

Hampshire Water Transfer and Water Recycling Project

Environmental Statement – Appendix 9.6 Subtidal grab sampling report

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The Southern Water logo consists of three stylized, wavy blue lines of varying lengths, positioned to the right of the text 'Southern Water'.

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1 Introduction

1.1 Overview

- 1.1.1 This technical report has been prepared in relation to the Hampshire Water Transfer and Water Recycling Project (hereafter referred to as the 'Proposed Development') and has been prepared to support the marine biodiversity assessment presented in Environmental Statement (ES) Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6). Details of the Proposed Development are described in ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6) and have informed the scope of this study.
- 1.1.2 This report details baseline data for subtidal benthic communities collected between 25 and 27 April 2022 and is produced to inform the ecological assessment presented within ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6). The survey scoping and methodology used for establishing the ecological baseline for subtidal benthic communities are provided in section 1.3 and section 2 respectively of this report.
- 1.1.3 As part of the Proposed Development, APEM Limited was commissioned to conduct geophysical and benthic characterisation surveys within Langstone Harbour and outside the Harbour in the Solent. APEM in turn subcontracted the geophysical acquisition phase to Seastar Survey Limited and particle size analysis (PSA) to Kenneth Pye Associates Limited.
- 1.1.4 The survey works were divided into two parts, the first part included single beam echosounder and side scan sonar surveys and broadscale EUNIS Level 3 habitat map production which was undertaken by Seastar Survey Limited. This first part of the surveys focussing on establishing broadscale subtidal habitat is reported separately in ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6).
- 1.1.5 The second part of the survey works consisted of benthic grab sampling, macrofauna sample processing, PSA of benthic sediment samples and reporting including the production of detailed biotope classifications of the acquired samples. This survey report presents the results of second part of the survey works that reflect the make-up of the subtidal benthic community.

1.2 Objectives

- 1.2.1 The Proposed Development EIA Scoping Report identified potential effects on marine benthic environment and fauna with additional study being recommended.
- 1.2.2 To inform the assessment of likely significant effects on marine subtidal benthic communities the following survey objectives were set:
1. Undertake benthic grab sampling to acquire sediment and faunal samples from the marine benthic environment in order to provide high level characterisation of the subtidal benthic community present within Langstone Harbour and nearby coastal waters.
 2. Identification of any species or habitats of conservation importance.

3. The PSA results were used to ground truth the geophysical surveying work, which supported the EUNIS Level 3 habitat mapping (ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6)).
4. Statistical assessment of the subtidal benthic community to characterise its current composition and assign appropriate biotope complexes or biotopes (EUNIS level 4 or 5), where feasible.

1.3 Subtidal benthic ecology

- 1.3.1 Subtidal habitats range from hard substrata such as rock and reefs to soft substrata including but not limited to sands, gravels, cobbles, pebbles, sandy muds and mixed sediment. The diversity of benthic communities colonising in the habitat is subject to the level of environmental stress to which they are exposed. Subtidal benthic habitats of the areas off the Proposed Development are mainly comprised of sands, gravels and sandy muds. Benthic species typically present in these areas include burrowing worms, crustaceans, bivalve molluscs, echinoderms, The shallower areas of sands are considered as important habitat for fish nursery and seabirds foraging grounds.

1.4 Legal context

- 1.4.1 Langstone Harbour is a designated Site of Special Scientific Interest (SSSI) under Section 28 of the Wildlife and Countryside Act 1981 (as amended). Langstone Harbour is also classified as a Special Protection Area (SPA) under Article 4.2 of the EU Directive (79/409/EEC), Ramsar site under the Convention on Wetlands of International Importance (Ramsar Convention) and forms part of the Solent Maritime Special Area of Conservation (SAC) designated under the Habitats Directive (92/43/EEC). Subtidal habitats in Langstone Harbour and the Solent are an integral part of these designations and are essential in supporting the designated features.

1.5 Survey design

- 1.5.1 The benthic grab survey design was informed by a geophysical survey which collected singlebeam echosounder and sidescan sonar acoustic data (refer to ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6)). The location of sample stations was determined based on in-survey analysis of acoustic data by Seastar Survey and in consultation with Southern Water Services Limited (the Applicant). In addition, the survey design identified five areas to be sampled to provide a representative characterisation of the benthic communities within Langstone Harbour and the Solent.
- 1.5.2 The broad-scale habitat maps produced from geophysical survey (refer to ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6)) characterised broad habitat types (sublittoral mud, sublittoral mixed sediment, sublittoral sand with coarse sediment, sublittoral sand and gravel, and sublittoral coarse sediment with megaripples), therefore, this survey design identified five areas (Area 1 to Area 5, refer to Graphic 3-1) to target the substrate sampling to the broad habitat types present to provide representative characterisation of the benthic communities in each habitat type. The survey was

planned operationally across these five areas. However, the asset proximity check undertaken by the Crown Estate indicated that Area 3 was crossed by sensitive telecommunication and communication assets, as such, sampling was restricted from this area to ensure safety of the survey and to maintain integrity of these sensitive assets.

- 1.5.3 Stations originally planned for Area 3 were not sampled and one station was moved west into Area 4 (Station 303, refer to Graphic 3-1).

2 Methodology

2.1 Survey vessel and permissions

- 2.1.1 The benthic grab sampling surveys were undertaken using the 15m vessel 'Wessex Explorer' (Graphic 2-1), mobilising from Gosport Marina in Langstone Harbour. All required survey permissions were obtained prior to the survey commencing.

Graphic 2-1 The survey vessel, Wessex Explorer.



2.2 Grab sampling

- 2.2.1 Grab sampling was conducted from the 25th to the 27th of April 2022. All grab sampling was conducted according to best practice guidance [1]. A global positioning system (GPS) was used to travel to the stations identified during the planning stage.
- 2.2.2 A 0.1m² mini-Hamon grab was found to be the most appropriate grab to use across the site and this was used at all sample stations. At each station a single grab sample was taken for analysis of biota, with an additional sample taken for PSA. The remaining sediment was then sieved over a 1.0mm mesh and preserved for biological analysis.
- 2.2.3 Using this approach valid samples for biota and PSA were collected at 24 sample stations. The criteria to check validity of samples was as follows:
1. Where a grab returned to the vessel without having triggered, triggered prior to reaching the seabed, or a sufficient sample had not been collected (i.e. sample volume is less than 50% or less than five litres in volume), the sample was discarded and the grab redeployed.

2. An additional three attempts were made at the same location, followed by repeat attempts at a different location approximately 50m from the original target.
 3. If an acceptable sample was still not obtained the station was abandoned.
- 2.2.4 Successful grab samples were photographed (record presented in Annex A), and the following information was recorded in the survey log:
1. The date and time of the sample
 2. The station number
 3. The volume of the sample
 4. Sediment type/colour
 5. Water depth
 6. Photograph file name
 7. Brief description of the sample (grab/biota)
- 2.2.5 Retained material was transferred to a suitable, labelled container and fixed in 4% buffered formaldehyde solution for subsequent laboratory analysis. Conspicuous fauna or large material were removed to a separate container prior to sieving to avoid damage to smaller material. Macrobenthic samples were transported directly to APEM's biolabs whilst PSA samples were couriered to Kenneth Pye Associates Ltd, a third-party UKAS ISO/IEC 17025 accredited laboratory, for analysis.

2.3 Laboratory processing

Macrobiota

- 2.3.1 Sample analysis was conducted according to APEM's standard operating procedure for marine benthic sample analysis which is fully compliant with the National Marine Biological Analytical Quality Control (NMBAQC) Scheme's Processing Requirement Protocol (PRP) [2].
- 2.3.2 Species/taxa are given separate data lines for juveniles clearly labelled in the data matrix table following APEM's standard policies. There is no published standard approach to determine juveniles though a similar common practice is to use across taxonomic labs. Juveniles may be determined based upon relative size to published maximum or separated due to difficulty of determining key identifying features in small specimens. Consequently, juveniles should not be removed from analyses.
- 2.3.3 To standardise the sizes of organisms recorded, and to separate preservative from the biota, all samples were washed in a fume cupboard over a series of graduated sieves with a base mesh sieve of 0.5mm. All faunal samples were stored in 70% Industrial Methylated Spirits (IMS) for identification and enumeration. Taxonomic nomenclature followed the World Register of Marine Species (WoRMS) [3] or more recent literature where appropriate.
- 2.3.4 Taxa were identified to the lowest practicable taxonomic level (usually species), using appropriate taxonomic literature. Where required, specimens were also compared with material maintained within the laboratory reference collection. Any colonial species identified were recorded only as present.

2.3.5 All samples have been subject to internal quality assurance procedures and, following analysis, 10% of samples were also subjected to formal Analytical Quality Control. Following identification, all samples were retained in methanol for quality assurance purposes and will be stored and retained for at least two months. A full reference collection has been compiled for the Proposed Development and retained by APEM, as is standard practice for their analytical work, which contains at least one example of each taxon encountered in the Proposed Development.

Particle size analysis

2.3.6 Sediment samples for PSA were suitably stored and transported to Kenneth Pye Associates Ltd, a third-party UKAS ISO/IEC 17025 accredited laboratory for processing. PSA samples were analysed according to NMBAQC Best Practice Guidelines for Particle Size Analysis accompanying Biological Data [4].

2.4 Data analysis

2.4.1 Data were collated into Excel spreadsheets and conforms to the relevant Marine Environmental Data and Information Network (MEDIN) data guidelines.

Particle size analysis

2.4.2 The particle size data from all survey samples were analysed using GRADISTAT software [5] to produce sediment classifications, following Wentworth [6] (Table 2-1 and Table 2-2) and Folk [7] (Graphic 2-2). Summary statistics were also calculated including mean (Phi), sorting, skewness, and kurtosis (following Blott and Pye [5]).

Table 2-1 Sediment classifications based on Wentworth [6]

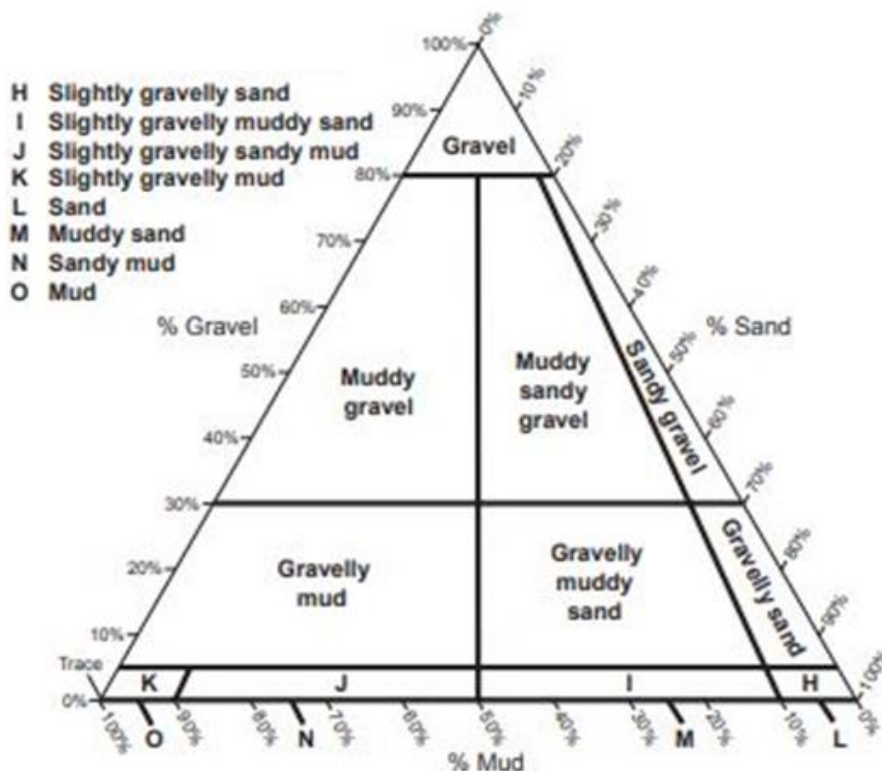
Aperture in microns	Phi aperture	Sediment description
≥16000 to 2000	≤-4 to -2	Pebbles
<4000 to 2000	>-2 to -1	Granules
<2000 to 1000	>-1 to 0	Very Coarse Sand
<1000 to 500	>0 to 1	Coarse Sand
<500 to 250	>1 to 2	Medium Sand
<250 to 125	>2 to 3	Fine Sand
<125 to 63	>3 to 4	Very Fine Sand
<63 to 44	>4 to 4.5	Silt (Mud)

Table 2-2 Sediment sorting categories based on Wentworth [6]

Sorting coefficient (graphical standard deviation)	Sediment sorting categories
0 < 0.35	Very Well Sorted
0.35 < 0.50	Well Sorted
0.50 < 0.71	Moderately Well Sorted

Sorting coefficient (graphical standard deviation)	Sediment sorting categories
0.71 < 1.00	Moderately Sorted
1.00 < 2.00	Poorly Sorted
2.00 < 4.00	Very Poorly Sorted
>4	Extremely Poorly Sorted

Graphic 2-2 GRADISTAT modification of Folk (1954) sediment classification pyramid [8]



Macrobiota

2.4.3 Before analysis, all data were checked for errors. Summary statistics were calculated, and outlying values investigated to identify possible data transcription errors. As a standard practice, truncation of the biological data was undertaken before calculation of summary statistics and other statistical analyses to avoid unnecessary weighting from colonial species, taxonomic ambiguity i.e. from small individuals and replication from juveniles (Table 2-3).

Table 2-3 Details of data truncation performed prior to statistical analysis

Taxon/records	Details of truncation performed
<i>Copepoda</i> Type A	<i>Copepoda</i> and <i>Copepoda</i> Type A combined
<i>Bathyporeia guilliamsoniana</i>	<i>Bathyporeia guilliamsoniana</i> and <i>Bathyporeia nana</i> combined
<i>Tanaissus lilljeborgi</i>	<i>Tanaissus lilljeborgi</i> removed

Taxon/records	Details of truncation performed
<i>Gastropoda</i>	<i>Gastropoda</i> combined with <i>Rissoa parva</i>
<i>Ascidacea</i>	<i>Ascidacea</i> and <i>Ascidia</i> combined
<i>Varicorbula gibba</i>	Dead specimens removed

- 2.4.4 For analyses based on numbers of individuals, any non-countable taxa, copepods, fish and fragments of individuals were also omitted from analysis. For abundance counts, non-countable taxa were allocated a numerical value of one.
- 2.4.5 Univariate and multivariate analyses were conducted using the PRIMER software package [9].

Univariate analysis

- 2.4.6 Biological diversity within a community was assessed based on taxon richness (total number of taxa present) and evenness (which considers relative abundances of different taxa). The following metrics were calculated:
1. Shannon-Wiener Diversity Index ($H'(\log_e)$): This is a widely used measure of diversity accounting for both the number of taxa present and the evenness of distribution of the taxa [10].
 2. Margalef's species richness (d): This is a measure of the number of species (richness) corrected to reflect the number of individuals (abundance) sampled.
 3. Pielou's Evenness Index (J'): This represents the uniformity in distribution of individuals spread between species in a sample. High values indicate more evenness or more uniform distribution of individuals. The output range is from zero to one.
 4. Simpson's Index ($1-\lambda$): This is an index (also known as the Gini-Simpsons Index) derived from the probability of picking two individuals from a community at random that are from the same species. Simpson's index ranges from zero to one with higher values representing a more diverse community without dominant taxa.

Multivariate analysis

- 2.4.7 Macrofaunal data were subjected to multivariate analysis using the PRIMER software package [10].
- 2.4.8 Multivariate analyses were computed from resemblance or similarity matrices. The particle size data resemblance matrix was calculated using Euclidean Distance following normalisation. For the macrofaunal data set, the Bray-Curtis measure of similarity was used following a square root transformation of the data to reduce the influence of highly abundant or dominant species.

Cluster analysis

- 2.4.9 Cluster analysis was utilised to provide a visual representation of sample similarity in the form of a dendrogram. Cluster analysis was conducted in conjunction with a SIMPROF (similarity profile) test to determine whether groups of samples were statistically indistinguishable at the 5% significance level, or whether any trends in groupings were apparent. Black lines on the dendrogram indicate statistical

distinctions between sampling stations, whilst red lines indicate that the samples were statistically inseparable.

Ordination analysis – non-metric multidimensional scaling

2.4.10 Non-metric multidimensional scaling (MDS) is a type of ordination method which creates a 2- or 3-dimensional ‘map’ or plot of the samples from the PRIMER resemblance matrix. The plot generated is a representation of the dissimilarity of the samples (or replicates), with distances between the replicates indicating the extent of the dissimilarity. For example, replicates that are more dissimilar are further apart on the MDS plot. No axes are present on the MDS plots as the scales and orientations of the plots are arbitrary in nature.

2.4.11 Each MDS plot provides a stress value which is a broadscale indication of the usefulness of plots, with a general guide indicated below [10]:

Table 2-4 Stress values for the MDS plots

Stress value	Usefulness of plots
Less than 0.05	Almost perfect representation of rank similarities;
0.05 to less than 0.1	Good representation;
0.1 to less than 0.2	Still useful;
0.2 to less than 0.3	Should be treated with caution;
More than 0.3	Little better than random points.

SIMPER

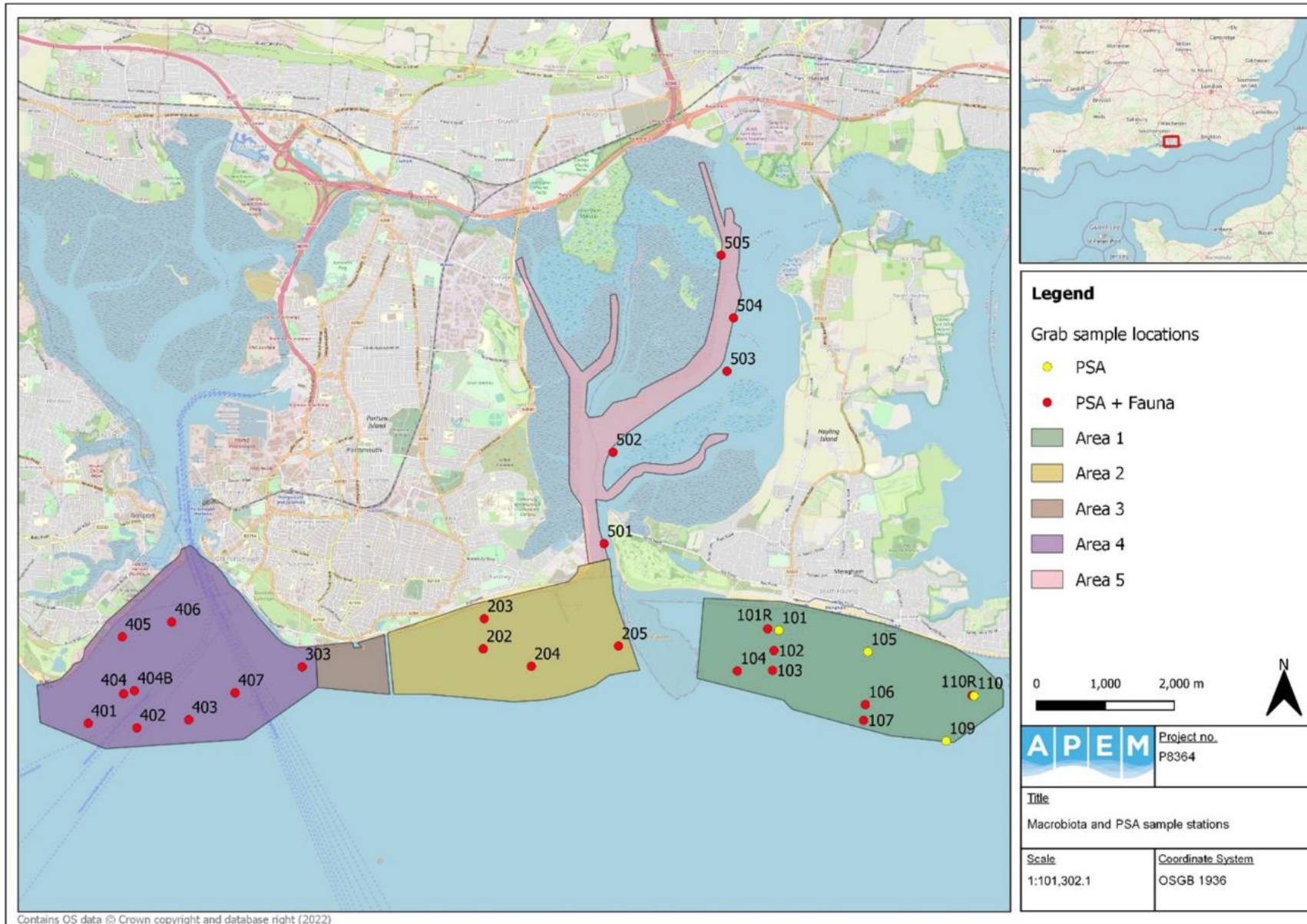
2.4.12 Where differences between groups of samples were found, SIMPER analysis was used to determine which taxa were principally responsible for the differences between the statistically distinct groups of stations. Results from the SIMPER analysis are presented in Annex F.

3 Results

3.1 Operations

- 3.1.1 Only PSA samples could be retrieved from Stations 105 and 109. At both stations, the nature of the seabed meant that samples of sufficient volume were unattainable with grab sampler despite multiple attempts and minor relocation (see paragraph 2.2.3 for the criteria for validity of samples). Damage ended up being sustained to the cable during the final attempt at Station 109 which required equipment repair ashore before recommencing at another station. Results of this survey will optimise the subtidal survey, by targeting the substrate sampling to the broad habitat types present in the subtidal survey area.
- 3.1.2 The achieved array of sampling locations are indicated in Graphic 3-1. Samples taken at Station 404 were later found to be significantly far away from the originally intended target, thus an additional two samples were taken at the original target location. For completeness, data from all samples at these locations have been included in the analysis.
- 3.1.3 Stations with the suffix ‘_R’ refer to stations which were relocated due to difficulties in sample collection. Stations with the suffix ‘_B’ refer to one station which was resampled due to the original sample being off target.

Graphic 3-1 Station array for grab sampling for seabed characterisation survey.



3.2 Particle size analysis

- 3.2.1 Sediment descriptions noted in the field varied across sampling stations, ranging from coarse gravel to finer muddy sediments.
- 3.2.2 PSA result showed that gravel was present across sample stations, though in some cases was present in negligible quantities (i.e. less than 1% of sediment composition) (Table 3-1).
- 3.2.3 The samples were generally classified as poorly sorted, mixed sediments. Out of the 29 survey stations, 24 were classified as either Extremely Poorly Sorted, Very Poorly Sorted or Poorly Sorted. The remaining five stations were either Moderately Sorted (Stations 501 and 502) or Well Sorted (Stations 101R, 103 and 109).
- 3.2.4 The primary mode of the particle size distribution ranged from 13.3 micrometres (μm) (Station 505) to 38,250 μm (Stations 101, 105, 203 and 406). Using the Wentworth classification [6] the most common primary mode was Fine Sand (125 – 250 μm), which accounted for nine of the 29 stations. Coarse Gravel (500 – 1000 μm) was the second most frequently occurring sediment type accounting for six stations (Table 3-1).
- 3.2.5 Gravel sized particles featured predominantly in sediments across stations. Gravel and sand fractions contributed to the dominant sediment types, contributing to at least 60% of the sediment composition at 11 and nine stations respectively. The mud fraction was less dominant in its contribution and was only present in similar levels at five stations and typically remained below 10% contribution.
- 3.2.6 Under the Folk Classification [7], six stations were designated as Gravel, followed jointly by Gravelly Sand and Slightly Gravelly Sandy Mud (five stations each), then by Muddy Gravel and Slightly Gravelly Sand (four stations each) and three stations were designated as Muddy Sandy Gravel (Table 3-1). Stations in South of Hayling Island (Area 1) tended to be sandy or gravelly (Graphic 3-2), with sand contributing to at least 70% of the overall sediment composition at six stations and gravel contributing to at least 70% of sediment composition at five stations.
- 3.2.7 Stations in South of Eastney (Area 2) were variable in their sediment composition with two stations dominated by gravel, one station dominated by sand and one station dominated by both gravel and mud. Stations in approaches to Portsmouth Harbour (Area 4) and Langstone Harbour (Area 5) were more generally mud dominated with four stations in Area 4 constituting at least 50% mud and two stations in Langstone harbour with greater than 70% mud (Graphic 3-2). The PSA data across each survey area is broadly in agreement with the side-scan sonar data, although the ground truthing suggested that the sediments throughout the survey area were generally coarser in nature than the side-scan sonar data suggested (see ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6)).

Graphic 3-2 Relative contributions to sediment composition by gravel, sand and mud across sample stations

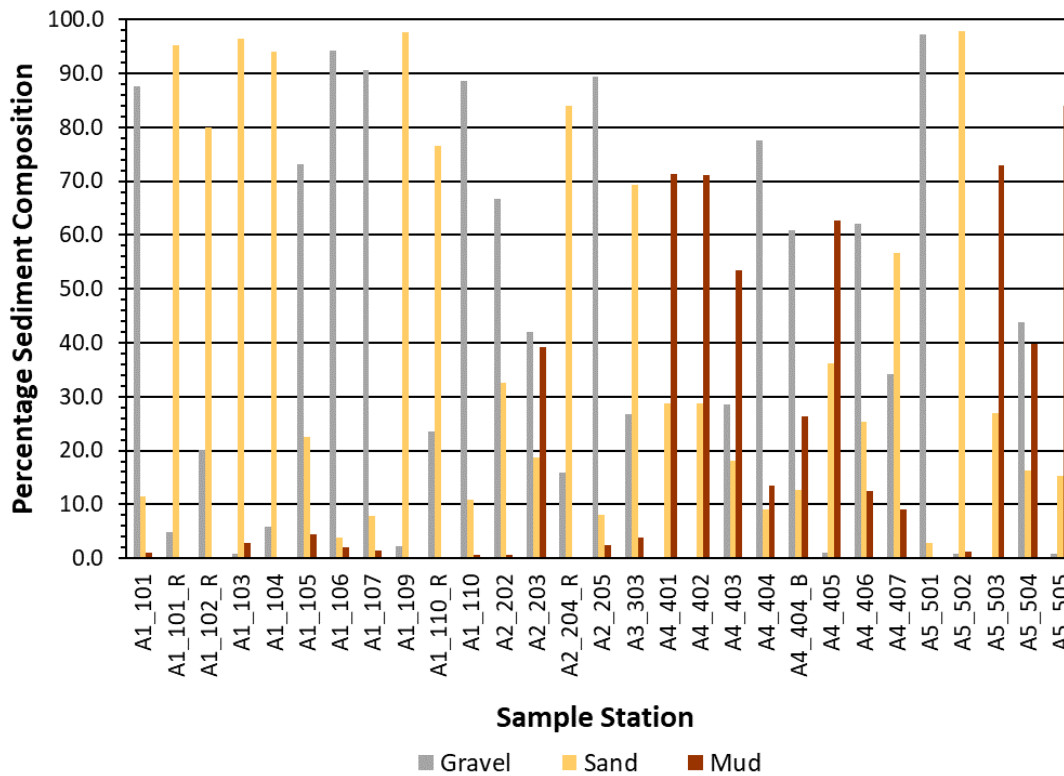


Table 3-1 Summary of particle size analysis results

Survey Area	Station	Mode (µm)	Gravel (%)	Sand (%)	Mud (%)	Folk*	Sorting
A1	101	38250.0	87.7	11.4	1.0	Gravel	Very Poorly Sorted
A1	101R	213.4	4.8	95.2	0.0	Slightly Gravelly Sand	Well Sorted
A1	102R	150.9	20.1	79.9	0.0	Gravelly Sand	Very Poorly Sorted
A1	103	150.9	0.8	96.4	2.8	Slightly Gravelly Sand	Well Sorted
A1	104	213.4	5.9	94.1	0.0	Gravelly Sand	Poorly Sorted
A1	105	38250.0	73.1	22.5	4.4	Muddy Sandy Gravel	Very Poorly Sorted
A1	106	9600.0	94.2	3.9	1.9	Gravel	Poorly Sorted
A1	107	9600.0	90.7	7.9	1.4	Gravel	Poorly Sorted
A1	109	213.4	2.3	97.7	0.0	Slightly Gravelly Sand	Well Sorted
A1	110R	213.4	23.5	76.5	0.0	Gravelly Sand	Very Poorly Sorted
A1	110	13600.0	88.6	10.8	0.6	Gravel	Poorly Sorted

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Survey Area	Station	Mode (µm)	Gravel (%)	Sand (%)	Mud (%)	Folk*	Sorting
A2	202	26950.0	66.6	32.7	0.7	Sandy Gravel	Very Poorly Sorted
A2	203	38250.0	42.0	18.8	39.2	Muddy Gravel	Extremely Poorly Sorted
A2	204R	213.4	15.9	84.1	0.0	Gravelly Sand	Very Poorly Sorted
A2	205	19200.0	89.5	8.1	2.4	Gravel	Poorly Sorted
A3	303	213.4	26.8	69.4	3.8	Gravelly Sand	Very Poorly Sorted
A4	401	106.7	0.0	28.7	71.2	Slightly Gravelly Sandy Mud	Very Poorly Sorted
A4	402	75.4	0.1	28.7	71.2	Slightly Gravelly Sandy Mud	Very Poorly Sorted
A4	403	19200.0	28.5	18.1	53.4	Gravelly Mud	Extremely Poorly Sorted
A4	404	19200.0	77.5	9.0	13.4	Muddy Gravel	Very Poorly Sorted
A4	404B	19200.0	60.8	12.7	26.4	Muddy Gravel	Extremely Poorly Sorted
A4	405	75.4	1.1	36.2	62.7	Slightly Gravelly Sandy Mud	Very Poorly Sorted
A4	406	38250.0	62.2	25.3	12.5	Muddy Sandy Gravel	Very Poorly Sorted
A4	407	603.6	34.2	56.7	9.1	Muddy Sandy Gravel	Very Poorly Sorted
A5	501	9600.0	97.2	2.8	0.0	Gravel	Moderately Sorted
A5	502	426.8	0.8	97.9	1.3	Slightly Gravelly Sand	Moderately Sorted
A5	503	150.9	0.2	27.0	72.9	Slightly Gravelly Sandy Mud	Very Poorly Sorted
A5	504	19200.0	43.9	16.3	39.8	Muddy Gravel	Extremely Poorly Sorted
A5	505	13.3	0.8	15.2	84.0	Slightly Gravelly Sandy Mud	Very Poorly Sorted

*GRADISTAT sediment classifications [5]

3.3 Macrobiodiversity

3.3.1 Samples of adequate volume were successfully accessed at 24 stations across the five sampling areas. While typically a grab sample would need to retain at least five litres of sediment to be considered viable, time constraints meant that samples of a lower volume needed to be accepted at times. There were 20 stations where the grab sample was less than five litres. It was considered at the time of survey that these samples would still be viable despite their reduced volume. The coordinates of sample stations and field notes are presented in Annex B.

Features of note

3.3.2 The bryozoan *Epistomia bursaria* was recorded at Station 407 and is listed as a nationally rare species by the Joint Nature Conservation Committee (JNCC) [11]. At Station 401, two individuals of mud volcano worm *Maxmuelleria lankesteri* were recorded. *Maxmuelleria lankesteri* is known to be a key species in the priority habitat 'Mud habitats in Deep Water' which occurs at depths below 20 to 30m across the UK. It usually would constitute this as part of the biotope complex [12], however no features indicative of this specific habitat was recorded at the sampled location.

3.3.3 At Stations 404B, 406 and 407, *Sabellaria spinulosa* was recorded, which represents the priority habitat 'Sabellaria spinulosa Reefs' when it is reef building. However, the EUNIS habitat mapping conducted for the area based on geophysical survey outputs did not note reef-like features in this area (ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6)). Therefore, *S. spinulosa* individuals recorded were not considered to be reef building and not of particular conservation importance in this area.

3.3.4 Three annelid species recorded in the samples (*Syllis garciai*, *Lumbrineris coccinea* and *Spio symphyta*) have not formally been recorded in the UK (they are recently described or do not yet have formal published UK records).

Non-native species

3.3.5 Across the survey area, a total of five species confirmed to be non-native to the UK were recorded, one of which is a commercially important species, the bivalve mollusc *Ensis leei*. The other non-native taxa recorded were the annelids *Desdemona ornata* and *Euchone limnicola*, the ostracod *Eusarsiella zostericola* and the slipper limpet *Crepidula fornicata* (of which, adults, juveniles and eggs were recorded).

3.3.6 The mollusc American jack knife clam *Ensis leei* originates from the east coast of North America and is distributed from Labrador in Canada to Florida. In Britain it was first recorded in Southend on Sea in 1989 and was found in abundance in the Wash during dredging in 1997. No direct impacts on native species or communities have been reported although it has established large populations, likely because it inhabits a niche unoccupied by native clams [13].

3.3.7 The annelid *Desdemona ornata* was first recorded in Britain from surveys at Southampton Water in 1997. This species was found to have been recorded from Australia and South Africa [14] [15].

- 3.3.8 The other annelid *Euchone limnicola* was discovered from South California in the 1950s [16] and believed to have arrived in the UK during or after 1990 [17] [18].
- 3.3.9 The ostracod *Eusarsiella zostericola* was reported native to the east coast of North America and first recorded in England at the Blackwater River estuary in 1967 [19]. It tolerates a wide span of temperatures and salinities and occurs over a depth range of 0.18m to 44.5m. Habitats include unstructured sediments, ranging from silt to fine sand, oyster beds, eelgrass beds, mangroves, and hydroids. This ostracod is thought to be a carnivore [20].
- 3.3.10 The native range of the slipper limpet is from Point Escuminac, Canada along the eastern coast of America, down to the Caribbean. It is thought to have been introduced to the Solent in the 1930s and is now common along the entire southern coast of England. The slipper limpet competes with other filter-feeding species including mussels and oysters for food and space and can smother seabed species and alter seabed habitat structure dramatically [21].
- 3.3.11 A total of six cryptogenic species (i.e. species with uncertain origin, so it is not known if they are native or non-native) were recorded across samples. The taxonomy of one is yet to be resolved, *Aphelochaeta marioni* (sensu MarLIN). Another cryptogenic taxon is a potentially undescribed species belonging to the *Tharyx* genus. Three other potentially undescribed species were recorded belonging to the genera *Sphaerosyllis*, *Dipolydora* and *Aphelochaeta*. It is common for large-scale surveys to include new UK records and potentially new species due to unresolved taxonomy and a lack of published data for many groups. All notable taxa are presented in 0.

Summary statistics

- 3.3.12 Across the survey area a total of 289 taxa were recorded, of which 50 were non-countable. There were 504 juvenile taxa recorded, and post-truncation, a total of 8,727 countable individuals were recorded.

Abundance

- 3.3.13 Summary statistics of key taxonomic groups recorded within sampling stations are indicated in Table 3-2. Overall, the most abundant taxonomic group across sample stations were annelids, with a total abundance of 4,482 individuals (mean density of $1,868 \pm 2,936$ individuals per m^2) comprising approximately 51.4% of total invertebrate abundance (Table 3-2). This was followed by invertebrates classified as 'other countable taxa' and crustaceans, which had total abundances of 1,717 individuals (mean density of $715 \pm 1,705$ individuals per m^2) and 1,568 individuals (mean density of $653 \pm 1,658$ individuals per m^2) respectively (approximately 19.7% and 18% of invertebrate abundance respectively). Molluscs and echinoderms were found to have total abundances of 853 individuals (mean density 355 ± 729 individuals per m^2) and 107 individuals (mean density of 45 ± 149 individuals per m^2), contributing to 9.8% and 1.2% of invertebrate abundance, respectively (Table 3-2).
- 3.3.14 Station 504 had the greatest invertebrate abundance, with a total abundance of 1,555 individuals (density of 15,550 individuals per m^2), 1,080 of which were annelids (Graphic 3-3 and Table 3-3). Invertebrate abundance also exceeded 1,000 individuals (greater than 10,000 individuals per m^2) at Stations 403, 404 and

501 (Graphic 3-3 and Table 3-3). Station 501 was primarily dominated by crustaceans, which contributed to roughly 78% of this station's invertebrate abundance (Graphic 3-3). The next highest invertebrate abundance was 675 individuals (density of 6,750 individuals per m²) recorded at Station 404B (Graphic 3-3 and Table 3-3). At all other stations abundance was relatively low and remained below 400 individuals (less than 4,000 individuals per m²) (Graphic 3-3 and Table 3-3).

- 3.3.15 The most abundant taxon was the baked bean ascidian *Dendrodoa grossularia*, which across sample stations had a total abundance of 1,458 individuals (mean density of $608 \pm 1,686$ individuals per m²) and contributed to approximately 85% of the total abundance of 'other countable taxa' and approximately 17% of total abundance. The second and third most abundant taxa across samples were the annelids *Tubificoides benedii* and *A. marioni*, which had total abundances of 876 individuals (mean density of $365 \pm 1,773$ individuals per m²) and 537 individuals (224 ± 830 individuals per m²) respectively.
- 3.3.16 The most abundant crustaceans were the amphipods *Cheirocratus* sp. and *Leptocheirus pectinatus*, which had total abundances of 327 individuals (mean density of 136 ± 648 individuals per m²) and 209 individuals (mean density of 87 ± 425 individuals per m²), respectively. The most abundant mollusc species were *C. fornicata*, which had a total abundance of 418 individuals (mean density of 174 ± 596 individuals per m²) (267 of which were juveniles) and *Dikoleps nitens* which had a total abundance of 221 individuals (mean density of 92 ± 445 individuals per m²). The most abundant echinoderms were *Amphipholis squamata* and *Ocnus planci*, which had respective abundances of 28 individuals (mean density of 12 ± 31 individuals per m²) and 65 individuals (mean density of 27 ± 131 individuals per m²), respectively. After *D. grossularia*, the next most abundant taxon in the group 'other countable taxa' was *Nematoda*, with an abundance of 166 individuals (mean density of 69 ± 212 individuals per m²).

Graphic 3-3 Density (individuals per m²) for taxonomic groups across sample stations

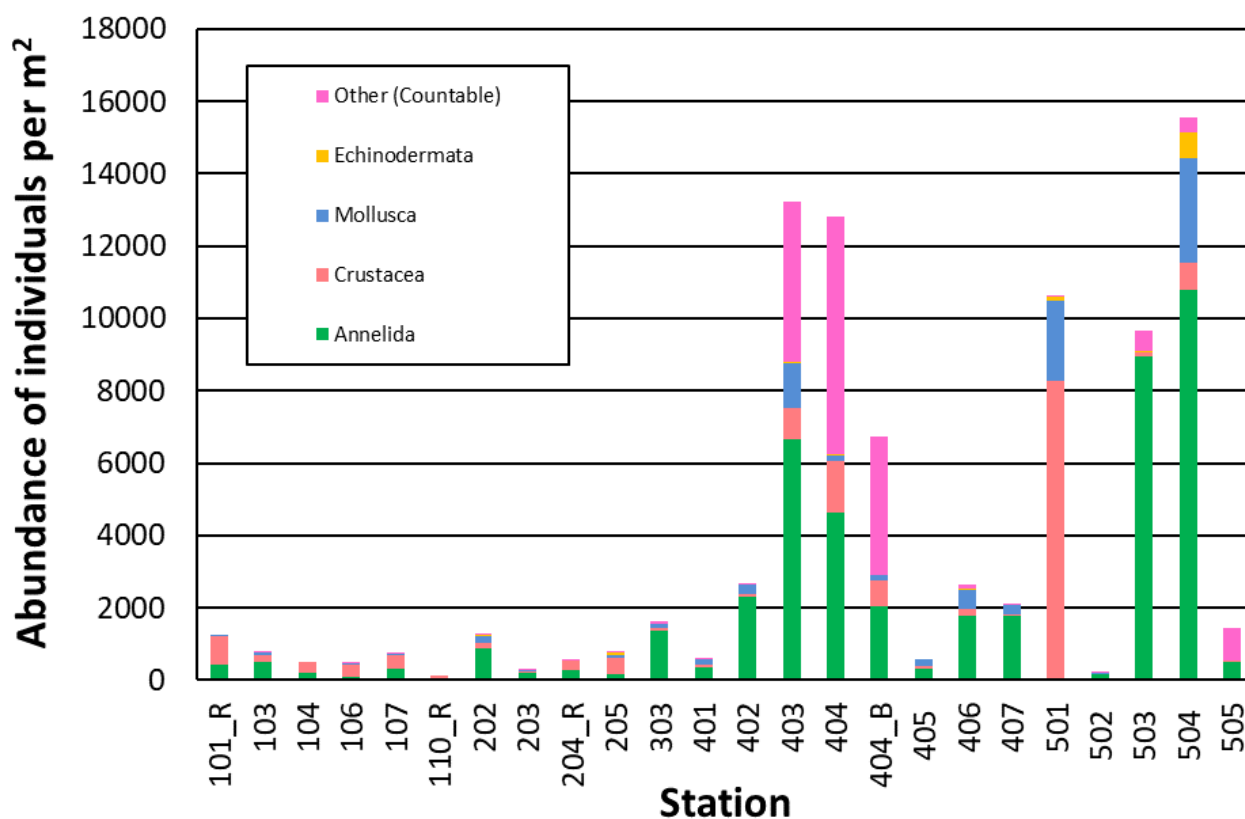


Table 3-2 Abundance and taxon richness within taxonomic groups

Taxonomic group	Number of individuals		Taxon richness	
	Total abundance	Percent contribution	Total number of taxa	Percent contribution
Annelida	4,482	51.4	110	38.1
Crustacea	1,568	18.0	74	25.6
Mollusca	853	9.8	34	11.8
Echinodermata	107	1.2	5	1.7
Other (Countable)	1,717	19.7	16	5.5
Other (non-countable)	-	-	50	17.3
Total	8727	100	289	100

Table 3-3 Abundance and taxon richness at each station

Station	Number of individuals		Taxon richness	
	Total abundance	Percent contribution	Total number of taxa	Percent contribution
101_R	121	1.4	18	6.2
103	76	0.9	14	4.8

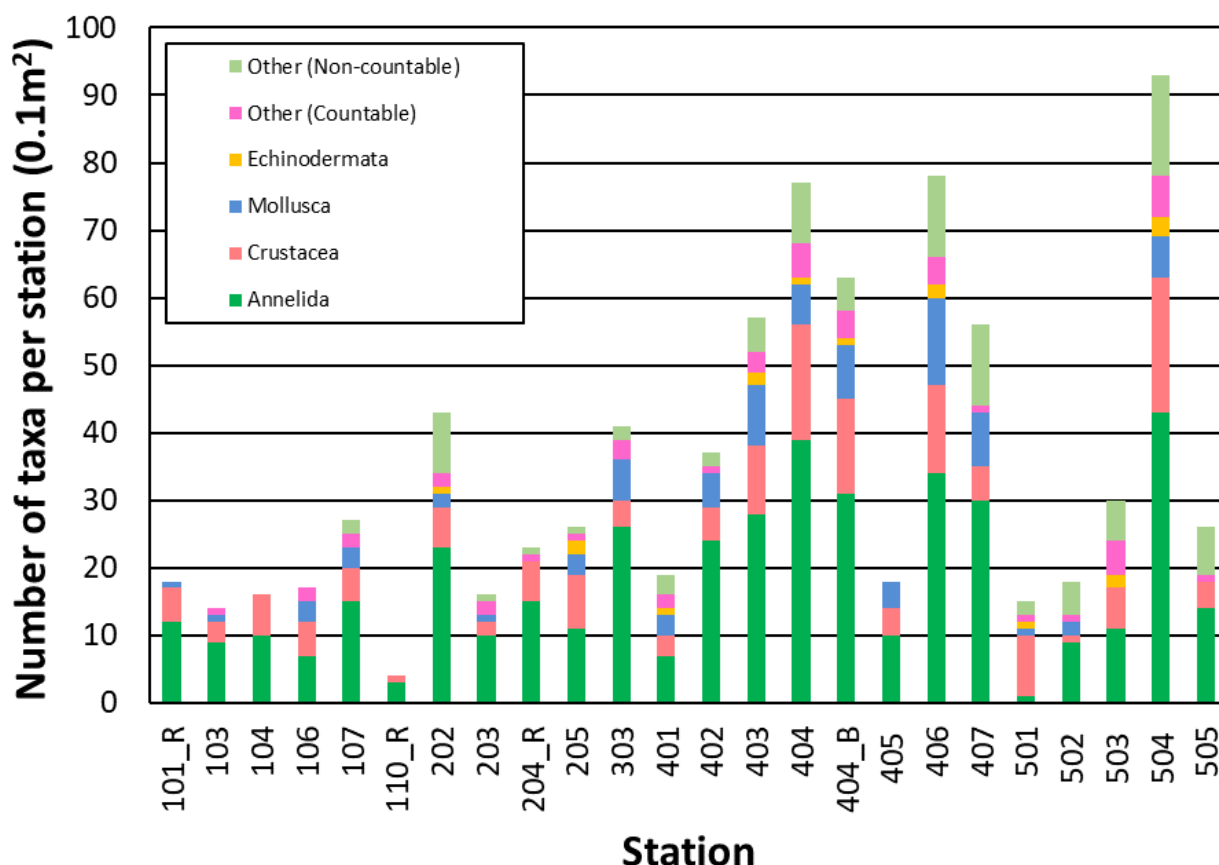
Station	Number of individuals		Taxon richness	
	Total abundance	Percent contribution	Total number of taxa	Percent contribution
104	49	0.6	16	5.5
106	52	0.6	17	5.9
107	77	0.9	27	8.7
110_R	14	0.2	4	1.4
202	126	1.4	43	11.8
203	29	0.3	16	5.2
204_R	56	0.6	23	7.6
205	76	0.9	26	8.7
303	162	1.9	41	13.5
401	61	0.7	19	5.5
402	267	3.1	37	12.1
403	1324	15.2	57	18.0
404	1283	14.7	77	23.5
404_B	675	7.7	63	20.1
405	58	0.7	18	6.2
406	264	3.0	78	22.8
407	208	2.4	56	15.2
501	1062	12.2	15	4.5
502	20	0.2	18	4.5
503	966	11.1	30	8.3
504	1555	17.8	93	27.0
505	146	1.7	26	6.6
Total	8727	100	289	-

Taxon richness

3.3.17 A total of 289 taxa were recorded across sampling stations (including non-countable taxa). Annelids had the greatest taxon richness with 110 taxa recorded (38% of total taxa) (Table 3-2). This was followed by crustaceans with 74 taxa (25% of taxa), other (non-countable) taxa with 50 (17% of taxa), molluscs with 34 taxa (12% of taxa) and other (countable) taxa with 16 taxa (6% of taxa). Echinoderms had the lowest taxon richness, with five taxa (2% of taxa), (e). As with abundance, Station 504 had the greatest taxon richness with 93 taxa recorded (annelids and crustaceans accounting for 43 and 20 taxa, respectively) (Graphic 3-4 and Table 3-2).

- 3.3.18 Despite having one of the highest recorded abundances and mean densities, the category ‘other (countable)’ taxa was represented by the second lowest number of taxa, and density values for this group were dominated by *D. grossularia*. This is evident at Stations 403 and 404 where, in Graphic 3-3, the category ‘other countable taxa’ has high densities, contrasting to Graphic 3-4, which indicates relatively low taxon richness for this group.
- 3.3.19 Station 501 had one of the lowest recorded taxon richness values despite having one of the highest measured abundances and densities (Graphic 3-4 and Table 3-3). This is primarily due to the dominance of individuals of *Cheirocratus* sp. and *L. pectinatus* at this station.

Graphic 3-4 Taxon richness per 0.1m² for major taxonomic groups across sample stations



Diversity indices

- 3.3.20 $H'(\log_e)$ values indicated that there was variable biological diversity within the marine communities sampled across the survey stations (Table 3-4). Shannon-Wiener diversity index values ranged between 0.53 at Station 503 to 3.34 at Station 406. Diversity at Stations 407 and 303 were also relatively high with index values of 3.16 and 3.09 respectively. Margalef’s species richness index (d) reflected the pattern observed for Shannon-Wiener index with lower values at stations with low diversity values.
- 3.3.21 The results for the Pielou’s Evenness (J') and Simpson’s ($1-\lambda$) indices indicated that the evenness of benthic communities across survey stations was highly variable with little evidence of any dominant taxa (Table 3-4). For instance, Pielou’s Evenness ranged from 0.17 at Station 503 to 0.96 at Station 502, (maximum

potential value is one). Similarly, Simpson’s index varied across stations ranging from 0.19 at Station 503 to 0.95 at Station 502, (with a maximum potential value of 1). Higher values indicate that the probability of any two individuals recorded within a station being different species is high and vice versa. Pielou’s Evenness and Simpson’s indices were lowest at Station 503, which is likely due to the dominance of *T. benedii* at this station.

Table 3-4 Number of taxa, taxon richness and diversity indices at each station. SD = Standard Deviation

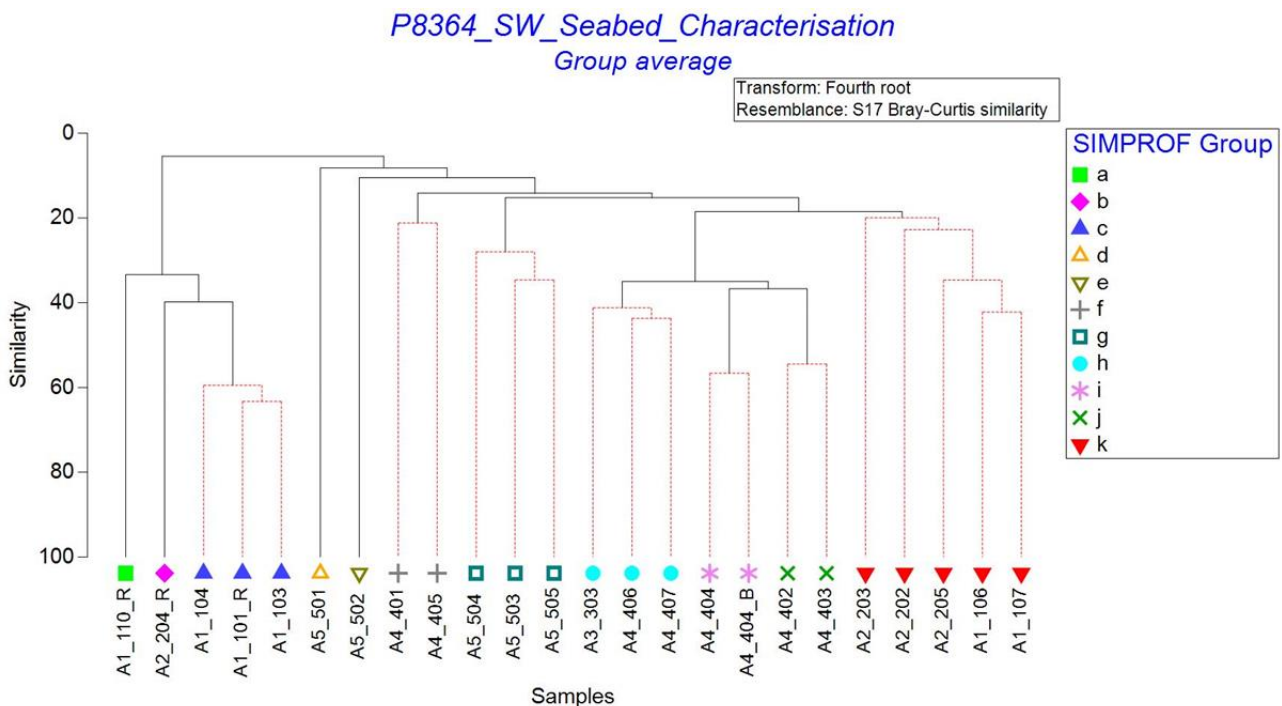
Station	Total no. Taxa	Density (individuals per m ²)	Margalef's species richness (d)	Pielou's evenness (J')	Shannon-Weiner Diversity (H'(log _e))	Simpson's index (1-λ)
101R	18	1210	3.54	0.67	1.95	0.76
103	14	760	3.00	0.80	2.11	0.84
104	16	490	3.85	0.83	2.31	0.88
106	17	520	4.05	0.80	2.27	0.85
107	27	770	5.53	0.82	2.65	0.88
110R	4	140	1.14	0.54	0.75	0.40
202	43	1260	6.82	0.85	2.98	0.94
203	16	290	4.16	0.93	2.51	0.93
204R	23	560	5.22	0.84	2.58	0.89
205	26	760	5.54	0.74	2.38	0.80
303	41	1620	7.47	0.84	3.09	0.94
401	19	610	3.65	0.80	2.22	0.84
402	37	2670	6.09	0.77	2.74	0.91
403	57	13240	7.09	0.67	2.66	0.87
404	77	12830	9.36	0.47	1.97	0.70
404B	63	6750	8.75	0.54	2.18	0.68
405	18	580	4.19	0.87	2.53	0.90
406	78	2640	11.66	0.80	3.34	0.94
407	56	2080	8.06	0.84	3.16	0.94
501	15	10620	1.72	0.72	1.84	0.81
502	18	200	4.01	0.96	2.46	0.95
503	30	3660	3.35	0.17	0.53	0.19
504	93	15550	10.21	0.62	2.70	0.87
505	26	1460	3.61	0.53	1.57	0.59
Min	4	140	1.14	0.17	0.53	0.19
Mean	34.58	3636	5.50	0.73	2.31	0.80

Station	Total no. Taxa	Density (individuals per m ²)	Margalef's species richness (d)	Pielou's evenness (J')	Shannon-Weiner Diversity (H'(log _e))	Simpson's index (1-λ)
Max	91	15550	11.66	0.96	3.34	0.95
SD	23.70	4768.4	2.69	0.18	0.67	0.18

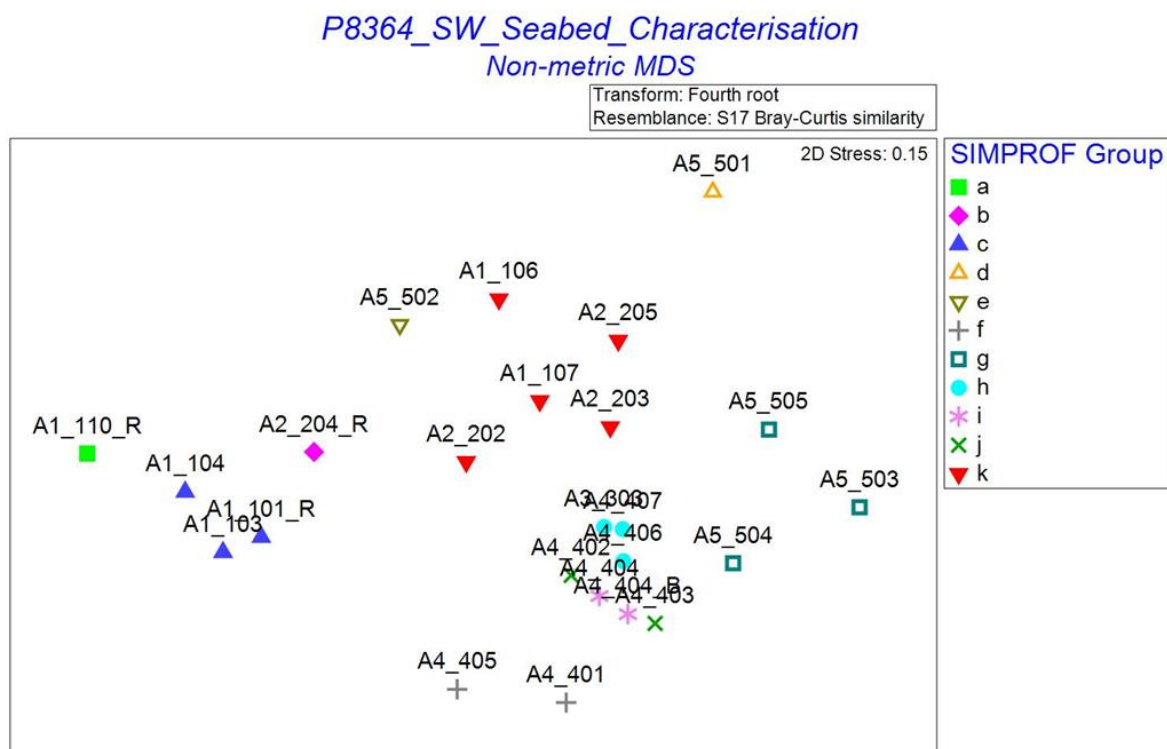
Cluster and Multi-Dimensional Scaling analyses

3.3.22 The results of the cluster analysis are presented in a cluster dendrogram (Graphic 3-5) and MDS plot (Graphic 3-6). Black lines denote significant structure within the group to that point and red lines connect samples that cannot be significantly differentiated at the 95% confidence interval. The SIMPROF test identified 11 groups (Group a-k) that can be considered statistically distinct from one another at the 95% confidence level, four of which consisted of a single station. Black lines show groupings at ≥ 5%. The accompanying MDS plot (Graphic 3-6) provides an alternative visualisation of the groupings observed in the cluster analysis. With a stress value of 0.15, the MDS plot is considered a useful visual representation of the data [10].

Graphic 3-5 Cluster analysis dendrogram with SIMPROF for benthic grab invertebrate abundance.



Graphic 3-6 Multidimensional Scaling ordination plot for benthic grab invertebrate abundance



- 3.3.23 The results of SIMPER analysis indicating percentage contributions of different taxa to within-group similarity and between group dissimilarity are provided in Annex F.
- 3.3.24 **Group a** was made up of just one sample station (110R) separating from other groups at approximately 36% similarity.
- 3.3.25 **Group b** was made up of just one sample station (204) separating from other groups at approximately 40% similarity.
- 3.3.26 **Group c** consisted of three sample stations (101R, 103 and 104) which separated from the other groups on the dendrogram at approximately 60% similarity and are placed towards the left of the MDS plot based on the representation in Graphic 3-6. This group was characterised by *Bathyporeia elegans* with 14.41% contribution to similarity. This was followed by *Spio martinensis* with 9.73%, then *Copepoda* with 9.69, *Megalona johnstoni* with 9.61% and then *Polycirrus* with 9.37%.
- 3.3.27 **Group d** was made up of just one sample station (501) separating from other groups at approximately 8% similarity.
- 3.3.28 **Group e** was made up of just one sample station (502) separating from other groups at approximately 10% similarity.
- 3.3.29 **Group f** was comprised of two sample stations (401 and 405) which separated from the other groups on the dendrogram at approximately 21% similarity and are placed towards the bottom of the MDS plot based on the representation in Graphic 3-6. This group was characterised by *Melinna palmata* with a 30.68% contribution to similarity. This was followed by *Nucula nitidosa* and *Saxicavella jeffreysi* both with a 24.4% contribution.

- 3.3.30 **Group g** consisted of three sample stations (503, 504 and 505) which separated from the other groups on the dendrogram at approximately 30% similarity and are placed towards the right of the MDS plot based on the representation in Graphic 3-6. This group was characterised by Nematoda with a contribution of 13.59%. Other contributing species included *M. palmata*, *Platynereis dumerilii*, *Nephyts hombergii* and *T. benedii*. These taxa all had percentage contributions of roughly 6%.
- 3.3.31 **Group h** consisted of three sample stations (303, 406 and 407) which separated from the other groups on the dendrogram at approximately 42% similarity and are placed towards the bottom right of the MDS plot based on the representation in Graphic 3-6. This group was characterised by *Chaetozone gibber* with a percentage contribution of 6.78%. Other contributing taxa included *Caulleriella alata*, *Spirobranchus lamarcki*, *Notomastus*, *M. palmata* and *Mediomastus fragilis*. The percentage contributions of these taxa ranged from 5.84% to 4.34%.
- 3.3.32 **Group i** was comprised of two sample stations (404 and 404B) which separated from the other groups on the dendrogram at approximately 56% similarity and are placed towards the bottom right of the MDS plot based on the representation in Graphic 3-6. This group was characterised by *D. grossularia* with a contribution to similarity of 8.27%. Other contributing taxa included *S. lamarcki*, *Ampelisca diadema*, *Pisidia longicornis*, *Nephyts kersivalensis* and *M. fragilis*. The contributions to similarity of these taxa ranged from 3.96% to 3.33%.
- 3.3.33 **Group j** was comprised of two sample stations (402 and 403) which separated from the other groups on the dendrogram at approximately 54% similarity and are placed towards the bottom right of the MDS plot based on the representation in Graphic 3-6. This group was characterised by *S. lamarcki* with a similarity contribution of 6.68%. Other contributing taxa included *Aphelochaeta marioni*, *C. gibber*, *C. fornicata*, *Serpulidae* and *Notomastus*. The similarity contributions of these taxa ranged from 6.26% to 4.27%.
- 3.3.34 **Group k** was the largest SIMPROF group consisting of five sample stations (106, 107, 202, 203 and 205). This group separated from the other groups on the dendrogram at approximately 26% similarity and are placed towards the centre of the MDS plot (Graphic 3-6). This group was characterised by *Socarnes erythrophthalmus* which had a similarity contribution of 19%. Other taxa included *Glycera tridactyla*, *Rissoa parva*, *C. alata*, and *Notomastus* with similarity contributions ranging from 9.5% to 7.54%.

Biotope Assignment

- 3.3.35 SIMPER analysis indicated the main species driving the differences between SIMPROF groupings (as aforementioned in paragraphs 3.3.24 to 3.3.34) and a combination of SIMPER outputs (as provided in Annex F) and the abundance of different taxa within replicates were considered when assigning biotopes to each replicate. Biotopes were assigned according to the EUNIS classification system [22] and notes were made of any variations to the standard descriptions (Table 3-5).
- 3.3.36 The prefix 'c.f.' to the biotopes code has been used to indicate biotopes that are closest to a particular described biotope though not necessarily an exact fit. The suffix '#' to the biotopes code has been used to indicate biotopes which represent

probable undescribed or new biotopes. Where SIMPROF groups have been assigned two biotopes ('biotope a'/'biotope b'), biotopes most closely resemble 'biotope a' though show some similarity to and may be transitional with 'biotope b'. Biotopes were assigned based on the SIMPROF groups and the most abundant taxa within replicates (Table 3-5).

- 3.3.37 A total of five standalone biotopes were assigned to SIMRPOF groups, one of these biotopes was similar to a particular described biotope though not necessarily an exact fit (c.f. prefix), two were assigned to an undescribed or new biotope (# suffix) and the remaining two biotopes were a close match to the standard description. Of the remaining SIMPROF groups, two biotopes were assigned in combination with a second biotope and may be transitional between the two. These biotopes were assigned based on the SIMPROF groups and the most abundant taxa within replicates (Table 3-5).
- 3.3.38 Two undefined biotopes (SIMPROF groups i and k) were identified and classified as 'Infralittoral mixed sediment' (EUNIS code: A5.43). These may represent undescribed or new biotopes though given limited within group similarity and low number stations it is not appropriate to define the characteristics further than grouping at a broad level. Both being grouped under the same broad classification meant these were the most frequently encountered biotope across the survey area. This broad level biotope was assigned to 7 of the 24 stations.
- 3.3.39 The next most frequently observed biotope was '*Crepidula fornicata* and *Mediomastus fragilis* in variable salinity infralittoral mixed sediment' (EUNIS code: A5.422) which was assigned to 5 of the 24 stations (SIMPROF groups g and j). This biotope is primarily characterised by *C. fornicata* in addition to the polychaetes *M. fragilis* and *A. marioni*. Other characterising taxa include *T. benedii*, syllids such as *Exogone naidina* and *Sphaerosyllis*, and *N. hombergii* [23].
- 3.3.40 SIMPROF group a (one sample) was assigned to the biotope '*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand' (EUNIS code: A5.233). Similarly, SIMPROF groups b (one sample), c (three samples) and e (one sample) most clearly resembled this biotope. However, these groups also showed some similarity to other biotopes (Table 3-5).
- 3.3.41 SIMPROF group d (one sample) was assigned to a probable undescribed or new biotope within 'Sublittoral coarse sediment' (EUNIS code: A5.1) (Table 3-5). This biotope is characterised by robust fauna and found in tide-swept channels of marine inlets [24].
- 3.3.42 SIMPROF group f (two samples) most closely resembled the biotope 'Burrowing megafauna *Maxmuelleria lankesteri* in circalittoral mud' (EUNIS code: A5.362) though only two individuals of *M. lankesteri* and no other features indicative of this habitat were recorded at these locations. However, this group also showed similarity to the biotope '*Melinna palmata* with *Magelona* spp. and *Thyasira* spp. in infralittoral sandy mud' (EUNIS code: A5.334).
- 3.3.43 SIMPROF group h (3 samples) had similarities to the biotope '*Venerupis corrugata*, *Amphipholis squamata* and *Aapseudes holthuisi* in infralittoral mixed sediment' (EUNIS code: A5.433). This biotope is characterised by large populations of the pullet carpet shell *Venerupis senegalensis* with the brittlestar *A. squamata* and the tanaid *Aapseudes latreilli* [25]. This biotope was assigned c.f. because although this SIMPROF group is close to the described biotope in some ways, it lacks some key

species such as the crustacean *Apeudopsis latreillii* which is restricted to the south-west of the UK.

Table 3-5 Biotope allocation for SIMPROF groups

Biotope with EUNIS and JNCC codes	SIMPROF group	Station allocated	Description and information to allocate biotope type
<p><i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand</p> <p>A5.233</p> <p>SS.SSa.IFiSa.NcirBat</p>	a	110R	<p>Group a (1 sample); Within-group similarity = not applicable.</p> <p>This biotope is primarily characterised by <i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp., occurring in sediments subject to physical disturbance. Polychaetes such as <i>S. martinensis</i> may also be present [26].</p>
<p><i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand/Semi-permanent tube-building amphipods and polychaetes in sublittoral sand</p> <p>A5.233/A5.234</p> <p>SS.SSa.IFiSa.NcirBat/S S.SSa.IFiSa.TbAmPo</p>	b	204R	<p>Group b (1 sample); Within-group similarity = not applicable.</p> <p>Most clearly resembles A5.233 due to characterising species such as spionid polychaetes (e.g. <i>S. martinensis</i>) [26]. However, this group also shows resemblance to A5.234 due to the presence of taxa such as <i>Spiophanes bombyx</i> and <i>Bathyporeia</i> spp. [27].</p>
<p><i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand/<i>Fabulina fabula</i> and <i>Magelona mirabilis</i> with venerid bivalves and amphipods in infralittoral compacted fine muddy sand</p> <p>A5.233/A5.242</p> <p>SS.SSa.IFiSa.NcirBat/S S.SSa.IMuSa.FfabMag</p>	c	101R; 103; 104	<p>Group c (3 samples); Within-group similarity = 60.75.</p> <p>Most clearly resembles A5.233 due to characterising species such as <i>S. martinensis</i> and <i>Bathyporeia</i> spp. [26]. However, this group also shows resemblance to A5.242 due to the presence of taxa such as <i>B. elegans</i>, <i>S. bombyx</i> and <i>Nephtys</i> spp. [27].</p>
<p>Sublittoral coarse sediment #</p> <p>A5.1 #</p> <p>SS.SCS #</p>	d	501	<p>Group d (1 sample); Within-group similarity = not applicable.</p> <p>This biotope was assigned the suffix # because taxa recorded within stations didn't fit the standard description of any previously described biotope.</p>

Biotope with EUNIS and JNCC codes	SIMPROF group	Station allocated	Description and information to allocate biotope type
<p><i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand/<i>Sertularia cupressina</i> and <i>Hydrallmania falcata</i> on tide-swept sublittoral sand with cobbles or pebbles</p> <p>A5.233/A5.232</p> <p>SS.SSa.IFiSa.NcirBat/S S.SSa.IFiSa.ScupHyd</p>	e	502	<p>Group e (1 sample); Within-group similarity = not applicable.</p> <p>Most clearly resembles A5.233 due to characterising species such as <i>N. cirrose</i> [26]. However, this group also shows resemblance to A5.232 due to the presence of taxa other characterising taxa for this biotope.</p>
<p>Burrowing megafauna <i>Maxmuelleria lankesteri</i> in circalittoral mud/<i>Melinna palmata</i> with <i>Magelona</i> spp. and <i>Thyasira</i> spp. in infralittoral sandy mud</p> <p>A5.362/A5.334</p> <p>SS.SMu.CFiMu.MegMax /SS.SMu.ISaMu.MelMag Thy</p>	f	401; 405	<p>Group f (2 samples); Within-group similarity = 21.21.</p> <p>Most closely resembles A5.362 due to characterising species such as <i>M. lankesteri</i> [28]. However, group F also has resemblance to A5.334 due to the presence of <i>M. palmata</i>, <i>C. gibber</i> and <i>Euclymene oerstedii</i> [25].</p>
<p><i>Crepidula fornicata</i> and <i>Mediomastus fragilis</i> in variable salinity infralittoral mixed sediment</p> <p>A5.422</p> <p>SS.SMx.SMxVS.CreMed</p>	g	503; 504; 505	<p>Group g (3 samples); Within-group similarity = 30.20.</p> <p>This group showed a resemblance to A5.422 due to the presence of characterising taxa such as <i>C. fornicata</i>, <i>A. marioni</i>, <i>T. benedii</i>, <i>E. naidina</i>, <i>Sphaerosyllis</i> spp., and <i>N. hombergii</i> [23].</p>
<p>c.f. <i>Venerupis corrugata</i>, <i>Amphipholis squamata</i> and <i>Apseudes holthuisi</i> in infralittoral mixed sediment</p> <p>c.f. A5.433</p>	h	303; 406; 407	<p>Group h (3 samples); Within-group similarity = 42.02.</p> <p>This biotope was assigned to a variant of A5.433 due to the presence of some characterising taxa such as <i>M. fragilis</i>, <i>M. palmata</i>, <i>A. marioni</i> and tubificid oligochaetes [25]. This biotope was assigned c.f. because although this</p>

Biotope with EUNIS and JNCC codes	SIMPROF group	Station allocated	Description and information to allocate biotope type
c.f. SS.SMx.IMx.VsenAsquA ps			SIMPROF group is close to the described biotope in some ways, it lacks some key species such as the crustacean <i>Apseudopsis latreillii</i> which is restricted to the south-west of the UK.
Infralittoral mixed sediment # A5.43 # SS.SMx.Imx.#	i	404; 404B	Group i (2 samples); Within-group similarity = 56.66. This biotope was assigned the suffix # because taxa recorded within stations didn't fit the standard description of any previously described biotope.
<i>Crepidula fornicata</i> and <i>Mediomastus fragilis</i> in variable salinity infralittoral mixed sediment A5.422 SS.SMx.SMxVS.CreMed	j	402; 403	Group j (2 samples); Within-group similarity = 54.45. This group showed a resemblance to A5.422 due to the presence of characterising taxa such as <i>D. grossularia</i> , <i>M. fragilis</i> , <i>C. fornicata</i> and <i>A. marioni</i> [23].
Infralittoral mixed sediment # A5.43 # SS.SMx.Imx.#	k	106; 107; 202; 203; 205	Group k (5 samples); Within-group similarity = 25.97. This biotope was assigned the suffix # because taxa recorded within stations didn't fit the standard description of any previously described biotope.

3.4 Sediment composition

- 3.4.1 Overall, the sediment type varied between sample stations, however, gravel did predominantly feature in many of the survey locations. Using the GRADISTAT Folk classification, gravel was at least a partial component of every sediment type.
- 3.4.2 Particle size varied widely across stations with the mode particle size ranging from 13.3µm to 38,250µm. The most common primary mode was Fine Sand (125 – 250µm), which accounted for 9 of the 29 stations. Coarse Gravel (500 – 1000µm) was the second most frequently occurring sediment type accounting for six stations.
- 3.4.3 Gravel had at least a 60% contribution in the sediment composition of 11 sample stations. Sand and mud had a contribution of 60% in nine and five sample stations respectively. When sediment was divided into gravel (greater than 2mm), sand (63 – 2,000µm) and mud (less than 63µm), stations across the four sampled areas

would be typically dominated by one sediment type. Very rarely were similar levels of gravel, sand and mud found within one sample station.

- 3.4.4 Within South of Hayling Island (Area 1), sample stations were dominated largely by either sand or gravel, and mud was virtually absent. From the geophysical survey result (refer to ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6)) the area was relatively shallow and influenced by sediment transport out of the entrance channels that accounted for the coarser sediment composition.
- 3.4.5 Sample stations across South of Eastney (Area 2) were dominated by gravel whereas mud was only present in any substantial capacity at one station within this area. This was coherent with the geophysical survey finding a small area slightly deeper than the surrounding seabed and comprised of mixed sediment.
- 3.4.6 Approaches to Portsmouth Harbour (Area 4) was more often dominated by mud. Referring to the geophysical survey result the relatively deeper section in this area leads to more muddy sediments comprised.
- 3.4.7 Sediment types sampled within Langstone Harbour (Area 5) varied from mud to gravel. This is likely correlated with the various depths ranging from 1m to 13.5m (as referred from the geophysical survey) and thus the varying current exposure on sediments within the harbour and its entrance channel.

3.5 Community composition

- 3.5.1 In total, 289 taxa were recorded across 24 sample stations, while 50 of these taxa were non-countable. The numbers of individuals and of taxa varied considerably between stations, with trends in abundance typically linking to trends in taxon richness. Station 504 had the greatest density with 15,550 individuals per m², this station also had the highest taxon richness with 78 taxa present.
- 3.5.2 A number of species that are considered rare, or that are component parts of priority habitats, were recorded across the survey area. *Epistomia bursaria* was recorded at Station 407 and is listed as a nationally rare species by the JNCC. In addition, *Maxmuelleria lankesteri* is representative of the biotope 'Burrowing megafauna *Maxmuelleria lankesteri* in circalittoral mud' (A5.362), which can be a component part of the priority habitat 'Mud habitats in deep water'. Though *Maxmuelleria lankesteri* can form habitats that can constitute "*Mud habitats in deep water*" priority habitat, no features indicative of the presence of this habitat were recorded during this survey. *Sabellaria spinulosa* forms the priority habitat '*Sabellaria spinulosa* reef' when it is reef building (although reef type features were not recorded within the EUNIS habitat mapping based on the geophysical survey conducted across the survey area) (ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6)).
- 3.5.3 The most abundant taxon by a considerable margin was the baked bean ascidian, *D. grossularia*, with a mean density of 608 ± 1,686 individuals per m². This ascidian is widely distributed throughout the north-eastern Atlantic Ocean, ranging from around the Baltic Sea to as far south as Quiberon off the west coast of France. It typically colonises rocky areas with gravel or boulders, often in areas with strong currents. Due to its tolerance of lower salinity levels, it can also often be found in estuaries. In addition, there are some indeterminate bedforms present which may be providing ideal habitat for colonisation by *D. grossularia*.

- 3.5.4 The second most abundant taxon was the annelid, *T. benedii*, with a mean density of $365 \pm 1,773$ individuals per m^2 . This was primarily concentrated around Station 503, potentially due to the very fine sediment present at this station ($16\mu m$) and the preference of this annelid for very fine littoral muds. It should be noted however, that *T. benedii* was virtually absent from Station 505, which had the finest sediment of all stations, potentially suggesting other factors are affecting its distribution.
- 3.5.5 All the stations dominated by 'other (countable)' taxa (such as *D. grossularia*) were located within Approaches to Portsmouth Harbour (Area 4), with no stations in other areas having comparative levels of density for this taxonomic category. Station 404 was the station with the greatest density of other (countable) taxa with a density of 6,580 individuals per m^2 . This does not appear to be correlated with sediment composition. The sediment grain size of the three stations with large ascidian densities ranged from 137.8 to $3,477.1\mu m$. Two of the stations were classified as muddy gravel and the other was classified as gravelly mud.
- 3.5.6 Most other stations across the survey area were dominated either by annelids or crustaceans. Station 501 was almost entirely dominated by crustacea, with crustaceans having a density of 8,260 individuals per m^2 at this station. This primarily consisted of female *Cheirocratus* sp. as well as *Leptocheirus pectinatus*. This was the only instance in which the density of crustacea exceeded 150 individuals per m^2 at any station.
- 3.5.7 Molluscs and echinoderms had typically low densities, with molluscs largely remaining below 500 individuals per m^2 and echinoderms rarely exceeding 10 individuals per m^2 . However, the station with the highest invertebrate density (Station 504), had both the highest mollusc and echinoderm density with values of 2,900 and 730 individuals per m^2 respectively. The mollusc species with the highest densities were *Crepidula fornicata* and *Dikoleps nitens* with mean densities of 174 ± 596 and 92 ± 445 individuals per m^2 respectively.
- 3.5.8 The station with the highest abundance and diversity, Station 504, was one of the few stations with a relatively even composition of mud, sand and gravel. However, the sediment composition of Station 203 was very similar though had much lower levels of abundance and diversity. This is potentially due to different current regimes between these two stations relating to their respective locations with 504 being located within Langstone Harbour and Station 203 being located outside the harbour on the more exposed open coast.
- 3.5.9 Typically, the stations that were dominated by one sediment type (greater than 60%) were also those with diversity values of less than 20 taxa per $0.1 m^2$. Station 203 was a notable exception to this trend, with low diversity levels though a more heterogenous sediment composition.

3.6 Biotope assignment

- 3.6.1 Across the entire survey area, SIMPROF analysis identified a total of 11 groups which were assigned to biotopes. A total of five standalone biotopes were assigned to SIMPROF groups, one of these biotopes was similar to a particular described biotope though not necessarily an exact fit (c.f. prefix), two were assigned to an undescribed or new biotope (# suffix) and the remaining two biotopes were a close match to the standard description. Of the remaining SIMPROF groups, two

biotopes were assigned in-combination with a second biotope and may be transitional between both.

- 3.6.2 The dominant biotope across the survey area was a probable undescribed or new biotope within the ‘Infralittoral mixed sediment’ habitat (EUNIS code: A5.43), followed by ‘*Crepidula fornicata* and *Mediomastus fragilis* in variable salinity infralittoral mixed sediment’ (EUNIS code: A5.422). Other biotopes assigned to groups were ‘*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand’ (EUNIS code: A5.233) on its own and transitional with other biotopes; ‘Burrowing megafauna *Maxmuelleria lankesteri* in circalittoral mud’ (EUNIS code: A5.362) transitional with ‘*Melinna palmata* with *Magelona* spp. and *Thyasira* spp. in infralittoral sandy mud’ (EUNIS code: A5.334). The biotopes which were similar to a described biotope though not an exact fit were ‘*Venerupis corrugata*, *Amphipholis squamata* and *Apseudes holthuisi* in infralittoral mixed sediment’ (EUNIS code: A5.433). Finally, a probable undescribed or new biotope within the ‘Sublittoral coarse sediment’ habitat (EUNIS code: A5.1) was assigned to a single SIMPROF Group.
- 3.6.3 When compared to the EUNIS 3 habitat mapping (Graphic 3-7) based on the geophysical survey (ES Appendix 9.5 Subtidal geophysical survey, Volume II (Document reference 6.2, DCO Volume 6)), the biotope analysis (based primarily on the dominant taxa in the samples and also with some consideration of sediment composition) indicated agreement across 14 of the 24 sample stations.
- 3.6.4 There were slight differences in the allocated habitat type at 10 of the 24 sample stations (Table 3-6). Such differences can occur due to various reasons including:

An area being transitional between two habitats

Biotopes extending to similar habitat types though in an impoverished form

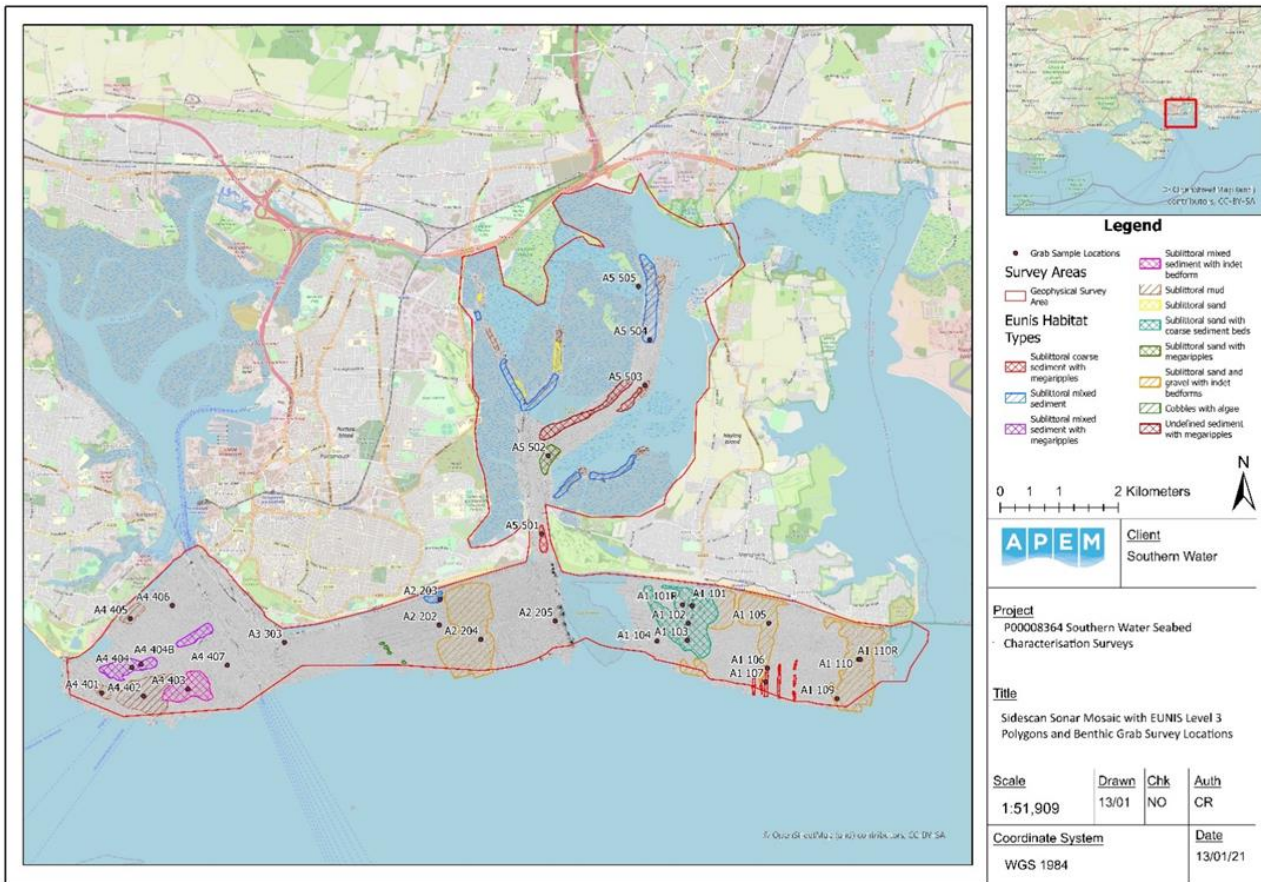
Species being able to colonise component parts of a habitat that are not the dominant part of the habitat, for example species colonising larger stones and shells of other species (including live organisms) in a habitat otherwise dominated by mud

Table 3-6 Differences in habitat allocation between the EUNIS Level 3 habitat mapping and the biotope analysis

SIMPROF group	Station	Habitat type based on geophysical survey	Habitat type based on biotope analysis	Context to habitat allocations
K	106 107 202 205	A5.1 Sublittoral coarse sediment	A5.4 Sublittoral mixed sediments	The geophysical survey and PSA data suggest a coarse sediment habitat at these stations, however; the biotope analysis based on the dominant taxa within the benthic samples suggest a community more associated with mixed sediments. This includes both species that would colonise small stones and those that live within finer sediment. This suggests the majority of this habitat is coarse sediment though with a fraction that is at least partially mixed and potentially transitional between these two habitats.

SIMPROF group	Station	Habitat type based on geophysical survey	Habitat type based on biotope analysis	Context to habitat allocations
A	110R	A5.1 Sublittoral coarse sediment	A5.2 Sublittoral sand	The geophysical and PSA data suggest a coarse sediment habitat, however; the benthic samples show a reduced faunal community typical of clean sands. It is likely that this community extends to coarse sediment habitats in an impoverished form.
B	204R	A5.1 Sublittoral coarse sediment	A5.2 Sublittoral sand	As SIMPROF group A above.
H	303	A5.1 Sublittoral coarse sediment	A5.4 Sublittoral mixed sediments	As SIMPROF group K above.
J	402	A5.3 Sublittoral mud	A5.4 Sublittoral mixed sediments	The geophysical survey and PSA data suggest a mud dominated habitat, however; the faunal data suggest species associated with mud habitats but also those that colonise small stones and shells, including those of live organisms such as <i>Crepidula</i> . It is likely the habitat is dominated by mud though with other larger stones and shells providing opportunity for colonisation by fauna not typically associated with mud communities.
G	503 505	A5.3 Sublittoral mud	A5.4 Sublittoral mixed sediments	As SIMPROF group J above.

Graphic 3-7 Sidescan sonar mosaic with EUNIS level 3 habitat polygons and benthic grab sample locations



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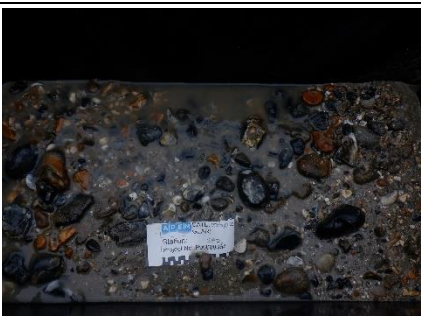

Annex A Grab sample survey photos











Successful grab samples were photographed, and the following table log presents the photo record.










Table A-1 Photo record of successful grab samples from the survey stations











Station	Raw sample	Sieved sample
101		
102		No photo taken.
103		
104		

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Station	Raw sample	Sieved sample
105		No photo taken.
106		
107		
110		No photo taken.
202		

Station	Raw sample	Sieved sample
203		
204		
205		
303		
401		

Station	Raw sample	Sieved sample
402		
403		
404		
404B		No photo taken
405		

Station	Raw sample	Sieved sample
406		
407		
501		
502		
503		

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Station	Raw sample	Sieved sample
504		
505		

Annex B Field survey log sheet

Table B-1 Field survey log sheet

Area	Station	Sample type	Attempt	Position (WGS84) latitude	Longitude	Date	Time (BST)	Water depth (m)	Grab volume (L)	Notes
A1	101	PSA	2	50.7802928	-0.9901055	26/04/2022	11:40	4.9	>1	Target location - sample taken
A1	101R	Biota	4	50.7802928	-0.9901055	26/04/2022	12:15	5.8	5	Fine sand
A1	101R	PSA	4	50.7802928	-0.9901055	26/04/2022	12:15	5.8	5	Fine sand 101 - Target relocation
A1	102R	PSA	5	50.7776079	-0.9910544	25/04/2022	16:35	4.4	>1	Sand - taken
A1	103	Biota	2	50.7748984	-0.9988529	25/04/2022	15:55	4.6	5	Sand
A1	103	PSA	1	50.7748984	-0.9988529	25/04/2022	15:45	4.4	1	Sand - taken just in case
A1	104	PSA	1	50.7773893	-0.972034	25/04/2022	16:45	3.8	>1	Sand - Taken
A1	104	Biota	2	50.7773893	-0.972034	25/04/2022	16:55	3.9	3.5	Sand - Taken
A1	105	PSA	3	50.7705133	-0.9725681	25/04/2022	17:35	5.4	>1	Sandy Gravel Taken
A1	106	Biota	1	50.7685605	-0.9727688	25/04/2022	15:15	5.2	13	Muddy Gravel
A1	106	PSA	1	50.7685605	-0.9727688	25/04/2022	15:15	5.2	13	Muddy Gravel
A1	107	Biota	1	50.7691669	-0.9627352	25/04/2022	14:55	5.2	10	Muddy Gravel
A1	107	PSA	1	50.7691669	-0.9627352	25/04/2022	14:55	5.2	10	Muddy Gravel
A1	109	PSA	1	50.765927	-0.9559539	26/04/2022	13:56	5.2	1.5	
A1	110	PSA	3	50.7716991	-0.9501398	26/04/2022	12:59	3.2	>1	Taken
A1	110R	Biota	4	50.7716991	-0.9501398	26/04/2022	13:05	3.3	3.5	Slightly Gravelly Sand Target Relocation

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Area	Station	Sample type	Attempt	Position (WGS84) latitude	Longitude	Date	Time (BST)	Water depth (m)	Grab volume (L)	Notes
A1	110R	PSA	4	50.7716991	-0.9501398	26/04/2022	13:05	3.3	>2.5	Slightly Gravelly Sand Target Relocation
A2	202	Biota	1	50.7767782	-1.0544438	27/04/2022	14:25	2.8	3.5	Gravelly Sand
A2	202	PSA	1	50.7767782	-1.0544438	27/04/2022	14:33	3.2	4	Gravelly Sand
A2	203	Biota	1	50.7819748	-1.0509571	27/04/2022	13:40	3.5	3	
A2	203	PSA	1	50.7819748	-1.0509571	27/04/2022	13:45	4.2	>1	
A2	204	PSA	1	50.7753463	-1.0410916	27/04/2022	13:15	4.6	3.5	
A2	204	Biota	2	50.7753463	-1.0410916	27/04/2022	13:25	4.6	6	Gravelly sand
A2	205	Biota	1	50.7781771	-1.0233054	27/04/2022	12:40	9	<3.5	Gravel on clay
A2	205	PSA	1	50.7781771	-1.0233054	27/04/2022	12:45	9	>2	Gravel on clay
A3	303	Biota	1	50.7728959	-1.0846773	27/04/2022	15:12	2.8	3	Gravelly Sand
A3	303	PSA	1	50.7728959	-1.0846773	27/04/2022	15:15	2.8	3	
A4	401	Biota	1	50.7679895	-1.1326737	26/04/2022	09:11	13.4	10	
A4	401	PSA	1	50.7679895	-1.1326737	26/04/2022	09:22	23.1	10	
A4	402	Biota	1	50.7675206	-1.1223579	26/04/2022	09:53	12	10	Sandy Mud
A4	402	PSA	1	50.7675206	-1.1223579	26/04/2022	09:53	12	10	Sandy Mud
A4	403	Biota	1	50.768404	-1.1117758	26/04/2022	08:40	9.2	10	
A4	403	PSA	1	50.768404	-1.1117758	26/04/2022	08:40	9.2	10	
A4	404	Biota	1	50.772275	-1.1229916	25/04/2022	13:45	7.2	5.2	Gravelly mud
A4	404	PSA	1	50.772275	-1.1229916	25/04/2022	13:45	7.2	5.2	Gravelly mud
A4	404B	Biota	1	50.772275	-1.1229916	27/04/2022	10:39	9.2	10	Mud - Shelly mud

Hampshire Water Transfer and Water Recycling Project
Environmental Statement – Appendix 9.6 Subtidal grab sampling report

Area	Station	Sample type	Attempt	Position (WGS84) latitude	Longitude	Date	Time (BST)	Water depth (m)	Grab volume (L)	Notes
A4	404B	PSA	1	50.772275	-1.1229916	27/04/2022	10:50	9.3	10	Mud - Shelly mud
A4	405	Biota	1	50.7794539	-1.1256279	27/04/2022	11:05	5.9	7	Sandy Clay
A4	405	PSA	1	50.7794539	-1.1256279	27/04/2022	11:16	5.9	7	Sandy Clay
A4	406	Biota	1	50.7812132	-1.1152904	27/04/2022	11:44	6	5	Sandy Gravelly Clay
A4	406	PSA	1	50.7812132	-1.1152904	27/04/2022	11:52	6.1	1.5	Sandy Gravelly Clay
A4	407	Biota	1	50.7721053	-1.1021343	26/04/2022	08:25	5.9	10	Sandy Gravel/Gravelly Sand
A4	407	PSA	1	50.7721053	-1.1021343	26/04/2022	08:25	5.9	10	
A5	501	Biota	1	50.7912754	-1.0261541	26/04/2022	09:12	10.5	10	Gravel
A5	501	PSA	1	50.7912754	-1.0261541	26/04/2022	09:12	10.5	10	Gravel
A5	502	Biota	1	50.8034575	-1.024345	26/04/2022	08:25	10.4	10	Sandy
A5	502	PSA	1	50.8034575	-1.024345	26/04/2022	08:25	10.4	10	Sandy
A5	503	Biota	1	50.8138316	-1.0009283	26/04/2022	10:01	4.7	11	
A5	503	PSA	1	50.8138316	-1.0009283	26/04/2022	10:01	4.7	11	
A5	504	Biota	1	50.8208261	-0.999612	26/04/2022	08:35	9.5	12	Gravelly mud
A5	504	PSA	1	50.8208261	-0.999612	26/04/2022	08:35	9.5	12	Gravelly mud
A5	505	Biota	1	50.8288597	-0.9970813	26/04/2022	09:44	4.3	12	
A5	505	PSA	1	50.8288597	-0.9970813	26/04/2022	09:44	4.3	12	

Annex C Raw and GRADISTAT PSA data

Table C-1 GRADISTAT descriptive sediment classification

Sample ID	Sample date	Visual description pre-analysis	Folk (1954) classification	Statistics calculated using Folk and Ward (1957) formulae							
				Mean		Sorting		Skewness		Kurtosis	
				(µm)	Description	(phi)	Description	(phi)	Description	(phi)	Description
101	26/04/2022	Muddy sandy gravel	Gravel	16727.2	Coarse Gravel	2.008	Very Poorly Sorted	0.614	Very Fine Skewed	1.634	Very Leptokurtic
101_R	26/04/2022	Sand with a few shells, shell fragments and gravel particles	Slightly Gravelly Sand	180.5	Fine Sand	0.458	Well Sorted	-0.083	Symmetrical	1.085	Mesokurtic
102_R	25/04/2022	Sand with shells, shell fragments and gravel particles	Gravelly Sand	617.2	Coarse Sand	2.639	Very Poorly Sorted	-0.804	Very Coarse Skewed	1.705	Very Leptokurtic
103	25/04/2022	Sand with a few shells, shell fragments and gravel particles	Slightly Gravelly Sand	162.3	Fine Sand	0.416	Well Sorted	0.005	Symmetrical	1.008	Mesokurtic
104	25/04/2022	Sand with a few shells, shell fragments and gravel particles	Gravelly Sand	220.1	Fine Sand	1.039	Poorly Sorted	-0.493	Very Coarse Skewed	2.485	Very Leptokurtic
105	25/04/2022	Muddy sandy gravel	Muddy Sandy Gravel	4776.2	Fine Gravel	3.202	Very Poorly Sorted	0.593	Very Fine Skewed	0.771	Platykurtic
106	25/04/2022	Muddy sandy gravel	Gravel	6732.9	Fine Gravel	1.015	Poorly Sorted	0.181	Fine Skewed	1.163	Leptokurtic
107	25/04/2022	Muddy sandy gravel	Gravel	8112.1	Medium Gravel	1.365	Poorly Sorted	0.227	Fine Skewed	1.253	Leptokurtic
109	26/04/2022	Sand with a few shell fragments and gravel particles	Slightly Gravelly Sand	183.2	Fine Sand	0.488	Well Sorted	-0.117	Coarse Skewed	1.182	Leptokurtic
110_R	26/04/2022	Gravelly sand with shell fragments	Gravelly Sand	668.3	Coarse Sand	2.565	Very Poorly Sorted	-0.802	Very Coarse Skewed	1.105	Mesokurtic
110	26/04/2022	Sandy gravel with shell fragments	Gravel	10258.1	Medium Gravel	1.611	Poorly Sorted	0.491	Very Fine Skewed	2.493	Very Leptokurtic
202	27/04/2022	Muddy sandy gravel	Sandy Gravel	4181.4	Fine Gravel	2.472	Very Poorly Sorted	0.383	Very Fine Skewed	0.735	Platykurtic
203	27/04/2022	Gravelly mud	Muddy Gravel	397.6	Medium Sand	5.092	Extremely Poorly Sorted	-0.190	Coarse Skewed	0.556	Very Platykurtic
204_R	27/04/2022	Sand with a few shell fragments and gravel particles	Gravelly Sand	425.5	Medium Sand	2.002	Very Poorly Sorted	-0.756	Very Coarse Skewed	3.528	Extremely Leptokurtic
205	27/04/2022	Muddy sandy gravel with shells and shell fragments	Gravel	9783.4	Medium Gravel	1.880	Poorly Sorted	0.356	Very Fine Skewed	1.390	Leptokurtic
303	27/04/2022	Muddy sandy gravel with shells and shell fragments	Gravelly Sand	767.9	Coarse Sand	2.398	Very Poorly Sorted	-0.510	Very Coarse Skewed	0.832	Platykurtic
401	27/04/2022	Mud	Slightly Gravelly Sandy Mud	18.1	Coarse Silt	2.695	Very Poorly Sorted	0.147	Fine Skewed	0.921	Mesokurtic
402	27/04/2022	Mud	Slightly Gravelly Sandy Mud	16.9	Coarse Silt	2.829	Very Poorly Sorted	0.113	Fine Skewed	0.922	Mesokurtic
403	27/04/2022	Mud with shells and shell fragments	Gravelly Mud	137.8	Fine Sand	5.381	Extremely Poorly Sorted	-0.263	Coarse Skewed	0.624	Very Platykurtic

Sample ID	Sample date	Visual description pre-analysis	Folk (1954) classification	Statistics calculated using Folk and Ward (1957) formulae							
				Mean		Sorting		Skewness		Kurtosis	
				(µm)	Description	(phi)	Description	(phi)	Description	(phi)	Description
404	25/04/2022	Shells with mud	Muddy Gravel	3477.1	Very Fine Gravel	3.756	Very Poorly Sorted	0.894	Very Fine Skewed	2.094	Very Leptokurtic
404_B	27/04/2022	Shells with mud	Muddy Gravel	1385.4	Very Coarse Sand	4.677	Extremely Poorly Sorted	0.847	Very Fine Skewed	0.640	Very Platykurtic
405	27/04/2022	Mud with a few shells and shell fragments	Slightly Gravelly Sandy Mud	22.6	Coarse Silt	3.382	Very Poorly Sorted	0.074	Symmetrical	0.923	Mesokurtic
406	27/04/2022	Muddy gravel	Muddy Sandy Gravel	3287.7	Very Fine Gravel	3.873	Very Poorly Sorted	0.616	Very Fine Skewed	0.919	Mesokurtic
407	27/04/2022	Muddy gravel	Muddy Sandy Gravel	1111.2	Very Coarse Sand	2.882	Very Poorly Sorted	0.020	Symmetrical	1.190	Leptokurtic
501	26/04/2022	Sandy gravel	Gravel	7178.0	Fine Gravel	0.974	Moderately Sorted	0.110	Fine Skewed	1.039	Mesokurtic
502	26/04/2022	Sand with shells and shell fragments	Slightly Gravelly Sand	427.0	Medium Sand	0.775	Moderately Sorted	-0.108	Coarse Skewed	1.217	Leptokurtic
503	26/04/2022	Mud with a few shell fragments	Slightly Gravelly Sandy Mud	16.2	Coarse Silt	2.703	Very Poorly Sorted	0.050	Symmetrical	0.885	Platykurtic
504	26/04/2022	Shells with mud	Muddy Gravel	377.6	Medium Sand	5.221	Extremely Poorly Sorted	0.058	Symmetrical	0.625	Very Platykurtic
505	26/04/2022	Mud with a few shell fragments and gravel particles	Slightly Gravelly Sandy Mud	13.7	Medium Silt	2.326	Very Poorly Sorted	0.098	Symmetrical	1.101	Mesokurtic

Table C-2 Raw PSA data (Part 1 of 4)

Sample ID	Primary mode (µm)	d10	d50	d90	Gravel	Sand	Mud	V coarse gravel	Coarse gravel	Medium gravel	Fine gravel	V fine gravel	V coarse sand	Coarse sand
		(µm)	(µm)	(µm)	(>2 mm)	(63-2000 µm)	(<63 µm)	(32-64 mm)	(16-32 mm)	(8-16 mm)	(4-8 mm)	(2-4 mm)	(1-2 mm)	(500-1000 µm)
		(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
101	38250.0	1418.8	25460.9	50466.8	87.7	11.4	1.0	40.6	23.1	15.0	5.5	3.4	4.1	2.0
101_R	213.4	128.1	180.5	275.0	4.8	95.2	0.0	0.0	0.0	3.5	0.7	0.6	0.0	0.0
102_R	150.9	127.8	194.7	16215.1	20.1	79.9	0.0	0.0	10.4	6.6	2.0	1.2	3.3	1.7
103	150.9	105.5	159.1	231.8	0.8	96.4	2.8	0.0	0.7	0.0	0.1	0.0	0.0	0.0
104	213.4	130.9	197.9	1071.1	5.9	94.1	0.0	0.0	0.5	1.5	1.6	2.3	4.5	4.5
105	38250.0	156.0	12920.0	40781.9	73.1	22.5	4.4	34.6	12.2	13.9	8.0	4.4	3.1	1.9
106	9600.0	2798.2	7044.1	14832.7	94.2	3.9	1.9	0.0	7.1	35.5	36.7	14.9	1.6	0.4
107	9600.0	2135.2	8637.3	22195.0	90.7	7.9	1.4	0.0	21.0	32.9	26.7	10.0	4.1	1.0
109	213.4	128.9	183.8	295.4	2.3	97.7	0.0	0.0	0.0	1.6	0.4	0.2	0.0	1.7
110_R	213.4	137.7	217.9	13692.5	23.5	76.5	0.0	0.0	7.6	10.4	4.1	1.4	1.6	1.6
110	13600.0	517.3	11886.6	22055.7	88.6	10.8	0.6	0.0	28.7	45.0	11.6	3.3	0.9	0.5
202	26950.0	284.4	6591.3	25718.0	66.6	32.7	0.7	0.0	25.6	20.6	12.2	8.2	8.7	8.4
203	38250.0	5.1	188.5	38516.6	42.0	18.8	39.2	21.9	12.2	4.6	1.8	1.5	0.0	1.1
204_R	213.4	148.9	234.1	16715.9	15.9	84.1	0.0	0.0	10.8	3.5	1.3	0.3	2.0	1.9
205	19200.0	1745.5	11077.8	30241.2	89.5	8.1	2.4	7.8	32.9	22.1	16.9	9.8	2.2	1.1
303	213.4	143.4	393.2	10374.5	26.8	69.4	3.8	0.0	4.4	9.6	6.3	6.5	11.1	7.9
401	106.7	1.3	20.1	151.7	0.0	28.7	71.2	0.0	0.0	0.0	0.0	0.0	0.0	1.3
402	75.4	1.1	18.1	165.5	0.1	28.7	71.2	0.0	0.0	0.0	0.0	0.1	0.0	1.4
403	19200.0	1.6	48.2	18998.7	28.5	18.1	53.4	0.0	18.1	6.0	2.8	1.7	0.0	0.9
404	19200.0	22.3	16625.7	22964.8	77.5	9.0	13.4	0.0	55.0	14.3	5.3	2.9	0.0	0.9
404_B	19200.0	5.5	10987.5	20793.3	60.8	12.7	26.4	0.0	40.4	13.0	4.9	2.6	0.0	1.1
405	75.4	1.0	24.9	482.5	1.1	36.2	62.7	0.0	0.5	0.0	0.3	0.3	1.3	7.3
406	38250.0	25.5	8851.1	34132.5	62.2	25.3	12.5	12.3	21.3	18.8	5.9	3.8	6.2	4.6
407	603.6	98.5	871.4	10971.7	34.2	56.7	9.1	0.0	2.7	11.1	12.2	8.1	12.6	17.2
501	9600.0	2917.2	7626.1	15801.9	97.2	2.8	0.0	0.0	9.5	37.9	33.0	16.7	2.5	0.2
502	426.8	229.6	420.7	915.5	0.8	97.9	1.3	0.0	0.0	0.1	0.1	0.6	7.5	26.1
503	150.9	1.2	15.1	150.3	0.2	27.0	72.9	0.0	0.0	0.0	0.0	0.2	0.0	0.0
504	19200.0	3.4	411.3	28739.6	43.9	16.3	39.8	8.7	13.9	9.0	6.6	5.7	0.0	4.9
505	13.3	1.5	14.1	92.1	0.8	15.2	84.0	0.0	0.0	0.0	0.1	0.7	0.0	0.0

Table C-3 Raw PSA data (Part 2 of 4)

Sample ID	Medium sand	Fine sand	V fine sand	V coarse silt	Coarse silt	Medium silt	Fine silt	V fine silt	Clay	Percentages of the distribution in each 'half-phi' size interval, expressed in µm (sieving for >2mm fraction, laser diffraction for <2mm fraction)									
	(250-500 µm)	(125-250 µm)	(63-125 µm)	(31-63 µm)	(16-31 µm)	(8-16 µm)	(4-8 µm)	(2-4 µm)	(<2 µm)	>63000	45000 to 63000	31500 to 45000	22400 to 31500	16000 to 22400	11200 to 16000	8000 to 11200	5600 to 8000	4000 to 5600	2800 to 4000
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)										
101	1.5	3.3	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.0	15.2	26.6	13.1	8.8	10.5	4.5	3.1	2.5	2.0
101_R	7.2	80.8	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.8	0.5	0.2	0.4
102_R	4.3	62.8	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	9.3	3.5	3.1	0.9	1.0	0.6
103	2.1	80.6	13.6	0.7	0.4	0.3	0.2	0.2	1.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.1	0.0
104	10.5	68.8	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.5	0.8	0.9	1.1
105	3.5	12.1	1.9	0.7	0.7	0.8	0.9	0.6	0.6	0.0	0.0	36.2	0.0	10.6	5.3	8.6	4.3	3.6	2.8
106	0.3	1.1	0.4	0.3	0.4	0.4	0.4	0.2	0.3	0.0	0.0	0.0	0.0	7.1	13.7	21.8	20.8	15.9	10.7
107	1.2	1.3	0.4	0.2	0.3	0.3	0.3	0.2	0.2	0.0	0.0	0.0	9.7	11.3	15.7	17.2	16.2	10.5	6.5
109	10.1	79.4	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.4	0.3	0.1	0.1
110_R	9.3	61.2	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	5.5	4.9	2.6	1.6	1.0
110	1.3	7.6	0.5	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	9.1	19.7	25.5	19.5	8.2	3.4	2.4
202	7.8	7.4	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.0	16.8	8.8	11.8	8.8	6.9	5.3	4.7
203	4.7	5.1	7.8	10.6	7.4	7.2	6.2	3.8	4.0	0.0	0.0	22.9	11.2	0.0	3.4	1.1	0.9	1.0	1.0
204_R	22.8	56.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	6.1	2.3	1.2	1.0	0.3	0.2
205	1.6	2.6	0.6	0.5	0.5	0.5	0.4	0.2	0.3	0.0	0.0	8.1	15.8	16.8	8.9	13.2	8.8	8.1	6.7
303	18.8	29.6	2.0	0.6	0.6	0.6	0.7	0.5	0.8	0.0	0.0	0.0	0.5	3.9	4.4	5.2	3.6	2.7	3.3
401	2.7	9.6	15.1	14.1	10.9	12.6	12.5	8.1	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
402	3.7	9.6	14.0	12.9	10.4	12.2	12.7	8.7	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
403	2.8	6.1	8.3	9.0	7.7	9.2	9.5	6.6	11.4	0.0	0.0	0.0	2.3	15.8	5.0	1.0	1.7	1.1	1.0
404	1.1	4.1	2.8	2.4	2.1	2.4	2.4	1.6	2.6	0.0	0.0	0.0	10.8	44.3	11.1	3.2	3.2	2.1	1.9
404_B	1.7	5.3	4.6	4.5	4.2	5.2	4.9	3.1	4.6	0.0	0.0	0.0	1.4	39.0	9.4	3.5	2.6	2.3	1.6
405	5.4	9.3	12.8	9.9	8.3	9.7	10.7	8.2	15.8	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.1	0.2	0.2
406	5.7	6.3	2.6	1.9	1.8	2.1	2.2	1.7	2.7	0.0	0.0	12.9	9.1	11.6	10.8	8.0	3.2	2.7	2.4
407	18.0	7.5	1.4	1.4	1.3	1.6	1.7	1.2	2.0	0.0	0.0	0.0	0.0	2.7	7.0	4.1	6.6	5.5	4.7
501	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	5.3	14.5	23.4	19.2	13.8	10.8
502	53.6	10.4	0.4	0.2	0.2	0.2	0.1	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2
503	0.6	13.6	12.7	10.9	11.4	14.3	13.8	9.0	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
504	3.6	4.1	3.5	5.9	7.2	8.4	7.3	4.4	6.5	0.0	8.7	0.0	4.9	8.9	6.1	2.9	3.5	3.1	3.2
505	0.7	4.6	9.9	15.5	15.8	18.2	14.5	8.2	11.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2

Table C-4 Raw PSA data (Part 3 of 4)

Sample ID	Percentages of the distribution in each 'half-phi' size interval, expressed in µm (sieving for >2mm fraction, laser diffraction for <2mm fraction)																					
	2000 to 2800	1400 to 2000	1000 to 1400	710 to 1000	500 to 710	355 to 500	250 to 355	180 to 250	125 to 180	90 to 125	63 to 90	44.19 to 63	31.25 to 44.19	22.097 to 31.25	15.625 to 22.097	11.049 to 15.625	7.813 to 11.049	5.524 to 7.813	3.906 to 5.524	2.762 to 3.906	1.953 to 2.762	
101	1.4	2.4	1.7	1.1	0.9	0.8	0.7	1.8	1.5	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
101_R	0.2	0.0	0.0	0.0	0.0	0.0	7.2	40.4	40.4	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102_R	0.6	2.1	1.3	0.4	1.2	0.7	3.6	28.5	34.3	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	2.1	32.4	48.3	13.1	0.5	0.6	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
104	1.2	2.4	2.1	1.6	2.9	1.4	9.2	36.3	32.5	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	1.5	1.8	1.3	1.0	0.9	1.0	2.5	6.3	5.8	1.6	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.4	0.3
106	4.2	1.0	0.6	0.3	0.2	0.1	0.1	0.5	0.6	0.3	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
107	3.5	2.7	1.4	0.5	0.4	0.6	0.6	0.7	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1
109	0.1	0.0	0.0	0.0	1.7	1.7	8.4	40.5	38.9	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110_R	0.4	0.9	0.7	0.5	1.2	0.4	9.0	35.1	26.1	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110	0.8	0.5	0.4	0.2	0.3	0.3	1.0	4.4	3.2	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
202	3.5	4.4	4.3	4.2	4.2	3.7	4.1	5.2	2.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
203	0.5	0.0	0.0	0.0	1.1	2.5	2.1	2.6	2.5	3.0	4.8	5.5	5.0	3.9	3.5	3.7	3.5	3.3	2.9	2.2	1.6	1.6
204_R	0.1	1.2	0.8	0.6	1.3	2.5	20.3	38.5	17.7	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
205	3.1	1.3	0.9	0.6	0.5	0.6	1.0	1.6	1.0	0.4	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
303	3.2	6.1	5.0	3.9	4.0	6.2	12.6	19.2	10.4	1.6	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
401	0.0	0.0	0.0	0.1	1.3	1.4	1.3	3.0	6.6	7.6	7.5	7.3	6.8	5.7	5.2	6.1	6.5	6.5	5.9	4.6	3.4	3.4
402	0.0	0.0	0.0	0.0	1.4	1.8	1.9	3.7	5.9	7.0	7.1	6.6	6.3	5.5	4.9	5.9	6.3	6.5	6.2	4.9	3.7	3.7
403	0.6	0.0	0.0	0.0	0.9	1.5	1.3	2.0	4.1	4.1	4.2	4.5	4.4	4.0	3.7	4.4	4.7	4.9	4.6	3.7	2.9	2.9
404	1.0	0.0	0.0	0.3	0.6	0.5	0.7	2.0	2.2	1.6	1.3	1.2	1.2	1.1	1.0	1.2	1.2	1.2	1.1	0.9	0.7	0.7
404_B	0.9	0.0	0.0	0.4	0.7	0.6	1.0	2.5	2.9	2.4	2.2	2.2	2.3	2.1	2.1	2.5	2.7	2.6	2.3	1.8	1.3	1.3
405	0.1	0.0	1.3	4.0	3.3	2.6	2.9	4.6	4.7	6.0	6.8	5.3	4.7	4.3	4.1	4.9	4.9	5.3	5.4	4.5	3.7	3.7
406	1.4	2.8	3.4	2.7	1.9	2.3	3.4	3.9	2.4	1.4	1.1	1.0	1.0	0.9	0.9	1.1	1.1	1.1	1.1	0.9	0.7	0.7
407	3.4	5.7	6.9	8.1	9.1	9.1	8.9	5.7	1.8	0.8	0.7	0.7	0.7	0.6	0.6	0.7	0.8	0.9	0.8	0.7	0.5	0.5
501	5.9	1.8	0.7	0.2	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
502	0.4	3.6	3.9	6.9	19.2	31.5	22.2	8.4	2.0	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
503	0.1	0.0	0.0	0.0	0.0	0.0	0.6	5.3	8.3	7.3	5.4	5.2	5.6	5.6	5.8	7.0	7.4	7.3	6.5	5.2	3.8	3.8
504	2.5	0.0	0.0	2.1	2.8	2.0	1.6	2.1	2.1	1.6	1.9	2.6	3.3	3.5	3.7	4.2	4.2	3.9	3.4	2.6	1.9	1.9
505	0.5	0.0	0.0	0.0	0.0	0.0	0.7	1.9	2.7	4.4	5.5	7.0	8.4	7.9	8.0	9.2	9.0	8.0	6.5	4.8	3.4	3.4

Table C-5 Raw PSA data (Part 4 of 4)

Sample ID	Percentages of the distribution in each 'half-phi' size interval, expressed in µm (sieving for >2mm fraction, laser diffraction for <2mm fraction)											
	1.381 to 1.953	0.977 to 1.381	0.691 to 0.977	0.488 to 0.691	0.345 to 0.488	0.244 to 0.345	0.173 to 0.244	0.122 to 0.173	0.086 to 0.122	0.061 to 0.086	0.043 to 0.061	0.01 to 0.043
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101_R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102_R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
106	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
109	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110_R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
202	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
203	1.1	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.0	0.0
204_R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
205	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
303	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
401	2.7	2.2	1.7	1.5	1.4	1.2	1.0	0.7	0.5	0.2	0.0	0.0
402	2.9	2.3	1.9	1.7	1.6	1.4	1.1	0.8	0.5	0.2	0.0	0.0
403	2.3	1.9	1.5	1.3	1.3	1.1	0.9	0.6	0.4	0.1	0.0	0.0
404	0.6	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0
404_B	1.0	0.7	0.6	0.5	0.5	0.4	0.3	0.3	0.2	0.1	0.0	0.0
405	3.2	2.7	2.1	1.8	1.7	1.5	1.2	0.8	0.5	0.2	0.0	0.0
406	0.6	0.5	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0
407	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0
501	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
502	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
503	2.9	2.2	1.8	1.6	1.5	1.3	1.0	0.7	0.5	0.2	0.0	0.0
504	1.4	1.1	0.9	0.7	0.7	0.6	0.5	0.4	0.2	0.1	0.0	0.0
505	2.5	1.9	1.5	1.4	1.3	1.1	0.9	0.7	0.4	0.2	0.0	0.0

Annex D Raw macrobiota data

The table below shows the species abundance data for each grab station from the subtidal grab sampling.

Table D-1 Macrobiota abundances per stations

Code	Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
-	Animalia	eggs	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-
A5025	Ciliophora		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-
A5050	Folliculinidae		-	-	-	-	-	-	-	-	-	-	-	-	-	P	P	P	-	P	-	-	-	-	-	-
C0001	Porifera		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	P	-
C0475	Cliona		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-
D0271	Hydractiniidae		-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-
D0343	<i>Phialella quadrata</i>	?	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-
D0424	<i>Hydrallmania falcata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	P	-	-	-
D0491	Campanulariidae		-	-	-	-	-	-	P	P	-	-	-	-	-	-	P	P	-	P	P	-	-	-	-	P
D0503	<i>Clytia hemisphaerica</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-
D0632	<i>Cerianthus lloydii</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
D0662	Actiniaria		-	1	-	-	2	-	-	1	-	-	4	-	-	-	3	1	-	5	-	-	-	-	-	-
D0759	Edwardsiidae		-	-	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
F0001	Fecampiidae	eggs	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-
F0120	Dalyelliidae		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G0001	Nemertea		-	-	-	-	-	-	-	-	-	-	3	-	-	26	1	1	-	1	-	1	-	1	4	-
G0039	Cerebratulus		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HD0001	Nematoda		-	-	-	1	-	-	-	-	-	-	1	1	-	-	1	-	-	1	-	-	-	52	17	92
K0040	<i>Loxosomella varians</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-
O0018	<i>Maxmuelleria lankesteri</i>		-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
P0025	Polynoidae		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
P0050	<i>Malmgrenia darbouxii</i>		-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
P0065	<i>Harmothoe impar</i>	aggregate	-	-	-	-	2	-	-	-	-	-	-	-	-	-	6	1	-	-	-	-	-	1	-	-
P0067	<i>Malmgrenia arenicolae</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-
P0082	<i>Lepidonotus squamatus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-
P0092	<i>Pholoe baltica</i> (sensu Petersen)		-	-	-	-	-	-	-	-	1	-	-	-	1	1	1	1	-	2	-	-	-	-	-	-
P0094	<i>Pholoe inornata</i> (sensu Petersen)		-	-	-	-	-	-	6	1	1	-	10	1	3	72	29	20	-	35	9	-	-	4	13	-
P0107	<i>Sthenelais boa</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	1	-	-	-	-	-	-

Hampshire Water Transfer and Water Recycling Project
Environmental Statement – Appendix 9.6 Subtidal grab sampling report

Code	Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
P0118	<i>Eteone longa</i>	aggregate	1	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	3	-	-	-	-	1	-
P0167	<i>Eumida sanguinea</i>	aggregate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
P0176	<i>Paranaitis kosteriensis</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
P0255	<i>Glycera fallax</i>		-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
P0260	<i>Glycera lapidum</i>	aggregate	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0265	<i>Glycera tridactyla</i>		-	-	-	1	7	-	7	3	1	-	-	-	-	-	-	-	-	5	9	-	-	-	-	-
P0288	<i>Sphaerodoridium cf. minutum</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
P0303	<i>Hesiospina aurantiaca</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
P0321	<i>Syllidia armata</i>		-	-	-	-	-	-	-	-	-	1	-	-	-	-	16	3	-	1	-	-	-	1	5	-
P0358	<i>Syllis garciai</i>		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0360	<i>Syllis gracilis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-
P0405	<i>Streptosyllis websteri</i>		-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0406	Syllides		-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
P0421	<i>Parexogone hebes</i>		-	-	-	-	-	-	6	-	-	2	1	4	-	-	-	-	-	1	2	-	-	-	-	-
P0422	<i>Exogone naidina</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	105	-
P0422	<i>Exogone naidina</i>	epitoke	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	1	
P0426	<i>Erinaceusyllis erinaceus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
P0430	<i>Sphaerosyllis cf. taylora</i>		-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	43	2
P0430	<i>Sphaerosyllis cf. taylora</i>	epitoke	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	
P0434	Myrianida		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
P0475	<i>Eunereis longissima</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	-	-	-	1	-
P0484	<i>Platynereis dumerilii</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	5	13	1
P0494	Nephtys	juvenile	-	1	-	-	-	-	-	-	1	-	-	-	-	-	1	7	2	1	-	-	-	-	-	-
P0498	<i>Nephtys cirrosa</i>		2	-	1	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
P0499	<i>Nephtys hombergii</i>		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	3	10
P0502	<i>Nephtys kersivalensis</i>		-	-	-	-	-	-	-	-	-	-	-	-	2	4	19	12	1	3	1	-	-	-	1	-
P0566	<i>Marphysa sanguinea</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
P0568	<i>Lysidice unicornis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
P0574	<i>Lumbrineris cingulata</i>	aggregate	-	-	-	-	-	-	-	1	-	-	-	-	2	10	-	-	-	2	1	-	-	-	-	-
P0576	<i>Lumbrineris coccinea</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
P0582	<i>Lumbrineris latreilli</i>		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0613	Ophryotrocha		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-
P0632	Parougia		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
P0638	<i>Protodorvillea kefersteini</i>		-	-	-	2	1	-	1	-	-	1	2	-	5	-	-	-	-	-	3	-	-	-	-	-

Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
P0672	<i>Scoloplos armiger</i>		1	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0677	<i>Aricidea minuta</i>		-	5	1	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-
P0691	<i>Cirrophorus furcatus</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-
P0718	<i>Poecilochaetus serpens</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
P0722	<i>Aonides oxycephala</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
P0723	<i>Aonides paucibranchiata</i>		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0748	Dipolydora species B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
P0751	<i>Dipolydora caulleryi</i>	aggregate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6	-	-	-	-	-	-	-	-
P0754	<i>Dipolydora flava</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
P0774	<i>Pseudopolydora pulchra</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-
P0790	<i>Spio symphyta</i>		-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
P0791	<i>Spio martinensis</i>		9	24	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0794	<i>Spiophanes bombyx</i>		1	5	5	-	-	-	15	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0798	Streblospio		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	7
P0805	<i>Magelona filiformis</i>		2	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0806	<i>Magelona minuta</i>		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0807	<i>Magelona johnstoni</i>		8	9	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0822	Protocirrinieris		-	-	-	-	-	-	-	-	-	-	-	-	33	4	-	-	-	-	-	-	-	-	15	-
P0823	Aphelochaeta species A		-	-	-	-	-	-	-	-	-	-	-	-	1	52	-	-	-	2	-	-	-	-	1	-
P0824	<i>Aphelochaeta marioni</i> (sensu MarLIN)		-	-	-	-	-	-	-	-	-	1	5	-	37	63	14	-	-	7	3	-	-	-	406	1
P0829	<i>Caulleriella alata</i>		1	-	-	-	2	-	1	3	-	2	13	-	1	2	3	2	-	7	30	-	-	-	6	-
P0830	<i>Caulleriella bioculata</i>		-	-	-	-	4	-	5	-	-	-	14	-	-	-	2	1	-	1	9	-	-	-	-	-
P0831	<i>Chaetozone zetlandica</i>		-	-	-	-	-	-	-	1	-	-	-	-	2	6	-	2	-	1	9	-	-	-	-	-
P0833	<i>Chaetozone gibber</i>		-	-	-	-	-	-	-	6	-	-	29	-	32	48	3	-	14	33	12	-	-	-	74	1
P0834	<i>Chaetozone christiei</i>		1	3	2	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0834	<i>Chaetozone setosa</i>	aggregate	-	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
P0836	<i>Cirratulus cirratus</i>		-	-	-	-	-	-	-	-	-	-	-	2	-	77	-	-	-	-	-	-	-	-	-	-
P0838	Cirriformia	juvenile	-	-	-	-	-	-	-	1	-	-	-	-	10	3	18	15	-	1	1	-	-	-	5	-
P0839	<i>Cirriformia tentaculata</i>		-	-	-	-	-	-	-	-	-	-	8	-	-	1	7	-	-	-	-	-	-	1	-	-
P0843	Kirkegaardia		-	-	-	1	-	-	-	-	-	-	-	2	-	-	1	2	-	1	-	-	-	-	-	-
P0847	Tharyx species A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	215	2
P0863	<i>Psammodrillus balanoglossoides</i>		-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0871	<i>Cossura pygodactylata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	16	2

Hampshire Water Transfer and Water Recycling Project
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Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
P0906	Capitella		-	-	-	-	-	-	-	-	1	-	1	-	-	1	1	-	-	-	-	-	-	-	4	-
P0919	<i>Mediomastus fragilis</i>		-	-	-	-	2	-	-	-	-	1	5	21	4	137	46	10	-	9	2	-	-	-	11	-
P0923	Notomastus		-	-	-	1	3	-	1	-	4	3	3	1	10	8	3	2	2	9	13	-	1	-	-	-
P0955	Leiochone		11	1	3	2	-	1	5	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P0964	<i>Euclymene oerstedii</i>	aggregate	-	-	-	-	-	-	12	-	-	-	4	-	13	19	-	-	4	4	3	-	-	-	-	-
P0971	<i>Praxillella affinis</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	6	-	-	-	-	5	-	-	-	-	-
P1007	<i>Travisia forbesii</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
P1026	<i>Scalibregma celticum</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	-	-	-	1	-
P1093	<i>Galathowenia oculata</i>		-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	2	7	-	-	-	-	-	-
P1117	<i>Sabellaria spinulosa</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	8	17	-	1	2	-	-	-	-	-	-
P1124	<i>Melinna palmata</i>		-	-	-	-	1	-	-	1	-	-	1	5	7	20	1	16	5	20	29	-	-	2	33	3
P1134	<i>Ampharete baltica</i>		-	-	-	-	-	-	-	3	-	-	-	-	-	-	1	-	-	-	2	-	-	-	2	-
P1139	<i>Ampharete lindstroemi</i>		-	-	-	-	4	-	-	-	-	-	3	-	2	-	3	12	1	-	-	-	-	-	-	-
P1143	<i>Amphicteis midas</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	7	14	-	4	-	-	-	-	-	-	-
P1174	Terebellides		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-	-	-	-
P1195	<i>Lanice conchilega</i>		-	-	-	-	-	-	8	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-
P1204	<i>Amphitrite edwardsii</i> (sensu Jirkov)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-
P1215	<i>Phisidia aurea</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
P1235	Polycirrus		5	2	2	-	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-
P1257	Amphicorina		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
P1257	<i>Desdemonia ornata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
P1262	Branchiomma		-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1264	Dialychone		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
P1271	Parasabella		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
P1277	<i>Euchone limnicola</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-
P1287	Jasmineira		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	11	-	1	-	-	-	-	-	-
P1315	Pseudopotamilla		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-
P1320	<i>Sabella pavonina</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	3	-	11
P1324	Serpulidae		-	-	-	1	-	-	1	-	-	3	-	-	12	31	1	6	-	5	-	-	2	-	1	-
P1340	<i>Spirobranchus lamarcki</i>		-	-	-	-	2	-	3	-	-	-	11	-	48	77	19	29	-	7	12	3	3	-	5	-
P1362	Spirorbinae		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	P	-	-
P1402	Oligochaeta	eggs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-
P1479	<i>Baltidrilus costatus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-

	Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
P1489	<i>Tubificoides amplivasatus</i>		-	-	-	-	-	-	-	-	-	-	9	-	2	-	231	2	-	-	1	-	1	-	10	2
P1490	<i>Tubificoides benedii</i>		-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	869	3	1
P1494	<i>Tubificoides diazi</i>	aggregate	-	-	-	-	-	-	7	2	-	-	8	-	-	14	-	-	-	-	-	-	-	-	13	6
P1500	<i>Tubificoides swirencoides</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	9	-
Q0005	<i>Nymphon brevirostre</i>		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q0015	<i>Achelia echinata</i>	aggregate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	1	4	-
Q0032	Callipallene		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
R0015	Sessilia	juvenile	-	-	-	-	-	-	-	-	16	1	-	-	-	-	-	-	-	4	-	-	-	-	-	-
R0142	Copepoda		3	2	4	-	-	-	10	-	-	-	1	-	-	-	5	1	1	1	1	-	-	-	5	-
R0678	Notodelphyidae		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
R2413	Myodocopida		-	-	-	-	-	-	-	-	-	-	-	2	-	8	1	1	-	-	-	-	-	-	-	-
R2432	<i>Eusarsiella zostericola</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
S0131	<i>Perioculodes longimanus</i>		-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
S0132	<i>Pontocrates moorei</i>		-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0138	<i>Synchelidium maculatum</i>		-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0158	<i>Amphilocheus manudens</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
S0176	<i>Leucothoe articulosa</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
S0213	<i>Stenothoe marina</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
S0214	<i>Stenothoe monoculoides</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
S0247	<i>Urothoe brevicornis</i>		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
S0250	<i>Urothoe poseidonis</i>		-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0257	<i>Harpinia pectinata</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
S0262	<i>Metaphoxus simplex</i>		-	-	-	-	-	-	-	-	-	-	-	2	3	28	1	8	-	-	-	-	-	-	-	-
S0330	<i>Socarnes erythrophthalmus</i>		-	-	-	18	24	-	1	2	1	33	-	-	-	-	-	-	-	-	-	92	-	-	-	1
S0380	<i>Iphimedia minuta</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
S0396	<i>Liljeborgia kinahani</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	-	-	-	-
S0411	<i>Nototropis guttatus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
S0412	<i>Nototropis swammerdamei</i>		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0416	<i>Dexamine thea</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	-
S0423	<i>Ampelisca</i>	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-
S0427	<i>Ampelisca brevicornis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
S0429	<i>Ampelisca diadema</i>		-	-	-	-	-	-	-	-	-	-	-	3	2	11	14	26	-	1	-	-	-	-	-	-
S0440	<i>Ampelisca tenuicornis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-
S0442	<i>Ampelisca typica</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-

Hampshire Water Transfer and Water Recycling Project
Environmental Statement – Appendix 9.6 Subtidal grab sampling report

	Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
S0452	<i>Bathyporeia elegans</i>		54	14	10	-	-	11	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0454	<i>Bathyporeia guilliamsoniana</i>		1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0455	<i>Bathyporeia nana</i>		-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0458	<i>Bathyporeia sarsi</i>		18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0464	Gammaridae	juvenile	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0478	<i>Gammarus locusta</i>		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0497	<i>Abludomelita obtusata</i>		-	-	-	8	6	-	-	-	-	6	-	-	-	-	-	-	-	1	-	131	-	-	-	-
S0502	<i>Animoceradocus semiserratus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-
S0503	Cheirocratus	female	-	-	-	3	4	-	-	-	-	1	-	-	-	-	-	-	-	-	-	318	-	-	-	1
S0503	<i>Cheirocratus pseudosundevallii</i>		-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0506	<i>Cheirocratus sundevallii</i>		-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S0516	<i>Maera grossimana</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	6	-
S0539	<i>Megamphopus cornutus</i>		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	33	-	-	-	-
S0550	<i>Microprotopus maculatus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
S0577	Aoridae	female	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	30	1
S0588	<i>Leptocheirus hirsutimanus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
S0589	<i>Leptocheirus pectinatus</i>		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	208	-	-	-	-
S0591	<i>Leptocheirus tricristatus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-
S0593	<i>Microdeutopus anomalus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	-
S0606	<i>Monocorophium acherusicum</i>		-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	2	-	1	-	5	3	1	-
S0607	<i>Apocorophium acutum</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
S0621	<i>Unciola crenatipalma</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
S0640	Caprella	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
S0657	Phtisica marina		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
S0792	Gnathiidae	female	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
S0792	Gnathiidae	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
S0901	Munna		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
S1114	<i>Chondrochelia savignyi</i>		-	-	-	-	-	-	-	-	-	-	-	-	12	-	1	-	1	-	-	-	-	-	-	-
S1142	<i>Tanaopsis graciloides</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	14	-	-	-	-	1	-	-	-	-	-
S1208	<i>Eudorella truncatula</i>		-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
S1224	<i>Cumella pygmaea</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
S1236	<i>Pseudocuma longicorne</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	-	-	-	-	-
S1276	Decapoda	megalopa	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
S1333	<i>Athanas nitescens</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-

Hampshire Water Transfer and Water Recycling Project
 Environmental Statement – Appendix 9.6 Subtidal grab sampling report

Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5	
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
S1360	<i>Eualus cranchii</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-
S1366	<i>Processa modica</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
S1388	<i>Philocheras fasciatus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
S1419	<i>Upogebia deltaura</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
S1445	Paguridae	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-
S1448	<i>Anapagurus hyndmanni</i>		-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
S1460	<i>Pagurus cuanensis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	-
S1482	<i>Pisidia longicornis</i>		1	-	-	-	1	-	-	-	-	1	-	-	1	6	107	13	-	2	-	-	-	-	3	-
S1526	<i>Inachus dorsettensis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
S1594	<i>Carcinus maenas</i>	juvenile	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-
S1614	Pilumnus		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
S1614	Pilumnus	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-
S1615	<i>Pilumnus hirtellus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
S1615	<i>Pilumnus hirtellus</i>	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
W0075	<i>Callochiton septemvalvis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
W0079	<i>Lepidochitona cinerea</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	6	-
W0086	<i>Acanthochitona crinita</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
W0161	<i>Steromphala tumida</i>		-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0163	<i>Steromphala cineraria</i>		-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	1	-	-	-	-	2	-
W0204	<i>Dikoleps nitens</i>		-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	218	-	-	-	-
W0224	<i>Tectura virginea</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	2	-	-	-	-	-	-
W0334	<i>Rissoa parva</i>		-	-	-	5	1	-	18	1	-	-	-	-	-	-	4	-	-	38	-	-	-	-	-	-
W0371	<i>Onoba semicostata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
W0385	<i>Peringia ulvae</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3	-	
W0439	<i>Crepidula fornicata</i>		-	-	-	-	-	-	1	-	-	3	-	-	12	27	-	-	-	-	-	1	-	109	-	
W0439	<i>Crepidula fornicata</i>	eggs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	
W0439	<i>Crepidula fornicata</i>	juvenile	-	-	-	-	-	-	-	-	-	1	-	-	8	82	1	-	-	2	3	-	-	-	168	-
W0708	<i>Buccinum undatum</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
W0708	<i>Buccinum undatum</i>	juvenile	-	-	-	-	2	-	-	-	-	-	-	1	-	-	1	-	-	1	1	-	-	-	-	-
W0743	Tritia	eggs	-	-	-	-	-	-	-	-	-	-	-	-	-	P	P	P	-	P	-	-	-	-	-	-
W0745	<i>Tritia reticulata</i>		-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-
W0747	<i>Tritia incrassata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
W0915	<i>Odostomia turrita</i>		-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
W0965	<i>Spiralinella spiralis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-

Hampshire Water Transfer and Water Recycling Project
Environmental Statement – Appendix 9.6 Subtidal grab sampling report

Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
W0967	<i>Tragula fenestrata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
W1569	<i>Nucula nitidosa</i>		1	7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	9	-	-	-	-	-	-	-
W1570	<i>Nucula nucleus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	1	-	1	-	-	-	-	-	-
W1779	<i>Mimachlamys varia</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
W1779	<i>Mimachlamys varia</i>	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
W1829	<i>Lucinoma borealis</i>	juvenile	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	7	-	-	-	-	-
W1837	<i>Thyasira flexuosa</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
W1949	<i>Parvicardium exiguum</i>		-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	2	-	-	-	-	-	-	-
W1952	<i>Parvicardium scabrum</i>		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
W1961	<i>Cerastoderma edule</i>	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
W1994	<i>Solen marginatus</i>	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
W1997	<i>Ensis leei</i>		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-
W2059	<i>Abra alba</i>		-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	2	-	1	-	-	-	-	-	-
W2061	<i>Abra nitida</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	1	-
W2124	<i>Venerupis corrugata</i>		-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	3	-	1	3	-	-	-	-	-
W2124	<i>Venerupis corrugata</i>	juvenile	-	-	-	-	-	-	-	-	-	-	1	-	-	2	-	1	-	-	5	-	-	-	-	-
W2157	<i>Varicorbula gibba</i>		-	-	-	1	-	-	-	-	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-	-
W2157	<i>Varicorbula gibba</i>	dead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-
W2172	<i>Saxicavella jeffreysi</i>		-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	2	-	-	-	-	-	-	-
W2183	<i>Barnea parva</i>		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-
W2313	<i>Rossia macrosoma</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Y0027	Tubulipora		-	-	-	-	-	-	-	-	-	-	-	P	-	P	P	-	-	-	-	-	-	-	-	-
Y0080	<i>Alcyonidioides mytili</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-
Y0119	<i>Triticella flava</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-
Y0131	<i>Vesicularia spinosa</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-
Y0135	<i>Amathia lendigera</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	P	-	-
Y0137	Amathia		-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-
Y0172	<i>Conopeum reticulum</i>		-	-	-	-	P	-	-	-	-	-	P	-	-	-	P	-	-	P	-	-	-	-	P	-
Y0178	<i>Electra pilosa</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-
Y0187	<i>Flustra foliacea</i>		-	-	-	-	-	-	-	-	-	-	-	-	P	P	-	-	-	-	-	-	-	-	-	-
Y0264	<i>Epistomia bursaria</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-
Y0337	<i>Celleporella hyalina</i>		-	-	-	-	-	-	P	-	-	-	-	P	-	-	-	-	-	P	-	-	-	-	-	-
Y0364	<i>Escharella immersa</i>		-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-
Y0410	<i>Cryptosula pallasiana</i>		-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	P	-	P	-

Hampshire Water Transfer and Water Recycling Project
 Environmental Statement – Appendix 9.6 Subtidal grab sampling report

Station	A1	A1	A1	A1	A1	A1	A2	A2	A2	A2	A3	A4	A4	A4	A4	A4	A4	A4	A4	A4	A5	A5	A5	A5	A5	A5
Code	Taxa ID	Notes	101R	103	104	106	107	110R	202	203	204R	205	303	401	402	403	404	404B	405	406	407	501	502	503	504	505
Y0467	Schizomavella		-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-
Y0495	<i>Cellepora pumicosa</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-
ZB0148	Amphiuridae	juvenile	-	-	-	-	-	-	1	-	-	2	-	-	-	1	-	-	-	2	-	-	-	2	-	-
ZB0161	<i>Amphipholis squamata</i>		-	-	-	-	-	-	-	-	-	2	-	1	-	-	4	2	-	-	-	14	-	-	5	-
ZB0165	Ophiuridae	juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	4	-
ZB0276	Ocnus planci		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	64	-
ZB0296	<i>Leptosynapta inhaerens</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
ZD0002	Ascidiacea	juvenile	-	-	-	3	2	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-
ZD0041	Didemnidae		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-
ZD0071	<i>Ciona intestinalis</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
ZD0084	<i>Asciella aspersa</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	6	-
ZD0120	<i>Dendrodoa grossularia</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	417	651	380	-	2	-	-	-	-	8	-
ZG0001	Actinopterygii	eggs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
ZM0002	Rhodophyta		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	P	-
ZM0319	<i>Calliblepharis ciliata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-
ZM0345	<i>Chondrus crispus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P
ZM0431	Gracilaria		-	-	-	-	P	-	-	-	-	P	P	-	-	-	P	-	-	P	P	-	-	P	P	P
ZM0456	<i>Lomentaria clavellosa</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-
ZM0471	Aglaothamnion	?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-
ZM0507	Ceramium		-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	P	P
ZM0539	<i>Halurus flosculosus</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-
ZM0566	Spermothamnion	?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-
ZM0610	<i>Hypoglossum hypoglossoides</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-
ZM0612	<i>Membranoptera alata</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-
ZM0628	<i>Vertebrata byssoides</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-	-
ZM0631	<i>Chondria coerulescens</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	P	-	-	-	-	P
ZM0655	Polysiphonia		-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	P	P	-	-	-	P	P
ZR0004	Ectocarpaceae		-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-
ZR0288	Sphacelaria		-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZS0179	<i>Ulva lactuca</i>		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P
ZS0189	Chaetomorpha		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-

Annex E Notable Taxa recorded in samples

Taxa which are notable in some way e.g. non-native or commercially important, are listed below.

Table E-1 Notable taxa

Code	Taxa ID	Qualifiers	Notes
O0018	<i>Maxmuelleria lankesteri</i>		Represents priority habitat
P0358	<i>Syllis garciai</i>		Not formally recorded from UK
P0406	<i>Syllides</i>		May include non-native species
P0430	<i>Sphaerosyllis cf. taylori</i>		Possible undescribed species
P0430	<i>Sphaerosyllis cf. taylori</i>	epitoke	Possible undescribed species
P0576	<i>Lumbrineris coccinea</i>		Not formally recorded from UK
P0613	<i>Ophryotrocha</i>		May include non-native species
P0632	<i>Parougia</i>		May include undescribed species
P0748	<i>Dipolydora</i> species B		Possible undescribed species
P0751	<i>Dipolydora caulleryi</i>	aggregate	May include undescribed species
P0790	<i>Spio symphyta</i>		Not formally recorded from UK
P0798	<i>Streblospio</i>		May include non-native species
P0822	<i>Protocirrinis</i>		May include non-native species May include undescribed species
P0823	<i>Aphelochaeta species A</i>		Possible undescribed species
P0824	<i>Aphelochaeta marioni</i> (sensu MarLIN)		Cryptogenic Taxonomy yet to be resolved
P0834	<i>Chaetozone christiei</i>		May include undescribed species
P0834	<i>Chaetozone setosa</i>	aggregate	May include undescribed species
P0843	<i>Kirkegaardia</i>		May include undescribed species
P0847	<i>Tharyx</i> species A		Cryptogenic Possible undescribed species
P0871	<i>Cossura pygodactylata</i>		Cryptogenic Representative of organic enrichment
P0906	<i>Capitella</i>		Representative of organic enrichment
P0964	<i>Euclymene oerstedii</i>	aggregate	May include undescribed species
P1117	<i>Sabellaria spinulosa</i>		Represents priority habitat, if reef-forming
P1257	<i>Desdemona ornata</i>		Non-native in the UK

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Code	Taxa ID	Qualifiers	Notes
P1264	<i>Dialychone</i>		May include undescribed species
P1277	<i>Euchone limnicola</i>		Non-native in the UK
P1315	<i>Pseudopotamilla</i>		May include undescribed species
R0015	<i>Sessilia</i>	juvenile	May include non-native species
R2432	<i>Eusarsiella zostericola</i>		Non-native in the UK
S0176	<i>Leucothoe articulosa</i>		Previously recorded as <i>Leucothoe spinicarpa</i>
S0464	<i>Gammaridae</i>	juvenile	May include non-native species
S0577	<i>Aoridae</i>	female	May include non-native species
S0606	<i>Monocorophium acherusicum</i>		Cryptogenic
S0607	<i>Apocorophium acutum</i>		Cryptogenic
S0640	<i>Caprella</i>	juvenile	May include non-native species
S1333	<i>Athanas nitescens</i>		Southern species in UK
W0439	<i>Crepidula fornicata</i>		Non-native in the UK
W0439	<i>Crepidula fornicata</i>	eggs	Non-native in the UK
W0439	<i>Crepidula fornicata</i>	juvenile	Non-native in the UK
W0708	<i>Buccinum undatum</i>		Commercially important
W0708	<i>Buccinum undatum</i>	juvenile	Commercially important
W1779	<i>Mimachlamys varia</i>		Northern Ireland Biodiversity List
W1779	<i>Mimachlamys varia</i>	juvenile	Northern Ireland Biodiversity List
W1961	<i>Cerastoderma edule</i>	juvenile	Commercially important
W1997	<i>Ensis leei</i>		Non-native in the UK Commercially important
Y0137	<i>Amathia</i>		May include non-native species
Y0264	<i>Epistomia bursaria</i>		Nationally rare
ZB0276	<i>Ocnus planci</i>		Northern Ireland Biodiversity List
ZD0002	<i>Asciacea</i>	juvenile	May include non-native species
ZD0041	<i>Didemnidae</i>		May include non-native species
ZD0084	<i>Asciella aspersa</i>		Cryptogenic
ZM0431	<i>Gracilaria</i>		May include non-native species
ZM0631	<i>Chondria coerulescens</i>		Southern species in UK

Annex F SIMPER analysis results

Outputs from the PRIMER-E statistical analysis software for the SIMPER analysis conducted on the species abundance data.

Table F-1 SIMPER analysis outputs

SIMPER
Similarity Percentages - species contributions
One-Way Analysis
Data worksheet
Name: 4thRt_Abundance
Data type: Abundance
Sample selection: All
Variable selection: All
Parameters
Resemblance: S17 Bray Curtis similarity

Sample	SIMPROF																																																
A1_101_R	c																																																
A1_103	c																																																
A1_104	c																																																
A1_106	k																																																
A1_107	k																																																
A2_202	k																																																
A2_203	k																																																
A2_205	k																																																
A1_110_R	a																																																
A2_204_R	b																																																
A3_303	h																																																
A4_406	h																																																
A4_407	h																																																
A4_401	f																																																
A4_405	f																																																
A4_402	j																																																
A4_403	j																																																
A4_404	i																																																
A4_404_B	i																																																
A5_501	d																																																
A5_502	e																																																
A5_503	g																																																
A5_504	g																																																
A5_505	g																																																
Group a	Less than 2 samples in group																																																
Group b	Less than 2 samples in group																																																
Group c	Average similarity: 60.75																																																
<table border="1"> <thead> <tr> <th>Species</th> <th>Av.Abund</th> <th>Av.Sim</th> <th>Sim/SD</th> <th>Contrib%</th> <th>Cum.%</th> </tr> </thead> <tbody> <tr> <td><i>Bathyporeia elegans</i></td> <td>2.14</td> <td>8.75</td> <td>16.04</td> <td>14.41</td> <td>14.41</td> </tr> <tr> <td><i>Spio martinensis</i></td> <td>1.65</td> <td>5.91</td> <td>3.25</td> <td>9.73</td> <td>24.14</td> </tr> <tr> <td><i>Copepoda</i></td> <td>1.31</td> <td>5.89</td> <td>16.52</td> <td>9.69</td> <td>33.83</td> </tr> <tr> <td><i>Magelona johnstoni</i></td> <td>1.47</td> <td>5.84</td> <td>3.46</td> <td>9.61</td> <td>43.44</td> </tr> <tr> <td><i>Polycirrus</i></td> <td>1.29</td> <td>5.69</td> <td>14.33</td> <td>9.37</td> <td>52.81</td> </tr> <tr> <td><i>Spiophanes bombyx</i></td> <td>1.33</td> <td>5.64</td> <td>3.11</td> <td>9.29</td> <td>62.1</td> </tr> <tr> <td><i>Leiochone</i></td> <td>1.38</td> <td>5.27</td> <td>7.38</td> <td>8.68</td> <td>70.78</td> </tr> </tbody> </table>		Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%	<i>Bathyporeia elegans</i>	2.14	8.75	16.04	14.41	14.41	<i>Spio martinensis</i>	1.65	5.91	3.25	9.73	24.14	<i>Copepoda</i>	1.31	5.89	16.52	9.69	33.83	<i>Magelona johnstoni</i>	1.47	5.84	3.46	9.61	43.44	<i>Polycirrus</i>	1.29	5.69	14.33	9.37	52.81	<i>Spiophanes bombyx</i>	1.33	5.64	3.11	9.29	62.1	<i>Leiochone</i>	1.38	5.27	7.38	8.68	70.78
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Group g	Average similarity: 30.20																																																

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Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Nematoda</i>	2.6	4.11	1.39	13.59	13.59
<i>Melinna palmata</i>	1.63	2.1	1.97	6.95	20.54
<i>Sphaerosyllis cf. taylori</i>	1.66	2.05	1.85	6.78	27.32
<i>Platynereis dumerilii</i>	1.46	1.91	2.37	6.33	33.65
<i>Nephtys hombergii</i>	1.36	1.85	2.18	6.12	39.78
<i>Tubificoides benedii</i>	2.58	1.84	2.2	6.1	45.88
<i>Monocorophium acherusicum</i>	1.27	1.84	2.2	6.1	51.99
<i>Aoridae female</i>	1.51	1.79	2.06	5.94	57.93
<i>Gracilaria</i>	1	1.72	1.85	5.7	63.63
<i>Sabella pavonina</i>	1.05	1.23	0.58	4.06	67.69
<i>Streblospio</i>	1.12	0.66	0.58	2.17	69.86
<i>Tubificoides diazi</i> aggregate	1.15	0.63	0.58	2.09	71.96
Group h			Average similarity: 40.02		
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Chaetozone gibber</i>	2.19	2.85	5.79	6.78	6.78
<i>Pholoe inornata</i> (sensu Petersen)	1.98	2.48	6.83	5.89	12.67
<i>Caulleriella alata</i>	1.96	2.45	4.13	5.84	18.51
<i>Spirobranchus lamarcki</i>	1.77	2.41	4.62	5.74	24.25
<i>Notomastus</i>	1.65	2.04	10.5	4.84	29.09
<i>Aphelochaeta marioni</i> (sensu MarLIN)	1.48	1.95	6.68	4.63	33.73
<i>Euclymene oerstedii</i> aggregate	1.38	1.91	6.9	4.55	38.27
<i>Melinna palmata</i>	1.81	1.87	2.92	4.46	42.73
<i>Mediomastus fragilis</i>	1.47	1.83	5.7	4.34	47.08
<i>Caulleriella bioculata</i>	1.56	1.82	2.03	4.33	51.4
<i>Gracilaria</i>	1	1.42	6.69	3.37	54.78
<i>Parexogone hebes</i>	1.06	1.42	6.69	3.37	58.15
<i>Copepoda</i>	1	1.42	6.69	3.37	61.52
<i>Venerupis corrugata</i>	1.23	1.42	6.69	3.37	64.89
<i>Protodorvillea kefersteini</i>	0.84	0.65	0.58	1.55	66.45
<i>Actiniaria</i>	0.97	0.65	0.58	1.55	67.99
<i>Glycera tridactyla</i>	1.08	0.61	0.58	1.46	69.45
<i>Nematoda</i>	0.67	0.55	0.58	1.31	70.75
Group i			Average similarity: 56.66		

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Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Dendrodoa grossularia</i>	4.73	4.69	0.45	8.27	8.27
<i>Pholoe inornata</i> (sensu Petersen)	2.22	2.25	0.15	3.96	12.24
<i>Spirobranchus lamarcki</i>	2.2	2.22	0.16	3.91	16.15
<i>Cirriformia</i> juvenile	2.01	2.09	0.06	3.69	19.84
<i>Ampelisca diadema</i>	2.1	2.05	0.23	3.63	23.46
<i>Pisidia longicornis</i>	2.56	2.02	0.93	3.56	27.02
<i>Nephtys kersivalensis</i>	1.97	1.98	0.16	3.49	30.51
<i>Mediomastus fragilis</i>	2.19	1.89	0.58	3.33	33.84
<i>Sabellaria spinulosa</i>	1.86	1.79	0.25	3.15	36.99
<i>Amphicteis midas</i>	1.78	1.73	0.22	3.05	40.04
<i>Dipolydora caulleryi</i> aggregate	1.49	1.5	0.11	2.65	42.69
<i>Syllidia armata</i>	1.66	1.4	0.48	2.47	45.16
<i>Ampharete lindstroemi</i>	1.59	1.4	0.39	2.47	47.63
<i>Caulleriella alata</i>	1.25	1.26	0.09	2.23	49.85
<i>Notomastus</i>	1.25	1.26	0.09	2.23	52.08
<i>Tubificoides amplivasatus</i>	2.54	1.26	1.92	2.23	54.31
Gnathiidae female	1.19	1.26	0	2.23	56.54
<i>Amphipholis squamata</i>	1.3	1.26	0.16	2.23	58.77
Folliculinidae	1	1.06	0	1.87	60.64
Campanulariidae	1	1.06	0	1.87	62.52
<i>Tritia</i> eggs	1	1.06	0	1.87	64.39
<i>Actinaria</i>	1.16	1.06	0.22	1.87	66.27
Nemertea	1	1.06	0	1.87	68.14
<i>Harmothoe impar</i> aggregate	1.28	1.06	0.4	1.87	70.01

Group j Average similarity: 54.45

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Spirobranchus lamarcki</i>	2.8	3.64	0.23	6.68	6.68
<i>Aphelochaeta marioni</i> (sensu MarLIN)	2.64	3.41	0.25	6.26	12.95
<i>Chaetozone gibber</i>	2.51	3.29	0.18	6.04	18.99
<i>Crepidula fornicata</i>	2.67	2.92	0.79	5.37	24.35
<i>Euclymene oerstedii</i> aggregate	1.99	2.63	0.13	4.82	29.18
Serpulidae	2.11	2.57	0.35	4.73	33.9
<i>Notomastus</i>	1.73	2.33	0.07	4.27	38.17
<i>Melinna palmata</i>	1.87	2.25	0.35	4.13	42.3
<i>Protocirrinis</i>	1.91	1.96	0.69	3.59	45.89
<i>Mediomastus fragilis</i>	2.42	1.96	1.42	3.59	49.48
<i>Pholoe inornata</i> (sensu Petersen)	2.11	1.82	1.13	3.34	52.83
<i>Cirriformia</i> juvenile	1.55	1.82	0.33	3.34	56.17
<i>Metaphoxus simplex</i>	1.81	1.82	0.70	3.34	59.51
<i>Nephtys kersivalensis</i>	1.3	1.64	0.16	3.02	62.53
<i>Lumbrineris cingulata</i> aggregate	1.48	1.64	0.42	3.02	65.55
<i>Chaetozone zetlandica</i>	1.38	1.64	0.27	3.02	68.57
<i>Ampelisca diadema</i>	1.51	1.64	0.45	3.02	71.59

Group k Average similarity: 25.97

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Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Socarnes erythropthalmus</i>	1.77	4.93	2.18	19	19
<i>Glycera tridactyla</i>	1.11	2.47	1.1	9.5	28.5
<i>Rissoa parva</i>	1.11	2.24	1.09	8.62	37.13
<i>Caulleriella alata</i>	0.94	2.12	1.06	8.15	45.28
<i>Notomastus</i>	0.93	1.96	1.09	7.54	52.81
<i>Protodorvillea kefersteini</i>	0.84	1.86	1.11	7.15	59.96
<i>Abludomelita obtusata</i>	0.96	1.71	0.62	6.59	66.55
<i>Cheirocratus</i> female	0.75	1.21	0.61	4.67	71.22

Table F-2 Benthic samples: Average dissimilarity (%) between SIMPROF groups

	A	B	C	D	E	F	G	H	I	J	K
B	70.90										
C	65.20	60.18									
D	100.00	96.68	100.00								
E	91.67	77.32	92.99	95.02							
F	100.00	91.54	92.55	98.24	95.26						
G	100.00	96.60	97.69	92.81	91.32	89.59					
H	100.00	89.47	95.67	95.08	90.98	81.47	79.49				
I	100.00	91.38	94.20	92.63	87.79	83.06	84.37	66.38			
J	100.00	91.93	98.27	95.84	87.29	81.28	84.04	63.69	63.30		
K	97.70	82.59	91.92	83.97	86.78	89.15	88.37	78.55	83.87	83.59	



from
Southern
Water. 

The Southern Water logo graphic consists of three white, stylized wavy lines that resemble water waves, positioned to the right of the word "Water".