CALEDONIA
Offshore Wind Farm

Code: UKCAL-CWF-CON-EIA-RPT-00007-7B07

Volume 7B Proposed Development (Offshore) Appendices

Appendix 4-1 Environmental Baseline Report (Array Area)

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OCEAN WINDS

Volume 7B Appendix 4-1 Environmental Baseline Report (Array Area)

Code	UKCAL-CWF-CON-EIA-RPT-00007-7B07
Revision	Issued
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This document contains the following report: 'Caledonia OWF Phase 2 Array Area Environmental Baseline Survey' as prepared by Gardline in October 2023. For the purpose of Consent Application, the document has been retitled to: 'Volume 7B, Appendix 4-1: Environmental Baseline Report (Array Area)', alongside the addition of a new front cover.

Survey Report for:
Caledonia Offshore Wind Limited

Project:
Caledonia OWF Phase 2
Array Area

Description:
Environmental Baseline Survey

Survey Date:
Survey: March 2023 to June 2023

Project Number:
54463

Report Status:
Final

REPORT AUTHORISATION AND DISTRIBUTION

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Distribution

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For attention of:

[redacted]

EXECUTIVE SUMMARY

- Integrated survey work within the array area and along the export cable route, situated in the Moray Firth was conducted by Gardline on behalf of Caledonia Offshore Wind Farm Limited between March and June 2023 onboard the motor vessel *Ocean Endeavour*. Environmental operations were undertaken between 14-Apr-2023 and 22-Apr-2023.
- Upon completion of the survey 35 environmental stations were investigated, with an additional 7 camera only stations. Of these stations all except Station ENV20 had a successful sampling suite collected.
- Seabed imagery and observations from grab samples confirmed the presence sand with occasional gravel and shell fragments.
- Observed fauna was generally sparse, with 34% of images containing no visible fauna.
- Water profiling revealed well mixed upper layers (to *c*10m). Thermoclines were present at stations, with the exceptions of Stations ENV18 and ENV34. A halocline was recorded at Station ENV12, between 10m and 25m. Dissolved oxygen, pH and turbidity were consistent with published literature for the wider North Sea.
- Particle size analysis supported the seabed imagery with sediment across the array area classified as muddy sand to sandy gravel under modified Folk (1954). Generally, sand was the dominant fraction accounting for between 49.0% and 97.1% of the sediment, with the exception of Station ENV13 where gravel was dominant; accounting for 50.2% of the sediment.
- Concentrations of total organic carbon varied between 0.21% and 1.10% and were positively correlated with fines ($r=0.89$, $p<0.01$).
- Total hydrocarbon (THC) concentrations by GC-FID ranged from 2.1µg g^{-1} to 20.7µg g^{-1} with a mean value of 7.0µg g^{-1} (±5.4SD). Concentrations of THC were highest at stations to the south of the survey area, generally in deeper waters. Concentrations of THC were generally below thresholds expected to impact faunal communities.
- Gas chromatography traces and the prevalence of higher molecular weight odd-numbered n-alkane indicated terrestrial plant sources and the residue of highly weathered and biodegraded petrogenic material.
- Total polycyclic aromatic hydrocarbons (PAHs) concentrations ranged from 0.001µg g^{-1} to 0.275µg g^{-1}, with concentrations below effects range low (ERL; Long *et al.*, 1995) and apparent effects threshold (AET; Buchman, 2008).
- Polychlorinated biphenyls and organotins were recorded below the limit of detection (LOD) at all stations.
- Polybrominated diphenyl ethers were recorded below the LOD, with the exception of PBDE 209 at Stations ENV12, ENV21, ENV22, ENV24 and ENV35 and exceeded the OSPAR (2020) background assessment criteria after normalisation to 2.5% TOC at Stations ENV12 and ENV24. However, all concentrations were below Federal Environmental Quality Guidelines (Viñas *et al.*, 2023).
- Organochloropesticides were below LOD at most stations and where recorded did not exceed CEFAS Action Level 1 concentrations.
- With the exception of arsenic at Station ENV22, all metal concentrations were below their respective ERL thresholds (Long *et al.*, 1995). However, all metals were below the apparent effects thresholds (Buchman, 2008) indicating that toxicological impacts to biota associated with metal concentrations were unlikely to occur.
- Multivariate analysis of the physico-chemical data set revealed that 92% of the multivariate pattern could be explained by variations in sand proportions and overall the multivariate pattern reflects the natural variation in the survey area.
- A total of 578 operational taxonomic units (OTUs) were recorded from sediment samples across the array area. This was broken down to 515 bacterial OTUs and 63 infaunal OTUs. Overall, there was a high proportion of widespread taxa and lone taxa suggesting that the community has been subjected to relatively little disturbance.
- A total of 74 OTUs were recorded from water samples, comprising 37 fish OTUs and 37 vertebrate OTUs.

- Macrofaunal analysis identified 2063 adult individuals representing 238 taxa. Polychaetes were the most dominant taxonomic group across the array area. Relatively high numbers of single and low abundance taxa within the macrofaunal community suggests relatively low exposure to disturbance or contamination.
- Biomass recorded a total wet weight of 469.5g at the array area. As expected, Mollusca was the most dominant taxonomic taxa due to the size difference when compared to polychaetes.
- EUNIS classification was conducted based on all data collected from the survey, resulting in three level 4 biotope classifications: MD421 (Faunal communities in Atlantic offshore circalittoral mixed sediment), MD521 (Faunal communities in Atlantic offshore circalittoral sand) and MD621 (Faunal communities on Atlantic offshore circalittoral mud).

Report volumes are as follows:

Report	Report No.
Caledonia OWF Array Area Field Report	54463.E0
Caledonia OWF ECR Field Report	54463.E1
Caledonia OWF ECR MMO and PAMS Report	54463.E2
Caledonia OWF Array Area MMO and PAMS Report	54463.E3
Caledonia OWF Array Area Habitat Assessment Report	54463.E4
Caledonia OWF Array Area Environmental Baseline Report	54463.E5
Caledonia OWF ECR Habitat Assessment Report	54463.E6
Caledonia OWF ECR Environmental Baseline Report	54463.E7

USE OF THIS REPORT

This report has been prepared with due care and diligence and with the skill reasonably expected of a reputable contractor experienced in the types of work carried out under the contract and as such the findings in this report are based on an interpretation of data which is a matter of opinion on which professionals may differ and unless clearly stated is not a recommendation of any course of action.

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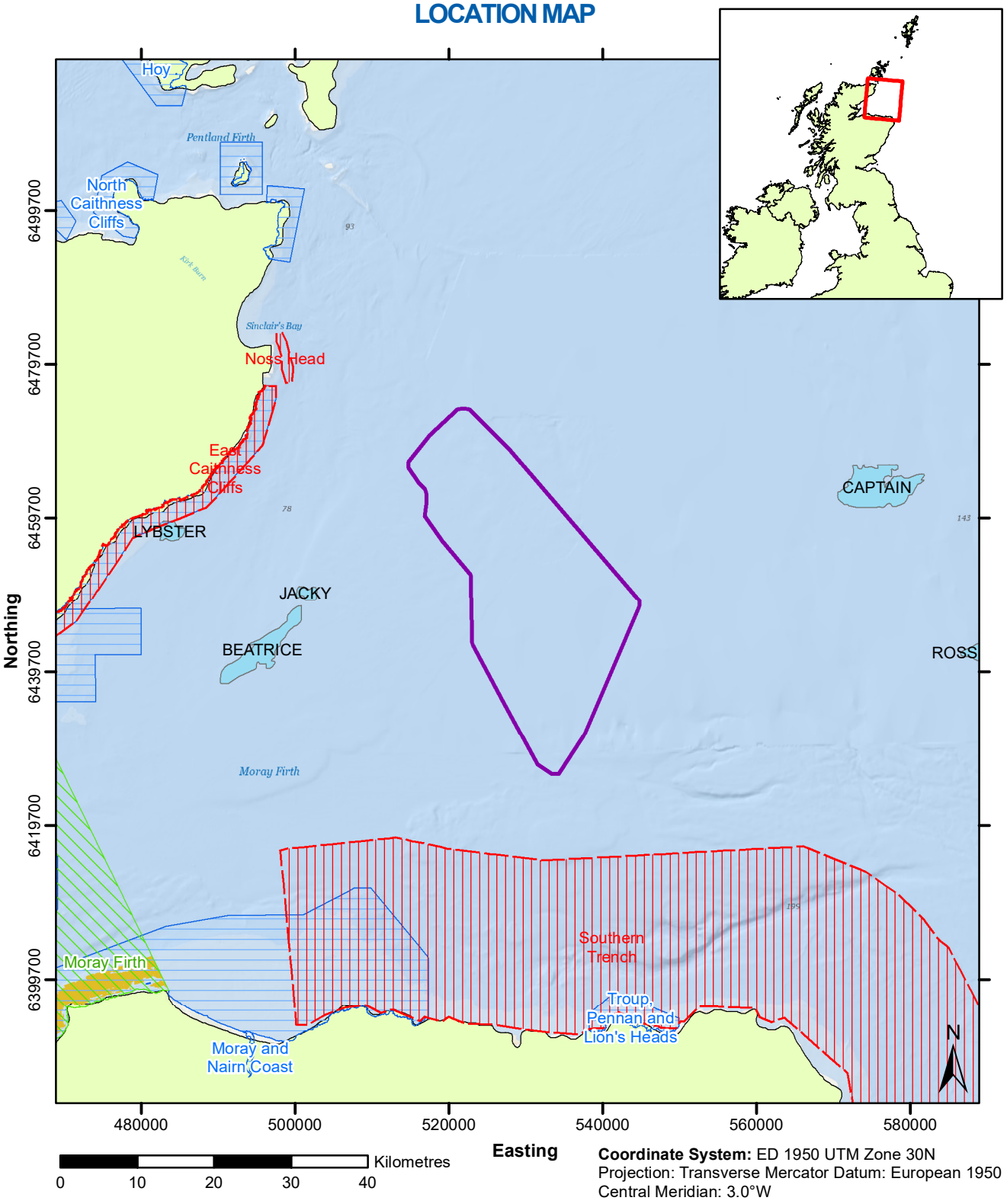
LOCATION MAP



Coordinate System: ED 1950 UTM Zone 30N
Projection: Transverse Mercator Datum: European 1950
Central Meridian: 3.0°W

Key

- Caledonia OWF Array Area
- Nature Conservation Marine Protected Areas (NCMPA; JNCC, 2022)
- Special Area of Conservation (JNCC, 2022)
- Special Protected Area (JNCC, 2022)
- Oil Field (NSTA, 2022)
- Sandy Sediment in less than 20m water (JNCC, 2019)

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GLOSSARY OF TERMS AND ABBREVIATIONS

AET	Apparent Effects Threshold
Aliphatic	An organic compound having open-chain structure (see Alkane)
Alkane	Any of a series of open-chain, saturated hydrocarbons CnH2n+2 (e.g. methane, ethane)
Anthropogenic	Produced or caused by human activity
BAC	Background Assessment Criteria
BC(s)	Background Concentration(s)
Benthic	Relating to the seabed
Biogenic	Produced by living organisms
BSI	British Standards Institute
CAL	Cefas Action Level
CCC	Continuing Calibration Check
Cefas	Centre of Environment Fisheries and Aquaculture Science
CEMP	Coordinated Environmental Management Programme
CHEM	Chemistry Sample
Clay	Sediment grains <3.9µm in diameter
CM	Central Meridian
CPI	Carbon Preference Index
CTD	Conductivity, Temperature and Depth Profiler
DCM	Dichloromethane
DO	Dissolved Oxygen
EAC	Environmental Assessment Criteria
ECR	Export Cable Route
EEA	European Environment Agency
ERL	Effects Range Low
ERM	Effects Range Median
EQR	Ecological Quality Ratio
EUNIS	European Union Nature Identification System
Fines	Sediment grains <63µm in diameter (same as Mud)
FTU	Formazin Turbidity Units
GC	Gas Chromatography
GC-FID	Gas Chromatography Flame Ionisation Detection
GC-MS	Gas Chromatography Mass Spectrometry
Gravel	Sediment grains >2mm in diameter
HF	Hydrofluoric Acid
HMW	High Molecular Weight
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
LAT	Lowest Astronomical Tide
LMW	Low Molecular Weight
LOD	Limit of Detection
Macrofauna	Organisms that are normally larger than the 1mm mesh of the sieve.
MBES	Multi-beam Echo Sounder
MDS	Multi Dimensional Scaling
Meiofauna	Organisms that are usually smaller than the 1mm mesh size of the sieve used.
MMO	Marine Management Organisation
Mud	Sediment grains <63µm (includes Silt and Clay)
MV	Motor Vessel
NDIR	Non-dispersive infrared
NMBAQC	North East Atlantic Marine Biological Analytical Quality Control
NPD	Naphthalenes, phenanthrenes and dibenzothiophenes
NSTA	North Sea Transit Authority
OCP	Organochoutine Pesticide
OTU	Operational Taxonomic Unit
OWF	Offshore Wind Farm
PAH(s)	Polycyclic Aromatic Hydrocarbon(s)
PBDE	Polybrominated Diphenyl Ether
PCB	Polychlorinated Biphenyl
PCR	Polymerase Chain Reaction
Petrogenic	Relating to unburned petroleum products
PMF	Priority Marine Feature
PRIMER	A statistical analysis program - Plymouth Routines in Multivariate Research
PSA	Particle Size Analysis
PSU	Practical Salinity Units
Pyrogenic	Produced under conditions involving intense heat
QC	Quality Control
SAC	Special Area of Conservation
Sand	Sediment grains ≥63µm and <2mm in diameter
SD	Standard Deviation
Silt	Sediment grains ≥3.9µm and <63µm in diameter
Sobs	A species accumulation curve with samples added in label order
Sorting	Measure of the range of grain sizes in a sediment sample
SSS	Side Scan Sonar
THC	Total Hydrocarbon
TOC	Total Organic Carbon
UCM	Unresolved Complex Mixture
UGE	A smoothed species accumulation curve based on samples being added randomly and averaged over several runs
UKCS	United Kingdom Continental Shelf
UKOOA	United Kingdom Offshore Operators Association
USBL	Ultra-Short Baseline
US EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
UVF	Ultra-Violet Fluorescence Spectroscopy

1 INTRODUCTION

1.1 Scope of Work

Between March and June 2023 Gardline conducted and integrated survey on behalf of Caledonia Offshore Windfarm Limited across the offshore array area and associated export cable route (ECR) located in the outer region of the Moray Firth.

The environmental operations for the survey were conducted on the motor vessel (MV) *Ocean Endeavour* between 03-Mar-2023 and 12-Jun-2023, with the environmental operations across the array area taking place between 14-Apr-2023 and 22-Apr-2023. The current report details the full environmental baseline survey results for the array area only, results of the habitat assessment (Gardline, 2023), with results summarised within this report where relevant and ECR surveys (Gardline, issue pendingc; issue pendingb) are reported separately.

As detailed in the scope of work (Appendix A) the overall aim of the survey was data collection to support the design of the proposed offshore windfarm infrastructure within the array area. To support the placement and design of proposed offshore subsea facilities within the survey area a multi-discipline survey was required.

The objectives of the environmental survey were:

- characterise the benthic sub-tidal environment that is present across the footprint of the array area.
- identify the occurrence and distribution of any habitats or species of conservation interest.
- characterise the grain type and levels of contaminants within the seabed sediments.

All positional information in this report is referenced to WGS 1984. All grid coordinates are projected using Universal Transverse Mercator (UTM) Projection Grid Zone 30N, Central Meridian (CM) 3°W.

1.2 Environmental Survey Strategy

To enable clear and concise reporting the naming convention of the stations have been shortened by the removal of the 'AA_' station identifier. These shortened names have been used throughout the report where possible, though the original full names have been retained in survey logs, the image file names and on the video overlays. The abbreviated station names have been presented in Table 1.1 along with details of grab samples and seabed imagery, which may be offset from the intended target, are presented in the positional logs within Appendix B.

A total of 42 stations were pre-selected by the client throughout the array area to meet the objectives of the scope of work (Appendix A). All stations were successfully investigated using a digital still camera system, with imagery acquired at Station ENV1 to ENV35 utilised for grab sampling pre-clearance purposes only. Imagery at the remaining 7 stations (ENV36 to ENV42) were analysed for the occurrence and distribution of any habitats or species of conservation interest.

Benthic sampling was undertaken at 35 stations (ENV1 to ENV35), with all stations successfully investigated with the exception of Station ENV20. No grab samples were acquired at Station ENV20 due to either low retention in the grab sample or pebbles becoming stuck in the grab's jaw leading to sample washout. Using the 0.1m^2 mini-Hamon grab, two macrofaunal samples were acquired. These were sub-sampled for particle size analysis (PSA), prior to being sieved onboard through a 1mm mesh sieve to provide benthic macrofaunal samples, which were preserved in formaldehyde solution. One of the faunal samples (labelled MFA) was worked up in the laboratory, with the second sample (MFB) retained at Gardline's premises as a spare. Chemistry samples were acquired at ten stations, as detailed in Table 1.1, using the 0.1m^2 Day grab. One grab sample

(designated CHEM) from each station was sub-sampled for analysis of hydrocarbons, metals, organotins, polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), organochlorine pesticides (OCPs) and eDNA. Sampling and analytical methods are detailed in Appendix C.

CTD profiles and water samples were also acquired at the ten stations, see Table 1.1. Two water samples, one near the seabed and one below the sea surface, were acquired at each station for eDNA analysis. Sampling and analytical methods are detailed in Appendix C.

Details of the station locations are summarised in Table 1.1. Target and actual sampling location, the latter of which may be slightly offset from the former, are presented in Figure 1.1 and Figure 1.2 and in the Surveyor's log sheets in Appendix B.

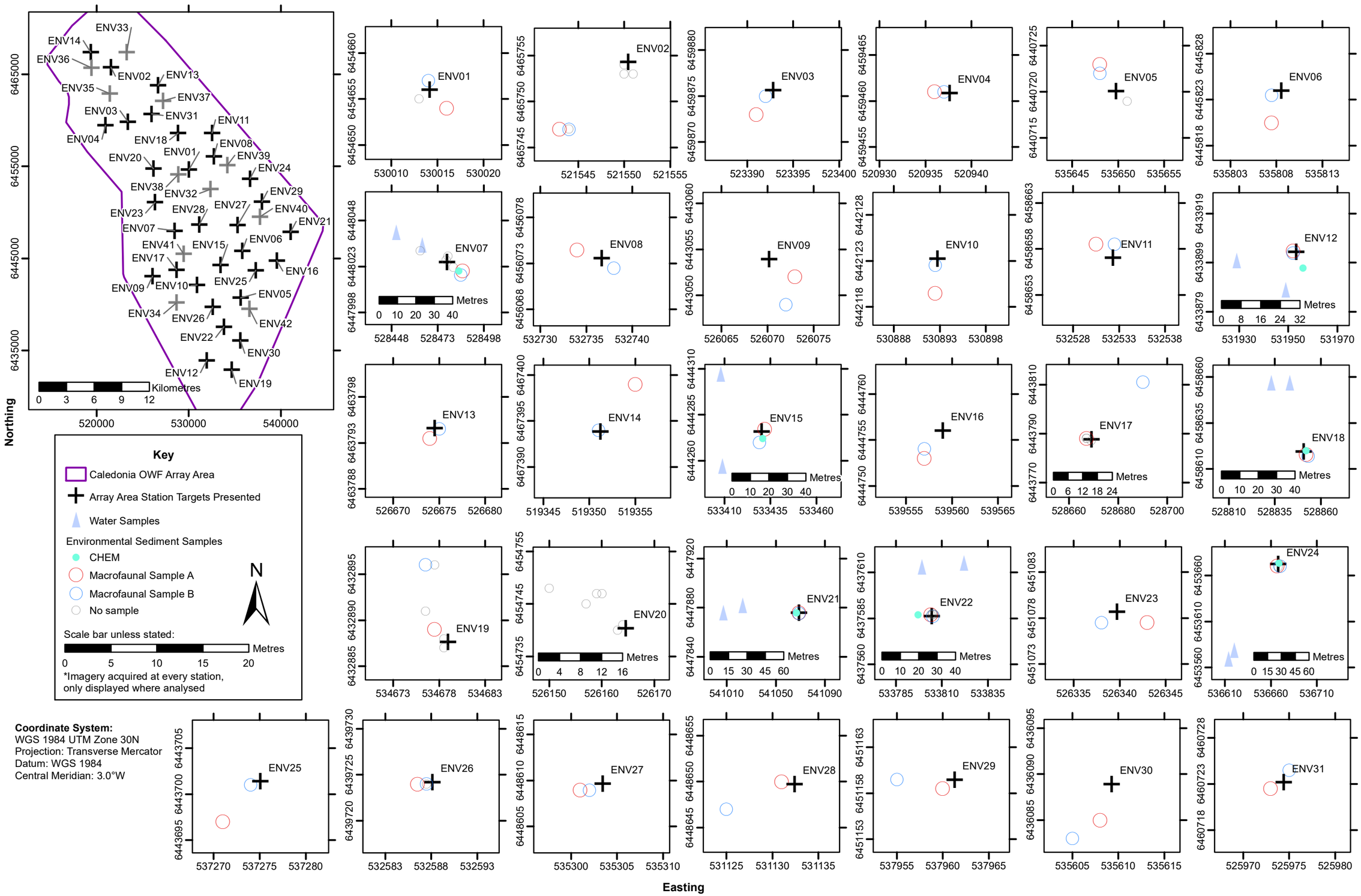
Table 1.1 Summary of Environmental Sampling Positions and Samples Acquired

Target ID	Station ID for use in the report	Start Easting[1]	Start Northing[1]	End Easting[1]	End Northing[1]	Observed Water Depth (m)[2]	Description	Camera	CTD Profile	Water eDNA	Macrofauna Grab[3]	Chemistry Grab[4]
AA_ENV_01	ENV01	530 014	6 454 656			56	Side-scan sonar medium reflectivity, mixed sediment, general flat seabed	Y			2	
AA_ENV_02	ENV02	521 550	6 465 754			59	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y			2	
AA_ENV_03	ENV03	523 393	6 459 876			58	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y			2	
AA_ENV_04	ENV04	520 937	6 459 461			56	Side-scan sonar medium reflectivity, mixed sediment, general flat seabed with megaripples	Y			2	
AA_ENV_05	ENV05	535 650	6 440 720			64	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y			2	
AA_ENV_06	ENV06	535 808	6 445 823			64	Slope of sand bank, side-scan sonar- low reflectivity, sandy sediment	Y			2	
AA_ENV_07	ENV07	528 478	6 448 025			55	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y	Y	4	2	2
AA_ENV_08	ENV08	532 737	6 456 073			59	Side-scan sonar medium reflectivity, mixed sediment, seabed elevation, top of sand ridge	Y			2	
AA_ENV_09	ENV09	526 070	6 443 054			58	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y			2	
AA_ENV_10	ENV10	530 892	6 442 123			63	Side-scan sonar medium reflectivity, mixed sediment, seabed elevation, megaripples	Y			2	
AA_ENV_11	ENV11	532 532	6 458 657			55	Side-scan sonar medium reflectivity, mixed sediment, seabed elevation, top of sand ridge	Y			2	
AA_ENV_12	ENV12	531 953	6 433 903			71	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y	Y	4	2	2
AA_ENV_13	ENV13	526 674	6 463 794			51	Side-scan sonar high reflectivity, mixed/gravelly sediment, seabed elevation, megaripples	Y			2	
AA_ENV_14	ENV14	519 351	6 467 394			58	Side-scan sonar medium reflectivity, mixed sediment, seabed elevation, megaripples	Y			2	
AA_ENV_15	ENV15	533 430	6 444 275			65	Side-scan sonar indicates slight reflectivity change in seabed	Y	Y	4	2	2
AA_ENV_16	ENV16	539 559	6 444 756			75	Side-scan sonar indicates slight reflectivity change in seabed	Y			2	
AA_ENV_17	ENV17	528 669	6 443 788			55	Side-scan sonar high reflectivity, mixed/gravelly sediment, slope of seabed elevation	Y			2	
AA_ENV_18	ENV18	528 669	6 458 620			55	Sand waves, side-scan sonar - patches of high reflectivity, Sand and slightly gravelly sand in furrows	Y	Y	4	2	2
AA_ENV_19	ENV19	534 678	6 432 888			70	Slope of sand bank, side-scan sonar- low reflectivity, sandy sediment	Y			2	
AA_ENV_20	ENV20	526 165	6 454 740			54	Top of sand bank with sand waves, side-scan sonar - high reflectivity, Sand and slightly gravelly sand in furrows	Y			0	
AA_ENV_21	ENV21	541 069	6 447 876			104	Seabed depression	Y	Y	4	2	2
AA_ENV_22	ENV22	533 80–	6 437 586			64	Top of sand ridge, side-scan sonar - high reflectivity, Sand and slightly gravelly sand in furrows	Y	Y	4	2	2
AA_ENV_23	ENV23	526 340	6 451 078			54	Top of sand bank with sand waves, side-scan sonar - low reflectivity, Sand and slightly gravelly sand in furrows	Y			2	
AA_ENV_24	ENV24	536 668	6 453 672			66	Slope of sand bank, side-scan sonar- low reflectivity, sandy sediment	Y	Y	4	2	2
AA_ENV_25	ENV25	537 275	6 443 701			69	High reflectivity feature - discreet	Y			2	
AA_ENV_26	ENV26	532 588	6 439 724			70	Area of low reflectivity - featureless ground	Y			2	
AA_ENV_27	ENV27	535 303	6 448 610			61	Area of low reflectivity - featureless ground	Y			2	
AA_ENV_28	ENV28	531 132	6 448 650			55	Side-scan sonar medium reflectivity, mixed sediment, general flat seabed with megaripples	Y			2	
AA_ENV_29	ENV29	537 961	6 451 159			65	Slope of sand bank, side-scan sonar- low reflectivity, sandy sediment	Y			2	
AA_ENV_30	ENV30	535 609	6 436 089			79	Base of slope feature	Y			2	
AA_ENV_31	ENV31	525 974	6 460 723			54	Side-scan sonar medium reflectivity, mixed sediment, megaripples	Y			2	
AA_ENV_32	ENV32	532 374	6 452 533			59	General featureless seabed	Y			2	
AA_ENV_33	ENV33	523 255	6 467 414			56	Side-scan sonar medium reflectivity, mixed sediment, seabed with megaripples	Y	Y	4	2	2
AA_ENV_34	ENV34	528 681	6 440 177			68	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y	Y	4	2	2
AA_ENV_35	ENV35	521 411	6 462 903			54	Side-scan sonar medium reflectivity, mixed sediment, general flat seabed with megaripples	Y	Y	4	2	2

Target ID	Station ID for use in the report	Start Easting[1]	Start Northing[1]	End Easting[1]	End Northing[1]	Observed Water Depth (m)[2]	Description	Camera	CTD Profile	Water eDNA	Macrofauna Grab[3]	Chemistry Grab[4]
AA_ENV_36	ENV36	519 419	6 465 726	519 434	6 465 681	57	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y				
AA_ENV_37	ENV37	527 224	6 462 147	527 224	6 462 198	50	Side-scan sonar high reflectivity, mixed/gravelly sediment, seabed elevation, megaripples	Y				
AA_ENV_38	ENV38	528 860	6 454 156	528 887	6 454 193	54	General flat seabed, side-scan sonar low reflectivity, sandy sediment	Y				
AA_ENV_39	ENV39	534 188	6 455 116	534 224	6 455 150	60	Side-scan sonar medium reflectivity, mixed sediment, general flat seabed with megaripples	Y				
AA_ENV_40	ENV40	537 753	6 449 539	537 772	6 449 583	57	Side-scan sonar medium reflectivity, mixed sediment	Y				
AA_ENV_41	ENV41	52– 446	6 445 486	529 485	6 445 463	52	Side-scan sonar - high reflectivity, Sand and slightly gravelly sand in furrows	Y				
AA_ENV_42	ENV42	536 595	6 439 492	536 637	6 439 505	64	Side-scan sonar indicates a transition area between low and high reflectivity, mixed sediment, slight seabed elevation	Y				

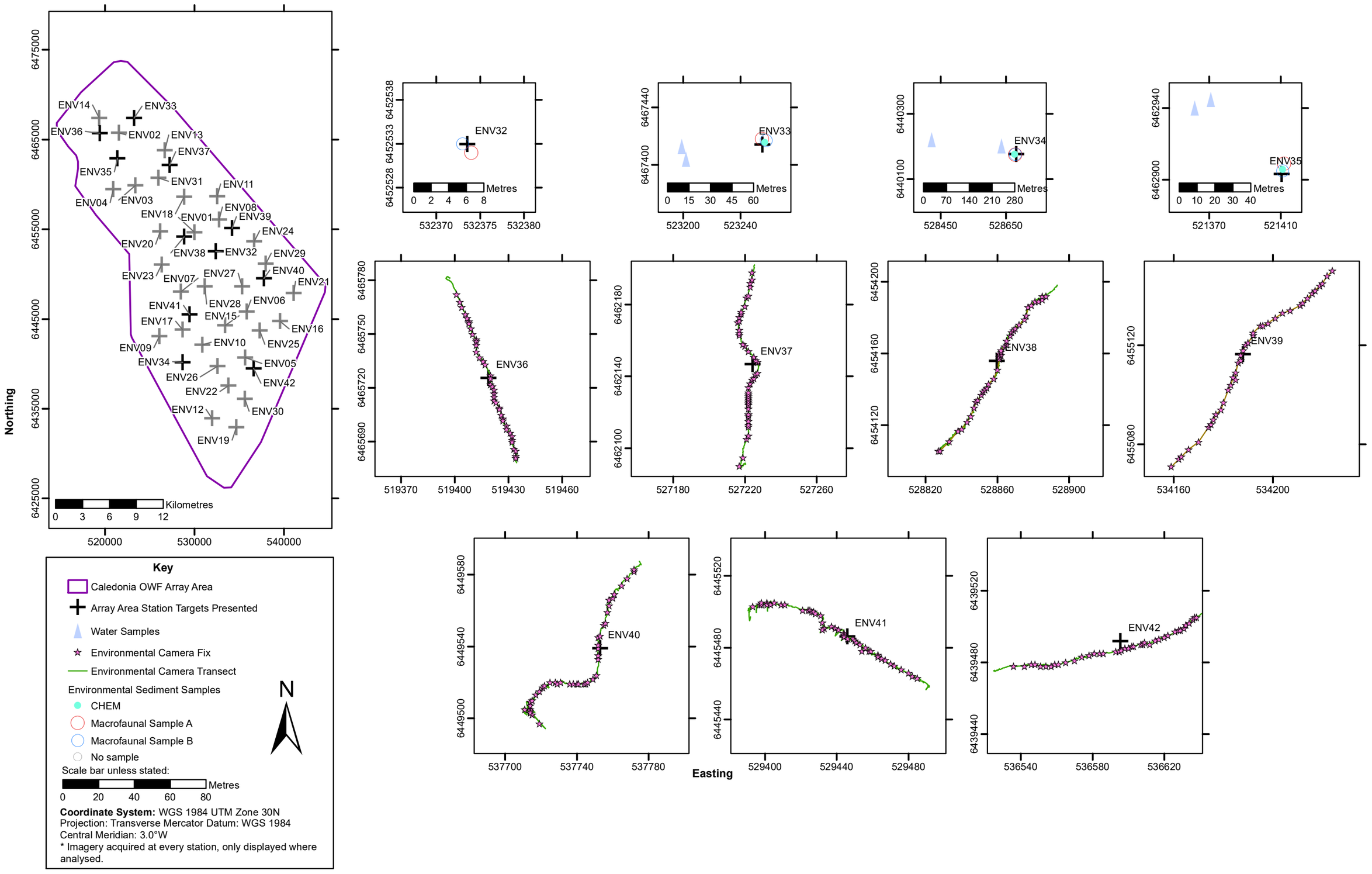
1 Environmental target locations. Actual sampling positions for each individual grab sample are detailed in Appendix B.
2 Actual depth at time of sampling, not corrected to lowest astronomical tide (LAT).
3 PSA sub-sample removed prior to sieving through a 1mm mesh sieve. One macrofauna sample was sent to be analysed, one sample kept as a spare at room temperature. Analysis methods are as detailed in Appendix C.1.
4 eDAN sub-sampled removed prior to chemistry sub-sampling. One chemistry to be analysed, one to be retained as a spare. Analysis methods are as detailed in Appendix C.1.

Figure 1.1 Target and Actual Sampling Locations; Stations ENV01 to ENV31



Coordinate System:
WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
Central Meridian: 3.0°W

Figure 1.2 Target and Actual Sampling Locations; Stations ENV32 to ENV42



1.3 Published Background Data

Reference, where possible, has been made to suitable published background data for marine sediments from the North-East Atlantic and North Sea such as CEFAS Action Levels (CALs; MMO, 2022), UKOOA (2001) and OSPAR (2005), along with toxicity information including effects range low (ERL) and effects range median (ERM; Long *et al.*, 1995) and the apparent effects thresholds (AETs) as detailed by Buchman (2008). Background information is also provided in Appendix D.

The MMO (2022) CALs are used to assess dredging material and its suitability for disposal at sea. The values can be used in conjunction with other assessment methods to monitor the contaminant levels of metals, organotins, PCBs and OCPs. In general, contaminant levels in dredged material below CAL1 are of no concern and are unlikely to influence the licencing decision. Dredged material with contaminant levels between CAL1 and CAL2 would require further consideration and testing before a decision can be made. Dredged material with contaminant levels above CAL2 is generally considered unsuitable for sea disposal.

OSPAR (2005) has published a set of background concentrations (BC), which represent the concentrations of certain hazardous substances that would be expected in the North-East Atlantic if certain industrial developments had not happened. OSPAR has also described 'background assessment criteria' (BACs), a set of statistical tools that enable testing of whether mean observed concentrations (*i.e.*, collected during a seabed survey) can be considered to be near background concentrations. Where no updated BCs have been developed, the upper limit of the range of background/reference concentrations (BRC) agreed by OSPAR in 1997 have been used. Comparison to OSPAR (2005) data required normalisation of the hydrocarbon concentrations to 2.5% total organic carbon (TOC). However, OSPAR (2015) acknowledge that the current BC and BAC may be inappropriate for application throughout the Convention area, as they were derived from a data set that emphasises the northern part of the Convention area and within other areas there may be differences in origin and composition of the sediment. In particular, OSPAR (2015) point out that if the composition of the sampled sediments is very different to the sediment type defined for the assessment criteria, normalisation will require a large extrapolation and may cause an unacceptable uncertainty. As such, where OSPAR (2005) BC, BAC and BRC values are compared with predominantly sandy or coarse sediments, particularly in the southern part of the convention area, interpretation should be treated with some caution.

The best estimates of the potential toxicity of polyaromatic hydrocarbons (PAHs) in marine sediments are ERL and ERM concentrations for total low molecular weight (2- to 3-ring, LMW), total high molecular weight (4- to 6-ring HMW) and total 2-6 ring PAHs (Neff, 2004) as given by Long *et al.* (1995) and OSPAR (2009c). These concentrations are not actual thresholds of toxicity but delineate concentration ranges with associated probabilities of toxicity. More information on the ERL and ERM for PAHs can be found in Appendix Section E.2. Long *et al.* (1995) also define ERL and ERM values for selected metals.

OSPAR have also defined Environmental Assessment Criteria (EAC) for PAHs, PCBs and the metals cadmium (Cd), lead (Pb) and zinc (Zn) as part of their Coordinated Environmental Management Programme (CEMP; OSPAR, 2009c). EACs represent the contaminant concentration in the environment below which no chronic effects are expected to occur in marine species, including the most sensitive species. Therefore, concentrations below the EACs are considered to present no significant risk to the environment. EACs for a range of contaminants were proposed in 2004, and updated EACs for PCBs were proposed in 2008. Further EACs continue to be developed for use in data assessments. Comparison with EACs required normalisation of PAH and PCB concentrations to 2.5% TOC and metals to 1% TOC. Where EACs are not available, OSPAR instead advise using the aforementioned ERL and ERM values.

Buchman's (2008) AETs were obtained by establishing relationships between the sediment metal concentrations and benthic community toxicological impacts and correspond to the highest concentrations at which no toxicological effects were observed.

1.4 Existing Infrastructure

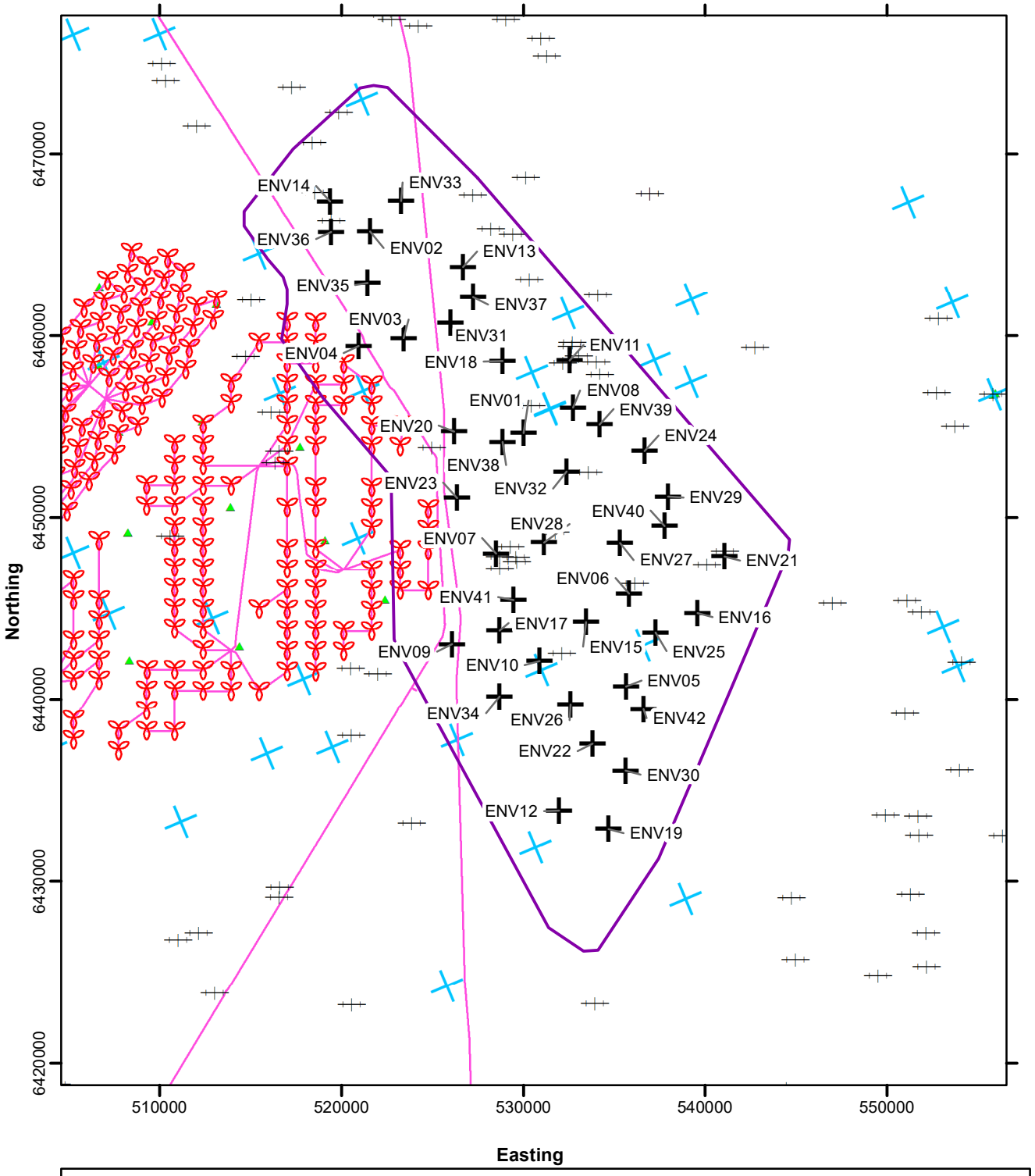
Based on data from the North Sea Transit Authority (NSTA, 2023), the position and status of the twelve wells within 5km of the environmental target stations are listed in Table 1.2. The SHEFA-2 subsea fibre optic communications cable connecting the Faroe Islands to mainland Scotland also runs through the survey area. There were no pipelines in the vicinity of the survey area. An overview of all existing infrastructure is illustrated in Figure 1.3.

Table 1.2 Details of Historical Wells Closest to Each Station

Well	Easting	Northing	Status	Intent	Completion Date	Distance and Direction from Nearest Station
12/29- 1	536 516	6 442 968	Abandoned Phase 3	Exploration	25-Oct-81	1056 SW of ENV25
12/23- 3	531 406	6 455 998	Abandoned Phase 3	Exploration	26-Nov-85	1333m W of ENV08
12/23-3A	531 401	6 455 964	Abandoned Phase 3	Exploration	02-Feb-86	1340m W of ENV08
12/23- 2	530 413	6 457 994	Abandoned Phase 3	Exploration	24-Nov-82	1683m ESE of ENV18
12/28- 2	530 597	6 431 851	Abandoned Phase 3	Exploration	10-Aug-84	2460m SSW of ENV12
12/22- 2	521 153	6 456 964	Abandoned Phase 3	Exploration	24-Oct-82	2507m S of ENV04
12/23- 1	532 390	6 461 242	Abandoned Phase 3	Exploration	06-Oct-67	2589m N of ENV11
12/28- 3	526 301	6 437 741	Abandoned Phase 3	Exploration	03-Sep-84	3406m SW of ENV34
12/22- 3	515 384	6 464 522	Abandoned Phase 3	Exploration	29-Jul-86	4211m WSW of ENV36
12/24- 2	539 157	6 457 481	Abandoned Phase 3	Exploration	25-Sep-81	4550m NNE of ENV24
12/24- 1	537 139	6 458 676	Abandoned Phase 3	Exploration	12-May-75	4607m E of ENV11
12/28- 1	530 944	6 441 630	Abandoned Phase 3	Exploration	09-Apr-82	496m S of ENV10

<1km	1-2km	2-3km	3-4km	4-5km

Figure 1.3 Local Subsea Infrastructure Features



Key

- Array Area Station Targets
- Caledonia OWF Array Area
- Wrecks (NSTA)
- Turbines
- Cables (4C Database)
- Plugged and Abandoned Wells (NSTA, 2023)
- Other Subsurface Infrastructure (NSTA, 2023)

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator Datum:WGS 1984
Central Meridian: 3.0°W

0 2.5 5 7.5 10 Kilometres

N

2 RESULTS AND DISCUSSION

2.1 Geophysical Survey Summary

Geophysical survey data were successfully acquired across the array area. Acquisition comprised data from MBES, side scan sonar (SSS), magnetometer, hull-mounted pinger, USBL and 2D ultra-high resolution seismic equipment. The data is reported separately in the geophysical interpretation report (Gardline, issue pendinga). Overview maps of the bathymetry (gridded at 2m) and side scan sonar mosaic are presented in Figure 2.1 and Figure 2.2 respectively.

Figure 2.1 Colour Shaded Relief of Bathymetry

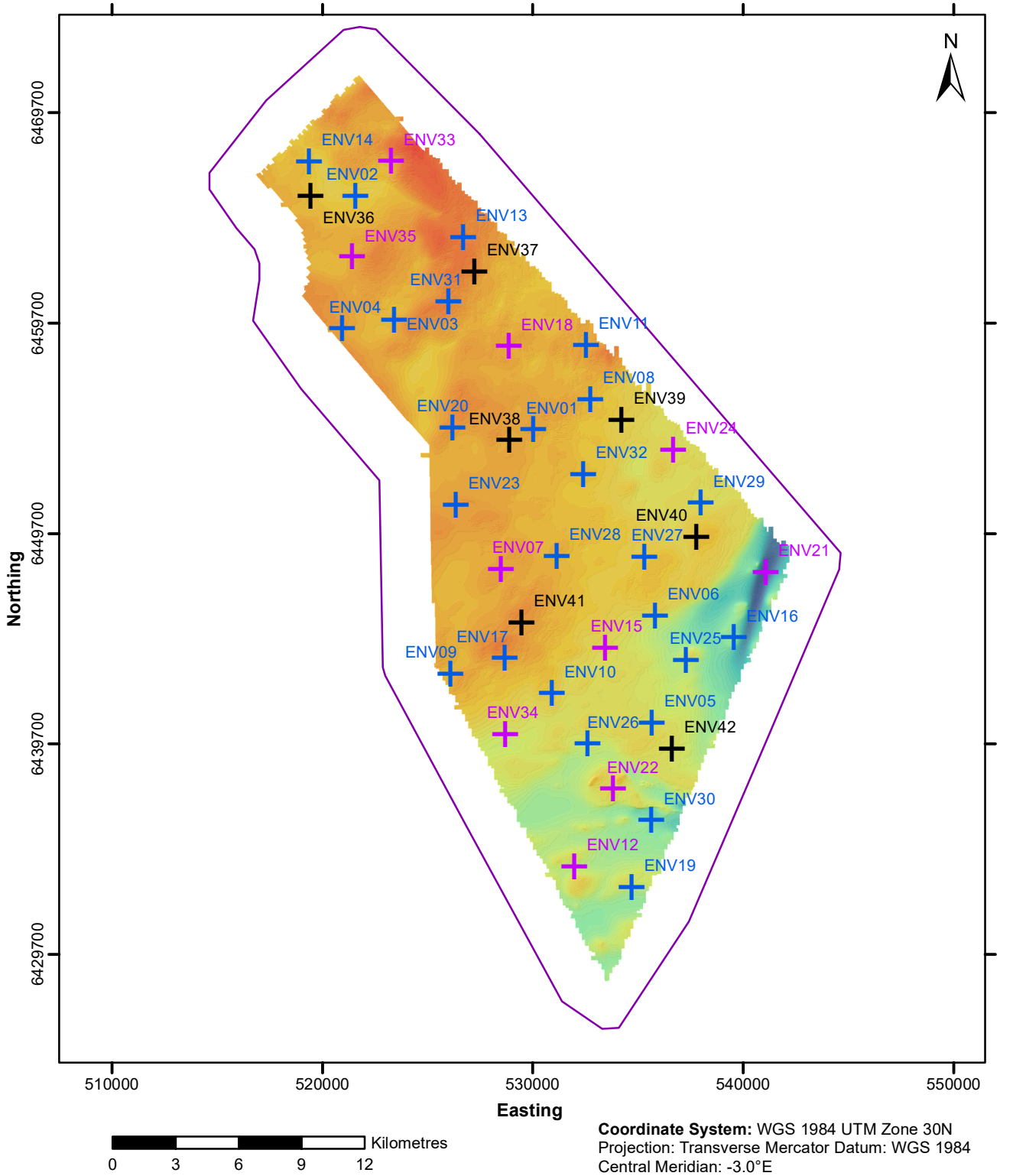
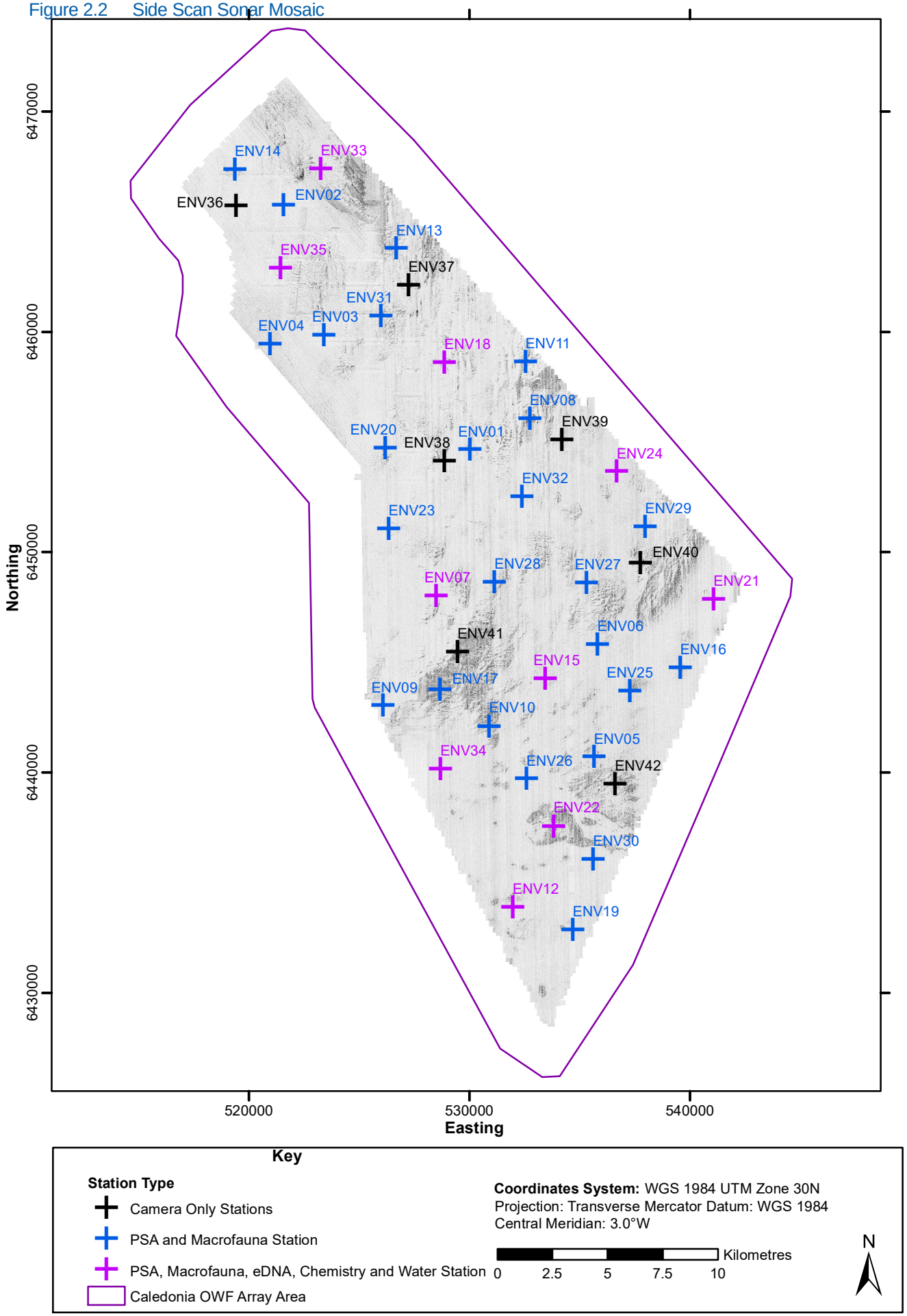


Figure 2.2 Side Scan Sonar Mosaic



2.2 Seabed Imagery Observations Summary

Results of the camera investigation at the seven analysed stations (ENV36 to ENV42) are summarised below and presented in full in the habitat assessment report (Gardline, 2023). A selection of seabed images, together with sediment and faunal descriptions are presented in Appendix D.

Imagery confirmed the sediments comprised generally sand with occasional gravel and shell material. Fauna was generally sparse, with 34% (n=101) of images containing no visible fauna. Of all taxa observed in imagery, faunal turf was the most common feature and was only identified in 2% (n=91) of images.

A single individual of Pennatuloidea was observed at Station ENV36, whilst a further nine individuals were observed at Station ENV42. In accordance with SACFOR, Pennatuloidea at Station ENV36 were classified as 'rare' whilst at Station ENV42 they were classified as 'rare' to 'occasional'. Further, a single burrow was observed at Station ENV39, whilst 15 burrows were recorded at Station ENV42. Burrows at Station ENV39 were classified as 'occasional', whereas burrows at Station ENV42 were classified as 'rare' to 'frequent'. The JNCC (2014) clarification report states that to be considered a 'sea pen and burrowing megafauna communities' habitat densities of burrows and/or mounds, together with sea pens if present, should be classified as 'frequent' or above on the SACFOR scale. Overall, the survey area did not indicate a resemblance to a 'sea pen and burrowing megafauna communities' habitat, which is classified as a threatened and/or declining habitat (OSPAR, 2008) and a priority marine feature (PMF) in Scotland's seas (NatureScot, 2020a).

A total of 30 pairs of *Arctica islandica* siphons were observed across Stations ENV39, ENV40 and ENV42. This species is on the OSPAR (2008) list of threatened and/or declining species and habitat and is listed as a low or limited mobility species PMF in Scottish offshore waters (NatureScot, 2020a).

The flatfish *Pleuronectes platessa* was observed across Stations ENV36, ENV37 and ENV38. This species is listed on the Scottish Biodiversity List (NatureScot, 2020b); however, it is listed as least concern on the IUCN Red List (2023).

Other than those habitats and species detailed above, there was no further evidence from seabed imagery of any other habitats or species of conservation focus within the array area.

2.3 Water Physico-Chemical Profile

Water CTD profiles were acquired at ten stations. The upcast profiles used in the following analysis of the different physico-chemical variables are presented graphically in Appendix F. Depth profiles for temperature (°C), salinity (practical salinity units; PSU), turbidity (formazin turbidity units; FTU), dissolved oxygen (DO) and pH were recorded against depth on each deployment. Observed temperature has been converted to potential temperature (θ) using UNESCO algorithms (Fofonoff & Millard, 1983), while DO concentration was calculated from the percentage saturation using the formula from Weiss (1970).

2.3.1 Potential Temperature

To aid comparison between different profiled stations, a summary of potential temperature (θ, °C) measurements is tabulated in Table 2.1 for specific depth horizons. The potential temperature profiles revealed surface temperatures between 7.8°C at Station ENV34 and 9.7°C at Station ENV12, remaining relatively constant throughout the well mixed upper layer (to *c.*10m). Overall, Station ENV12 in the south of the array area presented surface water temperatures approximately 1°C to 2°C warmer than the other stations sampled. With the exception of Stations ENV18 and ENV34 which showed well mixed profiles, a thermocline was present at

all stations with temperatures decreasing rapidly between depths of 5m and 20m. Beyond the thermocline, temperatures were relatively stable.

Table 2.1 Summary of Potential Temperature (°C)

Station	Range (θ, °C)			θ (°C) at Specific Depth			Station Depth (m LAT)
	Min	Max	Surface	25m	50m	Max Depth	
ENV07	7.7	8.0	7.9	7.7	7.7	7.7	53
ENV12	7.6	9.7	9.7	7.9	7.7	7.6	69
ENV15	7.8	8.7	8.7	7.9	7.8	7.8	62
ENV18	8.0	8.0	8.0	8.0	8.0	8.0	54
ENV21	7.7	8.8	8.8	8.0	7.8	7.7	102
ENV22	7.5	8.2	8.1	7.6	7.5	7.5	62
ENV24	8.0	8.7	8.7	8.1	8.0	8.0	62
ENV33	8.1	8.6	8.5	8.1	8.1	8.1	54
ENV34	7.6	7.8	7.8	7.8	7.7	7.6	66
ENV35	8.0	8.5	8.5	8.0	8.0	8.0	54

2.3.2 Salinity

A summary of salinity values is tabulated in Table 2.2. Between stations, salinity varied from 34.1 PSU to 34.8 PSU. All stations recorded stable salinity profiles apart from Station ENV12. Station ENV12 shows a halocline between approximately 10m to 25m. Decreasing salinity and development of a halocline is consistent with the freshwater input from the river catchments of the Inner Moray and Cromarty Firths which flow into the Moray Firth.

Table 2.2 Summary of Salinity (PSU)

Station	Range of Salinity (PSU)			Salinity (PSU) at Specific Depth		
	Min	Max	Surface	25m	50m	Max. Depth
ENV07	34.6	34.7	34.6	34.7	34.7	34.7
ENV12	34.1	34.8	34.1	34.7	34.7	34.8
ENV15	34.6	34.7	34.6	34.7	34.7	34.7
ENV18	34.6	34.6	34.6	34.6	34.6	34.6
ENV21	34.6	34.8	34.6	34.6	34.8	34.8
ENV22	34.6	34.8	34.6	34.6	34.8	34.8
ENV24	34.6	34.7	34.6	34.7	34.7	34.7
ENV33	34.6	34.7	34.6	34.6	34.6	34.6
ENV34	34.6	34.7	34.6	34.6	34.7	34.7
ENV35	34.6	34.7	34.6	34.6	34.6	34.6

2.3.3 Dissolved Oxygen

A summary of DO results recorded in mg L^{-1} is tabulated in Table 2.3. Concentrations of DO ranged from 9.1mg L^{-1} at three of the ten stations to 11.4mg L^{-1} at Station ENV15. Profiles revealed that maximum DO concentrations were typically recorded within the top 10m of the water column, consistent with surface mixing and oxygen exchange at the air-sea interface. Stations ENV12, ENV15 and ENV21 recorded maximum DO concentrations between 10m and 20m. A cline in DO was evident below the well-mixed surface waters to approximately 30m. The decrease of DO throughout the water column may be attributed to bacterial degradation of organic matter sinking from the sea-surface, the respiration of planktonic organisms within the upper water column, nitrification, chemical oxidation and the increasing distance from the sea surface-atmosphere interface. A previous study found DO concentrations in the North Sea to vary between 6mg L^{-1} and 10mg L^{-1} (Mahaffey *et al.*, 2020), which is consistent with the current survey.

DO readings in excess of 100% air saturation are possible due to the production of pure oxygen by photosynthetically-active organisms and due to the non-ideal equilibrium of DO between the water and the air above (YSI, 2019). This was the case for surface waters at all stations.

Table 2.3 Summary of Dissolved Oxygen (mg L^{-1})

Station	Range of Dissolved Oxygen (mg L^{-1})			Dissolved Oxygen (mg L^{-1}) at Specific Depth		
	Min	Max	Surface	25m	50m	Max. Depth
ENV07	9.4	10.0	10.0	9.5	9.4	9.4
ENV12	9.1	11.3	10.0	9.9	9.2	9.1
ENV15	9.6	11.4	11.3	9.8	9.6	9.6
ENV18	9.9	10.1	10.1	9.9	9.9	9.9
ENV21	9.1	11.1	10.8	9.9	9.5	9.1
ENV22	9.1	10.7	10.7	9.6	9.1	9.1
ENV24	9.9	11.0	11.0	9.9	9.9	9.9
ENV33	10.0	10.3	10.3	10.1	10.0	10.0
ENV34	9.3	10.0	10.0	9.7	9.4	9.3
ENV35	9.8	10.4	10.4	9.9	9.9	9.9

2.3.4 Turbidity

A summary of turbidity values in FTU is tabulated in Table 2.4. Turbidity profiles indicated that overall, the turbidity of the water was relatively consistent throughout the water column. A slight increase in turbidity was observed below 60m at Station ENV21, the deepest station, with turbidity increasing from 1.4 FTU to 3.3 FTU. The 'spiky' appearance of the profiles presented in Appendix F, is consistent with the sensor becoming momentarily obscured by suspended particles, debris or fauna in the water column.

Table 2.4 Summary of Turbidity (FTU)

Station	Range of Turbidity (FTU)			Turbidity (FTU) at Specific Depth		
	Min	Max	Surface	25m	50m	Max. Depth
ENV07	1.2	5.1	1.4	1.3	1.4	1.4
ENV12	1.3	4.3	1.4	1.4	1.9	2.5
ENV15	1.2	5.8	1.4	1.5	1.7	1.9
ENV18	1.3	5.4	1.5	1.5	1.6	1.8
ENV21	1.2	3.5	1.3	1.4	1.5	2.8
ENV22	1.2	2.9	1.6	1.4	2.1	2.0
ENV24	1.3	5.1	1.4	1.5	1.6	1.8
ENV33	1.3	8.3	1.5	1.7	1.8	1.6
ENV34	1.2	2.5	1.4	1.4	1.4	1.5
ENV35	1.4	5.2	1.5	1.6	1.8	1.6

2.3.5 pH

A summary of pH values recorded during the water profiles is presented in Table 2.5. Values for pH remained relatively consistent throughout the water column and survey area, with slight increases in pH associated with the thermoclines present.

Table 2.5 Summary of pH from CTD

Station	Range of pH			pH at Specific Depth		
	Min	Max	Surface	25m	50m	Max. Depth
ENV07	8.0	8.0	8.0	8.0	8.0	8.0
ENV12	7.9	8.1	8.1	8.0	8.0	8.0
ENV15	7.9	8.1	8.1	8.0	7.9	7.9
ENV18	8.2	8.3	8.2	8.2	8.3	8.3
ENV21	7.9	8.1	8.1	8.0	8.0	7.9
ENV22	7.9	8.1	8.1	8.0	7.9	7.9
ENV24	8.0	8.1	8.1	8.0	8.0	8.0
ENV33	8.0	8.0	8.0	8.0	8.0	8.0
ENV34	7.9	8.0	8.0	8.0	8.0	7.9
ENV35	8.0	8.0	8.0	8.0	8.0	8.0

2.4 Sediment Sampling Summary

Seabed sampling was conducted at 35 stations across the array area. Stations were sampled using a 0.1m^2 mini-Hamon grab (PSA and macrofauna samples) and the 0.1m^2 Day grab (eDNA and chemistry samples) at a subset of 10 stations. Environmental deck and positioning logs are presented in Appendix B with example images presented in Appendix D.

Overall, 78 single grab samples were retained from 108 deployments. Of these retained samples 99% were acquired within 20m of their target location. At Station ENV17, one grab sample was retained 31m from the target after several failed sampling attempts. No samples were retained at Station ENV20 due to either low sample retention or a stone in the jaws of the grab leading to sample washout. On average, retained samples were acquired 3.5m (±4.1SD) from their target location. The 30 unsuccessful sampling attempts occurred across 10 stations, generally due to low sample volume (83%) or stones in the grab jaws (17%).

Seabed sampling supported the initial interpretation of the seabed imagery findings, confirming that the seabed comprised primarily sand with varying amounts of gravel, shell fragments and fine sediment. Visible fauna observed within the retrieved grab was limited and included:

- Annelida (Polychaeta, Serpulidae)
- Arthropoda (Brachyura)
- Cnidaria (Hydrozoa)
- Echinodermata (Asteroidea, Ophiuroidea, Spatangoidea)
- Mollusca (*A. islandica*, Bivalvia, Scaphopoda).

Individuals of *A. islandica* were identified in grab samples at Stations ENV07, ENV15, ENV26 and ENV27. These individuals were measured and photographed before being returned to the sea. This species in on the OSPAR (2008) list of threatened and/or declining species and habitats and is listed as a low or limited mobility species under Scotland's PMF (NatureScot, 2020a). These individuals will be included in the macrofaunal abundance analysis in Section 2.11; however, they will not be included in the biomass analysis.

2.5 Sediment Characteristics

2.5.1 Particle Size Analysis

The results of the PSA for the 34 sampled stations across the array area, determined using wet and dry sieving are presented in Table 2.6. Full results, including histograms illustrating the particle size distribution at each of the sampled stations are presented in Appendix G.

Mean particle size varied from 45µm at Station ENV21 to 2881µm at Station ENV13, with an average mean grain diameter of 439µm (±613SD). Generally, sand (≥63µm and <2mm) was the dominant fraction accounting for between 49.0% and 97.1% of the sediment. Station ENV13 was an exception to this with gravel (≥2mm) being the dominant fraction accounting for 50.2% of the sediment, resulting in this station being classified as sandy gravel under the modified Folk classification (1954). Gravel was absent at three stations (ENV12, ENV21 and ENV30) and negligible (<1%) at a further 12 stations.

Under the modified Folk classification, stations ranged from muddy sand to sandy gravel, with these classifications being confirmed by the analysis of the relative proportions of fines, sand and gravel. Samples recorded a very poorly sorted to moderately sorted particle size distribution (Folk & Ward, 1957).

Table 2.6 Sediment Characteristics

Station		Mean Diameter (µm)	Mean Diameter (phi)	Fines %	Sand %	Gravel %	Wentworth Classification of Mean Grain Size	Sorting[1]	Modified Folk Classification	Total Organic Carbon %
ENV01		328	1.6	4.3	94.2	1.6	Medium sand	Moderate	Slightly gravelly sand	
ENV02		241	2.1	8.3	88.6	3.2	Fine sand	Poor	Slightly gravelly sand	
ENV03		306	1.7	2.3	96.5	1.1	Medium sand	Moderate	Slightly gravelly sand	
ENV04		800	0.3	3.0	67.1	29.9	Coarse sand	Very poor	Gravelly sand	
ENV05		160	2.6	14.1	85.7	0.1	Fine sand	Poor	Muddy sand	
ENV06		208	2.3	9.3	90.4	0.3	Fine sand	Poor	Sand	
ENV07		234	2.1	5.8	85.5	8.7	Fine sand	Poor	Gravelly sand	0.23
ENV08		324	1.6	2.3	93.7	4.0	Medium sand	Poor	Slightly gravelly sand	
ENV09		197	2.3	6.8	91.5	1.7	Fine sand	Poor	Slightly gravelly sand	
ENV10		763	0.4	2.8	86.2	11.0	Coarse sand	Poor	Gravelly sand	
ENV11		358	1.5	2.3	96.7	1.0	Medium sand	Moderate	Sand	
ENV12		106	3.2	18.2	81.8	0.0	Very fine sand	Poor	Muddy sand	0.44
ENV13		2881	-1.5	0.8	49.0	50.2	Granule	Very poor	Sandy gravel	
ENV14		357	1.5	4.8	90.3	4.8	Medium sand	Poor	Slightly gravelly sand	
ENV15		157	2.7	11.0	87.9	1.1	Fine sand	Poor	Slightly gravelly muddy sand	0.44
ENV16		125	3.0	21.1	78.3	0.5	Very fine sand	Poor	Muddy sand	
ENV17		2501	-1.3	1.1	59.6	39.3	Granule	Very poor	Sandy gravel	
ENV18		257	2.0	3.5	95.0	1.5	Medium sand	Moderate	Slightly gravelly sand	0.21
ENV19		182	2.5	14.4	85.6	0.004	Fine sand	Poor	Muddy sand	
ENV21		45	4.5	41.9	58.1	0.0	Coarse silt	Very poor	Muddy sand	1.10
ENV22		1057	-0.1	8.5	68.0	23.5	Very coarse sand	Very poor	Gravelly muddy sand	0.43
ENV23		318	1.7	2.7	94.4	2.9	Medium sand	Poor	Slightly gravelly sand	
ENV24		197	2.3	8.9	90.7	0.4	Fine sand	Poor	Sand	0.32
ENV25		229	2.1	16.4	77.4	6.2	Fine sand	Very poor	Gravelly muddy sand	
ENV26		120	3.1	15.6	84.4	0.007	Very fine sand	Poor	Muddy sand	
ENV27		325	1.6	4.5	84.3	11.2	Medium sand	Poor	Gravelly sand	
ENV28		223	2.2	5.4	91.4	3.2	Fine sand	Moderate	Slightly gravelly sand	
ENV29		190	2.4	8.4	91.0	0.6	Fine sand	Poor	Sand	
ENV30		85	3.6	21.6	78.4	0.0	Very fine sand	Poor	Muddy sand	
ENV31		683	0.6	3.9	84.6	11.5	Coarse sand	Poor	Gravelly sand	
ENV32		230	2.1	5.5	93.8	0.7	Fine sand	Moderate	Sand	
ENV33		309	1.7	4.3	94.9	0.8	Medium sand	Moderate	Sand	0.22
ENV34		124	3.0	14.4	85.5	0.1	Very fine sand	Poor	Muddy sand	0.45
ENV35		305	1.7	2.3	97.1	0.7	Medium sand	Moderate	Sand	0.29
This Study	Minimum	45	-1.5	0.8	49.0	0.0	Coarse silt to granule	Very poor to moderate	Muddy sand to sandy gravel	0.21
	Maximum	2881	4.5	41.9	97.1	50.2				1.10
	Mean	439	1.8	8.8	84.6	6.5				0.41
	±SD	613	1.2	8.3	11.8	11.9				0.10

Sediments were not treated to remove carbonates prior to particle size analyses.

1 Sorting according to Folk and Ward (1957).

2.5.2 Total Organic Carbon

The results of the TOC analysis are presented in Table 2.6. TOC is measured as a percentage of the total weight and represents the carbon constituent of the organic matter. Organic matter in marine sediment is primarily comprised detrital matter and naphthenic material (carboxylic acids) and humic substances with a small proportion of biological biomass. Station ENV21 recorded the highest TOC concentration of 1.10%, concentrations of TOC at all remaining stations were relatively uniform with concentrations ranging from 0.21% at Station ENV18 to 0.45% at Station ENV34. Station ENV21 was identified as a high outlier (Dixon's $p<0.01$, Appendix G), this station recorded at the highest fines content.

In general, for continental shelf sediment there is a close relationship between organic carbon content and the surface area of the mineral matrix (Mayer, 1994). Increased TOC is expected with fine (<63µm fraction) sediment, as it adsorbs to the increased surface area provided by the fine grain particles. As such, TOC values were expected considering the general predominant sand component of the sediment. This was supported by Spearman's rank results, with TOC positively correlated with fines ($r=0.89$, $p<0.01$; Appendix H).

2.6 Hydrocarbon Concentrations

2.6.1 Total Hydrocarbons and Alkanes

Concentrations of THC were analysed by GC-FID and to meet MMO (2022) guidelines by ultra-violet fluorescence (UVF) spectroscopy. Detailed information on analytical methods is presented in Appendix C. A summary of the results of the hydrocarbon analyses are presented in Table 2.7.

THC analysed by GC-FID (comprising n-alkanes, pristane, phytane, unresolved complex mixture (UCM) and PAHs) ranged from 2.1µg g^{-1} at Station ENV35 to 20.7µg g^{-1} at Station ENV21, with an average concentration of 7.0µg g^{-1} (±5.4SD). Concentrations of THC by GC-FID at Station ENV21 was identified as a high outlier on the Dixon's test for high outliers ($r=0.68$, $p<0.01$). This station recorded the greatest proportion of fines in the sediment (41.9%). Spearman's rank calculations (Appendix H) showed that concentrations of THC by GC-FID were negatively correlated with mean particle diameter ($r=-0.81$, $p<0.01$) and positively correlated with depth ($r=0.97$, $p<0.01$) and fines ($r=0.96$, $p<0.01$). A spatial representation of the THC concentrations by GC-FID is presented in Figure 2.3. Concentrations of THC were highest at stations to the south of the survey area, generally in deeper waters. Concentrations of THC by UVF were overall lower than THC measured by GC-FID; with only Stations ENV12, ENV21 and ENV22 recording concentrations above the limit of detection (LOD; 1.2µg g^{-1}, 2.8µg g^{-1} and 1.0µg g^{-1} respectively).

It has previously been shown that benthic macrofauna suffer adverse effects when THC is in excess of 50µg g^{-1} (Kjeilen-Eilertsen *et al.*, 2004; UKOOA, 2002; 2005) and as such, this value represents the threshold above which hydrocarbons are expected to have a 'significant environmental impact'. Kingston (1992) also previously reported that benthic fauna suffer adverse effects, namely reduced diversity, when THC is more than 50µg g^{-1} to 60µg g^{-1} and that specific sensitive species may be impacted at levels more than 10µg g^{-1}. Concentrations of THC by GC-FID at Station ENV21 was above the 10µg g^{-1} threshold and as such were expected to have a potential negative impact on specific benthic macrofauna. However, concentrations of THC by UVF were below the threshold of 10µg g^{-1}. Mair *et al*. (1987) observed a notable increase in the dominance of opportunistic species a THC levels more than 291.4µg g^{-1}, a threshold which none of the stations in the current survey exceeded.

Although THC concentrations gives an indication of the total oil in the sediment at each station, it does not give an indication of the source. Analysis of GC chromatograms (Appendix I) may provide further understanding of the distribution of hydrocarbons by giving an indication of the origin of hydrocarbons in marine sediments and the extent to which they are weathered. Peaks in the gas chromatograms correspond to individual n-alkanes

and other compounds, with carbon numbers increasing with eluting time. The area beneath the trace constitutes a complex mixture (see Appendix E for further information) of hydrocarbons that could not be resolved by GC-FID. This UCM includes cycloalkane compounds, which remain after substantial weathering and biodegradation of petrogenic inputs to the sediment (McDougall, 2000).

The chromatograms generally presented a pattern of low level, HMW resolved alkanes and UCM ranging approximately from nC_{20} to nC_{36} with a peak between nC_{28} and nC_{32}. Such distributions are considered typical of background levels of hydrocarbon inputs in areas such as the North Sea with historical oil and gas explorations which include a relatively low level UCM distributed between nC_{20} and nC_{33}. Hydrocarbons in the molecular weight range nC_{24} to nC_{36} commonly originate from terrestrial plant sources (Harborne, 1999) or may represent the residue of highly weathered and biodegraded petrogenic material including natural seeps, shipping discharge and oil and gas exploration and extraction (Bouloubassi *et al.*, 2001; McDougall, 2000). The chromatograms generally display larger resolved peaks over the HMW n-alkanes, with a predominance of heavier weight n-alkanes and compounds with odd carbon numbers over those with an even carbon number. This profile is characteristic of background concentrations of n-alkanes in North Sea sediments and it is indicative of sedimentary biogenic hydrocarbons from a terrestrial plant source (Harborne, 1999; Tran *et al.*, 1995; Wang & Fingas, 2005). The UCM accounted for 43% to 79% of THC across the array area, indicating that generally hydrocarbons were weathered with some fresher inputs.

Further insight into the origin of hydrocarbons in marine sediments can be gained by measuring concentrations of individual alkanes. Concentrations of n-alkanes from nC_{10} to nC_{37}, pristane and phytane are summarised in Table 2.7. Individual n-alkane concentrations are presented in Table 2.8, whilst their distributions at each station are summarised as bar charts in Appendix I. Total n-alkane concentrations varied between 0.016µg g^{-1} at Station ENV35 and 0.537µg g^{-1} at Station ENV21, with a mean concentration of 0.138µg g^{-1} (±0.150SD).

The ratio of odd to even numbered n-alkanes within the HMW range (nC_{26} to nC_{30}), commonly referred to as the carbon preference index (CPI), can provide further insight into the origin of alkanes in marine sediment. Marine sediments containing a high level of biogenically derived (odd carbon number) n-alkanes are known to have CPI ≥2.0, with values ≥4.0 suggesting a virtual absence of petrogenic hydrocarbons (McDougall, 2000). CPI values close to 0 indicate a predominance of petrogenic hydrocarbons. Across the array area, CPI values ranged from 1.9 at Station ENV07 to 4.3 at Station ENV15, suggesting a mixture of petrogenic and biogenic inputs; with biogenic aliphatic hydrocarbons such as higher terrestrial plant waxes being more dominant. At Stations ENV15 and ENV21 the CPI was ≥4.0 suggesting a virtual absence of petrogenic hydrocarbons.

The ratio of the isoprenoids pristane and phytane can be used to derive similar information to the CPI where a high Pr:Ph ratio is indicative of biogenic hydrocarbons most commonly originating from the decomposition of the phytol side-chain of chlorophyll (Muniz *et al.*, 2004). The isoprenoid pristane is primarily biogenic in origin (Bouloubassi *et al.*, 2001; Muniz *et al.*, 2004) while phytane is rarely produced biogenically but is a common component of crude oil (Steinhauer & Boehm, 1992). Concentrations of pristane was below LOD at Station ENV07 and ranged between 0.002µg g^{-1} and 0.026µg g^{-1} at all remaining stations. Phytane was only recorded above LOD at Station ENV22 with a concentration of 0.003µg g^{-1} and therefore the Pr:Ph ratio was only quantifiable at this station. The predominance of biogenic pristane over phytane suggests that primarily biogenic aliphatic hydrocarbons contributed to the THC concentrations at all stations, though a degree of petrogenic input was evident by the presence of phytane at a single station.

Table 2.7 Summary of Sediment Hydrocarbon Analyses

Station	UVF	GC-FID									GC-MS	
				n-alkanes				Isoprenoids				
	THC	THC	UCM	nC_{10-20}	nC_{21-37}	nC_{10-37}	CPI[1]	Pristane	Phytane	Pr/Ph Ratio	NPD[2]	Total PAH
ENV07	<1	3.6	1.6	0.004	0.055	0.059	1.9	<1	<1	NC	NC	0.004
ENV12	1.2	8.8	5.1	0.019	0.171	0.190	3.5	0.004	<1	NC	0.010	0.047
ENV15	<1	7.6	4.1	0.017	0.111	0.128	4.3	0.005	<1	NC	0.007	0.019
ENV18	<1	3.1	2.0	0.010	0.033	0.044	2.4	0.002	<1	NC	NC	0.001
ENV21	2.8	20.7	14.2	0.086	0.451	0.537	4.0	0.026	<1	NC	0.066	0.275
ENV22	1.0	5.2	4.1	0.024	0.101	0.125	3.3	0.007	0.003	2.7	0.019	0.060
ENV24	<1	8.4	4.7	0.014	0.080	0.094	2.8	0.007	<1	NC	0.002	0.012
ENV33	<1	3.3	2.1	0.015	0.036	0.051	3.4	0.003	<1	NC	NC	NC
ENV34	<1	7.6	4.4	0.026	0.107	0.134	3.4	0.006	<1	NC	0.007	0.033
ENV35	<1	2.1	1.2	0.001	0.015	0.016	NC	0.002	<1	NC	NC	NC
Minimum	NQ	2.1	1.2	0.001	0.015	0.016	NC	NQ	NQ	NC	NQ	NQ
Maximum	2.76	20.7	14.2	0.086	0.451	0.537	4.3	0.026	0.003	2.7	0.066	0.275
Mean	NC	7.0	4.3	0.022	0.116	0.138	NC	NC	NC	NC	NQ	NQ
±SD	NC	5.4	3.7	0.024	0.127	0.150	NC	NC	NC	NC	NQ	NQ

Unless indicated, concentrations expressed as µg g^{-1} dry sediment.

1 Calculated using $2(nC_{27} + nC_{29})/nC_{26} + 2(nC_{28}) + nC_{30}$ (Farrington & Tripp, 1977).

2 Naphthalenes, phenanthrenes and dibenzothiophenes (total).

NQ Not quantified due to concentrations below LOD

NC Not calculated due to concentrations below LOD

Figure 2.3 Spatial Distribution of Total Hydrocarbon Concentrations by GC-FID

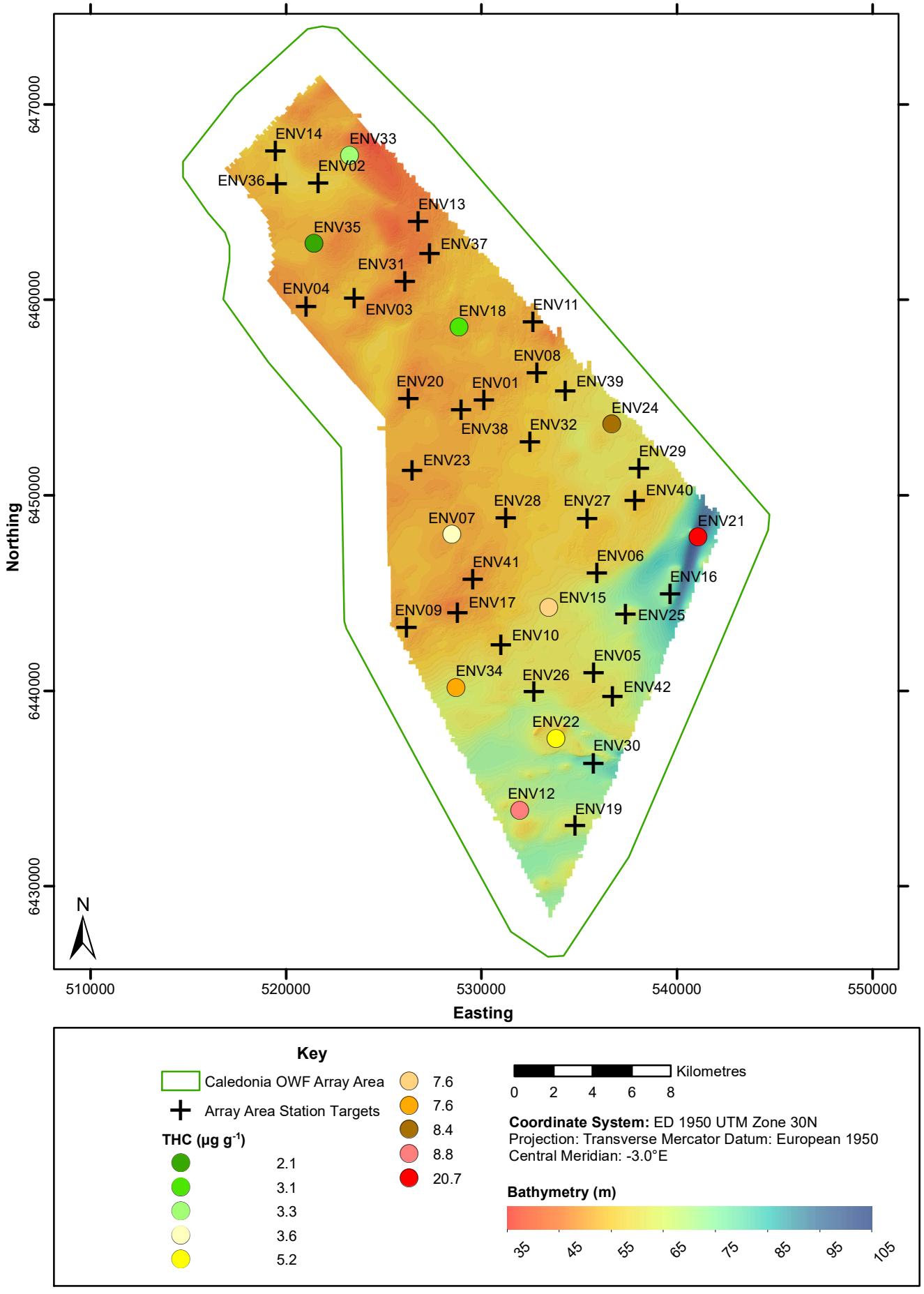


Table 2.8 n-Alkane Concentrations

Station	ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35
nC_{10}	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
nC_{11}	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
nC_{12}	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
nC_{13}	1	<1	<1	<1	5	2	<1	<1	1	<1
nC_{14}	1	3	<1	<1	7	3	2	3	3	<1
nC_{15}	1	4	3	1	12	3	2	2	4	<1
nC_{16}	<1	3	2	1	8	3	1	2	2	<1
nC_{17}	<1	2	3	3	22	6	4	4	5	1
nC_{18}	<1	2	2	2	10	2	1	2	3	<1
nC_{19}	<1	4	5	3	14	3	3	2	5	<1
nC_{20}	<1	2	2	1	9	2	1	1	3	<1
nC_{21}	2	4	8	1	21	3	3	1	3	<1
nC_{22}	1	2	2	1	9	2	3	2	2	<1
nC_{23}	1	4	2	1	16	1	2	1	2	1
nC_{24}	1	5	4	2	10	3	2	3	4	<1
nC_{25}	8	11	23	3	10	2	3	4	12	1
nC_{26}	3	5	4	1	13	3	3	2	5	<1
nC_{27}	4	14	10	3	48	11	7	4	10	3
nC_{28}	4	6	3	2	18	4	5	1	5	<1
nC_{29}	8	29	18	5	96	14	14	5	19	3
nC_{30}	2	8	4	1	23	4	3	1	3	<1
nC_{31}	8	33	15	7	94	26	12	5	18	3
nC_{32}	1	4	<1	<1	5	3	7	2	2	<1
nC_{33}	4	16	8	3	40	13	7	4	7	3
nC_{34}	<1	7	2	<1	4	2	2	<1	4	<1
nC_{35}	3	7	6	2	37	5	4	1	7	1
nC_{36}	2	8	2	1	5	2	3	<1	2	<1
nC_{37}	2	7	3	<1	<1	2	3	<1	2	<1
Total	**59**	**190**	**128**	**44**	**537**	**125**	**94**	**51**	**134**	**16**

Concentrations expressed as ng g^{-1} dry weight sediment.

2.6.2 Polycyclic Aromatic Hydrocarbons

Total PAH concentrations for the MMO (2022) stipulated compounds ranged from 0.001µg g^{-1} to 0.275µg g^{-1} across the array area, with the exception of Stations ENV33 and ENV35 where the total PAH concentrations were below the LOD.

Information on the origin of PAHs can be derived from the parent compound molecular weight indices as detailed by Yunker *et al*. (2002) and are presented in Figure 2.4. The molecular mass indices identified pyrogenic PAHs at stations, where calculated. The 276 (indeno[123,cd]pyrene and benzo[ghi]perylene) mass indices identified that stations were from grass, wood and coal combustion.

A study of the alkyl homologue distributions can provide further indication of sources of PAHs in sediment. Pyrogenic PAHs are predominantly unalkylated HMW compounds, whereas petrogenic PAHs display a greater degree of alkylation, particularly of the LMW compounds of naphthalene and phenanthrene (Wang & Fingas, 2005). As illustrated in Figure 2.5, where present, it is evident that the alkylated homologues are more abundant than their parent compounds which indicates there are PAHs from petrogenic sources present.

The best estimates of the potential toxicity of PAHs in marine sediments are the ERL and ERM values (Long *et al.*, 1995), as described in Section 1.3 and Appendix C. Total PAH concentrations and those for individual compounds were well below their respective ERL values, indicating that toxic effects to fauna by PAHs are unlikely. The AET (Buchman, 2008) represent the concentrations above which adverse biological impacts would be expected on the biological indicator due to exposure to that contaminant alone. Total and individual PAH concentrations were also well below their respective AETs at all stations, further suggesting that overall adverse biological impacts would be extremely unlikely.

When comparing to the OSPAR BC, BAC and EAC (OSPAR, 2005; OSPAR, 2009a) concentrations were first normalised to 2.5% TOC (as presented in Appendix I). After normalisation several of the measurable concentrations for many of the PAHs were above BC concentrations at Stations ENV21 and ENV22; however, none exceeded the EAC threshold. However, when comparing average concentrations for the entire survey area against BAC concentrations no PAH concentrations were above the corresponding BAC concentrations.

Figure 2.4 Ratio of 276 Molecular Weight PAH Indices

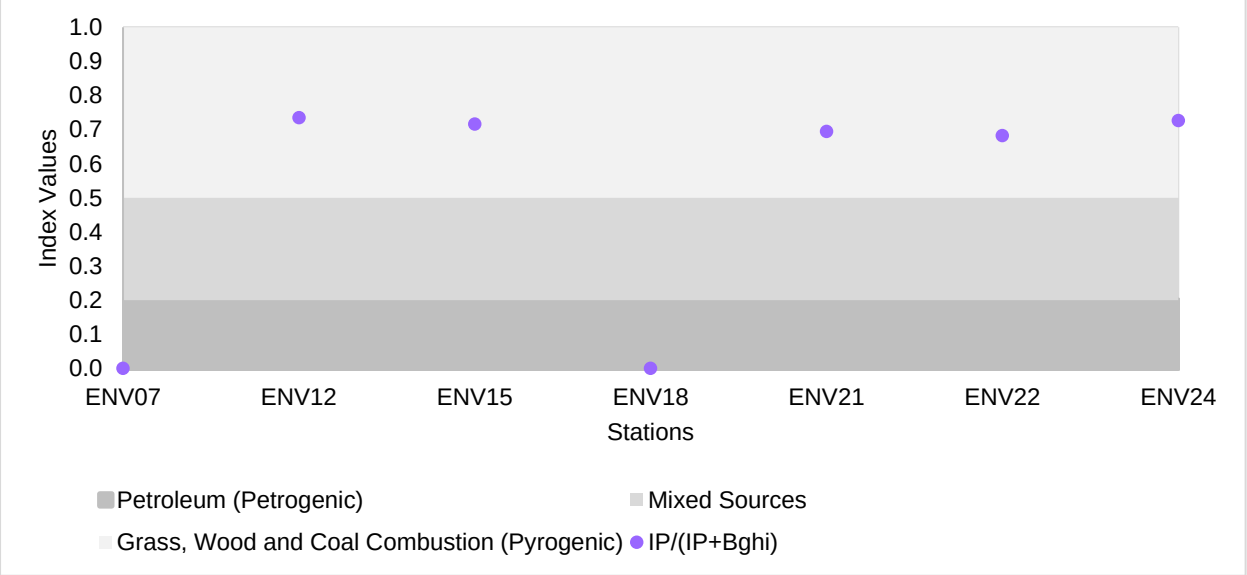


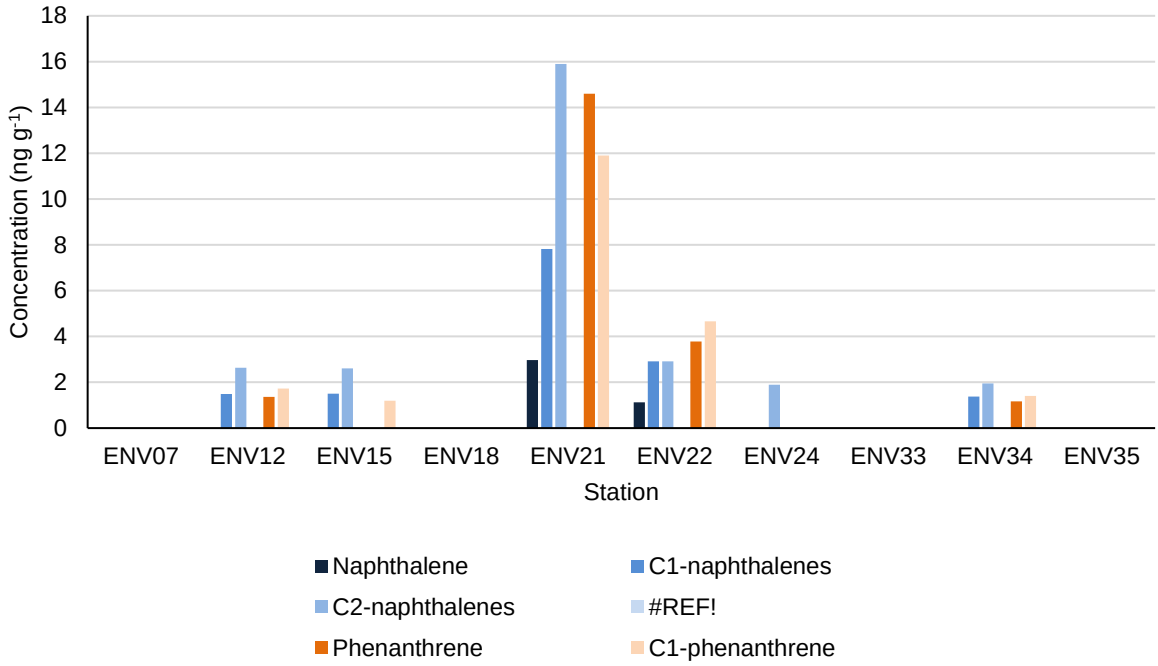
Table 2.9 PAH Concentrations

Station	ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35	Long *et al.* (1995)	Buchman (2008)[1]
											ERL	AET
Acenaphthene	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	16	130[E]
Acenaphthylene	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	44	171[E]
Anthracene	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	85.3	280[E]
Benzo[a]anthracene	<1	1	<1	<1	12	3	<1	<1	<1	<1	261	960[e]
Benzo[a]pyrene	<1	2	<1	<1	15	3	<1	<1	1	<1	430	1100[E]
Benzo[b]fluoranthene	1	6	2	<1	23	5	2	<1	4	<1	NA	1800 [EJ]
Benzo[e]pyrene	1	7	3	<1	25	5	2	<1	5	<1	NA	NA
Benzo[ghi]perylene	<1	3	2	<1	14	3	1	<1	2	<1	NA	NA
Benzo[k]fluoranthene	<1	4	2	<1	18	4	2	<1	3	<1	NA	1800[EJ]
C1-naphthalenes	<1	1	2	<1	8	3	<1	<1	1	<1	NA	NA
C1-phenanthrene	<1	2	1	<1	12	5	<1	<1	1	<1	NA	NA
C2-naphthalenes	<1	3	3	<1	16	3	2	<1	2	<1	NA	NA
C3-naphthalenes	<1	1	1	<1	8	3	<1	<1	1	<1	NA	NA
Chrysene	<1	2	<1	<1	14	3	<1	<1	1	<1	384	950[E]
Dibenzo[ah]anthracene	<1	1	<1	<1	5	1	<1	<1	<1	<1	63.4	230[OM]
Fluoranthene	<1	2	<1	<1	26	5	<1	<1	2	<1	600	1300[E]
Fluorene	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	19	120[E]
Indeno[1,2,3-cd]pyrene	2	9	4	1	31	6	3	<1	6	<1	160	600[M]
Naphthalene	<1	<1	<1	<1	3	1	<1	<1	<1	<1	NA	230[E]
Perylene	<1	<1	<1	<1	4	<1	<1	<1	<1	<1	NA	NA
Phenanthrene	<1	1	<1	<1	15	4	<1	<1	1	<1	NA	660[E]
Pyrene	<1	2	<1	<1	20	4	<1	<1	1	<1	665	2400[E]
Total	**4**	**47**	**19**	**1**	**275**	**60**	**12**	NC	**33**	NC	**4022**	NA

Concentrations expressed as ng g^{-1} dry weight sediment.

1 Apparent effect threshold according to Buchman (2008) under the following assessment targets in superscript E = Echinoderm larvae, I = infaunal community impact, M = microtox assay and O = oyster larvae

Figure 2.5 Naphthalene and Phenanthrene Parent Versus Alkylated Homologue PAHs



2.6.3 Polychlorinated Biphenyls

Polychlorinated biphenyl concentrations were recorded below the LOD at all sampled stations.

2.6.4 Polybrominated Diphenyl Ethers

Concentrations of PBDEs, presented in Appendix K, were recorded below the LOD for all PBDEs with the exception of PBDE 209 at Stations ENV12, ENV21, ENV22, ENV24 and ENV35 and ranged from 0.31ng g^{-1} to 1.16ng g^{-1}. After normalisation to 2.5% TOC (see Appendix K) PBDE 209 at Stations ENV12 and ENV24 exceeded the OSPAR (2020) BAC. However, concentrations were below the Federal Environmental Quality Guidelines (FEQGs; Viñas *et al.*, 2023). PBDE 209 has a high affinity to bind to the sediment, which reduces mobility in the environment.

Table 2.10 Concentrations of PBDEs

Station	ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35	FEQG (Viñas *et al.*, 2023)
PBDE 17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA
PBDE 28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	110
PBDE 47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	97.5
PBDE 66	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	97.5
PBDE 85	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1
PBDE 99	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1
PBDE 100	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1
PBDE 138	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA
PBDE 153	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1100
PBDE 154	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1100
PBDE 183	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	14000
PBDE 209	<0.2	1.16	<0.2	<0.2	0.31	0.51	2.01	<0.2	<0.2	0.37	47.5

Concentrations expressed as ng g^{-1} dry weight sediment.

2.6.5 Organochloropesticides

Generally, concentrations of organochloropesticides (OCPs) were below the LOD with the excep'ion of dieldrin at Station ENV15 (0'1ng g^{-1}) and p,p'-Dichlorodiphenyldichloroethane (p,p'-DDD) at Station ENV33 (0.1ng g^{-1}). Dieldrin concentration at Station ENV15 did not exceed the CAL1 (MMO, 2022) concentration of 0.5ng g^{-1}.

2.7 Organotins

The organotins dibutyltin and tributyltin were below the LOD at all sampled stations.

2.8 Metal Concentrations

Following extraction by aqua regia, concentrations of As, Cd, Cr, Cu, Hg, Ni, Pb and Zn were determined by ICP-MS. The results of the metal analyses are presented in Table 2.11.

Of the metals reported, Cr, Cu, Ni and Zn were positively correlated with the proportion of fines and negatively correlated with sand (Appendix H), indicating that fluctuations in metal concentrations were influenced by variations in sediment particle size and the resultant adsorption properties. These four metals also showed positive correlations with TOC and total n-alkanes. Concentrations of Hg were below the LOD at all stations except Station ENV12, where a concentration of 0.02µg g^{-1} was recorded.

Metals data were directly compared to MMO (2022) CALs, Buchman (2008) AETs and Long *et al.* (1995) ERL and ERM (see Section 1.3). Station ENV22 recorded an As concentration of 10.9µg g^{-1} which exceeds the ERL; however, the concentration was below the respective ERM, suggesting toxic effects on the faunal community may occasionally occur due to the concentrations of this metal. Concentrations for all other metals across the array area where well below their CALs and AETs indicating that toxicological impacts where unlikely to occur.

Table 2.11 Sediment Metal Concentrations

Station		As	Cd	Cr	Cu	Hg	Ni	Pb	Zn
ENV07		3.7	0.12	10.2	4.4	<0.01	3.8	3.5	13.1
ENV12		1.9	0.07	10.2	4.0	0.02	6.0	3.2	15.6
ENV15		2.3	0.14	8.9	3.7	<0.01	6.1	3.0	13.1
ENV18		4.0	0.10	7.2	3.0	<0.01	2.6	3.1	6.6
ENV21		3.5	0.34	11.8	6.5	<0.01	9.0	5.3	19.3
ENV22		10.9	0.20	10.6	3.9	<0.01	5.9	7.8	15.8
ENV24		3.0	0.09	9.5	3.1	<0.01	3.4	3.1	8.7
ENV33		6.7	0.11	6.0	3.0	<0.01	2.9	3.5	6.3
ENV34		2.7	0.16	9.6	4.0	<0.01	6.0	3.3	11.8
ENV35		6.9	0.09	8.6	3.4	<0.01	3.1	3.5	6.6
This Study	Minimum	1.9	0.07	6.0	3.0	NQ	2.6	3.0	6.3
	Maximum	10.9	0.34	11.8	6.5	0.02	9.0	7.8	19.3
	Mean	4.6	0.14	9.3	3.9	NC	4.9	3.9	11.7
	±SD	2.8	0.08	1.7	1.0	NC	2.0	1.5	4.5
CAL 1 (MMO, 2022)		20	0.4	40	40	0.3	20	50	130
CAL 2 (MMO, 2022)		100	5	400	400	3	200	500	800
Long *et al.* (1995)	ERL	8.2	1.2	81.0	34.0	0.15	20.9	46.7	150
	ERM	70.0	9.6	370.0	270.0	0.70	51.6	218.0	410
Buchman (2008)	AET	35	3	62	390	0.41	110	400	410

Concentrations expressed as µg g^{-1} dry weight sediment.
Unless specified, concentrations determined following aqua regia sediment extraction.
NQ Not qualified due to concentrations below LOD.
NC Not calculated due to concentrations below LOD.
NA Not available.
Green cells represent values above the ERL (Long *et al.*, 1995).
Results in green are from published background data see Section 1.3.

2.9 Statistical Analysis of Sediment Physico-chemical Results

2.9.1 Multivariate

Multivariate analyses were performed using PRIMER v7 (Plymouth Marine Laboratories) on the 10 station physico-chemical data set to ascertain similarities and differences between stations. Prior to undertaking the analysis the following variables were excluded:

- UCM concentration was excluded as it is closely related to THC.
- Total n-alkanes (nC_{10}-nC_{37}) concentration was excluded as it is closely related to LMW n-alkanes (nC_{10}-nC_{20}) and HMW n-alkanes (nC_{21}-nC_{37}).
- Hg was excluded as its concentrations were predominantly below the LOD.

In order for pristane and total PAH to be included, stations recording below LOD were assigned a value just below the LOD to allow appropriate ranking.

A log+1 transformation of the data sets was undertaken on all variables based on the examination of the draftsman's plot and the presence of Dixon's high outliers within each group of variables. The transformation was selected to down-weigh the influence of these outliers. The data sets were then normalised to make the variables unitless and Euclidean distance resemblance matrix was produced. A CLUSTER analysis was performed to graphically represent the (dis)similarities between the stations, with a SIMPROF routine run in conjunction, to show whether the differences between stations were statistically significant. In the resulting dendrogram, stations joined by red lines are statistically indistinguishable from each other, while those joined by black lines are statistically distinct. Only three or more stations can be considered a true cluster due to the

permutative nature of SIMPROF. A non-metric multidimensional scaling (nMDS) routine was also run, applying the 'fix collapse' function, which creates a two-dimensional plot of the stations from the similarity matrix. The configuration of the stations on the MDS plot reflects similarity with distances between stations being representative of their Euclidean distance or relative (dis)similarity.

The Euclidean similarity dendrogram for the physico-chemical data set (Figure 2.6a) illustrates variations in the physico-chemical characteristics of the stations sampled across the array area. The SIMPROF routine identified two clusters and four statistically distinct stations. The key factors responsible for the multivariate pattern in the physico-chemical data are summarised in Table 2.12, based on a review of the raw data and SIMPER analysis. The pattern of the CLUSTER analysis was corroborated by the nMDS ordination (Figure 2.6b) with a stress value of 0.01 it is considered an almost perfect two-dimensional representation of rank dis(similarities).

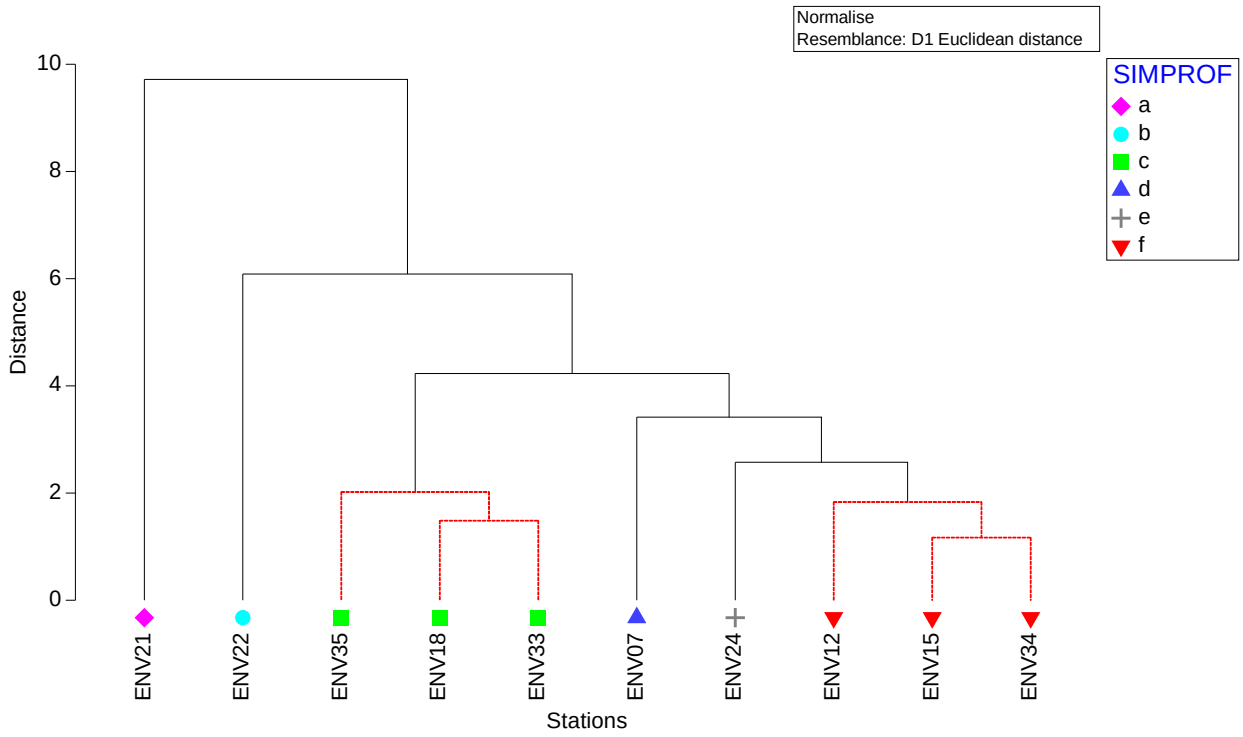
A BIOENV analysis routine revealed a 98% correlation between the overall multivariate pattern and a subset of four variables: mean diameter (µm), LMW n-alkanes, pristane and Zn. Further, 92% of the multivariate pattern could be explained by variations in sand proportions alone. Overall, the multivariate pattern supported the overall interpretation of the physico-chemical data and reflects the natural variation in the survey area.

Table 2.12 Physico-chemical Parameters Influencing SIMPROF Separation in the 10 Station Data Set

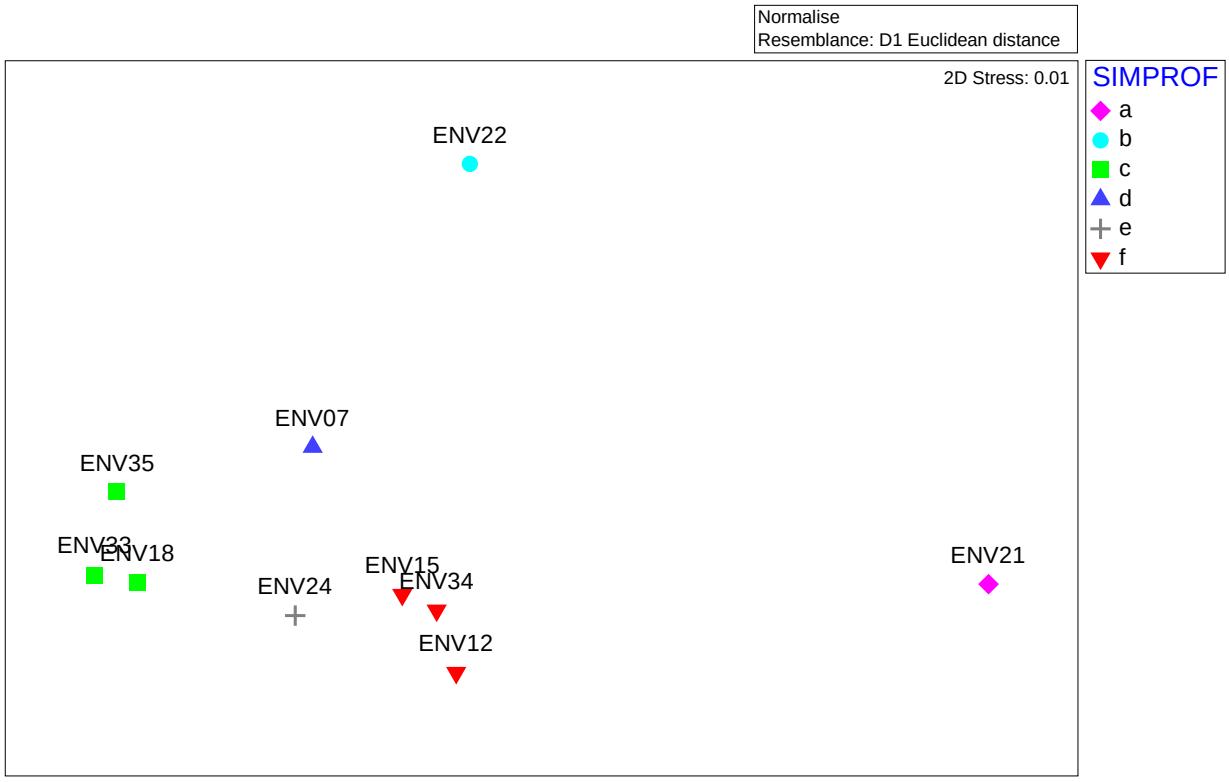
Stations	SIMPROF	Dissimilarity (Euclidean distance)	Physico-chemical parameter influencing Station Separation
ENV21	SIMPROF *a* vs *b-f*	9.27	Highest total PAH and pristane concentrations
ENV22	SIMPROF *b* vs *c-f*	6.09	Highest concentration of Pb and highest gravel content
ENV18, ENV33 and ENV35	SIMPROF *c* vs *d-f*	4.23	Lowest concentrations of Cr and Zn
ENV07	SIMPROF *d* vs *e,f*	3.42	Highest gravel content of the remaining stations
ENV24	SIMPROF *e* vs *f*	2.57	Lower concentrations of Ni and Zn than the remaining stations

Figure 2.6 Multivariate Analyses of the 10 Station Physico-chemical Data Set

a) Euclidean Distance Dendrogram



b) MDS Ordination



2.10 DNA Metabarcoding

2.10.1 Overview

Two samples for sediment eDNA and four for water eDNA (two near surface and two near seabed) were collected at a subset of ten stations where physico-chemical samples were obtained with primary samples sent to the laboratory. The remaining samples were retained as spares. All records are provided in Appendix L. Each row in Appendix L represents one operational taxonomic unit (OTU), shown with the lowest possible taxonomic assignment based on currently available reference data. Each column represents a sample showing the proportion of sequence reads per detected OTU. Care should be taken interpreting the numbers of reads in terms of relative species abundance or biomass s unavoidable biases introduced during the laboratory process can have a major effect on this relationship, for example, some species amplify more readily than other during processing.

The most conservative approach is to analyse the data in terms of presence-absence. Due to the number of taxa included in the analysis, presence-absence data still has high statistical power for demonstrating change. If abundance data for particular species is important to the project. Then incidence across multiple samples can be used as a proxy for abundance (*e.g*. a species detected in every sample replicate is likely to be more abundant than one found only in a small proportion of replicates). Alternatively, this may be a scenario in which conventional methods are the better suited (see Section 2.11).

2.10.2 Summary of Notable Species

The vertebrate eDNA data set detected Norway pout (*Trisopterus esmarkii*) and Atlantic mackerel (*Scomber scombrus*), which are PMFs in Scottish waters (NatureScot, 2020a), and listed on the Scottish Biodiversity List (NatureScot, 2020b). Both species are listed as Least Concern when considering global and European stocks on the IUCN (2023) Red List.

The fish eDNA data set recorded Atlantic cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*), together with *T. esmarkii* and *S. scombrus* also detected in the vertebrate analysis. *G. morhua* is listed as a PMF in Scottish waters (NatureScot, 2020a) and on the Scottish Biodiversity List (NatureScot, 2020b). Both *G. morhua* and *M. aeglefinus* are listed as vulnerable on the IUCN (2023) Red List when considering global stock assessment; however, they are listed as least concern when considering European stocks.

In addition, the invasive species pink salmon (*Oncorhynchus gorbuscha*) was detected in the surface sample at Station ENV15.

The three marine mammals recorded as part of the vertebrate analysis; (minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*) and harbour porpoise (*Phocoena phocoena*) from the 20 water eDNA samples are PMFs in Scottish waters (NatureScot, 2020a). Additionally, the harbour porpoise is listed on the Scottish Biodiversity List (NatureScot, 2020b).

2.10.3 Summary Statistics for Sediment Metabacoding

A total of 578 operational taxonomic units (OTUs) were detected from sediment samples across the array area as detailed in Table 2.13. Full read count of the OTUs detected per station are tabulated in Appendix L. Of the 578 detected bacterial and infaunal OTUs, a greater percentage of infaunal OTUs were identified to species level (44%) compared to the bacterial OTUs (1%) possibly related to the larger pool of reference material for infaunal OTUs.

Bacteria

The bacterial data set identified 31 taxonomic groups based on class with the proportional contributions of these taxonomic groups across the array area detailed in Table 2.14 and presented for each station in Figure 2.7. The 'Other' category comprised 197 OTUs which could not be identified to class.

The most detected taxonomic group across the array area (n=197) was the 'Other' which accounted for 38% of OTUs. The second most detected taxonomic group was Gammaproteobacteria (n=106) accounting for 21% of OTUs. Gammaproteobacteria dominance is likely given it is one of the richest classes within the bacteria phyla (Williams *et al.*, 2010). The relative dominance of 'Other' within the proportional contributions was partly due to the inability to determine these OTUs further than phylum (n=102) or domain (n=95).

Of the 515 bacterial OTUs, a total of 65 (13%) were present in all sediment stations, while 113 (26%) occurred at a single station. The relatively high numbers of widespread OTUs and lone OTUs across the survey area suggested that the community had been subjected to relatively little disturbance.

Infauna

A total of 15 taxonomic groups based on class were detected from the sediment infaunal data set with the proportional contribution of these taxonomic groups across the array area detailed in Table 2.15 and presented for each station in Figure 2.8. The 'Other' category comprised the 9 OTUs which could not be classified to class.

Polychaeta (n=18) was the most detected taxonomic group across the array area and accounted for 29% of the OTUs. The second most detected group was the Arthropoda Copepoda (n=15, 24%). The relative abundance of 'Other' within the proportional contributions was partly due to the inability to determine these OTUs further than phylum (n=8) or kingdom (n=1).

Five infaunal taxonomic groups (Anthozoa, Bivalvia, Chromadoreaoutemospongia and Sagittoidea) were represented by a single OTU.

Of the 63 infaunal OTUs, a total of 44 (70%) were present at a single station across the array area. However, unlike the bacterial data set, none were detected at all stations. The absence of a consistent infaunal community as well as a relatively high proportion of lone OTUs suggest the community heterogeneity across the array area may have been under sampled for the infaunal size class. This may be improved by analysis of the samples from the remaining 24 stations or analysis of second samples acquired at each of the stations, though it is not certain that this would fill all community gaps.

Table 2.13 OTU Sediment Detections per Target and Percentage Successfully Classified

Target	Number of Stations Analysed	Number of Stations containing OTUs	Number of OTUs	Phylum (%)	Class (%)	Order (%)	Family (%)	Genus (%)	Species (%)
Bacteria (sediment)	10	10	515	82	62	39	26	6	1
Infauna (sediment)	10	8	63	100	86	83	86	71	44

Table 2.14 Contribution of Gross Sediment Bacterial OTU Taxonomic Groups

Group by Class	Reads		OTUs	
	Number	Proportional Contribution %	Abundance	Proportional Contribution %
Acidimicrobiia	1074	<1	3	1
Acidobacteria	11262	4	18	3
Actinomycetia	8506	3	18	3
Alphaproteobacteria	11803	5	48	9
Aminicenantia	174	<1	4	1
Anaerolineae	3398	1	16	3
Bacteroidia	2904	1	14	3
Betaproteobacteria	4842	2	2	<1
Clostridia	18	<1	1	<1
Cyanophyceae	124	<1	1	<1
Cytophagia	2810	1	6	1
Deferribacteres	403	<1	1	<1
Dehalococcoidia	67	<1	2	<1
Deltaproteobacteria	316	<1	6	1
Epsilonproteobacteria	60	<1	1	<1
Flavobacteria	3104	1	11	2
Fusobacteria	23	<1	1	<1
Gammaproteobacteria	94032	36	106	21
Gemmatimonadetes	247	<1	3	1
Holophagae	44	<1	1	<1
Ignavibacteria	677	<1	1	<1
Kiritimatiellae	171	<1	1	<1
Latescibacteria	74	<1	1	<1
Nitrospira	398	<1	2	<1
Phycisphaerae	235	<1	3	1
Planctomycetacia	5738	2	34	7
Planctomycetia	75	<1	1	<1
Sphingobacteria	273	<1	2	<1
Thermoleophilia	23	<1	1	<1
Verrucomicrobiae	1294	<1	9	2
Other Bacteria	107656	41	197	38
Total	**261825**	**100**	**515**	**100**

"Other Bacteria" includes the 197 (38%) OTUs that could not be identified beyond Phylum and the 95 (18%) OTUs that could not be identified beyond domain.

Table 2.15 Contribution of Gross Sediment Infaunal OTU Taxonomic Groups

Group by Class	Reads		OTUs	
	Number	Proportional Contribution %	Number	Proportional Contribution %
Anthozoa	57	<1	1	2
Bivalvia	40	<1	1	2
Chromadorea	86	<1	1	2
Clitellata	92	<1	2	3
Copepoda	2052	1.5	15	24
Demospongiae	126	<1	1	2
Echinoidea	3058	2.2	2	3
Gastropoda	1111	<1	3	5
Hydrozoa	402	<1	2	3
Malacostraca	5064	3.6	2	3
Ophiuroidea	10430	7.5	2	3
Polychaeta	113384	81.2	18	29
Sagittoidea	14	<1	1	2
Thecostraca	497	<1	3	5
Other	3147	2.3	9	14
Total	**139560**	**100**	**63**	**100**

"Other" represents OTUs that could not be identified beyond Phylum.

Figure 2.7 Contributions of Gross Sediment Bacteria OTU Taxonomic Groups by Station

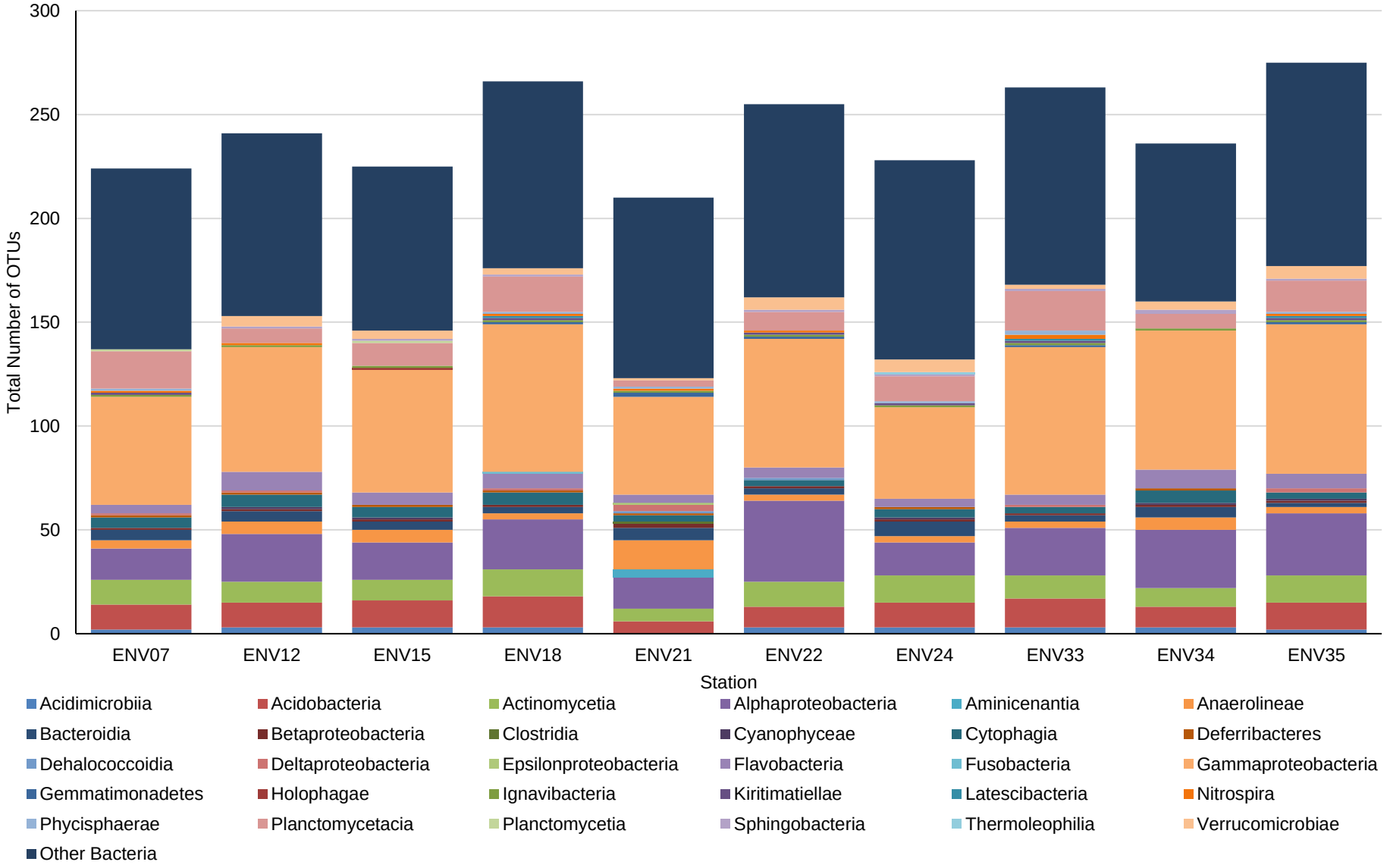
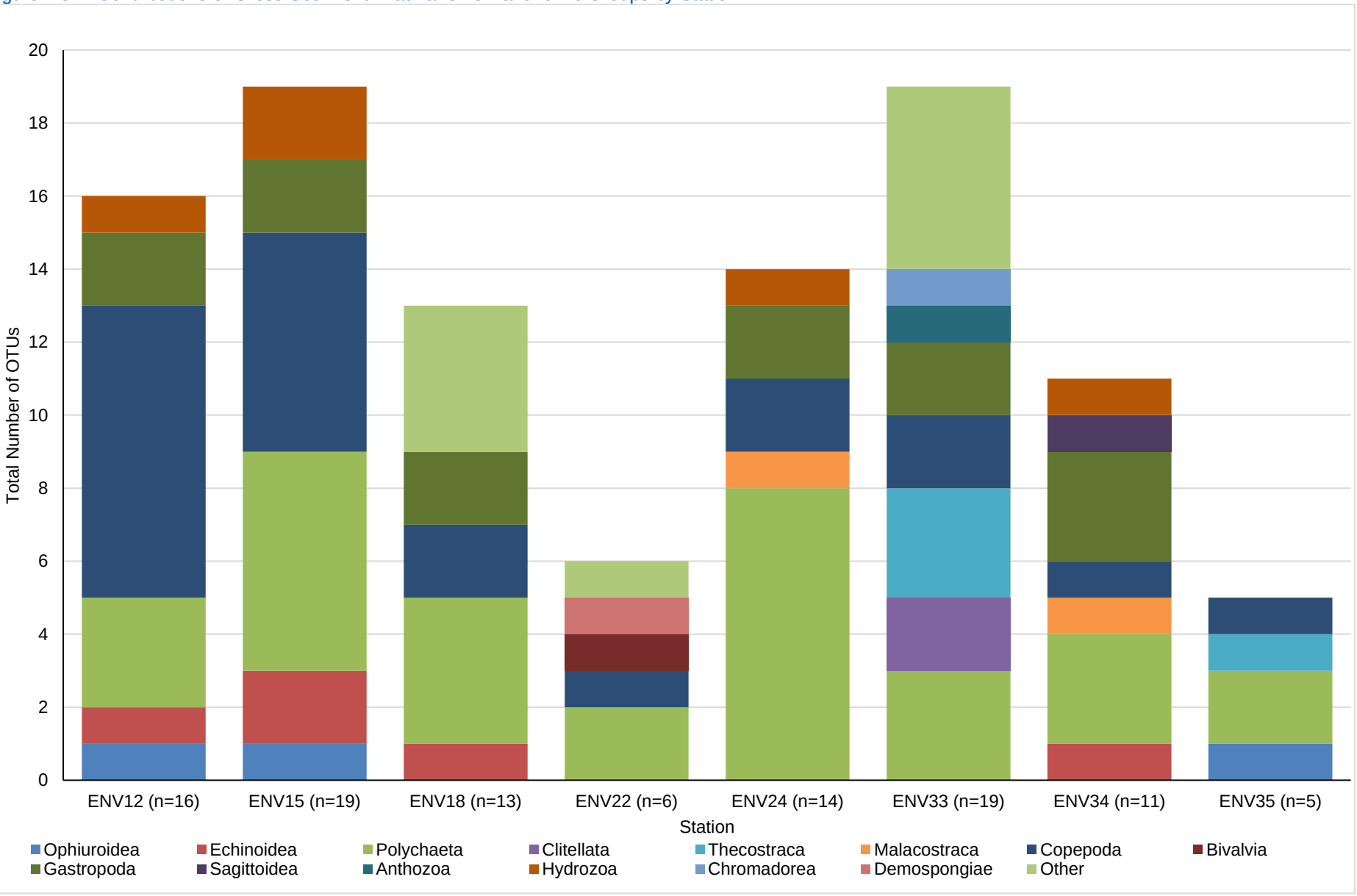


Figure 2.8 Contributions of Gross Sediment Infaunal OTU Taxonomic Groups by Station



Comparative taxonomic heat trees detailing the number of OTUs across the array area from bacteria taxa down to the order rank is presented in Figure 2.9 while the taxonomic heat trees detailing discrete infaunal taxa OTUs down to the rank order are presented in Figure 2.10. The nodes (circles) represent taxon whilst the lines detail the hierarchical relationships between taxa. The colour scale and relative width of the nodes represent the number of OTUs for each taxon. Labels without nodes represent missing taxa. Summary statistics for the sediment bacterial and infaunal richness are detailed in Table 2.16.

Figure 2.9 Sediment Bacterial Taxonomic Heat Trees of the Number of OTUs

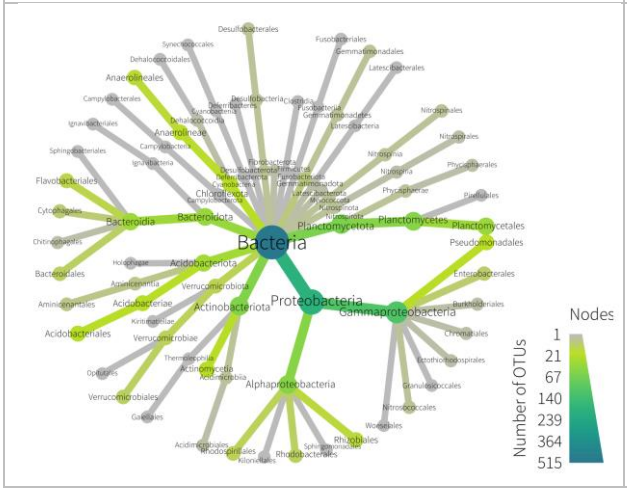


Figure 2.10 Sediment Infaunal Taxonomic Heat Trees of the Number of OTUs

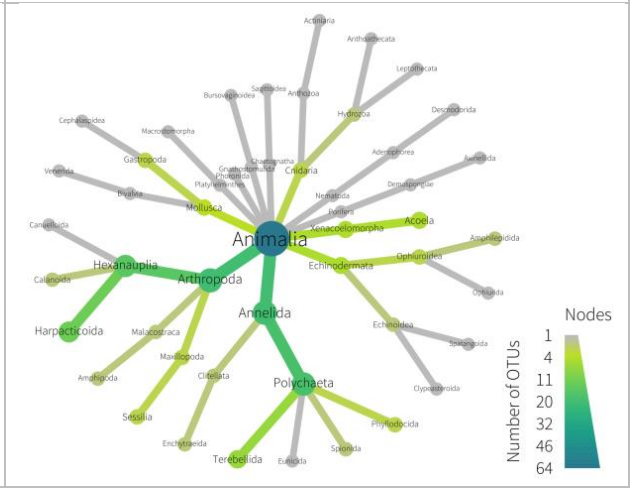


Table 2.16 Summary of Sediment (Bacterial and Infaunal) Richness

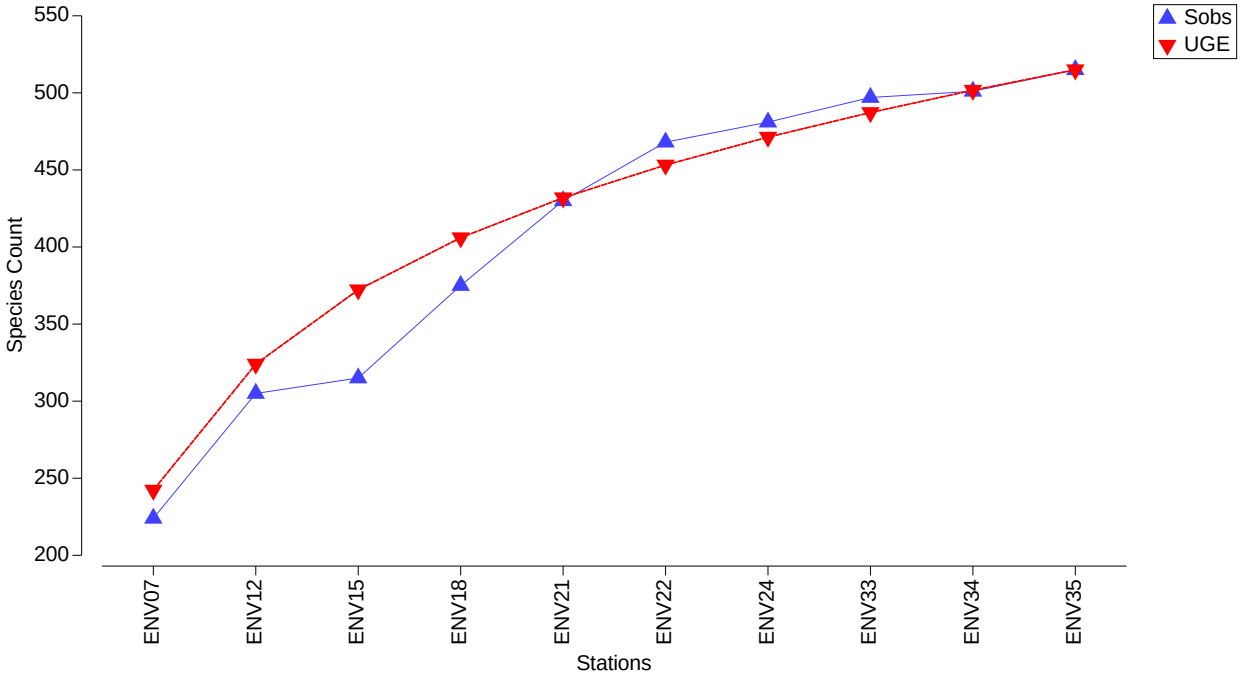
	Bacterial	Infaunal
Minimum	210	5
Maximum	275	19
Mean	242	13
±SD	21.5	5.3

Accumulation plots of OTUs for the bacterial and infaunal data sets, for the array area are presented in Figure 2.11 and Figure 2.12. Two lines are plotted; the first (plotted in blue and often referred to as a Sobs curve) adds the new taxa to those already recorded, in sample order. The second line (plotted in red and often referred to as the UGE curve) is smooth, as it is an average output based on the samples being added in a random order 999 times (Ugland *et al.*, 2003). Notable changes in the slope of the species in order of observation (Sobs) curve compared to the UGE curve can be an indication of differences in the community composition. Further, the relative position of the Sobs curve to that of the UGE curve can reflect the number of OTUs versus expectations had all samples been equal.

The Sobs curve for the sediment bacteria data set (Figure 2.11) initially began below the UGE curve until the addition of Stations ENV18, ENV21 and ENV22 where the Sobs curve rose above the UGE curve, indicating that a greater number of OTUs were present in Station ENV22 than was to be expected. Following this the Sobs curve then closely followed the UGE curve until the addition of Station ENV34.

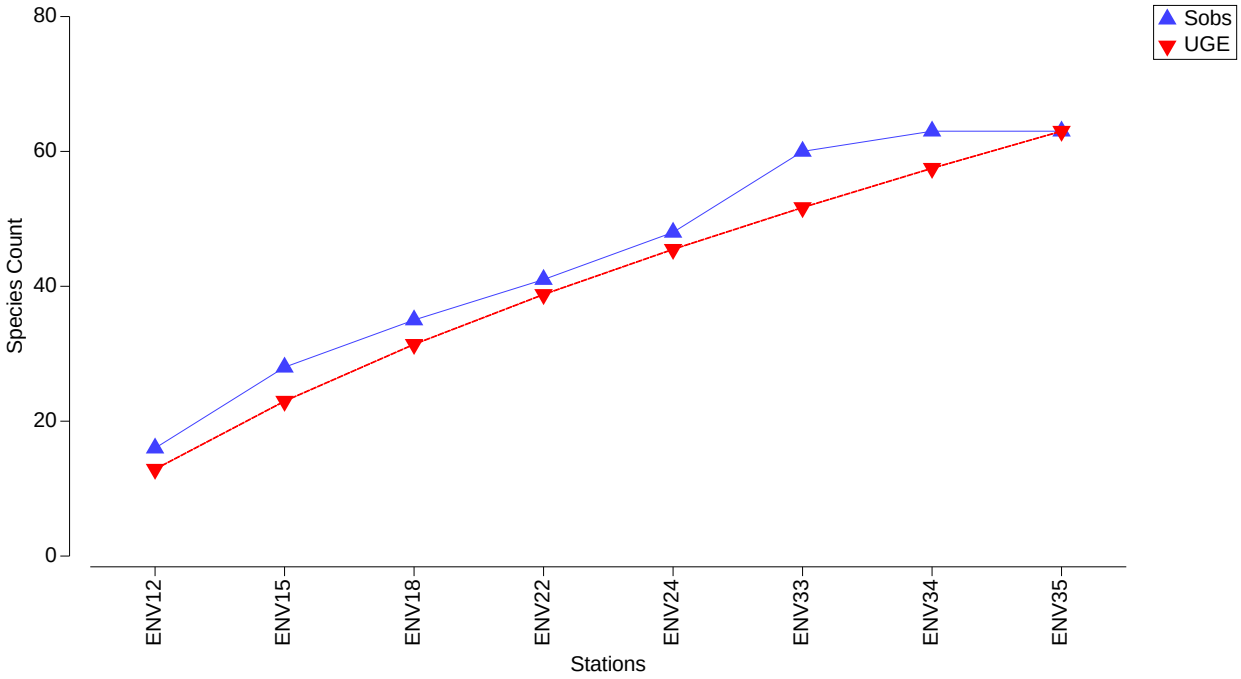
The Sobs and UGE curve of the sediment bacterial data OTU accumulation plot for the array area continued to rise with the addition of the last samples. This reflected that further samples across the array area may elicit additional OTUs to those reported during the current sampling campaign though the rate of increase was low (<14 OTUs added with the last stations).

Figure 2.11 Bacterial OTU Accumulation Curve



The Sobs curve for the array area sediment infaunal data set (Figure 2.12) rose consistently with and slightly above the UGE curve, indicating a greater number of OTUs were present than was to be expected. There were no new OTUs added with the addition of the last sample; however, the Sobs and UGE curve continued to rise at a consistent rate (UGE; 6 OTUs) with the addition of the last station. This reflected that analysis of samples from the other 24 stations across the array area may elicit additional OTUs to those reported.

Figure 2.12 Infaunal OTU Accumulation Curve



2.10.4 Summary Statistics for Water Metabacoding

A total of 74 operational taxonomic units (OTUs) were detected from water samples across the array area as detailed in Table 2.17. Full read count of the OTUs detected per station are tabulated in Appendix L.

Fish

The fish eDNA data set identified 16 taxonomic groups based on family with the proportional contribution of these taxonomic families to the overall structure of the array area detailed in Table 2.18 and presented for each station and sample in Figure 2.13 and Figure 2.14 respectively.

Of the 20 samples acquired across 10 stations for fish eDNA water analysis, 14 samples contained amplifiable DNA. As a minimum one sample from each station recovered amplifiable DNA. Gadidae (n=8, 22%) was the most detected taxonomic family with Pleuronectidae (n=6, 16%) as the second most detected. In addition, eight taxonomic families were represented by a single OTU.

Of the 37 fish OTUs obtained from the water samples, 16 (43%) were present in a single sample, with none present at every station.

Vertebrates

The vertebrate eDNA data set identified 23 taxonomic groups based on family. Contributions of the taxonomic families to the overall structure of the survey area are detailed in Table 2.18 and presented for each station and sample in Figure 2.15 and Figure 2.16 respectively.

All samples acquired across the array area for vertebrate eDNA analysis, contained amplifiable DNA. Pleuronectidae (n=5, 14%) was the most detected taxonomic family with Ammodytidae (n=4, 11%) as the second most detected. Additionally, 16 taxonomic families were represented by a single OTU.

Of the 37 vertebrate OTUs obtained from the water samples, 14 (38%) were present in a single sample, 6 (16%) were present at every station, of which 3 (8%) were present in every sample.

Table 2.17 OTU Water Detections per Target and Percentage Successfully Classified

Target	Number of Stations Analysed	Number of Stations containing OTUs	Number of OTUs	Phylum (%)	Class (%)	Order (%)	Family (%)	Genus (%)	Species (%)
Fish (water)	10	10	37	100	100	100	100	86	76
Vertebrates (water)	10	10	37	100	100	100	100	78	68

Table 2.18 Contribution of Gross Water Fish OTU Taxonomic Families

Group by Class	Reads		OTUs	
	Number	Proportional Contribution %	Number	Proportional Contribution %
Ammodytidae	577229	46	3	8
Argentinidae	891	<1	1	3
Callionymidae	1746	<1	2	5
Clupeidae	222702	18	3	8
Cottidae	15911	1	2	5
Cyclopteridae	287	<1	1	3
Gadidae	72937	6	8	22
Gasterosteidae	1098	<1	1	3
Gobiidae	5330	<1	3	8
Pholidae	1601	<1	1	3
Pleuronectidae	138076	11	6	16
Salmonidae	93	<1	1	3
Scombridae	4347	<1	1	3
Scophthalmidae	5064	<1	1	3
Stichaeidae	98	<1	1	3
Triglidae	219715	17	2	5
Total	**1267125**	**100**	**37**	**100**

Table 2.19 Contribution of Gross Water Vertebrate OTU Taxonomic Families

Group by Class	Reads		OTUs	
	Number	Proportional Contribution %	Number	Proportional Contribution %
Agonidae	150	<1	1	3
Ammodytidae	138423	45	4	11
Argentinidae	3798	1	1	3
Callionymidae	1060	<1	2	5
Clupeidae	12428	4	1	3
Cottidae	1473	<1	2	5
Cyclopteridae	54	<1	1	3
Gadidae	89351	29	3	8
Gobiidae	62	<1	1	3
Labridae	27	<1	1	3
Lotidae	377	<1	1	3
Pholidae	2881	1	1	3
Pleuronectidae	32091	11	5	14
Salmonidae	228	<1	1	3
Scombridae	200	<1	1	3
Scophthalmidae	333	<1	3	8
Soleidae	40	<1	1	3
Stichaeidae	437	<1	1	3
Triglidae	14790	5	1	3
Balaenopteridae	1290	<1	1	3
Delphinidae	568	<1	2	5
Phocoenidae	4834	2	1	3
Phocidae	155	<1	1	3
Total	**305050**	**100**	**37**	**100**

Figure 2.13 Contributions of Gross Water Fish OTU Taxonomic Families by Station

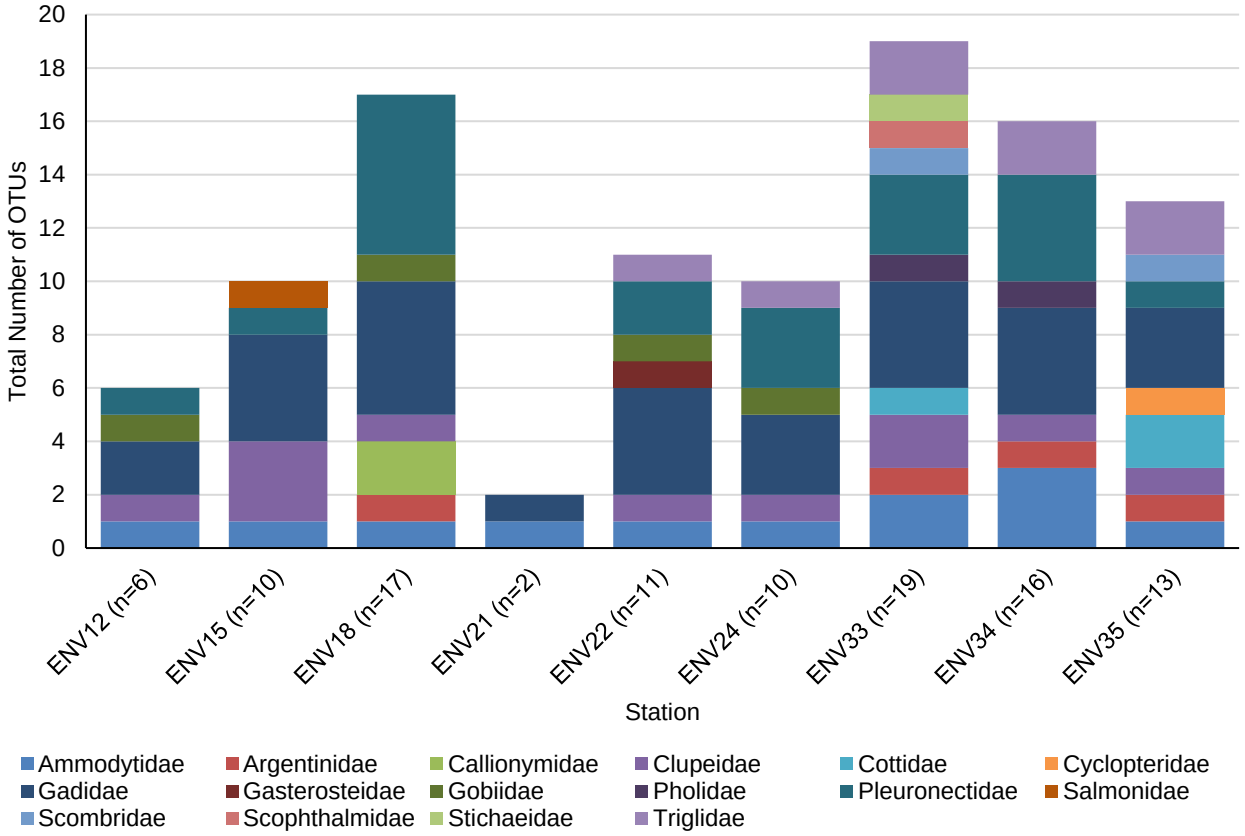


Figure 2.14 Contributions of Gross Water Fish OTU Taxonomic Families by Sample

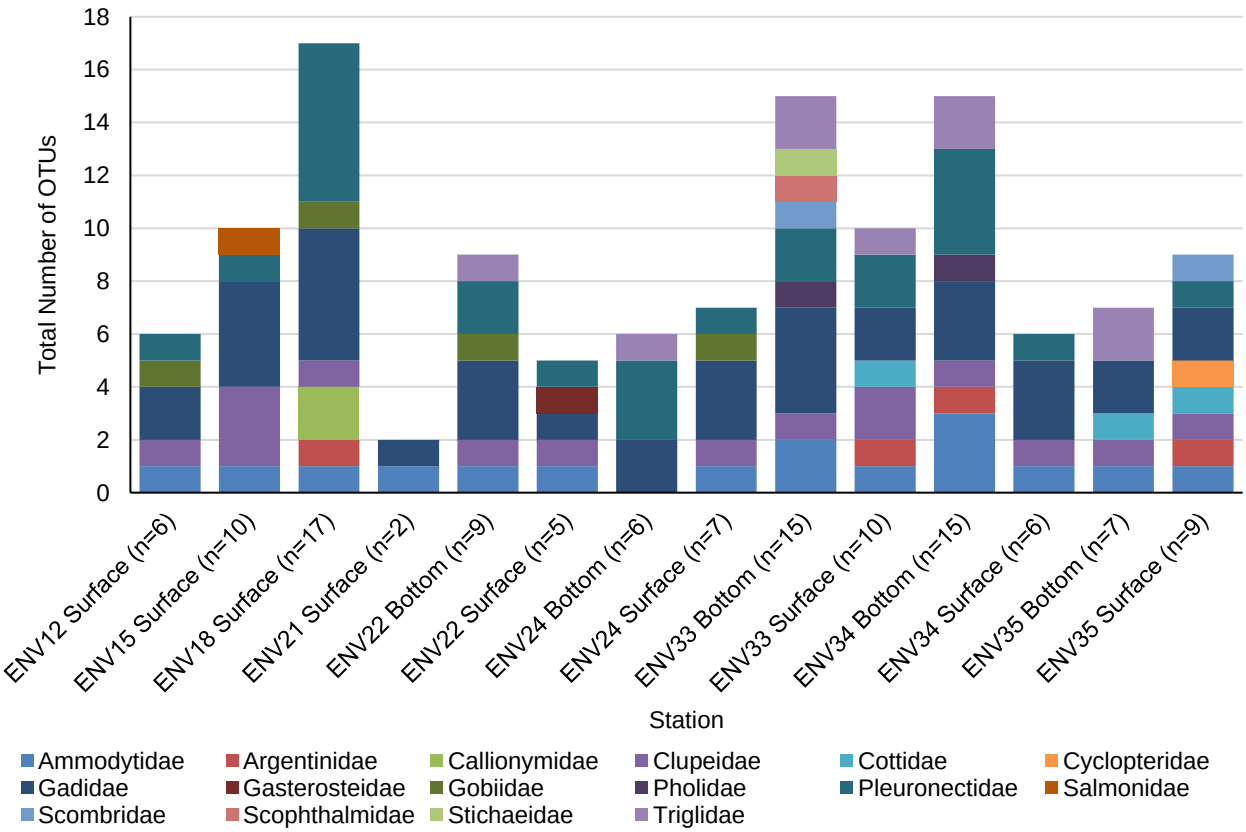


Figure 2.15 Contributions of Gross Water Vertebrate OTU Taxonomic Families by Station

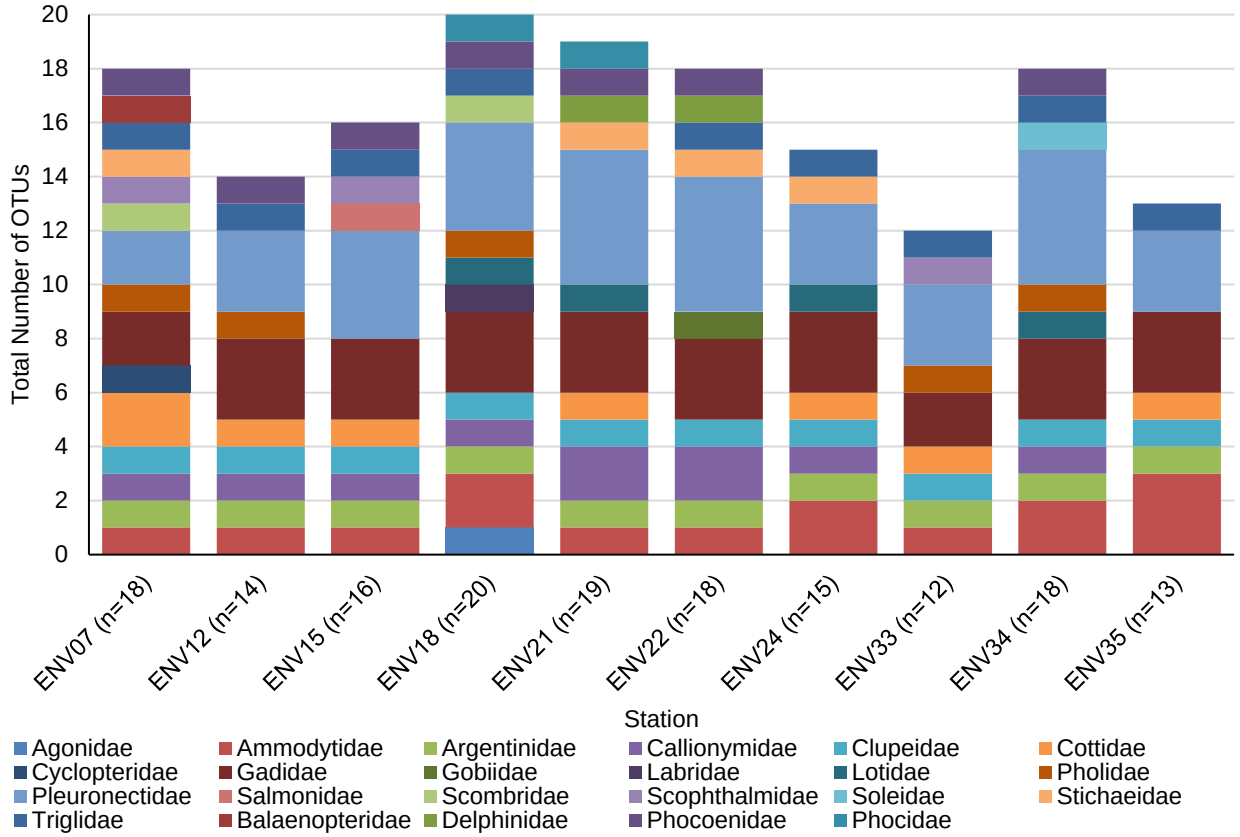
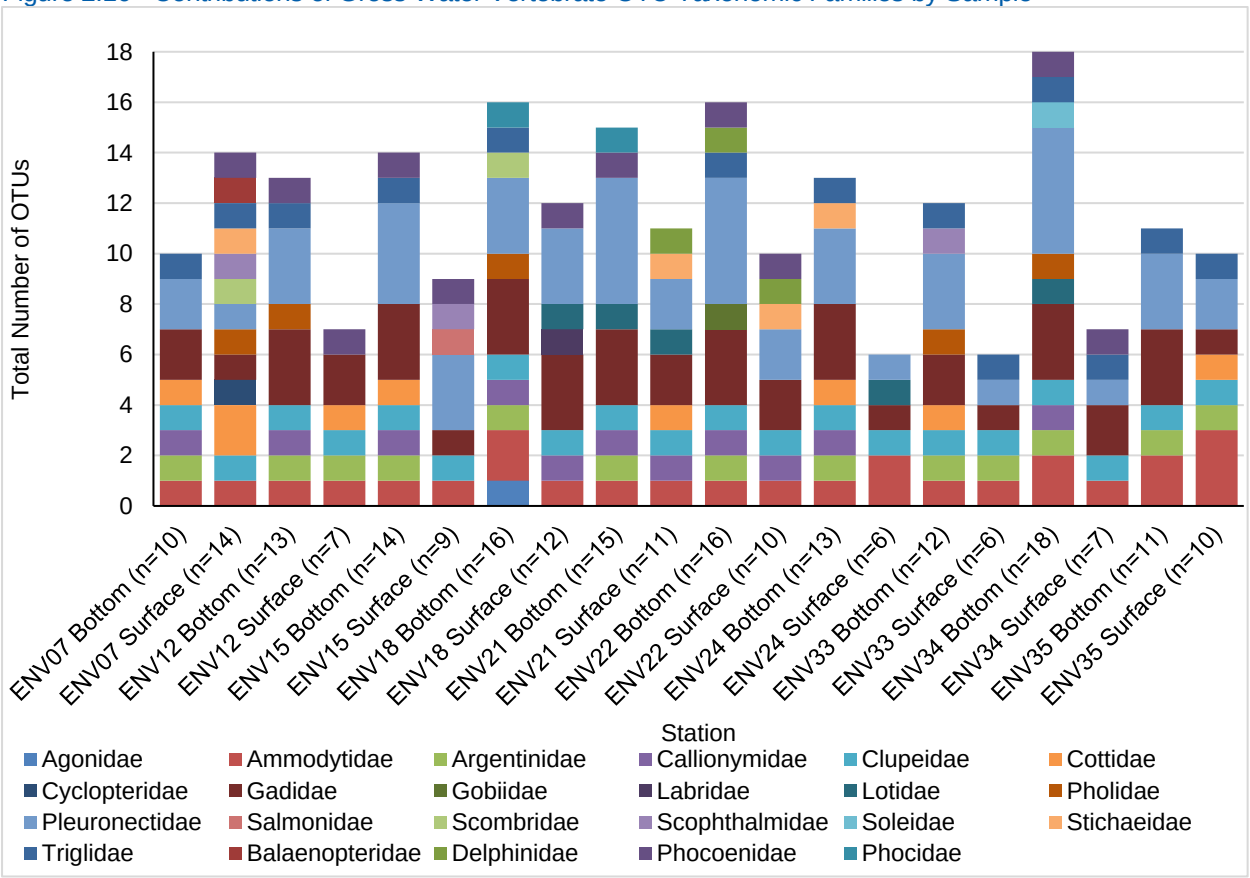


Figure 2.16 Contributions of Gross Water Vertebrate OTU Taxonomic Families by Sample



Comparative taxonomic heat trees detailing the number of OTUs across the array area from fish taxa down to the order rank is presented in Figure 2.17 while the taxonomic heat trees detailing vertebrate taxa OTUs down to the rank order are presented in Figure 2.18. Summary statistics for the water fish and vertebrate richness are detailed in Table 2.20.

Figure 2.17 Water Fish Taxonomic Heat Trees of the Number of OTUs

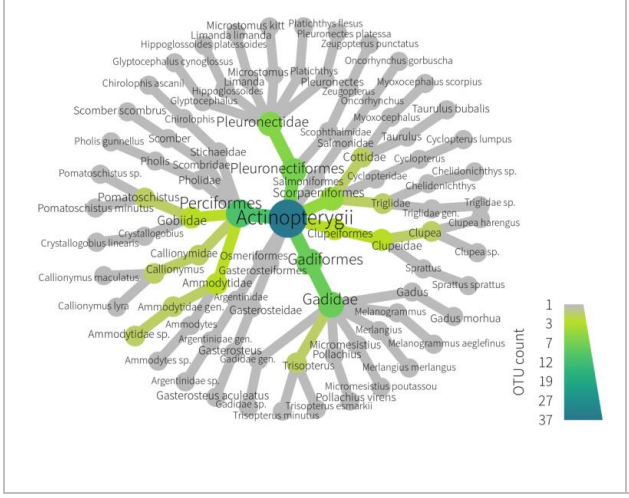


Figure 2.18 Water Vertebrate Taxonomic Heat Trees of the Number of OTUs

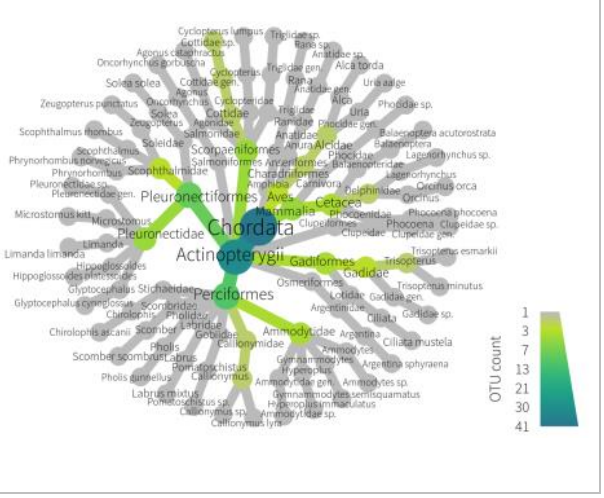


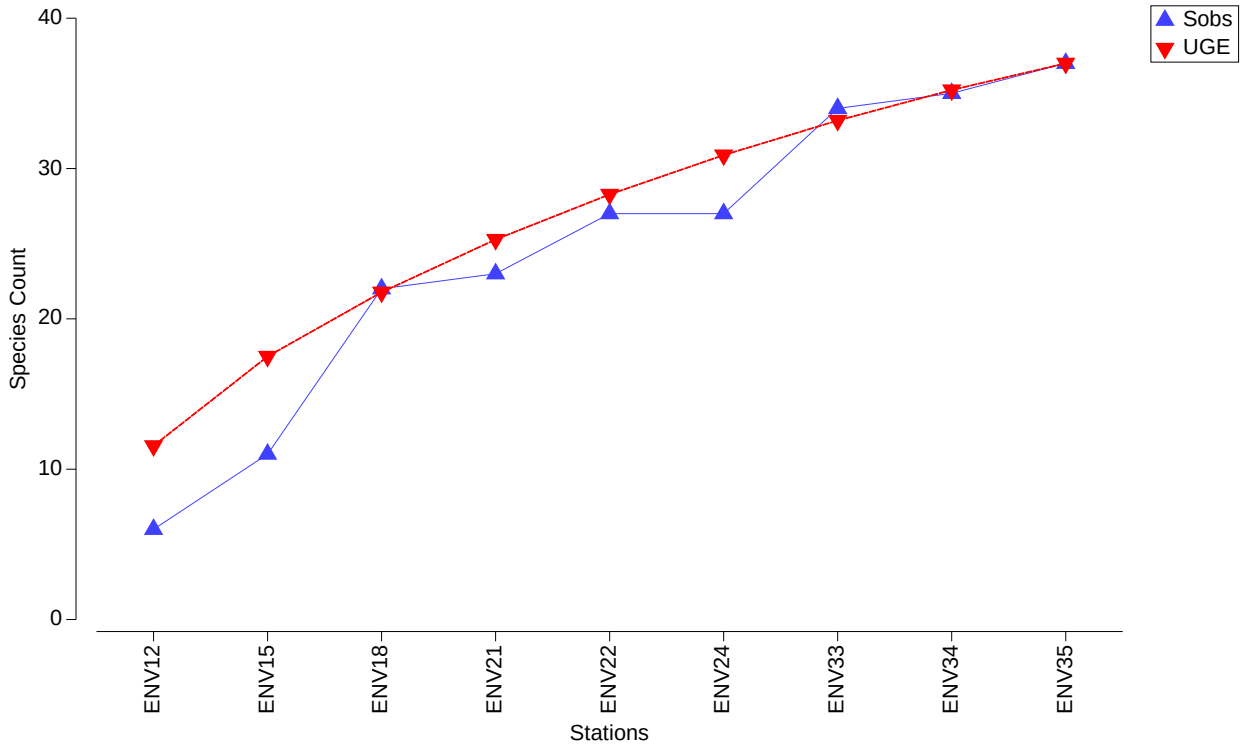
Table 2.20 Summary of Water (Fish and Vertebrate) Richness

	Fish	Vertebrate
Minimum	2	12
Maximum	37	37
Mean	14	18
±SD	9.5	6.8

Accumulation plots of OTUs for the fish and vertebrate data sets, for the array area are presented in Figure 2.19 and Figure 2.20.

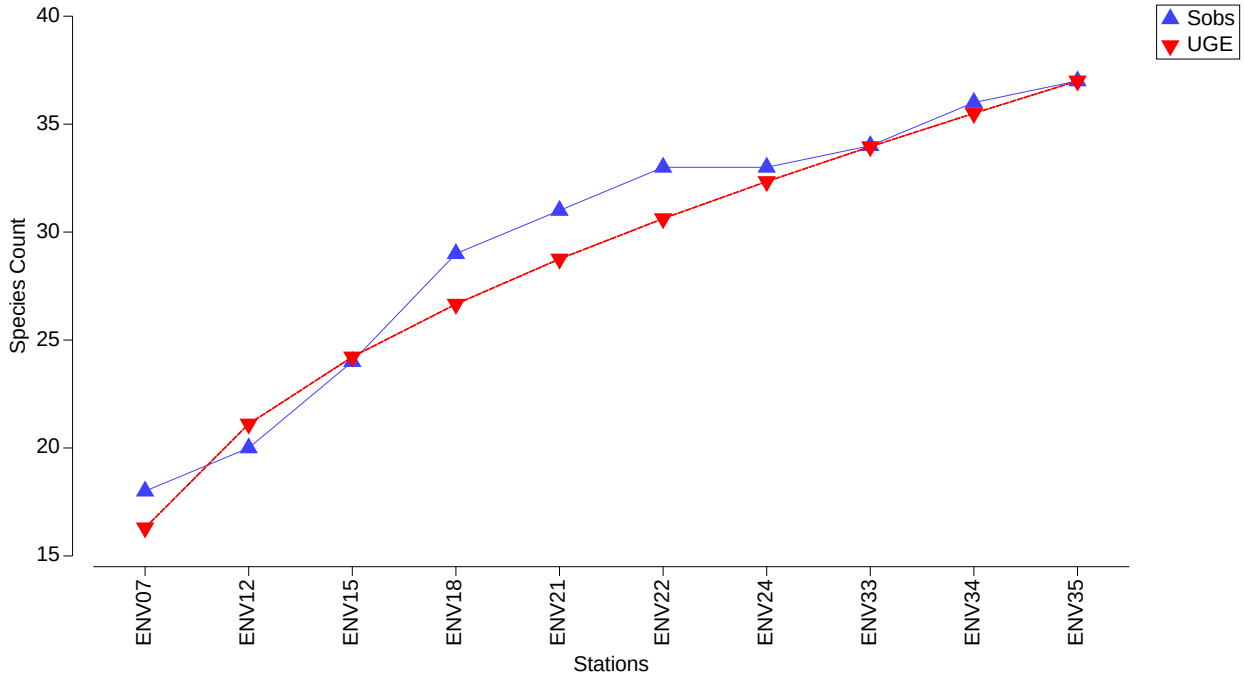
The Sobs curve for the water fish data set (Figure 2.19) initially began below the UGE curve. The addition of Stations ENV18 and ENV33 temporarily elevated the Sobs curve above the UGE curve, indicating that a greater number of OTUs were present at these stations than was to be expected. The Sobs and UGE curve of the water fish data OTU accumulation plot for the array area continued to rise with the addition of the last sample. This reflected that further samples across the array area may elicit additional OTUs to those reported during the current sampling campaign though the rate of increase was low (<2 OTUs added with the last UGE stations).

Figure 2.19 Fish OTU by Station Accumulation Curve



The Sobs curve for the array area water vertebrate data set (Figure 2.20) began above the UGE curve. The addition of Stations ENV and ENV15 yielded fewer OTUs than expected causing the Sobs curve to drop below the UGE curve. The addition of Station ENV18 with five new OTUs elevated the sobs curve above the UGE where it remained until the addition of Station ENV24 which added no new OTUs. The Sobs and UGE curves then continued to rise with the addition of the last stations. This reflected that further samples across the array area may elicit additional OTUs to those reported during the current sampling campaign though the rate of increase was low (<2 OTUs added with the last UGE stations).

Figure 2.20 Vertebrate OTU by Station Accumulation Curve



2.10.5 Sediment OTU Community Structure using Multivariate Analyses

Multivariate analyses enable subtle trends within the data sets to be identified. Bray-Curtis similarity matrices were produced from the standardised data using PRIMER v7. Rather than applying the conservative approach of presence-absence, the decision was made to used standardised reads as a proxy for relative abundance to maximise use of the available data. A SIMPROF permutation test was conducted in conjunction with CLUSTER analysis and the results illustrated on a dendrogram. Red lines join samples that are statistically indistinguishable, whilst black lines join samples which are distinct from one another. A nMDS routine was also run, using the 'fix collapse' function. The results of the CLUSTER analysis including SIMPROF analysis in the form of a Bray-Curtis similarity dendrogram and nMDS plot for the sediment bacteria samples are displayed in Figure 2.21, while results of the same analysis on the infaunal data are presented in Figure 2.22.

Bacteria

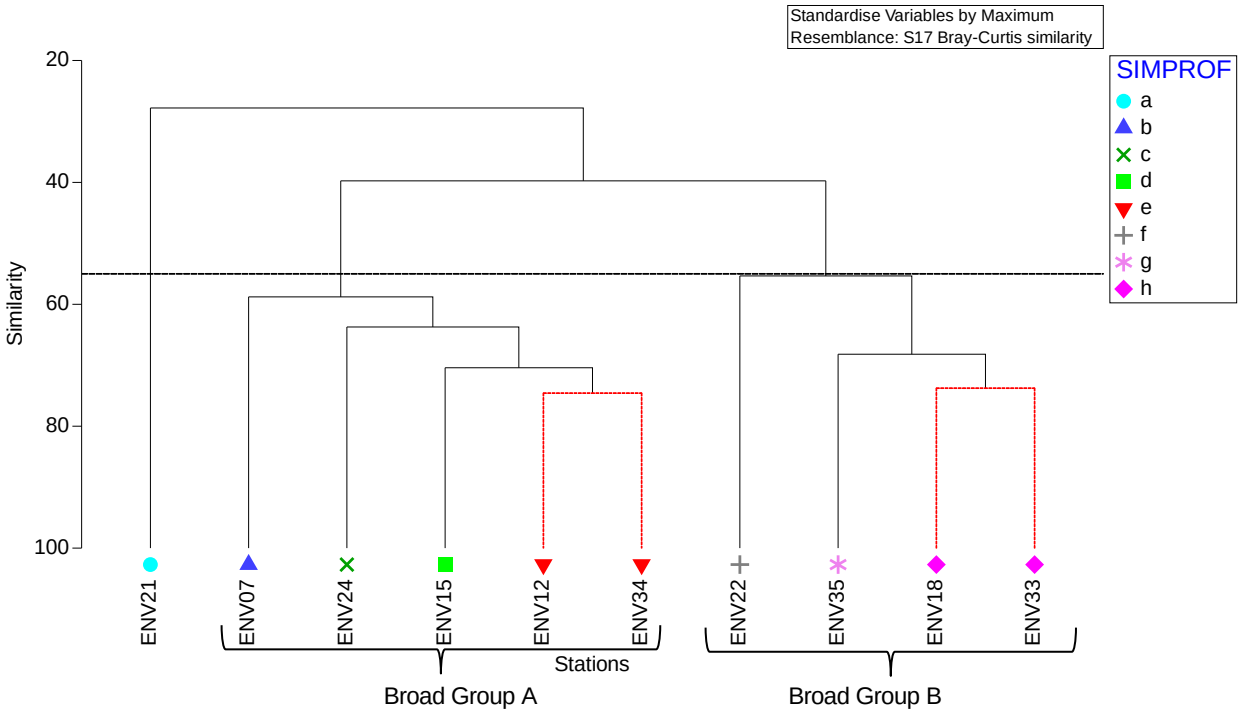
The CLUSTER analysis and resulting dendrogram for the array area sediment bacterial OTU data set (Figure 2.21a) identified eight SIMPROF groups, showing all stations were more similar than dissimilar to one another (*i.e.* Bray-Curtis similarity of >50%). One SIMPROF group (SMPROF a) was less than 40% similar, while the remaining stations could be split into two broad groups at a Bray-Curtis similarity of 55%. The key OTUs and classes responsible for the multivariate pattern in the bacterial eDNA data set are displayed in Table 2.21, based on SIMPER analysis and review of the raw data.

Numerous OTUs each made a small contribution towards the separation of the groups from the remaining stations. This may be due to the bacterial communities being far richer than equivalent metazoan communities and less discriminately bound to the sediment given their established variation with both overlying water quality along with direct sediment physico-chemistry (Allison & Martiny, 2008; Frühe *et al.*, 2021). However, they still provide a suitable sensitive receptor to environmental pressures for monitoring impacts (Horton *et al.*, 2019).

The nMDS ordination of the array area sediment bacterial sample data set (Figure 2.21b) revealed a similar pattern to the CLUSTER analysis, with a stress level of 0.04, this can be considered a near perfect representation of the rank dis(similarities) and overall pattern observed in the data set.

Figure 2.21 Multivariate Analysis of Sediment Bacterial OUT Data by Station

a) Bray-Curtis Similarity Dendrogram



b) MDS Oroutation

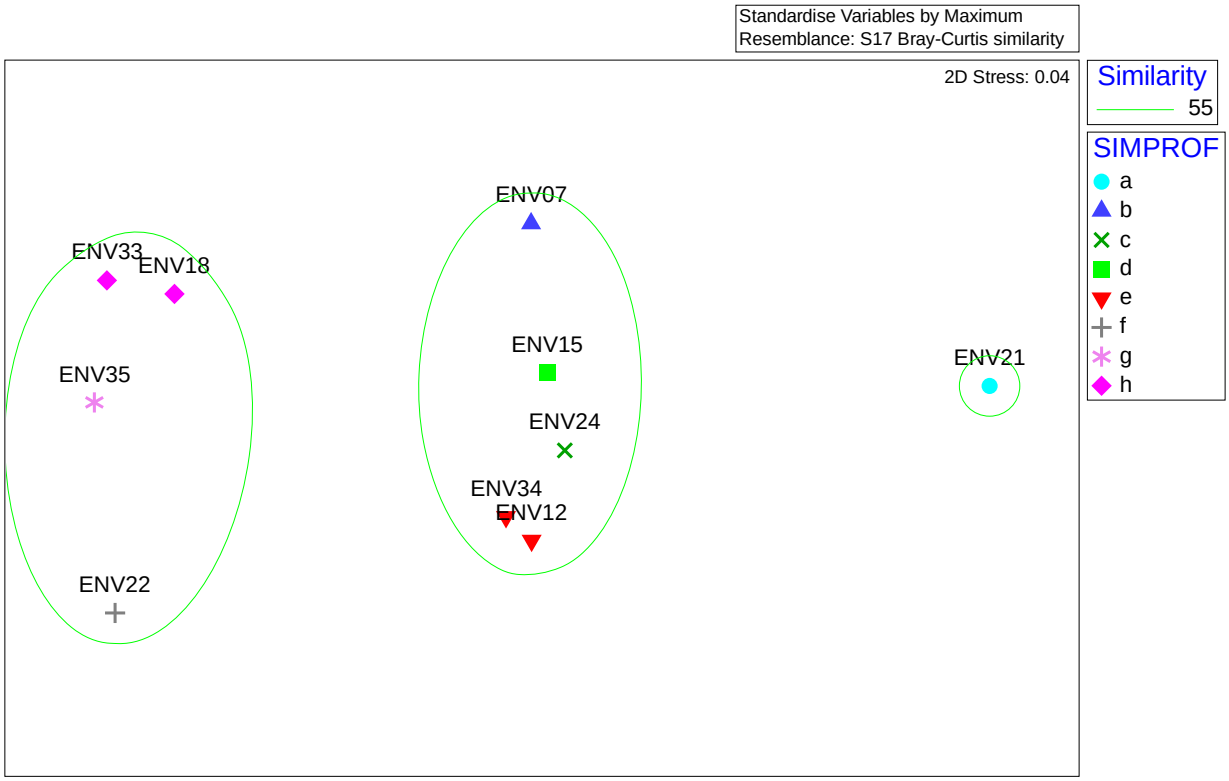


Table 2.21 Taxa Influencing Sediment Bacteria OTU SIMPROF Variation

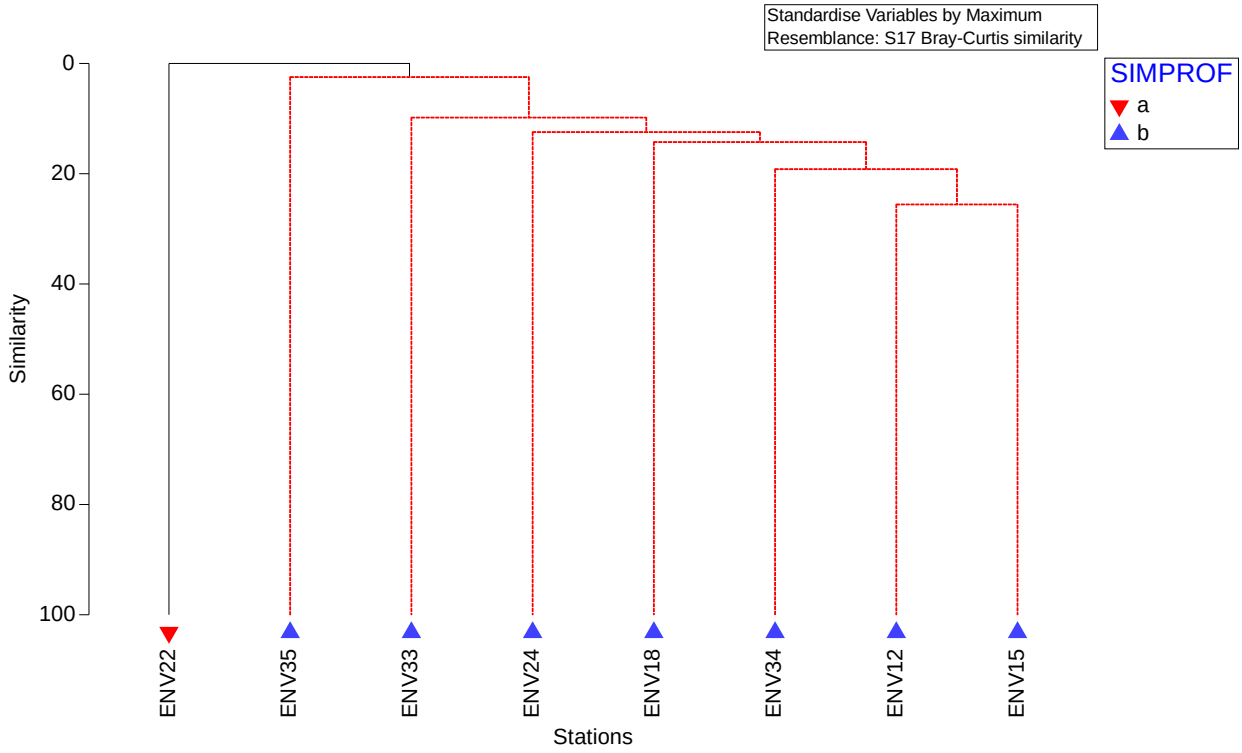
Stations	SIMPROF	Similarity (Bray-Curtis %)	OTUs and Groups Influencing Sample Separation[1]
ENV21	SIMPROF *a* vs Broad Group A and B	27.79	• Unique presence of 52 OTUs (including 13 Proteobacteria OTUs), accounting for 10% of the OTUs across the array area, (*c.* 24.2% of the dissimilarity). • 11% of OTUs recorded higher reads (58 OTU's including 17 Proteobacteria OTUs). • No reads of 87 OTUs (including 15 Actinobacteriota OTUs, 32 Proteobacteria OTUs and 13 Planctomycetes OTUs), accounting for 17% of the OTUs across the array area. • 31 OTUs recorded lower reads accounting for 6% of the OTUs across the array area (including 16 Proteobacteria OTUs).
ENV07, ENV12, ENV15, ENV24 and ENV34	Broad Group A vs Broad Group B	39.75	• Unique presence of 27 OTUs (including 6 Proteobacteria OTUs and 5 Planctomycetes OTUs), accounting for 5% of the OTUs across the array area. • No reads of 61 OTUs (including 18 Proteobacteria OTUs, 12 Planctomycetes OTUs and 10 Actinobacteriota OTUs), accounting for 12% of the OTUs across the array area. • 11% of OTUs recorded higher reads (58 OTUs including 20 Proteobacteria OTUs). • 96 OTUs recorded lower reads accounting for 19% of the OTUs across the array area (including 46 Proteobacteria OTUs and 17 Planctomycetes OTUs).

Infauna

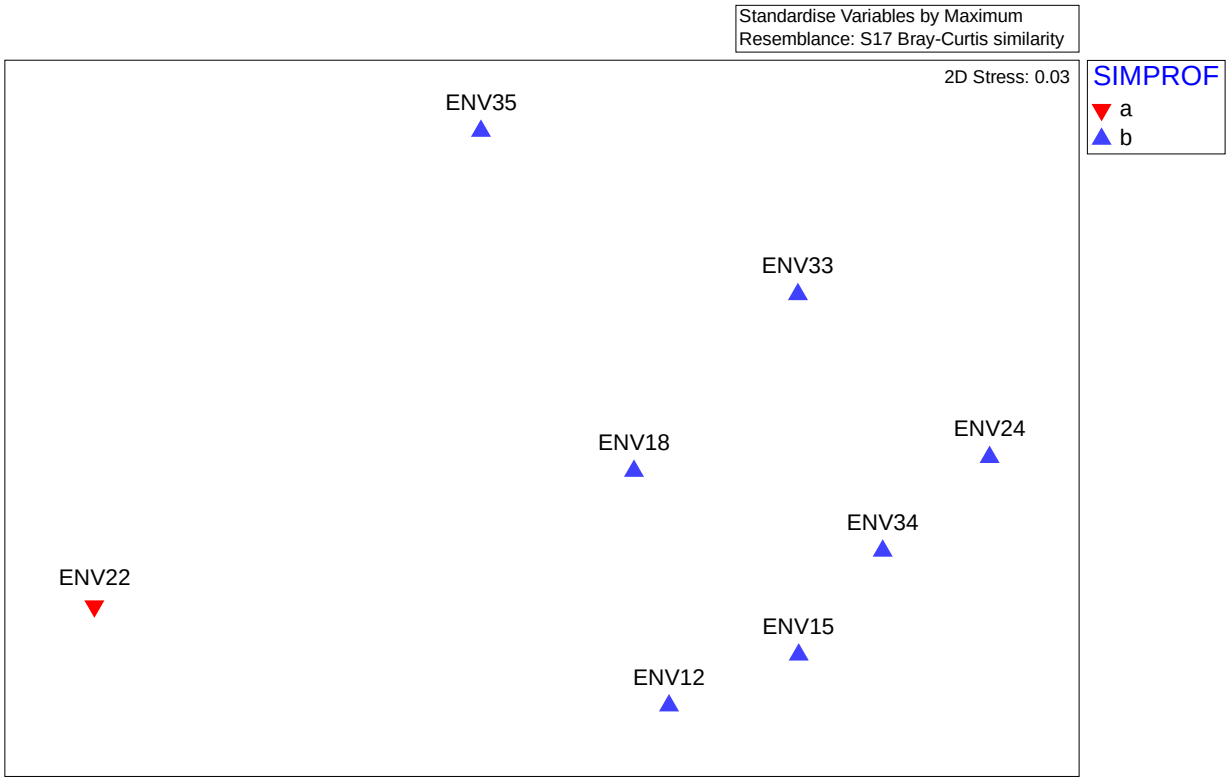
CLUSTER analysis and the resulting dendrogram for the array area sediment infaunal OTU data set (Figure 2.22a) identified two groups, all of which were more dissimilar than similar (*i.e.* Bray-Curtis similarity of <50%). Station ENV22 (SIMPROF *a*) with a similarity of 0%, included 20 unique OTUs accounting for 32% of the OTUs across the array area. These consisted of six Annelida OTUs, five Arthropoda OTUs, two OTUs each for Mollusca and Cnidaria, with one OTU each for Echinodermata, Gnathostomulida, Phoronida, Platyhelminthes and Xenacoelomorpha. Six OTUs were absent from Station ENV22, accounting for 10% of the OTUs across the array area and contributing approximately 41% of the dissimilarity.

Figure 2.22 Multivariate Analysis of Sediment Infaunal OTU Data by Station

a) Bray-Curtis Similarity Dendrogram



b) MDS Ordination



2.10.6 Water OTU Community Structure using Multivariate Analyses

The water multivariate analyses were produced from the standardised data in PRIMER v7. A SIMPROF permutation test was conducted in conjunction with CLUSTER analysis and the results illustrated on a dendrogram. In addition, a nMDS routine was also run.

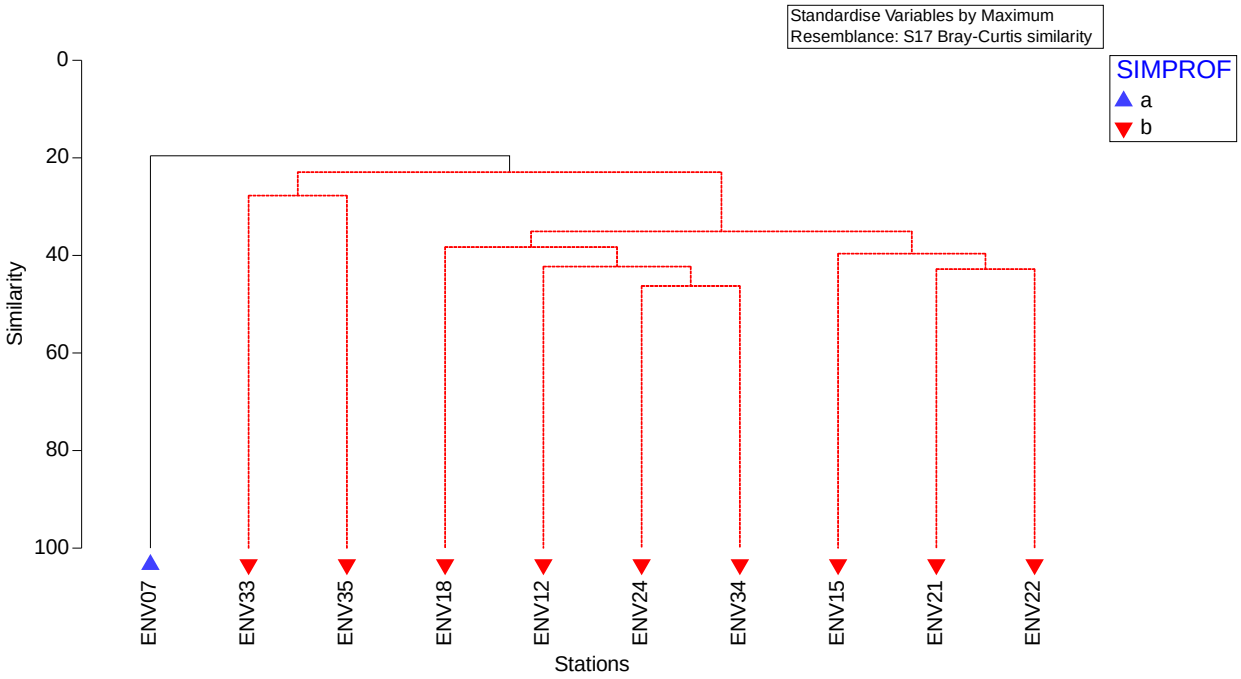
Fish

The cluster analysis and resulting dendrogram for the array area water fish OTU data set identified one SIMPROF group (SIMPROF *a*), indicating that all stations were more dissimilar than similar to one another (*i.e.*, Bray-Curtis similarity of ~15%).

Vertebrates

CLUSTER analysis and the resulting dendrogram for the array area water vertebrate OTU data set (Figure 2.1) identified two groups, all of which were more dissimilar than similar (*i.e.*, Bray-Curtis similarity of <25%). Station ENV07 (SIMPROF *a*) with a similarity of ~20% included 4 unique OTUs accounting for 11% of the OTUs across the array area. These consisted of one each of Balaenopteridae, Cottidae, Cylcopteridae and Scophthalmidae. One OTU (*Hippoglossoides platessoides* IM-7966NE) was absent from Station ENV07 accounting for 2% of the dissimilarity.

Figure 2.1 Multivariate Analysis of Water Vertebrate OTU Data by Station



2.10.7 Multivariate Comparison of Sediment Metabarcoding Results to Physico-chemical Data

The bacterial and infaunal eDNA multivariate patterns were compared to the physico-chemical data to determine if any patterns correlated. All of the 10 stations analysed for sediment eDNA also had a full suite of physio-chemistry analysed.

A RELATE analysis identified a 75% correlation between the sediment bacteria eDNA multivariate pattern and that of the physico-chemical variables. BV STEP analyses further identified a sub-set of three physico-chemical variables (THC (GC-FID), As and Cu) which showed an 86% correlation with the sediment bacteria eDNA multivariate pattern. When compared with the PSA results, fines and sand showed a 71% correlation with the sediment bacteria eDNA multivariate pattern.

A RELATE analysis identified a 75% correlation between the sediment infaunal eDNA multivariate pattern and that of the physico-chemical variables. BV STEP analyses further identified a sub-set of three physico-chemical variables (THC (GC-FID), Pr and Pb) which showed a 88% correlation with the sediment infaunal eDNA multivariate pattern. When compared with the PSA results, fines and gravel showed a 73% correlation with the sediment infaunal eDNA multivariate pattern.

An analysis of similarity (ANOSIM) was conducted on both the bacterial and infaunal eDNA data sets to investigate the influence of depth (rounded down to the nearest 5m LAT). This revealed a significant but low-level impact on the bacterial eDNA data set ($r=0.411$, $p<0.05$) and no significant affect to the infaunal eDNA data set.

Further sampling, including additional stations and replication would allow further investigation of the relationship between bacterial and infaunal OTU data and the physico-chemical variables. As a result of the current sample size (n=34, of which 10 stations had concurrent physico-chemical, bacterial and infaunal eDNA) and use of single eDNA replicates per station the statistical robustness of the analysis patterns is limited and may be obscured.

2.11 Macrofaunal Interpretation

2.11.1 Overview

Two 0.1m^2 faunal samples (labelled MFA and MFB) were collected from each station, one of which (MFA) were worked up and the second retained and appropriately stored as a spare. All faunal samples were screened through a 1mm mesh sieve. Before analysing the data set provided by the laboratory, several taxa were removed as per our stated methods; however, all records, regardless of whether they were included in statistical analyses, are listed in Appendix M.

2.11.2 Summary of Notable Species

A single adult individuals of the bivalve ocean quahog (*A. islandica*) was present in grab samples at Stations ENV07 and ENV15, example image presented in Figure 2.23; these were weighed, measured and returned to the sea. They have been added to the abundance and biomass statistics. This species is on the OSPAR (2008) list of threatened and/or declining species and habitats and is listed as a low or limited mobility species PMF in Scottish offshore waters (NatureScot, 2020a). However, *A. islandica* is commonly found in this area of the North Sea, where populations of 40- to 80-year old specimens have been recorded, with a substantial proportion over 100 years old (OSPAR, 2009b).

Figure 2.23 *A. islandica* Returned to the Sea from Station ENV07 MFA

2.11.3 Summary Statistics

A total of 2075 individuals representing 242 taxa were recorded from 34 samples. Full enumeration of the taxa recorded per sample are tabulated in Appendix M. Of these, juveniles accounted for 0.6% of total individuals and 2.5% of taxa.

The presence of a large number of juveniles in the macrobenthos tends to be ephemeral due to high mortality and can temporarily disturb the normal balance of relative abundance amongst species (and consequently measures of diversity). A RELATE analysis was conducted in PRIMER to determine whether the presence of juveniles caused significant differences between the rationalised full and adult only resemblance matrices. The tests showed the two data sets were 99.9% similar ($p<0.01$), indicating no significant differences between the multivariate pattern of the two data sets. No juvenile taxa were recorded in the top ten ranked taxa and therefore adult only data will be presented within this report.

The data set was divided into five broad taxonomic groups; Annelida (Polychaeta), Arthropoda (Malacostraca), Mollusca, Echinodermata and 'Others'. The 'Others' category included Annelida (Clitellata, Sipuncula), Arthropoda (Pycnogonida), Chaetognatha, Cnidaria (Anthozoa), Foraminifera, Hemichordata, Nemertea, Phoronida and Platyhelminthes. The absolute and proportional contributions of these five taxonomic groups to the overall community structure for the adult data set are summarised in Table 2.22. The contributions of each taxonomic group to total individuals and taxa are illustrated as stacked bar charts in Figure 2.24.

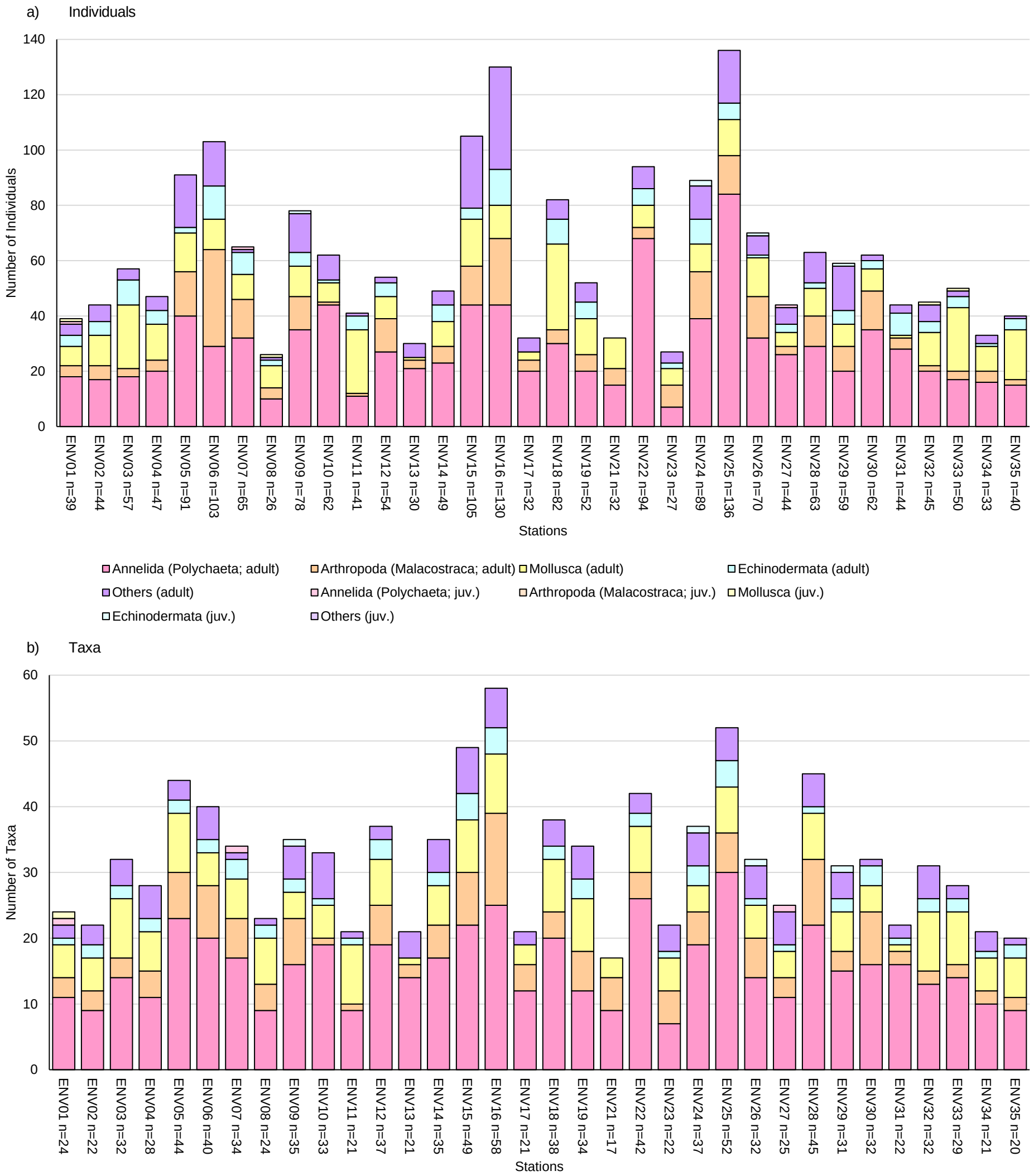
Table 2.22 Contribution of Gross Taxonomic Groups of Adults by Abundance

Group	Adult Individuals		Taxa	
	Total	Proportional Contribution %	Total	Proportional Contribution %
Annelida (Polychaeta)	954	46	121	51
Arthropoda (Malacostraca)	289	14	47	20
Mollusca	387	19	45	19
Echinodermata	159	8	9	4
Others	274	13	16	7
Total	**2063**	**100**	**238**	**100**

Annelida (Polychaeta; n=954) was the most abundant taxonomic group accounting for 46% of the individuals and 51% of the taxa. Mollusca (n=387) was the second most abundant taxonomic group accounting for 19% of individuals and 19% of taxa.

Of the 238 adult taxa recorded across the array area, none were present at every station. The most widespread taxon was Nemertea, which were present at 27 of the 34 stations. A total of 72 (30%) taxa were recorded in a single sample and of those 62 (26%) were represented by a single individual. It is generally accepted that ecological communities which are frequently subjected to local disturbance or contamination events will be dominated by a limited number of tolerant taxa, which will be represented in high individual abundances (Clarke & Warwick, 2006). There was no evidence of localised super-abundances of pollution tolerant taxa and the numbers of single or low abundance taxa in this survey suggest a reasonably diverse community that has been subject to relatively little disturbance or contamination.

Figure 2.24 Contributions of Gross Taxonomic Groups by Abundance



Species ranking provides additional information on the dominance structure of the faunal community in the array area and results are presented based on abundance in Table 2.23. Of the top ten ranked adult taxa; four were Annelida, three were 'Others', two were Mollusca, with a single Arthropoda and Echinodermata.

Results of the species ranking and fidelity scores can give further indication of a taxon's distribution with results ≥0.8 and ≤1.2 indicating a generally even distribution of a taxon, whilst values outside of this range represent a patchier distribution. Only two taxa (*Astrorhiza* and *Abra*) within the adult only top ten fell within this range. Additionally, there was some reordering of the taxa when ranked by abundance rather than score suggesting the dominant taxa exhibited a patchy distribution. This is consistent with sampling across a relatively wide area covering shifting sediment types.

Table 2.23 Species Ranking by Abundance of Adult Only Data

Rank		Taxon	Total Rank Score	Fidelity	Total Abundance	Present in Number of Samples
Score	Abundance					
1	1	*Echinocyamus pusillus*	210	0.62	111	26
2	7	Nemertea	177	0.58	51	27
3	5	*Antalis entalis*	167	0.61	74	24
4	9	*Nephtys*	138	0.58	39	22
4	4	*Lumbrineris aniara*	138	0.58	78	17
5	8	Phoronis	131	0.64	46	20
6	3	Galathowenia	122	0.72	89	16
7	2	*Astrorhiza*	121	0.89	90	17
8	11	*Abra*	120	1.18	36	17
9	6	*Urothoe elegans*	113	1.66	65	15
10	13	*Phascolion (Phascolion) strombus strombus*	109	3.21	32	18

Cells are coloured to indicate taxonomic divisions: Annelida, Arthropoda, Mollusca, Echinodermata, 'Others'.

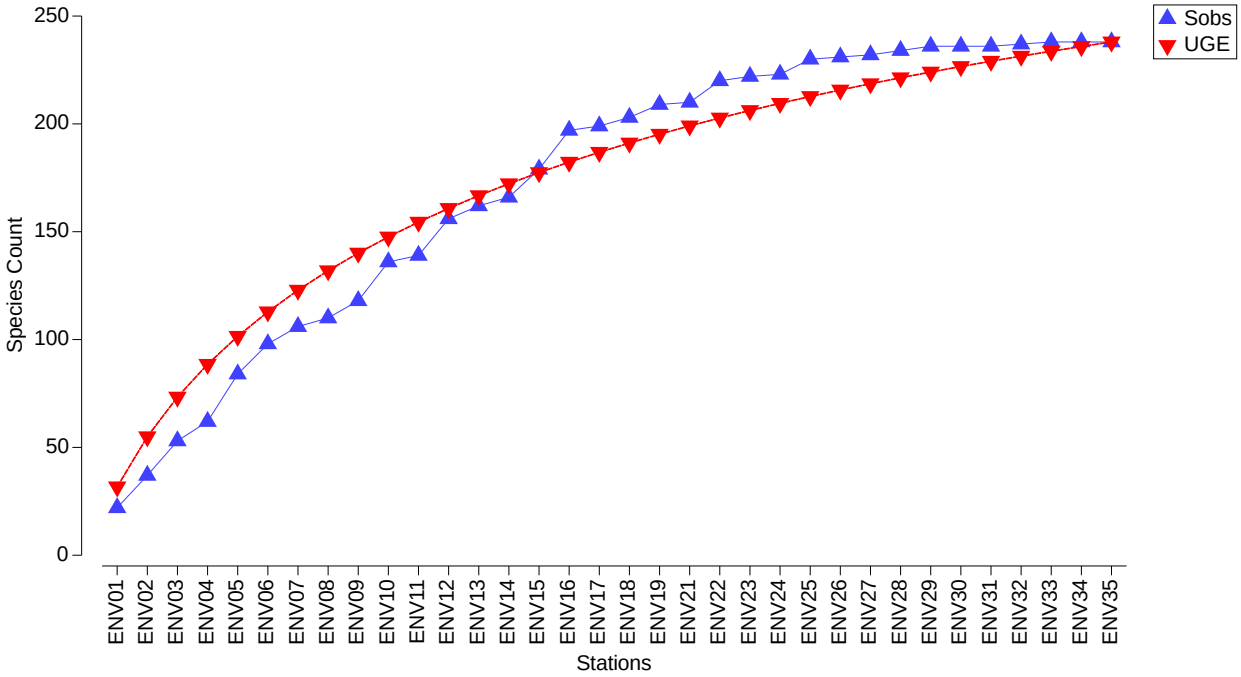
When considering the species observed within the array area in terms of feeding guilds, the majority of species were identified as suspension feeders (both passive and active), deposit feeders (surface and sub-surface), with examples of predatory and scavenger species. Among the dominant taxa across the array area there were examples of suspension and deposit feeders.

A species accumulation plot for the adult only abundance data set is presented for the array area in Figure 2.25. This plot shows the increasing total number of different taxa observed as samples are pooled. Significant changes in the slope of the Sobs curve compared to the UGE curve can be an indication of differences in the community composition. The Sobs curve began below the UGE curve until the addition of Station ENV15 where 13 additional taxa were added, of which 5 were unique to this station and Station ENV16 where 18 (6 unique) additional taxa were added. This is consistent with a notable change in the faunal community in terms of an increase in the total number of individuals and taxa at Stations ENV15 and ENV16 and leading to the preceding stations appearing relatively below average in terms of their taxonomic richness and diversity. This notable step-up at Stations ENV15 and ENV16; however, masks some more subtle shifts in community among preceding stations. For example, the Sobs curve on addition of Stations ENV10 and ENV12 was also notably (>100%) steeper than the UGE curve.

After Station ENV16, there were further subtle shifts in community with the Sobs curve, on addition of Stations ENV22 and ENV25, again notably (>100%) steeper than the UGE curve. There were also several stations from Station ENV30 where no new taxa were added, leading to the Sobs curve converging with the UGE with the addition of the last sample.

The UGE curve for the array area continued to rise with the addition of the last sample. This reflected that further samples across the array area may elicit additional taxa to those reported during the current sampling campaign, though the rate of increase was small.

Figure 2.25 Adult Data Set Species Accumulation Curve



2.11.4 Biomass Summary Statistics

A total biomass of 469.5g was recorded from the 2075 individuals from 34 samples. Of these juveniles accounted for 0.09% of the total biomass. Full enumeration of the biomass per sample is tabulated in Appendix N. Two individuals of *A. islandica* (163g and 150g) and one individual of *Acanthocardia echinata* (75.82g) have been excluded from the remaining analysis due to their large contribution to the overall biomass masking underlying patterns within the data set, and the remaining contributions are summarised in Table 2.24.

AS to be expected, Mollusca (n=51.385g) dominated by weight and accounted for 65% of the sampled weight. The second highest biomass was recorded within Annelida (n=14.583g) accounting for 19% of the total biomass. Although Arthropoda was the third most abundant group by individuals it recorded the lowest biomass contribution accounting for 1% of the total remaining biomass.

Table 2.24 Contribution of Gross Taxonomic Groups by Biomass

Group	Individuals	
	Total Biomass (g)	Proportional Contribution %
Annelida (Polychaeta)	14.583	19
Arthropoda (Malacostraca)	1.096	1
Mollusca	51.385	65
Echinodermata	5.931	8
Others	5.559	7
Total	**78.554**	**100**

Species ranking provides additional information on the dominance structure of the faunal community in the array area and results are presented based on biomass in Table 2.25. When considering species ranking based on biomass, as expected there was some movement in terms of species ranking compared to abundance. Four taxa (*Antalis entalis*, Astrorhiza, Nemertea, *Lumbrineris aniara*) remained in the top ten when ranked by biomass with the other taxa being replaced by Mollusca, Annelida and Echinodermata taxa.

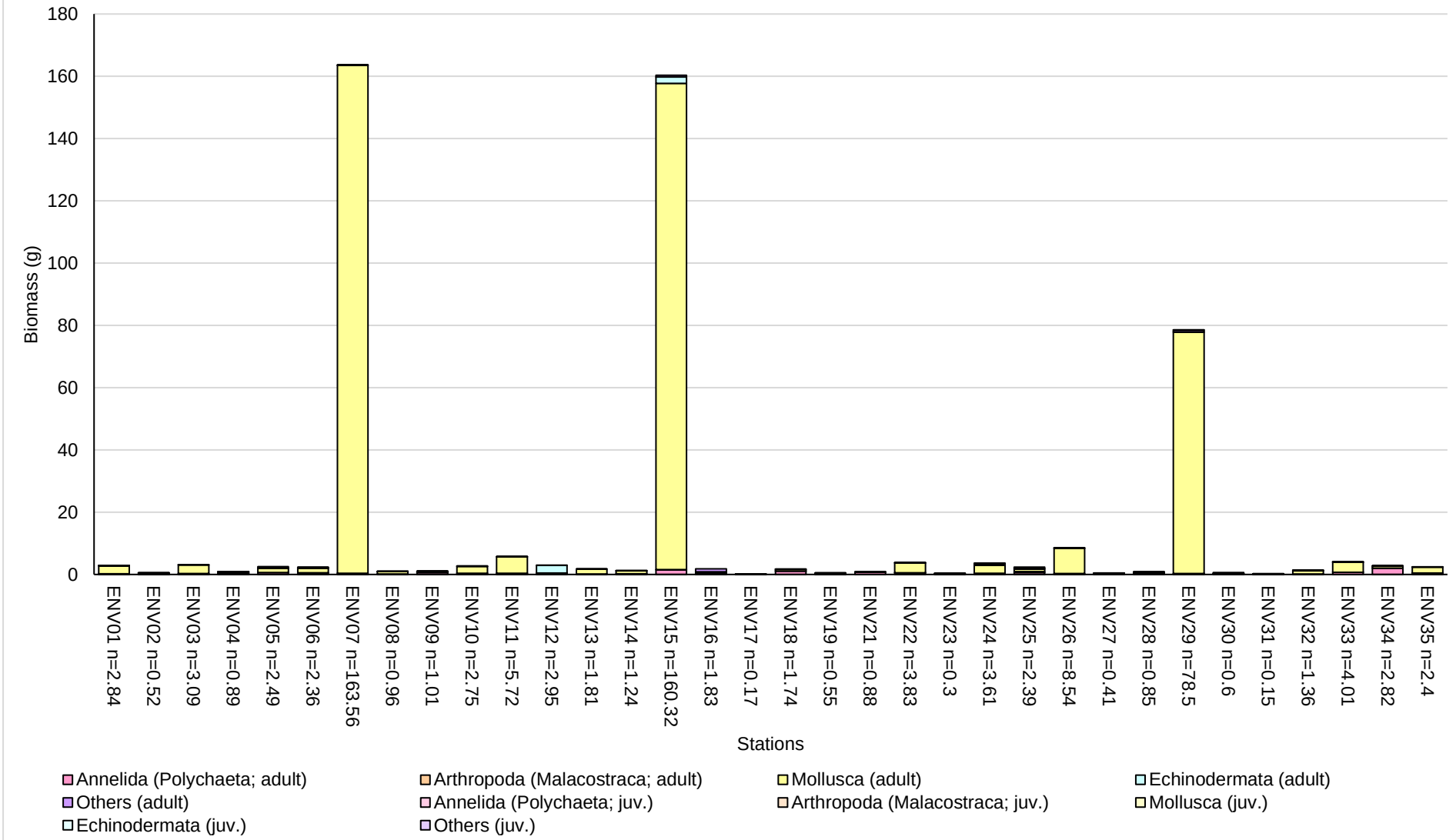
Table 2.25 Species Ranking by Biomass of Adult Only Data

Rank		Taxon	Total Rank Score	Fidelity	Total Abundance	Present in Number of Samples
Score	Abundance					
1	4	*Antalis entalis*	171	0.50	4	24
2	10	Astrorhiza	96	0.31	10	17
3	5	*Cochlodesma praetenue*	76	0.28	5	9
4	19	Nemertea	75	0.32	19	27
5	16	*Fabulina fabula*	63	0.31	16	10
6	17	*Hyalinoecia tubicola*	57	0.34	17	8
7	22	*Amphiura filiformis*	52	0.38	22	12
8	28	*Lumbrineris aniara agg.*	50	0.49	28	17
9	24	Leiochone	48	0.71	24	17
10	6	*Gari fervensis*	46	1.35	6	11
10	13	Dosinia	46	1.35	13	7

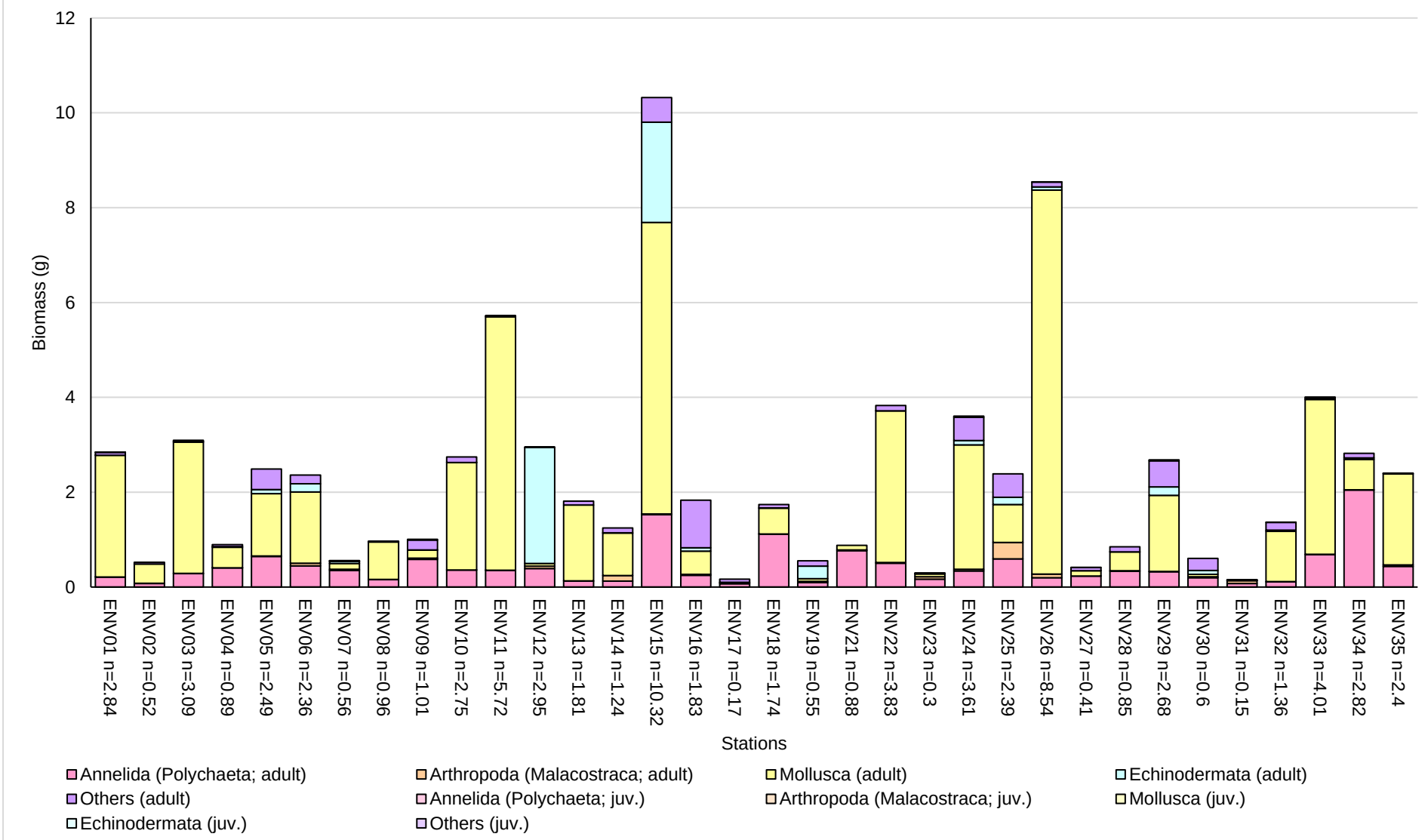
Cells are coloured to indicate taxonomic divisions: Annelida, Arthropoda, Mollusca, Echinodermata, 'Others'.

Figure 2.26 Contributions of Gross Taxonomic Groups by Biomass

a) Biomass – Large Molluscs Included



b) Biomass – Large Mollusc Individuals Excluded



2.11.5 Diversity using Univariate Statistics

The adult abundance data set for the array area was analysed to provide the total number of individuals and taxa, Shannon Weiner diversity index (H'), calculated using logarithm base 2 (Shannon & Weaver, 1949), Pielou's eveness (*J*), Simpson's dominance (λ) and Margalef's index (*d*). Increasing values of the Shannon-Weiner diversity correspond to increasing diversity of the community. Values for the Simpson's dominance index and Pielou's both range from 0 to 1, with 1 indicating a dominated community for the former and an even community for the latter. Margalef's index takes account of the number of species present for a given number of individuals. Detailed information on methods for univariate statistics are presented in Appendix C.

The results of the univariate statistics for the adult only survey area are displayed in Table 2.26. Shannon-Weiner diversity values ranged from 3.79 at Station ENV21 to 5.33 at Station ENV28 with a mean value of 4.55 (±0.39SD). Margalef's richness ranged from 4.62 at Station ENV21 to 11.71 at Station ENV16. Pielou's eveness suggested the community was overall relatively even, with values ranging from 0.84 to 0.99. This was further supported by low Simpson's dominance values which ranged from 0.03 to 0.11.

Overall, the ranges across the survey area indicated a generally diverse and evenly distributed community, influenced predominantly by natural variability in sediment characteristics, with a notable lack of consistent dominance structure.

Table 2.26 Faunal Abundance Univariate Statistics

Sample		n Taxa	n Individuals	Margalef's Richness (*d*)	Simpson's Dominance (λ)	Pielou's Evenness (*J'*)	Shannon Wiener Diversity (H'_{log2})
ENV01		22	37	5.82	0.06	0.95	4.23
ENV02		22	44	5.55	0.06	0.95	4.23
ENV03		32	57	7.67	0.06	0.92	4.61
ENV04		28	47	7.01	0.07	0.91	4.37
ENV05		44	91	9.53	0.06	0.88	4.80
ENV06		40	103	8.41	0.06	0.87	4.61
ENV07		33	64	7.69	0.05	0.93	4.68
ENV08		23	25	6.83	0.05	0.99	4.48
ENV09		34	77	7.60	0.04	0.94	4.81
ENV10		33	62	7.75	0.05	0.94	4.75
ENV11		21	41	5.39	0.07	0.92	4.06
ENV12		37	54	9.02	0.04	0.96	5.01
ENV13		21	30	5.88	0.06	0.97	4.28
ENV14		35	49	8.74	0.04	0.97	4.99
ENV15		49	105	10.31	0.04	0.91	5.09
ENV16		58	130	11.71	0.07	0.86	5.02
ENV17		21	32	5.77	0.07	0.94	4.14
ENV18		38	82	8.40	0.05	0.91	4.79
ENV19		34	52	8.35	0.04	0.95	4.82
ENV21		17	32	4.62	0.09	0.93	3.79
ENV22		42	94	9.02	0.04	0.93	5.00
ENV23		22	27	6.37	0.05	0.98	4.36
ENV24		36	87	7.84	0.05	0.92	4.77
ENV25		52	136	10.38	0.04	0.89	5.10
ENV26		31	69	7.09	0.10	0.84	4.16
ENV27		24	43	6.12	0.11	0.88	4.02
ENV28		45	63	10.62	0.03	0.97	5.33
ENV29		30	58	7.14	0.05	0.93	4.55
ENV30		32	62	7.51	0.05	0.94	4.69
ENV31		22	44	5.55	0.08	0.90	4.03
ENV32		31	44	7.93	0.05	0.95	4.71
ENV33		28	49	6.94	0.06	0.93	4.48
ENV34		21	33	5.72	0.07	0.94	4.12
ENV35		20	40	5.15	0.08	0.91	3.95
This Study	Minimum	17	25	4.62	0.03	0.84	3.79
	Maximum	58	136	11.71	0.11	0.99	5.33
	Mean	32	61	7.51	0.06	0.93	4.55
	SD	10	28	1.70	0.02	0.03	0.39

2.11.6 Faunal Community Structure using Multivariate Analyses

In comparison to univariate statistics, multivariate analyses enable subtle trends within the adult data sets to be identified. Multivariate analyses were performed on the rationalised data using PRIMER v7. Bray-Curtis similarity matrices were produced based on the square root transformed abundance data set and fourth root transformed biomass data set. These transformations were chosen to down weight the influence of the numerically dominant species and to ensure that the intermediately abundant and sparse species contribute to the multivariate pattern.

A SIMPROF permutation test was conducted in conjunction with CLUSTER analysis and the results illustrated on a dendrogram (Figure 2.27a). Red lines join samples that are statistically indistinguishable, whilst black lines join samples which are distinct from one another. The Bray-Curtis similarity dendrogram and nMDS plot for the adult only abundance data are presented in Figure 2.27.

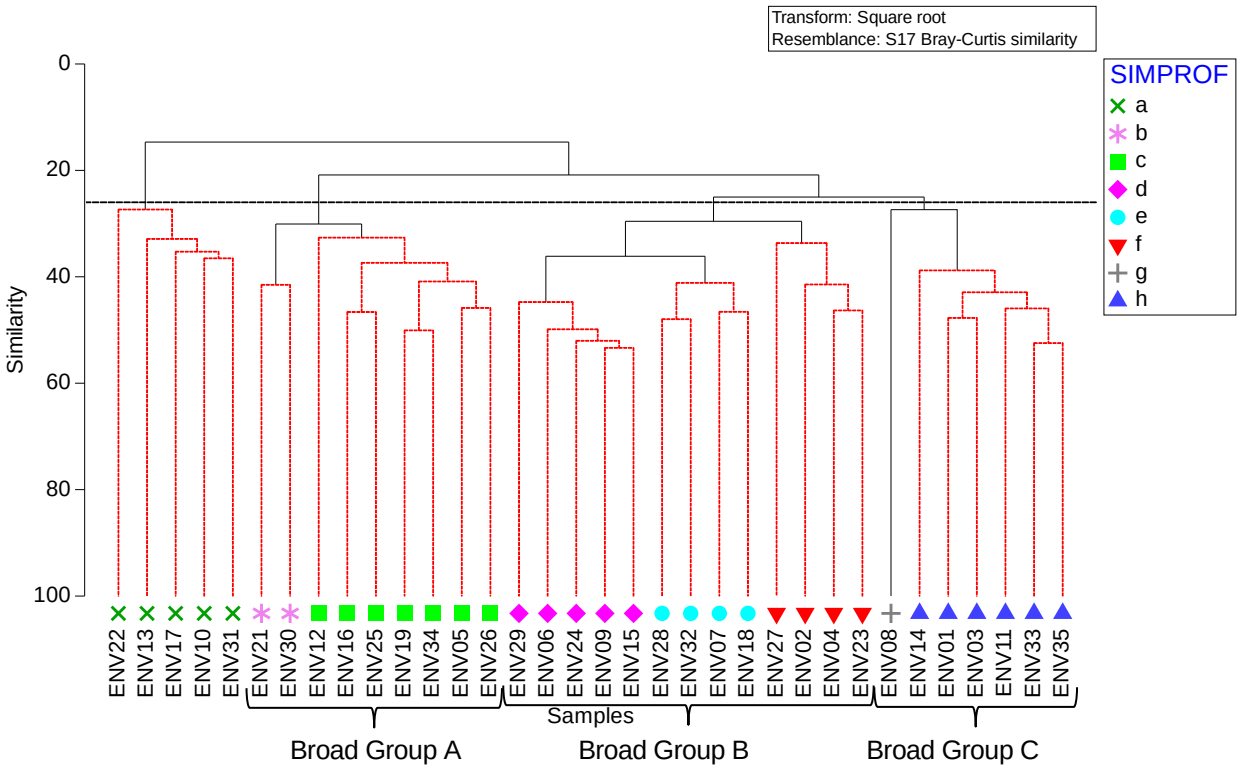
The CLUSTER analysis and dendrogram for adult abundance data (Figure 2.27a) identified eight SIMPROF groups comprising one outlier (SIMPROF *g*), one closely associated pair (SIMPROF *b*) and six clusters (SIMPROF *a*, *c*, *d*, *e*, *f*, and *h*). All the samples were more dissimilar than similar to one another and joined together at a Bray-Curtis similarity of 15%.

The nMDS ordination of the array area adult only abundance station data set (Figure 2.27b) revealed a similar pattern to the CLUSTER analysis, with a stress value of 0.18 the ordination can be considered a useful two-dimensional representation of rank dis(similarities) and the overall pattern observed in the data set.

Examination of the array area adult only abundance station data set together with results of SIMPER analyses, presented in Table 2.27, highlighted the principal contributors to the grouping and separation of the stations. This was restricted to explaining the separation where similarity was less than 26% for conciseness and includes the principal contributors to the grouping and separation of the stations. Variation in taxa, namely the top ten ranked taxa were responsible for the sample separation.

Figure 2.27 Multivariate Analysis of Abundance Faunal Data

a) Bray-Curtis Similarity Dendrogram



b) MDS Ordination

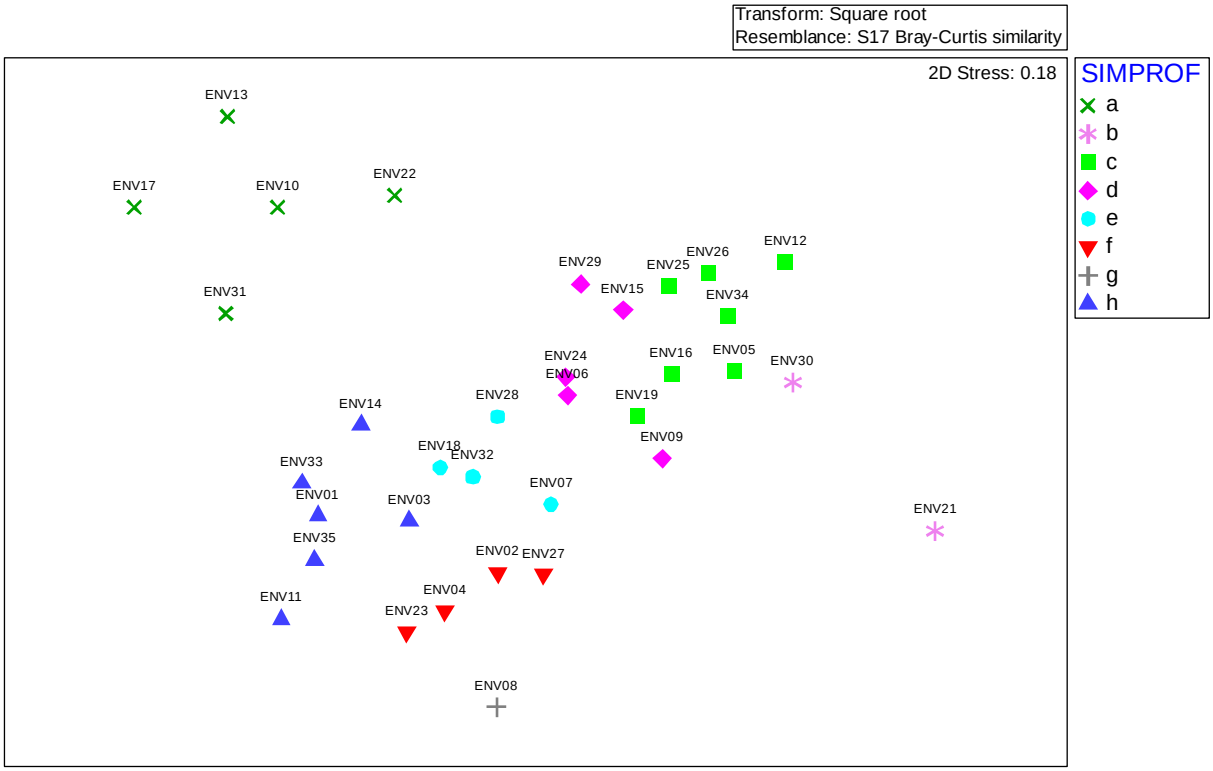


Table 2.27 Taxa Influencing Macrofauna Abundance SIMPROF Variation

SIMPROF	Similarity (Bray-Curtis %)	Taxa Influencing Sample Separation
SIMPROF a vs Broad Groups A, B and C	14.68	• *Notomastus*, *Glycera lapidum*, *Aonides paucibranchiata* and Sabellidae were more abundant in SIMPROF Group *a* (*c.*6.7% of the dissimilarity). • ***Echinocyamus pusillus***, ***Lumbrineris aniara*****,** ***Antalis entalis***, Galathowenia and **Astrorhiza** were more abundant in the remaining SIMPROF groups (*c.*8.5% of the dissimilarity). • *Laonice bahusiensis*, *Protodorvillea kefersteini* and *Syllis pontxioi* were unique to SIMPROF group *a* (*c.*5.9% of the dissimilarity).
Broad Group A vs Broad Groups B and C	20.86	• **Galathowenia**, **Astrorhiza**, *Prionospio dubia*, ***Urothoe elegans***, ***A. entalis***, *Spiophanes kroyeri* and *Myriochele danielsseni* were more abundant in Broad Group A (*c.*14.3% of the dissimilarity). • ***E. pusillus*** was more abundant in Broad Groups B and C (*c.*2.2% of the dissimilarity). • ***L. aniara*** and *Cochlodesma praetenue* were absent from Broad Group A (*c.*3.7% of the dissimiliarity).
Broad Group B vs Broad Group C	25.01	• ***L. aniara***, **Astrorhiza** and ***Phoronis*** were more abundant in Broad Group B (*c.*7.2% of the dissimilarity). • *C. praetenue*, *Gari fervensis* and Thracioidea were more abundant in Broad Group C *(*c.7.07% of the dissimilarity). • *Ophelia borealis* was absent from Broad Group B (*c.*2.0% of the dissimilarity). • *Edwardsia claparedii* and ***U. elegans*** were absent from Broad Group C (*c.*4.1% of the dissimilarity).

Taxa in **bold** denotes taxa within the top ten ranked taxa when assessed by abundance

There was some rearranging of the dendrogram when biomass is considered (Figure 2.28a). The adult biomass stations were similarly analysed with CLUSTER analysis and identified five SIMPROF groups comprising two outliers (SIMPROF *a* and *d*), and three clusters (SIMPROF *b*, *c* and *e*). Similar to grouping by abundance, all stations were more dissimilar than similar to one another.

The nMDS ordinations of the array area adult only biomass station data (Figure 2.28b) revealed a similar pattern to the CLUSTER analysis, with a stress value of 0.2 the ordination should be treated with caution as a two-dimensional representation of rank dis(similarities) and overall pattern observed in the data set and as such has not been included in this report.

Examination of the array area adult only biomass station data together with results of SIMPER analyses presented in Table 2.28, highlighted the principal contributors to the groupings and separations of the stations.

Figure 2.28 Multivariate Analysis of Adult Faunal Biomass Data

a) Bray-Curtis Similarity Dendrogram

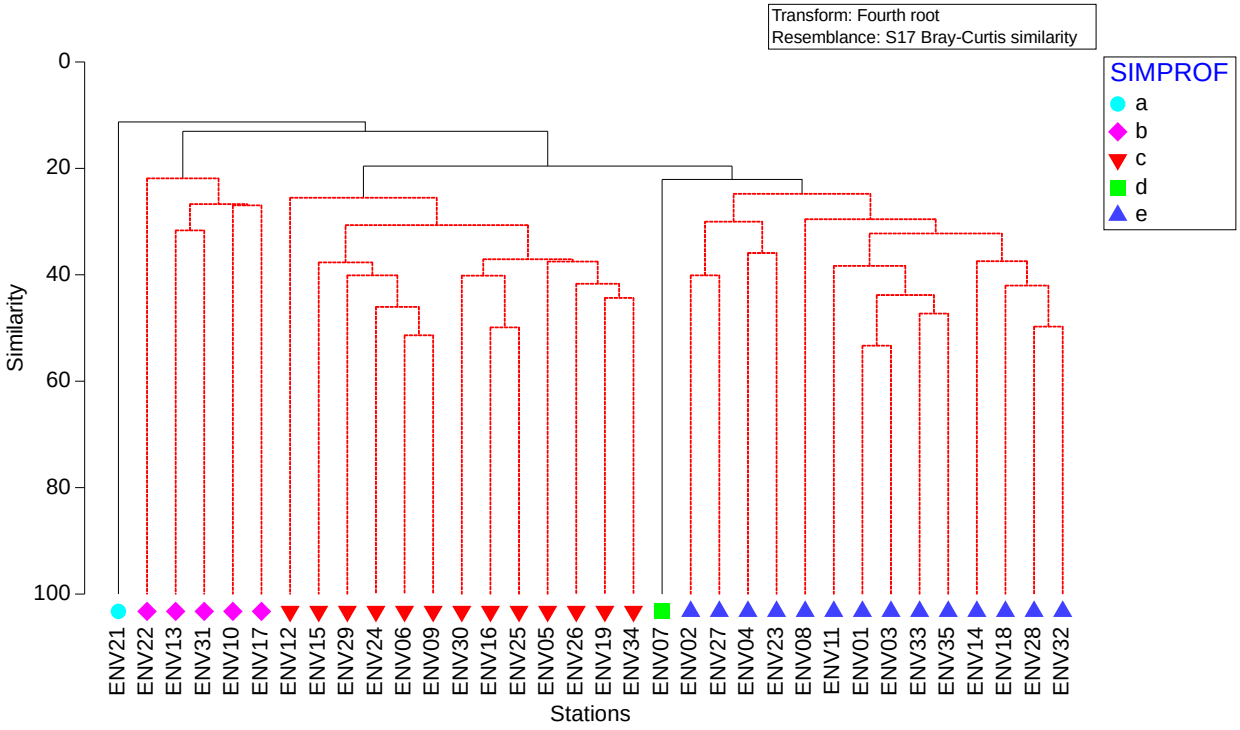


Table 2.28 Taxa Influencing Macrofauna Biomass SIMPROF Variation

SIMPROF	Similarity (Bray-Curtis %)	Taxa Influencing Sample Separation
SIMPROF *a* vs SIMPROF *b-e*	11.27	• Higher recorded biomass of *Notomastus, Myrteaspinifera, Goniada maculata* and *Callianassa subterranea* in SIMPROF *a*. • Biomass recorded of ***A. entalis*** and **Nemertea** in SIMPROF *b-e*.
SIMPROF *b* vs SIMPROF *c-e*	13.03	• Higher recorded biomass of *Lanice conchilega*, *Spisula elliptica*, Notomastus, *Phascolion (Phascolion) strombus strombus* and *G. lapidum* in SIMPROF *b.* • Lower recorded biomass of ***A. entalis***, **Astrorhiza**, **Leiochone** and **Nemertea** in SIMPROF *b.* • Biomass recorded of ***C. praetenue*** in SIMPROF *c-e.* • Biomass recorded of *Solecurtus scopula* in SIMPROF *b.*
SIMPROF *c* vs SIMPROF *d-e*	19.57	• Higher recorded biomass of ***A. entalis***, **Astrorhiza**, *A. islandica,* ***Amphiura filiformis****, Galathowenia and Diplocirrus glaucus in SIMPROF c.* • Higher recorded biomass of ***Gari fervensis*** in SIMPROF *d-e*. • Biomass recorded of *Nephtys hombergii* in SIMPROF *c.* • Biomass recorded of ***C. praetenue*** and ***Fabulina fabula*** in SIMPROF *d-e*.
SIMPROF *d* vs SIMPROF *e*	22.08	• Biomass recorded of *A. islandica* in SIMPROF *d.*

Taxa in **bold** denotes taxa within the top ten ranked taxa when assessed on biomass

2.11.7 Multivariate Comparison of Faunal and Physico-Chemical Data Sets

The macrofauna community adult data set was compared to the sediment characteristics data in PRIMER v7 to determine if any patterns in the faunal community correlated with the environmental factors assessed. The BVSTEP analysis identified a 78% correlation between the adult abundance multivariate pattern with mean particle diameter (µm) and fines content.

Similarly, a subset of 10 stations of the macrofauna community adult station data set was compared to the corresponding 10 stations physico-chemical characteristics data set. The BVSTEP analysis identified an 87% correlation between the 10 station adult abundance multivariate pattern with fines proportion, HMW n-alkanes and As, suggesting that the patterns identified are due to natural spatial variation.

2.11.8 Multivariate Comparison of Macrofaunal and Metabarcoding Data Sets

The sediment bacterial and infaunal OTU data sets were compared to the adult macrofaunal abundance and biomass data to determine if there was any correlation. A RELATE analysis identified a significant correlation of 73% ($p<0.01$) for bacterial OTUs and 43% ($p<0.05$) for infaunal OTUs when compared to the adult macrofauna abundance data. Similar results for the bacterial OTUs were found for the biomass indicating a significant correlation of 69% ($p<0.01$); however, there was no significant correlation for the infaunal OTUs with the biomass data set.

It is important to note that despite significant correlations found, only one macrofauna sample was used for metabarcoding of bacteria and infauna. In order to better utilise this approach for monitoring and avoid missed taxa present in the environment, more replicate DNA samples are needed, in particular replicates associated with each sample (*i.e.* MFA and MFB). Additional sample replication would allow for better comparison between data sets further aiding in a more comprehensive characterisation of the macrofaunal communities across the survey area.

2.12 EUNIS Habitat Classification

The European Union Nature Identification System (EUNIS) classification hierarchy to biotope level 5 was mainly based on depth, sediment type and faunal composition. Results of the EUNIS habitat classification based on these data are summarised in Table 2.29 and Appendix O.

All habitats observed in the array area related to EUNIS level 1 environment ‘Marine benthic habitats’ (EUNIS habitat code M). One level 2 broad habitat was identified as ‘Offshore circalittoral’ (EUNIS habitat type code MD).

The following EUNIS level 3 main habitats were present across the array area:

- Areas of increased gravel and shell fragments were assigned EUNIS habitat MD4 (Offshore circalittoral mixed sediment).
- Areas of sandy and muddy sand were assigned EUNIS habitat MD5 (Offshore circalittoral sand).
- Areas of mud and sandy mud were assigned EUNIS habitat MD6 (Offshore circalittoral mud).

EUNIS level 4 main habitat classification was determined considering the habitat descriptions of both the EUNIS website and associated documentation (Davies *et al.*, 2004; EEA, 2019). Across the survey area the following three EUNIS biotope complexes were identified:

- EUNIS biotope MD421 (Faunal communities in Atlantic offshore circalittoral mixed sediment) which are classified as circalittoral habitats with slightly muddy mixed gravelly sand and stones or shell.
- EUNIS biotope MD521 (Faunal communities in Atlantic offshore circalittoral sand) which are classified as fine sands or non-cohesive muddy sands.

- EUNIS biotope MD621 (Faunal communities on Atlantic offshore circalittoral mud) classified as Sublittoral muds, occurring below moderate depths of 15-20 m, either on the open coast or in marine inlets such as sealochs.

Further classification of the macrofaunal community to EUNIS level 5 was attempted with limited success due to an imperfect fit against the information available on the biotope communities (EEA, 2019; JNCC, 2022b) in addition to the physical mismatch of dominant taxa with sediment type. Due to a lack of consistent structure resulting from a lack of cosmopolitan species across each station it is difficult to suggest a new biotope.

Table 2.29 EUNIS Habitat Classification

Cluster	Station	Water Depth (m)	EUNIS Folk Classification for PSA Data	EUNIS Level 2	EUNIS Habitat Classification		MNCR Habitat Classification		EUNIS/MNCR Habitat Type	Remarks
					Level	Code	Level	Code		
a	ENV10	63	Coarse sediments	MD4	4	MD421	3	SS.SMx.CMx	Faunal communitites in Atlantic offshore circalittoral mixed sediment	Fauna is dominated by polychaetes in slightly muddy mixed sediment
	ENV13	51	Coarse sediments							
	ENV17	55	Coarse sediments							
	ENV22	64	Mixed sediments							
	ENV31	54	Coarse sediments							
b	ENV21	104	Mud and sandy mud	MD6	4	MD621	3	SS.SMu.Omu	Faunal communities on Atlantic offshore circalittoral mud	Fauna is dominated by polychaetes, arthropods and molluscs in mud and sandy mud
	ENV30	79	Mud and sandy mud							
c	ENV05	64	Sand and muddy sand	MD4	4	MD421	3	SS.SMx.CMx	Faunal communitites in Atlantic offshore circalittoral mixed sediment	Fauna is dominated by polychaetes and molluscs in slightly muddy mixed sediment
	ENV12	71	Coarse sediments							
	ENV16	75	Mud and sandy mud							
	ENV19	70	Mud and sandy mud							
	ENV25	69	Mixed sediments							
	ENV26	70	Sand and muddy sand							
	ENV34	68	Sand and muddy sand							
d	ENV06	64	Sand and muddy sand	MD5	4	MD521	3	SS.SSa.CMuSa	Faunal communities in Atlantic offshore circalittoral sand	Fauna is dominated by bivalves, polychaetes and crustacea in sand and muddy sand.
	ENV09	58	Sand and muddy sand							
	ENV15	65	Sand and muddy sand							
	ENV24	66	Sand and muddy sand							
	ENV29	65	Sand and muddy sand							
e	ENV07	55	Coarse sediments	MD5	4	MD521	3	SS.SSa.CMuSa	Faunal communities in Atlantic offshore circalittoral sand	Fauna is dominated by bivalves and polychaetes in sand and muddy sand
	ENV18	55	Sand and muddy sand							
	ENV28	55	Sand and muddy sand							
	ENV32	59	Sand and muddy sand							
f	ENV02	59	Sand and muddy sand	MD4	4	MD421	3	SS.SMx.CMx	Faunal communitites in Atlantic offshore circalittoral mixed sediment	Fauna is dominated by bivalves, polychaetes and cnidarians in sand and coarse sand
	ENV04	56	Coarse sediments							
	ENV23	54	Sand and muddy sand							
	ENV27	61	Coarse sediments							
g	ENV08	59	Sand and muddy sand	MD5	4	MD521	3	SS.SSa.CMuSa	Faunal communities in Atlantic offshore circalittoral sand	Fauna is dominated by polychaetes in sand
h	ENV01	56	Sand and muddy sand	MD5	4	MD521	3	SS.SSa.CMuSa	Faunal communities in Atlantic offshore circalittoral sand	Fauna is dominated by polychaetes and molluscs in sand and muddy sand
	ENV03	58	Sand and muddy sand							
	ENV11	55	Sand and muddy sand							
	ENV14	58	Sand and muddy sand							
	ENV33	56	Sand and muddy sand							
	ENV35	54	Sand and muddy sand							

NA MNCR Habitat Classification not available for the EUNIS biotope classification

3 CONCLUSION

Water profiles across the array area displayed mixed surface waters overlying a more stable water column structure below 20-40m depth. The salinity profiles reflected the freshwater inputs from the catchments of the Inner Moray Firth and Cromarty Firths, which both discharge into the Moray Firth. The dissolved oxygen maximum within the top 10m of the water column was consistent with the air-sea interface providing a gas exchange, with a decrease in dissolved oxygen through the water column consistent with respiration of organisms and bacterial digestion of sinking organic matter. Turbidity and pH profiles were relatively consistent throughout the water column. Overall, the profiles were generally typical of the wider North Sea and areas with stable freshwater inputs.

Sediment samples within the array area were dominated by the sand fraction. Sediments were described as very poorly to moderately well sorted coarse silt to granule (Folk, 1954). Concentrations of TOC were consistent across the survey area, except for the deepest Station ENV21 which also presented the greatest fines (41.9%, <63µm) content.

Hydrocarbon values at the array area were below published threshold values, with the exception of Station ENV21 which was slightly above the level at which some sensitive species may be impacted (Kingston, 1992). Overall, the faunal community was not expected to be significantly influenced by THC concentrations.

The concentrations of UCM suggested that the hydrocarbons were well weathered and typical of background levels. Further investigation of the CPI values indicated a prevalence of biogenic inputs. Examinations of the PAHs indicated that were from predominantly petrogenic sources with a mixture of sources present at Station ENV21. However, concentrations were low with total PAH concentrations below their respective ERL values.

Of the metals, only As was recorded above ERL; however, values were below ERM suggesting toxic effects on the faunal community were unlikely to occur due to metal concentrations.

PCB and organotins were recorded below LOD at all stations, while PBDE 209 exceeded the OSPAR (2020) BAC after normalisation to 2.5% TOC at Stations ENV12 and ENV 24. However, these values were below the FEQG values (Viñas *et al.*, 2023). OCP values, where recorded above the limit of detection, were below CAL1 concentrations.

A total of 515 bacterial sediment OTUs were recorded across the array area, while 63 infaunal sediment OTUs were identified. Of these, the most abundant bacterial OTUs were within the ‘Others’ category when classified by class, while the most abundant infaunal OTUs were within the Polychaeta class. The water eDNA analysis recorded 37 fish OTUs and 37 vertebrate OTUs. The most abundant of the fish OTUs were within the Gadidae taxonomic group when classified by family, while the most abundant vertebrate OTUs were within the Pleuronectidae family.

When considering the array area in terms of abundance, the macrofaunal community was characterised by Annelida followed by Mollusca. However, when considering the faunal community in terms of biomass Mollusca was the most dominant group which is to be expected given the size difference of this group compared to polychaetes.

EUNIS classification based on the macrofaunal community was attempted with limited success due to an imperfect fit against information available on the biotope communities. Additionally, there was a physical mismatch of the dominant taxa with the sediment type identified within PSA data. Due to the lack of consistent structure resulting from a lack of cosmopolitan species across the stations a new biotope was not able to be suggested.

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APPENDICES

APPENDIX A SCOPE OF WORK

Appendix A is confidential and has been withdrawn from this report.

APPENDIX B FIELD SAMPLING LOGS

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N	Vertical / Tidal Datum	VORF, LAT			

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
14-Apr-2023	18:24:11	2413	AA_ENV_19			Camera	67	534626	6432915	534678	6432888	-53	28	60	118		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
14-Apr-2023		2414	AA_ENV_19			Camera											Lost connection with Environmental Electronic Logging System (EELS), Photo but no Fix taken
14-Apr-2023		2415	AA_ENV_19			Camera											Lost connection with EELS, Photo but no Fix taken
14-Apr-2023		2416	AA_ENV_19			Camera											Lost connection with EELS, Photo but no Fix taken
14-Apr-2023	18:25:34	2417	AA_ENV_19			Camera	67	534638	6432911	534678	6432888	-40	24	47	120		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
14-Apr-2023	18:25:46	2418	AA_ENV_19			Camera	67	534641	6432910	534678	6432888	-37	23	44	121		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
14-Apr-2023	18:25:59	2419	AA_ENV_19			Camera	67	534641	6432907	534678	6432888	-38	19	42	117		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
14-Apr-2023	18:26:07	2420	AA_ENV_19			Camera	67	534644	6432910	534678	6432888	-34	22	41	123		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
14-Apr-2023	18:26:22	2421	AA_ENV_19			Camera	67	534647	6432910	534678	6432888	-31	22	39	126		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
14-Apr-2023	18:26:43	2422	AA_ENV_19			Camera	67	534650	6432910	534678	6432888	-29	22	36	128		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
14-Apr-2023	18:26:54	2423	AA_ENV_19			Camera	67	534651	6432910	534678	6432888	-28	22	35	129		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
14-Apr-2023	18:27:18	2424	AA_ENV_19			Camera	67	534653	6432910	534678	6432888	-26	22	34	131		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
14-Apr-2023	18:27:42	2425	AA_ENV_19			Camera	67	534653	6432908	534678	6432888	-25	20	32	129		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
14-Apr-2023	18:27:55	2426	AA_ENV_19			Camera	68	534654	6432904	534678	6432888	-24	16	29	124		(Raw Nav, Kongsberg 14208, img#14) (B)
14-Apr-2023	18:28:16	2426a	AA_ENV_19			Camera	67	534655	6432903	534678	6432888	-23	16	28	124		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A) # Double Fix
14-Apr-2023	18:28:31	2427	AA_ENV_19			Camera	67	534660	6432904	534678	6432888	-18	16	24	132		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
14-Apr-2023	18:28:43	2428	AA_ENV_19			Camera	67	534663	6432903	534678	6432888	-16	15	22	135		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
14-Apr-2023	18:28:57	2429	AA_ENV_19			Camera	67	534665	6432903	534678	6432888	-14	16	21	139		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
14-Apr-2023	18:29:12	2430	AA_ENV_19			Camera	67	534666	6432903	534678	6432888	-12	16	20	142		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
14-Apr-2023	18:29:25	2431	AA_ENV_19			Camera	67	534668	6432902	534678	6432888	-11	14	18	144		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
14-Apr-2023	18:29:43	2432	AA_ENV_19			Camera	67	534671	6432900	534678	6432888	-8	12	14	147		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
14-Apr-2023	18:30:19	2433	AA_ENV_19			Camera	67	534669	6432893	534678	6432888	-10	5	11	119		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
14-Apr-2023	18:30:34	2434	AA_ENV_19			Camera	67	534674	6432893	534678	6432888	-4	6	7	142		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
14-Apr-2023	18:30:46	2435	AA_ENV_19			Camera	67	534675	6432891	534678	6432888	-3	4	5	141		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
14-Apr-2023	18:31:03	2436	AA_ENV_19			Camera	67	534677	6432890	534678	6432888	-1	2	3	153		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
14-Apr-2023	18:31:25	2437	AA_ENV_19			Camera	67	534679	6432888	534678	6432888	1	0	1	-100		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
14-Apr-2023	18:31:43	2438	AA_ENV_19			Camera	68	534679	6432884	534678	6432888	1	-4	4	-15		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
14-Apr-2023	18:32:14	2439	AA_ENV_19			Camera	67	534684	6432883	534678	6432888	6	-4	7	-52		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
14-Apr-2023	18:32:28	2440	AA_ENV_19			Camera	68	534686	6432883	534678	6432888	8	-5	9	-57		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
14-Apr-2023	18:32:53	2441	AA_ENV_19			Camera	68	534686	6432877	534678	6432888	7	-11	13	-33		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
14-Apr-2023	18:33:03	2442	AA_ENV_19			Camera	68	534688	6432877	534678	6432888	9	-11	14	-40		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
14-Apr-2023	18:33:16	2443	AA_ENV_19			Camera	68	534684	6432873	534678	6432888	5	-15	16	-19		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
14-Apr-2023	18:33:34	2444	AA_ENV_19			Camera	68	534689	6432872	534678	6432888	11	-16	19	-34		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
14-Apr-2023	18:33:44	2445	AA_ENV_19			Camera	68	534689	6432871	534678	6432888	11	-16	19	-33		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
14-Apr-2023	18:34:15	2446	AA_ENV_19			Camera	68	534691	6432865	534678	6432888	12	-22	25	-29		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
14-Apr-2023	18:34:22	2447	AA_ENV_19			Camera	68	534694	6432864	534678	6432888	16	-23	28	-34		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
14-Apr-2023	18:34:29	2448	AA_ENV_19			Camera	68	534694	6432863	534678	6432888	15	-25	29	-31		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
14-Apr-2023	18:34:46	2449	AA_ENV_19			Camera	68	534696	6432860	534678	6432888	18	-27	32	-33		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
14-Apr-2023	18:34:58	2450	AA_ENV_19			Camera	68	534698	6432858	534678	6432888	20	-29	35	-34		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
14-Apr-2023	18:35:12	2451	AA_ENV_19			Camera	68	534698	6432855	534678	6432888	19	-33	38	-31		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
14-Apr-2023	18:35:33	2452	AA_ENV_19			Camera	68	534702	6432855	534678	6432888	23	-33	40	-36		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
14-Apr-2023	18:35:47	2453	AA_ENV_19			Camera	68	534704	6432855	534678	6432888	26	-33	42	-38		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
14-Apr-2023	18:35:59	2454	AA_ENV_19			Camera	68	534706	6432854	534678	6432888	27	-34	44	-39		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
14-Apr-2023	18:36:15	2455	AA_ENV_19			Camera	68	534709	6432853	534678	6432888	31	-35	47	-41		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
14-Apr-2023	21:54:04	2456	AA_ENV_22			Camera	62	533800	6437638	533805	6437586	-4	52	52	175		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
14-Apr-2023	21:54:18	2457	AA_ENV_22			Camera	62	533801	6437637	533805	6437586	-4	51	51	176		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
14-Apr-2023	21:54:33	2458	AA_ENV_22			Camera	62	533799	6437637	533805	6437586	-6	51	51	173		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
14-Apr-2023	21:54:49	2459	AA_ENV_22			Camera	62	533797	6437633	533805	6437586	-8	47	48	171		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
14-Apr-2023	21:55:02	2460	AA_ENV_22			Camera	62	533800	6437635	533805	6437586	-5	49	49	174		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
14-Apr-2023	21:55:20	2461	AA_ENV_22			Camera	62	533798	6437633	533805	6437586	-6	47	47	173		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
14-Apr-2023	21:55:33	2462	AA_ENV_22			Camera	62	533800	6437632	533805	6437586	-5	46	46	174		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
14-Apr-2023	21:55:45	2463	AA_ENV_22			Camera	62	533801	6437630	533805	6437586	-3	44	44	176		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
14-Apr-2023	21:55:57	2464	AA_ENV_22			Camera	62	533801	6437628	533805	6437586	-3	42	42	175		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
14-Apr-2023	21:56:14	2465	AA_ENV_22			Camera	62	533802	6437625	533805	6437586	-2	39	39	177		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
14-Apr-2023	21:56:24	2466	AA_ENV_22			Camera	62	533804	6437624	533805	6437586	0	37	37	180		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
14-Apr-2023	21:56:34	2467	AA_ENV_22			Camera	62	533805	6437622	533805	6437586	0	36	36	-180		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
14-Apr-2023	21:56:50	2468	AA_ENV_22			Camera	62	533805	6437619	533805	6437586	1	33	33	-179		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
14-Apr-2023	21:57:04	2469	AA_ENV_22			Camera	62	533806	6437618	533805	6437586	1	32	32	-178		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
14-Apr-2023	21:57:23	2470	AA_ENV_22			Camera	62	533805	6437615	533805	6437586	0	29	29	-179		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
14-Apr-2023	21:57:42	2471	AA_ENV_22			Camera	62	533805	6437612	533805	6437586	1	26	26	-179		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
14-Apr-2023	21:58:05	2472	AA_ENV_22			Camera	62	533805	6437609	533805	6437586	0	23	23	-180		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
14-Apr-2023	21:58:14	2473	AA_ENV_22			Camera	62	533804	6437607	533805	6437586	-1	21	21	179		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
14-Apr-2023	21:58:21	2474	AA_ENV_22			Camera	62	533804	6437607	533805	6437586	0	20	20	179		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
14-Apr-2023	21:58:39	2475	AA_ENV_22			Camera	62	533802	6437604	533805	6437586	-2	18	18	172		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
14-Apr-2023	21:58:50	2476	AA_ENV_22			Camera	62	533802	6437603	533805	6437586	-2	17	17	173		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
14-Apr-2023	21:59:54	2477	AA_ENV_22			Camera	63	533800	6437594	533805	6437586	-5	8	9	148		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
14-Apr-2023	22:00:07	2478	AA_ENV_22			Camera	63	533800	6437593	533805	6437586	-5	6	8	142		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
14-Apr-2023	22:00:36	2479	AA_ENV_22			Camera	63	533800	6437589	533805	6437586	-5	3	6	124		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
14-Apr-2023	22:01:02	2480	AA_ENV_22			Camera	62	533804	6437584	533805	6437586	0	-2	2	4		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
14-Apr-2023	22:01:19	2481	AA_ENV_22			Camera	63	533807	6437582	533805	6437586	2	-4	5	-27		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
14-Apr-2023	22:01:40	2482	AA_ENV_22			Camera	62	533810	6437579	533805	6437586	6	-7	9	-39		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
14-Apr-2023	22:02:01	2483	AA_ENV_22			Camera	63	533815	6437577	533805	6437586	10	-9	14	-49		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
14-Apr-2023	22:02:31	2484	AA_ENV_22			Camera	63	533817	6437574	533805	6437586	13	-12	18	-47		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
14-Apr-2023	22:02:43	2485	AA_ENV_22			Camera	63	533818	6437575	533805	6437586	14	-11	18	-50		(Raw Nav, Kongsberg 14208, img#30) (B)
14-Apr-2023	22:02:59	2486	AA_ENV_22			Camera	63	533822	6437575	533805	6437586	17	-12	21	-56		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
14-Apr-2023	22:03:10	2487	AA_ENV_22			Camera	63	533823	6437574	533805	6437586	19	-12	22	-57		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
14-Apr-2023	22:03:21	2488	AA_ENV_22			Camera	63	533824	6437573	533805	6437586	19	-14	23	-55		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
14-Apr-2023	22:03:46	2489	AA_ENV_22			Camera	63	533828	6437572	533805	6437586	24	-14	28	-59		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
14-Apr-2023	22:04:05	2490	AA_ENV_22			Camera	63	533830	6437570	533805	6437586	26	-17	30	-57		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
14-Apr-2023	22:04:29	2491	AA_ENV_22			Camera	63	533833	6437570	533805	6437586	28	-17	33	-60		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
14-Apr-2023	22:04:48	2492	AA_ENV_22			Camera	63	533834	6437569	533805	6437586	30	-17	34	-60		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
14-Apr-2023	22:05:14	2493	AA_ENV_22			Camera	63	533838	6437567	533805	6437586	34	-19	39	-61		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
14-Apr-2023	22:05:31	2494	AA_ENV_22			Camera	63	533840	6437565	533805	6437586	35	-21	41	-59		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
14-Apr-2023	22:05:47	2495	AA_ENV_22			Camera	63	533842	6437564	533805	6437586	38	-22	44	-60		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
14-Apr-2023	22:06:01	2496	AA_ENV_22			Camera	63	533845	6437562	533805	6437586	40	-24	47	-59		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
14-Apr-2023	22:06:13	2497	AA_ENV_22			Camera	63	533846	6437562	533805	6437586	42	-24	48	-60		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
15-Apr-2023	02:49:46	2498	AA_ENV_34			Camera	65	528639	6440215	528681	6440177	-42	38	57	132		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
15-Apr-2023	02:50:41	2499	AA_ENV_34			Camera	65	528641	6440214	528681	6440177	-41	37	55	132		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
15-Apr-2023	02:50:52	2500	AA_ENV_34			Camera	65	528641	6440213	528681	6440177	-40	36	54	132		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
15-Apr-2023	02:51:45	2501	AA_ENV_34			Camera	65	528642	6440205	528681	6440177	-39	27	48	125		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
15-Apr-2023	02:52:12	2502	AA_ENV_34			Camera	65	528647	6440205	528681	6440177	-34	28	44	129		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
15-Apr-2023	02:52:36	2503	AA_ENV_34			Camera	65	528647	6440203	528681	6440177	-34	25	42	127		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
15-Apr-2023	02:52:46	2504	AA_ENV_34			Camera	65	528648	6440202	528681	6440177	-33	25	41	127		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
15-Apr-2023	02:52:59	2505	AA_ENV_34			Camera	65	528648	6440198	528681	6440177	-33	20	39	121		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
15-Apr-2023	02:53:13	2506	AA_ENV_34			Camera	65	528652	6440199	528681	6440177	-29	22	36	127		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
15-Apr-2023	02:54:01	2507	AA_ENV_34			Camera	65	528655	6440194	528681	6440177	-26	17	31	123		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
15-Apr-2023	02:54:34	2508	AA_ENV_34			Camera	65	528660	6440191	528681	6440177	-21	13	25	122		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
15-Apr-2023	02:54:40	2509	AA_ENV_34			Camera	65	528660	6440191	528681	6440177	-21	13	25	122		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
15-Apr-2023	02:54:51	2510	AA_ENV_34			Camera	65	528662	6440189	528681	6440177	-20	12	23	121		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	02:54:57	2511	AA_ENV_34			Camera	65	528660	6440187	528681	6440177	-21	10	23	115		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
15-Apr-2023	02:55:16	2512	AA_ENV_34			Camera	66	528664	6440187	528681	6440177	-17	9	20	118		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
15-Apr-2023	02:55:44	2513	AA_ENV_34			Camera	65	528668	6440184	528681	6440177	-13	7	15	118		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
15-Apr-2023	02:55:52	2514	AA_ENV_34			Camera	65	528668	6440183	528681	6440177	-13	6	14	112		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
15-Apr-2023	02:56:05	2515	AA_ENV_34			Camera	65	528669	6440183	528681	6440177	-12	6	13	116		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
15-Apr-2023	02:56:19	2516	AA_ENV_34			Camera	66	528671	6440180	528681	6440177	-10	3	10	108		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
15-Apr-2023	02:56:25	2517	AA_ENV_34			Camera	66	528672	6440179	528681	6440177	-9	2	9	103		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
15-Apr-2023	02:56:31	2518	AA_ENV_34			Camera	65	528673	6440178	528681	6440177	-8	1	8	97		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
15-Apr-2023	02:56:38	2519	AA_ENV_34			Camera	66	528673	6440178	528681	6440177	-8	1	8	97		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
15-Apr-2023	02:57:03	2520	AA_ENV_34			Camera	66	528676	6440177	528681	6440177	-5	0	5	91		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
15-Apr-2023	02:57:13	2521	AA_ENV_34			Camera	65	528677	6440175	528681	6440177	-5	-2	5	70		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
15-Apr-2023	02:57:39	2522	AA_ENV_34			Camera	66	528680	6440173	528681	6440177	-1	-4	4	15		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
15-Apr-2023	02:57:56	2523	AA_ENV_34			Camera	66	528681	6440172	528681	6440177	0	-5	5	1		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
15-Apr-2023	02:58:16	2524	AA_ENV_34			Camera	66	528684	6440171	528681	6440177	3	-6	6	-25		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
15-Apr-2023	02:59:15	2525	AA_ENV_34			Camera	66	528690	6440167	528681	6440177	9	-10	13	-41		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
15-Apr-2023	02:59:30	2526	AA_ENV_34			Camera	66	528691	6440165	528681	6440177	10	-12	15	-39		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
15-Apr-2023	03:00:09	2527	AA_ENV_34			Camera	66	528695	6440162	528681	6440177	14	-15	20	-41		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
15-Apr-2023	03:00:18	2528	AA_ENV_34			Camera	66	528695	6440160	528681	6440177	14	-17	22	-38		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
15-Apr-2023	03:00:39	2529	AA_ENV_34			Camera	66	528696	6440158	528681	6440177	15	-19	24	-38		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
15-Apr-2023	03:01:06	2530	AA_ENV_34			Camera	66	528699	6440156	528681	6440177	18	-21	27	-40		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
15-Apr-2023	03:01:30	2531	AA_ENV_34			Camera	66	528700	6440154	528681	6440177	19	-24	30	-39		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
15-Apr-2023	03:01:37	2532	AA_ENV_34			Camera	66	528700	6440152	528681	6440177	19	-25	31	-38		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
15-Apr-2023	03:01:55	2533	AA_ENV_34			Camera	66	528703	6440151	528681	6440177	21	-26	34	-39		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
15-Apr-2023	03:02:14	2534	AA_ENV_34			Camera	66	528704	6440148	528681	6440177	23	-29	37	-38		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
15-Apr-2023	03:02:46	2535	AA_ENV_34			Camera	66	528706	6440145	528681	6440177	25	-32	41	-38		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
15-Apr-2023	03:03:05	2536	AA_ENV_34			Camera	66	528707	6440141	528681	6440177	26	-36	44	-36		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
15-Apr-2023	03:03:46	2537	AA_ENV_34			Camera	66	528712	6440139	528681	6440177	31	-38	49	-39		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
15-Apr-2023	03:03:53	2538	AA_ENV_34			Camera	66	528713	6440138	528681	6440177	31	-40	50	-38		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
15-Apr-2023	05:27:05	2539	AA_ENV_09			Camera	55	526020	6443047	526070	6443054	-50	-7	51	82		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
15-Apr-2023	05:27:56	2540	AA_ENV_09			Camera	56	526017	6443046	526070	6443054	-53	-8	53	81		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
15-Apr-2023	05:28:16	2541	AA_ENV_09			Camera	56	526015	6443044	526070	6443054	-55	-10	56	80		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
15-Apr-2023	05:28:23	2542	AA_ENV_09			Camera	56	526015	6443043	526070	6443054	-56	-11	57	79		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
15-Apr-2023	05:28:40	2543	AA_ENV_09			Camera	56	526015	6443042	526070	6443054	-56	-12	57	78		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
15-Apr-2023	05:28:54	2544	AA_ENV_09			Camera	56	526015	6443041	526070	6443054	-55	-13	57	77		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	05:29:05	2545	AA_ENV_09			Camera	55	526016	6443042	526070	6443054	-54	-12	55	78		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
15-Apr-2023	05:29:44	2546	AA_ENV_09			Camera	55	526021	6443043	526070	6443054	-49	-11	51	77		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
15-Apr-2023	05:30:08	2547	AA_ENV_09			Camera	56	526023	6443045	526070	6443054	-47	-9	48	79		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
15-Apr-2023	05:30:20	2548	AA_ENV_09			Camera	56	526025	6443045	526070	6443054	-45	-9	46	78		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
15-Apr-2023	05:30:32	2549	AA_ENV_09			Camera	55	526027	6443045	526070	6443054	-44	-9	44	78		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
15-Apr-2023	05:30:39	2550	AA_ENV_09			Camera	55	526028	6443045	526070	6443054	-42	-9	43	78		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
15-Apr-2023	05:30:56	2551	AA_ENV_09			Camera	55	526031	6443045	526070	6443054	-39	-9	40	77		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
15-Apr-2023	05:31:01	2552	AA_ENV_09			Camera	56	526031	6443046	526070	6443054	-39	-8	40	78		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
15-Apr-2023	05:31:57	2553	AA_ENV_09			Camera	55	526041	6443044	526070	6443054	-30	-10	31	72		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
15-Apr-2023	05:32:03	2554	AA_ENV_09			Camera	55	526041	6443045	526070	6443054	-29	-9	31	73		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
15-Apr-2023	05:32:15	2555	AA_ENV_09			Camera	55	526043	6443044	526070	6443054	-28	-10	29	70		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
15-Apr-2023	05:32:27	2556	AA_ENV_09			Camera	55	526043	6443045	526070	6443054	-27	-9	28	71		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
15-Apr-2023	05:32:35	2557	AA_ENV_09			Camera	55	526045	6443044	526070	6443054	-25	-10	27	69		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
15-Apr-2023	05:33:10	2558	AA_ENV_09			Camera	55	526051	6443044	526070	6443054	-19	-10	22	62		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
15-Apr-2023	05:33:18	2559	AA_ENV_09			Camera	55	526052	6443044	526070	6443054	-18	-10	21	61		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
15-Apr-2023	05:33:27	2560	AA_ENV_09			Camera	55	526054	6443044	526070	6443054	-16	-10	19	58		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
15-Apr-2023	05:34:09	2561	AA_ENV_09			Camera	55	526060	6443043	526070	6443054	-10	-11	14	43		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
15-Apr-2023	05:34:25	2562	AA_ENV_09			Camera	55	526063	6443044	526070	6443054	-7	-10	12	37		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
15-Apr-2023	05:34:35	2563	AA_ENV_09			Camera	55	526065	6443045	526070	6443054	-6	-9	11	31		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
15-Apr-2023	05:34:49	2564	AA_ENV_09			Camera	55	526067	6443045	526070	6443054	-3	-9	10	18		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
15-Apr-2023	05:34:55	2565	AA_ENV_09			Camera	55	526068	6443045	526070	6443054	-3	-9	9	16		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
15-Apr-2023	05:35:05	2566	AA_ENV_09			Camera	55	526070	6443044	526070	6443054	0	-10	10	-1		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
15-Apr-2023	05:35:29	2567	AA_ENV_09			Camera	55	526074	6443045	526070	6443054	4	-9	10	-23		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
15-Apr-2023	05:35:35	2568	AA_ENV_09			Camera	55	526075	6443045	526070	6443054	5	-9	10	-30		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
15-Apr-2023	05:36:04	2569	AA_ENV_09			Camera	55	526079	6443045	526070	6443054	9	-9	13	-45		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
15-Apr-2023	05:36:26	2570	AA_ENV_09			Camera	55	526084	6443046	526070	6443054	14	-8	16	-59		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
15-Apr-2023	05:36:36	2571	AA_ENV_09			Camera	55	526086	6443045	526070	6443054	16	-9	18	-60		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
15-Apr-2023	05:36:56	2572	AA_ENV_09			Camera	55	526088	6443045	526070	6443054	18	-9	20	-63		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
15-Apr-2023	05:37:27	2573	AA_ENV_09			Camera	55	526093	6443046	526070	6443054	23	-8	24	-70		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
15-Apr-2023	05:38:03	2574	AA_ENV_09			Camera	55	526098	6443048	526070	6443054	28	-6	29	-77		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A) # No photo taken
15-Apr-2023	05:38:05	2575	AA_ENV_09			Camera	55	526098	6443048	526070	6443054	28	-6	29	-78		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
15-Apr-2023	05:38:33	2576	AA_ENV_09			Camera	55	526102	6443049	526070	6443054	32	-5	33	-81		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
15-Apr-2023	05:39:18	2577	AA_ENV_09			Camera	55	526109	6443049	526070	6443054	39	-5	39	-83		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
15-Apr-2023	05:39:28	2578	AA_ENV_09			Camera	55	526110	6443049	526070	6443054	40	-5	40	-84		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
15-Apr-2023	05:40:26	2579	AA_ENV_09			Camera	55	526118	6443049	526070	6443054	48	-5	48	-84		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
15-Apr-2023	07:10:48	2580	AA_ENV_17			Camera	52	528628	6443749	528669	6443788	-41	-39	56	47		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
15-Apr-2023	07:11:47	2581	AA_ENV_17			Camera	52	528629	6443750	528669	6443788	-40	-38	55	47		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	07:11:57	2582	AA_ENV_17			Camera	52	528630	6443750	528669	6443788	-39	-37	54	46		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
15-Apr-2023	07:12:11	2583	AA_ENV_17			Camera	52	528631	6443752	528669	6443788	-38	-36	52	47		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
15-Apr-2023	07:12:27	2584	AA_ENV_17			Camera	52	528633	6443753	528669	6443788	-36	-35	50	45		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
15-Apr-2023	07:13:29	2585	AA_ENV_17			Camera	52	528641	6443756	528669	6443788	-28	-32	43	42		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
15-Apr-2023	07:13:55	2586	AA_ENV_17			Camera	52	528643	6443759	528669	6443788	-26	-29	39	42		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
15-Apr-2023	07:14:34	2587	AA_ENV_17			Camera	52	528646	6443762	528669	6443788	-23	-25	34	42		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
15-Apr-2023	07:14:41	2588	AA_ENV_17			Camera	52	528648	6443763	528669	6443788	-21	-24	32	41		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
15-Apr-2023	07:15:10	2589	AA_ENV_17			Camera	52	528651	6443768	528669	6443788	-18	-20	27	43		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
15-Apr-2023	07:15:17	2590	AA_ENV_17			Camera	52	528652	6443769	528669	6443788	-18	-19	26	43		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
15-Apr-2023	07:15:32	2591	AA_ENV_17			Camera	52	528653	6443771	528669	6443788	-16	-17	23	43		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
15-Apr-2023	07:15:41	2592	AA_ENV_17			Camera	52	528655	6443772	528669	6443788	-14	-16	21	42		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
15-Apr-2023	07:15:57	2593	AA_ENV_17			Camera	52	528656	6443774	528669	6443788	-13	-14	19	43		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
15-Apr-2023	07:16:08	2594	AA_ENV_17			Camera	52	528658	6443775	528669	6443788	-11	-13	17	40		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
15-Apr-2023	07:16:37	2595	AA_ENV_17			Camera	52	528660	6443778	528669	6443788	-9	-10	13	42		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
15-Apr-2023	07:16:47	2596	AA_ENV_17			Camera	52	528663	6443776	528669	6443788	-6	-12	13	28		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
15-Apr-2023	07:17:07	2597	AA_ENV_17			Camera	52	528663	6443781	528669	6443788	-6	-7	9	43		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
15-Apr-2023	07:17:25	2598	AA_ENV_17			Camera	52	528665	6443782	528669	6443788	-4	-6	7	38		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
15-Apr-2023	07:17:41	2599	AA_ENV_17			Camera	52	528664	6443784	528669	6443788	-5	-4	6	51		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
15-Apr-2023	07:17:58	2600	AA_ENV_17			Camera	52	528666	6443784	528669	6443788	-3	-4	5	41		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
15-Apr-2023	07:18:16	2601	AA_ENV_17			Camera	52	528668	6443786	528669	6443788	-1	-2	2	29		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
15-Apr-2023	07:18:28	2602	AA_ENV_17			Camera	52	528668	6443787	528669	6443788	-2	-1	2	53		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
15-Apr-2023	07:19:37	2603	AA_ENV_17			Camera	52	528673	6443790	528669	6443788	4	2	5	-117		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
15-Apr-2023	07:20:21	2604	AA_ENV_17			Camera	52	528680	6443793	528669	6443788	11	5	12	-116		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
15-Apr-2023	07:20:47	2605	AA_ENV_17			Camera	52	528682	6443795	528669	6443788	13	7	15	-119		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
15-Apr-2023	07:21:30	2606	AA_ENV_17			Camera	52	528688	6443800	528669	6443788	19	12	23	-123		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
15-Apr-2023	07:21:44	2607	AA_ENV_17			Camera	54	528690	6443802	528669	6443788	21	14	25	-124		(Raw Nav, Kongsberg 14208, img#28) (B)
15-Apr-2023	07:22:06	2607a	AA_ENV_17			Camera	52	528692	6443803	528669	6443788	23	16	28	-124		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A) # Double Fix
15-Apr-2023	07:23:04	2608	AA_ENV_17			Camera	52	528699	6443812	528669	6443788	30	24	39	-128		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
15-Apr-2023	07:23:11	2609	AA_ENV_17			Camera	52	528700	6443812	528669	6443788	31	25	40	-129		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
15-Apr-2023	07:23:21	2610	AA_ENV_17			Camera	52	528701	6443813	528669	6443788	32	26	41	-129		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
15-Apr-2023	07:23:27	2611	AA_ENV_17			Camera	52	528701	6443814	528669	6443788	32	27	42	-130		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
15-Apr-2023	07:23:35	2612	AA_ENV_17			Camera	52	528702	6443816	528669	6443788	33	28	44	-130		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
15-Apr-2023	07:23:42	2613	AA_ENV_17			Camera	52	528703	6443815	528669	6443788	34	28	44	-129		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
15-Apr-2023	07:23:57	2614	AA_ENV_17			Camera	52	528704	6443818	528669	6443788	35	30	46	-130		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
15-Apr-2023	07:24:05	2615	AA_ENV_17			Camera	52	528706	6443819	528669	6443788	37	31	48	-130		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
15-Apr-2023	07:24:11	2616	AA_ENV_17			Camera	52	528705	6443819	528669	6443788	36	31	48	-131		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
15-Apr-2023	07:24:19	2617	AA_ENV_17			Camera	52	528707	6443820	528669	6443788	38	32	50	-130		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463				Vessel	MV *Ocean Endeavour*							
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	COG							
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93	
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon							
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N			Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	09:10:27	2618	AA_ENV_41			Camera	52	529393	6445503	529446	6445486	-53	17	56	107		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
15-Apr-2023	09:11:05	2619	AA_ENV_41			Camera	52	529397	6445504	529446	6445486	-49	18	52	110		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
15-Apr-2023	09:11:14	2620	AA_ENV_41			Camera	52	529398	6445504	529446	6445486	-48	18	51	111		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
15-Apr-2023	09:11:21	2621	AA_ENV_41			Camera	52	529398	6445505	529446	6445486	-47	18	51	111		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
15-Apr-2023	09:11:51	2622	AA_ENV_41			Camera	52	529401	6445505	529446	6445486	-44	18	48	112		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
15-Apr-2023	09:11:58	2623	AA_ENV_41			Camera	52	529401	6445504	529446	6445486	-44	18	48	112		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
15-Apr-2023	09:12:10	2624	AA_ENV_41			Camera	52	529403	6445504	529446	6445486	-43	18	47	113		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
15-Apr-2023	09:12:29	2625	AA_ENV_41			Camera	52	529405	6445505	529446	6445486	-41	18	45	114		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
15-Apr-2023	09:13:10	2626	AA_ENV_41			Camera	52	529409	6445504	529446	6445486	-37	18	41	116		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
15-Apr-2023	09:13:30	2627	AA_ENV_41			Camera	52	529411	6445504	529446	6445486	-35	17	39	116		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
15-Apr-2023	09:14:37	2628	AA_ENV_41			Camera	52	529421	6445501	529446	6445486	-25	15	29	121		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
15-Apr-2023	09:14:53	2629	AA_ENV_41			Camera	52	529424	6445501	529446	6445486	-22	15	27	124		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
15-Apr-2023	09:15:02	2630	AA_ENV_41			Camera	52	529425	6445501	529446	6445486	-21	14	26	124		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
15-Apr-2023	09:15:09	2631	AA_ENV_41			Camera	52	529426	6445500	529446	6445486	-20	14	24	124		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
15-Apr-2023	09:15:14	2632	AA_ENV_41			Camera	52	529427	6445500	529446	6445486	-19	14	23	126		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
15-Apr-2023	09:15:22	2633	AA_ENV_41			Camera	52	529428	6445499	529446	6445486	-18	13	22	126		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
15-Apr-2023	09:15:39	2634	AA_ENV_41			Camera	52	529431	6445498	529446	6445486	-15	12	19	128		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
15-Apr-2023	09:16:30	2635	AA_ENV_41			Camera	52	529432	6445494	529446	6445486	-14	7	15	118		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
15-Apr-2023	09:16:54	2636	AA_ENV_41			Camera	52	529433	6445491	529446	6445486	-13	5	14	110		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
15-Apr-2023	09:17:00	2637	AA_ENV_41			Camera	52	529432	6445490	529446	6445486	-13	3	14	104		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
15-Apr-2023	09:17:24	2638	AA_ENV_41			Camera	52	529437	6445492	529446	6445486	-9	5	10	122		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
15-Apr-2023	09:17:34	2639	AA_ENV_41			Camera	52	529439	6445491	529446	6445486	-7	4	8	120		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
15-Apr-2023	09:17:49	2640	AA_ENV_41			Camera	52	529441	6445490	529446	6445486	-5	4	6	127		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
15-Apr-2023	09:18:20	2641	AA_ENV_41			Camera	52	529444	6445488	529446	6445486	-2	1	2	128		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
15-Apr-2023	09:18:40	2642	AA_ENV_41			Camera	52	529444	6445487	529446	6445486	-1	1	2	121		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
15-Apr-2023	09:18:46	2643	AA_ENV_41			Camera	52	529444	6445486	529446	6445486	-2	0	2	79		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
15-Apr-2023	09:19:08	2644	AA_ENV_41			Camera	52	529446	6445485	529446	6445486	0	-1	1	-3		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
15-Apr-2023	09:19:28	2645	AA_ENV_41			Camera	52	529449	6445485	529446	6445486	3	-2	4	-64		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
15-Apr-2023	09:19:36	2646	AA_ENV_41			Camera	52	529450	6445484	529446	6445486	4	-3	5	-57		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
15-Apr-2023	09:19:43	2647	AA_ENV_41			Camera	52	529451	6445483	529446	6445486	5	-3	6	-57		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
15-Apr-2023	09:19:59	2648	AA_ENV_41			Camera	52	529453	6445482	529446	6445486	7	-4	9	-59		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
15-Apr-2023	09:20:16	2649	AA_ENV_41			Camera	52	529454	6445478	529446	6445486	8	-8	11	-45		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
15-Apr-2023	09:20:22	2650	AA_ENV_41			Camera	52	529456	6445480	529446	6445486	10	-6	12	-59		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
15-Apr-2023	09:20:46	2651	AA_ENV_41			Camera	52	529458	6445478	529446	6445486	12	-8	15	-56		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
15-Apr-2023	09:20:53	2652	AA_ENV_41			Camera	52	529459	6445478	529446	6445486	13	-8	16	-57		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
15-Apr-2023	09:21:26	2653	AA_ENV_41			Camera	52	529463	6445476	529446	6445486	17	-11	20	-57		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
15-Apr-2023	09:21:33	2654	AA_ENV_41			Camera	52	529463	6445475	529446	6445486	18	-11	21	-57		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N	Vertical / Tidal Datum	VORF, LAT			

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	09:21:49	2655	AA_ENV_41			Camera	52	529465	6445474	529446	6445486	19	-12	23	-57		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
15-Apr-2023	09:22:08	2656	AA_ENV_41			Camera	52	529467	6445473	529446	6445486	21	-13	25	-58		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
15-Apr-2023	09:22:34	2657	AA_ENV_41			Camera	52	529470	6445471	529446	6445486	24	-16	29	-57		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
15-Apr-2023	09:22:55	2658	AA_ENV_41			Camera	52	529472	6445470	529446	6445486	27	-16	31	-58		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
15-Apr-2023	09:23:46	2659	AA_ENV_41			Camera	52	529476	6445468	529446	6445486	30	-18	35	-58		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
15-Apr-2023	09:24:34	2660	AA_ENV_41			Camera	52	529480	6445466	529446	6445486	34	-21	40	-59		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
15-Apr-2023	09:24:57	2661	AA_ENV_41			Camera	52	529482	6445464	529446	6445486	36	-22	43	-59		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
15-Apr-2023	09:25:26	2662	AA_ENV_41			Camera	52	529485	6445463	529446	6445486	39	-23	46	-59		(Corr'd Nav, Kongsberg 14208, img#45) (B) (T.A)
15-Apr-2023	11:35:33	2663	AA_ENV_07			Camera	53	528485	6448078	528478	6448025	8	53	53	-172		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
15-Apr-2023	11:35:49	2664	AA_ENV_07			Camera	53	528483	6448076	528478	6448025	6	51	51	-174		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
15-Apr-2023	11:36:06	2665	AA_ENV_07			Camera	53	528479	6448074	528478	6448025	2	49	49	-178		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
15-Apr-2023	11:36:22	2666	AA_ENV_07			Camera	53	528476	6448071	528478	6448025	-2	46	46	177		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
15-Apr-2023	11:37:01	2667	AA_ENV_07			Camera	53	528468	6448066	528478	6448025	-9	41	42	167		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
15-Apr-2023	11:37:16	2668	AA_ENV_07			Camera	53	528466	6448063	528478	6448025	-12	38	40	163		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
15-Apr-2023	11:37:38	2669	AA_ENV_07			Camera	53	528463	6448059	528478	6448025	-14	34	37	157		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
15-Apr-2023	11:37:57	2670	AA_ENV_07			Camera	53	528461	6448054	528478	6448025	-16	29	33	151		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
15-Apr-2023	11:38:29	2671	AA_ENV_07			Camera	53	528459	6448045	528478	6448025	-19	20	27	137		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
15-Apr-2023	11:38:52	2672	AA_ENV_07			Camera	53	528458	6448038	528478	6448025	-19	13	23	124		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
15-Apr-2023	11:39:10	2673	AA_ENV_07			Camera	53	528459	6448034	528478	6448025	-19	9	21	116		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
15-Apr-2023	11:39:30	2674	AA_ENV_07			Camera	53	528462	6448032	528478	6448025	-16	7	17	115		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
15-Apr-2023	11:39:55	2675	AA_ENV_07			Camera	53	528465	6448033	528478	6448025	-12	8	15	122		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
15-Apr-2023	11:40:17	2676	AA_ENV_07			Camera	53	528467	6448034	528478	6448025	-11	10	14	132		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
15-Apr-2023	11:41:01	2677	AA_ENV_07			Camera	53	528475	6448035	528478	6448025	-2	10	10	167		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
15-Apr-2023	11:52:32	2678	AA_ENV_07			Camera	53	528464	6448039	528478	6448025	-14	14	20	136		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
15-Apr-2023	11:53:08	2679	AA_ENV_07			Camera	53	528471	6448036	528478	6448025	-7	11	13	148		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
15-Apr-2023	11:53:23	2680	AA_ENV_07			Camera	53	528473	6448033	528478	6448025	-4	8	9	153		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
15-Apr-2023	11:53:36	2681	AA_ENV_07			Camera	53	528475	6448032	528478	6448025	-3	7	8	158		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
15-Apr-2023	11:53:49	2682	AA_ENV_07			Camera	53	528476	6448030	528478	6448025	-1	5	5	164		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
15-Apr-2023	11:54:40	2683	AA_ENV_07			Camera	53	528479	6448026	528478	6448025	1	1	1	-121		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
15-Apr-2023	11:55:01	2684	AA_ENV_07			Camera	53	528480	6448024	528478	6448025	2	-1	2	-64		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
15-Apr-2023	11:55:23	2685	AA_ENV_07			Camera	53	528482	6448022	528478	6448025	4	-3	5	-53		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
15-Apr-2023	11:55:36	2686	AA_ENV_07			Camera	53	528484	6448020	528478	6448025	6	-5	8	-54		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
15-Apr-2023	11:55:58	2687	AA_ENV_07			Camera	53	528487	6448018	528478	6448025	10	-7	12	-54		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
15-Apr-2023	11:56:10	2688	AA_ENV_07			Camera	53	528489	6448016	528478	6448025	11	-9	14	-53		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
15-Apr-2023	11:56:24	2689	AA_ENV_07			Camera	53	528492	6448014	528478	6448025	14	-11	18	-52		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
15-Apr-2023	11:56:40	2690	AA_ENV_07			Camera	53	528494	6448013	528478	6448025	17	-12	21	-54		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
15-Apr-2023	11:56:58	2691	AA_ENV_07			Camera	53	528498	6448011	528478	6448025	20	-14	25	-56		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	11:57:17	2692	AA_ENV_07			Camera	53	528501	6448009	528478	6448025	24	-16	29	-56		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
15-Apr-2023	11:57:37	2693	AA_ENV_07			Camera	53	528504	6448007	528478	6448025	27	-18	32	-56		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
15-Apr-2023	11:57:54	2694	AA_ENV_07			Camera	53	528504	6448005	528478	6448025	27	-20	34	-53		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
15-Apr-2023	11:58:05	2695	AA_ENV_07			Camera	53	528505	6448003	528478	6448025	27	-22	35	-51		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
15-Apr-2023	11:58:16	2696	AA_ENV_07			Camera	53	528505	6448002	528478	6448025	28	-23	36	-50		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
15-Apr-2023	11:58:24	2697	AA_ENV_07			Camera	53	528506	6448001	528478	6448025	28	-24	37	-49		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
15-Apr-2023	11:58:31	2698	AA_ENV_07			Camera	53	528507	6448000	528478	6448025	29	-25	38	-49		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
15-Apr-2023	11:58:42	2699	AA_ENV_07			Camera	53	528508	6447998	528478	6448025	30	-27	40	-49		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
15-Apr-2023	11:58:50	2700	AA_ENV_07			Camera	53	528509	6447997	528478	6448025	31	-28	42	-48		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
15-Apr-2023	11:58:57	2701	AA_ENV_07			Camera	53	528510	6447996	528478	6448025	32	-29	44	-48		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
15-Apr-2023	11:59:05	2702	AA_ENV_07			Camera	53	528511	6447995	528478	6448025	34	-30	45	-48		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
15-Apr-2023	11:59:13	2703	AA_ENV_07			Camera	53	528513	6447994	528478	6448025	35	-31	47	-48		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
15-Apr-2023	15:02:20	2704	AA_ENV_23			Camera	52	526303	6451116	526340	6451078	-37	37	52	135		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
15-Apr-2023	15:02:50	2705	AA_ENV_23			Camera	52	526306	6451114	526340	6451078	-34	36	49	137		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
15-Apr-2023	15:02:59	2706	AA_ENV_23			Camera	52	526307	6451114	526340	6451078	-33	35	48	137		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
15-Apr-2023	15:03:25	2707	AA_ENV_23			Camera	52	526310	6451111	526340	6451078	-30	33	44	138		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
15-Apr-2023	15:03:34	2708	AA_ENV_23			Camera	52	526311	6451110	526340	6451078	-29	32	43	138		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
15-Apr-2023	15:03:43	2709	AA_ENV_23			Camera	52	526311	6451109	526340	6451078	-29	31	42	137		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
15-Apr-2023	15:03:57	2710	AA_ENV_23			Camera	52	526312	6451107	526340	6451078	-28	29	40	137		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
15-Apr-2023	15:04:14	2711	AA_ENV_23			Camera	52	526314	6451105	526340	6451078	-25	27	37	137		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
15-Apr-2023	15:04:28	2712	AA_ENV_23			Camera	52	526316	6451103	526340	6451078	-23	25	34	137		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
15-Apr-2023	15:04:47	2713	AA_ENV_23			Camera	52	526319	6451100	526340	6451078	-20	22	30	137		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
15-Apr-2023	15:05:09	2714	AA_ENV_23			Camera	52	526321	6451097	526340	6451078	-19	19	27	135		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
15-Apr-2023	15:05:27	2715	AA_ENV_23			Camera	52	526323	6451095	526340	6451078	-17	17	24	136		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
15-Apr-2023	15:05:36	2716	AA_ENV_23			Camera	52	526323	6451094	526340	6451078	-17	16	23	134		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
15-Apr-2023	15:05:55	2717	AA_ENV_23			Camera	52	526324	6451092	526340	6451078	-16	14	21	131		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
15-Apr-2023	15:06:09	2718	AA_ENV_23			Camera	52	526326	6451091	526340	6451078	-14	13	19	132		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
15-Apr-2023	15:06:50	2719	AA_ENV_23			Camera	52	526331	6451087	526340	6451078	-9	9	12	134		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
15-Apr-2023	15:07:57	2720	AA_ENV_23			Camera	52	526338	6451081	526340	6451078	-2	3	4	147		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
15-Apr-2023	15:08:13	2721	AA_ENV_23			Camera	52	526339	6451079	526340	6451078	0	1	1	165		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
15-Apr-2023	15:08:21	2722	AA_ENV_23			Camera	52	526340	6451079	526340	6451078	1	0	1	-119		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
15-Apr-2023	15:08:56	2723	AA_ENV_23			Camera	52	526342	6451076	526340	6451078	2	-2	3	-54		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
15-Apr-2023	15:09:33	2724	AA_ENV_23			Camera	52	526346	6451074	526340	6451078	6	-5	7	-52		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
15-Apr-2023	15:09:48	2725	AA_ENV_23			Camera	52	526348	6451072	526340	6451078	9	-6	11	-56		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
15-Apr-2023	15:10:12	2726	AA_ENV_23			Camera	53	526351	6451069	526340	6451078	11	-9	14	-52		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
15-Apr-2023	15:10:20	2727	AA_ENV_23			Camera	52	526351	6451068	526340	6451078	12	-10	16	-48		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
15-Apr-2023	15:10:55	2728	AA_ENV_23			Camera	52	526353	6451063	526340	6451078	14	-15	20	-42		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	15:11:09	2729	AA_ENV_23			Camera	52	526355	6451061	526340	6451078	15	-17	23	-42		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
15-Apr-2023	15:11:20	2730	AA_ENV_23			Camera	52	526357	6451059	526340	6451078	17	-19	26	-41		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
15-Apr-2023	15:11:35	2731	AA_ENV_23			Camera	52	526359	6451058	526340	6451078	19	-21	28	-43		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
15-Apr-2023	15:11:52	2732	AA_ENV_23			Camera	52	526360	6451056	526340	6451078	20	-22	30	-42		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
15-Apr-2023	15:12:04	2733	AA_ENV_23			Camera	52	526359	6451054	526340	6451078	20	-24	31	-40		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
15-Apr-2023	15:12:27	2734	AA_ENV_23			Camera	53	526361	6451051	526340	6451078	22	-27	35	-39		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
15-Apr-2023	15:12:41	2735	AA_ENV_23			Camera	52	526364	6451050	526340	6451078	25	-28	37	-42		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
15-Apr-2023	15:12:56	2736	AA_ENV_23			Camera	52	526366	6451049	526340	6451078	26	-29	39	-42		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
15-Apr-2023	15:13:06	2737	AA_ENV_23			Camera	52	526367	6451048	526340	6451078	27	-30	41	-42		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
15-Apr-2023	15:13:21	2738	AA_ENV_23			Camera	52	526367	6451046	526340	6451078	28	-32	42	-41		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
15-Apr-2023	15:13:43	2739	AA_ENV_23			Camera	52	526369	6451044	526340	6451078	29	-34	45	-40		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
15-Apr-2023	15:13:51	2740	AA_ENV_23			Camera	52	526370	6451043	526340	6451078	30	-35	46	-41		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
15-Apr-2023	15:14:07	2741	AA_ENV_23			Camera	52	526372	6451041	526340	6451078	32	-37	49	-41		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
15-Apr-2023	17:01:23	2742	AA_ENV_20			Camera	51	526119	6454777	526165	6454740	-45	36	58	129		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
15-Apr-2023	17:02:16	2743	AA_ENV_20			Camera	51	526124	6454771	526165	6454740	-40	30	50	127		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
15-Apr-2023	17:02:32	2744	AA_ENV_20			Camera	51	526126	6454768	526165	6454740	-38	28	48	126		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
15-Apr-2023	17:02:56	2745	AA_ENV_20			Camera	51	526128	6454766	526165	6454740	-36	26	44	125		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
15-Apr-2023	17:03:14	2746	AA_ENV_20			Camera	51	526129	6454764	526165	6454740	-35	24	43	124		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
15-Apr-2023	17:03:45	2747	AA_ENV_20			Camera	51	526133	6454761	526165	6454740	-31	21	37	123		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
15-Apr-2023	17:04:13	2748	AA_ENV_20			Camera	51	526137	6454757	526165	6454740	-28	16	32	121		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
15-Apr-2023	17:04:22	2749	AA_ENV_20			Camera	51	526138	6454755	526165	6454740	-27	15	30	119		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
15-Apr-2023	17:04:43	2750	AA_ENV_20			Camera	51	526141	6454753	526165	6454740	-24	12	27	117		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
15-Apr-2023	17:05:20	2751	AA_ENV_20			Camera	51	526145	6454748	526165	6454740	-19	8	21	113		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
15-Apr-2023	17:05:30	2752	AA_ENV_20			Camera	51	526146	6454748	526165	6454740	-18	8	20	114		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
15-Apr-2023	17:05:59	2753	AA_ENV_20			Camera	51	526146	6454746	526165	6454740	-19	5	20	106		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
15-Apr-2023	17:06:06	2754	AA_ENV_20			Camera	51	526146	6454746	526165	6454740	-19	5	20	106		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
15-Apr-2023	17:06:31	2755	AA_ENV_20			Camera	51	526147	6454744	526165	6454740	-18	3	18	101		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
15-Apr-2023	17:06:59	2756	AA_ENV_20			Camera	51	526151	6454741	526165	6454740	-14	1	14	94		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
15-Apr-2023	17:07:12	2757	AA_ENV_20			Camera	52	526153	6454740	526165	6454740	-11	-1	11	87		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
15-Apr-2023	17:07:41	2758	AA_ENV_20			Camera	51	526156	6454738	526165	6454740	-8	-2	9	74		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
15-Apr-2023	17:08:13	2759	AA_ENV_20			Camera	52	526159	6454737	526165	6454740	-5	-4	6	52		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
15-Apr-2023	17:08:24	2760	AA_ENV_20			Camera	52	526161	6454735	526165	6454740	-3	-5	6	34		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
15-Apr-2023	17:08:39	2761	AA_ENV_20			Camera	52	526164	6454735	526165	6454740	-1	-5	5	9		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
15-Apr-2023	17:09:07	2762	AA_ENV_20			Camera	52	526166	6454735	526165	6454740	2	-6	6	-16		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
15-Apr-2023	17:09:39	2763	AA_ENV_20			Camera	52	526166	6454733	526165	6454740	1	-7	8	-8		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
15-Apr-2023	17:09:53	2764	AA_ENV_20			Camera	52	526166	6454732	526165	6454740	2	-8	9	-13		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
15-Apr-2023	17:10:08	2765	AA_ENV_20			Camera	52	526168	6454731	526165	6454740	3	-10	10	-17		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	17:10:19	2766	AA_ENV_20			Camera	52	526168	6454729	526165	6454740	3	-11	12	-16		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
15-Apr-2023	17:10:57	2767	AA_ENV_20			Camera	52	526171	6454726	526165	6454740	6	-14	15	-25		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
15-Apr-2023	17:11:12	2768	AA_ENV_20			Camera	52	526173	6454724	526165	6454740	8	-16	18	-27		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
15-Apr-2023	17:11:36	2769	AA_ENV_20			Camera	52	526174	6454723	526165	6454740	9	-18	20	-28		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
15-Apr-2023	17:11:44	2770	AA_ENV_20			Camera	52	526174	6454721	526165	6454740	9	-19	21	-26		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
15-Apr-2023	17:12:05	2771	AA_ENV_20			Camera	52	526177	6454720	526165	6454740	12	-20	23	-31		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
15-Apr-2023	17:12:27	2772	AA_ENV_20			Camera	52	526179	6454719	526165	6454740	15	-22	26	-34		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
15-Apr-2023	17:13:04	2773	AA_ENV_20			Camera	52	526181	6454717	526165	6454740	17	-23	28	-36		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
15-Apr-2023	17:13:14	2774	AA_ENV_20			Camera	52	526182	6454716	526165	6454740	17	-25	30	-35		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
15-Apr-2023	17:13:29	2775	AA_ENV_20			Camera	52	526183	6454715	526165	6454740	19	-26	32	-36		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
15-Apr-2023	17:13:54	2776	AA_ENV_20			Camera	52	526185	6454712	526165	6454740	21	-29	36	-36		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
15-Apr-2023	17:14:03	2777	AA_ENV_20			Camera	52	526186	6454710	526165	6454740	22	-30	37	-36		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
15-Apr-2023	17:14:12	2778	AA_ENV_20			Camera	52	526187	6454710	526165	6454740	23	-31	38	-37		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
15-Apr-2023	17:14:47	2779	AA_ENV_20			Camera	52	526189	6454707	526165	6454740	25	-33	42	-37		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
15-Apr-2023	17:15:08	2780	AA_ENV_20			Camera	52	526192	6454707	526165	6454740	27	-34	43	-39		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
15-Apr-2023	17:15:40	2781	AA_ENV_20			Camera	52	526195	6454704	526165	6454740	30	-37	48	-40		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
18-Apr-2023	20:11:46	2782	AA_ENV_38			Camera	55	528827	6454106	528860	6454156	-33	-50	60	33		(Raw Nav, Kongsberg 14208, img#1) (B)
18-Apr-2023		2783	AA_ENV_38			Camera											Lost connection with EELS, Photo but no Fix taken
18-Apr-2023	20:12:36	2784	AA_ENV_38			Camera	54	528828	6454106	528860	6454156	-32	-50	59	33		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
18-Apr-2023	20:13:28	2785	AA_ENV_38			Camera	54	528833	6454111	528860	6454156	-27	-45	52	31		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
18-Apr-2023	20:14:14	2786	AA_ENV_38			Camera	54	528838	6454117	528860	6454156	-22	-39	45	29		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
18-Apr-2023	20:14:39	2787	AA_ENV_38			Camera	54	528840	6454118	528860	6454156	-20	-38	42	28		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
18-Apr-2023	20:15:05	2788	AA_ENV_38			Camera	54	528843	6454122	528860	6454156	-17	-34	38	26		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
18-Apr-2023	20:15:26	2789	AA_ENV_38			Camera	54	528845	6454125	528860	6454156	-15	-31	34	25		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
18-Apr-2023	20:15:54	2790	AA_ENV_38			Camera	54	528847	6454130	528860	6454156	-13	-26	29	26		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
18-Apr-2023	20:16:12	2791	AA_ENV_38			Camera	54	528848	6454133	528860	6454156	-12	-23	26	26		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
18-Apr-2023	20:16:22	2792	AA_ENV_38			Camera	54	528849	6454134	528860	6454156	-11	-22	24	26		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
18-Apr-2023	20:16:43	2793	AA_ENV_38			Camera	54	528851	6454137	528860	6454156	-9	-19	21	25		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
18-Apr-2023	20:17:01	2794	AA_ENV_38			Camera	54	528852	6454139	528860	6454156	-7	-17	18	24		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
18-Apr-2023	20:17:11	2795	AA_ENV_38			Camera	54	528853	6454140	528860	6454156	-7	-16	17	23		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
18-Apr-2023	20:17:20	2796	AA_ENV_38			Camera	54	528854	6454141	528860	6454156	-6	-15	16	21		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
18-Apr-2023	20:17:33	2797	AA_ENV_38			Camera	54	528855	6454143	528860	6454156	-5	-13	14	21		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
18-Apr-2023	20:18:05	2798	AA_ENV_38			Camera	54	528858	6454146	528860	6454156	-2	-10	11	10		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
18-Apr-2023	20:18:44	2799	AA_ENV_38			Camera	54	528860	6454151	528860	6454156	1	-5	5	-10		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
18-Apr-2023	20:19:28	2800	AA_ENV_38			Camera	54	528861	6454157	528860	6454156	1	1	2	-134		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
18-Apr-2023	20:19:35	2801	AA_ENV_38			Camera	54	528861	6454158	528860	6454156	1	2	2	-142		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
18-Apr-2023	20:19:45	2802	AA_ENV_38			Camera	54	528862	6454159	528860	6454156	2	3	4	-148		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
18-Apr-2023	20:19:52	2803	AA_ENV_38			Camera	54	528861	6454160	528860	6454156	2	4	4	-156		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
18-Apr-2023	20:20:07	2804	AA_ENV_38			Camera	54	528862	6454161	528860	6454156	3	6	6	-155		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
18-Apr-2023	20:20:15	2805	AA_ENV_38			Camera	54	528862	6454162	528860	6454156	2	6	6	-160		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
18-Apr-2023	20:20:54	2806	AA_ENV_38			Camera	54	528864	6454164	528860	6454156	4	8	9	-154		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
18-Apr-2023	20:21:03	2807	AA_ENV_38			Camera	54	528865	6454165	528860	6454156	5	9	10	-150		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
18-Apr-2023	20:21:15	2808	AA_ENV_38			Camera	54	528865	6454167	528860	6454156	6	11	12	-151		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
18-Apr-2023	20:21:50	2809	AA_ENV_38			Camera	54	528867	6454170	528860	6454156	7	15	16	-154		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
18-Apr-2023	20:22:09	2810	AA_ENV_38			Camera	54	528868	6454172	528860	6454156	9	16	18	-152		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
18-Apr-2023	20:22:21	2811	AA_ENV_38			Camera	54	528869	6454173	528860	6454156	9	17	20	-152		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
18-Apr-2023	20:22:32	2812	AA_ENV_38			Camera	54	528870	6454174	528860	6454156	10	18	21	-150		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
18-Apr-2023	20:22:56	2813	AA_ENV_38			Camera	54	528872	6454176	528860	6454156	13	20	24	-148		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
18-Apr-2023	20:23:14	2814	AA_ENV_38			Camera	54	528875	6454179	528860	6454156	15	23	27	-147		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
18-Apr-2023	20:23:28	2815	AA_ENV_38			Camera	54	528876	6454181	528860	6454156	16	25	30	-147		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
18-Apr-2023	20:24:10	2816	AA_ENV_38			Camera	54	528877	6454186	528860	6454156	18	30	35	-149		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
18-Apr-2023	20:24:22	2817	AA_ENV_38			Camera	54	528879	6454187	528860	6454156	19	31	36	-148		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
18-Apr-2023	20:24:43	2818	AA_ENV_38			Camera	54	528881	6454189	528860	6454156	21	33	39	-147		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
18-Apr-2023	20:24:58	2819	AA_ENV_38			Camera	54	528883	6454189	528860	6454156	23	33	41	-145		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
18-Apr-2023	20:25:12	2820	AA_ENV_38			Camera	54	528885	6454190	528860	6454156	25	34	42	-144		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
18-Apr-2023	20:25:29	2821	AA_ENV_38			Camera	54	528885	6454192	528860	6454156	25	36	44	-145		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
18-Apr-2023	20:25:49	2822	AA_ENV_38			Camera	54	528887	6454192	528860	6454156	27	36	46	-143		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
18-Apr-2023	20:57:11	2823	AA_ENV_01			Camera	53	530007	6454601	530014	6454656	-7	-55	56	8		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
18-Apr-2023	20:57:43	2824	AA_ENV_01			Camera	53	530010	6454605	530014	6454656	-4	-51	51	5		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
18-Apr-2023	20:58:22	2825	AA_ENV_01			Camera	53	530011	6454610	530014	6454656	-3	-46	46	4		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
18-Apr-2023	20:58:48	2826	AA_ENV_01			Camera	53	530012	6454613	530014	6454656	-2	-43	43	3		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
18-Apr-2023	20:59:10	2827	AA_ENV_01			Camera	53	530013	6454616	530014	6454656	-1	-40	40	1		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
18-Apr-2023	20:59:21	2828	AA_ENV_01			Camera	53	530013	6454618	530014	6454656	-1	-38	38	1		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
18-Apr-2023	20:59:35	2829	AA_ENV_01			Camera	53	530015	6454619	530014	6454656	0	-37	37	-1		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
18-Apr-2023	20:59:58	2830	AA_ENV_01			Camera	53	530016	6454622	530014	6454656	2	-34	34	-4		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
18-Apr-2023	21:00:25	2831	AA_ENV_01			Camera	53	530017	6454626	530014	6454656	3	-30	30	-6		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
18-Apr-2023	21:00:43	2832	AA_ENV_01			Camera	53	530018	6454629	530014	6454656	4	-27	27	-8		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
18-Apr-2023	21:01:04	2833	AA_ENV_01			Camera	53	530018	6454632	530014	6454656	4	-24	24	-9		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
18-Apr-2023	21:01:20	2834	AA_ENV_01			Camera	53	530018	6454635	530014	6454656	4	-22	22	-10		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
18-Apr-2023	21:01:32	2835	AA_ENV_01			Camera	53	530017	6454636	530014	6454656	3	-20	20	-8		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
18-Apr-2023	21:02:16	2836	AA_ENV_01			Camera	53	530017	6454641	530014	6454656	2	-15	15	-9		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
18-Apr-2023	21:02:38	2837	AA_ENV_01			Camera	53	530016	6454643	530014	6454656	2	-13	13	-8		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
18-Apr-2023	21:02:49	2838	AA_ENV_01			Camera	53	530016	6454644	530014	6454656	2	-13	13	-8		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
18-Apr-2023	21:03:08	2839	AA_ENV_01			Camera	53	530016	6454645	530014	6454656	2	-11	11	-11		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463				Vessel	MV *Ocean Endeavour*							
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	COG							
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93	
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon							
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N			Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
18-Apr-2023	21:03:57	2840	AA_ENV_01			Camera	53	530017	6454650	530014	6454656	3	-6	6	-24		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
18-Apr-2023	21:04:11	2841	AA_ENV_01			Camera	53	530016	6454651	530014	6454656	2	-5	5	-27		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
18-Apr-2023	21:04:22	2842	AA_ENV_01			Camera	53	530016	6454653	530014	6454656	2	-3	4	-31		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
18-Apr-2023	21:04:51	2843	AA_ENV_01			Camera	53	530015	6454656	530014	6454656	1	0	1	-79		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
18-Apr-2023	21:05:00	2844	AA_ENV_01			Camera	53	530015	6454657	530014	6454656	1	1	1	-130		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
18-Apr-2023	21:05:13	2845	AA_ENV_01			Camera	53	530014	6454658	530014	6454656	0	2	2	-173		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
18-Apr-2023	21:05:21	2846	AA_ENV_01			Camera	53	530014	6454659	530014	6454656	0	3	3	-176		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
18-Apr-2023	21:05:28	2847	AA_ENV_01			Camera	53	530014	6454660	530014	6454656	0	4	4	-179		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
18-Apr-2023	21:05:51	2848	AA_ENV_01			Camera	53	530013	6454662	530014	6454656	-1	6	6	171		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
18-Apr-2023	21:06:09	2849	AA_ENV_01			Camera	53	530013	6454664	530014	6454656	-1	8	8	170		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
18-Apr-2023	21:06:38	2850	AA_ENV_01			Camera	53	530012	6454666	530014	6454656	-2	10	10	168		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
18-Apr-2023	21:07:09	2851	AA_ENV_01			Camera	53	530012	6454667	530014	6454656	-2	11	12	171		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
18-Apr-2023	21:07:21	2852	AA_ENV_01			Camera	53	530013	6454669	530014	6454656	-1	13	13	174		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
18-Apr-2023	21:07:42	2853	AA_ENV_01			Camera	53	530014	6454670	530014	6454656	0	14	14	179		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
18-Apr-2023	21:08:20	2854	AA_ENV_01			Camera	53	530015	6454674	530014	6454656	1	18	18	-176		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
18-Apr-2023	21:08:36	2855	AA_ENV_01			Camera	53	530016	6454677	530014	6454656	2	21	21	-176		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
18-Apr-2023	21:08:53	2856	AA_ENV_01			Camera	53	530016	6454679	530014	6454656	2	23	23	-176		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
18-Apr-2023	21:09:24	2857	AA_ENV_01			Camera	53	530016	6454683	530014	6454656	2	28	28	-176		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
18-Apr-2023	21:09:38	2858	AA_ENV_01			Camera	53	530016	6454685	530014	6454656	2	29	29	-176		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
18-Apr-2023	21:09:47	2859	AA_ENV_01			Camera	53	530017	6454685	530014	6454656	3	29	30	-175		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
18-Apr-2023	21:10:12	2860	AA_ENV_01			Camera	53	530018	6454689	530014	6454656	3	33	33	-174		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
18-Apr-2023	21:10:42	2861	AA_ENV_01			Camera	53	530019	6454691	530014	6454656	5	35	35	-172		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
18-Apr-2023	21:11:32	2862	AA_ENV_01			Camera	53	530022	6454695	530014	6454656	8	39	40	-168		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
18-Apr-2023	21:11:54	2863	AA_ENV_01			Camera	53	530023	6454698	530014	6454656	9	42	43	-168		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
18-Apr-2023	21:12:13	2864	AA_ENV_01			Camera	53	530024	6454701	530014	6454656	10	45	46	-168		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
18-Apr-2023	22:37:16	2865	AA_ENV_39			Camera	60	534159	6455071	534188	6455116	-29	-46	54	32		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
18-Apr-2023	22:37:58	2866	AA_ENV_39			Camera	60	534162	6455074	534188	6455116	-26	-42	49	32		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
18-Apr-2023	22:38:11	2867	AA_ENV_39			Camera	60	534163	6455075	534188	6455116	-25	-41	48	31		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
18-Apr-2023	22:38:35	2868	AA_ENV_39			Camera	60	534166	6455078	534188	6455116	-22	-38	44	29		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
18-Apr-2023	22:39:05	2869	AA_ENV_39			Camera	60	534170	6455081	534188	6455116	-18	-35	39	27		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
18-Apr-2023	22:39:38	2870	AA_ENV_39			Camera	60	534174	6455087	534188	6455116	-14	-30	33	25		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
18-Apr-2023	22:39:45	2871	AA_ENV_39			Camera	60	534175	6455088	534188	6455116	-13	-29	32	25		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
18-Apr-2023	22:40:00	2872	AA_ENV_39			Camera	60	534176	6455090	534188	6455116	-12	-26	28	24		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
18-Apr-2023	22:40:10	2873	AA_ENV_39			Camera	60	534177	6455092	534188	6455116	-11	-25	27	25		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
18-Apr-2023	22:40:29	2874	AA_ENV_39			Camera	60	534179	6455094	534188	6455116	-9	-22	24	22		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
18-Apr-2023	22:40:44	2875	AA_ENV_39			Camera	60	534180	6455097	534188	6455116	-8	-19	21	23		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
18-Apr-2023	22:41:16	2876	AA_ENV_39			Camera	60	534182	6455102	534188	6455116	-6	-14	15	22		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
18-Apr-2023	22:41:33	2877	AA_ENV_39			Camera	60	534183	6455104	534188	6455116	-4	-12	13	20		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
18-Apr-2023	22:41:44	2878	AA_ENV_39			Camera	60	534184	6455107	534188	6455116	-4	-10	11	23		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
18-Apr-2023	22:41:54	2879	AA_ENV_39			Camera	62	534185	6455106	534188	6455116	-3	-10	11	16		(Raw Nav, Kongsberg 14208, img#15) (B)
18-Apr-2023	22:42:09	2880	AA_ENV_39			Camera	62	534185	6455109	534188	6455116	-3	-7	8	22		(Raw Nav, Kongsberg 14208, img#16) (B)
18-Apr-2023	22:42:31	2881	AA_ENV_39			Camera	62	534186	6455113	534188	6455116	-2	-3	4	30		(Raw Nav, Kongsberg 14208, img#17) (B)
18-Apr-2023	22:42:46	2882	AA_ENV_39			Camera	62	534187	6455114	534188	6455116	-1	-2	2	21		(Raw Nav, Kongsberg 14208, img#18) (B)
18-Apr-2023	22:42:58	2883	AA_ENV_39			Camera	62	534187	6455116	534188	6455116	-1	0	1	70		(Raw Nav, Kongsberg 14208, img#19) (B)
18-Apr-2023	22:43:20	2884	AA_ENV_39			Camera	62	534188	6455118	534188	6455116	0	2	2	-176		(Raw Nav, Kongsberg 14208, img#20) (B)
18-Apr-2023	22:43:35	2885	AA_ENV_39			Camera	62	534189	6455120	534188	6455116	1	4	4	-163		(Raw Nav, Kongsberg 14208, img#21) (B)
18-Apr-2023	22:43:50	2886	AA_ENV_39			Camera	62	534190	6455121	534188	6455116	2	5	5	-156		(Raw Nav, Kongsberg 14208, img#22) (B)
18-Apr-2023	22:44:09	2887	AA_ENV_39			Camera	62	534192	6455124	534188	6455116	4	8	9	-152		(Raw Nav, Kongsberg 14208, img#23) (B)
18-Apr-2023	22:44:26	2888	AA_ENV_39			Camera	62	534192	6455125	534188	6455116	4	9	10	-155		(Raw Nav, Kongsberg 14208, img#24) (B)
18-Apr-2023	22:44:43	2889	AA_ENV_39			Camera	62	534195	6455128	534188	6455116	7	12	14	-149		(Raw Nav, Kongsberg 14208, img#25) (B)
18-Apr-2023	22:44:51	2890	AA_ENV_39			Camera	62	534196	6455128	534188	6455116	8	12	14	-145		(Raw Nav, Kongsberg 14208, img#26) (B)
18-Apr-2023	22:45:05	2891	AA_ENV_39			Camera	62	534198	6455129	534188	6455116	10	13	16	-141		(Raw Nav, Kongsberg 14208, img#27) (B)
18-Apr-2023	22:45:31	2892	AA_ENV_39			Camera	62	534201	6455131	534188	6455116	13	15	20	-138		(Raw Nav, Kongsberg 14208, img#28) (B)
18-Apr-2023	22:45:51	2893	AA_ENV_39			Camera	62	534204	6455133	534188	6455116	16	17	23	-136		(Raw Nav, Kongsberg 14208, img#29) (B)
18-Apr-2023	22:46:17	2894	AA_ENV_39			Camera	62	534207	6455134	534188	6455116	19	18	26	-133		(Raw Nav, Kongsberg 14208, img#30) (B)
18-Apr-2023	22:46:39	2895	AA_ENV_39			Camera	62	534211	6455136	534188	6455116	23	20	30	-130		(Raw Nav, Kongsberg 14208, img#31) (B)
18-Apr-2023	22:46:50	2896	AA_ENV_39			Camera	62	534212	6455137	534188	6455116	24	21	32	-131		(Raw Nav, Kongsberg 14208, img#32) (B)
18-Apr-2023	22:47:04	2897	AA_ENV_39			Camera	62	534214	6455139	534188	6455116	26	23	35	-131		(Raw Nav, Kongsberg 14208, img#33) (B)
18-Apr-2023	22:47:15	2898	AA_ENV_39			Camera	62	534216	6455141	534188	6455116	28	25	37	-131		(Raw Nav, Kongsberg 14208, img#34) (B)
18-Apr-2023	22:47:28	2899	AA_ENV_39			Camera	62	534217	6455142	534188	6455116	29	26	39	-131		(Raw Nav, Kongsberg 14208, img#35) (B)
18-Apr-2023	22:47:36	2900	AA_ENV_39			Camera	62	534219	6455144	534188	6455116	31	28	42	-132		(Raw Nav, Kongsberg 14208, img#36) (B)
18-Apr-2023	22:47:49	2901	AA_ENV_39			Camera	62	534220	6455145	534188	6455116	32	29	43	-132		(Raw Nav, Kongsberg 14208, img#37) (B)
18-Apr-2023	22:48:04	2902	AA_ENV_39			Camera	62	534222	6455148	534188	6455116	34	32	47	-133		(Raw Nav, Kongsberg 14208, img#38) (B)
18-Apr-2023	22:48:18	2903	AA_ENV_39			Camera	62	534224	6455150	534188	6455116	36	34	49	-133		(Raw Nav, Kongsberg 14208, img#39) (B)
18-Apr-2023	23:32:52	2904	AA_ENV_08			Camera	56	532700	6456032	532737	6456073	-37	-42	56	42		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
18-Apr-2023	23:33:51	2905	AA_ENV_08			Camera	56	532702	6456033	532737	6456073	-34	-40	53	41		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
18-Apr-2023	23:34:02	2906	AA_ENV_08			Camera	56	532703	6456034	532737	6456073	-34	-39	52	41		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
18-Apr-2023	23:34:21	2907	AA_ENV_08			Camera	56	532705	6456035	532737	6456073	-31	-38	49	40		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
18-Apr-2023	23:34:52	2908	AA_ENV_08			Camera	56	532708	6456037	532737	6456073	-29	-36	46	39		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
18-Apr-2023	23:35:17	2909	AA_ENV_08			Camera	56	532711	6456039	532737	6456073	-26	-34	43	37		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
18-Apr-2023	23:35:33	2910	AA_ENV_08			Camera	56	532713	6456041	532737	6456073	-24	-32	40	37		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
18-Apr-2023	23:35:40	2911	AA_ENV_08			Camera	56	532713	6456042	532737	6456073	-24	-31	39	37		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
18-Apr-2023	23:36:16	2912	AA_ENV_08			Camera	56	532716	6456045	532737	6456073	-21	-28	34	37		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
18-Apr-2023	23:36:41	2913	AA_ENV_08			Camera	56	532716	6456048	532737	6456073	-20	-25	32	39		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463						Vessel	MV *Ocean Endeavour*									
Client	Caledonia Offshore Windfarm Limited						Vessel Reference Point (VRP)	COG									
Project Name	Caledonia OWF Phase 2						Deployment Location	Camera Deployment Node		x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1						Actual Coordinates derived from	Vessel or Beacon									
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84			Projection	UTM zone 30N					Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
18-Apr-2023	23:36:53	2914	AA_ENV_08			Camera	56	532718	6456050	532737	6456073	-19	-23	30	39		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
18-Apr-2023	23:37:15	2915	AA_ENV_08			Camera	56	532720	6456052	532737	6456073	-17	-21	27	39		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
18-Apr-2023	23:37:30	2916	AA_ENV_08			Camera	56	532720	6456053	532737	6456073	-16	-21	26	39		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
18-Apr-2023	23:37:41	2917	AA_ENV_08			Camera	56	532721	6456054	532737	6456073	-16	-19	25	40		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
18-Apr-2023	23:38:04	2918	AA_ENV_08			Camera	56	532722	6456055	532737	6456073	-14	-18	23	38		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
18-Apr-2023	23:38:24	2919	AA_ENV_08			Camera	56	532724	6456056	532737	6456073	-13	-17	21	38		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
18-Apr-2023	23:38:50	2920	AA_ENV_08			Camera	56	532724	6456057	532737	6456073	-13	-16	20	38		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
18-Apr-2023	23:39:20	2921	AA_ENV_08			Camera	56	532725	6456058	532737	6456073	-12	-15	19	38		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
18-Apr-2023	23:39:47	2922	AA_ENV_08			Camera	56	532727	6456060	532737	6456073	-9	-13	16	36		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
18-Apr-2023	23:40:53	2923	AA_ENV_08			Camera	56	532731	6456063	532737	6456073	-5	-10	11	29		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
18-Apr-2023	23:41:17	2924	AA_ENV_08			Camera	56	532733	6456065	532737	6456073	-3	-8	8	24		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
18-Apr-2023	23:41:58	2925	AA_ENV_08			Camera	56	532737	6456071	532737	6456073	0	-2	2	-6		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
18-Apr-2023	23:42:10	2926	AA_ENV_08			Camera	56	532737	6456072	532737	6456073	1	-1	1	-47		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
18-Apr-2023	23:42:35	2927	AA_ENV_08			Camera	56	532739	6456076	532737	6456073	3	3	4	-132		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
18-Apr-2023	23:42:48	2928	AA_ENV_08			Camera	56	532741	6456077	532737	6456073	4	4	6	-135		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
18-Apr-2023	23:43:18	2929	AA_ENV_08			Camera	56	532743	6456081	532737	6456073	6	8	10	-142		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
18-Apr-2023	23:43:24	2930	AA_ENV_08			Camera	55	532743	6456082	532737	6456073	6	9	10	-144		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
18-Apr-2023	23:43:54	2931	AA_ENV_08			Camera	55	532745	6456085	532737	6456073	9	12	15	-143		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
18-Apr-2023	23:44:33	2932	AA_ENV_08			Camera	56	532747	6456089	532737	6456073	11	16	19	-146		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
18-Apr-2023	23:44:50	2933	AA_ENV_08			Camera	55	532749	6456089	532737	6456073	12	16	20	-143		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
18-Apr-2023	23:45:03	2934	AA_ENV_08			Camera	55	532750	6456091	532737	6456073	13	17	22	-143		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
18-Apr-2023	23:45:13	2935	AA_ENV_08			Camera	55	532750	6456091	532737	6456073	14	18	23	-143		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
18-Apr-2023	23:45:22	2936	AA_ENV_08			Camera	55	532752	6456091	532737	6456073	15	18	23	-140		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
18-Apr-2023	23:45:50	2937	AA_ENV_08			Camera	55	532752	6456094	532737	6456073	16	21	26	-143		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
18-Apr-2023	23:46:22	2938	AA_ENV_08			Camera	55	532755	6456095	532737	6456073	19	22	29	-140		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
18-Apr-2023	23:46:40	2939	AA_ENV_08			Camera	55	532758	6456097	532737	6456073	22	24	33	-138		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
18-Apr-2023	23:46:56	2940	AA_ENV_08			Camera	55	532761	6456100	532737	6456073	24	27	36	-138		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
18-Apr-2023	23:47:29	2941	AA_ENV_08			Camera	55	532764	6456104	532737	6456073	28	31	42	-138		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
18-Apr-2023	23:47:56	2942	AA_ENV_08			Camera	56	532767	6456108	532737	6456073	30	35	46	-139		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
18-Apr-2023	23:48:14	2943	AA_ENV_08			Camera	56	532767	6456110	532737	6456073	30	37	48	-141		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
19-Apr-2023	01:16:27	2944	AA_ENV_11			Camera	54	532487	6458681	532532	6458657	-45	25	51	119		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
19-Apr-2023	01:17:08	2945	AA_ENV_11			Camera	54	532488	6458683	532532	6458657	-44	26	51	121		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
19-Apr-2023	01:17:39	2946	AA_ENV_11			Camera	54	532488	6458683	532532	6458657	-44	26	51	121		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
19-Apr-2023	01:17:47	2947	AA_ENV_11			Camera	54	532489	6458682	532532	6458657	-43	26	50	121		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
19-Apr-2023	01:18:01	2948	AA_ENV_11			Camera	54	532489	6458682	532532	6458657	-43	25	49	121		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
19-Apr-2023	01:18:19	2949	AA_ENV_11			Camera	54	532490	6458680	532532	6458657	-42	24	48	120		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
19-Apr-2023	01:18:31	2950	AA_ENV_11			Camera	54	532491	6458679	532532	6458657	-41	23	46	119		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	01:18:40	2951	AA_ENV_11			Camera	54	532493	6458678	532532	6458657	-39	22	45	119		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
19-Apr-2023	01:18:51	2952	AA_ENV_11			Camera	54	532494	6458678	532532	6458657	-38	21	43	119		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
19-Apr-2023	01:18:59	2953	AA_ENV_11			Camera	54	532495	6458677	532532	6458657	-37	21	42	120		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
19-Apr-2023	01:19:17	2954	AA_ENV_11			Camera	54	532497	6458677	532532	6458657	-35	20	40	120		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
19-Apr-2023	01:19:28	2955	AA_ENV_11			Camera	54	532498	6458676	532532	6458657	-34	20	40	120		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
19-Apr-2023	01:19:44	2956	AA_ENV_11			Camera	54	532499	6458675	532532	6458657	-33	19	38	120		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
19-Apr-2023	01:20:11	2957	AA_ENV_11			Camera	54	532502	6458674	532532	6458657	-29	17	34	120		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
19-Apr-2023	01:20:45	2958	AA_ENV_11			Camera	53	532507	6458672	532532	6458657	-25	15	30	121		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
19-Apr-2023	01:21:15	2959	AA_ENV_11			Camera	54	532512	6458670	532532	6458657	-20	13	24	124		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
19-Apr-2023	01:21:32	2960	AA_ENV_11			Camera	53	532514	6458669	532532	6458657	-18	13	22	126		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
19-Apr-2023	01:21:39	2961	AA_ENV_11			Camera	53	532515	6458669	532532	6458657	-17	12	21	126		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
19-Apr-2023	01:22:38	2962	AA_ENV_11			Camera	53	532523	6458664	532532	6458657	-9	7	12	128		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
19-Apr-2023	01:22:42	2963	AA_ENV_11			Camera	53	532523	6458664	532532	6458657	-9	7	11	128		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
19-Apr-2023	01:23:10	2964	AA_ENV_11			Camera	53	532525	6458662	532532	6458657	-7	5	8	128		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
19-Apr-2023	01:24:06	2965	AA_ENV_11			Camera	53	532532	6458658	532532	6458657	1	1	1	-150		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
19-Apr-2023	01:24:43	2966	AA_ENV_11			Camera	53	532536	6458656	532532	6458657	4	0	4	-85		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
19-Apr-2023	01:25:12	2967	AA_ENV_11			Camera	53	532538	6458655	532532	6458657	6	-1	6	-80		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
19-Apr-2023	01:25:20	2968	AA_ENV_11			Camera	53	532538	6458655	532532	6458657	7	-1	7	-80		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
19-Apr-2023	01:25:58	2969	AA_ENV_11			Camera	53	532542	6458653	532532	6458657	10	-4	11	-71		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
19-Apr-2023	01:26:12	2970	AA_ENV_11			Camera	53	532544	6458652	532532	6458657	12	-4	13	-69		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
19-Apr-2023	01:26:39	2971	AA_ENV_11			Camera	53	532546	6458651	532532	6458657	14	-5	15	-70		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
19-Apr-2023	01:27:16	2972	AA_ENV_11			Camera	53	532548	6458649	532532	6458657	17	-8	18	-65		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
19-Apr-2023	01:27:49	2973	AA_ENV_11			Camera	53	532552	6458646	532532	6458657	20	-11	23	-62		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
19-Apr-2023	01:28:10	2974	AA_ENV_11			Camera	53	532553	6458645	532532	6458657	22	-12	25	-61		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
19-Apr-2023	01:29:11	2975	AA_ENV_11			Camera	54	532555	6458642	532532	6458657	23	-15	27	-58		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
19-Apr-2023	01:29:23	2976	AA_ENV_11			Camera	54	532556	6458641	532532	6458657	24	-15	28	-58		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
19-Apr-2023	01:29:33	2977	AA_ENV_11			Camera	54	532557	6458640	532532	6458657	25	-16	30	-57		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
19-Apr-2023	01:30:04	2978	AA_ENV_11			Camera	54	532559	6458639	532532	6458657	28	-18	33	-57		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
19-Apr-2023	01:30:19	2979	AA_ENV_11			Camera	54	532561	6458638	532532	6458657	29	-19	34	-57		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
19-Apr-2023	01:30:40	2980	AA_ENV_11			Camera	54	532563	6458637	532532	6458657	31	-20	37	-58		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
19-Apr-2023	01:30:51	2981	AA_ENV_11			Camera	54	532564	6458636	532532	6458657	32	-20	38	-57		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
19-Apr-2023	01:31:18	2982	AA_ENV_11			Camera	54	532567	6458635	532532	6458657	35	-22	41	-58		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
19-Apr-2023	01:31:42	2983	AA_ENV_11			Camera	54	532569	6458634	532532	6458657	37	-23	43	-58		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
19-Apr-2023	01:32:07	2984	AA_ENV_11			Camera	54	532572	6458633	532532	6458657	40	-24	46	-59		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
19-Apr-2023	04:41:19	2985	AA_ENV_18			Camera	53	528853	6458677	528851	6458620	2	57	57	-178		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
19-Apr-2023	04:42:31	2986	AA_ENV_18			Camera	54	528851	6458675	528851	6458620	0	56	56	-180		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
19-Apr-2023	04:42:39	2987	AA_ENV_18			Camera	54	528851	6458675	528851	6458620	0	55	55	-180		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	04:42:51	2988	AA_ENV_18			Camera	54	528851	6458674	528851	6458620	0	55	55	-180		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
19-Apr-2023	04:43:03	2989	AA_ENV_18			Camera	54	528851	6458673	528851	6458620	0	54	53	-180		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
19-Apr-2023	04:43:42	2990	AA_ENV_18			Camera	54	528853	6458668	528851	6458620	2	48	48	-178		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
19-Apr-2023	04:43:56	2991	AA_ENV_18			Camera	54	528854	6458665	528851	6458620	3	46	46	-176		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
19-Apr-2023	04:44:22	2992	AA_ENV_18			Camera	54	528855	6458662	528851	6458620	4	42	42	-175		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
19-Apr-2023	04:44:34	2993	AA_ENV_18			Camera	54	528855	6458660	528851	6458620	4	40	41	-174		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
19-Apr-2023	04:44:44	2994	AA_ENV_18			Camera	54	528855	6458658	528851	6458620	4	39	39	-174		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
19-Apr-2023	04:45:10	2995	AA_ENV_18			Camera	54	528855	6458655	528851	6458620	4	35	35	-173		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
19-Apr-2023	04:45:21	2996	AA_ENV_18			Camera	54	528855	6458653	528851	6458620	4	33	33	-173		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
19-Apr-2023	04:45:30	2997	AA_ENV_18			Camera	54	528855	6458651	528851	6458620	4	31	32	-172		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
19-Apr-2023	04:45:38	2998	AA_ENV_18			Camera	54	528855	6458650	528851	6458620	4	30	31	-172		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
19-Apr-2023	04:45:43	2999	AA_ENV_18			Camera	54	528855	6458649	528851	6458620	4	30	30	-172		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
19-Apr-2023	04:45:57	3000	AA_ENV_18			Camera	54	528855	6458647	528851	6458620	4	27	28	-172		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
19-Apr-2023	04:46:05	3001	AA_ENV_18			Camera	54	528855	6458646	528851	6458620	4	26	26	-172		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
19-Apr-2023	04:46:25	3002	AA_ENV_18			Camera	54	528854	6458642	528851	6458620	3	23	23	-172		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
19-Apr-2023	04:46:42	3003	AA_ENV_18			Camera	53	528854	6458640	528851	6458620	4	21	21	-170		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
19-Apr-2023	04:46:57	3004	AA_ENV_18			Camera	53	528853	6458638	528851	6458620	2	19	19	-174		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
19-Apr-2023	04:47:06	3005	AA_ENV_18			Camera	53	528853	6458637	528851	6458620	2	17	18	-174		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
19-Apr-2023	04:47:26	3006	AA_ENV_18			Camera	53	528852	6458634	528851	6458620	1	14	14	-174		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
19-Apr-2023	04:47:49	3007	AA_ENV_18			Camera	53	528852	6458630	528851	6458620	1	11	11	-175		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
19-Apr-2023	04:47:55	3008	AA_ENV_18			Camera	53	528852	6458630	528851	6458620	1	10	10	-175		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
19-Apr-2023	04:48:21	3009	AA_ENV_18			Camera	53	528852	6458626	528851	6458620	1	6	6	-168		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
19-Apr-2023	04:48:34	3010	AA_ENV_18			Camera	54	528852	6458624	528851	6458620	1	4	4	-163		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
19-Apr-2023	04:49:00	3011	AA_ENV_18			Camera	54	528853	6458620	528851	6458620	2	0	2	-90		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
19-Apr-2023	04:49:18	3012	AA_ENV_18			Camera	54	528853	6458616	528851	6458620	2	-3	4	-30		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
19-Apr-2023	04:49:23	3013	AA_ENV_18			Camera	54	528853	6458616	528851	6458620	2	-4	4	-27		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
19-Apr-2023	04:50:16	3014	AA_ENV_18			Camera	54	528853	6458606	528851	6458620	2	-13	13	-10		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
19-Apr-2023	04:50:28	3015	AA_ENV_18			Camera	54	528853	6458605	528851	6458620	2	-15	15	-9		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
19-Apr-2023	04:50:33	3016	AA_ENV_18			Camera	54	528853	6458604	528851	6458620	3	-16	16	-10		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
19-Apr-2023	04:50:44	3017	AA_ENV_18			Camera	54	528854	6458602	528851	6458620	3	-18	18	-9		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
19-Apr-2023	04:51:07	3018	AA_ENV_18			Camera	54	528854	6458599	528851	6458620	4	-21	21	-10		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
19-Apr-2023	04:51:19	3019	AA_ENV_18			Camera	54	528855	6458597	528851	6458620	5	-23	23	-11		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
19-Apr-2023	04:51:34	3020	AA_ENV_18			Camera	55	528856	6458594	528851	6458620	5	-25	26	-11		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
19-Apr-2023	04:51:54	3021	AA_ENV_18			Camera	54	528856	6458591	528851	6458620	6	-28	29	-11		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
19-Apr-2023	04:52:15	3022	AA_ENV_18			Camera	54	528857	6458588	528851	6458620	6	-31	32	-11		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
19-Apr-2023	04:52:55	3023	AA_ENV_18			Camera	54	528857	6458583	528851	6458620	7	-36	37	-10		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
19-Apr-2023	04:53:18	3024	AA_ENV_18			Camera	54	528858	6458580	528851	6458620	7	-40	40	-10		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463				Vessel	MV *Ocean Endeavour*							
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	COG							
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93	
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon							
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N			Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	04:53:43	3025	AA_ENV_18			Camera	54	528858	6458575	528851	6458620	8	-44	45	-10		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
19-Apr-2023	04:54:04	3026	AA_ENV_18			Camera	54	528860	6458573	528851	6458620	9	-47	47	-11		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
19-Apr-2023	07:13:32	3027	AA_ENV_13			Camera	49	526656	6463741	526674	6463794	-18	-53	56	19		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
19-Apr-2023	07:13:59	3028	AA_ENV_13			Camera	49	526655	6463742	526674	6463794	-19	-52	56	20		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
19-Apr-2023	07:14:15	3029	AA_ENV_13			Camera	49	526655	6463742	526674	6463794	-19	-52	55	20		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
19-Apr-2023	07:14:25	3030	AA_ENV_13			Camera	49	526657	6463742	526674	6463794	-18	-52	55	19		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
19-Apr-2023	07:14:32	3031	AA_ENV_13			Camera	49	526656	6463743	526674	6463794	-18	-51	54	19		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
19-Apr-2023	07:14:49	3032	AA_ENV_13			Camera	49	526656	6463745	526674	6463794	-18	-49	52	20		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
19-Apr-2023	07:15:03	3033	AA_ENV_13			Camera	49	526657	6463746	526674	6463794	-17	-48	51	20		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
19-Apr-2023	07:15:24	3034	AA_ENV_13			Camera	49	526658	6463748	526674	6463794	-16	-46	48	20		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
19-Apr-2023	07:15:39	3035	AA_ENV_13			Camera	49	526659	6463751	526674	6463794	-15	-44	46	19		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
19-Apr-2023	07:15:54	3036	AA_ENV_13			Camera	49	526660	6463753	526674	6463794	-14	-42	44	19		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
19-Apr-2023	07:16:14	3037	AA_ENV_13			Camera	49	526661	6463755	526674	6463794	-13	-39	41	19		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
19-Apr-2023	07:16:38	3038	AA_ENV_13			Camera	49	526663	6463757	526674	6463794	-11	-37	38	17		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
19-Apr-2023	07:16:52	3039	AA_ENV_13			Camera	49	526664	6463759	526674	6463794	-10	-35	37	16		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
19-Apr-2023	07:17:07	3040	AA_ENV_13			Camera	49	526666	6463760	526674	6463794	-9	-34	35	14		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
19-Apr-2023	07:17:15	3041	AA_ENV_13			Camera	49	526667	6463761	526674	6463794	-7	-33	34	13		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
19-Apr-2023	07:17:31	3042	AA_ENV_13			Camera	49	526668	6463762	526674	6463794	-6	-32	32	11		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
19-Apr-2023	07:17:42	3043	AA_ENV_13			Camera	49	526669	6463764	526674	6463794	-5	-31	31	10		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
19-Apr-2023	07:18:09	3044	AA_ENV_13			Camera	49	526671	6463768	526674	6463794	-4	-26	27	8		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
19-Apr-2023	07:18:27	3045	AA_ENV_13			Camera	49	526672	6463771	526674	6463794	-3	-23	23	7		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
19-Apr-2023	07:18:51	3046	AA_ENV_13			Camera	49	526672	6463775	526674	6463794	-2	-20	20	6		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
19-Apr-2023	07:19:42	3047	AA_ENV_13			Camera	49	526672	6463783	526674	6463794	-3	-11	11	15		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
19-Apr-2023	07:19:49	3048	AA_ENV_13			Camera	49	526671	6463785	526674	6463794	-3	-9	10	19		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
19-Apr-2023	07:20:00	3049	AA_ENV_13			Camera	49	526673	6463786	526674	6463794	-2	-8	9	10		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
19-Apr-2023	07:20:16	3050	AA_ENV_13			Camera	49	526673	6463789	526674	6463794	-2	-5	5	20		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
19-Apr-2023	07:20:25	3051	AA_ENV_13			Camera	49	526674	6463789	526674	6463794	0	-5	5	6		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
19-Apr-2023	07:20:42	3052	AA_ENV_13			Camera	49	526674	6463792	526674	6463794	-1	-2	2	13		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
19-Apr-2023	07:20:54	3053	AA_ENV_13			Camera	49	526675	6463793	526674	6463794	0	-1	1	-2		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
19-Apr-2023	07:21:35	3054	AA_ENV_13			Camera	49	526677	6463796	526674	6463794	3	2	3	-131		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
19-Apr-2023	07:21:53	3055	AA_ENV_13			Camera	49	526678	6463799	526674	6463794	3	5	6	-143		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
19-Apr-2023	07:22:11	3056	AA_ENV_13			Camera	49	526679	6463801	526674	6463794	5	7	8	-145		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
19-Apr-2023	07:22:30	3057	AA_ENV_13			Camera	49	526681	6463803	526674	6463794	6	9	11	-146		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
19-Apr-2023	07:22:49	3058	AA_ENV_13			Camera	49	526682	6463806	526674	6463794	8	11	14	-145		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
19-Apr-2023	07:23:10	3059	AA_ENV_13			Camera	49	526684	6463808	526674	6463794	10	14	17	-146		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
19-Apr-2023	07:23:44	3060	AA_ENV_13			Camera	49	526687	6463813	526674	6463794	13	19	23	-145		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
19-Apr-2023	07:23:56	3061	AA_ENV_13			Camera	49	526689	6463815	526674	6463794	14	21	25	-146		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	07:24:08	3062	AA_ENV_13			Camera	49	526690	6463816	526674	6463794	15	22	27	-145		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
19-Apr-2023	07:24:21	3063	AA_ENV_13			Camera	49	526691	6463818	526674	6463794	17	24	29	-145		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
19-Apr-2023	07:24:30	3064	AA_ENV_13			Camera	49	526692	6463819	526674	6463794	18	25	30	-144		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
19-Apr-2023	07:24:44	3065	AA_ENV_13			Camera	49	526693	6463821	526674	6463794	18	27	32	-146		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
19-Apr-2023	07:25:03	3066	AA_ENV_13			Camera	49	526695	6463823	526674	6463794	21	29	35	-144		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
19-Apr-2023	07:25:23	3067	AA_ENV_13			Camera	49	526697	6463825	526674	6463794	23	31	39	-144		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
19-Apr-2023	07:25:33	3068	AA_ENV_13			Camera	49	526698	6463826	526674	6463794	24	32	40	-144		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
19-Apr-2023	07:25:42	3069	AA_ENV_13			Camera	49	526700	6463827	526674	6463794	25	33	42	-143		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
19-Apr-2023	07:25:58	3070	AA_ENV_13			Camera	49	526701	6463830	526674	6463794	26	36	45	-144		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
19-Apr-2023	08:36:30	3071	AA_ENV_37			Camera	50	527217	6462090	527224	6462147	-7	-57	57	7		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
19-Apr-2023	08:37:18	3072	AA_ENV_37			Camera	50	527219	6462095	527224	6462147	-6	-52	52	6		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
19-Apr-2023	08:38:27	3073	AA_ENV_37			Camera	50	527221	6462105	527224	6462147	-3	-41	42	5		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
19-Apr-2023	08:38:38	3074	AA_ENV_37			Camera	50	527222	6462107	527224	6462147	-3	-40	40	4		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
19-Apr-2023	08:39:07	3075	AA_ENV_37			Camera	50	527222	6462112	527224	6462147	-2	-34	34	4		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
19-Apr-2023	08:39:14	3076	AA_ENV_37			Camera	50	527222	6462113	527224	6462147	-2	-33	33	4		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
19-Apr-2023	08:39:23	3077	AA_ENV_37			Camera	50	527222	6462115	527224	6462147	-2	-32	32	4		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
19-Apr-2023	08:39:25	3078	AA_ENV_37			Camera	50	527222	6462115	527224	6462147	-2	-32	32	4		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
19-Apr-2023	08:39:45	3079	AA_ENV_37			Camera	50	527222	6462118	527224	6462147	-2	-29	29	5		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
19-Apr-2023	08:39:51	3080	AA_ENV_37			Camera	50	527222	6462119	527224	6462147	-2	-28	28	5		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
19-Apr-2023	08:39:57	3081	AA_ENV_37			Camera	50	527222	6462119	527224	6462147	-2	-27	27	5		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
19-Apr-2023	08:40:11	3082	AA_ENV_37			Camera	50	527222	6462122	527224	6462147	-2	-25	25	5		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
19-Apr-2023	08:40:26	3083	AA_ENV_37			Camera	50	527222	6462124	527224	6462147	-2	-23	23	6		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
19-Apr-2023	08:40:32	3084	AA_ENV_37			Camera	50	527222	6462125	527224	6462147	-2	-22	22	7		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
19-Apr-2023	08:40:38	3085	AA_ENV_37			Camera	50	527222	6462126	527224	6462147	-2	-20	20	6		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
19-Apr-2023	08:40:44	3086	AA_ENV_37			Camera	50	527222	6462127	527224	6462147	-2	-20	20	7		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
19-Apr-2023	08:40:46	3087	AA_ENV_37			Camera	50	527222	6462128	527224	6462147	-3	-19	19	8		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
19-Apr-2023	08:40:55	3088	AA_ENV_37			Camera	50	527222	6462129	527224	6462147	-2	-18	18	8		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
19-Apr-2023	08:41:04	3089	AA_ENV_37			Camera	50	527222	6462130	527224	6462147	-2	-16	17	9		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
19-Apr-2023	08:41:10	3090	AA_ENV_37			Camera	50	527222	6462131	527224	6462147	-2	-15	15	8		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
19-Apr-2023	08:41:31	3091	AA_ENV_37			Camera	50	527222	6462134	527224	6462147	-2	-13	13	10		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
19-Apr-2023	08:41:57	3092	AA_ENV_37			Camera	50	527223	6462136	527224	6462147	-1	-10	10	7		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
19-Apr-2023	08:42:08	3093	AA_ENV_37			Camera	50	527224	6462138	527224	6462147	0	-9	9	1		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
19-Apr-2023	08:42:19	3094	AA_ENV_37			Camera	50	527225	6462139	527224	6462147	1	-8	8	-5		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
19-Apr-2023	08:42:36	3095	AA_ENV_37			Camera	50	527226	6462141	527224	6462147	1	-5	5	-16		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
19-Apr-2023	08:42:45	3096	AA_ENV_37			Camera	50	527227	6462142	527224	6462147	2	-4	5	-27		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
19-Apr-2023	08:43:21	3097	AA_ENV_37			Camera	50	527227	6462148	527224	6462147	2	1	2	-118		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
19-Apr-2023	08:43:30	3098	AA_ENV_37			Camera	50	527226	6462149	527224	6462147	2	2	3	-135		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	08:43:50	3099	AA_ENV_37			Camera	50	527225	6462151	527224	6462147	0	5	5	-175		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
19-Apr-2023	08:44:10	3100	AA_ENV_37			Camera	50	527222	6462154	527224	6462147	-3	7	7	159		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
19-Apr-2023	08:44:29	3101	AA_ENV_37			Camera	50	527220	6462157	527224	6462147	-4	10	11	157		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
19-Apr-2023	08:44:39	3102	AA_ENV_37			Camera	50	527219	6462158	527224	6462147	-5	12	13	156		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
19-Apr-2023	08:45:05	3103	AA_ENV_37			Camera	50	527217	6462163	527224	6462147	-7	16	18	156		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
19-Apr-2023	08:45:13	3104	AA_ENV_37			Camera	50	527217	6462164	527224	6462147	-7	18	19	157		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
19-Apr-2023	08:45:24	3105	AA_ENV_37			Camera	50	527217	6462166	527224	6462147	-8	19	21	158		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
19-Apr-2023	08:45:49	3106	AA_ENV_37			Camera	50	527216	6462170	527224	6462147	-8	23	25	161		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
19-Apr-2023	08:45:55	3107	AA_ENV_37			Camera	50	527217	6462171	527224	6462147	-8	24	26	163		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
19-Apr-2023	08:46:05	3108	AA_ENV_37			Camera	50	527217	6462173	527224	6462147	-7	26	27	164		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
19-Apr-2023	08:46:23	3109	AA_ENV_37			Camera	50	527218	6462175	527224	6462147	-6	28	29	168		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
19-Apr-2023	08:46:31	3110	AA_ENV_37			Camera	50	527218	6462176	527224	6462147	-6	29	30	168		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
19-Apr-2023	08:46:53	3111	AA_ENV_37			Camera	50	527220	6462179	527224	6462147	-5	33	33	172		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
19-Apr-2023	08:47:16	3112	AA_ENV_37			Camera	50	527221	6462184	527224	6462147	-3	37	37	175		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
19-Apr-2023	08:47:25	3113	AA_ENV_37			Camera	50	527222	6462185	527224	6462147	-2	39	39	176		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
19-Apr-2023	08:47:48	3114	AA_ENV_37			Camera	50	527223	6462190	527224	6462147	-2	43	43	178		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
19-Apr-2023	08:48:00	3115	AA_ENV_37			Camera	50	527223	6462192	527224	6462147	-1	46	46	179		(Corr'd Nav, Kongsberg 14208, img#45) (B) (T.A)
19-Apr-2023	08:48:11	3116	AA_ENV_37			Camera	50	527224	6462194	527224	6462147	0	48	48	180		(Corr'd Nav, Kongsberg 14208, img#46) (B) (T.A)
19-Apr-2023	08:48:31	3117	AA_ENV_37			Camera	50	527224	6462198	527224	6462147	0	51	51	180		(Corr'd Nav, Kongsberg 14208, img#47) (B) (T.A)
19-Apr-2023	09:28:57	3118	AA_ENV_31			Camera	50	525972	6460667	525974	6460723	-2	-56	56	2		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
19-Apr-2023	09:29:11	3119	AA_ENV_31			Camera	50	525972	6460668	525974	6460723	-2	-55	55	2		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
19-Apr-2023	09:30:01	3120	AA_ENV_31			Camera	50	525974	6460671	525974	6460723	0	-52	52	0		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
19-Apr-2023	09:30:15	3121	AA_ENV_31			Camera	50	525976	6460673	525974	6460723	2	-50	50	-2		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
19-Apr-2023	09:30:23	3122	AA_ENV_31			Camera	50	525976	6460675	525974	6460723	2	-48	48	-2		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
19-Apr-2023	09:31:00	3123	AA_ENV_31			Camera	50	525978	6460681	525974	6460723	3	-42	42	-5		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
19-Apr-2023	09:31:08	3124	AA_ENV_31			Camera	50	525978	6460683	525974	6460723	3	-39	39	-5		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
19-Apr-2023	09:31:50	3125	AA_ENV_31			Camera	52	525976	6460691	525974	6460723	2	-32	32	-3		(Raw Nav, Kongsberg 14208, img#8) (B)
19-Apr-2023	09:31:56	3125a	AA_ENV_31			Camera	50	525975	6460692	525974	6460723	1	-30	30	-2		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A) #Double Fix
19-Apr-2023	09:32:32	3126	AA_ENV_31			Camera	50	525973	6460695	525974	6460723	-2	-28	28	3		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
19-Apr-2023	09:33:06	3127	AA_ENV_31			Camera	50	525971	6460694	525974	6460723	-4	-28	28	7		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
19-Apr-2023	09:33:45	3128	AA_ENV_31			Camera	50	525970	6460695	525974	6460723	-5	-28	28	10		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
19-Apr-2023	09:34:09	3129	AA_ENV_31			Camera	50	525970	6460696	525974	6460723	-5	-27	27	10		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
19-Apr-2023	09:34:32	3130	AA_ENV_31			Camera	50	525970	6460699	525974	6460723	-4	-24	24	10		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
19-Apr-2023	09:34:41	3131	AA_ENV_31			Camera	50	525971	6460700	525974	6460723	-4	-23	23	10		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
19-Apr-2023	09:35:01	3132	AA_ENV_31			Camera	50	525971	6460703	525974	6460723	-3	-20	20	10		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
19-Apr-2023	09:35:22	3133	AA_ENV_31			Camera	50	525971	6460707	525974	6460723	-3	-16	16	12		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
19-Apr-2023	09:35:46	3134	AA_ENV_31			Camera	50	525971	6460710	525974	6460723	-3	-12	13	16		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	09:35:57	3135	AA_ENV_31			Camera	50	525971	6460712	525974	6460723	-3	-11	11	18		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
19-Apr-2023	09:36:06	3136	AA_ENV_31			Camera	50	525971	6460713	525974	6460723	-3	-9	10	20		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
19-Apr-2023	09:36:18	3137	AA_ENV_31			Camera	50	525971	6460715	525974	6460723	-3	-8	8	22		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
19-Apr-2023	09:36:26	3138	AA_ENV_31			Camera	50	525972	6460717	525974	6460723	-2	-6	6	22		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
19-Apr-2023	09:36:32	3139	AA_ENV_31			Camera	50	525972	6460718	525974	6460723	-3	-5	5	30		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
19-Apr-2023	09:36:37	3140	AA_ENV_31			Camera	50	525972	6460719	525974	6460723	-2	-4	5	29		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
19-Apr-2023	09:36:44	3141	AA_ENV_31			Camera	50	525972	6460720	525974	6460723	-2	-3	4	39		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
19-Apr-2023	09:37:16	3142	AA_ENV_31			Camera	50	525975	6460724	525974	6460723	0	2	2	-165		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
19-Apr-2023	09:37:27	3143	AA_ENV_31			Camera	50	525976	6460726	525974	6460723	2	3	4	-151		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
19-Apr-2023	09:37:40	3144	AA_ENV_31			Camera	50	525977	6460728	525974	6460723	3	5	6	-153		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
19-Apr-2023	09:37:50	3145	AA_ENV_31			Camera	50	525977	6460729	525974	6460723	3	7	7	-157		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
19-Apr-2023	09:38:13	3146	AA_ENV_31			Camera	50	525977	6460733	525974	6460723	3	11	11	-165		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
19-Apr-2023	09:38:23	3147	AA_ENV_31			Camera	50	525977	6460735	525974	6460723	3	12	12	-166		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
19-Apr-2023	09:39:02	3148	AA_ENV_31			Camera	50	525974	6460741	525974	6460723	0	18	18	180		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
19-Apr-2023	09:39:13	3149	AA_ENV_31			Camera	50	525973	6460743	525974	6460723	-2	20	20	175		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
19-Apr-2023	09:39:41	3150	AA_ENV_31			Camera	50	525970	6460749	525974	6460723	-4	26	26	171		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
19-Apr-2023	09:39:56	3151	AA_ENV_31			Camera	50	525969	6460751	525974	6460723	-5	29	29	170		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
19-Apr-2023	09:40:13	3152	AA_ENV_31			Camera	50	525968	6460755	525974	6460723	-7	32	33	168		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
19-Apr-2023	09:40:21	3153	AA_ENV_31			Camera	50	525967	6460756	525974	6460723	-7	33	34	168		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
19-Apr-2023	09:40:36	3154	AA_ENV_31			Camera	50	525967	6460758	525974	6460723	-8	36	36	168		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
19-Apr-2023	09:40:47	3155	AA_ENV_31			Camera	50	525966	6460760	525974	6460723	-8	37	38	168		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
19-Apr-2023	09:40:51	3156	AA_ENV_31			Camera	50	525966	6460761	525974	6460723	-8	38	39	168		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
19-Apr-2023	09:41:02	3157	AA_ENV_31			Camera	50	525966	6460762	525974	6460723	-8	40	40	168		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
19-Apr-2023	09:41:17	3158	AA_ENV_31			Camera	50	525966	6460764	525974	6460723	-8	42	42	169		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
19-Apr-2023	09:41:24	3159	AA_ENV_31			Camera	50	525966	6460766	525974	6460723	-8	43	44	169		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
19-Apr-2023	09:41:41	3160	AA_ENV_31			Camera	50	525967	6460768	525974	6460723	-8	45	46	170		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
19-Apr-2023	11:00:35	3161	AA_ENV_03			Camera	54	523378	6459827	523393	6459876	-15	-48	51	17		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
19-Apr-2023	11:00:45	3162	AA_ENV_03			Camera	54	523379	6459827	523393	6459876	-14	-49	51	15		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
19-Apr-2023	11:00:59	3163	AA_ENV_03			Camera	54	523381	6459828	523393	6459876	-12	-47	49	15		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
19-Apr-2023	11:01:13	3164	AA_ENV_03			Camera	55	523382	6459830	523393	6459876	-11	-45	46	13		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
19-Apr-2023	11:01:28	3165	AA_ENV_03			Camera	54	523383	6459832	523393	6459876	-9	-43	44	12		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
19-Apr-2023	11:01:49	3166	AA_ENV_03			Camera	54	523385	6459835	523393	6459876	-8	-41	41	11		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
19-Apr-2023	11:02:00	3167	AA_ENV_03			Camera	54	523386	6459836	523393	6459876	-6	-40	40	9		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
19-Apr-2023	11:02:21	3168	AA_ENV_03			Camera	54	523388	6459839	523393	6459876	-5	-37	37	8		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
19-Apr-2023	11:02:32	3169	AA_ENV_03			Camera	54	523388	6459842	523393	6459876	-5	-34	34	8		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
19-Apr-2023	11:02:54	3170	AA_ENV_03			Camera	54	523388	6459845	523393	6459876	-5	-31	31	9		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
19-Apr-2023	11:03:19	3171	AA_ENV_03			Camera	54	523388	6459848	523393	6459876	-5	-27	28	10		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463				Vessel	MV *Ocean Endeavour*							
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	COG							
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93	
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon							
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N			Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	11:05:06	3172	AA_ENV_03			Camera	54	523390	6459856	523393	6459876	-3	-20	20	7		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
19-Apr-2023	11:05:33	3173	AA_ENV_03			Camera	54	523390	6459860	523393	6459876	-2	-16	16	9		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
19-Apr-2023	11:06:05	3174	AA_ENV_03			Camera	54	523391	6459865	523393	6459876	-2	-11	11	9		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
19-Apr-2023	11:06:25	3175	AA_ENV_03			Camera	55	523392	6459868	523393	6459876	-1	-8	8	9		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
19-Apr-2023	11:06:33	3176	AA_ENV_03			Camera	55	523391	6459870	523393	6459876	-2	-6	6	17		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
19-Apr-2023	11:06:48	3177	AA_ENV_03			Camera	54	523390	6459872	523393	6459876	-3	-4	5	35		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
19-Apr-2023	11:07:03	3178	AA_ENV_03			Camera	55	523393	6459873	523393	6459876	0	-3	3	4		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
19-Apr-2023	11:07:11	3179	AA_ENV_03			Camera	55	523391	6459876	523393	6459876	-2	0	2	92		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
19-Apr-2023	11:07:24	3180	AA_ENV_03			Camera	55	523392	6459875	523393	6459876	-1	0	1	72		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
19-Apr-2023	11:07:43	3181	AA_ENV_03			Camera	55	523392	6459879	523393	6459876	-1	3	3	162		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
19-Apr-2023	11:08:29	3182	AA_ENV_03			Camera	55	523393	6459882	523393	6459876	0	6	6	-178		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
19-Apr-2023	11:08:37	3183	AA_ENV_03			Camera	55	523395	6459880	523393	6459876	2	4	5	-158		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
19-Apr-2023	11:08:51	3184	AA_ENV_03			Camera	55	523394	6459883	523393	6459876	2	7	7	-168		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
19-Apr-2023	11:09:03	3185	AA_ENV_03			Camera	55	523395	6459884	523393	6459876	3	8	8	-162		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
19-Apr-2023	11:09:22	3186	AA_ENV_03			Camera	55	523397	6459885	523393	6459876	4	9	10	-158		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
19-Apr-2023	11:09:37	3187	AA_ENV_03			Camera	55	523396	6459887	523393	6459876	3	11	12	-163		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
19-Apr-2023	11:09:49	3188	AA_ENV_03			Camera	55	523396	6459888	523393	6459876	4	13	13	-164		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
19-Apr-2023	11:10:19	3189	AA_ENV_03			Camera	55	523396	6459890	523393	6459876	4	14	15	-166		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
19-Apr-2023	11:10:48	3190	AA_ENV_03			Camera	55	523396	6459893	523393	6459876	3	17	17	-170		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
19-Apr-2023	11:11:07	3191	AA_ENV_03			Camera	55	523396	6459895	523393	6459876	3	19	19	-171		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
19-Apr-2023	11:11:37	3192	AA_ENV_03			Camera	55	523396	6459898	523393	6459876	3	23	23	-171		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
19-Apr-2023	11:12:05	3193	AA_ENV_03			Camera	55	523396	6459903	523393	6459876	4	27	27	-172		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
19-Apr-2023	11:12:15	3194	AA_ENV_03			Camera	55	523397	6459904	523393	6459876	4	28	28	-172		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
19-Apr-2023	11:12:35	3195	AA_ENV_03			Camera	55	523396	6459907	523393	6459876	3	32	32	-174		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
19-Apr-2023	11:12:55	3196	AA_ENV_03			Camera	55	523396	6459910	523393	6459876	3	34	34	-175		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
19-Apr-2023	11:13:14	3197	AA_ENV_03			Camera	55	523395	6459913	523393	6459876	3	37	37	-176		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
19-Apr-2023	11:13:29	3198	AA_ENV_03			Camera	55	523395	6459915	523393	6459876	2	39	39	-177		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
19-Apr-2023	11:13:52	3199	AA_ENV_03			Camera	55	523395	6459918	523393	6459876	2	42	42	-177		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
19-Apr-2023	11:14:15	3200	AA_ENV_03			Camera	55	523394	6459921	523393	6459876	2	45	45	-178		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
19-Apr-2023	11:14:43	3201	AA_ENV_03			Camera	55	523394	6459923	523393	6459876	2	47	47	-178		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
19-Apr-2023	12:24:10	3202	AA_ENV_04			Camera	53	520893	6459430	520938	6459461	-45	-31	54	55		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
19-Apr-2023	12:24:33	3203	AA_ENV_04			Camera	53	520893	6459431	520938	6459461	-44	-30	53	56		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
19-Apr-2023	12:24:54	3204	AA_ENV_04			Camera	53	520894	6459432	520938	6459461	-43	-28	52	57		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
19-Apr-2023	12:25:03	3205	AA_ENV_04			Camera	53	520896	6459434	520938	6459461	-42	-27	49	57		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
19-Apr-2023	12:25:25	3206	AA_ENV_04			Camera	53	520899	6459436	520938	6459461	-39	-25	46	57		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A) # No photo taken
19-Apr-2023	12:26:41	3207	AA_ENV_04			Camera	53	520905	6459442	520938	6459461	-32	-19	37	60		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
19-Apr-2023	12:27:10	3208	AA_ENV_04			Camera	53	520903	6459442	520938	6459461	-35	-19	39	62		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	12:27:52	3209	AA_ENV_04			Camera	53	520904	6459443	520938	6459461	-34	-18	39	62		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
19-Apr-2023	12:28:19	3210	AA_ENV_04			Camera	53	520906	6459443	520938	6459461	-32	-18	37	61		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
19-Apr-2023	12:28:46	3211	AA_ENV_04			Camera	53	520909	6459444	520938	6459461	-29	-17	34	60		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
19-Apr-2023	12:29:08	3212	AA_ENV_04			Camera	53	520911	6459445	520938	6459461	-27	-16	31	60		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
19-Apr-2023	12:29:17	3213	AA_ENV_04			Camera	53	520912	6459446	520938	6459461	-25	-15	30	59		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
19-Apr-2023	12:29:57	3214	AA_ENV_04			Camera	53	520917	6459448	520938	6459461	-21	-13	24	59		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
19-Apr-2023	12:30:36	3215	AA_ENV_04			Camera	53	520921	6459452	520938	6459461	-17	-9	19	62		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
19-Apr-2023	12:31:05	3216	AA_ENV_04			Camera	53	520922	6459454	520938	6459461	-15	-7	17	65		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
19-Apr-2023	12:31:22	3217	AA_ENV_04			Camera	53	520924	6459455	520938	6459461	-14	-6	15	67		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
19-Apr-2023	12:32:10	3218	AA_ENV_04			Camera	53	520928	6459457	520938	6459461	-10	-4	11	67		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
19-Apr-2023	12:32:22	3219	AA_ENV_04			Camera	53	520930	6459457	520938	6459461	-8	-4	9	64		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
19-Apr-2023	12:32:56	3220	AA_ENV_04			Camera	53	520932	6459458	520938	6459461	-5	-3	6	59		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
19-Apr-2023	12:33:11	3221	AA_ENV_04			Camera	53	520933	6459458	520938	6459461	-4	-3	5	53		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
19-Apr-2023	12:33:23	3222	AA_ENV_04			Camera	53	520935	6459458	520938	6459461	-3	-3	4	49		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
19-Apr-2023	12:33:34	3223	AA_ENV_04			Camera	53	520936	6459459	520938	6459461	-2	-2	3	37		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
19-Apr-2023	12:33:47	3224	AA_ENV_04			Camera	53	520937	6459459	520938	6459461	0	-2	2	8		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
19-Apr-2023	12:33:56	3225	AA_ENV_04			Camera	53	520938	6459460	520938	6459461	1	-1	1	-44		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
19-Apr-2023	12:34:12	3226	AA_ENV_04			Camera	53	520941	6459461	520938	6459461	3	0	3	-84		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
19-Apr-2023	12:34:23	3227	AA_ENV_04			Camera	53	520943	6459461	520938	6459461	5	0	5	-92		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
19-Apr-2023	12:34:43	3228	AA_ENV_04			Camera	53	520945	6459462	520938	6459461	7	1	7	-95		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
19-Apr-2023	12:35:04	3229	AA_ENV_04			Camera	53	520947	6459462	520938	6459461	9	1	9	-97		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
19-Apr-2023	12:35:30	3230	AA_ENV_04			Camera	53	520950	6459463	520938	6459461	12	2	12	-99		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
19-Apr-2023	12:35:46	3231	AA_ENV_04			Camera	53	520952	6459463	520938	6459461	15	2	15	-100		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
19-Apr-2023	12:35:56	3232	AA_ENV_04			Camera	53	520953	6459464	520938	6459461	16	3	16	-101		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
19-Apr-2023	12:36:18	3233	AA_ENV_04			Camera	53	520957	6459465	520938	6459461	19	5	19	-104		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
19-Apr-2023	12:36:24	3234	AA_ENV_04			Camera	53	520957	6459466	520938	6459461	20	5	20	-104		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
19-Apr-2023	12:36:41	3235	AA_ENV_04			Camera	53	520960	6459467	520938	6459461	23	6	23	-105		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
19-Apr-2023	12:37:02	3236	AA_ENV_04			Camera	53	520963	6459468	520938	6459461	25	7	26	-106		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
19-Apr-2023	12:37:25	3237	AA_ENV_04			Camera	53	520966	6459470	520938	6459461	28	9	29	-108		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
19-Apr-2023	12:37:57	3238	AA_ENV_04			Camera	53	520969	6459472	520938	6459461	32	11	34	-109		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
19-Apr-2023	12:38:10	3239	AA_ENV_04			Camera	53	520971	6459473	520938	6459461	33	12	35	-110		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
19-Apr-2023	12:38:23	3240	AA_ENV_04			Camera	53	520972	6459473	520938	6459461	34	13	37	-110		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
19-Apr-2023	12:39:16	3241	AA_ENV_04			Camera	53	520978	6459478	520938	6459461	40	18	44	-114		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
19-Apr-2023	12:40:01	3242	AA_ENV_04			Camera	53	520981	6459482	520938	6459461	43	21	48	-116		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
19-Apr-2023	15:15:49	3243	AA_ENV_35			Camera	54	521375	6462947	521411	6462903	-36	44	56	141		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
19-Apr-2023	15:17:02	3244	AA_ENV_35			Camera	54	521379	6462942	521411	6462903	-32	39	50	141		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
19-Apr-2023	15:17:29	3245	AA_ENV_35			Camera	54	521380	6462941	521411	6462903	-31	38	49	141		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*							
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG							
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93	
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon							
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N			Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
19-Apr-2023	15:18:03	3246	AA_ENV_35			Camera	54	521381	6462939	521411	6462903	-30	36	47	141		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
19-Apr-2023	15:18:29	3247	AA_ENV_35			Camera	54	521382	6462938	521411	6462903	-28	35	45	141		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
19-Apr-2023	15:18:50	3248	AA_ENV_35			Camera	54	521384	6462937	521411	6462903	-27	34	44	142		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
19-Apr-2023	15:19:00	3249	AA_ENV_35			Camera	54	521384	6462936	521411	6462903	-27	33	43	141		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
19-Apr-2023	15:19:29	3250	AA_ENV_35			Camera	54	521386	6462935	521411	6462903	-25	32	40	142		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
19-Apr-2023	15:20:22	3251	AA_ENV_35			Camera	54	521388	6462932	521411	6462903	-23	29	37	142		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
19-Apr-2023	15:21:03	3252	AA_ENV_35			Camera	54	521390	6462929	521411	6462903	-20	26	33	142		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
19-Apr-2023	15:21:40	3253	AA_ENV_35			Camera	53	521394	6462926	521411	6462903	-16	23	28	145		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
19-Apr-2023	15:22:16	3254	AA_ENV_35			Camera	53	521398	6462923	521411	6462903	-13	20	23	147		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
19-Apr-2023	15:22:45	3255	AA_ENV_35			Camera	53	521400	6462920	521411	6462903	-11	17	20	148		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
19-Apr-2023	15:23:28	3256	AA_ENV_35			Camera	53	521403	6462917	521411	6462903	-7	14	16	153		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
19-Apr-2023	15:23:42	3257	AA_ENV_35			Camera	53	521405	6462917	521411	6462903	-6	14	15	157		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
19-Apr-2023	15:24:04	3258	AA_ENV_35			Camera	53	521407	6462915	521411	6462903	-3	12	13	164		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
19-Apr-2023	15:24:37	3259	AA_ENV_35			Camera	53	521411	6462912	521411	6462903	0	9	9	-179		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
19-Apr-2023	15:25:03	3260	AA_ENV_35			Camera	53	521412	6462910	521411	6462903	1	7	8	-170		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
19-Apr-2023	15:25:16	3261	AA_ENV_35			Camera	53	521413	6462910	521411	6462903	2	7	7	-161		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
19-Apr-2023	15:25:32	3262	AA_ENV_35			Camera	53	521415	6462909	521411	6462903	4	6	7	-146		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
19-Apr-2023	15:25:54	3263	AA_ENV_35			Camera	53	521417	6462908	521411	6462903	6	5	8	-129		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
19-Apr-2023	15:26:13	3264	AA_ENV_35			Camera	53	521418	6462907	521411	6462903	8	4	9	-115		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
19-Apr-2023	15:26:23	3265	AA_ENV_35			Camera	54	521420	6462906	521411	6462903	9	3	10	-108		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
19-Apr-2023	15:26:33	3266	AA_ENV_35			Camera	53	521420	6462905	521411	6462903	10	2	10	-104		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
19-Apr-2023	15:27:09	3267	AA_ENV_35			Camera	53	521423	6462903	521411	6462903	13	0	13	-91		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
19-Apr-2023	15:27:24	3268	AA_ENV_35			Camera	54	521424	6462902	521411	6462903	14	-1	14	-88		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
19-Apr-2023	15:27:43	3269	AA_ENV_35			Camera	54	521425	6462901	521411	6462903	15	-2	15	-83		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
19-Apr-2023	15:27:55	3270	AA_ENV_35			Camera	54	521426	6462900	521411	6462903	16	-3	16	-81		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
19-Apr-2023	15:28:22	3271	AA_ENV_35			Camera	54	521428	6462898	521411	6462903	18	-5	18	-74		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
19-Apr-2023	15:28:34	3272	AA_ENV_35			Camera	54	521429	6462897	521411	6462903	19	-6	20	-72		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
19-Apr-2023	15:28:50	3273	AA_ENV_35			Camera	54	521431	6462895	521411	6462903	21	-8	22	-70		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
19-Apr-2023	15:29:01	3274	AA_ENV_35			Camera	54	521432	6462894	521411	6462903	22	-9	23	-68		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
19-Apr-2023	15:29:44	3275	AA_ENV_35			Camera	54	521435	6462892	521411	6462903	24	-11	26	-66		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
19-Apr-2023	15:29:51	3276	AA_ENV_35			Camera	54	521435	6462892	521411	6462903	24	-11	27	-65		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
19-Apr-2023	15:30:14	3277	AA_ENV_35			Camera	54	521437	6462890	521411	6462903	26	-13	29	-64		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
19-Apr-2023	15:30:41	3278	AA_ENV_35			Camera	54	521439	6462888	521411	6462903	28	-15	32	-63		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
19-Apr-2023	15:31:16	3279	AA_ENV_35			Camera	54	521442	6462885	521411	6462903	32	-18	37	-60		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
19-Apr-2023	15:31:37	3280	AA_ENV_35			Camera	54	521444	6462882	521411	6462903	34	-21	40	-59		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
19-Apr-2023	15:32:06	3281	AA_ENV_35			Camera	54	521447	6462879	521411	6462903	37	-25	44	-56		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
19-Apr-2023	15:32:29	3282	AA_ENV_35			Camera	54	521449	6462876	521411	6462903	39	-27	47	-55		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
20-Apr-2023	14:44:42	3283	AA_ENV_33			Camera	54	523202	6467421	523255	6467414	-53	7	53	98		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
20-Apr-2023	14:44:58	3284	AA_ENV_33			Camera	54	523203	6467422	523255	6467414	-52	7	53	98		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
20-Apr-2023	14:45:25	3285	AA_ENV_33			Camera	54	523205	6467422	523255	6467414	-50	8	51	99		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
20-Apr-2023	14:45:49	3286	AA_ENV_33			Camera	54	523208	6467423	523255	6467414	-47	9	48	101		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
20-Apr-2023	14:46:09	3287	AA_ENV_33			Camera	54	523211	6467424	523255	6467414	-45	10	46	102		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
20-Apr-2023	14:46:19	3288	AA_ENV_33			Camera	54	523212	6467425	523255	6467414	-43	10	44	104		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
20-Apr-2023	14:46:37	3289	AA_ENV_33			Camera	54	523214	6467425	523255	6467414	-41	11	42	105		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
20-Apr-2023	14:47:13	3290	AA_ENV_33			Camera	54	523219	6467425	523255	6467414	-36	11	38	107		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
20-Apr-2023	14:47:41	3291	AA_ENV_33			Camera	54	523223	6467424	523255	6467414	-32	10	33	108		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
20-Apr-2023	14:48:15	3292	AA_ENV_33			Camera	54	523228	6467423	523255	6467414	-28	9	29	108		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
20-Apr-2023	14:48:29	3293	AA_ENV_33			Camera	54	523229	6467423	523255	6467414	-26	8	27	108		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
20-Apr-2023	14:48:51	3294	AA_ENV_33			Camera	54	523233	6467421	523255	6467414	-23	7	24	108		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
20-Apr-2023	14:49:13	3295	AA_ENV_33			Camera	54	523235	6467421	523255	6467414	-20	7	21	109		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
20-Apr-2023	14:50:02	3296	AA_ENV_33			Camera	54	523241	6467418	523255	6467414	-14	4	15	107		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
20-Apr-2023	14:50:15	3297	AA_ENV_33			Camera	54	523243	6467418	523255	6467414	-12	3	13	105		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
20-Apr-2023	14:50:30	3298	AA_ENV_33			Camera	54	523245	6467417	523255	6467414	-10	3	10	105		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
20-Apr-2023	14:50:47	3299	AA_ENV_33			Camera	54	523248	6467416	523255	6467414	-8	2	8	103		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
20-Apr-2023	14:51:03	3300	AA_ENV_33			Camera	54	523249	6467416	523255	6467414	-6	1	6	103		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
20-Apr-2023	14:51:29	3301	AA_ENV_33			Camera	54	523252	6467415	523255	6467414	-3	0	3	96		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
20-Apr-2023	14:51:53	3302	AA_ENV_33			Camera	54	523255	6467414	523255	6467414	-1	0	1	91		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
20-Apr-2023	14:52:13	3303	AA_ENV_33			Camera	54	523257	6467414	523255	6467414	2	0	2	-86		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
20-Apr-2023	14:52:37	3304	AA_ENV_33			Camera	54	523259	6467413	523255	6467414	4	-1	4	-77		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
20-Apr-2023	14:52:51	3305	AA_ENV_33			Camera	54	523261	6467413	523255	6467414	6	-2	6	-75		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
20-Apr-2023	14:53:09	3306	AA_ENV_33			Camera	54	523264	6467413	523255	6467414	8	-2	9	-79		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
20-Apr-2023	14:53:20	3307	AA_ENV_33			Camera	54	523265	6467412	523255	6467414	10	-2	10	-78		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
20-Apr-2023	14:53:49	3308	AA_ENV_33			Camera	54	523269	6467411	523255	6467414	14	-3	14	-78		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
20-Apr-2023	14:54:01	3309	AA_ENV_33			Camera	54	523271	6467411	523255	6467414	16	-4	16	-77		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
20-Apr-2023	14:54:15	3310	AA_ENV_33			Camera	54	523274	6467410	523255	6467414	18	-4	19	-76		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
20-Apr-2023	14:54:29	3311	AA_ENV_33			Camera	54	523276	6467410	523255	6467414	20	-5	21	-77		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
20-Apr-2023	14:54:41	3312	AA_ENV_33			Camera	54	523277	6467410	523255	6467414	22	-5	23	-78		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
20-Apr-2023	14:54:54	3313	AA_ENV_33			Camera	54	523279	6467409	523255	6467414	24	-6	25	-77		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
20-Apr-2023	14:55:04	3314	AA_ENV_33			Camera	54	523281	6467409	523255	6467414	26	-6	26	-77		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
20-Apr-2023	14:55:23	3315	AA_ENV_33			Camera	54	523284	6467408	523255	6467414	29	-6	29	-78		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
20-Apr-2023	14:55:39	3316	AA_ENV_33			Camera	54	523286	6467408	523255	6467414	31	-7	32	-78		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
20-Apr-2023	14:55:51	3317	AA_ENV_33			Camera	54	523288	6467407	523255	6467414	33	-7	34	-78		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
20-Apr-2023	14:56:02	3318	AA_ENV_33			Camera	54	523290	6467407	523255	6467414	35	-7	36	-78		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
20-Apr-2023	14:56:17	3319	AA_ENV_33			Camera	54	523293	6467407	523255	6467414	37	-7	38	-80		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*					
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG					
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z 2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon					
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
20-Apr-2023	14:56:42	3320	AA_ENV_33			Camera	54	523297	6467407	523255	6467414	41	-7	42	-80		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
20-Apr-2023	14:57:06	3321	AA_ENV_33			Camera	54	523301	6467407	523255	6467414	46	-8	46	-81		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
20-Apr-2023	14:57:23	3322	AA_ENV_33			Camera	54	523303	6467407	523255	6467414	48	-8	49	-81		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
20-Apr-2023	16:36:42	3323	AA_ENV_14			Camera	57	519346	6467450	519351	6467394	-5	56	56	175		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
20-Apr-2023	16:37:02	3324	AA_ENV_14			Camera	57	519347	6467448	519351	6467394	-4	55	55	176		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
20-Apr-2023	16:37:40	3325	AA_ENV_14			Camera	57	519347	6467445	519351	6467394	-4	52	52	176		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
20-Apr-2023	16:37:48	3326	AA_ENV_14			Camera	57	519348	6467445	519351	6467394	-4	51	51	176		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
20-Apr-2023	16:38:44	3327	AA_ENV_14			Camera	57	519350	6467441	519351	6467394	-1	47	47	178		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
20-Apr-2023	16:39:25	3328	AA_ENV_14			Camera	57	519351	6467437	519351	6467394	-1	43	43	179		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
20-Apr-2023	16:39:54	3329	AA_ENV_14			Camera	57	519351	6467434	519351	6467394	0	41	41	180		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
20-Apr-2023	16:40:15	3330	AA_ENV_14			Camera	57	519351	6467432	519351	6467394	-1	39	39	179		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
20-Apr-2023	16:40:34	3331	AA_ENV_14			Camera	57	519351	6467431	519351	6467394	0	37	37	179		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
20-Apr-2023	16:41:06	3332	AA_ENV_14			Camera	57	519351	6467428	519351	6467394	-1	34	34	179		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
20-Apr-2023	16:41:44	3333	AA_ENV_14			Camera	57	519351	6467425	519351	6467394	-1	31	31	179		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
20-Apr-2023	16:42:30	3334	AA_ENV_14			Camera	57	519351	6467420	519351	6467394	0	26	26	179		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
20-Apr-2023	16:42:46	3335	AA_ENV_14			Camera	57	519351	6467419	519351	6467394	0	25	25	179		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
20-Apr-2023	16:43:43	3336	AA_ENV_14			Camera	57	519350	6467415	519351	6467394	-1	21	21	176		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
20-Apr-2023	16:44:31	3337	AA_ENV_14			Camera	57	519350	6467411	519351	6467394	-1	17	17	176		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
20-Apr-2023	16:44:43	3338	AA_ENV_14			Camera	57	519350	6467409	519351	6467394	-1	16	16	176		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
20-Apr-2023	16:45:20	3339	AA_ENV_14			Camera	57	519350	6467405	519351	6467394	-1	11	11	173		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
20-Apr-2023	16:45:38	3340	AA_ENV_14			Camera	57	519350	6467403	519351	6467394	-2	9	9	170		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
20-Apr-2023	16:45:53	3341	AA_ENV_14			Camera	57	519350	6467401	519351	6467394	-2	7	7	168		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
20-Apr-2023	16:46:11	3342	AA_ENV_14			Camera	57	519350	6467399	519351	6467394	-2	5	5	162		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
20-Apr-2023	16:46:40	3343	AA_ENV_14			Camera	57	519350	6467396	519351	6467394	-1	2	2	141		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
20-Apr-2023	16:46:49	3344	AA_ENV_14			Camera	57	519350	6467394	519351	6467394	-2	1	2	108		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
20-Apr-2023	16:46:58	3345	AA_ENV_14			Camera	57	519349	6467393	519351	6467394	-2	-1	2	71		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
20-Apr-2023	16:47:11	3346	AA_ENV_14			Camera	57	519349	6467392	519351	6467394	-2	-2	3	44		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
20-Apr-2023	16:47:21	3347	AA_ENV_14			Camera	57	519349	6467391	519351	6467394	-2	-3	4	32		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
20-Apr-2023	16:47:46	3348	AA_ENV_14			Camera	57	519348	6467388	519351	6467394	-3	-6	6	26		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
20-Apr-2023	16:47:57	3349	AA_ENV_14			Camera	57	519349	6467387	519351	6467394	-3	-7	8	20		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
20-Apr-2023	16:48:08	3350	AA_ENV_14			Camera	57	519349	6467386	519351	6467394	-3	-8	9	18		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
20-Apr-2023	16:48:35	3351	AA_ENV_14			Camera	57	519348	6467383	519351	6467394	-3	-11	11	14		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
20-Apr-2023	16:49:02	3352	AA_ENV_14			Camera	57	519349	6467380	519351	6467394	-3	-14	14	11		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
20-Apr-2023	16:49:45	3353	AA_ENV_14			Camera	57	519349	6467375	519351	6467394	-2	-19	19	7		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
20-Apr-2023	16:49:53	3354	AA_ENV_14			Camera	57	519349	6467374	519351	6467394	-3	-20	20	7		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
20-Apr-2023	16:50:18	3355	AA_ENV_14			Camera	57	519349	6467370	519351	6467394	-2	-24	24	4		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
20-Apr-2023	16:50:45	3356	AA_ENV_14			Camera	57	519350	6467367	519351	6467394	-1	-27	27	2		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Seabed Imagery Positioning Summary

Job No	54463	Vessel	MV *Ocean Endeavour*
Client	Caledonia Offshore Windfarm Limited	Vessel Reference Point (VRP)	COG
Project Name	Caledonia OWF Phase 2	Deployment Location	Camera Deployment Node; x 6.7; y 21.94; z 2.93
Primary Positioning System	Starpack 1	Actual Coordinates derived from	Vessel or Beacon
Geodetic Reference System	Datum: WGS 84 - WGS 84; Ellipsoid: WGS 84	Projection	UTM zone 30N; Vertical / Tidal Datum: VORF, LAT

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
20-Apr-2023	16:50:55	3357	AA_ENV_14			Camera	57	519351	6467366	519351	6467394	-1	-28	28	1		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
20-Apr-2023	16:51:14	3358	AA_ENV_14			Camera	57	519350	6467364	519351	6467394	-1	-30	30	2		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
20-Apr-2023	16:51:22	3359	AA_ENV_14			Camera	57	519350	6467363	519351	6467394	-1	-31	31	2		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
20-Apr-2023	16:51:59	3360	AA_ENV_14			Camera	57	519350	6467358	519351	6467394	-1	-36	36	2		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
20-Apr-2023	16:52:27	3361	AA_ENV_14			Camera	57	519351	6467355	519351	6467394	-1	-39	39	1		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
20-Apr-2023	16:52:56	3362	AA_ENV_14			Camera	57	519351	6467352	519351	6467394	0	-42	42	1		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
20-Apr-2023	16:53:35	3363	AA_ENV_14			Camera	57	519351	6467347	519351	6467394	0	-47	47	0		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
20-Apr-2023	17:57:48	3364	AA_ENV_36			Camera	57	519401	6465772	519419	6465726	-18	46	49	159		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
20-Apr-2023	17:58:18	3365	AA_ENV_36			Camera	57	519403	6465768	519419	6465726	-16	42	45	160		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
20-Apr-2023	17:58:37	3366	AA_ENV_36			Camera	57	519404	6465765	519419	6465726	-14	39	42	160		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
20-Apr-2023	17:59:04	3367	AA_ENV_36			Camera	57	519406	6465761	519419	6465726	-12	35	37	161		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
20-Apr-2023	17:59:12	3368	AA_ENV_36			Camera	57	519407	6465759	519419	6465726	-12	34	36	160		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
20-Apr-2023	17:59:27	3369	AA_ENV_36			Camera	57	519408	6465757	519419	6465726	-11	32	33	161		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
20-Apr-2023	17:59:36	3370	AA_ENV_36			Camera	57	519408	6465756	519419	6465726	-11	30	32	160		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
20-Apr-2023	17:59:56	3371	AA_ENV_36			Camera	57	519409	6465753	519419	6465726	-10	27	29	160		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
20-Apr-2023	18:00:13	3372	AA_ENV_36			Camera	57	519410	6465750	519419	6465726	-9	24	26	160		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
20-Apr-2023	18:00:31	3373	AA_ENV_36			Camera	57	519412	6465747	519419	6465726	-7	22	23	162		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
20-Apr-2023	18:00:43	3374	AA_ENV_36			Camera	57	519412	6465746	519419	6465726	-7	21	22	161		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
20-Apr-2023	18:01:09	3375	AA_ENV_36			Camera	57	519412	6465744	519419	6465726	-7	18	19	159		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
20-Apr-2023	18:01:54	3376	AA_ENV_36			Camera	57	519412	6465740	519419	6465726	-6	14	15	156		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
20-Apr-2023	18:02:18	3377	AA_ENV_36			Camera	57	519414	6465737	519419	6465726	-4	11	12	159		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
20-Apr-2023	18:02:34	3378	AA_ENV_36			Camera	57	519416	6465735	519419	6465726	-3	10	10	162		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
20-Apr-2023	18:02:53	3379	AA_ENV_36			Camera	57	519417	6465733	519419	6465726	-1	8	8	169		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
20-Apr-2023	18:03:34	3380	AA_ENV_36			Camera	57	519420	6465727	519419	6465726	1	1	2	-134		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
20-Apr-2023	18:03:49	3381	AA_ENV_36			Camera	57	519420	6465725	519419	6465726	2	-1	2	-68		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
20-Apr-2023	18:04:13	3382	AA_ENV_36			Camera	57	519420	6465722	519419	6465726	2	-3	4	-25		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
20-Apr-2023	18:04:21	3383	AA_ENV_36			Camera	57	519421	6465721	519419	6465726	2	-4	5	-25		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
20-Apr-2023	18:04:34	3384	AA_ENV_36			Camera	57	519422	6465719	519419	6465726	3	-6	7	-24		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
20-Apr-2023	18:04:46	3385	AA_ENV_36			Camera	57	519422	6465717	519419	6465726	3	-8	9	-22		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
20-Apr-2023	18:04:58	3386	AA_ENV_36			Camera	57	519422	6465715	519419	6465726	3	-10	11	-17		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
20-Apr-2023	18:05:10	3387	AA_ENV_36			Camera	57	519422	6465713	519419	6465726	4	-13	13	-16		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
20-Apr-2023	18:05:17	3388	AA_ENV_36			Camera	57	519423	6465712	519419	6465726	4	-14	14	-18		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
20-Apr-2023	18:05:35	3389	AA_ENV_36			Camera	57	519425	6465709	519419	6465726	6	-16	17	-20		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
20-Apr-2023	18:05:48	3390	AA_ENV_36			Camera	57	519425	6465708	519419	6465726	7	-18	19	-21		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
20-Apr-2023	18:06:07	3391	AA_ENV_36			Camera	57	519426	6465705	519419	6465726	8	-20	22	-21		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
20-Apr-2023	18:06:25	3392	AA_ENV_36			Camera	57	519427	6465703	519419	6465726	8	-22	24	-20		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
20-Apr-2023	18:06:35	3393	AA_ENV_36			Camera	57	519427	6465702	519419	6465726	9	-23	25	-20		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
20-Apr-2023	18:07:00	3394	AA_ENV_36			Camera	57	519429	6465699	519419	6465726	10	-27	29	-20		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
20-Apr-2023	18:07:11	3395	AA_ENV_36			Camera	57	519429	6465697	519419	6465726	11	-29	30	-20		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
20-Apr-2023	18:07:26	3396	AA_ENV_36			Camera	57	519431	6465695	519419	6465726	12	-31	33	-21		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
20-Apr-2023	18:07:36	3397	AA_ENV_36			Camera	57	519432	6465693	519419	6465726	13	-32	35	-22		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
20-Apr-2023	18:07:49	3398	AA_ENV_36			Camera	57	519432	6465691	519419	6465726	14	-34	37	-22		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
20-Apr-2023	18:08:06	3399	AA_ENV_36			Camera	57	519432	6465690	519419	6465726	13	-36	38	-20		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
20-Apr-2023	18:08:30	3400	AA_ENV_36			Camera	57	519433	6465686	519419	6465726	15	-39	42	-20		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
20-Apr-2023	18:08:37	3401	AA_ENV_36			Camera	57	519434	6465685	519419	6465726	15	-40	43	-21		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
20-Apr-2023	18:08:59	3402	AA_ENV_36			Camera	57	519434	6465682	519419	6465726	16	-44	47	-20		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
20-Apr-2023	18:09:06	3403	AA_ENV_36			Camera	57	519434	6465681	519419	6465726	16	-45	48	-19		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
20-Apr-2023	18:48:48	3404	AA_ENV_02			Camera	58	521517	6465790	521550	6465754	-34	36	49	137		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
20-Apr-2023	18:49:05	3405	AA_ENV_02			Camera	59	521516	6465791	521550	6465754	-34	37	50	137		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
20-Apr-2023	18:49:26	3406	AA_ENV_02			Camera	58	521516	6465789	521550	6465754	-34	34	48	135		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
20-Apr-2023	18:49:33	3407	AA_ENV_02			Camera	58	521517	6465788	521550	6465754	-34	34	48	135		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
20-Apr-2023	18:49:58	3408	AA_ENV_02			Camera	58	521520	6465785	521550	6465754	-30	31	43	135		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
20-Apr-2023	18:50:26	3409	AA_ENV_02			Camera	58	521524	6465783	521550	6465754	-26	28	39	137		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
20-Apr-2023	18:50:58	3410	AA_ENV_02			Camera	58	521529	6465779	521550	6465754	-21	25	33	140		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
20-Apr-2023	18:51:06	3411	AA_ENV_02			Camera	58	521530	6465778	521550	6465754	-20	24	31	140		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
20-Apr-2023	18:51:29	3412	AA_ENV_02			Camera	58	521531	6465775	521550	6465754	-20	21	28	137		(Raw Nav, Kongsberg 14208, img#9) (B)
20-Apr-2023	18:51:53	3413	AA_ENV_02			Camera	58	521533	6465772	521550	6465754	-17	17	25	135		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
20-Apr-2023	18:52:16	3414	AA_ENV_02			Camera	58	521536	6465768	521550	6465754	-15	14	20	134		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
20-Apr-2023	18:52:48	3415	AA_ENV_02			Camera	58	521539	6465764	521550	6465754	-11	10	15	132		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
20-Apr-2023	18:53:09	3416	AA_ENV_02			Camera	58	521540	6465761	521550	6465754	-10	7	12	123		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
20-Apr-2023	18:53:26	3417	AA_ENV_02			Camera	58	521542	6465758	521550	6465754	-8	4	9	115		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
20-Apr-2023	18:53:48	3418	AA_ENV_02			Camera	58	521546	6465755	521550	6465754	-5	1	5	99		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
20-Apr-2023	18:54:01	3419	AA_ENV_02			Camera	58	521547	6465754	521550	6465754	-3	0	3	85		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
20-Apr-2023	18:54:13	3420	AA_ENV_02			Camera	58	521549	6465753	521550	6465754	-1	-1	2	38		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
20-Apr-2023	18:54:34	3421	AA_ENV_02			Camera	58	521551	6465750	521550	6465754	0	-4	4	-4		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
20-Apr-2023	18:54:49	3422	AA_ENV_02			Camera	58	521553	6465748	521550	6465754	2	-6	6	-21		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
20-Apr-2023	18:55:04	3423	AA_ENV_02			Camera	58	521555	6465747	521550	6465754	4	-8	9	-30		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
20-Apr-2023	18:55:11	3424	AA_ENV_02			Camera	58	521556	6465746	521550	6465754	5	-8	10	-32		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
20-Apr-2023	18:55:25	3425	AA_ENV_02			Camera	58	521558	6465744	521550	6465754	7	-10	12	-35		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
20-Apr-2023	18:55:41	3426	AA_ENV_02			Camera	58	521560	6465742	521550	6465754	10	-12	16	-39		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
20-Apr-2023	18:55:49	3427	AA_ENV_02			Camera	58	521562	6465741	521550	6465754	11	-13	17	-40		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
20-Apr-2023	18:55:58	3428	AA_ENV_02			Camera	58	521563	6465740	521550	6465754	13	-14	19	-42		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
20-Apr-2023	18:56:21	3429	AA_ENV_02			Camera	58	521567	6465739	521550	6465754	17	-15	23	-48		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
20-Apr-2023	18:56:36	3430	AA_ENV_02			Camera	58	521570	6465738	521550	6465754	20	-16	25	-51		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
20-Apr-2023	18:56:46	3431	AA_ENV_02			Camera	58	521571	6465738	521550	6465754	21	-16	27	-52		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
20-Apr-2023	18:56:59	3432	AA_ENV_02			Camera	58	521573	6465737	521550	6465754	23	-18	29	-52		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
20-Apr-2023	18:57:13	3433	AA_ENV_02			Camera	58	521575	6465736	521550	6465754	25	-18	31	-54		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
20-Apr-2023	18:57:26	3434	AA_ENV_02			Camera	58	521577	6465735	521550	6465754	27	-19	33	-54		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
20-Apr-2023	18:57:49	3435	AA_ENV_02			Camera	58	521578	6465732	521550	6465754	28	-22	36	-52		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
20-Apr-2023	18:58:14	3436	AA_ENV_02			Camera	58	521579	6465730	521550	6465754	29	-25	38	-49		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
20-Apr-2023	18:58:30	3437	AA_ENV_02			Camera	58	521580	6465727	521550	6465754	30	-27	40	-48		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
20-Apr-2023	18:58:38	3438	AA_ENV_02			Camera	58	521581	6465726	521550	6465754	30	-28	41	-47		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
20-Apr-2023	18:58:47	3439	AA_ENV_02			Camera	58	521582	6465725	521550	6465754	31	-29	43	-47		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
20-Apr-2023	18:58:58	3440	AA_ENV_02			Camera	58	521583	6465724	521550	6465754	32	-30	44	-47		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
20-Apr-2023	18:59:22	3441	AA_ENV_02			Camera	58	521586	6465721	521550	6465754	35	-33	48	-47		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
20-Apr-2023	21:35:01	3442	AA_ENV_32			Camera	56	532359	6452483	532374	6452533	-14	-50	52	16		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
20-Apr-2023	21:35:27	3443	AA_ENV_32			Camera	57	532360	6452486	532374	6452533	-14	-47	49	16		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
20-Apr-2023	21:35:56	3444	AA_ENV_32			Camera	57	532361	6452488	532374	6452533	-13	-45	46	16		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
20-Apr-2023	21:36:47	3445	AA_ENV_32			Camera	56	532363	6452491	532374	6452533	-11	-42	43	14		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
20-Apr-2023	21:37:09	3446	AA_ENV_32			Camera	56	532364	6452493	532374	6452533	-10	-40	41	14		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
20-Apr-2023	21:37:24	3447	AA_ENV_32			Camera	57	532365	6452495	532374	6452533	-9	-38	39	13		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
20-Apr-2023	21:38:01	3448	AA_ENV_32			Camera	57	532366	6452500	532374	6452533	-7	-33	34	12		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
20-Apr-2023	21:38:33	3449	AA_ENV_32			Camera	57	532367	6452505	532374	6452533	-6	-28	29	13		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
20-Apr-2023	21:38:54	3450	AA_ENV_32			Camera	57	532368	6452508	532374	6452533	-6	-25	26	13		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
20-Apr-2023	21:39:06	3451	AA_ENV_32			Camera	57	532368	6452510	532374	6452533	-5	-23	24	13		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
20-Apr-2023	21:39:34	3452	AA_ENV_32			Camera	56	532369	6452514	532374	6452533	-5	-19	19	15		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
20-Apr-2023		3453	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3454	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3455	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3456	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3457	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3458	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3459	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3460	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3461	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023	21:42:16	3462	AA_ENV_32			Camera	57	532376	6452535	532374	6452533	2	2	3	-136		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
20-Apr-2023	21:42:22	3463	AA_ENV_32			Camera	57	532376	6452536	532374	6452533	3	3	4	-137		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
20-Apr-2023	21:42:33	3464	AA_ENV_32			Camera	56	532377	6452536	532374	6452533	3	3	4	-137		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
20-Apr-2023	21:42:40	3465	AA_ENV_32			Camera	57	532377	6452537	532374	6452533	3	4	5	-137		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
20-Apr-2023	21:43:11	3466	AA_ENV_32			Camera	57	532378	6452540	532374	6452533	4	7	8	-148		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
20-Apr-2023	21:43:18	3467	AA_ENV_32			Camera	56	532378	6452541	532374	6452533	4	8	9	-151		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
20-Apr-2023	21:43:24	3468	AA_ENV_32			Camera	56	532378	6452542	532374	6452533	4	9	10	-153		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
20-Apr-2023	21:43:39	3469	AA_ENV_32			Camera	57	532378	6452544	532374	6452533	5	11	12	-157		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
20-Apr-2023	21:44:02	3470	AA_ENV_32			Camera	57	532379	6452547	532374	6452533	5	14	15	-160		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
20-Apr-2023	21:44:16	3471	AA_ENV_32			Camera	57	532379	6452549	532374	6452533	5	16	17	-162		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
20-Apr-2023	21:44:31	3472	AA_ENV_32			Camera	57	532379	6452551	532374	6452533	6	18	19	-163		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
20-Apr-2023	21:44:42	3473	AA_ENV_32			Camera	57	532379	6452553	532374	6452533	6	20	21	-163		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
20-Apr-2023	21:44:54	3474	AA_ENV_32			Camera	57	532380	6452554	532374	6452533	6	21	22	-164		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
20-Apr-2023	21:45:14	3475	AA_ENV_32			Camera	57	532380	6452557	532374	6452533	7	24	25	-164		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
20-Apr-2023	21:45:29	3476	AA_ENV_32			Camera	57	532380	6452559	532374	6452533	7	26	27	-165		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
20-Apr-2023	21:45:39	3477	AA_ENV_32			Camera	57	532381	6452560	532374	6452533	7	27	28	-165		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
20-Apr-2023	21:45:51	3478	AA_ENV_32			Camera	57	532381	6452561	532374	6452533	7	28	29	-166		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
20-Apr-2023	21:46:25	3479	AA_ENV_32			Camera	57	532381	6452565	532374	6452533	7	32	33	-167		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
20-Apr-2023	21:46:35	3480	AA_ENV_32			Camera	56	532381	6452566	532374	6452533	7	33	34	-167		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
20-Apr-2023	21:47:12	3481	AA_ENV_32			Camera	57	532382	6452570	532374	6452533	8	37	38	-168		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
20-Apr-2023	21:47:30	3482	AA_ENV_32			Camera	57	532382	6452573	532374	6452533	8	40	41	-168		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
20-Apr-2023		3483	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3484	AA_ENV_32			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023		3485	AA_ENV_33			Camera											Lost connection with EELS, Photo but no Fix taken
20-Apr-2023	23:25:13	3486	AA_ENV_29			Camera	62	537954	6451105	537961	6451159	-8	-54	54	8		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
20-Apr-2023	23:25:51	3487	AA_ENV_29			Camera	62	537954	6451107	537961	6451159	-7	-52	52	8		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
20-Apr-2023	23:29:04	3488	AA_ENV_29			Camera	62	537957	6451112	537961	6451159	-5	-47	47	6		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
20-Apr-2023	23:29:21	3489	AA_ENV_29			Camera	62	537957	6451111	537961	6451159	-4	-48	48	5		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
20-Apr-2023	23:30:07	3490	AA_ENV_29			Camera	62	537956	6451112	537961	6451159	-5	-48	48	6		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
20-Apr-2023	23:30:35	3491	AA_ENV_29			Camera	64	537957	6451114	537961	6451159	-4	-45	45	5		(Raw Nav, Kongsberg 14208, img#6) (B)
20-Apr-2023	23:30:44	3492	AA_ENV_29			Camera	62	537957	6451115	537961	6451159	-4	-44	44	6		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
20-Apr-2023	23:30:59	3493	AA_ENV_29			Camera	62	537957	6451117	537961	6451159	-4	-42	43	6		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
20-Apr-2023	23:31:14	3494	AA_ENV_29			Camera	62	537957	6451118	537961	6451159	-4	-41	41	6		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
20-Apr-2023	23:31:21	3495	AA_ENV_29			Camera	62	537958	6451118	537961	6451159	-4	-41	41	5		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
20-Apr-2023	23:31:28	3496	AA_ENV_29			Camera	62	537957	6451119	537961	6451159	-4	-40	40	6		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
20-Apr-2023	23:31:48	3497	AA_ENV_29			Camera	62	537958	6451121	537961	6451159	-4	-38	38	6		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
20-Apr-2023	23:32:02	3498	AA_ENV_29			Camera	62	537958	6451123	537961	6451159	-3	-36	37	5		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
20-Apr-2023	23:32:32	3499	AA_ENV_29			Camera	62	537958	6451126	537961	6451159	-3	-33	33	6		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
20-Apr-2023	23:32:53	3500	AA_ENV_29			Camera	62	537958	6451129	537961	6451159	-3	-30	30	6		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
20-Apr-2023	23:33:01	3501	AA_ENV_29			Camera	62	537958	6451130	537961	6451159	-3	-29	29	6		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
20-Apr-2023	23:33:07	3502	AA_ENV_29			Camera	62	537958	6451131	537961	6451159	-3	-28	28	7		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
20-Apr-2023	23:33:22	3503	AA_ENV_29			Camera	62	537958	6451133	537961	6451159	-3	-26	26	6		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
20-Apr-2023	23:33:30	3504	AA_ENV_29			Camera	62	537958	6451134	537961	6451159	-3	-25	25	7		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
20-Apr-2023	23:33:39	3505	AA_ENV_29			Camera	62	537958	6451135	537961	6451159	-3	-24	24	7		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
20-Apr-2023	23:33:57	3506	AA_ENV_29			Camera	62	537958	6451137	537961	6451159	-3	-22	22	9		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
20-Apr-2023	23:34:05	3507	AA_ENV_29			Camera	62	537958	6451138	537961	6451159	-4	-21	21	10		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
20-Apr-2023	23:34:17	3508	AA_ENV_29			Camera	62	537957	6451140	537961	6451159	-4	-19	19	11		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
20-Apr-2023	23:34:22	3509	AA_ENV_29			Camera	62	537958	6451140	537961	6451159	-4	-19	19	11		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
20-Apr-2023	23:34:43	3510	AA_ENV_29			Camera	62	537958	6451144	537961	6451159	-3	-15	15	12		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
20-Apr-2023	23:35:16	3511	AA_ENV_29			Camera	64	537959	6451149	537961	6451159	-2	-10	10	13		(Raw Nav, Kongsberg 14208, img#26) (B)
20-Apr-2023	23:35:22	3512	AA_ENV_29			Camera	62	537960	6451149	537961	6451159	-2	-10	10	9		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
20-Apr-2023	23:35:45	3513	AA_ENV_29			Camera	62	537961	6451153	537961	6451159	0	-6	6	2		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
20-Apr-2023	23:36:03	3514	AA_ENV_29			Camera	62	537962	6451155	537961	6451159	0	-4	4	-5		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
20-Apr-2023	23:36:15	3515	AA_ENV_29			Camera	64	537962	6451157	537961	6451159	1	-2	2	-21		(Raw Nav, Kongsberg 14208, img#30) (B)
20-Apr-2023	23:36:21	3516	AA_ENV_29			Camera	62	537963	6451157	537961	6451159	1	-2	2	-40		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
20-Apr-2023	23:36:47	3517	AA_ENV_29			Camera	62	537964	6451161	537961	6451159	2	2	3	-131		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
20-Apr-2023	23:36:58	3518	AA_ENV_29			Camera	62	537964	6451163	537961	6451159	3	4	5	-143		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
20-Apr-2023	23:37:11	3519	AA_ENV_29			Camera	62	537965	6451165	537961	6451159	3	6	7	-152		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
20-Apr-2023	23:37:29	3520	AA_ENV_29			Camera	62	537965	6451168	537961	6451159	4	9	10	-156		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
20-Apr-2023	23:37:38	3521	AA_ENV_29			Camera	62	537965	6451169	537961	6451159	4	10	11	-158		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
20-Apr-2023	23:37:48	3522	AA_ENV_29			Camera	62	537965	6451170	537961	6451159	4	11	12	-161		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
20-Apr-2023	23:38:06	3523	AA_ENV_29			Camera	62	537964	6451174	537961	6451159	3	15	15	-168		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
20-Apr-2023	23:38:20	3524	AA_ENV_29			Camera	62	537964	6451176	537961	6451159	3	17	17	-170		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
20-Apr-2023	23:38:28	3525	AA_ENV_29			Camera	62	537964	6451177	537961	6451159	3	18	19	-171		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
20-Apr-2023	23:39:02	3526	AA_ENV_29			Camera	62	537963	6451182	537961	6451159	2	23	23	-175		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
20-Apr-2023	23:39:27	3527	AA_ENV_29			Camera	62	537963	6451186	537961	6451159	2	27	27	-176		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
20-Apr-2023	23:39:35	3528	AA_ENV_29			Camera	62	537963	6451186	537961	6451159	2	27	27	-177		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
20-Apr-2023	23:39:57	3529	AA_ENV_29			Camera	62	537963	6451189	537961	6451159	2	30	30	-176		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
20-Apr-2023	23:40:10	3530	AA_ENV_29			Camera	62	537964	6451190	537961	6451159	3	31	31	-175		(Corr'd Nav, Kongsberg 14208, img#45) (B) (T.A)
20-Apr-2023	23:40:18	3531	AA_ENV_29			Camera	62	537964	6451191	537961	6451159	3	32	32	-175		(Corr'd Nav, Kongsberg 14208, img#46) (B) (T.A)
20-Apr-2023	23:40:27	3532	AA_ENV_29			Camera	62	537965	6451192	537961	6451159	4	33	33	-174		(Corr'd Nav, Kongsberg 14208, img#47) (B) (T.A)
20-Apr-2023	23:40:37	3533	AA_ENV_29			Camera	62	537965	6451193	537961	6451159	4	34	34	-173		(Corr'd Nav, Kongsberg 14208, img#48) (B) (T.A)
20-Apr-2023	23:40:58	3534	AA_ENV_29			Camera	62	537966	6451196	537961	6451159	5	37	38	-172		(Corr'd Nav, Kongsberg 14208, img#49) (B) (T.A)
20-Apr-2023	23:41:10	3535	AA_ENV_29			Camera	62	537967	6451198	537961	6451159	6	39	39	-172		(Corr'd Nav, Kongsberg 14208, img#50) (B) (T.A)
20-Apr-2023	23:41:20	3536	AA_ENV_29			Camera	62	537967	6451200	537961	6451159	5	41	41	-172		(Corr'd Nav, Kongsberg 14208, img#51) (B) (T.A)
20-Apr-2023	23:41:31	3537	AA_ENV_29			Camera	62	537967	6451202	537961	6451159	6	43	43	-172		(Corr'd Nav, Kongsberg 14208, img#52) (B) (T.A)
20-Apr-2023	23:41:45	3538	AA_ENV_29			Camera	62	537967	6451204	537961	6451159	6	45	45	-172		(Corr'd Nav, Kongsberg 14208, img#53) (B) (T.A)
20-Apr-2023	23:42:00	3539	AA_ENV_29			Camera	62	537967	6451207	537961	6451159	6	48	48	-173		(Corr'd Nav, Kongsberg 14208, img#54) (B) (T.A)
21-Apr-2023	01:12:24	3540	AA_ENV_27			Camera	58	535287	6448552	535303	6448610	-16	-58	60	16		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
21-Apr-2023	01:13:01	3541	AA_ENV_27			Camera	58	535286	6448553	535303	6448610	-17	-56	59	17		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	01:13:22	3542	AA_ENV_27			Camera	58	535287	6448554	535303	6448610	-16	-55	58	16		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	01:13:49	3543	AA_ENV_27			Camera	58	535288	6448558	535303	6448610	-15	-52	54	16		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	01:14:10	3544	AA_ENV_27			Camera	58	535289	6448561	535303	6448610	-14	-49	51	16		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	01:14:27	3545	AA_ENV_27			Camera	58	535290	6448564	535303	6448610	-13	-46	48	16		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	01:14:38	3546	AA_ENV_27			Camera	58	535290	6448566	535303	6448610	-13	-44	46	17		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	01:15:02	3547	AA_ENV_27			Camera	58	535291	6448569	535303	6448610	-12	-41	43	17		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	01:15:25	3548	AA_ENV_27			Camera	58	535292	6448572	535303	6448610	-11	-38	39	17		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	01:15:35	3549	AA_ENV_27			Camera	58	535293	6448573	535303	6448610	-11	-37	38	17		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	01:15:50	3550	AA_ENV_27			Camera	58	535294	6448575	535303	6448610	-10	-34	36	16		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	01:15:56	3551	AA_ENV_27			Camera	58	535294	6448576	535303	6448610	-10	-33	35	16		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	01:16:22	3552	AA_ENV_27			Camera	58	535295	6448579	535303	6448610	-9	-30	31	16		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	01:16:46	3553	AA_ENV_27			Camera	58	535296	6448582	535303	6448610	-7	-27	28	15		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	01:16:58	3554	AA_ENV_27			Camera	58	535296	6448584	535303	6448610	-7	-25	26	16		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	01:17:17	3555	AA_ENV_27			Camera	58	535297	6448587	535303	6448610	-6	-23	24	15		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	01:17:58	3556	AA_ENV_27			Camera	58	535298	6448592	535303	6448610	-5	-18	18	16		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	01:18:30	3557	AA_ENV_27			Camera	58	535299	6448597	535303	6448610	-4	-13	14	18		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	01:18:42	3558	AA_ENV_27			Camera	58	535299	6448598	535303	6448610	-4	-11	12	21		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	01:18:52	3559	AA_ENV_27			Camera	58	535299	6448599	535303	6448610	-4	-10	11	22		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	01:19:18	3560	AA_ENV_27			Camera	58	535300	6448604	535303	6448610	-3	-6	7	29		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	01:19:31	3561	AA_ENV_27			Camera	58	535301	6448606	535303	6448610	-3	-3	4	37		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	01:19:59	3562	AA_ENV_27			Camera	58	535302	6448611	535303	6448610	-2	1	2	120		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	01:20:22	3563	AA_ENV_27			Camera	58	535303	6448615	535303	6448610	-1	5	5	170		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	01:20:37	3564	AA_ENV_27			Camera	58	535303	6448617	535303	6448610	0	7	7	-180		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	01:20:56	3565	AA_ENV_27			Camera	58	535304	6448620	535303	6448610	1	10	10	-175		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	01:21:07	3566	AA_ENV_27			Camera	58	535305	6448621	535303	6448610	2	12	12	-171		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	01:21:17	3567	AA_ENV_27			Camera	58	535306	6448623	535303	6448610	2	13	13	-170		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	01:21:34	3568	AA_ENV_27			Camera	58	535307	6448624	535303	6448610	3	15	15	-167		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	01:21:44	3569	AA_ENV_27			Camera	58	535308	6448626	535303	6448610	4	16	17	-165		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	01:21:51	3570	AA_ENV_27			Camera	58	535308	6448627	535303	6448610	5	17	18	-164		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	01:22:05	3571	AA_ENV_27			Camera	58	535309	6448629	535303	6448610	6	19	20	-163		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	01:22:14	3572	AA_ENV_27			Camera	58	535310	6448630	535303	6448610	7	20	21	-162		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	01:22:22	3573	AA_ENV_27			Camera	58	535311	6448631	535303	6448610	7	21	22	-162		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	01:22:42	3574	AA_ENV_27			Camera	58	535312	6448633	535303	6448610	8	24	25	-161		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	01:22:50	3575	AA_ENV_27			Camera	58	535312	6448634	535303	6448610	9	24	26	-160		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	01:23:01	3576	AA_ENV_27			Camera	58	535313	6448636	535303	6448610	9	26	28	-160		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	01:23:12	3577	AA_ENV_27			Camera	58	535313	6448637	535303	6448610	10	27	29	-160		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	01:23:25	3578	AA_ENV_27			Camera	58	535314	6448638	535303	6448610	10	29	30	-160		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	01:23:35	3579	AA_ENV_27			Camera	58	535314	6448640	535303	6448610	10	30	32	-161		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	01:23:51	3580	AA_ENV_27			Camera	58	535314	6448642	535303	6448610	11	32	34	-162		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
21-Apr-2023	01:23:57	3581	AA_ENV_27			Camera	58	535314	6448642	535303	6448610	11	33	34	-162		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
21-Apr-2023	01:24:09	3582	AA_ENV_27			Camera	58	535314	6448644	535303	6448610	10	34	36	-163		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
21-Apr-2023	01:24:26	3583	AA_ENV_27			Camera	58	535313	6448645	535303	6448610	10	36	37	-164		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
21-Apr-2023	01:25:07	3584	AA_ENV_27			Camera	58	535314	6448649	535303	6448610	10	39	41	-166		(Corr'd Nav, Kongsberg 14208, img#45) (B) (T.A)
21-Apr-2023	01:25:10	3585	AA_ENV_27			Camera	58	535313	6448649	535303	6448610	9	40	41	-167		(Corr'd Nav, Kongsberg 14208, img#46) (B) (T.A)
21-Apr-2023	01:25:20	3586	AA_ENV_27			Camera	58	535313	6448651	535303	6448610	9	42	43	-167		(Corr'd Nav, Kongsberg 14208, img#47) (B) (T.A)
21-Apr-2023	01:25:59	3587	AA_ENV_27			Camera	58	535312	6448656	535303	6448610	9	47	48	-169		(Corr'd Nav, Kongsberg 14208, img#48) (B) (T.A)
21-Apr-2023	02:55:47	3588	AA_ENV_06			Camera	62	535750	6445788	535808	6445823	-58	-35	68	59		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
21-Apr-2023	02:55:55	3589	AA_ENV_06			Camera	62	535750	6445788	535808	6445823	-58	-35	68	59		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
21-Apr-2023	02:56:13	3590	AA_ENV_06			Camera	62	535752	6445790	535808	6445823	-56	-33	65	59		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	02:57:26	3591	AA_ENV_06			Camera	62	535756	6445791	535808	6445823	-53	-33	62	58		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	02:57:41	3592	AA_ENV_06			Camera	62	535757	6445790	535808	6445823	-51	-33	61	57		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	02:57:55	3593	AA_ENV_06			Camera	62	535759	6445790	535808	6445823	-49	-33	59	56		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	02:58:10	3594	AA_ENV_06			Camera	62	535762	6445791	535808	6445823	-46	-33	57	55		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	02:58:18	3595	AA_ENV_06			Camera	62	535763	6445791	535808	6445823	-45	-32	55	54		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	02:58:29	3596	AA_ENV_06			Camera	62	535765	6445792	535808	6445823	-43	-32	53	54		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	02:58:37	3597	AA_ENV_06			Camera	62	535767	6445793	535808	6445823	-41	-31	51	53		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	02:58:45	3598	AA_ENV_06			Camera	62	535768	6445793	535808	6445823	-40	-30	50	53		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	02:58:52	3599	AA_ENV_06			Camera	62	535770	6445794	535808	6445823	-38	-29	48	52		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	02:58:59	3600	AA_ENV_06			Camera	62	535771	6445795	535808	6445823	-37	-28	47	52		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	02:59:20	3601	AA_ENV_06			Camera	62	535774	6445797	535808	6445823	-34	-26	43	52		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	02:59:32	3602	AA_ENV_06			Camera	62	535775	6445798	535808	6445823	-33	-25	42	52		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	02:59:48	3603	AA_ENV_06			Camera	62	535778	6445800	535808	6445823	-30	-24	39	52		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	03:00:05	3604	AA_ENV_06			Camera	62	535780	6445801	535808	6445823	-28	-22	36	52		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	03:00:18	3605	AA_ENV_06			Camera	62	535782	6445802	535808	6445823	-26	-21	33	51		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	03:00:29	3606	AA_ENV_06			Camera	62	535784	6445804	535808	6445823	-25	-20	31	51		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	03:00:48	3607	AA_ENV_06			Camera	62	535786	6445806	535808	6445823	-22	-17	28	52		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	03:01:10	3608	AA_ENV_06			Camera	62	535787	6445808	535808	6445823	-21	-15	26	54		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	03:01:22	3609	AA_ENV_06			Camera	62	535789	6445809	535808	6445823	-19	-14	24	54		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	03:01:35	3610	AA_ENV_06			Camera	62	535791	6445811	535808	6445823	-17	-12	21	55		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	03:01:41	3611	AA_ENV_06			Camera	62	535791	6445812	535808	6445823	-17	-12	21	55		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	03:02:11	3612	AA_ENV_06			Camera	62	535793	6445815	535808	6445823	-15	-8	17	61		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	03:02:33	3613	AA_ENV_06			Camera	62	535796	6445817	535808	6445823	-13	-7	14	61		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	03:02:48	3614	AA_ENV_06			Camera	62	535798	6445819	535808	6445823	-10	-5	11	66		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	03:03:27	3615	AA_ENV_06			Camera	62	535799	6445821	535808	6445823	-9	-3	9	73		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*								
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG								
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon								
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N					Vertical / Tidal Datum	VORF, LAT	

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	03:03:52	3616	AA_ENV_06			Camera	62	535802	6445822	535808	6445823	-6	-1	6	80		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	03:04:17	3617	AA_ENV_06			Camera	62	535804	6445824	535808	6445823	-4	1	4	99		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	03:05:12	3618	AA_ENV_06			Camera	62	535810	6445828	535808	6445823	2	5	5	-160		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	03:06:07	3619	AA_ENV_06			Camera	62	535817	6445832	535808	6445823	9	9	13	-134		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	03:06:19	3620	AA_ENV_06			Camera	62	535818	6445833	535808	6445823	10	10	14	-134		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	03:06:29	3621	AA_ENV_06			Camera	62	535820	6445835	535808	6445823	12	11	16	-134		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	03:07:19	3622	AA_ENV_06			Camera	62	535825	6445839	535808	6445823	17	15	23	-133		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	03:07:34	3623	AA_ENV_06			Camera	62	535827	6445841	535808	6445823	19	17	25	-133		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	03:08:17	3624	AA_ENV_06			Camera	62	535832	6445846	535808	6445823	24	22	33	-133		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	03:08:28	3625	AA_ENV_06			Camera	62	535834	6445847	535808	6445823	26	24	35	-133		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	03:08:42	3626	AA_ENV_06			Camera	62	535835	6445849	535808	6445823	27	26	37	-134		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
21-Apr-2023	03:08:52	3627	AA_ENV_06			Camera	62	535836	6445850	535808	6445823	28	27	38	-134		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	03:09:18	3628	AA_ENV_06			Camera	62	535838	6445852	535808	6445823	30	28	41	-133		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
21-Apr-2023	03:09:25	3629	AA_ENV_06			Camera	62	535839	6445854	535808	6445823	31	30	43	-134		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
21-Apr-2023	03:09:51	3630	AA_ENV_06			Camera	62	535842	6445856	535808	6445823	34	32	47	-134		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
21-Apr-2023		3631	AA_ENV_28			Camera											Lost connection with EELS, Photo but no Fix taken
21-Apr-2023		3632	AA_ENV_28			Camera											Lost connection with EELS, Photo but no Fix taken
21-Apr-2023		3633	AA_ENV_28			Camera											Lost connection with EELS, Photo but no Fix taken
21-Apr-2023		3634	AA_ENV_28			Camera											Lost connection with EELS, Photo but no Fix taken
21-Apr-2023	05:31:42	3635	AA_ENV_28			Camera	54	531076	6448609	531132	6448650	-57	-40	70	54		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	05:36:59	3636	AA_ENV_28			Camera	54	531069	6448623	531132	6448650	-64	-27	69	67		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	05:37:57	3637	AA_ENV_28			Camera	54	531074	6448626	531132	6448650	-58	-24	63	68		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	05:38:08	3638	AA_ENV_28			Camera	54	531076	6448626	531132	6448650	-57	-23	61	68		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	05:38:26	3639	AA_ENV_28			Camera	54	531079	6448627	531132	6448650	-53	-23	58	67		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	05:38:39	3640	AA_ENV_28			Camera	54	531081	6448628	531132	6448650	-51	-21	55	67		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	05:39:00	3641	AA_ENV_28			Camera	54	531085	6448630	531132	6448650	-47	-20	51	67		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	05:39:06	3642	AA_ENV_28			Camera	54	531086	6448630	531132	6448650	-46	-20	50	67		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	05:39:10	3643	AA_ENV_28			Camera	54	531087	6448630	531132	6448650	-46	-20	50	67		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	05:39:26	3644	AA_ENV_28			Camera	54	531089	6448632	531132	6448650	-43	-18	47	67		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	05:39:40	3645	AA_ENV_28			Camera	54	531091	6448632	531132	6448650	-41	-17	45	67		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	05:39:47	3646	AA_ENV_28			Camera	54	531092	6448632	531132	6448650	-41	-18	44	67		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	05:39:56	3647	AA_ENV_28			Camera	54	531093	6448633	531132	6448650	-40	-17	43	67		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	05:40:01	3648	AA_ENV_28			Camera	54	531093	6448634	531132	6448650	-39	-16	42	68		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	05:40:15	3649	AA_ENV_28			Camera	54	531095	6448636	531132	6448650	-37	-14	40	69		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	05:40:27	3650	AA_ENV_28			Camera	54	531097	6448637	531132	6448650	-35	-13	37	70		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	05:40:45	3651	AA_ENV_28			Camera	54	531100	6448640	531132	6448650	-33	-10	34	73		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	05:40:55	3652	AA_ENV_28			Camera	54	531101	6448641	531132	6448650	-31	-9	33	74		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	05:41:18	3653	AA_ENV_28			Camera	54	531102	6448641	531132	6448650	-30	-8	31	75		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	05:41:25	3654	AA_ENV_28			Camera	54	531103	6448642	531132	6448650	-29	-8	30	75		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	05:41:33	3655	AA_ENV_28			Camera	54	531104	6448642	531132	6448650	-28	-7	29	76		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	05:41:53	3656	AA_ENV_28			Camera	54	531107	6448644	531132	6448650	-26	-5	26	78		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	05:42:16	3657	AA_ENV_28			Camera	54	531110	6448646	531132	6448650	-22	-4	22	81		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	05:42:39	3658	AA_ENV_28			Camera	54	531113	6448647	531132	6448650	-20	-3	20	82		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	05:42:57	3659	AA_ENV_28			Camera	55	531114	6448647	531132	6448650	-18	-2	18	83		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	05:43:05	3660	AA_ENV_28			Camera	55	531115	6448648	531132	6448650	-17	-2	17	84		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	05:43:14	3661	AA_ENV_28			Camera	55	531116	6448648	531132	6448650	-16	-2	16	85		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	05:43:22	3662	AA_ENV_28			Camera	55	531118	6448648	531132	6448650	-15	-1	15	85		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	05:43:39	3663	AA_ENV_28			Camera	55	531120	6448649	531132	6448650	-13	-1	13	87		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	05:43:57	3664	AA_ENV_28			Camera	55	531122	6448651	531132	6448650	-11	1	11	95		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	05:44:06	3665	AA_ENV_28			Camera	55	531122	6448651	531132	6448650	-10	1	10	98		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	05:45:00	3666	AA_ENV_28			Camera	55	531129	6448651	531132	6448650	-4	1	4	112		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	05:45:17	3667	AA_ENV_28			Camera	55	531132	6448652	531132	6448650	-1	3	3	167		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	05:45:23	3668	AA_ENV_28			Camera	55	531133	6448653	531132	6448650	0	3	3	-173		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	05:45:35	3669	AA_ENV_28			Camera	55	531135	6448653	531132	6448650	2	3	4	-145		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	05:45:54	3670	AA_ENV_28			Camera	55	531138	6448654	531132	6448650	6	4	7	-126		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	05:46:01	3671	AA_ENV_28			Camera	55	531139	6448654	531132	6448650	7	4	8	-121		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
21-Apr-2023	05:46:24	3672	AA_ENV_28			Camera	55	531142	6448654	531132	6448650	10	5	11	-115		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	05:46:41	3673	AA_ENV_28			Camera	55	531145	6448655	531132	6448650	13	5	14	-113		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
21-Apr-2023	05:46:51	3674	AA_ENV_28			Camera	55	531147	6448655	531132	6448650	15	6	16	-111		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
21-Apr-2023	05:46:55	3675	AA_ENV_28			Camera	55	531148	6448655	531132	6448650	15	6	16	-110		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
21-Apr-2023	05:47:23	3676	AA_ENV_28			Camera	55	531151	6448656	531132	6448650	18	6	19	-108		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
21-Apr-2023	05:47:35	3677	AA_ENV_28			Camera	55	531151	6448655	531132	6448650	19	6	20	-106		(Corr'd Nav, Kongsberg 14208, img#45) (B) (T.A)
21-Apr-2023	05:47:55	3678	AA_ENV_28			Camera	54	531154	6448655	531132	6448650	22	6	22	-105		(Corr'd Nav, Kongsberg 14208, img#46) (B) (T.A)
21-Apr-2023	05:48:12	3679	AA_ENV_28			Camera	55	531157	6448656	531132	6448650	24	6	25	-104		(Corr'd Nav, Kongsberg 14208, img#47) (B) (T.A)
21-Apr-2023	05:48:29	3680	AA_ENV_28			Camera	55	531159	6448655	531132	6448650	26	6	27	-102		(Corr'd Nav, Kongsberg 14208, img#48) (B) (T.A)
21-Apr-2023	05:48:53	3681	AA_ENV_28			Camera	55	531162	6448656	531132	6448650	29	6	30	-101		(Corr'd Nav, Kongsberg 14208, img#49) (B) (T.A)
21-Apr-2023	05:49:06	3682	AA_ENV_28			Camera	55	531162	6448655	531132	6448650	30	5	30	-100		(Corr'd Nav, Kongsberg 14208, img#50) (B) (T.A)
21-Apr-2023	05:50:07	3683	AA_ENV_28			Camera	54	531170	6448654	531132	6448650	38	4	38	-96		(Corr'd Nav, Kongsberg 14208, img#51) (B) (T.A)
21-Apr-2023	05:50:22	3684	AA_ENV_28			Camera	54	531172	6448653	531132	6448650	39	3	40	-95		(Corr'd Nav, Kongsberg 14208, img#52) (B) (T.A)
21-Apr-2023	05:50:43	3685	AA_ENV_28			Camera	54	531174	6448654	531132	6448650	42	4	42	-96		(Corr'd Nav, Kongsberg 14208, img#53) (B) (T.A)
21-Apr-2023	05:51:04	3686	AA_ENV_28			Camera	54	531177	6448653	531132	6448650	45	3	45	-94		(Corr'd Nav, Kongsberg 14208, img#54) (B) (T.A)
21-Apr-2023	05:51:22	3687	AA_ENV_28			Camera	54	531180	6448653	531132	6448650	48	3	48	-93		(Corr'd Nav, Kongsberg 14208, img#55) (B) (T.A)
21-Apr-2023	09:02:31	3688	AA_ENV_15			Camera	63	533427	6444208	533430	6444276	-3	-68	68	3		(Raw Nav, Kongsberg 14208, img#1) (B)
21-Apr-2023	09:04:35	3689	AA_ENV_15			Camera	63	533424	6444228	533430	6444276	-6	-48	48	7		(Raw Nav, Kongsberg 14208, img#2) (B)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	09:04:41	3690	AA_ENV_15			Camera	63	533423	6444229	533430	6444276	-7	-47	47	9		(Raw Nav, Kongsberg 14208, img#3) (B)
21-Apr-2023	09:04:51	3691	AA_ENV_15			Camera	63	533424	6444230	533430	6444276	-6	-46	46	8		(Raw Nav, Kongsberg 14208, img#4) (B)
21-Apr-2023	09:05:02	3692	AA_ENV_15			Camera	63	533423	6444231	533430	6444276	-7	-45	45	9		(Raw Nav, Kongsberg 14208, img#5) (B)
21-Apr-2023	09:05:10	3693	AA_ENV_15			Camera	63	533424	6444232	533430	6444276	-6	-44	44	8		(Raw Nav, Kongsberg 14208, img#6) (B)
21-Apr-2023	09:05:16	3694	AA_ENV_15			Camera	63	533424	6444233	533430	6444276	-6	-43	43	8		(Raw Nav, Kongsberg 14208, img#7) (B)
21-Apr-2023	09:05:24	3695	AA_ENV_15			Camera	63	533424	6444233	533430	6444276	-6	-43	43	8		(Raw Nav, Kongsberg 14208, img#8) (B)
21-Apr-2023	09:05:41	3696	AA_ENV_15			Camera	63	533425	6444235	533430	6444276	-5	-41	41	7		(Raw Nav, Kongsberg 14208, img#9) (B)
21-Apr-2023	09:05:52	3697	AA_ENV_15			Camera	63	533426	6444236	533430	6444276	-4	-40	40	6		(Raw Nav, Kongsberg 14208, img#10) (B)
21-Apr-2023	09:06:04	3698	AA_ENV_15			Camera	63	533426	6444237	533430	6444276	-4	-39	39	6		(Raw Nav, Kongsberg 14208, img#11) (B)
21-Apr-2023	09:06:15	3699	AA_ENV_15			Camera	63	533427	6444239	533430	6444276	-3	-37	37	5		(Raw Nav, Kongsberg 14208, img#12) (B)
21-Apr-2023	09:06:20	3700	AA_ENV_15			Camera	63	533427	6444240	533430	6444276	-3	-36	36	5		(Raw Nav, Kongsberg 14208, img#13) (B)
21-Apr-2023	09:06:38	3701	AA_ENV_15			Camera	63	533428	6444243	533430	6444276	-2	-33	33	4		(Raw Nav, Kongsberg 14208, img#14) (B)
21-Apr-2023	09:07:06	3702	AA_ENV_15			Camera	63	533428	6444246	533430	6444276	-2	-30	30	4		(Raw Nav, Kongsberg 14208, img#15) (B)
21-Apr-2023	09:07:28	3703	AA_ENV_15			Camera	63	533428	6444250	533430	6444276	-2	-26	26	5		(Raw Nav, Kongsberg 14208, img#16) (B)
21-Apr-2023	09:08:14	3704	AA_ENV_15			Camera	63	533428	6444255	533430	6444276	-2	-21	21	6		(Raw Nav, Kongsberg 14208, img#17) (B)
21-Apr-2023	09:08:30	3705	AA_ENV_15			Camera	63	533428	6444258	533430	6444276	-2	-18	18	7		(Raw Nav, Kongsberg 14208, img#18) (B)
21-Apr-2023	09:08:57	3706	AA_ENV_15			Camera	63	533428	6444262	533430	6444276	-2	-14	14	9		(Raw Nav, Kongsberg 14208, img#19) (B)
21-Apr-2023	09:09:21	3707	AA_ENV_15			Camera	63	533427	6444266	533430	6444276	-3	-10	10	19		(Raw Nav, Kongsberg 14208, img#20) (B)
21-Apr-2023	09:09:45	3708	AA_ENV_15			Camera	63	533427	6444269	533430	6444276	-3	-7	7	26		(Raw Nav, Kongsberg 14208, img#21) (B)
21-Apr-2023	09:09:56	3709	AA_ENV_15			Camera	63	533428	6444271	533430	6444276	-2	-5	5	26		(Raw Nav, Kongsberg 14208, img#22) (B)
21-Apr-2023	09:10:12	3710	AA_ENV_15			Camera	63	533429	6444272	533430	6444276	-1	-4	4	19		(Raw Nav, Kongsberg 14208, img#23) (B)
21-Apr-2023	09:10:48	3711	AA_ENV_15			Camera	63	533432	6444275	533430	6444276	2	-1	2	-69		(Raw Nav, Kongsberg 14208, img#24) (B)
21-Apr-2023	09:11:02	3712	AA_ENV_15			Camera	63	533432	6444276	533430	6444276	2	0	2	-101		(Raw Nav, Kongsberg 14208, img#25) (B)
21-Apr-2023	09:11:21	3713	AA_ENV_15			Camera	63	533432	6444279	533430	6444276	2	3	4	-153		(Raw Nav, Kongsberg 14208, img#26) (B)
21-Apr-2023	09:11:32	3714	AA_ENV_15			Camera	63	533432	6444280	533430	6444276	2	4	5	-158		(Raw Nav, Kongsberg 14208, img#27) (B)
21-Apr-2023	09:11:43	3715	AA_ENV_15			Camera	63	533432	6444282	533430	6444276	2	6	7	-165		(Raw Nav, Kongsberg 14208, img#28) (B)
21-Apr-2023	09:12:02	3716	AA_ENV_15			Camera	63	533431	6444284	533430	6444276	1	8	8	-175		(Raw Nav, Kongsberg 14208, img#29) (B)
21-Apr-2023		3717	AA_ENV_15			Camera											Lost connection with EELS, Photo but no Fix taken
21-Apr-2023		3718	AA_ENV_15			Camera											Lost connection with EELS, Photo but no Fix taken
21-Apr-2023		3719	AA_ENV_15			Camera											Lost connection with EELS, Photo but no Fix taken
21-Apr-2023		3720	AA_ENV_15			Camera											Lost connection with EELS, Photo but no Fix taken
21-Apr-2023	09:13:56	3721	AA_ENV_15			Camera	63	533431	6444299	533430	6444276	1	23	23	-178		(Raw Nav, Kongsberg 14208, img#34) (B)
21-Apr-2023	09:14:16	3722	AA_ENV_15			Camera	63	533431	6444301	533430	6444276	1	25	25	-178		(Raw Nav, Kongsberg 14208, img#35) (B)
21-Apr-2023	09:14:38	3723	AA_ENV_15			Camera	63	533432	6444304	533430	6444276	2	28	28	-177		(Raw Nav, Kongsberg 14208, img#36) (B)
21-Apr-2023	09:14:47	3724	AA_ENV_15			Camera	63	533432	6444305	533430	6444276	2	29	29	-177		(Raw Nav, Kongsberg 14208, img#37) (B)
21-Apr-2023	09:14:52	3725	AA_ENV_15			Camera	63	533432	6444306	533430	6444276	2	30	30	-177		(Raw Nav, Kongsberg 14208, img#38) (B)
21-Apr-2023	09:15:14	3726	AA_ENV_15			Camera	63	533432	6444309	533430	6444276	2	33	33	-177		(Raw Nav, Kongsberg 14208, img#39) (B)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node		x	6.7	y	21.94	z	2.93			
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N					Vertical / Tidal Datum	VORF, LAT			

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	09:15:31	3727	AA_ENV_15			Camera	63	533432	6444313	533430	6444276	2	37	37	-177		(Raw Nav, Kongsberg 14208, img#40) (B)
21-Apr-2023	09:15:40	3728	AA_ENV_15			Camera	63	533432	6444314	533430	6444276	2	38	38	-177		(Raw Nav, Kongsberg 14208, img#41) (B)
21-Apr-2023	09:17:21	3729	AA_ENV_15			Camera	62	533423	6444320	533430	6444276	-8	44	45	170		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
21-Apr-2023	09:17:27	3730	AA_ENV_15			Camera	62	533422	6444319	533430	6444276	-9	43	44	169		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
21-Apr-2023	09:17:37	3731	AA_ENV_15			Camera	62	533421	6444316	533430	6444276	-10	41	42	167		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
21-Apr-2023	09:17:47	3732	AA_ENV_15			Camera	62	533420	6444313	533430	6444276	-10	38	39	165		(Corr'd Nav, Kongsberg 14208, img#45) (B) (T.A)
21-Apr-2023	09:17:54	3733	AA_ENV_15			Camera	62	533420	6444312	533430	6444276	-10	36	37	164		(Corr'd Nav, Kongsberg 14208, img#46) (B) (T.A)
21-Apr-2023	09:18:04	3734	AA_ENV_15			Camera	62	533420	6444309	533430	6444276	-10	33	35	164		(Corr'd Nav, Kongsberg 14208, img#47) (B) (T.A)
21-Apr-2023	09:18:14	3735	AA_ENV_15			Camera	62	533421	6444306	533430	6444276	-9	30	31	164		(Corr'd Nav, Kongsberg 14208, img#48) (B) (T.A)
21-Apr-2023	09:19:09	3736	AA_ENV_15			Camera	62	533425	6444300	533430	6444276	-5	24	25	168		(Corr'd Nav, Kongsberg 14208, img#49) (B) (T.A)
21-Apr-2023	09:19:22	3737	AA_ENV_15			Camera	62	533427	6444300	533430	6444276	-4	25	25	171		(Corr'd Nav, Kongsberg 14208, img#50) (B) (T.A)
21-Apr-2023	09:19:51	3738	AA_ENV_15			Camera	62	533428	6444302	533430	6444276	-2	27	27	176		(Corr'd Nav, Kongsberg 14208, img#51) (B) (T.A)
21-Apr-2023	09:20:44	3739	AA_ENV_15			Camera	62	533431	6444307	533430	6444276	0	32	31	-179		(Corr'd Nav, Kongsberg 14208, img#52) (B) (T.A)
21-Apr-2023	09:20:59	3740	AA_ENV_15			Camera	62	533431	6444309	533430	6444276	1	33	33	-178		(Corr'd Nav, Kongsberg 14208, img#53) (B) (T.A)
21-Apr-2023	09:21:18	3741	AA_ENV_15			Camera	62	533432	6444312	533430	6444276	2	37	37	-177		(Corr'd Nav, Kongsberg 14208, img#54) (B) (T.A)
21-Apr-2023	09:21:38	3742	AA_ENV_15			Camera	62	533433	6444315	533430	6444276	2	40	40	-177		(Corr'd Nav, Kongsberg 14208, img#55) (B) (T.A)
21-Apr-2023	09:21:59	3743	AA_ENV_15			Camera	62	533433	6444319	533430	6444276	2	43	43	-177		(Corr'd Nav, Kongsberg 14208, img#56) (B) (T.A)
21-Apr-2023	09:22:13	3744	AA_ENV_15			Camera	62	533432	6444321	533430	6444276	2	46	46	-178		(Corr'd Nav, Kongsberg 14208, img#57) (B) (T.A)
21-Apr-2023	09:22:21	3745	AA_ENV_15			Camera	62	533432	6444323	533430	6444276	2	47	47	-178		(Corr'd Nav, Kongsberg 14208, img#58) (B) (T.A)
21-Apr-2023	11:12:51	3746	AA_ENV_10			Camera	59	530887	6442069	530892	6442123	-5	-54	54	5		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
21-Apr-2023	11:13:32	3747	AA_ENV_10			Camera	59	530887	6442072	530892	6442123	-5	-50	51	6		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
21-Apr-2023	11:13:56	3748	AA_ENV_10			Camera	59	530888	6442075	530892	6442123	-4	-48	48	5		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	11:14:17	3749	AA_ENV_10			Camera	59	530889	6442077	530892	6442123	-3	-45	46	4		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	11:14:48	3750	AA_ENV_10			Camera	59	530891	6442081	530892	6442123	-2	-42	42	2		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	11:15:15	3751	AA_ENV_10			Camera	59	530892	6442085	530892	6442123	0	-38	38	0		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	11:15:33	3752	AA_ENV_10			Camera	59	530893	6442087	530892	6442123	0	-36	36	-1		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	11:15:58	3753	AA_ENV_10			Camera	59	530893	6442091	530892	6442123	1	-32	32	-1		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	11:16:10	3754	AA_ENV_10			Camera	59	530893	6442093	530892	6442123	1	-30	30	-2		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	11:16:50	3755	AA_ENV_10			Camera	59	530893	6442099	530892	6442123	0	-24	24	-1		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	11:17:04	3756	AA_ENV_10			Camera	59	530892	6442101	530892	6442123	0	-21	21	1		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	11:17:43	3757	AA_ENV_10			Camera	59	530891	6442107	530892	6442123	-2	-16	16	6		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	11:17:52	3758	AA_ENV_10			Camera	59	530890	6442108	530892	6442123	-2	-15	15	7		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	11:18:21	3759	AA_ENV_10			Camera	59	530890	6442111	530892	6442123	-2	-12	12	12		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	11:18:37	3760	AA_ENV_10			Camera	59	530890	6442113	530892	6442123	-2	-10	10	14		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	11:18:56	3761	AA_ENV_10			Camera	59	530891	6442115	530892	6442123	-2	-8	8	11		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	11:19:12	3762	AA_ENV_10			Camera	59	530891	6442116	530892	6442123	-1	-6	7	7		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	11:19:22	3763	AA_ENV_10			Camera	59	530892	6442117	530892	6442123	0	-6	6	4		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	11:19:44	3764	AA_ENV_10			Camera	59	530893	6442119	530892	6442123	1	-4	4	-13		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	11:19:55	3765	AA_ENV_10			Camera	59	530894	6442120	530892	6442123	1	-2	3	-32		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	11:20:18	3766	AA_ENV_10			Camera	59	530894	6442123	530892	6442123	2	0	2	-102		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	11:20:25	3767	AA_ENV_10			Camera	59	530894	6442124	530892	6442123	2	1	2	-127		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	11:20:43	3768	AA_ENV_10			Camera	59	530894	6442127	530892	6442123	2	4	4	-159		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	11:20:54	3769	AA_ENV_10			Camera	59	530894	6442128	530892	6442123	2	5	6	-160		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	11:21:17	3770	AA_ENV_10			Camera	59	530895	6442132	530892	6442123	2	9	9	-166		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	11:21:26	3771	AA_ENV_10			Camera	59	530895	6442133	530892	6442123	3	11	11	-166		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	11:21:38	3772	AA_ENV_10			Camera	59	530895	6442135	530892	6442123	3	12	13	-168		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	11:21:50	3773	AA_ENV_10			Camera	59	530895	6442137	530892	6442123	3	14	14	-169		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	11:21:59	3774	AA_ENV_10			Camera	59	530895	6442138	530892	6442123	3	16	16	-171		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A) # No photo taken
21-Apr-2023	11:22:11	3775	AA_ENV_10			Camera	59	530895	6442140	530892	6442123	2	18	18	-172		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	11:22:24	3776	AA_ENV_10			Camera	59	530895	6442142	530892	6442123	3	19	20	-172		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	11:22:35	3777	AA_ENV_10			Camera	59	530895	6442144	530892	6442123	2	21	21	-173		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	11:22:45	3778	AA_ENV_10			Camera	59	530895	6442146	530892	6442123	2	23	23	-174		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	11:23:04	3779	AA_ENV_10			Camera	59	530895	6442148	530892	6442123	3	26	26	-174		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	11:23:11	3780	AA_ENV_10			Camera	59	530895	6442149	530892	6442123	2	27	27	-175		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	11:23:29	3781	AA_ENV_10			Camera	59	530895	6442152	530892	6442123	3	29	29	-175		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	11:23:41	3782	AA_ENV_10			Camera	59	530895	6442153	530892	6442123	3	31	31	-175		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	11:23:51	3783	AA_ENV_10			Camera	59	530895	6442155	530892	6442123	3	32	32	-175		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	11:24:10	3784	AA_ENV_10			Camera	59	530895	6442157	530892	6442123	3	34	34	-175		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
21-Apr-2023	11:24:43	3785	AA_ENV_10			Camera	59	530895	6442160	530892	6442123	3	37	37	-175		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	11:25:21	3786	AA_ENV_10			Camera	59	530896	6442163	530892	6442123	4	41	41	-174		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
21-Apr-2023	11:25:37	3787	AA_ENV_10			Camera	59	530897	6442165	530892	6442123	5	42	42	-174		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
21-Apr-2023	11:26:16	3788	AA_ENV_10			Camera	59	530898	6442170	530892	6442123	6	47	47	-173		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
21-Apr-2023	12:30:22	3789	AA_ENV_26			Camera	66	532580	6439672	532588	6439724	-8	-52	53	8		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
21-Apr-2023	12:30:32	3790	AA_ENV_26			Camera	66	532580	6439673	532588	6439724	-7	-51	51	8		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
21-Apr-2023	12:30:46	3791	AA_ENV_26			Camera	66	532580	6439675	532588	6439724	-7	-49	49	8		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	12:31:14	3792	AA_ENV_26			Camera	66	532581	6439679	532588	6439724	-7	-45	46	8		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	12:31:52	3793	AA_ENV_26			Camera	66	532583	6439683	532588	6439724	-5	-41	42	7		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	12:32:23	3794	AA_ENV_26			Camera	66	532585	6439686	532588	6439724	-3	-38	38	4		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	12:32:39	3795	AA_ENV_26			Camera	66	532586	6439688	532588	6439724	-2	-36	36	3		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	12:32:55	3796	AA_ENV_26			Camera	66	532586	6439690	532588	6439724	-1	-34	34	2		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	12:33:41	3797	AA_ENV_26			Camera	66	532588	6439697	532588	6439724	0	-27	27	-1		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	12:34:06	3798	AA_ENV_26			Camera	66	532588	6439702	532588	6439724	0	-22	22	0		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	12:34:27	3799	AA_ENV_26			Camera	66	532587	6439706	532588	6439724	-1	-18	18	3		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	12:34:37	3800	AA_ENV_26			Camera	66	532586	6439708	532588	6439724	-1	-16	16	5		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Seabed Imagery Positioning Summary

Job No	54463	Vessel	MV *Ocean Endeavour*
Client	Caledonia Offshore Windfarm Limited	Vessel Reference Point (VRP)	COG
Project Name	Caledonia OWF Phase 2	Deployment Location	Camera Deployment Node; x 6.7; y 21.94; z 2.93
Primary Positioning System	Starpack 1	Actual Coordinates derived from	Vessel or Beacon
Geodetic Reference System	Datum: WGS 84 - WGS 84; Ellipsoid: WGS 84	Projection	UTM zone 30N; Vertical / Tidal Datum: VORF, LAT

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	12:34:52	3801	AA_ENV_26			Camera	66	532586	6439712	532588	6439724	-2	-12	13	7		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	12:35:17	3802	AA_ENV_26			Camera	66	532586	6439716	532588	6439724	-2	-9	9	11		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	12:35:25	3803	AA_ENV_26			Camera	66	532586	6439716	532588	6439724	-1	-8	8	10		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	12:35:37	3804	AA_ENV_26			Camera	66	532587	6439718	532588	6439724	-1	-6	6	7		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	12:35:49	3805	AA_ENV_26			Camera	66	532588	6439719	532588	6439724	0	-5	5	-2		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	12:36:05	3806	AA_ENV_26			Camera	66	532589	6439721	532588	6439724	2	-3	4	-29		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	12:36:15	3807	AA_ENV_26			Camera	66	532590	6439722	532588	6439724	3	-2	3	-52		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	12:36:22	3808	AA_ENV_26			Camera	66	532591	6439723	532588	6439724	3	-2	4	-65		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	12:36:33	3809	AA_ENV_26			Camera	66	532591	6439724	532588	6439724	3	0	3	-95		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	12:36:46	3810	AA_ENV_26			Camera	66	532591	6439726	532588	6439724	3	2	4	-122		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	12:36:56	3811	AA_ENV_26			Camera	68	532592	6439728	532588	6439724	4	4	6	-131		(Raw Nav, Kongsberg 14208, img#23) (B)
21-Apr-2023	12:37:09	3811a	AA_ENV_26			Camera	66	532592	6439731	532588	6439724	4	6	8	-149		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A) #Double Fix
21-Apr-2023	12:37:18	3812	AA_ENV_26			Camera	66	532592	6439732	532588	6439724	4	8	9	-153		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	12:37:38	3813	AA_ENV_26			Camera	66	532593	6439736	532588	6439724	5	12	13	-157		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	12:37:56	3814	AA_ENV_26			Camera	66	532593	6439739	532588	6439724	6	15	16	-159		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	12:38:05	3815	AA_ENV_26			Camera	66	532593	6439740	532588	6439724	5	16	17	-161		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	12:38:20	3816	AA_ENV_26			Camera	66	532594	6439743	532588	6439724	6	19	20	-163		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	12:38:35	3817	AA_ENV_26			Camera	66	532594	6439746	532588	6439724	6	21	22	-164		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	12:39:05	3818	AA_ENV_26			Camera	66	532593	6439750	532588	6439724	6	26	27	-168		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	12:39:19	3819	AA_ENV_26			Camera	66	532593	6439752	532588	6439724	5	28	29	-169		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	12:39:29	3820	AA_ENV_26			Camera	66	532593	6439754	532588	6439724	6	30	30	-169		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	12:39:42	3821	AA_ENV_26			Camera	66	532594	6439754	532588	6439724	7	30	31	-168		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	12:40:08	3822	AA_ENV_26			Camera	66	532594	6439757	532588	6439724	6	33	33	-169		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	12:40:20	3823	AA_ENV_26			Camera	66	532595	6439757	532588	6439724	7	33	34	-168		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	12:40:54	3824	AA_ENV_26			Camera	66	532597	6439760	532588	6439724	9	36	37	-166		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	12:41:19	3825	AA_ENV_26			Camera	66	532597	6439762	532588	6439724	9	38	39	-167		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	12:41:29	3826	AA_ENV_26			Camera	66	532597	6439764	532588	6439724	10	40	41	-166		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
21-Apr-2023	12:42:00	3827	AA_ENV_26			Camera	66	532597	6439768	532588	6439724	10	43	45	-167		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	12:42:13	3828	AA_ENV_26			Camera	66	532598	6439769	532588	6439724	10	45	46	-167		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
21-Apr-2023	15:45:12	3829	AA_ENV_12			Camera	70	531918	6433860	531953	6433903	-35	-44	56	39		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
21-Apr-2023	15:45:22	3830	AA_ENV_12			Camera	70	531919	6433861	531953	6433903	-34	-42	54	39		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
21-Apr-2023	15:45:40	3831	AA_ENV_12			Camera	70	531921	6433864	531953	6433903	-32	-40	51	39		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	15:45:49	3832	AA_ENV_12			Camera	70	531922	6433866	531953	6433903	-31	-38	49	40		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	15:46:21	3833	AA_ENV_12			Camera	70	531925	6433869	531953	6433903	-28	-35	45	39		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	15:46:39	3834	AA_ENV_12			Camera	70	531926	6433871	531953	6433903	-27	-32	42	40		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	15:46:55	3835	AA_ENV_12			Camera	70	531928	6433873	531953	6433903	-26	-31	40	40		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	15:47:54	3836	AA_ENV_12			Camera	70	531931	6433880	531953	6433903	-22	-23	32	44		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	15:48:25	3837	AA_ENV_12			Camera	70	531933	6433882	531953	6433903	-20	-21	29	44		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	15:48:42	3838	AA_ENV_12			Camera	70	531935	6433885	531953	6433903	-19	-19	27	45		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	15:49:21	3839	AA_ENV_12			Camera	69	531939	6433888	531953	6433903	-14	-16	21	43		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	15:49:58	3840	AA_ENV_12			Camera	70	531942	6433890	531953	6433903	-12	-13	18	41		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	15:50:24	3841	AA_ENV_12			Camera	70	531946	6433893	531953	6433903	-8	-11	13	36		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	15:51:16	3842	AA_ENV_12			Camera	69	531950	6433900	531953	6433903	-3	-3	5	40		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	15:51:23	3843	AA_ENV_12			Camera	70	531951	6433901	531953	6433903	-3	-2	3	50		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	15:51:33	3844	AA_ENV_12			Camera	69	531952	6433903	531953	6433903	-2	-1	2	65		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	15:51:47	3845	AA_ENV_12			Camera	69	531953	6433904	531953	6433903	0	0	1	133		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	15:52:11	3846	AA_ENV_12			Camera	69	531955	6433905	531953	6433903	1	2	2	-139		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	15:52:18	3847	AA_ENV_12			Camera	69	531956	6433906	531953	6433903	2	2	3	-135		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	15:52:29	3848	AA_ENV_12			Camera	69	531957	6433907	531953	6433903	4	3	5	-132		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	15:53:03	3849	AA_ENV_12			Camera	69	531960	6433909	531953	6433903	6	6	9	-133		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	15:53:18	3850	AA_ENV_12			Camera	69	531962	6433911	531953	6433903	9	8	12	-132		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	15:53:27	3851	AA_ENV_12			Camera	70	531963	6433911	531953	6433903	9	8	12	-131		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	15:53:40	3852	AA_ENV_12			Camera	69	531964	6433912	531953	6433903	10	9	14	-131		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	15:53:56	3853	AA_ENV_12			Camera	69	531966	6433914	531953	6433903	13	11	16	-131		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	15:54:06	3854	AA_ENV_12			Camera	69	531966	6433915	531953	6433903	13	12	18	-131		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	15:54:20	3855	AA_ENV_12			Camera	69	531967	6433916	531953	6433903	14	12	19	-131		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	15:54:29	3856	AA_ENV_12			Camera	69	531968	6433916	531953	6433903	15	13	20	-130		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	15:54:40	3857	AA_ENV_12			Camera	69	531969	6433916	531953	6433903	16	13	20	-130		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	15:54:51	3858	AA_ENV_12			Camera	69	531970	6433917	531953	6433903	16	14	21	-130		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	15:55:06	3859	AA_ENV_12			Camera	69	531971	6433919	531953	6433903	18	15	23	-131		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	15:55:20	3860	AA_ENV_12			Camera	69	531973	6433920	531953	6433903	20	17	26	-130		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	15:55:33	3861	AA_ENV_12			Camera	69	531974	6433921	531953	6433903	21	18	27	-130		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	15:55:46	3862	AA_ENV_12			Camera	69	531975	6433922	531953	6433903	22	18	28	-130		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	15:56:07	3863	AA_ENV_12			Camera	69	531978	6433923	531953	6433903	24	19	31	-129		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	15:56:21	3864	AA_ENV_12			Camera	69	531978	6433924	531953	6433903	25	21	33	-129		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	15:56:35	3865	AA_ENV_12			Camera	69	531981	6433926	531953	6433903	28	23	36	-129		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	15:56:58	3866	AA_ENV_12			Camera	69	531983	6433929	531953	6433903	30	25	39	-130		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	15:57:12	3867	AA_ENV_12			Camera	69	531985	6433932	531953	6433903	31	28	42	-132		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
21-Apr-2023	15:57:42	3868	AA_ENV_12			Camera	69	531988	6433936	531953	6433903	34	33	47	-134		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	17:35:19	3869	AA_ENV_30			Camera	77	535551	6436092	535609	6436089	-58	3	58	93		(Raw Nav, Kongsberg 14208, img#1) (B)
21-Apr-2023	17:35:35	3870	AA_ENV_30			Camera	78	535553	6436092	535609	6436089	-56	3	57	94		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
21-Apr-2023	17:36:10	3871	AA_ENV_30			Camera	78	535559	6436093	535609	6436089	-51	4	51	94		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	17:36:30	3872	AA_ENV_30			Camera	78	535562	6436094	535609	6436089	-47	5	47	96		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	17:37:08	3873	AA_ENV_30			Camera	78	535567	6436093	535609	6436089	-42	4	42	95		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463				Vessel	MV *Ocean Endeavour*							
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	COG							
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93	
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon							
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N			Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	17:37:20	3874	AA_ENV_30			Camera	78	535569	6436093	535609	6436089	-41	4	41	95		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	17:37:41	3875	AA_ENV_30			Camera	78	535572	6436092	535609	6436089	-37	3	37	94		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	17:37:58	3876	AA_ENV_30			Camera	78	535574	6436091	535609	6436089	-35	2	35	94		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	17:38:23	3877	AA_ENV_30			Camera	78	535576	6436091	535609	6436089	-33	2	33	94		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	17:38:38	3878	AA_ENV_30			Camera	78	535578	6436091	535609	6436089	-31	2	31	94		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	17:38:46	3879	AA_ENV_30			Camera	78	535579	6436090	535609	6436089	-30	1	30	93		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	17:39:23	3880	AA_ENV_30			Camera	78	535583	6436090	535609	6436089	-26	1	26	92		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	17:39:59	3881	AA_ENV_30			Camera	78	535588	6436090	535609	6436089	-21	1	21	93		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	17:40:30	3882	AA_ENV_30			Camera	78	535593	6436089	535609	6436089	-16	1	16	92		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	17:41:08	3883	AA_ENV_30			Camera	78	535597	6436091	535609	6436089	-12	2	12	99		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	17:41:48	3884	AA_ENV_30			Camera	78	535602	6436091	535609	6436089	-7	2	8	108		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	17:42:06	3885	AA_ENV_30			Camera	78	535605	6436091	535609	6436089	-4	2	5	111		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	17:42:30	3886	AA_ENV_30			Camera	78	535608	6436091	535609	6436089	-1	2	3	153		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	17:42:37	3887	AA_ENV_30			Camera	78	535609	6436091	535609	6436089	0	2	2	173		(Raw Nav, Kongsberg 14208, img#19) (B)
21-Apr-2023	17:42:48	3888	AA_ENV_30			Camera	78	535611	6436091	535609	6436089	2	2	3	-141		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	17:43:06	3889	AA_ENV_30			Camera	78	535614	6436091	535609	6436089	5	2	5	-109		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	17:43:16	3890	AA_ENV_30			Camera	78	535615	6436091	535609	6436089	6	2	6	-110		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	17:43:25	3891	AA_ENV_30			Camera	78	535616	6436091	535609	6436089	7	2	7	-107		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	17:43:48	3892	AA_ENV_30			Camera	78	535619	6436091	535609	6436089	10	2	10	-100		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	17:44:02	3893	AA_ENV_30			Camera	78	535621	6436091	535609	6436089	11	2	12	-100		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	17:44:27	3894	AA_ENV_30			Camera	78	535624	6436090	535609	6436089	15	1	15	-95		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	17:44:37	3895	AA_ENV_30			Camera	78	535625	6436090	535609	6436089	16	1	16	-93		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	17:44:54	3896	AA_ENV_30			Camera	78	535628	6436090	535609	6436089	19	1	19	-93		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	17:45:16	3897	AA_ENV_30			Camera	78	535630	6436091	535609	6436089	21	2	21	-95		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	17:45:29	3898	AA_ENV_30			Camera	78	535632	6436091	535609	6436089	22	2	22	-96		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	17:46:07	3899	AA_ENV_30			Camera	78	535636	6436091	535609	6436089	27	2	27	-95		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	17:46:14	3900	AA_ENV_30			Camera	78	535637	6436091	535609	6436089	27	2	27	-94		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	17:46:35	3901	AA_ENV_30			Camera	78	535640	6436090	535609	6436089	30	1	30	-92		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	17:47:03	3902	AA_ENV_30			Camera	78	535642	6436090	535609	6436089	33	1	33	-92		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	17:47:25	3903	AA_ENV_30			Camera	78	535644	6436089	535609	6436089	35	0	35	-91		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	17:47:45	3904	AA_ENV_30			Camera	78	535647	6436089	535609	6436089	38	0	38	-90		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	17:48:16	3905	AA_ENV_30			Camera	78	535650	6436092	535609	6436089	41	3	41	-94		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	17:48:40	3906	AA_ENV_30			Camera	78	535653	6436092	535609	6436089	44	4	44	-95		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	17:49:06	3907	AA_ENV_30			Camera	78	535655	6436092	535609	6436089	46	3	46	-94		(Raw Nav, Kongsberg 14208, img#39) (B)
21-Apr-2023	17:49:19	3908	AA_ENV_30			Camera	78	535657	6436092	535609	6436089	47	3	48	-93		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	18:56:10	3909	AA_ENV_42			Camera	64	536536	6439478	536595	6439492	-60	-14	61	77		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
21-Apr-2023	18:56:48	3910	AA_ENV_42			Camera	64	536542	6439478	536595	6439492	-53	-14	55	76		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	18:57:17	3911	AA_ENV_42			Camera	64	536546	6439479	536595	6439492	-49	-13	51	75		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	18:57:26	3912	AA_ENV_42			Camera	64	536548	6439479	536595	6439492	-48	-13	50	75		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	18:57:52	3913	AA_ENV_42			Camera	64	536551	6439478	536595	6439492	-44	-13	46	73		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	18:58:14	3914	AA_ENV_42			Camera	64	536554	6439478	536595	6439492	-41	-14	43	72		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	18:58:31	3915	AA_ENV_42			Camera	64	536557	6439478	536595	6439492	-39	-14	41	71		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	18:58:48	3916	AA_ENV_42			Camera	64	536559	6439479	536595	6439492	-37	-13	39	70		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	18:59:01	3917	AA_ENV_42			Camera	64	536561	6439479	536595	6439492	-35	-13	37	69		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	18:59:29	3918	AA_ENV_42			Camera	64	536565	6439480	536595	6439492	-30	-12	32	69		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	18:59:53	3919	AA_ENV_42			Camera	64	536570	6439481	536595	6439492	-26	-11	28	67		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	19:00:46	3920	AA_ENV_42			Camera	64	536574	6439483	536595	6439492	-22	-9	24	67		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	19:01:35	3921	AA_ENV_42			Camera	64	536578	6439484	536595	6439492	-17	-8	19	65		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	19:01:55	3922	AA_ENV_42			Camera	64	536581	6439485	536595	6439492	-15	-7	16	64		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	19:02:32	3923	AA_ENV_42			Camera	64	536584	6439485	536595	6439492	-11	-7	13	58		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	19:02:44	3924	AA_ENV_42			Camera	64	536586	6439485	536595	6439492	-9	-7	12	53		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	19:03:29	3925	AA_ENV_42			Camera	64	536593	6439486	536595	6439492	-2	-6	6	20		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	19:03:36	3926	AA_ENV_42			Camera	64	536595	6439486	536595	6439492	0	-5	5	4		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	19:03:45	3927	AA_ENV_42			Camera	64	536596	6439487	536595	6439492	1	-5	5	-11		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	19:03:55	3928	AA_ENV_42			Camera	64	536598	6439488	536595	6439492	3	-4	5	-34		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	19:04:07	3929	AA_ENV_42			Camera	64	536600	6439488	536595	6439492	5	-4	6	-51		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	19:04:20	3930	AA_ENV_42			Camera	64	536602	6439489	536595	6439492	6	-3	7	-62		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	19:04:32	3931	AA_ENV_42			Camera	64	536603	6439489	536595	6439492	8	-3	9	-69		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	19:04:52	3932	AA_ENV_42			Camera	64	536607	6439490	536595	6439492	11	-2	11	-81		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	19:05:02	3933	AA_ENV_42			Camera	64	536608	6439490	536595	6439492	12	-2	13	-81		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	19:05:15	3934	AA_ENV_42			Camera	64	536609	6439491	536595	6439492	14	-1	14	-85		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	19:05:33	3935	AA_ENV_42			Camera	64	536612	6439490	536595	6439492	17	-2	17	-84		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	19:05:48	3936	AA_ENV_42			Camera	64	536615	6439492	536595	6439492	19	0	19	-90		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	19:06:05	3937	AA_ENV_42			Camera	64	536617	6439493	536595	6439492	22	1	22	-93		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	19:06:23	3938	AA_ENV_42			Camera	64	536620	6439494	536595	6439492	25	2	25	-96		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	19:06:38	3939	AA_ENV_42			Camera	64	536622	6439495	536595	6439492	27	3	27	-96		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	19:07:07	3940	AA_ENV_42			Camera	64	536626	6439497	536595	6439492	31	5	31	-99		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	19:07:17	3941	AA_ENV_42			Camera	64	536628	6439498	536595	6439492	32	6	33	-100		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	19:07:24	3942	AA_ENV_42			Camera	64	536629	6439498	536595	6439492	33	6	34	-101		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	19:07:39	3943	AA_ENV_42			Camera	64	536631	6439499	536595	6439492	35	7	36	-102		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	19:07:54	3944	AA_ENV_42			Camera	64	536632	6439501	536595	6439492	36	9	38	-104		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	19:08:17	3945	AA_ENV_42			Camera	64	536634	6439502	536595	6439492	39	10	40	-105		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	19:08:33	3946	AA_ENV_42			Camera	64	536636	6439504	536595	6439492	41	12	43	-107		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	19:08:39	3947	AA_ENV_42			Camera	64	536637	6439505	536595	6439492	42	13	43	-107		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	19:08:49	3948	AA_ENV_42			Camera	64	536638	6439505	536595	6439492	42	13	44	-108		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	19:48:44	3949	AA_ENV_05			Camera	63	535602	6440689	535650	6440720	-48	-31	57	57		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
21-Apr-2023	19:49:16	3950	AA_ENV_05			Camera	63	535607	6440692	535650	6440720	-43	-28	51	57		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
21-Apr-2023	19:49:44	3951	AA_ENV_05			Camera	63	535610	6440694	535650	6440720	-40	-26	48	57		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	19:50:03	3952	AA_ENV_05			Camera	63	535612	6440694	535650	6440720	-38	-26	46	56		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	19:50:22	3953	AA_ENV_05			Camera	63	535614	6440696	535650	6440720	-35	-24	43	56		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	19:50:55	3954	AA_ENV_05			Camera	63	535619	6440698	535650	6440720	-31	-22	38	54		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	19:51:19	3955	AA_ENV_05			Camera	63	535622	6440699	535650	6440720	-27	-21	34	53		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	19:51:31	3956	AA_ENV_05			Camera	63	535624	6440700	535650	6440720	-26	-20	33	52		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	19:51:41	3957	AA_ENV_05			Camera	63	535625	6440702	535650	6440720	-25	-19	31	53		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	19:51:50	3958	AA_ENV_05			Camera	63	535626	6440702	535650	6440720	-24	-18	30	52		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	19:52:10	3959	AA_ENV_05			Camera	63	535629	6440704	535650	6440720	-21	-16	26	52		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	19:52:28	3960	AA_ENV_05			Camera	63	535630	6440705	535650	6440720	-20	-15	25	52		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	19:52:52	3961	AA_ENV_05			Camera	63	535634	6440707	535650	6440720	-16	-13	21	52		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	19:53:11	3962	AA_ENV_05			Camera	63	535635	6440709	535650	6440720	-14	-11	18	52		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	19:53:45	3963	AA_ENV_05			Camera	63	535639	6440713	535650	6440720	-11	-7	13	56		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	19:53:58	3964	AA_ENV_05			Camera	63	535640	6440714	535650	6440720	-10	-6	12	56		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	19:54:19	3965	AA_ENV_05			Camera	63	535642	6440715	535650	6440720	-8	-5	9	61		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	19:54:25	3966	AA_ENV_05			Camera	63	535642	6440716	535650	6440720	-8	-4	9	62		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	19:54:42	3967	AA_ENV_05			Camera	63	535643	6440717	535650	6440720	-7	-3	8	64		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	19:55:05	3968	AA_ENV_05			Camera	63	535645	6440718	535650	6440720	-5	-2	6	70		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	19:55:18	3969	AA_ENV_05			Camera	63	535646	6440719	535650	6440720	-4	-1	4	74		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	19:55:28	3970	AA_ENV_05			Camera	63	535646	6440720	535650	6440720	-3	0	3	88		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	19:55:40	3971	AA_ENV_05			Camera	63	535647	6440721	535650	6440720	-3	1	3	102		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	19:55:49	3972	AA_ENV_05			Camera	63	535648	6440721	535650	6440720	-2	1	2	117		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	19:56:41	3973	AA_ENV_05			Camera	63	535650	6440722	535650	6440720	0	2	2	-173		(Raw Nav, Kongsberg 14208, img#25) (B)
21-Apr-2023	19:57:01	3974	AA_ENV_05			Camera	63	535652	6440724	535650	6440720	3	4	5	-147		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	19:57:13	3975	AA_ENV_05			Camera	63	535653	6440725	535650	6440720	4	5	6	-145		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	19:57:21	3976	AA_ENV_05			Camera	63	535655	6440727	535650	6440720	5	7	8	-144		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	19:57:33	3977	AA_ENV_05			Camera	63	535656	6440728	535650	6440720	6	8	10	-141		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	19:57:46	3978	AA_ENV_05			Camera	63	535658	6440729	535650	6440720	8	9	12	-138		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	19:58:05	3979	AA_ENV_05			Camera	63	535661	6440731	535650	6440720	11	11	16	-136		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	19:58:47	3980	AA_ENV_05			Camera	63	535668	6440738	535650	6440720	19	18	26	-134		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	19:59:18	3981	AA_ENV_05			Camera	63	535672	6440744	535650	6440720	23	24	33	-137		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	19:59:34	3982	AA_ENV_05			Camera	63	535674	6440744	535650	6440720	24	24	34	-135		(Raw Nav, Kongsberg 14208, img#34) (B)
21-Apr-2023	19:59:53	3982a	AA_ENV_05			Camera	63	535675	6440748	535650	6440720	25	28	38	-138		Inccorect Fix number (Raw Nav, Kongsberg 14208, img#35) (B)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	20:00:14	3982b	AA_ENV_05			Camera	63	535677	6440751	535650	6440720	27	31	41	-139		Inccorect Fix number (Raw Nav, Kongsberg 14208, img#36) (B)
21-Apr-2023	20:00:27	3982c	AA_ENV_05			Camera	63	535678	6440753	535650	6440720	28	33	43	-139		Inccorect Fix number (Raw Nav, Kongsberg 14208, img#37) (B)
21-Apr-2023	20:00:49	3982d	AA_ENV_05			Camera	63	535680	6440755	535650	6440720	30	35	46	-139		Inccorect Fix number (Raw Nav, Kongsberg 14208, img#38) (B)
21-Apr-2023	20:01:01	3982e	AA_ENV_05			Camera	63	535681	6440755	535650	6440720	31	35	47	-138		Inccorect Fix number (Raw Nav, Kongsberg 14208, img#39) (B)
21-Apr-2023	21:13:11	3983	AA_ENV_25			Camera	67	537239	6443655	537275	6443701	-36	-47	59	38		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
21-Apr-2023	21:15:42	3984	AA_ENV_25			Camera	67	537245	6443662	537275	6443701	-30	-40	50	37		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
21-Apr-2023	21:15:53	3985	AA_ENV_25			Camera	67	537245	6443663	537275	6443701	-30	-38	49	38		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
21-Apr-2023	21:16:12	3986	AA_ENV_25			Camera	67	537247	6443665	537275	6443701	-28	-36	46	37		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
21-Apr-2023	21:16:29	3987	AA_ENV_25			Camera	67	537249	6443668	537275	6443701	-26	-34	43	37		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
21-Apr-2023	21:17:09	3988	AA_ENV_25			Camera	67	537254	6443671	537275	6443701	-21	-30	37	36		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	21:17:20	3989	AA_ENV_25			Camera	67	537255	6443674	537275	6443701	-21	-28	34	37		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	21:17:45	3990	AA_ENV_25			Camera	67	537257	6443675	537275	6443701	-18	-26	32	34		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	21:18:22	3991	AA_ENV_25			Camera	67	537262	6443678	537275	6443701	-14	-24	27	30		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
21-Apr-2023	21:18:36	3992	AA_ENV_25			Camera	67	537264	6443681	537275	6443701	-12	-21	24	29		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	21:18:57	3993	AA_ENV_25			Camera	67	537265	6443683	537275	6443701	-10	-19	21	27		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	21:19:10	3994	AA_ENV_25			Camera	67	537267	6443685	537275	6443701	-9	-16	18	28		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	21:19:19	3995	AA_ENV_25			Camera	67	537268	6443686	537275	6443701	-7	-15	17	25		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	21:19:42	3996	AA_ENV_25			Camera	67	537270	6443690	537275	6443701	-5	-12	13	23		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	21:20:02	3997	AA_ENV_25			Camera	67	537272	6443693	537275	6443701	-4	-9	9	23		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	21:20:22	3998	AA_ENV_25			Camera	67	537272	6443696	537275	6443701	-3	-6	6	25		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	21:20:28	3999	AA_ENV_25			Camera	67	537274	6443697	537275	6443701	-1	-4	4	13		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	21:20:40	4000	AA_ENV_25			Camera	67	537276	6443696	537275	6443701	1	-5	5	-13		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	21:20:48	4001	AA_ENV_25			Camera	67	537276	6443700	537275	6443701	1	-1	2	-24		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	21:21:10	4002	AA_ENV_25			Camera	67	537277	6443702	537275	6443701	2	1	2	-109		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	21:21:18	4003	AA_ENV_25			Camera	67	537278	6443704	537275	6443701	3	3	4	-135		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	21:21:28	4004	AA_ENV_25			Camera	67	537278	6443705	537275	6443701	3	4	5	-139		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	21:21:41	4005	AA_ENV_25			Camera	67	537279	6443708	537275	6443701	4	7	8	-149		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	21:21:55	4006	AA_ENV_25			Camera	67	537280	6443710	537275	6443701	5	8	10	-147		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	21:22:17	4007	AA_ENV_25			Camera	66	537282	6443712	537275	6443701	7	11	13	-148		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	21:22:27	4008	AA_ENV_25			Camera	66	537282	6443716	537275	6443701	7	15	16	-154		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	21:22:42	4009	AA_ENV_25			Camera	66	537283	6443719	537275	6443701	8	17	19	-157		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
21-Apr-2023	21:22:58	4010	AA_ENV_25			Camera	66	537283	6443721	537275	6443701	8	20	21	-158		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	21:23:05	4011	AA_ENV_25			Camera	66	537283	6443722	537275	6443701	8	21	22	-159		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	21:23:28	4012	AA_ENV_25			Camera	66	537284	6443724	537275	6443701	9	23	24	-160		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463					Vessel	MV *Ocean Endeavour*										
Client	Caledonia Offshore Windfarm Limited					Vessel Reference Point (VRP)	COG										
Project Name	Caledonia OWF Phase 2					Deployment Location	Camera Deployment Node			x	6.7	y	21.94	z	2.93		
Primary Positioning System	Starpack 1					Actual Coordinates derived from	Vessel or Beacon										
Geodetic Reference System	Datum	WGS 84 - WGS 84		Ellipsoid	WGS 84		Projection	UTM zone 30N						Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	21:23:46	4013	AA_ENV_25			Camera	66	537284	6443725	537275	6443701	9	24	25	-160		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	21:23:55	4014	AA_ENV_25			Camera	66	537285	6443725	537275	6443701	10	24	26	-156		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	21:24:25	4015	AA_ENV_25			Camera	66	537287	6443725	537275	6443701	12	23	26	-153		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	21:24:37	4016	AA_ENV_25			Camera	66	537288	6443725	537275	6443701	13	23	27	-151		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	21:24:57	4017	AA_ENV_25			Camera	66	537290	6443725	537275	6443701	15	24	28	-147		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	21:25:20	4018	AA_ENV_25			Camera	66	537294	6443728	537275	6443701	19	27	32	-145		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	21:25:37	4019	AA_ENV_25			Camera	66	537297	6443730	537275	6443701	22	29	36	-143		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	21:25:55	4020	AA_ENV_25			Camera	66	537300	6443733	537275	6443701	25	31	40	-141		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	21:26:12	4021	AA_ENV_25			Camera	66	537303	6443736	537275	6443701	28	35	45	-142		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
21-Apr-2023	21:26:27	4022	AA_ENV_25			Camera	66	537304	6443740	537275	6443701	29	38	48	-143		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	23:01:09	4023	AA_ENV_16			Camera	74	539583	6444695	539559	6444756	24	-61	66	-21		(Raw Nav, Kongsberg 14208, img#1) (B)
21-Apr-2023	23:01:21	4024	AA_ENV_16			Camera	73	539584	6444694	539559	6444756	25	-62	67	-22		(Raw Nav, Kongsberg 14208, img#2) (B)
21-Apr-2023	23:01:53	4025	AA_ENV_16			Camera	73	539591	6444695	539559	6444756	32	-61	69	-28		(Raw Nav, Kongsberg 14208, img#3) (B)
21-Apr-2023	23:02:25	4026	AA_ENV_16			Camera	74	539593	6444697	539559	6444756	34	-59	68	-30		(Raw Nav, Kongsberg 14208, img#4) (B)
21-Apr-2023	23:03:00	4027	AA_ENV_16			Camera	73	539596	6444704	539559	6444756	37	-52	64	-35		(Raw Nav, Kongsberg 14208, img#5) (B)
21-Apr-2023	23:03:20	4028	AA_ENV_16			Camera	72	539596	6444709	539559	6444756	37	-47	60	-38		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
21-Apr-2023	23:03:59	4029	AA_ENV_16			Camera	72	539592	6444717	539559	6444756	33	-39	51	-40		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
21-Apr-2023	23:04:11	4030	AA_ENV_16			Camera	72	539590	6444720	539559	6444756	31	-36	48	-41		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
21-Apr-2023	23:04:17	4031	AA_ENV_16			Camera	72	539589	6444721	539559	6444756	30	-36	47	-40		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A) # No photo taken
21-Apr-2023	23:04:33	4032	AA_ENV_16			Camera	72	539587	6444724	539559	6444756	28	-32	43	-41		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
21-Apr-2023	23:04:37	4033	AA_ENV_16			Camera	72	539586	6444725	539559	6444756	27	-32	42	-41		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
21-Apr-2023	23:04:42	4034	AA_ENV_16			Camera	72	539585	6444725	539559	6444756	26	-31	40	-41		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
21-Apr-2023	23:04:52	4035	AA_ENV_16			Camera	72	539584	6444726	539559	6444756	25	-30	39	-40		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
21-Apr-2023	23:05:06	4036	AA_ENV_16			Camera	72	539583	6444727	539559	6444756	25	-29	38	-40		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
21-Apr-2023	23:05:26	4037	AA_ENV_16			Camera	72	539582	6444727	539559	6444756	23	-29	37	-39		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
21-Apr-2023	23:05:35	4038	AA_ENV_16			Camera	72	539580	6444728	539559	6444756	21	-28	35	-37		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
21-Apr-2023	23:05:41	4039	AA_ENV_16			Camera	72	539580	6444727	539559	6444756	21	-29	36	-36		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
21-Apr-2023	23:05:53	4040	AA_ENV_16			Camera	72	539580	6444727	539559	6444756	21	-29	36	-36		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
21-Apr-2023	23:06:24	4041	AA_ENV_16			Camera	72	539579	6444726	539559	6444756	21	-30	37	-34		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
21-Apr-2023	23:06:44	4042	AA_ENV_16			Camera	72	539582	6444724	539559	6444756	23	-32	39	-35		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
21-Apr-2023	23:06:58	4043	AA_ENV_16			Camera	72	539580	6444727	539559	6444756	21	-29	36	-36		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
21-Apr-2023	23:07:11	4044	AA_ENV_16			Camera	72	539580	6444727	539559	6444756	21	-29	36	-36		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
21-Apr-2023	23:07:23	4045	AA_ENV_16			Camera	72	539582	6444729	539559	6444756	23	-27	35	-40		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
21-Apr-2023	23:07:44	4046	AA_ENV_16			Camera	73	539582	6444732	539559	6444756	23	-25	34	-43		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
21-Apr-2023	23:08:43	4047	AA_ENV_16			Camera	73	539580	6444741	539559	6444756	21	-15	26	-54		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
21-Apr-2023	23:08:53	4048	AA_ENV_16			Camera	73	539580	6444743	539559	6444756	21	-13	24	-57		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
21-Apr-2023	23:09:54	4049	AA_ENV_16			Camera	73	539574	6444752	539559	6444756	15	-4	15	-74		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463				Vessel	MV *Ocean Endeavour*							
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	COG							
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93	
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon							
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N			Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	23:10:20	4050	AA_ENV_16			Camera	73	539572	6444753	539559	6444756	13	-3	13	-78		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
21-Apr-2023	23:10:35	4051	AA_ENV_16			Camera	73	539570	6444755	539559	6444756	11	-1	11	-84		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
21-Apr-2023	23:10:57	4052	AA_ENV_16			Camera	73	539567	6444756	539559	6444756	8	0	8	-87		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
21-Apr-2023	23:11:43	4053	AA_ENV_16			Camera	73	539560	6444760	539559	6444756	1	4	4	-161		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
21-Apr-2023	23:12:20	4054	AA_ENV_16			Camera	73	539553	6444764	539559	6444756	-6	8	10	145		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
21-Apr-2023	23:12:31	4055	AA_ENV_16			Camera	73	539551	6444765	539559	6444756	-8	9	12	139		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
21-Apr-2023	23:13:00	4056	AA_ENV_16			Camera	73	539544	6444769	539559	6444756	-15	13	20	132		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
21-Apr-2023	23:13:10	4057	AA_ENV_16			Camera	74	539542	6444770	539559	6444756	-17	14	22	129		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
21-Apr-2023	23:13:23	4058	AA_ENV_16			Camera	73	539541	6444770	539559	6444756	-18	14	23	128		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
21-Apr-2023	23:13:49	4059	AA_ENV_16			Camera	73	539539	6444769	539559	6444756	-20	13	24	122		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
21-Apr-2023	23:14:00	4060	AA_ENV_16			Camera	73	539539	6444767	539559	6444756	-20	11	22	119		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
21-Apr-2023	23:15:18	4061	AA_ENV_16			Camera	73	539544	6444760	539559	6444756	-15	4	15	106		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
21-Apr-2023	23:15:50	4062	AA_ENV_16			Camera	74	539545	6444764	539559	6444756	-14	8	16	121		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
21-Apr-2023	23:15:58	4063	AA_ENV_16			Camera	74	539545	6444765	539559	6444756	-14	9	16	124		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
21-Apr-2023	23:16:50	4064	AA_ENV_16			Camera	74	539544	6444776	539559	6444756	-15	20	25	143		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
21-Apr-2023	23:17:06	4065	AA_ENV_16			Camera	74	539543	6444780	539559	6444756	-17	24	29	145		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
21-Apr-2023	23:17:35	4066	AA_ENV_16			Camera	74	539538	6444788	539559	6444756	-21	32	38	147		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
21-Apr-2023	23:17:42	4067	AA_ENV_16			Camera	74	539537	6444790	539559	6444756	-22	34	41	147		(Corr'd Nav, Kongsberg 14208, img#45) (B) (T.A)
21-Apr-2023	23:17:55	4068	AA_ENV_16			Camera	74	539534	6444793	539559	6444756	-25	37	44	146		(Corr'd Nav, Kongsberg 14208, img#46) (B) (T.A)
21-Apr-2023	23:18:29	4069	AA_ENV_16			Camera	74	539531	6444796	539559	6444756	-28	40	49	145		(Corr'd Nav, Kongsberg 14208, img#47) (B) (T.A)
22-Apr-2023	07:08:02	4070	AA_ENV_21			Camera	100	541010	6447865	541069	6447876	-59	-11	60	79		(Raw Nav, Kongsberg 14208, img#1) (B)
22-Apr-2023	07:08:33	4071	AA_ENV_21			Camera	101	541000	6447884	541069	6447876	-69	8	69	97		(Raw Nav, Kongsberg 14208, img#2) (B)
22-Apr-2023	07:08:59	4072	AA_ENV_21			Camera	101	540996	6447862	541069	6447876	-73	-14	74	79		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
22-Apr-2023	07:09:13	4073	AA_ENV_21			Camera	101	540998	6447861	541069	6447876	-71	-15	73	78		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
22-Apr-2023	07:10:30	4074	AA_ENV_21			Camera	101	541013	6447865	541069	6447876	-57	-11	57	79		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
22-Apr-2023	07:10:56	4075	AA_ENV_21			Camera	101	541016	6447868	541069	6447876	-53	-8	53	82		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
22-Apr-2023	07:11:07	4076	AA_ENV_21			Camera	101	541019	6447870	541069	6447876	-50	-6	50	83		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
22-Apr-2023	07:11:12	4077	AA_ENV_21			Camera	101	541019	6447870	541069	6447876	-50	-6	50	84		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
22-Apr-2023	07:11:50	4078	AA_ENV_21			Camera	101	541026	6447873	541069	6447876	-43	-3	43	86		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
22-Apr-2023	07:12:18	4079	AA_ENV_21			Camera	101	541027	6447875	541069	6447876	-42	-1	42	89		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
22-Apr-2023	07:12:25	4080	AA_ENV_21			Camera	102	541030	6447871	541069	6447876	-39	-6	40	82		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
22-Apr-2023	07:12:40	4081	AA_ENV_21			Camera	102	541028	6447869	541069	6447876	-41	-7	41	81		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
22-Apr-2023	07:13:01	4082	AA_ENV_21			Camera	102	541028	6447874	541069	6447876	-41	-2	41	88		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)
22-Apr-2023	07:13:15	4083	AA_ENV_21			Camera	102	541029	6447875	541069	6447876	-40	-1	40	89		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
22-Apr-2023	07:13:42	4084	AA_ENV_21			Camera	102	541035	6447876	541069	6447876	-34	0	34	91		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
22-Apr-2023	07:14:05	4085	AA_ENV_21			Camera	102	541039	6447876	541069	6447876	-30	0	30	91		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
22-Apr-2023	07:14:28	4086	AA_ENV_21			Camera	102	541043	6447877	541069	6447876	-26	1	26	91		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463				Vessel	MV *Ocean Endeavour*							
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	COG							
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93	
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon							
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N			Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
22-Apr-2023	07:14:42	4087	AA_ENV_21			Camera	102	541045	6447876	541069	6447876	-24	0	24	90		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
22-Apr-2023	07:15:02	4088	AA_ENV_21			Camera	102	541049	6447877	541069	6447876	-20	1	20	93		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
22-Apr-2023	07:15:29	4089	AA_ENV_21			Camera	102	541051	6447876	541069	6447876	-18	0	18	91		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
22-Apr-2023	07:15:36	4090	AA_ENV_21			Camera	102	541053	6447875	541069	6447876	-16	-1	16	88		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
22-Apr-2023	07:16:03	4091	AA_ENV_21			Camera	102	541058	6447876	541069	6447876	-11	0	11	89		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
22-Apr-2023	07:16:14	4092	AA_ENV_21			Camera	102	541060	6447877	541069	6447876	-9	1	9	97		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
22-Apr-2023	07:16:29	4093	AA_ENV_21			Camera	102	541063	6447878	541069	6447876	-6	2	6	109		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
22-Apr-2023	07:16:49	4094	AA_ENV_21			Camera	102	541067	6447879	541069	6447876	-2	3	4	144		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
22-Apr-2023	07:17:03	4095	AA_ENV_21			Camera	102	541071	6447879	541069	6447876	2	3	3	-149		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
22-Apr-2023	07:17:34	4096	AA_ENV_21			Camera	102	541075	6447876	541069	6447876	6	0	6	-94		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
22-Apr-2023	07:18:00	4097	AA_ENV_21			Camera	102	541079	6447875	541069	6447876	11	-1	11	-84		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
22-Apr-2023	07:18:20	4098	AA_ENV_21			Camera	102	541085	6447875	541069	6447876	16	-1	16	-86		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
22-Apr-2023	07:18:40	4099	AA_ENV_21			Camera	102	541088	6447878	541069	6447876	19	2	19	-97		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
22-Apr-2023	07:18:52	4100	AA_ENV_21			Camera	102	541091	6447880	541069	6447876	22	4	22	-100		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
22-Apr-2023	07:19:10	4101	AA_ENV_21			Camera	102	541094	6447881	541069	6447876	25	5	25	-101		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
22-Apr-2023	07:19:19	4102	AA_ENV_21			Camera	102	541095	6447882	541069	6447876	26	6	26	-103		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
22-Apr-2023	07:19:33	4103	AA_ENV_21			Camera	102	541096	6447883	541069	6447876	27	8	28	-106		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
22-Apr-2023	07:19:52	4104	AA_ENV_21			Camera	102	541099	6447888	541069	6447876	30	12	32	-112		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
22-Apr-2023	07:20:16	4105	AA_ENV_21			Camera	102	541104	6447890	541069	6447876	35	14	38	-111		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
22-Apr-2023	07:20:45	4106	AA_ENV_21			Camera	102	541106	6447893	541069	6447876	37	17	41	-114		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
22-Apr-2023	07:21:01	4107	AA_ENV_21			Camera	102	541110	6447892	541069	6447876	41	16	44	-111		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
22-Apr-2023	07:21:31	4108	AA_ENV_21			Camera	101	541110	6447897	541069	6447876	41	21	46	-117		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
22-Apr-2023	07:21:50	4109	AA_ENV_21			Camera	101	541112	6447900	541069	6447876	43	24	49	-119		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
22-Apr-2023	07:22:08	4110	AA_ENV_21			Camera	101	541115	6447901	541069	6447876	46	25	52	-119		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
22-Apr-2023	09:16:20	4111	AA_ENV_40			Camera	57	537714	6449505	537753	6449539	-39	-34	51	49		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
22-Apr-2023	09:16:58	4112	AA_ENV_40			Camera	57	537714	6449504	537753	6449539	-39	-35	53	48		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
22-Apr-2023	09:17:13	4113	AA_ENV_40			Camera	57	537719	6449497	537753	6449539	-34	-42	53	39		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
22-Apr-2023	09:17:19	4114	AA_ENV_40			Camera	57	537715	6449502	537753	6449539	-38	-37	53	45		(Corr'd Nav, Kongsberg 14208, img#4) (B) (T.A)
22-Apr-2023	09:18:00	4115	AA_ENV_40			Camera	57	537714	6449503	537753	6449539	-39	-36	54	47		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
22-Apr-2023	09:18:36	4116	AA_ENV_40			Camera	57	537711	6449505	537753	6449539	-42	-34	54	51		(Corr'd Nav, Kongsberg 14208, img#6) (B) (T.A)
22-Apr-2023	09:18:59	4117	AA_ENV_40			Camera	57	537714	6449507	537753	6449539	-39	-32	50	51		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A)
22-Apr-2023	09:19:10	4118	AA_ENV_40			Camera	57	537714	6449509	537753	6449539	-39	-30	49	52		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
22-Apr-2023	09:19:18	4119	AA_ENV_40			Camera	57	537715	6449510	537753	6449539	-38	-29	48	52		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
22-Apr-2023	09:19:46	4120	AA_ENV_40			Camera	57	537717	6449513	537753	6449539	-36	-26	44	54		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
22-Apr-2023	09:20:05	4121	AA_ENV_40			Camera	57	537719	6449515	537753	6449539	-34	-25	42	54		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
22-Apr-2023	09:20:21	4122	AA_ENV_40			Camera	57	537721	6449517	537753	6449539	-32	-22	39	55		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
22-Apr-2023	09:20:35	4123	AA_ENV_40			Camera	57	537722	6449518	537753	6449539	-31	-21	38	56		(Corr'd Nav, Kongsberg 14208, img#13) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

Seabed Imagery Positioning Summary

Job No	54463		Vessel	MV *Ocean Endeavour*				
Client	Caledonia Offshore Windfarm Limited		Vessel Reference Point (VRP)	COG				
Project Name	Caledonia OWF Phase 2		Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1		Actual Coordinates derived from	Vessel or Beacon				
Geodetic Reference System	Datum: WGS 84 - WGS 84	Ellipsoid: WGS 84	Projection	UTM zone 30N	Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates Easting	Actual coordinates Northing	Target coordinates Easting	Target coordinates Northing	Offset from target dE	Offset from target dN	Offset from target Range	Offset from target Bearing	Surveyor	Remarks
22-Apr-2023	09:21:03	4124	AA_ENV_40			Camera	57	537725	6449520	537753	6449539	-28	-19	34	55		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
22-Apr-2023	09:21:19	4125	AA_ENV_40			Camera	57	537728	6449520	537753	6449539	-25	-19	32	53		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
22-Apr-2023	09:21:33	4126	AA_ENV_40			Camera	57	537729	6449519	537753	6449539	-24	-20	31	50		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
22-Apr-2023	09:21:46	4127	AA_ENV_40			Camera	57	537731	6449520	537753	6449539	-22	-19	29	50		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
22-Apr-2023	09:22:16	4128	AA_ENV_40			Camera	57	537736	6449519	537753	6449539	-17	-20	26	41		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
22-Apr-2023	09:22:25	4129	AA_ENV_40			Camera	57	537738	6449519	537753	6449539	-16	-20	25	38		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
22-Apr-2023	09:22:39	4130	AA_ENV_40			Camera	57	537740	6449519	537753	6449539	-13	-20	24	32		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
22-Apr-2023	09:22:46	4131	AA_ENV_40			Camera	57	537741	6449519	537753	6449539	-12	-20	23	31		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
22-Apr-2023	09:23:01	4132	AA_ENV_40			Camera	57	537744	6449519	537753	6449539	-9	-20	22	25		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
22-Apr-2023	09:23:09	4133	AA_ENV_40			Camera	57	537745	6449519	537753	6449539	-8	-20	22	22		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
22-Apr-2023	09:23:16	4134	AA_ENV_40			Camera	57	537746	6449520	537753	6449539	-7	-19	21	19		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
22-Apr-2023	09:23:39	4135	AA_ENV_40			Camera	57	537749	6449522	537753	6449539	-4	-17	17	14		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
22-Apr-2023	09:24:05	4136	AA_ENV_40			Camera	57	537751	6449524	537753	6449539	-2	-15	15	7		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
22-Apr-2023	09:24:51	4137	AA_ENV_40			Camera	57	537752	6449533	537753	6449539	-1	-6	6	11		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
22-Apr-2023	09:24:57	4138	AA_ENV_40			Camera	57	537752	6449535	537753	6449539	-1	-4	4	13		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
22-Apr-2023	09:25:13	4139	AA_ENV_40			Camera	57	537752	6449539	537753	6449539	-1	0	1	96		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
22-Apr-2023	09:25:23	4140	AA_ENV_40			Camera	57	537752	6449541	537753	6449539	-1	2	2	150		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
22-Apr-2023	09:25:43	4141	AA_ENV_40			Camera	57	537752	6449545	537753	6449539	-1	6	6	171		(Corr'd Nav, Kongsberg 14208, img#31) (B) (T.A)
22-Apr-2023	09:25:50	4142	AA_ENV_40			Camera	57	537753	6449546	537753	6449539	0	7	7	177		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
22-Apr-2023	09:26:30	4143	AA_ENV_40			Camera	57	537755	6449552	537753	6449539	2	13	13	-169		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
22-Apr-2023	09:26:38	4144	AA_ENV_40			Camera	57	537756	6449553	537753	6449539	3	14	14	-169		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
22-Apr-2023	09:27:13	4145	AA_ENV_40			Camera	57	537757	6449559	537753	6449539	4	20	21	-168		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
22-Apr-2023	09:27:36	4146	AA_ENV_40			Camera	57	537758	6449563	537753	6449539	5	24	24	-169		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
22-Apr-2023	09:27:53	4147	AA_ENV_40			Camera	57	537758	6449566	537753	6449539	5	27	27	-169		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
22-Apr-2023	09:28:06	4148	AA_ENV_40			Camera	57	537760	6449567	537753	6449539	7	28	29	-166		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
22-Apr-2023	09:28:22	4149	AA_ENV_40			Camera	57	537761	6449569	537753	6449539	8	30	31	-165		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
22-Apr-2023	09:28:26	4150	AA_ENV_40			Camera	57	537761	6449569	537753	6449539	8	30	31	-165		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
22-Apr-2023	09:29:03	4151	AA_ENV_40			Camera	57	537765	6449574	537753	6449539	12	35	37	-161		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)
22-Apr-2023	09:29:27	4152	AA_ENV_40			Camera	57	537768	6449578	537753	6449539	15	39	42	-159		(Corr'd Nav, Kongsberg 14208, img#42) (B) (T.A)
22-Apr-2023	09:29:56	4153	AA_ENV_40			Camera	57	537772	6449582	537753	6449539	19	43	47	-157		(Corr'd Nav, Kongsberg 14208, img#43) (B) (T.A)
22-Apr-2023	09:30:02	4154	AA_ENV_40			Camera	57	537772	6449583	537753	6449539	19	44	48	-156		(Corr'd Nav, Kongsberg 14208, img#44) (B) (T.A)
22-Apr-2023	11:08:12	4155	AA_ENV_24			Camera	62	536647	6453610	536668	6453672	-21	-63	66	18		(Corr'd Nav, Kongsberg 14208, img#1) (B) (T.A)
22-Apr-2023	11:11:16	4156	AA_ENV_24			Camera	62	536660	6453623	536668	6453672	-8	-49	50	10		(Corr'd Nav, Kongsberg 14208, img#2) (B) (T.A)
22-Apr-2023	11:11:43	4157	AA_ENV_24			Camera	62	536661	6453627	536668	6453672	-7	-45	46	8		(Corr'd Nav, Kongsberg 14208, img#3) (B) (T.A)
22-Apr-2023	11:12:00	4158	AA_ENV_24			Camera	64	536662	6453629	536668	6453672	-6	-43	43	8		(Raw Nav, Kongsberg 14208, img#4) (B)
22-Apr-2023	11:12:17	4159	AA_ENV_24			Camera	62	536664	6453631	536668	6453672	-4	-41	41	6		(Corr'd Nav, Kongsberg 14208, img#5) (B) (T.A)
22-Apr-2023	11:12:28	4160	AA_ENV_24			Camera	64	536663	6453633	536668	6453672	-5	-39	39	7		(Raw Nav, Kongsberg 14208, img#6) (B)

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seabed Imagery Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Vessel or Beacon						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT		

Date	Time (UTC/GMT)	Fix number	Stn No	Penetration %	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
22-Apr-2023	11:12:49	4160	AA_ENV_24			Camera	63	536663	6453636	536668	6453672	-5	-36	36	8		(Corr'd Nav, Kongsberg 14208, img#7) (B) (T.A) #Double Fix
22-Apr-2023	11:13:06	4161	AA_ENV_24			Camera	62	536663	6453638	536668	6453672	-5	-34	34	8		(Corr'd Nav, Kongsberg 14208, img#8) (B) (T.A)
22-Apr-2023	11:13:31	4162	AA_ENV_24			Camera	62	536664	6453642	536668	6453672	-4	-30	30	8		(Corr'd Nav, Kongsberg 14208, img#9) (B) (T.A)
22-Apr-2023	11:14:10	4163	AA_ENV_24			Camera	62	536665	6453645	536668	6453672	-3	-27	27	7		(Corr'd Nav, Kongsberg 14208, img#10) (B) (T.A)
22-Apr-2023	11:14:23	4164	AA_ENV_24			Camera	62	536665	6453647	536668	6453672	-3	-25	25	8		(Corr'd Nav, Kongsberg 14208, img#11) (B) (T.A)
22-Apr-2023	11:14:56	4165	AA_ENV_24			Camera	62	536665	6453650	536668	6453672	-3	-22	22	7		(Corr'd Nav, Kongsberg 14208, img#12) (B) (T.A)
22-Apr-2023	11:15:17	4166	AA_ENV_24			Camera	65	536666	6453653	536668	6453672	-2	-19	19	6		(Raw Nav, Kongsberg 14208, img#13) (B)
22-Apr-2023	11:15:54	4167	AA_ENV_24			Camera	63	536667	6453656	536668	6453672	-1	-16	16	2		(Corr'd Nav, Kongsberg 14208, img#14) (B) (T.A)
22-Apr-2023	11:16:25	4168	AA_ENV_24			Camera	63	536668	6453659	536668	6453672	0	-13	13	-1		(Corr'd Nav, Kongsberg 14208, img#15) (B) (T.A)
22-Apr-2023	11:16:38	4169	AA_ENV_24			Camera	63	536669	6453661	536668	6453672	1	-11	11	-3		(Corr'd Nav, Kongsberg 14208, img#16) (B) (T.A)
22-Apr-2023	11:16:56	4170	AA_ENV_24			Camera	63	536669	6453664	536668	6453672	1	-8	8	-4		(Corr'd Nav, Kongsberg 14208, img#17) (B) (T.A)
22-Apr-2023	11:17:12	4171	AA_ENV_24			Camera	63	536669	6453665	536668	6453672	1	-7	7	-8		(Corr'd Nav, Kongsberg 14208, img#18) (B) (T.A)
22-Apr-2023	11:17:31	4172	AA_ENV_24			Camera	63	536668	6453668	536668	6453672	0	-4	4	-4		(Corr'd Nav, Kongsberg 14208, img#19) (B) (T.A)
22-Apr-2023	11:17:41	4173	AA_ENV_24			Camera	63	536667	6453669	536668	6453672	-1	-3	3	17		(Corr'd Nav, Kongsberg 14208, img#20) (B) (T.A)
22-Apr-2023	11:17:48	4174	AA_ENV_24			Camera	63	536668	6453671	536668	6453672	0	-1	1	3		(Corr'd Nav, Kongsberg 14208, img#21) (B) (T.A)
22-Apr-2023	11:18:03	4175	AA_ENV_24			Camera	63	536668	6453672	536668	6453672	0	0	1	145		(Corr'd Nav, Kongsberg 14208, img#22) (B) (T.A)
22-Apr-2023	11:18:26	4176	AA_ENV_24			Camera	63	536668	6453676	536668	6453672	0	4	4	178		(Corr'd Nav, Kongsberg 14208, img#23) (B) (T.A)
22-Apr-2023	11:18:33	4177	AA_ENV_24			Camera	63	536668	6453677	536668	6453672	0	5	5	-179		(Corr'd Nav, Kongsberg 14208, img#24) (B) (T.A)
22-Apr-2023	11:18:51	4178	AA_ENV_24			Camera	63	536669	6453678	536668	6453672	1	6	6	-173		(Corr'd Nav, Kongsberg 14208, img#25) (B) (T.A)
22-Apr-2023	11:19:17	4179	AA_ENV_24			Camera	63	536669	6453683	536668	6453672	1	11	11	-173		(Corr'd Nav, Kongsberg 14208, img#26) (B) (T.A)
22-Apr-2023	11:19:37	4180	AA_ENV_24			Camera	63	536671	6453685	536668	6453672	3	13	13	-168		(Corr'd Nav, Kongsberg 14208, img#27) (B) (T.A)
22-Apr-2023	11:19:56	4181	AA_ENV_24			Camera	63	536671	6453688	536668	6453672	3	17	17	-170		(Corr'd Nav, Kongsberg 14208, img#28) (B) (T.A)
22-Apr-2023	11:20:17	4182	AA_ENV_24			Camera	63	536672	6453691	536668	6453672	4	20	20	-167		(Corr'd Nav, Kongsberg 14208, img#29) (B) (T.A)
22-Apr-2023	11:20:30	4183	AA_ENV_24			Camera	63	536673	6453693	536668	6453672	5	21	22	-166		(Corr'd Nav, Kongsberg 14208, img#30) (B) (T.A)
22-Apr-2023	11:20:55	4184	AA_ENV_24			Camera	65	536675	6453698	536668	6453672	7	26	27	-165		(Raw Nav, Kongsberg 14208, img#31) (B)
22-Apr-2023	11:21:02	4185	AA_ENV_24			Camera	63	536676	6453698	536668	6453672	8	26	27	-164		(Corr'd Nav, Kongsberg 14208, img#32) (B) (T.A)
22-Apr-2023	11:21:13	4186	AA_ENV_24			Camera	63	536676	6453700	536668	6453672	8	28	29	-164		(Corr'd Nav, Kongsberg 14208, img#33) (B) (T.A)
22-Apr-2023	11:21:33	4187	AA_ENV_24			Camera	63	536675	6453702	536668	6453672	7	30	31	-166		(Corr'd Nav, Kongsberg 14208, img#34) (B) (T.A)
22-Apr-2023	11:21:46	4188	AA_ENV_24			Camera	63	536676	6453703	536668	6453672	8	31	32	-166		(Corr'd Nav, Kongsberg 14208, img#35) (B) (T.A)
22-Apr-2023	11:22:09	4189	AA_ENV_24			Camera	63	536672	6453705	536668	6453672	4	33	33	-173		(Corr'd Nav, Kongsberg 14208, img#36) (B) (T.A)
22-Apr-2023	11:22:19	4190	AA_ENV_24			Camera	63	536671	6453706	536668	6453672	3	34	34	-175		(Corr'd Nav, Kongsberg 14208, img#37) (B) (T.A)
22-Apr-2023	11:22:44	4191	AA_ENV_24			Camera	63	536667	6453705	536668	6453672	-1	33	33	179		(Corr'd Nav, Kongsberg 14208, img#38) (B) (T.A)
22-Apr-2023	11:24:41	4192	AA_ENV_24			Camera	63	536662	6453700	536668	6453672	-6	28	29	168		(Corr'd Nav, Kongsberg 14208, img#39) (B) (T.A)
22-Apr-2023	11:32:22	4193	AA_ENV_24			Camera	63	536680	6453713	536668	6453672	12	41	42	-164		(Corr'd Nav, Kongsberg 14208, img#40) (B) (T.A)
22-Apr-2023	11:32:45	4194	AA_ENV_24			Camera	63	536682	6453716	536668	6453672	14	44	46	-162		(Corr'd Nav, Kongsberg 14208, img#41) (B) (T.A)

APPENDIX B FIELD SAMPLING LOGS

SEABED IMAGERY LOG SHEET (Deck) **FOR-ENV-0538**

Job No:	54463	Area: North Sea	Scale: Green Line Lasers (99mm)
Project:	Caledonia OWF Phase 2		Equipment: 1Cam / OE Konsberg 14-208 / CT3022
Client:	Caledonia Offshore Windfarm Limited		Vessel: MV *Ocean Endeavour*

Station Number	Date	Time on Overlay Start	Time on Overlay Finish	Duration	HD Video HDD File Name(s)	Topside SD Video File Name (s)	Sediment Description	Fauna Description	Operator(s)	No. of Photos	First Fix No.	Last Fix No.	Comments
AA_ENV_19	14-Apr-2023	17:24:36	17:36:25	0:11:49	54463_AA_ENV_19 00010.MTS	54463_AA_ENV_19_2023-04-14_172436_Ch1/2_00	Fine sand with faunal burrows and occasional shell	Arthropoda (Paguroidea), Chordata (Actinopterygii, Pleuronectiformes), Cnidaria (*Pennatula phosphorea*), Mollusca (Gastropoda)	RH, MC	44	2413	2455	Issue with EELs, photo taken but no fix 2414 to 2416
AA_ENV_22	14-Apr-2023	20:53:43	21:06:25	0:12:42	54463_AA_ENV_22 00011.MTS	54463_AA_ENV_22_2023-04-14_205343_Ch1/2_00	Cobbles, gravel, coarse sand with shell fragments.	Arthropoda, Chordata (Actinopterygii), Cnidaria (*P. phosphorea*), Echinodermata (Asteroidea), Mollusca (Gastropda)	RH, MC	42	2456	2497	
AA_ENV_34	15-Apr-2023	01:49:13	02:04:07	0:14:54	54463_AA_ENV_34 00012.MTS	54463_AA_ENV_34_2023-04-15_014913_Ch1/2_00	Fine sand with faunal burrows	Chordata (Actinopterygii, Pleuronectiformes), Cnidaria (*P. phosphorea*), Echinodermata (Asteroidea)	MJ, JH	41	2498	2538	
AA_ENV_09	15-Apr-2023	04:26:31	04:40:45	0:14:14	54463_AA_ENV_09 00013.MTS	54463_AA_ENV_09_2023-04-15_042631_Ch1/2_00	Fine sand with faunal burrows with shell fragments	Bryozoa, Chordata (Pleuronectiformes, Triglidae), Cnidaria (Hydrozoa, *P. phosphorea*)	MJ, JH	40	2539	2579	
AA_ENV_17	15-Apr-2023	06:10:30	06:24:35	00:14:05	54463_AA_ENV_17 00014.MTS	54463_AA_ENV_17_2023-04-15_061030_Ch1/2_00	Cobbles, gravel, coarse sand with shell fragments	Cnidaria (Hydrozoa), Echinodermata (Echinoidea), Mollusca (Pectinidae)	MJ, JH	39	2580	2617	
AA_ENV_41	15-Apr-2023	08:09:30	08:26:12	00:16:42	54463_AA_ENV_41 00015.MTS	54463_AA_ENV_41_2023-04-15_080930_Ch1/2_00	Cobbles, gravel, coarse sand with shell fragments	Arthropoda (Brachyura), Chordata (Actinopterygii)	MJ, JH	45	2618	2662	
AA_ENV_07	15-Apr-2023	10:32:01	10:59:21	00:27:20	54463_AA_ENV_07 00000.MTS	54463_AA_ENV_07_2023-04-15_103201_Ch1/2_00	Coarse sand with shell fragments	Chordata (Actinopterygii), Echinodermata (Asteroidea), Mollusca (*Arctica islandica*)	MJ, JH	41	2663	2703	Confirmed presence of *A. islandica*
AA_ENV_23	15-Apr-2023	14:02:37	14:14:25	00:11:48	54463_AA_ENV_23 00001.MTS	54463_AA_ENV_23_2023-04-15_140237_Ch1/2_00	Gravel, coarse sand with shell fragments	Annelida (Polychaeta), Arthropoda (Paguroidea), Echinodermata (Asteroidea) Mollusca (Bivalvia, Gastropoda, *A. islandica*)	RH, MC	38	2704	2741	Confirmed presence of *A. islandica*
AA_ENV_20	15-Apr-2023	16:00:54	16:16:00	00:15:06	54463_AA_ENV_20 00002.MTS	54463_AA_ENV_20_2023-04-15_160054_Ch1/2_00	Cobbles, gravel, coarse sand with shell fragments	Arthropoda (Paguroidea), Cnidaria (*Alcyonium digitatum* , Hydrozoa), Echinodermata (Ophiuroidea) Mollusca (Pectinidae, Gastropoda)	RH, MC	40	2742	2781	
AA_ENV_38	18-Apr-2023	19:11:34	19:26:31	00:14:57	54463_AA_ENV_38 00003.MTS	54463_AA_ENV_38_2023-04-18_191134_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Paguroidea), Chordata (Actinopterygii, Pleuronectiformes, Triglidae), Cnidaria (Hydrozoa), Mollusca (Gastropoda)	RH, MC	41	2782	2822	
AA_ENV_01	18-Apr-2023	19:56:37	20:12:46	00:16:09	54463_AA_ENV_01 00004.MTS	54463_AA_ENV_01_2023-04-18_195637_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Paguoidea), Chordata (Actinopterygii, Pleuronectiformes), Echinodermata (Ophiuroidea), Mollusca (Gastropoda, *A. islandica*)	RH, MC	42	2823	2864	Confirmed presence of *A. islandica*
AA_ENV_39	18-Apr-2023	21:36:59	21:48:32	00:11:33	54463_AA_ENV_39 00005.MTS	54463_AA_ENV_39_2023-04-18_213659_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Paguroidea), Bryozoa (Flustridae) Cnidaria (Hydrozoa), Echinodermata (Asteroidea), Mollusca (Pectinidae, *A. islandica*)	RH, MC	39	2865	2903	Confirmed presence of *A. islandica*
AA_ENV_08	18-Apr-2023	22:32:30	22:48:46	00:16:16	54463_AA_ENV_08 00006.MTS	54463_AA_ENV_08_2023-04-18_223230_Ch1/2_00	Cobbles, gravel, coarse sand with shell fragments	Bryozoa (Flustridae), Arthropoda (Paguroidea), Chordata (Actinopterygii), Echinodermata (Asteroidea), Mollusca (Bivalvia, *A. islandica*)	RH, MC	40	2904	2943	Confirmed presence of *A. islandica*
AA_ENV_11	19-Apr-2023	00:16:10	00:33:55	00:17:45	54463_AA_ENV_11 00007.MTS	54463_AA_ENV_11_2023-04-19_001610_Ch1/2_00	Cobbles, gravel, coarse sand with shell fragments	Arthropoda (Paguroidea), Bryozoa (Flustridae), Chordata (Pleuronectiformes), Echinodermata (Echinoidea, Ophiuroidea), Mollusca (Bivalvia, *A. islandica*)	MJ, JH	41	2944	2984	Confirmed presence of *A. islandica*

APPENDIX B FIELD SAMPLING LOGS

SEABED IMAGERY LOG SHEET (Deck) **FOR-ENV-0538**

Job No:	54463	Area: North Sea	Scale: Green Line Lasers (99mm)
Project:	Caledonia OWF Phase 2		Equipment: 1Cam / OE Konsberg 14-208 / CT3022
Client:	Caledonia Offshore Windfarm Limited		Vessel: MV *Ocean Endeavour*

Station Number	Date	Time on Overlay Start	Time on Overlay Finish	Duration	HD Video HDD File Name(s)	Topside SD Video File Name (s)	Sediment Description	Fauna Description	Operator(s)	No. of Photos	First Fix No.	Last Fix No.	Comments
AA_ENV_18	19-Apr-2023	03:40:55	03:54:40	00:13:45	54463_AA_ENV_18 00008.MTS	54463_AA_ENV_18_2023-04-19_034055_Ch1/2_00	Coarse sand with shell fragments	Bryozoa (Flustridae), Chordata (Actinopterygii, Pleuronectiformes), Echinodermata (Ophiuroidea)	MJ, JH	42	2985	3026	
AA_ENV_13	19-Apr-2023	06:12:45	06:26:43	00:13:58	54463_AA_ENV_13 00009.MTS	54463_AA_ENV_13_2023-04-19_061245_Ch1/2_00	Boulder, cobbles, gravel, coarse sand with shell fragments	Bryozoa (Flustridae), Chordata (Actinopterygii), Cnidaria (*A. digitatum*), Echinodermata (Asteroidea)	MJ, JH	44	3027	3070	
AA_ENV_37	19-Apr-2023	07:35:10	07:48:48	00:13:38	54463_AA_ENV_37 00010.MTS	54463_AA_ENV_37_2023-04-19_073510_Ch1/2_00	Gravel, coarse sand with shell fragments	Bryozoa (Flustridae), Chordata (Pleuronectiformes), Cnidaria (*A. digitatum*)	MJ, JH	47	3071	3117	
AA_ENV_31	19-Apr-2023	08:28:20	08:42:27	00:14:07	54463_AA_ENV_31 00011.MTS	54463_AA_ENV_31_2023-04-19_082820_Ch1/2_00	Coarse sand with shell fragments	Chordata (Pleuronectiformes, Triglidae), Cnidaria (*P. phosphorea*)	MJ, JH	44	3118	3160	
AA_ENV_03	19-Apr-2023	10:00:21	10:14:55	00:14:34	54463_AA_ENV_03 00012.MTS	54463_AA_ENV_03_2023-04-19_100025_Ch1/2_00	Coarse sand with shell fragments	Bryozoa (Flustridae), Chordata (Actinopterygii), Echinodermata, Mollusca (Gastropoda)	RH, MC	41	3161	3201	
AA_ENV_04	19-Apr-2023	11:24:02	11:40:15	00:16:13	54463_AA_ENV_04 00013.MTS	54463_AA_ENV_04_2023-04-19_112402_Ch1/2_00	Cobbles, gravel, coarse sand with shell fragments	Arthropoda (Paguroidea), Chordata (Pleuronectiformes), Cnidaria (*A. digitatum*, Hydrozoa), Echinodermata (*Asterias rubens*), Mollusca (Gastropoda)	RH, MC	40	3202	3242	
AA_ENV_35	19-Apr-2023	14:15:40	14:32:36	00:16:56	54463_AA_ENV_35 00014.MTS	54463_AA_ENV_35_2023-04-19_141540_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Paguroidea), Chordata (*Chelidonichthys obsura*), Cnidaria (Hydrozoa)	RH, MC	40	3243	3282	
AA_ENV_33	19-Apr-2023	13:44:34	13:57:37	00:13:03	54463_AA_ENV_33 00015.MTS	54463_AA_ENV_33_2023-04-20_134432_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Paguroidea), Bryozoa, Cnidaria (Hydrozoa), Echinodermata (Echinoidea), Mollusca (Bivalvia)	RH, MC	40	3283	3322	
AA_ENV_14	19-Apr-2023	15:36:24	15:55:55	00:19:31	54463_AA_ENV_14 00016.MTS	54463_AA_ENV_14_2023-04-20_153624_Ch1/2_00	Coarse sand with shell fragments	Annelida (Polychaeta), Bryozoa, Chordata (Pleuronectiformes), Cnidaria (Hydrozoa)	RH, MC	41	3323	3363	
AA_ENV_36	20-Apr-2023	16:57:30	17:09:17	00:11:47	54463_AA_ENV_36 00017.MTS	54463_AA_ENV_36_2023-04-20_165730_Ch1/2_00	Coarse sand with shell fragments	Chordata (Pleuronectiformes), Cnidaria (Hydrozoa), Mollusca (Bivalvia, Gastropoda)	RH, MC	40	3364	3403	
AA_ENV_02	20-Apr-2023	17:48:38	17:59:34	00:10:56	54463_AA_ENV_02 00018.MTS	54463_AA_ENV_02_2023-04-20_174838_Ch1/2_00	Coarse sand with shell fragments	Chordata (Pleuronectiformes), Cnidaria (Hydrozoa), Mollusca (Gastropoda)	RH, MC	38	3404	3441	
AA_ENV_32	20-Apr-2023	20:34:32	20:49:05	00:14:33	54463_AA_ENV_32 00000.MTS	54463_AA_ENV_32_2023-04-20_203432_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Caridea, Paguroidea), Bryozoa (Flustridae), Chordata (Pleuronectiformes), Echinodermata (Asteroidea, Ophiuroidea), Mollusca (Bivalvia, *A. islandica*)	RH, MC	44	3442	3482	Issue with EELs, photo taken but no fix 3453 to 3461 and 3483 to 3485 Confirmed presence of *A. islandica*
AA_ENV_29	20-Apr-2023	22:24:45	22:42:25	00:17:40	54463_AA_ENV_29 00001.MTS	54463_AA_ENV_29_2023-04-20_222445_Ch1/2_00 54463_AA_ENV_29_2023-04-20_222806_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Brachyura), Chordata (Actinopterygii. Triglidae), Cnidaria (*P. phosphorea*), Echinodermata (Ophiuroidea), Mollusca (*A. islandica*)	MJ, JH	54	3486	3529	Overlay for first few frames of AA_ENV_29 read AA_ENV_32. Video overlay header corrected Confirmed presence of *A. islandica*
AA_ENV_27	21-Apr-2023	00:12:01	00:26:38	00:14:37	54463_AA_ENV_27 00002.MTS	54463_AA_ENV_27_2023-04-21_001201_Ch1/2_00	Coarse sand with shell fragments	Bryozoa, Chordata (Actinopterygii), Cnidaria (Hydrozoa, *P. phosphorea*), Echinodermata (Ophiuroidea), Mollusca (Bivalvia, *A. islandica*)	MJ, JH	48	3540	3587	Confirmed presence of *A. islandica*

APPENDIX B FIELD SAMPLING LOGS

SEABED IMAGERY LOG SHEET (Deck)													FOR-ENV-0538
Job No:	54463		Area:	North Sea				Scale: Green Line Lasers (99mm)					
Project:	Caledonia OWF Phase 2							Equipment: 1Cam / OE Konsberg 14-208 / CT3022					
Client:	Caledonia Offshore Windfarm Limited							Vessel: MV *Ocean Endeavour*					
Station Number	Date	Time on Overlay Start	Time on Overlay Finish	Duration	HD Video HDD File Name(s)	Topside SD Video File Name (s)	Sediment Description	Fauna Description	Operator(s)	No. of Photos	First Fix No.	Last Fix No.	Comments
AA_ENV_06	21-Apr-2023	01:55:30	02:10:30	00:15:00	54463_AA_ENV_06 00003.MTS	54463_AA_ENV_06_2023-04-21_015530_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Paguroidea), Chordata (Actinopterygii, Pleuronectiformes, Triglidae), Cnidaria (*P. phosphorea*), Echinodermata (Asteroidea, Ophiuroidea), Mollusca (Bivalvia, A. islandica)	MJ, JH	43	3588	3630	Confirmed presence of *A. islandica*
AA_ENV_28	21-Apr-2023	04:35:00	04:51:46	00:16:46	54463_AA_ENV_28 00004.MTS 00005.MTS	54463_AA_ENV_28_2023-04-21_040555_Ch1/2_00 54463_AA_ENV_28_2023-04-21_043500_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Brachyura, Paguroidea), Bryozoan (Flustridae), Chordata (Pleuronectiformes), Cnidaria (Alcyonium digitatum, Anthozoa, Hydrozoa), Echinodermata (Ophiuroidea), Mollusca (Bivalvia, *A. islandica*)	MJ, JH	57	3635	3687	Issue with EELs, photo taken but no fix 3631 to 3634 Confirmed presence of *A. islandica*
AA_ENV_15	21-Apr-2023	08:02:07	08:22:47	00:20:40	54463_AA_ENV_15 00006.MTS	54463_AA_ENV_15_2023-04-21_080207_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Brachyura), Bryozoa (Flustridae), Chordata (Actinopterygii), Cnidaria (*A. digitatum*, Hydrozoa, *P. phosphorea*), Echinodermata (Ophiuroidea), Mollusca (Bivalvia, *A. islandica*)	MJ, JH	58	3688	3745	Issue with EELs, photo taken but no fix 3717 to 3720 Confirmed presence of A. islandica
AA_ENV_10	21-Apr-2023	10:12:39	10:26:39	00:14:00	54463_AA_ENV_10 00007.MTS	54463_AA_ENV_10_2023-04-21_101239_Ch1/2_00	Boulders, cobbles and coarse sand with shell fragments	Annelida (Polychaeta), Arthropoda (Paguroidea), Cnidaria (Hydrozoa), Echinodermata (Astropoda, Ophiuroidea), Mollusca (Gastropoda)	RH, MC	42	3746	3788	
AA_ENV_26	21-Apr-2023	11:30:08	11:42:08	00:12:00	54463_AA_ENV_26 00008.MTS	54463_AA_ENV_26_2023-04-21_113008_Ch1/2_00	Fine sand with faunal burrows with shell fragments	Arthropoda (Brachyura), Chordata (Actinopterygii, Pleuronectiformes), Cnidaria (Hydrozoa, *P. phosphorea*), Mollusca (Bivalvia, Gastropoda, *A. islandica*)	RH, MC	41	3789	3828	Confirmed presence of *A. islandica*
AA_ENV_12	21-Apr-2023	14:45:06	14:57:52	00:12:46	54463_AA_ENV_12 00009.MTS	54463_AA_ENV_12_2023-04-21_144459_Ch1/2_00	Fine sand with faunal burrows with shell fragments	Chordata (Actinopterygii, Pleuronectiformes), Cnidaria (*P. phosphorea*), Echinodermata (Asteroidea)	RH, MC	40	3829	3868	
AA_ENV_30	21-Apr-2023	16:34:50	16:49:27	00:14:37	54463_AA_ENV_30 00010.MTS	54463_AA_ENV_30_2023-04-21_163450_Ch1/2_00	Fine sand with faunal burrows with shell fragments	Chordata (Actinopterygii), Cnidaria (*P. phosphorea*)	RH, MC	40	3869	3908	
AA_ENV_42	21-Apr-2023	17:55:59	18:09:10	00:13:11	54463_AA_ENV_42 00011.MTS	54463_AA_ENV_42_2023-04-21_175559_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Paguroidea), Chordata (Actinopterygii, Pleuronectiformes), Cnidaria (*A. digitatum*, *P. phosphorea*), Mollusca (*A. islandica*, Bivalvia, Gastropoda, Scaphopoda)	RH, MC	40	3909	3948	Confirmed presence of *A. islandica*
AA_ENV_05	21-Apr-2023	18:48:29	19:01:13	00:12:44	54463_AA_ENV_05 00012.MTS	54463_AA_ENV_05_2023-04-21_184829_Ch1/2_00	Fine sand with faunal burrows with shell fragments	Chordata (Actinopterygii, Pleuronectiformes, Triglidae), Cnidaria (*A. digitatum*, Hydrozoa), Echinodermata (Asteroidea), Mollusca (Bivalvia)	RH, MC	39	3949	3982	Issue with EELs, Incorrect fix number issued 3982
AA_ENV_25	21-Apr-2023	20:13:32	20:26:35	00:13:03	54463_AA_ENV_25 00013.MTS	54463_AA_ENV_25_2023-04-21_201332_Ch1/2_00	Fine sand with shell fragments and occasional boulders	Artrhopoda (Paguroidea), Chordata (Actinopterygii), Cnidaria (*A. digitatum*, Hydrozoa, *P. phosphorea*), Echinodermata (Asteroidea, Echinoidea), Mollusca (Gastropoda)	RH, MC	40	3983	4022	

APPENDIX B FIELD SAMPLING LOGS

SEABED IMAGERY LOG SHEET (Deck) **FOR-ENV-0538**

Job No:	54463	Area: North Sea	Scale: Green Line Lasers (99mm)
Project:	Caledonia OWF Phase 2		Equipment: 1Cam / OE Konsberg 14-208 / CT3022
Client:	Caledonia Offshore Windfarm Limited		Vessel: MV *Ocean Endeavour*

Station Number	Date	Time on Overlay Start	Time on Overlay Finish	Duration	HD Video HDD File Name(s)	Topside SD Video File Name (s)	Sediment Description	Fauna Description	Operator(s)	No. of Photos	First Fix No.	Last Fix No.	Comments
AA_ENV_16	22-Apr-2023	22:00:45	22:19:53	00:19:08	54463_AA_ENV_16 00014.MTS	54463_AA_ENV_16_2023-04-21_220045_Ch1/2_00	Boulders, cobbles and coarse sand with shell fragments	Arthropoda (Brachyura, Paguroidea), Chordata (Actinopterygii, Pleuronectiformes), Cnidaria (Hydrozoa, *P. phosphorea*), Echinodermata (Asteroidea, Echinoidea), Mollusca (Bivalvia)	MJ, JH	46	4023	4069	
AA_ENV_21	22-Apr-2023	06:07:42	06:22:20	00:14:38	54463_AA_ENV_21 00015.MTS	54463_AA_ENV_21_2023-04-22_060742_Ch1/2_00	Fine sand with faunal burrows with shell fragments	Arthropoda (*Nephrops norvegicus*), Chordata (Actinopterygii, Pleuronectiformes)	MJ, JH	41	4070	4110	
AA_ENV_40	22-Apr-2023	08:15:55	08:30:23	00:14:28	54463_AA_ENV_40 00016.MTS	54463_AA_ENV_40_2023-04-22_081555_Ch1/2_00	Fine sand with faunal burrows with shell fragments	Chordata (Pleuronectiformes), Cnidaria (Hydrozoa), Echinodermata (Asteroidea)	MJ, JH	44	4111	4154	
AA_ENV_24	22-Apr-2023	10:07:58	10:33:01	00:25:03	54463_AA_ENV_24 00017.MTS	54463_AA_ENV_24_2023-04-22_100758_Ch1/2_00	Coarse sand with shell fragments	Arthropoda (Paguroidea), Chordata (Pleuronectiformes), Cnidaria (*A. digitatum*, Hydrozoa, *P. phosphorea*), Mollusca (Bivalvia, *A. islandica*)	RH, MC	41	4155	4194	Confirmed presence of *A. islandica*

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seafloor Sampling Positioning Summary

Job No	54464				Vessel	MV *Ocean Endeavour*					
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	CoG					
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z 2.93
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon					
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT	

Date	Time (UTC)	Fix number	Stn No	Penetration	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
14-Apr-2023	18:49	116	AA_ENV_19	40%	MFA	HG	70	534677	6432889	534678	6432888	-1	2	2	327	SG	
14-Apr-2023	18:56	117	AA_ENV_19	-	No sample	HG	70	534678	6432887	534678	6432888	0	-1	1	200	SG	Low retention
14-Apr-2023	19:03	118	AA_ENV_19	-	No sample	HG	70	534676	6432891	534678	6432888	-3	3	4	318	SG	Low retention
14-Apr-2023	19:09	119	AA_ENV_19	30%	No sample	HG	70	534678	6432888	534678	6432888	-1	0	1	262	SG	Low retention
14-Apr-2023	19:19	120	AA_ENV_19	20%	No sample	HG	70	534677	6432896	534678	6432888	-1	8	8	354	SG	moved 10m to N, Low retention
14-Apr-2023	19:24	121	AA_ENV_19	40%	MFB	HG	70	534676	6432896	534678	6432888	-2	9	9	347	SG	
14-Apr-2023	22:18	122	AA_ENV_22	50%	MFA	HG	65	533804	6437587	533805	6437586	-1	1	1	324	SG	
14-Apr-2023	22:26	123	AA_ENV_22	90%	MFB	HG	65	533805	6437586	533805	6437586	0	0	0	101	SG	
14-Apr-2023	22:42	124	AA_ENV_22	30%	No sample	HG	65	533805	6437587	533805	6437586	1	1	1	47	SG	Low retention
14-Apr-2023	22:53	125	AA_ENV_22	-	No sample	HG	65	533806	6437587	533805	6437586	1	1	2	61	PL	Low retention
14-Apr-2023	23:00	126	AA_ENV_22	-	No sample	HG	65	533805	6437588	533805	6437586	1	2	2	25	PL	Rock in grab jaws
14-Apr-2023	23:12	127	AA_ENV_22	-	No sample	HG	65	533804	6437587	533805	6437586	0	1	1	354	PL	Rock in grab jaws
14-Apr-2023	23:22	128	AA_ENV_22	50%	CHEM	DG	64	533797	6437587	533805	6437586	-7	0	7	273	PL	
15-Apr-2023	03:24	129	AA_ENV_34	70%	MFA	HG	68	528679	6440176	528681	6440177	-2	-1	2	243	PL	
15-Apr-2023	03:36	130	AA_ENV_34	40%	MFB	HG	68	528679	6440177	528681	6440177	-3	0	3	261	PL	
15-Apr-2023	04:00	131	AA_ENV_34	50%	CHEM	DG	68	528677	6440177	528681	6440177	-4	0	4	264	PL	
15-Apr-2023	06:00	132	AA_ENV_09	40%	MFA	HG	58	526073	6443052	526070	6443054	3	-2	4	119	PL	
15-Apr-2023	06:08	133	AA_ENV_09	50%	MFB	HG	58	526072	6443049	526070	6443054	2	-5	5	161	PL	
15-Apr-2023	07:40	134	AA_ENV_17	20%	No sample	HG	55	528667	6443788	528669	6443788	-2	0	2	275	PL	Low retention
15-Apr-2023	07:49	135	AA_ENV_17	20%	No sample	HG	55	528669	6443787	528669	6443788	-1	-1	1	223	PL	Low retention
15-Apr-2023	07:57	136	AA_ENV_17	40%	MFA	HG	55	528667	6443788	528669	6443788	-2	0	2	282	PL	
15-Apr-2023	08:04	137	AA_ENV_17	10%	No sample	HG	55	528667	6443788	528669	6443788	-2	0	2	274	PL	Low retention
15-Apr-2023	08:18	138	AA_ENV_17	60%	MFB	HG	55	528690	6443811	528669	6443788	21	23	31	42	PL	
15-Apr-2023	12:28	139	AA_ENV_07	20%	No sample	HG	55	528478	6448028	528478	6448025	0	3	3	358	SG	Low retention
15-Apr-2023	12:36	140	AA_ENV_07	20%	No sample	HG	55	528463	6448031	528478	6448025	-15	6	16	293	SG	Low retention, vessel struggling to hold position
15-Apr-2023	12:42	141	AA_ENV_07	20%	No sample	HG	55	528477	6448026	528478	6448025	-1	1	1	316	SG	Low retention
15-Apr-2023	13:38	142	AA_ENV_07	20%	No sample	HG	55	528481	6448022	528478	6448025	3	-3	5	134	SG	Low retention
15-Apr-2023	13:44	143	AA_ENV_07	40%	MFA	HG	55	528486	6448020	528478	6448025	8	-5	10	122	SG	Moved 10m to S
15-Apr-2023	13:50	144	AA_ENV_07	40%	MFB	HG	55	528485	6448018	528478	6448025	8	-6	10	130	SG	
15-Apr-2023	14:01	145	AA_ENV_07	60%	CHEM	DG	55	528484	6448020	528478	6448025	6	-5	8	128	SG	
15-Apr-2023	15:28	146	AA_ENV_23	40%	MFA	HG	54	526343	6451077	526340	6451078	4	-2	4	114	SG	
15-Apr-2023	15:34	147	AA_ENV_23	50%	MFB	HG	54	526338	6451077	526340	6451078	-2	-1	2	237	SG	
15-Apr-2023	17:31	148	AA_ENV_20	-	No sample	HG	54	526163	6454740	526165	6454740	-1	0	1	258	SG	Rock in grab jaws
15-Apr-2023	17:36	149	AA_ENV_20	-	No sample	HG	54	526164	6454741	526165	6454740	0	1	1	337	SG	Rock in grab jaws
15-Apr-2023	17:47	150	AA_ENV_20	0%	No sample	HG	54	526160	6454747	526165	6454740	-5	7	9	326	SG	Low retention

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seafloor Sampling Positioning Summary

Job No	54464				Vessel	MV *Ocean Endeavour*					
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	CoG					
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon					
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT	

Date	Time (UTC)	Fix number	Stn No	Penetration	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
15-Apr-2023	17:57	151	AA_ENV_20	0%	No sample	HG	54	526159	6454747	526165	6454740	-5	6	8	318	SG	Moved 10m to NW, Low retention
15-Apr-2023	18:02	152	AA_ENV_20	-	No sample	HG	54	526157	6454745	526165	6454740	-7	5	9	304	SG	Rock in grab jaws
15-Apr-2023	18:08	153	AA_ENV_20	0%	No sample	HG	54	526150	6454748	526165	6454740	-14	8	16	298	SG	Low retention, Station abandoned
18-Apr-2023	21:28	154	AA_ENV_01	40%	MFA	HG	56	530016	6454654	530014	6454656	2	-2	2	133	SG	
18-Apr-2023	21:34	155	AA_ENV_01	20%	No sample	HG	56	530013	6454655	530014	6454656	-1	-1	1	238	SG	Low retention
18-Apr-2023	21:40	156	AA_ENV_01	50%	MFB	HG	56	530014	6454657	530014	6454656	0	1	1	23	SG	
19-Apr-2023	00:13	157	AA_ENV_08	>95%	MFA	HG	59	532734	6456074	532737	6456073	-2	1	3	282	PL	
19-Apr-2023	00:21	158	AA_ENV_08	>95%	MFB	HG	58	532738	6456072	532737	6456073	1	-1	1	136	PL	
19-Apr-2023	01:53	159	AA_ENV_11	90%	MFA	HG	55	532530	6458658	532532	6458657	-2	1	2	303	PL	
19-Apr-2023	02:06	160	AA_ENV_11	90%	MFB	HG	55	532532	6458658	532532	6458657	0	2	2	6	PL	
19-Apr-2023	05:11	161	AA_ENV_18	90%	MFA	HG	55	528852	6458618	528851	6458620	1	-2	2	145	PL	
19-Apr-2023	05:22	162	AA_ENV_18	90%	MFB	HG	55	528853	6458617	528851	6458620	2	-3	3	145	PL	
19-Apr-2023	05:44	163	AA_ENV_18	70%	CHEM	DG	55	528852	6458620	528851	6458620	1	1	1	48	PL	
19-Apr-2023	07:41	164	AA_ENV_13	90%	MFA	HG	51	526674	6463793	526674	6463794	-1	-2	2	201	PL	
19-Apr-2023	07:49	165	AA_ENV_13	40%	MFB	HG	51	526675	6463794	526674	6463794	1	0	1	73	PL	
19-Apr-2023	09:56	166	AA_ENV_31	90%	MFA	HG	54	525973	6460722	525974	6460723	-1	0	2	251	PL	
19-Apr-2023	10:05	167	AA_ENV_31	80%	MFB	HG	54	525975	6460724	525974	6460723	1	2	2	24	PL	
19-Apr-2023	11:30	168	AA_ENV_03	50%	MFA	HG	58	523391	6459873	523393	6459876	-2	-3	4	214	SG	
19-Apr-2023	11:35	169	AA_ENV_03	40%	MFB	HG	58	523392	6459875	523393	6459876	0	0	0	245	SG	
19-Apr-2023	12:55	170	AA_ENV_04	40%	MFA	HG	56	520936	6459461	520938	6459461	-1	0	1	269	SG	
19-Apr-2023	13:01	171	AA_ENV_04	50%	MFB	HG	56	520937	6459461	520938	6459461	-1	0	1	290	SG	
19-Apr-2023	15:44	172	AA_ENV_35	40%	MFA	HG	54	521412	6462909	521411	6462903	1	6	6	10	SG	
19-Apr-2023	15:51	173	AA_ENV_35	50%	MFB	HG	54	521411	6462905	521411	6462903	1	2	2	23	SG	
19-Apr-2023	16:15	174	AA_ENV_35	60%	CHEM	DG	54	521411	6462906	521411	6462903	1	3	3	14	SG	
20-Apr-2023	15:09	175	AA_ENV_33	80%	MFA	HG	56	523255	6467418	523255	6467414	0	4	4	3	SG	
20-Apr-2023	15:16	176	AA_ENV_33	80%	MFB	HG	56	523258	6467417	523255	6467414	3	3	4	47	SG	
20-Apr-2023	15:29	177	AA_ENV_33	80%	CHEM	DG	56	523257	6467416	523255	6467414	2	2	3	41	SG	
20-Apr-2023	17:11	178	AA_ENV_14	40%	MFA	HG	58	519355	6467399	519351	6467394	4	5	6	37	SG	
20-Apr-2023	17:16	179	AA_ENV_14	40%	MFB	HG	58	519351	6467394	519351	6467394	0	0	0	113	SG	
20-Apr-2023	19:13	180	AA_ENV_02	30%	No sample	HG	59	521550	6465753	521551	6465754	-1	-1	1	217	SG	Low retention
20-Apr-2023	19:18	181	AA_ENV_02	30%	No sample	HG	59	521550	6465754	521551	6465754	0	-1	1	219	SG	Low retention
20-Apr-2023	19:24	182	AA_ENV_02	30%	No sample	HG	59	521551	6465753	521551	6465754	0	-1	1	169	SG	Low retention
20-Apr-2023	19:31	183	AA_ENV_02	20%	No sample	HG	59	521544	6465747	521551	6465754	-6	-7	10	222	SG	Moved 10m SW, Low retention
20-Apr-2023	19:36	184	AA_ENV_02	40%	MFA	HG	59	521543	6465747	521551	6465754	-7	-8	10	224	SG	
20-Apr-2023	19:41	185	AA_ENV_02	40%	MFB	HG	60	521544	6465747	521551	6465754	-7	-8	10	221	SG	
20-Apr-2023	22:00	186	AA_ENV_32	50%	MFA	HG	59	532374	6452532	532374	6452533	0	-1	1	164	SG	
20-Apr-2023	22:07	187	AA_ENV_32	40%	MFB	HG	59	532373	6452533	532374	6452533	0	0	0	264	SG	
21-Apr-2023	00:02	188	AA_ENV_29	50%	MFA	HG	65	537960	6451158	537961	6451159	-1	-1	1	240	PL	
21-Apr-2023	00:11	189	AA_ENV_29	50%	MFB	HG	65	537955	6451159	537961	6451159	-6	1	6	275	PL	

APPENDIX B FIELD SAMPLING LOGS

Gardline — Seafloor Sampling Positioning Summary

Job No	54464				Vessel	MV *Ocean Endeavour*					
Client	Caledonia Offshore Windfarm Limited				Vessel Reference Point (VRP)	CoG					
Project Name	Caledonia OWF Phase 2				Deployment Location	Camera Deployment Node	x	6.7	y	21.94	z 2.93
Primary Positioning System	Starpack 1				Actual Coordinates derived from	Vessel or Beacon					
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84		Projection	UTM zone 30N		Vertical / Tidal Datum	VORF, LAT	

Date	Time (UTC)	Fix number	Stn No	Penetration	Sample Retention	Retention	Observed Seafloor Depth (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
								Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
21-Apr-2023	01:45	190	AA_ENV_27	50%	MFA	HG	61	535301	6448609	535303	6448610	-2	0	2	256	PL	
21-Apr-2023	01:54	191	AA_ENV_27	40%	MFB	HG	61	535302	6448609	535303	6448610	-1	-1	2	240	PL	
21-Apr-2023	03:28	192	AA_ENV_06	40%	MFA	HG	64	535807	6445820	535808	6445823	-1	-3	3	195	PL	
21-Apr-2023	03:41	193	AA_ENV_06	50%	MFB	HG	64	535807	6445823	535808	6445823	-1	0	1	256	PL	
21-Apr-2023	06:07	194	AA_ENV_28	60%	MFA	HG	55	531131	6448650	531132	6448650	-2	1	2	295	PL	
21-Apr-2023	06:15	195	AA_ENV_28	60%	MFB	HG	55	531125	6448647	531132	6448650	-8	-3	8	249	PL	
21-Apr-2023	09:39	196	AA_ENV_15	60%	MFA	HG	65	533432	6444277	533430	6444276	2	1	2	61	PL	
21-Apr-2023	09:52	197	AA_ENV_15	50%	MFB	HG	65	533429	6444270	533430	6444276	-1	-5	6	191	PL	
21-Apr-2023	10:10	198	AA_ENV_15	50%	CHEM	DG	65	533431	6444272	533430	6444276	0	-3	4	174	PL	
21-Apr-2023	11:36	199	AA_ENV_10	60%	MFA	HG	63	530892	6442119	530892	6442123	0	-4	4	180	SG	
21-Apr-2023	11:41	200	AA_ENV_10	90%	MFB	HG	63	530892	6442122	530892	6442123	0	-1	1	173	SG	
21-Apr-2023	12:52	201	AA_ENV_26	50%	MFA	HG	70	532586	6439724	532588	6439724	-2	0	2	257	SG	
21-Apr-2023	12:59	202	AA_ENV_26	20%	No sample	HG	70	532587	6439724	532588	6439724	-1	0	1	270	SG	Low retention
21-Apr-2023	13:05	203	AA_ENV_26	70%	MFB	HG	70	532587	6439724	532588	6439724	-1	0	1	257	SG	
21-Apr-2023	16:10	204	AA_ENV_12	40%	MFA	HG	71	531952	6433904	531953	6433903	-1	1	1	297	SG	
21-Apr-2023	16:17	205	AA_ENV_12	40%	MFB	HG	71	531952	6433903	531953	6433903	-1	-1	1	241	SG	
21-Apr-2023	16:29	206	AA_ENV_12	50%	CHEM	DG	71	531956	6433897	531953	6433903	3	-7	7	158	SG	
21-Apr-2023	18:01	207	AA_ENV_30	60%	MFA	HG	79	535608	6436085	535609	6436089	-1	-3	4	195	SG	
21-Apr-2023	18:08	208	AA_ENV_30	60%	MFB	HG	79	535605	6436083	535609	6436089	-5	-6	8	217	SG	
21-Apr-2023	20:12	209	AA_ENV_05	20%	No sample	HG	64	535651	6440719	535650	6440720	1	-1	2	142	SG	Low retention
21-Apr-2023	20:17	210	AA_ENV_05	40%	MFA	HG	64	535648	6440723	535650	6440720	-2	3	3	331	SG	
21-Apr-2023	20:23	211	AA_ENV_05	40%	MFB	HG	64	535648	6440722	535650	6440720	-1	2	2	317	SG	
21-Apr-2023	21:40	212	AA_ENV_25	50%	MFA	HG	69	537271	6443697	537275	6443701	-4	-5	6	223	SG	
21-Apr-2023	22:07	213	AA_ENV_25	40%	MFB	HG	70	537274	6443701	537275	6443701	-1	0	1	271	SG	
22-Apr-2023	04:15	214	AA_ENV_16	50%	MFA	HG	75	539557	6444753	539559	6444756	-2	-3	4	218	PL	
22-Apr-2023	04:30	215	AA_ENV_16	40%	MFB	HG	75	539557	6444754	539559	6444756	-2	-2	2	228	PL	
22-Apr-2023	07:44	216	AA_ENV_21	>95%	MFA	HG	103	541069	6447876	541069	6447876	0	0	0	150	PL	
22-Apr-2023	08:04	217	AA_ENV_21	>95%	MFB	HG	103	541069	6447875	541069	6447876	0	-1	1	154	PL	
22-Apr-2023	08:23	218	AA_ENV_21	90%	CHEM	DG	104	541067	6447876	541069	6447876	-2	0	2	281	PL	
22-Apr-2023	11:46	219	AA_ENV_24	30%	No sample	HG	66	536668	6453669	536668	6453672	0	-3	3	188	SG	Low retention
22-Apr-2023	11:51	220	AA_ENV_24	50%	MFA	HG	66	536667	6453670	536668	6453672	-1	-2	2	197	SG	
22-Apr-2023	11:58	221	AA_ENV_24	50%	MFB	HG	66	536670	6453670	536668	6453672	2	-2	3	138	SG	
22-Apr-2023	12:12	222	AA_ENV_24	70%	CHEM	DG	66	536669	6453673	536668	6453672	1	1	2	63	SG	

APPENDIX B FIELD SAMPLING LOGS

SEABED SAMPLING LOG SHEET (Deck)										FOR-ENV-0539
Job No:	54463		Area:	North Sea			Sieve Size: 1mm			
Project:	Caledonia OWF Phase 2						Equipment: Mini-Hamon Grab, Day Grab			
Client:	Caledonia Offshore Windfarm Limited						Vessel: MV *Ocean Endeavour*			
Sample Number	Station Number	Date	Time	Penetration	Sample Retention	Sample Receptacle	Sediment Description	Fauna Description	Operator(s)	Comments
1	AA_ENV_19	14-Apr-23	18:49	40%	MFA	1 x 1L 1 x ziplock bag	Fine to medium sand with occasional shell fragments Munsell: 2.5Y 4/1	No visible fauna	RH, MC	PSA
2	AA_ENV_19	14-Apr-23	18:56	0%	No sample				RH, MC	
3	AA_ENV_19	14-Apr-23	19:03	0%	No sample				RH, MC	
4	AA_ENV_19	14-Apr-23	19:09	30%	No sample				RH, MC	Low retention
5	AA_ENV_19	14-Apr-23	19:19	20%	No sample				RH, MC	Low retention
6	AA_ENV_19	14-Apr-23	19:24	40%	MFB	1 x 1L 1 x ziplock bag	Fine to medium sand with occasional shell fragments Munsell: 2.5Y 4/1	Annelida (Polychaeta), Arthropoda (Brachyura)	RH, MC	PSA Spare
7	AA_ENV_22	14-Apr-23	22:18	50%	MFA	1 x 5L 2 x ziplock bag	Coarse sand with gravel and shells Munsell: 10YR 5/6	Annelida (Polychaeta)	RH, MC	PSA eDNA
8	AA_ENV_22	14-Apr-23	22:26	90%	MFB	3 x 5L 2 x ziplock bag	Coarse sand with gravel and shells Munsell: 10YR 5/6	No visible fauna	RH, MC	PSA Spare eDNA Spare
9	AA_ENV_22	14-Apr-23	22:42	30%	No sample				RH, MC	Low retention
10	AA_ENV_22	14-Apr-23	22:53	0%	No sample				RH, MC	Rock in grab jaws
11	AA_ENV_22	14-Apr-23	23:00	0%	No sample				RH, MC	Rock in grab jaws
12	AA_ENV_22	14-Apr-23	23:12	0%	No sample				RH, MC	Low retention
13	AA_ENV_22	14-Apr-23	23:22	50%	CHEM	2 x 1L Jar	Coarse sand with gravel and shells Munsell: 10YR 5/6	No visible fauna	RH, MC	Moved 10m W. CHEM and CHEM Spare
14	AA_ENV_34	15-Apr-23	03:24	70%	MFA	1 x 1L 2 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 5/4	Annelida (Polychaeta), Echinodermata (Spatangoidea, Ophiuroidea), Mollusca (Scaphopoda)	MJ, JH	PSA eDNA
15	AA_ENV_34	15-Apr-23	03:36	40%	MFB	1 x 1L 2 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 5/4	No visible fauna	MJ, JH	PSA Spare eDNA Spare
16	AA_ENV_34	15-Apr-23	04:00	50%	CHEM	2 x 1L Jar	Fine sand with occasional shell fragments Munsell: 5Y 5/4	No visible fauna	MJ, JH	CHEM and CHEM Spare
17	AA_ENV_09	15-Apr-23	06:00	40%	MFA	1 x 1L 1 x ziplock bag	Fine to medium sand with occasional shell fragments Munsell: 5Y 4/3	Arthropoda	MJ, JH	PSA
18	AA_ENV_09	15-Apr-23	06:08	50%	MFB	1 x 1L 1 x ziplock bag	Fine to medium sand with occasional shell fragments Munsell: 5Y 4/3	Arthropoda	MJ, JH	PSA Spare
19	AA_ENV_17	15-Apr-23	07:40	20%	No sample		Cobbles: 50%		MJ, JH	Low retention
20	AA_ENV_17	15-Apr-23	07:49	20%	No sample		Cobbles: 30%		MJ, JH	Low retention

APPENDIX B FIELD SAMPLING LOGS

SEABED SAMPLING LOG SHEET (Deck)										FOR-ENV-0539
Job No:	54463		Area:	North Sea			Sieve Size: 1mm			
Project:	Caledonia OWF Phase 2						Equipment: Mini-Hamon Grab, Day Grab			
Client:	Caledonia Offshore Windfarm Limited						Vessel: MV *Ocean Endeavour*			
Sample Number	Station Number	Date	Time	Penetration	Sample Retention	Sample Receptacle	Sediment Description	Fauna Description	Operator(s)	Comments
21	AA_ENV_17	15-Apr-23	07:57	40%	MFA	2 x 5L 1 x ziplock bag	Coarse sand with cobbles, gravel and shells Munsell: 5Y 6/6 Cobbles: 10%	Annelida (Serpulidae), Cnidaria (Hydrozoa)	MJ, JH	PSA
22	AA_ENV_17	15-Apr-23	08:04	10%	No sample				MJ, JH	Low retention
23	AA_ENV_17	15-Apr-23	08:18	60%	MFB	2 x 5L 1 x ziplock bag	Coarse sand with cobbles, gravel and shells Munsell: 5Y 6/6 Cobbles: 10%	No visible fauna	MJ, JH	PSA Spare
24	AA_ENV_07	15-Apr-23	12:28	20%	No sample				RH, MC	Low retention
25	AA_ENV_07	15-Apr-23	12:36	20%	No sample				RH, MC	Low retention
26	AA_ENV_07	15-Apr-23	12:42	20%	No sample				RH, MC	Low retention
27	AA_ENV_07	15-Apr-23	13:38	20%	No sample				RH, MC	Low retention
28	AA_ENV_07	15-Apr-23	13:44	40%	MFA	1 x 1L 2 x ziplock bag	Coarse sand with cobbles, gravel and shells Munsell: 5Y 6/6 Cobbles: 10%	Mollusca (*A. islandica*)	RH, MC	PSA eDNA *A. islandica:* L 93.3 mm; H 78.44 mm; W 48.8 mm; weight 163.0g
29	AA_ENV_07	15-Apr-23	13:50	40%	MFB	1 x 1L 2 x ziplock bag	Coarse sand with cobbles, gravel and shells Munsell: 5Y 6/6 Cobbles: 10%	Annelida (Polychaeta), Mollusca (*A. islandica*)	RH, MC	PSA Spare eDNA Spare *A. islandica:* L 86.66 mm; H 78.44 mm; W 46.88 mm; weight 254.5g
30	AA_ENV_07	15-Apr-23	14:01	60%	CHEM	2 x 1L Jar	Coarse sand with cobbles, gravel and shells Munsell: 5Y 6/6 Cobbles: 10%	No visible fauna	RH, MC	CHEM and CHEM Spare
31	AA_ENV_23	15-Apr-23	15:28	40%	MFA	1 x 5L 1 x ziplock bag	Fine to medium sand with occasional shell fragments Munsell: 5Y 6/6	Annelida (Polychaeta)	RH, MC	PSA
32	AA_ENV_23	15-Apr-23	15:34	50%	MFB	1 x 5L 1 x ziplock bag	Fine to medium sand with occasional shell fragments Munsell: 5Y 6/6	Annelida (Polychaeta)	RH, MC	PSA Spare
33	AA_ENV_20	15-Apr-23	17:31	0%	No sample				RH, MC	Rock in grab jaws
34	AA_ENV_20	15-Apr-23	17:36	0%	No sample				RH, MC	Rock in grab jaws
35	AA_ENV_20	15-Apr-23	17:47	0%	No sample				RH, MC	Grab empty
36	AA_ENV_20	15-Apr-23	17:57	0%	No sample				RH, MC	Moved 10m S, Grab empty
37	AA_ENV_20	15-Apr-23	18:02	0%	No sample				RH, MC	Rock in grab jaws

APPENDIX B FIELD SAMPLING LOGS

SEABED SAMPLING LOG SHEET (Deck)										FOR-ENV-0539
Job No:	54463		Area:	North Sea			Sieve Size: 1mm			
Project:	Caledonia OWF Phase 2						Equipment: Mini-Hamon Grab, Day Grab			
Client:	Caledonia Offshore Windfarm Limited						Vessel: MV *Ocean Endeavour*			
Sample Number	Station Number	Date	Time	Penetration	Sample Retention	Sample Receptacle	Sediment Description	Fauna Description	Operator(s)	Comments
38	AA_ENV_20	15-Apr-23	18:08	0%	No sample				RH, MC	Grab empty, station abandoned
39	AA_ENV_01	18-Apr-23	21:28	40%	MFA	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 4/6	No visible fauna	RH, MC	PSA
40	AA_ENV_01	18-Apr-23	21:34	20%	No sample				RH, MC	Low retention
41	AA_ENV_01	18-Apr-23	21:40	50%	MFB	1 x 5L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 4/6	Annelida (Polychaeta)	RH, MC	PSA Spare
42	AA_ENV_08	19-Apr-23	00:13	>95%	MFA	2 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 5/4 Cobble: 1%	Mollusca (Scaphopoda)	MJ, JH	PSA
43	AA_ENV_08	19-Apr-23	00:21	>95%	MFB	2 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 5/4 Cobble: 1%	Mollusca (Scaphopoda)	MJ, JH	PSA Spare
44	AA_ENV_11	19-Apr-23	01:53	90%	MFA	2 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 4/4	No visible fauna	MJ, JH	PSA
45	AA_ENV_11	19-Apr-23	02:06	90%	MFB	2 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 4/4	No visible fauna	MJ, JH	PSA Spare
46	AA_ENV_18	19-Apr-23	05:11	90%	MFA	1 x 1L 2 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 4/3	No visible fauna	MJ, JH	PSA eDNA
47	AA_ENV_18	19-Apr-23	05:22	90%	MFB	1 x 1L 2 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 4/3	Annelida, Echinodermata, Mollusca (Scaphopoda)	MJ, JH	PSA Spare eDNA Spare
48	AA_ENV_18	19-Apr-23	05:44	70%	CHEM	2 x 1L Jar	Coarse sand with shell fragments Munsell: 5Y 4/3	No visible fauna	MJ, JH	CHEM and CHEM Spare
49	AA_ENV_13	19-Apr-23	07:41	90%	MFA	3 x 5L 1 x ziplock bag	Coarse sand with cobbles, gravel and shells Munsell: 10YR 5/6 Cobbles: 5%	Annelida (Polychaeta)	MJ, JH	PSA
50	AA_ENV_13	19-Apr-23	07:49	40%	MFB	2 x 5L 1 x ziplock bag	Coarse sand with cobbles, gravel and shells Munsell: 10YR 5/6 Cobbles: 10%	Annelida (Polychaeta)	MJ, JH	PSA Spare
51	AA_ENV_31	19-Apr-23	09:56	90%	MFA	3 x 5L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 4/3	Annelida (Polychaeta)	MJ, JH	PSA
52	AA_ENV_31	19-Apr-23	10:05	80%	MFB	3 x 5L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 4/3	No visible fauna	MJ, JH	PSA Spare

APPENDIX B FIELD SAMPLING LOGS

SEABED SAMPLING LOG SHEET (Deck)										FOR-ENV-0539
Job No:	54463		Area:	North Sea			Sieve Size: 1mm			
Project:	Caledonia OWF Phase 2						Equipment: Mini-Hamon Grab, Day Grab			
Client:	Caledonia Offshore Windfarm Limited						Vessel: MV *Ocean Endeavour*			
Sample Number	Station Number	Date	Time	Penetration	Sample Retention	Sample Receptacle	Sediment Description	Fauna Description	Operator(s)	Comments
53	AA_ENV_03	19-Apr-23	11:30	50%	MFA	1 x 5L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 3/6	Annelida (Polychaeta)	RH, MC	PSA
54	AA_ENV_03	19-Apr-23	11:35	40%	MFB	1 x 5L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 3/6	Annelida (Polychaeta), Mollusca (Bivalvia)	RH, MC	PSA Spare
55	AA_ENV_04	19-Apr-23	12:55	40%	MFA	1 x 5L 1 x ziplock bag	Coarse sand with gravel and shell fragments Munsell: 10YR 3/3	Annelida (Polychaeta)	RH, MC	PSA
56	AA_ENV_04	19-Apr-23	13:01	50%	MFB	2 x 5L 1 x ziplock bag	Coarse sand with gravel and shell fragments Munsell: 10YR 3/3	Annelida (Polychaeta), Mollusca (Scaphopoda)	RH, MC	PSA Spare
57	AA_ENV_35	19-Apr-23	15:44	40%	MFA	1 x 1L 2 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 4/3	Annelida (Polychaeta)	RH, MC	PSA eDNA
58	AA_ENV_35	19-Apr-23	15:51	50%	MFB	1 x 1L 2 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 4/3	Annelida (Polychaeta)	RH, MC	PSA Spare eDNA Spare
59	AA_ENV_35	19-Apr-23	16:15	60%	CHEM	2 x 1L Jar	Coarse sand with shell fragments Munsell: 10YR 4/3	No visible fauna	RH, MC	CHEM and CHEM Spare
60	AA_ENV_33	20-Apr-23	15:09	80%	MFA	1 x 5L 2 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 4/3	Annelida (Polychaete), Mollusca (Bivalvia)	RH, MC	PSA eDNA
61	AA_ENV_33	20-Apr-23	15:16	80%	MFB	1 x 5L 2 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 4/3	Annelida (Polychaete), Mollusca (Bivalvia)	RH, MC	PSA Spare eDNA Spare
62	AA_ENV_33	20-Apr-23	15:29	80%	CHEM	2 x 1L Jar	Coarse sand with shell fragments Munsell: 10YR 4/3	No visible fauna	RH, MC	CHEM and CHEM Spare
63	AA_ENV_14	20-Apr-23	17:11	40%	MFA	1 x 5L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 3/3	Mollusca (Scaphopoda)	RH, MC	PSA
64	AA_ENV_14	20-Apr-23	17:16	40%	MFB	1 x 5L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 3/3	Annelida (Polychaeta), Mollusca (Scaphopoda)	RH, MC	PSA Spare
65	AA_ENV_02	20-Apr-23	19:13	30%	No sample				RH, MC	Low retention
66	AA_ENV_02	20-Apr-23	19:18	30%	No sample				RH, MC	Low retention
67	AA_ENV_02	20-Apr-23	19:24	30%	No sample				RH, MC	Low retention
68	AA_ENV_02	20-Apr-23	19:31	20%	No sample				RH, MC	Moved 10m SW, Low retention
69	AA_ENV_02	20-Apr-23	19:36	40%	MFA	1 x 1L 1 x ziplock bag	Coarse sand with gravel and shell fragments Munsell: 10YR 4/2	Annelida (Polychaeta)	RH, MC	PSA

APPENDIX B FIELD SAMPLING LOGS

SEABED SAMPLING LOG SHEET (Deck)										FOR-ENV-0539
Job No:	54463		Area:	North Sea			Sieve Size: 1mm			
Project:	Caledonia OWF Phase 2						Equipment: Mini-Hamon Grab, Day Grab			
Client:	Caledonia Offshore Windfarm Limited						Vessel: MV *Ocean Endeavour*			
Sample Number	Station Number	Date	Time	Penetration	Sample Retention	Sample Receptacle	Sediment Description	Fauna Description	Operator(s)	Comments
70	AA_ENV_02	20-Apr-23	19:41	40%	MFB	1 x 1L 1 x ziplock bag	Coarse sand with gravel and shell fragments Munsell: 10YR 4/2	Annelida (Polychaeta)	RH, MC	PSA Spare
71	AA_ENV_32	20-Apr-23	22:00	50%	MFA	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 3/1	Annelida (Polychaete), Mollusca (Bivalvia, Scaphoda)	MJ, JH	PSA
72	AA_ENV_32	20-Apr-23	22:07	40%	MFB	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 10YR 3/1	Annelida (Polychaeta)	MJ, JH	PSA Spare
73	AA_ENV_29	21-Apr-23	00:02	50%	MFA	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 4/2	Annelida (Polychaeta), Mollusca (Bivalvia)	MJ, JH	PSA
74	AA_ENV_29	21-Apr-23	00:11	50%	MFB	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 4/2	Annelida (Polychaeta)	MJ, JH	PSA Spare
75	AA_ENV_27	21-Apr-23	01:45	50%	MFA	3 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 5/6	No visible fauna	MJ, JH	PSA
76	AA_ENV_27	21-Apr-23	01:54	40%	MFB	1 x 5L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 5/6	Mollusca (*A. islandica*)	MJ, JH	PSA Spare *A. islandica:* Length 82.39 mm Height 71.20 mm Width 42.96 mm Mass 155.0 g
77	AA_ENV_06	21-Apr-23	03:28	40%	MFA	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 5/4	Annelida (Polychaeta), Echinodermata (Ophiuroidea)	MJ, JH	PSA
78	AA_ENV_06	21-Apr-23	03:41	50%	MFB	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 5/4	No visible fauna	MJ, JH	PSA Spare
79	AA_ENV_28	21-Apr-23	06:07	60%	MFA	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 5/4	Annelida (Polychaeta), Mollusca (Scaphopoda)	MJ, JH	PSA
80	AA_ENV_28	21-Apr-23	06:15	60%	MFB	1 x 1L 1 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 5/4	Annelida (Polychaeta), Mollusca (Scaphopoda)	MJ, JH	PSA Spare
81	AA_ENV_15	21-Apr-23	09:39	60%	MFA	1 x 1L 2 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 6/8	Annelida (Polychaeta), Mollusca (*A. islandica*, Bivalvia, Scaphopoda)	MJ, JH	PSA eDNA *A. islandica:* Length 82.31 mm Height 75.14 mm Width 45.74 mm Mass 150 g

APPENDIX B FIELD SAMPLING LOGS

SEABED SAMPLING LOG SHEET (Deck) **FOR-ENV-0539**

Job No:	54463	Area: North Sea	Sieve Size: 1mm
Project:	Caledonia OWF Phase 2		Equipment: Mini-Hamon Grab, Day Grab
Client:	Caledonia Offshore Windfarm Limited		Vessel: MV *Ocean Endeavour*

Sample Number	Station Number	Date	Time	Penetration	Sample Retention	Sample Receptacle	Sediment Description	Fauna Description	Operator(s)	Comments
82	AA_ENV_15	21-Apr-23	09:52	50%	MFB	1 x 1L 2 x ziplock bag	Coarse sand with shell fragments Munsell: 5Y 6/8	Annelida (Polychaeta), Mollusca (Scaphopoda)	MJ, JH	PSA Spare eDNA Spare
83	AA_ENV_15	21-Apr-23	10:10	50%	CHEM	2 x 1L Jar	Coarse sand with shell fragments Munsell: 5Y 6/8	No visible fauna	MJ, JH	CHEM and CHEM Spare
84	AA_ENV_10	21-Apr-23	11:36	60%	MFA	3 x 5L 1 x ziplock bag	Coarse sand with gravel and shellss Munsell: 10Y 4/3	Annelida (Polychaeta), Mollusca (Bivalvia)	MJ, JH	PSA
85	AA_ENV_10	21-Apr-23	11:41	90%	MFB	3 x 5L 1 x ziplock bag	Coarse sand with gravel and shellss Munsell: 10Y 4/3	Annelida (Polychaeta), Mollusca (Bivalvia)	MJ, JH	PSA Spare
86	AA_ENV_26	21-Apr-23	12:52	50%	MFA	1 x 1L 1 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 3/2	Annelida (Polychaeta)	MJ, JH	PSA
87	AA_ENV_26	21-Apr-23	12:59	20%	No sample			Mollusca (*Arctica islandica*)	MJ, JH	Low retention, *Arctica islandica* Length 87.0 mm Height 77.1 mm Width 43.8 mm Mass 179.0 g
88	AA_ENV_26	21-Apr-23	13:05	70%	MFB	1 x 1L 1 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 3/2	No visible fauna	MJ, JH	PSA Spare
89	AA_ENV_12	21-Apr-23	16:10	40%	MFA	1 x 1L 2 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 4/2	Annelida (Polychaeta), Echinodermata (Ophiuroidea)	MJ, JH	PSA eDNA
90	AA_ENV_12	21-Apr-23	16:17	40%	MFB	1 x 1L 2 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 4/2	Annelida (Polychaeta), Echinodermata (Asteroidea)	MJ, JH	PSA Spare eDNA Spare
91	AA_ENV_12	21-Apr-23	16:29	50%	CHEM	2 x 1L Jar	Fine sand with occasional shell fragments Munsell: 5Y 4/2	No visible fauna	MJ, JH	CHEM and CHEM Spare
92	AA_ENV_30	21-Apr-23	18:01	60%	MFA	1 x 1L 1 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 4/2	Annelida (Polychaeta), Echinodermata (Ophiuroidea)	RH, MC	PSA
93	AA_ENV_30	21-Apr-23	18:08	60%	MFB	1 x 1L 1 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 4/2	Annelida (Polychaeta)	RH, MC	PSA Spare
94	AA_ENV_05	21-Apr-23	20:12	20%	No sample				RH, MC	Low retention
95	AA_ENV_05	21-Apr-23	20:17	40%	MFA	1 x 1L 1 x ziplock bag	Fine sand with occasional shell fragments Munsell: 10YR 3/4	Annelida (Polychaeta), Molluca (Bivalvia)	RH, MC	PSA

APPENDIX B FIELD SAMPLING LOGS

SEABED SAMPLING LOG SHEET (Deck)										FOR-ENV-0539
Job No:	54463		Area:	North Sea			Sieve Size: 1mm			
Project:	Caledonia OWF Phase 2						Equipment: Mini-Hamon Grab, Day Grab			
Client:	Caledonia Offshore Windfarm Limited						Vessel: MV *Ocean Endeavour*			
Sample Number	Station Number	Date	Time	Penetration	Sample Retention	Sample Receptacle	Sediment Description	Fauna Description	Operator(s)	Comments
96	AA_ENV_05	21-Apr-23	20:23	40%	MFB	1 x 1L 1 x ziplock bag	Fine sand with occasional shell fragments Munsell: 10YR 3/4	Annelida (Polychaeta), Molluca (Scaphopoda)	RH, MC	PSA Spare
97	AA_ENV_25	21-Apr-23	21:40	50%	MFA	1 x 5L 1 x ziplock bag	Fine sand with gravel Munsell: 2.5Y 4/2	Arthropoda (Brachyura), Annelida (Polychaeta)	RH, MC	PSA
98	AA_ENV_25	21-Apr-23	22:07	40%	MFB	1 x 5L 1 x ziplock bag	Fine sand with gravel Munsell: 2.5Y 4/2	Annelida (Polychaeta), Molluca (Bivalvia)	RH, MC	PSA Spare
99	AA_ENV_16	22-Apr-23	04:15	50%	MFA	1 x 1L 1 x ziplock bag	Fine sand with gravel Munsell: 5Y 4/2	Annelida (Polychaeta), Echinodermata (Ophiuroidea)	MJ, JH	PSA
100	AA_ENV_16	22-Apr-23	04:30	40%	MFB	1 x 1L 1 x ziplock bag	Fine sand with gravel Munsell: 5Y 4/2 Cobble: 2%	Annelida (Polychaeta), Echinodermata (Ophiuroidea)	MJ, JH	PSA Spare
101	AA_ENV_21	22-Apr-23	07:44	>95%	MFA	1 x 1L 2 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 4/2	Annelida (Polychaeta)	MJ, JH	PSA eDNA
102	AA_ENV_21	22-Apr-23	08:04	>95%	MFB	1 x 1L 2 x ziplock bag	Fine sand with occasional shell fragments Munsell: 5Y 4/2	Annelida (Polychaeta)	MJ, JH	PSA Spare eDNA Spare
103	AA_ENV_21	22-Apr-23	08:23	90%	CHEM	2 x 1L Jar	Fine sand with occasional shell fragments Munsell: 5Y 4/2	No visible fauna	MJ, JH	CHEM and CHEM Spare
104	AA_ENV_24	22-Apr-23	11:46	30%	No sample				RH, MC	Low retention
105	AA_ENV_24	22-Apr-23	11:51	50%	MFA	1 x 1L 2 x ziplock bag	Fine sand with occasional shell fragments Munsell: 10YR 3/3	Annelida (Polychaeta)	RH, MC	PSA eDNA
106	AA_ENV_24	22-Apr-23	11:58	50%	MFB	1 x 1L 2 x ziplock bag	Fine sand with occasional shell fragments Munsell: 10YR 3/3	Annelida (Polychaeta), Echinodermata (Echinoidea), Mollusca (Bivalvia)	RH, MC	PSA Spare eDNA Spare
107	AA_ENV_24	22-Apr-23	12:12	70%	CHEM	2 x 1L Jar	Fine sand with occasional shell fragments Munsell: 10YR 3/3	No visible fauna	RH, MC	CHEM and CHEM Spare

APPENDIX B FIELD SAMPLING LOGS

Seafloor Sampling Positioning Summary

Job No	54463			Vessel	MV *Ocean Endeavour*						
Client	Caledonia Offshore Windfarm Limited			Vessel Reference Point (VRP)	COG						
Project Name	Caledonia OWF Phase 2			Deployment Location	STBD Water Sampling Deployment	x	6.7	y	21.94	z	2.93
Primary Positioning System	Starpack 1			Actual Coordinates derived from	Water Sampling Deployment NODE						
Geodetic Reference System	Datum	WGS 84 - WGS 84	Ellipsoid	WGS 84	Projection	UTM zone 30N			Vertical / Tidal Datum		

Date	FIX Time (UTC)	Fix number	Line No/Stn No	Penetration	Sample Retention	Beacon Depth (m)	Observed Depth (m)	Reduced Depth LAT (m)	Actual coordinates		Target coordinates		Offset from target				Surveyor	Remarks
									Easting	Northing	Easting	Northing	dE	dN	Range	Bearing		
14-Apr-2023	20:39	18	AA_ENV_22		5 Litres	60	65	62	533799	6437613	533805	6437586	-6	27	27	348	SG	
14-Apr-2023	20:54	19	AA_ENV_22		5 Litres	60	65	63	533822	6437615	533805	6437586	17	29	34	31	SG	
15-Apr-2023	01:07	20	AA_ENV_34		5 Litres	62	67	66	528636	6440202	528681	6440177	-46	25	52	299	PL	
15-Apr-2023	01:35	21	AA_ENV_34		5 Litres	62	67	66	528422	6440221	528681	6440177	-259	43	263	280	PL	Difficult for vessel to hold station
15-Apr-2023	10:21	22	AA_ENV_07		5 Litres	50	55	53	528450	6448041	528478	6448025	-28	16	32	300	PL	
15-Apr-2023	10:37	23	AA_ENV_07		5 Litres	50	55	53	528464	6448034	528478	6448025	-14	9	16	303	PL	
19-Apr-2023	03:21	24	AA_ENV_18		5 Litres	50	55	54	528833	6458657	528851	6458620	-17	38	41	335	PL	
19-Apr-2023	03:38	25	AA_ENV_18		5 Litres	50	55	54	528843	6458657	528851	6458620	-7	38	39	349	PL	
19-Apr-2023	13:58	26	AA_ENV_35		5 Litres	50	55	53	521362	6462940	521411	6462903	-49	37	61	307	SG	
19-Apr-2023	14:16	27	AA_ENV_35		5 Litres	51	56	54	521371	6462945	521411	6462903	-39	42	57	317	SG	
20-Apr-2023	13:35	28	AA_ENV_33		5 Litres	52	57	54	523202	6467404	523255	6467414	-53	-11	54	259	SG	
20-Apr-2023	13:48	29	AA_ENV_33		5 Litres	52	57	54	523199	6467413	523255	6467414	-56	-1	56	269	SG	
21-Apr-2023	07:30	30	AA_ENV_15		5 Litres	58	63	62	533408	6444307	533430	6444276	-22	32	39	325	PL	
21-Apr-2023	07:52	31	AA_ENV_15		5 Litres	58	63	62	533409	6444257	533430	6444276	-21	-18	28	229	PL	
21-Apr-2023	14:24	32	AA_ENV_12		5 Litres	68	73	69	531929	6433900	531953	6433903	-25	-3	25	262	SG	
21-Apr-2023	14:45	33	AA_ENV_12		5 Litres	68	72	69	531949	6433888	531953	6433903	-4	-15	15	195	SG	
22-Apr-2023	05:43	34	AA_ENV_21		5 Litres	98	103	102	541023	6447882	541069	6447876	-46	6	46	277	PL	
22-Apr-2023	06:00	35	AA_ENV_21		5 Litres	98	103	102	541007	6447876	541069	6447876	-62	0	62	270	PL	
22-Apr-2023	10:28	36	AA_ENV_24		5 Litres	60	65	62	536620	6453579	536668	6453672	-48	-94	105	207	PL	
22-Apr-2023	10:49	37	AA_ENV_24		5 Litres	60	65	62	536614	6453569	536668	6453672	-54	-103	117	207	SG	

APPENDIX B FIELD SAMPLING LOGS

WATER SAMPLING LOG SHEET (Deck)									FOR-ENV-0540
Job No:	54463		Area:	North Sea			Volume: 5L		
Project:	Caledonia OWF Phase 2						Equipment: Niskin Bottle		
Client:	Caledonia Offshore Windfarm Limited						Vessel: MV *Ocean Endeavour*		
Sample Number	Station Number	Date	Time	Load	Overall Station Depth (m)	Sample Depth (m)	Sample Analysis	Operator(s)	Comments
1	AA_ENV_22	14-Apr-2023	20:39	5 Litres	73	5	CTD Profile, Water eDNA	RH, MC	Surface Primary
2	AA_ENV_22	14-Apr-2023	20:39	5 Litres	73	68	CTD Profile, Water eDNA	RH, MC	Bottom Primary
3	AA_ENV_22	14-Apr-2023	20:54	5 Litres	73	5	CTD Profile, Water eDNA	RH, MC	Surface Spare
4	AA_ENV_22	14-Apr-2023	20:54	5 Litres	73	68	CTD Profile, Water eDNA	RH, MC	Bottom Spare
5	AA_ENV_34	15-Apr-2023	01:07	5 Litres	65	5	CTD Profile, Water eDNA	JH, MJ	Surface Primary
6	AA_ENV_34	15-Apr-2023	01:07	5 Litres	65	60	CTD Profile, Water eDNA	JH, MJ	Bottom Primary
7	AA_ENV_34	15-Apr-2023	01:35	5 Litres	65	5	CTD Profile, Water eDNA	JH, MJ	Surface Spare - Difficult for vessel to hold station
8	AA_ENV_34	15-Apr-2023	01:35	5 Litres	65	60	CTD Profile, Water eDNA	JH, MJ	Bottom Spare - Difficult for vessel to hold station
9	AA_ENV_07	15-Apr-2023	10:21	5 Litres	55	5	CTD Profile, Water eDNA	JH, MJ	Surface Primary
10	AA_ENV_07	15-Apr-2023	10:21	5 Litres	55	50	CTD Profile, Water eDNA	JH, MJ	Bottom Primary
11	AA_ENV_07	15-Apr-2023	10:37	5 Litres	55	5	CTD Profile, Water eDNA	JH, MJ	Surface Spare
12	AA_ENV_07	15-Apr-2023	10:37	5 Litres	55	50	CTD Profile, Water eDNA	JH, MJ	Bottom Spare
13	AA_ENV_18	19-Apr-2023	03:21	5 Litres	55	5	CTD Profile, Water eDNA	JH, MJ	Surface Primary
14	AA_ENV_18	19-Apr-2023	03:21	5 Litres	55	50	CTD Profile, Water eDNA	JH, MJ	Bottom Primary
15	AA_ENV_18	19-Apr-2023	03:38	5 Litres	55	5	CTD Profile, Water eDNA	JH, MJ	Surface Spare
16	AA_ENV_18	19-Apr-2023	03:38	5 Litres	55	50	CTD Profile, Water eDNA	JH, MJ	Bottom Spare
17	AA_ENV_35	19-Apr-2023	13:58	5 Litres	55	5	CTD Profile, Water eDNA	RH, MC	Surface Primary
18	AA_ENV_35	19-Apr-2023	13:58	5 Litres	55	50	CTD Profile, Water eDNA	RH, MC	Bottom Primary
19	AA_ENV_35	19-Apr-2023	14:16	5 Litres	56	5	CTD Profile, Water eDNA	RH, MC	Surface Spare
20	AA_ENV_35	19-Apr-2023	14:16	5 Litres	56	51	CTD Profile, Water eDNA	RH, MC	Bottom Spare
21	AA_ENV_33	20-Apr-2023	13:35	5 Litres	57	5	CTD Profile, Water eDNA	RH, MC	Surface Primary
22	AA_ENV_33	20-Apr-2023	13:35	5 Litres	57	52	CTD Profile, Water eDNA	RH, MC	Bottom Primary
23	AA_ENV_33	20-Apr-2023	13:48	5 Litres	57	5	CTD Profile, Water eDNA	RH, MC	Surface Spare
24	AA_ENV_33	20-Apr-2023	13:48	5 Litres	57	52	CTD Profile, Water eDNA	RH, MC	Bottom Spare
25	AA_ENV_15	21-Apr-2023	07:30	5 Litres	63	5	CTD Profile, Water eDNA	JH, MJ	Surface Primary
26	AA_ENV_15	21-Apr-2023	07:30	5 Litres	63	58	CTD Profile, Water eDNA	JH, MJ	Bottom Primary
27	AA_ENV_15	21-Apr-2023	07:52	5 Litres	63	5	CTD Profile, Water eDNA	JH, MJ	Surface Spare
28	AA_ENV_15	21-Apr-2023	07:52	5 Litres	63	58	CTD Profile, Water eDNA	JH, MJ	Bottom Spare
30	AA_ENV_12	21-Apr-2023	14:24	5 Litres	73	5	CTD Profile, Water eDNA	RH, MC	Surface Primary
31	AA_ENV_12	21-Apr-2023	14:24	5 Litres	73	68	CTD Profile, Water eDNA	RH, MC	Bottom Primary
32	AA_ENV_12	21-Apr-2023	14:45	5 Litres	72	5	CTD Profile, Water eDNA	RH, MC	Surface Spare
33	AA_ENV_12	21-Apr-2023	14:45	5 Litres	72	68	CTD Profile, Water eDNA	RH, MC	Bottom Spare
34	AA_ENV_21	22-Apr-2023	05:43	5 Litres	103	5	CTD Profile, Water eDNA	JH, MJ	Surface Primary
35	AA_ENV_21	22-Apr-2023	05:43	5 Litres	103	98	CTD Profile, Water eDNA	JH, MJ	Bottom Primary
36	AA_ENV_21	22-Apr-2023	06:00	5 Litres	103	5	CTD Profile, Water eDNA	JH, MJ	Surface Spare

APPENDIX B FIELD SAMPLING LOGS

WATER SAMPLING LOG SHEET (Deck)									FOR-ENV-0540
Job No:	54463			Area:	North Sea			Volume: 5L	
Project:	Caledonia OWF Phase 2							Equipment: Niskin Bottle	
Client:	Caledonia Offshore Windfarm Limited							Vessel: MV *Ocean Endeavour*	
Sample Number	Station Number	Date	Time	Load	Overall Station Depth (m)	Sample Depth (m)	Sample Analysis	Operator(s)	Comments
37	AA_ENV_21	22-Apr-2023	06:00	5 Litres	103	98	CTD Profile, Water eDNA	JH, MJ	Bottom Spare
38	AA_ENV_24	22-Apr-2023	10:28	5 Litres	65	5	CTD Profile, Water eDNA	RH, MC	Surface Primary
39	AA_ENV_24	22-Apr-2023	10:28	5 Litres	65	60	CTD Profile, Water eDNA	RH, MC	Bottom Primary
40	AA_ENV_24	22-Apr-2023	10:49	5 Litres	65	5	CTD Profile, Water eDNA	RH, MC	Surface Spare
41	AA_ENV_24	22-Apr-2023	10:49	5 Litres	65	60	CTD Profile, Water eDNA	RH, MC	Bottom Spare

APPENDIX C METHODS

APPENDIX D METHODS

C.1 Seabed Sampling

Benthic physico-chemical samples were recovered using a stainless-steel, 0.1m^2 Day grab which had been modified in-house. The modification, shown in Figure D.1 incorporated guides for the cables to prevent them becoming trapped during triggering. Low-slung pad feet when in contact with the seabed trigger the instrument. On recovery (once triggered) the weight of the instrument is transferred along the warp wires, closing the jaws of the grab. The grab carried extra weights to aid penetration on recovery and an extended bucket lip to reduce sediment washout. Storm feet and elastic straps were used to reduce the likelihood of the instrument pre-triggering in the water column during deployment.

Figure D.1 Modified Day Grab

Left: The modified 0.1m^2 Day grab.

Above (inset): The modification to the grab incorporated guides for the cables to prevent them from becoming trapped as the grab triggers.

Faunal and particle size samples were recovered using an in-house constructed, modified, stainless steel 0.1m^2 mini-Hamon grab. The mini-Hamon grab comprises a box-shaped scoop which is mechanically driven in a 90° arc through the surface sediments to close against a stainless-steel closure plate. The closure plate is lined by a rubberised gasket to retain the mixed sediment sample and also has a viewing window allowing the operator to determine the recovered volume of the sample. Tension on a trigger hook is released upon impact of the grab with the seafloor thereby allowing, on inhaul, the pivot arm to drive the scoop through the sediment. The vessel offset of grab deployment was used to represent the position of the sampler.

Grab sampling operational procedures were as follows:

The vessel's sampling area was pre-cleaned using a powerful deck fire-hose and seawater. The Day grab/mini-Hamon grab was washed thoroughly using pentane prior to deployment at every station to prevent hydrocarbon cross contamination. A 500m-length of 10mm, dry-core, galvanised-steel cable/100m-length of 8mm was used to lower the Day grab/mini-Hamon grab to the seabed.

APPENDIX D METHODS

All containers were thoroughly washed with appropriate solvents and labelled externally prior to use. Biology samples were placed in 1-litre polypropylene, screw-top, squat jars and/or 5 litre buckets and provided with an additional internal waterproof label. Hydrocarbon samples were placed in 1L amber glass jars, whilst the remaining samples (eDNA and particle size) were placed in double-lined zip-lock bags.

Communication between the deck, bridge crew and the surveyors was conducted by means of VHF radio. When directly over the sampling station the grab was winched to the seabed and recovered so that the sample could be obtained and the apparatus prepared for the next deployment.

Positional fixes were taken for each grab sample immediately following the grab reaching the sea floor. The precise time that the grab reached the seabed was determined by observations of the tension on the winch cable.

On recovery of a sample, the grab would first be examined for acceptability following strict quality assurance criteria. In the following cases, a grab sample would be rejected and the instrument returned to the pre-deployment position:

1. Jammed sample closure due to entrapment of a large stone, shell or other objects allowing surface sediment washout.
2. Accidental premature opening of sampler on recovery, causing possible surface washout.
3. Half sample obtained where the grab had not struck a flat area of bottom, or not hit true, causing a side or half bite of sediment;
4. Disruption of the sample by obvious shaking or contamination (these can occur when a sample is badly handled or if the grab strikes the side of the vessel during operations);
5. The sample represents less than 40% of the grab's total capacity (*i.e.* less than 6 litres) or totally fills the grab. The latter potentially allowing the sample to overflow the grab or for the surface sediments to come into contact with the lids.
6. Sample was acquired more than 50m from the target (as determined by the onboard surveyors, environmentalist and client representative, with consideration of survey objectives);
7. The presence of exopolymeric substances, mucus coagulants and/or fauna that generate them *i.e.* Myxinidae.

Brief descriptions of the collected sediments were made at the time of sampling. These were recorded in the environmentalist's log sheets and are presented in Appendix B. A selection of photographs, taken of the sediment samples whilst still in the Day grab, is presented in Appendix D.

Sediment samples were taken directly from the Day grab for physico-chemical analysis (CHEM) were sub-sampled into the relevant containers. All containers were thoroughly washed with the appropriate solvents and labelled externally prior to use. Two surficial sediment (<2cm) sub-samples were scooped directly into 1l amber glass using a stainless steel spoon; one of these was intended for hydrocarbon and metal determinations, the other was retained as a spare. Using the mini-Hamon grab, sediment samples were decanted into a suitable receptacle and homogenised. Two samples of approximately 500g comprising one each for particle size analysis (PSA) and a spare were collected using a plastic scoop, with a third sample of approximately 40g retained for eDNA analysis. All three samples were placed in double-lined zip-lock bags.

All physico-chemical and eDNA sediment samples were transferred to an onboard freezer for storage at less than -18ºC.

Sediment samples collected for faunal analyses (MFA and MFB) were thoroughly washed from the grab into a plastic tray. Once all of the equipment was washed free of sediment, the sediment sample was transferred to a

sieving machine where it was broken down using a low powered seawater spray. All materials retained by the 1mm mesh sieve were transferred to a squat jar or bucket by means of a scoop and funnel, making sure that none of the sample was lost or trapped in the mesh. The sample was fixed with a pre-buffered <20% formalin solution of known concentration, then subsequently diluted to a final concentration of approximately 4% formalin. Biological samples were placed in 1 litre polypropylene screw-top squat jars or 5 litre buckets, depending on sample size, and provided with an additional internal waterproof label.

C.2 Water Sampling

Niskin bottles were mounted directly to the 11mm coaxial deployment cable along with a purse weight to maintain vertical transit and a messenger weight affixed to allow acquisition of sample. A fix was taken immediately after release of the messenger and prior to recovery.

Water samples were taken 5m from the seabed and 5m from the surface. On recovery of the water sample, the Niskin bottles would first be examined for acceptability following strict quality assurance (QA) criteria. In the following cases, a water sample would be rejected, and the instrument prepared for the next deployment:

1. One or both ends have not released, and the sampler has failed to trigger.
2. One or both ends have failed to seal the sample and water has leaked out.
3. Disruption of the sample by obvious shaking or contamination.
4. Sample was taken an unacceptable distance or depth from the target.

Details of collected samples were made at the time of sampling. These were recorded in the environmentalist's log sheets and presented in Appendix B. Each 5-litre water sample was decanted from the Niskin bottle into a sterilised bag and filtered through a specialised filter kit. Two samples were retained for each depth, one intended for analysis and one retained as a spare. Each filter was placed into a labelled zip-lock bag and transferred to an onboard freezer for storage at less than -18ºC.

C.3 Sample Analysis

At the end of the survey, all of the retained samples for analysis were delivered directly to their respective laboratories for analysis. The remaining samples were delivered to Gardline's Great Yarmouth office. All physico-chemical sub-samples were kept frozen, and biological and water eDNA samples stored at room temperature. Spares of one physico-chemical and one hydrocarbon sub-sample from each station were stored frozen, and one biological sample from each station stored at room temperature. Spare samples are retained at Gardline's Great Yarmouth office for at least six months after which time the client is contacted to advise on appropriate disposal, continued storage or dispatch to a destination of the client's choice.

Sediment and faunal samples were analysed by the following laboratories / persons:

- Sediment hydrocarbon, metals, total organic carbon (TOC), polyaromatic hydrocarbons (PAHs), polychlorinated biphenols (PCBs), organotins, organochlorine pesticides (OCPs) and polybrominated diphenyl esters (PBDEs) analyses were carried out by SOCOTEC, Burton-on Trent, Staffordshire, UK.
- Benthic macrofaunal identification and PSA was undertaken by Thomson Environmental Consultants Limited, Guildford, UK;
- eDNA metabarcoding was carried out by Nature Metrics Ltd, Egham, UK.

The laboratories detailed above meet quality control requirements exacted by Gardline's internal procedures (BS/EN/ISO 9001:2015; BSI, 2015).

APPENDIX D METHODS

C.4 Particle Size Analysis

Particle size analysis (PSA) was carried out by Thomson Environmental Consultants Limited in accordance with NMBAQC methods for diamictons (Mason, 2016).

No dispersants were used and the sediment was not treated to remove carbonates or organic matter prior to analysis. The range of sieve sizes, together with their Wentworth classifications (Wentworth, 1922), is given in Table D.1.

The results, given in Appendix G and summarised in Section 2.5.1, present particle size distributions in terms of mean phi, fraction percentages (*i.e.*, gravel, sand and fines), sorting (mixture of sediment sizes) and skewness (weighting of sediment fractions above and below the mean sediment size) and kurtosis (degree of peakedness) (Folk & Ward, 1957). These indices are described below:

1. Graphic Mean - a measure of average particle size in phi units (-log2(diamm), Folk & Ward, 1957).

$$M_z = \frac{\emptyset 16 + \emptyset 84 + \emptyset 50}{3}$$

where M_z= The graphic mean particle size in phi
ø = the phi size of the nth percentile of the sample

2. Sorting – the inclusive graphic standard deviation of the sample is a measure of the degree of sorting. Sorting classifications are presented in Table D.2.

$$\sigma_1 = \frac{\emptyset 84 - \emptyset 16}{4} + \frac{\emptyset 95 - \emptyset 5}{6.6}$$

where σ_1 = the inclusive graphic standard deviation

3. Inclusive Graphic Skewness – the degree of asymmetry of a frequency or cumulative curve, Skewness classification are presented in Table D.3.

$$S = \frac{\emptyset 16 + \emptyset 84 - 2(\emptyset 50)}{2(\emptyset 84 - \emptyset 16)} + \frac{\emptyset 5 + \emptyset 95 - 2(\emptyset 50)}{2(\emptyset 95 - \emptyset 5)}$$

where S= the skewness of the sample

4 Graphic Kurtosis – The degree of peakdness or departure from a 'normal' frequency or cumulative curve. Kurtosis classifications are presented in Table D.4.

$$K = \frac{\emptyset 95 - \emptyset 5}{2.44(\emptyset 75 - \emptyset 25)}$$

where K= Kurtosis

The sediment samples were additionally classified using the modified Folk triangle classification and the EUNIS classification (Figure D.2), with results presented in 1Appendix G. These classifications use the sand:mud ratio and the percentage of gravel (Folk, 1954; Parry, 2019).

APPENDIX D METHODS

Table D.1 Phi and Sieve Aperture with Wentworth Classifications

Aperture in microns	Aperture in Phi Unit	Sediment Description	
<63000 to 45000	>-6 to -5.5	Pebble	GRAVEL
<45000 to 32000	>-5.5 to -5		
<32000 to 22600	>-5 to -4.5		
<22600 to 16000	>-4.5 to -4		
<16000 to 11200	>-4 to -3.5		
<11200 to 8000	>-3.5 to -3		
<8000 to 5600	>-3 to -2.5		
<5600 to 4000	>-2.5 to -2		
<4000 to 2800	>-2 to -1.5	Granule	
<2800 to 2000	>-1.5 to -1		
<2000 to 1400	>-1 to -0.5	Very Coarse Sand	SAND
<1400 to 1000	>-0.5 to 0		
<1000 to 710	>0 to 0.5	Coarse Sand	
<710 to 500	>0.5 to 1		
<500 to 355	>1 to 1.5	Medium Sand	
<355 to 250	>1.5 to 2		
<250 to 180	>2 to 2.5	Fine Sand	
<180 to 125	>2.5 to 3		
<125 to 90	>3 to 3.5	Very Fine Sand	
<90 to 63	>3.5 to 4		
<63 to 44	>4 to 4.5	Coarse Silt	FINES
<44 to 31.5	>4.5 to 5		
<31.5 to 22	>5 to 5.5	Medium Silt	
<22 to 15.6	>5.5 to 6		
<15.6 to 11	>6 to 6.5	Fine Silt	
<11 to 7.8	>6.5 to 7		
<7.8 to 5.5	>7 to 7.5	Very Fine Silt	
<5.5 to 3.9	>7.5 to 8		
<3.9 to 2.8	>8 to 8.5	Clay	
<2.8 to 2	>8.5 to 9		
<2 to 1.4	>9 to 9.5		
<1.4 to 1	>9.5 to 10		
<1	>10		

APPENDIX D METHODS

Table D.2 Sorting Classifications

Sorting Coefficient (Graphical Standard Deviation)	Sorting Classifications
0 < 0.35	Very well sorted
0.35 < 0.50	Well sorted
0.50 < 0.71	Moderately well sorted
0.71 < 1.00	Moderately sorted
1.00 < 2.00	Poorly sorted
2.00 < 4.00	Very poorly sorted
4.00	Extremely poorly sorted

Table D.3 Skewness Classification

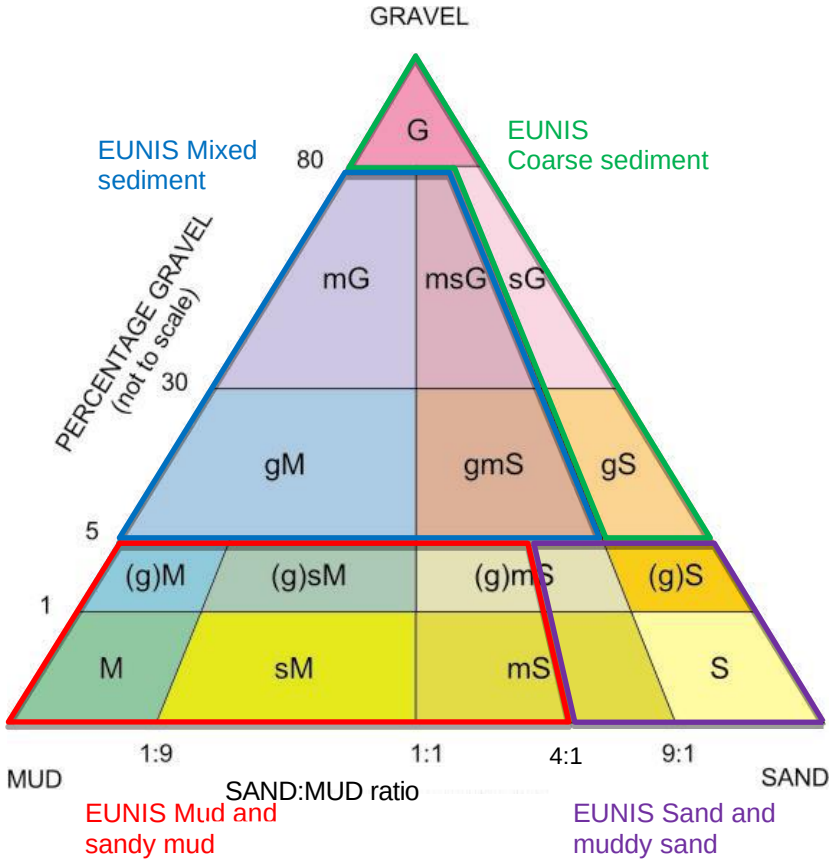
Skewness Coefficient	Mathematical Skewness	Graphical Skewness
1.00 > 0.30	Strongly Positive	Strongly fine skewed
0.30 > 0.10	Positive	Fine skewed
0.10 > -0.10	Near Symmetrical	Symmetrical
-0.10 > -0.30	Negative	Coarse skewed
-0.30 > -1.00	Strongly Negative	Strongly coarse skewed

Table D.4 Kurtosis Classification

Kurtosis Coefficient	Kurtosis Classification	Graphical meaning
≤ 0.67	Very Platykurtic	Flat-peaked; the ends are better sorted than the centre
0.67 < 0.90	Platykurtic	
0.90 < 1.11	Mesokurtic	Normal; bell shaped curve
1.11 < 1.50	Leptokurtic	Curves are excessively peaked; the centre is better sorted than the ends
1.50 < 3.00	Very Leptokurtic	
≥ 3.00	Extremely Leptokurtic	

APPENDIX D METHODS

Figure D.2 Modified Folk Classification and EUNIS Sediment Classes



Code	Modified Folk Classification
G	Gravel
mG	Muddy gravel
msG	Muddy sandy gravel
sG	Sandy gravel
gM	Gravelly mud
gmS	Gravelly muddy sand
gS	Gravelly sand
(g)M	Slightly gravelly mud
(g)sM	Slightly gravelly sandy mud
(g)mS	Slightly gravelly muddy sand
(g)S	Slightly gravelly sand
M	Mud
sM	Sandy mud
mS	Muddy sand
S	Sand

Source: Folk (1954) and Parry (2019)

C.5 Total Organic Carbon

A 0.25g aliquot of air dried and ground (particle size <118µm) sample was mixed with 10ml of analytical grade sulphurous acid and allowed to effervesce at 40°C for fourteen hours in order to remove any inorganic carbon. The digested sample was then heated to 105°C until any remaining acid had evaporated and the sample had dried. The dried residue was then analysed for carbon content using an Eltra induction furnace, fitted with a non-dispersive infrared (NDIR) cell. In this instrument the sample was combusted at 1600°C in an oxygen atmosphere, the combustion gases pass through the NDIR cell which measures the carbon dioxide (CO_2) concentration. The total quantity of carbon liberated is calculated and reported as a percentage of the original mass of sample.

The method is calibrated every day and incorporates a three point calibration (including blank) using matrix matched standards sourced from traceable material. The calibration range extends to 4.0%. Any samples that are over-range are re-extracted with reduced sample weight and re-analysed. The method is statistically controlled using both process and instrument quality control samples. Both are sourced independently from the solutions used to calibrate the method. Instrument and process blank solutions are also run at regular intervals (with each batch) to monitor potential sources of contamination.

The results are expressed as % w/w of a dry sample and will not include volatile organic carbons, the majority of which are lost during digestion and drying. The upper range limit of this technique has not been investigated, whilst the lower limit is dependent on the sensitivity of the furnace and the sample weight taken. In practice, the limit of detection (LOD) is 0.02% of sample weight. The standard used was OAS Acetanilide.

APPENDIX D METHODS

C.6 Hydrocarbons

C.6.1 Extraction Procedures

A 15g sub-sample of the sample was treated with 15ml of methanol and 60ml of dichloromethane (DCM) and mixed on a magnetic stirring plate for one hour (wet vortex extraction). The solvent extract was then chemically dried, water partitioned and then reduced to approximately 1ml using a Kuderna Danish evaporator with micro Snyder. The clean -up stage utilised 1g of activated silica gel along with DCM and pentane, which removes polar organics. One third of the column was made up with the DCM/Silica slurry and then the column was eluted with 9ml of DCM and 3ml of pentane. The 1ml of DCM extract was then eluted through the column with a further 1ml of DCM and 2ml of Pentane giving a final extract of 4ml (DCM:pentane). The samples were then subjected to a further copper clean up stage to remove any sulphur.

A separate sub-sample was taken for analysis of moisture content by drying at 120ºC for 8 hours. The moisture content was later used to convert the hydrocarbon concentrations from wet weight to dry weight.

C.6.2 Analysis by Gas Chromatography

An aliquot of the extract was then taken and analysed for total hydrocarbons and individual n-alkanes by large volume injection GC-FID and one taken to be analysed for PAH and alkylated isomer concentrations by GC-MS selected ion monitoring as specified in DTI (1992).

Appropriate column and GC conditions were used to provide sufficient chromatographic separation of all analytes and required sensitivity. GC chromatograms are presented in Appendix I.

C.6.3 Quality Control Samples

All samples have surrogates and internal standards (heptamethylnonane (A), 1-chlorooctadecane (B) and squalane (C)) added prior to commencement of extraction. Decanoic acid and eicosanoic Acid were added to the sample post extraction but prior to the clean up stage. These are reverse surrogates to measure the clean up. The method was statistically controlled using both process and instrument quality control samples. Both were sourced independently from the solutions used to calibrate the method. Three instrument blanks of 50:50 pentane:DCM were run initially and one after the continuing calibration check (CCC) before any samples. Two method blanks and an in-house prepared reference material were analysed with each batch and process blank solutions were also run at regular intervals (with each batch) to monitor potential sources of contamination.

C.6.4 Calibration and Calculation

Two calibration check standards are measured by GC-FID before and after each batch. The first CCC is a florida mix used to calibrate the individual alkane method and determine retention times and areas for the nC_{10} – nC_{40} alkane groups. The second CCC is a diesel/mineral oil mix which provides the odd alkane group retention times from nC_{11} – nC_{27}, pristane and phytane. The second CCC is used to calibrate the total petroleum hydrocarbons area.

Concentrations of total hydrocarbons from the extract analysed by GC-FID were quantified by comparison with the chromatographic envelopes from the mixed diesel/mineral oil calibration standards. The concentration in the sample was then calculated against the squalene surrogate. The chromatographically resolved individual n-alkane peaks nC_{10}-nC_{37} were quantified using the florida mix standard.
The GC/MS is calibrated initially at four concentrations to confirm linearity of each target compound across the working range. With each batch a calibration check standard is measured before and after each batch and the

concentration calculated from the slope of the four point initial calibration. The CCC is used to calibrate the method and samples are quantified using the CCC response factors.

Concentrations of PAH from the extract analysed by GC-MS were determined by referencing individual quantified mass peak areas for each target compound to the appropriate internal standard quantified mass peak area and the relative response factor calculated from the applicable CCC standard.

The analysis detection limits were 1ng g^{-1} for PAHs and 100ng g^{-1} for THC.

C.7 Metals

C.7.1 Aqua Regia Extractions for ICP-MS Determination

Approximately 1g of air-dried and ground (particle size <118µm) sediment was accurately weighed and placed in a Teflon digestion vessel. The microwave digestion process involved a two stage extraction process. The digest is made up to 100ml in a Gradplex flask. The sample was then analysed by inductively coupled plasma-mass spectrometry (ICP-MS).

C.7.2 Inductively Coupled Plasma – Mass Spectrometry (ICP-MS)

All metals were determined by ICP-MS. The spectrometer was calibrated using seven different concentrations of matrix-matched standards made from dilutions of 10g l^{-1} spectroscopic standard solutions. Target analyte concentrations were measured by direct comparison to the internal standard with the nearest mass ionisation properties, to take into account changes in plasma conditions as a result of matrix differences between standards and samples. Detection limits and the atomic mass units of the various elements analysed are presented in Table D.5.

Table D.5 ICP Detection Limits, Elemental Emission Wavelengths and Atomic Masses

Analysis	ICP-MS	Aqua Regia Extraction
Element	Atomic Mass Units	LOD (µg g^{-1})
As	75	0.5
Cd	111	0.04
Cr	52	0.5
Cu	65	0.5
Ni	60	0.5
Pb	208	0.5
Zn	66	2
Hg	202	0.01

C.7.3 Organotins

A portion of the received sample was digested with hydrochloric acid and methanol before being extracted into toluene. The extract was then derivatized using sodium tetraethylborate before concentration and a copper/silica clean-up was performed. The extract was analysed by GC-MS and quantified by comparing the results against a calibration curve for each of the target analytes.

C.7.4 Polybrominated Diphenyl Ethers

A portion of air-dried and sieved sample was treated with 13C labelled internal standards before being extracted using an automated extraction system and concentrated under nitrogen. A clean-up stage was employed to

remove contaminants that may have interfered with the analysis. The sample extract was analysed by gas chromatography coupled to a triple quadrupole mass spectrometer (GC-MS-MS) with a cooling injection system. Quantification was performed by comparison with a solution containing each of the targeted compounds, normalised to the 13C labelled internal standards.

C.7.5 Polychlorinated Biphenyl and Organochlorine Pesticides

A portion of air-dried and sieved sample was spiked with 13C labelled internal standards, ultrasonically solvent extracted and concentrated under nitrogen. A clean-up stage was employed to remove contaminants that may have interfered with the analysis. The sample extract was analysed by gas chromatography coupled to a GC-MS-MS. Quantification was performed by comparison with a solution containing each of the targeted compounds, normalised to the 13C labelled internal standards.

C.7.6 Quality Control

Quality control consists of running full method blanks together with one in-house reference material or certified reference material where required, and one duplicate sample per batch of twenty samples. Instrument performance is monitored by the use of instrument blanks, continuing calibration checks and independent calibration checks.

Instrument and process blank solutions are also run at regular intervals (with each batch) to monitor potential sources of contamination.

C.8 Sediment Metabarcoding

C.8.1 DNA Extraction and Sequencing

In the laboratory, DNA was extracted using a commercial DNA extraction kit. An extraction blank was also processed for each extraction batch. Purified DNA extracts were amplified with PCR utilising primers that target a specific region of a barcode gene. The PCR is repeated multiple times per sample to maximise the detection of target species. Amplification success was determined by gel electrophoresis. All purified index PCRs were pooled into final libraries with each sample added in equal quantities. Illumina MiSeq was used to sequence the final library.

C.8.2 Bioinformatics

Sequence data were processed for quality filtering, OTU clustering and taxonomic assignment. Taxonomic assignments were made for each OTU using sequence similarity searched against four reference databases appropriate for the dataset. Taxonomic consistency between databases was determined with Global Biodiversity Information Facility (GBIF). Results for all searches were combined and assignments made to the lowest possible taxonomic level where there was consistency.

APPENDIX D METHODS

C.9 Macrofaunal Analysis

C.9.1 Sorting and Identification

In the laboratory, samples were gently washed across a 1mm mesh sieve to remove any sediment fines and preservative. The retained material was sorted by hand to extract all macrofauna. The organisms were identified and counted to produce a species list for each grab sample. Sample residues were checked by a second individual to provide a degree of quality control.

C.9.2 Data Set Rationalisation

The faunal data set was rationalised according to the standard Gardline (2022) procedure, which is largely based on British Standard ISO16665:2005 (BSI, 2005) and OSPAR (2017) guidelines. A summary of these methods follows.

Juveniles

The inclusion of juvenile organisms in data sets is a contentious issue, as is the definition of a juvenile. Only when the following conditions were satisfied was an organism recorded as a juvenile:

- Organisms that were too small or immature to be identified to species were identified to the lowest possible taxonomic level and recorded as juveniles.
- The organism was in a pre-adult life stage *e.g.* megalopa, praniza, *etc.*
- For large-bodied (>4cm) species of echinoderm and bivalve, the organism was less than 10% of the maximum body size reported in the literature.

In accordance with ISO16665:2005 guidelines, juveniles are recorded separately in the faunal list in Appendix M. Juveniles were included in the analysed data set at the lowest achievable taxonomic level. In the first instance, statistical analyses were performed after counts of juveniles of known species had been combined with adult records of that same species. In accordance with OSPAR (2017), if one or more of the juvenile taxa, or species that included juvenile records, were among the ten most dominant, then a RELATE analysis was carried out to compare the data sets with and without juveniles to determine if discussion of both sets separately is required. If the two data sets are found to be at least 95% similar, then the juveniles are included in the data set for all further multivariate analyses and discussion. Alternatively, the multivariate analyses are additionally performed following exclusion of all juvenile records to illustrate their influence.

Damaged Specimens

Destructive sampling techniques and sieving may damage delicate benthic organisms. It is, therefore, commonplace for fragmented organisms to be found in faunal samples. The following conditions were applied to the recording of damaged specimens and fragments:

- Fragments that constituted a major component of an individual, that unequivocally represented the presence of an entire organism, and that could be identified to species level, were recorded and included with other counts of that species. Examples include: the heads of polychaetes and crustaceans; the complete mouth structure or central disk of brittle stars; the oral area/feeding tentacles of holothurians.
- Fragments that constituted a significant component of an individual, that unequivocally represented the presence of an entire organism, but that could not be identified to species by virtue of their incompleteness, were recorded to the lowest possible taxonomic level.
- Fragments that did not unequivocally represent the presence of an entire organism were ignored, *e.g.* *Ophiura* arms, *Echinocardium* shell fragments, *etc*.

Recorded fragments, therefore, represent discrete observations of individuals that were present at the time of sampling and were included in the analysed data set.

Treatment of Specific Groups of Organisms
Gardline defines macrofauna as organisms that are normally larger that the mesh size of the sieve used to separate them from the sediment (Gardline, 2022). Meiofaunal organisms, such as Ostracoda and Copepoda, which would not be consistently sampled, were not recorded. Due to their generally small size (in fully marine environments), species from the Oligochaeta, Tardigrada and Gnathostomulida were only enumerated when a sieve with a mesh size of 0.5mm or less was used to separate organisms from sediments; otherwise, these organisms were noted to be present, but not enumerated.

Planktonic organisms, such as Chaetognatha and Mysidacea were not recorded. The presence of nektonic species, such as fish and Cephalopoda, was recorded, but they were not enumerated.

Colonial, stoloniferous and encrusting epibenthic species were identified but not enumerated.

With the exception of discrete sea pen (Pennatuloidea) colonies, only solitary tunicates and cnidarians were enumerated and included in statistical analyses. Colonial tunicates and cnidarians were identified but not enumerated.

The testate amoeba *Astrorhiza* sp. was the only foram routinely enumerated.

In accordance with our in-house guidelines the following organisms were not identified to species, but were enumerated and included in the data set for analyses at a higher taxonomic level:

- Nemertea – identified to phylum
- Platyhelminthes – identified to phylum
- Phoronida – identified to genus
- Hemichordata – identified to phylum.

C.9.3 Biomass

Following identification of the sample, each individual taxon (where required) were biomasses by wet weight. Biomass were weighed in grams recorded to 4d.p.

C.10 Statistical Analyses

C.10.1 Hydrocarbon Indices

In order to aid the determination of hydrocarbon sources and levels of weathering of recorded hydrocarbons, a number of indices (largely based on n-alkanes) have been developed (Tran *et al.*, 1995). The following indices were calculated from raw data using Microsoft Excel:

Carbon Preference Index (CPI)
The ratio of odd to even numbered alkanes, commonly referred to as the CPI, may provide further insight into the origin of alkanes in marine sediments. Opinions differ as to which is the most informative chain length over which to calculate CPI. Douglas and Eglinton (1966) suggest that the nC_{20} to nC_{36} range is most informative, whilst Farrington and Tripp (1977) suggest CPI calculated using nC_{27} to nC_{33} alkanes is most informative. The basic premise of most CPI calculations is that land-based vegetation predominantly produces alkanes with odd carbon numbers (*i.e.*, nC_{29}), whereas there is no such tendency in alkanes of anthropogenic or marine origin. Therefore, the sum of odd numbered alkanes divided by the sum of even numbered alkanes decreases with

increasing petrogenic contamination. Jeng (2006) indicates that the tendency for land-based vegetation to predominantly produce alkanes with odd carbon numbers is most prevalent in the nC_{27} to nC_{33} range.

The carbon preference index of Farrington and Tripp (1977), which is used more often than any other in the literature, is calculated as follows:

$$CPI = \frac{2(nC_{27} + nC_{29})}{nC_{26} + 2(nC_{28}) + nC_{30}}$$

CPI values close to unity suggest that sediments are contaminated with petrogenic material; whereas values of 4 and above suggest a dominance of biogenic material and a virtual absence of petrogenics.

Pristane/Phytane Ratio

Pristane and phytane are both biogenic and petrogenic but their relative abundance may vary greatly. Pristane is primarily biogenic and most commonly originates from the decomposition of a phytol side-chain of chlorophyll (Muniz *et al.*, 2004). Elevated concentrations of pristane in sediments can be indicative of high levels of microbial degradation. Phytane is rarely produced biogenically but is a common component of crude oil (Steinhauer & Boehm, 1992); it is generally absent or found in only small quantities in marine sediments. Concentrations of pristane and phytane, and their ratio to each other have, therefore, been used as an indicator of petrogenic contamination (Berthou & Friocourt, 1981). In samples that are contaminated by petroleum products the concentrations of pristane and phytane are usually nearly equal (pristane/phytane ratio close to unity) (McDougall, 2000).

Molecular weight PAH Indices

Information regarding the possible petrogenic or pyrogenic sources of PAHs in the environment can be derived from the ratio of PAH compounds of the same molecular weight as detailed by Yunker *et al*., (2002) and adopted by Fisner *et al.,* (2013). Fisner *et al.,* (2013) states that the identification of possible sources can be made according to the ratios that are commonly used in studies related to sediment analysis, such as:

- Ratio of 178 Molecular Weight PAHs (Ant/(Ant+Phe)), where Ant=anthracene, Phe=phenanthrene and values ≤0.10 indicate the dominance of petrogenic sources and >0.10 indicate the dominance of pyrogenic sources;
- Ratio of 202 Molecular Weight PAHs (Fluo/(Fluo+Py)), where Fluo=fluoranthene, Py=pyrene and values ≤0.40 indicate the dominance of petrogenic inputs and >0.40 indicated the dominance of pyrogenic sources;
- Ratio of 228 Molecular Weight PAHs (BaA/(BaA+Ch)) where BaA=benz[a]anthracene, Ch=chrysene and values ≤0.20 indicate the dominance of petrogenic PAHs, >0.20 to ≤0.35 a mixture of inputs and >0.35 the dominance of pyrogenic inputs;
- Ratio of 276 Molecular Weight PAHs (IP/(IP+Bghi)) where IP=indeno[1,2,3-cd]pyrene, Bghi=benzo[g,h,i]perylene and values ≤0.2 indicate the dominance of petrogenic sources and >0.50 indicate the dominance of pyrogenic sources.

C.10.2 Univariate Macrofauna Indices

Univariate community analyses were undertaken using the PRIMER (version 7; Plymouth Marine Laboratories) software package. Univariate indices seek, by means of a single number, to summarise information about some aspect of community structure. The two aspects of community structure contributing to the concept of diversity are species richness (a measure related to the total number of species present) and evenness (a measure relating to the pattern of distribution of individuals among the species present).

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Diversity indices, as typified by the Shannon-Wiener index, are considered to be a relatively insensitive measure of anthropogenic disturbance. However, benthic ecologists have been able to demonstrate a clear inverse relationship between diversity and total oil concentrations in sediments (Davies *et al.*, 1984). They are therefore of some practical use for making comparisons between stations and sites.

The following indices were calculated and are presented in the report:

Margalef's Richness Index

Species richness is sometimes given simply as the number of species in a sample but this is of course very dependent upon sample size. Alternatively, Margalef's index (*d*) may be used as this takes account of the number of species present for a given number of individuals. Margalef's richness index is calculated as follows:

$$d = \frac{(S-1)}{\ln N}$$

where d = Margalef's richness
S = total number of species
N = total number of individuals

Shannon-Wiener Diversity Index

This is a widely used measure of diversity providing an integrated index of species richness and relative abundance (Clarke & Warwick, 2006). It is basically a measure of the difficulty of predicting the identity of an individual based on overall community composition. The Shannon-Wiener diversity index is expressed as:

$$H' = -\sum_{i=1}^{s} p_i \log_n p_i$$

where H'= Shannon-Wiener diversity index
p_i = proportion of the total number of individuals from the i^{th} species.
n = log base value (log base 2 is used during this report; Shannon & Weaver, 1949)

H' integrates the number of species and individual abundance to provide a summary value reflecting the diversity of fauna at a station. This index of diversity is influenced by both species richness (*i.e.* the number of species) and evenness (or equitability) of distribution of individuals between species.

Simpson's Dominance Index

Simpson's is a dominance index derived from the probability of picking two individuals from a community at random that are from the same species. Therefore, Simpson's dominance index values with be large when a community is dominated by one or a few species but lower when the community is diverse. Simpson's dominance index was calculated as follows:

$$\lambda = \sum {p_i}^2$$

where λ = Simpson's dominance index
p_i = proportion of the total number of individuals from the i^{th} species

Simpson's dominance index ranges from 0 to 1 with values typically reflecting the abundances of the most common species in the samples.

Pielou's Evenness

Evenness (or equitability) is a representation of how uniformly individuals are spread between species in a sample. It is a component of, and calculated using, a theoretical diversity measure (in this instance Shannon-Wiener). Values range from 0 to 1 with high values indicating low dominance and high evenness (*N.B.* the log base that was used to calculate H' must also be used to calculate evenness).

$$J = \frac{H'}{\log_n S}$$

where J = Pielou's evenness
H' = Shannon-Wiener diversity index
S = total number of species in a sample

Species Accumulation Curves

Species accumulation curves show the increasing total number of different taxa observed as samples are successively pooled. Two versions are plotted in this report; the first (plotted in blue) simply takes the samples in their label order, this is often referred to as the "species observed" (Sobs) curve. The second curve (plotted in red) is smooth as it is an averaged output based on the samples being added in random order 999 times. This is referred to as the UGE (Ugland, Gray, Ellingsen) curve after Ugland *et al.*, (2003).

Species Ranking

A measure of the overall dominance pattern in the sampling area may be achieved by ranking the top species per station according to abundance, giving a rank score of ten to the most abundant species, decreasing to one for the tenth most abundant species, and summing these scores for all stations to provide an overall dominance score for each species (Eleftheriou & Basford, 1989). For those species ranked in the top ten, the fidelity of the species ranking can be assessed by comparing the actual rank score with the maximum possible score (thus ten multiplied by number of stations for the top rank, etc.) for that rank as a proportion; perfect fidelity is equal to one; values lower than 0.8 or higher than 1.2 represent erratic ranking, as in a species with a patchy distribution.

C.10.3 Multivariate Analyses

In addition to univariate analyses, the data were subjected to multivariate analysis using a number of different methods available within the PRIMER package (Clarke & Warwick, 2006). By considering the full data matrix as a whole and comparing each station with every other, multivariate analyses are able to highlight subtle trends in data sets that are commonly not identified when using univariate techniques. Multivariate techniques are not restricted to use with faunal data sets and if treated appropriately may also be used to compare complex physico-chemical data sets. Multivariate analyses were computed from resemblance or similarity matrices. In the case of faunal abundance data these were constructed using the Bray-Curtis measure of similarity following transformation of the data to down-weight the influence of highly abundant or dominant species. For the purposes of this survey, a square root transformation was used for the abundance data set, whilst a fourth-root transformation was applied to the biomass data set to down-weigh the influence of adult *A. islandica* and *A. echinata* individuals, whose biomass values were several orders of magnitude greater than the remaining specimens. According to Clarke and Warwick (2006), square root transformation allows the intermediately abundant species to contribute to the similarity, while a fourth root takes account of the rarer species. Chemical data resemblance matrices are computed using Euclidean Distance following transformation (where necessary) and normalisation to standardise measurement scales.

Cluster Analysis and SIMPROF

Cluster analysis groups samples according to their similarity *i.e.*, samples within a group are more similar to each other than they are to samples in other groups. Clustering was by a hierarchical agglomerative method

using group average sorting, and the results are presented as a dendrogram. Using PRIMER v7 it is possible to perform a SIMPROF (similarity profile) test at the same time as the cluster analysis to determine whether groups of samples are statistically indistinguishable or whether they contain identifiable structure. SIMPROF is an *a priori* test designed to identify groups of samples from unstructured data sets. The test employs a permutation-based analysis to determine whether groups of samples below each successive node of a dendrogram possess identifiable internal structure. If the result of a test at a particular node is not significant there is no identifiable structure within the samples below the node and they might therefore be considered to be a uniform group. A significant result indicates that samples within a group (below a particular node in the dendrogram) contain some structure and therefore may not be considered uniform. The analysis therefore identifies groups of samples that are each highly self-similar and also that are distinguishable from each other.

Ordination Analyses using non-Metric Multidimensional Scaling

Non-metric multidimensional scaling (nMDS or MDS) is a type of ordination method which creates a 2- or 3-dimensional 'map' of the samples (or stations) from the similarity matrix. The configuration of the samples on the 'map' is a reflection of their similarity, with distances between samples being representative of their dissimilarity.

It is normal for there to be some distortion (stress) between actual similarity values (in the resemblance matrix) and distance between samples on the ordination plot; perfect solutions are very rarely achieved when dealing with complex data sets. In order to achieve the lowest possible stress PRIMER adopts an iterative approach to ordination, constructing the plot by successively refining the positions of samples until the lowest stress is achieved. In reality the lowest possible stress is not always achieved since data points may become trapped in local minima. It is therefore necessary to re-run the analyses multiple times to ensure that the lowest achievable stress is found. The ordination analysis results reported were the product of a minimum of 25 restarts. In instances where the lowest achieved stress was found for <5 (20%) of the restarts the ordination was repeated with 999 restarts to ensure that a lower stress result could not be found.

The scale and orientation of MDS ordinations are arbitrary so no axes are drawn on the plots. Stress values increase with sample size, and usually also with increasingly severe transformation of the initial data set (due to the increasing influence of rarer species on the outcome of analyses). The stress value may be used as an indication of the usefulness of plots, with a general guide being as follows (Clarke & Warwick, 2006):

<0.05	Almost perfect representation of rank similarities
0.05 to <0.1	Good representation
0.1 to <0.2	Still useful
0.2 to <0.3	Should be treated with caution
>0.3	Little better than random points

BEST (BIOENV and BVSTEP)

Where differences in macrofaunal community structure are found it is acceptable to attempt to link these to abiotic variations in the environment. This may be achieved using multivariate routines in the PRIMER called BVSTEP and BIOENV. In this instance BIOENV analysis has been used due to the manageable size of the data sets.

BIOENV searches amongst a specified data matrix (normally transformed and/or untransformed data matrix) to find subsets of variables (or species) that best 'fit' the multivariate pattern of a separately specified resemblance matrix. In other words, it identified a subset (or subsets) of variables within one data set that produces the most similar (highest correlation) pattern to the overall multivariate pattern of another data set. From a random starting point the analysis adds and removes variables from the initial data sets and assesses whether these improve or worsen the match to the second data set overall. Once the best match is achieved analysis is terminated.

The results depend somewhat upon the starting point of the analysis and the test is therefore always run with multiple restarts in order to ensure that the best fit is found.

Since BVSTEP may be used to compare any two similarly structured data sets it has a variety of applications. These include Bio-Env tests (where the subset of environmental variables that best fit or 'explain' the biotic data are determined), Env-Bio tests (where the subset of species that best fit the environmental data are determined) and Bio-Bio tests (where a subset or subsets of species that most resemble the overall multivariate biotic pattern are determined). The results of these analyses may provide valuable insight into the processes affecting species distributions in survey areas.

ANOSIM

ANOSIM is a multivariate equivalent of an ANOVA test. It is applied to a priori structured data sets to test for differences between pre-selected groups of samples or stations. For instance, ANOSIM may be used to test whether the fauna found <1km of an offshore installation differs from that found at >1km. The result of such an analysis might provide an indication of whether the installation and operation of offshore facilities has affected the benthic community. Results of ANOSIM tests are given as r values that range from 0 (no difference) to 1 (highly different), and the significance is determined by comparison to the randomly permuted distribution of the samples included in the analysis.

SIMPER

Where differences between groups of samples are found, SIMPER may be used to interpret which species, or environmental variables, are principally responsible for the differences between the groups and which are most responsible for the similarities within groups. The SIMPER analysis decomposes differences between all pairs of sample, one from each identified group, into their contributions from each species or variable, and ranks them in decreasing order of their contribution to overall dissimilarity.

RELATE

The RELATE test of PRIMER calculates the rank similarity of two specified data matrices, so, for instance, may be used to provide an indication of the effect of the removal of a subset of taxa (*e.g.*, juveniles) on the structure of the data set overall.

C.10.4 Spearman's Rank Correlation

Spearman's Rank Correlation Co-efficient is a non-parametric correlation analysis that may be used to test for relationships between environmental variables. Significant relationships indicate that environmental variables vary similarly. Large numbers of significant correlations might suggest the presence of an environmental gradient, that in the absence of obvious natural changes in the environment (such a depth gradient), may be attributable to point source pollution or some other form of anthropogenic interference. A matrix of Spearman's rank correlation coefficients, comparing many of the environmental variables, was calculated using Microsoft Excel and is presented in Appendix H.

C.10.5 Dixon's test for Outliers

Within the data set of environmental variables, one or more values may differ considerably from the majority of the rest. In order to identify such values for investigation as to whether they are deviant results or indicative of a notable trend at seabed, Dixon's Q-test for outliers may be used for data sets of five to 25 samples. The test assumes a normal distribution.

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The Dixon's Q-test is performed by taking the difference of the highest (or lowest) value and the value nearest to it and dividing this by the range of the data for that variable. The results of the Dixon's test for both high and low outliers was calculated using Microsoft Excel and is presented in Appendix H.

C.11 EUNIS Habitat Classification

Habitat classification is used to identify different habitats and biotopes based on the biotic and abiotic features of the seabed. Habitat and biotope classifications were conducted on the available survey data, adhering to protocols within the European Union Nature Identification System (EUNIS). The system was developed between 1996 and 2001 by the European Environment Agency (EEA) in collaboration with European experts. The table below gives examples of the five EUNIS levels used to describe the marine environments.

Table D.6 Example EUNIS Habitat Classification Levels

	Detail Covered (EUNIS code)
1. Environment	Marine benthic habitats (M)
2. Broad habitats	Circalittoral biogenic habtiat (MC2)
3. Main habitats	Atlantic circalittoral biogenic habitat (MC22)
4. Biotope complexes	Worm reefs in the Atlantic circalittoral zone (MC221)
5. Biotopes	*Sabellaria spinulosa* on stable Atlantic circalittoral mixed sediment (MC2211)

Development of the EUNIS classification comes from both a top-down and a bottom-up approach. The first division is based on differentiating between major biological zones related to depth (littoral down to abyssal) and differentiation of substrate type *(e.g.* rock, sand, gravel). These high-level divisions can be further subdivided based on the main biogeographical regions of Europe's seas (*e.g.* Arctic, Baltic, Atlantic) with these regional splits being based on a combination of salinity and temperature. Such broad-scale differences in habitat character are readily understood by non-specialists and provide classification types that are easily mapped. However, they also have ecological relevance as they reflect major changes in habitat character upon which species distribution depends (Connor *et al.*, 2004).

Bottom-up classification differentiates between places with different species communities. Relative species composition, diversity and abundance vary from place to place and are dependent both on environmental characteristics and upon interactions between species. Surveyed sites with similar environmental characteristics, such as sediment type and depth, show certain levels of similarity in their species communities.

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV01
Fix number: 154 **E:** 530016 **N:** 6454654 **Depth (m):** 56
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
No visible fauna

Station: ENV01
Fix number: 154 **E:** 530016 **N:** 6454654 **Depth (m):** 56
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
No visible fauna

Station: ENV02
Fix number: 185 **E:** 521544 **N:** 6465747 **Depth (m):** 60
Retention: MFB

Sediment Description:
Coarse sand with gravel and shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV02
Fix number: 185 **E:** 521544 **N:** 6465747 **Depth (m):** 60
Retention: MFB

Sediment Description:
Coarse sand with gravel and shell fragments

Faunal Description:
Annelida (Polychaeta)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV03
Fix number: 169 **E:** 523392 **N:** 6459875 **Depth (m):** 58
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta), Mollusca (Bivalvia)

Station: ENV03
Fix number: 169 **E:** 523392 **N:** 6459875 **Depth (m):** 58
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta), Mollusca (Bivalvia)

Station: ENV04
Fix number: 170 **E:** 520936 **N:** 6459461 **Depth (m):** 56
Retention: MFA

Sediment Description:
Coarse sand with gravel and shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV04
Fix number: 170 **E:** 520936 **N:** 6459461 **Depth (m):** 56
Retention: MFA

Sediment Description:
Coarse sand with gravel and shell fragments

Faunal Description:
Annelida (Polychaeta)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV05
Fix number: 211 **E:** 535648 **N:** 6440722 **Depth (m):** 64
Retention: MFB

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta), Molluca (Scaphopoda)

Station: ENV05
Fix number: 211 **E:** 535648 **N:** 6440722 **Depth (m):** 64
Retention: MFB

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta), Molluca (Scaphopoda)

Station: ENV06
Fix number: 193 **E:** 535807 **N:** 6445823 **Depth (m):** 64
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
No visible fauna

Station: ENV06
Fix number: 193 **E:** 535807 **N:** 6445823 **Depth (m):** 64
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
No visible fauna

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV07
Fix number: 143 **E:** 528486 **N:** 6448020 **Depth (m):** 55
Retention: MFA

Sediment Description:
Coarse sand with cobbles, gravel and shells

Faunal Description:
Mollusca (*Arctica islandica*)

Station: ENV07
Fix number: 143 **E:** 528486 **N:** 6448020 **Depth (m):** 55
Retention: MFA

Sediment Description:
Coarse sand with cobbles, gravel and shells

Faunal Description:
Mollusca (*Arctica islandica*)

Station: ENV08
Fix number: 157 **E:** 532734 **N:** 6456074 **Depth (m):** 59
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Mollusca (Scaphopoda)

Station: ENV08
Fix number: 157 **E:** 532734 **N:** 6456074 **Depth (m):** 59
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Mollusca (Scaphopoda)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV09
Fix number: 132 **E:** 526073 **N:** 6443052 **Depth (m):** 58
Retention: MFA

Sediment Description:
Fine to medium sand with occasional shell fragments

Faunal Description:
Arthropoda

Station: ENV09
Fix number: 132 **E:** 526073 **N:** 6443052 **Depth (m):** 58
Retention: MFA

Sediment Description:
Fine to medium sand with occasional shell fragments

Faunal Description:
Arthropoda

Station: ENV10
Fix number: 200 **E:** 530892 **N:** 6442122 **Depth (m):** 63
Retention: MFB

Sediment Description:
Coarse sand with gravel and shells

Faunal Description:
Annelida (Polychaeta), Mollusca (Bivalvia)

Station: ENV10
Fix number: 200 **E:** 530892 **N:** 6442122 **Depth (m):** 63
Retention: MFB

Sediment Description:
Coarse sand with gravel and shells

Faunal Description:
Annelida (Polychaeta), Mollusca (Bivalvia)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV11
Fix number: 159 **E:** 532530 **N:** 6458658 **Depth (m):** 55
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
No visible fauna

No sieve photo acquired

Station: ENV11
Fix number: 160 **E:** 532532 **N:** 6458658 **Depth (m):** 55
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
No visible fauna

No sieve photo acquired

Station: ENV12
Fix number: 205 **E:** 531952 **N:** 6433903 **Depth (m):** 71
Retention: MFB

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
No visible fauna

Station: ENV12
Fix number: 205 **E:** 531952 **N:** 6433903 **Depth (m):** 71
Retention: MFB

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
No visible fauna

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV13
Fix number: 165 **E:** 526675 **N:** 6463794 **Depth (m):** 51
Retention: MFB

Sediment Description:
Coarse sand with cobbles, gravel and shells

Faunal Description:
Annelida (Polychaeta)

Station: ENV13
Fix number: 165 **E:** 526675 **N:** 6463794 **Depth (m):** 51
Retention: MFB

Sediment Description:
Coarse sand with cobbles, gravel and shells

Faunal Description:
Annelida (Polychaeta)

Station: ENV14
Fix number: 178 **E:** 519355 **N:** 6467399 **Depth (m):** 58
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Mollusca (Scaphopoda)

Station: ENV14
Fix number: 178 **E:** 519355 **N:** 6467399 **Depth (m):** 58
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Mollusca (Scaphopoda)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV15
Fix number: 196 **E:** 533432 **N:** 6444277 **Depth (m):** 65
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta), Mollusca (*Arctica islandica*, Bivalvia, Scaphopoda)

Station: ENV15
Fix number: 196 **E:** 533432 **N:** 6444277 **Depth (m):** 65
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta), Mollusca (*Arctica islandica*, Bivalvia, Scaphopoda)

Station: ENV16
Fix number: 215 **E:** 539557 **N:** 6444754 **Depth (m):** 75
Retention: MFB

Sediment Description:
Fine sand with gravel

Faunal Description:
Annelida (Polychaeta), Echinodermata (Ophiuroidea)

Station: ENV16
Fix number: 215 **E:** 539557 **N:** 6444754 **Depth (m):** 75
Retention: MFB

Sediment Description:
Fine sand with gravel

Faunal Description:
Annelida (Polychaeta), Echinodermata (Ophiuroidea)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV17
Fix number: 136 **E:** 528667 **N:** 6443788 **Depth (m):** 55
Retention: MFA

Sediment Description:
Coarse sand with cobbles, gravel and shells

Faunal Description:
Annelida (Serpulidae), Cnidaria (Hydrozoa)

Station: ENV17
Fix number: 136 **E:** 528667 **N:** 6443788 **Depth (m):** 55
Retention: MFA

Sediment Description:
Coarse sand with cobbles, gravel and shells

Faunal Description:
Annelida (Serpulidae), Cnidaria (Hydrozoa)

Station: ENV18
Fix number: 162 **E:** 528853 **N:** 6458617 **Depth (m):** 55
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida, Echinodermata, Mollusca (Scaphopoda)

Station: ENV18
Fix number: 162 **E:** 528853 **N:** 6458617 **Depth (m):** 55
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida, Echinodermata, Mollusca (Scaphopoda)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV19
Fix number: 121 **E:** 534676 **N:** 6432896 **Depth (m):** 70
Retention: MFB

Sediment Description:
Fine to medium sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta), Arthropoda (Brachyura)

Station: ENV19
Fix number: 121 **E:** 534676 **N:** 6432896 **Depth (m):** 70
Retention: MFB

Sediment Description:
Fine to medium sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta), Arthropoda (Brachyura)

Station: ENV20
Fix number: 150 **E:** 526160 **N:** 6454747 **Depth (m):** 54
Retention: No Sample

Sediment Description:
No Sample

Faunal Description:
No visible fauna

No sieve photo acquired

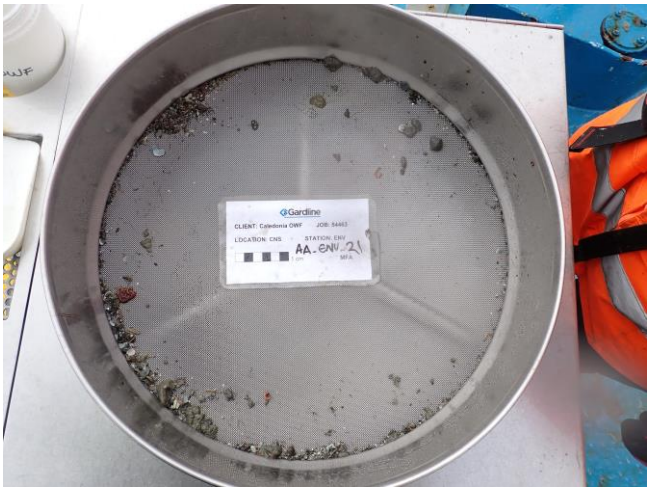
Station: ENV20
Fix number: 152 **E:** 526157 **N:** 6454745 **Depth (m):** 54
Retention: No Sample

Sediment Description:
No Sample

Faunal Description:
No visible fauna

No sieve photo acquired

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS



Station: ENV21
Fix number: 216 **E:** 541069 **N:** 6447876 **Depth (m):** 103
Retention: MFA

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV21
Fix number: 216 **E:** 541069 **N:** 6447876 **Depth (m):** 103
Retention: MFA

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV22
Fix number: 122 **E:** 533804 **N:** 6437587 **Depth (m):** 65
Retention: MFA

Sediment Description:
Coarse sand with gravel and shells

Faunal Description:
Annelida (Polychaeta)

Station: ENV22
Fix number: 122 **E:** 533804 **N:** 6437587 **Depth (m):** 65
Retention: MFA

Sediment Description:
Coarse sand with gravel and shells

Faunal Description:
Annelida (Polychaeta)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV23
Fix number: 147 **E:** 526338 **N:** 6451077 **Depth (m):** 54
Retention: MFB

Sediment Description:
Fine to medium sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV23
Fix number: 147 **E:** 526338 **N:** 6451077 **Depth (m):** 54
Retention: MFB

Sediment Description:
Fine to medium sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV24
Fix number: 220 **E:** 536667 **N:** 6453670 **Depth (m):** 66
Retention: MFA

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV24
Fix number: 220 **E:** 536667 **N:** 6453670 **Depth (m):** 66
Retention: MFA

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV25
Fix number: 212 **E:** 537271 **N:** 6443697 **Depth (m):** 69
Retention: MFA

Sediment Description:
Fine sand with gravel

Faunal Description:
Arthropoda (Brachyura), Annelida (Polychaeta)

Station: ENV25
Fix number: 212 **E:** 537271 **N:** 6443697 **Depth (m):** 69
Retention: MFA

Sediment Description:
Fine sand with gravel

Faunal Description:
Arthropoda (Brachyura), Annelida (Polychaeta)

Station: ENV26
Fix number: 201 **E:** 532586 **N:** 6439724 **Depth (m):** 70
Retention: MFA

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV26
Fix number: 201 **E:** 532586 **N:** 6439724 **Depth (m):** 70
Retention: MFA

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV27
Fix number: 191 **E:** 535302 **N:** 6448609 **Depth (m):** 61
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Mollusca (*Arctica islandica*)

Station: ENV27
Fix number: 191 **E:** 535302 **N:** 6448609 **Depth (m):** 61
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Mollusca (*Arctica islandica*)

Station: ENV28
Fix number: 194 **E:** 531131 **N:** 6448650 **Depth (m):** 55
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta), Mollusca (Scaphopoda)

Station: ENV28
Fix number: 194 **E:** 531131 **N:** 6448650 **Depth (m):** 55
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta), Mollusca (Scaphopoda)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV29
Fix number: 188 **E:** 537960 **N:** 6451158 **Depth (m):** 65
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta), Mollusca (Bivalvia)

Station: ENV29
Fix number: 188 **E:** 537960 **N:** 6451158 **Depth (m):** 65
Retention: MFA

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta), Mollusca (Bivalvia)

Station: ENV30
Fix number: 207 **E:** 535608 **N:** 6436085 **Depth (m):** 79
Retention: MFA

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta), Echinodermata (Ophiuroidea)

Station: ENV30
Fix number: 207 **E:** 535608 **N:** 6436085 **Depth (m):** 79
Retention: MFA

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
Annelida (Polychaeta), Echinodermata (Ophiuroidea)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV31
Fix number: 167 **E:** 525975 **N:** 6460724 **Depth (m):** 54
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
No visible fauna

Station: ENV31
Fix number: 167 **E:** 525975 **N:** 6460724 **Depth (m):** 54
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
No visible fauna

Station: ENV32
Fix number: 187 **E:** 532373 **N:** 6452533 **Depth (m):** 59
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV32
Fix number: 187 **E:** 532373 **N:** 6452533 **Depth (m):** 59
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV33
Fix number: 175 **E:** 523255 **N:** 6467418 **Depth (m):** 56
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaete), Mollusca (Bivalvia)

Station: ENV33
Fix number: 175 **E:** 523255 **N:** 6467418 **Depth (m):** 56
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaete), Mollusca (Bivalvia)

Station: ENV34
Fix number: 130 **E:** 528679 **N:** 6440177 **Depth (m):** 68
Retention: MFB

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
No visible fauna

Station: ENV34
Fix number: 130 **E:** 528679 **N:** 6440177 **Depth (m):** 68
Retention: MFB

Sediment Description:
Fine sand with occasional shell fragments

Faunal Description:
No visible fauna

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV35
Fix number: 173 **E:** 521411 **N:** 6462905 **Depth (m):** 54
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

Faunal Description:
Annelida (Polychaeta)

Station: ENV35
Fix number: 173 **E:** 521411 **N:** 6462905 **Depth (m):** 54
Retention: MFB

Sediment Description:
Coarse sand with shell fragments

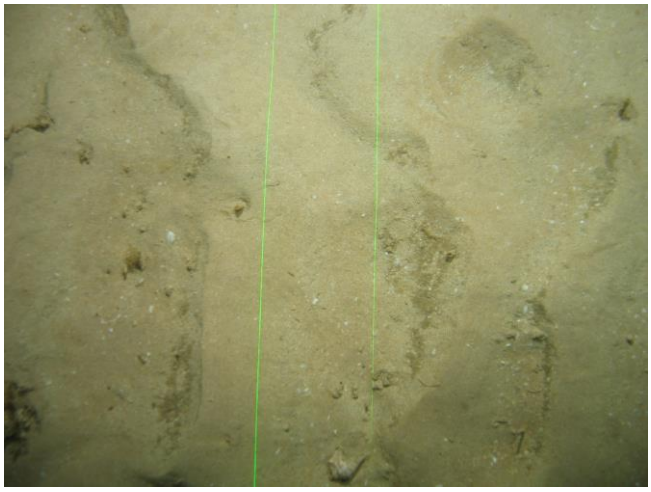
Faunal Description:
Annelida (Polychaeta)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV36
Fix number: 3373 **E:** 519412 **N:** 6465747 **Depth (m):** 57

Sediment Description:
Soft rippled sediment

Faunal Description:
Animalia tube



Station: ENV36
Fix number: 3374 **E:** 519412 **N:** 6465746 **Depth (m):** 57

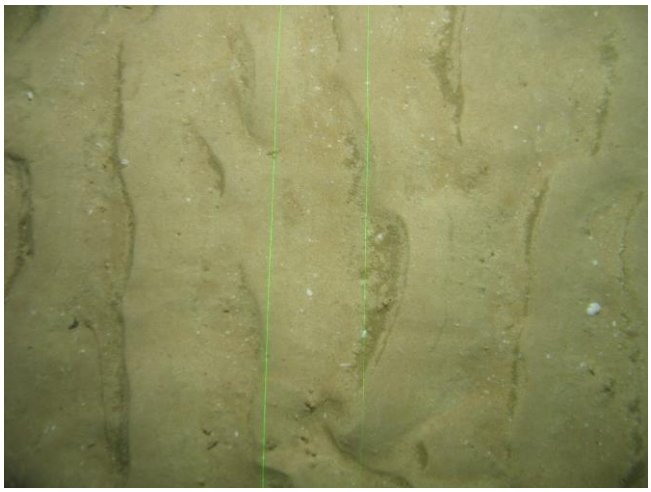
Sediment Description:
Soft rippled sediment

Faunal Description:
Animalia tube

Station: ENV36
Fix number: 3387 **E:** 519422 **N:** 6465713 **Depth (m):** 57

Sediment Description:
Soft rippled sediment

Faunal Description:
Animalia tube, Mollusca (Scaphopoda *stet.*)

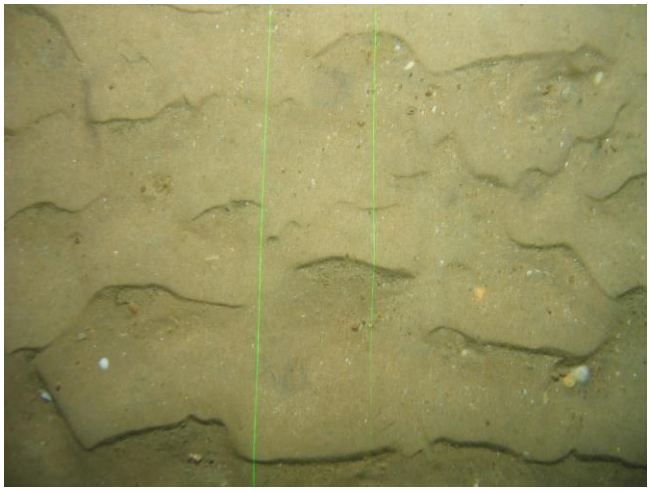


Station: ENV36
Fix number: 3402 **E:** 519434 **N:** 6465682 **Depth (m):** 57

Sediment Description:
Soft rippled sediment

Faunal Description:
No visible fauna

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS



Station: ENV37
Fix number: 3075 **E:** 527222 **N:** 6462112 **Depth (m):** 50

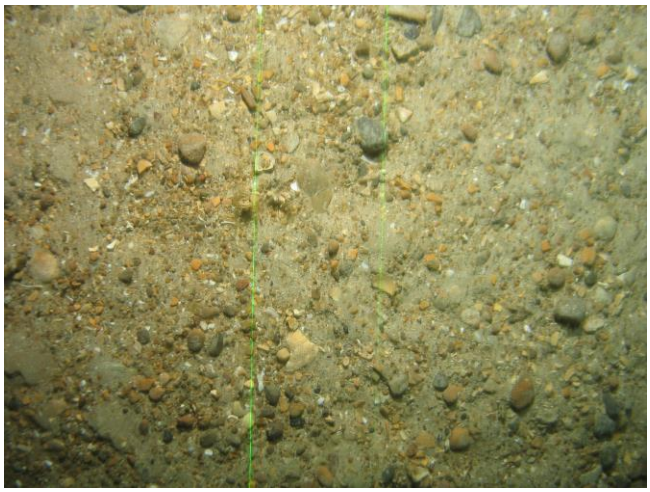
Sediment Description:
Soft rippled sediment

Faunal Description:
No visible fauna

Station: ENV37
Fix number: 3093 **E:** 527224 **N:** 6462138 **Depth (m):** 50

Sediment Description:
Scattered cobbles with soft sediment and shell fragments

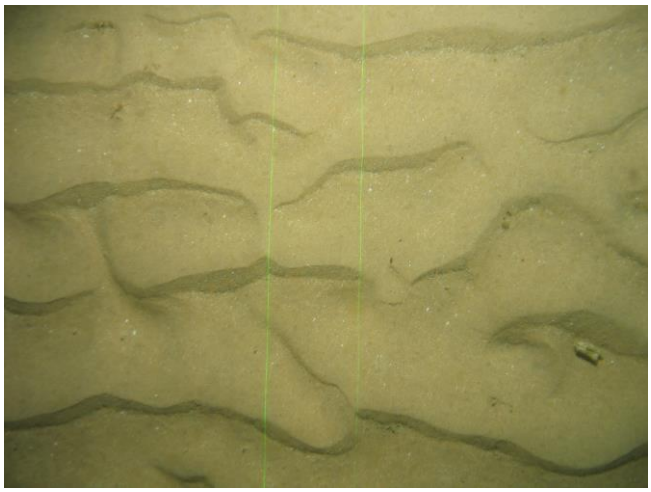
Faunal Description:
Annelida (*Lanice conchilega*, Serpulidae *stet.*), Chordata (*Microstomus kitt*)



Station: ENV37
Fix number: 3104 **E:** 527217 **N:** 6462164 **Depth (m):** 50

Sediment Description:
Scattered cobbles with soft sediment and shell fragments

Faunal Description:
No visible fauna



Station: ENV37
Fix number: 3111 **E:** 527220 **N:** 6462179 **Depth (m):** 50

Sediment Description:
Soft rippled sediment

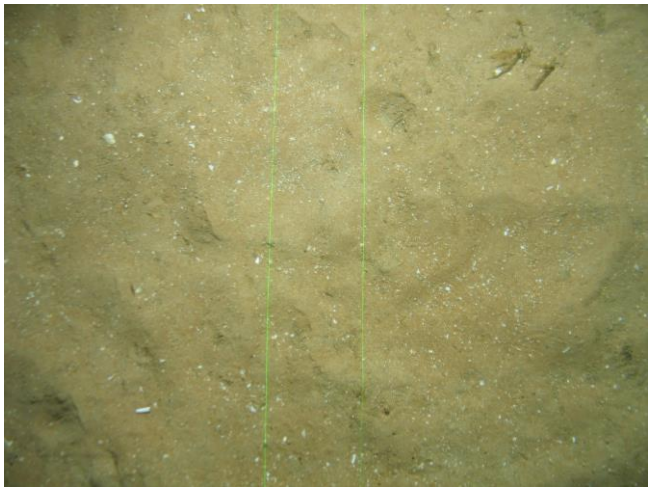
Faunal Description:
No visible fauna

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV38
Fix number: 2785 **E:** 528833 **N:** 6454111 **Depth (m):** 54

Sediment Description:
Soft rippled sediment

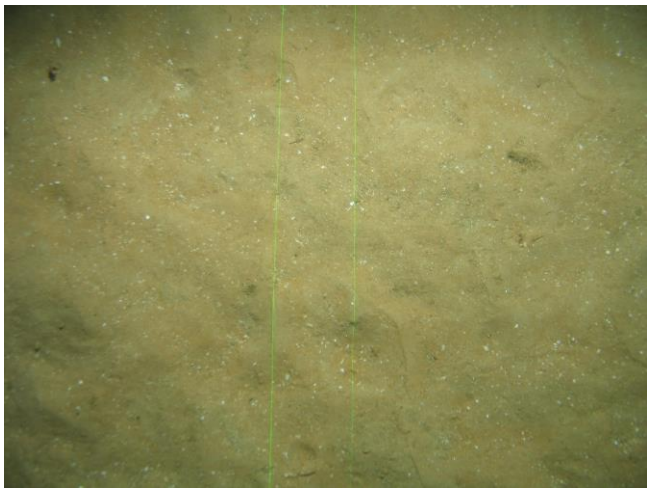
Faunal Description:
No visible fauna



Station: ENV38
Fix number: 2796 **E:** 528854 **N:** 6454141 **Depth (m):** 54

Sediment Description:
Soft rippled sediment with faunal tracks

Faunal Description:
Animalia tube



Station: ENV38
Fix number: 2814 **E:** 528875 **N:** 6454179 **Depth (m):** 54

Sediment Description:
Soft rippled sediment

Faunal Description:
Animalia tube

Station: ENV38
Fix number: 2820 **E:** 528885 **N:** 6454190 **Depth (m):** 54

Sediment Description:
Soft rippled sediment

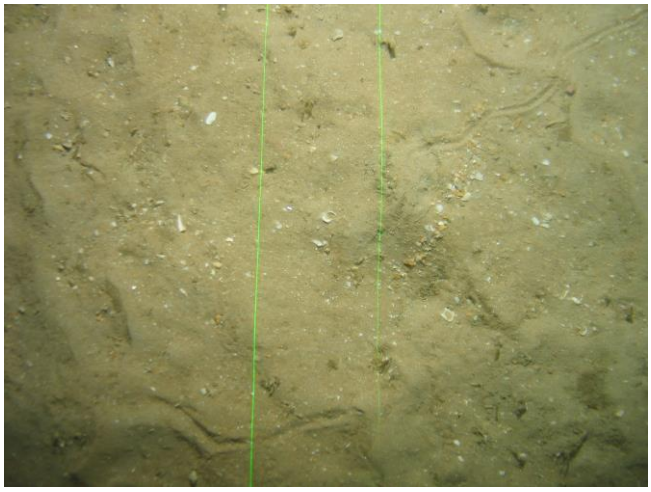
Faunal Description:
No visible fauna

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV39
Fix number: 2872 **E:** 534176 **N:** 6455090 **Depth (m):** 60

Sediment Description:
Soft rippled sediment with faunal tracks and shell fragments.

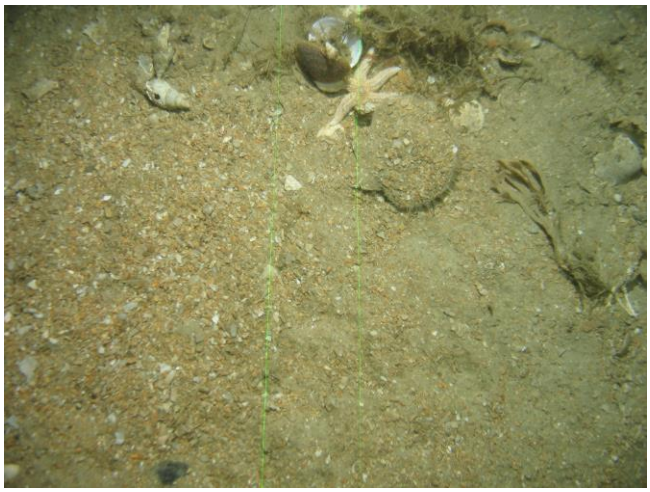
Faunal Description:
Animalia tube, Mollusca (*Arctica islandica* siphon)



Station: ENV39
Fix number: 2886 **E:** 534190 **N:** 6455121 **Depth (m):** 62

Sediment Description:
Soft rippled sediment with faunal tracks and shell fragments.

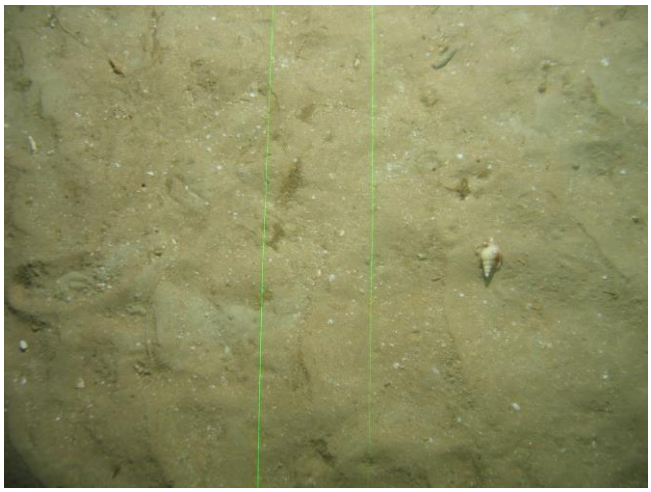
Faunal Description:
Foraminifera



Station: ENV39
Fix number: 2893 **E:** 534204 **N:** 6455133 **Depth (m):** 62

Sediment Description:
Soft sediment with shell fragments.

Faunal Description:
Annelida (Serpulidae *stet.*), Arthropoda (Paguroidea *stet.*), Bryozoa (*Flustridae indet.*), Echinodermata (*Asterias rubens*, Ophiuridae *stet.*), Mollusca (*Aequipecten opercularis*)



Station: ENV39
Fix number: 2900 **E:** 534219 **N:** 6455144 **Depth (m):** 62

Sediment Description:
Soft rippled sediment with faunal tracks

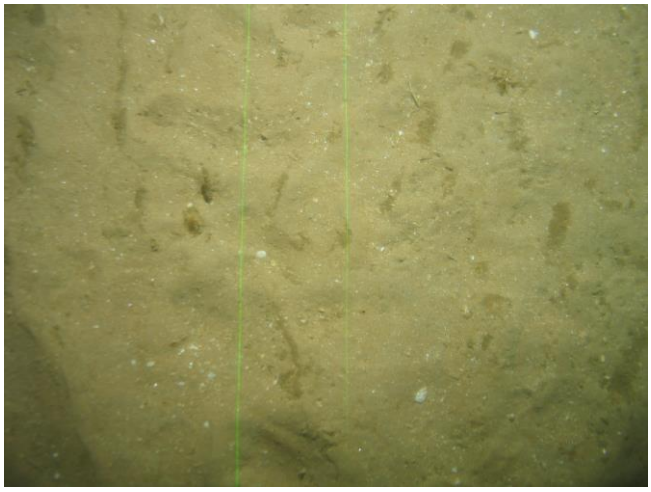
Faunal Description:
Arthropoda (Paguroidea *stet.*)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV40
Fix number: 4126 **E:** 537729 **N:** 6449519 **Depth (m):** 57

Sediment Description:
Soft rippled sediment with faunal tracks

Faunal Description:
No visible fauna



Station: ENV40
Fix number: 4144 **E:** 537756 **N:** 6449553 **Depth (m):** 57

Sediment Description:
Soft sediment with shell fragments

Faunal Description:
Animalia tube, Annelida (*Hyalinoecia tubicola*)

Station: ENV40
Fix number: 4149 **E:** 537761 **N:** 6449569 **Depth (m):** 57

Sediment Description:
Soft sediment with shell fragments and gravel patches

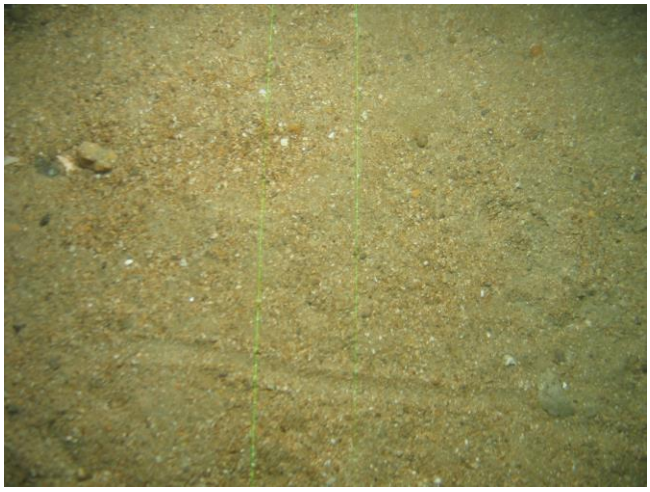
Faunal Description:
No visible fauna

Station: ENV40
Fix number: 4154 **E:** 537772 **N:** 6449583 **Depth (m):** 57

Sediment Description:
Soft sediment with gravel and shell fragments

Faunal Description:
Annelida (Serpulidae *stet.*), Bryozoa (Flustridae *indet.*)

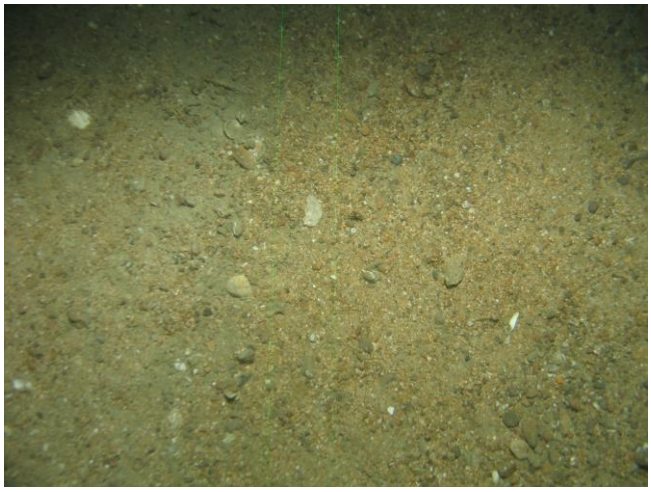
APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS



Station: ENV41
Fix number: 2622 **E:** 529401 **N:** 6445505 **Depth (m):** 52

Sediment Description:
Soft sediment with shell fragmetns and faunal tracks

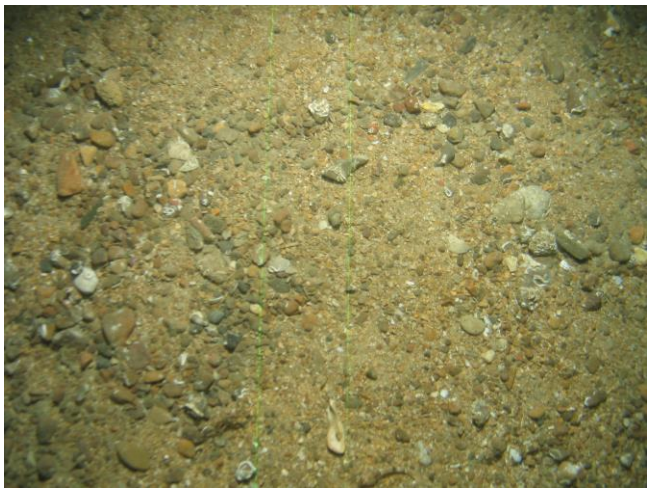
Faunal Description:
No visible fauna



Station: ENV41
Fix number: 2639 **E:** 529439 **N:** 6445491 **Depth (m):** 52

Sediment Description:
Soft sediment with gravel and shell fragments

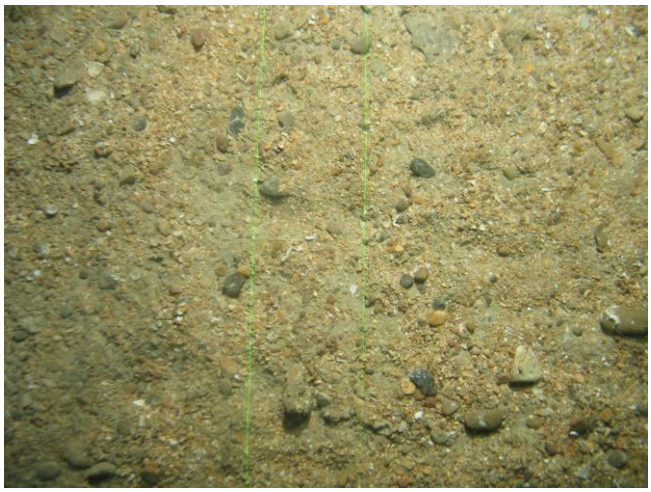
Faunal Description:
Annelida (*Hyalinoecia tubicola*, Serpulidae *stet.*)



Station: ENV41
Fix number: 2650 **E:** 529456 **N:** 6445480 **Depth (m):** 52

Sediment Description:
Scattered cobbles with soft sediment, gravel and shell fragments

Faunal Description:
Annelida (Serpulidae *stet.*), Chordata (*Callionymus lyra*)



Station: ENV41
Fix number: 2661 **E:** 529482 **N:** 6445464 **Depth (m):** 52

Sediment Description:
Mixed sediment with sand, gravel and shell fragments

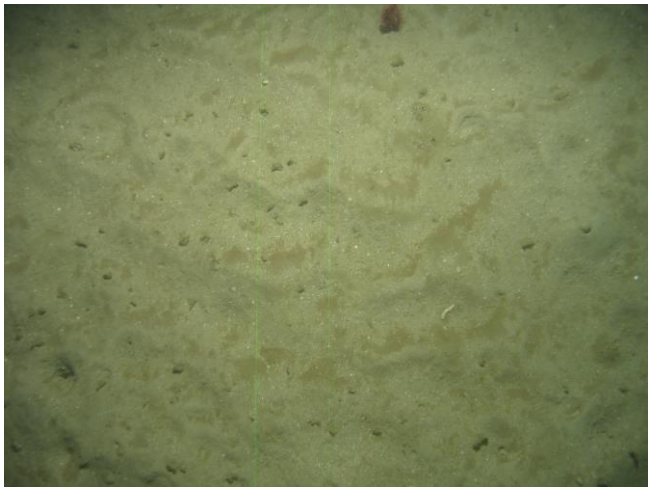
Faunal Description:
Annelida (Serpulidae *stet.*)

APPENDIX D SAMPLING AND SEABED PHOTOGRAPHS

Station: ENV42
Fix number: 3911 **E:** 536546 **N:** 6439479 **Depth (m):** 64

Sediment Description:
Soft sediment

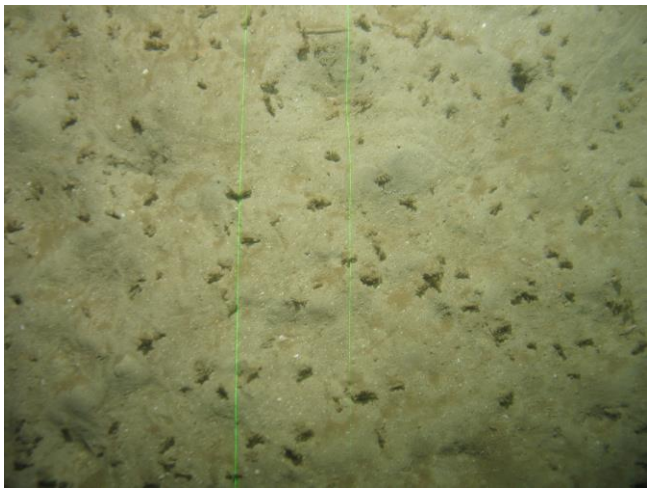
Faunal Description:
Mollusca - (*Arctica islandica* siphon, Scaphopoda *stet.*)



Station: ENV42
Fix number: 3921 **E:** 536578 **N:** 6439484 **Depth (m):** 64

Sediment Description:
Soft sediment

Faunal Description:
Cnidaria (Pennatuloidea *stet.*)



Station: ENV42
Fix number: 3935 **E:** 536612 **N:** 6439490 **Depth (m):** 64

Sediment Description:
Soft sediment with faunal tracks

Faunal Description:
Animalia tube

Station: ENV42
Fix number: 3938 **E:** 536620 **N:** 6439494 **Depth (m):** 64

Sediment Description:
Soft sediment

Faunal Description:
Chordata (Actinopterygii *indet.* GL0001), Mollusca (*Arctica islandica* siphon)

APPENDIX E BACKGROUND INFORMATION

APPENDIX C BACKGROUND INFORMATION

E.1 Sediment Characteristics

Particle size distributions of sediments in the marine environment are to a large extent determined by hydrodynamic energy at the sediment water interface. Strong currents tend to scour the seabed thereby resuspending fine particles and any material associated with them, whilst the finest sediments predominate in areas with the least hydrodynamic energy.

The role of sediment in the transport and retention of chemical pollutants is tied to both particle size and to the amount of particulate organic carbon associated with the sediment. The chemically active fraction of sediment is usually cited as the organic component and the finest size fractions (smaller than 63µm, silt, clay). The sediment, in particular the organic carbon and finer fractions, acts as a sink for many of the persistent compounds, including metals, hydrocarbons and chlorinated compounds. Many of these persistent substances are also inherently bioaccumulative and toxic. The concentrations of many parameters are typically positively correlated with the proportion of fines found in the sediment as a result of fine particles possessing a relatively large surface area. Fine sediment particles are relatively easily resuspended by waves and currents, and may be transported, along with the materials sorbed to them, over large distances, finally being deposited in areas of lower hydrodynamic energy.

Generally speaking, sands and coarser grained materials are often organically deficient. Strong currents have a tendency to resuspend fine materials and their associated organic matter. Therefore, in an environment that is not nutrient enriched due to anthropogenic discharges, both total organic matter and total organic carbon will normally be lowest at sites with coarse-grained sediment, where currents are often strongest.

Sediment particle size and organic content are also critical measurements for the categorisation of habitat type since to a large extent they control which organisms are capable of living within sediments. Most benthic infaunal organisms exhibit preferences for sediment with particular grain size characteristics. Many organisms live in tubes or burrows constructed from sediment particles; each organism's ability to do this may be limited by the range of different sized particles available. The distribution and abundance of free-living mobile organisms, *i.e.*, those that do not construct tubes or burrows, are also affected by particle sizes, which influence their ability to move within the sediment. Sand grains of inappropriate sizes may be too big to move or, conversely, too small to be stable.

Feeding guilds are groupings of organisms based upon the feeding strategies they employ (United States Environmental Protection Agency or US EPA, 2008) and, as such, sediment particle size and organic content can greatly affect which species guilds may dominate in any given area. Many deposit feeding organisms, which process sediment through the alimentary tract to obtain nutrition (Gage & Tyler, 1992), are highly selective of the grain sizes that they will ingest, often preferring finer sediments that possess relatively high organic content. Conversely, resuspension of fine particulate matter may clog delicate filtering apparatus used by suspension feeders to obtain their suspended food particles from seawater (Gibson *et al.*, 2005), resulting in their exclusion from muddy sediments. Additionally, the mixtures of particle sizes determine the ease with which water and oxygen move through the sediment. An abundance of fine particles in a stable environment may lead to the formation of substrata with small interstitial spaces through which oxygen diffusion can be restricted. This may lead to anoxic conditions within the sediment, which further affects the range of species that may be present. Determination of sediment particle sizes and organic content is therefore of critical importance to the interpretation of benthic environmental survey data.

APPENDIX C BACKGROUND INFORMATION

E.2 Sediment Hydrocarbons

The principal sources of hydrocarbons in the marine environment are anthropogenic (McDougall, 2000). However, contamination of the marine environment with crude oils is not a recent phenomenon, nor solely attributable to anthropogenic activities (Douglas *et al.*, 1981). Three general processes can add hydrocarbons to marine environments: biosynthetic, geochemical and anthropogenic (McDougall, 2000).

Oil is a complex mixture of hydrocarbons and other organic compounds. Hydrocarbons are the principal component of oil, usually contributing >75% of the constituents (Laflamme & Hites, 1978). Petroleum hydrocarbons can be divided into the following broad classes according to their structure: saturates (alkanes, isoalkanes and cycloalkanes), olefins (alkenes), aromatics (benzene, toluene, ethylbenzene and xylenes, or BTEX, and polycyclic aromatic hydrocarbons), asphaltenes, polar compounds and resins (Leahy & Colwell, 1990; Wang & Fingas, 2005).

Due to the complex and variable composition of oil in marine sediments, quantification of total hydrocarbons, groups of hydrocarbons and individual hydrocarbons is required to allow identification of the source of oil within the sediments, be it anthropogenic, biogenic or geochemical. The OSPAR (2017) guidelines for monitoring the environmental impact of offshore oil and gas activities recommend the following analyses to be conducted for environmental surveys (including baseline surveys): total hydrocarbon (THC) concentration, unresolved complex mixture (UCM) concentration, individual and total n-alkane concentrations, pristane and phytane concentrations; individual and total 2-6 ring polycyclic aromatic hydrocarbon (PAH) concentrations, and those of their respective alkyl derivatives.

Total Hydrocarbon Concentration

THC concentration gives an indication of the total hydrocarbon present within a sediment sample; it does not give an indication of the source of contamination. The definition of THC is wholly dependent on the analytical process utilised to quantify it. In this case, THC is equivalent to total n-alkane (nC_{10} to nC_{37}), pristane, phytane, UCM and total PAH (all PAHs including alkylated derivatives) concentrations.

Unresolved Complex Mixture

The UCM consists of a large variety of branched alicyclic hydrocarbons, which are not resolved by conventional capillary gas chromatography (GC) columns and appear as a 'hump' in GC chromatograms (Bouloubassi *et al.*, 2001). These compounds remain after substantial weathering and biodegradation of petrogenic inputs has taken place, with the 'hump' becoming a more predominant feature as resolvable n-alkanes are selectively transformed by weathering. Abundant UCM is ascribed to either degraded or weathered oil residues, and therefore its occurrence in environmental samples is an indicator of oil pollution (Bouloubassi *et al.*, 2001). Notably, a UCM between nC_{20} and nC_{34}, centred on nC_{29} is typical of North Sea sediments, and is generally considered as 'North Sea Background'.

N-alkanes

Alkanes are the simplest aliphatic compounds, containing only carbon and hydrogen held together by single bonds and not containing a ring; they have the general formula C_nH_{2n+2} (Lyons & Plisga, 2005). The n-alkanes are continuous, straight chain alkanes, while branched-chain alkanes are known as isoalkanes or isoprenoids (Lyons & Plisga, 2005). The only isoprenoids quantified in this survey are pristane and phytane, which are isomers of nC_{18} and nC_{19}. These compounds are substantially less susceptible to weathering than their straight chain equivalents and are therefore of use when investigating the degree of weathering of a sample (Tran *et al.*, 1995).

APPENDIX C BACKGROUND INFORMATION

Although generally less harmful to many living organisms than aromatic hydrocarbons, analysis of the aliphatic component (n-alkanes, pristane and phytane) can still provide valuable information to aid in the determination of hydrocarbon sources (Tran *et al.*, 1995). N-alkanes can be derived from a variety of origins, both anthropogenic and natural; it is therefore necessary to distinguish which of these are present, or indeed predominate, in a given environment (Tran *et al.*, 1995). There is a wide range of methods available for this purpose, but those undertaken in this report include: quantification of individual n-alkane concentrations, interpretation of GC chromatograms, the carbon preference index (CPI; Farrington & Tripp, 1977) and the pristane:phytane ratio (Berthou & Friocourt, 1981).

Polycyclic Aromatic Hydrocarbons

PAHs and their alkyl derivatives are almost ubiquitous in marine environments (Laflamme & Hites, 1978). Natural sources of PAHs include forest fires (Youngblood & Blumer, 1975), synthesis by plants (Neff, 1979) and oil seeps (Page *et al.*, 1998). However, the largest sources of PAHs are associated with anthropogenic activities, particularly fossil fuel combustion (Neff, 2004; Laflamme & Hites, 1978). Pyrogenic PAHs may be transported long distances through the atmosphere before finally being deposited. Even after deposition, PAHs may undergo further transport, *e.g.* in urban runoff and rivers, before ultimately being deposited in marine sediments, where they sorb to organic matter and sediment particles.

Concentrations of PAHs in marine sediments vary by many orders of magnitude, ranging from less than 1ng g^{-1} in deep-water oceanic sediments up to a few mg g^{-1} in highly contaminated harbours and coastal sediments (Neff, 2004). In enclosed waters subjected to oil exploration and production activity, PAH concentrations tend to be somewhat higher than in the open ocean. Generally speaking, the greatest PAH concentrations are found in coastal sediments. Barring the presence of point sources of hydrocarbon contamination, total PAH concentrations in marine sediments normally decrease with distance from major human population centres (Larsen *et al.*, 1986).

The occurrence and concentration of PAHs in the environment is of concern since many possess mutagenic, carcinogenic and toxic properties (McDougall, 2000; Neff, 2004). Many PAHs are readily bioaccumulated through the food web and higher weight aromatics in particular are persistent. The rate at which PAHs degrade is affected by many factors; in the marine environment photooxidation and biodegradation are considered to be the two most important processes of degradation (Neff, 2004). Therefore, PAHs are likely to be most persistent in cold, high latitude deep-waters where sediments receive little or no light. ESGOSS (1994) estimate the half-lives of 2-ring aromatics to be generally less than 100 days whilst heavier weight 5- and 6-ring aromatics may possess half lives in excess of 10,000 days.

Although found in most marine sediments, petrogenic aromatics are normally less abundant than the pyrogenic, HMW aromatics (Bence *et al.*, 1996). Elevated concentrations of LMW, more volatile, 2 and 3 ring PAHs (naphthalenes, phenanthrenes and dibenzothiophenes; NPD) may often be related to the presence of point sources of hydrocarbon input, including oil spills, natural seeps, drilling activity and produced water outfalls (Neff, 2004). A major source of NPD PAHs is the use of oil-based muds during drilling operations and the subsequent discharge of these cuttings on the seabed (Breuer *et al.*, 2004). Pyrogenic PAHs tend to be more widespread, but generally in relatively low concentrations.

The concentrations at which individual PAHs produce toxic effects vary widely (Long *et al.*, 1995) and are dependent on their type and bioavailability. Values for the toxicity of individual aromatics may be misleading since individual PAHs are rarely found in isolation. The best estimates of the potential toxicity of PAHs in marine sediments are ERL and ERM concentrations for total LMW, total HMW and total PAHs (Neff, 2004). Long *et al.* (1995) gives ERL concentrations for LMW and HMW PAHs of 0.55 and 1.70µg g^{-1}, respectively. ERM concentrations are 3.16 and 9.60µg g^{-1} for LMW and HMW PAHs, respectively. The ERL and ERM

concentrations for total PAH concentration in sediments are 4.022 and 44.792µg g^{-1}, respectively. These concentrations are not actual thresholds of toxicity, but delineate concentration ranges with associated probabilities of toxicity. The ERL is the tenth percentile in the PAH effects data provided by Long *et al.* (1995), while the ERM is the median, or 50th percentile. Concentrations below the ERL concentration therefore represent a range in which effects would rarely be observed; concentrations equal to or above the ERL concentration, but below the ERM concentration, represent a range in which effects would occasionally occur and concentrations equalling or exceeding the ERM concentration represent a range within which effects could frequently be expected.

The US EPA identified 16 priority low and higher molecular weight PAHs. Nine of these were selected by OSPAR as the focus for their studies and are the 4 to 6 ring compounds of particular importance due to their toxic nature even at very low concentrations. OSPAR CEMP EAC benchmark concentrations (OSPAR, 2009c) have been developed for the nine OSPAR priority PAHs plus naphthalene and dibenzothiophenes.

Information on the source of PAHs in sediments may be obtained from a study of the alkyl homologues (*e.g.* methyl, ethyl etc. substitution) and parent compound distributions and concentrations. Sediments contaminated with petrogenic material normally contain a predominance of alkylated PAHs, particularly within the LMW range, whereas pyrogenic PAHs comprise mostly HMW unalkylated parent compounds.

E.3 Sediment Metal Concentrations

Metals are generally persistent and at elevated concentrations most are toxic to varying degrees. Many metals such as copper, zinc and chromium are readily bioaccumulated meaning that they are absorbed and stored in organisms over time leading to potential high concentrations capable of causing lethal and sub-lethal toxic effects in benthic organisms even when found in apparently low concentrations in sediment. Metal concentrations in uncontaminated marine sediments generally exceed those found in overlying seawater by three to five orders of magnitude (Bryan & Langston, 1992), since the buffering effects of saline water cause many metals to be rapidly precipitated. Furthermore, dissolved metals are readily scavenged from the water column by organic coatings and iron and manganese coatings found on the surface of fine sediment particles. Consequently fresh waters that are metal enriched by terrestrial runoff tend to deposit much of their metal load in estuarine or near coastal sediments. Ecological impacts attributable to anthropogenic metal contamination in non-coastal marine environments are often somewhat limited in geographical range close to the point of their origin (Rygg, 1985).

Several metals are found in high concentrations in drilling muds and produced water. Some of these metals are added intentionally to drilling muds as metal salts or organo-metallic compounds whilst others are present as trace impurities in major mud ingredients, particularly barite and clay. Those metals most characteristic of contamination of the sediment with drilling muds or cuttings are barium, chromium, lead and zinc (Neff, 2005), but this may vary depending upon the specific constituents of the muds. By far the most abundant metal in most drilling muds is barium, found in the form of barite ($BaSO_4$). In exceptional cases, fine-grained marine sediments may naturally contain in excess of 1000µg g^{-1} barium, but this figure may be greatly enhanced by contamination of sediments with drilling muds containing up to 450mg g^{-1} barium (Neff, 2005). Due to its low solubility and the fact that it is not toxic in its sulphate form (Gerrard *et al.*, 1999), elevated barium concentrations are rarely of toxicological concern. However, monitoring sediment barium concentrations can provide information regarding the extent to which drill cuttings have been transported from their point of origin.

When considering the results of the sediment metal determinations it should be borne in mind that speciation (the particular forms, or species, of any given metal that exist in a sample), sediment granulometry and partitioning of metals between water and sediment phases all affect bioavailability and therefore toxicity. Even if

APPENDIX C BACKGROUND INFORMATION

a metal is present at above normal concentrations, it does not necessarily follow that the metal will produce ecologically deleterious effects, particularly if it is present in an insoluble or relatively low toxicity form. Historically, a wide range of different extraction techniques have been employed that were intended to provide an estimate of the concentrations of metals in marine sediments that may be available to the biota. One of the most commonly used methods of modelling metal bioavailability is extraction of oxic (surficial) sediments with weak acids (*e.g.* 1M nitric acid) since most anthropogenic metal contaminants show a much higher affinity to fine particulate matter than the coarse fraction by the presence of organic matter and clay minerals. These techniques have been shown to produce results that correlate closely with metal burdens in the tissues of benthic organisms (Luoma & Davis, 1983; Bryan & Langston, 1992). However, the extent to which a particular method of extracting metals from sediments reflects their bioavailability is still not well understood, and the debate regarding which methods may be most appropriate is ongoing.

Total sediment metal concentrations have historically been the preferred measurement for offshore surveys. Whilst these provide little information regarding concentrations of metals that may be bioavailable, since they involve total dissolution of the sediment, they are; however, useful for comparisons between surveys and will give an indication of whether or not sediments are contaminated. There is a growing body of data that provides broad figures for the total concentrations of many metals likely to be found in uncontaminated marine sediments (see OSPAR, 2005). Baseline figures may therefore be compared to these data in order to assess whether sediments in an area may have been anthropogenically contaminated prior to any works being carried out. Where elevated concentrations of metals are found, results may be compared to existing sediment metal toxicity data in order to assess whether particular metals may be exerting a toxicological effect on benthic communities (see Buchman, 2008).

E.4 Metabarcoding

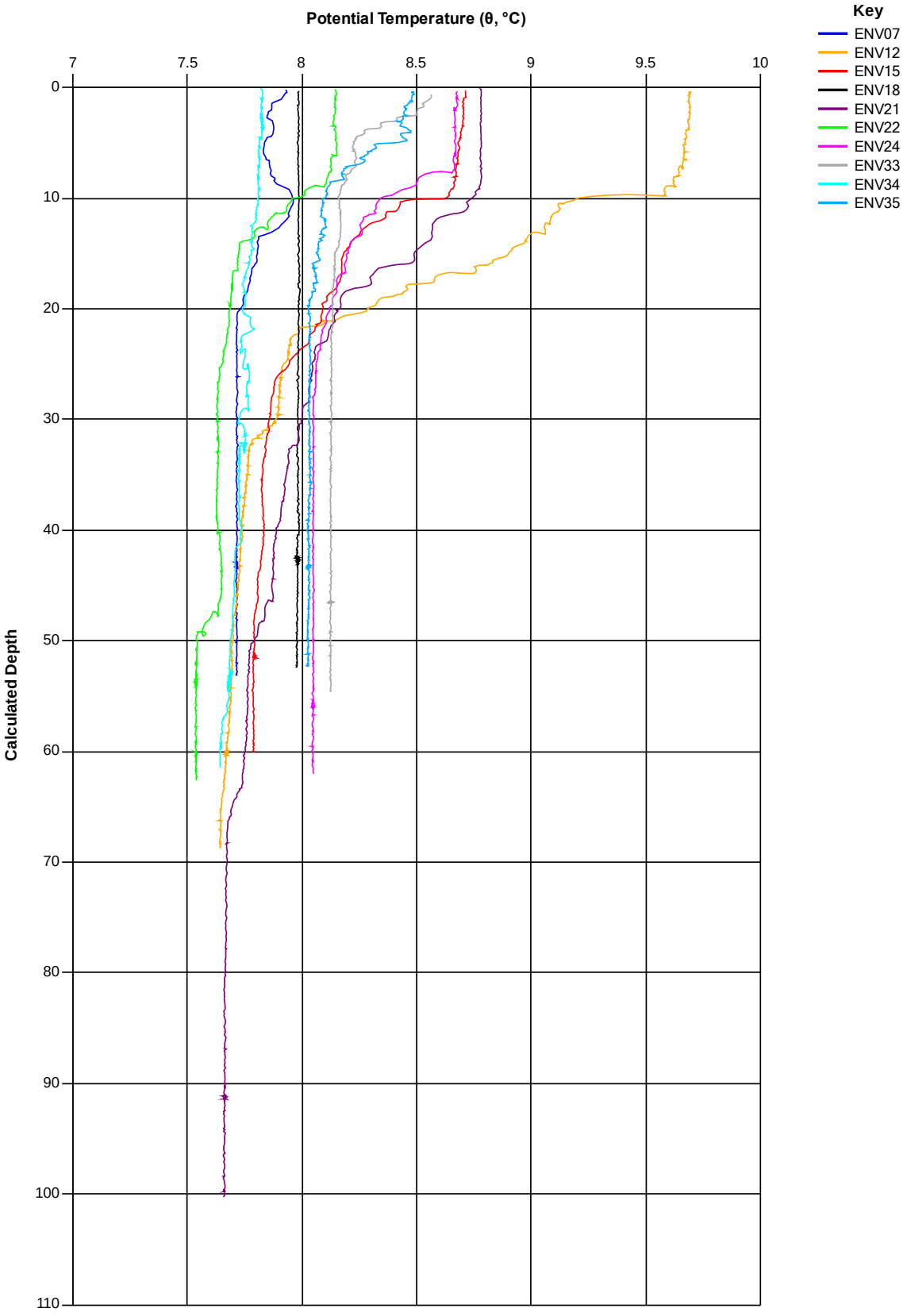
In addition to traditional methods used in this survey, sediment and water metabarcoding acts to increase assessments of important components of biodiversity that may be neglected due to the difficulty of taxonomic identification using conventional morphological approaches. DNA biodiversity monitoring provides additional information about the sediment biodiversity of the bacteria and fauna within the survey area. Bacteria are a useful indicator of water quality due to species diversity and ability to respond to changing environmental conditions (Lemke *et al.*, 1997).

E.5 Macrofaunal Analyses

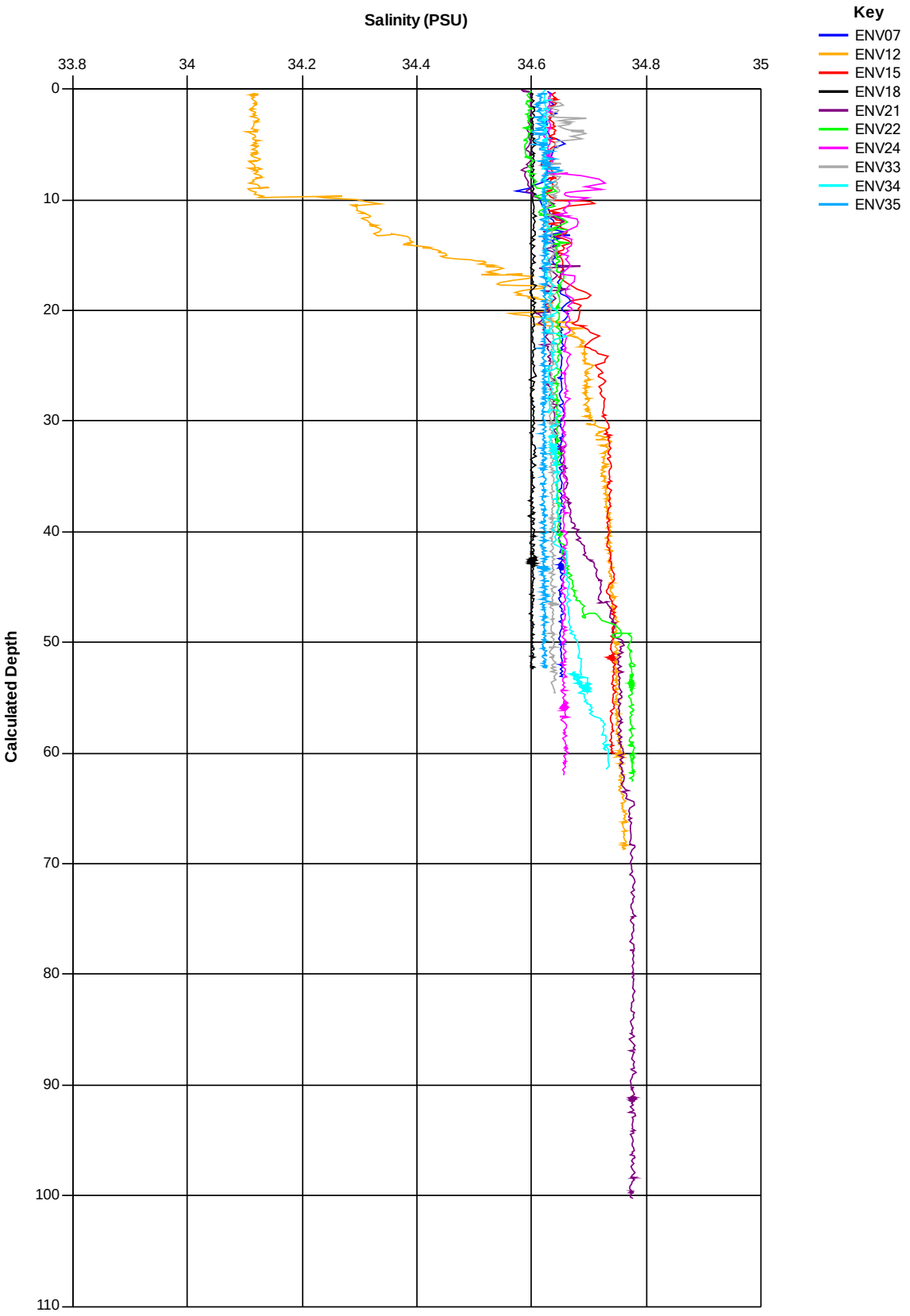
The macrofaunal investigation in this survey is designed to provide a description of the benthic infauna and how it varies across the survey area. Marine benthic invertebrate communities have been shown to be sensitive to environmental change, particularly environmental degradation from anthropogenic contamination (Davies *et al.*, 1984; Warwick & Clarke, 1991). Analysis of faunal data sets may therefore provide insight into any changes resulting from point source pollutants and disturbance.

APPENDIX F CTD PROFILES

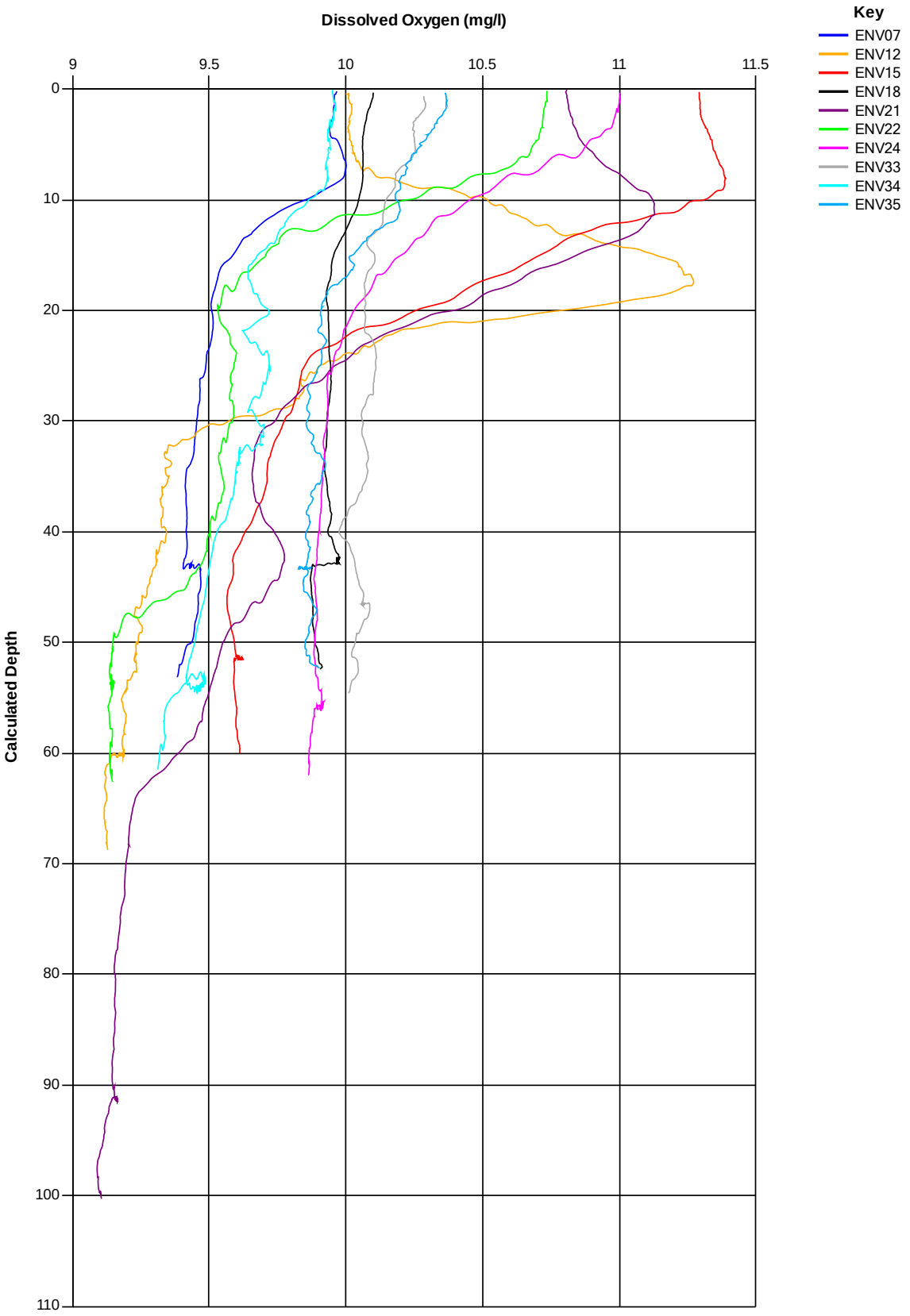
APPENDIX F CTD PROFILES



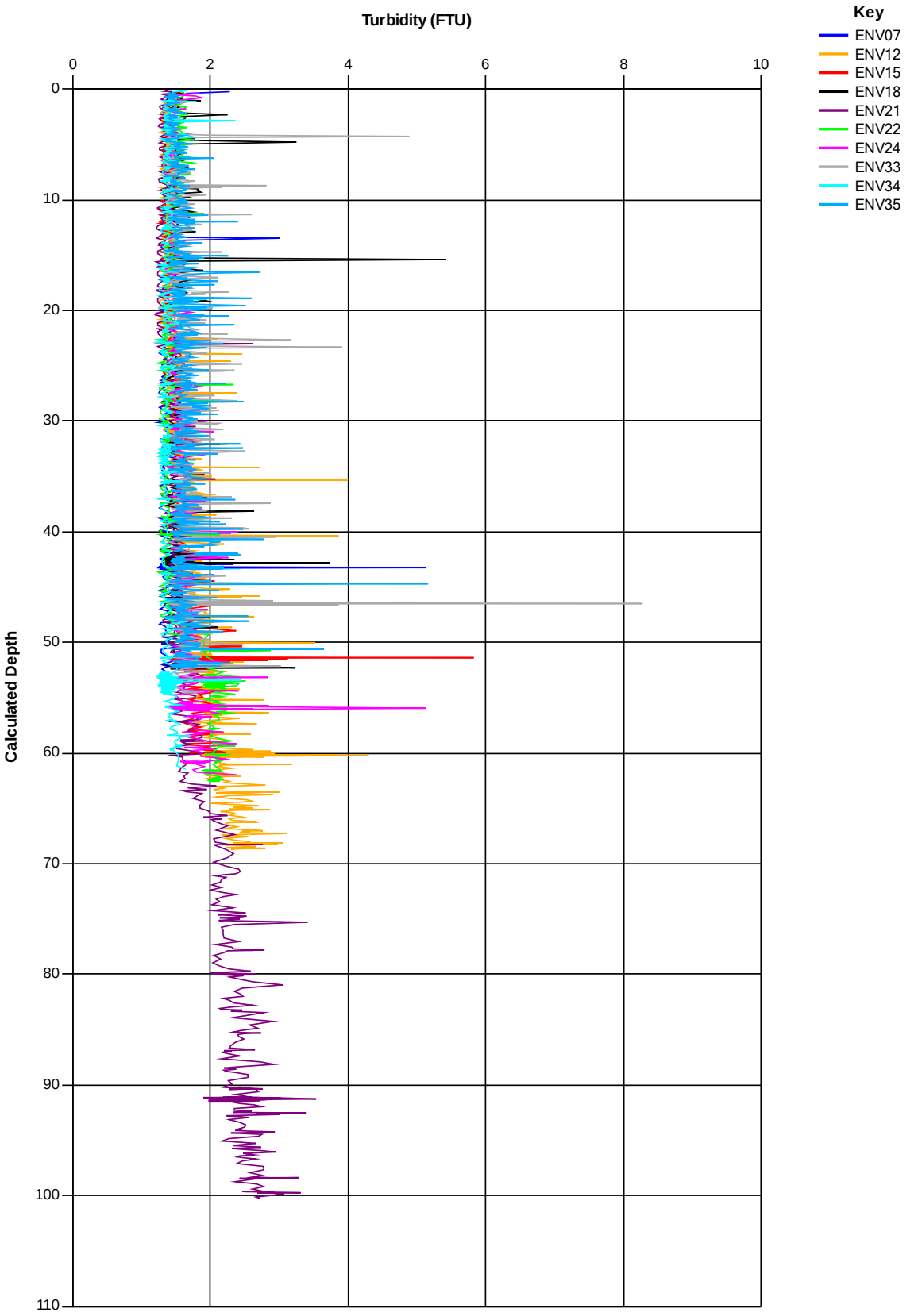
APPENDIX F CTD PROFILES



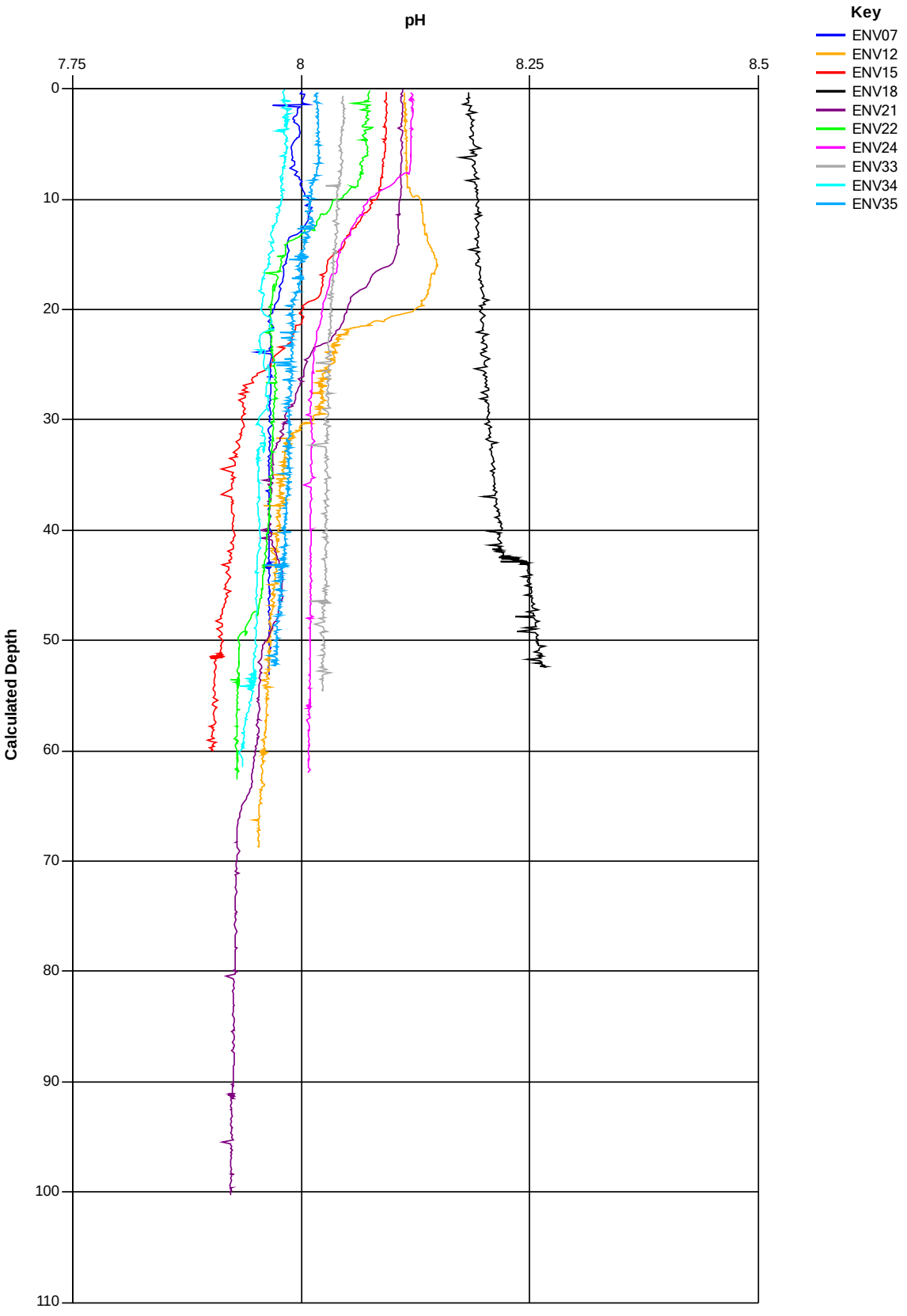
APPENDIX F CTD PROFILES



APPENDIX F CTD PROFILES



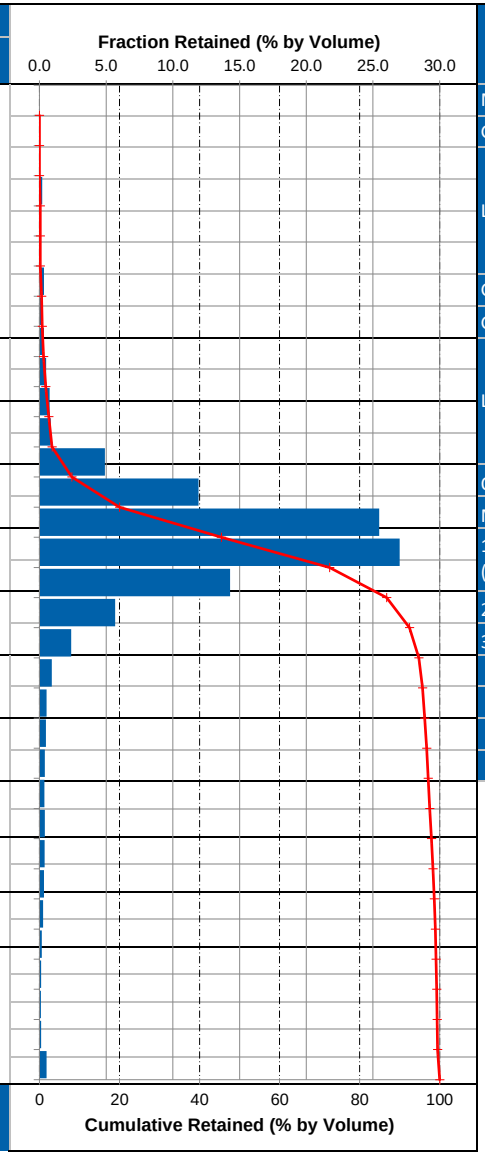
APPENDIX F CTD PROFILES



APPENDIX G PARTICLE SIZE ANALYSIS

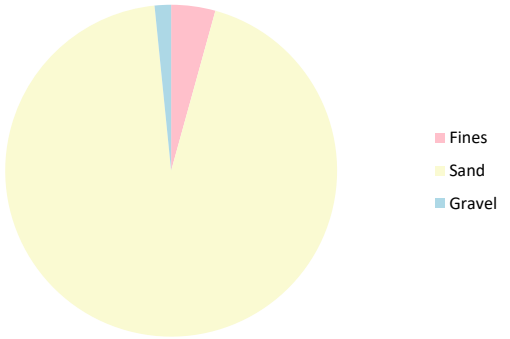
APPENDIX G PARTICLE SIZE ANALYSIS

ENV01				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.2	0.2	Pebble
11313.7	-3.5	0.0	0.2	
8000.0	-3.0	0.0	0.2	
5656.9	-2.5	0.3	0.5	
4000.0	-2.0	0.2	0.7	
2828.4	-1.5	0.3	1.0	Granule
2000.0	-1.0	0.5	1.6	
1414.2	-0.5	0.8	2.3	Very coarse sand
1000.0	0.0	0.9	3.2	
707.1	0.5	4.9	8.1	Coarse sand
500.0	1.0	11.9	20.0	
353.6	1.5	25.5	45.5	Medium sand
250.0	2.0	27.0	72.5	
176.8	2.5	14.3	86.8	Fine sand
125.0	3.0	5.7	92.4	
88.4	3.5	2.4	94.8	Very fine sand
62.5	4.0	0.9	95.7	
44.2	4.5	0.5	96.3	Coarse silt
31.3	5.0	0.5	96.7	
22.1	5.5	0.4	97.1	Medium silt
15.6	6.0	0.4	97.5	
11.0	6.5	0.4	97.9	Fine silt
7.8	7.0	0.4	98.3	
5.5	7.5	0.3	98.7	Very fine silt
3.9	8.0	0.3	98.9	
2.8	8.5	0.2	99.1	Clay
2.0	9.0	0.1	99.2	
1.4	9.5	0.1	99.3	
1.0	10.0	0.1	99.5	
<1.0	>10	0.5	100.0	



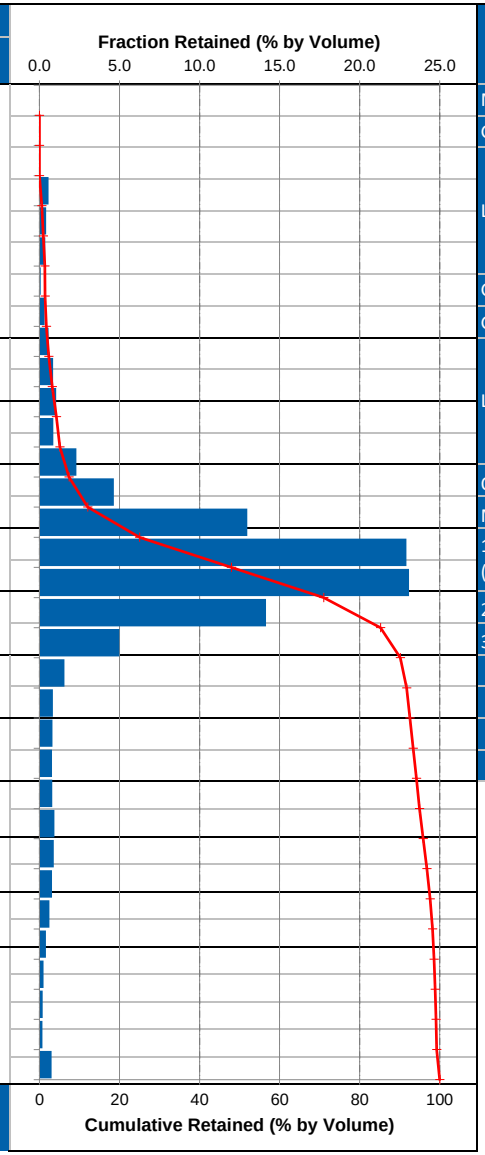
Method of Moments			
Geometric	Mean (µm)	300.36	Wentworth:
Logarithmic	Mean (Phi)	1.74	Medium sand
	Sorting	1.47	Poor
	Skewness	2.62	Very fine
	Kurtosis	18.06	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	328.34	Wentworth:
Logarithmic	Mean (Phi)	1.61	Medium sand
	Sorting	0.91	Moderate
	Skewness	0.11	Fine
	Kurtosis	1.42	Leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.58	333.56	Medium sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	4.30%
EUNIS Folk	Sand and muddy sand	Sand	94.20%
Distribution	Unimodal	Gravel	1.60%



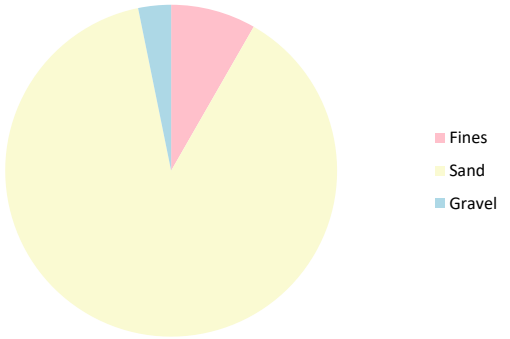
APPENDIX G PARTICLE SIZE ANALYSIS

ENV02				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.6	0.6	Pebble
11313.7	-3.5	0.4	1.0	
8000.0	-3.0	0.4	1.3	
5656.9	-2.5	0.1	1.4	
4000.0	-2.0	0.3	1.7	
2828.4	-1.5	0.6	2.3	Granule
2000.0	-1.0	0.9	3.2	
1414.2	-0.5	1.0	4.2	Very coarse sand
1000.0	0.0	0.9	5.1	
707.1	0.5	2.3	7.4	Coarse sand
500.0	1.0	4.7	12.0	
353.6	1.5	13.0	25.0	Medium sand
250.0	2.0	22.9	48.0	
176.8	2.5	23.1	71.0	Fine sand
125.0	3.0	14.1	85.2	
88.4	3.5	5.0	90.2	Very fine sand
62.5	4.0	1.6	91.7	
44.2	4.5	0.8	92.6	Coarse silt
31.3	5.0	0.8	93.4	
22.1	5.5	0.8	94.2	Medium silt
15.6	6.0	0.8	95.0	
11.0	6.5	0.9	95.9	Fine silt
7.8	7.0	0.9	96.8	
5.5	7.5	0.8	97.6	Very fine silt
3.9	8.0	0.6	98.2	
2.8	8.5	0.4	98.6	Clay
2.0	9.0	0.2	98.9	
1.4	9.5	0.2	99.1	
1.0	10.0	0.2	99.2	
<1.0	>10	0.8	100.0	



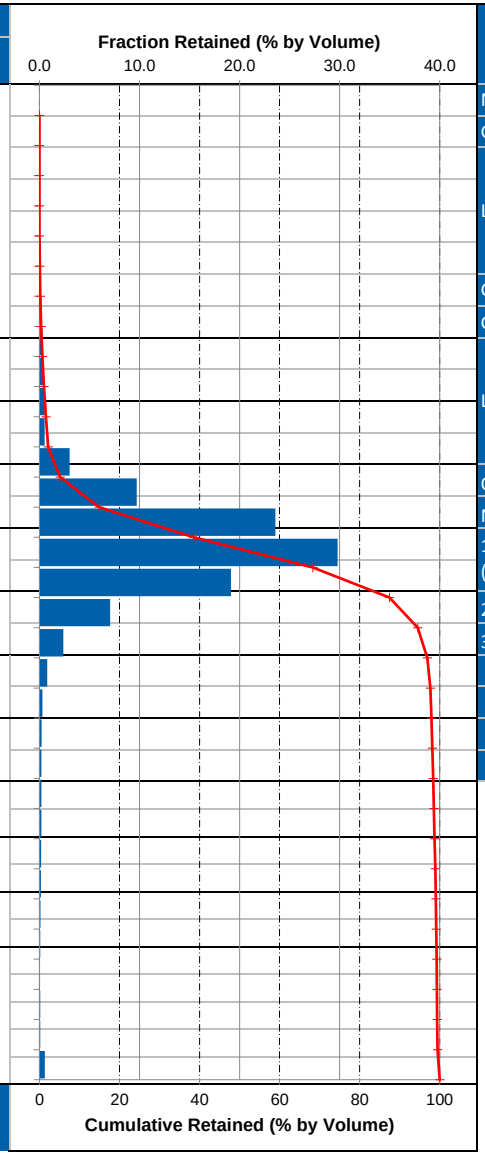
Method of Moments			
Geometric	Mean (µm)	216.97	Wentworth:
Logarithmic	Mean (Phi)	2.20	Fine sand
	Sorting	1.87	Poor
	Skewness	1.32	Very fine
	Kurtosis	10.05	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	241.22	Wentworth:
Logarithmic	Mean (Phi)	2.05	Fine sand
	Sorting	1.37	Poor
	Skewness	0.16	Fine
	Kurtosis	2.18	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.04	242.44	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	-0.50	1414.21	Very coarse sand
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	8.30%
EUNIS Folk	Sand and muddy sand	Sand	88.60%
Distribution	Bimodal	Gravel	3.20%



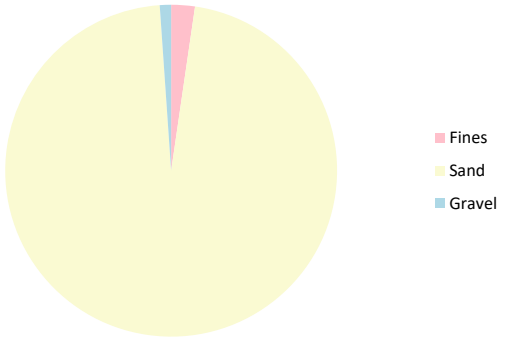
APPENDIX G PARTICLE SIZE ANALYSIS

ENV03				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.1	0.1	
5656.9	-2.5	0.1	0.2	
4000.0	-2.0	0.2	0.4	
2828.4	-1.5	0.3	0.7	Granule
2000.0	-1.0	0.4	1.1	
1414.2	-0.5	0.5	1.6	Very coarse sand
1000.0	0.0	0.5	2.2	
707.1	0.5	3.0	5.2	Coarse sand
500.0	1.0	9.7	14.9	
353.6	1.5	23.6	38.5	Medium sand
250.0	2.0	29.8	68.3	
176.8	2.5	19.1	87.4	Fine sand
125.0	3.0	7.1	94.5	
88.4	3.5	2.4	96.9	Very fine sand
62.5	4.0	0.8	97.7	
44.2	4.5	0.3	97.9	Coarse silt
31.3	5.0	0.2	98.2	
22.1	5.5	0.2	98.4	Medium silt
15.6	6.0	0.2	98.5	
11.0	6.5	0.2	98.7	Fine silt
7.8	7.0	0.2	98.9	
5.5	7.5	0.1	99.0	Very fine silt
3.9	8.0	0.1	99.2	
2.8	8.5	0.1	99.2	Clay
2.0	9.0	0.1	99.3	
1.4	9.5	0.1	99.4	
1.0	10.0	0.1	99.5	
<1.0	>10	0.5	100.0	



Method of Moments			
Geometric	Mean (µm)	291.74	Wentworth:
Logarithmic	Mean (Phi)	1.78	Medium sand
	Sorting	1.25	Poor
	Skewness	3.39	Very fine
	Kurtosis	27.91	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	305.89	Wentworth:
Logarithmic	Mean (Phi)	1.71	Medium sand
	Sorting	0.75	Moderate
	Skewness	0.05	Symmetrical
	Kurtosis	1.12	Leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.69	309.25	Medium sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

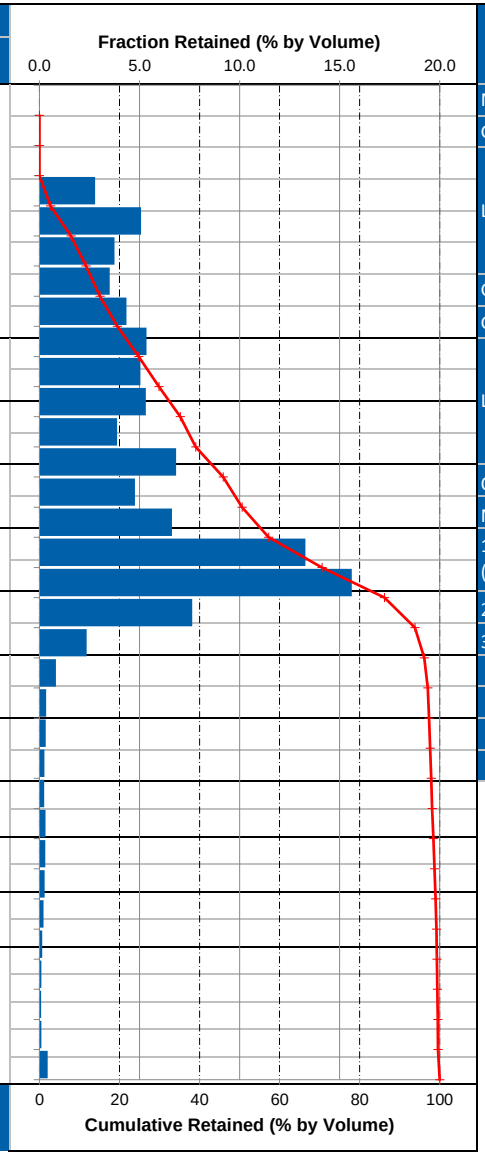
Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	2.30%
EUNIS Folk	Sand and muddy sand	Sand	96.50%
Distribution	Unimodal	Gravel	1.10%



APPENDIX G PARTICLE SIZE ANALYSIS

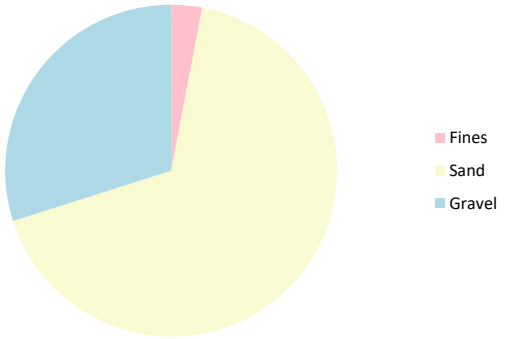
ENV04

Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	2.8	2.8	Pebble
11313.7	-3.5	5.1	7.9	
8000.0	-3.0	3.7	11.6	
5656.9	-2.5	3.5	15.1	
4000.0	-2.0	4.3	19.5	
2828.4	-1.5	5.3	24.8	Granule
2000.0	-1.0	5.0	29.9	
1414.2	-0.5	5.3	35.2	Very coarse sand
1000.0	0.0	3.9	39.0	
707.1	0.5	6.8	45.9	Coarse sand
500.0	1.0	4.8	50.6	
353.6	1.5	6.6	57.3	Medium sand
250.0	2.0	13.3	70.6	
176.8	2.5	15.6	86.2	Fine sand
125.0	3.0	7.6	93.8	
88.4	3.5	2.4	96.2	Very fine sand
62.5	4.0	0.8	97.0	
44.2	4.5	0.3	97.3	Coarse silt
31.3	5.0	0.3	97.6	
22.1	5.5	0.2	97.9	Medium silt
15.6	6.0	0.2	98.1	
11.0	6.5	0.3	98.4	Fine silt
7.8	7.0	0.3	98.7	
5.5	7.5	0.3	99.0	Very fine silt
3.9	8.0	0.2	99.2	
2.8	8.5	0.1	99.3	Clay
2.0	9.0	0.1	99.4	
1.4	9.5	0.1	99.5	
1.0	10.0	0.1	99.6	
<1.0	>10	0.4	100.0	



Method of Moments			
Geometric	Mean (µm)	748.21	Wentworth:
Logarithmic	Mean (Phi)	0.42	Coarse sand
	Sorting	2.48	Very poor
	Skewness	0.27	Symmetrical
	Kurtosis	4.25	Leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	800.37	Wentworth:
Logarithmic	Mean (Phi)	0.32	Coarse sand
	Sorting	2.27	Very poor
	Skewness	-0.36	Very coarse
	Kurtosis	0.80	Platykurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	0.93	524.03	Coarse sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	0.50	707.11	Coarse sand
3rd Local Maxima	-1.50	2828.43	Granule

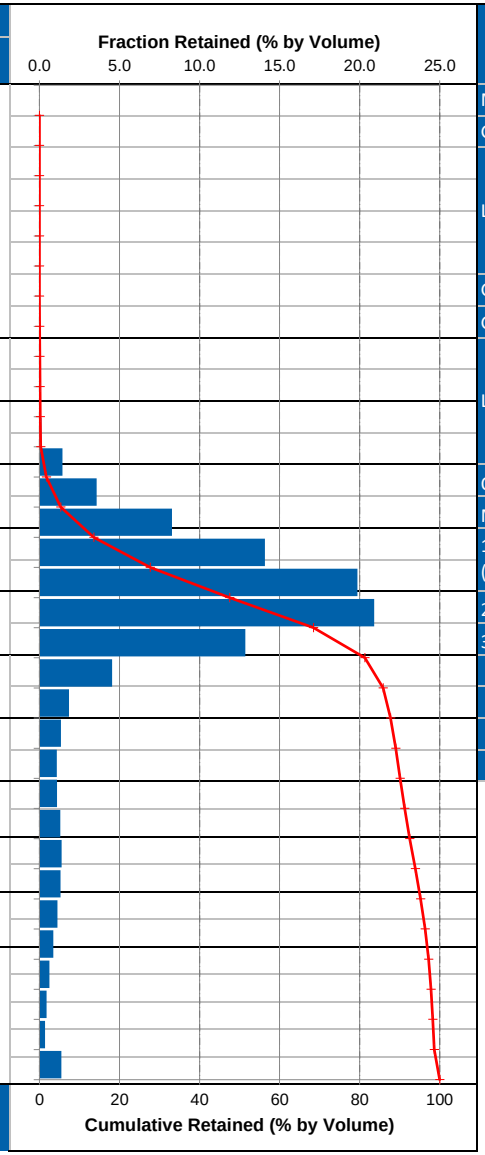
Classification		Composition	
Modified Folk	Gravelly sand	Fines	3.00%
EUNIS Folk	Coarse sediments	Sand	67.10%
Distribution	Multimodal	Gravel	29.90%



APPENDIX G PARTICLE SIZE ANALYSIS

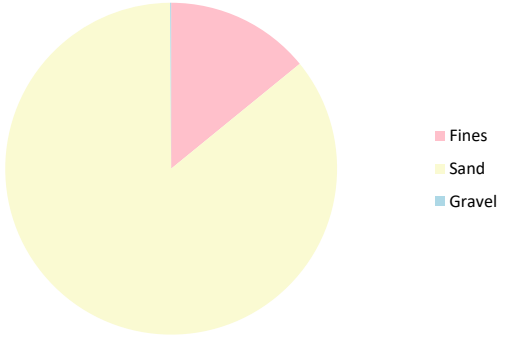
ENV05

Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	Pebble
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.0	0.0	
2828.4	-1.5	0.1	0.1	Granule
2000.0	-1.0	0.0	0.1	
1414.2	-0.5	0.1	0.2	Very coarse sand
1000.0	0.0	0.1	0.3	
707.1	0.5	1.4	1.8	Coarse sand
500.0	1.0	3.6	5.3	
353.6	1.5	8.3	13.6	Medium sand
250.0	2.0	14.1	27.7	
176.8	2.5	19.9	47.5	Fine sand
125.0	3.0	20.9	68.5	
88.4	3.5	12.9	81.3	Very fine sand
62.5	4.0	4.5	85.9	
44.2	4.5	1.8	87.7	Coarse silt
31.3	5.0	1.3	89.0	
22.1	5.5	1.1	90.1	Medium silt
15.6	6.0	1.1	91.2	
11.0	6.5	1.3	92.5	Fine silt
7.8	7.0	1.4	93.9	
5.5	7.5	1.3	95.2	Very fine silt
3.9	8.0	1.1	96.3	
2.8	8.5	0.9	97.2	Clay
2.0	9.0	0.6	97.8	
1.4	9.5	0.4	98.3	
1.0	10.0	0.4	98.6	
<1.0	>10	1.4	100.0	



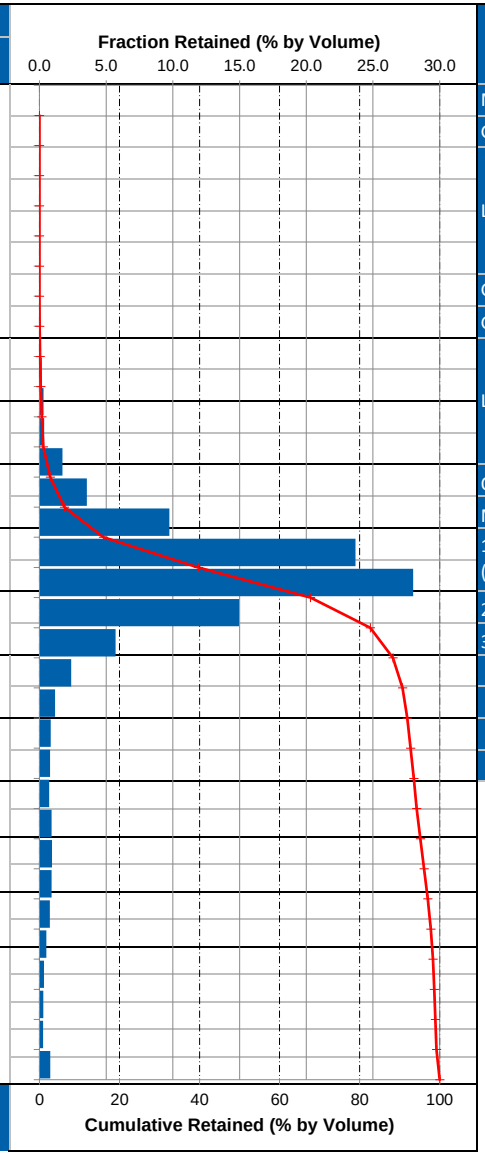
Method of Moments			
Geometric	Mean (µm)	128.13	Wentworth:
Logarithmic	Mean (Phi)	2.96	Fine sand
	Sorting	1.94	Poor
	Skewness	2.14	Very fine
	Kurtosis	8.69	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	159.70	Wentworth:
Logarithmic	Mean (Phi)	2.65	Fine sand
	Sorting	1.53	Poor
	Skewness	0.31	Very fine
	Kurtosis	1.96	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.56	169.72	Fine sand
1st Local Maxima (Mode)	3.00	125.00	Fine sand
2nd Local Maxima	7.00	7.81	Fine silt
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Muddy sand	Fines	14.10%
EUNIS Folk	Sand and muddy sand	Sand	85.70%
Distribution	Bimodal	Gravel	0.10%



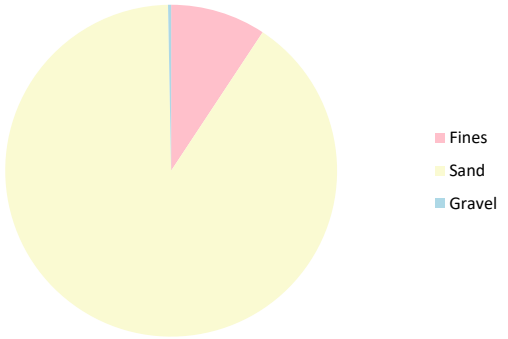
APPENDIX G PARTICLE SIZE ANALYSIS

ENV06				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	Pebble
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.0	0.0	
2828.4	-1.5	0.1	0.1	Granule
2000.0	-1.0	0.2	0.3	
1414.2	-0.5	0.3	0.6	Very coarse sand
1000.0	0.0	0.4	1.0	
707.1	0.5	1.7	2.7	Coarse sand
500.0	1.0	3.6	6.2	
353.6	1.5	9.7	16.0	Medium sand
250.0	2.0	23.7	39.7	
176.8	2.5	28.0	67.7	Fine sand
125.0	3.0	15.0	82.6	
88.4	3.5	5.7	88.3	Very fine sand
62.5	4.0	2.4	90.7	
44.2	4.5	1.2	91.9	Coarse silt
31.3	5.0	0.8	92.7	
22.1	5.5	0.8	93.5	Medium silt
15.6	6.0	0.7	94.3	
11.0	6.5	0.9	95.2	Fine silt
7.8	7.0	0.9	96.1	
5.5	7.5	0.9	97.0	Very fine silt
3.9	8.0	0.8	97.8	
2.8	8.5	0.5	98.3	Clay
2.0	9.0	0.3	98.6	
1.4	9.5	0.3	98.9	
1.0	10.0	0.3	99.2	
<1.0	>10	0.8	100.0	



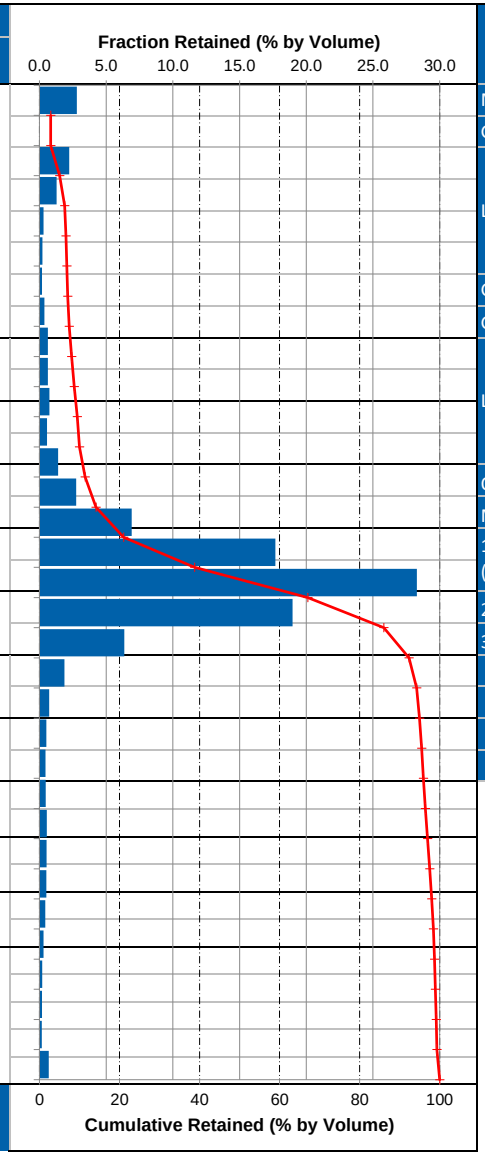
Method of Moments			
Geometric	Mean (µm)	175.55	Wentworth:
Logarithmic	Mean (Phi)	2.51	Fine sand
	Sorting	1.68	Poor
	Skewness	2.55	Very fine
	Kurtosis	11.72	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	207.60	Wentworth:
Logarithmic	Mean (Phi)	2.27	Fine sand
	Sorting	1.25	Poor
	Skewness	0.33	Very fine
	Kurtosis	2.17	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.18	220.02	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Sand	Fines	9.30%
EUNIS Folk	Sand and muddy sand	Sand	90.40%
Distribution	Unimodal	Gravel	0.30%



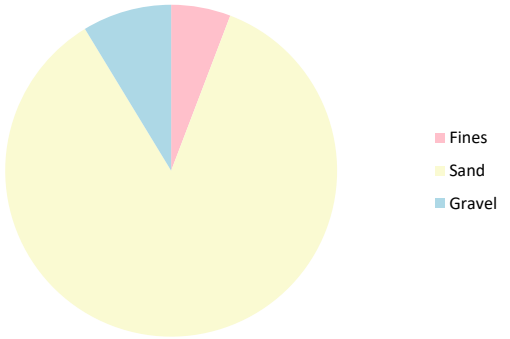
APPENDIX G PARTICLE SIZE ANALYSIS

ENV07				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	2.8	2.8	Pebble
32000.0	-5.0	0.0	2.8	
22627.4	-4.5	2.2	5.0	
16000.0	-4.0	1.3	6.3	
11313.7	-3.5	0.3	6.6	
8000.0	-3.0	0.2	6.9	
5656.9	-2.5	0.2	7.0	
4000.0	-2.0	0.4	7.4	
2828.4	-1.5	0.6	8.0	Granule
2000.0	-1.0	0.6	8.7	
1414.2	-0.5	0.8	9.4	Very coarse sand
1000.0	0.0	0.6	10.0	
707.1	0.5	1.4	11.4	Coarse sand
500.0	1.0	2.7	14.1	
353.6	1.5	6.9	21.1	Medium sand
250.0	2.0	17.7	38.7	
176.8	2.5	28.3	67.0	Fine sand
125.0	3.0	19.0	86.0	
88.4	3.5	6.4	92.4	Very fine sand
62.5	4.0	1.9	94.2	
44.2	4.5	0.7	95.0	Coarse silt
31.3	5.0	0.5	95.5	
22.1	5.5	0.5	95.9	Medium silt
15.6	6.0	0.5	96.4	
11.0	6.5	0.5	96.9	Fine silt
7.8	7.0	0.5	97.5	
5.5	7.5	0.5	98.0	Very fine silt
3.9	8.0	0.4	98.4	
2.8	8.5	0.3	98.7	Clay
2.0	9.0	0.2	98.9	
1.4	9.5	0.2	99.1	
1.0	10.0	0.2	99.3	
<1.0	>10	0.7	100.0	



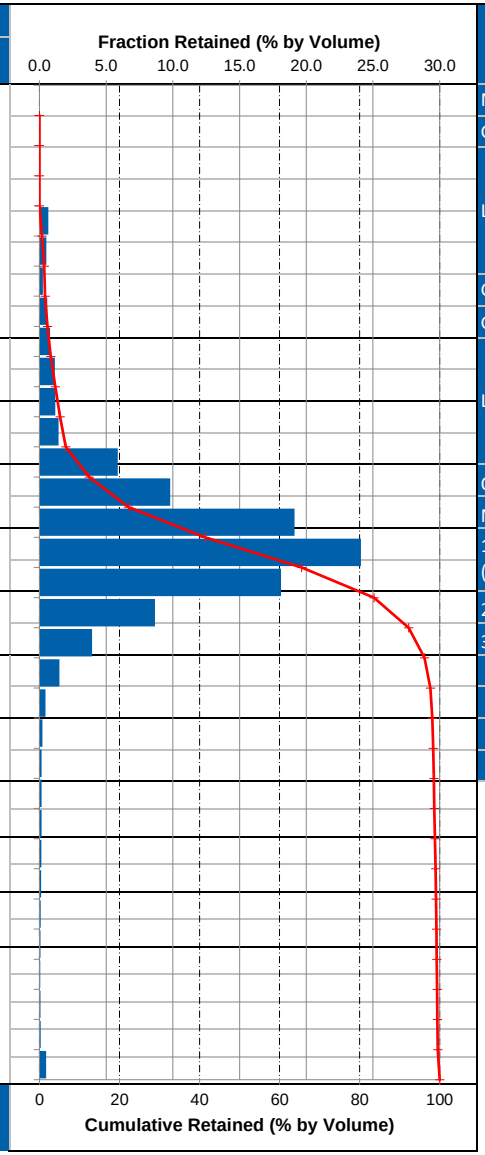
Method of Moments			
Geometric	Mean (µm)	271.90	Wentworth:
Logarithmic	Mean (Phi)	1.88	Medium sand
	Sorting	2.42	Very poor
	Skewness	-0.78	Coarse
	Kurtosis	7.71	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	234.32	Wentworth:
Logarithmic	Mean (Phi)	2.09	Fine sand
	Sorting	1.82	Poor
	Skewness	-0.33	Very coarse
	Kurtosis	3.38	Extremely leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.20	217.78	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	-5.50	45254.83	Pebble
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Gravelly sand	Fines	5.80%
EUNIS Folk	Coarse sediments	Sand	85.50%
Distribution	Bimodal	Gravel	8.70%



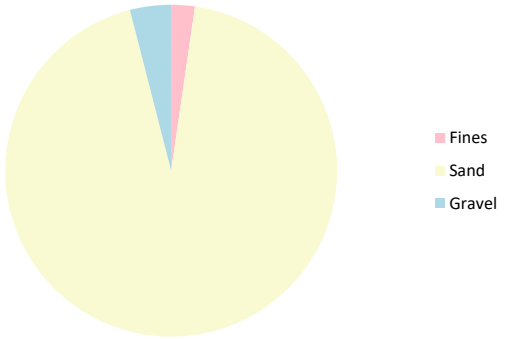
APPENDIX G PARTICLE SIZE ANALYSIS

ENV08				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.7	0.7	
8000.0	-3.0	0.5	1.2	
5656.9	-2.5	0.3	1.4	
4000.0	-2.0	0.6	2.0	
2828.4	-1.5	0.8	2.8	Granule
2000.0	-1.0	1.2	4.0	
1414.2	-0.5	1.2	5.1	Very coarse sand
1000.0	0.0	1.4	6.6	
707.1	0.5	5.9	12.5	Coarse sand
500.0	1.0	9.8	22.3	
353.6	1.5	19.1	41.4	Medium sand
250.0	2.0	24.1	65.5	
176.8	2.5	18.1	83.6	Fine sand
125.0	3.0	8.7	92.2	
88.4	3.5	4.0	96.2	Very fine sand
62.5	4.0	1.5	97.7	
44.2	4.5	0.5	98.1	Coarse silt
31.3	5.0	0.2	98.3	
22.1	5.5	0.2	98.5	Medium silt
15.6	6.0	0.2	98.7	
11.0	6.5	0.2	98.8	Fine silt
7.8	7.0	0.1	99.0	
5.5	7.5	0.1	99.1	Very fine silt
3.9	8.0	0.1	99.2	
2.8	8.5	0.1	99.3	
2.0	9.0	0.1	99.3	
1.4	9.5	0.1	99.4	Clay
1.0	10.0	0.1	99.5	
<1.0	>10	0.5	100.0	



Method of Moments			
Geometric	Mean (µm)	319.75	Wentworth:
Logarithmic	Mean (Phi)	1.64	Medium sand
	Sorting	1.49	Poor
	Skewness	1.34	Very fine
	Kurtosis	15.86	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	323.51	Wentworth:
Logarithmic	Mean (Phi)	1.63	Medium sand
	Sorting	1.05	Poor
	Skewness	-0.11	Coarse
	Kurtosis	1.35	Leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.68	312.29	Medium sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

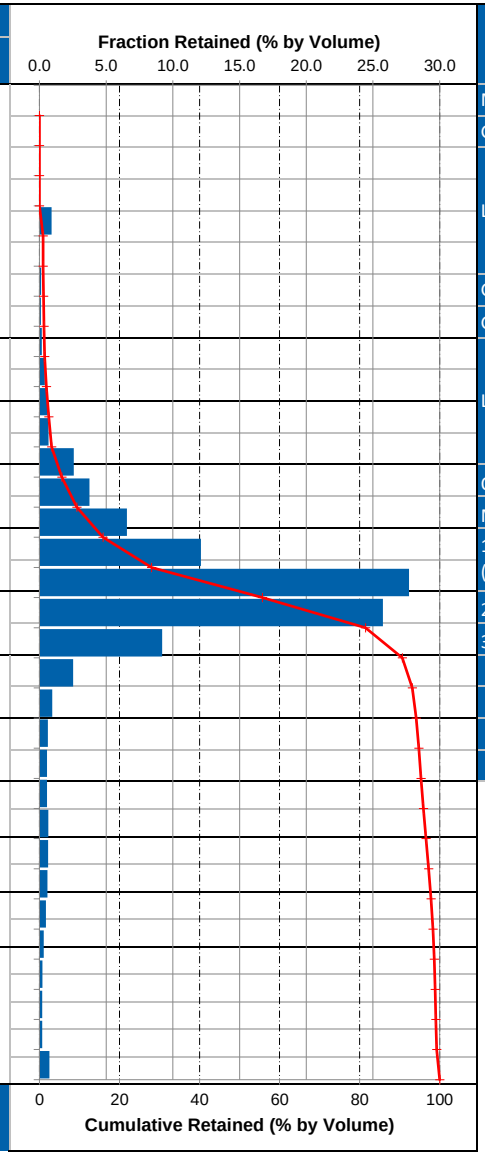
Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	2.30%
EUNIS Folk	Sand and muddy sand	Sand	93.70%
Distribution	Unimodal	Gravel	4.00%



APPENDIX G PARTICLE SIZE ANALYSIS

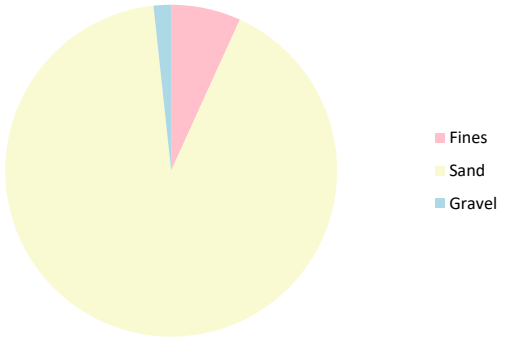
ENV09

Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.9	0.9	
8000.0	-3.0	0.0	0.9	
5656.9	-2.5	0.1	1.0	
4000.0	-2.0	0.1	1.1	
2828.4	-1.5	0.2	1.3	Granule
2000.0	-1.0	0.4	1.7	
1414.2	-0.5	0.6	2.3	Very coarse sand
1000.0	0.0	0.7	3.0	
707.1	0.5	2.6	5.6	Coarse sand
500.0	1.0	3.8	9.3	
353.6	1.5	6.5	15.9	Medium sand
250.0	2.0	12.1	28.0	
176.8	2.5	27.7	55.7	Fine sand
125.0	3.0	25.7	81.5	
88.4	3.5	9.2	90.6	Very fine sand
62.5	4.0	2.5	93.2	
44.2	4.5	1.0	94.1	Coarse silt
31.3	5.0	0.6	94.8	
22.1	5.5	0.6	95.3	Medium silt
15.6	6.0	0.6	95.9	
11.0	6.5	0.7	96.6	Fine silt
7.8	7.0	0.7	97.2	
5.5	7.5	0.6	97.8	Very fine silt
3.9	8.0	0.5	98.3	
2.8	8.5	0.3	98.6	Clay
2.0	9.0	0.2	98.9	
1.4	9.5	0.2	99.1	
1.0	10.0	0.2	99.3	
<1.0	>10	0.7	100.0	



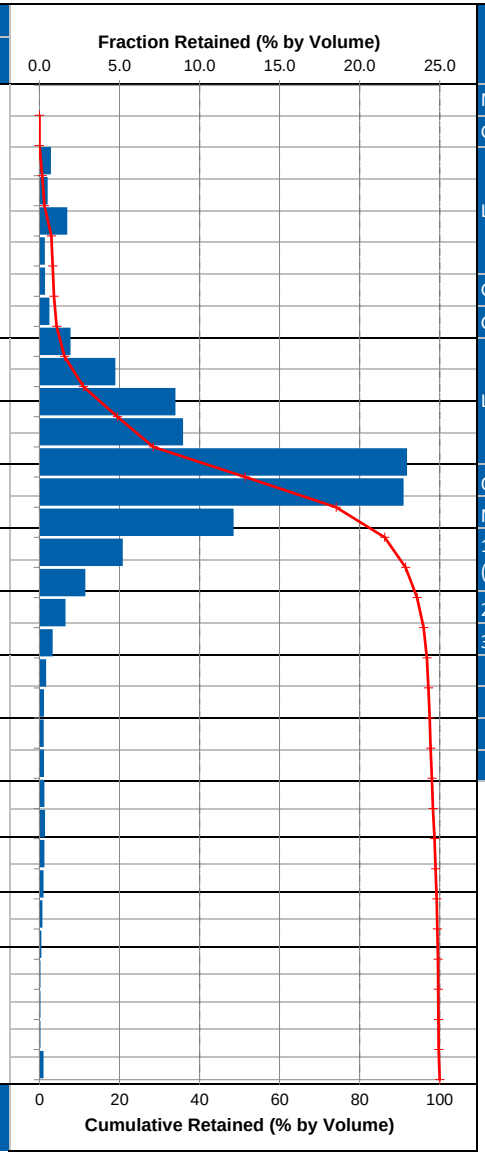
Method of Moments			
Geometric	Mean (µm)	180.76	Wentworth:
Logarithmic	Mean (Phi)	2.47	Fine sand
	Sorting	1.67	Poor
	Skewness	1.50	Very fine
	Kurtosis	12.46	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	196.60	Wentworth:
Logarithmic	Mean (Phi)	2.35	Fine sand
	Sorting	1.14	Poor
	Skewness	0.04	Symmetrical
	Kurtosis	1.98	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.40	189.85	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	6.80%
EUNIS Folk	Sand and muddy sand	Sand	91.50%
Distribution	Unimodal	Gravel	1.70%



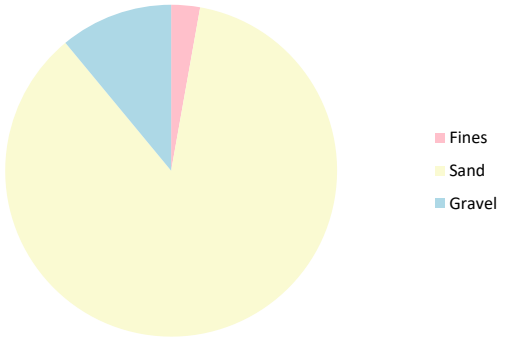
APPENDIX G PARTICLE SIZE ANALYSIS

ENV10				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.7	0.7	
16000.0	-4.0	0.5	1.2	Pebble
11313.7	-3.5	1.7	3.0	
8000.0	-3.0	0.3	3.3	
5656.9	-2.5	0.4	3.6	
4000.0	-2.0	0.6	4.3	
2828.4	-1.5	1.9	6.2	Granule
2000.0	-1.0	4.7	11.0	
1414.2	-0.5	8.5	19.5	Very coarse sand
1000.0	0.0	9.0	28.4	
707.1	0.5	23.0	51.4	Coarse sand
500.0	1.0	22.7	74.1	
353.6	1.5	12.1	86.3	Medium sand
250.0	2.0	5.2	91.5	
176.8	2.5	2.9	94.3	Fine sand
125.0	3.0	1.6	96.0	
88.4	3.5	0.8	96.8	Very fine sand
62.5	4.0	0.4	97.2	
44.2	4.5	0.3	97.5	Coarse silt
31.3	5.0	0.3	97.7	
22.1	5.5	0.3	98.0	Medium silt
15.6	6.0	0.3	98.3	
11.0	6.5	0.4	98.7	Fine silt
7.8	7.0	0.3	99.0	
5.5	7.5	0.3	99.2	Very fine silt
3.9	8.0	0.2	99.4	
2.8	8.5	0.1	99.5	Clay
2.0	9.0	0.1	99.6	
1.4	9.5	0.1	99.7	
1.0	10.0	0.1	99.7	
<1.0	>10	0.3	100.0	



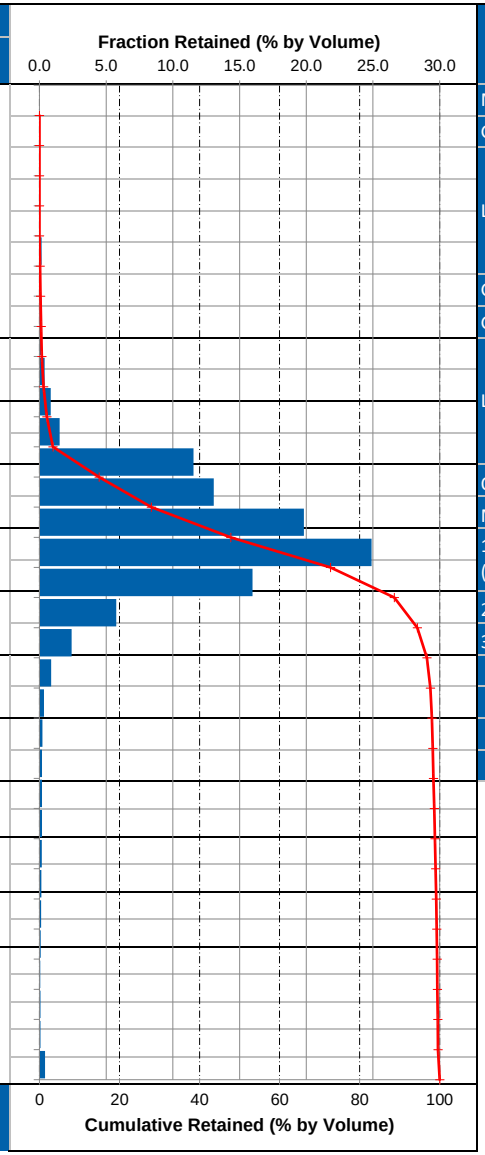
Method of Moments			
Geometric	Mean (µm)	718.62	Wentworth:
Logarithmic	Mean (Phi)	0.48	Coarse sand
	Sorting	1.69	Poor
	Skewness	1.29	Fine
	Kurtosis	11.80	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	762.57	Wentworth:
Logarithmic	Mean (Phi)	0.39	Coarse sand
	Sorting	1.21	Poor
	Skewness	-0.06	Symmetrical
	Kurtosis	1.51	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	0.47	722.14	Coarse sand
1st Local Maxima (Mode)	0.50	707.11	Coarse sand
2nd Local Maxima	-3.50	11313.71	Pebble
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Gravelly sand	Fines	2.80%
EUNIS Folk	Coarse sediments	Sand	86.20%
Distribution	Bimodal	Gravel	11.00%



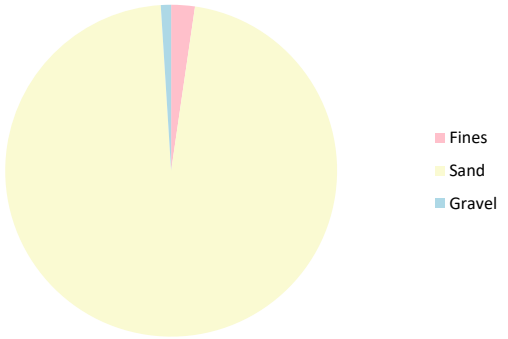
APPENDIX G PARTICLE SIZE ANALYSIS

ENV11				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.2	0.2	
5656.9	-2.5	0.1	0.3	
4000.0	-2.0	0.1	0.4	
2828.4	-1.5	0.2	0.6	Granule
2000.0	-1.0	0.4	1.0	
1414.2	-0.5	0.8	1.8	Very coarse sand
1000.0	0.0	1.5	3.4	
707.1	0.5	11.5	14.9	Coarse sand
500.0	1.0	13.1	28.0	
353.6	1.5	19.8	47.8	Medium sand
250.0	2.0	24.9	72.7	
176.8	2.5	16.0	88.6	Fine sand
125.0	3.0	5.8	94.4	
88.4	3.5	2.4	96.8	Very fine sand
62.5	4.0	0.9	97.7	
44.2	4.5	0.3	98.0	Coarse silt
31.3	5.0	0.2	98.3	
22.1	5.5	0.2	98.4	Medium silt
15.6	6.0	0.2	98.6	
11.0	6.5	0.2	98.8	Fine silt
7.8	7.0	0.2	99.0	
5.5	7.5	0.2	99.1	Very fine silt
3.9	8.0	0.1	99.3	
2.8	8.5	0.1	99.4	
2.0	9.0	0.1	99.4	
1.4	9.5	0.1	99.5	Clay
1.0	10.0	0.1	99.6	
<1.0	>10	0.4	100.0	



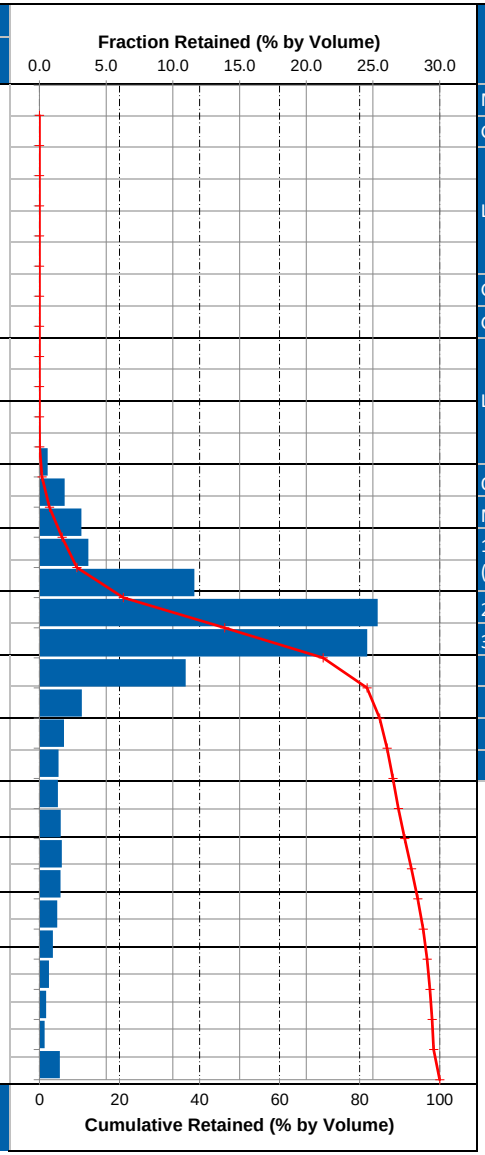
Method of Moments			
Geometric	Mean (µm)	335.52	Wentworth:
Logarithmic	Mean (Phi)	1.58	Medium sand
	Sorting	1.30	Poor
	Skewness	2.80	Very fine
	Kurtosis	22.04	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	358.38	Wentworth:
Logarithmic	Mean (Phi)	1.48	Medium sand
	Sorting	0.92	Moderate
	Skewness	-0.04	Symmetrical
	Kurtosis	1.06	Mesokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.54	342.81	Medium sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Sand	Fines	2.30%
EUNIS Folk	Sand and muddy sand	Sand	96.70%
Distribution	Unimodal	Gravel	1.00%



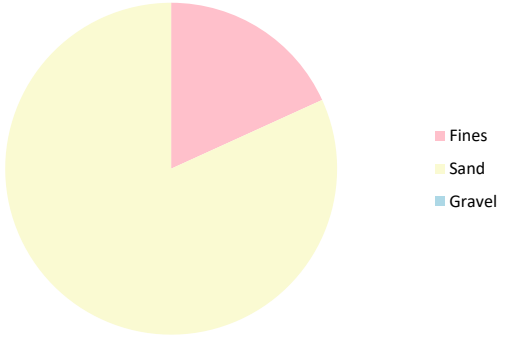
APPENDIX G PARTICLE SIZE ANALYSIS

ENV12				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.0	0.0	
2828.4	-1.5	0.0	0.0	Granule
2000.0	-1.0	0.0	0.0	
1414.2	-0.5	0.0	0.0	Very coarse sand
1000.0	0.0	0.0	0.0	
707.1	0.5	0.6	0.6	Coarse sand
500.0	1.0	1.9	2.5	
353.6	1.5	3.1	5.7	Medium sand
250.0	2.0	3.7	9.3	
176.8	2.5	11.6	20.9	Fine sand
125.0	3.0	25.3	46.3	
88.4	3.5	24.6	70.9	Very fine sand
62.5	4.0	11.0	81.8	
44.2	4.5	3.2	85.0	Coarse silt
31.3	5.0	1.8	86.8	
22.1	5.5	1.4	88.3	Medium silt
15.6	6.0	1.4	89.7	
11.0	6.5	1.6	91.3	Fine silt
7.8	7.0	1.7	92.9	
5.5	7.5	1.6	94.5	Very fine silt
3.9	8.0	1.3	95.8	
2.8	8.5	1.0	96.9	Clay
2.0	9.0	0.7	97.6	
1.4	9.5	0.5	98.1	
1.0	10.0	0.4	98.5	
<1.0	>10	1.5	100.0	



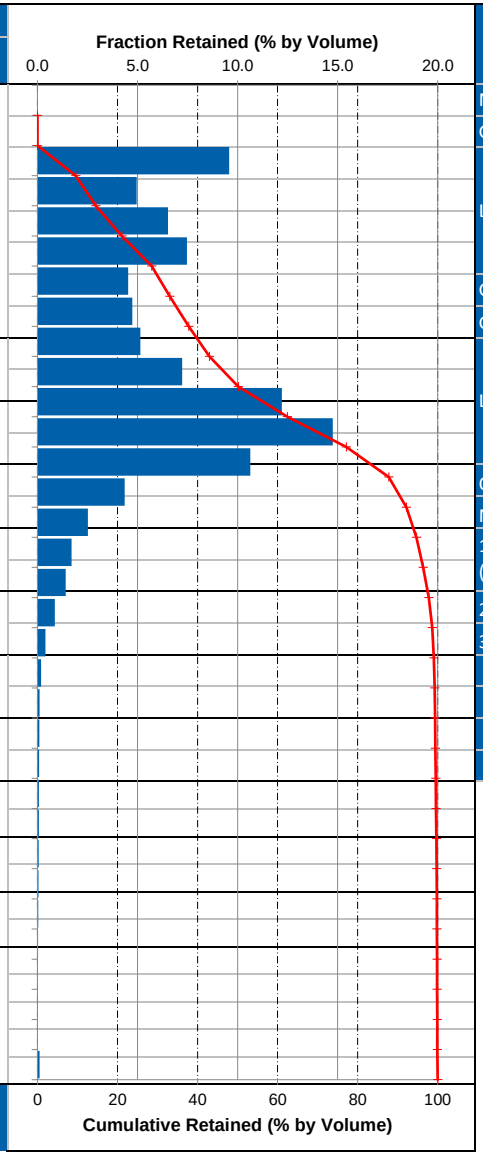
Method of Moments			
Geometric	Mean (µm)	88.34	Wentworth:
Logarithmic	Mean (Phi)	3.50	Very fine sand
	Sorting	1.86	Poor
	Skewness	2.09	Very fine
	Kurtosis	8.48	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	106.22	Wentworth:
Logarithmic	Mean (Phi)	3.23	Very fine sand
	Sorting	1.47	Poor
	Skewness	0.35	Very fine
	Kurtosis	2.32	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	3.08	118.63	Very fine sand
1st Local Maxima (Mode)	3.00	125.00	Fine sand
2nd Local Maxima	7.00	7.81	Fine silt
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Muddy sand	Fines	18.20%
EUNIS Folk	Sand and muddy sand	Sand	81.80%
Distribution	Bimodal	Gravel	0.00%



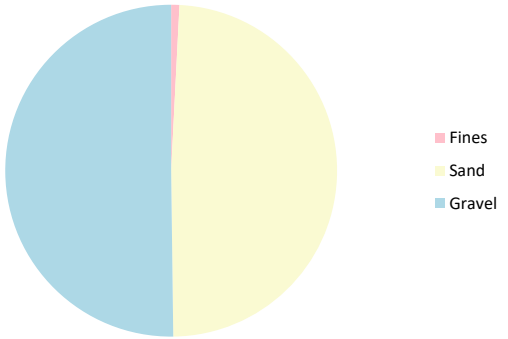
APPENDIX G PARTICLE SIZE ANALYSIS

ENV13				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	9.6	9.6	
16000.0	-4.0	5.0	14.5	Pebble
11313.7	-3.5	6.5	21.1	
8000.0	-3.0	7.5	28.5	
5656.9	-2.5	4.5	33.1	
4000.0	-2.0	4.7	37.8	
2828.4	-1.5	5.1	43.0	Granule
2000.0	-1.0	7.2	50.2	
1414.2	-0.5	12.2	62.4	Very coarse sand
1000.0	0.0	14.8	77.2	
707.1	0.5	10.6	87.8	Coarse sand
500.0	1.0	4.4	92.2	
353.6	1.5	2.5	94.7	Medium sand
250.0	2.0	1.7	96.4	
176.8	2.5	1.4	97.8	Fine sand
125.0	3.0	0.9	98.6	
88.4	3.5	0.4	99.0	Very fine sand
62.5	4.0	0.2	99.2	
44.2	4.5	0.1	99.3	Coarse silt
31.3	5.0	0.1	99.4	
22.1	5.5	0.1	99.5	Medium silt
15.6	6.0	0.1	99.6	
11.0	6.5	0.1	99.7	Fine silt
7.8	7.0	0.1	99.7	
5.5	7.5	0.1	99.8	Very fine silt
3.9	8.0	0.0	99.8	
2.8	8.5	0.0	99.8	
2.0	9.0	0.0	99.9	
1.4	9.5	0.0	99.9	Clay
1.0	10.0	0.0	99.9	
<1.0	>10	0.1	100.0	



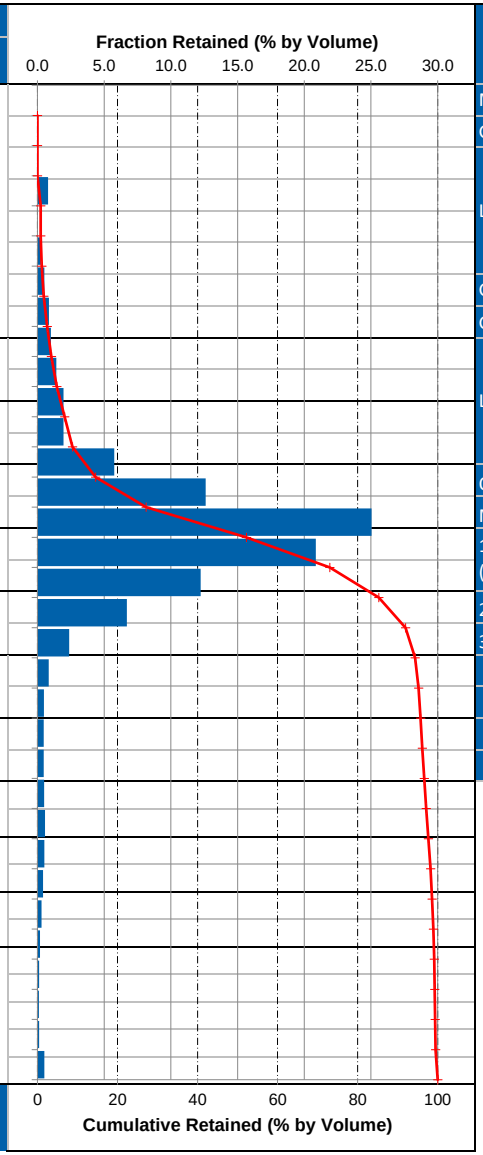
Method of Moments			
Geometric	Mean (µm)	2722.60	Wentworth:
Logarithmic	Mean (Phi)	-1.44	Granule
	Sorting	2.08	Very poor
	Skewness	0.44	Fine
	Kurtosis	4.73	Leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	2880.69	Wentworth:
Logarithmic	Mean (Phi)	-1.53	Granule
	Sorting	2.01	Very poor
	Skewness	-0.27	Coarse
	Kurtosis	0.82	Platykurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	-1.01	2018.20	Granule
1st Local Maxima (Mode)	0.00	1000.00	Very coarse sand
2nd Local Maxima	-4.50	22627.42	Pebble
3rd Local Maxima	-3.00	8000.00	Pebble

Classification		Composition	
Modified Folk	Sandy gravel	Fines	0.80%
EUNIS Folk	Coarse sediments	Sand	49.00%
Distribution	Multimodal	Gravel	50.20%



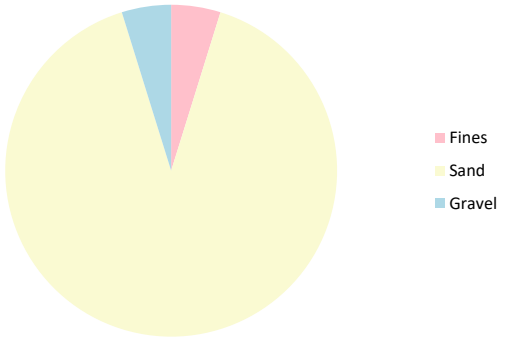
APPENDIX G PARTICLE SIZE ANALYSIS

ENV14				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.8	0.8	Pebble
11313.7	-3.5	0.0	0.8	
8000.0	-3.0	0.3	1.1	
5656.9	-2.5	0.5	1.6	
4000.0	-2.0	0.9	2.4	
2828.4	-1.5	1.0	3.4	Granule
2000.0	-1.0	1.4	4.8	
1414.2	-0.5	2.0	6.8	Very coarse sand
1000.0	0.0	2.0	8.8	
707.1	0.5	5.8	14.5	Coarse sand
500.0	1.0	12.6	27.1	
353.6	1.5	25.0	52.2	Medium sand
250.0	2.0	20.9	73.0	
176.8	2.5	12.2	85.3	Fine sand
125.0	3.0	6.7	92.0	
88.4	3.5	2.4	94.4	Very fine sand
62.5	4.0	0.8	95.2	
44.2	4.5	0.5	95.7	Coarse silt
31.3	5.0	0.5	96.1	
22.1	5.5	0.5	96.6	Medium silt
15.6	6.0	0.5	97.1	
11.0	6.5	0.6	97.7	Fine silt
7.8	7.0	0.5	98.2	
5.5	7.5	0.4	98.6	Very fine silt
3.9	8.0	0.3	98.9	
2.8	8.5	0.2	99.1	Clay
2.0	9.0	0.1	99.2	
1.4	9.5	0.1	99.4	
1.0	10.0	0.1	99.5	
<1.0	>10	0.5	100.0	



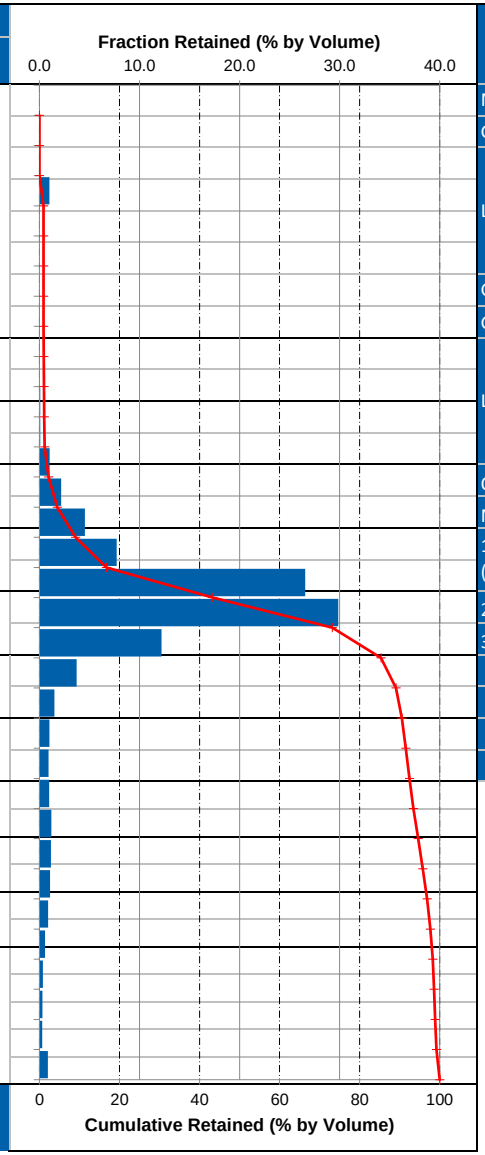
Method of Moments			
Geometric	Mean (µm)	340.35	Wentworth:
Logarithmic	Mean (Phi)	1.55	Medium sand
	Sorting	1.73	Poor
	Skewness	1.46	Very fine
	Kurtosis	11.88	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	356.54	Wentworth:
Logarithmic	Mean (Phi)	1.49	Medium sand
	Sorting	1.21	Poor
	Skewness	0.03	Symmetrical
	Kurtosis	1.70	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.46	364.34	Medium sand
1st Local Maxima (Mode)	1.50	353.55	Medium sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	4.80%
EUNIS Folk	Sand and muddy sand	Sand	90.30%
Distribution	Unimodal	Gravel	4.80%



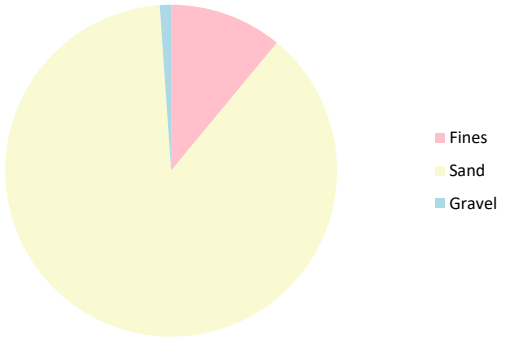
APPENDIX G PARTICLE SIZE ANALYSIS

ENV15				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	1.0	1.0	Pebble
11313.7	-3.5	0.0	1.0	
8000.0	-3.0	0.0	1.0	
5656.9	-2.5	0.0	1.0	
4000.0	-2.0	0.0	1.0	
2828.4	-1.5	0.0	1.1	Granule
2000.0	-1.0	0.0	1.1	
1414.2	-0.5	0.1	1.2	Very coarse sand
1000.0	0.0	0.1	1.3	
707.1	0.5	1.0	2.3	Coarse sand
500.0	1.0	2.2	4.5	
353.6	1.5	4.5	9.0	Medium sand
250.0	2.0	7.7	16.7	
176.8	2.5	26.6	43.3	Fine sand
125.0	3.0	29.9	73.2	
88.4	3.5	12.2	85.3	Very fine sand
62.5	4.0	3.7	89.0	
44.2	4.5	1.5	90.5	Coarse silt
31.3	5.0	1.0	91.5	
22.1	5.5	0.9	92.5	Medium silt
15.6	6.0	1.0	93.4	
11.0	6.5	1.2	94.6	Fine silt
7.8	7.0	1.2	95.8	
5.5	7.5	1.1	96.8	Very fine silt
3.9	8.0	0.9	97.7	
2.8	8.5	0.6	98.2	Clay
2.0	9.0	0.3	98.6	
1.4	9.5	0.3	98.9	
1.0	10.0	0.3	99.2	
<1.0	>10	0.8	100.0	



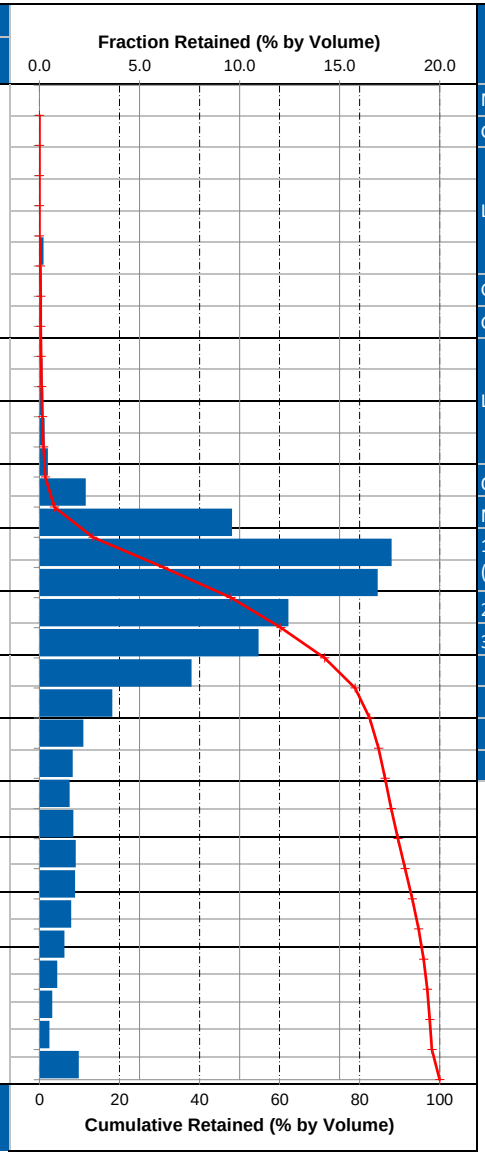
Method of Moments			
Geometric	Mean (µm)	138.30	Wentworth:
Logarithmic	Mean (Phi)	2.85	Fine sand
	Sorting	1.76	Poor
	Skewness	1.34	Very fine
	Kurtosis	10.83	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	157.14	Wentworth:
Logarithmic	Mean (Phi)	2.67	Fine sand
	Sorting	1.22	Poor
	Skewness	0.28	Fine
	Kurtosis	2.50	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.61	163.53	Fine sand
1st Local Maxima (Mode)	3.00	125.00	Fine sand
2nd Local Maxima	6.50	11.05	Fine silt
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	lightly gravelly muddy san	Fines	11.00%
EUNIS Folk	Sand and muddy sand	Sand	87.90%
Distribution	Bimodal	Gravel	1.10%



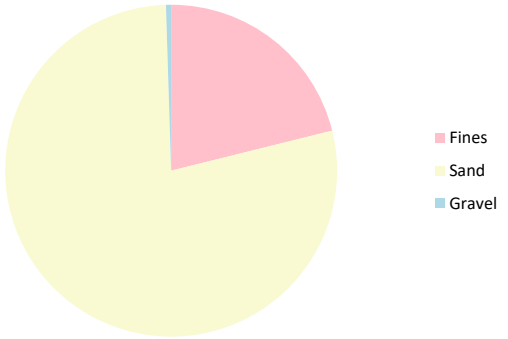
APPENDIX G PARTICLE SIZE ANALYSIS

ENV16				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.2	0.2	
5656.9	-2.5	0.1	0.3	
4000.0	-2.0	0.0	0.3	
2828.4	-1.5	0.1	0.4	Granule
2000.0	-1.0	0.1	0.5	
1414.2	-0.5	0.2	0.7	Very coarse sand
1000.0	0.0	0.3	1.0	
707.1	0.5	0.4	1.4	Coarse sand
500.0	1.0	2.3	3.7	
353.6	1.5	9.6	13.4	Medium sand
250.0	2.0	17.6	31.0	
176.8	2.5	16.9	47.9	Fine sand
125.0	3.0	12.4	60.3	
88.4	3.5	10.9	71.3	Very fine sand
62.5	4.0	7.6	78.9	
44.2	4.5	3.6	82.5	Coarse silt
31.3	5.0	2.2	84.7	
22.1	5.5	1.7	86.4	Medium silt
15.6	6.0	1.5	87.9	
11.0	6.5	1.7	89.6	Fine silt
7.8	7.0	1.8	91.4	
5.5	7.5	1.8	93.2	Very fine silt
3.9	8.0	1.6	94.7	
2.8	8.5	1.2	96.0	Clay
2.0	9.0	0.9	96.9	
1.4	9.5	0.6	97.5	
1.0	10.0	0.5	98.0	
<1.0	>10	2.0	100.0	



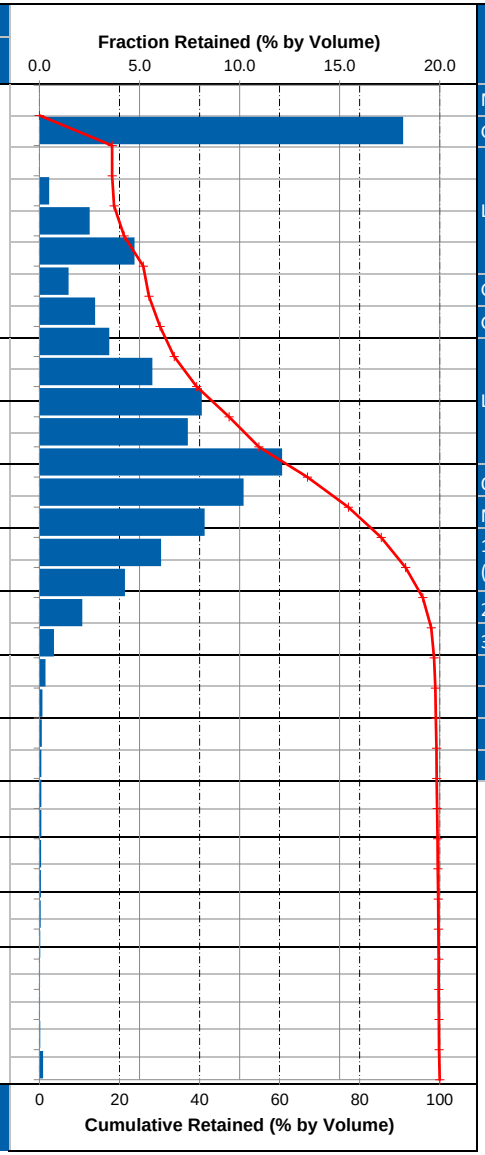
Method of Moments			
Geometric	Mean (µm)	107.12	Wentworth:
Logarithmic	Mean (Phi)	3.22	Very fine sand
	Sorting	2.24	Very poor
	Skewness	1.64	Very fine
	Kurtosis	6.27	Leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	124.94	Wentworth:
Logarithmic	Mean (Phi)	3.00	Very fine sand
	Sorting	1.88	Poor
	Skewness	0.47	Very fine
	Kurtosis	1.51	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.59	166.56	Fine sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	7.00	7.81	Fine silt
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Muddy sand	Fines	21.10%
EUNIS Folk	Mud and sandy mud	Sand	78.30%
Distribution	Bimodal	Gravel	0.50%



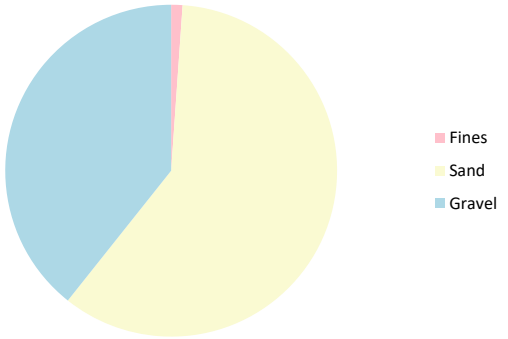
APPENDIX G PARTICLE SIZE ANALYSIS

ENV17				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	Pebble
32000.0	-5.0	18.2	18.2	
22627.4	-4.5	0.0	18.2	
16000.0	-4.0	0.5	18.7	
11313.7	-3.5	2.5	21.2	
8000.0	-3.0	4.7	25.9	
5656.9	-2.5	1.5	27.4	
4000.0	-2.0	2.8	30.1	
2828.4	-1.5	3.5	33.6	Granule
2000.0	-1.0	5.6	39.3	
1414.2	-0.5	8.1	47.4	Very coarse sand
1000.0	0.0	7.4	54.8	
707.1	0.5	12.1	66.9	Coarse sand
500.0	1.0	10.2	77.1	
353.6	1.5	8.3	85.4	Medium sand
250.0	2.0	6.1	91.5	
176.8	2.5	4.3	95.7	Fine sand
125.0	3.0	2.1	97.9	
88.4	3.5	0.7	98.6	Very fine sand
62.5	4.0	0.3	98.9	
44.2	4.5	0.1	99.1	Coarse silt
31.3	5.0	0.1	99.2	
22.1	5.5	0.1	99.3	Medium silt
15.6	6.0	0.1	99.4	
11.0	6.5	0.1	99.5	Fine silt
7.8	7.0	0.1	99.5	
5.5	7.5	0.1	99.6	Very fine silt
3.9	8.0	0.1	99.7	
2.8	8.5	0.0	99.7	Clay
2.0	9.0	0.0	99.8	
1.4	9.5	0.0	99.8	
1.0	10.0	0.0	99.8	
<1.0	>10	0.2	100.0	



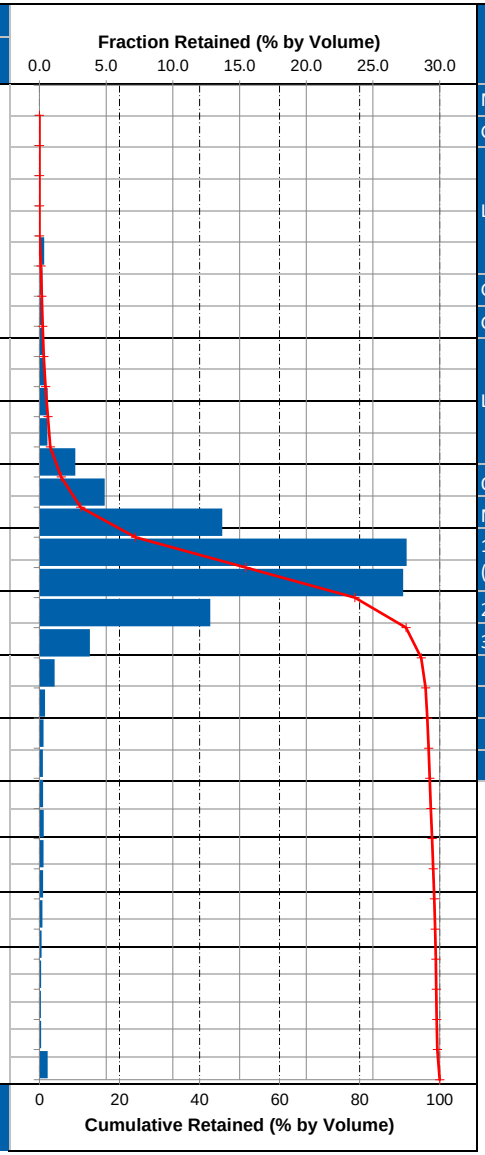
Method of Moments			
Geometric	Mean (µm)	1935.63	Wentworth:
Logarithmic	Mean (Phi)	-0.95	Very coarse sand
	Sorting	2.65	Very poor
	Skewness	-0.13	Symmetrical
	Kurtosis	3.24	Mesokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	2501.20	Wentworth:
Logarithmic	Mean (Phi)	-1.32	Granule
	Sorting	2.80	Very poor
	Skewness	-0.38	Very coarse
	Kurtosis	0.80	Platykurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	-0.32	1251.58	Very coarse sand
1st Local Maxima (Mode)	-5.00	32000.00	Pebble
2nd Local Maxima	0.50	707.11	Coarse sand
3rd Local Maxima	-0.50	1414.21	Very coarse sand

Classification		Composition	
Modified Folk	Sandy gravel	Fines	1.10%
EUNIS Folk	Coarse sediments	Sand	59.60%
Distribution	Multimodal	Gravel	39.30%



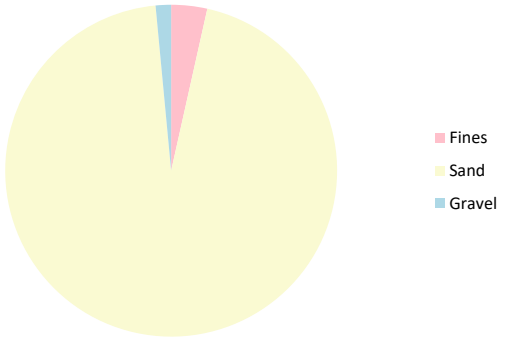
APPENDIX G PARTICLE SIZE ANALYSIS

ENV18				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.4	0.4	
5656.9	-2.5	0.2	0.6	
4000.0	-2.0	0.2	0.8	
2828.4	-1.5	0.3	1.1	Granule
2000.0	-1.0	0.4	1.5	
1414.2	-0.5	0.6	2.1	Very coarse sand
1000.0	0.0	0.6	2.7	
707.1	0.5	2.7	5.4	Coarse sand
500.0	1.0	4.9	10.3	
353.6	1.5	13.7	24.0	Medium sand
250.0	2.0	27.5	51.5	
176.8	2.5	27.3	78.8	Fine sand
125.0	3.0	12.8	91.6	
88.4	3.5	3.8	95.4	Very fine sand
62.5	4.0	1.1	96.5	
44.2	4.5	0.4	96.9	Coarse silt
31.3	5.0	0.3	97.2	
22.1	5.5	0.3	97.5	Medium silt
15.6	6.0	0.3	97.8	
11.0	6.5	0.3	98.1	Fine silt
7.8	7.0	0.3	98.4	
5.5	7.5	0.3	98.7	Very fine silt
3.9	8.0	0.2	98.9	
2.8	8.5	0.2	99.0	
2.0	9.0	0.1	99.1	
1.4	9.5	0.1	99.3	Clay
1.0	10.0	0.1	99.4	
<1.0	>10	0.6	100.0	



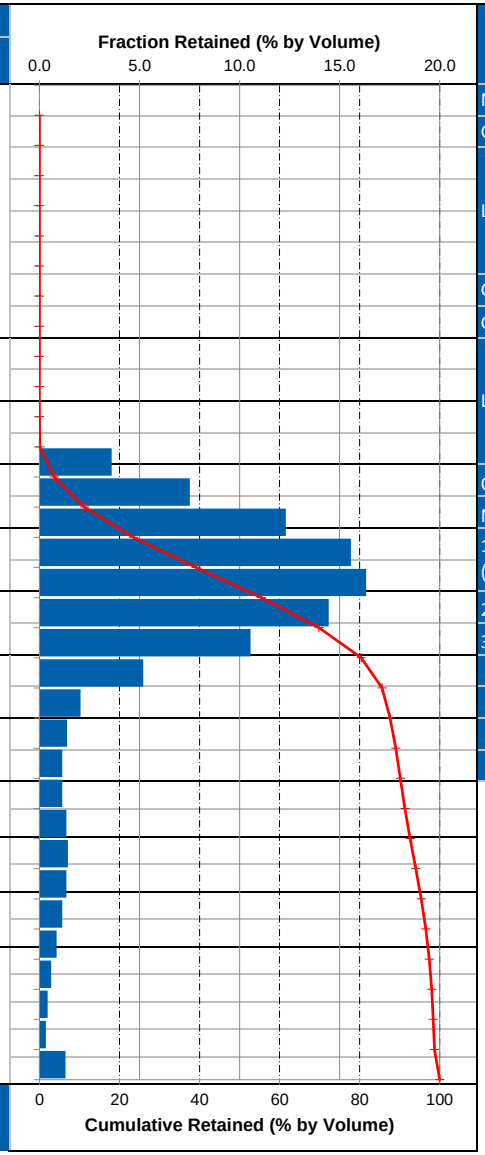
Method of Moments			
Geometric	Mean (µm)	242.55	Wentworth:
Logarithmic	Mean (Phi)	2.04	Fine sand
	Sorting	1.40	Poor
	Skewness	2.55	Very fine
	Kurtosis	20.16	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	256.74	Wentworth:
Logarithmic	Mean (Phi)	1.96	Medium sand
	Sorting	0.83	Moderate
	Skewness	-0.02	Symmetrical
	Kurtosis	1.36	Leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.97	254.83	Medium sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	3.50%
EUNIS Folk	Sand and muddy sand	Sand	95.00%
Distribution	Unimodal	Gravel	1.50%



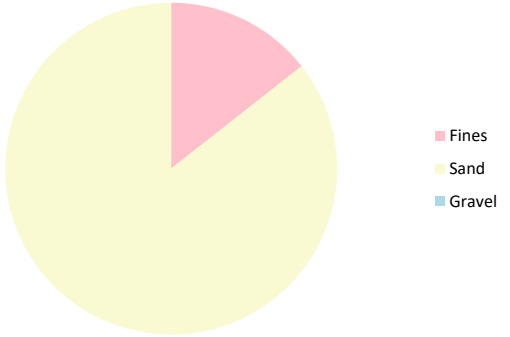
APPENDIX G PARTICLE SIZE ANALYSIS

ENV19				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	Pebble
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.0	0.0	
2828.4	-1.5	0.0	0.0	Granule
2000.0	-1.0	0.0	0.0	
1414.2	-0.5	0.0	0.0	Very coarse sand
1000.0	0.0	0.1	0.1	
707.1	0.5	3.6	3.7	Coarse sand
500.0	1.0	7.5	11.2	
353.6	1.5	12.3	23.5	Medium sand
250.0	2.0	15.6	39.1	
176.8	2.5	16.3	55.4	Fine sand
125.0	3.0	14.5	69.8	
88.4	3.5	10.5	80.4	Very fine sand
62.5	4.0	5.2	85.6	
44.2	4.5	2.0	87.6	Coarse silt
31.3	5.0	1.4	89.0	
22.1	5.5	1.1	90.1	Medium silt
15.6	6.0	1.1	91.3	
11.0	6.5	1.3	92.6	Fine silt
7.8	7.0	1.4	94.0	
5.5	7.5	1.3	95.4	Very fine silt
3.9	8.0	1.1	96.5	
2.8	8.5	0.9	97.4	Clay
2.0	9.0	0.6	98.0	
1.4	9.5	0.4	98.4	
1.0	10.0	0.3	98.7	
<1.0	>10	1.3	100.0	



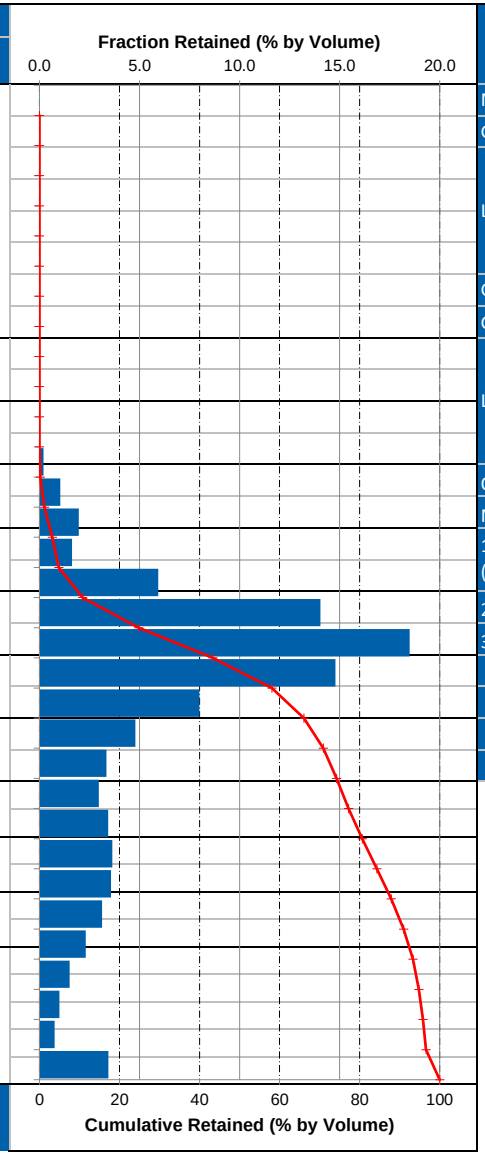
Method of Moments			
Geometric	Mean (µm)	145.96	Wentworth:
Logarithmic	Mean (Phi)	2.78	Fine sand
	Sorting	2.03	Very poor
	Skewness	1.99	Very fine
	Kurtosis	7.84	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	181.84	Wentworth:
Logarithmic	Mean (Phi)	2.46	Fine sand
	Sorting	1.69	Poor
	Skewness	0.31	Very fine
	Kurtosis	1.64	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.33	198.23	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	7.00	7.81	Fine silt
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Muddy sand	Fines	14.40%
EUNIS Folk	Sand and muddy sand	Sand	85.60%
Distribution	Bimodal	Gravel	0.00%



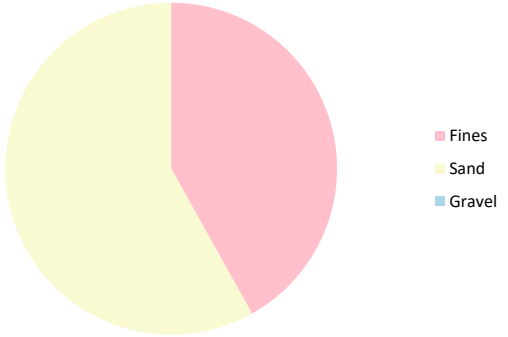
APPENDIX G PARTICLE SIZE ANALYSIS

ENV21				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.0	0.0	
2828.4	-1.5	0.0	0.0	Granule
2000.0	-1.0	0.0	0.0	
1414.2	-0.5	0.0	0.0	Very coarse sand
1000.0	0.0	0.0	0.0	
707.1	0.5	0.2	0.2	Coarse sand
500.0	1.0	1.0	1.2	
353.6	1.5	2.0	3.2	Medium sand
250.0	2.0	1.6	4.8	
176.8	2.5	5.9	10.8	Fine sand
125.0	3.0	14.0	24.8	
88.4	3.5	18.5	43.3	Very fine sand
62.5	4.0	14.8	58.1	
44.2	4.5	8.0	66.1	Coarse silt
31.3	5.0	4.8	70.9	
22.1	5.5	3.4	74.2	Medium silt
15.6	6.0	3.0	77.2	
11.0	6.5	3.4	80.6	Fine silt
7.8	7.0	3.6	84.3	
5.5	7.5	3.6	87.9	Very fine silt
3.9	8.0	3.1	91.0	
2.8	8.5	2.3	93.3	
2.0	9.0	1.5	94.8	
1.4	9.5	1.0	95.8	Clay
1.0	10.0	0.8	96.6	
<1.0	>10	3.4	100.0	



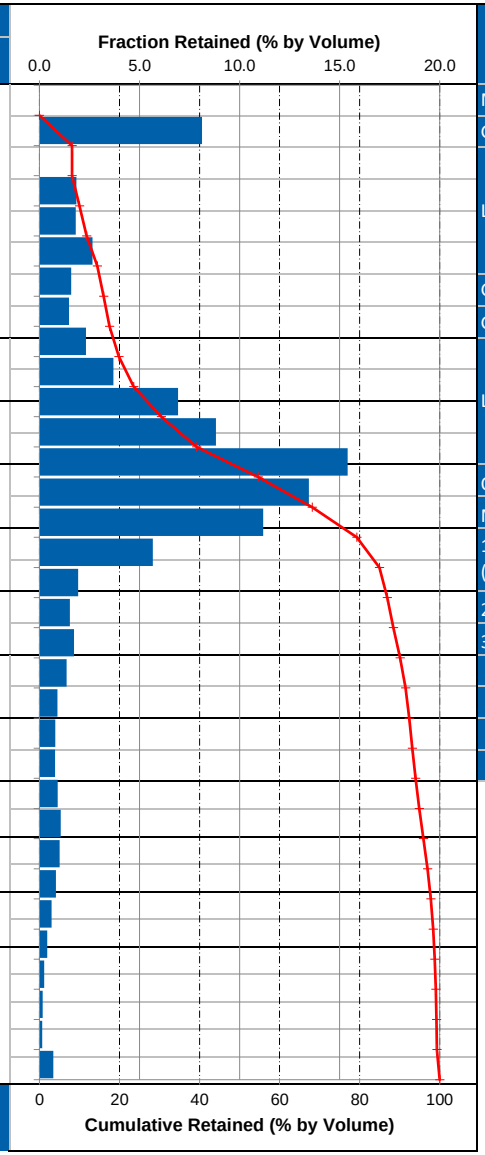
Method of Moments			
Geometric	Mean (µm)	44.28	Wentworth:
Logarithmic	Mean (Phi)	4.50	Coarse silt
	Sorting	2.31	Very poor
	Skewness	1.30	Fine
	Kurtosis	4.52	Leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	45.49	Wentworth:
Logarithmic	Mean (Phi)	4.46	Coarse silt
	Sorting	2.14	Very poor
	Skewness	0.52	Very fine
	Kurtosis	1.11	Mesokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	3.73	75.55	Very fine sand
1st Local Maxima (Mode)	3.50	88.39	Very fine sand
2nd Local Maxima	7.00	7.81	Fine silt
3rd Local Maxima	1.50	353.55	Medium sand

Classification		Composition	
Modified Folk	Muddy sand	Fines	41.90%
EUNIS Folk	Mud and sandy mud	Sand	58.10%
Distribution	Multimodal	Gravel	0.00%



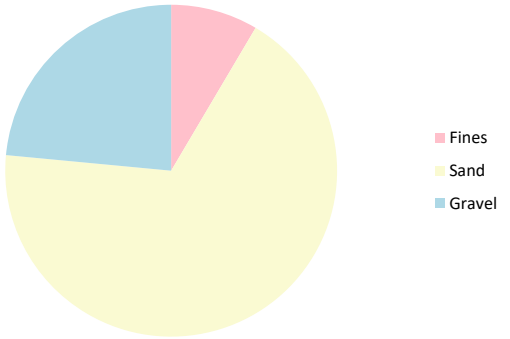
APPENDIX G PARTICLE SIZE ANALYSIS

ENV22				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	8.1	8.1	
22627.4	-4.5	0.0	8.1	
16000.0	-4.0	1.8	10.0	Pebble
11313.7	-3.5	1.8	11.8	
8000.0	-3.0	2.7	14.4	
5656.9	-2.5	1.6	16.0	
4000.0	-2.0	1.5	17.5	
2828.4	-1.5	2.3	19.8	Granule
2000.0	-1.0	3.7	23.5	
1414.2	-0.5	6.9	30.4	Very coarse sand
1000.0	0.0	8.8	39.3	
707.1	0.5	15.4	54.7	Coarse sand
500.0	1.0	13.5	68.1	
353.6	1.5	11.2	79.3	Medium sand
250.0	2.0	5.7	85.0	
176.8	2.5	1.9	86.9	Fine sand
125.0	3.0	1.5	88.4	
88.4	3.5	1.7	90.1	Very fine sand
62.5	4.0	1.4	91.5	
44.2	4.5	0.9	92.4	Coarse silt
31.3	5.0	0.8	93.2	
22.1	5.5	0.8	94.0	Medium silt
15.6	6.0	0.9	94.9	
11.0	6.5	1.1	95.9	Fine silt
7.8	7.0	1.0	96.9	
5.5	7.5	0.8	97.8	Very fine silt
3.9	8.0	0.6	98.4	
2.8	8.5	0.4	98.8	Clay
2.0	9.0	0.2	99.0	
1.4	9.5	0.2	99.2	
1.0	10.0	0.1	99.3	
<1.0	>10	0.7	100.0	



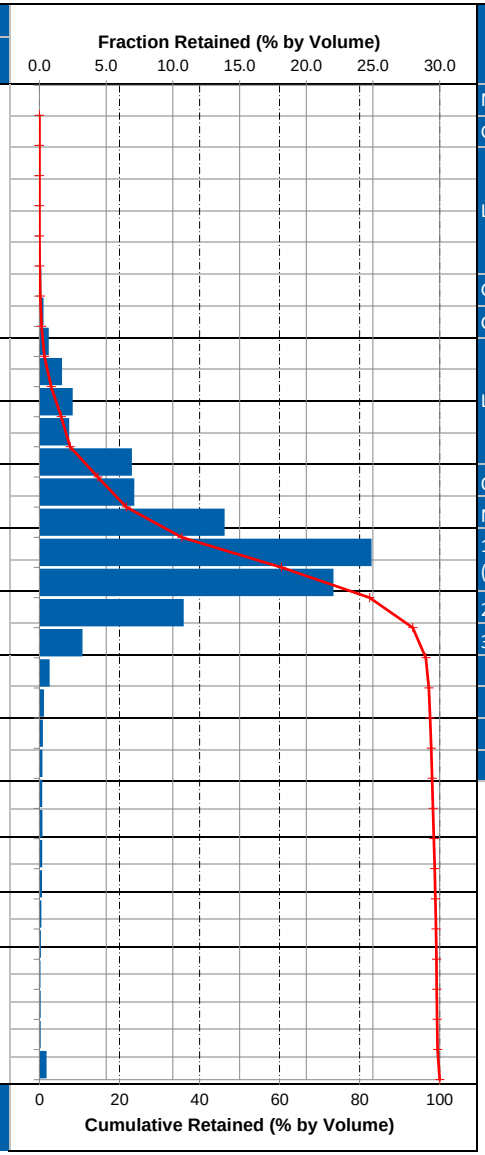
Method of Moments			
Geometric	Mean (µm)	843.37	Wentworth:
Logarithmic	Mean (Phi)	0.25	Coarse sand
	Sorting	2.93	Very poor
	Skewness	0.53	Fine
	Kurtosis	4.77	Leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	1057.39	Wentworth:
Logarithmic	Mean (Phi)	-0.08	Very coarse sand
	Sorting	2.81	Very poor
	Skewness	-0.14	Coarse
	Kurtosis	2.10	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	0.35	785.24	Coarse sand
1st Local Maxima (Mode)	0.50	707.11	Coarse sand
2nd Local Maxima	-5.00	32000.00	Pebble
3rd Local Maxima	-3.00	8000.00	Pebble

Classification		Composition	
Modified Folk	Gravelly muddy sand	Fines	8.50%
EUNIS Folk	Mixed sediments	Sand	68.00%
Distribution	Multimodal	Gravel	23.50%



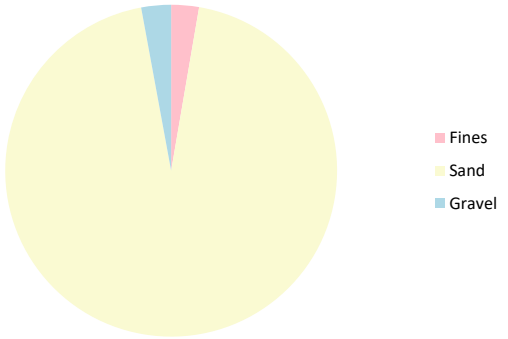
APPENDIX G PARTICLE SIZE ANALYSIS

ENV23				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.1	0.1	
5656.9	-2.5	0.1	0.2	
4000.0	-2.0	0.3	0.5	
2828.4	-1.5	0.7	1.2	Granule
2000.0	-1.0	1.7	2.9	
1414.2	-0.5	2.5	5.4	Very coarse sand
1000.0	0.0	2.2	7.6	
707.1	0.5	6.9	14.6	Coarse sand
500.0	1.0	7.1	21.7	
353.6	1.5	13.9	35.5	Medium sand
250.0	2.0	24.9	60.4	
176.8	2.5	22.0	82.5	Fine sand
125.0	3.0	10.8	93.3	
88.4	3.5	3.2	96.5	Very fine sand
62.5	4.0	0.8	97.3	
44.2	4.5	0.3	97.6	Coarse silt
31.3	5.0	0.3	97.9	
22.1	5.5	0.2	98.1	Medium silt
15.6	6.0	0.2	98.3	
11.0	6.5	0.2	98.5	Fine silt
7.8	7.0	0.2	98.7	
5.5	7.5	0.2	98.9	Very fine silt
3.9	8.0	0.1	99.1	
2.8	8.5	0.1	99.2	Clay
2.0	9.0	0.1	99.3	
1.4	9.5	0.1	99.4	
1.0	10.0	0.1	99.5	
<1.0	>10	0.5	100.0	



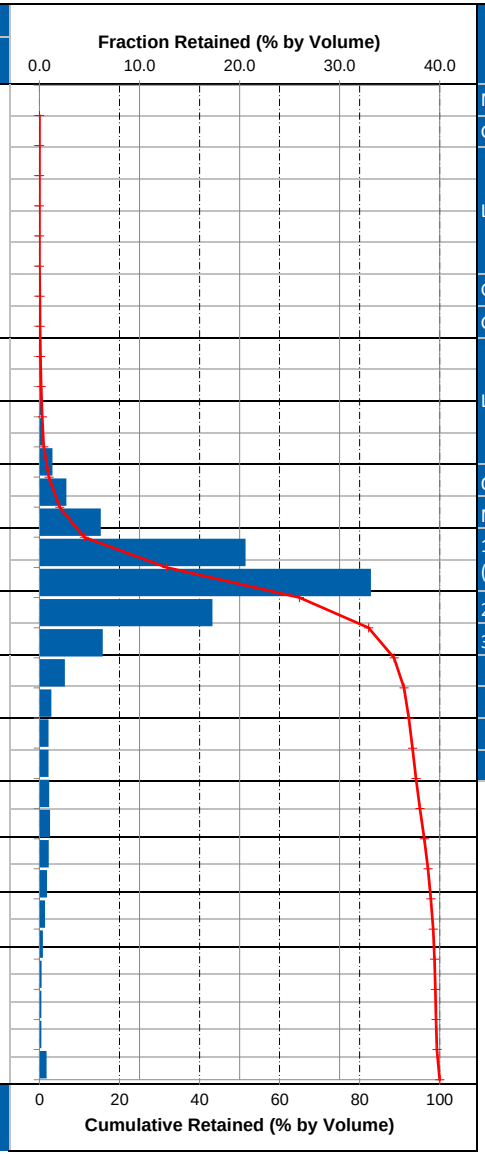
Method of Moments			
Geometric	Mean (µm)	300.27	Wentworth:
Logarithmic	Mean (Phi)	1.74	Medium sand
	Sorting	1.46	Poor
	Skewness	2.05	Very fine
	Kurtosis	16.73	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	317.75	Wentworth:
Logarithmic	Mean (Phi)	1.65	Medium sand
	Sorting	1.07	Poor
	Skewness	-0.22	Coarse
	Kurtosis	1.30	Leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.79	289.12	Medium sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	-0.50	1414.21	Very coarse sand
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	2.70%
EUNIS Folk	Sand and muddy sand	Sand	94.40%
Distribution	Bimodal	Gravel	2.90%



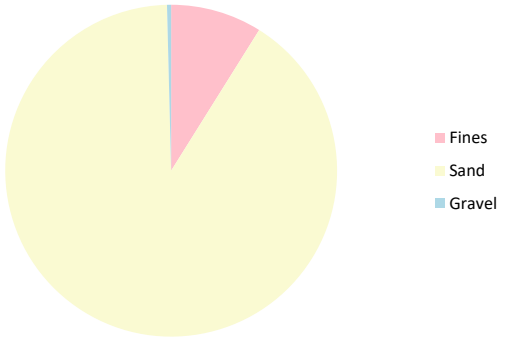
APPENDIX G PARTICLE SIZE ANALYSIS

ENV24				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.1	0.1	
4000.0	-2.0	0.1	0.2	
2828.4	-1.5	0.1	0.2	Granule
2000.0	-1.0	0.2	0.4	
1414.2	-0.5	0.3	0.7	Very coarse sand
1000.0	0.0	0.4	1.1	
707.1	0.5	1.3	2.4	Coarse sand
500.0	1.0	2.7	5.1	
353.6	1.5	6.1	11.2	Medium sand
250.0	2.0	20.6	31.8	
176.8	2.5	33.1	64.9	Fine sand
125.0	3.0	17.3	82.2	
88.4	3.5	6.3	88.6	Very fine sand
62.5	4.0	2.5	91.1	
44.2	4.5	1.2	92.3	Coarse silt
31.3	5.0	0.9	93.2	
22.1	5.5	0.9	94.1	Medium silt
15.6	6.0	1.0	95.1	
11.0	6.5	1.1	96.1	Fine silt
7.8	7.0	0.9	97.0	
5.5	7.5	0.8	97.8	Very fine silt
3.9	8.0	0.6	98.3	
2.8	8.5	0.3	98.7	Clay
2.0	9.0	0.2	98.9	
1.4	9.5	0.2	99.1	
1.0	10.0	0.2	99.3	
<1.0	>10	0.7	100.0	



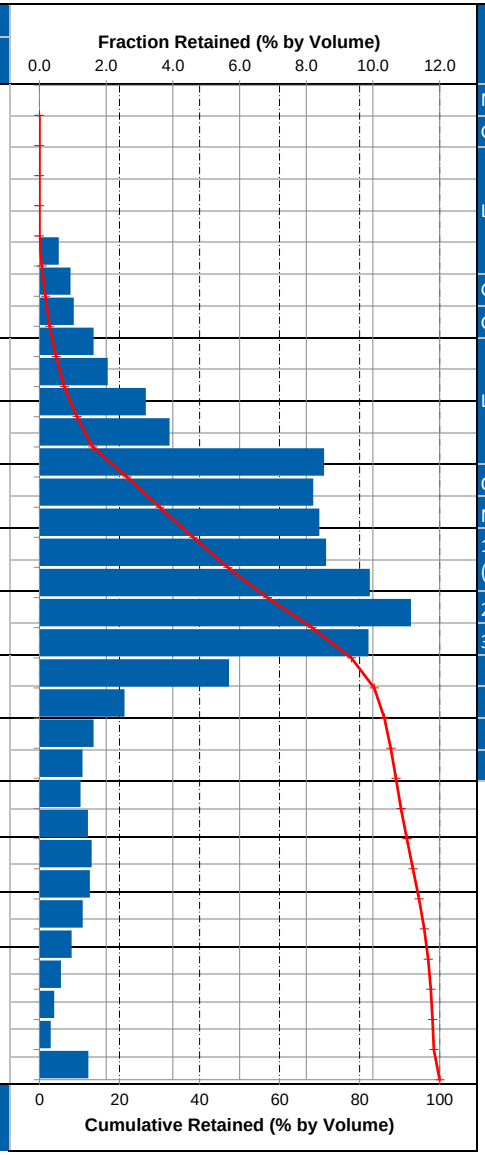
Method of Moments			
Geometric	Mean (µm)	169.79	Wentworth:
Logarithmic	Mean (Phi)	2.56	Fine sand
	Sorting	1.56	Poor
	Skewness	2.55	Very fine
	Kurtosis	13.13	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	197.00	Wentworth:
Logarithmic	Mean (Phi)	2.34	Fine sand
	Sorting	1.14	Poor
	Skewness	0.31	Very fine
	Kurtosis	2.13	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.27	206.68	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	6.50	11.05	Fine silt
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Sand	Fines	8.90%
EUNIS Folk	Sand and muddy sand	Sand	90.70%
Distribution	Bimodal	Gravel	0.40%



APPENDIX G PARTICLE SIZE ANALYSIS

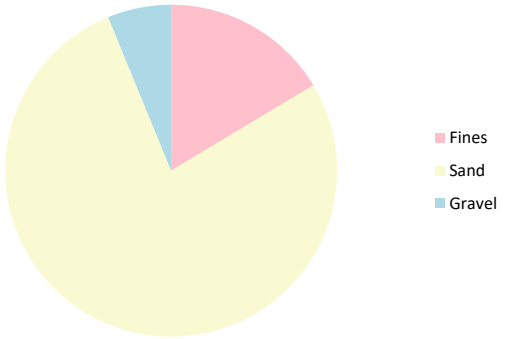
ENV25				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.6	0.6	
5656.9	-2.5	0.9	1.5	
4000.0	-2.0	1.0	2.5	
2828.4	-1.5	1.6	4.2	Granule
2000.0	-1.0	2.0	6.2	
1414.2	-0.5	3.2	9.4	Very coarse sand
1000.0	0.0	3.9	13.3	
707.1	0.5	8.5	21.8	Coarse sand
500.0	1.0	8.2	30.0	
353.6	1.5	8.4	38.4	Medium sand
250.0	2.0	8.6	47.0	
176.8	2.5	9.9	56.9	Fine sand
125.0	3.0	11.1	68.1	
88.4	3.5	9.9	77.9	Very fine sand
62.5	4.0	5.7	83.6	
44.2	4.5	2.6	86.2	Coarse silt
31.3	5.0	1.6	87.8	
22.1	5.5	1.3	89.1	Medium silt
15.6	6.0	1.2	90.3	
11.0	6.5	1.5	91.8	Fine silt
7.8	7.0	1.6	93.3	
5.5	7.5	1.5	94.9	Very fine silt
3.9	8.0	1.3	96.1	
2.8	8.5	1.0	97.1	Clay
2.0	9.0	0.6	97.8	
1.4	9.5	0.4	98.2	
1.0	10.0	0.3	98.5	
<1.0	>10	1.5	100.0	



Method of Moments			
Geometric	Mean (µm)	195.51	Wentworth:
Logarithmic	Mean (Phi)	2.35	Fine sand
	Sorting	2.57	Very poor
	Skewness	1.01	Fine
	Kurtosis	4.92	Leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	228.79	Wentworth:
Logarithmic	Mean (Phi)	2.13	Fine sand
	Sorting	2.32	Very poor
	Skewness	0.10	Fine
	Kurtosis	1.36	Leptokurtic

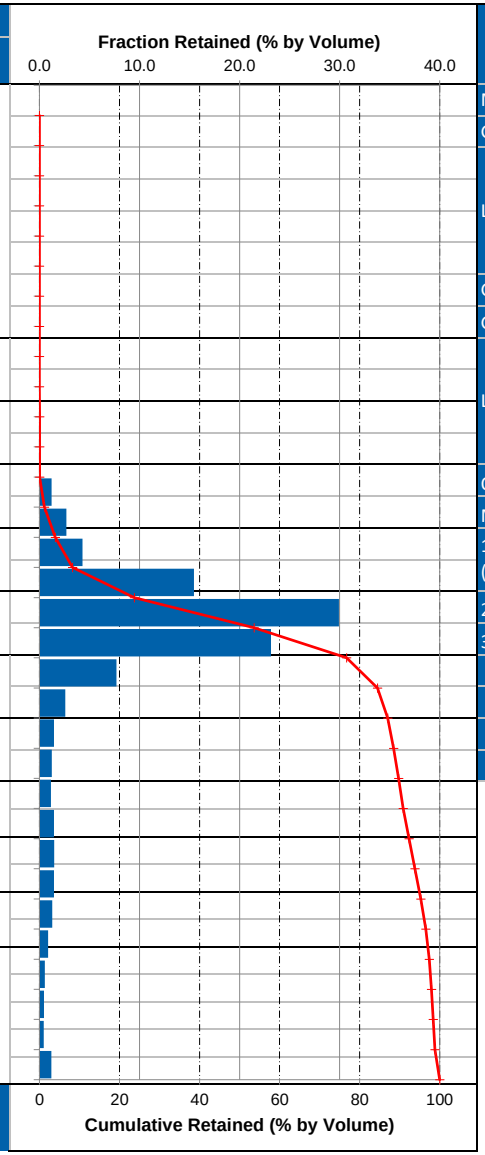
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.15	225.26	Fine sand
1st Local Maxima (Mode)	3.00	125.00	Fine sand
2nd Local Maxima	0.50	707.11	Coarse sand
3rd Local Maxima	7.00	7.81	Fine silt

Classification		Composition	
Modified Folk	Gravelly muddy sand	Fines	16.40%
EUNIS Folk	Mixed sediments	Sand	77.40%
Distribution	Multimodal	Gravel	6.20%



APPENDIX G PARTICLE SIZE ANALYSIS

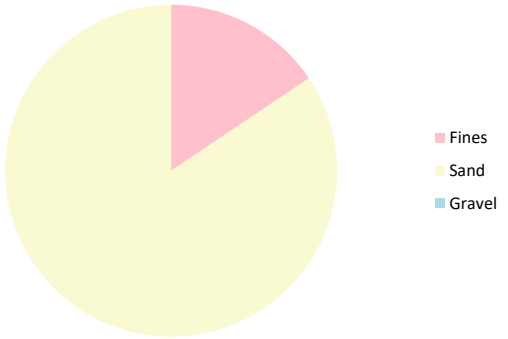
ENV26				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.0	0.0	
2828.4	-1.5	0.0	0.0	Granule
2000.0	-1.0	0.0	0.0	
1414.2	-0.5	0.0	0.0	Very coarse sand
1000.0	0.0	0.0	0.0	
707.1	0.5	0.0	0.0	Coarse sand
500.0	1.0	1.2	1.3	
353.6	1.5	2.7	3.9	Medium sand
250.0	2.0	4.3	8.2	
176.8	2.5	15.4	23.7	Fine sand
125.0	3.0	29.9	53.6	
88.4	3.5	23.2	76.7	Very fine sand
62.5	4.0	7.7	84.4	
44.2	4.5	2.6	87.0	Coarse silt
31.3	5.0	1.5	88.5	
22.1	5.5	1.2	89.7	Medium silt
15.6	6.0	1.2	90.9	
11.0	6.5	1.5	92.3	Fine silt
7.8	7.0	1.5	93.8	
5.5	7.5	1.5	95.2	Very fine silt
3.9	8.0	1.3	96.5	
2.8	8.5	0.9	97.4	
2.0	9.0	0.5	97.9	
1.4	9.5	0.5	98.4	Clay
1.0	10.0	0.4	98.8	
<1.0	>10	1.2	100.0	



Method of Moments			
Geometric	Mean (µm)	96.83	Wentworth:
Logarithmic	Mean (Phi)	3.37	Very fine sand
	Sorting	1.73	Poor
	Skewness	2.32	Very fine
	Kurtosis	9.36	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	120.40	Wentworth:
Logarithmic	Mean (Phi)	3.05	Very fine sand
	Sorting	1.31	Poor
	Skewness	0.37	Very fine
	Kurtosis	2.53	Very leptokurtic

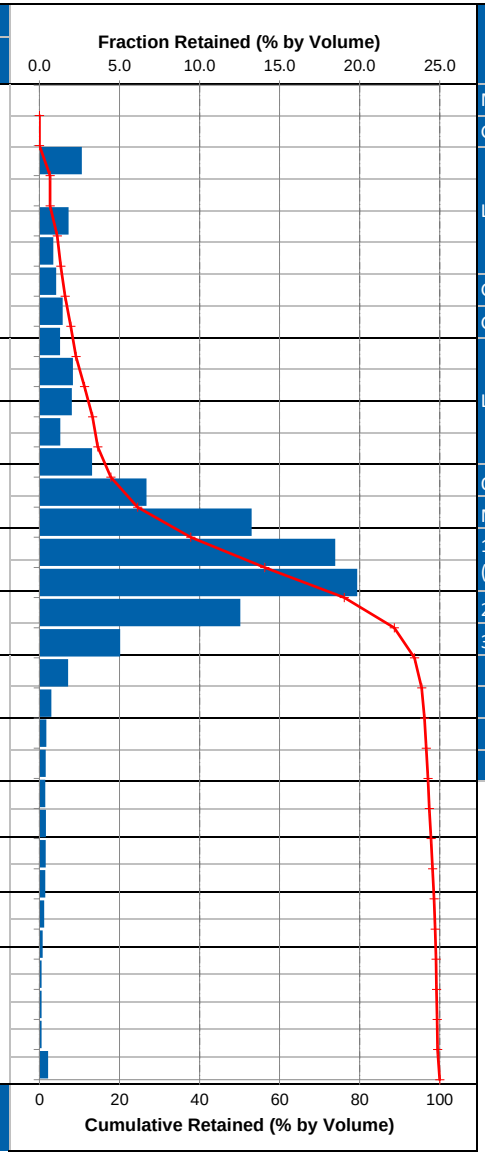
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.94	130.32	Fine sand
1st Local Maxima (Mode)	3.00	125.00	Fine sand
2nd Local Maxima	7.00	7.81	Fine silt
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Muddy sand	Fines	15.60%
EUNIS Folk	Sand and muddy sand	Sand	84.40%
Distribution	Bimodal	Gravel	0.00%



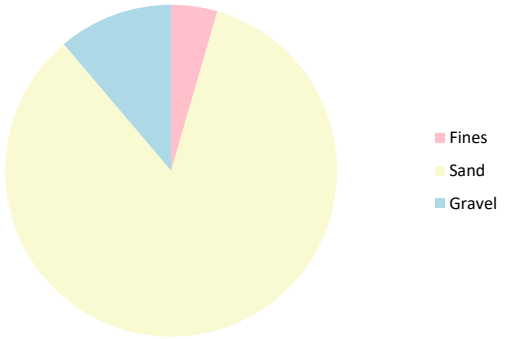
APPENDIX G PARTICLE SIZE ANALYSIS

ENV27				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	2.6	2.6	
16000.0	-4.0	0.0	2.6	Pebble
11313.7	-3.5	1.8	4.5	
8000.0	-3.0	0.9	5.3	
5656.9	-2.5	1.0	6.4	
4000.0	-2.0	1.5	7.8	
2828.4	-1.5	1.3	9.1	Granule
2000.0	-1.0	2.1	11.2	
1414.2	-0.5	2.0	13.2	Very coarse sand
1000.0	0.0	1.3	14.5	
707.1	0.5	3.3	17.8	Coarse sand
500.0	1.0	6.7	24.5	
353.6	1.5	13.3	37.8	Medium sand
250.0	2.0	18.5	56.3	
176.8	2.5	19.8	76.1	Fine sand
125.0	3.0	12.5	88.7	
88.4	3.5	5.0	93.7	Very fine sand
62.5	4.0	1.8	95.5	
44.2	4.5	0.7	96.2	Coarse silt
31.3	5.0	0.4	96.7	
22.1	5.5	0.4	97.0	Medium silt
15.6	6.0	0.4	97.4	
11.0	6.5	0.4	97.8	Fine silt
7.8	7.0	0.4	98.2	
5.5	7.5	0.4	98.6	Very fine silt
3.9	8.0	0.3	98.9	
2.8	8.5	0.2	99.1	Clay
2.0	9.0	0.1	99.2	
1.4	9.5	0.1	99.3	
1.0	10.0	0.1	99.5	
<1.0	>10	0.5	100.0	



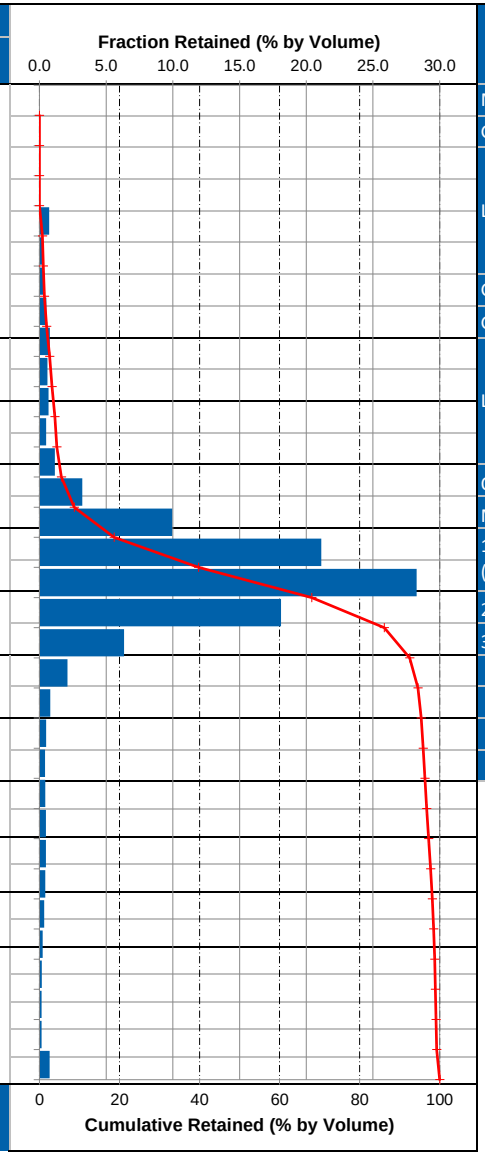
Method of Moments			
Geometric	Mean (µm)	346.82	Wentworth:
Logarithmic	Mean (Phi)	1.53	Medium sand
	Sorting	2.18	Very poor
	Skewness	-0.14	Symmetrical
	Kurtosis	7.07	Leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	324.90	Wentworth:
Logarithmic	Mean (Phi)	1.62	Medium sand
	Sorting	1.72	Poor
	Skewness	-0.33	Very coarse
	Kurtosis	1.99	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.83	281.17	Medium sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	-4.50	22627.42	Pebble
3rd Local Maxima	-1.00	2000.00	Granule

Classification		Composition	
Modified Folk	Gravelly sand	Fines	4.50%
EUNIS Folk	Coarse sediments	Sand	84.30%
Distribution	Multimodal	Gravel	11.20%



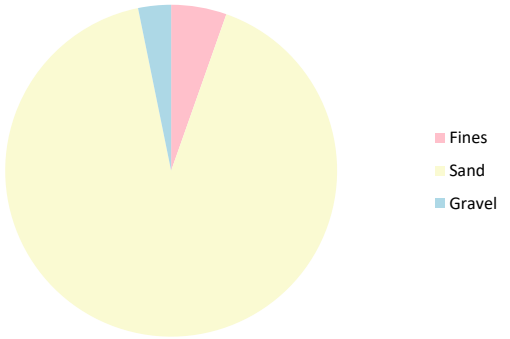
APPENDIX G PARTICLE SIZE ANALYSIS

ENV28				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.7	0.7	
8000.0	-3.0	0.2	1.0	
5656.9	-2.5	0.3	1.3	
4000.0	-2.0	0.5	1.8	
2828.4	-1.5	0.8	2.6	Granule
2000.0	-1.0	0.6	3.2	
1414.2	-0.5	0.7	3.8	Very coarse sand
1000.0	0.0	0.5	4.3	
707.1	0.5	1.1	5.5	Coarse sand
500.0	1.0	3.2	8.7	
353.6	1.5	9.9	18.6	Medium sand
250.0	2.0	21.1	39.8	
176.8	2.5	28.3	68.0	Fine sand
125.0	3.0	18.1	86.1	
88.4	3.5	6.3	92.5	Very fine sand
62.5	4.0	2.1	94.6	
44.2	4.5	0.8	95.4	Coarse silt
31.3	5.0	0.5	95.9	
22.1	5.5	0.4	96.3	Medium silt
15.6	6.0	0.4	96.7	
11.0	6.5	0.5	97.2	Fine silt
7.8	7.0	0.5	97.7	
5.5	7.5	0.4	98.2	Very fine silt
3.9	8.0	0.3	98.5	
2.8	8.5	0.2	98.7	Clay
2.0	9.0	0.2	98.9	
1.4	9.5	0.2	99.1	
1.0	10.0	0.2	99.2	
<1.0	>10	0.8	100.0	



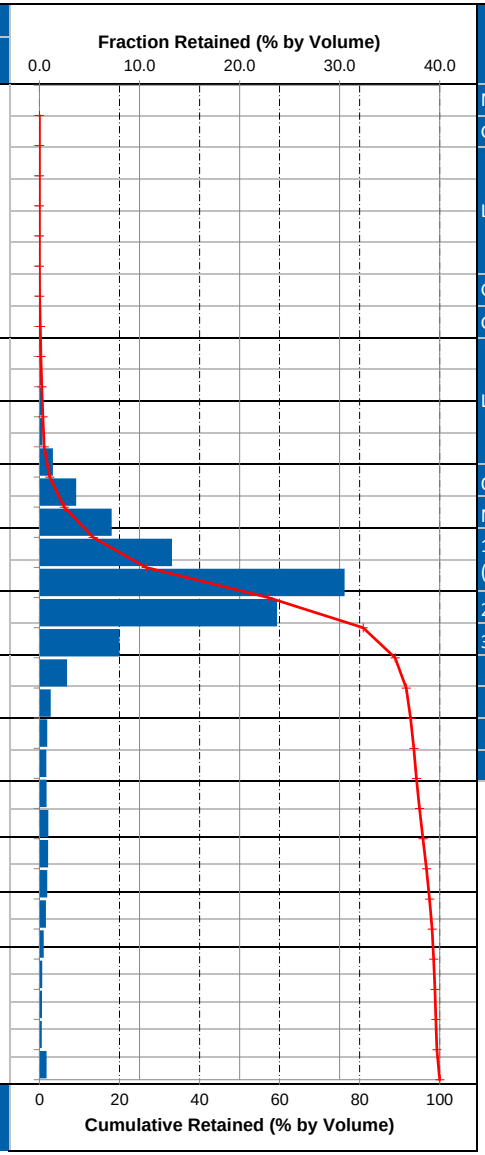
Method of Moments			
Geometric	Mean (µm)	212.01	Wentworth:
Logarithmic	Mean (Phi)	2.24	Fine sand
	Sorting	1.66	Poor
	Skewness	1.49	Very fine
	Kurtosis	13.73	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	223.27	Wentworth:
Logarithmic	Mean (Phi)	2.16	Fine sand
	Sorting	0.99	Moderate
	Skewness	0.01	Symmetrical
	Kurtosis	1.56	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.18	220.52	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Slightly gravelly sand	Fines	5.40%
EUNIS Folk	Sand and muddy sand	Sand	91.40%
Distribution	Unimodal	Gravel	3.20%



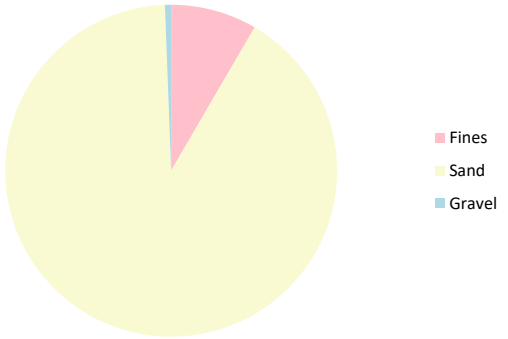
APPENDIX G PARTICLE SIZE ANALYSIS

ENV29				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.1	0.1	
4000.0	-2.0	0.1	0.2	
2828.4	-1.5	0.2	0.4	Granule
2000.0	-1.0	0.2	0.6	
1414.2	-0.5	0.3	0.9	Very coarse sand
1000.0	0.0	0.3	1.2	
707.1	0.5	1.3	2.5	Coarse sand
500.0	1.0	3.7	6.2	
353.6	1.5	7.2	13.4	Medium sand
250.0	2.0	13.2	26.6	
176.8	2.5	30.5	57.1	Fine sand
125.0	3.0	23.8	80.9	
88.4	3.5	8.0	88.9	Very fine sand
62.5	4.0	2.7	91.6	
44.2	4.5	1.1	92.7	Coarse silt
31.3	5.0	0.8	93.5	
22.1	5.5	0.7	94.2	Medium silt
15.6	6.0	0.7	94.9	
11.0	6.5	0.9	95.8	Fine silt
7.8	7.0	0.9	96.7	
5.5	7.5	0.8	97.4	Very fine silt
3.9	8.0	0.6	98.1	
2.8	8.5	0.4	98.5	Clay
2.0	9.0	0.3	98.8	
1.4	9.5	0.3	99.0	
1.0	10.0	0.2	99.3	
<1.0	>10	0.7	100.0	



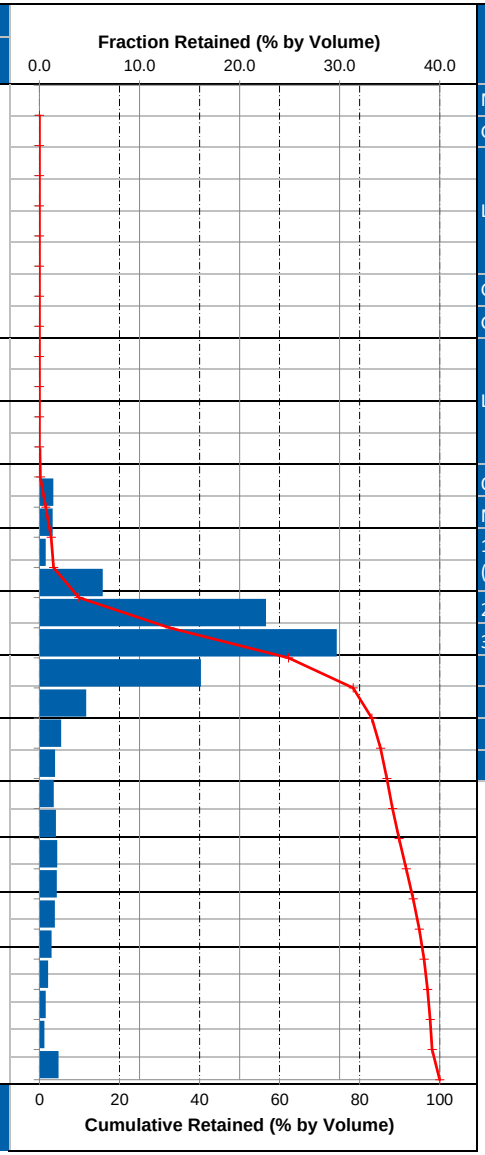
Method of Moments			
Geometric	Mean (µm)	163.85	Wentworth:
Logarithmic	Mean (Phi)	2.61	Fine sand
	Sorting	1.58	Poor
	Skewness	2.40	Very fine
	Kurtosis	12.47	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	190.46	Wentworth:
Logarithmic	Mean (Phi)	2.39	Fine sand
	Sorting	1.19	Poor
	Skewness	0.21	Fine
	Kurtosis	2.27	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.38	191.67	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Sand	Fines	8.40%
EUNIS Folk	Sand and muddy sand	Sand	91.00%
Distribution	Unimodal	Gravel	0.60%



APPENDIX G PARTICLE SIZE ANALYSIS

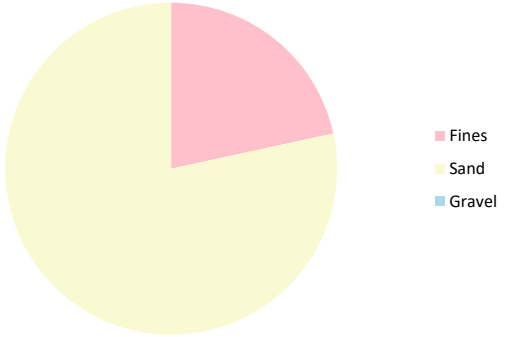
ENV30				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	Pebble
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.0	0.0	
2828.4	-1.5	0.0	0.0	Granule
2000.0	-1.0	0.0	0.0	
1414.2	-0.5	0.0	0.0	Very coarse sand
1000.0	0.0	0.0	0.0	
707.1	0.5	0.2	0.2	Coarse sand
500.0	1.0	1.4	1.6	
353.6	1.5	1.3	2.9	Medium sand
250.0	2.0	0.6	3.5	
176.8	2.5	6.3	9.9	Fine sand
125.0	3.0	22.6	32.5	
88.4	3.5	29.7	62.2	Very fine sand
62.5	4.0	16.1	78.4	
44.2	4.5	4.7	83.0	Coarse silt
31.3	5.0	2.2	85.2	
22.1	5.5	1.6	86.8	Medium silt
15.6	6.0	1.4	88.2	
11.0	6.5	1.6	89.8	Fine silt
7.8	7.0	1.8	91.6	
5.5	7.5	1.7	93.4	Very fine silt
3.9	8.0	1.5	94.9	
2.8	8.5	1.2	96.1	Clay
2.0	9.0	0.9	97.0	
1.4	9.5	0.6	97.6	
1.0	10.0	0.5	98.1	
<1.0	>10	1.9	100.0	



Method of Moments			
Geometric	Mean (µm)	71.38	Wentworth:
Logarithmic	Mean (Phi)	3.81	Very fine sand
	Sorting	1.87	Poor
	Skewness	2.15	Very fine
	Kurtosis	8.35	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	85.33	Wentworth:
Logarithmic	Mean (Phi)	3.55	Very fine sand
	Sorting	1.42	Poor
	Skewness	0.49	Very fine
	Kurtosis	2.29	Very leptokurtic

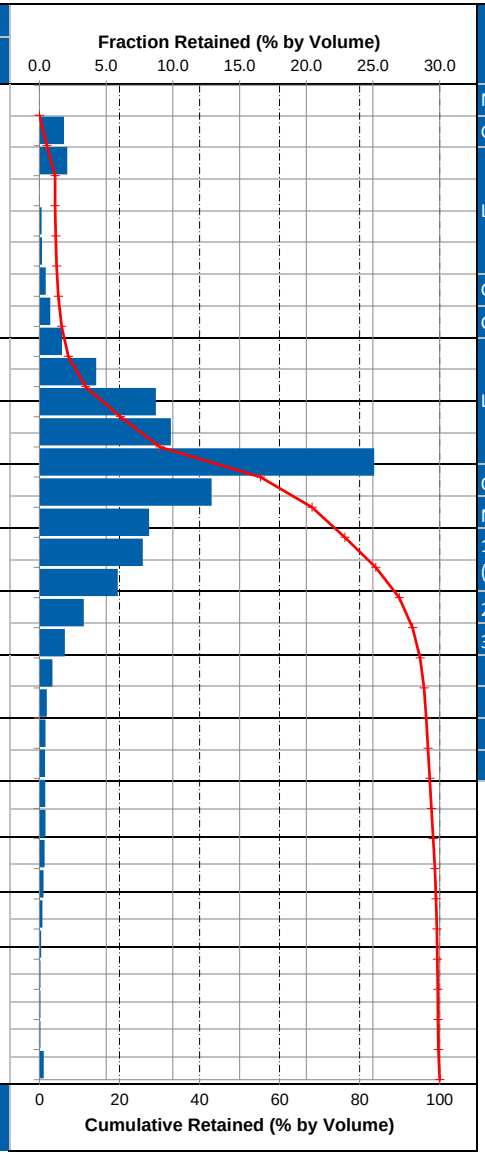
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	3.29	101.93	Very fine sand
1st Local Maxima (Mode)	3.50	88.39	Very fine sand
2nd Local Maxima	7.00	7.81	Fine silt
3rd Local Maxima	1.00	500.00	Coarse sand

Classification		Composition	
Modified Folk	Muddy sand	Fines	21.60%
EUNIS Folk	Mud and sandy mud	Sand	78.40%
Distribution	Multimodal	Gravel	0.00%



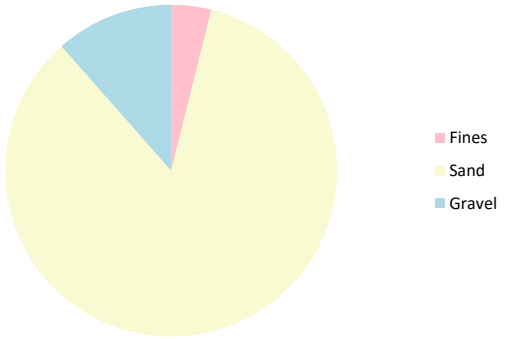
APPENDIX G PARTICLE SIZE ANALYSIS

ENV31				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	1.8	1.8	
22627.4	-4.5	2.1	3.9	
16000.0	-4.0	0.0	3.9	Pebble
11313.7	-3.5	0.2	4.1	
8000.0	-3.0	0.2	4.3	
5656.9	-2.5	0.5	4.7	
4000.0	-2.0	0.8	5.6	
2828.4	-1.5	1.7	7.2	Granule
2000.0	-1.0	4.3	11.5	
1414.2	-0.5	8.7	20.2	Very coarse sand
1000.0	0.0	9.9	30.1	
707.1	0.5	25.1	55.2	Coarse sand
500.0	1.0	12.9	68.1	
353.6	1.5	8.2	76.3	Medium sand
250.0	2.0	7.7	84.0	
176.8	2.5	5.9	89.9	Fine sand
125.0	3.0	3.3	93.2	
88.4	3.5	1.9	95.1	Very fine sand
62.5	4.0	1.0	96.1	
44.2	4.5	0.6	96.6	Coarse silt
31.3	5.0	0.4	97.1	
22.1	5.5	0.4	97.5	Medium silt
15.6	6.0	0.4	97.9	
11.0	6.5	0.5	98.4	Fine silt
7.8	7.0	0.4	98.8	
5.5	7.5	0.3	99.1	Very fine silt
3.9	8.0	0.2	99.3	
2.8	8.5	0.1	99.4	
2.0	9.0	0.1	99.5	
1.4	9.5	0.1	99.6	Clay
1.0	10.0	0.1	99.7	
<1.0	>10	0.3	100.0	



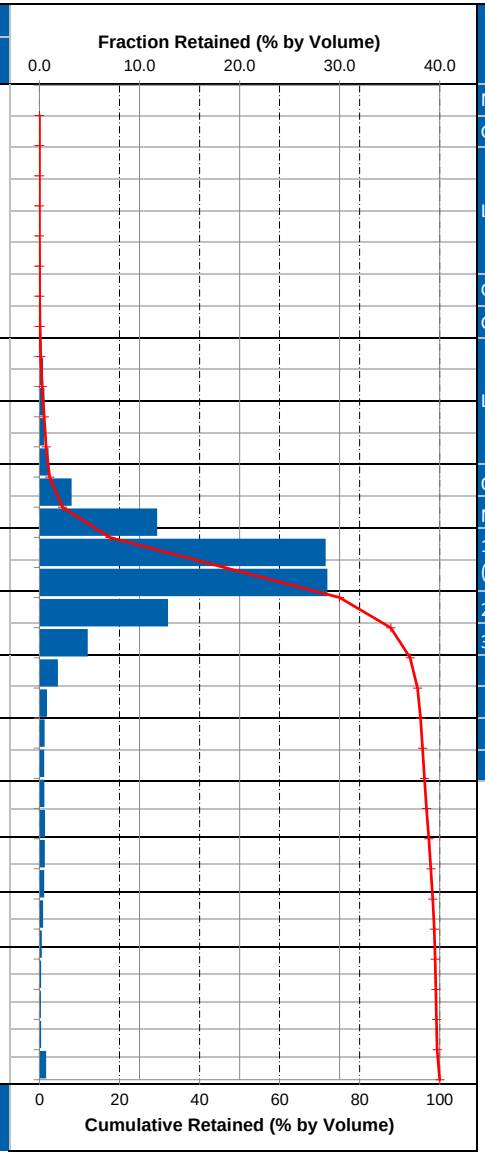
Method of Moments			
Geometric	Mean (µm)	677.16	Wentworth:
Logarithmic	Mean (Phi)	0.56	Coarse sand
	Sorting	2.03	Very poor
	Skewness	0.59	Fine
	Kurtosis	8.21	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	682.51	Wentworth:
Logarithmic	Mean (Phi)	0.55	Coarse sand
	Sorting	1.57	Poor
	Skewness	0.11	Fine
	Kurtosis	1.42	Leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	0.40	759.40	Coarse sand
1st Local Maxima (Mode)	0.50	707.11	Coarse sand
2nd Local Maxima	-4.50	22627.42	Pebble
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Gravelly sand	Fines	3.90%
EUNIS Folk	Coarse sediments	Sand	84.60%
Distribution	Bimodal	Gravel	11.50%



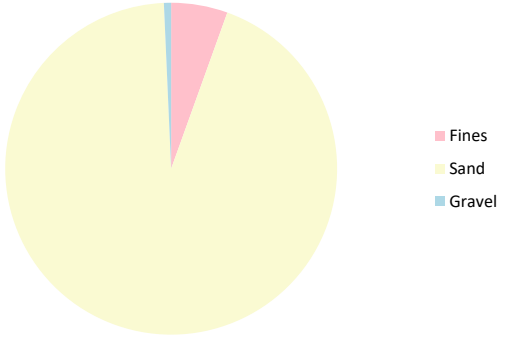
APPENDIX G PARTICLE SIZE ANALYSIS

ENV32				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.1	0.1	
5656.9	-2.5	0.0	0.1	
4000.0	-2.0	0.1	0.2	
2828.4	-1.5	0.2	0.3	Granule
2000.0	-1.0	0.4	0.7	
1414.2	-0.5	0.5	1.2	Very coarse sand
1000.0	0.0	0.5	1.7	
707.1	0.5	0.9	2.6	Coarse sand
500.0	1.0	3.2	5.8	
353.6	1.5	11.8	17.5	Medium sand
250.0	2.0	28.6	46.1	
176.8	2.5	28.8	74.9	Fine sand
125.0	3.0	12.9	87.8	
88.4	3.5	4.8	92.6	Very fine sand
62.5	4.0	1.8	94.5	
44.2	4.5	0.8	95.2	Coarse silt
31.3	5.0	0.5	95.7	
22.1	5.5	0.5	96.2	Medium silt
15.6	6.0	0.5	96.7	
11.0	6.5	0.6	97.3	Fine silt
7.8	7.0	0.5	97.8	
5.5	7.5	0.5	98.3	Very fine silt
3.9	8.0	0.4	98.6	
2.8	8.5	0.2	98.9	Clay
2.0	9.0	0.2	99.0	
1.4	9.5	0.2	99.2	
1.0	10.0	0.2	99.3	
<1.0	>10	0.7	100.0	



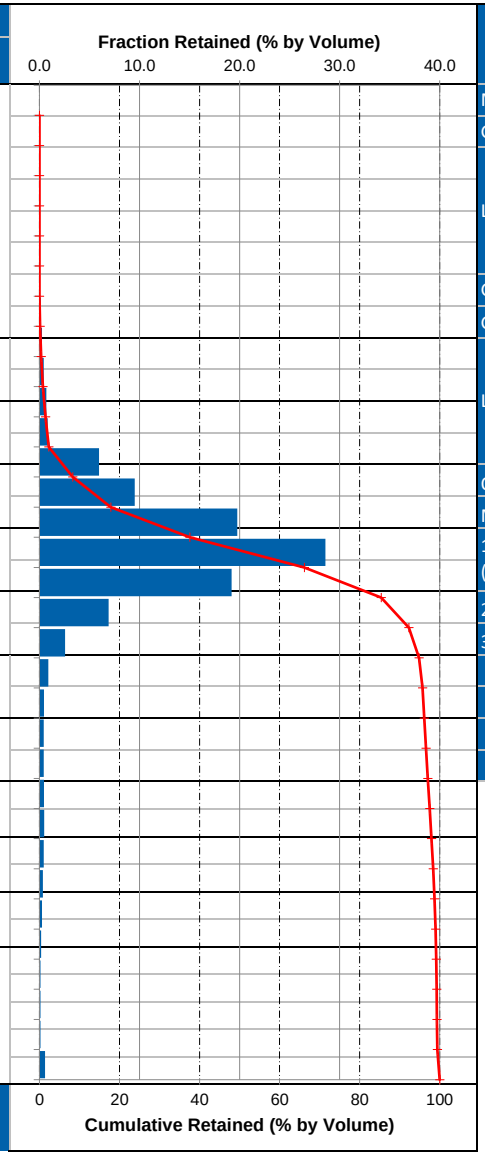
Method of Moments			
Geometric	Mean (µm)	207.78	Wentworth:
Logarithmic	Mean (Phi)	2.27	Fine sand
	Sorting	1.44	Poor
	Skewness	2.98	Very fine
	Kurtosis	18.09	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	230.34	Wentworth:
Logarithmic	Mean (Phi)	2.12	Fine sand
	Sorting	0.88	Moderate
	Skewness	0.21	Fine
	Kurtosis	1.64	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.07	238.65	Fine sand
1st Local Maxima (Mode)	2.50	176.78	Fine sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Sand	Fines	5.50%
EUNIS Folk	Sand and muddy sand	Sand	93.80%
Distribution	Unimodal	Gravel	0.70%



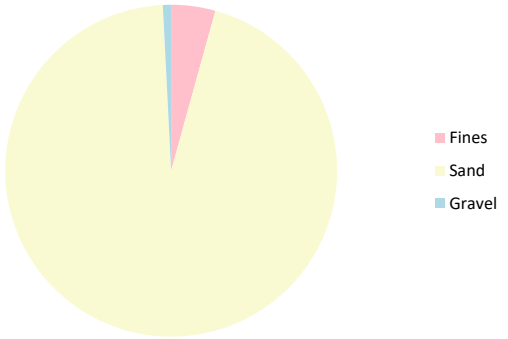
APPENDIX G PARTICLE SIZE ANALYSIS

ENV33				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.2	0.2	
2828.4	-1.5	0.3	0.4	Granule
2000.0	-1.0	0.4	0.8	
1414.2	-0.5	0.7	1.5	Very coarse sand
1000.0	0.0	0.8	2.3	
707.1	0.5	6.0	8.3	Coarse sand
500.0	1.0	9.5	17.8	
353.6	1.5	19.8	37.6	Medium sand
250.0	2.0	28.6	66.2	
176.8	2.5	19.2	85.4	Fine sand
125.0	3.0	6.9	92.3	
88.4	3.5	2.6	94.8	Very fine sand
62.5	4.0	0.9	95.7	
44.2	4.5	0.5	96.2	Coarse silt
31.3	5.0	0.4	96.6	
22.1	5.5	0.4	97.0	Medium silt
15.6	6.0	0.5	97.5	
11.0	6.5	0.5	98.0	Fine silt
7.8	7.0	0.4	98.4	
5.5	7.5	0.3	98.7	Very fine silt
3.9	8.0	0.2	99.0	
2.8	8.5	0.2	99.1	
2.0	9.0	0.1	99.2	
1.4	9.5	0.1	99.3	Clay
1.0	10.0	0.1	99.4	
<1.0	>10	0.6	100.0	



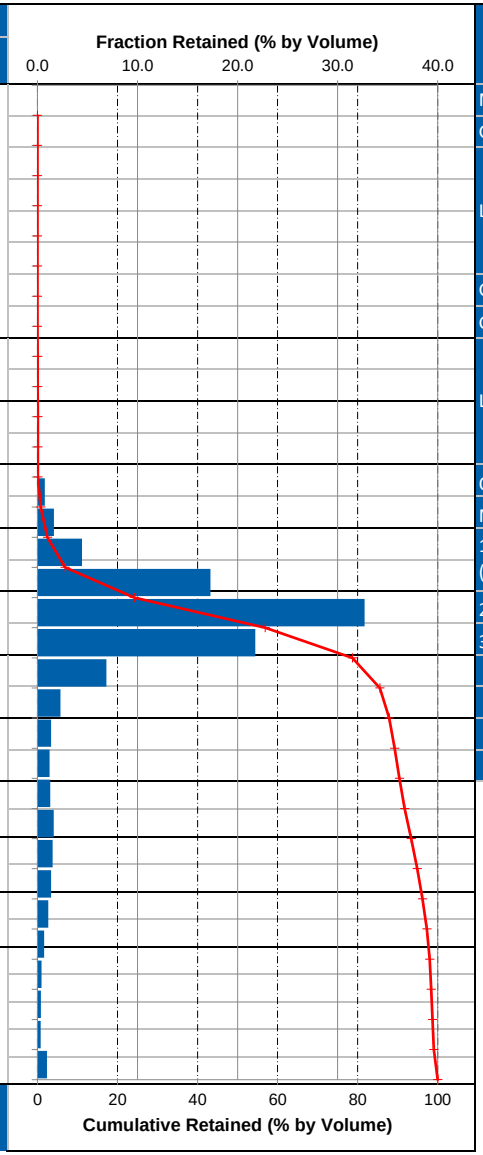
Method of Moments			
Geometric	Mean (µm)	277.63	Wentworth:
Logarithmic	Mean (Phi)	1.85	Medium sand
	Sorting	1.42	Poor
	Skewness	3.04	Very fine
	Kurtosis	19.36	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	308.72	Wentworth:
Logarithmic	Mean (Phi)	1.70	Medium sand
	Sorting	0.90	Moderate
	Skewness	0.04	Symmetrical
	Kurtosis	1.32	Leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.72	304.10	Medium sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Sand	Fines	4.30%
EUNIS Folk	Sand and muddy sand	Sand	94.90%
Distribution	Unimodal	Gravel	0.80%



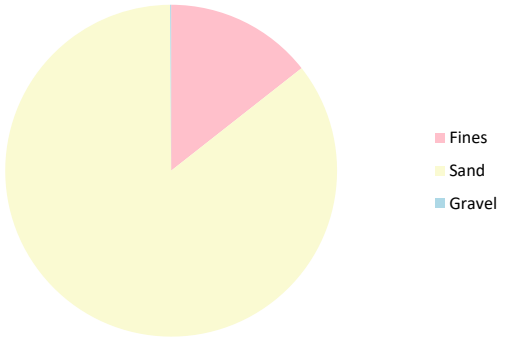
APPENDIX G PARTICLE SIZE ANALYSIS

ENV34				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	Pebble
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.0	0.0	
2828.4	-1.5	0.1	0.1	Granule
2000.0	-1.0	0.0	0.1	
1414.2	-0.5	0.0	0.1	Very coarse sand
1000.0	0.0	0.0	0.1	
707.1	0.5	0.0	0.1	Coarse sand
500.0	1.0	0.7	0.8	
353.6	1.5	1.6	2.5	Medium sand
250.0	2.0	4.4	6.9	
176.8	2.5	17.3	24.2	Fine sand
125.0	3.0	32.7	56.9	
88.4	3.5	21.8	78.7	Very fine sand
62.5	4.0	6.9	85.6	
44.2	4.5	2.3	87.9	Coarse silt
31.3	5.0	1.4	89.2	
22.1	5.5	1.2	90.4	Medium silt
15.6	6.0	1.3	91.7	
11.0	6.5	1.6	93.3	Fine silt
7.8	7.0	1.5	94.9	
5.5	7.5	1.4	96.2	Very fine silt
3.9	8.0	1.1	97.3	
2.8	8.5	0.7	98.0	Clay
2.0	9.0	0.4	98.4	
1.4	9.5	0.3	98.7	
1.0	10.0	0.3	99.0	
<1.0	>10	1.0	100.0	



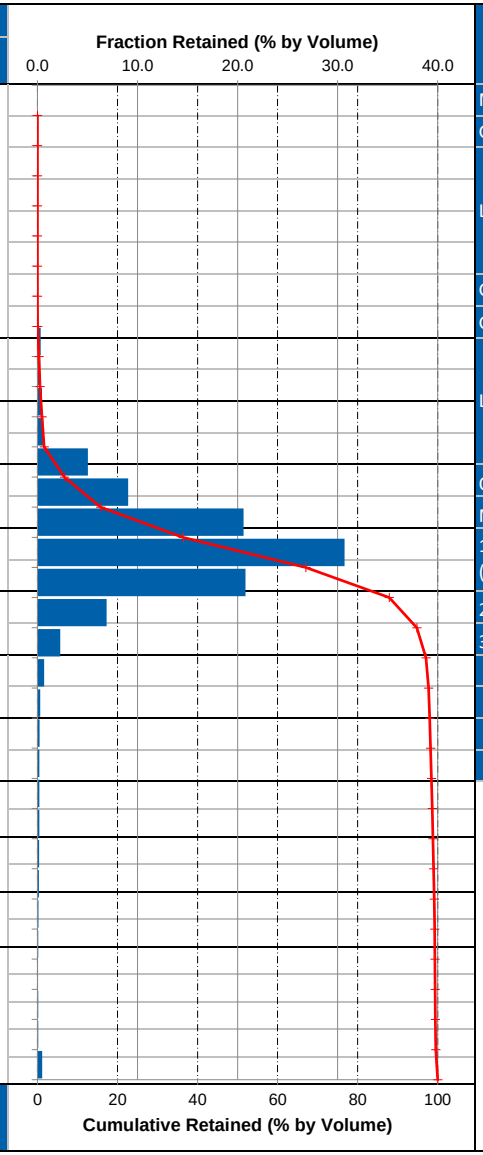
Method of Moments			
Geometric	Mean (µm)	101.29	Wentworth:
Logarithmic	Mean (Phi)	3.30	Very fine sand
	Sorting	1.62	Poor
	Skewness	2.44	Very fine
	Kurtosis	10.33	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	123.74	Wentworth:
Logarithmic	Mean (Phi)	3.01	Very fine sand
	Sorting	1.20	Poor
	Skewness	0.40	Very fine
	Kurtosis	2.39	Very leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	2.89	134.48	Fine sand
1st Local Maxima (Mode)	3.00	125.00	Fine sand
2nd Local Maxima	6.50	11.05	Fine silt
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Muddy sand	Fines	14.40%
EUNIS Folk	Sand and muddy sand	Sand	85.50%
Distribution	Bimodal	Gravel	0.10%



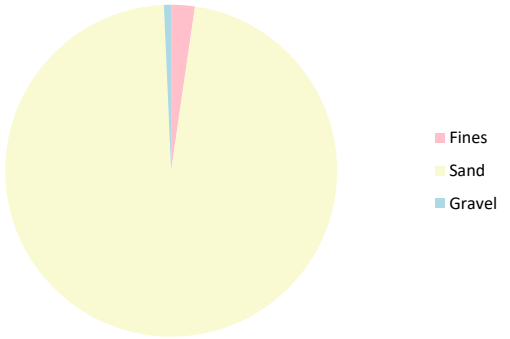
APPENDIX G PARTICLE SIZE ANALYSIS

ENV35				
Aperature (µm)	Aperature (Phi)	Percentage Fraction	Cumulative Percentage	Sediment Description
45254.8	-5.5	0.0	0.0	
32000.0	-5.0	0.0	0.0	
22627.4	-4.5	0.0	0.0	
16000.0	-4.0	0.0	0.0	Pebble
11313.7	-3.5	0.0	0.0	
8000.0	-3.0	0.0	0.0	
5656.9	-2.5	0.0	0.0	
4000.0	-2.0	0.1	0.1	
2828.4	-1.5	0.3	0.4	Granule
2000.0	-1.0	0.3	0.7	
1414.2	-0.5	0.4	1.1	Very coarse sand
1000.0	0.0	0.6	1.7	
707.1	0.5	5.0	6.7	Coarse sand
500.0	1.0	9.1	15.8	
353.6	1.5	20.6	36.4	Medium sand
250.0	2.0	30.7	67.1	
176.8	2.5	20.8	87.9	Fine sand
125.0	3.0	6.9	94.8	
88.4	3.5	2.3	97.1	Very fine sand
62.5	4.0	0.7	97.7	
44.2	4.5	0.3	98.0	Coarse silt
31.3	5.0	0.2	98.2	
22.1	5.5	0.2	98.4	Medium silt
15.6	6.0	0.2	98.6	
11.0	6.5	0.2	98.8	Fine silt
7.8	7.0	0.2	99.0	
5.5	7.5	0.1	99.1	Very fine silt
3.9	8.0	0.1	99.2	
2.8	8.5	0.1	99.3	
2.0	9.0	0.1	99.4	
1.4	9.5	0.1	99.4	Clay
1.0	10.0	0.1	99.5	
<1.0	>10	0.5	100.0	



Method of Moments			
Geometric	Mean (µm)	290.26	Wentworth:
Logarithmic	Mean (Phi)	1.78	Medium sand
	Sorting	1.20	Poor
	Skewness	3.63	Very fine
	Kurtosis	29.22	Very leptokurtic
Graphic Folk and Ward			
Geometric	Mean (µm)	305.34	Wentworth:
Logarithmic	Mean (Phi)	1.71	Medium sand
	Sorting	0.76	Moderate
	Skewness	-0.02	Symmetrical
	Kurtosis	1.15	Leptokurtic
Other Statistics	Phi (ϕ)	µm	Wentworth:
Median (D50)	1.72	303.13	Medium sand
1st Local Maxima (Mode)	2.00	250.00	Medium sand
2nd Local Maxima	-	-	-
3rd Local Maxima	-	-	-

Classification		Composition	
Modified Folk	Sand	Fines	2.30%
EUNIS Folk	Sand and muddy sand	Sand	97.10%
Distribution	Unimodal	Gravel	0.70%



APPENDIX H SPEARMAN'S RANK CORRELATION

APPENDIX H SPEARMAN'S RANK CORRELATION

Dixon's test for high outliers (n=8 to 10)	0.67	0.79	0.62	0.07	0.63	0.74	0.68	0.72	0.73	0.67	0.70	0.47	0.56	0.26	0.60	0.48	0.53	0.28
Dixon's test for low outliers (n=8 to 10)	0.06	0.23	0.08	0.27	0.00	0.04	0.14	0.09	0.09	0.12	0.16	0.08	0.15	0.26	0.00	0.09	0.04	0.03
Station	Depth at CHEM (Obs)	Mean µm	Fines	Sand	Gravel	TOC	THC by GC-FID	UCM	nC10-20	nC21-37	nC10-37	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)
ENV07	55	234.3	5.8	85.5	8.7	0.23	3.6	1.6	0.004	0.055	0.059	3.7	0.12	10.2	4.4	3.8	3.5	13.1
ENV12	71	106.2	18.2	81.8	0.0	0.44	8.8	5.1	0.019	0.171	0.190	1.9	0.07	10.2	4.0	6.0	3.2	15.6
ENV15	65	157.1	11.0	87.9	1.1	0.44	7.6	4.1	0.017	0.111	0.128	2.3	0.14	8.9	3.7	6.1	3.0	13.1
ENV18	55	256.7	3.5	95.0	1.5	0.21	3.1	2.0	0.010	0.033	0.044	4.0	0.10	7.2	3.0	2.6	3.1	6.6
ENV21	104	45.5	41.9	58.1	0.0	1.10	20.7	14.2	0.086	0.451	0.537	3.5	0.34	11.8	6.5	9.0	5.3	19.3
ENV22	64	1057.4	8.5	68.0	23.5	0.43	5.2	4.1	0.024	0.101	0.125	10.9	0.20	10.6	3.9	5.9	7.8	15.8
ENV24	66	197.0	8.9	90.7	0.4	0.32	8.4	4.7	0.014	0.080	0.094	3.0	0.09	9.5	3.1	3.4	3.1	8.7
ENV33	56	308.7	4.3	94.9	0.8	0.22	3.3	2.1	0.015	0.036	0.051	6.7	0.11	6.0	3.0	2.9	3.5	6.3
ENV34	68	123.7	14.4	85.5	0.1	0.45	7.6	4.4	0.026	0.107	0.134	2.7	0.16	9.6	4.0	6.0	3.3	11.8
ENV35	54	305.3	2.3	97.1	0.7	0.29	2.1	1.2	0.001	0.015	0.016	6.9	0.09	8.6	3.4	3.1	3.5	6.6
Depth at CHEM (Obs)		-0.79	0.97	-0.75	-0.71	0.84	0.97	0.98	0.85	0.92	0.94	-0.68	0.27	0.58	0.52	0.77	-0.05	0.62
Mean µm			-0.84	0.49	0.77	-0.74	-0.81	-0.76	-0.50	-0.77	-0.78	0.85	-0.09	-0.44	-0.61	-0.73	0.30	-0.49
Fines				-0.82	-0.63	0.89	0.96	0.93	0.83	0.98	0.99	-0.73	0.35	0.68	0.68	0.89	-0.04	0.74
Sand					0.25	-0.75	-0.77	-0.68	-0.83	-0.85	-0.88	0.30	-0.60	-0.92	-0.81	-0.80	-0.42	-0.92
Gravel						-0.61	-0.66	-0.71	-0.43	-0.51	-0.56	0.59	0.19	-0.19	-0.30	-0.42	0.11	-0.15
TOC							0.81	0.78	0.81	0.89	0.91	-0.56	0.46	0.67	0.70	0.94	0.10	0.72
THC								0.96	0.75	0.92	0.93	-0.70	0.23	0.68	0.60	0.78	-0.06	0.70
UCM									0.79	0.88	0.89	-0.66	0.19	0.53	0.41	0.70	-0.11	0.58
nC10-20										0.84	0.88	-0.35	0.63	0.60	0.51	0.75	0.25	0.65
nC21-37											0.99	-0.67	0.42	0.71	0.68	0.93	0.00	0.82
nC10-37												-0.66	0.43	0.73	0.71	0.91	0.05	0.80
Arsenic (As)													0.16	-0.18	-0.34	-0.59	0.64	-0.29
Cadmium (Cd)														0.49	0.48	0.53	0.48	0.52
Chromium (Cr)															0.88	0.72	0.49	0.94
Copper (Cu)																0.79	0.41	0.83
Nickel (Ni)																	0.08	0.83
Lead (Pb)																		0.34
Zinc (Zn)																		

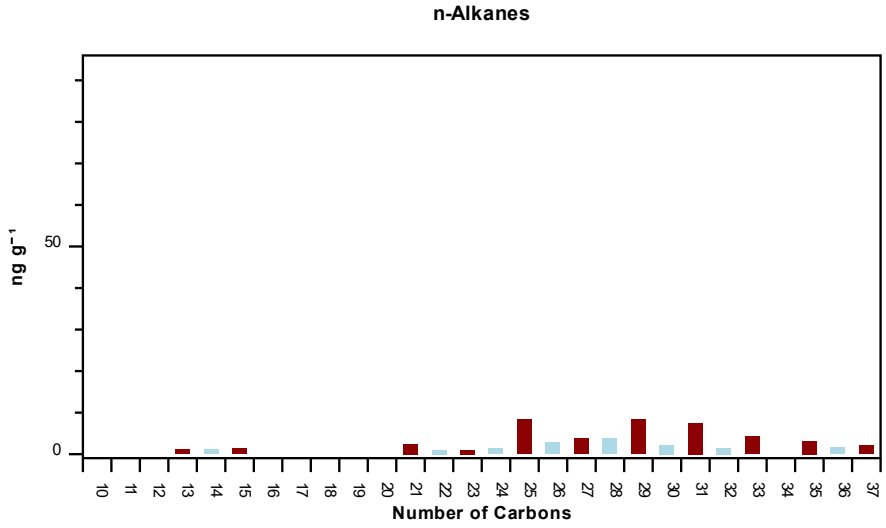
Critical Values Outliers Test
p < 0.01 if value >= 0.597
p < 0.05 if value >= 0.477

Critical Values Spearmans Test
p < 0.01 if value >= 0.794
p < 0.05 if value >= 0.648

APPENDIX I HYDROCARBON ANALYSIS

APPENDIX I HYDROCARBON ANALYSIS

APPENDIX I HYDROCARBON ANALYSIS



ENV07

nC_{10}-nC_{20}: 4ng g^{-1}

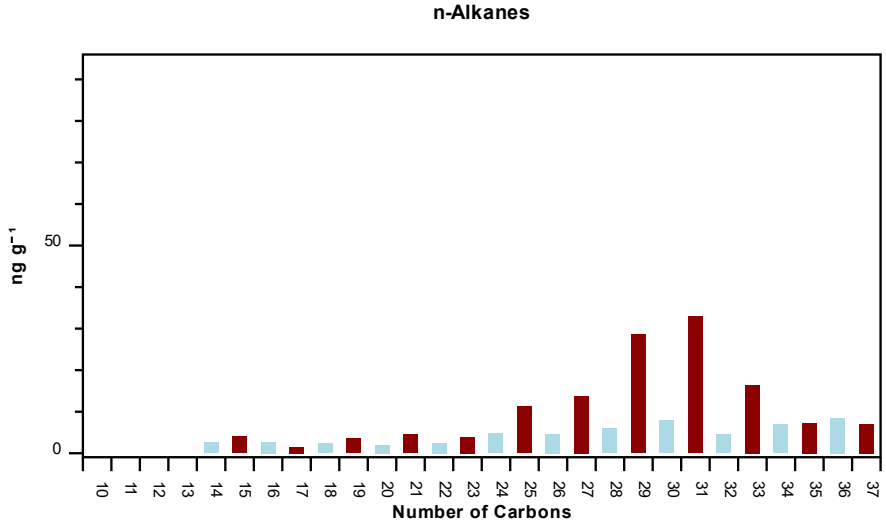
nC_{21}-nC_{37}: 55ng g^{-1}

nC_{10}-nC_{37}: 59ng g^{-1}

Odd Length n-Alkanes: 43ng g^{-1}

Even Length n-Alkanes: 16ng g^{-1}

CPI: 1.9



ENV12

nC_{10}-nC_{20}: 19ng g^{-1}

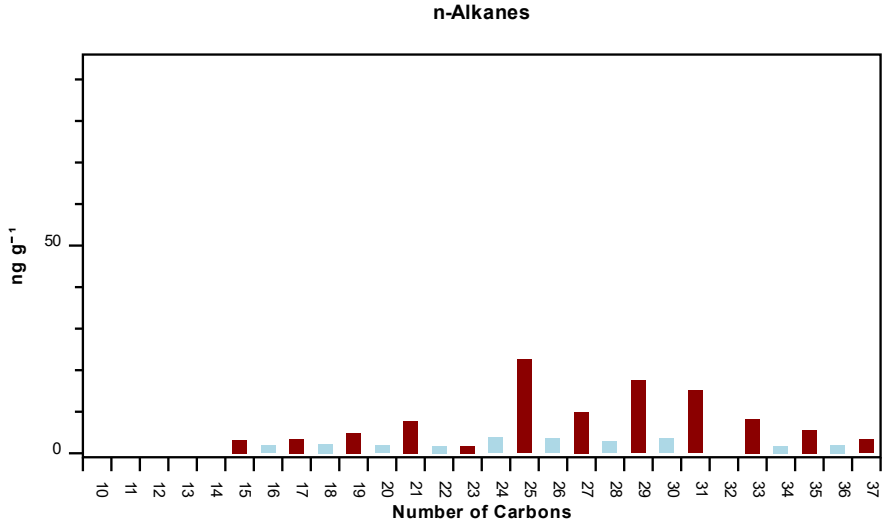
nC_{21}-nC_{37}: 171ng g^{-1}

nC_{10}-nC_{37}: 190ng g^{-1}

Odd Length n-Alkanes: 135ng g^{-1}

Even Length n-Alkanes: 55ng g^{-1}

CPI: 3.5



ENV15

nC_{10}-nC_{20}: 17ng g^{-1}

nC_{21}-nC_{37}: 111ng g^{-1}

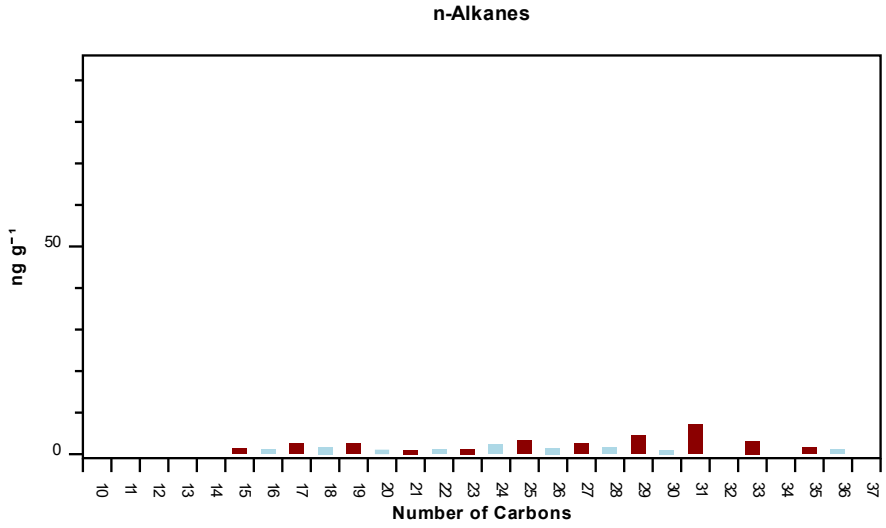
nC_{10}-nC_{37}: 128ng g^{-1}

Odd Length n-Alkanes: 103ng g^{-1}

Even Length n-Alkanes: 25ng g^{-1}

CPI: 4.3

APPENDIX I HYDROCARBON ANALYSIS



ENV18

nC_{10}-nC_{20}: 10ng g^{-1}

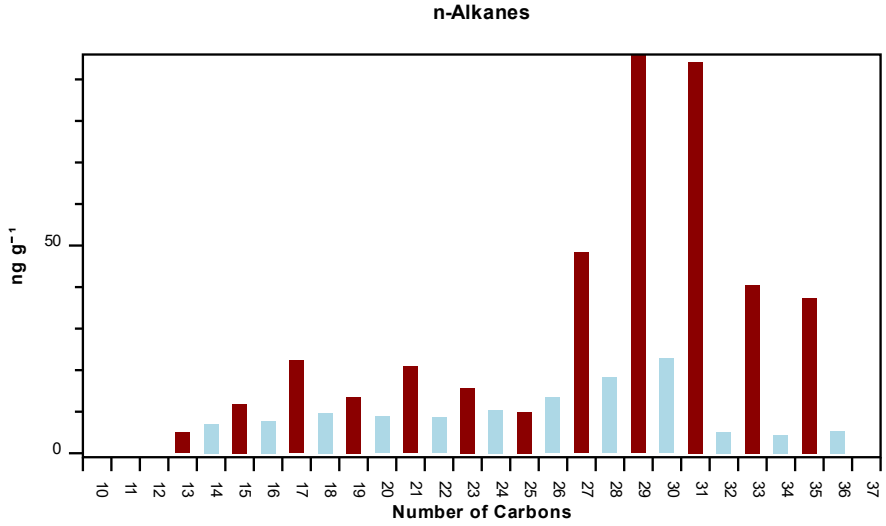
nC_{21}-nC_{37}: 33ng g^{-1}

nC_{10}-nC_{37}: 44ng g^{-1}

Odd Length n-Alkanes: 31ng g^{-1}

Even Length n-Alkanes: 13ng g^{-1}

CPI: 2.4



ENV21

nC_{10}-nC_{20}: 86ng g^{-1}

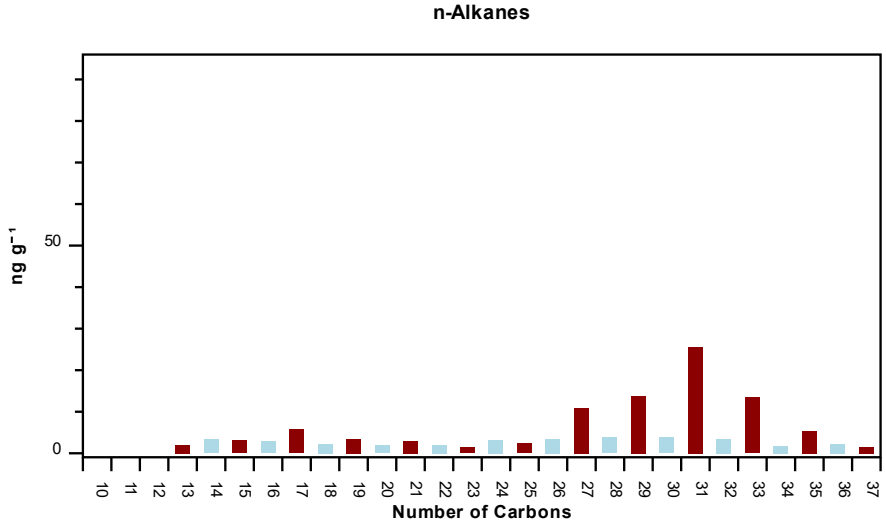
nC_{21}-nC_{37}: 451ng g^{-1}

nC_{10}-nC_{37}: 537ng g^{-1}

Odd Length n-Alkanes: 416ng g^{-1}

Even Length n-Alkanes: 122ng g^{-1}

CPI: 4.0



ENV22

nC_{10}-nC_{20}: 24ng g^{-1}

nC_{21}-nC_{37}: 101ng g^{-1}

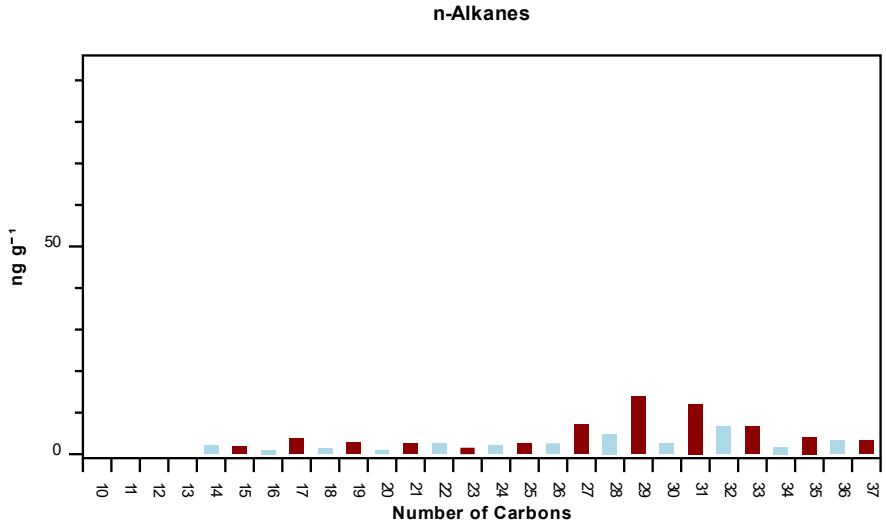
nC_{10}-nC_{37}: 125ng g^{-1}

Odd Length n-Alkanes: 92ng g^{-1}

Even Length n-Alkanes: 34ng g^{-1}

CPI: 3.3

APPENDIX I HYDROCARBON ANALYSIS



ENV24

nC_{10}-nC_{20}: 14ng g^{-1}

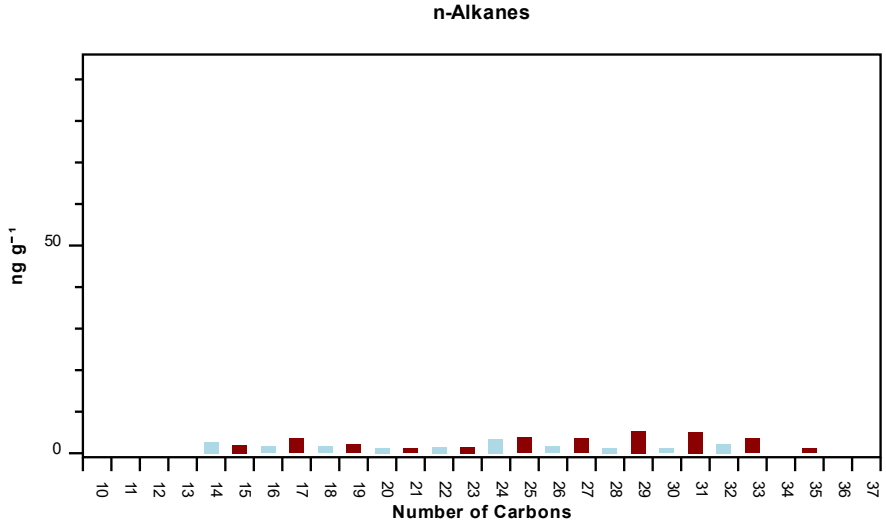
nC_{21}-nC_{37}: 80ng g^{-1}

nC_{10}-nC_{37}: 94ng g^{-1}

Odd Length n-Alkanes: 62ng g^{-1}

Even Length n-Alkanes: 32ng g^{-1}

CPI: 2.8



ENV33

nC_{10}-nC_{20}: 15ng g^{-1}

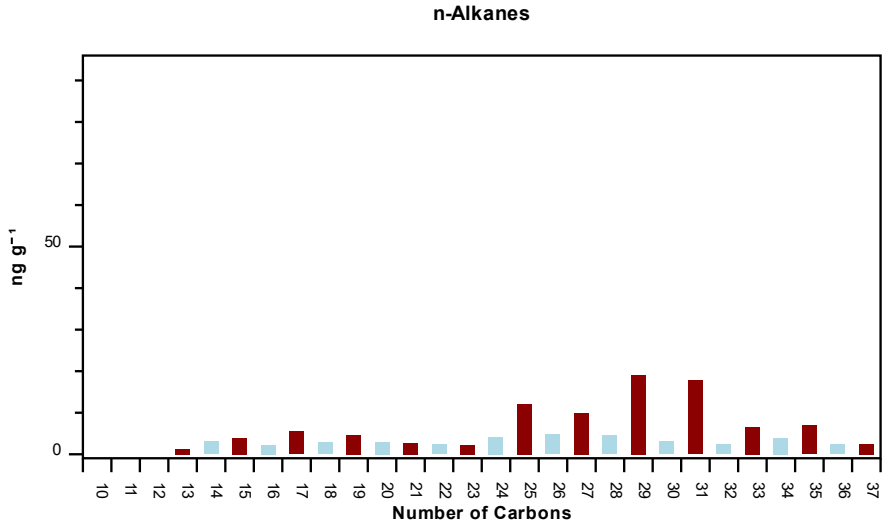
nC_{21}-nC_{37}: 36ng g^{-1}

nC_{10}-nC_{37}: 51ng g^{-1}

Odd Length n-Alkanes: 33ng g^{-1}

Even Length n-Alkanes: 18ng g^{-1}

CPI: 3.4



ENV34

nC_{10}-nC_{20}: 26ng g^{-1}

nC_{21}-nC_{37}: 107ng g^{-1}

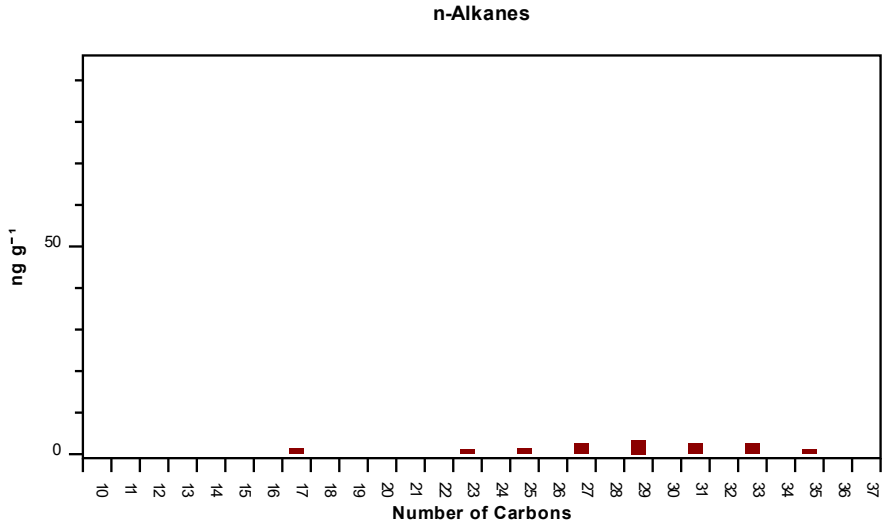
nC_{10}-nC_{37}: 134ng g^{-1}

Odd Length n-Alkanes: 95ng g^{-1}

Even Length n-Alkanes: 39ng g^{-1}

CPI: 3.4

APPENDIX I HYDROCARBON ANALYSIS



ENV35

nC_{10}-nC_{20}: 1ng g^{-1}

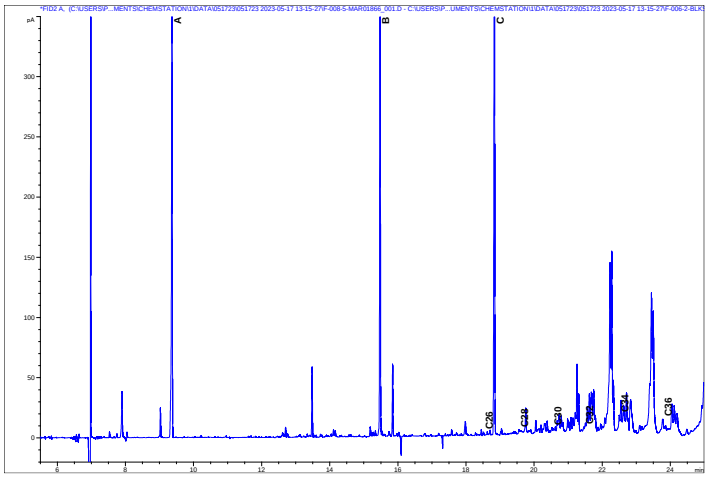
nC_{21}-nC_{37}: 15ng g^{-1}

nC_{10}-nC_{37}: 16ng g^{-1}

Odd Length n-Alkanes: 16ng g^{-1}

Even Length n-Alkanes: NCCPI: ∞

APPENDIX I HYDROCARBON ANALYSIS

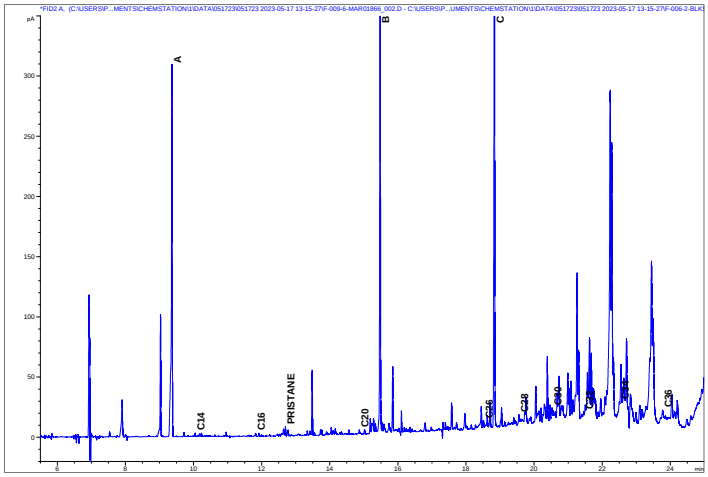


ENV07

THC: 3.626µg g^{-1}

UCM: 1.572µg g^{-1}

n-Alkanes: 0.059µg g^{-1}

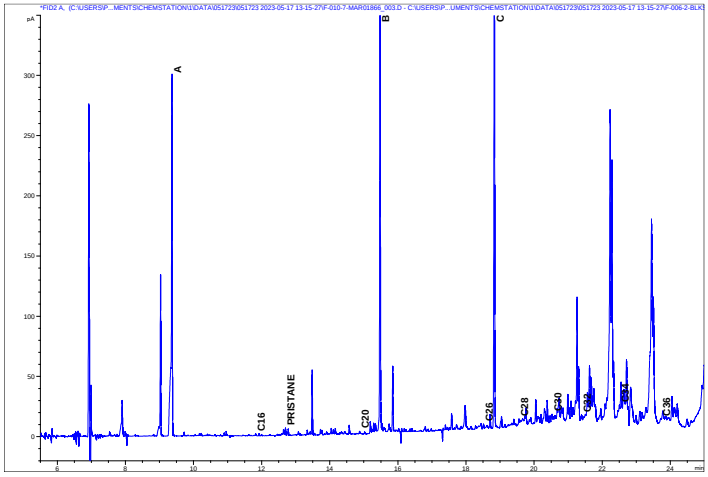


ENV12

THC: 8.778µg g^{-1}

UCM: 5.063µg g^{-1}

n-Alkanes: 0.190µg g^{-1}



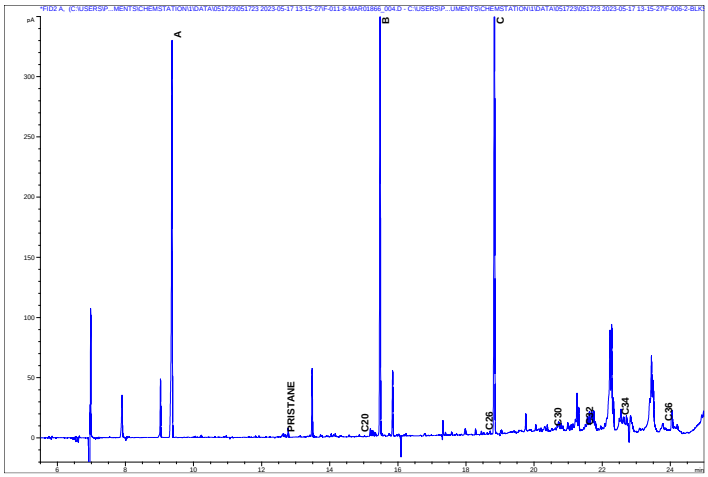
ENV15

THC: 7.592µg g^{-1}

UCM: 4.110µg g^{-1}

n-Alkanes: 0.128µg g^{-1}

APPENDIX I HYDROCARBON ANALYSIS

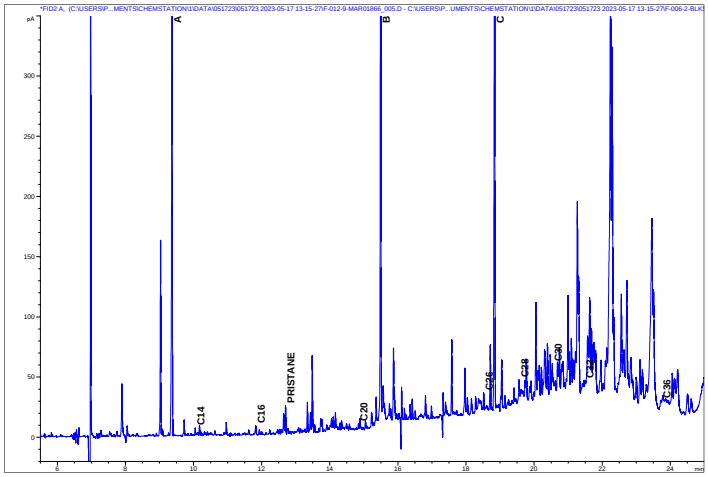


ENV18

THC: 3.061µg g^{-1}

UCM: 1.973µg g^{-1}

n-Alkanes: 0.044µg g^{-1}

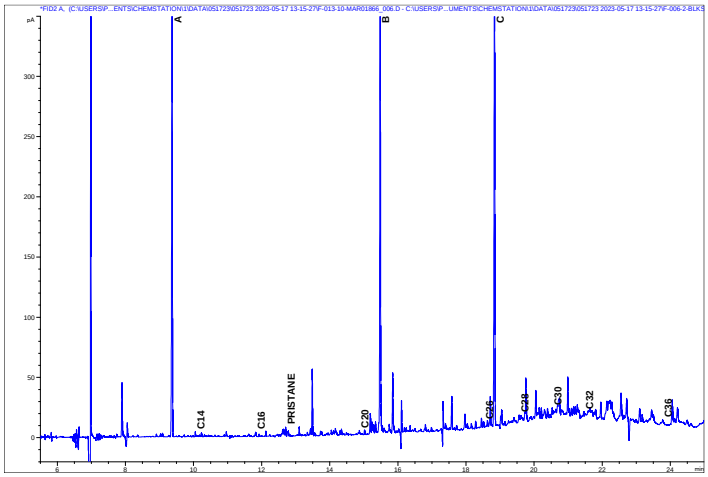


ENV21

THC: 20.708µg g^{-1}

UCM: 14.214µg g^{-1}

n-Alkanes: 0.537µg g^{-1}



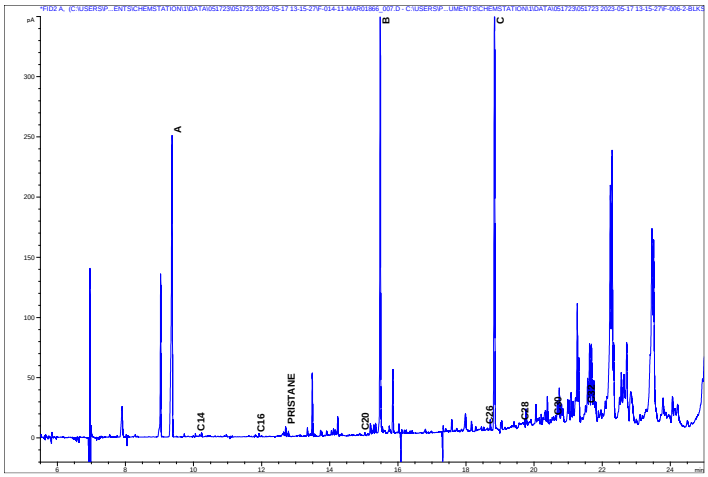
ENV22

THC: 5.223µg g^{-1}

UCM: 4.078µg g^{-1}

n-Alkanes: 0.125µg g^{-1}

APPENDIX I HYDROCARBON ANALYSIS

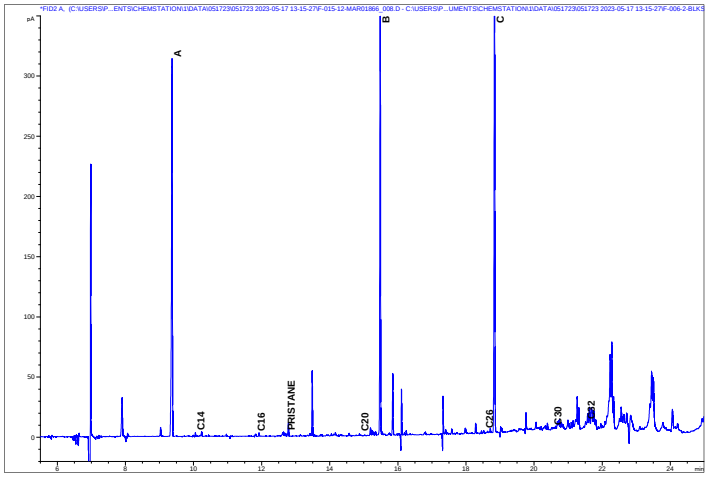


ENV24

THC: 8.365µg g^{-1}

UCM: 4.698µg g^{-1}

n-Alkanes: 0.094µg g^{-1}

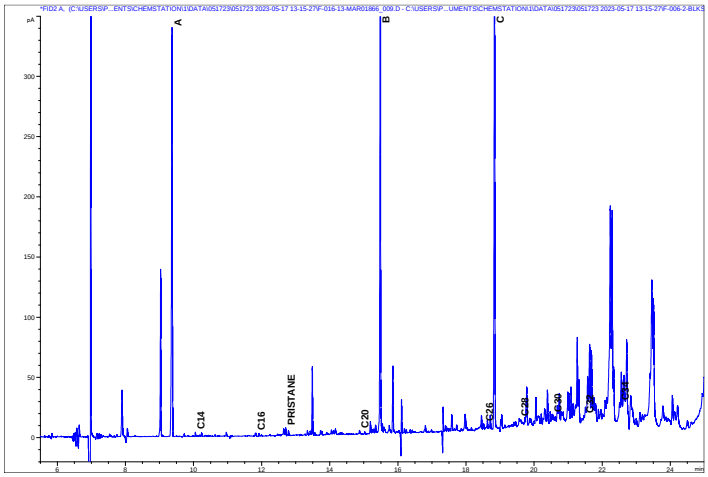


ENV33

THC: 3.278µg g^{-1}

UCM: 2.069µg g^{-1}

n-Alkanes: 0.051µg g^{-1}



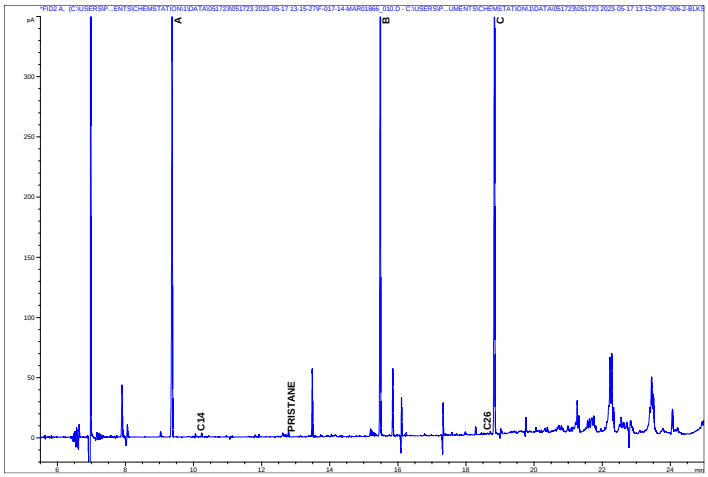
ENV34

THC: 7.636µg g^{-1}

UCM: 4.359µg g^{-1}

n-Alkanes: 0.134µg g^{-1}

APPENDIX I HYDROCARBON ANALYSIS

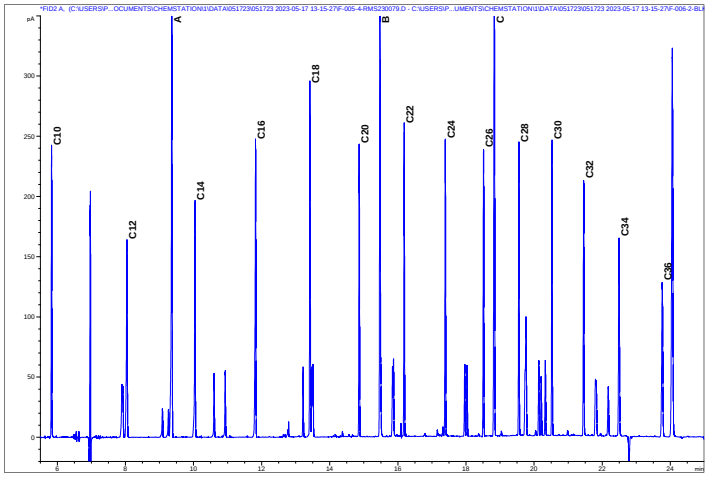


ENV35

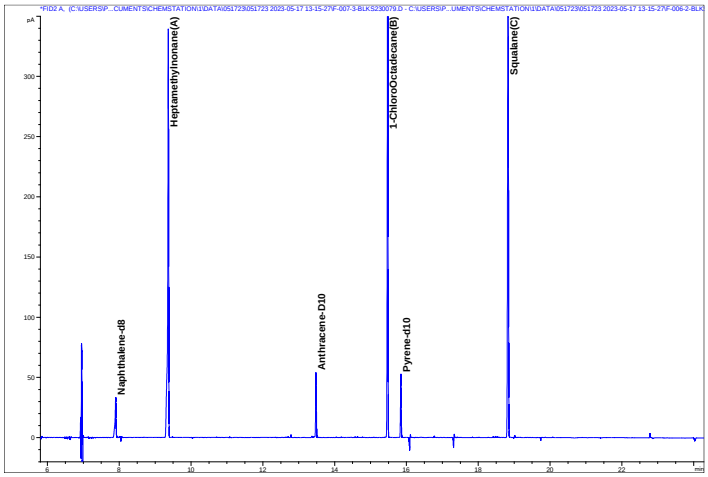
THC: 2.095µg g^{-1}

UCM: 1.210µg g^{-1}

n-Alkanes: 0.016µg g^{-1}



RMS230079



BLKS230079_Labelled

Table I.1 Normalised Selected OSPAR Listed PAH Concentrations to 2.5% TOC

Station	ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35	Survey Average	OSPAR (2009a)		
												BC	BAC	EAC
Naphthalene	<LOD	<LOD	<LOD	<LOD	7	7	<LOD	<LOD	<LOD	<LOD	NC	5	8	43
Acenaphthylene	<LOD	<LOD	<LOD	<LOD	3	<LOD	<LOD	<LOD	<LOD	<LOD	NC	NA	NA	NA
Acenaphthene	<LOD	<LOD	<LOD	<LOD	4	<LOD	<LOD	<LOD	<LOD	<LOD	NC	NA	NA	NA
Fluorene	<LOD	<LOD	<LOD	<LOD	5	<LOD	<LOD	<LOD	<LOD	<LOD	NC	NA	NA	NA
Phenanthrene	<LOD	8	<LOD	<LOD	33	22	<LOD	<LOD	7	<LOD	NC	17	32	1250
Anthracene	<LOD	<LOD	<LOD	<LOD	7	<LOD	<LOD	<LOD	<LOD	<LOD	NC	3	5	78
Fluoranthene	<LOD	11	<LOD	<LOD	58	28	<LOD	<LOD	10	<LOD	NC	20	39	250
Pyrene	<LOD	9	<LOD	<LOD	45	24	<LOD	<LOD	8	<LOD	NC	13	24	350
Benzo[a]anthracene	<LOD	6	<LOD	<LOD	28	16	<LOD	<LOD	<LOD	<LOD	NC	9	16	NA
Chrysene	<LOD	9	<LOD	<LOD	31	19	<LOD	<LOD	7	<LOD	NC	11	20	NA
Benzo[b]fluoranthene	13	32	13	<LOD	53	29	15	<LOD	19	<LOD	25	NA	NA	NA
Benzo[k]fluoranthene	<LOD	21	10	<LOD	41	21	12	<LOD	17	<LOD	NC	NA	NA	NA
Benzo[e]pyrene	16	42	18	<LOD	56	29	19	<LOD	27	<LOD	30	NA	NA	NA
Benzo[a]pyrene	<LOD	12	<LOD	<LOD	34	17	<LOD	<LOD	7	<LOD	NC	15	30	625
Perylene	<LOD	<LOD	<LOD	<LOD	10	<LOD	<LOD	<LOD	<LOD	<LOD	NC	NA	NA	NA
Indeno[123,cd]pyrene	19	50	22	13	70	36	23	<LOD	32	<LOD	33	50	103	NA
Dibenzo[a,h]anthracene	<LOD	7	<LOD	<LOD	11	7	<LOD	<LOD	<LOD	<LOD	NC	NA	NA	NA
Benzo[ghi]perylene	<LOD	18	9	<LOD	31	17	9	<LOD	13	<LOD	NC	45	80	NA
Benzo[bk]fluoranthene	13	53	23	<LOD	94	49	27	<LOD	37	<LOD	NC	NA	NA	NA

Concentrations are expressed as ng g^{-1} dry weight sediment normalised to 2.5% TOC

Blue cells are where concentrations exceed the OSPAR (2009c) BC with values below indicating pristine or remote environments

NC Not calculated due to concentrations below LOD

NA Not available

APPENDIX J METALS ANALYSIS

APPENDIX J METALS ANALYSIS

Table J.1 Normalised Metals to 1% TOC

Station	As	Cd	Cr	Cu	Hg	Ni	Pb	Zn
ENV07	3.7	0.12	10.2	4.4	<0.01	3.8	3.5	13.1
ENV12	1.9	0.07	10.2	4.0	0.02	6.0	3.2	15.6
ENV15	2.3	0.14	8.9	3.7	<0.01	6.1	3.0	13.1
ENV18	4.0	0.10	7.2	3.0	<0.01	2.6	3.1	6.6
ENV21	3.5	0.34	11.8	6.5	<0.01	9.0	5.3	19.3
ENV22	10.9	0.20	10.6	3.9	<0.01	5.9	7.8	15.8
ENV24	3.0	0.09	9.5	3.1	<0.01	3.4	3.1	8.7
ENV33	6.7	0.11	6.0	3.0	<0.01	2.9	3.5	6.3
ENV34	2.7	0.16	9.6	4.0	<0.01	6.0	3.3	11.8
ENV35	6.9	0.09	8.6	3.4	<0.01	3.1	3.5	6.6
OSPAR EAC	NA	60	NA	NA	220	NA	2200	NA

NA Not Available

APPENDIX K POLYBROMINATED DIPHENYL ETHERS ANALYSIS

APPENDIX K POLYBROMINATED DIPHENYL ETHERS ANALYSIS

Table K.1 Concentrations of PBDEs when Normalised to 2.5% TOC

Station	ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35	BAC (OSPAR, 2020)	FEQG (Viñas *et al.*, 2023)
PBDE 17	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	NA
PBDE 28	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	110
PBDE 47	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	97.5
PBDE 66	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	97.5
PBDE 85	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	1
PBDE 99	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	1
PBDE 100	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	1
PBDE 138	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	NA
PBDE 153	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	1100
PBDE 154	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	1100
PBDE 183	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.5	14000
PBDE 209	<LOD	0.51	<LOD	<LOD	0.34	0.22	0.64	<LOD	<LOD	0.11	0.5	47.5

Concentrations expressed as ng g^{-1} dry weight sediment.
Blue cells are where concentrations exceed the OSPAR (2020) BAC after normalisation to 2.5% TOC.

APPENDIX L DNA ANALYSIS

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-K4B9M8			Anderseniellaceae				48	74	61	65	19	50	59	29	91	62	**558**	**10**
IM-36XP3I	Acidobacteria						0	0	0	0	0	0	0	22	0	47	**69**	**2**
IM-Q42W4I	Acidobacteria						32	72	44	95	0	178	40	142	55	208	**866**	**9**
IM-L0J85O	Acidobacteria						0	0	0	0	0	27	0	0	0	0	**27**	**1**
IM-WZ430I	Acidobacteria						0	0	0	0	0	53	0	0	0	0	**53**	**1**
IM-3I5DA7	Acidobacteria						0	0	0	0	0	27	0	0	0	28	**55**	**2**
IM-5I3N6T	Acidobacteria						0	0	0	0	0	0	28	0	0	0	**28**	**1**
IM-A708D8	Acidobacteria						30	22	39	0	30	0	33	0	43	0	**197**	**6**
IM-M9JS13	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae	Acidobacterium		343	318	303	67	476	63	274	38	252	29	**2163**	**10**
IM-99ZQ9R	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae	Acidobacterium		0	0	0	51	0	161	0	53	0	60	**325**	**4**
IM-X970CA	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae	Acidobacterium		0	0	0	28	0	0	0	0	0	21	**49**	**2**
IM-CD13T2	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			565	245	340	307	95	191	352	213	290	322	**2920**	**10**
IM-P783BH	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			348	228	229	84	46	39	251	43	264	53	**1585**	**10**
IM-A38G3N	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			41	22	35	128	0	149	26	118	28	139	**686**	**9**
IM-45H6SB	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			36	50	34	140	0	95	24	99	62	149	**689**	**9**
IM-ZMK271	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			124	74	95	94	0	0	68	46	113	49	**663**	**8**
IM-FS70R2	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			0	0	23	24	0	67	0	20	0	0	**134**	**4**
IM-3R2Z0T	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			33	47	44	28	0	0	28	0	31	0	**211**	**6**
IM-4M7XA3	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			36	30	42	0	31	0	19	20	42	0	**220**	**7**
IM-NZ95U2	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			0	0	0	48	0	27	0	44	0	61	**180**	**4**
IM-YT35W6	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			28	0	26	37	0	0	32	33	0	41	**197**	**6**
IM-8M5UZ9	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			57	33	41	0	44	0	53	0	34	0	**262**	**6**
IM-6K9N1M	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			0	0	0	41	0	93	0	35	0	35	**204**	**4**
IM-9UQYQ7	Acidobacteria	Acidobacteria	Acidobacteriales	Acidobacteriaceae			0	20	0	0	0	0	0	0	0	0	**20**	**1**
IM-39V8CG	Acidobacteria	Acidobacteria	Acidobacteriales				71	58	68	47	29	61	121	27	53	52	**587**	**10**
IM-486AXC	Acidobacteria	Acidobacteria	Acidobacteriales				24	22	28	30	0	0	20	21	0	22	**167**	**7**
IM-Z8Z2Y9	Acidobacteria	Aminicenantia	Aminicenantales				0	0	0	0	37	0	0	0	0	0	**37**	**1**
IM-5E8B5U	Acidobacteria	Aminicenantia	Aminicenantales				0	0	0	0	60	0	0	0	0	0	**60**	**1**
IM-9ND27G	Acidobacteria	Aminicenantia	Aminicenantales				0	0	0	0	52	0	0	0	0	0	**52**	**1**
IM-SRU839	Acidobacteria	Aminicenantia	Aminicenantales				0	0	0	0	25	0	0	0	0	0	**25**	**1**
IM-WB5506	Acidobacteria	Holophagae	Acanthopleuribacterales	Acanthopleuribacteraceae			0	0	44	0	0	0	0	0	0	0	**44**	**1**
IM-ID4M60	Actinobacteriota						299	141	298	105	27	55	349	45	193	65	**1577**	**10**
IM-9D0S5X	Actinobacteriota						576	322	500	305	169	160	483	179	412	237	**3343**	**10**
IM-OI63K0	Actinobacteriota						166	102	108	61	25	29	188	42	84	51	**856**	**10**
IM-550TYU	Actinobacteriota						77	75	138	177	31	211	145	110	84	205	**1253**	**10**
IM-L59JP0	Actinobacteriota						104	53	77	169	0	176	94	115	77	162	**1027**	**9**
IM-2V92AL	Actinobacteriota						24	0	0	46	0	70	20	59	0	72	**291**	**6**
IM-P2X8L9	Actinobacteriota						39	31	30	47	0	113	46	37	43	100	**486**	**9**
IM-SV88J1	Actinobacteriota						43	34	38	23	0	0	64	0	0	29	**231**	**6**
IM-1K4O8I	Actinobacteriota						0	0	0	46	0	72	0	46	0	38	**202**	**4**
IM-IAY823	Actinobacteriota						0	45	30	58	0	159	27	55	47	93	**514**	**8**
IM-K376MQ	Actinobacteriota						75	43	39	75	0	37	50	68	65	79	**531**	**9**
IM-S295WC	Actinobacteriota						24	37	27	82	0	69	46	54	23	64	**426**	**9**
IM-21ESN3	Actinobacteriota						0	19	0	39	0	24	18	0	0	35	**135**	**5**
IM-76SRB9	Actinobacteriota						0	0	0	0	0	61	0	0	0	0	**61**	**1**
IM-3G5E6I	Actinobacteriota						0	32	27	33	0	83	33	21	21	32	**282**	**8**
IM-YK953O	Actinobacteriota						0	27	24	0	0	0	44	0	0	0	**95**	**3**
IM-2B3R1U	Actinobacteriota						0	0	0	38	0	88	0	35	0	65	**226**	**4**
IM-4W9NB1	Actinobacteriota						0	0	0	0	0	71	0	33	0	56	**160**	**3**
IM-O403KR	Actinobacteriota						0	0	0	0	0	0	26	0	0	0	**26**	**1**
IM-A03FN2	Actinobacteriota						30	0	26	0	79	0	0	0	28	0	**163**	**4**
IM-VVK823	Actinobacteriota						0	0	0	0	0	26	0	0	0	27	**53**	**2**
IM-3G5M1C	Actinobacteriota						0	22	0	0	0	0	0	0	0	0	**22**	**1**
IM-B3Q5A0	Actinobacteriota						0	0	0	0	0	25	0	27	0	0	**52**	**2**
IM-258SGN	Actinobacteriota						0	0	0	0	0	0	18	0	0	0	**18**	**1**
IM-O76ME0	Actinobacteriota						0	29	0	0	0	0	25	0	0	25	**79**	**3**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-R269DO	Actinobacteriota						0	0	0	0	0	37	0	0	0	39	**76**	**2**
IM-SC3E78	Actinobacteriota						0	0	0	0	0	0	18	0	0	0	**18**	**1**
IM-J03XP2	Actinobacteriota						0	0	0	0	0	63	0	0	0	0	**63**	**1**
IM-683GCY	Actinobacteriota						0	0	0	0	0	24	0	0	0	22	**46**	**2**
IM-FB43P4	Actinobacteriota						0	0	0	0	0	0	0	0	20	0	**20**	**1**
IM-Y5GY82	Actinobacteriota						0	0	0	0	0	0	24	0	0	0	**24**	**1**
IM-O56WL8	Actinobacteriota	Acidimicrobiia	Acidimicrobiales	Ilumatobacteraceae	Ilumatobacter	nonamiensis	24	63	24	26	0	62	55	28	45	84	**411**	**9**
IM-3TJ48M	Actinobacteriota	Acidimicrobiia	Acidimicrobiales				0	37	39	24	0	72	42	41	26	53	**334**	**8**
IM-VV19U2	Actinobacteriota	Acidimicrobiia					37	66	37	24	0	47	45	23	50	0	**329**	**8**
IM-HG948U	Actinobacteriota	Actinomycetia					127	111	88	89	30	33	109	66	86	104	**843**	**10**
IM-0T28WW	Actinobacteriota	Actinomycetia					312	175	246	89	97	49	237	47	207	63	**1522**	**10**
IM-O9B5P9	Actinobacteriota	Actinomycetia					90	0	22	143	0	120	62	166	0	205	**808**	**7**
IM-UP84G9	Actinobacteriota	Actinomycetia					113	271	191	128	53	238	158	94	161	105	**1512**	**10**
IM-57JG4R	Actinobacteriota	Actinomycetia					181	96	136	114	19	0	178	66	138	55	**983**	**9**
IM-9O40TY	Actinobacteriota	Actinomycetia					122	48	102	110	0	31	126	59	76	71	**745**	**9**
IM-U49YP7	Actinobacteriota	Actinomycetia					0	0	0	38	0	45	0	40	0	85	**208**	**4**
IM-7PJ17B	Actinobacteriota	Actinomycetia					0	0	0	42	0	34	0	55	0	55	**186**	**4**
IM-AQ937N	Actinobacteriota	Actinomycetia					51	0	0	61	0	0	0	32	19	46	**209**	**5**
IM-848INU	Actinobacteriota	Actinomycetia					24	26	28	59	0	108	32	53	37	67	**434**	**9**
IM-133JOP	Actinobacteriota	Actinomycetia					43	26	41	0	22	0	49	0	39	0	**220**	**6**
IM-U918DO	Actinobacteriota	Actinomycetia					34	23	25	36	0	0	66	0	0	39	**223**	**6**
IM-91BON0	Actinobacteriota	Actinomycetia					0	23	0	28	42	0	28	0	0	0	**121**	**4**
IM-PZ129M	Actinobacteriota	Actinomycetia					0	0	0	0	0	30	0	0	0	24	**54**	**2**
IM-8S80ME	Actinobacteriota	Actinomycetia					0	0	0	0	0	25	0	0	0	0	**25**	**1**
IM-NM09Y0	Actinobacteriota	Actinomycetia					23	0	20	47	0	82	43	28	0	23	**266**	**7**
IM-ES432S	Actinobacteriota	Actinomycetia					21	0	0	0	0	0	31	0	0	0	**52**	**2**
IM-ND8ME8	Actinobacteriota	Actinomycetia					0	21	0	0	0	27	19	0	28	0	**95**	**4**
IM-859ONU	Actinobacteriota	Thermoleophilia	Gaiellales	Gaiellaceae			0	0	0	0	0	0	23	0	0	0	**23**	**1**
IM-C2C2G6	Bacteria (Kingdom)						0	86	0	0	2457	0	19	0	28	0	**2590**	**4**
IM-33X7BG	Bacteria (Kingdom)						935	784	875	379	877	103	475	163	875	166	**5632**	**10**
IM-3ND16P	Bacteria (Kingdom)						4334	3833	4525	2113	755	1265	4527	1557	4108	1626	**28643**	**10**
IM-G598EW	Bacteria (Kingdom)						317	100	177	922	93	590	140	792	131	485	**3747**	**10**
IM-V2JV16	Bacteria (Kingdom)						0	0	0	0	269	0	0	0	0	0	**269**	**1**
IM-O11Y9J	Bacteria (Kingdom)						359	236	416	90	290	36	252	30	272	22	**2003**	**10**
IM-2XW61K	Bacteria (Kingdom)						134	298	192	54	225	137	392	31	175	34	**1672**	**10**
IM-B1X4N5	Bacteria (Kingdom)						168	111	123	101	38	0	208	50	99	62	**960**	**9**
IM-I82US4	Bacteria (Kingdom)						174	46	66	35	110	49	55	21	64	28	**648**	**10**
IM-5O96IV	Bacteria (Kingdom)						105	115	140	82	29	36	214	74	129	79	**1003**	**10**
IM-LHE675	Bacteria (Kingdom)						117	67	146	97	139	0	70	29	59	0	**724**	**8**
IM-54Y4FX	Bacteria (Kingdom)						21	102	51	0	95	40	112	0	39	0	**460**	**7**
IM-A0H1R3	Bacteria (Kingdom)						59	59	82	29	52	0	97	0	46	0	**424**	**7**
IM-X660EN	Bacteria (Kingdom)						54	72	81	31	68	36	133	0	83	0	**558**	**8**
IM-K5J16P	Bacteria (Kingdom)						126	29	33	404	0	238	37	372	37	318	**1594**	**9**
IM-8O68JU	Bacteria (Kingdom)						33	0	0	70	0	37	21	87	0	70	**318**	**6**
IM-M14D5G	Bacteria (Kingdom)						45	70	64	114	0	102	48	140	71	170	**824**	**9**
IM-C8EI80	Bacteria (Kingdom)						36	45	27	171	41	68	36	176	33	158	**791**	**10**
IM-8LSL93	Bacteria (Kingdom)						0	0	0	52	0	125	0	55	0	75	**307**	**4**
IM-8LAT59	Bacteria (Kingdom)						0	0	0	0	77	0	0	0	0	0	**77**	**1**
IM-Q27Y6O	Bacteria (Kingdom)						112	63	112	81	30	28	51	73	90	45	**685**	**10**
IM-KC58B8	Bacteria (Kingdom)						0	37	24	0	0	85	30	0	35	0	**211**	**5**
IM-F8J2B2	Bacteria (Kingdom)						47	69	56	0	90	0	59	0	41	0	**362**	**6**
IM-P47W8W	Bacteria (Kingdom)						59	74	85	0	277	0	36	0	86	0	**617**	**6**
IM-U9D1NN	Bacteria (Kingdom)						34	0	0	0	126	0	0	0	26	0	**186**	**3**
IM-UV51Y8	Bacteria (Kingdom)						88	44	32	81	0	81	24	62	43	84	**539**	**9**
IM-E1P2A1	Bacteria (Kingdom)						68	25	34	36	21	0	38	42	52	38	**354**	**9**
IM-82LK0X	Bacteria (Kingdom)						48	40	38	85	20	49	0	61	22	76	**439**	**9**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-2D1F4U	Bacteria (Kingdom)						51	24	26	0	61	0	0	0	23	0	**185**	**5**
IM-C0IB93	Bacteria (Kingdom)						0	0	0	24	0	50	0	0	0	31	**105**	**3**
IM-4Z3K4E	Bacteria (Kingdom)						50	27	27	150	27	293	37	172	0	166	**949**	**9**
IM-L40FZ3	Bacteria (Kingdom)						0	24	0	0	113	0	0	0	0	0	**137**	**2**
IM-78QM87	Bacteria (Kingdom)						0	0	0	0	62	0	0	0	0	0	**62**	**1**
IM-85Q8VI	Bacteria (Kingdom)						30	0	0	0	0	0	0	0	0	0	**30**	**1**
IM-45GVO7	Bacteria (Kingdom)						47	0	34	0	0	0	0	0	30	0	**111**	**3**
IM-4W3ZQ3	Bacteria (Kingdom)						0	35	30	0	0	0	36	0	26	0	**127**	**4**
IM-4R4XN2	Bacteria (Kingdom)						97	74	93	55	48	31	69	37	58	42	**604**	**10**
IM-R6NR41	Bacteria (Kingdom)						0	0	0	0	0	0	30	0	0	0	**30**	**1**
IM-9B9S1P	Bacteria (Kingdom)						0	0	0	0	29	0	0	0	0	0	**29**	**1**
IM-31ZZO8	Bacteria (Kingdom)						24	0	0	41	0	0	0	23	0	0	**88**	**3**
IM-A5946I	Bacteria (Kingdom)						0	0	0	0	54	0	0	0	0	0	**54**	**1**
IM-71S6YP	Bacteria (Kingdom)						39	35	47	32	84	0	18	34	36	27	**352**	**9**
IM-CC10L2	Bacteria (Kingdom)						0	0	0	0	112	0	0	0	0	0	**112**	**1**
IM-BMJ818	Bacteria (Kingdom)						25	28	0	26	23	32	27	21	0	0	**182**	**7**
IM-B1NG88	Bacteria (Kingdom)						0	0	0	24	0	29	0	28	0	34	**115**	**4**
IM-X056RN	Bacteria (Kingdom)						0	0	0	43	0	0	0	35	0	22	**100**	**3**
IM-Y24B6Q	Bacteria (Kingdom)						48	39	42	0	63	0	43	0	34	0	**269**	**6**
IM-I89WI1	Bacteria (Kingdom)						0	0	0	0	52	0	0	0	0	0	**52**	**1**
IM-9P10KY	Bacteria (Kingdom)						0	0	0	0	0	0	30	0	21	0	**51**	**2**
IM-M73QUG	Bacteria (Kingdom)						0	27	0	0	33	0	0	0	0	0	**60**	**2**
IM-UD0X51	Bacteria (Kingdom)						30	52	33	0	32	0	31	0	32	0	**210**	**6**
IM-H39UZ0	Bacteria (Kingdom)						0	0	0	0	24	0	20	0	0	0	**44**	**2**
IM-8EE2P9	Bacteria (Kingdom)						0	0	0	0	42	0	0	0	0	0	**42**	**1**
IM-OX5V29	Bacteria (Kingdom)						30	0	0	81	24	45	18	82	19	79	**378**	**8**
IM-3Y54SF	Bacteria (Kingdom)						0	23	0	24	0	0	23	27	31	25	**153**	**6**
IM-6C6EV0	Bacteria (Kingdom)						0	0	0	23	0	49	0	24	0	31	**127**	**4**
IM-7J06ON	Bacteria (Kingdom)						0	0	0	0	0	0	0	0	0	23	**23**	**1**
IM-381MRM	Bacteria (Kingdom)						27	19	0	76	0	58	0	59	0	51	**290**	**6**
IM-Q8A1C2	Bacteria (Kingdom)						0	0	0	0	0	0	0	0	0	21	**21**	**1**
IM-N2P67D	Bacteria (Kingdom)						0	0	0	0	0	26	0	0	0	0	**26**	**1**
IM-58I03B	Bacteria (Kingdom)						0	0	0	0	0	27	37	0	0	0	**64**	**2**
IM-0DI2F0	Bacteria (Kingdom)						37	20	26	62	0	27	45	51	19	61	**348**	**9**
IM-B7PV52	Bacteria (Kingdom)						0	0	0	0	43	0	0	0	0	0	**43**	**1**
IM-0X02OG	Bacteria (Kingdom)						0	0	0	0	51	0	0	0	0	0	**51**	**1**
IM-73CU4G	Bacteria (Kingdom)						0	0	0	24	0	0	0	34	0	44	**102**	**3**
IM-847CPP	Bacteria (Kingdom)						25	29	0	0	0	0	0	0	0	0	**54**	**2**
IM-55JZ7A	Bacteria (Kingdom)						0	0	0	0	0	0	20	0	0	0	**20**	**1**
IM-8PK2M0	Bacteria (Kingdom)						0	0	0	0	0	31	0	0	0	0	**31**	**1**
IM-9GBN48	Bacteria (Kingdom)						0	0	0	0	0	0	0	30	0	0	**30**	**1**
IM-571GAQ	Bacteria (Kingdom)						0	0	0	23	0	0	0	0	0	24	**47**	**2**
IM-T5L1ZX	Bacteria (Kingdom)						0	0	0	0	0	0	0	0	0	33	**33**	**1**
IM-6M3C4F	Bacteria (Kingdom)						0	0	0	36	31	0	0	0	0	0	**67**	**2**
IM-M97EB3	Bacteria (Kingdom)						0	0	0	0	0	0	0	0	0	27	**27**	**1**
IM-2X25RB	Bacteria (Kingdom)						0	0	0	0	0	28	0	0	0	0	**28**	**1**
IM-AF1NK9	Bacteria (Kingdom)						0	0	0	0	35	0	0	0	0	0	**35**	**1**
IM-43E5BV	Bacteria (Kingdom)						26	0	0	45	0	99	20	36	0	51	**277**	**6**
IM-D5J5V1	Bacteria (Kingdom)						24	0	30	0	56	0	0	0	0	0	**110**	**3**
IM-IU079K	Bacteria (Kingdom)						0	0	0	0	0	28	0	0	0	21	**49**	**2**
IM-2PR70D	Bacteria (Kingdom)						0	26	0	0	0	0	0	0	25	0	**51**	**2**
IM-JLQ04V	Bacteria (Kingdom)						0	0	0	30	0	0	0	31	0	0	**61**	**2**
IM-LC25K5	Bacteria (Kingdom)						0	0	0	0	0	0	0	30	0	28	**58**	**2**
IM-B9L97U	Bacteria (Kingdom)						0	27	21	0	0	0	27	0	0	0	**75**	**3**
IM-9R87DD	Bacteria (Kingdom)						0	22	0	0	0	0	0	0	0	0	**22**	**1**
IM-9V70VD	Bacteria (Kingdom)						0	0	0	0	0	37	0	0	0	0	**37**	**1**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-4V8DQ9	Bacteria (Kingdom)						0	0	0	0	25	0	26	0	0	0	**51**	**2**
IM-GZ1Y12	Bacteria (Kingdom)						0	0	0	28	0	45	0	35	0	38	**146**	**4**
IM-IG864A	Bacteria (Kingdom)						0	0	0	0	0	0	0	0	0	21	**21**	**1**
IM-1GJE62	Bacteria (Kingdom)						22	28	41	0	0	34	30	23	0	0	**178**	**6**
IM-8RKY42	Bacteria (Kingdom)						0	0	0	0	33	0	0	0	0	0	**33**	**1**
IM-OUN830	Bacteria (Kingdom)						0	26	0	0	70	0	0	0	0	0	**96**	**2**
IM-G6010D	Bacteria (Kingdom)						0	0	0	0	55	0	0	0	0	0	**55**	**1**
IM-L6E9FO	Bacteria (Kingdom)						0	0	0	0	27	0	0	0	0	0	**27**	**1**
IM-73SI2C	Bacteria (Kingdom)						0	0	0	0	33	0	0	0	0	0	**33**	**1**
IM-G1U75E	Bacteria (Kingdom)						0	0	0	0	23	0	0	0	0	0	**23**	**1**
IM-OGR558	Bacteroidetes						44	0	29	0	34	0	22	0	22	0	**151**	**5**
IM-JD54Z5	Bacteroidetes						23	37	20	0	0	40	26	20	33	0	**199**	**7**
IM-N093RS	Bacteroidetes	Bacteroidia	Bacteroidales	Lentimicrobiaceae			0	0	0	0	18	0	0	0	0	0	**18**	**1**
IM-1J5J8K	Bacteroidetes	Bacteroidia	Bacteroidales	Marinilabiliaceae			26	0	0	0	183	0	0	0	0	0	**209**	**2**
IM-C7QQ86	Bacteroidetes	Bacteroidia	Bacteroidales	Prolixibacteraceae			0	0	0	0	0	0	91	0	0	0	**91**	**1**
IM-2M7J0N	Bacteroidetes	Bacteroidia	Bacteroidales	Prolixibacteraceae			0	0	0	0	26	0	29	0	0	0	**55**	**2**
IM-44MR6F	Bacteroidetes	Bacteroidia	Bacteroidales	Prolixibacteraceae			0	0	0	0	0	0	46	0	0	0	**46**	**1**
IM-JY8Z25	Bacteroidetes	Bacteroidia	Bacteroidales				175	135	148	69	388	40	250	21	117	24	**1367**	**10**
IM-UIU138	Bacteroidetes	Bacteroidia	Bacteroidales				49	63	48	31	198	0	53	0	55	0	**497**	**7**
IM-BB17O9	Bacteroidetes	Bacteroidia	Bacteroidales				0	0	0	0	100	0	0	0	0	0	**100**	**1**
IM-I67EQ4	Bacteroidetes	Bacteroidia	Chitinophagales	Saprospiraceae	Phaeodactylibacter		22	0	0	0	0	0	0	0	0	0	**22**	**1**
IM-19AO5C	Bacteroidetes	Bacteroidia					35	38	36	42	0	33	25	32	28	51	**320**	**9**
IM-4X0GG6	Bacteroidetes	Bacteroidia					0	0	0	0	0	26	0	21	0	0	**47**	**2**
IM-81X6SO	Bacteroidetes	Bacteroidia					0	25	0	0	0	0	0	0	23	0	**48**	**2**
IM-S2FK62	Bacteroidetes	Bacteroidia					0	0	0	0	0	0	19	0	0	0	**19**	**1**
IM-NK91T0	Bacteroidetes	Bacteroidia					0	24	20	0	0	0	0	0	21	0	**65**	**3**
IM-18V7KT	Bacteroidetes	Cytophagia	Cytophagales	Cytophagaceae	Cytophaga		38	26	29	56	0	109	31	50	55	70	**464**	**9**
IM-GX314O	Bacteroidetes	Cytophagia	Cytophagales	Flammeovirgaceae			54	47	47	38	35	27	64	0	46	0	**358**	**8**
IM-0CY31C	Bacteroidetes	Cytophagia	Cytophagales				211	124	195	36	105	0	160	0	150	0	**981**	**7**
IM-8KRI74	Bacteroidetes	Cytophagia	Cytophagales				0	40	0	33	0	280	0	41	44	87	**525**	**6**
IM-ZT39H7	Bacteroidetes	Cytophagia	Cytophagales				42	29	53	64	19	0	28	37	42	27	**341**	**9**
IM-8S5D1Q	Bacteroidetes	Cytophagia	Cytophagales				23	36	33	30	0	0	0	0	19	0	**141**	**5**
IM-VQ73N7	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae	Aquimarina		0	38	0	0	0	0	0	0	23	0	**61**	**2**
IM-L4878E	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae	Lutibacter		0	30	0	0	0	0	0	0	34	0	**64**	**2**
IM-Z9H3N2	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae	Maribacter		32	41	27	42	21	35	26	27	27	44	**322**	**10**
IM-79MIM0	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae	Maritimimonas		0	20	0	0	0	0	0	0	0	0	**20**	**1**
IM-X9VD85	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae			82	197	123	72	73	145	202	62	177	131	**1264**	**10**
IM-9J8C20	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae			0	31	27	43	0	24	0	25	22	45	**217**	**7**
IM-393ROZ	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae			0	41	24	24	0	79	0	23	52	41	**284**	**7**
IM-OS03R5	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae			35	90	57	26	19	51	60	0	77	82	**497**	**9**
IM-8G8T9O	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae			27	73	23	26	27	0	33	0	46	0	**255**	**7**
IM-72SEM7	Bacteroidetes	Flavobacteria	Flavobacteriales	Flavobacteriaceae			0	0	0	28	0	0	0	0	0	26	**54**	**2**
IM-Q7L6J6	Bacteroidetes	Flavobacteria	Flavobacteriales	Schleiferiaceae			0	0	0	0	0	0	0	24	19	23	**66**	**3**
IM-6X38KG	Bacteroidetes	Ignavibacteria	Ignavibacteriales				98	46	89	77	82	26	60	71	44	84	**677**	**10**
IM-089LAM	Bacteroidetes	Sphingobacteria	Sphingobacteriales	Saprospiraceae			0	40	32	0	0	39	19	0	24	0	**154**	**5**
IM-UT43Q0	Bacteroidetes	Sphingobacteria	Sphingobacteriales				0	0	0	31	0	0	0	27	21	40	**119**	**4**
IM-7B70KD	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			159	86	147	76	597	32	97	38	134	23	**1389**	**10**
IM-S40I8N	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			76	171	72	59	193	34	73	36	148	39	**901**	**10**
IM-LB11W2	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	39	38	0	78	0	25	0	35	0	**215**	**5**
IM-X0S51W	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	31	0	0	58	0	0	0	24	0	**113**	**3**
IM-EWD208	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	0	0	0	56	0	0	0	0	0	**56**	**1**
IM-49FSF3	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	0	0	45	0	24	0	43	0	41	**153**	**4**
IM-78IM8W	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	0	0	0	85	0	0	0	0	0	**85**	**1**
IM-IM821T	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	0	0	0	33	0	0	0	0	0	**33**	**1**
IM-CF122P	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	19	0	0	0	0	0	0	0	0	**19**	**1**
IM-YH5Y54	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			23	25	0	0	26	0	0	0	22	0	**96**	**4**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-4B00FE	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	0	0	0	56	0	0	0	0	0	**56**	**1**
IM-42UA4S	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			26	0	21	0	43	0	0	0	0	0	**90**	**3**
IM-34P1FX	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	0	24	0	38	0	0	0	0	0	**62**	**2**
IM-48N8AX	Chloroflexi	Anaerolineae	Anaerolineales	Anaerolineaceae			0	0	0	0	22	0	0	0	0	0	**22**	**1**
IM-0MS24N	Chloroflexi	Anaerolineae					0	0	0	0	36	0	0	0	0	0	**36**	**1**
IM-8WGT08	Chloroflexi	Anaerolineae					0	0	24	0	29	0	0	0	19	0	**72**	**3**
IM-Y84O8O	Chloroflexi	Dehalococcoidia	Dehalococcoidales	Dehalococcoidaceae			0	0	0	0	43	0	0	0	0	0	**43**	**1**
IM-J0R37B	Chloroflexi	Dehalococcoidia					0	0	0	0	0	24	0	0	0	0	**24**	**1**
IM-J4J1P7	Cyanobacteria	Cyanophyceae	Synechococcales	Synechococcaceae	Synechococcus		0	20	24	0	0	0	27	0	29	24	**124**	**5**
IM-38NLW4	Deferribacteres	Deferribacteres					50	39	46	38	126	0	51	0	53	0	**403**	**7**
IM-W75J1X	Fibrobacterota						0	0	0	0	69	0	0	0	0	0	**69**	**1**
IM-473G5A	Fibrobacterota						0	0	0	0	65	0	0	0	0	0	**65**	**1**
IM-BKM359	Firmicutes_A	Clostridia					0	0	0	0	18	0	0	0	0	0	**18**	**1**
IM-2QW05X	Fusobacteria	Fusobacteria	Fusobacteriales	Fusobacteriaceae			0	0	0	23	0	0	0	0	0	0	**23**	**1**
IM-34Q1RC	Gemmatimonadetes						37	29	50	0	121	0	38	0	42	0	**317**	**6**
IM-6KC05J	Gemmatimonadetes						0	24	0	0	70	0	20	0	19	0	**133**	**4**
IM-45K2QF	Gemmatimonadetes	Gemmatimonadetes	Gemmatimonadales	Gemmatimonadaceae			0	0	0	0	68	0	0	0	0	0	**68**	**1**
IM-708R8B	Gemmatimonadetes	Gemmatimonadetes	Gemmatimonadales	Gemmatimonadaceae			0	0	0	0	26	0	0	0	0	0	**26**	**1**
IM-F2H31D	Gemmatimonadetes	Gemmatimonadetes	Gemmatimonadales	Gemmatimonadaceae			0	0	0	37	0	43	0	48	0	25	**153**	**4**
IM-09X4UP	Latescibacterota						29	0	29	0	30	0	40	0	0	0	**128**	**4**
IM-6RQ9T7	Latescibacterota	Latescibacteria	Latescibacterales	Latescibacteraceae			0	0	0	24	0	0	0	24	0	26	**74**	**3**
IM-78Z5NZ	Myxococcota						0	0	0	0	50	0	0	0	0	0	**50**	**1**
IM-2C0F4I	Myxococcota						31	31	33	0	36	0	19	0	0	0	**150**	**5**
IM-CI186G	Nitrospirae						0	0	0	0	0	55	0	0	0	0	**55**	**1**
IM-6DHS25	Nitrospirae	Nitrospira					22	0	0	0	0	0	0	38	0	0	**60**	**2**
IM-T75Q4D	Nitrospirae	Nitrospira	Nitrospirales	Nitrospiraceae			0	56	0	84	43	60	0	56	0	39	**338**	**6**
IM-N57H3V	Planctomycetes						319	251	328	325	34	455	395	274	301	294	**2976**	**10**
IM-8V3LI9	Planctomycetes						0	0	0	0	0	39	0	0	0	0	**39**	**1**
IM-4U27OB	Planctomycetes						53	0	0	61	0	0	28	49	0	48	**239**	**5**
IM-17N6FL	Planctomycetes						0	0	0	36	0	44	0	37	0	52	**169**	**4**
IM-H13B2G	Planctomycetes						27	0	0	67	0	46	0	50	0	30	**220**	**5**
IM-190FLF	Planctomycetes						0	22	0	0	0	29	28	0	0	0	**79**	**3**
IM-4UH3A1	Planctomycetes						51	0	26	93	0	64	38	96	0	94	**462**	**7**
IM-8I08UP	Planctomycetes						75	22	33	64	0	76	36	72	44	82	**504**	**9**
IM-DX311R	Planctomycetes						0	0	0	41	0	42	0	49	0	69	**201**	**4**
IM-Z223OW	Planctomycetes						0	0	0	0	0	0	0	20	0	0	**20**	**1**
IM-5GH81N	Planctomycetes						35	0	0	79	0	60	33	73	0	87	**367**	**6**
IM-W1B3J6	Planctomycetes						0	0	0	38	0	0	0	41	0	26	**105**	**3**
IM-E90UX8	Planctomycetes						0	0	0	0	0	0	0	23	0	24	**47**	**2**
IM-6CLH52	Planctomycetes						0	0	0	0	0	0	0	0	0	22	**22**	**1**
IM-29E5BV	Planctomycetes						0	0	0	38	0	53	0	48	0	76	**215**	**4**
IM-6J6W7I	Planctomycetes						51	24	36	120	0	94	38	125	0	95	**583**	**8**
IM-D3B8S2	Planctomycetes						0	0	0	42	0	37	0	50	0	25	**154**	**4**
IM-D97XRJ	Planctomycetes						0	0	0	0	36	0	0	0	0	0	**36**	**1**
IM-0OP2T5	Planctomycetes						0	0	0	41	0	48	0	52	0	56	**197**	**4**
IM-304PFL	Planctomycetes						0	0	0	0	0	0	0	32	0	26	**58**	**2**
IM-JU1I67	Planctomycetes						0	0	0	0	0	0	0	0	0	26	**26**	**1**
IM-6MU8W6	Planctomycetes						25	0	0	0	0	30	0	38	0	24	**117**	**4**
IM-H0XP8I	Planctomycetes	Phycisphaerae	Phycisphaerales	Phycisphaeraceae			0	0	0	28	0	0	0	39	0	24	**91**	**3**
IM-T0R94D	Planctomycetes	Phycisphaerae	Phycisphaerales	Phycisphaeraceae			33	0	0	0	0	0	53	21	0	0	**107**	**3**
IM-XTK973	Planctomycetes	Phycisphaerae					0	0	0	0	37	0	0	0	0	0	**37**	**1**
IM-484ZNH	Planctomycetes	Planctomycetacia	Planctomycetales	Planctomycetaceae			0	0	0	0	0	0	0	23	0	0	**23**	**1**
IM-2Q5KG6	Planctomycetes	Planctomycetacia	Planctomycetales	Planctomycetaceae			0	0	0	0	0	0	0	25	0	0	**25**	**1**
IM-3ZE5O7	Planctomycetes	Planctomycetacia	Planctomycetales	Planctomycetaceae			0	0	0	0	0	0	0	0	0	26	**26**	**1**
IM-4RF4L9	Planctomycetes	Planctomycetacia	Planctomycetales	Planctomycetaceae			21	0	0	0	0	0	0	28	0	0	**49**	**2**
IM-RS526Y	Planctomycetes	Planctomycetacia	Planctomycetales				47	0	20	129	0	112	0	155	0	73	**536**	**6**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-S056NK	Planctomycetes	Planctomycetacia	Planctomycetales				125	22	43	294	0	143	65	309	30	273	**1304**	**9**
IM-B4VH11	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	41	0	25	0	34	0	51	**151**	**4**
IM-69U3ZY	Planctomycetes	Planctomycetacia	Planctomycetales				80	47	54	135	0	84	85	115	49	116	**765**	**9**
IM-IO6R26	Planctomycetes	Planctomycetacia	Planctomycetales				46	0	41	0	0	0	30	0	0	0	**117**	**3**
IM-YMS387	Planctomycetes	Planctomycetacia	Planctomycetales				36	0	22	0	0	0	35	0	0	0	**93**	**3**
IM-359YYJ	Planctomycetes	Planctomycetacia	Planctomycetales				26	0	0	26	0	0	0	40	0	0	**92**	**3**
IM-X2G27W	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	49	0	0	0	46	0	21	**116**	**3**
IM-UU016L	Planctomycetes	Planctomycetacia	Planctomycetales				30	0	0	57	0	38	21	70	0	67	**283**	**6**
IM-08CY5D	Planctomycetes	Planctomycetacia	Planctomycetales				25	0	0	50	0	35	0	73	22	52	**257**	**6**
IM-3BO3Z9	Planctomycetes	Planctomycetacia	Planctomycetales				41	0	0	68	0	0	0	38	0	0	**147**	**3**
IM-D91GB4	Planctomycetes	Planctomycetacia	Planctomycetales				31	0	22	0	0	0	0	34	0	0	**87**	**3**
IM-GT200W	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	0	70	0	0	0	0	0	**70**	**1**
IM-MO08V9	Planctomycetes	Planctomycetacia	Planctomycetales				22	22	0	26	0	0	0	0	0	33	**103**	**4**
IM-U9JT87	Planctomycetes	Planctomycetacia	Planctomycetales				43	20	36	29	0	0	42	0	28	0	**198**	**6**
IM-41JGT6	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	0	0	0	0	0	0	22	**22**	**1**
IM-66EZ8U	Planctomycetes	Planctomycetacia	Planctomycetales				43	22	32	0	27	0	34	0	22	0	**180**	**6**
IM-10CF8K	Planctomycetes	Planctomycetacia	Planctomycetales				0	22	25	0	26	0	21	0	0	0	**94**	**4**
IM-829GSI	Planctomycetes	Planctomycetacia	Planctomycetales				23	0	27	55	0	33	0	52	0	44	**234**	**6**
IM-2EQ6A0	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	0	0	0	0	0	0	22	**22**	**1**
IM-SH56Z4	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	0	0	0	0	21	0	0	**21**	**1**
IM-T5OL75	Planctomycetes	Planctomycetacia	Planctomycetales				36	27	0	27	0	0	30	0	33	0	**153**	**5**
IM-5AL68F	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	24	0	58	18	35	0	38	**173**	**5**
IM-TG3T96	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	28	0	0	0	0	0	0	**28**	**1**
IM-B6BQ70	Planctomycetes	Planctomycetacia	Planctomycetales				28	0	0	0	0	0	0	0	0	0	**28**	**1**
IM-I35N9E	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	32	0	28	0	22	0	25	**107**	**4**
IM-JUG499	Planctomycetes	Planctomycetacia	Planctomycetales				28	0	25	0	0	0	19	0	0	0	**72**	**3**
IM-T2ED49	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	0	0	0	25	0	0	0	**25**	**1**
IM-L507EP	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	33	0	0	0	32	19	33	**117**	**4**
IM-99B5PW	Planctomycetes	Planctomycetacia	Planctomycetales				0	0	0	0	0	0	0	20	0	0	**20**	**1**
IM-GJE372	Planctomycetes	Planctomycetia	Pirellulales	Pirellulaceae			41	0	34	0	0	0	0	0	0	0	**75**	**2**
IM-WH08L3	Proteobacteria						126	370	203	110	832	97	98	45	159	27	**2067**	**10**
IM-X6NV02	Proteobacteria						659	294	542	271	730	110	325	176	339	111	**3557**	**10**
IM-558PYY	Proteobacteria						0	0	0	0	380	0	0	0	0	0	**380**	**1**
IM-A9Z0I2	Proteobacteria						53	104	108	0	794	0	42	0	88	0	**1189**	**6**
IM-GA2A78	Proteobacteria						458	215	234	230	287	146	202	139	259	160	**2330**	**10**
IM-F330GN	Proteobacteria						211	132	168	452	118	110	237	332	104	318	**2182**	**10**
IM-2S6O3D	Proteobacteria						115	269	250	119	37	300	264	131	274	215	**1974**	**10**
IM-Q8US76	Proteobacteria						136	145	218	67	160	32	120	25	115	0	**1018**	**9**
IM-X735NF	Proteobacteria						63	36	49	51	0	0	28	34	36	25	**322**	**8**
IM-57CXZK	Proteobacteria						0	0	0	0	81	0	0	0	0	0	**81**	**1**
IM-06LYO4	Proteobacteria						86	47	69	23	242	0	57	0	47	0	**571**	**7**
IM-75ZD3Y	Proteobacteria						34	39	65	93	47	0	0	48	68	29	**423**	**8**
IM-EPO161	Proteobacteria						49	54	52	23	72	26	19	0	48	0	**343**	**8**
IM-JE4U70	Proteobacteria						118	200	199	0	165	0	212	0	181	0	**1075**	**6**
IM-IDF373	Proteobacteria						25	44	21	68	0	0	19	62	25	94	**358**	**8**
IM-6WJ7A7	Proteobacteria						0	21	0	53	0	76	32	48	0	53	**283**	**6**
IM-UJ0O56	Proteobacteria						0	0	0	44	0	52	0	47	0	34	**177**	**4**
IM-O2K2Q6	Proteobacteria						28	0	27	0	0	0	0	0	19	0	**74**	**3**
IM-31OG3E	Proteobacteria						0	0	0	50	0	61	0	37	0	45	**193**	**4**
IM-28J2EO	Proteobacteria						27	19	26	96	0	57	23	103	0	83	**434**	**8**
IM-J8HT34	Proteobacteria						0	0	0	30	0	0	0	28	0	0	**58**	**2**
IM-9307PD	Proteobacteria						0	0	0	0	62	0	0	0	0	0	**62**	**1**
IM-4PN6R4	Proteobacteria						0	0	0	0	0	0	0	20	0	0	**20**	**1**
IM-ZN81YI	Proteobacteria						0	0	0	0	45	0	0	0	0	0	**45**	**1**
IM-1KZ30G	Proteobacteria						45	20	20	0	26	0	27	0	24	0	**162**	**6**
IM-X90TM9	Proteobacteria						73	61	77	59	22	82	76	41	73	28	**592**	**10**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-CFV734	Proteobacteria						38	35	53	49	17	65	36	47	36	47	**423**	**10**
IM-538PPN	Proteobacteria						0	26	24	33	0	42	25	25	31	27	**233**	**8**
IM-UP5D4Y	Proteobacteria						36	24	27	81	22	35	0	71	32	30	**358**	**9**
IM-T10PN8	Proteobacteria						0	0	0	0	0	0	0	30	0	0	**30**	**1**
IM-7VN4H6	Proteobacteria						21	0	0	42	0	0	0	32	0	22	**117**	**4**
IM-1HJH20	Proteobacteria						0	0	0	0	0	0	0	25	0	0	**25**	**1**
IM-8BT8Q3	Proteobacteria	Alphaproteobacteria	Alphaproteobacteria inc		Methyloceanibacter	stevinii	23	39	25	34	19	81	24	0	31	26	**302**	**9**
IM-5F5BV8	Proteobacteria	Alphaproteobacteria	Rhizobiales	Hyphomicrobiaceae	Hyphomicrobium		0	22	0	154	0	56	19	135	0	155	**541**	**6**
IM-GX82X8	Proteobacteria	Alphaproteobacteria	Rhizobiales	Hyphomicrobiaceae	Hyphomicrobium		83	98	75	127	27	109	89	54	111	75	**848**	**10**
IM-1U3IK8	Proteobacteria	Alphaproteobacteria	Rhizobiales	Hyphomicrobiaceae			38	35	40	34	0	52	60	21	38	22	**340**	**9**
IM-88HJ5S	Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	Ahrensia		0	0	0	0	26	0	0	0	0	0	**26**	**1**
IM-13WA2S	Proteobacteria	Alphaproteobacteria	Rhizobiales	Rhizobiaceae			0	38	23	0	0	55	26	0	46	26	**214**	**6**
IM-4UW8C7	Proteobacteria	Alphaproteobacteria	Rhizobiales				49	43	33	60	0	90	34	41	35	48	**433**	**9**
IM-O99QF8	Proteobacteria	Alphaproteobacteria	Rhizobiales				0	0	0	0	0	26	0	0	0	0	**26**	**1**
IM-TJ883H	Proteobacteria	Alphaproteobacteria	Rhizobiales				0	0	0	0	0	27	0	26	21	43	**117**	**4**
IM-19QOG8	Proteobacteria	Alphaproteobacteria	Rhizobiales				27	0	0	36	0	0	0	0	0	23	**86**	**3**
IM-8PR62H	Proteobacteria	Alphaproteobacteria	Rhizobiales				0	0	20	0	0	30	28	0	25	0	**103**	**4**
IM-TF0Z30	Proteobacteria	Alphaproteobacteria	Rhizobiales				0	19	0	0	0	25	0	0	23	25	**92**	**4**
IM-A30P8F	Proteobacteria	Alphaproteobacteria	Sphingomonadales	Sphingomondaceae	Parasphingopyxis	algicola	0	31	0	0	0	0	0	0	23	0	**54**	**2**
IM-443RWS	Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae	Silicimonas	algicola	0	0	0	0	0	0	0	0	19	0	**19**	**1**
IM-Y33E4M	Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae			0	51	0	40	0	47	0	26	59	44	**267**	**6**
IM-KFC916	Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae			0	80	70	0	23	72	41	26	86	38	**436**	**8**
IM-42BTH5	Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae			0	38	0	0	0	25	0	0	20	0	**83**	**3**
IM-ZB735J	Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae			0	23	21	0	0	0	0	0	24	22	**90**	**4**
IM-3ZV2P3	Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae			0	55	33	25	21	48	32	0	49	45	**308**	**8**
IM-3MR6N2	Proteobacteria	Alphaproteobacteria	Rhodobacterales	Rhodobacteraceae			0	0	0	0	0	26	0	0	0	35	**61**	**2**
IM-N787IX	Proteobacteria	Alphaproteobacteria	Rhodobacterales				0	42	39	0	0	36	37	0	34	30	**218**	**6**
IM-7JK8Y4	Proteobacteria	Alphaproteobacteria	Kiloniellales	Kiloniellaceae			0	0	0	42	0	53	0	21	21	32	**169**	**5**
IM-SF567Z	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae	Pelagibius		0	0	0	38	0	24	0	37	0	0	**99**	**3**
IM-FY1I30	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae	Pelagibius		0	0	0	26	0	37	0	32	0	23	**118**	**4**
IM-836CXC	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae	Pelagibius		0	0	0	0	0	54	0	0	0	0	**54**	**1**
IM-G3Q2W0	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae			72	0	36	143	29	130	31	103	41	72	**657**	**9**
IM-9D0XL3	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae			52	0	21	107	27	214	0	102	0	61	**584**	**7**
IM-Z3S14K	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae			75	23	44	148	39	249	30	151	50	96	**905**	**10**
IM-6D4XF5	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae			63	0	28	115	20	301	0	112	26	54	**719**	**8**
IM-1B39YS	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae			0	0	0	0	0	55	0	0	0	0	**55**	**1**
IM-6W2KR7	Proteobacteria	Alphaproteobacteria	Rhodospirillales	Rhodospirillaceae			0	0	0	23	0	0	0	0	0	0	**23**	**1**
IM-72K6VM	Proteobacteria	Alphaproteobacteria					134	0	37	69	0	150	52	67	0	37	**546**	**7**
IM-M0R8N8	Proteobacteria	Alphaproteobacteria					0	37	0	90	27	162	0	87	25	88	**516**	**7**
IM-9W3W5X	Proteobacteria	Alphaproteobacteria					28	73	36	0	23	70	63	37	65	40	**435**	**9**
IM-2X06KZ	Proteobacteria	Alphaproteobacteria					21	0	0	29	73	0	0	0	0	0	**123**	**3**
IM-70KHJB	Proteobacteria	Alphaproteobacteria					0	0	0	0	0	76	0	0	0	0	**76**	**1**
IM-AN28E2	Proteobacteria	Alphaproteobacteria					0	53	48	0	18	75	0	0	34	0	**228**	**5**
IM-ED529U	Proteobacteria	Alphaproteobacteria					0	39	0	72	0	52	0	54	19	91	**327**	**6**
IM-N7V1X7	Proteobacteria	Alphaproteobacteria					0	0	0	0	0	69	0	25	0	0	**94**	**2**
IM-Y63LT9	Proteobacteria	Alphaproteobacteria					25	0	0	67	0	98	0	61	26	52	**329**	**6**
IM-18CI5Y	Proteobacteria	Alphaproteobacteria					0	45	28	0	26	80	41	0	40	29	**289**	**7**
IM-OUC30M	Proteobacteria	Alphaproteobacteria					0	0	0	0	0	30	0	0	0	0	**30**	**1**
IM-A1NL69	Proteobacteria	Alphaproteobacteria					0	28	0	0	0	0	0	0	0	0	**28**	**1**
IM-2UUA23	Proteobacteria	Alphaproteobacteria					0	20	0	30	0	61	0	41	22	36	**210**	**6**
IM-OK804L	Proteobacteria	Alphaproteobacteria					21	0	0	41	0	54	0	53	0	31	**200**	**5**
IM-83F8HF	Proteobacteria	Alphaproteobacteria					0	0	0	0	0	35	0	0	0	0	**35**	**1**
IM-8QU4D6	Proteobacteria	Alphaproteobacteria					0	19	0	0	0	0	30	0	34	0	**83**	**3**
IM-E1663Q	Proteobacteria	Alphaproteobacteria					30	0	0	26	19	47	0	52	0	33	**207**	**6**
IM-WD296N	Proteobacteria	Betaproteobacteria	Nitrosomonadales	Nitrosomonadaceae			284	377	310	600	99	1078	225	657	384	802	**4816**	**10**
IM-60GF77	Proteobacteria	Betaproteobacteria	Nitrosomonadales	Nitrosomonadaceae			0	0	0	0	26	0	0	0	0	0	**26**	**1**

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NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-MGM4B8	Proteobacteria	Deltaproteobacteria	Desulfobacterales	Desulfosarcinaceae			0	0	0	0	35	0	0	0	0	0	**35**	**1**
IM-I9950Q	Proteobacteria	Deltaproteobacteria	Desulfobacterales	Desulfosarcinaceae			0	0	0	0	38	0	0	0	0	0	**38**	**1**
IM-J765LB	Proteobacteria	Deltaproteobacteria	Desulfobacterales				0	29	0	0	92	0	0	0	0	0	**121**	**2**
IM-1YJ14J	Proteobacteria	Deltaproteobacteria	Desulfobacterales	Nitrospinaceae			29	0	0	0	0	0	0	0	0	0	**29**	**1**
IM-Q70H2V	Proteobacteria	Deltaproteobacteria	Desulfobacterales	Nitrospinaceae			0	0	0	0	0	0	0	22	0	24	**46**	**2**
IM-E80H3S	Proteobacteria	Deltaproteobacteria	Desulfobacterales	Nitrospinaceae			0	0	0	23	0	0	0	0	0	24	**47**	**2**
IM-C938N1	Proteobacteria	Epsilonproteobacteria	Campylobacterales	Helicobacteraceae	Sulfurimonas		0	0	0	0	60	0	0	0	0	0	**60**	**1**
IM-222KMX	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Halieaceae	Haliea	alexandrii	36	0	32	74	23	44	0	59	32	32	**332**	**8**
IM-95J9NB	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Halieaceae			241	263	295	292	90	258	245	226	273	207	**2390**	**10**
IM-H5B15U	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Halieaceae			180	480	304	160	359	341	276	149	367	181	**2797**	**10**
IM-R1DJ21	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Halieaceae			69	138	123	64	101	107	137	53	138	141	**1071**	**10**
IM-I5G8A4	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Halieaceae			66	63	56	33	0	63	59	0	56	40	**436**	**8**
IM-0CMWO0	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Halieaceae			107	155	143	219	113	124	100	134	112	154	**1361**	**10**
IM-804WKK	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Halieaceae			35	0	0	77	0	0	0	61	28	43	**244**	**5**
IM-4KY7BS	Proteobacteria	Gammaproteobacteria	Oceanospirillales	Alcanivoracaceae			23	0	0	37	0	0	0	21	0	0	**81**	**3**
IM-7QOK42	Proteobacteria	Gammaproteobacteria	Alteromonadales	Alteromonadaceae	Marinobacter		0	23	21	46	0	49	0	54	0	0	**193**	**5**
IM-8Q92XS	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Pseudomonadaceae			33	0	0	0	0	0	0	0	0	0	**33**	**1**
IM-00HDK6	Proteobacteria	Gammaproteobacteria	Oceanospirillales	Saccharospirillaceae			0	19	24	0	0	0	0	21	20	0	**84**	**4**
IM-76YQG0	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Spongiibacteraceae			29	70	92	46	34	73	47	26	63	54	**534**	**10**
IM-Z941UQ	Proteobacteria	Gammaproteobacteria	Pseudomonadales	Spongiibacteraceae			0	0	0	0	0	0	0	0	0	30	**30**	**1**
IM-258AAC	Proteobacteria	Gammaproteobacteria	Pseudomonadales				70	53	64	114	55	105	46	112	65	106	**790**	**10**
IM-D29KZ1	Proteobacteria	Gammaproteobacteria	Pseudomonadales				28	49	39	46	31	84	0	72	52	38	**439**	**9**
IM-82D67R	Proteobacteria	Gammaproteobacteria	Pseudomonadales				0	49	61	0	28	0	0	0	53	0	**191**	**4**
IM-0S48T2	Proteobacteria	Gammaproteobacteria	Pseudomonadales				47	0	33	41	0	57	0	51	25	31	**285**	**7**
IM-U7QK8R	Proteobacteria	Gammaproteobacteria	Alteromonadales	Alteromonadaceae			0	0	0	0	0	0	0	0	0	32	**32**	**1**
IM-86E77Z	Proteobacteria	Gammaproteobacteria	Alteromonadales	Alteromonadaceae			0	0	0	0	0	0	0	0	0	72	**72**	**1**
IM-840WIF	Proteobacteria	Gammaproteobacteria	Alteromonadales	Alteromonadaceae			0	0	0	0	0	0	0	0	52	0	**52**	**1**
IM-0KO57E	Proteobacteria	Gammaproteobacteria	Alteromonadales	Alteromonadaceae			0	0	0	0	0	0	0	0	30	41	**71**	**2**
IM-K9TK49	Proteobacteria	Gammaproteobacteria	Alteromonadales	Alteromonadaceae			0	25	0	0	0	0	0	0	0	33	**58**	**2**
IM-9L7U7U	Proteobacteria	Gammaproteobacteria	Alteromonadales	Alteromonadaceae			0	0	0	0	0	26	0	0	0	0	**26**	**1**
IM-X02E56	Proteobacteria	Gammaproteobacteria	Alteromonadales	Vibrionaceae			0	0	0	0	0	0	0	0	0	31	**31**	**1**
IM-Y3NXD4	Proteobacteria	Gammaproteobacteria	Chromatiales	Chromatiaceae			40	0	25	0	0	0	0	0	0	0	**65**	**2**
IM-O56P7U	Proteobacteria	Gammaproteobacteria	Chromatiales	Thioalkalispiraceae	Thioprofundum		88	70	76	0	106	0	19	20	156	0	**535**	**7**
IM-4672QT	Proteobacteria	Gammaproteobacteria	Chromatiales	Ectothiorhodospiraceae			0	0	0	49	0	0	0	43	0	0	**92**	**2**
IM-19YI7A	Proteobacteria	Gammaproteobacteria	Chromatiales	Ectothiorhodospiraceae	Thioalkalivibrio		0	51	0	0	93	0	0	0	31	0	**175**	**3**
IM-Q517TY	Proteobacteria	Gammaproteobacteria	Chromatiales	Granulosicoccaceae			0	0	0	33	0	0	0	44	0	22	**99**	**3**
IM-460OPK	Proteobacteria	Gammaproteobacteria	Nitrsococcales	Nitrosococcaceae			34	0	20	324	17	239	0	359	36	390	**1419**	**8**
IM-8D37X2	Proteobacteria	Gammaproteobacteria	Nitrsococcales	Nitrosococcaceae			110	48	105	67	78	0	44	36	101	0	**589**	**8**
IM-23ZC6P	Proteobacteria	Gammaproteobacteria	Nitrsococcales	Nitrosococcaceae			0	0	0	30	0	0	0	0	20	27	**77**	**3**
IM-NT5Y11	Proteobacteria	Gammaproteobacteria	Woeseiales	Woeseiaceae	Woeseia		234	95	138	201	42	143	102	158	171	164	**1448**	**10**
IM-01YY9S	Proteobacteria	Gammaproteobacteria	Arenicellales	Arenicellaceae	Arenicella		0	0	0	54	0	0	0	38	22	65	**179**	**4**
IM-W706UB	Proteobacteria	Gammaproteobacteria	AKS1		Sulfuriflexus		27	24	43	0	0	0	20	0	22	0	**136**	**5**
IM-9QCQ08	Proteobacteria	Gammaproteobacteria					1105	758	1076	1606	760	1454	744	1541	1144	1310	**11498**	**10**
IM-49D8MH	Proteobacteria	Gammaproteobacteria					1373	1564	1545	1860	743	2836	1276	1544	1581	1716	**16038**	**10**
IM-U2CB84	Proteobacteria	Gammaproteobacteria					1076	1012	999	414	1157	135	557	183	1096	153	**6782**	**10**
IM-65MO9C	Proteobacteria	Gammaproteobacteria					775	799	926	253	375	109	506	119	629	101	**4592**	**10**
IM-5AC822	Proteobacteria	Gammaproteobacteria					326	259	293	469	130	632	231	512	349	462	**3663**	**10**
IM-IX0B54	Proteobacteria	Gammaproteobacteria					452	476	543	398	455	233	310	277	469	338	**3951**	**10**
IM-4D4HUE	Proteobacteria	Gammaproteobacteria					103	69	98	93	280	0	49	27	75	28	**822**	**9**
IM-RUF397	Proteobacteria	Gammaproteobacteria					111	88	108	152	34	358	116	126	96	170	**1359**	**10**
IM-CQ3Q65	Proteobacteria	Gammaproteobacteria					0	0	0	0	0	169	0	0	0	24	**193**	**2**
IM-T3W3O7	Proteobacteria	Gammaproteobacteria					234	251	180	215	121	124	168	138	221	153	**1805**	**10**
IM-974OMY	Proteobacteria	Gammaproteobacteria					49	107	61	268	62	626	42	232	134	251	**1832**	**10**
IM-23AKR5	Proteobacteria	Gammaproteobacteria					374	134	262	438	78	509	262	440	224	315	**3036**	**10**
IM-3061ED	Proteobacteria	Gammaproteobacteria					248	92	163	175	27	95	181	143	150	133	**1407**	**10**
IM-KC69E0	Proteobacteria	Gammaproteobacteria					0	0	0	92	0	117	0	82	0	155	**446**	**4**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-I953ZY	Proteobacteria	Gammaproteobacteria					36	0	0	171	0	33	0	258	31	189	**718**	**6**
IM-77D6UW	Proteobacteria	Gammaproteobacteria					0	0	0	64	0	168	0	101	0	107	**440**	**4**
IM-91NF6Y	Proteobacteria	Gammaproteobacteria					75	0	23	210	31	66	0	176	0	126	**707**	**7**
IM-H55OG7	Proteobacteria	Gammaproteobacteria					0	0	0	0	0	127	0	30	0	23	**180**	**3**
IM-3AQ5M3	Proteobacteria	Gammaproteobacteria					46	46	48	110	0	223	41	102	52	108	**776**	**9**
IM-2N2D1O	Proteobacteria	Gammaproteobacteria					154	37	112	113	144	0	46	85	112	44	**847**	**9**
IM-QB00E0	Proteobacteria	Gammaproteobacteria					27	86	106	35	29	52	79	48	99	63	**624**	**10**
IM-DR413B	Proteobacteria	Gammaproteobacteria					54	159	88	88	68	127	118	60	133	75	**970**	**10**
IM-ZD2673	Proteobacteria	Gammaproteobacteria					98	49	84	190	0	82	52	155	97	99	**906**	**9**
IM-19UH8S	Proteobacteria	Gammaproteobacteria					0	0	26	95	0	63	0	80	0	61	**325**	**5**
IM-TPX572	Proteobacteria	Gammaproteobacteria					159	146	188	140	91	101	141	94	140	98	**1298**	**10**
IM-V7WB13	Proteobacteria	Gammaproteobacteria					77	77	65	36	53	33	100	25	47	0	**513**	**9**
IM-U06KH7	Proteobacteria	Gammaproteobacteria					108	121	102	116	46	154	77	134	112	101	**1071**	**10**
IM-78KK9U	Proteobacteria	Gammaproteobacteria					31	70	81	48	38	86	90	58	95	72	**669**	**10**
IM-1612ES	Proteobacteria	Gammaproteobacteria					0	0	0	0	103	0	0	0	0	0	**103**	**1**
IM-C0X5T6	Proteobacteria	Gammaproteobacteria					0	0	0	53	0	0	0	39	0	44	**136**	**3**
IM-0R7L4V	Proteobacteria	Gammaproteobacteria					164	191	153	121	183	89	183	54	154	52	**1344**	**10**
IM-96M8UE	Proteobacteria	Gammaproteobacteria					94	278	179	123	152	146	155	94	216	91	**1528**	**10**
IM-2I2Y2X	Proteobacteria	Gammaproteobacteria					0	0	0	0	0	43	0	0	0	0	**43**	**1**
IM-394PXE	Proteobacteria	Gammaproteobacteria					21	59	40	32	0	58	0	46	52	42	**350**	**8**
IM-87SDJ9	Proteobacteria	Gammaproteobacteria					24	31	27	65	17	0	0	31	26	26	**247**	**8**
IM-N8G83V	Proteobacteria	Gammaproteobacteria					99	20	25	119	0	0	27	70	39	69	**468**	**8**
IM-52WKN7	Proteobacteria	Gammaproteobacteria					0	0	0	0	70	0	0	0	0	0	**70**	**1**
IM-OT10A5	Proteobacteria	Gammaproteobacteria					0	0	26	23	0	36	26	26	40	51	**228**	**7**
IM-P3O7K8	Proteobacteria	Gammaproteobacteria					0	60	0	0	0	113	19	32	33	44	**301**	**6**
IM-59MWC2	Proteobacteria	Gammaproteobacteria					77	91	98	104	41	89	60	73	121	83	**837**	**10**
IM-7A0OU9	Proteobacteria	Gammaproteobacteria					0	0	0	107	0	0	0	101	0	48	**256**	**3**
IM-64M6WE	Proteobacteria	Gammaproteobacteria					0	52	51	28	17	63	70	0	63	33	**377**	**8**
IM-44JU2I	Proteobacteria	Gammaproteobacteria					0	0	0	30	0	0	0	28	22	46	**126**	**4**
IM-Q18G2I	Proteobacteria	Gammaproteobacteria					0	21	29	0	98	0	0	0	32	0	**180**	**4**
IM-604RVF	Proteobacteria	Gammaproteobacteria					0	0	0	32	0	27	0	24	0	25	**108**	**4**
IM-KJ34P0	Proteobacteria	Gammaproteobacteria					0	81	44	0	50	32	0	0	39	0	**246**	**5**
IM-1O51RL	Proteobacteria	Gammaproteobacteria					30	84	29	27	89	0	22	0	66	0	**347**	**7**
IM-T0UX87	Proteobacteria	Gammaproteobacteria					0	21	0	0	0	40	21	27	39	28	**176**	**6**
IM-EY362J	Proteobacteria	Gammaproteobacteria					0	30	0	43	0	52	0	45	0	68	**238**	**5**
IM-5OZ24P	Proteobacteria	Gammaproteobacteria					33	25	34	75	0	127	0	79	31	70	**474**	**8**
IM-1EIB32	Proteobacteria	Gammaproteobacteria					0	0	0	25	0	33	0	40	0	43	**141**	**4**
IM-E1O62E	Proteobacteria	Gammaproteobacteria					0	25	27	0	26	45	23	27	32	27	**232**	**8**
IM-2D61A8	Proteobacteria	Gammaproteobacteria					0	0	25	35	0	0	0	26	20	21	**127**	**5**
IM-O2F7D3	Proteobacteria	Gammaproteobacteria					0	0	0	53	0	0	0	28	0	0	**81**	**2**
IM-8FIZ22	Proteobacteria	Gammaproteobacteria					0	0	20	23	0	0	0	0	0	0	**43**	**2**
IM-9OVXF6	Proteobacteria	Gammaproteobacteria					0	0	0	0	24	0	0	0	0	0	**24**	**1**
IM-55DIB3	Proteobacteria	Gammaproteobacteria					0	0	0	28	0	57	0	26	0	0	**111**	**3**
IM-2ZLW13	Proteobacteria	Gammaproteobacteria					0	0	0	0	0	46	0	0	0	0	**46**	**1**
IM-6B7Y5B	Proteobacteria	Gammaproteobacteria					0	20	0	0	0	30	22	0	19	21	**112**	**5**
IM-37PXV9	Proteobacteria	Gammaproteobacteria					0	31	0	0	0	0	0	0	0	0	**31**	**1**
IM-J5PCI0	Proteobacteria	Gammaproteobacteria					0	55	0	0	0	45	0	0	37	24	**161**	**4**
IM-GG75X3	Proteobacteria	Gammaproteobacteria					21	0	0	0	0	0	0	0	0	0	**21**	**1**
IM-1TA412	Proteobacteria	Gammaproteobacteria					0	0	0	0	31	0	0	0	0	0	**31**	**1**
IM-N3F2P9	Proteobacteria	Gammaproteobacteria					0	20	0	0	0	0	0	0	0	0	**20**	**1**
IM-63J2ZI	Proteobacteria	Gammaproteobacteria					0	19	0	0	0	0	0	0	24	0	**43**	**2**
IM-U4065V	Proteobacteria	Gammaproteobacteria					0	0	0	0	0	0	0	27	0	0	**27**	**1**
IM-76NJ19	Proteobacteria	Gammaproteobacteria					0	0	0	29	0	0	0	0	0	0	**29**	**1**
IM-SJ3N23	Proteobacteria	Gammaproteobacteria					21	0	0	30	0	57	0	27	0	0	**135**	**4**
IM-3T28WH	Proteobacteria	Gammaproteobacteria					0	0	0	29	0	0	0	0	0	0	**29**	**1**
IM-JV047W	Proteobacteria	Gammaproteobacteria					0	34	35	27	0	27	21	23	43	21	**231**	**8**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations										Total number of reads	Present at number of Stations (out of 10)
							ENV07	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-D3BK98	Proteobacteria	Gammaproteobacteria					0	24	22	49	0	48	0	46	23	47	**259**	**7**
IM-37W3GI	Verrucomicrobia	Kiritimatiellae					24	0	0	23	0	55	18	20	0	31	**171**	**6**
IM-B8BX49	Verrucomicrobia	Verrucomicrobiae	Verrucomicrobiales	Akkermansiaceae	Rubritalea	profundi	0	22	39	0	0	48	37	0	27	76	**249**	**6**
IM-BY29AH	Verrucomicrobia	Verrucomicrobiae	Verrucomicrobiales	Akkermansiaceae			0	0	0	0	0	30	0	0	0	0	**30**	**1**
IM-BC1IV4	Verrucomicrobia	Verrucomicrobiae	Verrucomicrobiales	Verrucomicrobiaceae	Verrucomicrobium		0	0	0	0	0	31	23	0	0	0	**54**	**2**
IM-1MM9Y3	Verrucomicrobia	Verrucomicrobiae	Verrucomicrobiales	Verrucomicrobiaceae			0	64	47	27	0	82	45	25	52	36	**378**	**8**
IM-Y5F3D4	Verrucomicrobia	Verrucomicrobiae	Verrucomicrobiales	Verrucomicrobiaceae			0	0	26	36	0	0	31	0	0	24	**117**	**4**
IM-3LW7T2	Verrucomicrobia	Verrucomicrobiae	Verrucomicrobiales	Verrucomicrobiaceae			0	31	22	0	0	0	34	0	30	22	**139**	**5**
IM-U4J53O	Verrucomicrobia	Verrucomicrobiae	Verrucomicrobiales				0	24	0	0	0	29	0	0	0	27	**80**	**3**
IM-8AFC89	Verrucomicrobia	Verrucomicrobiae	Verrucomicrobiales				0	26	0	32	0	36	28	45	20	42	**229**	**7**
IM-N8XP47	Verrucomicrobia	Verrucomicrobiae	Opitutales	Puniceicoccaceae			0	0	0	0	18	0	0	0	0	0	**18**	**1**
						Number of Reads	**28141**	**25671**	**27326**	**28407**	**24472**	**28299**	**24668**	**23704**	**26359**	**24778**	**261825**	
						Number of OTUs	**224**	**241**	**225**	**266**	**210**	**255**	**228**	**263**	**236**	**275**	**515**	

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations								Total number of reads	Present at number of samples (out of 8)
							ENV12	ENV15	ENV18	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-OLE233	Annelida	Clitellata	Enchytraeida	Enchytraeidae	*Grania*	*ovitheca*	0	0	0	0	0	68	0	0	**68**	**1**
IM-UEW882	Annelida	Clitellata	Enchytraeida	Enchytraeidae		*postclitellochaeta*	0	0	0	0	0	24	0	0	**24**	**1**
IM-G9E3L6	Annelida	Polychaeta	Eunicida	Dorvilleidae	*Parougia*	*ougi*	0	0	24	0	0	0	0	0	**24**	**1**
IM-QMB265	Annelida	Polychaeta	Phyllodocida	Hesionidae	*Gyptis*	*propinqua*	0	0	0	1133	0	0	0	0	**1133**	**1**
IM-8H028O	Annelida	Polychaeta	Phyllodocida	Nephtyidae	*Nephtys*	*assimilis*	0	71	0	0	0	0	0	0	**71**	**1**
IM-81ZZ24	Annelida	Polychaeta	Phyllodocida	Syllidae	*Streptosyllis*		0	0	15987	0	0	189	0	40	**16216**	**3**
IM-FVZL96	Annelida	Polychaeta	Spionida	Spionidae	*Laonice*	*irinae*	0	0	0	241	0	0	0	0	**241**	**1**
IM-3074HA	Annelida	Polychaeta	Spionida	Spionidae	*Malacoceros*	*fuliginosus*	0	0	0	0	106	0	0	0	**106**	**1**
IM-1GUTR7	Annelida	Polychaeta	Terebellida	Cirratulidae	*Chaetozone*		0	1094	0	0	0	0	0	0	**1094**	**1**
IM-0A74E4	Annelida	Polychaeta	Terebellida	Cirratulidae	*Chaetozone*		0	0	0	0	202	0	0	0	**202**	**1**
IM-7HJ284	Annelida	Polychaeta	Terebellida	Cirratulidae	*Tharyx*		96	125	0	0	0	0	0	0	**221**	**2**
IM-4WY8Z1	Annelida	Polychaeta	Terebellida	Flabelligeridae			8488	0	0	0	0	0	0	0	**8488**	**1**
IM-0RD6F1	Annelida	Polychaeta	Terebellida	Trichobranchidae	*Terebellides*		0	0	0	0	2425	0	0	0	**2425**	**1**
IM-05HYTT	Annelida	Polychaeta	Terebellida				0	0	0	0	405	0	0	0	**405**	**1**
IM-9MUQ9R	Annelida	Polychaeta	Terebellida				0	196	0	0	0	0	0	0	**196**	**1**
IM-O28VKC	Annelida	Polychaeta		Paraonidae	*Aricidea*	*laubieri*	0	0	0	0	2577	0	0	0	**2577**	**1**
IM-U60C29	Annelida	Polychaeta					0	0	34	0	20	0	76	59080	**59210**	**4**
IM-DHT5J0	Annelida	Polychaeta					0	4381	45	0	12223	44	0	0	**16693**	**4**
IM-2EG7RS	Annelida	Polychaeta					544	0	0	0	0	0	94	0	**638**	**2**
IM-6258GY	Annelida	Polychaeta					0	86	0	0	1332	612	1414	0	**3444**	**4**
IM-J5YBB6	Arthropoda	Copepoda	Calanoida	Paracalanidae	*Paracalanus*	*parvus*	42	0	0	0	0	0	0	0	**42**	**1**
IM-G7KP25	Arthropoda	Copepoda	Calanoida	Temoridae	*Temora*	*longicornis*	23	0	46	0	0	0	0	0	**69**	**2**
IM-8W51HP	Arthropoda	Copepoda	Harpacticoida	Ameiridae	*Filexilia*	*brevipes*	0	0	0	71	0	0	0	0	**71**	**1**
IM-NU1465	Arthropoda	Copepoda	Harpacticoida	Ameiridae		*psammophila*	0	0	0	0	0	27	0	0	**27**	**1**
IM-60ABVH	Arthropoda	Copepoda	Harpacticoida	Ameiridae			46	98	0	0	0	0	0	0	**144**	**2**
IM-F29G97	Arthropoda	Copepoda	Harpacticoida			*pygmaea*	524	76	0	0	60	0	0	0	**660**	**3**
IM-8J5ZK0	Arthropoda	Copepoda	Harpacticoida				0	152	31	0	0	43	0	25	**251**	**4**
IM-G12KUR	Arthropoda	Copepoda	Harpacticoida	Laophontidae	*Laophonte*	*longicaudata*	49	0	0	0	0	0	0	0	**49**	**1**
IM-Q09Z45	Arthropoda	Copepoda	Harpacticoida	Canthocamptidae	*Mesochra*	*pygmaea*	62	0	0	0	0	0	0	0	**62**	**1**
IM-F9AK5Z	Arthropoda	Copepoda	Harpacticoida	Idyanthidae	*Tachidiella*	*minuta*	0	137	0	0	0	0	0	0	**137**	**1**
IM-G39TGJ	Arthropoda	Copepoda	Harpacticoida	Cletodidae	*Cletodes*		89	0	0	0	0	0	0	0	**89**	**1**
IM-VX6OM8	Arthropoda	Copepoda	Harpacticoida	Ectinosomatidae			0	48	0	0	0	0	311	0	**359**	**2**
IM-P36PBZ	Arthropoda	Copepoda	Harpacticoida	Ectinosomatidae			32	0	0	0	0	0	0	0	**32**	**1**
IM-16DAP4	Arthropoda	Copepoda	Harpacticoida	Ectinosomatidae			0	19	0	0	0	0	0	0	**19**	**1**
IM-362K8F	Arthropoda	Copepoda	Polyarthra	Longipediidae	*Longipedia*		0	0	0	0	41	0	0	0	**41**	**1**
IM-7L924T	Arthropoda	Malacostraca	Amphipoda	Bathyporeiidae	*Bathyporeia*	*tenuipes*	0	0	0	0	4989	0	0	0	**4989**	**1**
IM-9UBQ7G	Arthropoda	Malacostraca	Amphipoda	Aoridae			0	0	0	0	0	0	75	0	**75**	**1**
IM-V9V05J	Arthropoda	Thecostraca	Balanomorpha	Balanidae	*Balanus*	*crenatus*	0	0	0	0	0	56	0	0	**56**	**1**
IM-BP1ZB1	Arthropoda	Thecostraca	Balanomorpha	Balanidae	*Balanus*		0	0	0	0	0	221	0	125	**346**	**2**
IM-PMB19Y	Arthropoda	Thecostraca	Enchytraeida			*balanus*	0	0	0	0	0	95	0	0	**95**	**1**
IM-6C5M25/IM	Echinodermata	Ophiuroidea	Amphilepidida	Amphiuridae	*Amphiura*	*filiformis*	9921	0	0	0	0	0	0	77	**9998**	**2**
IM-V5864M	Echinodermata	Ophiuroidea	Ophiurida	Ophiuridae	*Ophiocten*	*affinis*	0	432	0	0	0	0	0	0	**432**	**1**
IM-14PH54	Echinodermata	Echinoidea	Spatangoida	Loveniidae	*Echinocardium*	*cordatum*	123	61	63	0	0	0	2757	0	**3004**	**4**
IM-07KPNL	Echinodermata	Echinoidea	Echinolampadacea	Fibulariidae	*Echinocyamus*	*pusillus*	0	54	0	0	0	0	0	0	**54**	**1**
IM-T964V0	Mollusca	Bivalvia	Venerida	Veneridae	*Clausinella*	*fasciata*	0	0	0	40	0	0	0	0	**40**	**1**
IM-450FV4	Mollusca	Gastropoda	Cephalaspidea	Alacuppidae	*Roxania*	*utriculus*	0	0	0	0	0	0	71	0	**71**	**1**
IM-I55NUH	Mollusca	Gastropoda		Pyramidellidae	*Turbonilla*		127	128	80	0	73	64	129	0	**601**	**6**
IM-34LI74	Mollusca	Gastropoda		Pyramidellidae	*Turbonilla*		32	88	98	0	32	62	127	0	**439**	**6**
IM-796G4O	Animalia						0	0	0	316	0	0	0	0	**316**	**1**
IM-D06QML	Chaetognatha	Sagittoidea					0	0	0	0	0	0	14	0	**14**	**1**
IM-615B7B	Cnidaria	Anthozoa	Actiniaria	Edwardsiidae			0	0	0	0	0	57	0	0	**57**	**1**
IM-0W9L8F	Cnidaria	Hydrozoa	Anthoathecata	Bougainvilliidae	*Bougainvillia*		45	53	0	0	0	0	24	0	**122**	**3**
IM-54OR6K	Cnidaria	Hydrozoa	Leptothecata				0	194	0	0	86	0	0	0	**280**	**2**

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Stations								Total number of reads	Present at number of samples (out of 8)
							ENV12	ENV15	ENV18	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-867NK2	Gnathostomulida		Bursovaginoidea	Onychognathiidae	*Valvognathia*	*pogonostoma*	0	0	69	0	0	0	0	0	**69**	**1**
IM-4F3DJN	Nematoda	Chromadorea	Desmodorida	Monoposthiidae			0	0	0	0	0	86	0	0	**86**	**1**
IM-4OC6DB	Phoronida			Phoronidae	*Phoronis*	*muelleri*	0	0	344	0	0	0	0	0	**344**	**1**
IM-VOI6A8	Platyhelminthes			Haplopharyngidae	*Haplopharynx*	*rostratus*	0	0	1572	0	0	157	0	0	**1729**	**2**
IM-UCU547	Porifera	Demospongiae	Axinellida	Raspailiidae	*Sollasella*		0	0	0	126	0	0	0	0	**126**	**1**
IM-P9066C	Xenacoelomorpha		Acoela	Isodiametridae	*Baltalimania*		0	0	38	0	0	0	0	0	**38**	**1**
IM-S92YNB	Xenacoelomorpha		Acoela	Proporidae	*Simplicomorpha*		0	0	0	0	0	126	0	0	**126**	**1**
IM-4CYG54	Xenacoelomorpha		Acoela	Proporidae	*Simplicomorpha*		0	0	0	0	0	175	0	0	**175**	**1**
IM-9F8KUX	Xenacoelomorpha		Acoela	Proporidae			0	0	0	0	0	180	0	0	**180**	**1**
IM-3SKNW0	Xenacoelomorpha		Acoela	Proporidae			0	0	0	0	0	170	0	0	**170**	**1**
						Number of Reads	20243	7493	18431	1927	24571	2456	5092	59347	**8473**	
						Number of OTUs	16	19	13	6	14	19	11	5	**22**	

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Samples														Stations										Total number of reads	Present at number of samples (out of 14)
							ENV12 Surface	ENV15 Surface	ENV18 Surface	ENV21 Surface	ENV22 Bottom	ENV22 Surface	ENV24 Bottom	ENV24 Surface	ENV33 Bottom	ENV33 Surface	ENV34 Bottom	ENV34 Surface	ENV35 Bottom	ENV35 Surface	ENV12	ENV15	ENV18	ENV21	ENV22	ENV24	ENV33	ENV34	ENV35		
IM-H6683F	Chordata	Teleostei	Clupeiformes	Clupeidae	*Clupea*	*harengus*	0	6214	0	0	0	0	0	0	24095	16532	0	0	2336	483	0	6214	0	0	0	0	40627	0	2819	**49660**	**5**
IM-DE750W	Chordata	Teleostei	Clupeiformes	Clupeidae	*Clupea*		0	5666	0	0	0	0	0	0	0	0	0	0	0	0	0	5666	0	0	0	0	0	0	0	**5666**	**1**
IM-25HY87	Chordata	Teleostei	Clupeiformes	Clupeidae	*Sprattus*	*sprattus*	34116	3546	30924	0	3660	26721	0	41238	0	4541	8824	13806	0	0	34116	3546	30924	0	30381	41238	4541	22630	0	**167376**	**9**
IM-566W4J	Chordata	Teleostei	Gadiformes	Gadidae	*Gadus*	*morhua*	11416	404	65	0	11	0	0	1431	615	0	0	0	0	561	11416	404	65	0	11	1431	615	0	561	**14503**	**7**
IM-F25B05	Chordata	Teleostei	Gadiformes	Gadidae	*Melanogrammus*	*aeglefinus*	617	172	4249	0	5892	0	301	2579	2096	646	197	5169	668	2993	617	172	4249	0	5892	2880	2742	5366	3661	**25579**	**12**
IM-Y439L8	Chordata	Teleostei	Gadiformes	Gadidae	*Merlangius*	*merlangus*	0	515	7076	0	0	856	15258	1028	792	73	505	840	533	0	0	515	7076	0	856	16286	865	1345	533	**27476**	**10**
IM-M3V179	Chordata	Teleostei	Gadiformes	Gadidae	*Micromesistius*	*poutassou*	0	0	0	224	0	0	0	0	163	0	0	0	0	0	0	0	0	224	0	0	163	0	0	**387**	**2**
IM-3I149W	Chordata	Teleostei	Gadiformes	Gadidae	*Pollachius*	*virens*	0	378	0	0	0	0	0	0	0	0	91	0	0	0	0	378	0	0	0	0	0	91	0	**469**	**2**
IM-A3326P	Chordata	Teleostei	Gadiformes	Gadidae	*Trisopterus*	*esmarkii*	0	0	4391	0	0	0	0	0	0	0	0	35	0	0	0	0	4391	0	0	0	0	35	0	**4426**	**2**
IM-169S1P	Chordata	Teleostei	Gadiformes	Gadidae	*Trisopterus*	*minutus*	0	0	84	0	0	0	0	0	0	0	0	0	0	0	0	0	84	0	0	0	0	0	0	**84**	**1**
IM-82C5Z1	Chordata	Teleostei	Gadiformes	Gadidae			0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	**13**	**1**
IM-3693PA	Chordata	Teleostei	Perciformes	Gasterosteidae	*Gasterosteus*	*aculeatus*	0	0	0	0	0	1098	0	0	0	0	0	0	0	0	0	0	0	0	1098	0	0	0	0	**1098**	**1**
IM-3N1A04	Chordata	Teleostei	Argentiniformes	Argentinidae			0	0	737	0	0	0	0	0	0	57	66	0	0	31	0	0	737	0	0	0	57	66	31	**891**	**4**
IM-3YC7XS	Chordata	Teleostei	Perciformes	Ammodytidae	*Ammodytes*		0	0	0	0	0	0	0	0	30	0	40	0	0	0	0	0	0	0	0	0	30	40	0	**70**	**2**
IM-2Y9H72	Chordata	Teleostei	Perciformes	Ammodytidae			54456	75991	2259	75058	986	127485	0	39852	26892	8608	67095	13127	44412	28936	54456	75991	2259	75058	128471	39852	35500	80222	73348	**565157**	**13**
IM-5C27P4	Chordata	Teleostei	Perciformes	Ammodytidae			0	0	0	0	0	0	0	0	0	0	12002	0	0	0	0	0	0	0	0	0	0	12002	0	**12002**	**1**
IM-5W871B	Chordata	Teleostei	Callionymiformes	Callionymidae	*Callionymus*	*lyra*	0	0	1410	0	0	0	0	0	0	0	0	0	0	0	0	0	1410	0	0	0	0	0	0	**1410**	**1**
IM-AP0738	Chordata	Teleostei	Callionymiformes	Callionymidae	*Callionymus*	*maculatus*	0	0	336	0	0	0	0	0	0	0	0	0	0	0	0	0	336	0	0	0	0	0	0	**336**	**1**
IM-JV88J0	Chordata	Teleostei	Gobiiformes	Gobiidae	*Crystallogobius*	*linearis*	54	0	0	0	0	0	0	24	0	0	0	0	0	0	54	0	0	0	0	24	0	0	0	**78**	**2**
IM-PX5MQ9	Chordata	Teleostei	Gobiiformes	Gobiidae	*Pomatoschistus*	*minutus*	0	0	2433	0	0	0	0	0	0	0	0	0	0	0	0	0	2433	0	0	0	0	0	0	**2433**	**1**
IM-HC42XK	Chordata	Teleostei	Gobiiformes	Gobiidae	*Pomatoschistus*		0	0	0	0	2819	0	0	0	0	0	0	0	0	0	0	0	0	0	2819	0	0	0	0	**2819**	**1**
IM-X8JMR5	Chordata	Teleostei	Perciformes	Pholidae	*Pholis*	*gunnellus*	0	0	0	0	0	0	0	0	1153	0	448	0	0	0	0	0	0	0	0	0	1153	448	0	**1601**	**2**
IM-LR6159	Chordata	Teleostei	Scombriformes	Scombridae	*Scomber*	*scombrus*	0	0	0	0	0	0	0	0	1996	0	0	0	0	2351	0	0	0	0	0	0	1996	0	2351	**4347**	**2**
IM-20L1X9	Chordata	Teleostei	Perciformes	Stichaeidae	*Chirolophis*	*ascanii*	0	0	0	0	0	0	0	0	98	0	0	0	0	0	0	0	0	0	0	0	98	0	0	**98**	**1**
IM-Z6V570	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Glyptocephalus*	*cynoglossus*	0	0	1800	0	0	0	0	0	0	0	0	0	0	0	0	0	1800	0	0	0	0	0	0	**1800**	**1**
IM-316KA4	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Hippoglossoides*	*platessoides*	0	0	1093	0	0	0	0	0	0	0	0	0	0	0	0	0	1093	0	0	0	0	0	0	**1093**	**1**
IM-671BU9	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Limanda*	*limanda*	22265	583	12925	0	81	1916	592	18433	1516	2058	3254	5258	0	901	22265	583	12925	0	1997	19025	3574	8512	901	**69782**	**12**
IM-9Z4J32	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Microstomus*	*kitt*	0	0	5712	0	5264	0	61	0	6085	0	878	0	0	0	0	0	5712	0	5264	61	6085	878	0	**18000**	**5**
IM-9V81P6	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Platichthys*	*flesus*	0	0	4632	0	0	0	0	0	0	0	185	0	0	0	0	0	4632	0	0	0	0	185	0	**4817**	**2**
IM-3F88Y4	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Pleuronectes*	*platessa*	0	0	23749	0	0	0	282	0	0	13113	5440	0	0	0	0	0	23749	0	0	282	13113	5440	0	**42584**	**4**
IM-9C47V3	Chordata	Teleostei	Pleuronectiformes	Scophthalmidae	*Zeugopterus*	*punctatus*	0	0	0	0	0	0	0	0	5064	0	0	0	0	0	0	0	0	0	0	0	5064	0	0	**5064**	**1**
IM-97M80J	Chordata	Teleostei	Salmoniformes	Salmonidae	*Oncorhynchus*	*gorbuscha*	0	93	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0	0	0	0	0	0	0	**93**	**1**
IM-684P2D	Chordata	Teleostei	Perciformes	Cottidae	*Myoxocephalus*	*scorpius*	0	0	0	0	0	0	0	0	0	0	0	0	0	2085	0	0	0	0	0	0	0	0	2085	**2085**	**1**
IM-K0H647	Chordata	Teleostei	Perciformes	Cottidae	*Taurulus*	*bubalis*	0	0	0	0	0	0	0	0	0	125	0	0	13701	0	0	0	0	0	0	0	125	0	13701	**13826**	**2**
IM-MYJ6P1	Chordata	Teleostei	Perciformes	Cyclopteridae	*Cyclopterus*	*lumpus*	0	0	0	0	0	0	0	0	0	0	0	0	0	287	0	0	0	0	0	0	0	0	287	**287**	**1**
IM-7CW402	Chordata	Teleostei	Perciformes	Triglidae	*Chelidonichthys*		0	0	0	0	0	0	0	0	553	0	237	0	29	0	0	0	0	0	0	0	553	237	29	**819**	**3**
IM-7OH057	Chordata	Teleostei	Perciformes	Triglidae			0	0	0	0	29630	0	94597	0	48127	35699	4699	0	6144	0	0	0	0	0	29630	94597	83826	4699	6144	**218896**	**6**
						Number of Reads	**122924**	**93562**	**103875**	**75282**	**48356**	**158076**	**111091**	**104585**	**119275**	**81452**	**103961**	**38235**	**67823**	**38628**	**122924**	**93562**	**103875**	**75282**	**206432**	**215676**	**200727**	**142196**	**106451**	**1267125**	
						Number of OTUs	**6**	**10**	**17**	**2**	**9**	**5**	**6**	**7**	**15**	**10**	**15**	**6**	**7**	**9**	**6**	**10**	**17**	**2**	**11**	**10**	**19**	**16**	**13**	**37**	

Taxa in red denotes taxa of conservation interest.

APPENDIX L DNA ANALYSIS

NMSeqID	Phylum	Class	Order	Family	Genus	Species	Samples																				Stations									Total number of reads	Present at number of samples (out of 20)
							EN07 Bottom	EN07 Surface	EN12 Bottom	EN12 Surface	EN15 Bottom	EN15 Surface	EN18 Bottom	EN18 Surface	EN21 Bottom	EN21 Surface	EN22 Bottom	EN22 Surface	EN24 Bottom	EN24 Surface	EN33 Bottom	EN33 Surface	EN34 Bottom	EN34 Surface	EN35 Bottom	EN35 Surface	EN07	EN12	EN15	EN18	EN21	EN22	EN24	EN33	EN34	EN35		
Taxa included in statistical analysis																																						
IM-O56WL8	Chordata	Teleostei	Clupeiformes	Clupeidae			41	749	929	310	429	812	2007	198	235	312	1138	1683	382	50	259	444	1003	761	312	374	790	1239	1241	2205	547	2821	432	703	1764	686	**12428**	**20**
IM-235YBK	Chordata	Teleostei	Gadiformes	Gadidae	*Trisopterus*	*esmarkii*	0	0	4015	0	414	0	440	275	335	130	210	187	1066	0	70	0	693	1350	45	0	0	4015	414	715	465	397	1066	70	2043	45	**9230**	**13**
IM-13D7TQ	Chordata	Teleostei	Gadiformes	Gadidae	*Trisopterus*	*minutus*	26	0	250	616	39	0	52	57	115	0	248	0	335	0	0	0	126	0	23	0	26	866	39	109	115	248	335	0	126	23	**1887**	**11**
IM-5QF969	Chordata	Teleostei	Gadiformes	Gadidae			467	14162	10279	618	1545	415	4687	705	16152	810	4149	5375	5868	236	471	220	2773	3065	1073	5164	14629	10897	1960	5392	16962	9524	6104	691	5838	6237	**78234**	**20**
IM-3BJ15R	Chordata	Teleostei	Gadiformes	Lotidae	*Ciliata*	*mustela*	0	0	0	0	0	0	0	40	88	51	0	0	0	53	0	0	145	0	0	0	0	0	0	40	139	0	53	0	145	0	**377**	**5**
IM-3SF4IC	Chordata	Teleostei	Argentiniformes	Argentinidae	*Argentina*	*sphyraena*	25	0	740	83	129	0	287	0	1186	0	71	0	267	0	17	222	93	0	29	649	25	823	129	287	1186	71	267	239	93	678	**3798**	**13**
IM-200GC4	Chordata	Teleostei	Perciformes	Ammodytidae	*Ammodytes*		126	4514	6959	6312	1458	4435	5681	91	824	15125	749	33130	118	1858	2282	1080	22008	1445	5390	13487	4640	13271	5893	5772	15949	33879	1976	3362	23453	18877	**127072**	**20**
IM-3SGH9P	Chordata	Teleostei	Perciformes	Ammodytidae	*Gymnammodytes*	*semisquamatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5268	0	0	0	0	0	0	0	0	0	0	0	5268	0	**5268**	**1**
IM-12V4LU	Chordata	Teleostei	Perciformes	Ammodytidae	*Hyperoplus*	*immaculatus*	0	0	0	0	0	0	201	0	0	0	0	0	0	29	0	0	0	0	5709	104	0	0	0	201	0	0	29	0	0	5813	**6043**	**4**
IM-8QFDN8	Chordata	Teleostei	Perciformes	Ammodytidae			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	40	**40**	**1**
IM-TNK7V5	Chordata	Teleostei	Callionymiformes	Callionymidae	*Callionymus*	*lyra*	104	0	91	0	0	0	105	45	463	0	47	0	67	0	0	0	38	0	0	0	104	91	0	150	463	47	67	0	38	0	**960**	**8**
IM-1TL5OH	Chordata	Teleostei	Callionymiformes	Callionymidae	*Callionymus*		0	0	0	0	40	0	0	0	0	36	0	24	0	0	0	0	0	0	0	0	0	0	40	0	36	24	0	0	0	0	**100**	**3**
IM-L6Y1RG	Chordata	Teleostei	Gobiiformes	Gobiidae	*Pomatoschistus*		0	0	0	0	0	0	0	0	0	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	0	0	0	0	**62**	**1**
IM-MXR052	Chordata	Teleostei	Eupercaria incertae sedis	Labridae	*Labrus*	*mixtus*	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	**27**	**1**
IM-9O40TY	Chordata	Teleostei	Perciformes	Pholidae	*Pholis*	*gunnellus*	0	2647	28	0	0	0	65	0	0	0	0	0	0	0	23	0	118	0	0	0	2647	28	0	65	0	0	0	23	118	0	**2881**	**5**
IM-95LK8N	Chordata	Teleostei	Scombriformes	Scombridae	*Scomber*	*scombrus*	0	168	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	168	0	0	32	0	0	0	0	0	0	**200**	**2**
IM-8TFEW5	Chordata	Teleostei	Perciformes	Stichaeidae	*Chirolophis*	*ascanii*	0	321	0	0	0	0	0	0	0	23	0	67	26	0	0	0	0	0	0	0	321	0	0	0	23	67	26	0	0	0	**437**	**4**
IM-5R09YS	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Glyptocephalus*	*cynoglossus*	0	0	0	0	0	0	0	0	1303	0	127	0	0	0	0	0	280	0	0	0	0	0	0	0	1303	127	0	0	280	0	**1710**	**3**
IM-7966NE	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Hippoglossoides*	*platessoides*	0	0	90	0	165	135	0	119	353	0	165	0	0	0	0	0	107	0	0	0	0	90	300	119	353	165	0	0	107	0	**1134**	**7**
IM-W8AVS4	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Limanda*	*limanda*	0	0	0	0	30	75	74	0	775	238	306	308	94	0	47	0	28	0	15	50	0	0	105	74	1013	614	94	47	28	65	**2040**	**12**
IM-7TNE7C	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae	*Microstomus*	*kitt*	161	0	2384	0	387	0	239	36	574	0	1081	0	1273	0	243	0	598	0	108	0	161	2384	387	275	574	1081	1273	243	598	108	**7084**	**11**
IM-4T02DO	Chordata	Teleostei	Pleuronectiformes	Pleuronectidae			792	3292	700	0	1875	327	581	475	2148	490	879	1413	3254	267	79	70	1826	1006	339	310	4084	700	2202	1056	2638	2292	3521	149	2832	649	**20123**	**19**
IM-16IJB5	Chordata	Teleostei	Pleuronectiformes	Scophthalmidae	*Zeugopterus*	*norvegicus*	0	287	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	0	0	0	0	0	0	0	0	0	**287**	**1**
IM-X8TB17	Chordata	Teleostei	Pleuronectiformes	Scophthalmidae	*Scophthalmus*	*rhombus*	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	**28**	**1**
IM-W4Q35Q	Chordata	Teleostei	Pleuronectiformes	Scophthalmidae	*Zeugopterus*	*punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	**18**	**1**
IM-JY8Z25	Chordata	Teleostei	Pleuronectiformes	Soleidae	*Solea*	*solea*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	40	0	**40**	**1**
IM-J013GZ	Chordata	Teleostei	Salmoniformes	Salmonidae	*Oncorhynchus*	*gorbuscha*	0	0	0	0	0	228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228	0	0	0	0	0	0	0	**228**	**1**
IM-K081KZ	Chordata	Teleostei	Perciformes	Agonidae	*Agonus*	*cataphractus*	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	0	0	0	0	0	0	**150**	**1**
IM-Z0G78C	Chordata	Teleostei	Perciformes	Cottidae			74	836	0	219	29	0	0	0	0	53	0	0	42	0	18	0	0	0	0	77	910	219	29	0	53	0	42	18	0	77	**1348**	**8**
IM-4F5M8J	Chordata	Teleostei	Perciformes	Cottidae			0	125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	0	0	0	0	0	0	0	0	0	**125**	**1**
IM-7PX633	Chordata	Teleostei	Perciformes	Cyclopteridae	*Cyclopterus*	*lumpus*	0	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	0	0	0	0	**54**	**1**
IM-09GTKA	Chordata	Teleostei	Perciformes	Triglidae			4579	720	4411	0	490	0	242	0	0	0	459	0	752	0	527	101	1630	93	487	299	5299	4411	490	242	0	459	752	628	1723	786	**14790**	**13**
IM-W7HD24	Chordata	Mammalia	Carnivora	Phocidae			0	0	0	0	0	0	35	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	120	0	0	0	0	0	**155**	**2**
IM-WE4PH0	Chordata	Mammalia	Cetartiodactyla	Balaenopteridae	*Balaenoptera*	*acutorostrata*	0	1290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1290	0	0	0	0	0	0	0	0	0	**1290**	**1**
IM-R0G52P	Chordata	Mammalia	Cetartiodactyla	Delphinidae	*Lagenorhynchus*		0	0	0	0	0	0	0	0	0	0	42	487	0	0	0	0	0	0	0	0	0	0	0	0	0	529	0	0	0	0	**529**	**2**
IM-KUD880	Chordata	Mammalia	Cetartiodactyla	Delphinidae	*Orcinus*	*orca*	0	0	0	0	0	0	0	0	0	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	0	0	0	0	0	**39**	**1**
IM-16ZWI4	Chordata	Mammalia	Cetartiodactyla	Phocoenidae	*Phocoena*	*phocoena*	0	222	1804	547	57	1069	0	77	415	0	118	31	0	0	0	0	239	255	0	0	222	2351	1126	77	415	149	0	0	494	0	**4834**	**11**
Taxa excluded from statistical analysis																																						
IM-P284SF	Chordata	Amphibia	Anura	Ranidae	*Rana*		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	66	**66**	**1**
IM-6QW3E4	Chordata	Aves	Anseriformes	Anatidae			0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	0	0	0	0	0	0	0	0	0	0	0	0	147	0	0	**147**	**1**
IM-S08E89	Chordata	Aves	Charadriiformes	Alcidae	*Alca*	*torda*	0	0	0	0	0	148	0	0	0	0	0	228	0	0	0	0	0	0	0	0	0	0	148	0	0	228	0	0	0	0	**376**	**2**
IM-067F3J	Chordata	Aves	Charadriiformes	Alcidae	*Uria*	*aalge*	0	617	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	617	0	0	0	0	0	0	0	0	0	**617**	**1**
						Number of Reads	**6395**	**30004**	**32680**	**8705**	**7087**	**7672**	**14878**	**2145**	**25086**	**17307**	**9851**	**42933**	**13544**	**2493**	**4201**	**2137**	**37013**	**7975**	**13596**	**20554**	**36399**	**41385**	**14759**	**17023**	**42393**	**52784**	**16037**	**6338**	**44988**	**34150**	**306256**	
						Number of OTUs	**10**	**15**	**13**	**7**	**14**	**10**	**16**	**12**	**15**	**11**	**16**	**11**	**13**	**6**	**13**	**6**	**18**	**7**	**12**	**10**	**19**	**14**	**17**	**20**	**19**	**19**	**15**	**13**	**18**	**14**	**41**	

Species in blue denotes invasive species

APPENDIX M MACROFAUNA ANALYSIS

APPENDIX M MACROFAUNA ANALYSIS

Aphia ID	Phylum Class/Order	Taxon Name	Qualifiers	Authority	Stations																																			Total
					ENV01	ENV02	ENV03	ENV04	ENV05	ENV06	ENV07	ENV08	ENV09	ENV10	ENV11	ENV12	ENV13	ENV14	ENV15	ENV16	ENV17	ENV18	ENV19	ENV21	ENV22	ENV23	ENV24	ENV25	ENV26	ENV27	ENV28	ENV29	ENV30	ENV31	ENV32	ENV33	ENV34	ENV35	
Taxa included in statistical analysis																																								
	ANNELIDA																																							
938	**Polychaeta**	Aphroditidae	Juvenile	Malmgren, 1867	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
130599		*Pholoe baltica*		Örsted, 1843	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	5	0	0	2	0	0	0	0	0	0	0	0	0	0	0	**9**
939		Polynoidae		Kinberg, 1856	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**3**
130737		*Enipo elisabethae*		McIntosh, 1900	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
129491		Harmothoe		Kinberg, 1856	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
147006		Malmgrenia		McIntosh, 1874	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
147008		*Malmgrenia andreapolis*		McIntosh, 1874	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**2**
130707		*Pisione remota*		(Southern, 1914)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
131072		*Sigalion mathildae*	Juvenile	Audouin & Milne Edwards, 1832	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
131077		*Sthenelais limicola*		(Ehlers, 1864)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	**6**
129296		Glycera		Lamarck, 1818	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	**3**
130116		*Glycera alba*		(O.F. Müller, 1776)	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
336908		*Glycera fallax*		Quatrefages, 1850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
130123		*Glycera lapidum*		Quatrefages, 1866	0	0	0	0	0	0	0	0	0	3	0	0	2	1	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	1	0	0	0	0	**12**
130126		*Glycera oxycephala*		Ehlers, 1887	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
130136		*Glycinde nordmanni*		(Malmgren, 1866)	0	0	0	1	2	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	**7**
130140		*Goniada maculata*		Örsted, 1843	0	0	2	0	1	2	0	1	0	0	0	0	0	0	1	2	0	0	0	1	0	0	0	1	0	0	0	0	2	0	1	2	0	0	**16**
240580		*Goniada vorax*		(Kinberg, 1866)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
130145		*Goniadella gracilis*	Non-native	(Verrill, 1873)	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
710680		*Oxydromus flexuosus*		(Delle Chiaje, 1827)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
129319		Podarkeopsis		Laubier, 1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**2**
130375		*Eunereis longissima*		(Johnston, 1840)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	**4**
131328		*Odontosyllis gibba*		Claparède, 1863	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
333456		*Exogone verugera*		(Claparède, 1868)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**1**
131379		*Sphaerosyllis bulbosa*		Southern, 1914	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
196002		*Syllis parapari*		San Martín & López, 2000	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	0	0	**8**
196003		*Syllis pontxioi*		San Martín & López, 2000	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	**8**
130616		*Eteone longa*		(Fabricius, 1780)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**2**
130631		*Eulalia mustela*		Pleijel, 1987	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	**6**
129446		Eumida		Malmgren, 1865	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	**2**
152250		*Hypereteone foliosa*		(Quatrefages, 1865)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
130673		*Phyllodoce longipes*		Kinberg, 1866	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
334514		*Phyllodoce rosea*		(McIntosh, 1877)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
130683		*Pseudomystides limbata*		(Saint-Joseph, 1888)	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
130343		*Aglaophamus agilis*		(Langerhans, 1880)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
129370		Nephtys		Cuvier, 1817	1	1	2	2	0	0	2	0		0	2	2	0	2	2	2	0	2	3	0	0	1	3	1	1	0	1	1	0	2	0	1	1	4	**39**
130353		*Nephtys assimilis*		Örsted, 1843	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	**3**
130359		*Nephtys hombergii*		Savigny in Lamarck, 1818	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	**6**
130041		*Protodorvillea kefersteini*		(McIntosh, 1869)	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	**8**
1297882		Paucibranchia		Molina-Acevedo, 2018	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1297882		Paucibranchia	Juvenile	Molina-Acevedo, 2018	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
130238		*Lumbrineris aniara*		Fauchald, 1974	1	4	0	9	0	2	8	0	7	0	0	0	0	1	8	0	1	3	0	0	3	1	8	0	0	12	3	1	0	0	6	0	0	0	**78**
851788		*Lumbrineris futilis*		Kinberg, 1865	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
129861		*Notocirrus scoticus*		McIntosh, 1869	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**3**
965		Onuphidae		Kinberg, 1865	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
130452		*Aponuphis bilineata*		(Baird, 1870)	5	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0	1	0	0	**14**
130464		*Hyalinoecia tubicola*		(O.F. Müller, 1776)	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	**8**
129892		*Mediomastus fragilis*		Rasmussen, 1973	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	**5**
129220		Notomastus		M. Sars, 1851	0	0	0	0	0	0	0	0	0	6	0	0	1	1	0	0	0	0	0	1	9	0	0	1	1	2	3	0	0	1	1	1	0	0	**28**
129906		*Peresiella clymenoides*		Harmelin, 1968	0	0	0	0	0	1	0	0	4	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	1	0	0	1	0	0	0	1	0	**12**
129911		*Pseudonotomastus southerni*		Warren & Parker, 1994	0	0	0	0	0	2	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	2	0	0	1	0	0	6	1	0	0	0	**16**
209899		*Euclymene lombricoides*		(Quatrefages, 1866)	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
130294		*Euclymene oerstedii*		(Claparède, 1863)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	**3**
146991		Leiochone		Grube, 1868	2	0	1	0	1	1	1	2	0	0	1	0	2	1	0	2	0	1	0	0	2	0	0	1	0	0	1	0	1	0	0	1	0	1	3	**24**
130322		*Praxillella affinis*		(M. Sars in G.O. Sars, 1872)	0	0	0	0	1	0	0	0	0	0	0	1	0	0	2	4	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	**12**
130327		*Praxillura longissima*		Arwidsson, 1906	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**2**
130330		*Rhodine gracilior*		Tauber, 1879	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	**7**
924		Opheliidae		Malmgren, 1867	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
129410		Armandia		Filippi, 1861	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
130491		*Ophelia borealis*		Quatrefages, 1866	2	0	2	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	**10**
129414		Ophelina		Örsted, 1843	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**4**
130500		*Ophelina acuminata*		Örsted, 1843	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
129420		Orbinia		Quatrefages, 1866	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**2**
130523		*Orbinia sertulata*		(Savigny, 1822)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**2**
130537		*Scoloplos armiger*		(Müller, 1776)	0	1	0	1	0	1	1	0	0	0	1	2	0	1	0	2	0	2	0	3	0	0	1	5	0	0	1	0	1	0	1	1	0	1	**26**
333034		*Aricidea (Acmira) catherinae*		Laubier, 1967	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	**6**
525497		*Aricidea (Acmira) cerrutii*		Laubier, 1966	0	2	0	1	1	0	0	0	0	2	1	0	0	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	**15**
326587		*Aricidea (Acmira) laubieri*		Hartley, 1981	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**4**
333037		*Aricidea (Acmira) simplex*		Day, 1963	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	**3**
130578		*Levinsenia gracilis*		(Tauber, 1879)	0	0	1	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**
130585		*Paradoneis lyra*		(Southern, 1914)	0	4	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	3	0	0	1	1	0	0	0	0	0	0	0	**12**
130980		*Scalibregma inflatum*		Rathke, 1843	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
130512		*Travisia forbesii*		Johnston, 1840	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**5**
129198		Apistobranchus		Levinsen, 1884	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	**3**
130711		*Poecilochaetus serpens*		Allen, 1904	0	0	0	0	0	1	0	1	0	3	0	0	2	0	0	0	2	0	0	2	0	5	1	0	1	1	2	0	0	0	0	0	0	0	**21**
131107		*Aonides paucibranchiata*		Southern, 1914	0	0	1	0	0	0	0	0	0	4	0	0	3	0	0	0	0	1	0	0	3	0	0	0	0	0	1	0	0	0	0	2	0	0	**15**
129611		Dipolydora		Verrill, 1881	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**

APPENDIX M MACROFAUNA ANALYSIS

Aphia ID	Phylum Class/Order	Taxon Name	Qualifiers	Authority	Stations																																					Total
					ENV01	ENV02	ENV03	ENV04	ENV05	ENV06	ENV07	ENV08	ENV09	ENV10	ENV11	ENV12	ENV13	ENV14	ENV15	ENV16	ENV17	ENV18	ENV19	ENV21	ENV22	ENV23	ENV24	ENV25	ENV26	ENV27	ENV28	ENV29	ENV30	ENV31	ENV32	ENV33	ENV34	ENV35	
131116		*Dipolydora caulleryi*		(Mesnil, 1897)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
131117		*Dipolydora coeca*		(Örsted, 1843)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	**5**
131127		*Laonice bahusiensis*		Söderström, 1920	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**18**
131155		*Prionospio dubia*		Day, 1961	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	5	2	0	0	0	2	1	0	0	0	6	0	0	0	3	0	0	0	0	**23**
129620		Prionospio		Malmgren, 1867	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
131157		*Prionospio fallax*		Söderström, 1920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
129621		Pseudopolydora		Czerniavsky, 1881	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
131169		*Pseudopolydora pulchra*		(Carazzi, 1893)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
129623		Scolelepis		Blainville, 1828	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
131171		*Scolelepis bonnieri*		(Mesnil, 1896)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**2**
131187		*Spiophanes bombyx*		(Claparède, 1870)	1	0	2	1	1	3	2	1	1	0	0	0	0	0	0	1	0	3	0	0	0	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	**21**
131188		*Spiophanes kroyeri*		Grube, 1860	1	0	1	0	1	0	0	0	3	0	0	1	0	0	1	0	0	0	1	3	4	0	1	3	2	0	0	0	4	0	0	0	1	0	0	0	0	**27**
129240		Aphelochaeta		Blake, 1991	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**2**
567253		*Caulleriella venefica*		Doner & Blake, 2006	2	1	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**
129242		Chaetozone		Malmgren, 1867	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	**3**
152217		*Chaetozone christiei*		Chambers, 2000	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
1512071		*Chaetozone pseudosetosa*		Grosse, Capa & Bakken, 2021	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	6	1	0	0	0	3	0	0	0	0	0	0	0	0	**15**
152269		*Tharyx killariensis*		(Southern, 1914)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
130100		*Diplocirrus glaucus*		(Malmgren, 1867)	0	2	0	0	1	1	1	0	4	0	0	2	0	0	2	2	0	0	2	1	0	0	1	4	0	0	3	1	2	0	0	0	1	0	0	0	0	**30**
981		Ampharetidae		Malmgren, 1866	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
129777		*Ampharete falcata*		Eliason, 1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
129781		*Ampharete lindstroemi*		Hessle, 1917	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**
129789		*Anobothrus gracilis*		(Malmgren, 1866)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	**5**
152448		*Amphictene auricoma*		(O.F. Müller, 1776)	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	**7**
982		Terebellidae		Johnston, 1846	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**4**
181512		Polycirrini		Malmgren, 1866	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
131500		*Lysilla loveni*		Malmgren, 1866	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
129710		Polycirrus		Grube, 1850	0	0	0	0	0	0	3	0	0	3	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	2	1	0	1	0	1	0	0	0	0	0	**17**
131480		*Amphitritides gracilis*		(Grube, 1860)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
131495		*Lanice conchilega*		(Pallas, 1766)	0	1	0	0	2	1	1	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**10**
131519		*Pista mediterranea*		Gaillande, 1970	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
154972		*Pistella lornensis*	Lavesque et al. 2021	(Pearson, 1969)	1	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**7**
129712		Streblosoma		M. Sars in G.O. Sars, 1872	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
129717		Terebellides		Sars, 1835	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1374758		*Terebellides resomari*		Lavesque, Hutchings, Daffe, Nygren & Londoño-M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
874599		*Terebellides shetlandica*		Parapar, Moreira & O'Reilly, 2016	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
131575		*Trichobranchus roseus*		(Malm, 1874)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	**3**
985		Sabellidae		Latreille, 1825	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**8**
130920		*Jasmineira caudata*		Langerhans, 1880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
988		Serpulidae		Rafinesque, 1815	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
131009		*Hydroides norvegica*		Gunnerus, 1768	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
146949		Galathowenia		Kirkegaard, 1959	0	0	0	0	12	5	3	0	3	0	0	4	0	0	6	7	0	1	2	0	2	0	3	12	17	0	0	3	6	0	0	0	3	0	0	0	0	**89**
130540		*Myriochele danielsseni*		Hansen, 1878	0	0	0	0	2	1	0	0	2	0	0	2	0	0	5	1	0	1	0	0	0	0	0	15	2	0	0	3	1	0	0	0	0	0	0	0	0	**35**
129427		Owenia		Delle Chiaje, 1844	0	0	0	0	0	1	0	0	0	0	0	2	1	1	0	1	0	0	1	0	0	0	0	1	1	0	1	0	3	0	0	0	0	0	0	0	0	**13**
130266		*Magelona alleni*		Wilson, 1958	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**5**
130268		*Magelona filiformis*		Wilson, 1959	0	0	0	0	0	0	2	0	3	0	0	0	0	0	2	0	0	1	0	0	0	1	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	**14**
129472		Polygordius		Schneider, 1868	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1268	**Sipuncula**	Sipuncula		Stephen, 1965	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
175026		*Golfingia (Golfingia) elongata*		(Keferstein, 1862)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
136063		*Thysanocardia procera*		(Möbius, 1875)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
410749		*Phascolion (Phascolion) strombus strombus*		(Montagu, 1804)	2	0	1	0	1	2	0	0	0	2	0	0	2	1	4	2	0	2	1	0	5	0	1	0	1	0	2	0	0	1	1	1	0	0	0	0	0	**32**
2041	**Clitellata**	Hirudinea		Savigny, 1822	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
137349		Grania		Southern, 1913	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
2039		Naididae		Ehrenberg, 1831	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
	ARTHROPODA																																									
146996	**Malacostraca**	Leptostraca		Claus, 1880	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
110387		Bodotria		Goodsir, 1843	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
110445		*Bodotria scorpioides*		(Montagu, 1804)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
110380		Diastylidae		Bate, 1856	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**4**
110481		*Diastylis laevis*		Norman, 1869	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
110488		*Diastylis rugosa*		Sars, 1865	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
110494		*Diastyloides biplicatus*		(Sars G.O., 1865)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**2**
110535		*Eudorella truncatula*		(Bate, 1856)	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	**5**
110536		*Eudorellopsis deformis*		(Krøyer, 1846)	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**
102915		*Perioculodes longimanus*		(Spence Bate & Westwood, 1868)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
102917		*Pontocrates arcticus*		G.O. Sars, 1895	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
102932		*Westwoodilla caecula*		(Spence Bate, 1857)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**3**
179538		*Nototropis vedlomensis*		(Spence Bate & Westwood, 1862)	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	**8**
101708		Halicoides		Walker, 1896	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**3**
101891		*Ampelisca brevicornis*		A. Costa, 1853	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
101896		*Ampelisca diadema*		A. Costa, 1853	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
179882		*Ampelisca pectenata*		Reid, 1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
101930		*Ampelisca tenuicornis*		Liljeborg, 1856	0	0	0	0	0	2	3	1	2	0	0	0	0	0	1	2	0	0	0	0	1	0	0	3	2	0	1	0	1	0	1	0	1	0	0	0	0	**20**
101933		*Ampelisca typica*		(Spence Bate, 1857)	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
101716		Harpinia		Boeck, 1876	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
102960		*Harpinia antennaria*		Meinert, 1890	0	0	0	0	2	0	1	0	0	0	0	1	0	0	0	2	0	0	0	2	0	0	3	0	3	0	1	3	2	0	0	0	0	0	0	0	0	**20**
101789		Urothoe		Dana, 1852	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
103228		*Urothoe elegans*		Spence Bate, 1857	0	0	0	0	8	16	4	0	2	0	0	5	0	0	2	2	0	1	1	0	0	0	5	0	5	0	1	5	5	0	0	0	3	0	0	0	0	**65**
102497		*Acidostoma obesum*		(Spence Bate, 1862)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**

APPENDIX M MACROFAUNA ANALYSIS

Aphia ID	Phylum Class/Order	Taxon Name	Qualifiers	Authority	Stations																																					Total
					ENV01	ENV02	ENV03	ENV04	ENV05	ENV06	ENV07	ENV08	ENV09	ENV10	ENV11	ENV12	ENV13	ENV14	ENV15	ENV16	ENV17	ENV18	ENV19	ENV21	ENV22	ENV23	ENV24	ENV25	ENV26	ENV27	ENV28	ENV29	ENV30	ENV31	ENV32	ENV33	ENV34	ENV35	
102570		*Hippomedon denticulatus*		(Spence Bate, 1857)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	**2**
102598		*Lepidepecreum longicorne*		(Spence Bate & Westwood, 1861)	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	**5**
102779		*Tryphosites longipes*		(Spence Bate & Westwood, 1861)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
101742		Bathyporeia		Lindström, 1855	0	3	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	1	0	0	0	0	1	0	0	**14**
103058		*Bathyporeia elegans*		Watkin, 1938	2	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	0	**8**
103076		*Bathyporeia tenuipes*		Meinert, 1877	0	0	1	0	0	12	4	1	3	0	0	0	0	0	5	0	0	0	0	0	0	0	6	0	0	1	1	1	0	0	0	0	0	0	**35**
1468705		*Cheirocratus pseudosundevallii*		Gouillieux, 2019	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
101368		Aoridae		Stebbing, 1899	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
102021		*Autonoe longipes*		(Liljeborg, 1852)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
102061		*Unciola planipes*		Norman, 1867	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
423507		*Medicorophium affine*		(Bruzelius, 1859)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
1059649		*Centraloecetes striatus*		(Myers & McGrath, 1979)	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**3**
102364		*Gammaropsis maculata*		(Johnston, 1828)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
101857		*Pariambus typicus*		(Krøyer, 1845)	0	0	0	0	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**6**
118445		Astacilla		Cordiner, 1793	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
295579		*Astacilla dilatata*		G. O. Sars, 1883	0	1	0	0	2	1	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	0	**13**
119024		*Astacilla longicornis*		(Sowerby, 1806)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
118859		*Natatolana borealis*		Liljeborg, 1851	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
136458		*Tanaopsis graciloides*		(Lilljeborg, 1864)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	**4**
107729		*Callianassa subterranea*		(Montagu, 1808)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	1	1	0	0	0	1	3	0	0	0	0	0	0	0	1	0	**13**
107150		*Galathea intermedia*		Lilljeborg, 1851	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
106738		Paguridae		Latreille, 1802	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**2**
106889		Ebalia		Leach, 1817	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	1	0	0	0	1	**9**
134723	**Pycnogonida**	*Anoplodactylus petiolatus*		(Krøyer, 1844)	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	**6**
	MOLLUSCA																																									
139106	**Caudofoveata**	*Chaetoderma nitidulum*		Lovén, 1844	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	**4**
150534	**Scaphopoda**	*Antalis entalis*		(Linnaeus, 1758)	1	1	2	0	5	5	0	0	3	1	0	1	0	2	6	1	0	2	5	0	2	0	7	3	10	1	2	3	0	0	2	3	5	1	**74**
101	**Gastropoda**	Gastropoda		Cuvier, 1795	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
139476		*Cylichna cylindracea*		(Pennant, 1777)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
161		Philinidae		Gray, 1850 (1815)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**2**
145		Naticidae		Guilding, 1834	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	**5**
151894		*Euspira nitida*		(Donovan, 1803)	0	0	1	0	0	0	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	**8**
138691		*Acteon tornatilis*		(Linnaeus, 1758)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
105	**Bivalvia**	Bivalvia		Linnaeus, 1758	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	**2**
140103		*Hiatella arctica*		(Linnaeus, 1767)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
140737		*Phaxas pellucidus*		(Pennant, 1777)	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	2	0	0	1	0	0	0	1	1	0	0	1	0	2	0	0	0	1	0	**12**
138992		*Acanthocardia echinata*		(Linnaeus, 1758)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**2**
1417307		*Papillicardium minimum*		(R. A. Philippi, 1836)	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	**4**
181343		*Parvicardium pinnulatum*		(Conrad, 1831)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
140870		*Gari fervensis*		(Gmelin, 1791)	1	0	2	0	1	1	0	1	0	0	0	0	0	0	0	0	0	7	1	0	0	1	0	0	0	1	0	0	0	0	0	4	0	5	**25**
138474		Abra		Lamarck, 1818	0	2	2	1	1	2	3	2	0	0	2	0	0	0	0	2	0	5	2	5	0	1	0	0	0	2	1	0	2	0	1	0	0	0	**36**
141436		*Abra prismatica*		(Montagu, 1808)	1	0	0	1	0	0	1	0	1	0	4	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	**12**
141543		*Solecurtus scopula*		(W. Turton, 1822)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
879714		*Asbjornsenia pygmaea*		(Lovén, 1846)	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	**4**
146907		*Fabulina fabula*		(Gmelin, 1791)	0	4	2	5	0	0	2	0	0	0	0	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	1	0	0	0	2	1	0	2	**30**
147021		*Moerella donacina*		(Linnaeus, 1758)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
138823		*Astarte montagui*		(Dillwyn, 1817)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
140365		*Devonia perrieri*		(Malard, 1904)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
345281		*Kurtiella bidentata*		(Montagu, 1803)	0	3	0	0	0	2	0	0	6	0	0	0	0	0	5	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	**18**
146952		*Tellimya ferruginosa*		(Montagu, 1808)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**4**
140283		*Lucinoma borealis*		(Linnaeus, 1767)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	**4**
140283		*Lucinoma borealis*	Juvenile	(Linnaeus, 1767)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	**2**
140283		*Lucinoma borealis*	Combined		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	1	0	0	**6**
140287		*Myrtea spinifera*		(Montagu, 1803)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	0	0	0	4	0	0	0	0	2	0	0	0	0	0	**12**
219		Thyasiridae		Dall, 1900 (1895)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	**2**
141662		*Thyasira flexuosa*		(Montagu, 1803)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**3**
140440		*Crenella decussata*		(Montagu, 1808)	1	0	2	0	0	0	0	0	0	1	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**7**
138262		Nucula		Lamarck, 1799	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	**3**
140589		*Nucula nitidosa*		Winckworth, 1930	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	**4**
138802		*Arctica islandica*		(Linnaeus, 1767)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
138802		*Arctica islandica*	Juvenile	(Linnaeus, 1767)	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
138802		*Arctica islandica*	Combined	(Linnaeus, 1767)	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
138159		Spisula		J. E. Gray, 1837	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	**4**
140300		*Spisula elliptica*		T. Brown, 1827	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**2**
243		Veneridae		Rafinesque, 1815	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
141908		*Chamelea striatula*		(da Costa, 1778)	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
138636		Dosinia		Scopoli, 1777	0	0	0	2	1	0	0	1	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	**10**
141911		*Dosinia exoleta*		(Linnaeus, 1758)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**2**
140728		*Mysia undata*		(Pennant, 1777)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
141929		*Timoclea ovata*		(Pennant, 1777)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
382318		Thracioidea		Stoliczka, 1870 (1839)	0	0	7	3	0	1	1	0	0	0	4	1	0	2	0	0	1	1	0	0	0	2	0	1	0	0	0	0	0	1	2	2	0	2	**31**
137858		Cuspidaria		Nardo, 1840	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
181373		*Cochlodesma praetenue*		(Pulteney, 1799)	3	0	4	0	0	0	0	1	0	0	6	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	3	0	0	0	0	8	0	7	**37**
138549		Thracia		Blainville, 1824	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	**5**
	ECHINODERMATA																																									
124273	**Echinoidea**	*Echinocyamus pusillus*		(O.F. Müller, 1776)	4	3	8	0	0	11	6	1	4	1	5	0	0	4	1	8	0	8	4	0	5	2	6	3	0	3	2	4	1	8	3	3	0	3	**111**
123106		Spatangoida	Juvenile	L. Agassiz, 1840	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	**5**
140283		*Brissopsis lyrifera*		(Linnaeus, 1767)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
123426		Echinocardium		Gray, 1825	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**

APPENDIX M MACROFAUNA ANALYSIS

Aphia ID	Phylum Class/Order	Taxon Name	Qualifiers	Authority	Stations																																		Total
					ENV01	ENV02	ENV03	ENV04	ENV05	ENV06	ENV07	ENV08	ENV09	ENV10	ENV11	ENV12	ENV13	ENV14	ENV15	ENV16	ENV17	ENV18	ENV19	ENV21	ENV22	ENV23	ENV24	ENV25	ENV26	ENV27	ENV28	ENV29	ENV30	ENV31	ENV32	ENV33	ENV34	ENV35	
124394		*Echinocardium flavescens*		(O.F. Müller, 1776)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
123449	**Holothuroidea**	Leptosynapta		Verrill, 1867	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
124462		*Leptosynapta bergensis*		(Östergren, 1905)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	5
123206	**Ophiuroidea**	Amphiuridae		Ljungman, 1867	0	2	0	3	0	0	1	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	12
125080		*Amphiura filiformis*		(O.F. Müller, 1776)	0	0	0	0	1	1	0	0	0	0	0	3	0	0	1	2	0	0	1	0	0	0	0	1	1	0	0	0	1	0	1	0	1	1	15
123200		Ophiuridae		Müller & Troschel, 1840	0	0	1	2	0	0	1	0	0	0	0	0	0	2	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	1	0	0	11
	CHAETOGNATHA																																						
2081		Chaetognatha			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
	CNIDARIA																																						
100880	**Anthozoa**	*Edwardsia claparedii*		(Panceri, 1869)	0	1	0	1	0	4	1	0	3	1	0	0	0	0	1	0	1	0	0	0	0	1	1	0	0	1	2	7	0	0	1	0	0	0	26
283798		*Cerianthus lloydii*		Gosse, 1859	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	FORAMINIFERA																																						
112299		Astrorhiza		Sandahl, 1858	0	0	0	1	12	3	0	0	4	0	0	0	0	1	12	30	0	1	2	0	1	0	3	11	1	0	1	5	0	0	1	0	1	0	90
	HEMICHORDATA																																						
1820		Enteropneusta		Gegenbaur, 1870	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	10
	NEMERTEA																																						
152391		Nemertea			2	4	1	1	0	2	0	1	3	2	0	0	1	0	2	1	4	0	1	0	2	1	4	3	1	1	3	2	2	2	2	1	1	1	51
	PHORONIDA																																						
128545		Phoronis		Wright, 1856	0	0	1	1	6	5	0	0	2	1	0	1	0	1	5	2	0	3	2	0	0	1	3	2	3	2	3	0	0	0	1	0	1	0	46
	PLATYHELMINTHES																																						
793		Platyhelminthes		Minot, 1876	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
				Total Individuals	40	44	57	47	91	103	66	27	78	62	41	53	30	49	107	131	32	82	52	32	94	27	90	136	70	44	63	60	62	44	46	51	33	40	2084
				Total Taxa	25	22	32	28	44	40	35	25	35	33	21	36	21	35	51	59	21	38	34	17	42	22	38	52	32	25	45	32	32	22	33	30	21	20	1098
Taxa excluded from statistical analysis																																							
	ANNELIDA																																						
129370	**Polychaeta**	Nephtys		Cuvier, 1817	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
129439		Pholoe		Johnston, 1839	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
130599		Pholoe baltica		Örsted, 1843	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
131077		*Sthenelais limicola*		(Ehlers, 1864)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	P
129296		Glycera		Lamarck, 1818	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	P
129446		Eumida		Malmgren, 1865	0	0	0	0	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	P
921		Capitellidae		Grube, 1862	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
923		Maldanidae		Malmgren, 1867	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	P	0	0	P	0	0	0	P	0	0	P	0	0	0	0	0	P	0	0	P
130322		Praxillella affinis		(M. Sars in G.O. Sars, 1872)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	P
902		Orbiniidae		Hartman, 1942	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
903		Paraonidae		Cerruti, 1909	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
131107		*Aonides paucibranchiata*		Southern, 1914	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	P
152292		Terebelliformia		Levinsen, 1882	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	P	0	0	0	0	0	0	P	0	0	0	P
129240		Aphelochaeta		Blake, 1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	P
129242		*Chaetozone*		Malmgren, 1867	0	P	0	0	P	P	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	P
152269		*Tharyx killariensis*		(Southern, 1914)	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
130100		Diplocirrus glaucus		(Malmgren, 1867)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	P
146949		Galathowenia		Kirkegaard, 1959	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	P	0	0	0	P
129427		Owenia		Delle Chiaje, 1844	0	0	P	0	0	0	0	0	0	P	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	P	0	P	0	0	0	0	P	0	P
	ARTHROPODA																																						
101445	**Malacostraca**	Ampelisca		Krøyer, 1842	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	P
103228		*Urothoe elegans*		Spence Bate, 1857	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	P
101669		Cheirocratus		Norman, 1867	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
134723	**Pycnogonida**	*Anoplodactylus petiolatus*		(Krøyer, 1844)	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
1107	**Thecostraca**	Thoracica		Darwin, 1854	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
1080	**Copepoda**	Copepoda		Milne Edwards, 1840	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
	MOLLUSCA																																						
105	**Bivalvia**	Bivalvia		Linnaeus, 1758	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	P	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	P
	ECHINODERMATA																																						
123449	**Holothuroidea**	Leptosynapta		Verrill, 1867	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	P	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	P
123182		Synaptidae		Burmeister, 1837	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
123206	**Ophiuroidea**	Amphiuridae		Ljungman, 1867	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	P	0	0	0	0	P
124392	**Echinoidea**	*Echinocardium cordatum*		(Pennant, 1777)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	P
123106		Spatangoida	Juvenile		0	0	0	0	P	0	P	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	P	0	0	P
	ANIMALIA																																						
2		Animalia			0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
	BRYOZOA																																						
110819	**Gymnolaemata**	Aetea		Lamouroux, 1812	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	P
110829		Schizomavella		Canu & Bassler, 1917	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	P	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	P
111196		*Callopora dumerilii*		(Audouin, 1826)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	P
111358		*Pyripora catenularia*		(Fleming, 1828)	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
111496		*Escharella ventricosa*		(Hassall, 1842)	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
110976		Scruparia		Oken, 1815	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	P
111604		*Alcyonidium parasiticum*		(Fleming, 1828)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	P
	CHORDATA																																						
10194		Actinopterygii	Eggs		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3
1839	**Ascidiacea**	Ascidiacea		Blainville, 1824	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4
	CHROMISTA																																						
1692	**Heterotrichea**	Folliculinidae		Dons, 1914	0	0	P	P	0	0	0	0	0	0	0	0	0	P	P	0	P	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	P
	CNIDARIA																																						
13551	**Hydrozoa**	Anthoathecata		Cornelius, 1992	0	0	0	0	P	P	0	0	0	0	0	0	0	0	P	0	0	0	0	0	P	P	P	P	P	0	0	P	0	0	P	0	P	0	P
13552		Leptothecata		Cornelius, 1992	0	P	0	P	0	0	P	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	P
731048		Plumularioidea		McCrady, 1859	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P
117103		Halecium		Oken, 1815	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	P

APPENDIX M MACROFAUNA ANALYSIS

Aphia ID	Phylum Class/Order	Taxon Name	Qualifiers	Authority	Stations																																			Total
					ENV01	ENV02	ENV03	ENV04	ENV05	ENV06	ENV07	ENV08	ENV09	ENV10	ENV11	ENV12	ENV13	ENV14	ENV15	ENV16	ENV17	ENV18	ENV19	ENV21	ENV22	ENV23	ENV24	ENV25	ENV26	ENV27	ENV28	ENV29	ENV30	ENV31	ENV32	ENV33	ENV34	ENV35	
1614		Sertulariidae		Lamouroux, 1812	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**P**
117890		*Hydrallmania falcata*		(Linnaeus, 1758)	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	**P**
	HEMICHORDATA																																							
1820		Enteropneusta		Gegenbaur, 1870	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**P**
	NEMATODA																																							
799		Nematoda			0	0	0	0	0	P	0	0	0	P	0	0	P	0	0	P	P	0	0	0	P	0	0	0	0	P	0	0	0	P	0	0	0	0	**P**
	NEMERTEA																																							
152391		Nemertea			0	0	0	0	P	0	0	0	0	0	P	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**P**
	PHORONIDA																																							
128545		Phoronis		Wright, 1856	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	**P**
	PORIFERA																																							
132026		Cliona		Grant, 1826	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	**P**

Juvenile Record
Combined Adult and Juvenile Record
Taxa in blue are the top ten most dominant in the adult data set
Taxa in red are species of interest

APPENDIX N BIOMASS ANALYSIS

APPENDIX N BIOMASS ANALYSIS

Aphia ID	Phylum Class/Order	Taxon Name	Qualifiers	Authority	Stations																																		Total
					ENV01	ENV02	ENV03	ENV04	ENV05	ENV06	ENV07	ENV08	ENV09	ENV10	ENV11	ENV12	ENV13	ENV14	ENV15	ENV16	ENV17	ENV18	ENV19	ENV21	ENV22	ENV23	ENV24	ENV25	ENV26	ENV27	ENV28	ENV29	ENV30	ENV31	ENV32	ENV33	ENV34	ENV35	
Taxa included in statistical analysis																																							
	ANNELIDA																																						
938	**Polychaeta**	Aphroditidae	Juvenile	Malmgren, 1867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0012**
130599		*Pholoe baltica*		Örsted, 1843	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0063**
939		Polynoidae		Kinberg, 1856	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	**0.0027**
130737		*Enipo elisabethae*		McIntosh, 1900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0083	0.0000	0.0000	0.0036	0.0000	0.0000	0.0000	0.0000	0.0000	0.0252	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0371**
129491		*Harmothoe*		Kinberg, 1856	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0125**
147006		*Malmgrenia*		McIntosh, 1874	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0035	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0053**
147008		*Malmgrenia andreapolis*		McIntosh, 1874	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0746	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0527	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.1273**
130707		*Pisione remota*		(Southern, 1914)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0003**
131072		*Sigalion mathildae*	Juvenile	Audouin & Milne Edwards, 1832	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0002**
131077		*Sthenelais limicola*		(Ehlers, 1864)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0326	0.0000	0.0000	0.0149	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0181	0.0000	0.0000	0.0000	0.0000	0.1164	0.0000	0.0145	**0.1965**
129296		*Glycera*		Lamarck, 1818	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0021**
130116		*Glycera alba*		(O.F. Müller, 1776)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0029	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0025	0.0201	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0260**
336908		*Glycera fallax*		Quatrefages, 1850	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0623	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0623**
130123		*Glycera lapidum*		Quatrefages, 1866	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0000	0.0000	0.0242	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0070	0.0000	0.0000	0.0000	0.0000	**0.0403**
130126		*Glycera oxycephala*		Ehlers, 1887	0.0094	0.0000	0.0084	0.0000	0.0000	0.0000	0.0000	0.0089	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0033	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0300**
130136		*Glycinde nordmanni*		(Malmgren, 1866)	0.0000	0.0000	0.0000	0.0003	0.0045	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0017	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0073**
130140		*Goniada maculata*		Örsted, 1843	0.0000	0.0000	0.0595	0.0000	0.0007	0.0040	0.0000	0.0181	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0784	0.0000	0.0000	0.0000	0.0270	0.0000	0.0000	0.0000	0.0742	0.0000	0.0000	0.0000	0.0000	0.0290	0.0000	0.0003	0.0140	0.0000	0.0000	**0.3061**
240580		*Goniada vorax*		(Kinberg, 1866)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.2540**
130145		*Goniadella gracilis*	Non-native	(Verrill, 1873)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0016**
710680		*Oxydromus flexuosus*		(Delle Chiaje, 1827)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0017**
129319		*Podarkeopsis*		Laubier, 1961	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	**0.0018**
130375		*Eunereis longissima*		(Johnston, 1840)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0056	0.0000	0.0018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0031	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0127	0.0000	0.0000	0.0000	0.0000	**0.0232**
131328		*Odontosyllis gibba*		Claparède, 1863	0.0000	0.0007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0007**
333456		*Exogone verugera*		(Claparède, 1868)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	**0.0002**
131379		*Sphaerosyllis bulbosa*		Southern, 1914	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0001**
196002		*Syllis parapari*		San Martín & López, 2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0070	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0000	0.0015	0.0000	0.0001	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	**0.0136**
196003		*Syllis pontxioi*		San Martín & López, 2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000	0.0000	**0.0058**
130616		*Eteone longa*	cf.	(Fabricius, 1780)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0018**
130631		*Eulalia mustela*		Pleijel, 1987	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	**0.0022**
129446		*Eumida*		Malmgren, 1865	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0036	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000	**0.0056**
152250		*Hypereteone foliosa*		(Quatrefages, 1865)	0.0056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0056**
130673		*Phyllodoce longipes*	cf.	Kinberg, 1866	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0013**
334514		*Phyllodoce rosea*		(McIntosh, 1877)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0005**
130683		*Pseudomystides limbata*		(Saint-Joseph, 1888)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0006**
130343		*Aglaophamus agilis*		(Langerhans, 1880)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0071	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0071**
129370		*Nephtys*		Cuvier, 1817	0.0047	0.0009	0.0153	0.0011	0.0000	0.0000	0.0090	0.0000	0.0000	0.0000	0.0354	0.0204	0.0000	0.0047	0.0245	0.0001	0.0000	0.0035	0.0439	0.0000	0.0000	0.0013	0.0059	0.0040	0.0346	0.0000	0.0085	0.0014	0.0000	0.0047	0.0000	0.0305	0.0006	0.0913	**0.3463**
130353		*Nephtys assimilis*		Örsted, 1843	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0666	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0955	0.0432	0.0000	**0.2053**
130359		*Nephtys hombergii*		Savigny in Lamarck, 1818	0.0000	0.0000	0.0000	0.0000	0.2098	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0377	0.0000	0.0000	1.1053	0.0083	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2126	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.9353	0.0000	**3.5090**
130041		*Protodorvillea kefersteini*		(McIntosh, 1869)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	**0.0056**
1297882		*Paucibranchia*		Molina-Acevedo, 2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0249	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0249**
1297882		*Paucibranchia*	Juvenile	Molina-Acevedo, 2018	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0001**
130238		*Lumbrineris aniara*	agg.	Fauchald, 1974	0.0003	0.0242	0.0000	0.0429	0.0000	0.0297	0.0576	0.0000	0.0717	0.0000	0.0000	0.0000	0.0000	0.0040	0.0434	0.0000	0.0027	0.0264	0.0000	0.0000	0.0019	0.0001	0.0857	0.0000	0.0000	0.0744	0.0248	0.0006	0.0000	0.0000	0.0388	0.0000	0.0000	0.0000	**0.5292**
851788		*Lumbrineris futilis*		Kinberg, 1865	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2439	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0026	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.2465**
129861		*Notocirrus scoticus*		McIntosh, 1869	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0215	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0369	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0028	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0612**
965		Onuphidae		Kinberg, 1865	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0003**
130452		*Aponuphis bilineata*		(Baird, 1870)	0.0750	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0039	0.0000	0.0000	0.0029	0.0000	0.0000	0.0345	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0046	0.0000	0.0053	0.0000	0.0000	**0.2414**
130464		*Hyalinoecia tubicola*		(O.F. Müller, 1776)	0.0000	0.0000	0.0000	0.2290	0.1325	0.1684	0.0000	0.0184	0.3491	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1286	0.1516	0.0000	0.0000	0.0000	0.0000	0.0000	0.2586	**1.4362**
129892		*Mediomastus fragilis*		Rasmussen, 1973	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0028	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	**0.0046**
129220		*Notomastus*		M. Sars, 1851	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0154	0.0000	0.0000	0.0164	0.0074	0.0000	0.0000	0.0000	0.0000	0.0000	0.6852	0.1426	0.0000	0.0000	0.0009	0.0018	0.0263	0.0069	0.0000	0.0000	0.0006	0.0022	0.0919	0.0000	0.0000	**0.9976**
129906		*Peresiella clymenoides*		Harmelin, 1968	0.0000	0.0000	0.0000	0.0000	0.0000	0.0040	0.0000	0.0000	0.0042	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0031	0.0000	0.0004	0.0033	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0013	0.0000	**0.0184**
129911		*Pseudonotomastus southerni*		Warren & Parker, 1994	0.0000	0.0000	0.0000	0.0000	0.0000	0.0072	0.0149	0.0000	0.0000	0.0000	0.0000	0.0000	0.0136	0.0000	0.0000	0.0018	0.0000	0.0104	0.0000	0.0000	0.0000	0.0000	0.0000	0.0894	0.0000	0.0000	0.0010	0.0000	0.0000	0.0339	0.0028	0.0000	0.0000	0.0000	**0.1750**
209899		*Euclymene lombricoides*		(Quatrefages, 1866)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.8022**
130294		*Euclymene oerstedii*	agg.	(Claparède, 1863)	0.0000	0.0000	0.0000	0.0000	0.0034	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0047	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0103**
146991		*Leiochone*		Grube, 1868	0.0594	0.0000	0.0900	0.0000	0.1081	0.0121	0.0153	0.0680	0.0000	0.0000	0.0470	0.0000	0.0093	0.0451	0.0000	0.0011	0.0000	0.0349	0.0000	0.0000	0.0182	0.0000	0.0000	0.0033	0.0000	0.0000	0.0246	0.0000	0.0000	0.0000	0.0588	0.0000	0.0028	0.0533	**0.6513**
130322		*Praxillella affinis*		(M. Sars in G.O. Sars, 1872)	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0068	0.0000	0.0000	0.0085	0.0359	0.0000	0.0000	0.0000	0.0000	0.0031	0.0000	0.0000	0.0113	0.0000	0.0087	0.0000	0.0058	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0812**
130327		*Praxillura longissima*		Arwidsson, 1906	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0206	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0053	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0259**
130330		*Rhodine gracilior*		Tauber, 1879	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0674	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0674**
924		Opheliidae		Malmgren, 1867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0001**
129410		*Armandia*		Filippi, 1861	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0010**
130491		*Ophelia borealis*		Quatrefages, 1866	0.0487	0.0000	0.0094	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0023	0.0000	0.0000	0.0173	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0505	0.0000	0.0067	**0.1349**
129414		*Ophelina*		Örsted, 1843	0.0000	0.0000	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0014	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0044**
130500		*Ophelina acuminata*		Örsted, 1843	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0648	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0648**
129420		*Orbinia*		Quatrefages, 1866	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1326	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.1382**
130523		*Orbinia sertulata*		(Savigny, 1822)	0.0000	0.0000	0.0000	0.0000	0.0000	0.1083	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0289	0.0000	0.0000	**0.1372**
130537		*Scoloplos armiger*		(Müller, 1776)	0.0000	0.0010	0.0000	0.0024	0.0000	0.0019	0.0019	0.0000	0.0000	0.0000	0.0020	0.0029	0.0000	0.0013	0.0000	0.0009	0.0000	0.0045	0.0000	0.0124	0.0000	0.0000	0.0041	0.0130	0.0000	0.0000	0.0004	0.0000	0.0091	0.0000	0.0014	0.0041	0.0000	0.0042	**0.0675**
333034		*Aricidea (Acmira) catherinae*		Laubier, 1967	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0017	0.0012	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0048**
525497		*Aricidea (Acmira) cerrutii*		Laubier, 1966	0.0000	0.0008	0.0000	0.0006	0.0004	0.0000	0.0000	0.0000	0.0000	0.0011	0.0004	0.0000	0.0000	0.0014	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0009	0.0000	0.0011	**0.0076**
326587		*Aricidea (Acmira) laubieri*		Hartley, 1981	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0000	0.0000	0.0020	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0074**
333037		*Aricidea (Acmira) simplex*		Day, 1963	0.0000	0.0000	0.0000	0.0029	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	**0.0050**
130578		*Levinsenia gracilis*		(Tauber, 1879)	0.0000	0.0000	0.0003	0.0000	0.0007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0033**
130585		*Paradoneis lyra*		(Southern, 1914)	0.0000	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0003	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0059**
130980		*Scalibregma inflatum*		Rathke, 1843	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0021	0.0000	0.0000	0.0000	**0.0021**
130512		*Travisia forbesii*		Johnston, 1840	0.0000	0.0000	0.0600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0198	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0553	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0047	**0.1398**
129198		*Apistobranchus*		Levinsen, 1884	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0013	0.0000	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0034**
130711		*Poecilochaetus serpens*		Allen, 1904	0.0000	0.0000	0.0000	0.0000	0.0000	0.0025	0.0000	0.0053	0.0000	0.0173	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000	0.0002	0.0000	0.0222	0.0010	0.0000	0.0046	0.0003	0.0041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0604**
131107		*Aonides paucibranchiata*		Southern, 1914	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0024	0.0000	0.0000	0.0036	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0014	0.0000	0.0000	**0.0093**
129611		*Dipolydora*		Verrill, 1881	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0004**
131116		*Dipolydora caulleryi*	agg.	(Mesnil, 1897)	0.0000	0.0000	0.0000	0.0000	0.0028	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0028**
131117		*Dipolydora coeca*	agg.	(Örsted, 1843)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0008	0.0000	0.0000	0.0002	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0027**
131127		*Laonice bahusiensis*	agg.	Söderström, 1920	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0327	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0410	0.0000	0.0000	0.0000	0.0358	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0000	**0.1114**
131155		*Prionospio dubia*	cf.	Day, 1961	0.0000	0.0000	0.0052	0.0000	0.0169	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0089	0.0000	0.0000	0.0098	0.0114	0.0000	0.0000	0.0000	0.0076	0.0039	0.0000	0.0000	0.0000	0.0306	0.0000	0.0000	0.0000	0.0056	0.0000	**0.0999**
129620		*Prionospio*		Malmgren, 1867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0002**
131157		*Prionospio fallax*		Söderström, 1920	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0016**
129621		*Pseudopolydora*		Czerniavsky, 1881	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0002**
131169		*Pseudopolydora pulchra*		(Carazzi, 1893)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0027	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0027**
129623		*Scolelepis*		Blainville, 1828	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1297	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.1297**
131171		*Scolelepis bonnieri*		(Mesnil, 1896)	0.0000	0.0000	0.0212	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0369	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0581**
131187		*Spiophanes bombyx*		(Claparède, 1870)	0.0006	0.0000	0.0078	0.0009	0.0035	0.0037	0.0084	0.0034	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0047	0.0000	0.0000	0.0000	0.0013	0.0028	0.0000	0.0000	0.0024	0.0017	0.0000	0.0000	0.0000	0.0024	0.0000	0.0000	0.0000	**0.0515**
131188		*Spiophanes kroyeri*		Grube, 1860	0.0024	0.0000	0.0018	0.0000	0.0026	0.0000	0.0000	0.0000	0.0090	0.0000	0.0000	0.0088	0.0000	0.0000	0.0012	0.0000	0.0000	0.0000	0.0041	0.0113	0.0098	0.0000	0.0016	0.0102	0.0055	0.0000	0.0000	0.0000	0.0187	0.0000	0.0000	0.0000	0.0115	0.0000	**0.0985**
129240		*Aphelochaeta*		Blake, 1991	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0144	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0167**
567253		*Caulleriella venefica*		Doner & Blake, 2006	0.0019	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0025	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0046**
129242		*Chaetozone*		Malmgren, 1867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0013	**0.0016**
152217		*Chaetozone christiei*		Chambers, 2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0020**
1512071		*Chaetozone pseudosetosa*		Grosse, Capa & Bakken, 2021	0.0000	0.0000	0.0000	0.0000	0.0031	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0082	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0144	0.0028	0.0000	0.0000	0.0000	0.0091	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0376**
152269		*Tharyx killariensis*		(Southern, 1914)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0009**
130100		*Diplocirrus glaucus*		(Malmgren, 1867)	0.0000	0.0469	0.0000	0.0000	0.0068	0.0044	0.0001	0.0000	0.0671	0.0000	0.0000	0.0215	0.0000	0.0000	0.0309	0.0186	0.0000	0.0000	0.0068	0.0100	0.0000	0.0000	0.0072	0.0170	0.0000	0.0000	0.0324	0.0182	0.0127	0.0000	0.0000	0.0000	0.0063	0.0000	**0.3069**
981		Ampharetidae		Malmgren, 1866	0.0000	0.0000	0.0000	0.0000	0.0061	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0066**
129777		*Ampharete falcata*		Eliason, 1955	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000	0.0000	0.0034	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0046**
129781		*Ampharete lindstroemi*	agg.	Hessle, 1917	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0028	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0030**
129789		*Anobothrus gracilis*		(Malmgren, 1866)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	0.0002	0.0012	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0043**
152448		*Amphictene auricoma*		(O.F. Müller, 1776)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0089	0.0000	0.0000	0.0044	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0178	0.0000	0.0000	0.0000	0.0276	0.0000	**0.0607**
982		Terebellidae		Johnston, 1846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0086	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	**0.0103**
181512		*Polycirrini*		Malmgren, 1866	0.0000	0.0000	0.0000	0.1194	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.1204**
131500		*Lysilla loveni*		Malmgren, 1866	0.0000	0.0000	0.0000	0.0000	0.0000	0.0252	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0629	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0103	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0984**
129710		*Polycirrus*		Grube, 1850	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0293	0.0000	0.0000	0.0051	0.0000	0.0000	0.0000	0.0011	0.0431	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1060	0.0179	0.0141	0.0000	0.0016	0.0000	0.0043	0.0000	0.0000	**0.2225**
131480		*Amphitritides gracilis*		(Grube, 1860)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0562	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0562**
131495		*Lanice conchilega*		(Pallas, 1766)	0.0000	0.0001	0.0000	0.0000	0.0311	0.0198	0.0154	0.0000	0.0000	0.2719	0.0000	0.0000	0.0389	0.0000	0.0000	0.0001	0.0016	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0535	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.4324**
131519		*Pista mediterranea*		Gaillande, 1970	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1726	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.1726**
154972		*Pistella lornensis*		(Pearson, 1969)	0.0040	0.0000	0.0023	0.0057	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0270**
129712		*Streblosoma*		M. Sars <i>in</i> G.O. Sars, 1872	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0030**
129717		*Terebellides*		Sars, 1835	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0002**
1374758		*Terebellides resomari*		Lavesque, Hutchings, Daffe, Nygren & Londoño-M	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1844	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.1844**
874599		*Terebellides shetlandica*		Parapar, Moreira & O'Reilly, 2016	0.0000	0.0000	0.0000	0.0000	0.0092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0093**
131575		*Trichobranchus roseus*		(Malm, 1874)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0027	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0071	0.0000	0.0000	0.0000	0.0000	0.0102	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0200**
985		Sabellidae		Latreille, 1825	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0024	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0043	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2446	0.0000	0.0000	**0.2526**
130920		*Jasmineira caudata*		Langerhans, 1880	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0001**
988		Serpulidae		Rafinesque, 1815	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0076	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0076**

APPENDIX N BIOMASS ANALYSIS

Aphia ID	Phylum Class/Order	Taxon Name	Qualifiers	Authority	Stations																																			Total
					EN01	EN02	EN03	EN04	EN05	EN06	EN07	EN08	EN09	EN10	EN11	EN12	EN13	EN14	EN15	EN16	EN17	EN18	EN19	EN21	EN22	EN23	EN24	EN25	EN26	EN27	EN28	EN29	EN30	EN31	EN32	EN23	EN34	EN35	
131009		*Hydroides norvegica*		Gunnerus, 1768													0.0011				0.0024				0.0055															**0.0090**
146949		*Galathowenia*		Kirkegaard, 1959					0.0068	0.0044	0.0008		0.0053			0.0133			0.0019	0.0125		0.0001	0.0083		0.0007		0.0012	0.0229	0.0608			0.0025	0.0082					0.0129		**0.1626**
130540		*Myriochele danielsseni*		Hansen, 1878					0.0049	0.0017			0.0052			0.0027			0.0040	0.0001		0.0004						0.0050	0.0014			0.0055	0.0010							**0.0319**
129427		*Owenia*		Delle Chiaje, 1844						0.0289						0.0098	0.0060	0.0011		0.0256			0.0008						0.0218	0.0141		0.0246		0.0430						**0.1757**
130266		*Magelona alleni*		Wilson, 1958					0.0862										0.0192							0.0293								0.0010							**0.1357**
130268		*Magelona filiformis*		Wilson, 1959							0.0004		0.0067						0.0034			0.0005				0.0009	0.0023								0.0005						**0.0147**
129472		*Polygordius*		Schneider, 1868										0.0004																											**0.0004**
1268	**Sipuncula**	Sipuncula		Stephen, 1965										0.0018			0.0003					0.0005																			**0.0026**
175026		*Golfingia (Golfingia) elongata*		(Keferstein, 1862)										0.1104																											**0.1104**
136063		*Thysanocardia procera*		(Möbius, 1875)															0.0290	0.0040																					**0.0330**
410749		*Phascolion (Phascolion) strombus strombus*		(Montagu, 1804)	0.0169		0.0074		0.0481	0.0061				0.0009			0.0808	0.0019	0.0966	0.0001		0.0264	0.0095		0.0437		0.0247		0.0026		0.0173			0.0012	0.0052	0.0264				**0.4158**
2041	**Clitellata**	*Hirudinea*		Savigny, 1822													0.0010																							**0.0010**
137349		*Grania*		Southern, 1913														0.0001																							**0.0001**
2039		Naididae		Ehrenberg, 1831			0.0001																																	**0.0001**
	ARTHROPODA																																							
146996	**Malacostraca**	*Leptostraca*		Claus, 1880	0.0002																																			**0.0002**
110387		*Bodotria*		Goodsir, 1843										0.0005																										**0.0005**
110445		*Bodotria scorpioides*		(Montagu, 1804)																									0.0005											**0.0005**
110380		Diastylidae		Bate, 1856					0.0005											0.0001				0.0002									0.0012							**0.0020**
110481		*Diastylis laevis*		Norman, 1869												0.0099							0.0027						0.0025											**0.0151**
110488		*Diastylis rugosa*		Sars, 1865																					0.0005																**0.0005**
110494		*Diastyloides biplicatus*		(Sars G.O., 1865)																0.0002													0.0005							**0.0007**
110535		*Eudorella truncatula*		(Bate, 1856)					0.0001				0.0001																0.0008				0.0018							**0.0028**
110536		*Eudorellopsis deformis*		(Krøyer, 1846)			0.0002	0.0002														0.0006				0.0001														**0.0011**
102915		*Perioculodes longimanus*		(Spence Bate & Westwood, 1868)															0.0005																						**0.0005**
102917		*Pontocrates arcticus*		G.O. Sars, 1895																		0.0005																		**0.0005**
102932		*Westwoodilla caecula*		(Spence Bate, 1857)																0.0004				0.0022									0.0036							**0.0062**
179538		*Nototropis vedlomensis*		(Spence Bate & Westwood, 1862)				0.0006									0.0048									0.0007								0.0029						**0.0090**
101708		*Halicoides*		Walker, 1896												0.0038																	0.0015							**0.0053**
101891		*Ampelisca brevicornis*		A. Costa, 1853								0.0024				0.0217											0.0240													**0.0481**
101896		*Ampelisca diadema*		A. Costa, 1854																								0.0045												**0.0045**
179882		*Ampelisca pectenata*		Reid, 1951																	0.0099																			**0.0099**
101930		*Ampelisca tenuicornis*		Liljeborg, 1856						0.0170	0.0187	0.0017	0.0222						0.0003	0.0004				0.0001				0.0053	0.0048		0.0013		0.0025		0.0046					**0.0789**
101933		*Ampelisca typica*		(Spence Bate, 1857)			0.0052				0.0016							0.0024			0.0032																			**0.0124**
101716		*Harpinia*		Boeck, 1876															0.0007																					**0.0007**
102960		*Harpinia antennaria*		Meinert, 1890					0.0012		0.0013					0.0024				0.0002				0.0022			0.0015		0.0039		0.0015	0.0030	0.0041						**0.0213**
101789		*Urothoe*		Dana, 1852																				0.0008																**0.0008**
103228		*Urothoe elegans*		Spence Bate, 1857					0.0075	0.0131	0.0022		0.0008			0.0084			0.0027	0.0009		0.0005	0.0011				0.0045		0.0058			0.0002	0.0021	0.0070			0.0036			**0.0604**
102497		*Acidostoma obesum*		(Spence Bate, 1862)																0.0010																				**0.0010**
102570		*Hippomedon denticulatus*		(Spence Bate, 1857)																						0.0017														0.0262	**0.0279**
102598		*Lepidepecreum longicorne*		(Spence Bate & Westwood, 1861)						0.0003								0.0016				0.0008										0.0020									**0.0047**
102779		*Tryphosites longipes*		(Spence Bate & Westwood, 1861)						0.0094											0.0022																				**0.0116**
101742		*Bathyporeia*		Lindström, 1855		0.0024		0.0006	0.0006			0.0002	0.0013											0.0004			0.0014					0.0001				0.0008				**0.0078**
103058		*Bathyporeia elegans*		Watkin, 1938	0.0011										0.0009				0.0007																0.0007	0.0017			**0.0055**
103076		*Bathyporeia tenuipes*		Meinert, 1877			0.0005			0.0108	0.0028	0.0010	0.0041						0.0062								0.0056			0.0007	0.0003	0.0009							**0.0329**
1468705		*Cheirocratus pseudosundevallii*		Gouillieux, 2019												0.0068																								**0.0068**
101368		Aoridae		Stebbing, 1899																0.0001					0.0003															**0.0004**
102021		*Autonoe longipes*		(Liljeborg, 1852)				0.0004											0.0006																						**0.0010**
102061		*Unciola planipes*		Norman, 1867														0.0007																						**0.0007**
423507		*Medicorophium affine*		(Bruzelius, 1859)																0.0001			0.0006																	**0.0007**
1059649		*Centraloecetes striatus*		(Myers & McGrath, 1979)	0.0002	0.0001																							0.0003											**0.0006**
102364		*Gammaropsis maculata*		(Johnston, 1828)																0.0008																				**0.0008**
101857		*Pariambus typicus*		(Krøyer, 1845)					0.0004	0.0002	0.0001		0.0001						0.0004												0.0001									**0.0013**
118445		*Astacilla*		Cordiner, 1793													0.0002																							**0.0002**
295579		*Astacilla dilatata*		G. O. Sars,1883		0.0008			0.0012	0.0005									0.0010	0.0018								0.0024	0.0007											**0.0084**
119024		*Astacilla longicornis*		(Sowerby, 1806)																0.0009																				**0.0009**
118859		*Natatolana borealis*		Liljeborg, 1851																			0.0109																	**0.0109**
136458		*Tanaopsis graciloides*		(Liljeborg, 1864)									0.0007														0.0002				0.0001									**0.0010**
107729		*Callianassa subterranea*		(Montagu, 1808)																0.0136			0.0097	0.0136				0.1023	0.0615								0.0028			**0.2035**
107150		*Galathea intermedia*		Liljeborg, 1851																	0.0105			0.0114																**0.0219**
106738		Paguridae		Latreille, 1802																0.0003										0.0072									**0.0075**
106889		*Eballa*		Leach, 1817						0.0068								0.1102								0.0444		0.2306						0.0606					0.0030	**0.4556**
134723	**Pycnogonida**	*Anoplodactylus petiolatus*		(Krøyer, 1844)									0.0023						0.0009											0.0001		0.0011								**0.0044**
	MOLLUSCA																																							
139106	**Caudofoveata**	*Chaetoderma nitidulum*		Lovén, 1844					0.0264																			0.0153	0.0106												**0.0523**
150534	**Scaphopoda**	*Antalis entalis*		(Linnaeus, 1758)	0.0833	0.3949	0.1525		0.4943	1.2019			0.1055	0.0820		0.0035		0.0614	0.2060	0.0041		0.0251	0.0224		0.6320		1.2789	0.1868	1.3313	0.0995	0.1288	0.7799			0.2369	0.6753	0.5517	0.4161	**9.1541**
101	**Gastropoda**	Gastropoda		Cuvier, 1795															0.0003																				**0.0003**
139476		*Cylichna cylindracea*		(Pennant, 1777)																0.0022																				**0.0022**
161		Philinidae		Gray, 1850 (1815)								0.0021																	0.0018											**0.0039**
145		Naticidae		Guilding, 1834		0.0050			0.0008															0.0035									0.0260							**0.0353**
151894		*Euspira nitida*		(Donovan, 1803)			0.0012				0.1117	0.0508		0.0028	0.0960					0.0013										0.0033							0.0017			**0.2688**
138691		*Acteon tornatilis*		(Linnaeus, 1758)																			0.0083																	**0.0083**
105	**Bivalvia**	Bivalvia		Linnaeus, 1758																					0.0001			0.0006												**0.0007**
140103		*Hiatella arctica*		(Linnaeus, 1767)																0.0057																				**0.0057**
140737		*Phaxas pellucidus*		(Pennant, 1777)					0.0144				0.0191							0.0041			0.0018				0.1657	0.0737			0.0007		0.0176			0.0811				**0.3782**
138992		*Acanthocardia echinata*		(Linnaeus, 1758)					0.5058																							75.8200								**76.3258**
1417307		*Papillicardium minimum*		(R. A. Philippi, 1836)												0.0269													0.0050							0.0022			**0.0341**
181343		*Parvicardium pinnulatum*		(Conrad, 1831)																			0.0009																	**0.0009**
140870		*Gari fervensis*		(Gmelin, 1791)	2.2861		0.4620		0.0010	0.2877		0.2318										0.0133	0.0003			0.0010				0.0033						0.7708		0.0060	**4.0633**
138474		*Abra*		Lamarck, 1818		0.0009	0.0031	0.0001	0.0002	0.0035	0.0033	0.0022			0.0008					0.0009		0.0043	0.0059	0.0075		0.0039					0.0041	0.0006		0.0045		0.0008				**0.0466**
141436		*Abra prismatica*		(Montagu, 1808)	0.0850		0.0001	0.0229			0.0034		0.0361		0.0694				0.0023			0.0095													0.0307	0.0250				**0.2843**
141543		*Solecurtus scopula*		(W. Turton, 1822)										2.1688																										**2.1688**
879714		*Asbjornsenia pygmaea*		(Lovén, 1846)											0.0035			0.0208																	0.0207				**0.0450**
146907		*Fabulina fabula*		(Gmelin, 1791)		0.0045	0.3114	0.1406			0.0021											0.3899				0.0524					0.0587			0.0612	0.6005		0.0663	**1.6876**
147021		*Moerella donacina*		(Linnaeus, 1758)														0.0582																						**0.0582**
138823		*Astarte montagui*		(Dillwyn, 1817)																					0.7312															**0.7312**
140365		*Devonia perrieri*		(Malard, 1904)																													0.0019							**0.0019**
345281		*Kurtiella bidentata*		(Montagu, 1803)		0.0022				0.0055			0.0063						0.0158						0.0007		0.0008													**0.0313**
146952		*Tellimya ferruginosa*		(Montagu, 1808)															0.0023		0.0009		0.0018								0.0100									**0.0150**
140283		*Lucinoma borealis*		(Linnaeus, 1767)															1.5800	0.4125							0.1772							0.0169						**3.9866**
140283		*Lucinoma borealis*	Juvenile	(Linnaeus, 1767)																														0.0022	0.0157					**0.0179**
140284		*Lucinoma borealis*		(Linnaeus, 1767)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5800	0.4125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1772	0.0000	0.0000	0.0000	0.0000	0.0000	0.8169	0.0000	0.0000	0.0022	0.0157	0.0000	0.0000	**4.0045**
140287		*Myrtea spinifera*		(Montagu, 1803)																0.0253				0.0838				0.5228					0.0026							**0.6345**
219		Thyasiridae		Dall, 1900 (1895)																												0.0001			0.0002					**0.0003**
141662		*Thyasira flexuosa*		(Montagu, 1803)																								0.0009												**0.0036**
140440		*Crenella decussata*		(Montagu, 1808)	0.0037		0.0063							0.0015	0.0038						0.0009																			**0.0162**
138262		*Nucula*		Lamarck, 1799					0.0034																							0.0012				0.0017			**0.0063**
140589		*Nucula nitidosa*		Winckworth, 1930												0.0029							0.0141								0.0544				0.0590				**0.1304**
138802		*Arctica islandica*		(Linnaeus, 1767)							163.0000								150.0000																					**313.0000**
138802		*Arctica islandica*	Juvenile	(Linnaeus, 1767)	0.0015												0.0017																							**0.0032**
138802		*Arctica islandica*	Combined	(Linnaeus, 1767)	0.0015	0.0000	0.0000	0.0000	0.0000	0.0000	163.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	150.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**313.0047**
138159		*Spisula*		J. E. Gray, 1837			0.0072					0.0036													0.0008										0.0008					**0.0124**
140300		*Spisula elliptica*		T. Brown, 1827													1.6015																					0.2544	**1.8559**
243		Veneridae		Rafinesque, 1815																						0.0056														**0.0056**
141908		*Chamelea striatula*		(da Costa, 1778)				0.1989							2.5900																									**2.7889**
138636		*Dosinia*		Scopoli, 1777				0.0648	0.2701			0.4120		0.0091		0.0047		0.7311																		0.6652				**2.1570**
141911		*Dosinia exoleta*		(Linnaeus, 1758)															4.3424										6.7484											**11.0908**
140728		*Mysia undata*		(Pennant, 1777)												0.0135																								**0.0135**
141929		*Timoclea ovata*		(Pennant, 1777)																					1.3328															**1.3328**
382318		Thracioidea		Stoliczka, 1870 (1839)			0.0128	0.0050		0.0017	0.0013				0.0067	0.0022		0.0012			0.0002	0.0004				0.0014		0.0005						0.0011	0.0016	0.0035		0.0037	**0.0433**
137858		*Cuspidaria*		Nardo, 1840												0.0018				0.0358																			**0.0376**
181373		*Cochlodesma praetenue*		(Pulteney, 1799)	0.1064		1.8132					0.0871			2.5065			0.0253				0.0981								0.1405					1.1533		1.1752	**7.1056**
138549		*Thracia*		Blainville, 1824											0.0649										0.5000														**0.5803**
	ECHINODERMATA																																							
124273	**Echinoidea**	*Echinocyamus pusillus*		(O.F. Müller, 1776)	0.0012	0.0014	0.0051			0.0053	0.0032	0.0006	0.0021	0.0005	0.0222			0.0037	0.0006	0.0020		0.0045	0.0010		0.0019	0.0010	0.0030	0.0006		0.0025	0.0009	0.0021	0.0008	0.0125	0.0006	0.0039		0.0024		**0.0856**
123106		Spatangoida	Juvenile	L. Agassiz, 1840									0.0155														0.0249		0.0046			0.0190								**0.0640**
124373		*Brissopsis lyrifera*		(Forbes, 1841)												2.2752																								**2.2752**
123426		*Echinocardium*		Gray, 1825																			0.2350																	**0.2350**
124394		*Echinocardium flavescens*		(O.F. Müller, 1776)															1.9564																					**1.9564**

APPENDIX N BIOMASS ANALYSIS

Aphia ID	Phylum Class/Order	Taxon Name	Qualifiers	Authority	Stations																																		Total
					ENV01	ENV02	ENV03	ENV04	ENV05	ENV06	ENV07	ENV08	ENV09	ENV10	ENV11	ENV12	ENV13	ENV14	ENV15	ENV16	ENV17	ENV18	ENV19	ENV21	ENV22	ENV23	ENV24	ENV25	ENV26	ENV27	ENV28	ENV29	ENV30	ENV31	ENV32	ENV33	ENV34	ENV35	
123449	**Holothuroidea**	*Leptosynapta*		Verrill, 1867	0.0000	0.0000	0.0000	0.0000	0.0016	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0207	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0223
124462		*Leptosynapta bergensis*		(Östergren, 1905)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0000	0.0000	0.0000	0.1208	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0277	0.0000	0.0000	0.0000	0.1797	0.0399	0.0000	0.0000	0.0000	0.0000	0.0000	0.3713
123206	**Ophiuroidea**	Amphiuridae		Ljungman, 1867	0.0000	0.0004	0.0000	0.0136	0.0000	0.0000	0.0345	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0344	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0735	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1580
125080		*Amphiura filiformis*		(O.F. Müller, 1776)	0.0000	0.0000	0.0000	0.0000	0.0829	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.1557	0.0000	0.0000	0.0358	0.0272	0.0000	0.0000	0.0276	0.0000	0.0000	0.0000	0.0000	0.1220	0.0675	0.0000	0.0000	0.0000	0.0377	0.0000	0.0264	0.0000	0.0321	0.0081	0.7942
123200		Ophiuridae		Müller & Troschel, 1840	0.0000	0.0000	0.0004	0.0011	0.0000	0.0000	0.0052	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0034	0.0000	0.0041	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0333
	CNIDARIA																																						
100880	**Anthozoa**	*Edwardsia claparedii*		(Panceri, 1869)	0.0000	0.0206	0.0000	0.0095	0.0000	0.0599	0.0131	0.0000	0.0146	0.0013	0.0000	0.0000	0.0000	0.0000	0.0145	0.0000	0.0063	0.0000	0.0000	0.0000	0.0000	0.0051	0.0172	0.0000	0.0000	0.0115	0.0308	0.1346	0.0000	0.0000	0.0049	0.0000	0.0000	0.0000	0.3439
283798		*Cerianthus lloydii*		Gosse, 1859	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017
	PLATYHELMINTHES																																						
793		Platyhelminthes		Minot, 1876	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016
	NEMERTEA																																						
152391		Nemertea		0	0.0422	0.0057	0.0212	0.0087	0.0000	0.0156	0.0000	0.0101	0.0657	0.0028	0.0000	0.0000	0.0002	0.0000	0.0252	0.0118	0.0625	0.0000	0.0058	0.0000	0.0134	0.0129	0.2799	0.0198	0.0691	0.0080	0.0229	0.2868	0.2533	0.0001	0.0085	0.0041	0.0279	0.0011	1.2853
	CHAETOGNATHA																																						
2081		Chaetognatha		0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010
	PHORONIDA																																						
128545		Phoronis		Wright, 1856	0.0000	0.0000	0.0007	0.0045	0.0613	0.0386	0.0000	0.0000	0.0428	0.0006	0.0000	0.0010	0.0000	0.0012	0.1066	0.0620	0.0000	0.0195	0.0043	0.0000	0.0000	0.0003	0.0051	0.0672	0.0182	0.0400	0.0046	0.0000	0.0000	0.0000	0.0617	0.0000	0.0123	0.0000	0.5525
	HEMICHORDATA																																						
1820		Enteropneusta		Gegenbaur, 1870	0.0000	0.0050	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0041	0.0000	0.0383	0.0000	0.0000	0.0122	0.0000	0.0000	0.0012	0.0000	0.0006	0.0036	0.0054	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0709
	FORAMINIFERA																																						
112299		Astrorhiza		Sandahl, 1858	0.0000	0.0000	0.0000	0.0156	0.3214	0.0635	0.0000	0.0000	0.0839	0.0000	0.0000	0.0000	0.0000	0.0913	0.2475	0.8865	0.0000	0.0260	0.0774	0.0000	0.0543	0.0000	0.1618	0.4066	0.0037	0.0000	0.0335	0.1255	0.0000	0.0000	0.0814	0.0000	0.0546	0.0000	2.7345
				Total Individuals	2.8414	0.5208	3.0929	0.8925	2.4867	2.3642	326.5552	0.9665	1.0092	2.7462	5.7202	2.9511	1.8139	1.2441	311.9038	2.2421	0.1675	1.7399	0.5514	0.8792	3.8276	0.2997	4.7828	2.3884	8.5419	0.4117	0.8508	79.3172	0.6023	0.1510	1.3664	4.0223	2.8188	2.3982	784.4679
				Total Taxa	25	22	32	28	44	40	35	25	35	33	21	37	21	35	51	59	21	38	34	17	42	22	38	52	32	25	45	32	32	22	33	30	21	20	1099
Taxa excluded from statistical analysis																																							
	ANNELIDA																																						
129370	**Polychaeta**	*Nephtys*		Cuvier, 1817	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0263	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0263
129439		*Pholoe*		Johnston, 1839	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006
130599		*Pholoe baltica*		Örsted, 1843	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003
131077		*Sthenelais limicola*		(Ehlers, 1864)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0019
129296		*Glycera*		Lamarck, 1818	0.0000	0.0000	0.0000	0.1121	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0088	0.0000	0.0000	0.0000	0.0130	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1339
129446		*Eumida*		Malmgren, 1865	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0039
921		Capitellidae		Grube, 1862	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008
923		Maldanidae		Malmgren, 1867	0.0000	0.0000	0.0000	0.0000	0.0119	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0028	0.0000	0.0000	0.0061	0.0000	0.0000	0.0000	0.0054	0.0000	0.0000	0.0072	0.0000	0.0000	0.0000	0.0000	0.0000	0.0619	0.0000	0.0000	0.0953
130322		*Praxillella affinis*		(M. Sars in G.O. Sars, 1872)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0066	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0066
902		Orbiniidae		Hartman, 1942	0.0000	0.0000	0.0000	0.0000	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2974	0.0195	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3193
903		Paraonidae		Cerruti, 1909	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005
131107		*Aonides paucibranchiata*		Southern, 1914	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	0.0009
152292		*Terebelliformia*		Levinsen, 1882	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0028	0.0311	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0110	0.0000	0.0000	0.0000	0.0449
129240		*Aphelochaeta*		Blake, 1991	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020
129242		*Chaetozone*		Malmgren, 1867	0.0000	0.0001	0.0000	0.0000	0.0003	0.0015	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050
152269		*Tharyx killariensis*		(Southern, 1914)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
130100		*Diplocirrus glaucus*		(Malmgren, 1867)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0077	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0077
146949		*Galathowenia*		Kirkegaard, 1959	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0014
129427		*Owenia*		Delle Chiaje, 1844	0.0000	0.0000	0.0042	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0140	0.0000	0.0000	0.0000	0.0000	0.0144	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0064	0.0000	0.0000	0.0000	0.0000	0.0054	0.0000	0.0464
	ARTHROPODA																																						
101445	**Malacostraca**	*Ampelisca*		Krøyer, 1842	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0000	0.0014
103228		*Urothoe elegans*		Spence Bate, 1857	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007
101669		*Cheirocratus*		Norman, 1867	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009
134723	**Pycnogonida**	*Anoplodactylus petiolatus*		(Krøyer, 1844)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1107	**Thecostraca**	*Thoracica*		Darwin, 1854	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1080	**Copepoda**	Copepoda		Milne Edwards, 1840	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MOLLUSCA																																						
105	**Bivalvia**	Bivalvia		Linnaeus, 1758	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000	0.0032	0.0000	0.0000	0.0000	0.1346	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1390
	ECHINODERMATA																																						
123449	**Holothuroidea**	*Leptosynapta*		Verrill, 1867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0023	0.0000	0.0000	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0207	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0254
123182		Synaptidae		Burmeister, 1837	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0030	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0030
123206	**Ophiuroidea**	Amphiuridae		Ljungman, 1867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0025
124392	**Echinoidea**	*Echinocardium cordatum*		(Pennant, 1777)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.5300	0.0000	2.5300
123106		Spatangoida	Juvenile	L. Agassiz, 1840	0.0000	0.0000	0.0000	0.0000	0.4036	0.0000	0.0039	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2603	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0622	0.0000	0.0000	0.0000	0.0000	2.9996	0.0000	0.0000	5.7296
	ANIMALIA																																						
2		Animalia			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0172	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0172
	BRYOZOA																																						
110819	**Gymnolaemata**	*Aetea*		Lamouroux, 1812	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
110829		*Schizomavella*		Canu & Bassler, 1917	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
111196		*Callopora dumerilii*		(Audouin, 1826)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
111358		*Pyripora catenularia*		(Fleming, 1828)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
111496		*Escharella ventricosa*		(Hassall, 1842)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
110976		*Scruparia*		Oken, 1815	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
111604		*Alcyonidium parasiticum*		(Fleming, 1828)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	CHORDATA																																						
10194		Actinopterygii	Eggs		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1839		Ascidiacea		Blainville, 1824	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	CHROMISTA																																						
1692	**Heterotrichea**	Folliculinidae		Dons, 1914	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	CNIDARIA																																						
13551	**Hydrozoa**	Anthoathecata		Cornelius, 1992	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13552		Leptothecata		Cornelius, 1992	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
731048		Plumularioidea		McCrady, 1859	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
117103		*Halecium*		Oken, 1815	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1614		Sertulariidae		Lamouroux, 1812	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
117890		Hydrallmania falcata		(Linnaeus, 1758)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	HEMICHORDATA																																						
1820		Enteropneusta		Gegenbaur, 1870	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0111	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0111
	NEMATODA																																						
799		Nematoda			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	NEMERTEA																																						
152391		Nemertea			0.0000	0.0000	0.0000	0.0000	0.0191	0.0000	0.0000	0.0000	0.0000	0.0000	0.0249	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0421	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0861
	PHORONIDA																																						
128545		Phoronis		Wright, 1856	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0415	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0434
	PORIFERA																																						
132026		Cliona		Grant, 1826	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Juvenile Record

Combined Adult and Juvenile Record

Taxa in blue are the top ten most dominant in the adult data set

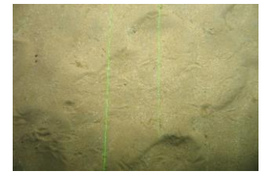
Taxa in red are species of interest

APPENDIX O EUNIS CLASSIFICATION

APPENDIX O EUNIS CLASSIFICATION

Adult Station Multivariate Cluster	Station	Water Depth (m)	Zone	Broad Substrate	Detailed Substrate Description	Salinity	EUNIS Level 2	EUNIS Habitat Classification		MNCR Habitat Classification		EUNIS/MNCR Habitat Type	Top Ten Fauna Abundance			Remarks	Representative Image
								Level	Code	Level	Code		Rank	Taxa	Abundance		
a	ENV10 ENV13 ENV17 ENV22 ENV31	63 51 55 64 54	Offshore Circalittoral	Sand	Muddy sand to gravelly sand	Full	MD4	4	MD421	3	SS.SMx.CMx	Faunal communitites in Atlantic offshore circalittoral mixed sediment	1	**Nemertea**	11	Fauna is dominated by polychaetes in slightly muddy mixed sediment	
													2	*Laonice bahusiensis*	18		
													2	Notomastus	17		
													3	*Protodorvillea kefersteini*	8		
													4	***Phascolion (Phascolion) strombus strombus***	10		
													4	*Glycera lapidum*	10		
													5	*Syllis parapari*	5		
													6	Sabellidae	7		
													6	*Aonides paucibranchiata*	10		
													7	***Echinocyamus pusillus***	14		
													8	*Syllis pontxioi*	8		
													9	Terebellidae	4		
													10	*Lanice conchilega*	3		
													10	*Hydroides norvegica*	4		
b	ENV21 ENV30	104 79	Offshore Circalittoral	Sand	Slightly gravelly sand	Full	MD6	4	MD621	3	SS.SMu.Omu	Faunal communities on Atlantic offshore circalittoral mud	1	*Prionospio dubia*	8	Fauna is dominated by polychaetes, arthropods and molluscs in mud and sandy mud	
													2	*Spiophanes kroyeri*	7		
													3	**Abra**	7		
													3	*Myrtea spinifera*	7		
													4	*Harpinia antennaria*	4		
													4	*Scoloplos armiger*	4		
													5	*Goniada maculata*	3		
													5	*Diplocirrus glaucus*	3		
													5	Naticidae	3		
													6	Diastylidae	2		
													6	*Westwoodilla caecula*	2		
													7	**Galathowenia**	6		
													8	***Urothoe elegans***	5		
													9	*Levinsenia gracilis*	2		
													10	*Glycera alba*	1		
													10	Notomastus	1		
													10	*Ampharete falcata*	1		
													10	Urothoe	1		
													10	*Callianassa subterranea*	1		
													10	*Chaetozone pseudosetosa*	3		
													10	Owenia	3		
c	ENV05 ENV12 ENV16 ENV19 ENV25 ENV26 ENV34	64 71 75 70 69 70 68	Offshore Circalittoral	Sand	Muddy sand to gravelly sand	Full	MD4	4	MD421	3	SS.SMx.CMx	Faunal communitites in Atlantic offshore circalittoral mixed sediment	1	**Galathowenia**	57	Fauna is dominated by polychaetes and molluscs in slightly muddy mixed sediment	
													2	***Antalis entalis***	30		
													3	**Astrorhiza**	57		
													4	***Urothoe elegans***	24		
													5	**Phoronis**	17		
													6	*Amphiura filiformis*	10		
													7	*Diplocirrus glaucus*	12		
													7	*Prionospio dubia*	14		
													8	*Spiophanes kroyeri*	9		
													8	**Nephtys**	10		
													9	*Myriochele danielsseni*	22		
													10	*Callianassa subterranea*	12		
d	ENV06 ENV09 ENV15 ENV24 ENV29	64 58 65 66 65	Offshore Circalittoral	Sand	Muddy sand to gravelly sand	Full	MD5	4	MC521	3	SS.SSa.CMuSa	*Faunal communities in Atlantic offshore circalittoral sand*	1	***Lumbrineris aniara***	26	Fauna is dominated by bivalves, polychaetes and crustacea in sand and muddy sand.	
													1	***Antalis entalis***	24		
													2	**Astrorhiza**	27		
													2	***Urothoe elegans***	30		
													3	***Echinocyamus pusillus***	26		
													3	*Bathyporeia tenuipes*	27		
													4	**Galathowenia**	20		
													5	*Edwardsia claparedii*	16		
													6	**Nemertea**	13		
													7	**Phoronis**	15		
													8	*Diplocirrus glaucus*	9		
													9	*Myriochele danielsseni*	11		
													9	*Kurtiella bidentata*	14		
													10	*Peresiella clymenoides*	7		

APPENDIX O EUNIS CLASSIFICATION

Adult Station Multivariate Cluster	Station	Water Depth (m)	Zone	Broad Substrate	Detailed Substrate Description	Salinity	EUNIS Level 2	EUNIS Habitat Classification		MNCR Habitat Classification		EUNIS/MNCR Habitat Type	Top Ten Fauna Abundance			Remarks	Representative Image
								Level	Code	Level	Code		Rank	Taxa	Abundance		
e	ENV07 ENV18 ENV28 ENV32	55 55 55 59	Offshore Circalittoral	Sand	Muddy sand to slightly gravelly sand	Full	MD5	4	MD521	3	SS.SSa.CMuSa	*Faunal communities in Atlantic offshore circalittoral sand*	1	***Echinocyamus pusillus***	19	Fauna is dominated by bivalves and polychaetes in sand and muddy sand	
													1	***Lumbrineris aniara***	20		
													2	*Fabulina fabula*	15		
													3	**Abra**	10		
													4	*Spiophanes bombyx*	7		
													5	*Scoloplos armiger*	5		
													6	*Pseudonotomastus southerni*	4		
													6	Leiochone	4		
													7	**Phoronis**	7		
													8	*Ampelisca tenuicornis*	5		
													8	***Antalis entalis***	6		
													9	*Edwardsia claparedii*	4		
													9	***Phascolion (Phascolion) strombus strombus***	5		
													10	***Urothoe elegans***	6		
f	ENV02 ENV04 ENV23 ENV27	59 56 54 61	Offshore Circalittoral	Sand	Sand to sandy gravel	Full	MD4	4	MD421	3	SS.SMx.CMx	*Faunal communitites in Atlantic offshore circalittoral mixed sediment*	1	***Lumbrineris aniara***	26	Fauna is dominated by bivalves, polychaetes and cnidarians in sand and coarse sand	
													2	**Nemertea**	7		
													3	**Abra**	6		
													4	*Edwardsia claparedii*	4		
													4	Enteropneusta	4		
													5	***Echinocyamus pusillus***	8		
													5	*Fabulina fabula*	10		
													6	Bathyporeia	7		
													7	Nephtys	4		
													7	**Phoronis**	4		
													8	*Spiophanes bombyx*	3		
													9	*Paradoneis lyra*	5		
													9	Thracioidea	5		
													10	Amphiuridae	5		
g	ENV08	59	Offshore Circalittoral	Sand	Slightly gravelly sand	Full	MD5	4	MD521	3	SS.SSa.CMuSa	*Faunal communities in Atlantic offshore circalittoral sand*	1	Leiochone	2	Fauna is dominated by polychaetes in sand	
													1	**Abra**	2		
													2	*Glycera oxycephala*	1		
													2	*Goniada maculata*	1		
													2	Paucibranchia	1		
													2	*Aponuphis bilineata*	1		
													2	*Hyalinoecia tubicola*	1		
													2	Orbinia	1		
													2	*Poecilochaetus serpens*	1		
													2	*Spiophanes bombyx*	1		
													2	*Ampelisca brevicornis*	1		
													2	*Ampelisca tenuicornis*	1		
													2	Bathyporeia	1		
													2	*Bathyporeia tenuipes*	1		
													2	Philinidae	1		
													2	*Euspira nitida*	1		
													2	*Gari fervensis*	1		
													2	Spisula	1		
													2	Dosinia	1		
													2	*Cochlodesma praetenue*	1		
													2	***Echinocyamus pusillus***	1		
													2	Amphiuridae	1		
													2	**Nemertea**	1		
h	ENV01 ENV03 ENV11 ENV14 ENV33 ENV35	56 58 55 58 56 54	Offshore Circalittoral	Sand	Muddy sand to gravelly sand	Full	MD5	4	MD521	4	SS.SSa.CMuSa	Faunal communities in Atlantic offshore circalittoral sand	1	*Cochlodesma praetenue*	30	Fauna is dominated by polychaetes and molluscs in sand and muddy sand	
													2	***Echinocyamus pusillus***	27		
													3	**Nephtys**	12		
													4	*Ophelia borealis*	10		
													5	***Antalis entalis***	9		
													6	Leiochone	8		
													7	*Gari fervensis*	12		
													8	*Aponuphis bilineata*	8		
													9	***Phascolion (Phascolion) strombus strombus***	5		
													9	*Bathyporeia elegans*	6		
													10	**Nemertea**	5		

Cells are coloured to indicate taxonomic divisions: Annelida, Arthropoda, Mollusca, Echinodermata, 'Others'.

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