

Eishort 1

Loch Eishort, Isle of Skye

Seabed Video Survey



HJALTLAND

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Summary

A remotely operated vehicle (ROV) video survey was undertaken by Elizabeth MacLeod (Hjaltland Seafarms Ltd.) and TRAC Oil and Gas on 7th and 8th April 2015. This survey was to determine the habitat type around the proposed Eishort 1 fish farm as part of an environmental impact assessment.

As commonly found in Scottish sea lochs the seabed was predominantly soft sandy mud. There was evidence of burrowing species, such as Norwegian lobster '*Nephrops norvegicus*'. The seapen (*Virgularia mirabilis*) and Hermit crabs (*Diogenes bernhardus*), The Common star fish (*Asterias rubens*) and Sea urchins (*Echinus esculentus*) were common in some areas. The Crab (*Cancer pagurus*) and scallops (*Pecten maximus*) were also noted during the survey.

Loch Eishort

This report is submitted in support of a planning application made to the Highland Council. Hjalmland Seafarms Ltd. has applied to install ten 120m circumference cages plus an automated feed barge.

Scope

To determine, visually, the habitat type around the proposed Eishort 1 site. TRAC Oil and Gas was commissioned to undertake a video survey of the seabed to provide site specific baseline data. The SEPA guidance 'baseline survey, visual – site specific' was followed.

Hydrographic survey and AutoDepomod Modelling

Hydrographic survey results indicate a weak to moderate tidal dispersion pattern. The modelling package AutoDepomod has been undertaken to determine the area of benthic impact. The modelling indicates that at a maximum site biomass of 1654.7 tonnes the 'AZE' (the allowable zone of effect, where sedimentation will be greater than 191 g / m²/ year) will not exceed 120m in any direction.

Survey Rational

In consultation with SEPA three survey transects were proposed, Figure 1. These transects were deemed sufficient to allow a representative survey to be carried out. The transects surveyed on the day differ slightly, due to suitability of anchoring points, and are detailed in figure 2 and later within this report. The transects obtained exceed the AZE of the proposed development, as can be seen in figure 3, and are representative of the Loch.

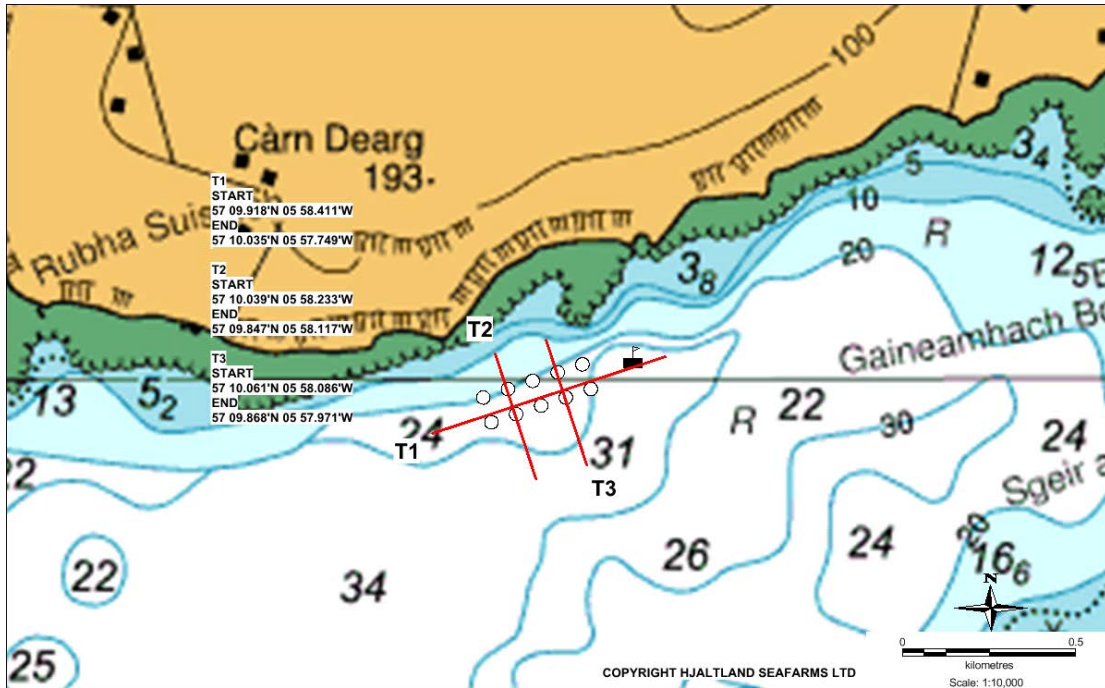


Figure 1: Proposed survey transect locations at the Eishort 1 site.

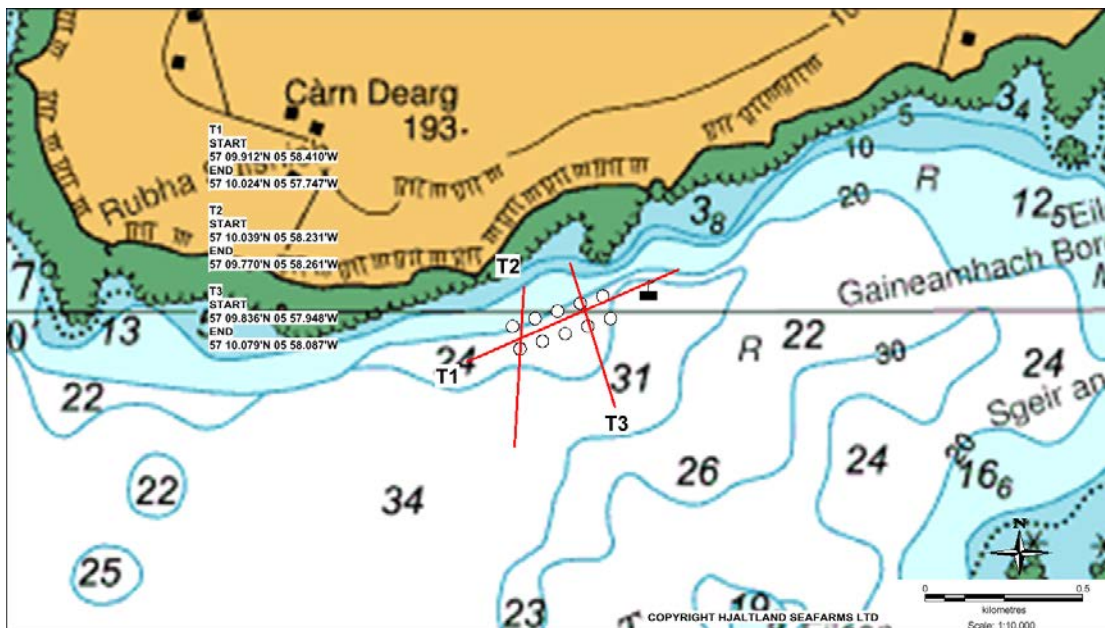


Figure 2: Actual survey transect locations at the Eishort 1 site.

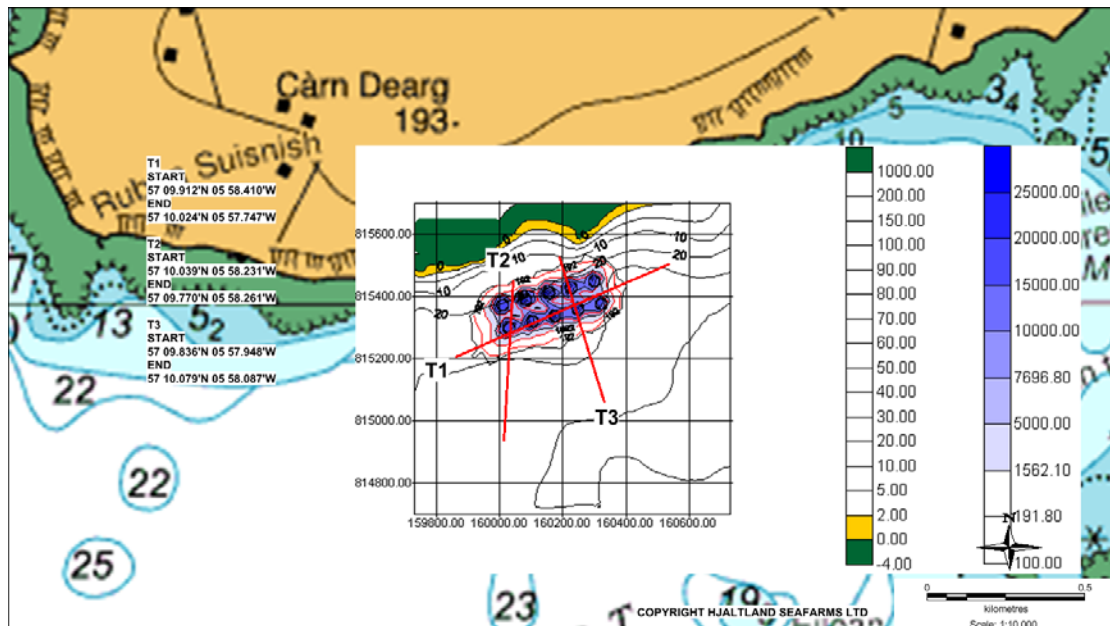


Figure 3: Survey transects and sites modelled Allowable Zone of Effect

Survey Results

A video survey was undertaken on 06/04/2015 and 07/04/2015 by Hjaltland Seafarms Ltd. and TRAC Oil and Gas. Start and end coordinates were entered into the boats on board positioning system and a weighted rope with tags at every 5m was placed between the two points. The boat was anchored to one end of the transect line while the ROV was piloted along the transects. At 10m intervals the ROV was piloted left and right out from the transect line to give a broader view of the area.

Abundance is given as occasional (1-3 within the 5 minute section), common (>3 within a five minute section), prolific (>10 within a five minute section).

Transect 1:

Transect 1 was approximately 725m in length, SW to NE across the AZE. This transect comprises 01:49:04 minutes of footage. A max water depth of approximately 35.4m was observed. The starting transect position was 57° 09.91200'N 005° 58.4100'W and the end transect position was 57° 10.0240'N 005° 57.7470'W.

Table 1: Summary of Transect 1

Time	Description	Abundance	Depth (m)
00:00 - 05:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Starfish (<i>Asterias rubens</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Prolific Occasional Common	Start – 28.0m End – 27.5 m
05:01 - 10:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) ? Snake Pipefish (<i>Entelurus aequoreus</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Prolific Occasional Common	Start – 27.5m End – 28.6 m
10:01 – 15:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>) Scallop (<i>Pectin maximus</i>)	Prolific Prolific Occasional	Start – 28.6 m End – 28.5 m
15:01 – 20:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Prolific Common	Start – 28.5 m End – 28.9 m
20:01 – 25:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Prolific Prolific	Start – 28.9 m End – 28.9 m
25:01 – 30:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>) Small fish	Prolific Common Occasional	Start – 28.9 m End – 29.8 m
30:01 – 35:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Prolific Common	Start – 29.8 m End – 30.6 m
35:01 – 40:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>) Starfish (<i>Asterias rubens</i>)	Prolific Common Occasional	Start – 30.6 m End – 30.9 m
40:01 – 45:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Starfish (<i>Asterias rubens</i>)	Prolific Occasional	Start – 30.9 m End – 31.8 m
45:01 – 50:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary on seafloor towards end of section to allow boat to reposition. Seapen (<i>Virgularia mirabilis</i>)	Prolific	Start – 31.8 m End – 32.3 m
50:01 – 55:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary on seafloor at the start of this section to allow boat to reposition.		Start – 32.3 m End – 32.5 m

	Seapen (<i>Virgularia mirabilis</i>) Flatfish Small fish	Prolific Occasional Occasional	
55:01 – 1:00:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>)	Common	Start – 32.5 m End – 33.0 m
1:00:01 – 1:05:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary on seafloor at the end of this section to allow boat to reposition. Seapen (<i>Virgularia mirabilis</i>) Small fish	Common Occasional	Start – 33.0 m End – 33.8 m
1:05:01 – 1:10:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>)	Common	Start – 33.8 m End – 34.0 m
1:10:01 – 1:15:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary on seafloor at the end of this section to allow boat to reposition. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Common Common	Start – 34.0 m End – 34.7 m
1:15:01 – 1:20:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary on seafloor during this section to allow boat to reposition.		Start – 34.7 m End – 34.9 m
1:20:01 – 1:25:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary on seafloor during some of this section to allow boat to reposition.		Start – 34.9 m End – 35.1 m
1:25:01 – 1:30:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary on seafloor during some of this section to allow boat to reposition.		Start – 35.1 m End – 35.0 m
1:30:01 – 1:35:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Starfish (<i>Asterias rubens</i>)	Occasional Occasional	Start – 35.0 m End – 34.9 m
1:35:01 – 1:40:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>)	Common	Start – 34.9 m End – 35.2 m
1:40:01 – 1:45:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Common Occasional	Start – 35.2 m End – 34.7 m
1:45:01 – 1:49:04	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>)	Common	Start – 34.7 m End – 35.4 m

Transect 2:

This transect was approximately 500m in length, N to S across the AZE. This transect comprises 01:15:30 minutes of footage. A max water depth of approximately 38.7m was observed. The starting point was 57° 10.0390'N 005° 58.2310'W and the end point was 57° 09.7700'N 005° 58.2610'W.

Table 2: Summary of Transect 2

Time	Description	Abundance	Depth (m)
00:00 - 05:00	Soft sandy mud. Extensive evidence of burrowing species. Footage poor for the first few minutes, improves towards the end of the section. Norwegian Lobster (<i>Nephrops norvegicus</i>)	Occasional	Start – 36.9 m End – 38.7 m
05:01 - 10:00	Soft sandy mud. Extensive evidence of burrowing species. Norwegian Lobster (<i>Nephrops norvegicus</i>) Small Fish ? Goby Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Occasional Common Common Common	Start – 38.7 m End – 38.0 m
10:01 – 15:00	Soft sandy mud. Extensive evidence of burrowing species. Small Fish ? Goby Seapen (<i>Virgularia mirabilis</i>) Small fish Scallop (<i>Pecten maximus</i>)	Occasional Common Occasional Occasional	Start – 38.0 m End – 36.6 m
15:01 – 20:00	Soft sandy mud. Extensive evidence of burrowing species. Flat Fish Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Occasional Common Occasional	Start – 36.6 m End – 35.6 m
20:01 – 25:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Common Occasional	Start – 35.6 m End – 35.0 m
25:01 – 30:00	Soft sandy mud. Extensive evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>)	Common	Start – 35.0 m End – 33.0 m
30:01 – 35:00	Soft sandy mud with boulders. Evidence of burrowing species. Sea Squirt (<i>Ascidella aspersa</i>) Spiny Starfish (<i>Marthasterias glacialis</i>) Scallop (<i>Pecten maximus</i>) Celtic Feather Star (<i>Leptometra celtica</i>) Northern Sea Fan (<i>Swiftia pallida</i>) Sea Urchin (<i>Echinus esculentus</i>) Squat Lobster (<i>Munida rugosa</i>)	Prolific Occasional Occasional Occasional Prolific Occasional Occasional	Start – 33.0 m End – 30.9 m
35:01 – 40:00	Soft sandy mud with boulders. Evidence of burrowing species. Sea Squirt (<i>Ascidella aspersa</i>) Seapen (<i>Virgularia mirabilis</i>)	Prolific Prolific	Start – 30.9 m End – 32.6 m
40:01 – 45:00	Soft sandy mud with boulders. Evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>)	Prolific	Start – 32.6 m End – 32.3 m
45:01 – 50:00	Soft sandy mud with boulders. Evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>)	Prolific	Start – 32.3 m End – 31.6 m

50:01 – 55:00	Soft sandy mud with boulders. Evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>) Northern Sea Fan (<i>Swiftia pallida</i>) Sea Urchin (<i>Echinus esculentus</i>) Squat Lobster (<i>Munida rugosa</i>) Sea Squirt (<i>Asciidiella aspersa</i>) Spiny Starfish (<i>Marthasterias glacialis</i>)	Occasional Common Occasional Occasional Prolific Occasional	Start – 31.6 m End – 27.8 m
55:01 – 1:00:00	Soft sandy mud with boulders. Evidence of burrowing species. Sea Urchin (<i>Echinus esculentus</i>) Squat Lobster (<i>Munida rugosa</i>) Sea Squirt (<i>Asciidiella aspersa</i>) Spiny Starfish (<i>Marthasterias glacialis</i>)	Common Occasional Prolific Occasional	Start – 27.8 m End – 27.5 m
1:00:01 – 1:05:00	Sandy mud with little evidence of burrowing species. Shell fragments		Start – 27.5 m End – 24.7 m
1:05:01 – 1:10:00	Sandy mud with little evidence of burrowing species. Shell fragments Small crab Anemone (<i>Sagartiogeton undatus</i>) Crab (<i>Cancer Paurus</i>)	Occasional Prolific Occasional	Start – 24.7 m End – 18.4 m
1:10:01 – 1:15:30	Sandy mud with little evidence of burrowing species. Shell fragments Squid eggs Anemone (<i>Sagartiogeton undatus</i>) Crab (<i>Cancer Paurus</i>)	Prolific – in 1 accumulation Prolific Occasional	Start – 18.4 m End – 15.0 m

Transect 3:

This transect was approximately 472m, in length, SE to NW across the AZE. Due to the ROV umbilical cable becoming snagged on rocks filming was stopped while the ROV was recovered. As the weighted transect line had not been lifted filming was restarted at a point along the transect that it could be confirmed we had previously passed, this was a splice joining two ropes together. The footage is therefore contained within two files. This transect comprises 1:11:27 minutes of footage in part 1 and 38:15 in part 2. A max water depth of approximately 39.7m was observed. The starting point was 57° 09.8360'N 005° 57.9480'W and the end point was 57° 10.0790'N 005° 58.0870'W.

Table 3a: Summary of Transect 3 part 1

Time	Description	Abundance	Depth (m)
00:00 – 05:00	Soft sandy mud. Extensive evidence of burrowing species. Norwegian Lobster (<i>Nephrops norvegicus</i>) Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Occasional Occasional Occasional	Start – 39.4 m End – 39.7 m
05:01 – 10:00	Soft sandy mud. Extensive evidence of burrowing species. Boulders in some areas. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>) Small fish Crab (<i>Cancer Paurus</i>) Squat Lobster (<i>Munida rugosa</i>) Sea Squirt (<i>Ascidella aspersa</i>) Starfish (<i>Asterias rubens</i>) Celtic Feather Star (<i>Leptometra celtica</i>)	Prolific Common Occasional Occasional Occasional Prolific Occasional Occasional	Start – 39.7 m End – 37.3 m
10:01 – 15:00	Soft sandy mud. Extensive evidence of burrowing species. Boulders in some areas. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>) Crab (<i>Cancer Paurus</i>) Squat Lobster (<i>Munida rugosa</i>) Sea Squirt (<i>Ascidella aspersa</i>) Starfish (<i>Asterias rubens</i>) Celtic Feather Star (<i>Leptometra celtica</i>) Scallop (<i>Pecten maximus</i>)	Prolific Common Occasional Common Prolific Occasional Occasional Occasional	Start – 37.3 m End – 35.9 m
15:01 – 20:00	Soft sandy mud. Extensive evidence of burrowing species. Boulders in some areas. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>) Crab (<i>Cancer Paurus</i>) Sea Squirt (<i>Ascidella aspersa</i>) Starfish (<i>Asterias rubens</i>) Celtic Feather Star (<i>Leptometra celtica</i>) Scallop (<i>Pecten maximus</i>) Starfish (<i>Luidia ciliaris</i>) Small fish	Prolific Occasional Occasional Prolific Occasional Occasional Occasional Occasional Occasional	Start – 35.9 m End – 34.5 m
20:01 – 25:00	Soft sandy mud. Extensive evidence of burrowing species. Boulders in some areas.		Start – 34.5 m End – 34.2 m

	Seapen (<i>Virgularia mirabilis</i>) Sea Squirt (<i>Ascidella aspersa</i>) Starfish (<i>Asterias rubens</i>) Squat Lobster (<i>Munida rugosa</i>) Sea Urchin (<i>Echinus esculentus</i>)	Prolific Prolific Occasional Occasional Occasional	
25:01 – 30:00	Soft sandy mud. Extensive evidence of burrowing species. Boulders in some areas. Seapen (<i>Virgularia mirabilis</i>) Sea Squirt (<i>Ascidella aspersa</i>) Small fish Squat Lobster (<i>Munida rugosa</i>) Sea Urchin (<i>Echinus esculentus</i>) Hermit crab (<i>Pegurus bernhardus</i>) Anemone (<i>Metridium senile</i>)	Common Prolific Prolific Occasional Occasional Occasional Occasional	Start – 34.2 m End – 34.9 m
30:01 – 35:00	Soft sandy mud. Extensive evidence of burrowing species. Splice in rope where transect 3 part 2 starts, footage overlaps from here in. Seapen (<i>Virgularia mirabilis</i>) Hermit crab (<i>Pegurus bernhardus</i>)	Common Occasional	Start – 34.9 m End – 34.5 m
35:01 – 40:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary from 38:16. Seapen (<i>Virgularia mirabilis</i>)	Occasional	Start – 34.5 m End – 33.7 m
40:01 – 45:00	Soft sandy mud. Extensive evidence of burrowing species. ROV attempting to move but not getting very far.		Start – 33.7 m End – 32.8 m
45:01 - 50:00	Soft sandy mud. Extensive evidence of burrowing species. ROV attempting to move but not getting very far. Crab (<i>Cancer Paurus</i>)	Occasional	Start – 32.8 m End – 30.8 m
50:01 – 55:00	Soft sandy mud. Extensive evidence of burrowing species. ROV attempting to move but not getting very far.		Start – 30.8 m End – 31.2 m
55:01 – 1:00:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary, some attempts to move but not getting very far. Hermit crab (<i>Pegurus bernhardus</i>)	Occasional	Start – 31.2 m End – 31.2 m
1:00:01 – 1:05:00	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary. Hermit crab (<i>Pegurus bernhardus</i>)	Occasional	Start – 31.2 m End – 31.2 m
1:05:01 – 1:11:27	Soft sandy mud. Extensive evidence of burrowing species. ROV stationary, some attempts to move but not getting very far. Returning along transect at the end of the section.		Start – 31.2 m End – 32.1 m

Table 3b: Summary of transect 3 part 2

Time	Description	Abundance	Depth (m)
00:00 – 05:00	Soft sandy mud. Extensive evidence of burrowing species. Splice in road located. Seapen (<i>Virgularia mirabilis</i>) Ray (<i>Raja clavata</i>)	Occasional Occasional	Start – 33.7 m End – 32.6 m
05:01 – 10:00	Soft sandy mud. Evidence of burrowing species. Seapen (<i>Virgularia mirabilis</i>)	Occasional	Start – 32.6 m End – 30.7 m
10:01 – 15:00	Sandy mud with shell fragments. Some evidence of burrowing species. Hermit crab (<i>Pegurus bernhardus</i>)	Occasional	Start – 30.7 m End – 27.1 m
15:01 – 20:00	Sandy mud with shell fragments. Some evidence of burrowing species. Anemone (<i>Sagartiogeton undatus</i>)	Prolific	Start – 27.1 m End – 19.5 m
20:01 – 25:00	Sandy mud with shell fragments. Anemone (<i>Sagartiogeton undatus</i>) Hermit crab (<i>Pegurus bernhardus</i>) Small fish ? Goby Crab (<i>Cancer Paurus</i>)	Prolific Common Occasional Occasional	Start – 19.5 m End – 16.5 m

25:01 – 30:00	Sandy mud with shell fragments. Anemone (<i>Sagartiogeton undatus</i>) Hermit crab (<i>Pegurus bernhardus</i>) Crab (<i>Cancer Paurus</i>) Spiny Starfish (<i>Marthasterias glacialis</i>)	Prolific Common Occasional Occasional	Start – 16.5 m End – 15.9 m
30:01 – 35:00	Sandy mud with shell fragments. Rock face encountered at the end of the section. Anemone (<i>Sagartiogeton undatus</i>) Hermit crab (<i>Pegurus bernhardus</i>) Spiny Starfish (<i>Marthasterias glacialis</i>) Sea Urchin (<i>Echinus esculentus</i>)	Prolific Common Occasional Common	Start – 15.9 m End – 12.5 m
35:01 – 38:15	Rock face encountered at the start of the section. Hard substrate covered in seaweed. Sea Urchin (<i>Echinus esculentus</i>)	Prolific	Start – 12.5 m End – 8.4 m

Appendix 1 –

Still images from video footage

Please see separate files for each transect

Still images are taken from paused video footage and therefore may not be as clear as within the original moving footage. The original footage has been submitted to statutory consultees to view alongside this report. Some still images are to show the substrate present and therefore may not have any visible species.