Oil spill contingency plans	Covers all A&B Council facilities	0%	5%	5.35	Sig	36	Availability of pollution response equipment	Contractor to have tier 1 pollution equipment	0%	15%	4.73	Mod
24	Tier 2 contractor	Provides personnel and equipment during oil spill response	0%	10%			136	Marine liaison officer	Coordinating activities for the construction	0%	5%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
13	Hazardous substance accidents	Accidental spill during marine works	Pollution from marine incident or accidental spill during construction phase leading to Tier 2 response. For example, split hose or pipe on construction craft. No effect to other nearby vessels.	5	0	0	3	3	Pollution from accidental spill during construction phase leading to Tier 1 response. For example, from refuelling machinery on marine plant such as generators, compressors or cranes. Contractors pollution response equipment deployed. No effect to other nearby vessels.	1	0	0	2	1	5.35	Sig	1	Human error/fatigue - Vessel Personnel
																	5	Human error/fatigue - Marine personnel
																	7	Inadequate procedures in place onboard vessel
																	11	Vessel breakdown or malfunction
																	25	Communication failure - Personnel
																	37	Failure to comply with safe systems of work
																	59	Inadequate marine procedures - Project
																	75	Inadequate maintenance/inspection
																	76	Inadequate training/competence - Personnel

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
14	Machinery related accidents	Heavy lift failure, or failure of lifting gear	Failure during unloading of barge with load slung. Load released and lands on vessel deck causing major damage to either vessel or failure during transfer of heavy cargo from vessel to construction site. Single fatality, minor pollution (Tier 1), operations cease pending recovery and investigation.	25	3	3	2	4	Failure of lifting equipment causes automatic shutoff. Delay to operations while repairs are made.	1	0	0	0	1	5.86	Sig	1	Human error/fatigue - Vessel Personnel
																	5	Human error/fatigue - Marine personnel
																	7	Inadequate procedures in place onboard vessel
																	11	Vessel breakdown or malfunction
																	23	Communication failure - Operational/procedural
																	37	Failure to comply with safe systems of work
																	69	Port Equipment (inc craft) mechanical breakdown/system malfunction
																	75	Inadequate maintenance/inspection

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
62	Emergency services equipment - shore side	Ambulance services	0%	5%	5.19	Sig	116	Weather forecasting	Monitoring of weather conditions	5%	0%	4.93	Mod
140	Contractor risk assessment method statement (RAMS)	Details the risks and mitigations for specific construction activities	10%	0%			117	Operational weather limits	Maximum wind/wave limits for construction activities	10%	0%		
							136	Marine liaison officer	Coordinating activities for the construction	5%	0%		

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
15	Payload related accidents	Incorrect payload distribution/loading affects vessel stability	Rock barge is loaded/unloaded incorrectly, causing instability and capsize of vessel. Loss of vessel, loss of life if barge manned, pollution (Tier 1), navigation hazard created by the sunk vessel, delays to marine construction programme.	25	3	3	2	3	Barge takes on list during unloading. Operations cease and barge unloaded causing delays.	1	0	0	0	1	6.05	Hig	1	Human error/fatigue - Vessel Personnel
																	5	Human error/fatigue - Marine personnel
																	26	Adverse weather conditions
																	37	Failure to comply with safe systems of work
																	59	Inadequate marine procedures - Project
																	76	Inadequate training/competence - Personnel

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
62	Emergency services equipment - shore side		0%	10%	4.72	Mod	121	Loading/unloading plan	Detailing the order to load/unload and position of cargo to maintain stability	15%	0%	4.46	Mod
44	Safe systems of work (H&S)		10%	10%			136	Marine liaison officer	Coordinating activities for the construction	5%	0%		
140	Contractor risk assessment method statement (RAMS)	Details the risks and mitigations for specific construction activities	10%	0%									

Operational Hazard Scenarios

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
1	Allision	Ferry or tour boat with the breakwater	Ferry or tour boat makes heavy contact with the breakwater on approach. Hull punctured leading to extensive flooding and vessel sinking. Multiple fatalities, pollution (Tier 2), national adverse publicity. Operations cease until wreck can be recovered.	50	4	4	3	4	Ferry or tour boat makes contact with breakwater on approach at slow speed causing minor damage to vessel hull. Minor injuries to passengers and crew, no pollution, vessel out of service until survey and repairs made.	10	1	3	0	1	7.11	Hig	1	Human error/fatigue - Vessel Personnel
																	6	Inadequate bridge resource management
																	7	Inadequate procedures in place onboard vessel
																	11	Vessel breakdown or malfunction
																	16	Unplanned interaction with recreational/fishing craft
																	26	Adverse weather conditions
																	28	Restricted visibility
																	34	Limited area for manoeuvring
																	36	Failure of Aid to Navigation (out of position/unlit)
																	61	Incorrect assessment of tidal flow
																	72	Failure to follow passage plan
																	103	Excessive vessel speed
																	110	Reduction in safe navigable space
																	113	Manoeuvre misjudged

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
10	Passage planning	Including all relevant information on the area	5%	0%	6.25	Hig	10	Passage planning	Update to CalMac passage plan	10%	0%	4.96	Mod
21	Oil spill contingency plans	Covers all A&B Council facilities	0%	5%			14	Update ALRS and Sailing Directions	Updates to include new structures	10%	0%		
24	Tier 2 contractor	Provides personnel and equipment during oil spill response	0%	10%			70	Marine Safety Management System	Review the A&B Council MSMS to cover operations at Iona and Fionnphort	0%	5%		
26	Communications equipment	Ability to request shoreside assistance	5%	5%			112	Review of available powers	To determine whether further powers are required to ensure navigational safety	10%	10%		
57	Aids to navigation, Provision & maintenance of	AtoN have been proposed for the breakwater, to be confirmed by NLB	15%	0%			122	Shore side facility maintenance programme	Schedule of maintenance including AtoN	10%	0%		
62	Emergency services equipment - shore side	Ambulance service	0%	10%									
116	Weather forecasting	Advance warning gained from available internet resources and metocean forecasts	5%	0%									
130	Vessel's emergency response procedures	Procedure for responding to a contact/allision	0%	10%									

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence				Most Likely Scenario	Years between likely occurrence	Consequence				Inherent Risk	Inherent Risk	Cause ID	Causes
					People	Property	Planet	Port			People	Property	Planet	Port				
2	Allision	Recreational or fishing vessel allision with the breakwater.	Recreational or fishing vessel makes heavy impact with the breakwater. Impact causes vessel to be holed leading to serious injury to crew, and significant damage to the vessel. Limited pollution (Tier 1), vessel stranded on breakwater resulting in delays to operations until vessel recovered.	50	2	2	2	3	Recreational or fishing vessel makes contact with the breakwater at slow speed causing vessel damage, leading to minor injury to crew, no pollution.	5	1	1	0	1	5.26	Sig	1	Human error/fatigue - Vessel Personnel
																	11	Vessel breakdown or malfunction
																	16	Unplanned interaction with recreational/fishing craft
																	26	Adverse weather conditions
																	28	Restricted visibility
																	31	Failure to observe standing notices
																	33	Increased vessel use
																	34	Limited area for manoeuvring
																	36	Failure of Aid to Navigation (out of position/unlit)
																	55	Incapacitated master (drinks/drugs)
																	61	Incorrect assessment of tidal flow
																	76	Inadequate training/competence - Personnel
																	103	Excessive vessel speed
																	110	Reduction in safe navigable space
																	113	Manoeuvre misjudged

Control ID	Embedded Controls: Control	Embedded Controls: Comment	Embedded Controls: Likelihood Reduction	Embedded Controls: Consequence Reduction	Current Risk	Current Risk	Control ID	Further Applicable Controls: Control	Further Applicable Controls: Comment	Further Applicable Controls: Likelihood Reduction	Further Applicable Controls: Consequence Reduction	Final Risk	Final Risk
21	Oil spill contingency plans	Covers all A&B Council facilities	0%	5%	4.27	Mod	14	Update ALRS and Sailing Directions	Updates to include new structures	10%	0%	3.29	Low
24	Tier 2 contractor	Provides personnel and equipment during oil spill response	0%	10%			70	Marine Safety Management System	Review the A&B Council MSMS to cover operations at Iona and Fionnphort	0%	5%		
57	Aids to navigation, Provision & maintenance of	AtoN have been proposed for the breakwater, to be confirmed by NLB	15%	0%			112	Review of available powers	To determine whether further powers are required to ensure navigational safety	10%	10%		
62	Emergency services equipment - shore side	Ambulance service	0%	10%			122	Shore side facility maintenance programme	Schedule of maintenance including AtoN	10%	0%		
116	Weather forecasting	Advance warning gained from available internet resources and metocean forecasts	5%	0%									

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence: People	Consequence: Property	Consequence: Planet	Consequence: Port	Most Likely Scenario	Years between likely occurrence	Consequence: People	Consequence: Property	Consequence: Planet	Consequence: Port	Inherent Risk	Inherent Risk	Cause ID	Causes
3	Grounding	Any vessel	Vessel grounds on materials dropped during the construction of the breakwater. Rock penetrates the hull resulting in flooding, vessel requires survey and repair, potential for minor pollution (Tier 1).	25	0	2	2	3	Breakwater construction, dredge works and changes to localised flow patterns lead to depth changes post-construction (scour, deposit, accidental material left from construction works). Grounding of a vessel on accumulated sediment, delay to operations as vessels requires checks for damage.	5	0	1	0	1	5.12	Sig	1	Human error/fatigue - Vessel Personnel
																	3	Human error/fatigue - Construction personnel
																	6	Inadequate bridge resource management
																	7	Inadequate procedures in place onboard vessel
																	25	Communication failure - Personnel
																	26	Adverse weather conditions
																	33	Increased vessel use
																	34	Limited area for manoeuvring
																	61	Incorrect assessment of tidal flow
																	80	Human error
																	86	Competence
																	104	Inadequate surveying
																	110	Reduction in safe navigable space
																	113	Manoeuvre misjudged

Control ID	Embedded Controls: Control	Embedded Controls: Comment	Embedded Controls: Likelihood Reduction	Embedded Controls: Consequence Reduction	Current Risk	Current Risk	Control ID	Further Applicable Controls: Control	Further Applicable Controls: Comment	Further Applicable Controls: Likelihood Reduction	Further Applicable Controls: Consequence Reduction	Final Risk	Final Risk
10	Passage planning	Including all relevant information on the area and contingency planning for ferry/tour boats	10%	0%	4.20	Mod	10	Passage planning	Update to CalMac passage plan	5%	0%	3.43	Low
11	Dredging programme	To be influenced by hydrographic survey	10%	5%			17	Hydrographic surveying program	Data to be provided to the UKHO for use in navigational charts	10%	0%		
21	Oil spill contingency plans	Covers all A&B Council facilities	0%	5%			70	Marine Safety Management System	Review the A&B Council MSMS to cover operations at Iona and Fionnphort	0%	5%		
24	Tier 2 contractor	Provides personnel and equipment during oil spill response	0%	10%			112	Review of available powers	To determine whether further powers are required to ensure navigational safety	10%	10%		
130	Vessel's emergency response procedures	Actions to be taken during a grounding emergency	0%	10%									

Assessment Number	Hazard Category	Hazard Scenario Title	Worst Credible Scenario	Years between worst occurrence	Consequence: People	Consequence: Property	Consequence: Planet	Consequence: Port	Most Likely Scenario	Years between likely occurrence	Consequence: People	Consequence: Property	Consequence: Planet	Consequence: Port	Inherent Risk	Inherent Risk	Cause ID	Causes
4	Other	Small non-powered craft, displaced by breakwater	Displacement of small non-powered craft (e.g. kayaks) into deeper water due to Breakwater presence and loss of line-of-sight for tour boat or ferry transiting across the Sound of Iona. Non-powered craft holed and sinks, loss of life, no pollution. Adverse publicity.	25	4	1	0	4	Collision of a small non-powered craft (kayaks, paddleboards, etc) into deeper water due to Breakwater presence and loss of line-of-sight for tour boat or ferry transiting across the Sound of Iona. Capsize of small non-powered craft. Minor injury, no pollution.	5	1	1	0	1	4.99	Mod	16	Unplanned interaction with recreational/fishing craft
																	28	Restricted visibility
																	33	Increased vessel use
																	34	Limited area for manoeuvring
																	80	Human error
																	86	Competence
																	110	Reduction in safe navigable space

Control ID	Embedded Controls				Current Risk	Current Risk	Control ID	Further Applicable Controls				Final Risk	Final Risk
	Control	Comment	Likelihood Reduction	Consequence Reduction				Control	Comment	Likelihood Reduction	Consequence Reduction		
					4.99	Mod	14	Update ALRS and Sailing Directions	Updates to include new structures	10%	0%	4.13	Mod
							70	Marine Safety Management System	Review the A&B Council MSMS to cover operations at Iona and Fionnphort	0%	5%		
							112	Review of available powers	To determine whether further powers are required to ensure navigational safety	10%	10%		

Publications and Charts used in this Navigational Risk Assessment

ADMIRALTY CHARTS

.

1. *ADMIRALTY Chart - 2617 Sound of Iona*

- Directly covers the area around **Iona**
- Critical for departure, with detailed bathymetry.

2. *ADMIRALTY Chart - 2169 Approaches to the Firth of Lorn*

- Covers central part of the route near **Oban**, **Kerrera**, and approaches to the **Sound of Mull**.

3 ADMIRALTY Chart - 2171 Sound of Mull and Approaches

- Essential chart for navigating through the **Sound of Mull**, which is a likely route toward Iona.

4. *ADMIRALTY Chart - 2389 Loch Linnhe, Southern Part*

- Covers Approach to Glensanda

.

ADMIRALTY PUBLICATIONS

1. Admiralty Sailing Directions – NP66: West Coast of Scotland Pilot, Volume 1

- Covers the entire region from the Mull of Kintyre to Ardnamurchan.
- Contains **narrative guidance** for navigating through:
  - Loch Linnhe
  - Sound of Mull
  - Firth of Lorn
  - Sound of Iona
- Includes tidal information, navigation hazards, recommended anchorages, and VHF channels.

2. NP5011 – Admiralty Symbols and Abbreviations Used on Paper Charts

- Useful for interpreting chart symbols, especially if using new or unfamiliar charts.

3. ADMIRALTY Tidal Stream Atlas - NP218 North Coast of Ireland and West Coast of Scotland

- For detailed tide predictions at **Oban**, **Tobermory**, and **Iona** (nearest standard/secondary ports).

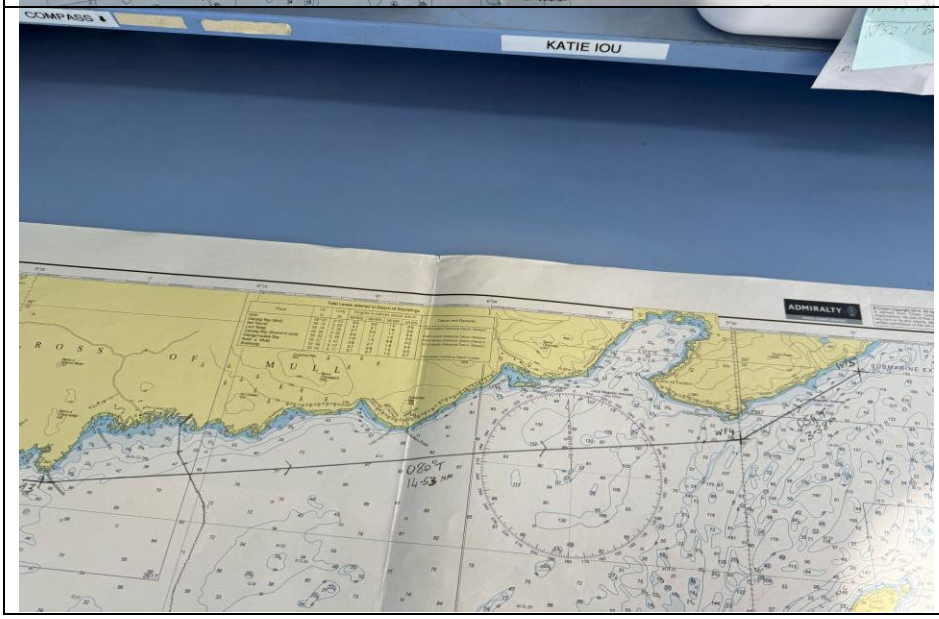
ROUTE OVERVIEW

Start: Iona Sound anchorage (approx. 56°19.83'N, 6°23.5'W)
End: Glensanda Quarry (approx. 56°34.10'N, 5°31.92'W)
Distance: ~45–55 NM depending on routing
Passage Time: ~5–7 hours (at 8–10 knots, accounting for tides)

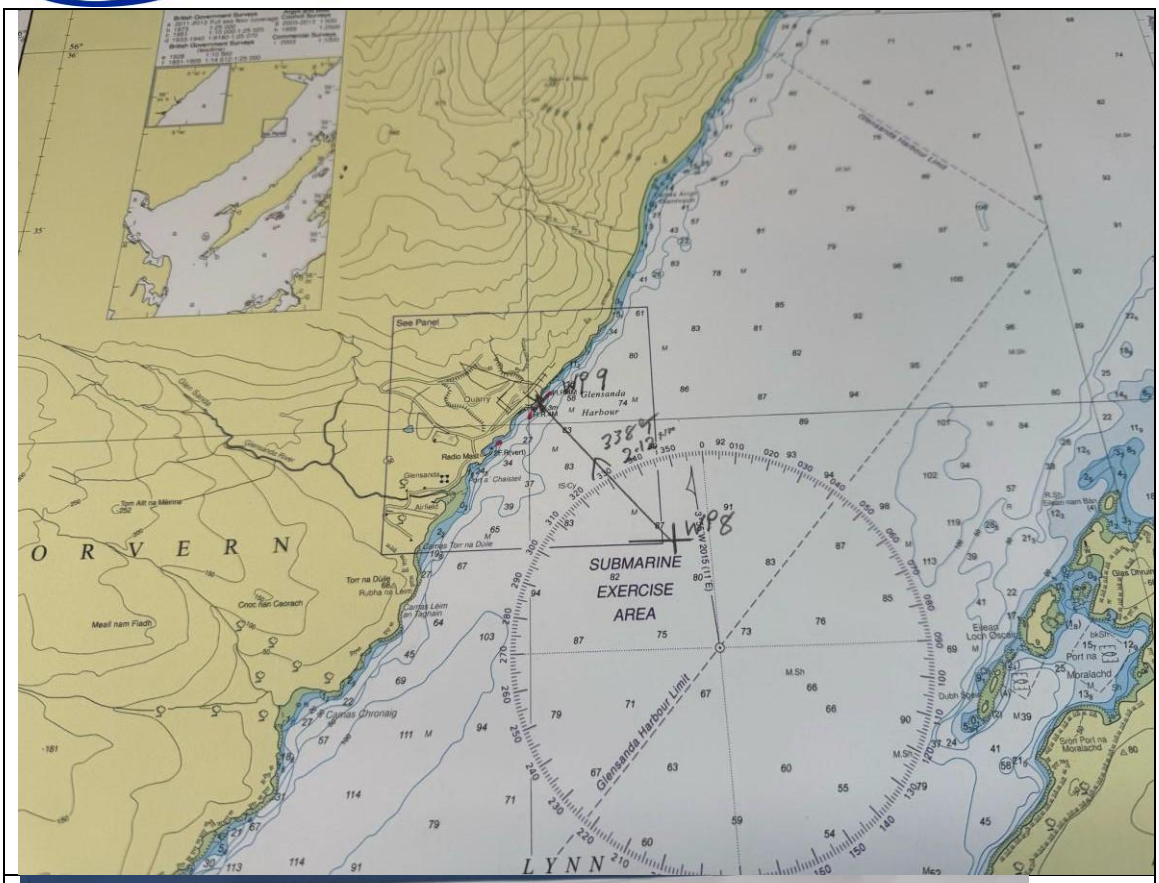
RECOMMENDED WAYPOINTS (WGS84)

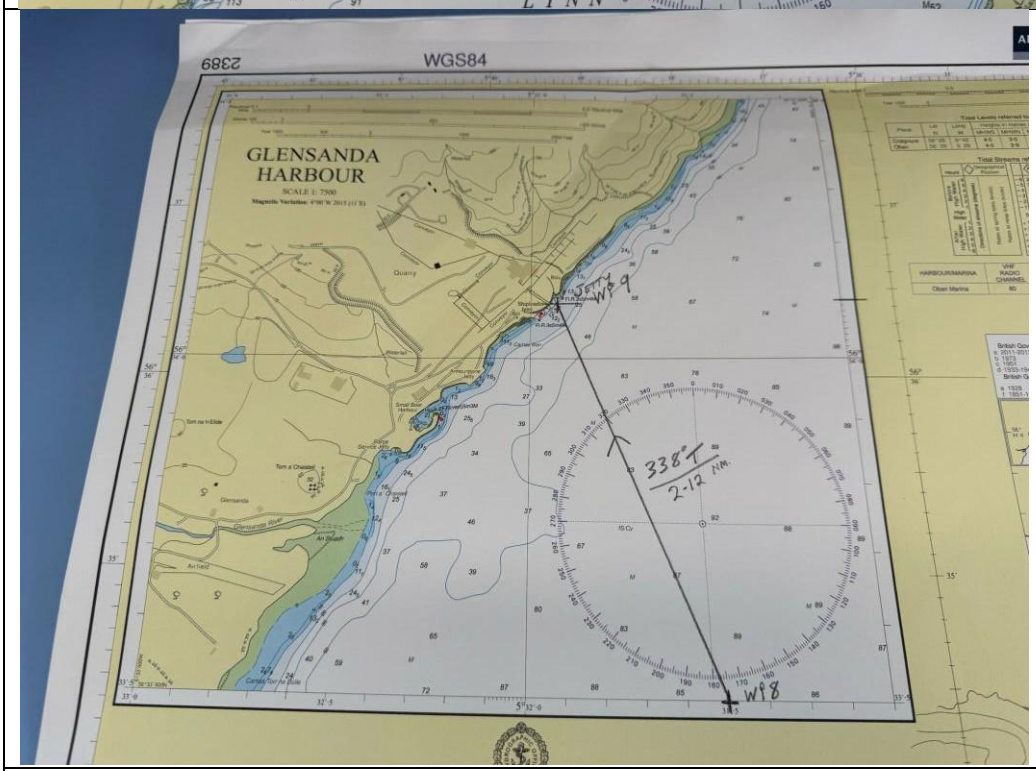
NO		WAYPOINT		CO	DIST	DTG	REMARKS
0		56° 19.83' n	006° 23.50' w			46.40	iona sliway
1		56° 19.70' n	006° 23.20' w	128.0°	0.2 nm	46.2nm	wp1
2		56° 16.30' n	006° 26.00' w	204.0°	3.75nm	42.45nm	wp2
3		56° 15.52' n	006° 16.00' w	098.0°	5.62 nm	36.83nm	wp3
4		56° 15.18' n	005° 50.00' w	080.0°	14.53 nm	22.30nm	wp4
5		56° 20.00' n	005° 45.00' w	054.0°	3.38 nm	18.92nm	wp5
6		56° 20.34' n	005° 38.00' w	049.0°	5.25 nm	13.67nm	wp6
7		56° 30.00' n	005° 38.00' w	000.0°	6.65 nm	7.02nm	wp7
8		56° 33.50' n	005° 31.50' w	044.0°	4.9 nm	2.12nm	wp8
9		56° 34.10' n	005° 31.92' w	338.0°	2.12nm	00nm	wp 9glensanda

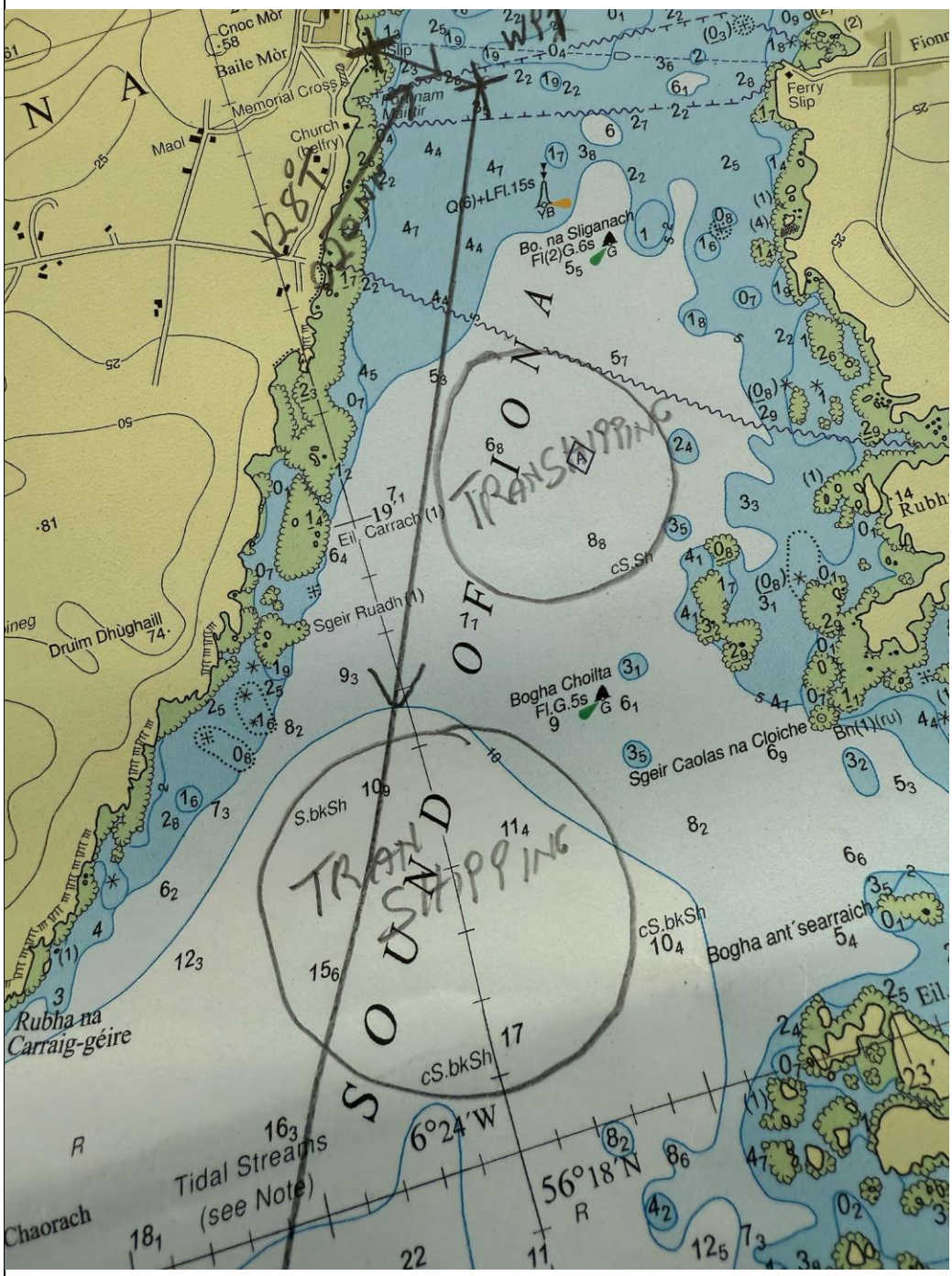
CHART PASSAGE PLAN




WP8
044°T
WP7
Explosives Dumping Ground (disused)
000°T
6.65NM
WP6
049°T
5.25NM
WP5
SUBMARINE EXERCISE AREA
FIRTH OF LORN
LYNN OF MORVERN
LISMORE ISLAND
KERRERA
MULL
Duart Point
Black's Memorial Tr
Craignure
Lochdon
RADIO TOWER
LOCH DON
WHITE HOUSE
Grass Point
LOCH SPELVE
Pier Croggan
Rubha nan Sailthean
Local Magnetic Anomaly (see Note)
Overfalls (see Note)
Eilean Musdile
Glensanda Harbour
Loch Uisg
SOUND OF INSH
Càrn Bàn
Cruach Ardura
Dubh Sgeir
Bach Island
Ardencaple Bay


WP9
WP8
338°T
2·12 NM
SUBMARINE
EXERCISE
AREA
Glensanda Harbour Limit
ORVERN
LYNN
Glensanda
Harbour


WGS84
2389
GLENSANDA
HARBOUR
WP9
WP8
338°T
2·12 NM



Southern Transshipment Zone Shown only for the moment (as northern isn't intended on being used)

HAZARDS TO CONSIDER

- **Tidal Streams:**
  - Strongest in the **Sound of Mull** (~2–3 knots). Time passage with **favourable flow** if possible (generally NE flood, SW ebb).
  - Watch for **overfalls** near Lismore and Mull headlands.
- **Ferry Traffic:**
  - Busy ferry routes near **Oban**, **Craignure**, and **Tobermory**. Monitor **VHF Ch. 16 and 12**.
  - AIS in operation
- **Weather Exposure:**
-
  - Western exit of Sound of Mull can be rough in westerlies. Check **inshore forecast** and **sea state**.
  - Sheltered anchorages at **Tobermory** and **Loch Aline** available if needed.
- **Rocky Areas & Shallows:**
  - Avoid **Treshnish Isles** and watch for drying rocks near **Iona Sound**.

TIDAL PLANNING

Location	Reference Port	Max Rate (Springs)	Notes
Sound of Mull	Oban	2–3 knots	Ebb SW, flood NE
Iona Sound	Oban	~1.5 knots	Use slack or rising tide for entry
Loch Linnhe	Corpach	2–2.5 knots	Streams vary near narrows

---

1. Project Scope and Location

Location specifics:

Navigational Route

The journey from Iona to Glensanda primarily follows the Inner Hebrides' sheltered channels:

- **Sound of Iona**: Separates Iona from the Isle of Mull; a narrow passage with strong tidal currents.

- **Firth of Lorn**: A broad expanse of water east of Mull, leading into Loch Linnhe.

- **Loch Linnhe**: A long sea loch extending northeast towards Glensanda, providing access to the quarry's deep-water port.

This route is favoured for its relative shelter compared to open Atlantic passages, making it suitable for vessels employed in the project

Proximity to Ports and Harbours

Several key ports and harbours are situated along or near the planned route

- **Oban**: Located on the mainland opposite Mull, Oban is a major ferry terminal and commercial port, serving as a hub for maritime traffic in the region.
- **Tobermory**: Situated on Mull's northern coast, this harbour accommodates fishing vessels and yachts, offering anchorage and resupply options.
- **Craignure**: Also on Mull, Craignure serves as a primary ferry terminal connecting to Oban, facilitating passenger and vehicle transport.
- **Glensanda Quarry Port**: A private deep-water facility designed for the export of granite aggregates, capable of accommodating large bulk carriers.
-

Shipping Lanes

The route encompasses several established fairways and shipping lanes:

- **Sound of Mull**: A designated navigational channel with marked fairways, facilitating safe passage for vessels transiting between the Inner Hebrides and mainland ports.
- **Firth of Lorn**: Recognized as a major maritime corridor, it supports significant commercial and ferry traffic, with buoyed channels and navigational aids.
- **Loch Linnhe**: Features marked channels leading to Glensanda, with considerations for deep-draft vessels accessing the quarry's port facilities.

These waterways are monitored and maintained to ensure navigational safety, with regular updates provided through Notices to Mariners.

Tidal Streams and Currents

Masters must account for strong tidal streams and currents along this route:

- **Sound of Iona**: Experiences swift tidal flows that can reach up to 6 knots during spring tides, necessitating precise timing for safe passage.

- **Sound of Mull**: Characterized by complex tidal patterns, including eddies and overfalls, especially near headlands and constricted areas.
- **Loch Linnhe**: Tidal streams can be strong, particularly near the Corran Narrows, affecting vessel maneuverability and requiring careful planning. With Glensanda being at the bottom of Loch Linnhe, these should not be an issue, only if in need to shelter

Navigational Considerations

Key factors for safe navigation between Iona and Glensanda include:

- **Tidal Planning**: Utilizing tidal stream atlases and local tide tables to schedule transits during favourable conditions.
- **Navigational Aids**: Relying on buoys, beacons, and lighthouses marking channels and hazards along the route.
- **Weather Monitoring**: Keeping abreast of weather forecasts, as sudden changes can significantly impact sea conditions and visibility.
- **Communication**: Maintaining contact with local maritime authorities and adhering to established reporting protocols when transiting busy or restricted areas.- Whilst the route planned has not mandatory reporting point, FMD Masters will actively communicate with local authorities when underway as required

By integrating these considerations into voyage planning, Masters can enhance safety and efficiency when navigating between the Isle of Iona and Glensanda Quarry.

- **Project duration**

- The duration of the project is inherently variable and subject to several external factors that can impact progress. Weather conditions, particularly in exposed coastal environments, play a significant role; high winds, heavy seas, or poor visibility can halt marine operations, delay material deliveries, or prevent safe access to the site. Mechanical breakdowns of critical equipment, such as barges, cranes, or dredgers, can also cause unforeseen stoppages, especially in remote locations where repair services or spare parts may not be immediately available. Additionally, the project timeline may be influenced by seasonal considerations, such as shorter daylight hours, increased storm activity in winter months, or environmental restrictions related to wildlife breeding or migration periods. As such, the project schedule must include adequate contingency allowances and remain flexible to accommodate these uncertainties. FMD have allowed a minimum of 14 months to complete the works in two summer phase if required

---

2. Stakeholder Engagement

- Harbour authorities and port operators – CALMAC, CMAL,OBAN, GLENSANDA

- Mariners and shipping companies - CALMAC
- Local fishing and recreational boat operators
- Environmental regulators (e.g., Marine Management Organisation, EPA)

---

3. Baseline Navigational Assessment

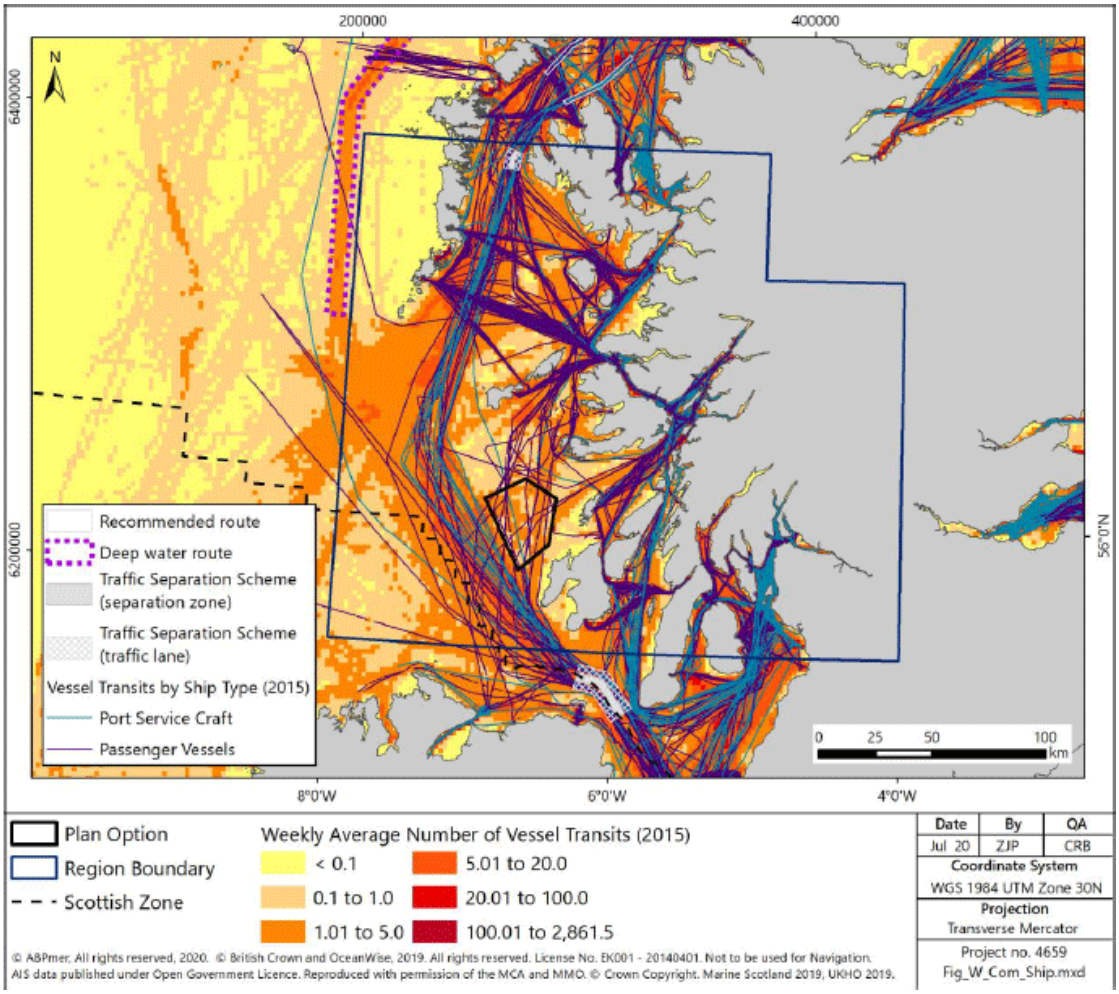
- **Traffic density and patterns:** Review AIS data and VTS records.

Vessel Traffic Density and Patterns

- **Glensanda Quarry Operations**: Glensanda Quarry is a significant contributor to vessel traffic in the area. Since its inception in 1986, it has facilitated the loading of approximately 2,600 ships, with current operations averaging 150–200 vessels annually.
- **Sound of Mull**: The Sound of Mull, a key passage along this route, experiences a particularly high density of marine traffic. This includes commercial shipping, ferries, and fishing vessels, making it one of the busier maritime areas in the region .
- **Loch Linnhe**: Leading up to Glensanda, Loch Linnhe serves as a conduit for vessels accessing the quarry's deep-water port. The loch accommodates a mix of vessel types, including bulk carriers associated with quarry operations and other commercial traffic.

Navigational Considerations

- **Tidal Streams**: Master for instance, the Sound of Iona experiences swift tidal flows that can reach up to 6 knots during spring tides, necessitating precise timing for safe passage. Similarly, the Sound of Mull is characterized by complex tidal patterns, including eddies and overfalls, especially near headlands and constricted areas. Loch Linnhe also presents strong tidal streams, particularly near the Corran Narrows, affecting vessel maneuverability and requiring careful planning.
- **Weather Conditions**: The region is subject to variable weather conditions, including high winds and reduced visibility, which can impact navigation and scheduling. Mariners should consult up-to-date weather forecasts and plan accordingly.
- **Navigational Aids**: The route is equipped with various navigational aids, such as buoys, beacons, and lighthouses, to assist in safe passage. Mariners should ensure they are familiar with these aids and maintain vigilance, especially in areas with high traffic density.



Types of Vessels Using the Sound of Mull, Loch Linnhe and Sea Area around Iona

1. Commercial Bulk Carriers

- **Size**: Up to Panamax size (~65,000 DWT), though most are smaller.
- **Draft**: Typically 7–12 meters.
- **Maneuverability**: Moderate; many require tugs or careful piloting, especially near Glensanda Quarry.
- **Frequency**: ~150–200 vessels annually for Glensanda alone.
- **Purpose**: Transport granite aggregate from Glensanda Quarry to UK and European ports.

2. Caledonian MacBrayne (CalMac) Ferries

- **Routes**: Oban–Craignure (Mull), Tobermory–Kilchoan, and other inner Hebridean routes.
- **Size**: ~40–100 meters in length.
- **Draft**: 2.5–4.5 meters.
- **Maneuverability**: High – equipped with bow/stern thrusters and/or azimuth drives.
- **Frequency**: Multiple daily sailings, year-round.
- **Purpose**: Passenger and vehicle transport.

3. Fishing Vessels

- **Size**: 10–25 meters.
- **Draft**: 2–4 meters.
- **Maneuverability**: High, suited for inshore operations.
- **Frequency**: Daily presence, especially around Tobermory and Oban.
- **Purpose**: Shellfish and whitefish fishing.

4. Tourist and Recreational Vessels

- **Types**: Yachts, RIBs (Rigid Inflatable Boats), cruise tenders, wildlife tours.
- **Size**: 5–20 meters.
- **Draft**: <2 meters.
- **Maneuverability**: Very high.
- **Frequency**: Seasonal (spring to autumn), heavy during summer months.
- **Purpose**: Leisure cruising, wildlife viewing, charter.

5. Cruise Ships (Occasional)

- **Size**: Up to 200 meters (usually anchoring near Oban or Tobermory).
- **Draft**: 6–8 meters.
- **Maneuverability**: Moderate; may use tugs or dynamic positioning.
- **Frequency**: Seasonal and infrequent, but increasing in summer months.
- **Purpose**: Tourism; passengers come ashore via tender

- **Existing navigational aids and systems:** Buoys, lights, radar, VTS coverage.

Area	Buoyage & Lights	Radar/AIS	VTS/Communications
Sound of Mull	Well-marked, sector lights	Radar reflectors, AIS AtoN	No VTS; VHF 16/12
Loch Linnhe	Fully buoyed, lighted	AIS, radar reflectors	No VTS; VHF 16/74
Iona Area	Minimal, mostly ferry lights	Visual/radar only	Local comms; VHF 16

4. Hazard Identification (HAZID)

- **Physical obstructions:** Temporary (e.g., jack-up barges) or permanent (e.g., new piers).

Type	Location	Description	Notes
Permanent	Glensanda Quarry	Large loading jetty and restricted zones	Access restricted, keep clear
Permanent	Iona (Fionnphort)	Small ferry pier	Local ferry operations only
Permanent	Mull (Lochaline, etc.)	Small piers/jetties	Generally minor obstructions
Temporary	Near Glensanda/Channels	Jack-up barges, construction platforms	Marked; check Notices to Mariners
Temporary	Various	Survey vessels anchoring	Temporary and marked

- There have been no major recent announcements of new permanent marine construction or piers between Iona and Glensanda that would significantly obstruct navigation.
- Any new infrastructure, such as upgrades to Glensanda quarry facilities, will be published via **UK Hydrographic Office Notices to Mariners** or local maritime authorities.

- **Restricted channels or turning areas**

Location	Restrictions & Notes	Turning Area Availability
Between Iona & Mull	Narrow channels; rocks/shallow areas	Limited; sheltered bays or open water near Fionnphort
Sound of Mull	Narrow, strong tidal streams, no formal TSS	Some wider areas near Tobermory/Salen for turns
Loch Linnhe near Glensanda	Restricted zones near quarry jetty; industrial operations	Turning usually offshore in deeper water; port control advised

- Use up-to-date **Admiralty Charts** and local tide/current tables.
- Contact **Glensanda Port Control** for permission and guidance near the quarry.

- Avoid tight maneuvers in narrow channels during peak tidal streams.
- Plan turning in wider sections or sheltered bays well ahead.
- Local pilotage or experienced local guidance recommended for large vessels.

- **Weather and sea conditions:** Wind, waves, fog, tidal streams.

Condition	Iona	Sound of Mull	Loch Linnhe
Wind	Moderate, variable (SW/W)	Wind funneling; gusts likely	Generally lighter winds
Waves	Moderate (1–2m), rough in storms	Choppy/confused seas; small waves	Sheltered, small waves (<0.5m)
Fog	Common morning fog	Occasional dense fog	Occasional, usually less dense
Tidal Streams	Moderate currents	Strong tidal streams (2-3+ knots)	

Crew fatigue is a critical safety hazard in marine and construction environments, posing significant risks to both personnel and operational integrity. Fatigue impairs cognitive functions such as decision-making, reaction time, and situational awareness—skills essential for safe navigation, machinery operation, and emergency response. Physically, it reduces coordination, strength, and stamina, increasing the likelihood of accidents such as slips, trips, falls, or mishandling of equipment.

In prolonged operations—especially those involving night shifts, extended hours, or adverse weather conditions—crew members may suffer from chronic sleep deprivation. This can lead to **microsleeps** (brief lapses in attention), poor communication, and errors in judgment that can cause collisions, groundings, or serious injuries.

---

5. Risk Analysis and Evaluation

- **Likelihood vs. consequence:** Use qualitative or semi-quantitative methods (e.g., risk matrix).
- **Vessel collision risk:** With fixed structures or other vessels.
- **Grounding risk:** Due to changes in depth, temporary exclusion zones.
- **Environmental risk:** Oil spills, harm to marine life from accidents.

6. Control Measures and Mitigation

- **Navigational aids:** Temporary buoys, lighting, marking construction zones.
- **Exclusion zones and Notices to Mariners**
- **Vessel traffic control measures:** Pilotage, tug escort, speed restrictions.
- **Procedural controls:** Permit to work systems, communication protocols, marine safety plans.

---

7. Emergency Response Planning

- **Contingency plans:** Collisions, oil spill response, search and rescue.
- **Coordination with emergency services:** Coastguard, marine police, pollution response teams.

---

8. Regulatory and Legal Compliance

- **National maritime regulations**
- **IMO guidelines and IALA standards**
- **Marine risk assessments required by authorities (e.g., UK MCA, Irish MSO)**

---

9. Monitoring and Review

- **Ongoing risk assessment:** Adjustments as the project progresses.
- **Post-incident analysis and near-miss reporting**

Incident Reporting Procedure

1. Purpose

To ensure all incidents, near-misses, and hazards are reported, investigated, and managed in a manner that prevents recurrence, promotes safety, and complies with applicable regulations.

2. Scope

This procedure applies to all employees, contractors, and visitors working on or near Foyle and Marine Dredging operations.

3. Definitions

- **Incident:** Any unplanned event that results in injury, illness, or damage to property or the environment.
- **Near-Miss:** An unplanned event that did not result in injury or damage but had the potential to do so.
- **Hazard:** A condition or practice with the potential to cause harm.

4. Steps for Reporting

1. **Immediate Action**
    - Ensure the safety of all individuals involved.
    - If required, administer first aid or call emergency services.
    - Control the scene to prevent further harm.
2. **Notification**
    - Notify your line manager or supervisor immediately.
    - For critical incidents, contact the Health and Safety (H&S) Officer directly.
3. **Document the Incident**
    - Complete the Incident Report Form
    - Provide clear and factual information:
        - Date, time, and location of the incident.
        - Individuals involved or affected.
        - Detailed description of the event.
        - Witnesses (if any).
4. **Submission of Report**
    - Submit the completed Incident Report Form to the H&S Department within 24 hours of the incident.

5. Investigation Process

1. **Initial Review**
    - The H&S Officer acknowledges receipt of the report.
    - A preliminary review determines the level of investigation required.
2. **Detailed Investigation**
    - Appoint an investigation team if necessary.
    - Collect evidence: photos, equipment inspections, and witness statements.
    - Analyze the root cause using appropriate tools (e.g., 5 Whys, Fishbone Diagram).
3. **Corrective and Preventative Actions (CAPA)**
    - Develop an action plan to address the root cause and prevent recurrence.
    - Assign responsibilities and deadlines.
4. **Close-Out**
    - Communicate findings and CAPA to all relevant parties.
    - Update risk assessments and safety policies if needed.

6. Reporting and Follow-Up

1. **Internal Communication**
   - Summarize key findings during weekly safety briefings.
2. **Regulatory Reporting**
   - If applicable, report the incident to regulatory authorities (e.g., HSE in the UK).
3. **Follow-Up**
   - Monitor the effectiveness of CAPA through regular audits and inspections.

7. Training

All employees and contractors must undergo incident reporting training during onboarding and annually thereafter.

By following this procedure, Foyle and Marine Dredging can foster a safer working environment and maintain compliance with safety standards

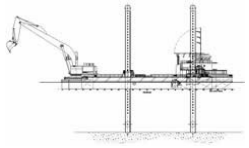
- **Audit and inspection:** By internal teams and authorities.

---

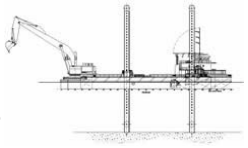
10. Documentation and Reporting

- **Navigational Risk Assessment (NRA) report**: Include methodology, findings, risk matrix, and mitigation strategy.
- **Review logs and revision history**

2. Vessel Navigational Risk Assessment



Foyle & Marine Dredging



Marine Dredging Contractor

VESSEL NAVIGATION RISK ASSESSMENT

Project Name: Iona Breakwater

Location: Isle of Iona, Scotland

Date: 24/02/2025

Document Owner(s)					**Organization Role**
Foyle & Marine Dredging					Main Contractor & Self Preforming Marine contractor
Client					**Project/Organization Role**
Argyll & Bute Council					Client
Revision	**Prepared By**	**Date**	**Author**	**Date**	**Change Description**
Rev 01	-	24/02/2025	Tomás Rooney		

The propose of this risk assessment statement is to provide details and guidance for a safe method of working for all site personal involved with the IONA BREAKWATER Project during navigation in and out of the site location.

Site conditions may vary over the duration of the project, there for this method statement may require amendment during the course for works, to accommodate current working conditions.

All Foyle & Marine Dredging (FMD) employees will undergo a site-specific induction as they join the project. FMD personnel will also read and sign this risk assessment & the marine method statement before commencing works.

In each case where a Risk is relevant to the task the relevant word should be placed into the box adjacent to the risk. The 1st box is for "Likelihood of it happening" is it "Almost Certain, Likely, Possible or Unlikely". Then in the 2nd box the "Outcome of Risk" column the words to be used are "No Injury, 1st Aid, Lost Time and Serious Injury". As can be seen in the table the "Result" is the "Likelihood x Risk". After the controls are put in place the same process should be completed to get the "Revised Result".	**Likelihood of it happening**	**Outcome of Risk**			
		No Injury	**1st Aid**	**Lost Time**	**Serious Injury**
	Almost Certain	*Medium*	*Medium*	*High*	*High*
	Likely	*Low*	*Medium*	*Medium*	*High*
	Possible	*Controlled*	*Low*	*Medium*	*Medium*
	Unlikely	*Controlled*	*Controlled*	*Low*	*Medium*

Hazard	**Likelihood**	**Outcome**	**Result**	**Risk Reduction Methods**	**Revised Likelihood**	**Revised Outcome**	**Revised Result**
1. Collision with another vessel;	**Possible**	**Serious Injury**	*High*	- Display correct day marks and lights at night - All Masters to prepare passage plans for voyages. - Dual Watch on VHF CH 16 and CH 14 with Pilots CH 09 communication and restrictions to be adhered to. - VTS Controlled over 20m in length - All planned vessel movements outside the project work area to be communicated to the harbour master in advance of works taking place.	**Unlikely**	**Serious Injury**	*Medium*

Hazard	Likelihood	Outcome	Result	Risk Reduction Methods	Revised Likelihood	Revised Outcome	Revised Result
				- The vessel master shall notify the harbour master and other harbour users on VHF channel _ prior to leaving and entering the harbour and await approval if necessary and ___for disposal operations - Follow the harbour masters instructions regarding exit and entry slots. - Vessel master/pilots to carry up to date professional qualifications and be deemed competent to carry out works by Foyle & Marine Dredging supervisor. - Vessel masters to keep vigilant for other harbour users and maintain CH14 & CH16 radio watch. - Crew toolbox talks regarding vessel movements and securing arrangements to be carried out on a regular basis. - Radio commination to be maintained between tug master and dredging operator. - FMD to Maintain 2-4 knots speed whilst within the works area, unless instructed by HM to adjust speed to suit conditions in the Port. All other traffic under the control of the Harbour Master to enforce the above vessel speed limits. - HM to issue a notice to mariners prior to works commencing to avoid congestion adjacent to the work site.			

Hazard	Likelihood	Outcome	Result	Risk Reduction Methods	Revised Likelihood	Revised Outcome	Revised Result
2. Collision with a fixed object including harbour walls	**Possible**	**Serious Injury**	*High*	- Only up to date admiralty charts shall be used and hard and soft copies maintained on board. - Up to date charts onboard and passage plans marked with waypoints onboard - Tug master to ensure that proper lookout is kept in close proximity to works. - Reduced Speed in low visibility - Vessel fendering to be sufficient for vessel type - Radar in operation in low vis conditions - Master not to rely on ECDIS only, visual navigation and no autopilot	**Unlikely**	**Serious Injury**	*Medium*
3. Collision with sea bed	**Possible**	**Serious Injury**	*High*	- Up to date charts onboard and passage plans marked with waypoints onboard - Shoal areas marked on chart - Echosounder to be in operation at all times - FMD to Maintain 2-4 knots speed whilst in Harbour, unless instructed by HM to adjust speed to suit conditions in the Port.	**Unlikely**	**Serious Injury**	*Medium*
	Possible		*High*		**Possible**	**Loss time**	*Medium*

Hazard	Likelihood	Outcome	Result	Risk Reduction Methods	Revised Likelihood	Revised Outcome	Revised Result
4. Congested Harbour; and	**Possible**	**Serious Injury**	*Medium*	- Listening watch on Ch 14 - Request permission from VTS to move - Obey all instructions from HM - Relevant Notice to Mariners to be posted in wheelhouse - Keep appropriate lookout at all times - Display correct day marks and lights at night - FMD to Maintain 2-4 knots speed whilst in Harbour, unless instructed by HM to adjust speed to suit conditions.	**Possible**	**No Injury**	*Controlled*
5. Adverse Weather Conditions.		**Loss Time**		- Weather conditions and tide levels will be monitored by the works supervisor. - Only commence operations when a suitable weather window allowing for contingency exists. Aspects which may hinder visibility must also be considered including dense fog / blizzard conditions where the shipping forecast will be monitored each day prior to works commencing. It is to the vessel masters discretion that disposal works can proceed. - A safe haven shall be identified by Foyle & Marine Dredging prior to commencing dredging/disposal operations.			

Hazard	**Likelihood**	**Outcome**	**Result**	**Risk Reduction Methods**	**Revised Likelihood**	**Revised Outcome**	**Revised Result**
				- The existing fendering system installed on each vessel has been deemed appropriate by the F&M supervisor however should the vessel master feel further protection is required F&M may proceed with installing it along the barge - Navigation will be by visual reference and use of ECDIS equipment on board the tug - All vessel lighting will be in accordance with the Merchant Shipping Regulations. - Sufficient lighting in place in tugs and dredger to illuminate quay walls during night-time working. - Vessel to proceed with entering work area providing vessel master is satisfied that safe manoeuvring can take place. Wind conditions and direction to be monitored. - Transfer vessel not to operate in wave height above 700mm. - Life jackets to be worn by all operatives unless operating excavator. Hard hat, steel toe cap boots, gloves, glasses and hi-vis vest must be worn at all times.			

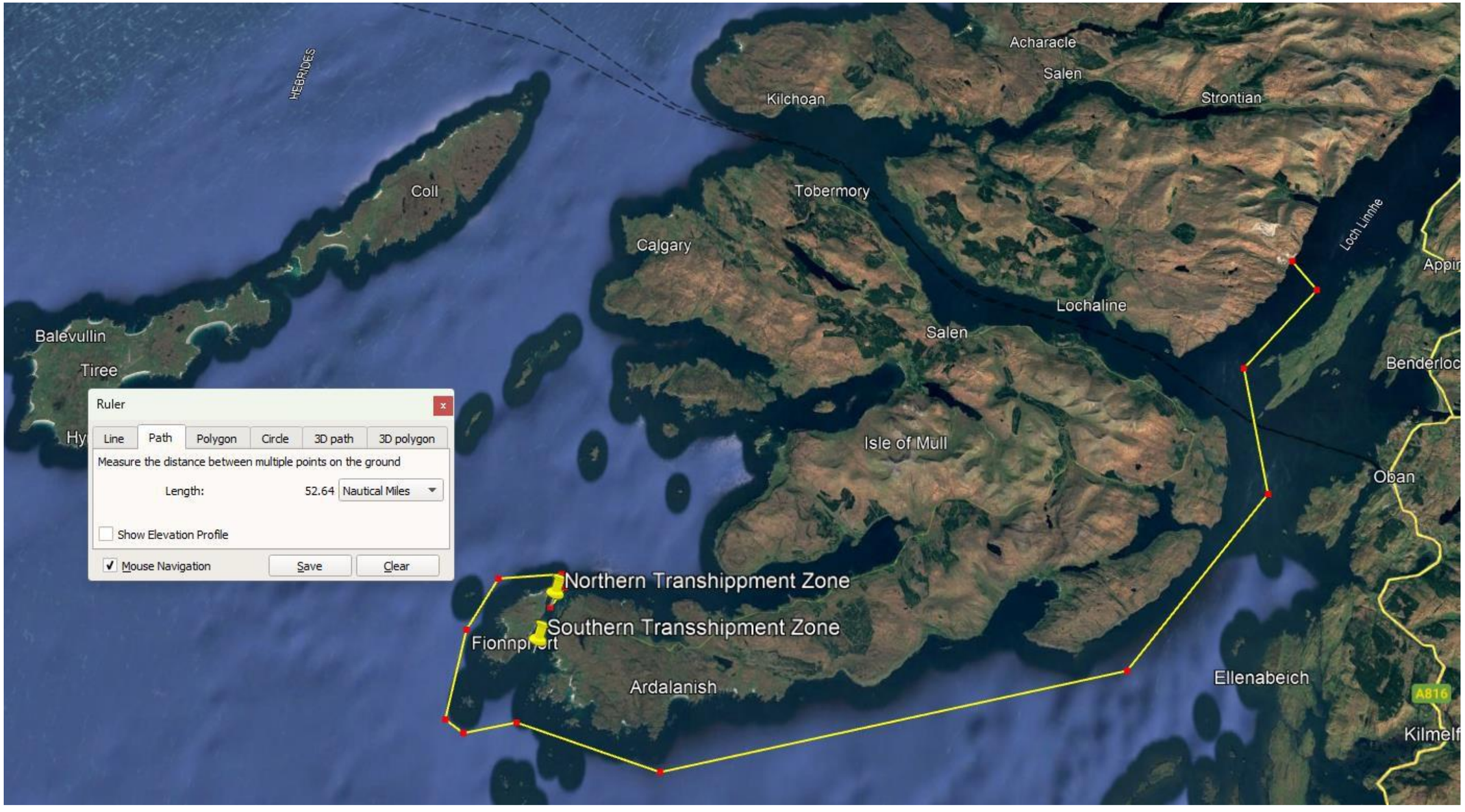
3. Overview Maps of General Marine Navigational Routes and Zones

IONA BREAKWATER – ROCK TRANSPORTATION – GLENSANDA QUARRY TO SITE TRANSSHIPMENT ZONES

Glensanda Quarry to Southern Transshipment Zone is Measured at approximately 44NM

Tug Master to prepare and confirm passage plan prior to departure

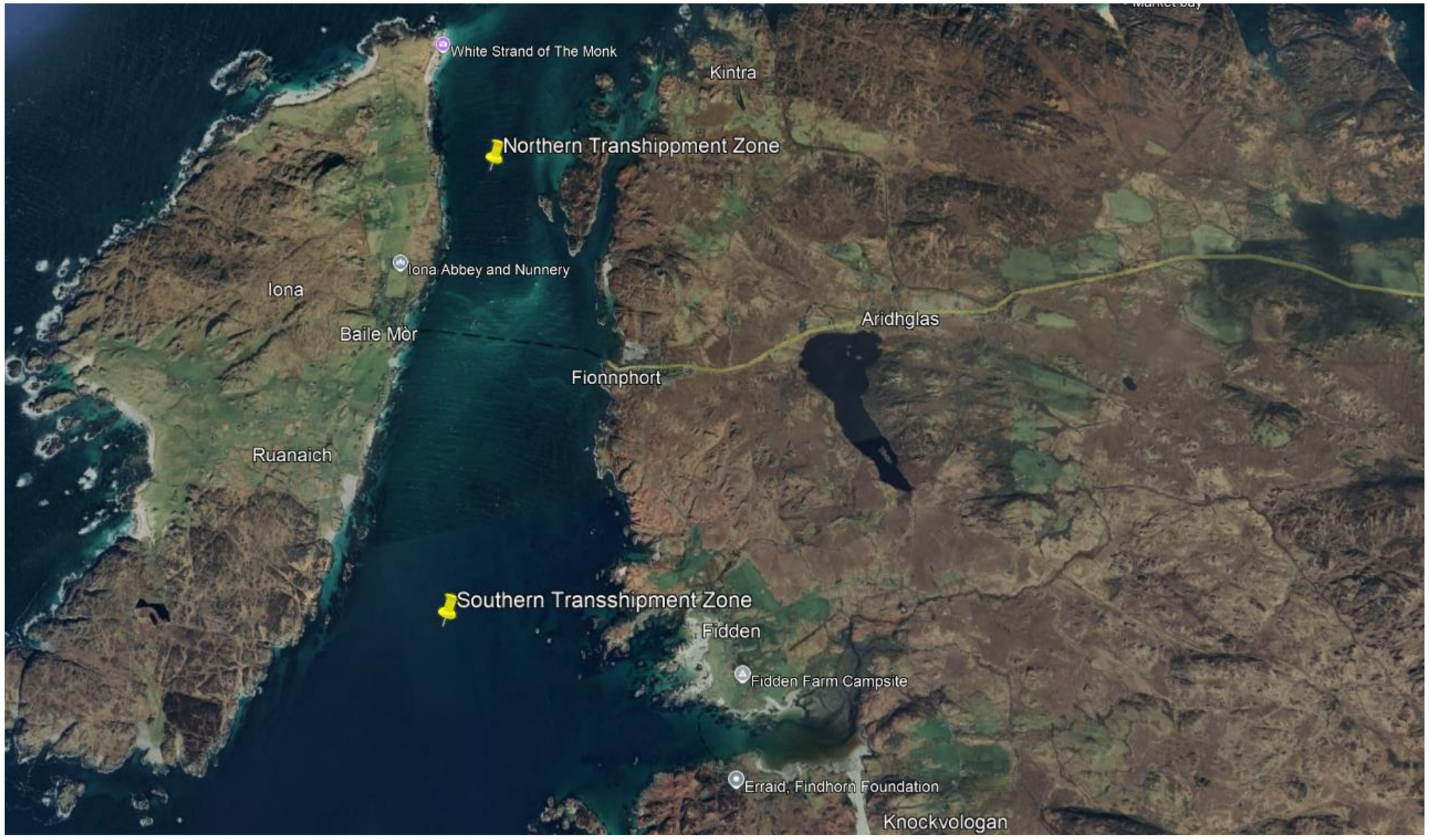
IONA BREAKWATER – ROCK TRANSPORTATION – GLENSANDA QUARRY TO SITE TRANSSHIPMENT ZONES



Glensanda Quarry to Northern Transshipment Zone is Measured at approximately 53NM.

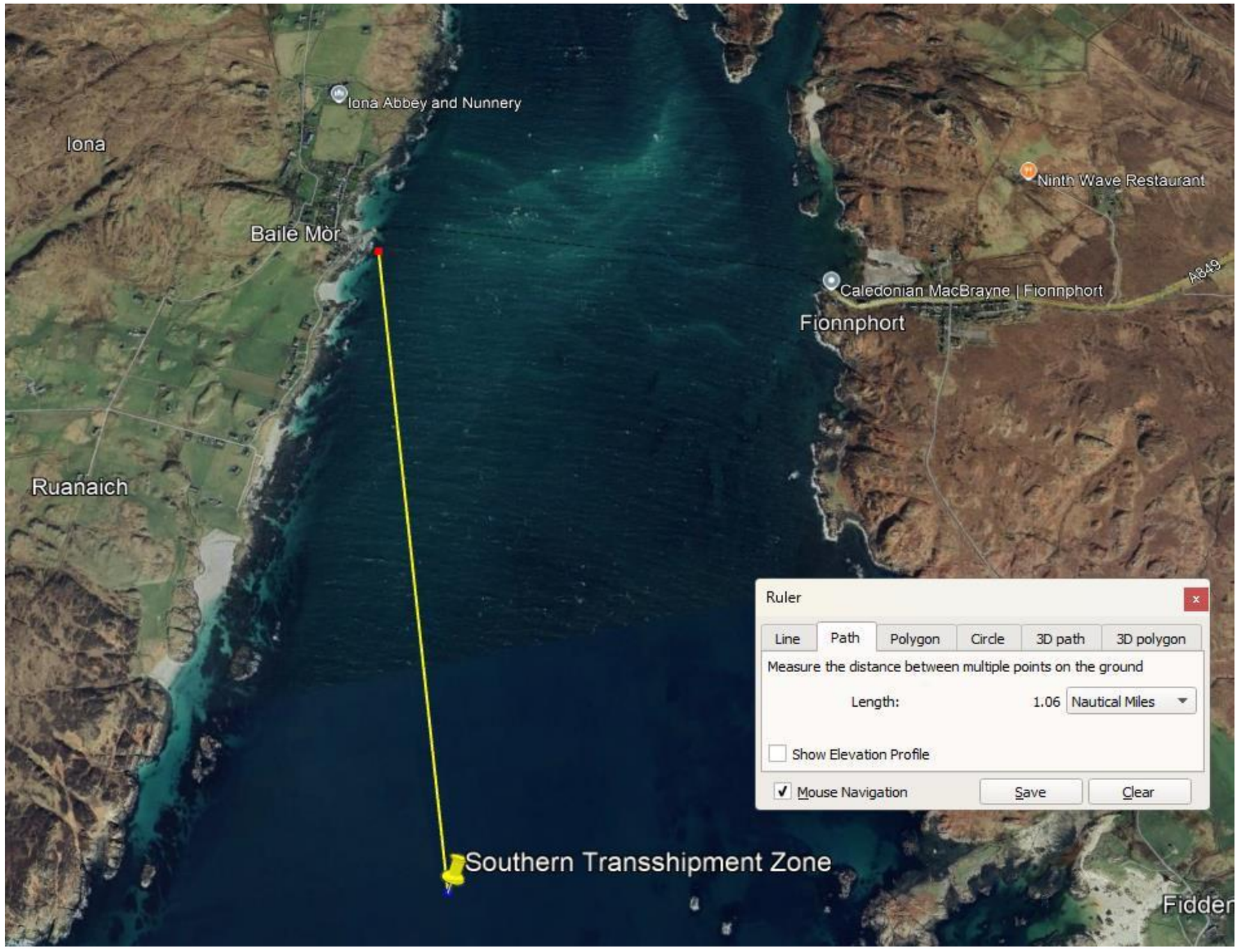
Tug Master to prepare and confirm passage plan prior to departure.

IONA BREAKWATER – ROCK TRANSPORTATION – TRANSSHIPMENT ZONES



Southern Zone Lat; 56°18'43.67"N. Long; 6°23'37.73"W **Northern Zone Lat 56°20'22.99"N; Long; 6°22'44.69"W**

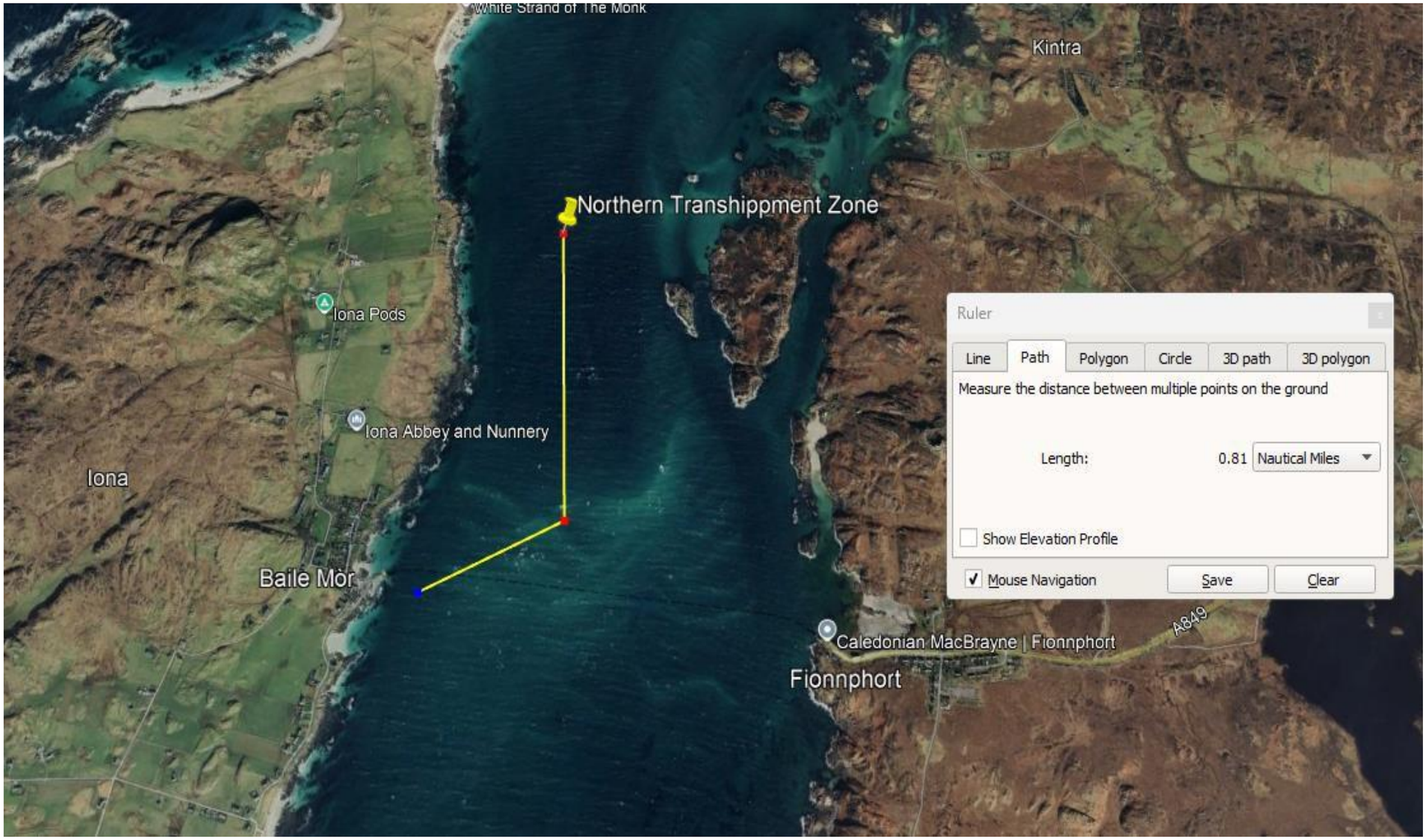
IONA BREAKWATER – ROCK TRANSPORTATION – SITE TRANSSHIPMENT ZONES



Southern Transshipment Zone distance from the site location is measured at 1NM

Tug Master to prepare and confirm passage Plan prior to departure

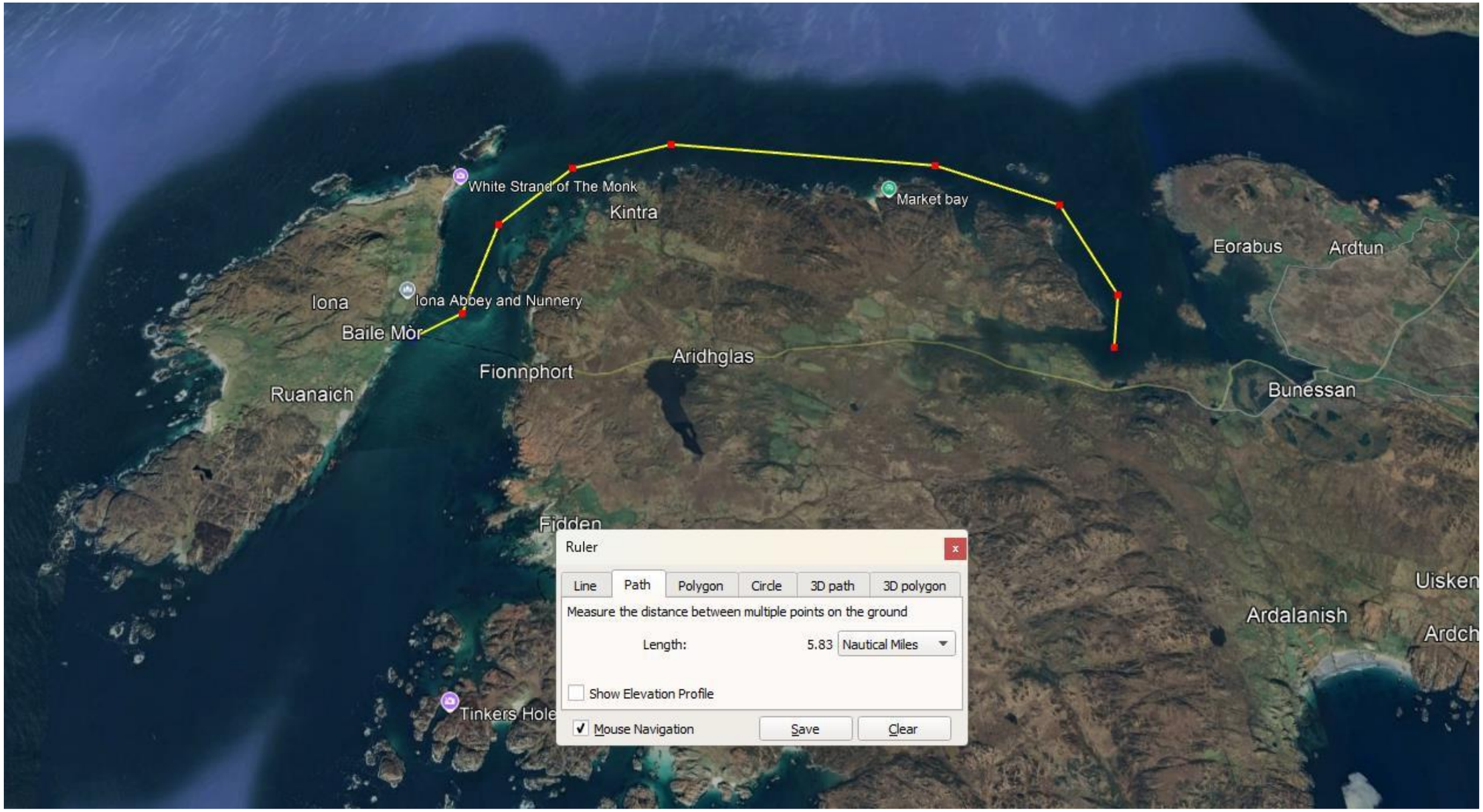
IONA BREAKWATER – ROCK TRANSPORTATION – SITE TRANSSHIPMENT ZONES



Northern Transshipment Zone Distance is Measured at 0.7NM

Tug Master to prepare and confirm passage plan prior to departure

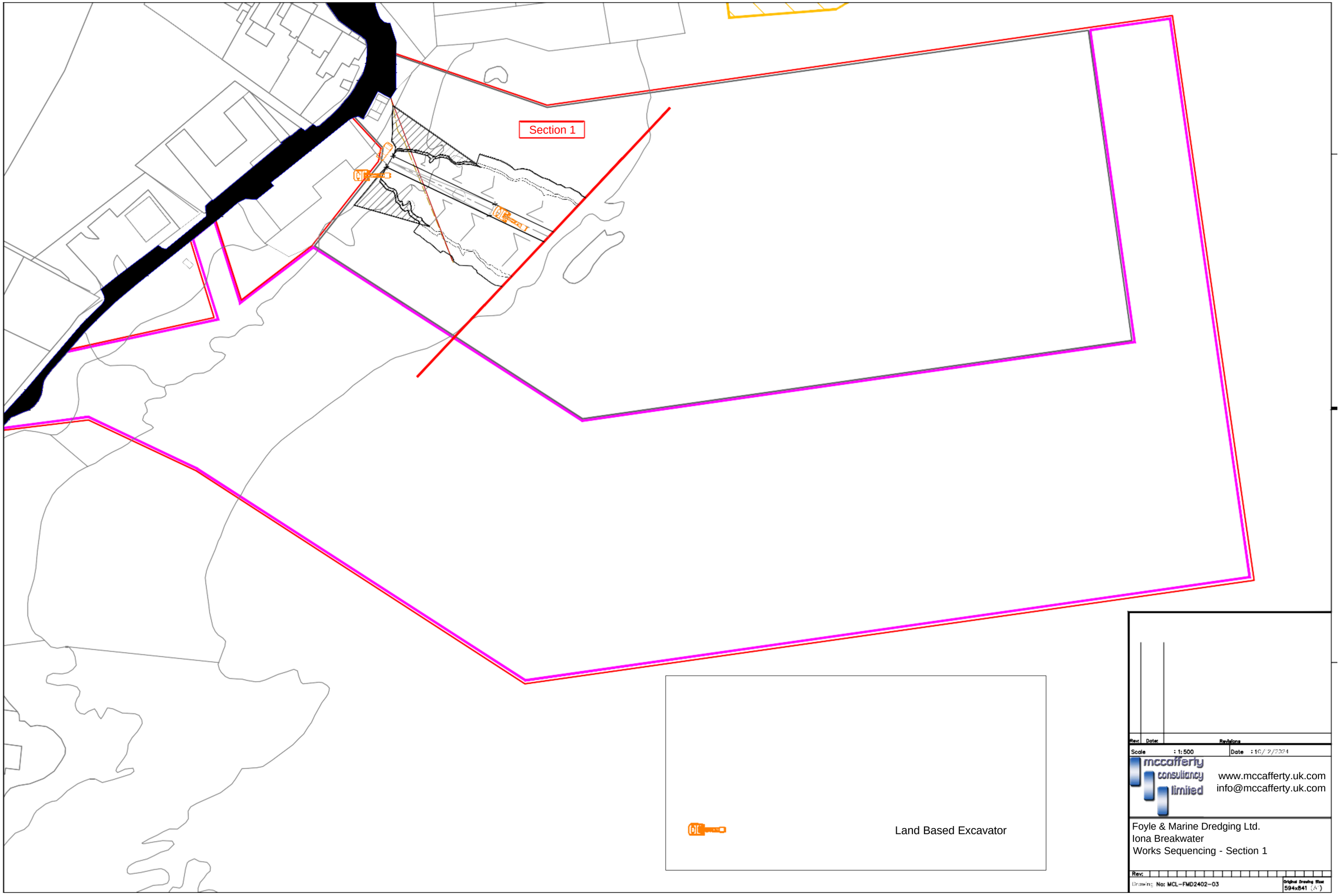
IONA BREAKWATER –SAFE HAVEN LOCATION



Identified safe haven during inclement weather is beside Loch na Lathaich, near to village of Bunessan. Distance is approximately 5.8NM from Iona Breakwater.

Tug Master to prepare & confirm passage plan prior to departing.

4. Breakwater Construction Sequence Drawings



Land Based Excavator

Rev: Date: Revisions

Scale : 1:500 Date : 16/ 2/2024

mccafferty consultancy limited

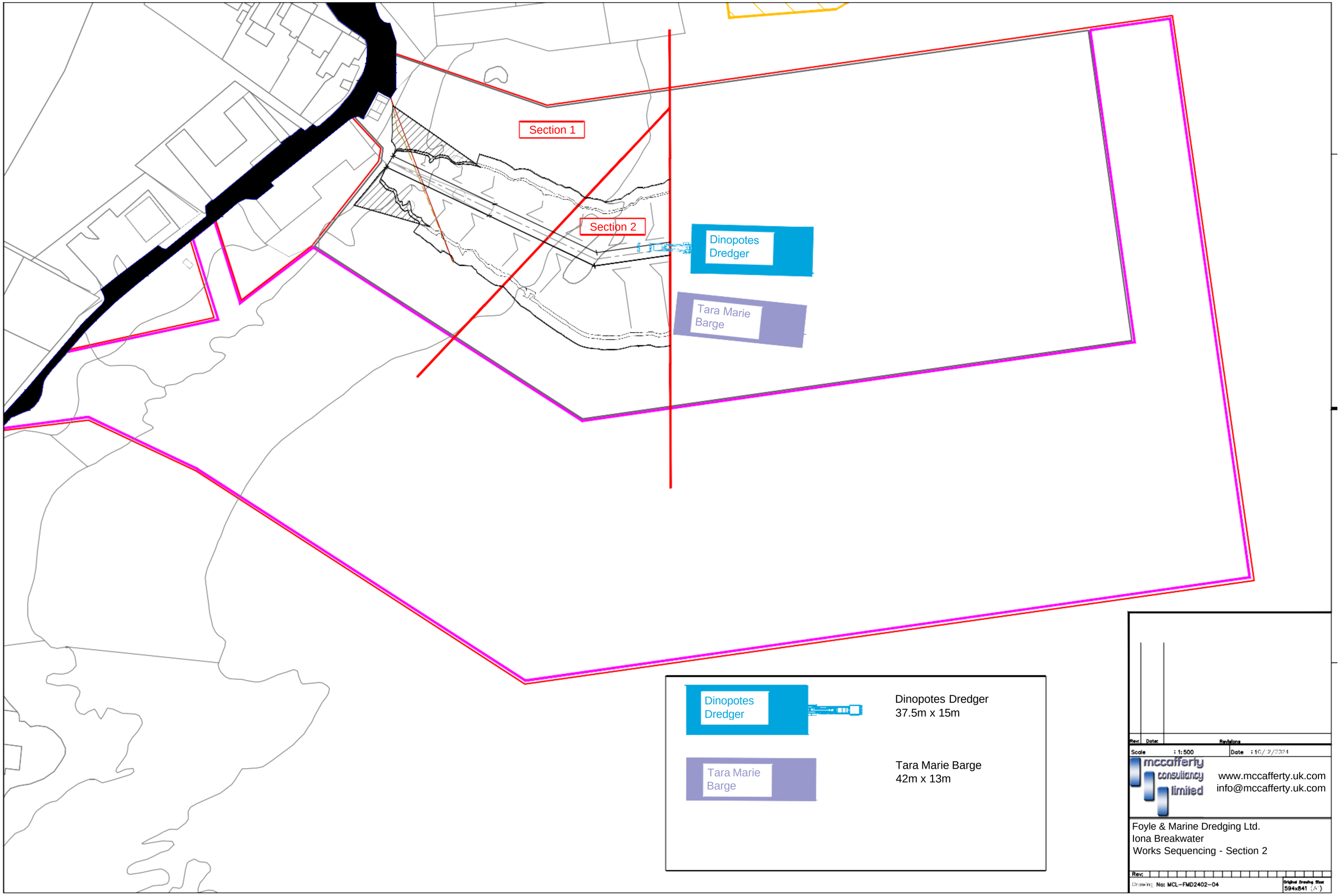
www.mccafferty.uk.com
info@mccafferty.uk.com

Foyle & Marine Dredging Ltd.
Iona Breakwater
Works Sequencing - Section 1

Rev:

Drawing No: MCL-FMD2402-03

Original Drawing Size 594x841 (A1)



Dinopotes Dredger
37.5m x 15m

Tara Marie Barge
42m x 13m

Rev: Date: Revisions

Scale : 1:500 Date : 16/ 2/2024

mccafferty consultancy limited

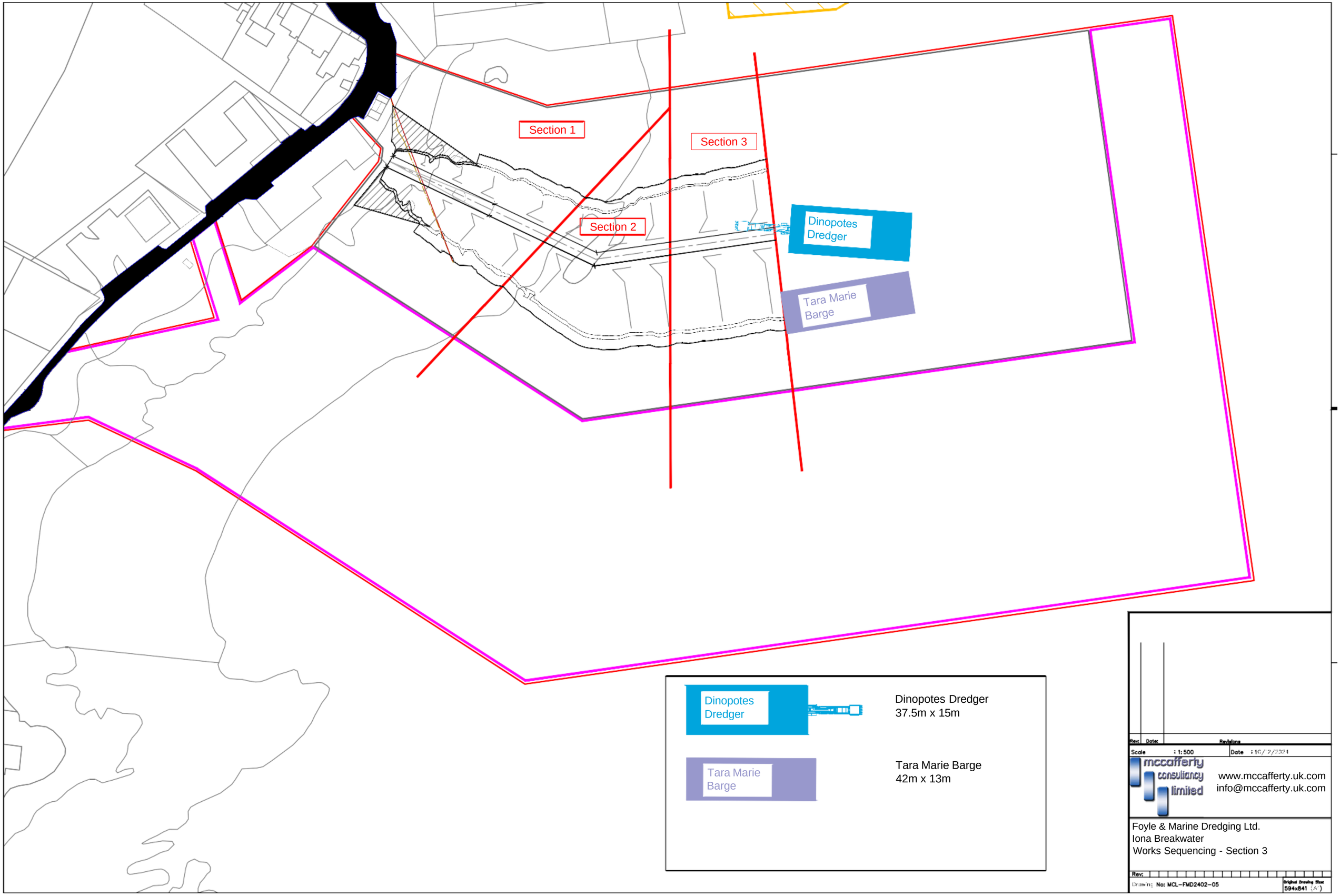
www.mccafferty.uk.com
info@mccafferty.uk.com

Foyle & Marine Dredging Ltd.
Iona Breakwater
Works Sequencing - Section 2

Rev:

Drawing No: MCL-FMD2402-04

Original Drawing Size 594x841 (A1)



Dinopotes Dredger

Dinopotes Dredger
37.5m x 15m

Tara Marie Barge

Tara Marie Barge
42m x 13m

Rev: Date: Revisions

Scale : 1:500 Date : 16/ 2/2024

mccafferty consultancy limited

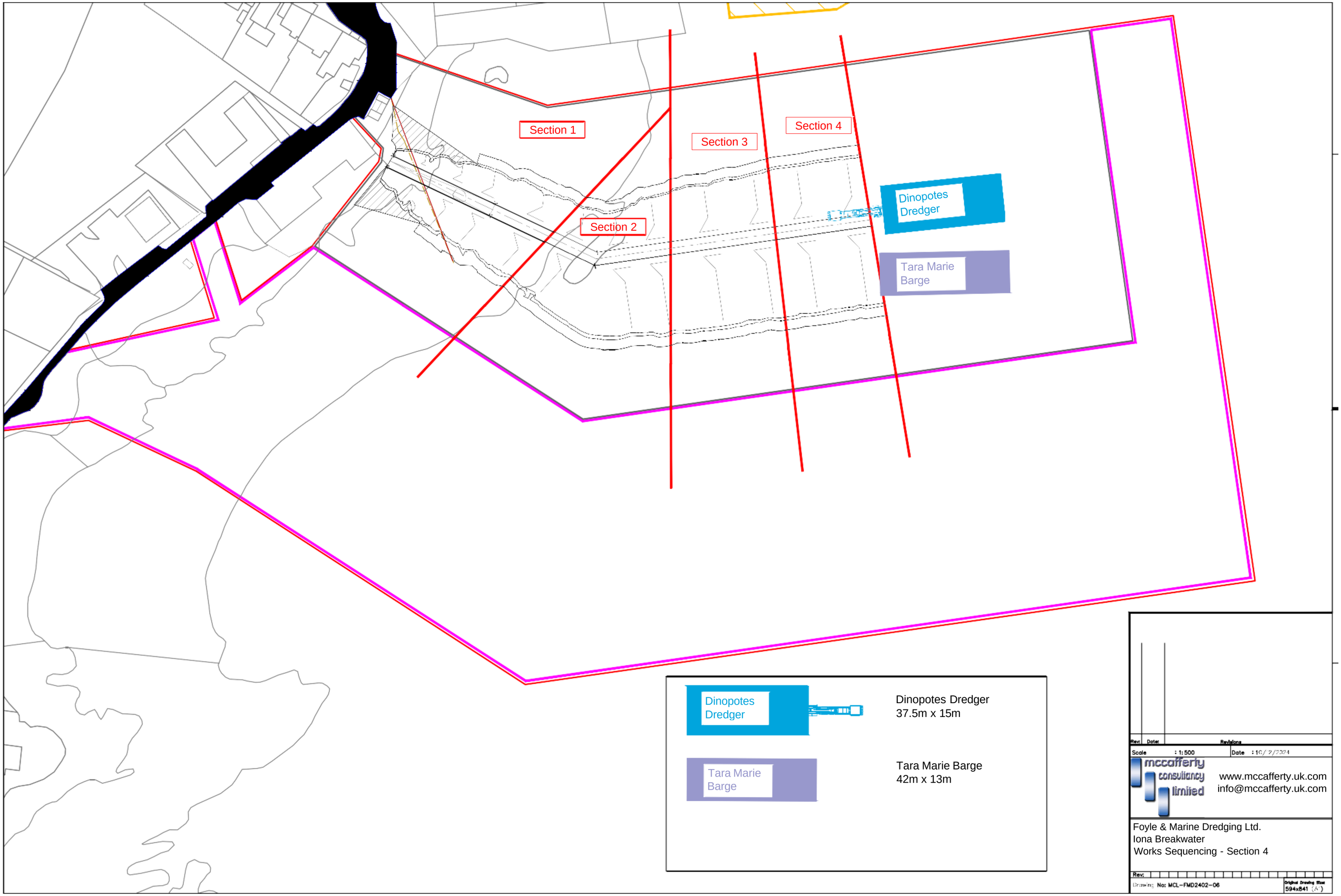
www.mccafferty.uk.com
info@mccafferty.uk.com

Foyle & Marine Dredging Ltd.
Iona Breakwater
Works Sequencing - Section 3

Rev:

Drawing No: MCL-FMD2402-05

Original Drawing Size 594x841 (A1)



Dinopotes Dredger
37.5m x 15m

Tara Marie Barge
42m x 13m

Rev: Date: Revisions

Scale : 1:500 Date : 16/ 2/2024

mccafferty consultancy limited

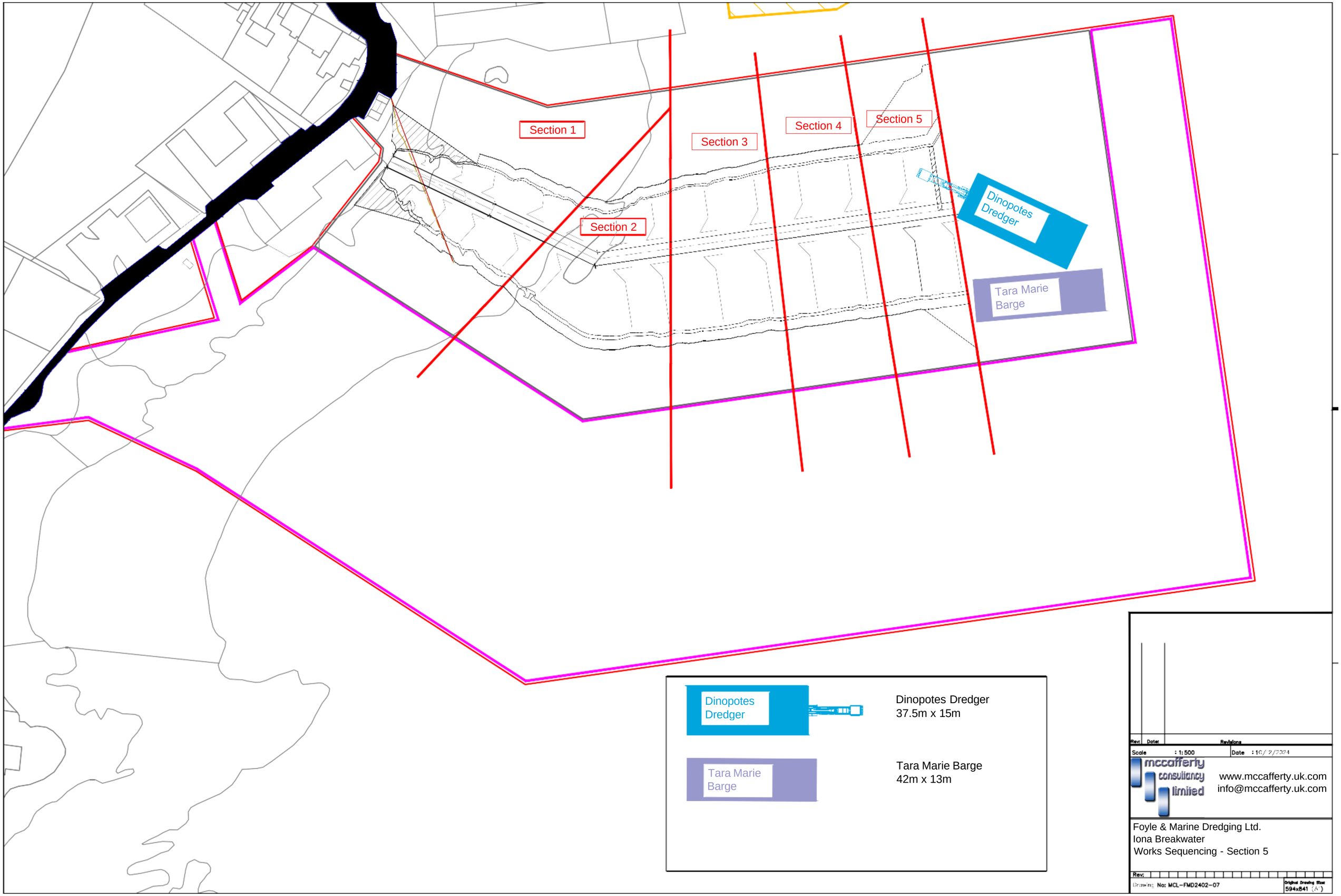
www.mccafferty.uk.com
info@mccafferty.uk.com

Foyle & Marine Dredging Ltd.
Iona Breakwater
Works Sequencing - Section 4

Rev:

Drawing No: MCL-FMD2402-06

Original Drawing Size 594x841 (A1)



Dinopotes Dredger

Dinopotes Dredger
37.5m x 15m

Tara Marie Barge

Tara Marie Barge
42m x 13m

Rev: Date: Revisions

Scale : 1:500 Date : 16/ 2/2024

mccafferty consultancy limited

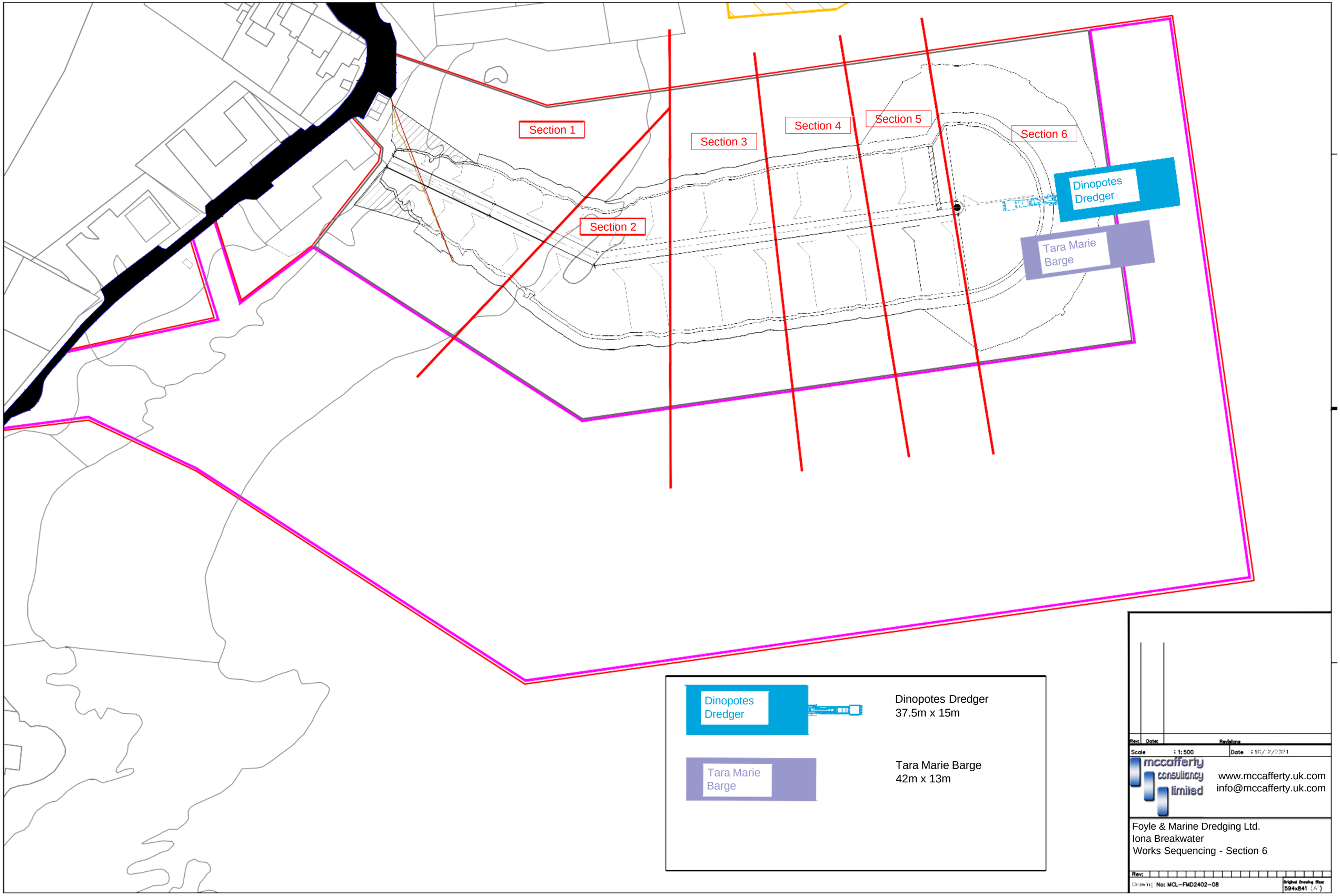
www.mccafferty.uk.com
info@mccafferty.uk.com

Foyle & Marine Dredging Ltd.
Iona Breakwater
Works Sequencing - Section 5

Rev:

Drawing No: MCL-FMD2402-07

Original Drawing Size 594x841 (A1)



Dinopotes Dredger

Dinopotes Dredger
37.5m x 15m

Tara Marie Barge

Tara Marie Barge
42m x 13m

Rev: Date: Revisions

Scale : 1:500 Date : 16/ 2/2024

mccafferty consultancy limited

www.mccafferty.uk.com
info@mccafferty.uk.com

Foyle & Marine Dredging Ltd.
Iona Breakwater
Works Sequencing - Section 6

Rev:

Drawing No: MCL-FMD2402-08

Original Drawing Size 594x841 (A1)

5. Vessel Information (not limited)

Foyle & Marine Dredging

Spud Leg Backhoe Dinopotes

Specification & Details

CLASSIFICATION	International Load line In Class with BV	
DIMENSIONS	**LENGTH**	35.52M
	BEAM	15.95M
	MODULE DEPTH	3.00M
	DRAFT	2.25M
EXCAVATOR	**MANUFACTURE**	DEMAG PC1400 (2009)
	DREDGE DEPTH	19M at CD
	DREDGE SYSTEM	Foreshore 3D GPS RTK
ATTACHMENTS	**QUICK HITCH**	To suit the below attachments
	DREDGING BUCKET	9.0m3
	ROCK BUCKET	4.4M3
	GRADING BUCKET	3M3
	CLAM SHELL	2.5M3
	MULCHER	If Required
	ROCK HAMMER	4T & 9T Rammer Hammers for under water rock breaking
DISPLACEMENT	795t Working	
TONNAGE GRT	381t	
FUEL CAPACITY	70,000l	
WATER CAPACITY	10,000l	
DREDGE DEPTH	19m At CD	
LENGTH OF SPUD LEGS	23.0M	
ACCOMMODATION	4 x single cabin, Mess Room, Office, Wash Room , Work Shop, Stores	

SELF-DISCHARGING VESSEL

*** MARY ***

Side-tipper and rock carrier

SPECIFICATION OF THE VESSELS.

	mv MARY
Call sign	TFSS
IMO no.	8857148
Class	Bureau Veritas
Flag	Iceland
Port of reg.	Kopavogur
Length	49,90 m
Breadth (b)	9,80 m
Draught, max	2,20 m
Gross tonnage	473
Cargo capacity	270 m3 / 560 ton
Main engine	2 X deutz 174
Speed load/ballast	7,5 knots/hour
Fuel consumption	1.860 ltr./24 hour
Propulsion	Kv 2 x schottel

SIDE-TIPPER - ROCK CARRIER

A fantastic vessels suitable for various purposes.

The vessel will help to avoid the expensive double handling. The material can be tipped directly and precisely below and above the water level.

Loaded draft is only 2,20 meters and LPP of less than 50 meters, highly maneuverable with two rudder propellers, operated with a small crew. In short, they solve all challenges when water depth is an issue.

Cargo capacity is approximately 560 ton. The vessels can in principle load more in tons, but the limitation is the volume or the capacity in m3.

Vessel have been converted to carry marine construction material, especially rock of different grading, and can handle material from sand to more than 10-ton block size and all between. Tipping in same position will end up leaving the heap on top of the water surface.

Compared to bottom discharge options the vessel needs much less depth on discharge area, meaning smaller onsite machinery if materials will be recovered or handled. Possible to discharge above the water level.

The vessel can enter and tip the materiel on almost no water – depending on the seabed or bottom conditions.

Main key points:

- reducing double handling on site
- reducing breakages
- flexibility in dumping locations
- tipping below and above the water level
- an environmentally friendly delivery option
- possible to transport materials from Quarry with bigger self-discharger vessels. Discharge from them directly onto the “side tipper”. Tip the material directly in the water.
- (maybe even save harbor dues).

Lately been lately used for:

- Moving dredging material, sand, aggregates, and rock armourstone
- onsite machine transport etc.
- logging transport vessels where self-discharging system may be possible to utilize.
- construction works, such as delivery of armourstones for erosion protection, breakwater construction material delivery, mass changes on marine construction sites and removal of underwater mining materials as well dredging materials.

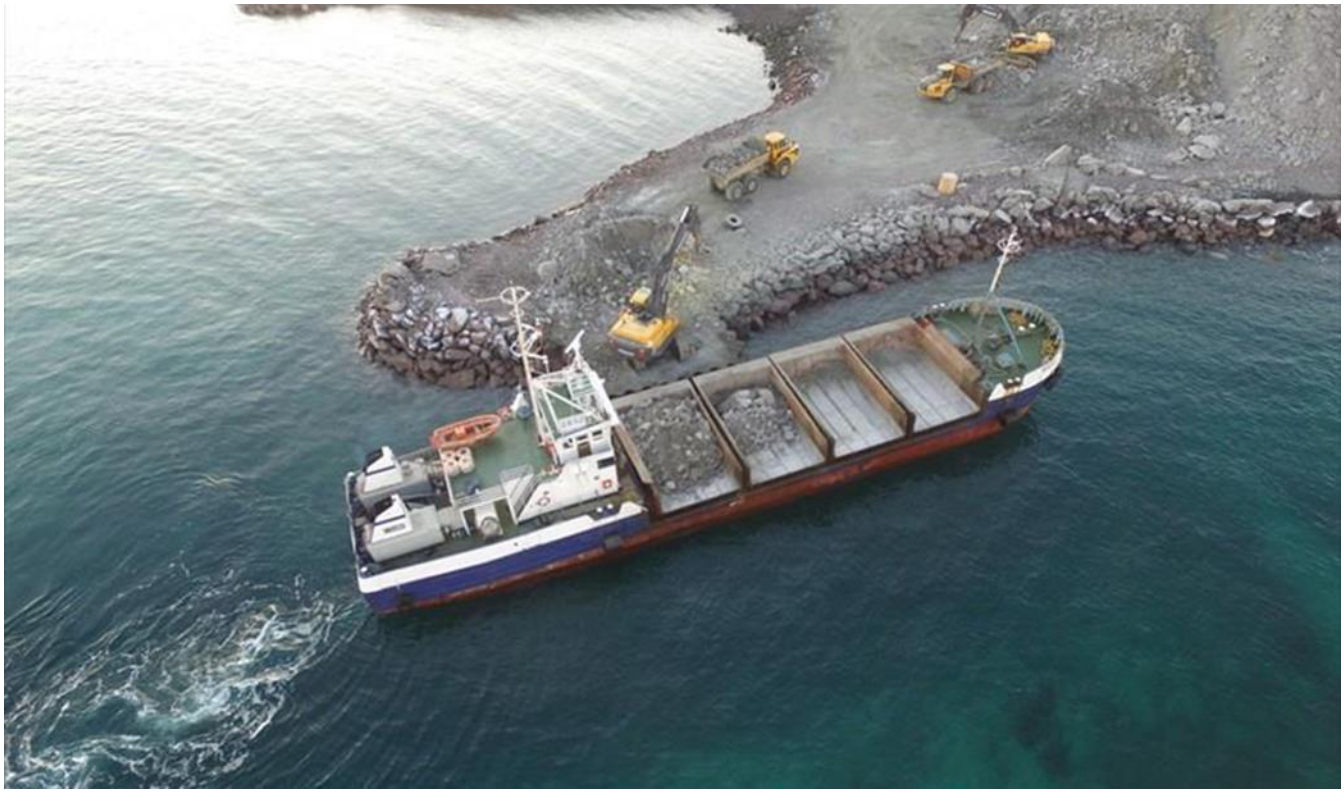
WAYS TO USE THE VESSEL

EXAMPLE 1:

Sailing rocks from the Quarry with a large self-discharger to the working plot. Discharge the rocks onto the vessel ready to use.

EXAMPLE 2

Sailing rock form land to tipping area – normally on GPS-spots (see example 7)



EXAMPLE 3:

Tipping the rocks directly on site – below and above the water, where the rocks must be used.

EXAMPLE 4:

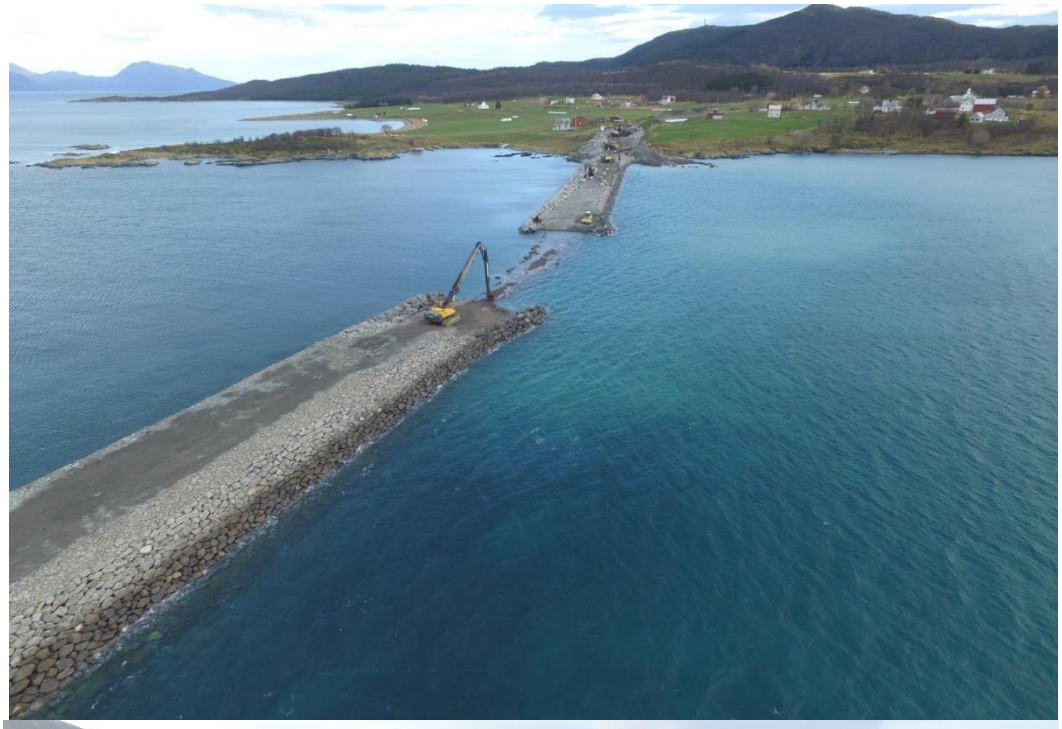
The vessel tipping on almost no water – of course depending on seabed and bottom conditions.

EXAMPLE 5:

Material is taken directly from the cargo holds without tipping.

EXAMPLE 6:

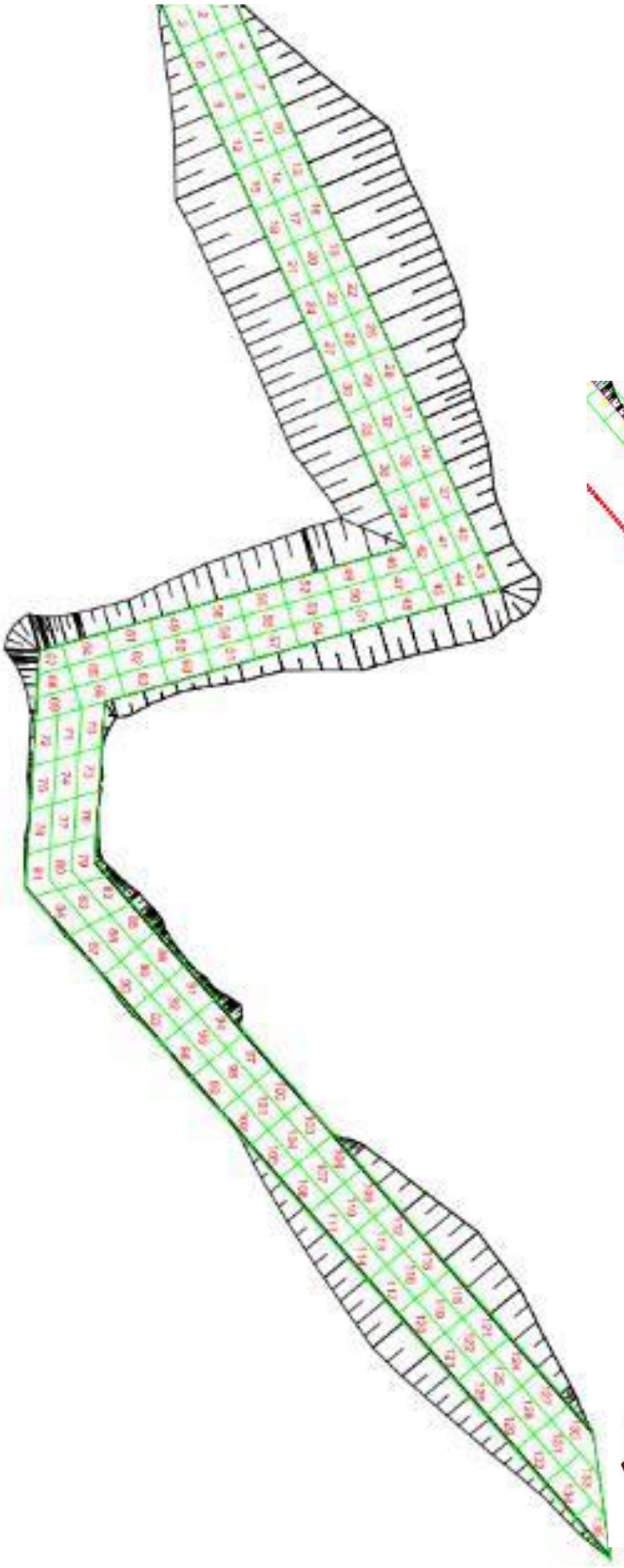
. All materials tipped accurately based on GPS positions



EXAMPLE 7:

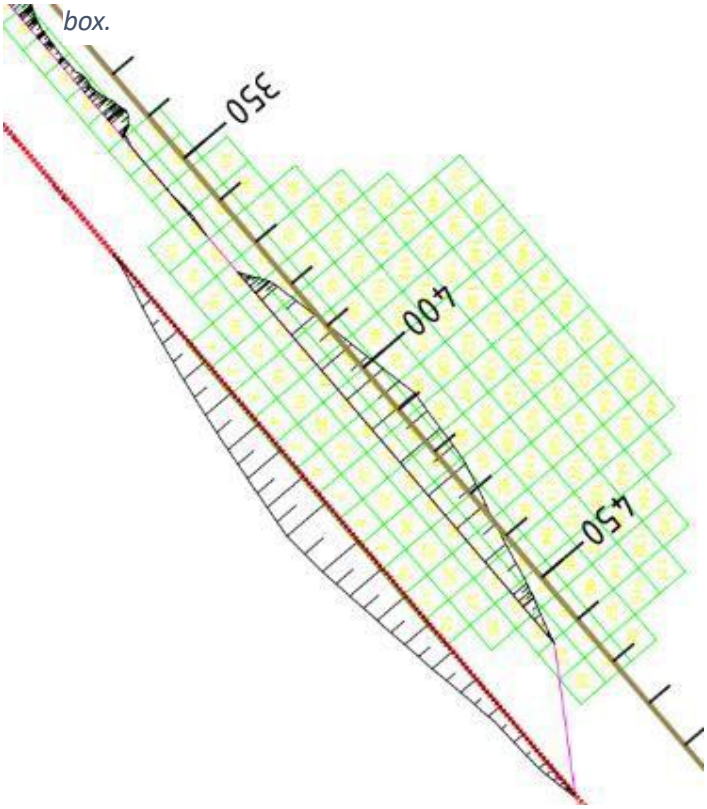
How materiel is tipped with GPS-positions

Example - layout as boxes.

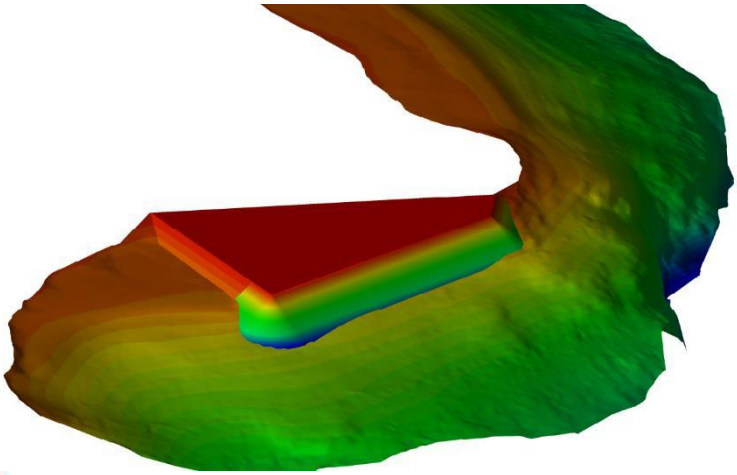


We receive a card with GPS-positions. On the right side an example showing GPS-position drawn as boxes where to tip the materiel.

Example – dumping layout for one specific dumping in one box.



Example – final result



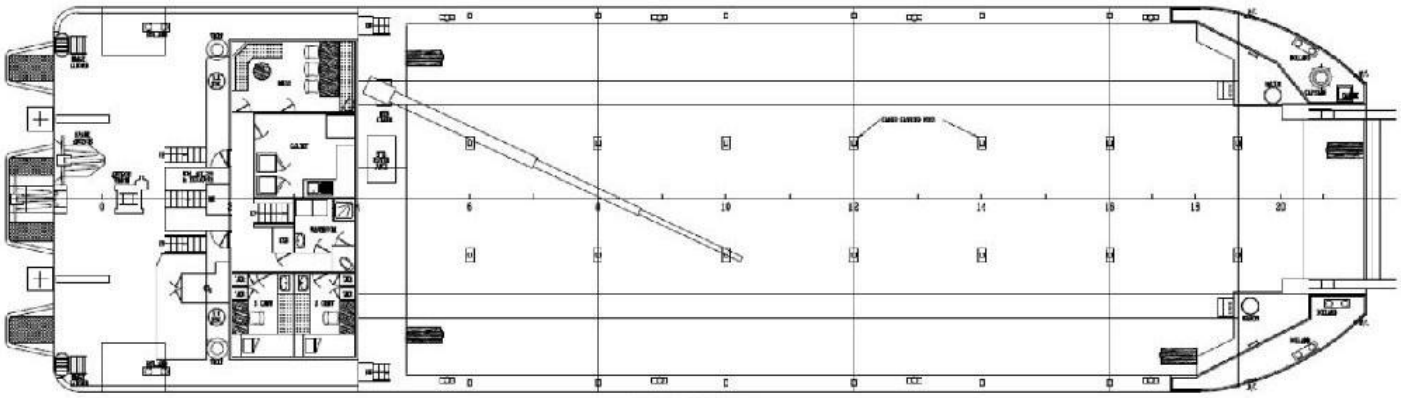
50m LANDING CRAFT

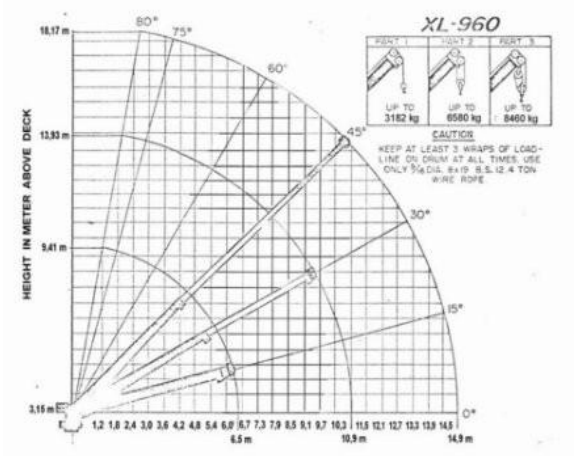
General Information

Built:	**Japan 1983**
Length:	**50.0m**
LBP:	**48.8m**
Breadth moulded:	**14.6m**
Depth moulded:	**3.1m**
Draft Min Operation:	**0.9m**
Draft Max Operation:	**2.1m**
Bow Ramp:	**Electro Hydraulic bow mounted ramp - 6.1m wide 8.15m long**
Reg. Tonnage Gross:	**722T**
Net:	**412T**
Fuel oil day tank:	**3.5m³**
Fresh Water:	**480m³**
Sludge Tank:	**20.0m³**
Fuel Oil Storage:	**1.0m³**
Water Ballast:	**72.9m³**
Deck Loading:	**8.0T/m²**
Dead Weight:	**772T**
Class:	**UK MCA Loadline Exemption Certificate**
Pollution Recovery - Capability:	**Full certified as a tanker recovering vessel with a capacity of 750T for recovered oil.**
Full Speed:	**8.5 knots @ 3.7 tonnes/day**

Main Engines: **2 Cummins VTA – 1710M diesels each 500 BHP; each propelling hydraulic retractable drives**
2 Cummins N-855 G diesels each driving Leroy Somer AZ2510M6 alternators; total output 250kW, 460v, 3 phase,60Hz
2 x 0.9 tonne anchors
2 fuel oil cargo pumps, capacity 833.3 litres/min @ 50m head
1 fresh water cargo pump capacity 833.3 litres/min @ 50m head
1 Gorman Rupp fire and general service pump
1 bilge pump
1 fresh water pump
1 emergency bilge pump
1 five-person lifeboat
2 life ra□s capable of accommoda□ng 12 people
Life buoys, Life jackets & Survival suits

Accommoda□on: **3 single berths, 2 double berths**
Crew: **6 persons**





WILLPOWER

Type	DAMEN Stan Tug 2207	
Built	2000, Damen Shipyards The Netherlands	
Dimensions	22,50 / 20,42 x 7,25 x 3,75 mtrs	
Draft	2,95 mtrs aft	
Propulsion	twin screw in nozzles	
Main engines	2x Caterpillar, type 3508B, DI-TA/B	
Output	2000 bhp total at 1600 rpm	
Gearboxes	2x Reintjes, type WAF 561L, ratio 5,947:1	
Speed	± 12 knots	
Bollard pull	25,5 tons	
Tonnage	GT 119,44 / NT 36,39	
Clear deck area	± 36 m^2 aft of towing bitt	
Deck equipment	towing winch 10 tons, 10 m/min.	
	towing hook SWL 45 tons	
	bow fender	
	anchor winch 10 m/min.	
Fifi equipment	fifi pump SIHI NOWA, 200 m^3 /hr , 11 bar, driven by Caterpillar diesel engine	
	1x fifi monitor	
Aux. engines	2x Caterpillar, type 3304 NA/SR 4	
Output	63 kVA each, 50Hz, 220/380 V	
Bow thruster	not fitted	
Tank capacities	fuel oil	34,9 m^3
	fresh water	9,2 m^3
	sewage	1,1 m^3
	ballast	4,5 m^3
Accommodation	2x single berth cabins, 2x double berth cabins, 1x 4 berth cabins, galley, mess room, 1x toilet and shower at main deck, 2x toilet and shower below main deck	
Nav./comm. equipment	3x VHF, radar, mag. compass, GPS, SSB, echo sounder	
Class	Bureau Veritas I X Hull X Mach Tug Coastal Area	
Survey status	Next special survey 2028	


WILLPOWER
Aerial Vision NI

6. Bathymetric Survey of Works Area – Feb 2025