PWGSC PROJECT #R.078190.002
UNDERWATER BENTHIC HABITAT SURVEY
Proposed Construction and Dredge Areas
Leonardville DFO-SCH
Leonardville, Deer Island, New Brunswick

DRAFT REPORT

Submitted to:
Public Works and Government Services Canada
Saint John, New Brunswick

Submitted by:

Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited
Saint John, New Brunswick

August 2015

TE131446.3000

07 August, 2015

TE131446.3000

Mr. Jason Keys
Environmental Officer
Environmental Services
Public Works and Government Services Canada
189 Prince William Street
Saint John, New Brunswick
E2L 2B9

Dear Mr. Keys:

Re: Underwater Benthic Habitat Survey at the Leonardville Fisheries and Oceans Canada Small Craft Harbour, Leonardville, New Brunswick – Draft Report

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to provide Public Works and Government Services Canada with the findings of an Underwater Benthic Habitat Survey undertaken within the footprint of proposed construction and dredge areas at the Leonardville Fisheries and Oceans Canada – Small Craft Harbour in Leonardville, New Brunswick.

Amec Foster Wheeler appreciates the opportunity to provide services to your organization. Please do not hesitate to call if you have any questions regarding this or any other matter.

Respectfully submitted,

Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited

DRAFT

Chyann Kirby, B.Sc., P.Tech, EP
Project Manager
Direct Tel.: 506.652.4530 (or 506.652.9497 ext. 226)
Direct Fax: 506.652.9517
E-mail: chyann.kirby@amecfw.com

BM/kk

Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited
580 Main Street, Suite 105
Hilyard Place Building B
Saint John, NB E2K 1J5
Tel +1 (506) 652-9497
Fax +1 (506) 652-9517
www.amecfw.com

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

At the request of Public Works and Government Services Canada (PWGSC), an Underwater Benthic Habitat Survey (UBHS) program was completed on 25 July, 2015 within the footprint of proposed construction and dredge areas at the Leonardville Fisheries and Oceans Canada (DFO) – Small Craft Harbour (SCH) in Leonardville, New Brunswick (NB).

2.0 SCOPE AND METHODOLOGY

Qualitative and quantitative observations were obtained from the footprint of the proposed construction and dredge areas using video survey techniques to map substrate types and document macrofaunal and macrofloral species presence and abundance. Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler) contracted Diversified Divers Inc. to perform the diving and video surveillance services. An Amec Foster Wheeler representative was on-site to guide the dive crew in the event that any issues arose and to obtain supporting habitat and biological information.

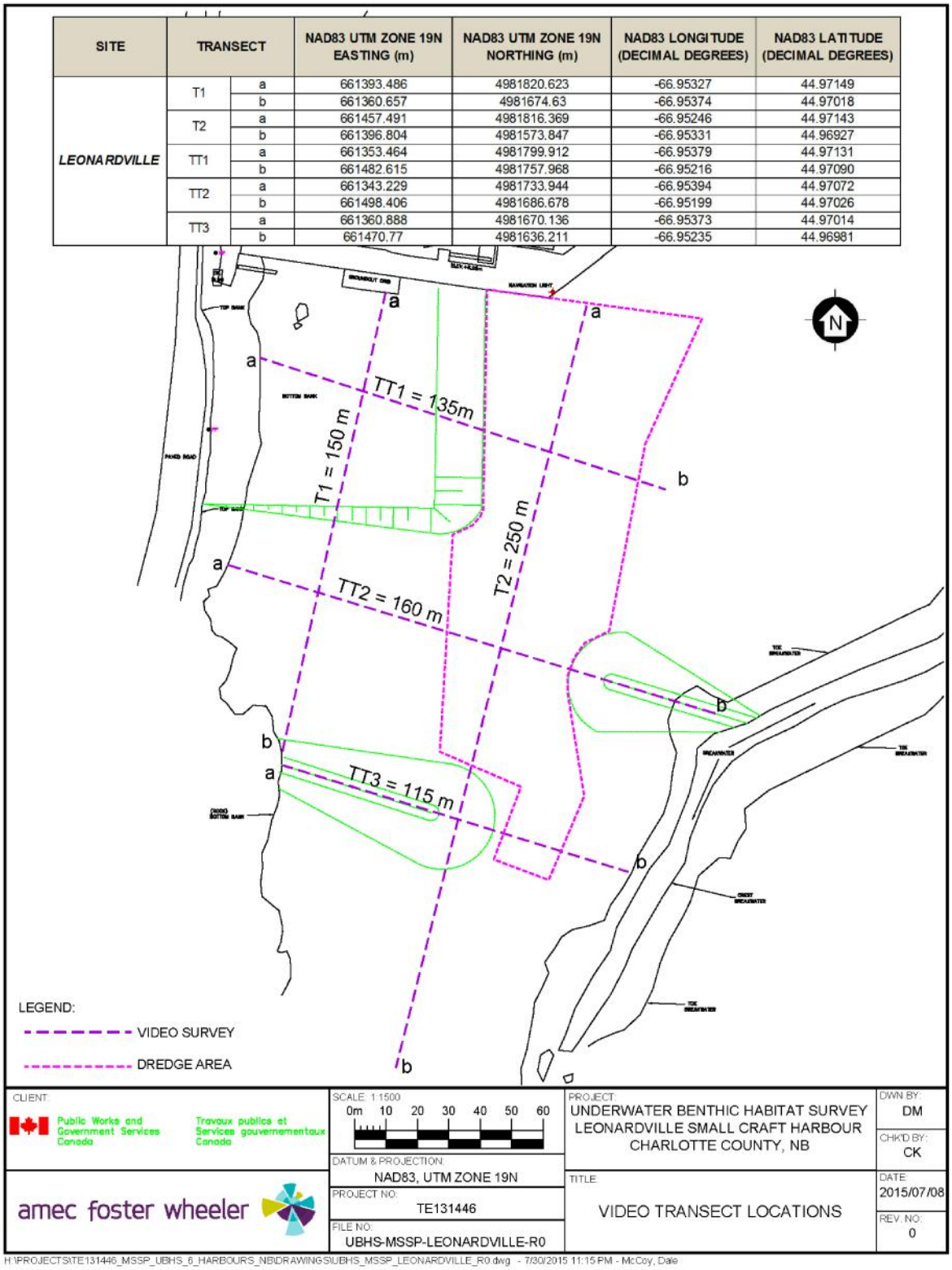
A total of 850 metres (m) of video surveillance was divided into two transects (T1 and T2) and three transect tie lines (TT1 to TT3) of various lengths from the footprint of the proposed construction and dredge areas at the Leonardville DFO-SCH (Figure 2.1).

A handheld Global Positioning System (GPS) was used to locate the pre-determined start and finish points of the transects.

The survey of the transects required the use of a video camera, operated by a Canadian Standards Association (CSA)-certified diver. Video at the Leonardville DFO-SCH were collected both on land and in the water. Portions of TT2 were not captured in the video, but were assessed both on-site and with photographs. Seabed characterization involved field observations made by the field crew and a review of the video survey recording. Observations along the video transect were made for every 5 m segment.

Figure 2.1 Benthic Transect Locations – Leonardville DFO-SCH, Leonardville, NB

SITE	TRANSECT		NAD83 UTM ZONE 19N EASTING (m)	NAD83 UTM ZONE 19N NORTHING (m)	NAD83 LONGITUDE (DECIMAL DEGREES)	NAD83 LATITUDE (DECIMAL DEGREES)
LEONARDVILLE	T1	a	661393.486	4981820.623	-66.95327	44.97149
		b	661360.657	4981674.63	-66.95374	44.97018
	T2	a	661457.491	4981816.369	-66.95246	44.97143
		b	661396.804	4981573.847	-66.95331	44.96927
	TT1	a	661353.464	4981799.912	-66.95379	44.97131
		b	661482.615	4981757.968	-66.95216	44.97090
	TT2	a	661343.229	4981733.944	-66.95394	44.97072
		b	661498.406	4981686.678	-66.95199	44.97026
	TT3	a	661360.888	4981670.136	-66.95373	44.97014
		b	661470.77	4981636.211	-66.95235	44.96981



3.0 UNDERWATER HABITAT SURVEY RESULTS

The results of the transect surveys for the proposed project footprint are presented in Appendix A (Tables A.1 to A.5), including the following information for each 5 m increment of transect line:

- visual determination of substrate type (in order of dominance);
- macrofaunal species identification and abundance; and
- macrofloral species identification and percent coverage.

A summary of the information provided in Tables A.1 to A.5 (Appendix A) is described in the following paragraphs. An annotated species list has been included in Appendix B. Photographs of the site and portions of TT2 at low tide have been included in Appendix C.

For the purposes of the video survey review and macrofaunal species identification and enumeration, four categories were developed to characterize the observed abundance levels. The categories are as follows:

A = Abundant
Numerous (not quantifiable) observations made throughout the entire 5 m segment.
C = Common
Numerous (not quantifiable) observations made intermittently along the 5 m segment.
O = Occasional
Quantifiable observations made intermittently along the 5 m segment.
U = Uncommon
Quantifiable observations made infrequently along the 5 m segment.

Observations of macrofaunal life were common and noted along all five transects as further described in this section.

Macrofloral life was noted in all five of the transects as further described below and in the associated tables in Appendix A (where encountered). Macrofloral debris (i.e., detritus from macrofloral species) was noted along segments of transects T2, TT1, TT2, and TT3.

3.1 Transect 1 (T1)

Transect 1 (T1) was 155 m long, at the wharf and proceeded in a south-southwesterly orientation to the high tide line. The first 5 m of the transect ran under a haul-out that was occupied by a fishing vessel, therefore the video started on the south side of the haul-out.

Substrate:
The substrate is a mix of cobble and sand with lesser amounts of silt, rock, and gravel. This situation exists for the first 90 m of the transect. The last 65 m of the transect were predominantly cobble with lesser amounts of sand, silt, gravel, and rock.

Macrofauna:
Macrofaunal life was composed primarily of abundant and common occurrences of Northern rock barnacle (*Semibalanus balanoides*), which were observed throughout the transect except at the very top of the intertidal zone (145-155m). Common and occasional occurrences of periwinkles (*Littorina* sp.) were also noted throughout the transect. Shell hash was noted throughout the first 85 m of the transect. A small cusk (*Brosme brosme*) was found in the intertidal zone during the video collection at T1; a photo has been included in Appendix C.

Macroflora:
Much of the transects ran along the bottom of the intertidal zone, therefore the macrofloral community was generally reduced. The community in this area was a mix of rockweed (*Ascophyllum nodosum*) and bladderwrack (*Fucus vesiculosus*) with a coverage between 5 and 60%. The last 55 m of the transect ran through the intertidal zone. The mid intertidal zone was dominated by rockweed with cover between 55 and 80%. The upper intertidal zone again showed a reduced community of rockweed and bladderwrack with a cover between 25 and 35%. Macrofloral debris was noted in only one segment (10-15 m).

3.2 Transect 2 (T2)

Transect 2 (T2) was 250 m long starting near the wharf and proceeded in a south-southwesterly orientation following the navigational channel (Figure 2.1).

Substrate:
The substrate in T2 was comprised predominantly of silt with lesser amounts of sand, cobble, rock, and gravel.

Macrofauna:
Green sea urchin (*Strongylocentrotus droebachiensis*) were noted in 75% of the segments with uncommon to common occurrences. The next most prominent fauna were uncommon observances of green crab (*Carcinus maenas*) and hermit crab (*Pagarus acadianus*) observed in approximately 10% of the segments. Other species noted were common and occasional occurrences of Northern rock barnacle, occasional occurrence of periwinkle, and uncommon occurrences of sea star (*Asterias* sp.), sea cucumber (*Cucumaria frondosa*), rock crab (*Cancer irroratus*), waved whelk (*Buccinum undatum*), winter flounder (*Pseduopleuronectes americanus*), and unidentified fish species. Benthic worm burrows were observed throughout the length of the transect. Shell hash was noted in thirty two of the fifty segments.

Macroflora:
Macrofloral life was noted in almost 90% of the segments but overall cover only ranged between 5 and 35%. The predominant species were sugar kelp (*Laminaria saccharina*) and spiny sour weed (*Desmarestia aculeata*) but neither has a coverage in any segment over 20% except for one instance of sugar kelp at 40%. Other species noted include sea lettuce (*Ulva lactuca*), dulse (*Palmaria palmata*), red alga (*Plumaria plumosa*), encrusting algae (*Leptophyllum* sp.), and rockweed. A moderate level (40% cover) of macrofloral debris was noted throughout the entire transect.

3.3 Transect Tie Line 1 (TT1)

Transect tie line 1 (TT1) was 150 m long, starting near the high tide mark and proceeding easterly. The starting point of the transect was approximately 15 m up the bank from the high tide mark, therefore the benthic video is 135 m long (Figure 2.1). The transect runs from the intertidal zone, through the navigational channel and ends again in the intertidal zone on the opposite site of the harbour.

Substrate:
The intertidal zone (0-35 m) was a mix of substrates with pockets of silt and sand alternating with areas of rock, cobble, and boulder. The subtidal zone (40-135 m) was predominantly silt with lesser amounts of gravel, sand, rock, and cobble except for two small areas (50-75 m and 120-135 m) that were predominantly cobble.

Macrofauna:
Macrofaunal life in areas with hard bottom (i.e., intertidal zone, subtidal pockets of cobble) was predominantly Northern rock barnacle (occasional to abundant occurrence) and periwinkle (occasional to common occurrence). Green sea urchin was noted in seven segments with uncommon to common occurrence. Uncommon occurrence of white cross jellyfish (*Staurophora mertensi*), green crab, hermit crab, winter flounder, sea cucumber, and unidentified fish species were noted. Benthic worm burrows were observed throughout the portion of the transect that was predominantly silt. Shell hash was observed in just over half of the segments.

Macrofloral:
Macrofloral life was noted in 85% of the segments with coverage ranging between 5 and 90%. The intertidal zone was dominated by rockweed and bladderwrack with coverage of 45-75%. The macrofloral community through much of the subtidal was comprised of a relatively low cover (5-40%) of sea lettuce, spiny sour weed, sugar kelp, brown alga (*Pilayella littoralis*), green alga (*Spongomorpha* sp.), and encrusting algae. The end of the transect saw a high algal cover (70-90%) that was predominantly sugar kelp with lesser amounts of rockweed, spiny sour weed, sea lettuce, encrusting algae, and bladderwrack. Macrofloral debris was observed between the 85 and 110 m marks.

3.4 Transect Tie Line 2 (TT2)

Transect tie line 2 (TT2) was 180 m long, starting near the high tide mark and proceeding easterly. The starting and ending points of the transect were above the high tide mark, therefore the benthic video is 135 m long (Figure 2.1). Photos of the upper 16 m of the intertidal zone at the start of the transect and 6 m of the intertidal zone have been included in Appendix C.

Substrate:
The intertidal zone, represented by the first 25 m of the video and the portion captured in the photograph (Appendix C) were predominantly cobble with lesser amounts of rock, gravel, sand and silt. As the video transitioned from the intertidal to the subtidal zone, the substrate changed from a mix of silt and cobble with lesser amounts of sand and gravel (25-45 m) to predominantly silt with lesser amounts of sand and cobble (45-90 m). As the water shallowed coming out of the

channel and moving towards the breakwater, the substrate was again a mix of silt and cobble (90-100 m) and then predominantly cobble (100-125 m). The last ten metres of the transect had a substrate that was predominantly gravel with lesser amounts of the cobble and rock. The final portion of the transect captured in the photograph was comprised of boulder (Appendix C).

Macrofauna:
Macrofaunal life in areas with hard bottom (i.e., intertidal zone, subtidal areas dominated by cobble) was predominantly Northern rock barnacle (common to abundant occurrence). Periwinkle (occasional to common occurrence) was the next most common species, observed in eight segments. Green sea urchin was noted with occasional occurrence in two segments. Uncommon occurrence of moon jellyfish (*Aurelia aurita*), green crab, hermit crab, and white cross jellyfish were noted. Benthic worm burrows were observed throughout the portion of the transect that was predominantly silt. Shell hash was observed in 85% of the segments.

Macroflora:
Macrofloral life was noted in almost 90% of the segments with coverage ranging between 5 and 95%. The intertidal zone was dominated by rockweed, bladderwrack, brown alga, and encrusting algae with coverage of 30-95%. The macrofloral community through much of the subtidal zone that was comprised of silt was reduced and included a low cover (5-25%) of sea lettuce, spiny sour weed, sugar kelp, dulse, and encrusting algae. As the transect moved from the upper subtidal to the intertidal the algal cover increased and the predominantly spiny sour weed and sugar kelp community transitioned to predominantly rockweed, bladderwrack, and brown alga. Macrofloral debris was observed between the 35 and 120 m marks with coverage of 35-40% between 45 m and 95 m.

3.5 Transect Tie Line 3 (TT3)

Transect tie line 3 (TT3) was 115 m long. It began at the high tide mark and proceeded easterly to the mid intertidal point on the breakwater (Figure 2.1).

Substrate:
The intertidal zone (0-45 m) was a mix of gravel, cobble, rock, and boulder any of which were the dominant substrate depending on the segment. The presence of sand and silt increased towards the bottom of the intertidal and into the subtidal zone. The upper subtidal zone (45-60 m) was a mix of cobble and silt with lesser amounts of sand, rock, and gravel. The lower subtidal zone (60-80 m) was predominantly silt with lesser amounts of sand and cobble. The remainder of the transect was predominantly cobble with lesser amounts of silt, rock, and gravel.

Macrofauna:
Macrofaunal life in areas with hard bottom (i.e., intertidal zone, subtidal areas dominated by cobble) was predominantly Northern rock barnacle (occasional to abundant occurrence). Green sea urchin (uncommon to occasional occurrence) the next most common species, observed in eight segments. Periwinkle (uncommon to common occurrence) was observed in six segments. Uncommon occurrence of burrowing anemone (*Cerianthus borealis*) and green crab were noted.

Benthic worm burrows were observed throughout the portion of the transect that was predominantly silt. Shell hash was observed in approximately one third of the segments.

Macroflora:
Macrofloral life was noted in all but one of the twenty three segments of the transect. The intertidal zone (0-45 m) is comprised of rockweed and bladderwrack but with more variable cover than the other intertidal transect areas. The algal cover in this area ranged between 5 and 90% but overall cover was less than 50% in most segments. The macrofloral community through much of the subtidal zone that was comprised of silt had moderate cover (20-55%) of sea lettuce, spiny sour weed, sugar kelp, dulse, and encrusting algae. The upper subtidal on the eastern side of the harbour had a high cover (85-90%) of spiny sour weed and sugar kelp. As the transect moved towards the intertidal zone the spiny sour weed and sugar kelp reduced in cover and was replaced by rockweed and bladderwrack. Macrofloral debris was noted in five of the twenty three segments and was reduced in cover in comparison to TT1 and TT2.

4.0 FISH HABITAT

Transect T1 ran along the bottom of the intertidal zone for much of its length before moving through the intertidal to the high tide mark at its end. The lack of algal cover and gravel/cobble substrate provided little in terms of habitat. The area of the T1 that ran through the intertidal showed a higher degree of algal cover and some larger substrate (i.e. rocks) that provided both food and refuge for several species. T2 seemed to run through the deeper parts of the navigational channel as evidenced by the accumulation of silt and macrofloral debris. Algal cover was highly reduced through the majority of the transect. Habitat through this region was limited but provided for the few species noted, which included scavengers (urchins, crabs) and filter feeders (anemones, sea cucumbers). Benthic worm burrows were also noted through most of the transect.

The three tie line transects (TT1, TT2, and TT3) were very similar in habitat type. All three started near the top of the intertidal zone on the western side of the harbour and proceeded through the navigation channel; TT2 and TT3 ended in the intertidal zone of the breakwater on the eastern side of the harbour. As in the latter portion of T1, the intertidal portions of the tie line transects provided a high degree of algal cover and larger substrate (i.e., rocks and boulders) provided refuge. A portion of each of the tie line transects was similar to the habitat seen in T2; highly reduced algal cover and predominantly silty substrate that overall provides little quality habitat. Each of the three tie line transects also had small transition zone between the intertidal and channel. These areas were a mix of the two habitats but in general had reduced algal cover and provided only mediocre habitat.

5.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The diving crew was directed by an on-site Amec Foster Wheeler representative (Mr. Bruce Moore, B.Sc.) who is experienced in data collection for environmental assessment project components. Mr. Moore was responsible for the data collection and overall data quality as well as for ensuring that all standard operating procedures were followed and that adequate health and safety measures were taken.

A Project Reviewer (Ms. Kerry Higgins, B.Sc, EP) has reviewed this report prior to its release. The limitations of this document are provided in Appendix D.

6.0 SUMMARY

Characterization of the substrate and benthic communities along five transects within the footprint of construction and dredge areas at the Leonardville DFO–SCH in Leonardville, NB was completed using a combination of visual field observations and underwater video survey techniques. A portion of the intertidal zones of TT2 was not included in the video, but photographs are included in Appendix C.

There were three distinct areas with a particular substrate within the harbour. The intertidal portions of the transects could feature boulder and rock or bare areas consisting of silt and sand but were predominantly cobble. The deeper areas of the harbour in the navigational channel were predominantly silt with lesser amounts of sand and cobble. The transition areas between these two zones were generally a mix of silt and cobble.

Macrofaunal life was observed in all five of the transects and almost 85% of the 5 m segments with a total of 13 unique species. In areas with hard bottom, Northern rock barnacles and periwinkles were prevalent with uncommon to abundant occurrences. In areas dominated by silt, green sea urchins were observed with uncommon to common occurrences. The remainder of the species were limited to uncommon or occasional occurrences and included green crab, white cross jellyfish, moon jellyfish, winter flounder, rock crab, hermit crab, seastar, burrowing anemone, sea cucumber, waved whelk, and unidentified fish species. In addition, benthic worm burrows were noted throughout the areas of silty substrate. Shell hash was observed throughout all five transects.

Macrofloral life was observed in all five transects surveyed and over 92% of the 5 m segments. Macrofloral cover could be divided into two broad zones; the intertidal zone that was primarily rockweed and bladderwrack with some brown alga and had a relatively high cover, and the channel that had a reduced algal cover and consisted of spiny sour weed, sugar kelp, sea lettuce, red alga, green alga, dulse, and encrusting algae. Macrofloral debris was noted in each transect in the areas where silty substrate was prominent.

Intertidal portions of the transects (all except T2) provided quality habitat with high algal cover and substrate that offer refuge. Portions of the transects in the navigation channel, in general, offered poor habitat because of reduced or absent algal cover and no refuge. The fauna in this area was limited to a few scavengers and filter feeders. The transition areas between these two broad habitats did offer some refuge and cover but in general could only be considered mediocre habitat.

7.0 CLOSING

This document has been prepared and reviewed by the following people:

Prepared by:	**Reviewed by:**
DRAFT	**DRAFT**
Bruce Moore, B.Sc. Marine Biologist / Intermediate Project Professional	**Kerry Higgins, B.Sc., EP** NB/PE Operations Manager / Senior Project Professional

APPENDIX A
Transcript of Video and On-Site Observations

Table A.1 150 m Survey – Transect T1, 25 July, 2015

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
0-5 **T1 Start**	Anchor-5	Cobble (40%); Sand (35%); Silt (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Periwinkle (*Littorina* sp.) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (55%); Bladderwrack (*Fucus vesiculosus*) (5%)
5-10	5-10	Sand (45%); Cobble (25%); Silt (20%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Shell hash	Rockweed (*Ascophyllum nodosum*) (30%); Green alga (*Spongomorpha* sp.) (5%)
10-15	10-15	Sand (50%); Silt (35%); Cobble (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (30%); Macrofloral debris (5%)
15-20	15-20	Cobble (50%); Sand (35%); Silt (15%)	Periwinkle (*Littorina* sp.) (**A**); Northern rock barnacle (*Semibalanus balanoides*) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (5%); Bladderwrack (*Fucus vesiculosus*) (5%)
20-25	20-25	Sand (45%); Silt (30%); Cobble (25%)	Periwinkle (*Littorina* sp.) (**C**); Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Rockweed (*Ascophyllum nodosum*) (5%)
25-30	25-30	Cobble (35%); Sand (35%); Silt (20%); Gravel (10%)	Periwinkle (*Littorina* sp.) (**C**); Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Bladderwrack (*Fucus vesiculosus*) (5%)
30-35	30-35	Cobble (60%); Sand (20%); Silt (10%); Gravel (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**)	No flora observed
35-40	35-40	Cobble (50%); Sand (20%); Silt (15%); Rock (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Shell hash	Rockweed (*Ascophyllum nodosum*) (15%); Bladderwrack (*Fucus vesiculosus*) (5%)
40-45	40-45	Cobble (50%); Sand (20%); Silt (15%); Rock (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Shell hash	Bladderwrack (*Fucus vesiculosus*) (5%)
45-50	45-50	Cobble (40%); Sand (30%); Silt (20%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Periwinkle (*Littorina* sp.) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (5%); Bladderwrack (*Fucus vesiculosus*) (5%)
50-55	50-55	Cobble (40%); Sand (30%); Silt (20%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Shell hash	Bladderwrack (*Fucus vesiculosus*) (10%)
55-60	55-60	Cobble (35%); Sand (25%); Silt (15%); Gravel (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Shell hash	Bladderwrack (*Fucus vesiculosus*) (10%)
60-65	60-65	Cobble (35%); Sand (25%); Silt (15%); Gravel (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Rockweed (*Ascophyllum nodosum*) (10%)
65-70	65-70	Cobble (35%); Sand (25%); Silt (15%); Gravel (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	No flora observed
70-75	70-75	Cobble (35%); Sand (25%); Silt (15%); Gravel (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Rockweed (*Ascophyllum nodosum*) (10%); Bladderwrack (*Fucus vesiculosus*) (5%)
75-80	75-80	Cobble (35%); Sand (25%); Silt (15%); Gravel (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 5-10 individuals); Shell hash	Rockweed (*Ascophyllum nodosum*) (5%)
80-85	80-85	Cobble (35%); Sand (25%); Silt (15%); Gravel (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 5-10 individuals); Shell hash	Rockweed (*Ascophyllum nodosum*) (15%); Bladderwrack (*Fucus vesiculosus*) (5%)
85-90	85-90	Cobble (35%); Sand (25%); Silt (15%); Gravel (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Rockweed (*Ascophyllum nodosum*) (20%)
90-95	90-95	No visibility	No visibility	Rockweed (*Ascophyllum nodosum*) (45%); Bladderwrack (*Fucus vesiculosus*) (10%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
95-100	95-100	Cobble (60%); Sand (20%); Silt (10%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Rockweed (*Ascophyllum nodosum*) (70%)
100-105	100-105	Cobble (60%); Sand (20%); Silt (10%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (55%)
105-110	105-110	Cobble (60%); Sand (20%); Silt (10%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (60%)
110-115	110-115	Cobble (60%); Sand (20%); Silt (10%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (70%)
115-120	115-120	Cobble (75%); Sand (10%); Rock (10%); Silt (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (80%)
120-125	120-125	Cobble (75%); Sand (10%); Rock (10%); Silt (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (60%)
125-130	125-130	Cobble (75%); Sand (10%); Rock (10%); Silt (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (15%); Bladderwrack (*Fucus vesiculosus*) (10%)
130-135	130-135	Cobble (75%); Sand (10%); Rock (10%); Silt (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (50%); Bladderwrack (*Fucus vesiculosus*) (5%)
135-140	135-140	Cobble (60%); Boulder (15%); Gravel (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (75%)
140-145	140-145	Cobble (65%); Gravel (25%); Rock (10%)	No fauna observed	Bladderwrack (*Fucus vesiculosus*) (30%); Rockweed (*Ascophyllum nodosum*) (5%)
145-150	145-150	Cobble (65%); Gravel (25%); Rock (10%)	No fauna observed	Rockweed (*Ascophyllum nodosum*) (15%); Bladderwrack (*Fucus vesiculosus*) (10%)
150-155 **T1 End**	150-155	Cobble (50%); Rock (30%); Gravel (15%); Bedrock (5%)	No fauna observed	Rockweed (*Ascophyllum nodosum*) (15%); Bladderwrack (*Fucus vesiculosus*) (10%)

*A = Abundant, C = Common, O = Occasional, U = Uncommon (See below).

Table A.2 250 m Survey – Transect T2, 25 July, 2015

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
0-5 **T2 Start**	0-5	Silt (70%); Sand (30%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 10-15 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual)	Macrofloral debris (40%)
5-10	5-10	Silt (70%); Sand (25%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Shell hash	Macrofloral debris (40%); Rockweed (*Ascophyllum nodosum*) (5%)
10-15	10-15	Silt (70%); Sand (25%); Rock (5%)	Periwinkles (*Littorina* sp.) (**O:** 5-10 individuals); Green sea urchin (*Strongylocentrotus droebachiensis*) (**U:** 2 individuals); Sea star (*Asterias* sp.) (**U:** 1 individual), Shell hash	Macrofloral debris (40%); Rockweed (*Ascophyllum nodosum*) (5%)
15-20	15-20	Silt (70%); Sand (30%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 20-25 individuals); Unidentified fish species (**U:** 1 individual)	Macrofloral debris (40%); Rockweed (*Ascophyllum nodosum*) (5%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
20-25	20-25	Silt (70%); Sand (25%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Sea star (*Asterias* sp.) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Rockweed (*Ascophyllum nodosum*) (10%)
25-30	25-30	Silt (35%); Sand (30%); Gravel (15%); Cobble (10%); Rock (10%)	Shell hash	Macrofloral debris (40%); Rockweed (*Ascophyllum nodosum*) (10%); Sugar kelp (*Laminaria saccharina*) (5%)
30-35	30-35	Silt (70%); Sand (30%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Sea star (*Asterias* sp.) (**U:** 2 individuals)	Macrofloral debris (40%)
35-40	35-40	Silt (70%); Sand (30%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 15-20 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual); Sea cucumber (*Cucumaria frondosa*) (**U:** 1 individual)	Macrofloral debris (40%); Green alga (*Spongomorph*a sp.) (5%)
40-45	40-45	Silt (70%); Sand (30%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Green crab (*Carcinus maenas*) (**U:** 3 individuals); Sea star (*Asterias* sp.) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Green alga (*Spongomorph*a sp.) (5%)
45-50	45-50	Silt (60%); Sand (25%); Cobble (15%)	Shell hash	Macrofloral debris (40%); Green alga (*Spongomorph*a sp.) (5%)
50-55	50-55	Silt (60%); Sand (25%); Cobble (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 15-20 individuals); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (15%); Sea lettuce (*Ulva lactuca*)
55-60	55-60	Silt (60%); Sand (25%); Cobble (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**U:** 2 individuals)	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (10%); Sea lettuce (*Ulva lactuca*) (5%); Red alga (*Plumaria plumosa*) (5%)
60-65	60-65	Silt (60%); Sand (25%); Cobble (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 10-15 individuals); Green crab (*Carcinus maenas*) (**U:** 2 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sea lettuce (*Ulva lactuca*) (10%); Encrusting algae (*Leptophyllum* sp.) (5%)
65-70	65-70	Silt (60%); Sand (25%); Cobble (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 10-15 individuals); Shell hash	Macrofloral debris (40%); Sea lettuce (*Ulva lactuca*) (5%); Encrusting algae (*Leptophyllum* sp.) (5%)
70-75	70-75	Silt (60%); Sand (25%); Cobble (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Green crab (*Carcinus maenas*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%)
75-80	75-80	Silt (60%); Sand (25%); Cobble (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Green crab (*Carcinus maenas*) (**U:** 1 individual); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual)	Macrofloral debris (40%)
80-85	80-85	Silt (60%); Sand (25%); Cobble (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Green crab (*Carcinus maenas*) (**U:** 2 individuals)	Macrofloral debris (40%)
85-90	85-90	Cobble (65%); Rock (25%); Gravel (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*); (**O:** 25-30 individuals); Sea cucumber (*Cucumaria frondosa*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (10%); Spiny sour weed (*Desmarestia aculeata*) (5%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
90-95	90-95	Silt (40%); Sand (20%); Gravel (15%); Cobble (15%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 15-20 individuals)	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (20%); Sugar kelp (*Laminaria saccharina*) (10%); Sea lettuce (*Ulva lactuca*) (5%)
95-100	95-100	Sand (65%); Silt (30%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**U:** 5 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual)	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (20%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Dulse (*Palmaria palmata*) (5%)
100-105	100-105	Sand (65%); Silt (25%); Rock (10%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 5-10 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 2 individuals)	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (10%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
105-110	105-110	Sand (60%); Silt (20%); Cobble (10%); Gravel (10%)	Green crab (*Carcinus maenas*) (**U:** 1 individual)	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (10%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
110-115	110-115	Sand (60%); Silt (15%); Cobble (10%); Gravel (10%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 10-15 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 3 individuals); Rock crab (*Cancer irroratus*) (**U:** 1 individual)	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (10%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Encrusting algae (*Leptophyllum* sp.) (5%)
115-120	115-120	Sand (60%); Silt (20%); Cobble (10%); Gravel (10%)	Sea star (*Asterias* sp.) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
120-125	120-125	Silt (70%); Sand (25%); Cobble (5%)	Unidentified fish species (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
125-130	125-130	Silt (70%); Sand (25%); Cobble (5%)	Green crab (*Carcinus maenas*) (**U:** 1 individual); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Unidentified fish species (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (20%); Sea lettuce (*Ulva lactuca*) (5%)
130-135	130-135	Silt (65%); Sand (25%); Cobble (10%)	Sea star (*Asterias* sp.) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (40%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Dulse (*Palmaria palmata*) (5%)
135-140	135-140	Silt (70%); Sand (25%); Cobble (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**O:** 10-15 individuals); Waved whelk (*Buccinum undatum*) (**U:** 1 individual); Unidentified fish species (**U:** 1 individual)	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (10%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Dulse (*Palmaria palmata*) (5%)
140-145	140-145	Silt (70%); Sand (25%); Cobble (5%)	Periwinkle (*Littorina* sp.) (**O:** 10-15 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (10%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
145-150	145-150	Silt (70%); Sand (25%); Cobble (5%)	Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Winter flounder (*Pseudopleuronectes americanus*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
150-155	150-155	Silt (70%); Sand (25%); Cobble (5%)	Green crab (*Carcinus maenas*) (**U:** 2 individuals)	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
155-160	155-160	Silt (70%); Sand (25%); Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 5-10 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 2 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual); Winter flounder (*Pseudopleuronectes americanus*) (**U:** 1 individual)	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (15%)
160-165	160-165	Silt (70%); Sand (25%); Cobble (5%)	Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Dulse (*Palmaria palmata*) (5%)
165-170	165-170	Silt (70%); Sand (25%); Cobble (5%)	Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
170-175	170-175	Silt (70%); Sand (25%); Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 5-10 individuals); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Encrusting algae (*Leptophyllum* sp.) (5%)
175-180	175-180	Silt (70%); Sand (25%); Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Northern rock barnacle (*Semibalanus balanoides*) (**C**); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (15%)
180-185	180-185	Silt (70%); Sand (25%); Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Hermit crab (*Pagarus acadianus*) (**U:** 2 individuals)	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (15%); Encrusting algae (*Leptophyllum* sp.) (5%)
185-190	185-190	Silt (70%); Sand (25%); Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 5-10 individuals); Shell hash	Macrofloral debris (40%); Encrusting algae (*Leptophyllum* sp.) (5%)
190-195	190-195	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 5-10 individuals); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (15%)
195-200	195-200	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Encrusting algae (*Leptophyllum* sp.) (5%)
200-205	200-205	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Encrusting algae (*Leptophyllum* sp.) (5%)
205-210	205-210	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Sea cucumber (*Cucumaria frondosa*) (**U:** 1 individual); Sea star (*Asterias* sp.) (**U:** 1 individual)	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Encrusting algae (*Leptophyllum* sp.) (5%)
210-215	210-215	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Hermit crab (*Pagarus acadianus*) (**U:** 2 individuals); Sea star (*Asterias* sp.) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (5%); Encrusting algae (*Leptophyllum* sp.) (5%)
215-220	215-220	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Encrusting algae (*Leptophyllum* sp.) (5%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
220-225	220-225	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 20-25 individuals); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (15%); Encrusting algae (*Leptophyllum* sp.) (5%)
225-230	225-230	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 20-25 individuals); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Encrusting algae (*Leptophyllum* sp.) (5%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
230-235	230-235	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 5-10 individuals); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
235-240	235-240	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 5-10 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual)	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%)
240-245	240-245	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Shell hash	Macrofloral debris (40%); Encrusting algae (*Leptophyllum* sp.) (10%)
245-250 **T2 End**	245-250	Silt (65%); Sand (25%); Cobble (5%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O:** 10-15 individuals); Shell hash	Macrofloral debris (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (5%)

*A = Abundant, C = Common, O = Occasional, U = Uncommon (See below).
Note: benthic worm burrows noted throughout the transect

Table A.3 135 m Survey – Transect TT1, 25 July, 2015

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
0-5 **TT1 Start**	0-5	Cobble (50%); Gravel (20%); Silt (15%); Sand (10%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**O**: 25-30 individuals)	Rockweed (*Ascophyllum nodosum*) (45%)
5-10	5-10	Silt (35%); Sand (30%); Rock (15%); Cobble (10%); Gravel (10%)	Periwinkle (*Littorina* sp.) (**C**)	Rockweed (*Ascophyllum nodosum*) (75%)
10-15	10-15	Silt (35%); Sand (30%); Rock (25%); Cobble (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (75%)
15-20	15-20	Boulder (30%); Silt (30%); Sand (25%); Gravel (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (50%)
20-25	20-25	Rock (30%); Silt (20%); Boulder (20%); Sand (15%); Gravel (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 5-10 individuals)	Rockweed (*Ascophyllum nodosum*) (75%)
25-30	25-30	Rock (60%); Gravel (20%); Silt (10%); Sand (10%)	Periwinkle (*Littorina* sp.) (**C**)	Rockweed (*Ascophyllum nodosum*) (40%); Bladderwrack (*Fucus vesiculosus*) (10%)
30-35	30-35	Silt (40%); Sand (20%); Rock (20%); Gravel (20%)	No fauna observed	Rockweed (*Ascophyllum nodosum*) (35%); Bladderwrack (*Fucus vesiculosus*) (10%)
35-40	35-40	Silt (40%); Gravel (30%); Sand (25%); Cobble (5%)	Shell hash	No flora observed
40-45	40-45	Silt (40%); Gravel (30%); Sand (20%); Cobble (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	No flora observed
45-50	45-50	Silt (50%); Sand (30%); Cobble (20%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Shell hash	Sea lettuce (*Ulva lactuca*) (5%)
50-55	50-55	Cobble (40%); Silt (20%); Gravel (20%); Sand (15%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Shell hash	Rockweed (*Ascophyllum nodosum*) (35%); Sea lettuce (*Ulva lactuca*) (5%); Brown alga (*Pilayella littoralis*) (5%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
55-60	55-60	Cobble (65%); Gravel (10%); Silt (15%); Sand (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Periwinkle (*Littorina* sp.) (**C**); Green crab (*Carcinus maenas*) (**U:** 2 individuals); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (10%); Sea lettuce (*Ulva lactuca*) (5%)
60-65	60-65	Silt (60%); Sand (25%); Cobble (10%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
65-70	65-70	Silt (60%); Sand (25%); Cobble (10%); Rock (5%)	Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (10%); Rockweed (*Ascophyllum nodosum*) (5%); Sugar kelp (*Laminaria saccharina*) (5%); Green alga (*Spongomorpha* sp.) (5%)
70-75	70-75	Cobble (40%); Silt (25%); Sand (15%); Gravel (15%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**U:** 2 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual); Shell hash	Sugar kelp (*Laminaria saccharina*) (20%); Spiny sour weed (*Desmarestia aculeata*) (15%); Sea lettuce (*Ulva lactuca*) (5%)
75-80	75-80	Silt (60%); Sand (25%); Cobble (10%); Rock (5%)	Green crab (*Carcinus maenas*) (**U:** 3 individuals); Green sea urchin (*Strongylocentrotus droebachiensis*) (**U:** 1 individual); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
80-85	80-85	Silt (75%); Sand (20%); Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 5-10 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual); Winter flounder (*Pseudopleuronectes americanus*) (**U:** 1 individual); Unidentified fish species (**U:** 1 individual)	Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
85-90	85-90	Silt (75%); Sand (25%)	No fauna observed	Macrofloral debris (40%)
90-95	90-95	Silt (65%); Sand (20%); Cobble (10%); Rock (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 10-15 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual)	Macrofloral debris (40%)
95-100	95-100	Silt (75%); Sand (20%); Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**C**); Northern rock barnacle (*Semibalanus balanoides*); (**O**: 5-10 individuals); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%)
100-105	100-105	Silt (75%); Sand (20%); Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 15-20 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual); White cross jellyfish (*Staurophora mertensi*) (**U:** 1 individual)	Macrofloral debris (40%); Encrusting algae (*Leptophyllum* sp.) (5%)
105-110	105-110	Silt (65%); Sand (20%); Cobble (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 5-10 individuals); Sea cucumber (*Cucumaria frondosa*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
110-115	110-115	Silt (65%); Sand (20%); Cobble (15%)	Shell hash	Sugar kelp (*Laminaria saccharina*) (20%); Sea lettuce (*Ulva lactuca*) (5%)
115-120	115-120	Silt (65%); Sand (20%); Cobble (15%)	Unidentified fish species (**U:** 1 individual); Shell hash	Sugar kelp (*Laminaria saccharina*) (20%); Sea lettuce (*Ulva lactuca*) (5%); Bladderwrack (*Fucus vesiculosus*) (5%)
120-125	120-125	Cobble (50%); Silt (30%); Sand (20%)	Shell hash	Sugar kelp (*Laminaria saccharina*) (40%); Spiny sour weed (*Desmarestia aculeata*) (20%); Sea lettuce (*Ulva lactuca*) (5%); Bladderwrack (*Fucus vesiculosus*) (5%)
125-130	125-130	Cobble (60%); Silt (15%); Gravel (15%); Sand (10%)	Shell hash	Sugar kelp (*Laminaria saccharina*) (75%); Spiny sour weed (*Desmarestia aculeata*) (10%); Sea lettuce (*Ulva lactuca*) (5%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
130-135 **TT1 End**	130-135	Cobble (60%); Silt (15%); Gravel (15%); Sand (5%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**C**); Green crab (*Carcinus maenas*) (**U:** 1 individual)	Sugar kelp (*Laminaria saccharina*) (40%); Spiny sour weed (*Desmarestia aculeata*) (10%); Macrofloral debris (10%); Rockweed (*Ascophyllum nodosum*) (5%); Encrusting algae (*Leptophyllum* sp.) (5%)

*A = Abundant, C = Common, O = Occasional, U = Uncommon (See below).
Note: benthic worm burrows noted throughout areas with predominantly silty substrate

Table A.4 135 m Survey – Transect TT2, 25 July, 2015

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
Intertidal zone **TT2 Start**	Photo in Attachment C	Predominantly cobble with lesser amounts of gravel	No fauna observed	Rockweed (*Ascophyllum nodosum*) (85%); Brown alga (*Pilayella littoralis*) (10%)
0-5	0-5	Cobble (45%); Rock (25%); Gravel (15%); Silt (10%); Sand (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**)	Rockweed (*Ascophyllum nodosum*) (90%); Encrusting algae (*Leptophyllum* sp.) (5%)
5-10	5-10	Cobble (40%); Silt (30%); Rock (15%); Sand (15%)	Periwinkle (*Littorina* sp.) (**O**: 5-10 individuals); Shell hash	Rockweed (*Ascophyllum nodosum*) (80%)
10-15	10-15	Cobble (60%); Silt (25%); Sand (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Shell hash	Rockweed (*Ascophyllum nodosum*) (45%); Bladderwrack (*Fucus vesiculosus*) (5%)
15-20	15-20	Cobble (60%); Silt (25%); Sand (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Shell hash	Rockweed (*Ascophyllum nodosum*) (35%); Brown alga (*Pilayella littoralis*) (5%)
20-25	20-25	Cobble (40%); Silt (35%); Sand (20%); Gravel (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green crab (*Carcinus maenas*) (**U:** 2 individuals); Shell hash	Rockweed (*Ascophyllum nodosum*) (25%); Brown alga (*Pilayella littoralis*) (5%)
25-30	25-30	Silt (50%); Sand (35%); Cobble (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (5%)
30-35	30-35	Silt (60%); Sand (30%); Cobble (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green crab (*Carcinus maenas*) (**U:** 2 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Shell hash	No flora observed
35-40	35-40	Silt (40%); Cobble (35%); Sand (25%)	Periwinkle (*Littorina* sp.) (**C**); Shell hash	Macrofloral debris (20%)
40-45	40-45	Silt (45%); Cobble (25%); Sand (25%); Rock (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**C**); Moon jellyfish (*Aurelia aurita*) (**U:** 1 individual)	Macrofloral debris (20%); Rockweed (*Ascophyllum nodosum*) (5%); Bladderwrack (*Fucus vesiculosus*) (5%)
45-50	45-50	Silt (75%); Sand (20%) Cobble (5%)	Periwinkle (*Littorina* sp.) (**C**); Green crab (*Carcinus maenas*) (**U:** 3 individuals); Moon jellyfish (*Aurelia aurita*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%)
50-55	50-55	Silt (75%); Sand (25%)	Periwinkle (*Littorina* sp.) (**C**); Green crab (*Carcinus maenas*) (**U:** 3 individuals); Shell hash	Macrofloral debris (40%)
55-60	55-60	Silt (75%); Sand (20%) Cobble (5%)	Periwinkle (*Littorina* sp.) (**O**: 25-30 individuals); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%)
60-65	60-65	Silt (75%); Sand (20%) Cobble (5%)	Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
65-70	65-70	Silt (75%); Sand (25%)	White cross jellyfish (*Staurophora mertensi*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%)
70-75	70-75	Silt (75%); Sand (20%) Cobble (5%)	Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
75-80	75-80	Silt (75%); Sand (20%) Cobble (5%)	Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Spiny sour weed (*Desmarestia aculeata*) (5%)
80-85	80-85	Silt (75%); Sand (20%) Cobble (5%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 5-10 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
85-90	85-90	Silt (75%); Sand (20%) Cobble (5%)	Shell hash	Macrofloral debris (40%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%)
90-95	90-95	Silt (40%); Sand (25%) Cobble (25%); Gravel (10%)	Shell hash	Macrofloral debris (35%); Sugar kelp (*Laminaria saccharina*) (10%); Sea lettuce (*Ulva lactuca*) (5%); Dulse (*Palmaria palmata*) (5%)
95-100	95-100	Silt (35%); Cobble (35%); Sand (20%) Gravel (10%)	Shell hash	Macrofloral debris (20%); Sugar kelp (*Laminaria saccharina*) (15%); Sea lettuce (*Ulva lactuca*) (5%); Spiny sour weed (*Desmarestia aculeata*) (5%)
100-105	100-105	Cobble (60%); Silt (15%); Rock (15%); Sand (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 5-10 individuals); Shell hash	Macrofloral debris (10%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Spiny sour weed (*Desmarestia aculeata*) (5%); Encrusting algae (*Leptophyllum* sp.) (5%)
105-110	105-110	Cobble (40%); Silt (25%); Sand (15%); Rock (10%); Gravel (10%)	Shell hash	Spiny sour weed (*Desmarestia aculeata*) (30%); Macrofloral debris (20%); Sugar kelp (*Laminaria saccharina*) (15%); Encrusting algae (*Leptophyllum* sp.) (5%)
110-115	110-115	Cobble (40%); Silt (25%); Sand (15%); Rock (10%); Gravel (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**O**: 5-10 individuals); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (15%); Sugar kelp (*Laminaria saccharina*) (10%); Sea lettuce (*Ulva lactuca*) (5%); Bladderwrack (*Fucus vesiculosus*) (5%)
115-120	115-120	Cobble (60%); Rock (15%); Silt (15%); Sand (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (10%); Encrusting algae (*Leptophyllum* sp.) (10%); Macrofloral debris (10%)
120-125	120-125	Cobble (60%); Rock (25%); Silt (10%); Sand (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (35%); Bladderwrack (*Fucus vesiculosus*) (5%)
125-130	125-130	Gravel (50%); Cobble (25%); Rock (25%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Shell hash	Rockweed (*Ascophyllum nodosum*) (40%); Brown alga (*Pilayella littoralis*) (15%); Bladderwrack (*Fucus vesiculosus*) (10%)
130-135	130-135	Gravel (40%); Cobble (35%); Rock (25%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Rockweed (*Ascophyllum nodosum*) (70%); Brown alga (*Pilayella littoralis*) (15%)
Intertidal zone **TT2 End**	Photo in Attachment C	Boulder (100%	No fauna observed	Rockweed (*Ascophyllum nodosum*) (85%); Brown alga (*Pilayella littoralis*) (10%); Bladderwrack (*Fucus vesiculosus*) (5%)

*A = Abundant, C = Common, O = Occasional, U = Uncommon (See below).
Note: benthic worm burrows noted throughout areas with predominantly silty substrate

Table A.5 115 m Survey – Transect TT3, 25 July, 2015

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
0-5 **TT3 Start**	0-5	Gravel (45%); Cobble (35%); Rock (10%); Boulder (5%)	No fauna observed	Rockweed (*Ascophyllum nodosum*) (35%); Bladderwrack (*Fucus vesiculosus*) (15%)
5-10	5-10	Boulder (60%); Gravel (15%); Cobble (15%)	No fauna observed	Rockweed (*Ascophyllum nodosum*) (80%); Bladderwrack (*Fucus vesiculosus*) (10%)
10-15	10-15	Cobble (65%); Gravel (25%); Rock (5%); Boulder (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**O**: 10-15 individuals); Periwinkle (*Littorina* sp.) (**U**: 3 individuals)	Rockweed (*Ascophyllum nodosum*) (45%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
15-20	15-20	Cobble (65%); Gravel (15%); Rock (15%); Boulder (5%)	No fauna observed	Bladderwrack (*Fucus vesiculosus*) (15%); Rockweed (*Ascophyllum nodosum*) (5%)
20-25	20-25	Cobble (60%); Rock (25%); Gravel (10%); Sand (5%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Bladderwrack (*Fucus vesiculosus*) (35%); Rockweed (*Ascophyllum nodosum*) (15%)
25-30	25-30	Cobble (50%); Rock (30%); Gravel (10%); Sand (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Bladderwrack (*Fucus vesiculosus*) (25%); Rockweed (*Ascophyllum nodosum*) (10%)
30-35	30-35	Rock (40%); Cobble (35%); Sand (15%); Gravel (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Bladderwrack (*Fucus vesiculosus*) (15%); Rockweed (*Ascophyllum nodosum*) (5%)
35-40	35-40	Rock (40%); Cobble (35%); Sand (15%); Gravel (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**)	Bladderwrack (*Fucus vesiculosus*) (20%)
40-45	40-45	Rock (40%); Cobble (35%); Sand (15%); Gravel (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Shell hash	Rockweed (*Ascophyllum nodosum*) (5%)
45-50	45-50	Rock (40%); Cobble (35%); Sand (15%); Gravel (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 25-30 individuals); Green crab (*Carcinus maenas*) (**U:** 2 individuals); Shell hash	Rockweed (*Ascophyllum nodosum*) (5%)
50-55	50-55	Cobble (40%); Gravel (25%); Sand (15%); Silt (10%); Rock (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 15-20 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (20%); Encrusting algae (*Leptophyllum* sp.) (15%)
55-60	55-60	Silt (45%); Cobble (25%); Sand (20%); Gravel (10%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 10-150 individuals); Shell hash	Macrofloral debris (15%)
60-65	60-65	Silt (70%); Sand (20%); Cobble (10%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**O**: 15-20 individuals); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (15%); Encrusting algae (*Leptophyllum* sp.) (10%); Sea lettuce (*Ulva lactuca*) (5%)
65-70	65-70	Silt (70%); Sand (20%); Cobble (10%)	Periwinkle (*Littorina* sp.) (**O**: 5-10 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Burrowing anemone (*Cerianthus borealis*) (**U:** 1 individual)	Spiny sour weed (*Desmarestia aculeata*) (5%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Dulse (*Palmaria palmata*) (5%)
70-75	70-75	Silt (65%); Cobble (20%); Sand (15%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Green sea urchin (*Strongylocentrotus droebachiensis*) (**U**: 5 individuals)	Spiny sour weed (*Desmarestia aculeata*) (40%); Macrofloral debris (15%); Encrusting algae (*Leptophyllum* sp.) (5%); Sea lettuce (*Ulva lactuca*) (5%)
75-80	75-80	Silt (65%); Cobble (20%); Sand (15%)	Shell hash	Spiny sour weed (*Desmarestia aculeata*) (25%); Sugar kelp (*Laminaria saccharina*) (15%); Macrofloral debris (15%); Sea lettuce (*Ulva lactuca*) (5%)
80-85	80-85	Silt (45%); Cobble (20%); Sand (20%); Gravel (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**U**: 5 individuals); Green crab (*Carcinus maenas*) (**U:** 3 individuals); Hermit crab (*Pagarus acadianus*) (**U:** 1 individual); Shell hash	Macrofloral debris (30%); Sugar kelp (*Laminaria saccharina*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Encrusting algae (*Leptophyllum* sp.) (5%)
85-90	85-90	Silt (30%); Gravel (30%); Cobble (25%); Sand (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**U**: 1 individual); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (30%); Sugar kelp (*Laminaria saccharina*) (15%); Sea lettuce (*Ulva lactuca*) (10%)

Transect Distance (m)	Transect Tag Numbers	Substrate (Estimated % Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (Estimated % Coverage)
90-95	90-95	Cobble (85%); Silt (15%)	Green sea urchin (*Strongylocentrotus droebachiensis*) (**U**: 2 individuals); Green crab (*Carcinus maenas*) (**U:** 1 individual)	Spiny sour weed (*Desmarestia aculeata*) (60%); Sugar kelp (*Laminaria saccharina*) (25%); Sea lettuce (*Ulva lactuca*) (5%)
95-100	95-100	Cobble (65%); Rock (25%); Silt (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Periwinkle (*Littorina* sp.) (**A**); Shell hash	Spiny sour weed (*Desmarestia aculeata*) (70%); Sugar kelp (*Laminaria saccharina*) (10%); Rockweed (*Ascophyllum nodosum*) (5%); Sea lettuce (*Ulva lactuca*) (5%); Encrusting algae (*Leptophyllum* sp.) (5%); Macrofloral debris (5%)
100-105	100-105	Cobble (65%); Rock (25%); Silt (10%)	Northern rock barnacle (*Semibalanus balanoides*) (**A**); Periwinkle (*Littorina* sp.) (**A**); Shell hash	Encrusting algae (*Leptophyllum* sp.) (15%); Rockweed (*Ascophyllum nodosum*) (10%); Sugar kelp (*Laminaria saccharina*) (5%)
105-110	105-110	Cobble (75%); Rock (25%)	Northern rock barnacle (*Semibalanus balanoides*) (**C**); Periwinkle (*Littorina* sp.) (**C**); Green crab (*Carcinus maenas*) (**U:** 1 individual); Shell hash	Rockweed (*Ascophyllum nodosum*) (60%); Spiny sour weed (*Desmarestia aculeata*) (10%); Sugar kelp (*Laminaria saccharina*) (5%); Bladderwrack (*Fucus vesiculosus*) (5%)
110-115 **TT3 End**	110-115	Cobble (45%); Sand (20%); Gravel (20%); Rock (20%)	Periwinkle (*Littorina* sp.) (**O**: 15-20 individuals)	Rockweed (*Ascophyllum nodosum*) (25%); Bladderwrack (*Fucus vesiculosus*) (20%)

*A = Abundant, C = Common, O = Occasional, U = Uncommon (See below).
Note: benthic worm burrows noted throughout areas with predominantly silty substrate

A = Abundant
Numerous (not quantifiable) observations made throughout the entire 5 m segment.

C = Common
Numerous (not quantifiable) observations made intermittently along the 5 m segment.

O = Occasional
Quantifiable observations made intermittently along the 5 m segment.

U = Uncommon
Quantifiable observations made infrequently along the 5 m segment.

APPENDIX B
Annotated Species List

Table B1 Annotated Species List

Classification	Common Name	Scientific Name
Macrofauna		
Crustacea	Northern Rock Barnacle	*Semibalanus balanoides*
	Green crab	*Carcinus maenas*
	Rock crab	*Cancer irroratus*
	Hermit crab	*Pagarus acadianus*
Mollusca	Periwinkle	*Littorina* sp.
	Waved whelk	*Buccinum undatum*
Enchinodermata	Seastar	*Asterias* sp.
	Green sea urchin	*Strongylocentrotus droebachiensis*
	Sea cucumber	*Cucumaria frondosa*
Cnidaria	White cross jellyfish	*Staurophora mertensi*
	Moon jellyfish	*Aurelia aurita*
	Burrowing anemone	*Cerianthus borealis*
Chordata	Winter flounder	*Pseudopleuronectes americanus*
Miscellaneous	Unidentified Fish	-----
Macroflora		
Chlorophyta	Green alga	*Spongomorpha* sp.
	Sea lettuce	*Ulva lactuca*
Rhodophyta	Dulse	*Palmaria palmata*
	Red alga	*Plumaria plumosa*
	Encrusting algae	*Leptophyllum* sp.
Phaeophyta	Bladderwrack	*Fucus vesiculosus*
	Rockweed	*Ascophyllum nodosum*
	Sugar kelp	*Laminaria saccharina*
	Spiny sour weed	*Desmarestia aculeata*
	Brown alga	*Pilayella littoralis*

APPENDIX C
Photo Log

General Site Photos

Looking south from wharf at study site at mid-tide

Looking west at intertidal portion of TT2 a

General Site Photos

Looking east at intertidal portion of TT2 b

Small cusk (*Brosme brosme*) found in the intertidal zone during benthic video collection

APPENDIX D
Limitations

LIMITATIONS

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:

    1. The Standard Terms and Conditions which form a part of our Professional Services Contract.
    2. The Scope of Services.
    3. Time and Budgetary limitations as described in our Contract.
    4. The Limitations stated herein.

2. The report has been prepared in accordance with generally accepted environmental study practices. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The objective of this report was solely to characterize the seabed footprint of the proposed Project area.
4. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Amec Foster Wheeler accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.