Global Energy Nigg Limited

Best Practicable Environmental Option (BPEO) Submission.

Supporting information for a Marine Licence Application for Dredging and Sea Disposal

Under the Marine (Scotland) Act 2010

Submitted November 2022

Revision 01 - February 2023

Revision 02 – March 2023

Revision 03 – 21st March 2023

Revision 04 – 24th March 2023

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1. **INTRODUCTION:**

1.1 General Port Facility Overview:

The Port of Nigg facility is located within the Cromarty Firth some 1.1 nautical miles upstream of the Sutors Licence disposal site CRO019.Both the Port facility at Nigg and the Sutors disposal site are both within the jurisdiction of the Cromarty Firth Port Authority Order of Confirmation Act 1973 (as amended).

The Port facility at Nigg was purchased by the Global Energy Group (GEG) in 2011 from the previous owners KBR (UK) Limited. Since purchasing the facility (GEG) have undertaken a significant upgrading of the site and port facilities with a capital spend of some £120m.

The port facilities at Nigg have proved to be very well received by the offshore oil/gas industry and offshore renewables with oil rigs, FPSO's, subsea vessels, general shipping and offshore renewable installation vessels utilising the quay areas. Traffic levels at the port have been between 200 and 250 port calls per annum, with an average of 2,000,000 gross tons of shipping being handled annually.

The port facility at Nigg comprises the following:

GRAVING DOCK:

Dimensions	300m long x 150m wide Entrance width 120m with single gate.
Length:	315m long x 15m high. (dry)
Depth of water over the sill	9.14m below CD 13.44m at Mean High Water Springs
Depth of water in the Dock	9.065m below CD 13.365m at Mean High Water Springs
Sheet Quay wall	240m long with a coping height of 5.8m above CD
Dock bottom concrete slab	238m long x 80m wide
Permissible loading 3m back:	20.4 tonnes/sq.m. to 15m back 51 tonnes/sq.m
Note:	Ordnance datum is 2.1m below chart datum.
	200 ton SWL Rig mooring bollard system
	30 ton SWL fixed mooring winch system

SOUTH QUAY:

Length	370m
Depth	12m below CD
Coping height	6 m above CD
Depth alongside	16.3m below CD at Mean High Water Springs &
	12.7m below CD at Mean Low Water Springs

Moorings:

300 ton SWL Rig mooring bollard system

200 ton and 50 ton SWL general shipping mooring system.

Ground loading spread 4m from quay edge 50 tonnes/m3

WEST FINGER JETTY:

East Side:

Length	130m
Depth	12m below CD
Coping height	6m above CD
Depth alongside and approaches	16.3m below CD at Mean High Water Springs &
	12.7m below CD at Mean Low Water Springs.

Mooring:

300 ton and 50 ton SWL

West Side:

Length	125m
Depth	5m to 6m below CD
Coping height	6m above CD
Depth alongside	9.3m below CD at Mean High Water Springs &
	5.7m below CD at Mean Low Water Springs

Mooring:

300 ton and 50 ton SWL

South End:

Length	40m
Depth	7m to 12m below CD
Coping height	6m above CD

EAST FINGER JETTY:

West Side:

Length	225m
Depth	12m below CD

Coping height	6m above CD
Depth alongside and approaches	16.3m below CD at Mean High Water Springs &
	12.7m below CD at Mean Low Water Springs.

Mooring:

200 ton and 125 ton SWL

East Side:

Length	60m
Depth	2m to 10m below CD
Coping height	6m above CD
Depth alongside	9.3m below CD at Mean High Water Springs &
	5.7m below CD at Mean Low Water Springs

Mooring:

200 ton and 125 ton SWL

South End:

Length	50m
Depth	10m below CD
Coping height	6m above CD

1.2 Previous Dredging Operations:

Between 2014 and 2017 856,810 wet tonnes of capital dredging material was licenced to be removed from the sea bed in the area of the Nigg facility of this approximately 50% was utilised for beneficial use as infill material for port developments at both Nigg and Invergordon. The remaining quantity being deposited on the Nigg disposal site CR019 with no detrimental effects to the environment reported.

The last maintenance dredge was conducted in 2021 with the dredge material being disposed of at the Nigg disposal site CR019 with no detrimental effects to the environment reported.

Capital dredging was conducted during 2021-2022 during the construction works associated with the new East Quay where approximately 200,000 wet tonnes of material were removed from the seabed and disposed of at the Nigg disposal site with no detrimental effects on the environment reported.

Both maintenance and capital dredging works have been regularly conducted by the ports within the Cromarty Firth with disposal at the Nigg disposal site CR019. Despite the numerous dredge disposal activities, the tidal flow and deep water depth at this location show no discernible variance in seabed level post the dredge disposal activities. Bathymetric surveys from 2021, 2022 and 2023 were referenced to reach this conclusion nor have there been any reported environmental incidents which have resulted from using the offshore disposal site.

All maintenance dredging activities will be conducted in accordance with the Marine Licence conditions which are designed to protect the marine environment.

1.3 Need for Future Maintenance Dredging Works:

To enable the Nigg Port facility to function effectively and to provide save navigation to and from its berths, it is necessary to undertake a programme of maintenance dredging every 2 to 3 years.

Both modelling and hydrographic surveys have shown that the level of siltation over the sea bed is in the region of 30,000 to 50,000 wet tonnes per year, however this is weather and tidal dependant.

Within the port's dry dock, there is a need to keep the dock sill clear of silt to allow the gate to provide a watertight seal when in position and the inner dock area dredged to maintain the water depth at the quay. The dock has not been in the dry condition since 2015 and is now predominantly used as a wet quayside. Therefore this area has now been included within the Maintenance dredging licence application, as material has migrated into this area which needs to be removed to retain the desired water depth.

In addition to dredging, seabed remediation works may be required due to multiple jack-up vessels using the quays for renewables marshalling activities in particular. Where the indentations cannot be backfilled via dredging, then the use of dumping of rocks into the indentations may be required. We shall submit a separate marine licence application for any such rock dumping activity.

1.4 Dredging Strategic Considerations:

1.4.1 – Strategic Considerations

- Type of dredging method – Best practical method (Suction, plough, back hoe or air lift)
- Operational Feasibility – Whether the chosen option is technically practicable.
- Disposal location options & availability
- Established Practice – What has been done before and was it successful.
- Cost – What are the most reasonably practicable options?
- Marine Scotland/Public Agency acceptability – Whether the regulator and public agencies are likely to have any objections or concerns.

1.4.2 – Health and Safety Considerations

- Health – Assessment whether there would be an adverse effect to Health caused by the planned operations.
- Safety – Considering the potential hazards and probability that there would be any risk / danger to the general public or operational workers.
- Environmental – Assessment of the significance of any potential impact on important habitats or species.

It is recognised that both the Nigg facility and the Sutors disposal sites are situated in and in close proximity to area with SSSI, SAC and RAMSAR designations.

1.4.3 – Cost Considerations

- Cost of disposal of the dredge material both in terms of the cost / duration of the dredging activities, and the costs and duration of the disposal methodology adopted.

1.4.4 – Compliance with relevant policies and plans

- The "Communications and Collaborative Working Plan (CCWP)" for dredging Operations conducted by the Marine Facilities within the Cromarty Firth was reviewed prior to submission of the application.
- Our Companies Environmental Operational Management Plan was reviewed prior to the submission of this Maintenance Dredging Application to ensure that it aligned with our company's internal objectives set out in that plan.

2 BEST PRACTICABLE ENVIRONMENTAL OPTION (BPEO) ASSESSMENT:

2.1 Introduction:

The BPEO is a method for identifying the options that provide the most environmental benefits or least environmental damage. It assesses the performance of different options in a range of criteria such as environmental impact, safety risk, technical feasibility and project risk.

Here, options for the management of the future additional surplus dredge material of 140,000 wet tonnes have been considered, against the following options:

- Moving material into the deeper water to the South of the quayside via plough dredging or air lifting
- Offshore disposal to the Sutors CR019 disposal site located close to the Nigg facility and dredged area.
- Land based disposal for agricultural improvement or betterment.
- Removal to land recycling as a construction material.
- Removal to land for recycling as general infill.
- Removal to land for coastal works, including beach nourishment and restoration.
- Removal to land for disposal to landfill.
- Do nothing approach.

2.2Considered Options for relocation of dredge material:

The material to be removed as maintenance dredging over a period of 3 years is 90,000 wet tonnes comprising sand and silt.

A number of dredging options such as air lift, plough dredging, back hoe dredging and suction dredging can be utilised, dependent on the specific nature and location of the influx of seabed material.

Below is a summary of the BPEO Options Considered:

Option	Description	Requirements	Considerations
1	Recycling of material as aggregate	• Collection of material • Stockpiling of material onshore • Drying of materials • Transportation of materials and associated cost (financial and environmental) • Demand for such materials. • Materials to be of sufficient quality	• Collection – Would require a suction or back hoe dredger. • Stockpiling – Would require a suitable onshore location • Drying of materials – Dredged material is typically 20% solids and 80% water. • Transportation of materials and associated costs and emissions. • Local demand for such material. • Characteristics of the dredge material and its suitability to be used for this purpose.
2	Recycling of material as general land fill.	• Collection of material • Stockpiling of material onshore • Drying of materials • Transportation of materials and associated cost (financial and environmental) • Demand for such materials. • Materials to be of sufficient quality	• Collection – Would require a suction or back hoe dredger. • Stockpiling – Would require a suitable onshore location • Drying of materials – Dredged material is typically 20% solids and 80% water. • Transportation of materials and associated costs and emissions. • Local demand for such material. • Characteristics of the dredge material and its suitability to be used for this purpose.
3	Land Based Use	• Collection of material • Stockpiling of material onshore • Drying of materials • Transportation of materials and associated cost (financial and environmental) • Demand for such materials.	• Collection – Would require a suction or back hoe dredger. • Stockpiling – Would require a suitable onshore location • Drying of materials – Dredged material is typically 20% solids and 80% water. • Transportation of materials and associated costs and emissions. • Local demand for such material. • Characteristics of the dredge material and its suitability to be used for this purpose.

4	Offshore Sea Disposal	• Movement of materials into deeper water South of the port via plough or air lift. • Option for disposal at Sutors licenced disposal site CR019.	• Collection – Dredging method best suited to address the influx of material at the berths. • Suction / Back Hoe dredging options for movement of materials to disposal site CR019 • Location proximity to minimise transportation emissions.
5	Beach Nourishment	• Availability of suitable sites • Environmental and disruption effects. • Health and Safety exposure	• Collection – Would require a suction or back hoe dredger. • Renourishment location – Would require a suitable onshore local beach location • Characteristics of the dredge material and its suitability to be used for this purpose. • Odour and potential health effects.
6	Do Nothing Approach	• Operational limitations presented by decreasing water depth over time.	• Types and drafts of vessels which use the port. • Under keel clearances required by marine warranty. • Operations conducted within the port waters.

2.3 Review of Options:

Option 1 – Recycling of Material as Aggregate

There is no known local demand for material of this type. There are several large sand quarries in the Region which are used for this purpose, and which are able to provide a far better quality of sand material than could be expected from using dredged material.

This is not the safest nor the most environmentally effective means of disposal due to the exposures presented during handling, dewatering, storage and transportation.

This option is considerably more expensive and not considered reasonably practicable.

Therefore, this method of disposal has been discounted.

Option 2 - Recycling of material as general land fill.

We have checked the local planning applications on the Highland Council website and have spoken to the Highland Council and there appears to be no capital projects within the local area that could utilise this relatively small quantity of poor quality material.

We had been approached by some civils contractors when the new quayside at Invergordon was being constructed a few years ago, but upon inspection of the dredged material available from Nigg, the silty consistency of the dredge material from Nigg was considered to be of insufficient quantity to represent a meaningful opportunity to reuse the dredge material elsewhere.

We have also assessed the material contained within the dock area both by taking grab samples and by the use of divers. The majority of the material within the dock is a soupy very soft consistency which shows up on the bathymetric surveys, but which would be unsuitable for reuse.

Capital dredging at Nigg has provided a better quality of sandy material previously:

This methodology was adopted both at Nigg and Invergordon when we performed capital dredging and created the West Finger quay at Nigg.

This is not the safest nor the most environmentally effective means of disposal due to the exposures presented during handling, dewatering, storage and transportation.

This option is considerably more expensive and not considered reasonably practicable.

Therefore, this method of disposal has been discounted.

Option 3 – Land Based Use

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Option 4 – Offshore Sea Disposal

There are two options which can be utilised for offshore sea disposal.

- **Plough Dredging / Air Lift and relocation of material.**

  Use of a plough dredger or air lift device to move the seabed material from the berths / quays at Nigg to the deeper water directly to the South of the quay.

  There are restrictions to how effective this means can be with a plough dredger which are unable to get very close to the quay edges.

  This method of removing materials from the berths would be recommended for seabed levelling works, and for smaller dredging campaigns at the South Quay, West Finger Quay and East Quay.

  This methodology is not capable of removing the seabed material within the inner dock area (Berths 1 & 2) as there is a rubber seal across the dock sill, and any ploughing over the top of this rubber seal, would result it significant damage. Suction dredging is the only available option to dispose of the inner dock material.

  This method represents the safest and most cost effective means available with the shortest travel distance for the materials.

  Therefore this Option of disposal is recommended.

  <u>**Transportation Plan for Plough / Air Lift Option**</u>

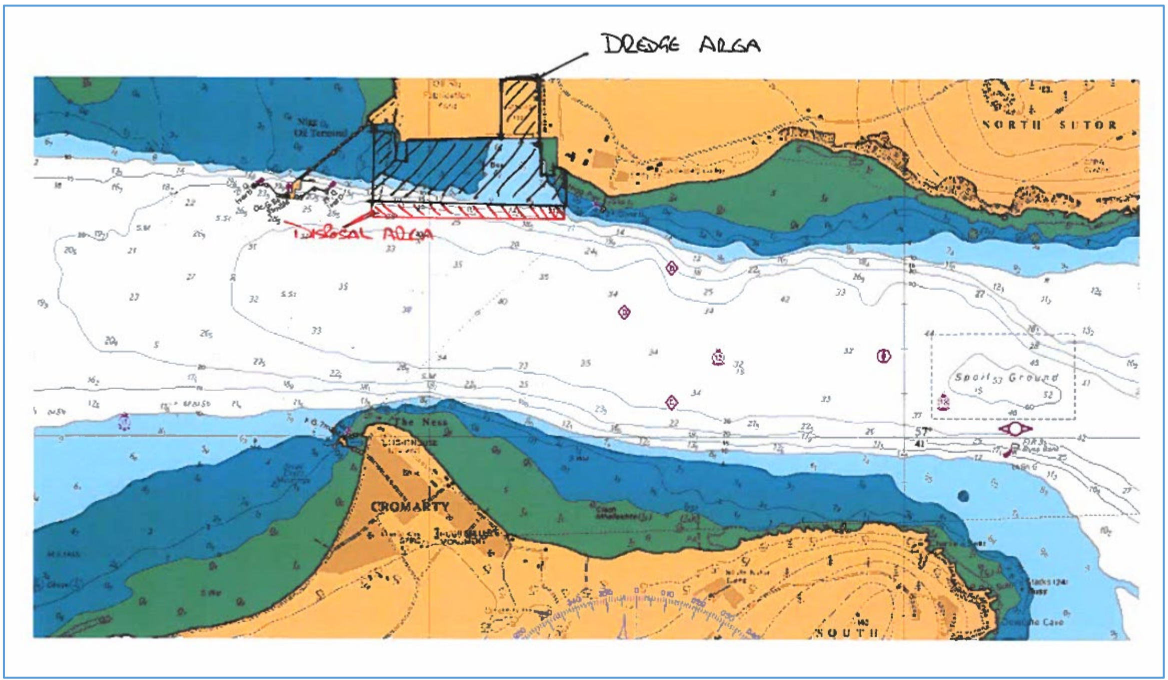


Figure 1 – Transport Route for Plough / Air Lift dredging option.

- **Back Hoe / Suctions dredging and disposal at licenced disposal site CR019**

Due to the close proximity (1.1 miles from the Nigg Site), the use of the CR019 disposal site from the Port of Nigg has been adopted as the preferred means of disposal of dredged material for both capital and maintenance dredging campaigns.

In instances where plough / air lift dredging has not been considered a suitable, using a suction or back hoe dredger then transporting the material to CR019 for disposal has been considered the option which offers the least operational and environmental risk exposure, and provides the best schedule and cost option.

The recommendation to utilise this disposal method within the marine licence application is consistent with all previous consented Maintenance Dredging activities conducted at the Port of Nigg.

Due to the depth of water and tidal flow at the Sutors disposal site, the seabed level in that area has historically seen very little variance in height despite large quantities of dredge material being disposed of previously.

There have been no reported environmental incidents whilst this disposal methodology has been adopted previously.

The following factors may the CR019 disposal site suitable:

i) The site has a long history of accepting dredge spoil of this type with no recorded detriment to the environments.
ii) The site is well monitored, regulated and controlled.
iii) This is the most cost effective means of disposal.
iv) The Sutors disposal site is within 1.1 nautical miles of the dredged area, reducing mammal and fish disturbance and shipping congestion.
v) This is the safest and most environmentally effective means of disposal due to limited exposure handling, dewatering, storage and transportation emissions.

Therefore, this Option of disposal is recommended.

Transportation Plan for suction / back hoe dredging disposal at CR019

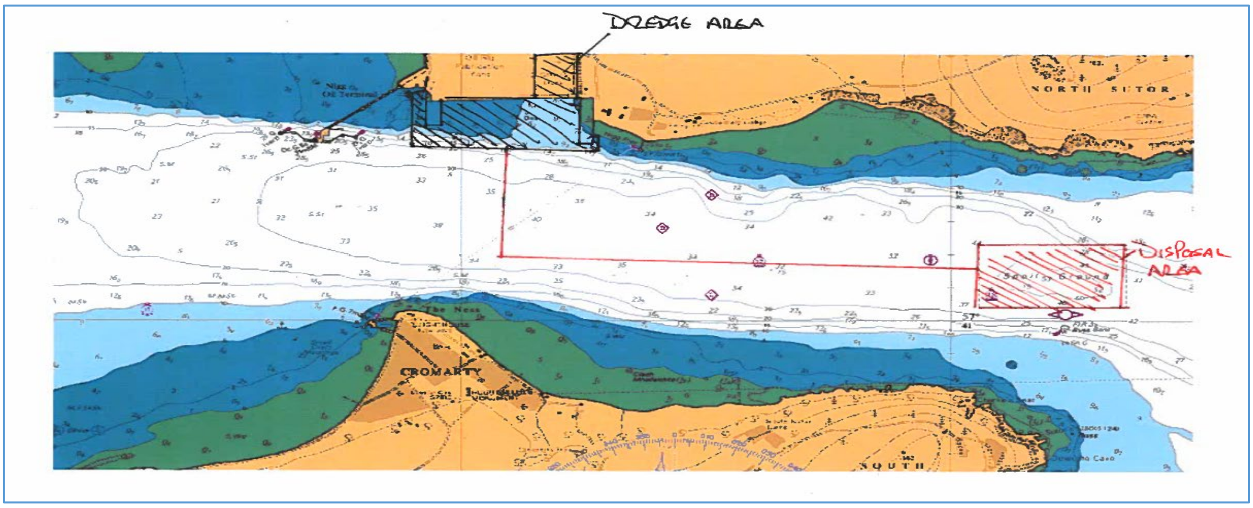


Figure 2 – Transport Route for Suction / Back hoe dredging sea disposal

Option 5 – Beach Renourishment

There are no nearby beaches in need of nourishment adjacent to the Nigg site and there are no capital beach projects within the local area that could utilise this relatively small quantity of poor quality material.

The dredging activities at the Port of Ardersier represent a better opportunity to provide a larger volume of sand material which could be utilised for beach nourishment if it is needed locally rather than the poor quality of the dredge material from Nigg.

There is no historical precedence to use this methodology in the Cromarty Firth where sand material migrates into the Firth from outside the Sutors, thus the local beaches are continually being replenished with new material.

There is insufficient space at the Port of Nigg to dewater, store and transport this material.

This is not the safest nor the most environmentally effective means of disposal due to the exposures presented during handling, dewatering, storage and transportation.

This option is considerably more expensive and not considered reasonably practicable.

Therefore, this method of disposal has been discounted.

Option 6 – Do nothing approach

Having purchased the Port of Nigg in 2011 we have conducted several maintenance and capital dredging programs and it is apparent that to maintain the water depths at the berths at Nigg, maintenance dredging is required every 2-3 years.

Bathymetric surveys of the seabed are taken at least annually, to monitor the seabed levels.

The shipping activities at the Port of Nigg are predominantly associated with Oil and Gas and Renewables project vessels. These vessels are large and often have deep drafts.

For the provision of safe navigation, marine warranty surveyors typically mandate at least 1 meter of under hull clearance for such vessels to come into a port berth.

Failure to maintain the desired water depth at the quays at Nigg would result in further siltation adjacent to the berths, and this will restrict the size and draft of vessels which come into the port, and would result in a significant loss of revenue and jobs at the port.

Therefore, this option has been discounted.

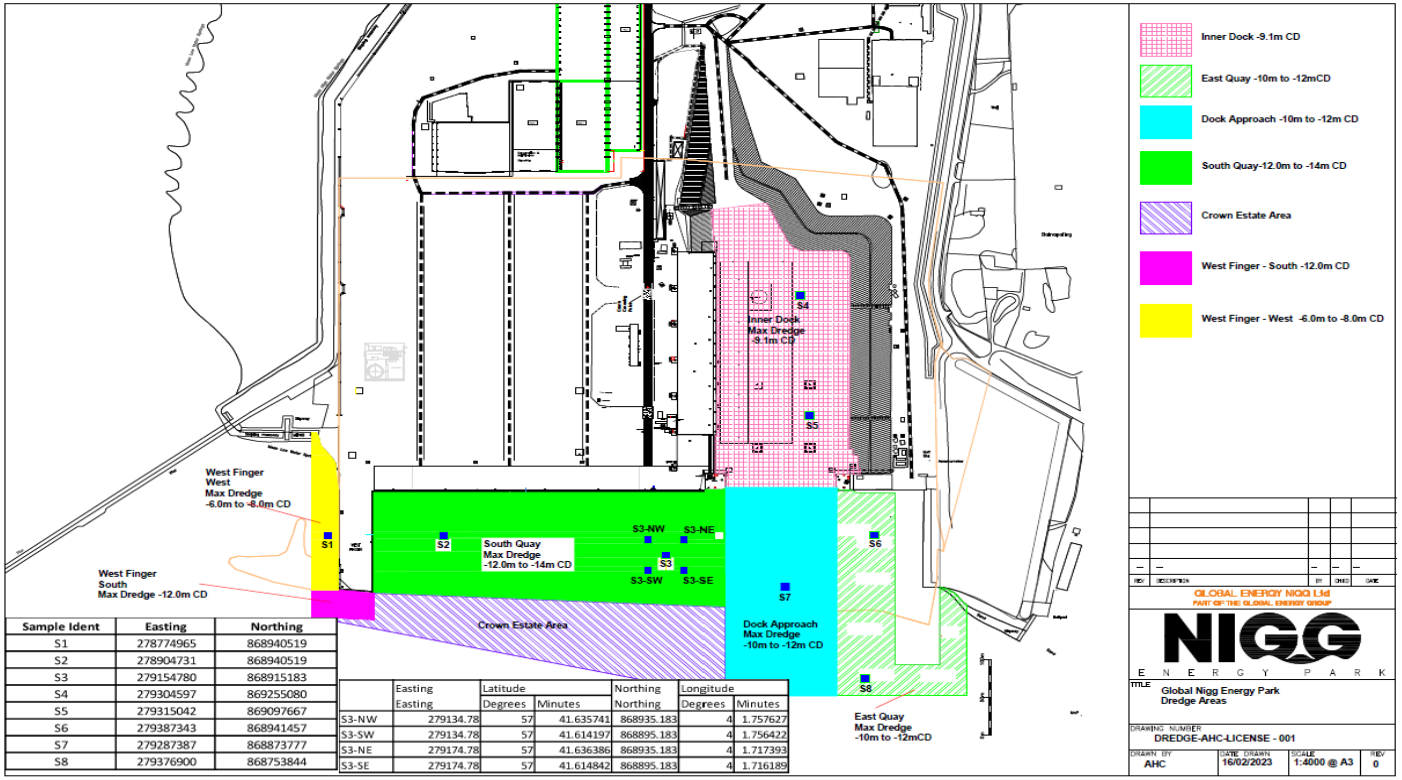
2.4 Sample Analysis:

2.4.1 Sample Locations

The initial seabed samples were taken on the 23rd August 2022 and transported to the laboratory to be examined by Fugro.

The Samples were initially taken from 8 separate locations (See Sample Locations map below)

To take the samples, a Van-Veen grab device was utilised deployed from a small vessel.



Sample Ident	Easting	Northing
S1	278774965	868940519
S2	278904731	868940519
S3	279154780	868915183
S4	279304597	869255080
S5	279315042	869097667
S6	279387343	868941457
S7	279287387	868873777
S8	279376900	868753844

	Easting	Latitude		Northing	Longitude	
	Easting	Degrees	Minutes	Northing	Degrees	Minutes
S3-NW	279134.78	57	41.635741	868935.183	4	1.757627
S3-SW	279134.78	57	41.614197	868895.183	4	1.756422
S3-NE	279174.78	57	41.636386	868935.183	4	1.717393
S3-SE	279174.78	57	41.614842	868895.183	4	1.716189

Figure 3 - Sample Locations

2.4.2 Sample Physical Properties

The physical characteristics and location of the grab samples are shown in the table below.

Sample information:

Sample ID	Dredge area	Latitude	Longitude	Type of sample	Sample depth (m)	Total solids (%)	Gravel (%)	Sand (%)	Silt (%)	TOC (%)	Specific gravity	Asbestos
S1	West side of West Finge	57°41.633'N	004°02.132'W	Grab	0-2cm	63.15	0.05	62.71	37.23	1.01		No
S2	South Quay (West)	57°41.635'N	004°02.001'W	Grab	0-2cm	60.33	0.34	51.83	47.83	1.08		No
S3	South Quay (East)	57°41.625'N	004°01.749'W	Grab	0-2cm	64.64	0.03	57.24	42.73	0.88		No
S4	Inner Dock (North)	57°41.811'N	004°01.609'W	Grab	0-2cm	43.76	0.16	25.22	74.62	2.16		No
S5	Inner Dock (South)	57°41.726'N	004°01.593'W	Grab	0-2cm	44.92	0.00	27.69	72.31	1.98		No
S6	East Quay (North)	57°41.643'N	004°01.152'W	Grab	0-2cm	74.88	0.00	73.94	26.06	0.52		No
S7	Dock Approach	57°41.605'N	004°01.615'W	Grab	0-2cm	73.93	0.05	86.11	13.84	0.24		No
S8	East Quay (South)	57°41.542'N	004°01.521'W	Grab	0-2cm	73.27	0.02	85.88	14.10	0.34		No
S3-NW	South Quay (East)	57°41.635'N	004°01.757'W	Grab	0-2cm							No
S3-SW	South Quay (East)	57°41.614'N	004°01.756'W	Grab	0-2cm							No
S3-NE	South Quay (East)	57°41.636'N	004°01.717'W	Grab	0-2cm							No
S3-SE	South Quay (East)	57°41.614'N	004°01.716'W	Grab	0-2cm							No

Figure 4 – Sample Physical Properties and Locations

2.4.3 Trace Metals and Organotins

The below table highlights the results of the initial laboratory test results for trace metals and organotins:

Trace Metals & Organotins

Explanatory Notes:
Results above Action Level 1 will be highlighted in blue and above Action Level 2 in red.

Sample information:

Sample ID	Dredge area	Type of sample	Sample depth (m)	mg/kg dry weight									
				Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)	Dibutyltin (DBT)	Tributyltin (TBT)
S1	West side of West Finge	Grab	0-2cm	8.20	0.10	27.2	6.90	0.03	10.4	14.2	36.4		< 0.0004
S2	South Quay (West)	Grab	0-2cm	6.50	< 0.10	39.1	11.5	0.06	14.7	19.9	50.5		0.00064
S3	South Quay (East)	Grab	0-2cm	6.00	< 0.10	29.0	402	0.03	11.4	15.7	42.8		0.000536
S4	Inner Dock (North)	Grab	0-2cm	26.8	0.60	67.0	160	0.08	28.9	50.4	266		0.00111
S5	Inner Dock (South)	Grab	0-2cm	10.3	0.20	49.0	13.3	0.07	20.6	23.0	63.1		0.00111
S6	East Quay (North)	Grab	0-2cm	3.70	< 0.10	22.9	5.70	0.01	8.90	12.8	26.0		0.000404
S7	Dock Approach	Grab	0-2cm	3.00	< 0.10	15.7	2.90	0.02	5.40	8.90	17.2		< 0.0004
S8	East Quay (South)	Grab	0-2cm	3.10	< 0.10	13.5	3.40	0.02	5.10	8.60	16.2		0.00252

Figure 5 – Initial Trace Metals and Organotins Lab findings

At location S4 (Inner Dock North) elevated levels of As, Cd, Cr, Cu, Pb and Zn were recorded from the sample which were at AL1 level.
No previous grab samples have been taken in this area, as no dredging has been performed in the dock previously.
None of the readings returned levels which reached the AL2 level.

For the inner dock, the seabed level is now well above the dock bottom level, thus any material which is in the dock has migrated there from elsewhere in the Firth. The physical characteristics of these samples as seen in Figure 4 above, indicate that the material is predominantly silt, and thus with the strong tidal flow and dispersion during dredging collection, it should be expected that there will be a large dilution of any localised re-suspended contaminants.

It was therefore our conclusion that the material from this location would be suitable for sea disposal.

Of more concern was the initial sample taken at location S3 (South Quay East) where the level of Copper exceeded the AR2 level. We therefore decided to take 4 x additional samples in close proximity to this initial S3 location to determine whether the high copper reading was a sampling anomaly or whether there was indeed a high concentration of copper in this area.

S3-NW	South Quay (East)	Grab	0-2cm				5.25						
S3-SW	South Quay (East)	Grab	0-2cm				1.62						
S3-NE	South Quay (East)	Grab	0-2cm				4.54						
S3-SE	South Quay (East)	Grab	0-2cm				2.22						

We subsequently received the results of the laboratory testing of these additional sample locations, and all samples recorded copper below the AL1 level indicating that the original sample result was an anomaly.

When looking at the samples wholistically, and the anticipated volume of material to be dredged, it is our view that when dilution across the whole site is factored in, then there would be no exceedance in the trace metals within the materials being disposed of at sea, and we therefore conclude that sea disposal is still the best option to be pursued.

2.4.4 Polyaromatic Hydrocarbons (PAH)

The below table highlights the results of the initial laboratory test results for PAH:

Polyaromatic Hydrocarbons (PAH)

Explanatory Notes:
Results above Action Level 1 will be highlighted in blue

Definitions:

ACENAPTH	Acenaphthene
ACENAPHY	Acenaphthylene
ANTHRACN	Anthracene
BAA	Benz(a)anthracene
BAP	Benzo(a)pyrene
BBF	Benzo(b)fluoranthene
BEP	Benzo(e)pyrene
BENZGHIP	Benzo(ghi)perylene
BKF	Benzo(K)fluoranthene
C1N	C1-naphthalenes
C1PHEN	C1-phenanthrene
C2N	C2-naphthalenes
C3N	C3-naphthalenes
CHRYSENE	Chrysene
DBENZAH	Diben(ah)anthracene
FLUORANT	Fluoranthene
FLUORENE	Fluorene
INDPYR	Indeno(1,2,3-cd)pyrene
NAPTH	Naphthalene
PERYLENE	Perylene
PHENANT	Phenanthrene
PYRENE	Pyrene
THC	Total Hydrocarbon Content

Sample information:

Sample ID	Dredge area	Type of sample	Sample depth (m)	µg/kg																						
				ACENAPTH	ACENAPHY	ANTHRACN	BAA	BAP	BBF	BEP	BENZGHIP	BKF	C1N	C1PHEN	C2N	C3N	CHRYSENE	DBENZAH	FLUORANT	FLUORENE	INDPYR	NAPTH	PERYLENE	PHENANT	PYRENE	THC
S1	West side of West Finger	Grab	0-2cm	1.4	0.4	2.4	17.6	21.1	36.1		14.7	11.5					15.8	0.8	29.9	1.7	18.7	1.9		12.0	27.7	16900
S2	South Quay (West)	Grab	0-2cm	27.4	1.1	3.3	30.3	37.7	77.7		25.4	25.6					46.3	5.8	102	22.6	34.3	44.5		86.8	78.0	23200
S3	South Quay (East)	Grab	0-2cm	2.1	0.5	3.0	13.5	14.8	26.5		12.0	8.3					11.5	0.7	26.8	2.0	14.8	3.1		11.3	23.6	20600
S4	Inner Dock (North)	Grab	0-2cm	1.5	0.5	2.8	12.7	15.2	33.9		15.1	9.9					10.6	1.0	27.3	2.2	19.3	3.9		11.9	24.1	34600
S5	Inner Dock (South)	Grab	0-2cm	1.8	0.5	2.6	12.2	13.7	29.7		13.2	8.8					10.6	0.9	24.6	2.1	16.9	2.7		11.3	21.8	30200
S6	East Quay (North)	Grab	0-2cm	1.5	0.2	1.4	6.1	7.0	13.4		5.8	4.1					5.1	0.5	12.6	1.4	7.2	1.2		6.4	11.5	18400
S7	Dock Approach	Grab	0-2cm	2.0	0.3	2.0	8.1	9.4	15.7		7.6	4.8					7.2	0.6	16.6	1.7	8.8	1.1		9.4	14.9	13700
S8	East Quay (South)	Grab	0-2cm	0.7	0.2	0.9	4.7	4.9	10.0		4.5	3.0					4.0	0.3	9.4	0.7	5.4	0.8		3.9	8.6	17200

Only a single location S2 (South Quay West) had an elevated level of Fluorant which was at the AL1 limit.
The levels of Fluorant from the samples taken prior to the previous dredging licence application in 2016 was review, and the levels were below AL1 level at that time.

With the strong tidal flow and dispersion during dredging collection, it should be expected that there will be a large dilution of any localised re-suspended contaminants.
It was therefore our conclusion that the material from this location would be suitable for sea disposal.

2.4.5 Organohalogens

All samples taken showed that the level of Organohalogens were within safe limits

2.5 Summary / Conclusion

The assessment of options highlights the major operational challenges associated with landfill and other use options due to the lack of available sites coupled with the physical characteristics and nature of the dredge materials.

There is also a significant additional cost associated with any land based re-use options caused by having to construct a landing area, store and dry to the material then transport the material using HGVs.

The laboratory sample results only had one sample which exceeded the AL2 level for copper which would have indicated it would have been unsuitable for sea disposal, but subsequent testing adjacent to the initial sample location, returned results which were within specification limits thus indicating that the initial sample was an anomaly, and the material in this area is now considered safe for sea disposal.

Historically, every marine licence issued at the Port of Nigg have approved sea disposal, and there have been no environmental incidents reported as a result of using the designated disposal site.

The proposed project supports the objectives set out in Scotland’s National marine Plan and will continue to maintain and support the sustainable development of the Port of Nigg and enable it to continue to operate as the larges port within the Cromarty Firth, and the pre-eminent renewables hub in Scotland.

Disposal at sea will keep the dredge material within the aquatic ecosystem.

Therefore, the BPEO is identified as the disposal at a licensed sea disposal site. The preferred site for this is CR019 at the mouth of the Cromarty Firth.