Ullapool Shore Street Widening and Promenade
&
Small Boat Harbour Development

Capital Dredge Best Practicable Environmental Opinion Report

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1 Introduction

This Best Practicable Environmental Option (BPEO) report has been produced to support the dredge and disposal marine licence application under the Marine Works (Scotland) Act 2010 for the proposed Ullapool Shore Street Widening & Promenade and Small Boat Harbour development.

1.1 Reports Aims and Objectives

The purpose of this report is to identify and assess the available options for the use/disposal of dredged materials, arising from the development of the Ullapool Shore Street Widening & Promenade and Small Boat Harbour development.

The objectives are:

- To provide an overview of the required dredging works;
- Describe the proposed areas for which a dredging campaign is required, including estimated quantity of dredged material likely to be removed;
- Describe the BPEO methodology employed to complete the assessment; and
- To identify and assess options for disposal of dredged material to determine the BPEO for disposal of dredge spoil.

2 Background

Shore Street, Ullapool, trunk road number A893, links to the main trunk road running through Ullapool, the A835, to the Ullapool Ferry Terminal. The ferry terminal is the main gateway between the mainland and the Outer Hebrides. Shore Street is also popular with residents and visitors to Ullapool as it includes shops, cafes and tourist accommodation. There are pavements on both sides of the carriageway and on-street parking. The street is protected from the sea by a small seawall with a concrete block revetment on its seaward side. The 40-year-old concrete block revetment sea defence is in a poor state due to age related damage and undercutting. Maintenance of Shore Street and its sea defences are the responsibility of the Trunk Road Authority, Transport Scotland.

Planning and Marine Licence applications are being made to widen Ullapool's Shore Street to make a wider road carriageway, and to construct a new shoreside promenade in place of the existing footway. Proposals will improve safety for vehicles and pedestrians and remove the hazardous bottleneck which currently exists over this length of the primary access route between Ullapool's Ferry Terminal and the rest of the trunk road network. The Ullapool Shore Street Widening and Promenade proposals require land reclamation and installation of new sea defences.

Small boats currently haul out on the beach at the western end of Shore Street, and the land reclamation will reduce the available space for haul out. To address this issue, the applications also include the development of a Small Boat Harbour within the inner basin of Ullapool Harbour. The Harbour Development works will consist of a new quay at the eastern end of Shore Street and the installation of new berthing pontoons in the area to the north side of the existing main pontoon. To facilitate safe navigation and berthing of vessels utilising the facilities provided, the area will require dredging and a floating breakwater pontoon will be

installed on the eastern end of the existing main pier to provide shelter to the berthing pontoons.

The development of the Small Boat Harbour not only replaces the haul out facility, it upgrades Ullapool Harbour's provision for small boats to meet a growing demand. The additional quay space and pontoons will provide extra berths and access for inshore fishing fleet, blue tourism companies and recreational boat users.

2.1 Dredge Areas and Volumes

Dredging required for the proposed project falls within three areas:

a) Inner harbour dredge to -2.5m Chart Datum (CD), with its eastern shore side slope protected by rock armour;
b) Deeper dredge pocket of the south inner harbour dredged to -3m CD; and
c) Toe dredge, for the new rock armoured revetment along the length of the promenade, dredged to 2m below existing levels.

The proposed dredge areas, as shown in Drawing 2127-955 will comprise an area of approximately 7,925m^2. An estimated total of up to 18,000m^3 of spoil will arise from the dredge.

A range of specific gravities have been identified across the total proposed dredge area between 2.74 and 2.91. To be conservative a specific gravity of 2.9 has been assumed, therefore the mass of the combined dredged materials would be approximately 52,200 tonnes.

Two methods of dredging will be implemented. It is estimated that 12,000m^3 will be dredged using a shore based long reach plant. This will include the areas of the inner basin which can be reached from land and the promenade toe dredge. The remaining 6,000m^3 of material from the inner harbour and deeper dredge pocket will be dredged by a backhoe digger on marine plant.

2.1.1 Sampling

Sampling was conducted by Blake Geoservices Ltd conforming to Marine Scotland Guidance notes on Pre-Disposal Sampling (Marine Scotland, 2017). The 'Factual Report at Ullapool Promenade' (Blake Geoservices, 2020) is attached as Appendix 1.

Marine Scotland Guidance requires, as a minimum, three sample locations in relation to the proposed volume of the dredge. As the proposed dredge depth will be more than 1m, core samples were needed at each of the sample locations.

In accordance with the guidance, three sample locations were completed within the inner harbour dredge area and a further one within the toe dredge area. Sampling was completed using land based borehole equipment to achieve core depths up to 5.75m, equivalent to minus 2.5m CD. Table 2.1 details the positions of the borehole sample stations (Boreholes (BH)). No samples were taken in the deeper dredge pocket as this would have required the mobilisation of a marine based plant, the cost of which would have been disproportionate to the scale of the dredge. There was no reason to expect a significant difference in the chemical composition of material in the deeper dredge area. It is also highly unusual to find contamination at depth with no signs of contamination in layers above.

Table 2.1: Coordinates of Sampling Stations

Sample ID	Length of Core (m)	Depth Below CD	Latitude (N)	Longitude (W)
BH1	5.75	-2m	57°53.730	5°09.551
BH2	4.75	-2.5m	57°53.747	5°09.508
BH3	4.75	-2.5m	57°53.744	5°09.477
BH4	2.00	+2m	57°53.763	5°09.402

2.1.2 Sample Analysis

All borehole samples were analysed by the Laboratory i2 Analytical who are accredited to ISO17025. In line with Marine Scotland Guidelines, boreholes BH1-4 had samples taken at the surface and then at approximately 0.5m intervals. Three samples (surface, middle and bottom) were sent for analysis.

All samples were tested for a suite of chemical parameters analysed against the Action Levels (AL) prescribed by Marine Scotland in the Pre-Disposal Sampling guidance (Marine Scotland, 2017).

2.1.3 Results

The results of the borehole sample analysis have been summarised in this section. The full sample results are available in the spreadsheets entitled Ullapool Pre-Disposal Sampling Results, which has been supplied with the dredge licence application.

2.1.3.1 Particle Size Distribution

Particle size distribution (PSD) analysis identified that they compromised 93.74% solids of which 76.97% was gravel, 18.55% was sand and 4.48% was silt on average across all samples. Geotechnical descriptions of the material from the boreholes are summarised in Table 2.2.

Table 2.2: Core Description

Core	Sample Section		
	Top	Middle	Bottom
BH1	0.00– 0.60 Brown, slightly sandy gravel, shelly, sand is coarse, gravel is rounded, fine of mixed lithologies.	0.60 – 5.75 Brown, dense becoming medium dense, sand and gravel, shelly, with frequent subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.	
BH2	0.00 – 0.50 Brown, gravelly sand, shelly with frequent subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.	0.50 – 4.75 Brown, sand and gravel, shelly, with frequent subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.	
BH3	0.00 – 3.20		3.20 – 4.75

Core	Sample Section		
	Top	Middle	Bottom
	Brown, sandy, gravel with numerous subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies		Brown, very sandy, gravel with numerous subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.
BH4	0.00 – 0.60 Brown, gravelly sand, shelly with frequent subangular cobbles of mixed lithologies, sand is coarse, gravel is rounded, fine of mixed lithologies	0.60 – 2.00 Brown, sandy, gravel with numerous subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.	

2.1.3.2 Trace Metals and Organotins

As shown in the Ullapool Pre-Disposal Sampling Results Spreadsheet, of all the borehole samples analysed, there were only two minor exceedances. At BH4-A concentrations of copper (Cu) were detected at 67.1 mg/kg (dry weight), which exceeds the AL1 limit of 30 mg/kg, however, is well under the AL2 limit of 300mg/kg (dry weight). At BH2-C, concentrations of mercury (Hg) were detected at 0.4 mg/kg, which only just exceeds to the AL1 limit of 0.25 mg/kg (dry weight), however, is well below the AL2 limit of 1.5 mg/kg (dry weight). The average for the total dredge area showed no exceedances of AL1 detection limits. Therefore, the potential dredge material is not predicted to pose a threat to the environment due to the presence of metals or organotins.

2.1.3.3 Polyaromatic Hydrocarbons (PAHs)

Across the range of Polyaromatic Hydrocarbons (PAH) tested at each of the sample locations, there were no exceedances of AL1. These can be seen in detail in the spreadsheet entitled Ullapool Pre- Disposal Sampling Results, which has been supplied with the dredge licence application.

3 BPEO Method

3.1 Introduction

In identifying the BPEO for this proposed dredge campaign the following methodology has been employed:

- Identification of options available for the disposal of material;
- Screening to eliminate unsuitable options;
- Scoring of remaining options; and
- Comparison of options and identification of the BPEO.

3.1.1 Option Identification

Options for disposal of the material were identified through discussions with Ullapool Harbour Trust and their engineers Wallace Stone.

3.1.2 Screening

All options have been screened against minimum criteria which each option had to meet in order to be taken forward for detailed consideration. Any option which failed to meet one or more of the criteria was not taken forward to the detailed assessment. The criteria used were:

- The proposed option must be suitable for the characteristics of the dredge material;
- It must be technically viable;
- It must allow for the development of the Ullapool Shore Street Widening and Promenade and Small Boat Harbour within the existing development programme; and
- Allow for continued use of the Ullapool Harbour during construction, with no operational impact.

3.1.3 Scoring

Options were scored against a list of attributes; this approach ensures that the same considerations are given to each option so that they can be compared fairly. Attributes were identified to ensure that environmental, technical and cost considerations were taken account of in the decision-making process.

Attributes were scored out of 5 with 1 being the worst performing and 5 being the best, the definitions for each criteria were decided prior to the options being assessed. Each score has been designated a colour to aid visual comparison. The attributes and scoring definitions are provided in Appendix 2.

Options meeting the minimum criteria were scored against each of the attributes (Appendix 3) and reasoning for this scoring provided (Appendix 4).

3.1.4 Comparison of Options and Identification of the BPEO

Following the scoring of the options detailed comparison was undertaken to identify the BPEO.

4 Assessment of Options

4.1 Identification of Options Available

Several options were initially identified for the disposal of the proposed dredge material including both terrestrial and marine based options. The options identified are outlined below. A "do nothing" scenario is included for consideration in line with standard practice for BPEO assessments.

- Do Nothing;
- Disposal to Landfill;
- Spreading on Agricultural Land;
- Re-use within the Development;
- Bring to Land for use as Aggregate;
- Deposit at Sea to the Existing Ullapool Deposit Site (HE050);
- Deposit at Sea to the Existing Lochinver Deposit Site (HE040);
- Plough Dredging; and
- Deposit at Sea to a New Spoil Deposit Site.

4.2 Screening of Options

Options were screened against the minimum criteria as outlined in Section 3.1.2. This process eliminated five of the nine options as they do not meet one or more of the screening criteria. The reasons why the five options have been discounted are discussed below.

4.2.1 Do Nothing

To not undertake dredging would have a significant impact on the proposed development. In order to widen Shore Street, the toe dredge is needed to ensure the stability of the rock revetment. In addition, the development of the Small Boat Harbour within the inner basin of Ullapool Harbour requires dredging to achieve the depth required to allow small boat access at all tide states, and for pontoons to function effectively. Hence, to do nothing would likely result in the project not going ahead. Alternative designs have been considered all of which require some element of dredge.

4.2.2 Disposal to Landfill

While the chemical and physical characteristics of the material are suitable for disposal to a landfill site, this option has been discounted. The dredge material would account for just over 80% of the annual capacity of the closest landfill in Caithness, located approximately 185km by road from Ullapool Harbour. The use of such a large proportion of landfill's capacity is unlikely to be acceptable. The use of the Granish Landfill Site in Aviemore is not feasible as the annual capacity is well below the volume dredged as part of the proposed development. As such this option is not technically viable.

Even if the landfill sites could take the waste volumes arising, the distance to them is such that the transport times involved would extend the programme significantly and hence would not deliver the works in the existing programme.

Although not part of the screening criteria it is noted that this option does not align with policy. The Scottish Government launched a Zero Waste Plan for Scotland in 2010 with a vision for a zero-waste society. The plan has a target to recycle 70% of material and a maximum of 5% to landfill by 2025 for all Scotland's waste (Scottish Government, 2010). The disposal of dredged material to existing landfill sites, therefore, does not align with the Scottish Government Policy where the onus is on reducing the amount of material being sent to a landfill site.

The disposal to landfill option is therefore screened out and not taken further.

4.2.3 Spreading on Agricultural Land

This option has not been considered further due to the limited arable land along the west coast of Scotland. In addition, the high saline content makes material unsuitable for spreading onto agricultural land without significant further treatment. Salinity is a key environmental limiting factor for the productivity of plant growth and many crops are salt sensitive, making excess salinity a threat to agriculture (Flowers, 2005). This option is therefore screened out as the characteristics of the dredge spoil and lack of arable land make this option technically unviable.

4.2.4 Plough Dredging

Plough dredging has not been considered further as it is not a technically feasible option. The location of large sections that require dredging are above the MLWS, meaning that they would

not be accessible by a plough dredge vessel. In addition, this method would move spoil into other areas of the harbour with the possibility of making these areas less navigable due to material deposition decreasing depth.

4.2.5 Deposit at Sea to New Spoil Deposit Site

The option requires a new spoil deposit site to be consented near Ullapool Harbour was screened out, as the legislative process is a complex and lengthy. A suitable site would need to be found, baseline surveys required, and assessments completed before a site could be designated. The requirement for characterisation of the candidate Spoil Deposit Site and Marine Scotland – Licensing Operations Team (MS-LOT) consultation with stakeholders can take up to a year to process, dependent on existing information (Marine Scotland, 2013). It is therefore unlikely to be permitted within the existing development programme.

4.3 Assessment of Feasible Options

Following the screening process, the options taken forward for further analysis are:

- Re-use within the Development;
- Bring to Land for use as Aggregate;
- Deposit at Sea to the Existing Ullapool Spoil Deposit Site; and
- Deposit at Sea to the Existing Lochinver Spoil Deposit Site (HE040).

Each of these options have been analysed against the attributes identified in Appendix 2. The options scoring is provided in Appendix 3 with the reasoning for attribute scoring provided in Appendix 4. Where referred to, scores are provided in brackets below.

4.3.1 Re-use within the Development

The construction activities associated with the proposed development include reclamation activities in order to construct the new Shore Quay and the promenade. The reclamation associated with the new quay will require 2,600m^3 of granular fill and a further 890m^3 will be required for the new promenade. This amounts to a total of 3,490m^3 of infill material required for the proposed development. In order for the re-use of material as infill to be viable, dredging would need to occur before or during the infilling activities. Dredging of the small boat harbour can only occur once the infill behind the sheet pile, for the Shore Quay, has been sufficiently progressed, such that the wall is sufficiently supported during dredging as such it has been assumed that only 890m^3 of material can be reused as infill. In addition to the infill activities discussed above, it is proposed that as part of the development, beach replenishment is undertaken. This will require a further 4,000m^3 of dredge spoil, increasing the volume of dredge spoil to be used within the development to 4,890m^3. This amounts to just over 27% to the total dredge spoil having the potential to be used within the development. As such this option if preferred is only a part solution.

The re-use of dredge material is near the top of the waste hierarchy and is therefore consistent with the Scottish Government's policy of a Zero Waste Scotland by 2025. In addition, the re-use of dredge spoil as part of the development is line with the Waste Directive Framework (Directive 2008/98/EC) and The Waste (Scotland) Regulations 2012 and positively implements and aligns with policy (5). For material to be suitable for re-use from a construction perspective, it needs to be both chemically and physically suitable. The lack of contamination present and the high gravel and sand content, with low levels of silt, make the dredge spoil both chemically and physically suitable for re-use within the development (5).

As discussed above, this option is dependent on the construction schedule and sequence. Dredging will need to occur prior to or during the infilling activities to ensure that the required dredge material is available (4). It is assumed that only material dredged from the land based plant will be utilised within the development, as the cost associated with bringing the remaining 6,000m^3 of dredge spoil from the marine plant to land would be high. While there are costs associated with the reuse of dredge material within the development, it is offset by the savings associated with purchasing less aggregate for infill activities (5).

In addition to cost savings associated with the re-use of aggregate within the development, once on land, there will be minimal transport of dredge spoil required (5). Limited transport and immediate use of the material means that the dredge spoil is unlikely to be a source of dust or increase number of vehicles on public roads. Standard management measures for use of aggregate within the development will need to be implement (4), hence any potential environmental impacts are deemed trivial (4).

The re-use of material is standard practice and would not require any further licences or permits as it will be permitted as part of the Marine Licence Process for the proposed development (4).

As dredge activities are occurring within an operational harbour, management of existing operations around dredge work will be required, which will ensure minimal disruption to operations. It is noted that the beach will not be available to the public while the beach is being replenished. However, the beach will be closed during the construction of the proposed project and therefore is not a new impact resulting from the beach replenishment. Therefore, only trivial impacts on harbour operations are expected through this option (4).

The option to re-use dredge spoil scored a 40 out of 45.

4.3.2 Bring to Land for use as Aggregate

The option to use dredge material as aggregate at various developments in the area. In order to achieve this, dredge material arising from both the land-based plant and marine plant will need to be transported to an area within the harbour where it can be loaded into trucks and transported to a quarry for storage until it can be utilised at other developments. The nearest quarry to the Ullapool Harbour is the Morefield Quarry, located approximately 4.4 miles. Prior to the material leaving the Harbour, it will need time to dewater /dry out to prevent seawater spilling out the back of the trucks during transport.

The re-use of material is near the top of the waste hierarchy and is therefore consistent with the Scottish Government's policy of a Zero Waste Scotland by 2025. In addition, the re-use of dredge spoil as an aggregate at other developments in the Ullapool area is line with the Waste Directive Framework and The Waste (Scotland) Regulations 2012 (5). For material to be suitable for re-use from a construction perspective, it needs to be both chemically and physically suitable. The lack of contamination present and the high gravel and sand content with low levels of silt make the dredge spoil both chemically and physically suitable for re-use as aggregate in other developments (5).

While the dredge spoil is suitable for use as aggregate for various developments, transporting the dredge spoil from the marine plant to land could lead to an extension of the construction timeline (4). The dredge spoil will then need to be transported to Morefield Quarry (4) for temporary storage and possible processing, before being removed and used for a

development project in the area. The cost of resale of this aggregate may offset the transport from the harbour to the quarry (5).

While the process of re-using dredge spoils is standard practice, it requires some processing before being used as an aggregate (4). The temporary storage, processing and re-use of the material in other developments will need to comply with the relevant waste legislation (3). In order for the quarry to store and process the dredge spoil for resale, registration for waste exemption under paragraph 13 of The Waste Management Licensing (Scotland) Regulations 2011 will be required. This is obtained through the submission a of registration form to the Scottish Environmental Protection Agency (SEPA).

The transportation of the dredge spoil has the potential to lead to traffic impacts with increased vehicle traffic to and from the harbour to the quarry. In addition, there is potential for dust generation during both the transport and storage of the dredge spoil (4). The landing of dredge spoil from the marine plant will require a large area of quay side space, which is already limited, for storage of dredge material until can be collected and transported to the quarry. This will significantly impact on current operations within the harbour. (2).

The option for re-use of the dredge spoil as an aggregate for other developments scored 36 out of 45.

4.3.3 Deposit at Sea to the existing Ullapool Deposit Site (HE050)

There are numerous open dredge and disposal sites located within Scottish Waters for deposition of dredged material. The closest site to the proposed dredge is the Ullapool (HE050) Spoil Deposit Site, located just outside the harbour. Deposit of dredge spoil to HE050 requires dredge material to be disposed of directly from marine plant or transferred from land-based dredge plant to marine plant for deposit.

The deposit of dredged spoil at sea to HE050 does not fully align with the Scottish Governments' policy of Zero Waste Scotland (2) as it is low on the waste hierarchy. As discussed in 2.2, the chemical analysis of the dredge material identified the material to be appropriate to be disposed of at sea, the high sand gravel content mean that the dredge spoil will drop through the water column rapidly minimising the spread of the dredge spoil through the water column (5).

The Spoil Deposit Site is within the bounds of the Wester Ross MPA, which is designated in part for the diversity of benthic organisms and burrowed mud habitats it supports, including burrowed mud and circalittoral muddy sand communities and three species of sea pen. A benthic survey was undertaken by APEM in October 2020 and has been appended to the Supporting Document (Affric Limited, 2021). The survey results are discussed within Section 5.1.3 Water and Seabed Quality of the Supporting Document. Depositing of dredged material on the southern edge of the disposal ground will avoid putting any pressure on the tall sea pen present in the disposal ground and hence not impact upon the features of the MPA (3).

As a large portion of the dredge spoil will be removed by the land-based plant, there will be a cost associated with transferring the dredge spoil onto the marine plant and disposing it to HE050 (4). Transferring dredge spoil from land onto the marine plant will lead to an extension in the construction timeline (4). The Spoil Deposit Site is within 1 mile of the site, limiting the amount of travel required to reach the site (5).

The deposit of dredge spoil to sea is established and a well-practised methodology, with (4). Deposit to the designated deposit site will be permitted in terms of the dredge licence for the Ullapool development, no further licence or permits will be required. There will, however, be some management required to ensure the deposit complies with the conditions of the licence (4).

The transfer of dredge spoil from land to the marine plant will require a large area of quay side space, which is already limited, for storage of dredge material while it is waiting to be loaded. This will significantly impact on current operations within the harbour (2).

The option to deposit dredge spoil to sea to HE050 scored 33 out 45.

4.3.4 Deposit at Sea to the Existing Lochinver Spoil Deposit Site (HE040)

As discussed in Section 4.3.3, there are numerous open dredge and spoil deposit sites located within Scottish Waters for deposition of dredged material. The nearest Spoil Deposit Site, after Ullapool, is Lochinver Spoil Deposit Site (HE040), located approximately 45km by sea from Ullapool. Deposit of dredge spoil to HE050 requires dredge material to be disposed of directly from marine plant or transferred from land-based dredge plant to a vessel for deposit.

The deposit of dredged spoil at sea to HE040 does not fully align with the Scottish Governments' policy of Zero Waste Scotland (2) as it is low on the waste hierarchy. As discussed in 2.2, the chemical analysis of the dredge material identified the material to be appropriate to be disposed of at sea, the high sand gravel content mean that the dredge spoil will drop through the water column rapidly minimising the spread of the dredge spoil through the water column (5).

Site HE040 is located within Enard Bay, which is currently under consideration for management due to the presence of Seagrass. Seagrasses (*Zostera noltii, Zostera angustifolia* and *Zostera marina*) are PMFs. However, the presence of Seagrass within the Spoil Deposit Site is unknown. In addition, the spoil deposit site is located within Inner Hebrides and the Minches Special Area of Conservation (SAC), designated for harbour porpoise (*Phocoena phocoena*), which would need taken account of during spoil deposit due to potential for harm if below the dredge vessel during a deposit operation (3).

As a large portion of the dredge spoil will be removed by the land-based plant, there will be a cost associated with transferring the dredge spoil onto a vessel, which will need to be hired for transporting dredge spoil to HE040 (3). Transferring dredge spoil from land onto the vessel will lead to an extension in the construction timeline (4). The Spoil Deposit Site is 45km by sea (2).

The deposit of dredge spoil to sea is established and a well-practised methodology (5). Deposit to the designated deposit site will be permitted in terms of the dredge licence for the Ullapool development, no further licence or permits will be required. There will, however, be some management required to ensure the deposit complies with the conditions of the licence (4).

The transfer of dredge spoil from land to a vessel for transport to HE040, will require a large area of quay side space, which is already limited, for storage of dredge material while it is waiting to be loaded. This will significantly impact on current operations within the harbour. In addition, the vessel will need to come in and out of Loch Broom to access HE040, increasing interactions with the ferry and other vessels coming in and out of the Loch (2).

The option to deposit dredge spoil to sea to HE040 scored 27 out 45.

4.4 Comparison of Options

The re-use of the dredge spoil within the development scored highest of the four options assessed, with re-use as aggregate within other developments scoring second highest. Out of the two deposit options, deposit at HE050 scored higher than HE040.

As the option to re-use dredge spoil within the development scored the highest it is the preferred option, however, only 27% of the total anticipated dredge volume will be required for use within the development, leaving 73% requiring an alternative route. As such the remaining three options need to be considered for the management of the remaining spoil.

All four options scored well against material suitability and technical feasibility. The chemical and physical characteristics make it suitable for re-use but also for deposit at sea and both are standard practice.

A comparison of the two deposit at sea options shows that the distance to the site, and hence associated transport costs and timescales to Lochinver (HE040), mean the option scores much lower than using the local Ullapool spoil site (HE050). Furthermore, HE040 does not score higher against any attributes than HE050, and hence there are no advantage of this option. It should be noted that HE040 was considered as an alternative due to potential ecological sensitivities at HE050, however, on examination HE040 also has ecological sensitivities which need to be borne in mind.

The re-use options scored high against alignment with policy, while the deposit at sea option scored low as waste disposal is low on the waste hierarchy while reuse is near the top. In addition, the reuse options scored well against environmental affects, while deposit at HE050 scored slightly lower due to potential environmental impacts.

In terms of the impacts on the harbour operations, the option to re-use within the development scored high, while use as aggregate at other developments and deposit at HE050 scored lower due to transfer of dredge spoil to land and visa versa. However, if a land-based solution was utilised for the land dredge material and a marine based solution (deposit at sea) was utilised for the marine plant dredged material then the impacts on harbour operations would be significantly reduced for both options.

The BPEO is therefore, a combination of three of the options.

- Every endeavour should be made to utilise land plant dredged spoil as aggregate in the development; as infill and beach replenishment; this is expected to be in the order of 4,890m^3/ 14181t of spoil.
- The remaining land plant dredged spoil (7,110m^3/ 20,619t) should be sent to the quarry for storage and processing before being utilised as aggregate in other developments.
- The 6,000m^3/17400t of spoil dredged by floating plant should be deposited at sea in the existing Ullapool spoil ground (HE050)

The combined approach ensures that the dredging can be completed cost effectively, within project timeframes, with minimal impact on harbour operations and the environment.

5 Conclusion

The pre-disposal sample results have informed this assessment in terms of providing an understanding of both the chemical and physical status of the sediments to be dredged. Due to a high gravel and sand content, and low silt content, the material is deemed suitable for reuse or marine deposit. Multiple options were considered, a number of which were screened out early in the process. Of those taken forward for full assessment, the option for 'Re-use within the Development' scored the highest against a range of attributes, followed closely by 'Bring to Land for use as Aggregate' and 'Deposit at Sea to the Existing HE050'. Due to the volume of dredge spoil that will be left over following re-use in the development and the impact on harbour operations of transferring dredge spoil from sea to land and visa versa, the BPEO for the management of dredged spoil is a combination of the two reuse options (within development and for other projects) for the dredge spoil already on land and deposit at sea to the existing HE050 Spoil Deposit Site for dredge spoil dredged by marine plant.

6 References

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7 Glossary

Acronym	Definition
AL	Action Levels
BH	Boreholes
BPEO	Best Practicable Environmental Option
CD	Chart Datum
Cu	Copper
Hg	Mercury
MHWS	Mean High Water Spring
MPA	Marine Protected Area
PAH	Polyaromatic Hydrocarbons
PMFs	Priority Marine Features
PSD	Particle Size Distribution
SAC	Special Area of Conservation
SEPA	Scottish Environmental Protection Agency

Appendix 1: Factual Report of Ullapool Promenade

Factual Report for:

Engineers:

For Site at:

Ullapool Promenade

Blake Geoservices Ltd
Munro Sawmills
Old Evanton Road
Dingwall
Ross-shire
IV15 9UN

www.blake-geoservices.co.uk

December 2020

Report prepared by:

Chris Blake BSc Hons FGS

For Blake Geoservices Ltd

CONTENTS

1.0 SCOPE OF SITE WORK

1.1 Introduction

Blake Geoservices Ltd (The Contractor) was appointed by Allen Gordon LLP (The Engineer) on the behalf of The Ullapool Harbour Trust (The Client) on 20th November 2020 to undertake site investigation works at the foreshore of Ullapool Harbour. The Engineer determined the scope of work prior to mobilisation including the location of the exploratory positions. The purpose of the investigation was to provide environmental & geotechnical information for the Clients consideration and to allow for removal of material, comprising of typed logs of the ground encountered to the standards outlined in BS5930:2015, followed by environmental & geotechnical testing of soils.

1.2 Site Description and Location

The site comprises the foreshore directly to the east of Ullapool Harbour bounded by the A893 to the north. The site has a grid reference of NH 12869 93950. The site comprises a fairly steep shingle beach lying between the low tide line and the concrete breakwater of the A893. The surrounding area is open water to the south & east, harbour to the west with the town of Ullapool to the north.

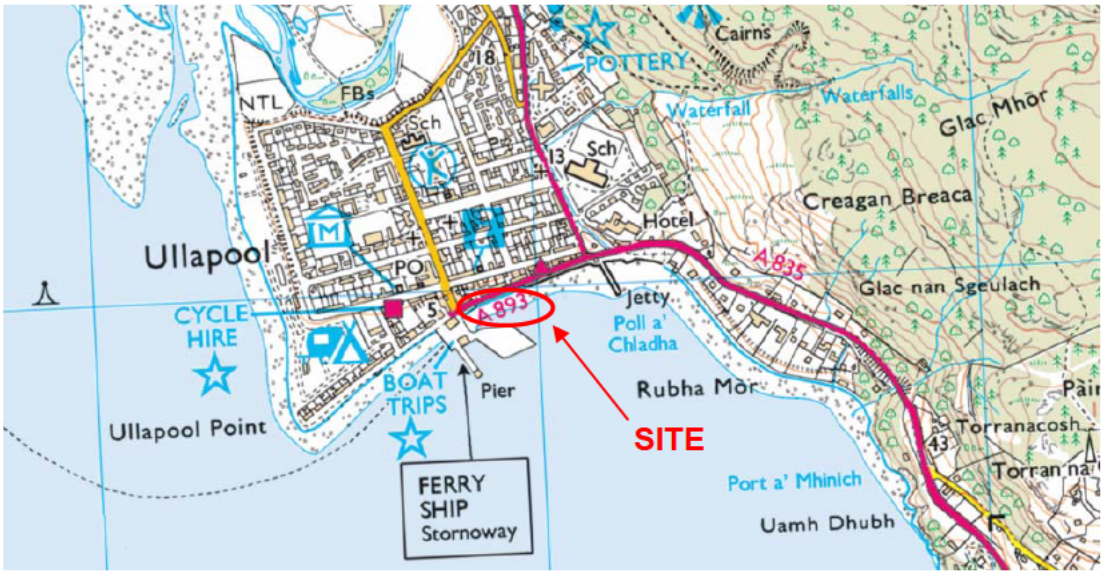


Figure 1. Approximate Site Location Plan

1.3 Site Work

The scope of all site work was determined by the Engineer including the positions of the investigation points. Upon to mobilisation to site, the original exploratory positions were walked through by the Contractor and all were deemed appropriate for safe intrusive works, albeit given the site comprises uneven ground in places, some minor repositioning was required to allow safe operation of the plant. Approximate as dug positions are presented in appendix 1.

2.0 FINDINGS OF SITE WORK

2.1 Rotary Percussive Boreholes

A total of 4no. rotary percussive boreholes were sunk with a Teredo DC93 rig using 128mm simultaneous casing and air flush on the 30th November 2020 in order to assess the strata on the site. The boreholes were logged by a suitably qualified engineering geologist to the methods outlined in BS5930:2015. The logs of the boreholes are presented in appendix 2. Suitable disturbed samples were collected and dispatched to the testing laboratory immediately following the intrusive works.

The natural stratum encountered was granular in composition and logged in the field as predominantly SAND & GRAVEL or sandy GRAVEL with varying quantities of silt, cobbles and boulders. There was evidence of shallow groundwater ingress within the boreholes during drilling, although these strikes are tidal and therefore of high variance. No made ground was encountered within boreholes. The boreholes were terminated upon the target depth requested by the engineer.

Upon completion the boreholes were backfilled with the arisings and left clean and tidy. There was no olfactory evidence of hydrocarbon contamination or otherwise encountered within the boreholes logged by the Contractor.

2.2 In-situ Geotechnical Testing

A standard penetration test (SPT) was carried out within borehole BH1 at regular intervals in order to assess the density of the strata. The test was carried out in accordance to the methods specified in BS1377:9. The total penetration of the SPT assembly due to its weight prior to the seating drive was recorded. The results of the SPTs are presented on the borehole log. Due to the granular nature of the strata a closed cone SPT (C) was used for the tests.

2.3 Laboratory Environmental Testing

Laboratory analytical testing of disturbed samples were commissioned by the Contractor with a schedule of tests undertaken by i2 Analytical Ltd, a UKAS registered laboratory. The results are presented in appendix 3, with the testing comprising:

- Metals: Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel & Zinc
- Organotins
- Total Organic Carbon
- PAH Speciated
- PCBs Speciated
- THC Hydrocarbons C10-C40
- Asbestos screen

2.4 Laboratory Geotechnical Testing

Laboratory geotechnical testing of disturbed soil samples was commissioned by the Contractor with a schedule of tests undertaken by i2 Analytical Ltd, a UKAS registered laboratory. The results are presented in appendix 3, with the testing comprising:

- Sieve analysis for PSD

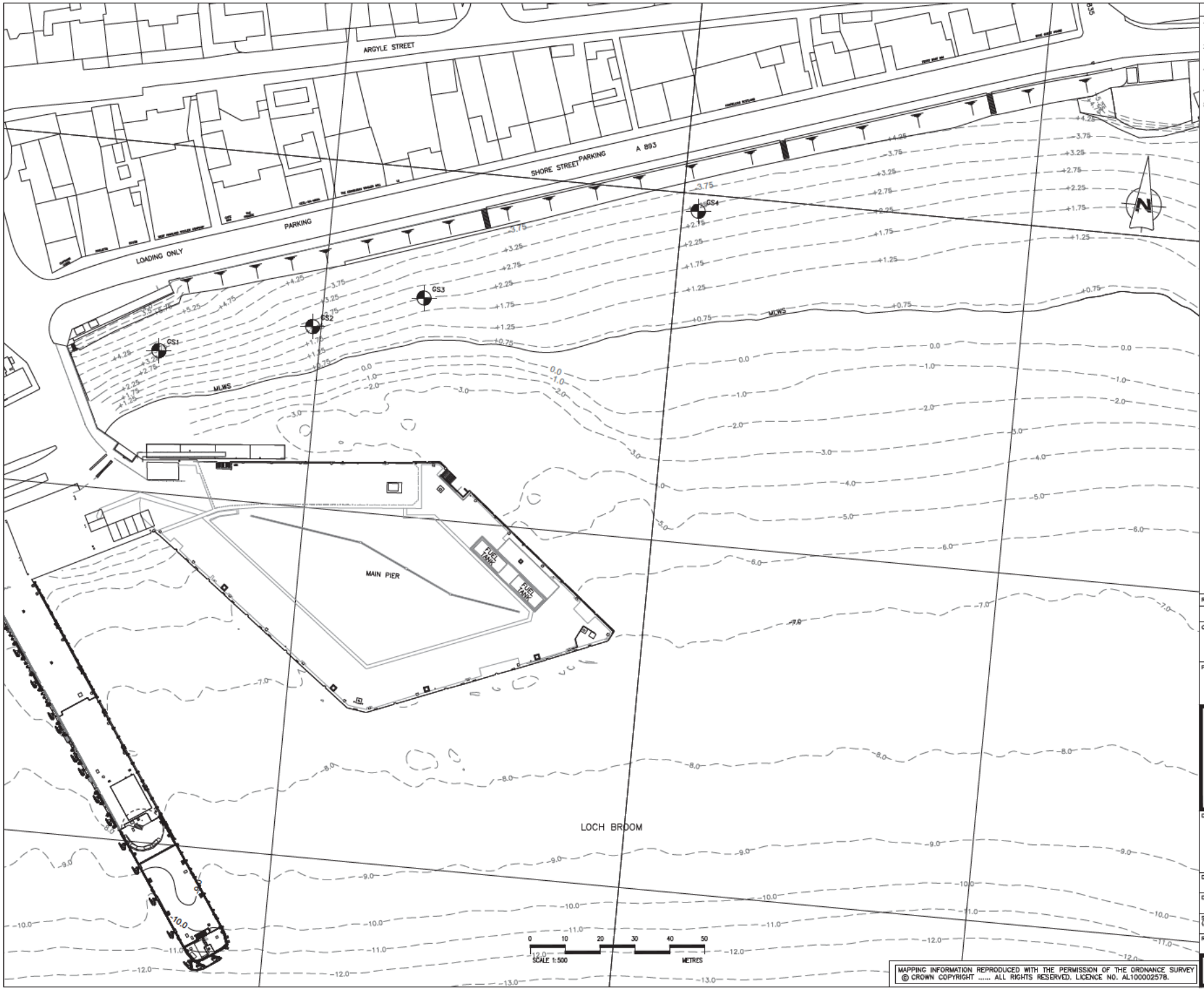
3.0 CONCLUSIONS

3.1 General

Site investigation works comprising of 4 no. rotary percussive boreholes with in-situ & laboratory environmental & geotechnical testing were carried out at the foreshore to the east of Ullapool Harbour. In-situ geotechnical testing was undertaken within BH1 comprising SPT testing. The intrusive works recorded predominantly natural granular deposits, with all the material logged to the standards outlined in BS5930:2015. There was evidence of groundwater ingress within the boreholes. All the data gathered is presented within this report and its appendices.

Appendix 1

Approximate Site Investigation Locations Plan



GENERAL NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. ALL CONTOURS ARE IN METRES RELATIVE TO CHART DATUM.
3. ALL TOPOGRAPHIC SURVEY LEVELS ARE IN METRES AND RELATE TO ORDNANCE DATUM.
4. CHART DATUM IS 2.75m BELOW ORDNANCE DATUM.
5. MHWS +5.2mCD
   MLWS +0.7mCD

LEGEND

GRAB SAMPLE

GRAB SAMPLE LOCATION		
GRAB SAMPLE	EASTING (m)	NORTHING (m)
1	212854.273	893940.792
2	212897.538	893951.789
3	212928.559	893962.923
4	213004.524	893995.073

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D

AMENDMENTS

CLIENT
ULLAPOOL PROMENADE GROUP

PROJECT
SHORE STREET WIDENING & PROMENDADE, ULLAPOOL

Wallace Stone
CONSULTING CIVIL ENGINEERS
GLASGOW 0141 554 8233 glasgow@wallacestone.co.uk
DINGWALL 01349 866775 dingwall@wallacestone.co.uk
HEBRIDES 01851 612454 hebrides@wallacestone.co.uk

DRAWING TITLE
GRAB SAMPLE LOCATIONS

DRAWN	CHECKED	APPROVED
JHG	NG	TR
DATE OCT 2020	DATE OCT 2020	DATE OCT 2020

SCALE (A1) 1:500 (1:1000 AT A3) STAGE INFORMATION

REVISION

PROJECT No. 2059 DRAWING No. SK010

Appendix 2

Borehole Logs

BOREHOLE LOG

Project				BOREHOLE No
Ullapool Promenade, Ullapool				1
Job No	Date	Ground Level (m)	Co-Ordinates ()	
20147-01	30-11-20		E 212,854.3 N 893,940.8	
Contractor				Sheet
Blake Geoservices Ltd - www.blake-geoservices.co.uk -				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.10	B						Brown, slightly sandy GRAVEL, shelly, sand is coarse, gravel is rounded, fine of mixed lithologies.		
0.10	ES					(0.60)			
						0.60			
							Brown, dense becoming medium dense, SAND & GRAVEL, shelly, with frequent subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.		
			1						
1.20		N31							
2.50		N15							
2.80	B X2								
2.80	ES					(5.15)			
4.00		N11							
						5.75			
5.75	B X2								
5.75	ES								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
30-11-20	14.30	5.75	5.75		1.20						Groundwater strikes indicative - highly tidal flucation likely.

All dimensions in metres Scale 1:37.5	Client Ullapool Harbour Trust c/o Wallace Stone	Method/ Plant Used 2.5t Rotary (air)	Logged By CLB

AGS3 UK BH 20147 ULLAPOOL HARBOUR.GPJ AGS3_1.GDT 17/12/20

BOREHOLE LOG

Project				BOREHOLE No
Ullapool Promenade, Ullapool				2
Job No	Date	Ground Level (m)	Co-Ordinates ()	
20147-01	30-11-20		E 212,897.5 N 893,951.8	
Contractor				Sheet
Blake Geoservices Ltd - www.blake-geoservices.co.uk -				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.10 0.10	B ES					(0.50) 0.50	Brown, gravelly SAND, shelly with frequent subangular cobbles of mixed lithologies, sand is coarse, gravel is rounded, fine of mixed lithologies.		
2.40 2.40	B ES					(4.25) 4.75	Brown, SAND & GRAVEL, shelly, with frequent subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.		
4.75 4.75	B X2 ES								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
30-11-20	13.30	4.75	4.75		0.40						Groundwater strikes indicative - highly tidal flucation likely.

All dimensions in metres Scale 1:37.5	Client Ullapool Harbour Trust c/o Wallace Stone	Method/ Plant Used 2.5t Rotary (air)	Logged By CLB

AGS3 UK BH 20147 ULLAPOOL HARBOUR.GPJ AGS3_1.GDT 17/12/20

BOREHOLE LOG

Project				BOREHOLE No
Ullapool Promenade, Ullapool				3
Job No	Date	Ground Level (m)	Co-Ordinates ()	
20147-01	30-11-20		E 212,928.6 N 893,962.9	
Contractor				Sheet
Blake Geoservices Ltd - www.blake-geoservices.co.uk -				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.10	B		1				Brown, sandy, GRAVEL with numerous subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.		
0.10	ES								
						(3.20)			
2.40	B								
2.40	ES								
						3.20			
							Brown, very sandy, GRAVEL with numerous subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.		
						(1.55)			
						4.75			
4.75	B X2								
4.75	ES								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
30-11-20	11.40	4.75	4.75		0.30						Groundwater strikes indicative - highly tidal flucation likely.

All dimensions in metres Scale 1:37.5	Client Ullapool Harbour Trust c/o Wallace Stone	Method/ Plant Used 2.5t Rotary (air)	Logged By CLB

AGS3 UK BH 20147 ULLAPOOL HARBOUR.GPJ AGS3_1.GDT 17/12/20

BOREHOLE LOG

Project				BOREHOLE No
Ullapool Promenade, Ullapool				4
Job No	Date	Ground Level (m)	Co-Ordinates ()	
20147-01	30-11-20		E 213,004.5 N 893,995.1	
Contractor				Sheet
Blake Geoservices Ltd - www.blake-geoservices.co.uk -				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.10 0.10	B ES		1			(0.60) 0.60	Brown, gravelly SAND, shelly with frequent subangular cobbles of mixed lithologies, sand is coarse, gravel is rounded, fine of mixed lithologies.		
1.00 1.00	B ES					(1.40) 2.00	Brown, sandy, GRAVEL with numerous subangular cobbles of mixed lithologies, sand is medium, gravel is subangular, medium of mixed lithologies.		
2.00 2.00	B X2 ES								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
30-11-20	10.30	2.00	2.00		0.10						Groundwater strikes indicative - highly tidal flucation likely.

All dimensions in metres Scale 1:37.5	Client Ullapool Harbour Trust c/o Wallace Stone	Method/ Plant Used 2.5t Rotary (air)	Logged By CLB

AGS3 UK BH 20147 ULLAPOOL HARBOUR.GPJ AGS3_1.GDT 17/12/20

Appendix 3

Environmental & Geotechnical Testing Results

Chris Blake
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i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-44893

Project / Site name:	Ullapool Harbour, Pre-Dredge Sampling	**Samples received on:**	02/12/2020
Your job number:	20147-01	**Sample instructed/ Analysis started on:**	02/12/2020
Your order number:	20147-01	**Analysis completed by:**	10/12/2020
Report Issue Number:	1	**Report issued on:**	10/12/2020
Samples Analysed:	12 soil samples		

Signed: [redacted]

Yvonne Croft

Customer Service and Compliance Advisor
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-44893

Project / Site name: Ullapool Harbour, Pre-Dredge Sampling
Your Order No: 20147-01

Lab Sample Number				1703905	1703906	1703907	1703908	1703909
Sample Reference				BH1	BH1	BH1	BH2	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	2 80	5.75	0.10	2.40
Date Sampled				01/12/2020	01/12/2020	01/12/2020	01/12/2020	01/12/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	6.0	4.4	10	6.9	5 5
Total mass of sample received	kg	0.001	NONE	2.0	2 0	2.0	2.0	2 0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.6	0 3	< 0.1	0.3	< 0.1
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Dibenz(a h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0 8	MCERTS	< 0.80	< 0.80	< 0 80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.1	3.1	3.3	3.6	3 3
Cadmium (aqua regia extractable)	mg/kg	0 2	MCERTS	< 0 2	< 0.2	< 0.2	< 0 2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	12	16	13	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	25	12	7.5	15	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	16	6.9	6.9	25	11
Mercury (aqua regia extractable)	mg/kg	0 3	MCERTS	< 0 3	< 0.3	< 0.3	< 0 3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.5	8 5	11	9.4	9.1
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	42	30	24	31	25
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	270	390	< 10	< 10	< 10

Analytical Report Number: 20-44893

Project / Site name: Ullapool Harbour, Pre-Dredge Sampling
Your Order No: 20147-01

Lab Sample Number				1703905	1703906	1703907	1703908	1703909
Sample Reference				BH1	BH1	BH1	BH2	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	2 80	5.75	0.10	2.40
Date Sampled				01/12/2020	01/12/2020	01/12/2020	01/12/2020	01/12/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	< 0 007	< 0.007	< 0.007	< 0 007	< 0.007
Organotins								
Tributyltin (chloride)	ug/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
Dibutyltin (dichloride)	ug/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
Triphenyltin (chloride)	ug/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

Analytical Report Number: 20-44893

Project / Site name: Ullapool Harbour, Pre-Dredge Sampling
Your Order No: 20147-01

Lab Sample Number				1703910	1703911	1703912	1703913	1703914
Sample Reference				BH2	BH3	BH3	BH3	BH4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.75	0.10	2.40	4.75	0.10
Date Sampled				01/12/2020	01/12/2020	01/12/2020	01/12/2020	01/12/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	6.5	4 3	5.1	4.8	6 8
Total mass of sample received	kg	0.001	NONE	2.0	2 0	2.0	2.0	2 0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
Total Organic Carbon (TOC)	%	0.1	MCERTS	< 0.1	0 5	0.2	< 0.1	0 2
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Dibenz(a h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0 05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0 8	MCERTS	< 0.80	< 0.80	< 0 80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.8	2.9	4.3	4.3	2 5
Cadmium (aqua regia extractable)	mg/kg	0 2	MCERTS	< 0 2	< 0.2	< 0.2	< 0 2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	13	16	16	11
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.3	12	13	11	72
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	24	11	7.6	15
Mercury (aqua regia extractable)	mg/kg	0 3	MCERTS	0.4	< 0.3	< 0.3	< 0 3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.8	10	12	13	9 5
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	25	34	28	24	25
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

Analytical Report Number: 20-44893

Project / Site name: Ullapool Harbour, Pre-Dredge Sampling
Your Order No: 20147-01

Lab Sample Number				1703910	1703911	1703912	1703913	1703914
Sample Reference				BH2	BH3	BH3	BH3	BH4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.75	0.10	2.40	4.75	0.10
Date Sampled				01/12/2020	01/12/2020	01/12/2020	01/12/2020	01/12/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0 001	< 0.001	< 0.001	< 0 001	< 0.001
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	< 0 007	< 0.007	< 0.007	< 0 007	< 0.007
Organotins								
Tributyltin (chloride)	ug/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
Dibutyltin (dichloride)	ug/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
Triphenyltin (chloride)	ug/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

Analytical Report Number: 20-44893

Project / Site name: Ullapool Harbour, Pre-Dredge Sampling
Your Order No: 20147-01

Lab Sample Number				1703915	1703916			
Sample Reference				BH4	BH4			
Sample Number				None Supplied	None Supplied			
Depth (m)				1.00	2 00			
Date Sampled				01/12/2020	01/12/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	0.01	NONE	9.5	5 3			
Total mass of sample received	kg	0.001	NONE	2.0	2 0			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
General Inorganics								
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.5	0 3			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Indeno(1 2 3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Dibenz(a h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0 8	MCERTS	< 0.80	< 0.80			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.5	5.4			
Cadmium (aqua regia extractable)	mg/kg	0 2	MCERTS	< 0 2	< 0.2			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	16			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	12			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	26	11			
Mercury (aqua regia extractable)	mg/kg	0 3	MCERTS	< 0 3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	13			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	46	33			
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10			

Analytical Report Number: 20-44893

Project / Site name: Ullapool Harbour, Pre-Dredge Sampling
Your Order No: 20147-01

Lab Sample Number				1703915	1703916			
Sample Reference				BH4	BH4			
Sample Number				None Supplied	None Supplied			
Depth (m)				1.00	2 00			
Date Sampled				01/12/2020	01/12/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0 001	< 0.001			
PCB Congener 52	mg/kg	0.001	MCERTS	< 0 001	< 0.001			
PCB Congener 101	mg/kg	0.001	MCERTS	< 0 001	< 0.001			
PCB Congener 118	mg/kg	0.001	MCERTS	< 0 001	< 0.001			
PCB Congener 138	mg/kg	0.001	MCERTS	< 0 001	< 0.001			
PCB Congener 153	mg/kg	0.001	MCERTS	< 0 001	< 0.001			
PCB Congener 180	mg/kg	0.001	MCERTS	< 0 001	< 0.001			
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	< 0 007	< 0.007			
Organotins								
Tributyltin (chloride)	ug/kg	10	NONE	< 10	< 10			
Dibutyltin (dichloride)	ug/kg	10	NONE	< 10	< 10			
Triphenyltin (chloride)	ug/kg	10	NONE	< 10	< 10			

Analytical Report Number : 20-44893

Project / Site name: Ullapool Harbour, Pre-Dredge Sampling

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1703905	BH1	None Supplied	0.10	Brown sand with gravel.
1703906	BH1	None Supplied	2.80	Brown sand with gravel.
1703907	BH1	None Supplied	5.75	Brown sand with gravel.
1703908	BH2	None Supplied	0.10	Brown sand with gravel.
1703909	BH2	None Supplied	2.40	Brown sand with gravel.
1703910	BH2	None Supplied	4.75	Brown sand with gravel.
1703911	BH3	None Supplied	0.10	Brown sand with gravel.
1703912	BH3	None Supplied	2.40	Brown sand with gravel.
1703913	BH3	None Supplied	4.75	Brown sand with gravel.
1703914	BH4	None Supplied	0.10	Brown sand with gravel.
1703915	BH4	None Supplied	1.00	Brown sand with gravel.
1703916	BH4	None Supplied	2.00	Brown sand with gravel.

Analytical Report Number : 20-44893

Project / Site name: Ullapool Harbour, Pre-Dredge Sampling

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Organotins in soil	Determination of organotin compounds in soil by GC-MS.	In-house method		W	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

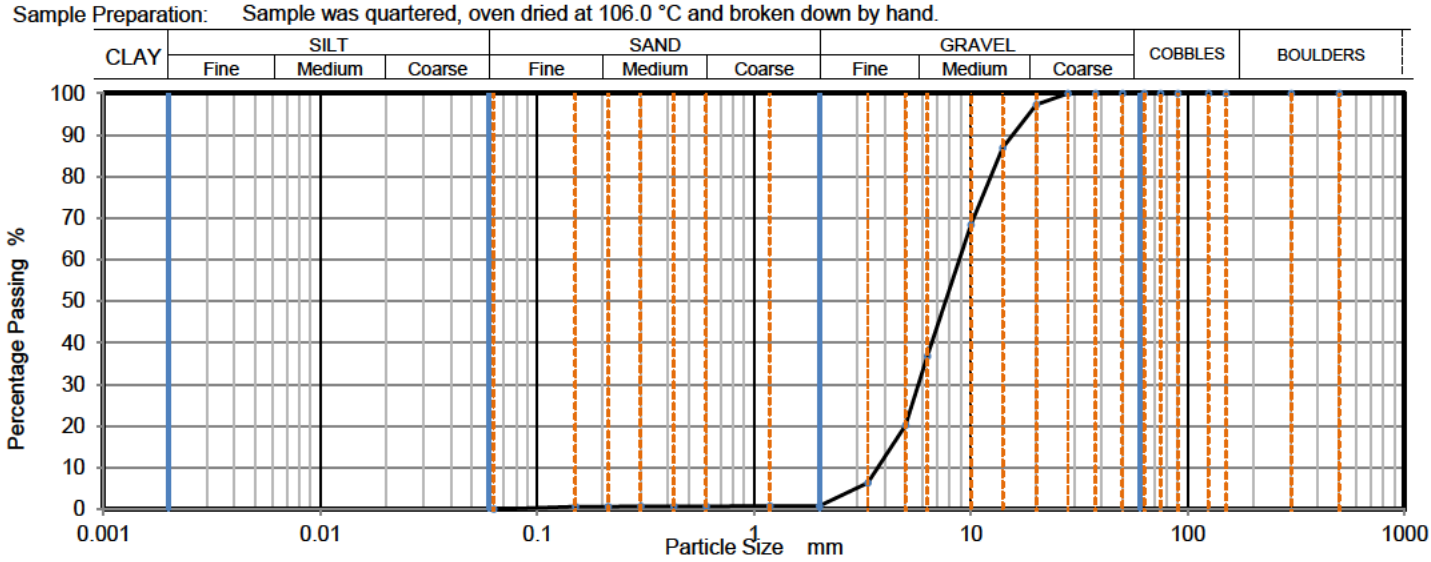
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705924	Depth Top [m]:	0.10
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Dark brown GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 106.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	87		
10	68		
6.3	37		
5	20		
3.35	6		
2	1		
1.18	1		
0.6	1		
0.425	1		
0.3	1		
0.212	1		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	99.20
Sand	0.30
Fines <0.063mm	0.50

Grading Analysis		
D100	mm	28
D60	mm	8.84
D30	mm	5.73
D10	mm	3.73
Uniformity Coefficient		2.4
Curvature Coefficient		1

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: [redacted]

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

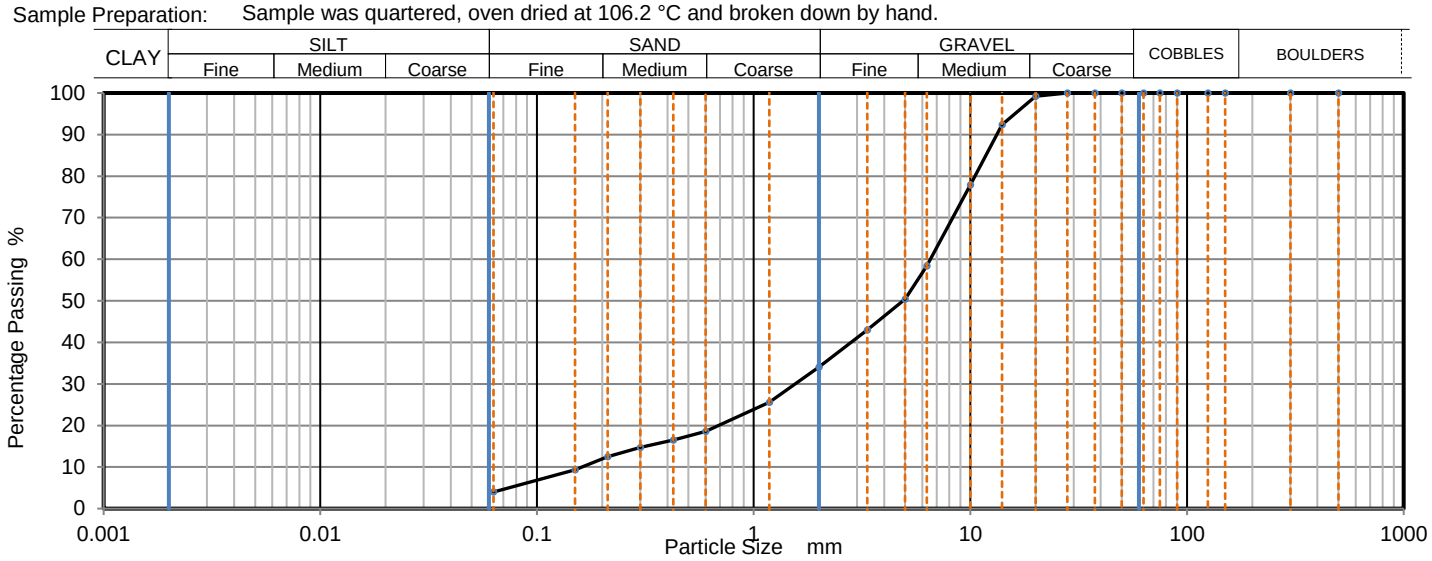
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705925	Depth Top [m]:	2.80
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey slightly clayey sandy GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 106.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	92		
10	78		
6.3	58		
5	50		
3.35	43		
2	34		
1.18	26		
0.6	19		
0.425	17		
0.3	15		
0.212	13		
0.15	9		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	65.90
Sand	29.20
Fines <0.063mm	4.90

Grading Analysis		
D100	mm	28
D60	mm	6.54
D30	mm	1.55
D10	mm	0.161
Uniformity Coefficient		41
Curvature Coefficient		2.3

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: [redacted]

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

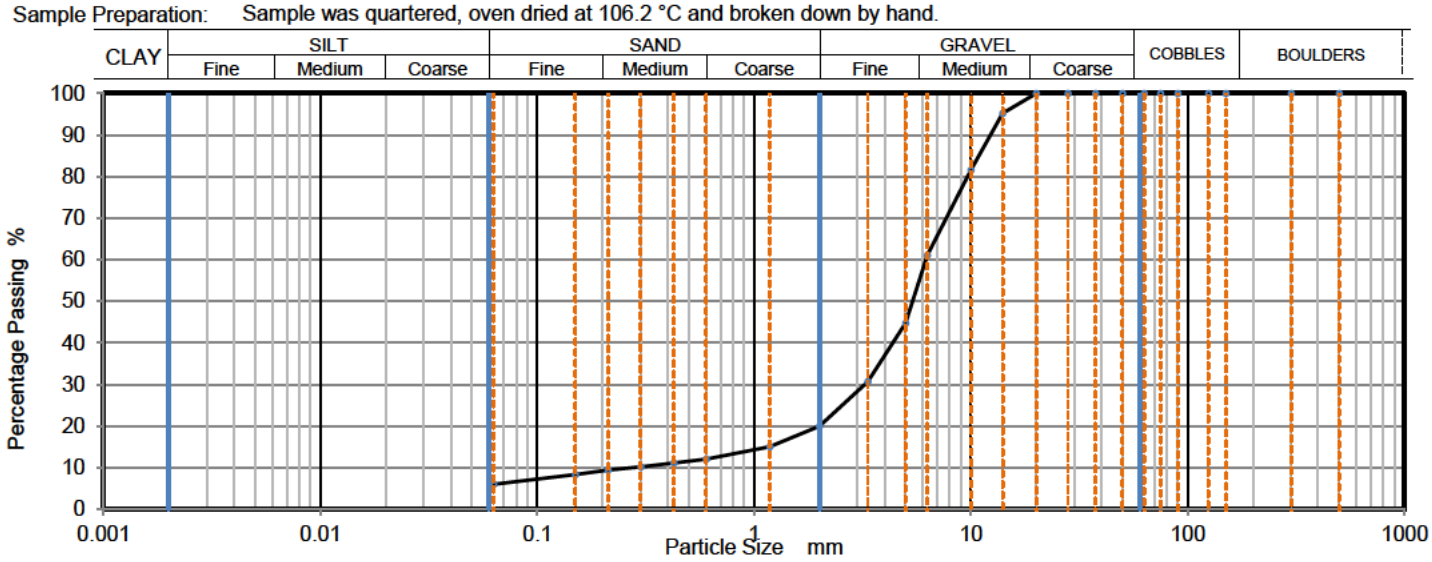
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705926	Depth Top [m]:	5.75
Hole No.:	BH1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey slightly clayey sandy GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 106.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	95		
10	82		
6.3	61		
5	45		
3.35	31		
2	20		
1.18	15		
0.6	12		
0.425	11		
0.3	10		
0.212	9		
0.15	8		
0.063	6		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	80.00
Sand	14.00
Fines <0.063mm	6.00

Grading Analysis		
D100	mm	20
D60	mm	6.21
D30	mm	3.24
D10	mm	0.274
Uniformity Coefficient		23
Curvature Coefficient		6.2

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

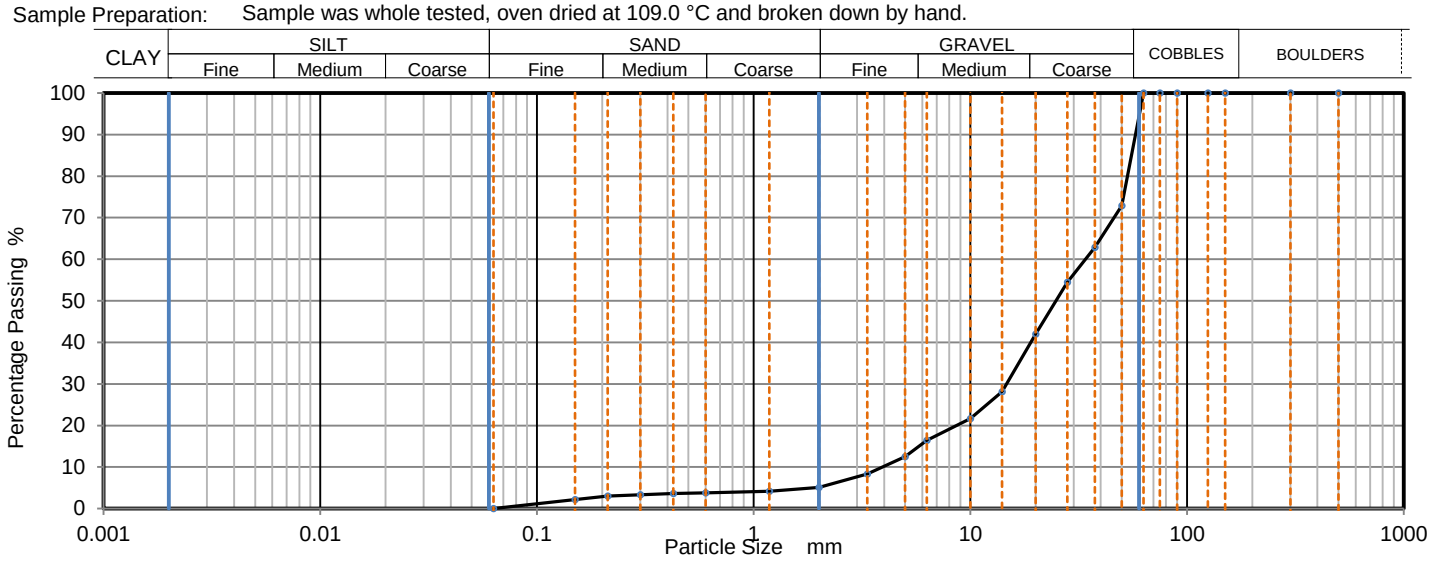
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705927	Depth Top [m]:	0.10
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Greyish brown GRAVEL		
Sample Preparation:	Sample was whole tested, oven dried at 109.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	73		
37.5	63		
28	55		
20	42		
14	28		
10	22		
6.3	16		
5	13		
3.35	8		
2	5		
1.18	4		
0.6	4		
0.425	4		
0.3	3		
0.212	3		
0.15	2		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	94.90
Sand	4.30
Fines <0.063mm	0.80

Grading Analysis		
D100	mm	63
D60	mm	33.9
D30	mm	14.7
D10	mm	3.95
Uniformity Coefficient		8.6
Curvature Coefficient		1.6

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Signed: [redacted]

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

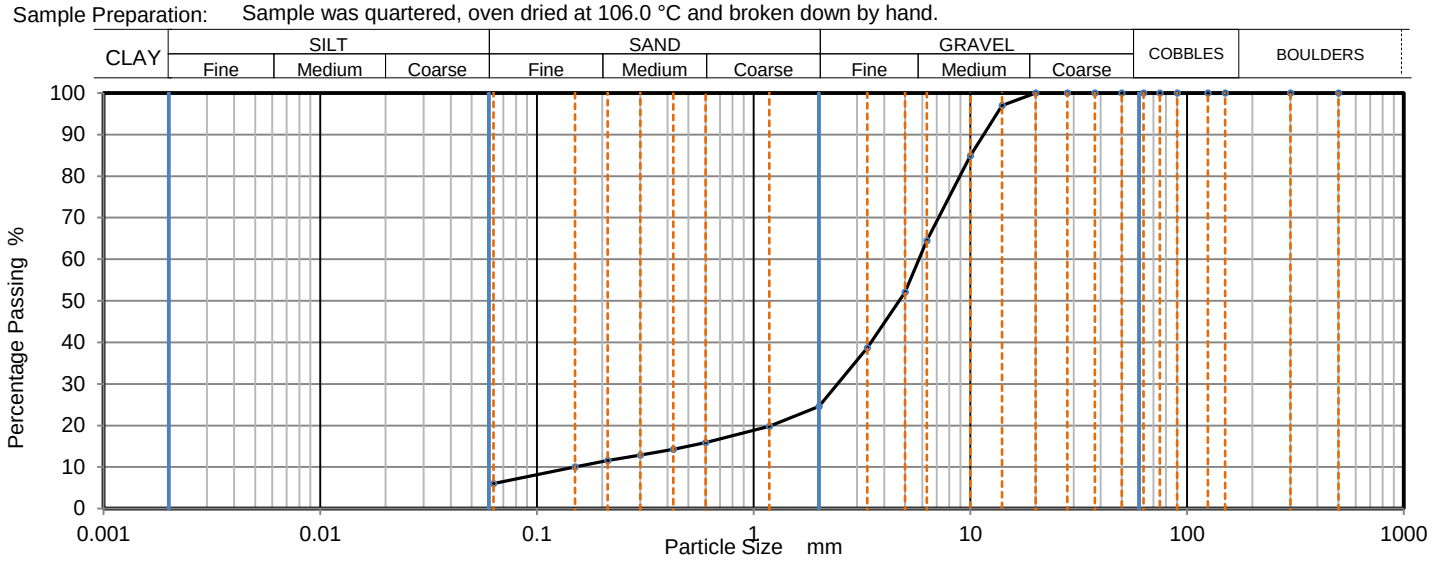
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705928	Depth Top [m]:	2.40
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey slightly clayey sandy GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 106.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	85		
6.3	65		
5	52		
3.35	39		
2	25		
1.18	20		
0.6	16		
0.425	14		
0.3	13		
0.212	12		
0.15	10		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	75.40
Sand	17.90
Fines <0.063mm	6.70

Grading Analysis		
D100	mm	20
D60	mm	5.79
D30	mm	2.44
D10	mm	0.149
Uniformity Coefficient		39
Curvature Coefficient		6.9

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: [redacted]

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

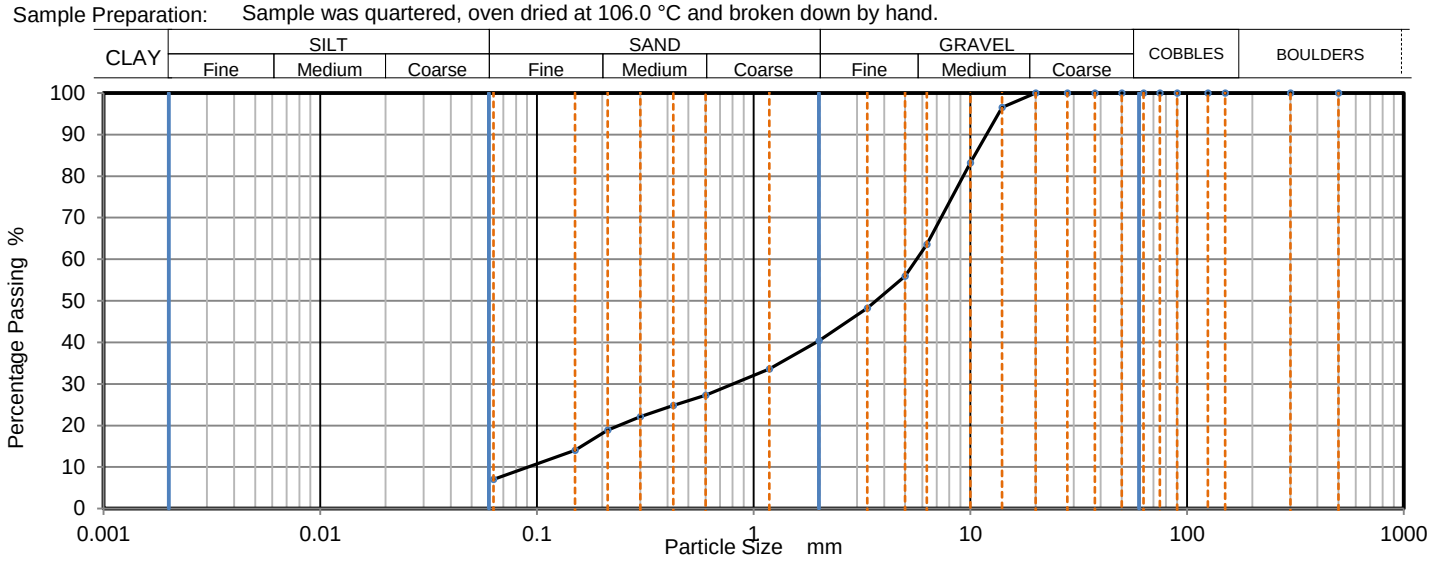
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705929	Depth Top [m]:	4.75
Hole No.:	BH2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey slightly clayey very sandy GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 106.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	83		
6.3	64		
5	56		
3.35	48		
2	40		
1.18	34		
0.6	27		
0.425	25		
0.3	22		
0.212	19		
0.15	14		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	59.60
Sand	33.30
Fines <0.063mm	7.10

Grading Analysis		
D100	mm	20
D60	mm	5.66
D30	mm	0.801
D10	mm	0.0909
Uniformity Coefficient		62
Curvature Coefficient		1.2

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: [redacted]

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Date Reported: 16/12/2020

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TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Blake Geoservices Ltd
Client Address: Sawmills, Old Evanton Rd, Dingwall, IV15 9UN
Contact: Chris Blake
Site Address: Ullapool Harbour, Pre-dredge Sampling

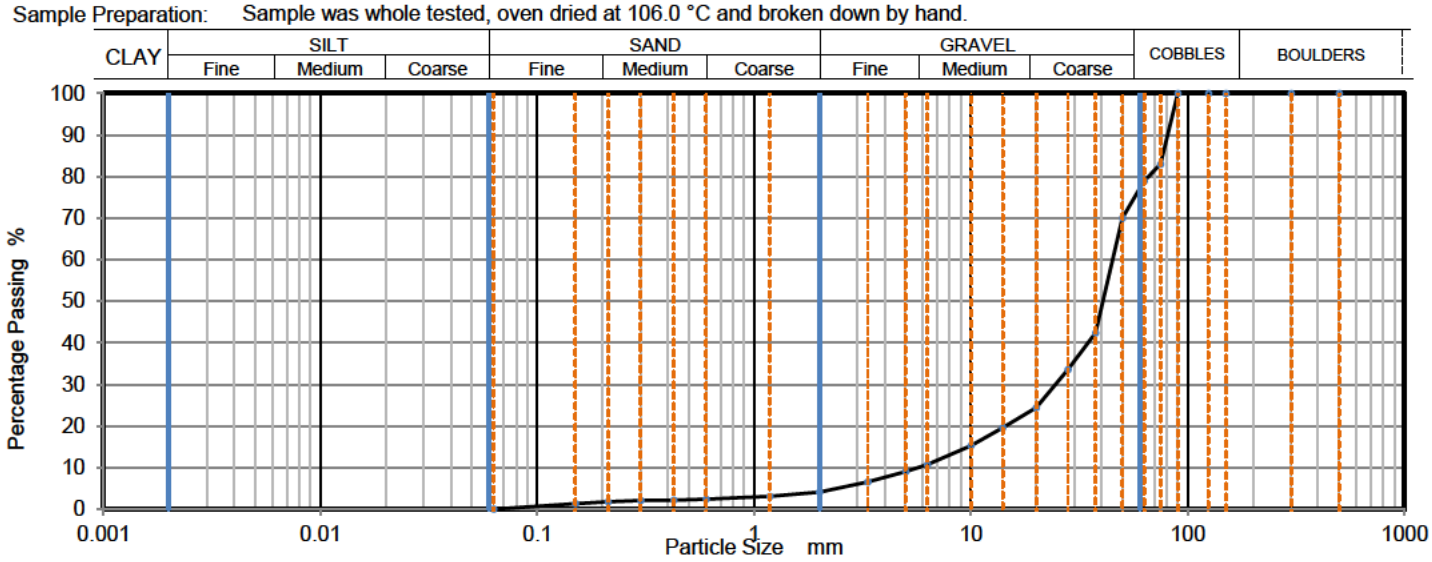
Client Reference: 20147-01
Job Number: 20-45306
Date Sampled: 01/12/2020
Date Received: 02/12/2020
Date Tested: 09/12/2020
Sampled By: Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 1705930
Hole No.: BH3
Sample Reference: Not Given
Sample Description: Dark grey GRAVEL with cobbles
Sample Preparation: Sample was whole tested, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 0.10
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	83		
63	79		
50	70		
37.5	42		
28	34		
20	24		
14	20		
10	15		
6.3	11		
5	9		
3.35	7		
2	4		
1.18	3		
0.6	2		
0.425	2		
0.3	2		
0.212	2		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	21.00
Gravel	74.90
Sand	3.50
Fines <0.063mm	0.60

Grading Analysis		
D100	mm	90
D60	mm	45
D30	mm	24.5
D10	mm	5.73
Uniformity Coefficient		7.9
Curvature Coefficient		2.3

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Signed: [redacted]

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

GF 100.19

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705931	Depth Top [m]:	2.40
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey clayey sandy GRAVEL with fragments of flintstone		
Sample Preparation:	Sample was quartered, oven dried at 107.7 °C and broken down by hand.		

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	89		
10	66		
6.3	51		
5	44		
3.35	39		
2	33		
1.18	27		
0.6	19		
0.425	17		
0.3	16		
0.212	16		
0.15	16		
0.063	16		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	66.80
Sand	16.80
Fines <0.063mm	16.30

Grading Analysis		
D100	mm	28
D60	mm	8.22
D30	mm	1.55
D10	mm	
Uniformity Coefficient		> 130
Curvature Coefficient		

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: [redacted]

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Northampton NN4 7EB

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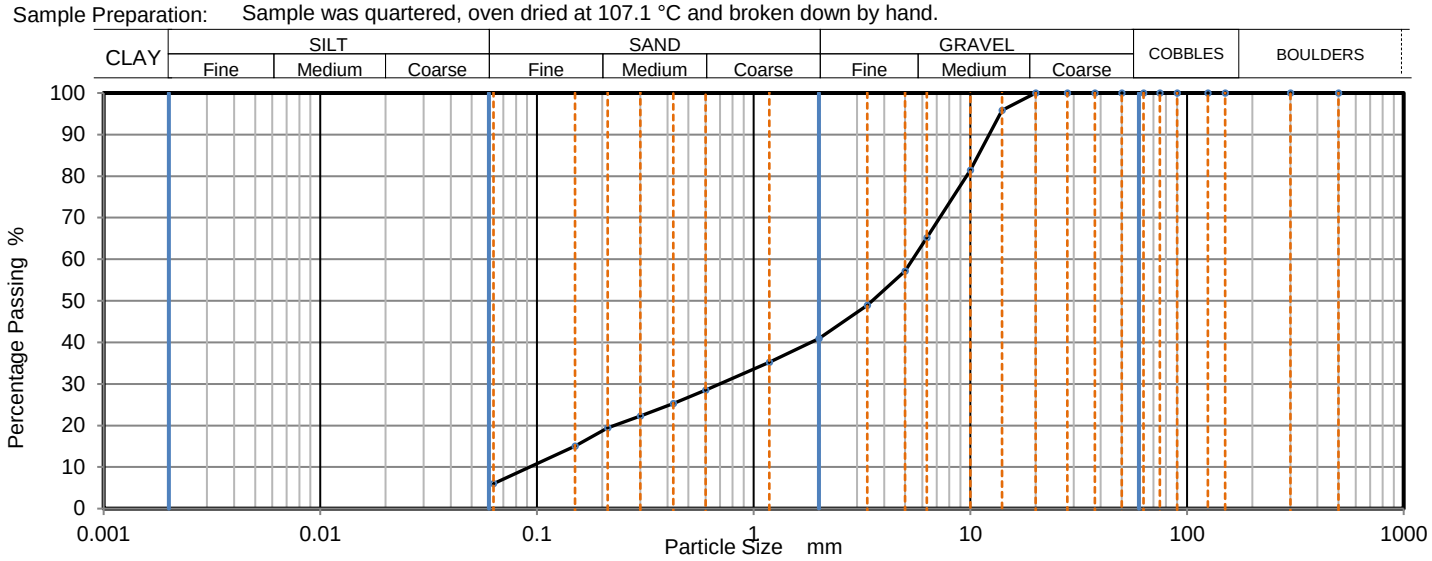
Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705932	Depth Top [m]:	4.75
Hole No.:	BH3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey slightly clayey very sandy GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 107.1 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	81		
6.3	65		
5	57		
3.35	49		
2	41		
1.18	35		
0.6	29		
0.425	25		
0.3	22		
0.212	19		
0.15	15		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	59.10
Sand	34.10
Fines <0.063mm	6.80

Grading Analysis		
D100	mm	20
D60	mm	5.42
D30	mm	0.697
D10	mm	0.0885
Uniformity Coefficient		61
Curvature Coefficient		1

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

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Brackmills Industrial Estate
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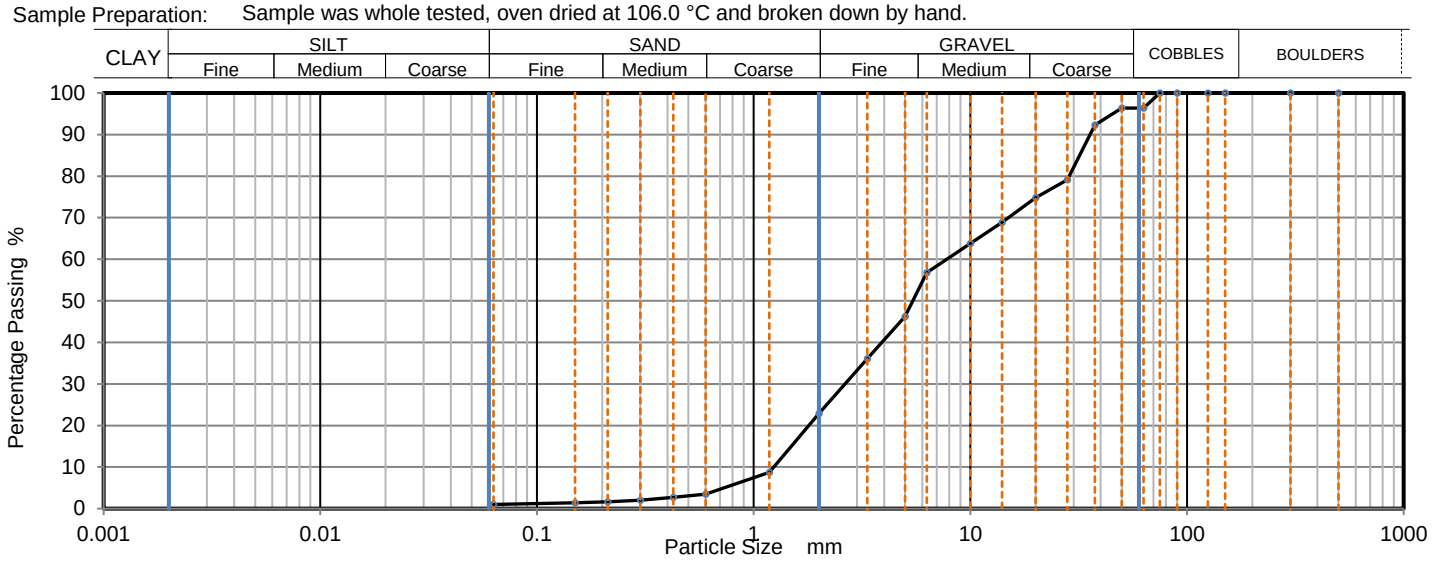
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705933	Depth Top [m]:	0.10
Hole No.:	BH4	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Dark brown sandy GRAVEL with cobbles		
Sample Preparation:	Sample was whole tested, oven dried at 106.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	96		
50	96		
37.5	92		
28	79		
20	75		
14	69		
10	64		
6.3	57		
5	46		
3.35	36		
2	23		
1.18	9		
0.6	4		
0.425	3		
0.3	2		
0.212	2		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	3.60
Gravel	73.50
Sand	21.80
Fines <0.063mm	1.20

Grading Analysis		
D100	mm	75
D60	mm	7.79
D30	mm	2.64
D10	mm	1.24
Uniformity Coefficient		6.3
Curvature Coefficient		0.72

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: [redacted]

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

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TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

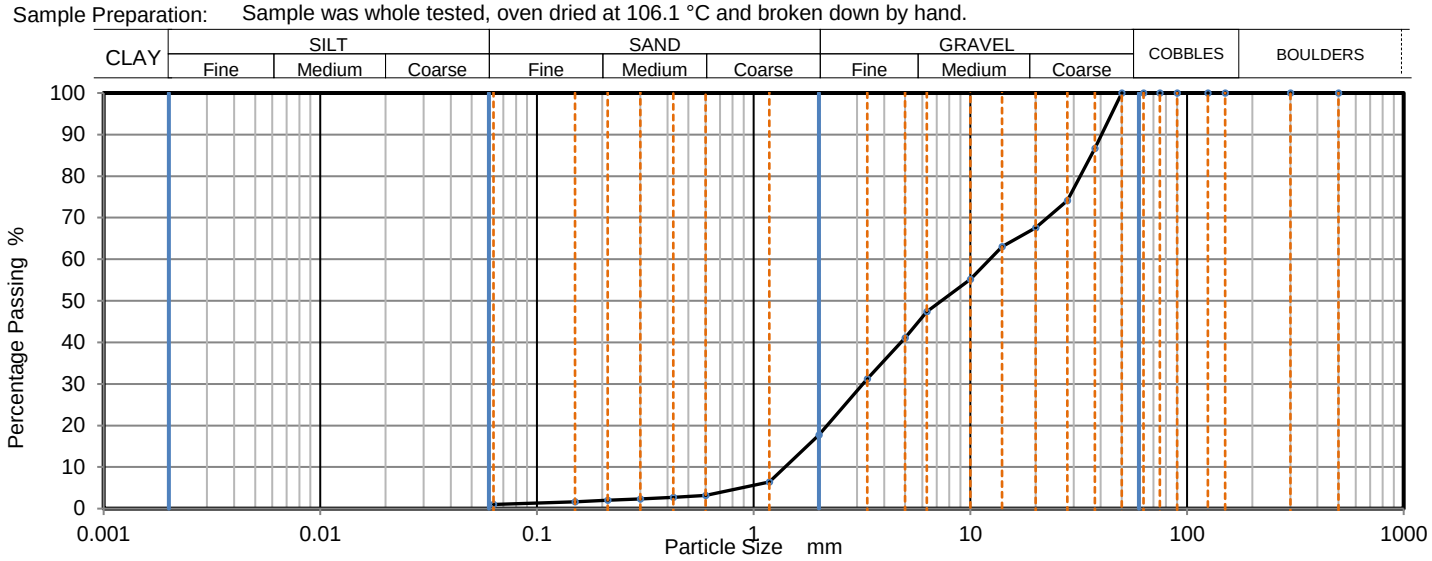
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705934	Depth Top [m]:	1.00
Hole No.:	BH4	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Greyish brown sandy GRAVEL		
Sample Preparation:	Sample was whole tested, oven dried at 106.1 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	87		
28	74		
20	68		
14	63		
10	55		
6.3	47		
5	41		
3.35	31		
2	18		
1.18	6		
0.6	3		
0.425	3		
0.3	2		
0.212	2		
0.15	2		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	82.30
Sand	16.60
Fines <0.063mm	1.10

Grading Analysis		
D100	mm	50
D60	mm	12.3
D30	mm	3.2
D10	mm	1.4
Uniformity Coefficient		8.8
Curvature Coefficient		0.6

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Signed: [redacted]

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

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Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

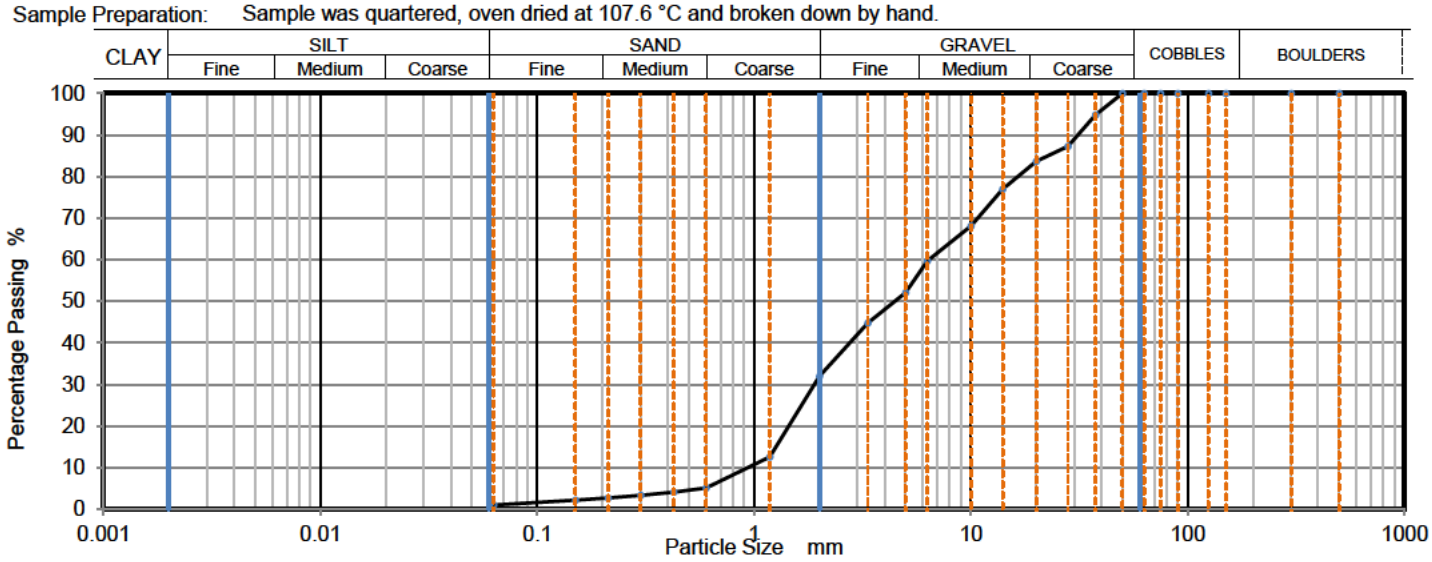
4041

Client:	Blake Geoservices Ltd	Client Reference:	20147-01
Client Address:	Sawmills, Old Evanton Rd, Dingwall, IV15 9UN	Job Number:	20-45306
		Date Sampled:	01/12/2020
		Date Received:	02/12/2020
Contact:	Chris Blake	Date Tested:	09/12/2020
Site Address:	Ullapool Harbour, Pre-dredge Sampling	Sampled By:	Client - CB

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1705935	Depth Top [m]:	2.00
Hole No.:	BH4	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey sandy GRAVEL		
Sample Preparation:	Sample was quartered, oven dried at 107.6 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	87		
20	84		
14	77		
10	68		
6.3	60		
5	52		
3.35	45		
2	32		
1.18	13		
0.6	5		
0.425	4		
0.3	3		
0.212	3		
0.15	2		
0.063	2		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	68.00
Sand	30.40
Fines <0.063mm	1.60

Grading Analysis		
D100	mm	50
D60	mm	6.4
D30	mm	1.89
D10	mm	0.932
Uniformity Coefficient		6.9
Curvature Coefficient		0.6

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed: [redacted]

Szczepan B e atow cz
PL Deputy of Head of Geotechn ca Sect on
for and on behalf of i2 Analytical Ltd

Date Reported: 16/12/2020

GF 100.19

Appendix 4

Documentary References

REFERENCES

British Standards:

BS 5930:2015 Code of Practice for Site Investigations

BS 1377:1990 Methods of Test for Soils of Civil Engineering Purposes

BS 10175:2011+A1:2017 Investigation of Potentially Contaminated Sites – Code of Practice

Other:

Norbury, David: Soil and Rock Description in Engineering Practice 2010

British Drilling Association – Guidance for the safe operation of rotary rigs

Appendix 2: Attributes

Attribute	Description	1	2	3	4	5
Alignment with Policy	How complex are the regulator requirements and what risks are posed.	In direct conflict with policy.	Does not fully align with policy.	No policy implications.	In the spirit of policy.	Positively implements policy.
Cost	Financial Cost of the Option	>£ 500 000	£300 000 to £500 000	£150,000 to £300,000	£50,000 to £150,000	<£50,000
Timescale	Impact of works on project programme.	Dredge would extend the project programme.	High risk dredge couldn't be completed within required timescale.	Slight risk dredge couldn't be completed within required timescale.	Allows dredge to be completed within required timescale.	Allows dredge to be completed comfortably within required timescale.
Material Suitability	Is the chemical makeup and PSD of material suitable for the option selected?	Not all of the material is acceptable.	Requires significant mitigation to be made suitable.	Acceptable with mitigation.	Acceptable material for option.	Ideal material for option.
Distance	Impact location has on logistics for material movements.	Beyond 50 miles	40-50 miles	30-40 miles	1-30 miles	Within 1 Mile
Technical Feasibility	Is the option within the capabilities of Ullapool Harbour Trust to carry out?	Technology not proven.	Complex requirements, but proven technology.	Simple proven technology available.	Practicable with basic management.	Standard practice
Environmental Effects	Potential environmental effects associated with implementing the option.	Very Significant	Significant	Minimal	Trivial	None
Impacts on Harbour Operations	Level of interference with normal harbour operations.	Very Significant	Significant	Minimal	Trivial	None
Legislative Complexity	How complex are the regulator requirements and what risks are posed.	Significant risk additional permits, licences or consents will not be granted.	Requires significant additional permits, licences or consents.	Requires additional permits, licences or consents.	Minor management required to comply with legislation	Complies with all relevant legislation.

Appendix 3: Options Scoring

Attribute	Re-use within the Development	Bring to Land for use as Aggregate	Deposit at Sea to HE050	Deposit at Sea to HE040
Alignment with Policy	5	5	2	2
Cost	5	5	4	3
Timescale	4	4	4	2
Material Suitability	5	5	5	5
Distance	5	4	5	2
Technically Feasibility	4	4	4	4
Environmental Effects	4	4	3	3
Impacts on Harbour Operations	4	2	2	2
Legislative Complexity	4	3	4	4
Total	**40**	**36**	**33**	**27**

Appendix 4: Reasoning for Attribute Scoring

Attribute	Re-use within the Development	Bring to Land for use as Aggregate	Deposit at Sea to HE050	Deposit at Sea to HE040
Alignment with Policy	The option to re-use dredge spoil directly aligns and positively implements the Zero Waste Scotland Policy, The Waste (Scotland) Regulations 2012 and Waste Framework Directive.		Deposit at sea is low on the waste hierarchy and as such does not align to policy.	
Cost	Bringing dredge spoil to land is expensive, however this can be offset by saving on the cost of aggregate for development.	Bringing dredge spoil to land is expensive. In addition, there is a cost associated with the transporting of dredge spoil for temporary storage and processing at the quarry, prior to use at other developments. However, the resale of aggregate will help offset the cost of transport.	Cost associated with utilising a marine plant to take material to the marine Spoil Deposit Site from land. Due to the volume of dredge spoil onshore, numerous trips will need to be made.	Due to the distance of deposit site being so far from Ullapool, the marine plant will not be able to dredge spoil, an additional boat will need to be hired to transport dredge spoil from the marine plant to the Spoil Deposit Site.
Timescale	The sequence of construction could mean that not all dredge spoil is available for re-use when required.	There will be a possible extension of construction timeline due to the transfer of marine dredge spoil to land.	There will be a possible extension of the construction timeline due to the transfer of dredge spoil to marine Spoil Deposit Site.	Due to the distance of deposit site being so far from Ullapool, the additional travel time to and from HE040 will result in delays in project timescale.
Material Suitability	The chemical and physical properties of the dredge spoil is suitable for re-use in the proposed Ullapool Promenade & Shore Street Widening and Small Boat Harbour Development.	The chemical and physical properties of the dredge spoil is suitable for re-use as an aggregate for various development projects in the area.	The material is acceptable for the option of deposit at sea under the Pre-Disposal Guidance issued by Marine Scotland. The high sand gravel content mean that the dredge spoil will drop through the water column rapidly, minimising effects on the marine environment.	
Distance	The benefit of utilising the dredge spoil within the development means that limited	The quarry, which will be used to store the aggregate before being transported to its intended	HE050 is within 1 mile from the harbour.	HE040 is 45km away from the Ullapool Harbour via sea.

Attribute	Re-use within the Development	Bring to Land for use as Aggregate	Deposit at Sea to HE050	Deposit at Sea to HE040
	transport is required (i.e. no transport further than 1 mile).	development, is approximately 4.5 miles from the harbour.		
Technically Feasibility	The re-use of material is standard practice and with the suitability of the material, it is practicable with basic management. The material will need to be transported from marine to land and will need to be managed.		The deposit to sea is an established and well-practised methodology. The material will need to be transported from land to marine Spoil Deposit Site, which will need to be managed.	
Environmental Effects	With limited transport required and the wet nature of the dredge spoil, there is unlikely to be any dust generated. In addition, the lack of space at the harbour for storage of dredge spoil means that the material will need to be used as soon as it is received on land.	Traffic impacts resulting from transport to quarry and onto future use. The transport and storage of the aggregate also have the potential for dust generation. These are anticipated to be short-lived and can be managed.	While there have been PMF's identified within HE050, an area of the site that does not contain PMF's has been identified for deposit of the material.	HE040 is in Enard Bay which is an area under consideration for management due to the presence of Seagrass in the area. It is also within the Inner Hebrides and the Minches SAC designated for Harbour porpoise (*Phocoena phocoena*).
Impacts on Harbour Operations	Dredging works are required to ensure safe access for the new vessel and improvements to the existing infrastructure. Existing operations would need to be managed around the dredging works.	The landing of dredge spoil from the marine plant will require a large area of quay side space, which is already limited, resulting in significant impacts on harbour operations.	The transfer of dredge spoil from the land to the marine plant will require a large area of quay side space, which is already limited, resulting in significant impacts on harbour operations.	The transfer of dredge spoil from the land to a vessel will require a large area of quay side space, which is already limited, resulting in significant impacts on harbour operations. Due to the distance there is likely to be more navigational impacts and interactions with other vessels and harbour users.

Attribute	Re-use within the Development	Bring to Land for use as Aggregate	Deposit at Sea to HE050	Deposit at Sea to HE040
Legislative Complexity	As the process of re-using dredge spoil material is standard practice, the legislative complexities involved are relatively simple with minor management required to comply with legislation.	Ensure waste legislation is complied with to allow material to be stored and re-used.	Deposit to sea would be permitted under the dredging marine licence.	Deposit to sea would be permitted under the dredging marine licence.