

APPENDIX J
Marine Habitat Assessment Supporting Documentation

ATTACHMENT A – Video Transect Results

ATTACHMENT B –Fish Community

ATTACHMENT C – Benthic Invertebrate Sample Results

ATTACHMENT D – Marine Sediment Results

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Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

ATTACHMENT A
Video Transect Results

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

Table E.1-1. 250m Transect – Transect T1, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
0-5	0-5	Sand (75%); Cobble (20%); Silt (5%)	Shell Hash	----
5-10	5-10	Cobble (80%); Sand (10%); Silt (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
10-15	10-15	Cobble (80%); Sand (10%); Silt (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Waved Whelk (<i>Buccinum undatum</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
15-20	15-20	Cobble (80%); Sand (10%); Silt (10%)	Waved Whelk (<i>Buccinum undatum</i>) (O: 5-10 individuals); Sea Cucumber (<i>Cucumaria frondosa</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
20-25	20-25	Cobble (80%); Sand (10%); Silt (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 2 individuals); Sea Star (<i>Asterias</i> sp.) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
25-30	25-30	Cobble (65%); Sand (25%); Silt (10%)	Periwinkle (<i>Littorina</i> sp.) (C); Waved Whelk (<i>Buccinum undatum</i>) (U: 2 individuals); Blue Mussel (<i>Mytilus edulis</i>) (U: 2 individuals); American Oyster (<i>Crassostrea virginica</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (15%); Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
30-35	30-35	Cobble (65%); Sand (25%); Silt (10%)	Blue Mussel (<i>Mytilus edulis</i>) (O: 10-15 individuals); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
35-40	35-40	Cobble (65%); Sand (25%); Silt (10%)	Waved Whelk (<i>Buccinum undatum</i>) (O: 10-15 individuals); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
40-45	40-45	Cobble (65%); Sand (25%); Silt (10%)	Waved Whelk (<i>Buccinum undatum</i>) (O: 10-15 individuals); Sea Star (<i>Asterias</i> sp.) (U: 1 individual); Sea Cucumber (<i>Cucumaria frondosa</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
45-50	45-50	Cobble (65%); Sand (25%); Silt (10%)	Periwinkle (<i>Littorina</i> sp.) (C); Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
50-55	50-55	Cobble (65%); Sand (25%); Silt (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
55-60	55-60	Cobble (65%); Sand (25%); Silt (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Bladderwrack (<i>Fucus</i> sp.) (5%)
60-65	60-65	Cobble (65%); Sand (25%); Silt (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
65-70	65-70	Cobble (65%); Sand (25%); Silt (10%)	Waved Whelk (<i>Buccinum undatum</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
70-75	70-75	Cobble (65%); Sand (25%); Silt (10%)	Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (20%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
75-80	75-80	Cobble (65%); Sand (25%); Silt (10%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
80-85	80-85	Cobble (75%); Sand (20%); Silt (5%)	Blue Mussel (<i>Mytilus edulis</i>) (U: 1 individual); Shell Hash	Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
85-90	85-90	Cobble (75%); Sand (20%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O:5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (20%)
90-95	90-95	Cobble (75%); Sand (20%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O:5-10 individuals); Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
95-100	95-100	Cobble (75%); Sand (20%); Silt (5%)	Blue Mussel (<i>Mytilus edulis</i>) (O 15-20 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
100-105	100-105	Cobble (75%); Sand (20%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O:5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
105-110	105-110	Cobble (75%); Sand (20%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O:5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
110-115	110-115	Cobble (75%); Sand (20%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O:5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
115-120	115-120	Cobble (75%); Sand (20%); Silt (5%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%)
120-125	120-125	Cobble (75%); Sand (15%); Rock (5%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)

Table E.1-1. 250m Transect – Transect T1, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
125-130	125-130	Cobble (90%); Sand (5%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O:5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
130-135	130-135	Cobble (90%); Sand (5%); Silt (5%)	Not visible	Sea Colander (<i>Agarum clathratum</i>) (5%)
135-140	135-140	Cobble (90%); Sand (5%); Silt (5%)	Not visible	Not visible
140-145	140-145	Cobble (85%); Boulder (5%); Sand (5%); Silt (5%)	Not visible	Not visible
145-150	145-150	Boulder (50%); Cobble (40%); Sand (5%); Silt (5%)	Friiled Anemone (<i>Metridium senile</i>) (O:5-10 individuals); Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (O:5-10 individuals)	Not visible
150-155	150-155	Boulder (75%); Cobble (20%); Sand (5%)	Not visible	Not visible
155-160	155-160	Boulder (50%); Cobble (40%); Sand (5%); Silt (5%)	Not visible	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
160-165	160-165	Cobble (85%); Sand (10%); Silt (5%)	Not visible	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
165-170	165-170	Cobble (85%); Sand (10%); Silt (5%)	Not visible	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
170-175	170-175	Cobble (85%); Sand (10%); Silt (5%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
175-180	175-180	Cobble (85%); Sand (10%); Silt (5%)	Lobster (<i>Homarus americanus</i>) (U: 1 individual)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
180-185	180-185	Cobble (85%); Sand (10%); Silt (5%)	Lobster (<i>Homarus americanus</i>) (U: 1 individual)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
185-190	185-190	Cobble (85%); Sand (10%); Silt (5%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
190-195	190-195	Cobble (85%); Sand (10%); Silt (5%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
195-200	195-200	Cobble (85%); Sand (10%); Silt (5%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
200-205	200-205	Cobble (85%); Sand (10%); Silt (5%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
205-210	205-210	Cobble (85%); Sand (10%); Silt (5%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
210-215	210-215	Cobble (85%); Sand (10%); Silt (5%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
215-220	215-220	Cobble (85%); Sand (10%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
220-225	220-225	Cobble (80%); Boulder (5%); Sand (5%); Silt (5%)	-----	Bladderwrack (<i>Fucus</i> sp.) (5%)
225-230	225-230	Cobble (80%); Boulder (5%); Sand (5%); Silt (5%)	Waved Whelk (<i>Buccinum undatum</i>) (U: 1 individual)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
230-235	230-235	Boulder (45%); Cobble (40%); Sand (10%); Silt (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
235-240	235-240	Boulder (45%); Cobble (40%); Sand (10%); Silt (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
240-245	240-245	Boulder (45%); Cobble (40%); Sand (10%); Silt (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Sea Peach (<i>Holacynthia adspersus</i>) (U: 2 individuals); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
245-250	245-250	Boulder (45%); Cobble (40%); Sand (10%); Silt (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Sea Peach (<i>Holacynthia pyriformis</i>) (O:5-10 individuals); Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (O:5-10 individuals)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)

*Definitions:

- 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)
- = Occasional** (Quantifiable observations made intermittently along the 5 m segment)
- U = Uncommon** (Quantifiable observations made infrequently along the 5 m segment)
- denotes "no life observed".

Table E.1-2. 250m Transect – Transect T2, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
0-5	0-5	Cobble (85%); Sand (10%); Silt (5%)	Shorthorn Sculpin (<i>Myoxocephalus scorpius</i>) (U: 1 individual); American Oyster (<i>Crassostrea virginica</i>) (U: 1 individual); Shell Hash	-----
5-10	5-10	Cobble (85%); Sand (10%); Silt (5%)	Blue Mussel (<i>Mytilus edulis</i>) (U: 1 individual); Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
10-15	10-15	Cobble (85%); Sand (10%); Silt (5%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
15-20	15-20	Cobble (85%); Sand (10%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
20-25	20-25	Cobble (85%); Sand (10%); Silt (5%)	Blue Mussel (<i>Mytilus edulis</i>) (O: 5-10 individuals)	Sea Colander (<i>Agarum clathratum</i>) (5%)
25-30	25-30	Cobble (85%); Sand (10%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
30-35	30-35	Cobble (85%); Sand (10%); Silt (5%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
35-40	35-40	Cobble (85%); Sand (10%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Unidentified Fish Species (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
40-45	40-45	Cobble (65%); Sand (30%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
45-50	45-50	Cobble (65%); Sand (30%); Silt (5%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
50-55	50-55	Cobble (65%); Sand (30%); Silt (5%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
55-60	55-60	Cobble (65%); Sand (30%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
60-65	60-65	Cobble (65%); Sand (30%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
65-70	65-70	Cobble (90%); Sand (10%)	Shell Hash	-----
70-75	70-75	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 2 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
75-80	75-80	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%)
80-85	80-85	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%)
85-90	85-90	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%)
90-95	90-95	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Kelp (<i>Laminaria saccharina</i>) (5%)
95-100	95-100	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
100-105	100-105	Cobble (90%); Sand (10%)	Blue Mussel (<i>Mytilus edulis</i>) (U:1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
105-110	105-110	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%)
110-115	110-115	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
115-120	115-120	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (20%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
120-125	120-125	Cobble (90%); Sand (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
125-130	125-130	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
130-135	130-135	Cobble (90%); Sand (10%)	Shorthorn Sculpin (<i>Myoxocephalus scorpius</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%); Bladderwrack (<i>Fucus</i> sp.) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)

Table E.1-2. 250m Transect – Transect T2, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
135-140	135-140	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%); Bladderwrack (<i>Fucus</i> sp.) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
140-145	140-145	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%); Bladderwrack (<i>Fucus</i> sp.) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
145-150	145-150	Cobble (90%); Sand (10%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (15%); Sea Colander (<i>Agarum clathratum</i>) (10%)
150-155	150-155	Cobble (90%); Sand (10%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (15%); Sea Colander (<i>Agarum clathratum</i>) (10%)
155-160	155-160	Boulder (45%); Cobble (40%); Sand (5%); Silt (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (C);	Sea Colander (<i>Agarum clathratum</i>) (5%)
160-165	160-165	Boulder (75%); Cobble (20%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (C); Lobster (<i>Homarus americanus</i>) (U: 1 individual)	-----
165-170	165-170	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
170-175	170-175	Cobble (90%); Sand (5%); Silt (5%)	Lobster (<i>Homarus americanus</i>) (U: 2 individuals)	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
175-180	175-180	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
180-185	180-185	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
185-190	185-190	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (15%); Sea Colander (<i>Agarum clathratum</i>) (5%)
190-195	190-195	Cobble (90%); Sand (5%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5 individuals)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
195-200	195-200	Cobble (90%); Sand (5%); Silt (5%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5 individuals)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
200-205	200-205	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
205-210	205-210	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
210-215	210-215	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
215-220	215-220	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
220-225	220-225	Cobble (90%); Sand (5%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
225-230	225-230	Cobble (60%); Boulder (30%); Sand (5%); Silt (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C)	Green Fleece (<i>Codium fragile</i>) (5%)
230-235	230-235	Cobble (60%); Boulder (30%); Sand (5%); Silt (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C)	-----
235-240	235-240	Boulder (75%); Cobble (20%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Lobster (<i>Homarus americanus</i>) (U: 1 individual)	-----
240-245	240-245	Boulder (75%); Cobble (20%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (O: 5 individuals); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 1 individual)	-----
245-250	245-250	Boulder (75%); Cobble (20%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C)	-----

*Definitions:

- 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)
- denotes "no life observed".

Table E.1-3. 250m Transect – Transect T3, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
0-5	0-5	Cobble (90%); Sand (10%)	Barnacle (<i>Semibalanus balanoides</i>) (A)	----
5-10	5-10	Cobble (65%); Rock (30%); Sand (10%)	Barnacle (<i>Semibalanus balanoides</i>) (A); ShellHash	Sea Colander (<i>Agarum clathratum</i>) (20%)
10-15	10-15	Rock (50%); Cobble (30%); Boulder (15%); Sand (5%)	Barnacle (<i>Semibalanus balanoides</i>) (A); Blue Mussel (<i>Mytilus edulis</i>) (C); Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (O: 5-10 individuals); Sea Star (<i>Asterias</i> sp.) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
15-20	15-20	Rock (50%); Cobble (30%); Boulder (15%); Sand (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (C); Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
20-25	20-25	Rock (50%); Cobble (30%); Boulder (15%); Sand (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (C); Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
25-30	25-30	Rock (50%); Cobble (30%); Boulder (15%); Sand (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
30-35	30-35	Rock (50%); Cobble (30%); Boulder (15%); Sand (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (C); Unidentified Fish Species (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (15%)
35-40	35-40	Cobble (90%); Sand (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
40-45	40-45	Cobble (90%); Sand (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C)	Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
45-50	45-50	Cobble (90%); Sand (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C); American Oyster (<i>Crassostrea virginica</i>) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
50-55	50-55	Cobble (85%); Sand (10%); Rock (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C)	Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
55-60	55-60	Cobble (90%); Sand (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (15%); Sea Colander (<i>Agarum clathratum</i>) (5%)
60-65	60-65	Cobble (75%); Boulder (15%); Rock (5%); Sand (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
65-70	65-70	Boulder (60%); Cobble (30%); Sand (10%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Sea Star (<i>Asterias</i> sp.) (U: 2 individuals); Lobster (<i>Homarus americanus</i>) (U: 1 individual)	----
70-75	70-75	Boulder (80%); Cobble (15%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Lobster (<i>Homarus americanus</i>) (U: 1 individual)	----
75-80	75-80	Boulder (100%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
80-85	80-85	Boulder (80%); Rock (10%); Cobble (10%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	----
85-90	85-90	Boulder (80%); Rock (10%); Cobble (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (C); Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	----
90-95	90-95	Boulder (50%); Cobble (30%); Rock (20%)	Blue Mussel (<i>Mytilus edulis</i>) (C); Shell Hash	Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
95-100	95-100	Boulder (50%); Cobble (30%); Rock (20%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Cunner (<i>Tautoglabrus adspersus</i>) (U: 1 individual); Lobster (<i>Homarus americanus</i>) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%)
100-105	100-105	Cobble (100%)	Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (20%)
105-110	105-110	Cobble (100%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Unidentified Fish Species (U: 1 individual)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (60%); Bladderwrack (<i>Fucus</i> sp.) (10%)

Table E.1-3. 250m Transect – Transect T3, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
110-115	110-115	Cobble (100%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (60%); Bladderwrack (<i>Fucus</i> sp.) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
115-120	115-120	Cobble (100%)	Cunner (<i>Tautogolabrus adspersus</i>) (U: 3 individuals)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (40%); Bladderwrack (<i>Fucus</i> sp.) (25%); Tube Weed (<i>Polysiphonia lanosa</i>) (10%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
120-125	120-125	Boulder (100%)	Cunner (<i>Tautogolabrus adspersus</i>) (U: 4 individuals)	Bladderwrack (<i>Fucus</i> sp.) (50%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (20%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
125-130	125-130	Boulder (100%)	Unidentified Fish Species (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (40%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (25%); Tube Weed (<i>Polysiphonia lanosa</i>) (10%)
130-135	130-135	Boulder (50%); Cobble (50%)	-----	Bladderwrack (<i>Fucus</i> sp.) (25%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (25%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)
135-140	135-140	Boulder (50%); Cobble (50%)	-----	Bladderwrack (<i>Fucus</i> sp.) (60%); Kelp (<i>Laminaria saccharina</i>) (15%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%)
140-145	140-145	Boulder (50%); Cobble (50%)	Cunner (<i>Tautogolabrus adspersus</i>) (U: 3 individuals); Sea Star (<i>Asterias</i> sp.) (U: 4 individuals)	Bladderwrack (<i>Fucus</i> sp.) (75%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
145-150	145-150	Boulder (75%); Cobble (25%)	-----	Bladderwrack (<i>Fucus</i> sp.) (60%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (20%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
150-155	150-155	Boulder (75%); Cobble (25%)	-----	Bladderwrack (<i>Fucus</i> sp.) (60%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (20%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
155-160	155-160	Boulder (75%); Cobble (25%)	Unidentified Fish Species (U: 2 individuals)	Bladderwrack (<i>Fucus</i> sp.) (60%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (20%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
160-165	160-165	Boulder (75%); Cobble (25%)	Cunner (<i>Tautogolabrus adspersus</i>) (O: 5-10 individuals)	Bladderwrack (<i>Fucus</i> sp.) (60%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (20%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
165-170	165-170	Boulder (75%); Cobble (25%)	Unidentified Fish Species (O: 5-10 individuals)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (45%); Bladderwrack (<i>Fucus</i> sp.) (25%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)
170-175	170-175	Boulder (75%); Cobble (25%)	Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (25%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (15%)
175-180	175-180	Boulder (75%); Cobble (25%)	-----	Bladderwrack (<i>Fucus</i> sp.) (30%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Kelp (<i>Laminaria saccharina</i>) (15%); Irish Moss (<i>Chondrus crispus</i>) (5%)
180-185	180-185	Boulder (75%); Cobble (25%)	Cunner (<i>Tautogolabrus adspersus</i>) (U: 2 individuals)	Bladderwrack (<i>Fucus</i> sp.) (65%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (15%); Tube Weed (<i>Polysiphonia lanosa</i>) (10%)
185-190	185-190	Boulder (75%); Cobble (25%)	Cunner (<i>Tautogolabrus adspersus</i>) (U: 1 individual); Lobster (<i>Homarus americanus</i>) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (80%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Irish Moss (<i>Chondrus crispus</i>) (5%)
190-195	190-195	Boulder (75%); Cobble (25%)	Cunner (<i>Tautogolabrus adspersus</i>) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (40%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Irish Moss (<i>Chondrus crispus</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
195-200	195-200	Cobble (80%); Boulder (20%)	-----	Black Whip Weed (<i>Chordaria flagelliformis</i>) (25%); Bladderwrack (<i>Fucus</i> sp.) (15%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Brown alga (<i>Pilayella littoralis</i>) (5%)
200-205	200-205	Cobble (100%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>); (O: 5-10 individuals)	Bladderwrack (<i>Fucus</i> sp.) (25%); Brown alga (<i>Pilayella littoralis</i>) (10%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)

Table E.1-3. 250m Transect – Transect T3, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
205-210	205-210	Cobble (80%); Boulder (20%)	Unidentified Fish Species (U: 1 individual); Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (20%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Brown alga (<i>Pilayella littoralis</i>) (5%)
210-215	210-215	Cobble (65%); Boulder (35%)	-----	Bladderwrack (<i>Fucus</i> sp.) (20%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Brown alga (<i>Pilayella littoralis</i>) (5%)
215-220	215-220	Cobble (100%)	-----	Bladderwrack (<i>Fucus</i> sp.) (20%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Brown alga (<i>Pilayella littoralis</i>) (5%)
220-225	220-225	Cobble (65%); Boulder (35%)	-----	Bladderwrack (<i>Fucus</i> sp.) (35%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Brown alga (<i>Pilayella littoralis</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)
225-230	225-230	Cobble (65%); Boulder (35%)	Unidentified Fish Species (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (35%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Brown alga (<i>Pilayella littoralis</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)
230-235	230-235	Cobble (65%); Boulder (35%)	-----	Bladderwrack (<i>Fucus</i> sp.) (35%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Brown alga (<i>Pilayella littoralis</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)
235-240	235-240	Cobble (65%); Boulder (35%)	Cunner (<i>Tautogolabrus adspersus</i>) (U: 1 individual); Sea Star (<i>Asterias</i> sp.) (U: 1 individual); Deep Sea Scallop (<i>Placopecten magellanicus</i>); (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (35%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Brown alga (<i>Pilayella littoralis</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)
240-245	240-245	Cobble (65%); Boulder (35%)	-----	Bladderwrack (<i>Fucus</i> sp.) (35%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Brown alga (<i>Pilayella littoralis</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)
245-250	245-250	Cobble (65%); Boulder (35%)	Cunner (<i>Tautogolabrus adspersus</i>) (O: 5-10 individuals)	Bladderwrack (<i>Fucus</i> sp.) (35%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (10%); Brown alga (<i>Pilayella littoralis</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)

*Definitions:

- 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)
- = Occasional** (Quantifiable observations made intermittently along the 5 m segment)
- U = Uncommon** (Quantifiable observations made infrequently along the 5 m segment)
- denotes "no life observed".

Table E.1-4. 150m Transect – Transect T4, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
0-5	0-5	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
5-10	5-10	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
10-15	10-15	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
15-20	15-20	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Waved Whelk (<i>Buccinum undatum</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
20-25	20-25	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Waved Whelk (<i>Buccinum undatum</i>) (O: 5-10 individuals); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals)	-----
25-30	25-30	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
30-35	30-35	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Waved Whelk (<i>Buccinum undatum</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Sea Colander (<i>Agarum clathratum</i>) (5%)
35-40	35-40	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
40-45	40-45	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Waved Whelk (<i>Buccinum undatum</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
45-50	45-50	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
50-55	50-55	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
55-60	55-60	Cobble (70%); Sand (25%); Silt (5%)	Barnacle (<i>Semibalanus balanoides</i>) (C); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
60-65	60-65	Cobble (70%); Sand (25%); Silt (5%)	Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
65-70	65-70	Cobble (70%); Sand (25%); Silt (5%)	Waved Whelk (<i>Buccinum undatum</i>) (O: 5-10 individuals); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
70-75	70-75	Cobble (70%); Sand (25%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
75-80	75-80	Cobble (70%); Sand (25%); Silt (5%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%)
80-85	80-85	Cobble (70%); Sand (25%); Silt (5%)	Shell Hash	Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
85-90	85-90	Cobble (90%); Sand (10%)	Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
90-95	90-95	Cobble (60%); Boulder (30%); Sand (10%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C)	Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%)
95-100	95-100	Boulder (70%); Cobble (25%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (O: 15-20 individuals); Lobster (<i>Homarus americanus</i>) (U: 1 individual)	Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
100-105	100-105	Boulder (70%); Cobble (25%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
105-110	105-110	Boulder (85%); Cobble (10%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Lobster (<i>Homarus americanus</i>) (U: 1 individual); Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%); Encrusting Red Alga (<i>Leptophyllum</i> sp.) (5%)
110-115	110-115	Boulder (90%); Sand (10%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (O: 25-30 individuals); Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	-----
115-120	115-120	Boulder (90%); Sand (10%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C)	Bladderwrack (<i>Fucus</i> sp.) (5%)

Table E.1-4. 150m Transect – Transect T4, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
120-125	120-125	Boulder (90%); Sand (10%)	Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (O:5-10 individuals); Cunner (<i>Tautogolabrus adspersus</i>) (O: 10-15 individuals)	Bladderwrack (<i>Fucus</i> sp.) (15%); Sea Colander (<i>Agarum clathratum</i>) (5%)
125-130	125-130	Boulder (90%); Sand (10%)	Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (15%); Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%)
130-135	130-135	Boulder (90%); Sand (10%)	Unidentified Fish Species (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (25%); Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%); Tube Weed (<i>Polysiphonia lanosa</i>) (10%); Irish Moss (<i>Chondrus crispus</i>) (5%)
135-140	135-140	Boulder (90%); Sand (10%)	Unidentified Fish Species (O: 5-10 individuals)	Bladderwrack (<i>Fucus</i> sp.) (60%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)
140-145	140-145	Boulder (90%); Sand (10%)	Cunner (<i>Tautogolabrus adspersus</i>) (O: 5-10 individuals); Lobster (<i>Homarus americanus</i>) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (75%); Irish Moss (<i>Chondrus crispus</i>) (10%); Tube Weed (<i>Polysiphonia lanosa</i>) (10%)
145-150	145-150	Boulder (90%); Sand (10%)	-----	Bladderwrack (<i>Fucus</i> sp.) (85%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Kelp (<i>Laminaria saccharina</i>) (5%)

*Definitions:

- 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)
- denotes "no life observed".

Table E.1-5. 150m Transect – Transect T5, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
0-5	0-5	Not visible	Not visible	Not visible
5-10	5-10	Not visible	Not visible	Not visible
10-15	10-15	Cobble (80%); Sand (20%)	Shell Hash	-----
15-20	15-20	Cobble (80%); Sand (20%)	Shell Hash	Bladderwrack (<i>Fucus</i> sp.) (5%)
20-25	20-25	Cobble (80%); Sand (20%)	Shell Hash	Bladderwrack (<i>Fucus</i> sp.) (5%)
25-30	25-30	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 2 individuals); Shell Hash	-----
30-35	30-35	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	-----
35-40	35-40	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Sea Star (<i>Asterias</i> sp.) (U: 1 individual); Shell Hash	-----
40-45	40-45	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	-----
45-50	45-50	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (10%); Red Alga (<i>Plumaria plumosa</i>) (10%)
50-55	50-55	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Green Alga (<i>Acrosiphonia arcta</i>) (10%); Red Alga (<i>Plumaria plumosa</i>) (10%)
55-60	55-60	Cobble (90%); Sand (10%)	Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (30%); Red Alga (<i>Plumaria plumosa</i>) (30%); Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
60-65	60-65	Cobble (90%); Sand (10%)	Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (20%); Red Alga (<i>Plumaria plumosa</i>) (20%); Sea Colander (<i>Agarum clathratum</i>) (5%)
65-70	65-70	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (20%); Red Alga (<i>Plumaria plumosa</i>) (20%)
70-75	70-75	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 1 individual); Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (10%); Red Alga (<i>Plumaria plumosa</i>) (10%); Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
75-80	75-80	Cobble (80%); Sand (20%)	Blue Mussel (<i>Mytilus edulis</i>) (O: 15-20 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%); Kelp (<i>Laminaria saccharina</i>) (5%)
80-85	80-85	Cobble (80%); Sand (20%)	Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (20%); Red Alga (<i>Plumaria plumosa</i>) (20%); Sea Colander (<i>Agarum clathratum</i>) (5%)
85-90	85-90	Cobble (80%); Sand (20%)	Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (20%); Red Alga (<i>Plumaria plumosa</i>) (20%); Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
90-95	90-95	Cobble (80%); Sand (20%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (15%); Red Alga (<i>Plumaria plumosa</i>) (15%); Sea Colander (<i>Agarum clathratum</i>) (5%); Kelp (<i>Laminaria saccharina</i>) (5%)
95-100	95-100	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (25%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
100-105	100-105	Cobble (90%); Sand (10%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (20%); Bladderwrack (<i>Fucus</i> sp.) (5%)
105-110	105-110	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (10%); Bladderwrack (<i>Fucus</i> sp.) (5%)
110-115	110-115	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
115-120	115-120	Cobble (90%); Sand (10%)	Shell Hash	Bladderwrack (<i>Fucus</i> sp.) (5%)
120-125	120-125	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
125-130	125-130	Cobble (90%); Sand (10%)	Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Sea Colander (<i>Agarum clathratum</i>) (5%)

Table E.1-5. 150m Transect – Transect T5, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
130-135	130-135	Cobble (75%); Rock (20%); Sand (5%)	Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (U: 1 individual); Lobster (<i>Homarus americanus</i>) (U: 1 individual); Unidentified Fish Species (U: 1 individual)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (35%); Bladderwrack (<i>Fucus</i> sp.) (15%)
135-140	135-140	Boulder (75%); Cobble (20%); Sand (5%)	Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (C); Unidentified Fish Species (U: 1 individual)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (10%); Bladderwrack (<i>Fucus</i> sp.) (10%)
140-145	140-145	Boulder (100%)	Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (C)	Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
145-150	145-150	Boulder (100%)	Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (C); Unidentified Fish Species (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (75%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)

*Definitions:

- 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)
- = Occasional** (Quantifiable observations made intermittently along the 5 m segment)
- U = Uncommon** (Quantifiable observations made infrequently along the 5 m segment)
- denotes "no life observed".

Table E.1-6. 150m Transect – Transect T6, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
0-5	0-5	Cobble (65%); Sand (35%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 1 individual); Shell Hash	----
5-10	5-10	Cobble (65%); Sand (35%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 2 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
10-15	10-15	Cobble (65%); Sand (35%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%)
15-20	15-20	Cobble (65%); Sand (35%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals)	----
20-25	20-25	Cobble (75%); Sand (25%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
25-30	25-30	Cobble (65%); Sand (35%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	----
30-35	30-35	Cobble (65%); Sand (35%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	----
35-40	35-40	Cobble (65%); Sand (35%)	Shell Hash	----
40-45	40-45	Cobble (65%); Sand (35%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (5%);
45-50	45-50	Cobble (75%); Sand (25%)	Shell Hash	----
50-55	50-55	Cobble (75%); Sand (25%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%)
55-60	55-60	Cobble (75%); Sand (25%)	Deep Sea Scallop (<i>Placopecten magellanicus</i>) (O: 5-10 individuals); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Kelp (<i>Laminaria saccharina</i>) (5%)
60-65	60-65	Cobble (90%); Sand (10%)	Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%); Green Alga (<i>Acrosiphonia arcta</i>) (10%); Red Alga (<i>Plumaria plumosa</i>) (10%)
65-70	65-70	Cobble (90%); Sand (10%)	Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (C); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%); Green Alga (<i>Acrosiphonia arcta</i>) (15%); Red Alga (<i>Plumaria plumosa</i>) (10%)
70-75	70-75	Cobble (70%); Rock (25%); Sand (5%)	Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (C); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (20%);
75-80	75-80	Cobble (85%); Sand (10%); Rock (5%)	Shell Hash	Green Alga (<i>Acrosiphonia arcta</i>) (10%); Red Alga (<i>Plumaria plumosa</i>) (10%); Sea Colander (<i>Agarum clathratum</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
80-85	80-85	Cobble (75%); Sand (25%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Deep Sea Scallop (<i>Placopecten magellanicus</i>) (U: 1 individual); Shell Hash	Sea Colander (<i>Agarum clathratum</i>) (15%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Bladderwrack (<i>Fucus</i> sp.) (5%)
85-90	85-90	Rock (90%); Cobble (10%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C)	Bladderwrack (<i>Fucus</i> sp.) (5%)
90-95	90-95	Rock (90%); Cobble (5%); Sand (5%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (O: 5-10 individuals)	----
95-100	95-100	Rock (100%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C)	----
100-105	100-105	Rock (100%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Blue Mussel (<i>Mytilus edulis</i>) (O: 5-10 individuals); Unidentified Fish Species (U: 1 individual)	----
105-110	105-110	Rock (100%)	Green Sea Urchin (<i>Strongylocentrotus droebachiensis</i>) (C); Unidentified Fish Species (U: 1 individual)	Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%); Black Whip Weed (<i>Chordaria flagelliformis</i>) (5%); Kelp (<i>Laminaria saccharina</i>) (5%)
110-115	110-115	Rock (100%)	Bowerbank's Halichondria (<i>Halichondria bowerbanki</i>) (C); Fish (O: 5-10 individuals)	Black Whip Weed (<i>Chordaria flagelliformis</i>) (25%); Bladderwrack (<i>Fucus</i> sp.) (15%); Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%)

Table E.1-6. 150m Transect – Transect T6, August 31-September 3, 2010

Transect Distance (m)	Transect Tag Numbers	Substrate (% Coverage)	Macrofaunal Life Observed (Estimated Abundances*)	Macrofloral Life Observed (% Coverage)
115-120	115-120	Rock (100%)	-----	Kelp (<i>Laminaria saccharina</i>) (5) Bladderwrack (<i>Fucus</i> sp.) (25%); Green Alga (<i>Acrosiphonia arcta</i>) (5%); Red Alga (<i>Plumaria plumosa</i>) (5%)
120-125	120-125	Rock (100%)	Unidentified Fish Species (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (75%); Tube Weed (<i>Polysiphonia lanosa</i>) (15%); Kelp (<i>Laminaria saccharina</i>) (5%)
125-130	125-130	Rock (90%); Cobble (10%)	Barnacle (<i>Semibalanus balanoides</i>) (C)	Bladderwrack (<i>Fucus</i> sp.) (75%); Irish Moss (<i>Chondrus crispus</i>) (15%); Tube Weed (<i>Polysiphonia lanosa</i>) (10%)
130-135	130-135	Rock (100%)	Barnacle (<i>Semibalanus balanoides</i>) (C)	Bladderwrack (<i>Fucus</i> sp.) (85%); Kelp (<i>Laminaria saccharina</i>) (15%)
135-140	135-140	Rock (100%)	Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (85%); Kelp (<i>Laminaria saccharina</i>) (5%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Sea Lettuce (<i>Ulva</i> sp.) (5%)
140-145	140-145	Rock (85%); Cobble (15%)	Sea Star (<i>Asterias</i> sp.) (U: 1 individual)	Bladderwrack (<i>Fucus</i> sp.) (85%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%); Dulse (<i>Palmaria palmata</i>) (5%)
145-150	145-150	Rock (80%); Cobble (20%)	-----	Bladderwrack (<i>Fucus</i> sp.) (85%); Tube Weed (<i>Polysiphonia lanosa</i>) (5%)

*Definitions:

- 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)
- = Occasional** (Quantifiable observations made intermittently along the 5 m segment)
- U = Uncommon** (Quantifiable observations made infrequently along the 5 m segment)
- denotes "no life observed".

Table E.1-7. List of Species Observed during Video Transect Survey of Benthic Habitat off Black Point, September 2010.

Marine Fauna	
American Oyster	<i>Crassostrea virginica</i>
Barnacle	<i>Semibalanus balanoides</i>
Blue Mussel	<i>Mytilus edulis</i>
Bowerbank's Halichondria	<i>Halichondria bowerbanki</i>
Cunner	<i>Tautoglabrus adspersus</i>
Frilled Anemone	<i>Metridium senile</i>
Green Sea Urchin	<i>Strongylocentrotus droebachiensis</i>
Lobster	<i>Homarus americanus</i>
Periwinkle	<i>Littorina sp.</i>
Scallop	<i>Placopecten magellanicus</i>
Sea Cucumber	<i>Cucumaria frondosa</i>
Sea Peach	<i>Holacynthia pyriformis</i>
Sea Star	<i>Asterias sp.</i>
Shorthorn Sculpin	<i>Myoxocephalus scorpius</i>
Waved Whelk	<i>Buccinum undatum</i>
Marine Flora	
Black Whip Weed	<i>Chordaria flagelliformis</i>
Bladderwrack	<i>Fucus sp.</i>
Brown alga	<i>Pilayella littoralis</i>
Encrusting Red Alga	<i>Leptophyllum sp.</i>
Green Alga	<i>Acrosiphonia arcta</i>
Green Fleece	<i>Codium fragile</i>
Irish Moss	<i>Chondrus crispus</i>
Kelp	<i>Laminaria saccharina</i>
Red Alga	<i>Plumaria plumosa</i>
Sea Colander	<i>Agarum clathratum</i>
Tube Weed	<i>Polysiphonia lanosa</i>

ATTACHMENT B
Fish Community

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

Species	Preferred Habitat	Life History Strategies
Atlantic Cod (<i>Gadus morhua</i>)	<p>From inshore regions to shelf break</p> <p>From surface to depths of 600 m → usually 150-200m</p> <p>Prefers temperatures between 3-8 deg C</p> <p>A variety of habitats</p>	<p>Spawns from March to December → winter and beginning of spring</p> <p>Spawning sites are in offshore water, at or near the bottom, 50-200m depth and 0-12 deg C</p> <p>Migrate between spawning, feeding and overwintering areas, usually within 200 km</p>
Atlantic Haddock (<i>Melanogrammus aeglefinus</i>)	<p>From inshore regions to shelf break</p> <p>Found in depths 10 – 450 m, usually 10-200 m → adults 80-200m</p> <p>Prefers temperatures between 4-10 deg C</p> <p>A variety of habitat, juveniles have higher survival rates when they settle on sand or gravel bottoms</p>	<p>Occasional year-round spawning activity</p> <p>Generally spawns in water less than 91 m → 50 -150 m depth</p>
Thorny Skate (<i>Amblyraja radiata</i>)	<p>Cool water fish – temperatures ranging from 50 deg F to near the freezing point of salt water</p> <p>Prefers water deeper than 18 m – majority between 65 m and 90 m likely due to the availability of food source</p> <p>Lives on the bottom partially buried in sand or mud</p>	<p>“Lay large eggs with blackish –sea green leathery shells, roughly oblong in outline, with a hollow tendril at each corner by which they become fastened to seaweeds or other objects”</p> <p>Egg cases can range from 3-3 ¼ inches in length → flat on one side and convex on the other</p> <p>Spawn throughout the year – incubation can last several months up to a year or more</p>
Winter Skate (<i>Leucoraja ocellata</i>)	<p>Depths from 45m to 65 m are preferred but can be found as shallow as 3-7m along banks and sandy beaches</p>	<p>Rock crab and squid are favoured prey</p> <p>“Lay large eggs with blackish</p>

	<p>Can be found on the icy bottom along the banks and shallower in the Southern portion of the Gulf of St. Lawrence – temperatures as high as 16 deg C or more</p>	<p>–sea green leathery shells, roughly oblong in outline, with a hollow tendril at each corner by which they become fastened to seaweeds or other objects”</p> <p>“Off the Atlantic coast of Nova Scotia this skate deposits its eggs from summer into autumn”</p> <p>Egg cases can range from 2 ½ to 2 ¾ inches by 1 ¾ inches</p>
<p>Sand Lance (<i>Ammodytes americanus</i>) (Auster and Stewart 1986)</p>	<p>Occur in estuarine, open coastal, and offshore habitats over sand substrates → schools during the day that increase in size as water depth increases → will bury themselves partly or fully in the sand for escape and rest → need relatively higher velocity bottom currents to keep interstitial water oxygenated</p> <p>Larvae common at the mouth of major estuaries but are commonly found right out to the edge of the continental shelf</p> <p>Most abundant between 3-6 deg C, as low as 0 deg C in bottom waters</p>	<p>Mature in 1-2 years</p> <p>Spawning occurs November to March → mainly inshore</p> <p>Eggs deposited on/in sand or gravel over a wide area</p> <p>Larvae 3-40 mm from hatching through planktonic stage to semidemersal stage where they start to exhibit schooling tendencies and burrow into the sand</p> <p>Sand Lance dominated by 1- to 2-year-old fish but can live to 9 years of age.</p>
<p>Cunner (<i>Tautoglabrus adspersus</i>) (Auster 1989)</p>	<p>Shallow inshore waters → on or near bottom</p> <p>Congregate around wharves, wrecks and seaweed</p>	<p>Spawning June – August</p> <p>Hibernates during the winter months under rocks</p> <p>Will return to home ranges when displaced</p>
<p>Shorthorn Sculpin (<i>Myoxocephalus scorpius</i>)</p>	<p>In shoal waters near bays and ledges → variety of substrates → prefers to hug the bottom closely</p> <p>Depths of 18-37 m → 55-60 deg F</p>	<p>Spawning November to February, main egg production in December</p> <p>Eggs stick together and sink and may be deposited in a variety of places</p>

		By May-June at lengths 22-25 mm they go from drifting near the surface to living near the bottom
<p>Atlantic Herring (<i>Clupea harengus</i>)</p> <p>(Gromack 2010)</p>	<p>Inhabit open sea and offshore banks</p> <p>Adults migrate hundreds of miles throughout their life</p> <p>During winter migrations they can form massive schools</p> <p>“Herring that spawn off the southwest coast of Nova Scotia near Yarmouth winter in Chedabucto Bay in northern Nova Scotia, a sea migration of over 500 kms” http://www.gma.org/herring/biology/life_cycle/default.asp</p>	<p>Travel from spawning sites (coastal, offshore, offshore banks) to feeding grounds in a migratory cycle → dependent on season and life history stage → spawning times late summer and early fall</p> <p>Eggs sink to the bottom to form dense carpets of eggs and hatch into larvae in 7-10 days (dependent on water temp) → larvae drift on ocean currents and eddies (7-29mm)</p> <p>Young juveniles (~40mm) are abundant in inshore waters through spring and summer → schools of juveniles will enter shallow bays and inlets → late summer and fall they move offshore to winter near the bottom (also avoid the adults going to the spawning grounds)</p> <p>Maturity reached at about 3-4 years and 23-26 cm → migrate to feed, spawn and over-winter</p>
<p>Atlantic Mackerel (<i>Scomber scombrus</i>)</p> <p>(Gromack 2010)</p>	<p>Gather in dense schools of thousands of fish during the daytime (14-18 m) and night time (as deep as 27-46 m)</p> <p>Prefer the open sea, young can enter estuaries and harbours looking for food but never fresh water → not</p>	<p>Spawn in spring and early summer (June for outer Nova Scotia) anywhere along the coast from Cape Hatteras to the southern side of the Gulf of St. Lawrence → release eggs wherever, no particular</p>

	<p>dependent upon being near the coast nor the bottom → usually found from the inner half to outer part of the continental shelf but not usually beyond the upper part of the shelf</p> <p>Range from surface to as deep as 100 fathoms (183 m) → spring to autumn common in 25-30 fathoms (46-55 m) and shallower</p> <p>Temperatures of 7-20 deg C</p>	<p>substrate → drift with the currents</p> <p>Newly hatched larvae 3.1-3.3 mm, resemble parents at 50 mm</p> <p>Migrate from the coast to deeper waters by the end of December and return in the spring and early summer</p>
<p>Atlantic Bluefin Tuna (<i>Thunnus thynnus</i>) (DFO 2013)</p>	<p>Open water fish but sticks to the continental shelf during the warm seasons due to prey concentration being higher → 50-54 deg F lower temp range favoured, when sea temps start to drop in autumn the schools will migrate to warmer waters</p> <p>Travel in small schools of 6 – 40 fish sometimes much larger schools → schools are made up of fish of approximately the same age → very large fish can be solitary</p> <p>Congregate at or near the surface → lower depths vary depending on temperature and prey</p>	<p>Prey on smaller schooling fish</p> <p>Will chase prey into small harbours and bays along the outer coasts of Nova Scotia, including Bras D’or lake</p> <p>Migrate up from Jamaica and the Gulf of Mexico starting in May and are reported in the Gulf of St. Lawrence in June-July</p> <p>Adults spawn in the Gulf of Mexico (mainly the northern portion) in early spring (April and May) and then migrate up the Western Atlantic (east coasts of the US and Canada) for their fall feeding season</p> <p>Juvenile tuna tend to stick to the eastern coast of the US with depths ranging from surface up to 250 m → mainly between surface and 50m m from July to Sept, and deepening in range gradually from Oct to April and back up again from May to June</p>

Species	Preferred Habitat	Life History Strategies
<p>American Lobster (<i>Homarus americanus</i>)</p> <p>(Mackenzie and Moring 1985)</p>	<p>Relatively low concentrations live along the outer edge of the Nova Scotia shelf</p> <p>Two types: inshore and offshore</p> <p>Offshore lobsters migrate between the outer Continental Shelf and shallower Continental Shelf seeking the optimum temperatures for growth and mating → migrations are triggered by water temperature changes, seek temps of 8-14 deg C → In spring they move to shallower water and return to the outer shelf starting in late summer through to Nov-Dec → use mud or clay substrates to make bowl shaped depressions for shelter</p> <p>Inshore lobsters don't migrate and have a limited home range → will move to deeper water during a storm → subject to winter temperatures → prefer sand with overlying boulder substrates</p> <p>Canadian east coast lobsters will move to water 15-18 m deep in the winter, and 7-9 m deep in the summer</p>	<p>Spawning lobsters pair for about 2 weeks after the females have molted → eggs are extruded 11-13 months after mating and attach to the females bodies for 9-11 months → eggs hatch from May to October depending on water temperature (starts at 15 deg C and peaks at 20 deg C) → females release larvae at night</p> <p>Four larval stages where they are planktonic and positively photosensitive from May to October → part way through stage four they turn negatively photosensitive and retreat to the bottom and burrow into the substrate → molt into juveniles while in their burrows</p> <p>Juveniles (<35 mm) rarely leave their burrows or shelters → 35-40 mm they start to venture outside → 45 mm they start to forage</p> <p>Juveniles and adults travel less than 300 m from their shelters</p> <p>Offshore lobsters molt more often than inshore lobsters → molting lobsters are more susceptible to low salinities</p> <p>Juveniles and adults are predators and catch live prey mostly → prefer rock crabs but will eat sea urchins, mussels, and sea stars</p> <p>Adults are preyed upon by many species including: Atlantic Cod, Skates, Cunners, and Haddock</p>
<p>Rock Crab (<i>Cancer irroratus</i>)</p>	<p>Inhabit near shore Atlantic regions from southern Labrador to Miami,</p>	<p>Mating occurs after females have molted → can produce 4000-</p>

<p>(</p>	<p>Florida → shallow waters in bays on sandy or muddy bottoms → depths from 0-575m, Canada's east coast generally between 5-20m</p>	<p>330,000 eggs → extruded mid-late autumn through to spring-early summer</p> <p>Larvae are planktonic for six stages of moulting before settling to the bottom → settle inshore on gravel or cobble substrates for juvenile stage</p> <p>Juvenile and adult diets include sea scallops, green sea urchin, sand shrimp, mussels, snails brittlestar and polychaete → Larger adults will prey on small lobsters</p>
<p>Snow Crab (<i>Chionoecetes opilio</i>) (DFO 2013)</p>	<p>Predators are: skates (primarily thorny skate), cod, seal, halibut, and the American plaice → smaller and soft-shell crabs are highly vulnerable</p> <p>Prefer a temperature range of 3-4 deg C on muddy or sandy bottoms ranging from 50-600 m</p> <p>"mostly found in the estuary and the Gulf of St. Lawrence, around Cape Breton Island, on the Scotian Shelf..."</p>	<p>Females are much smaller than males → only males are allowed to be harvested</p> <p>Mating pairs migrate to shallow waters in the spring → eggs are fertilized before being released → females carry the eggs under their abdomen for 1-2 years (water temperature dependant) before they hatch</p> <p>Eggs hatch in the spring (April to late May) and are planktonic larvae for 3-5 months until settling to the bottom for their juvenile stage</p> <p>Males go through: juvenile (cannot reproduce), adolescent (reproductive organs work but no enlarged claws), and adult (enlarged claws) → moult every year until they develop enlarged claws (8-13 moults)</p> <p>Females go through: immature (narrow abdomen and no detectable ovaries), prepubescent</p>

		(ovaries begin to develop), adult (broader abdomen and ability to reproduce) → become sexually mature between 8-10 moults
Northern Shrimp (<i>Pandalus borealis</i>) (DFO 2014)	<p>Prefers soft muddy bottoms between 150-600m deep</p> <p>Prefers water temperature of 2-6 deg C</p> <p>Migrate vertically and horizontally in the water column → egg-bearing females will migrate to shallower water and congregate → will migrate at night from the bottom through the water column in search of food (krill and copepods) → feed on the bottom during the day on annelids, small crustacean and detritus</p>	<p>Mating occurs in late summer-fall → eggs remain attached to the females until the following spring (7-8 months) → hatch in April-May and larvae are planktonic for a few months before spending more time near the bottom</p> <p>Reach male sexual maturity at 2-3 years → transition to females over the winter when 4-5 years → mating takes place the following fall</p>
Sea Scallop (<i>Placopecten magellanicus</i>) (Mullen et al. 1986)	<p>Occupy coastal waters rarely deeper than 110 m</p> <p>Do not compete well with other molluscs for food or space</p> <p>Young prefer shell fragments and other animals for settling due to the inability to survive on shifting sand bottoms and provides protection from predators</p> <p>Predators include: rock crab, adult and juvenile lobster, Atlantic cod, and sculpins, among others</p>	<p>Sea scallop eggs and larvae are planktonic → eggs hatch 30-40 hours after fertilization (at 12-18 deg C) → larvae remain planktonic for over a month and may be transported by currents out of their spawning area before spatfall → spat crawl around on the bottom until they can find something hard to attach to → relatively active until about 8cm long and can swim away when under threat (predators or dredging) → adults >10mm detach from the epibenthic structures and settle to the bottom → adult scallops (> 9 cm) do not migrate</p> <p>Spawning occurs in Newfoundland at temps between 4-16 deg C → a rapid drop in temperature may trigger spawning</p> <p>Commercially viable when reach</p>

		fifth or sixth year → the success/failure of a specific year class (affected by temperature and spawning success) can in turn have an effect on the commercial catch 5-6 years later
Green Sea Urchin (<i>Lytechinus variegates</i>) (DFO 2000-06)	Prefer shallow waters (<10 m) with rocky substrates (but will tolerate any substrate) → avoid areas of extreme wave action → can be found as deep as 1000 m “Found in highest concentration in feeding fronts bordering the deep edge of kelp beds” Thought to migrate seasonally	Crawl along the ocean floor feeding on fine algae, kelp and seaweeds Spawns in late winter/early spring → larvae planktonic for 8-12 weeks and then settle to the bottom → growth dependent on temperature and food supply taking anywhere from 5-15 years to reach commercial size of 50 mm

References

Auster, P.J. 1989. Species and profiles: life histories and environmental requirements of coastal fishes and invertebrates (north Atlantic and Mid-Atlantic) -- tautog and cunner. U.S. Fish and Wildlife Service Biological Reports 82(11.105). U.S. Army Corps of Engineers, TR EL-82-4. 13pp.

ATTACHMENT C
Benthic Invertebrate Sample Results

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

Table E.2-1. Species Presence and Abundance within Benthic Invertebrate Samples Collected off Black Point, September 2010.

PHYLUM	SPECIES	Abundance (# of individuals per sample)					
		GQ 02	GQ 25	GQ 27	GQ 31	GQ 47	GQ 50
CNIDARIA	<i>Metridium senile</i>	1	0	0	0	0	0
	<i>Sertularia sp.</i>	5	0	0	0	0	0
NEMERTEA	<i>Cerebratulus lacteus</i>	0	0	0	0	0	1
OLIGOCHAETA	<i>Pelosclex benedeni</i>	0	4	0	1	0	1
	Other Tubificidae	0	0	0	0	1	2
POLYCHAETA	<i>Acmira catherinae</i>	0	40	1	0	6	3
	<i>Amphitrite johnstoni</i>	0	0	0	0	0	1
	<i>Anaitides groenlandica</i>	1	0	0	0	0	0
	<i>Anaitides maculata</i>	0	5	0	0	0	2
	<i>Capitella capitata</i>	0	5	3	0	0	0
	<i>Dexiospira spirillum</i>	29	0	0	0	0	0
	<i>Eualia bilineata</i>	1	0	0	0	0	0
	<i>Exogone sp.</i>	0	2	2	1	0	0
	<i>Glycera dibranchiata</i>	2	10	1	6	2	2
	<i>Harmothoe extenuata</i>	2	7	0	2	0	6
	<i>Harmothoe imbricata</i>	1	1	3	0	2	2
	<i>Lepidonotus squamatus</i>	0	1	0	0	0	0
	<i>Lumbrineris fragilis</i>	5	4	2	13	5	1
	<i>Microthalamus sp.</i>	0	0	1	0	0	0
	<i>Naineris quadricuspida</i>	1	0	0	0	0	1
	<i>Neanthes virens</i>	1	0	1	0	0	1
	<i>Nephtys caeca</i>	1	0	0	0	0	0
	<i>Pectenaria granulata</i>	0	2	5	1	5	0
	<i>Pherusa sp.</i>	0	0	0	0	1	0
	<i>Pholoe minuta</i>	1	8	9	0	3	1
	<i>Polycirrus sp.</i>	0	0	3	0	0	1
	<i>Prionospio steenstrupi</i>	0	0	1	0	0	0
	<i>Schistomeringus caeca</i>	0	0	4	3	0	0
	<i>Scoloplos sp.</i>	1	0	0	0	0	0
	<i>Spio filicornis</i>	0	0	0	0	0	1
	<i>Spirorbis borealis</i>	48	0	0	0	0	0
<i>Syllis cornuta</i>	0	2	2	0	0	5	
<i>Tharyx sp.</i>	1	7	9	34	14	5	
BRYOZOA	<i>Dendrobeania murryana</i>	2	0	0	0	0	0
	<i>Electra pilosa</i>	0	0	0	0	0	1
	<i>Membranipora membranacea</i>	0	0	0	8	0	0
POLYPLACOPHORA	<i>Ischnochiton albus</i>	2	0	0	0	0	0
	<i>Ischnochiton rubra</i>	4	2	0	1	8	0

Table E.2-1. Species Presence and Abundance within Benthic Invertebrate Samples Collected off Black Point, September 2010.

PHYLUM	SPECIES	Abundance (# of individuals per sample)					
		GQ 02	GQ 25	GQ 27	GQ 31	GQ 47	GQ 50
GASTROPODA	<i>Bittium alternatum</i>	7	0	0	0	0	0
	<i>Euspira triseriata</i>	0	0	0	0	1	0
	<i>Lacuna vincta</i>	0	2	1	0	3	3
	<i>Margarites groenlandicus</i>	2	0	0	0	0	0
	<i>Moelleria costulata</i>	2	0	0	0	0	0
	<i>Nassarius trivittatus</i>	1	4	3	0	8	0
	<i>Oenopota sp.</i>	5	0	1	0	0	0
	<i>Onoba aculeus</i>	2	2	2	0	3	2
	<i>Tectura testudinalis</i>	13	44	49	21	34	35
	<i>Trichtropis borealis</i>	1	0	0	0	0	0
	<i>Turbonilla interrupta</i>	4	4	73	10	6	2
BIVALVIA	<i>Anomia simplex</i>	1	0	2	1	1	0
	<i>Arctica islandica</i>	1	0	0	0	0	0
	<i>Astarte undata</i>	13	0	1	2	0	0
	<i>Cerastoderma pinnulatum</i>	6	0	2	0	1	2
	<i>Clinocardium ciliatum</i>	2	0	0	0	0	0
	<i>Crenella glandula</i>	9	0	0	0	1	0
	<i>Hiatella arctica</i>	2	2	0	0	1	0
	<i>Modiolus modiolus</i>	3	1	0	3	4	53
	<i>Mysella planulata</i>	0	0	1	0	0	4
	<i>Mytilus edulis</i>	2	0	0	0	0	0
	<i>Nucula delphinodonta</i>	3	0	0	0	0	0
<i>Thyasira gouldii</i>	9	0	0	0	0	0	
CIRRIPEDIA	<i>Semibalanus balanoides</i>	3	0	2	0	0	0
ISOPODA	<i>Idotea phosphorea</i>	0	0	0	0	0	2
AMPHIPODA	<i>Corophium sp.</i>	0	0	1	0	4	0
	<i>Caprella linearis</i>	0	0	0	0	0	3
	<i>Caprella septentrionalis</i>	5	2	0	0	16	5
	<i>Dexamine thea</i>	0	0	0	0	1	0
	<i>Gammarus oceanicus</i>	0	2	0	0	0	0
	<i>Melita dentata</i>	1	0	0	0	0	0
	<i>Unciola irrorata</i>	0	53	0	1	1	17
DECAPODA	<i>Cancer irroratus</i>	0	0	0	0	0	1
	<i>Pagurus acadianus</i>	0	3	2	0	4	0
INSECTA	Chironomidae	0	0	0	0	0	1
ASTEROIDEA	<i>Asterias sp.</i>	2	3	0	0	0	2
OPHIUROIDEA	<i>Amphipholis squamatus</i>	4	1	1	1	3	1
	<i>Ophiopholis aculeata</i>	2	1	1	0	6	1
ECHINOIDEA	<i>Echinarachnius parma</i>	2	0	0	0	0	0
	<i>Strongylocentrotus droebachiensis</i>	3	94	8	0	21	11
ASCIDIACEA	<i>Molgula sp.</i>	0	0	0	0	0	1
Total # individuals		219	318	197	109	166	183
Number of Taxa		47	30	31	17	30	36
Wet weight g.		10.14	1.45	1.74	0.81	19.82	5.82

ATTACHMENT D
Marine Sediment Results

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

Marine Sediment Sampling Parameters and Guidelines

Parameter	Units	CEPA Ocean Disposal Guidelines - Atlantic Region	CCME Probable Effects Levels, Rev. 2002	CCME Soil Quality Guidelines, Rev. 2008					
			Maine/Estuarine Sediment	Human Health	Environmental Health				Human Health
Potable Water	Soil Contact			Soil and Food Ingestion	Freshwater Life	Direct Contact			
Agricultural, Residential/Parkland, Commercial, and Industrial Land Uses	Agricultural, Residential/Parkland Uses	Commercial/Industrial Land Uses		Agricultural, Residential/Parkland Uses	Agricultural, Residential/Parkland, Commercial, and Industrial Land Uses				
PAHs									
2-Methylnaphthalene	mg/kg	-	0.201	-	-	-	-	-	
Acenaphthene	mg/kg	-	0.0889	-	-	-	-	0.28	
Acenaphthylene	mg/kg	-	0.128	-	-	-	21.5	320	
Anthracene	mg/kg	-	0.245	-	2.5	32	61.5	-	
Benz(a)anthracene	mg/kg	-	0.693	0.33	-	-	6.2	-	-
Benzo(a)pyrene	mg/kg	-	0.763	0.37	20	72	0.6	8800	-
Benzo(b)fluoranthene	mg/kg	-	-	-	-	-	-	-	
Benzo(b+j)fluoranthene	mg/kg	-	-	0.16	-	-	6.2	-	-
Benzo(g,h,i)perylene	mg/kg	-	-	6.8	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	-	-	0.034	-	-	6.2	-	-
Chrysene	mg/kg	-	0.846	2.1	-	-	6.2	-	-
Dibenz(a,h)anthracene	mg/kg	-	0.135	0.23	-	-	-	-	-
Fluoranthene	mg/kg	-	1.494	-	50	180	15.4	-	
Fluorene	mg/kg	-	0.144	-	-	-	15.4	0.25	
Indeno(1,2,3-cd)pyrene		-	-	2.7	-	-	-	-	-

	mg/kg								
Naphthalene	mg/kg	-	0.391	-	-	-	8.8	0.013	
Phenanthrene	mg/kg	-	0.544	-	-	-	43.0	0.046	
Pyrene	mg/kg	-	1.398	-	-	-	7.7	-	
Total PAH3	mg/kg	2.5	-	-	-	-	-	-	
IACR (Protection of Potable Water)4	-	-	-	1	-	-	-	-	
Benzo(a)pyrene TPE (10-5)5	mg/kg								5.3
Benzo(a)pyrene TPE (10-5) with UF6	mg/kg								

Parameter	Units	CEPA Ocean Disposal Guidelines - Atlantic Region	CCME Probable Effects Levels, Rev. 2002	CCME Soil Quality Guidelines, Rev. 2008			
			Maine/Estuarine Sediment	Agricultural	Residential/Parkland	Commercial/Industrial	
Metals							
Antimony	mg/kg	-		20	20	40	
Arsenic	mg/kg	-		12	12	12	
Barium	mg/kg	-	-	750	500	2000	
Beryllium	mg/kg	-	-	4	4	8	
Cadmium	mg/kg	0.6	4.2	1.4	10	22	
Chromium +6	mg/kg	-	-	0.4	0.4	1.4	
Chromium (Total)	mg/kg	-	160	64	64	87	
Cobalt	mg/kg	-	-	40	50	300	
Copper	mg/kg	81*	108	63	63	91	
Lead	mg/kg	66*	112	70	140	260	600
Mercury	mg/kg	0.75	0.7	6.6	6.6	24	50
Molybdenum	mg/kg	-	-	5	10	40	
Nickel	mg/kg	-	-	50	50	50	
Selenium	mg/kg	-	-	1	1	2.9	
Silver	mg/kg	-	-	20	20	40	
Thallium	mg/kg	-	-	1	1	1	
Tin	mg/kg	-	-	5	50	300	
Uranium	mg/kg			23	23	33	300
Vanadium	mg/kg	-	-	130	130	130	
Zinc	mg/kg	160*	271	200	200	360	
PCBs							
Aroclor 1254	mg/kg	-	0.709	-	-	-	
Total PCB Concentration	mg/kg	0.1	0.189	0.5	1.3	33	

DDTs						
2,4' - DDD + 4,4' - DDD	mg/kg	-	0.00781	-	-	-
2,4' - DDE + 4,4' - DDE	mg/kg	-	0.37400	-	-	-
2,4' - DDT + 4,4' - DDT	mg/kg	-	0.00477	-	-	-
Total DDT	mg/kg	-	-	0.7	0.7	12
Grain Size Results						
<PHI -4.00 (12.5 mm)	%	-	-	-	-	-
<PHI -3.00 (9.5 mm)	%	-	-	-	-	-
<PHI -2.00 (4.75 mm)	%	-	-	-	-	-
<PHI -1.00 (2.00 mm)	%	-	-	-	-	-
<PHI 0.00 (1.00 mm)	%	-	-	-	-	-
<PHI +1.0 (0.50 mm)	%	-	-	-	-	-
<PHI +2.0 (0.25 mm)	%	-	-	-	-	-
<PHI +3.0 (0.125 mm)	%	-	-	-	-	-
<PHI +4.0 (0.0625 mm)	%	-	-	-	-	-
<PHI +5.0 (0.031 mm)	%	-	-	-	-	-
<PHI +6.0 (0.0156 mm)	%	-	-	-	-	-
<PHI +7.0 (0.0078 mm)	%	-	-	-	-	-
<PHI +8.0 (0.0039 mm)	%	-	-	-	-	-
<PHI +9.0 (0.002 mm)	%	-	-	-	-	-
Gravel	%	-	-	-	-	-
Sand	%	-	-	-	-	-
Silt	%	-	-	-	-	-
Clay	%	-	-	-	-	-
Carbon and Moisture Results						
Total Carbon	g/kg	-	-	-	-	-

Total Organic Carbon	g/kg	-	-	-	-	-
Total Inorganic Carbon	g/kg	-	-	-	-	-
Moisture	%	-	-	-	-	-

Table E.3-1. PAH Results of the Sediment Samples Collected for Black Point Quarry Project

Parameter	Units	Sample Identification and Date			CEPA Ocean Disposal Guidelines - Atlantic Region	CCME Probable Effects Levels, Rev. 2002 ¹	CCME Soil Quality Guidelines, Rev. 2008 ²				
		GQ 02	GQ 25	GQ 50			Human Health		Environmental Health		
							Potable Water	Soil Contact		Soil and Food Ingestion	Freshwater Life
		September 1, 2010					Marine / Estuarine Sediment	Agricultural, Residential / Parkland, Commercial, and Industrial Land Uses	Agricultural, Residential / Parkland Land Uses	Commercial / Industrial Land Uses	Agricultural, Residential / Parkland Land Uses
Polycyclic Aromatic Hydrocarbons (PAH) Results											
2-Methylnaphthalene	mg/kg	<0.02	<0.02	<0.02	-	0.201	-	-	-	-	-
Acenaphthene	mg/kg	<0.005	<0.005	<0.005	-	0.0889	-	-	-	-	0.28
Acenaphthylene	mg/kg	<0.005	<0.005	<0.005	-	0.128	-	-	-	21.5	320
Anthracene	mg/kg	<0.04	<0.04	<0.04	-	0.245	-	2.5	32	61.5	-
Benz(a)anthracene	mg/kg	<0.01	<0.01	<0.01	-	0.693	0.33	-	-	6.2	-
Benzo(a)pyrene	mg/kg	<0.01	<0.01	<0.01	-	0.763	0.37	20	72	0.6	8800
Benzo(b)fluoranthene	mg/kg	<0.05	<0.05	<0.05	-	-	-	-	-	-	-
Benzo(b+j)fluoranthene	mg/kg	<0.01	<0.01	<0.01	-	-	0.16	-	-	6.2	-
Benzo(g,h,i)perylene	mg/kg	<0.01	<0.01	<0.01	-	-	6.8	-	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.01	<0.01	<0.01	-	-	0.034	-	-	6.2	-
Chrysene	mg/kg	<0.01	<0.01	<0.01	-	0.846	2.1	-	-	6.2	-
Dibenz(a,h)anthracene	mg/kg	<0.006	<0.006	<0.006	-	0.135	0.23	-	-	-	-
Fluoranthene	mg/kg	<0.05	<0.05	<0.05	-	1.494	-	50	180	15.4	-
Fluorene	mg/kg	<0.02	<0.02	<0.02	-	0.144	-	-	-	15.4	0.25
Indeno(1,2,3-cd)pyrene	mg/kg	<0.01	<0.01	<0.01	-	-	2.7	-	-	-	-
Naphthalene	mg/kg	<0.01	<0.01	<0.01	-	0.391	-	-	-	8.8	0.013
Phenanthrene	mg/kg	<0.04	<0.04	<0.04	-	0.544	-	-	-	43.0	0.046
Pyrene	mg/kg	<0.05	<0.05	<0.05	-	1.398	-	-	-	7.7	-
Total PAH ³	mg/kg	0.168	0.168	0.168	2.5	-	-	-	-	-	-
IACR (Protection of Potable Water) ⁴	-	0.225	0.225	0.225	-	-	1	-	-	-	-

¹ denotes Canadian Council of Ministers for the Environment (CCME) Canadian Environmental Quality Guidelines - Sediment Quality Guidelines, revised 2002.

² denotes Canadian Council of Ministers for the Environment (CCME) Canadian Environmental Quality Guidelines - Soil Quality Guidelines, revised 2008.

³ Total PAH calculation based on the sum of 16 PAH compounds (acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluorene, fluoranthene, ideno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene) as per guidance from Environment Canada, 2009.

⁴ denotes Index of Additive Cancer Risk (IACR) = ([Benz(a)anthracene]/0.33mg/kg) + ([Chrysene]/2.1mg/kg) + ([Benzo(b+j)fluoranthene]/0.16mg/kg) + ([Benzo(k)fluoranthene]/0.034) + ([Benzo(a)pyrene]/0.37mg/kg) + ([Indeno(1,2,3-c,d)pyrene]/2.7mg/kg) + ([Dibenz(a,h)anthracene]/0.23mg/kg) + ([Benzo(g,h,i)perylene]/6.8mg/kg).

⁵ denotes Total Potency Equivalent (TPE) SQG based on an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10⁻⁵).

⁶ "NA" denotes the Benzo(a)pyrene TPE has not been multiplied by an uncertainty factor (UF) of 3 as results from the lab indicate there is no evidence of creosote in the sample.

NOTE: All results below the laboratory detection limit were divided by 2 prior to further calculations.

Table E.3-2. PAH Results of the Sediment Samples Collected for Black Point Quarry Project, with Application of Benzo(a)pyrene Potency Equivalency Factors

Parameter	Units	Sample Identification and Date			Benzo(a)pyrene Potency Equivalency Factors	CCME Soil Quality Guidelines, Rev. 2008 ¹
		GQ 02	GQ 25	GQ 50		Human Health
		July 22, 2010				Direct Contact
Agricultural, Residential / Parkland, Commercial, and Industrial Land Uses						
Polycyclic Aromatic Hydrocarbons (PAH) Results (with application of Benzo(a)pyrene Potency Equivalency Factors)						
Benz(a)anthracene	mg/kg	0.000500	0.000500	0.000500	0.1	-
Benzo(a)pyrene	mg/kg	0.005000	0.005000	0.005000	1	-
Benzo(b+j)fluoranthene	mg/kg	0.000500	0.000500	0.000500	0.1	-
Benzo(g,h,i)perylene	mg/kg	0.000050	0.000050	0.000050	0.01	-
Benzo(k)fluoranthene	mg/kg	0.000500	0.000500	0.000500	0.1	-
Chrysene	mg/kg	0.000050	0.000050	0.000050	0.01	-
Dibenz(a,h)anthracene	mg/kg	0.003000	0.003000	0.003000	1	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.000500	0.000500	0.000500	0.1	-
Benzo(a)pyrene TPE (10⁻⁵)⁵	mg/kg	0.010100	0.010100	0.010100	-	5.3
Benzo(a)pyrene TPE (10⁻⁵) with UF⁶	mg/kg	NA	NA	NA	-	

¹ denotes Canadian Council of Ministers for the Environment (CCME) Canadian Environmental Quality Guidelines - Sediment Quality Guidelines, revised 2002.

⁵ denotes Total Potency Equivalent (TPE) SQG based on an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10⁻⁵).

Table E.3-3. Metal Concentrations in the Sediment Samples Collected for Black Point Quarry Project

Metals	Units	Sample Identification and Date			CEPA Ocean Disposal Guidelines- Atlantic Region	CCME Probable Effects Levels, Rev. 2002 ¹	CCME Soil Quality Guidelines, Rev. 2008 ²			
		GQ 02	GQ 25	GQ 50			Agricultural	Residential/ Parkland	Commercial/ Industrial	
		September 1, 2010				Marine / Estuarine Sediment				
Antimony	mg/kg	<2	<2	<2	-	-	20	20	40	
Arsenic	mg/kg	3	<2	3	-	41.6	12	12	12	
Barium	mg/kg	18	6	<5	-	-	750	500	2000	
Beryllium	mg/kg	<2	<2	<2	-	-	4	4	8	
Cadmium	mg/kg	<0.3	<0.3	<0.3	0.6	4.2	1.4	10	22	
Chromium +6	mg/kg	<0.5	<0.5	<0.5	-	-	0.4	0.4	1.4	
Chromium (Total)	mg/kg	10	11	11	-	160	64	64	87	
Cobalt	mg/kg	3	3	3	-	-	40	50	300	
Copper	mg/kg	4	4	4	81*	108	63	63	91	
Lead	mg/kg	5.5	3.1	3	66*	112	70	140	260	600
Mercury	mg/kg	<0.05	<0.05	<0.05	0.75	0.7	6.6	6.6	24	50
Molybdenum	mg/kg	<2	<2	<2	-	-	5	10	40	
Nickel	mg/kg	9	10	10	-	-	50	50	50	
Selenium	mg/kg	<1	<1	<1	-	-	1	1	2.9	
Silver	mg/kg	<0.5	<0.5	<0.5	-	-	20	20	40	
Thallium	mg/kg	<0.1	<0.1	<0.1	-	-	1	1	1	
Tin	mg/kg	<2	<2	<2	-	-	5	50	300	
Uranium	mg/kg	0.6	0.5	0.3			23	23	33	300
Vanadium	mg/kg	12	12	12	-	-	130	130	130	
Zinc	mg/kg	29	25	20	160*	271	200	200	360	

*Former Interim Rejection Limits (1991) which are not currently used to screen for ocean based disposal permitting but may be considered in terms of further investigation prior to issuance of an Ocean Disposal Permit (Victor Li, Environment Canada, pers. comm., June 2002).

¹ denotes Canadian Council of Ministers for the Environment (CCME) Canadian Environmental Quality Guidelines - Sediment Quality Guidelines, revised 2002.

² denotes Canadian Council of Ministers for the Environment (CCME) Canadian Environmental Quality Guidelines - Soil Quality Guidelines, revised 2008.

Table E.3-4. Results Table for BTEX Compounds (mg/kg) and Individual TPH Carbon Segments (mg/kg) in the Sediment Samples Collected for Black Point Quarry Project

Sample Identification	Date	Benzene	Toluene	Ethylbenzene	Xylene (Total)	C ₆ -C ₁₀ Less BTEX	C ₁₀ -C ₁₆	C ₁₆ -C ₂₁	C ₂₁ -C ₃₂	C ₆ -C ₁₀ Less BTEX	Modified TPH	Resemblance*
GQ 02	Sept 1, 2010	<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<3	<20	No resemblance to fuel products.
GQ 25		<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<3	<20	No resemblance to fuel products.
GQ 50		<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<3	<20	No resemblance to fuel products.

Atlantic RBCA Version 2.0 and CCME SQGs for Comparison with the Above Analytical Results (mg/kg)

Atlantic RBCA Tier I Risk-Based Screening Levels**			Benzene	Toluene	Ethylbenzene	Xylenes	Gasoline	Diesel #2	#6 Oil
Residential	Potable	Coarse-grained	0.03	0.38	0.08	11	39	140	690
		Fine-grained	0.01	0.08	0.02	2.3	140	220	970
	Non-Potable	Coarse-grained	0.16	14	58	17	39	140	690
		Fine-grained	1.5	120	430	160	330	4,400	8,300
Commercial	Potable	Coarse-grained	0.03	0.38	0.08	11	450	7,400	10,000
		Fine-grained	0.01	0.08	0.02	2.3	520	840	4,700
	Non-Potable	Coarse-grained	1.8	160	430	200	450	7,400	10,000
		Fine-grained	11	680	430	650	10,000	7,700	10,000
CCME SQGs for Surface Soils***									
Agricultural	Coarse-grained	0.03 ¹ (0.0095 ²)	0.37	0.082	11.0	-	-	-	-
	Fine-grained	0.0068 ^{1,2}	0.08	0.018	2.4	-	-	-	-
Residential/Parkland	Coarse-grained	0.03 ¹ (0.0095 ²)	0.37	0.082	11.0	-	-	-	-
	Fine-grained	0.0068 ^{1,2}	0.08	0.018	2.4	-	-	-	-
Commercial	Coarse-grained	0.03 ^{1,2}	0.37	0.082	11.0	-	-	-	-
	Fine-grained	0.0068 ^{1,2}	0.08	0.018	2.4	-	-	-	-
Industrial	Coarse-grained	0.03 ^{1,2}	0.37	0.082	11.0	-	-	-	-
	Fine-grained	0.0068 ^{1,2}	0.08	0.018	2.4	-	-	-	-

*Modified TPH values reflect the sum of the individual carbon fractions that resembles gasoline, diesel #2, and lube oil. No guideline comparison required as results indicate no resemblance to fuel products observed in the samples.

**Atlantic RBCA Version 2.0 Reference Document for Petroleum Impacted Sites (2003, updated March 2007).

***A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. Report CCME-EPC-101E, March 1997 with updates to 2004.

"-" denotes no guideline available.

1 denotes guideline value based on "10-5 Incremental Risk". For the purposes of this report, an incremental risk of 10-5 is used.

2 denotes guideline value based on "10-6 Incremental Risk".

Table E.3-5. Analytical Results of the Sediment Samples Collected for Black Point Quarry Project

Parameter	Units	Sample Identification and Date			CEPA Ocean Disposal Guidelines- Atlantic Region	CCME Probable Effects Levels, Rev. 2002 ¹ Marine / Estuarine Sediment	CCME Soil Quality Guidelines, Rev. 2008 ²		
		GQ 02	GQ 25	GQ 50			Agricultural	Residential / Parkland	Commercial / Industrial
		September 1, 2010							
Polychlorinated Biphenyl (PCB) Results*									
Aroclor 1254	mg/kg	<0.1	<1.0	<1.0	-	0.709	-	-	-
Total PCB Concentration	mg/kg	<0.05	<0.5	<0.5	0.1	0.189	0.5	1.3	33
Dichloro-Diphenyl-Trichloroethane (DDT) Results*									
2,4' - DDD + 4,4' - DDD	mg/kg	<0.0015	<0.015	<0.015	-	0.00781	-	-	-
2,4' - DDE + 4,4' - DDE	mg/kg	<0.001	<0.010	<0.010	-	0.37400	-	-	-
2,4' - DDT + 4,4' - DDT	mg/kg	<0.001	<0.010	<0.010	-	0.00477	-	-	-
Total DDT	mg/kg	<0.0035	<0.035	<0.035	-	-	0.7	0.7	12
Grain Size Results									
<PHI -4.00 (12.5 mm)	%	100	100	100	-	-	-	-	-
<PHI -3.00 (9.5 mm)	%	87.3	86.3	100	-	-	-	-	-
<PHI -2.00 (4.75 mm)	%	53.4	46.6	34.3	-	-	-	-	-
<PHI -1.00 (2.00 mm)	%	48.9	23.6	17.6	-	-	-	-	-
<PHI 0.00 (1.00 mm)	%	45.9	16.5	13	-	-	-	-	-
<PHI +1.0 (0.50 mm)	%	40.5	11.1	7.6	-	-	-	-	-
<PHI +2.0 (0.25 mm)	%	28	7	3.6	-	-	-	-	-
<PHI +3.0 (0.125 mm)	%	12	5.3	2.3	-	-	-	-	-
<PHI +4.0 (0.0625 mm)	%	7.3	4.4	1.9	-	-	-	-	-
<PHI +5.0 (0.031 mm)	%	6.4	3.4	1.8	-	-	-	-	-
<PHI +6.0 (0.0156 mm)	%	5.1	2.5	1.2	-	-	-	-	-
<PHI +7.0 (0.0078 mm)	%	3.3	1.4	0.9	-	-	-	-	-
<PHI +8.0 (0.0039 mm)	%	2.8	1.2	0.6	-	-	-	-	-
<PHI +9.0 (0.002 mm)	%	1.9	0.6	<0.1	-	-	-	-	-
Gravel	%	51	76	82	-	-	-	-	-
Sand	%	42	19	16	-	-	-	-	-
Silt	%	5	3	1	-	-	-	-	-
Clay	%	3	1	<1	-	-	-	-	-
Carbon and Moisture Results									
Total Carbon	g/kg	1.62	0.60	1.10	-	-	-	-	-
Total Organic Carbon	g/kg	0.17	0.25	0.55	-	-	-	-	-
Total Inorganic Carbon	g/kg	1.45	0.35	0.55	-	-	-	-	-
Moisture	%	17	14	13	-	-	-	-	-

¹ denotes Canadian Council of Ministers for the Environment (CCME) Canadian Environmental Quality Guidelines - Sediment Quality Guidelines, revised 2002.

² denotes Canadian Council of Ministers for the Environment (CCME) Canadian Environmental Quality Guidelines - Soil Quality Guidelines, revised 2008.

*Standard laboratory detection limits were increased for samples GQ 25 and GQ 50 due to chromatographic interference.

NOTE: All results below the laboratory detection limit were divided by 2 prior to further calculations.

ATTACHMENT E
AGAT QA/QC Forms for Marine Sediment and Samples

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL
580 MAIN STREET, SUITE 105
SAINT JOHN, NB E2K1J5

ATTENTION TO: CHYANN KIRBY

PROJECT NO: GRQ - Marine

AGAT WORK ORDER: 10X432562

SOIL ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganic Supervisor

TRACE ORGANICS REVIEWED BY: Kelly Hogue, Senior Organic Chemist

DATE REPORTED: Sep 15, 2010

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718, or at 1-888-468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

11 Morris Drive, Unit 122
 Dartmouth, Nova Scotia
 CANADA B3B 1M2
 TEL (902)468-8718
 FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Available Metals in Soil

DATE SAMPLED: Sep 01, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 15, 2010

SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	GQ 02	GQ 25	GQ 50
				1971606	1971621	1971639
Aluminum	mg/kg		10	5550	4760	4300
Antimony	mg/kg		2	<2	<2	<2
Arsenic	mg/kg		2	3	<2	3
Barium	mg/kg		5	18	6	<5
Beryllium	mg/kg		2	<2	<2	<2
Boron	mg/kg		5	<5	<5	<5
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3
Chromium	mg/kg		2	10	11	11
Cobalt	mg/kg		1	3	3	3
Copper	mg/kg		2	4	4	4
Iron	mg/kg		50	14100	12100	11600
Lead	mg/kg		0.5	5.5	3.1	2.9
Manganese	mg/kg		2	413	267	213
Molybdenum	mg/kg		2	<2	<2	<2
Nickel	mg/kg		2	9	10	10
Selenium	mg/kg		1	<1	<1	<1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	60	69	155
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	<2	<2	<2
Uranium	mg/kg		0.1	0.6	0.5	0.3
Vanadium	mg/kg		2	12	12	12
Zinc	mg/kg		5	29	25	20

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
 1971606-1971639 Results are based on the dry weight of the sample.

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 10X432562

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CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Grain Size Analysis (Sieve & Pipette)

DATE SAMPLED: Sep 01, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 15, 2010

SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	GQ 02	GQ 25	GQ 50
				1971606	1971621	1971639
Particle Size Distribution (<12.5mm, -4 PHI)	%		0.1	100.0	100.0	100.0
Particle Size Distribution (<9.5mm, -3 PHI)	%		0.1	87.3	86.3	100.0
Particle Size Distribution (<4.75mm, -2 PHI)	%		0.1	53.4	46.6	34.3
Particle Size Distribution (<2mm, -1 PHI)	%		0.1	48.9	23.6	17.6
Particle Size Distribution (<1mm, 0 PHI)	%		0.1	45.9	16.5	13.0
Particle Size Distribution (<1/2mm, 1 PHI)	%		0.1	40.5	11.1	7.6
Particle Size Distribution (<1/4mm, 2 PHI)	%		0.1	28.0	7.0	3.6
Particle Size Distribution (<1/8mm, 3 PHI)	%		0.1	12.0	5.3	2.3
Particle Size Distribution (<1/16mm, 4 PHI)	%		0.1	7.3	4.4	1.9
Particle Size Distribution (<1/32mm, 5 PHI)	%		0.1	6.4	3.4	1.8
Particle Size Distribution (<1/64mm, 6 PHI)	%		0.1	5.1	2.5	1.2
Particle Size Distribution (<1/128mm, 7 PHI)	%		0.1	3.3	1.4	0.9
Particle Size Distribution (<1/256mm, 8 PHI)	%		0.1	2.8	1.2	0.6
Particle Size Distribution (<1/512mm, 9 PHI)	%		0.1	1.9	0.6	<0.1
Particle Size Distribution (Gravel)	%		1	51	76	82
Particle Size Distribution (Sand)	%		1	42	19	16
Particle Size Distribution (Silt)	%		1	5	3	1
Particle Size Distribution (Clay)	%		1	3	1	<1
Particles >75um	%		1	92	95	98
Classification	Coarse/Fine			Coarse	Coarse	Coarse

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:





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CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Mercury and Hexavalent Chromium Analysis in Soil

DATE SAMPLED: Sep 01, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 15, 2010

SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	GQ 02	GQ 25	GQ 50
				1971606	1971621	1971639
Mercury	mg/kg		0.05	<0.05	<0.05	<0.05
Chromium, Hexavalent	mg/kg		0.5	<0.5	<0.5	<0.5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
1971606-1971639 Results are based on the dry weight of the soil.

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

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<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Soil Analysis - Total Organic Carbon (W-B Wet Oxidation)

DATE SAMPLED: Sep 01, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 15, 2010

SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	GQ 02	GQ 25	GQ 50
				1971606	1971621	1971639
Total Organic Carbon	%		0.15	0.17	0.25	0.55
Total Inorganic Carbon	%		0.01	1.45	0.35	0.55

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

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<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Atlantic RBCA Tier 1 Hydrocarbons in Soil - Low Level HC (Version 3.0)

DATE SAMPLED: Sep 01, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 15, 2010

SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	GQ 02	GQ 25	GQ 50
				1971606	1971621	1971639
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3
>C10-C16 Hydrocarbons	mg/kg		15	<15	<15	<15
>C16-C21 Hydrocarbons	mg/kg		15	<15	<15	<15
>C21-C32 Hydrocarbons	mg/kg		15	<15	<15	<15
Modified TPH (Tier 1)	mg/kg		20	<20	<20	<20
Return to Baseline at C32				Y	Y	Y
% Moisture	%		1	17	14	13
Surrogate	Unit	Acceptable Limits				
Isobutylbenzene - EPH	%	60-140		99	92	95
Isobutylbenzene - VPH	%	60-140		113	112	111
n-Dotriacontane - EPH	%	60-140		112	94	102

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1971606-1971639 Results are based on the dry weight of the soil.
 Resemblance: No resemblance.

Certified By:

Kelly Hogue



Certificate of Analysis

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

11 Morris Drive, Unit 122
 Dartmouth, Nova Scotia
 CANADA B3B 1M2
 TEL (902)468-8718
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<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

OC Pesticides and PCBs in Soil

DATE SAMPLED: Sep 01, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 15, 2010

SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	GQ 02		GQ 25		GQ 50	
				1971606	RDL	1971621	RDL	1971639	RDL
alpha-BHC	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
beta-BHC	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Gamma-BHC (Lindane)	mg/Kg		0.0003	<0.0003	0.0030	<0.0030	<0.0030	<0.0030	<0.0030
delta-BHC	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Heptachlor	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Aldrin	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Heptachlor Epoxide	mg/Kg		0.0006	<0.0006	0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Alpha-Chlordane	mg/Kg		0.002	<0.002	0.020	<0.020	<0.020	<0.020	<0.020
Gamma-Chlordane	mg/Kg		0.002	<0.002	0.020	<0.020	<0.020	<0.020	<0.020
Endosulfan I	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan II	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan Sulfate	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Dieldrin	mg/Kg		0.0007	<0.0007	0.0070	<0.0070	<0.0070	<0.0070	<0.0070
p,p'-DDE	mg/Kg		0.001	<0.001	0.010	<0.010	<0.010	<0.010	<0.010
o,p'-DDE	mg/Kg		0.001	<0.001	0.010	<0.010	<0.010	<0.010	<0.010
Endrin	mg/Kg		0.002	<0.002	0.020	<0.020	<0.020	<0.020	<0.020
DDD (o,p')	mg/Kg		0.002	<0.002	0.020	<0.020	<0.020	<0.020	<0.020
p,p'-DDD	mg/Kg		0.001	<0.001	0.010	<0.010	<0.010	<0.010	<0.010
p,p'- DDT	mg/Kg		0.001	<0.001	0.010	<0.010	<0.010	<0.010	<0.010
o,p'-DDT	mg/Kg		0.001	<0.001	0.010	<0.010	<0.010	<0.010	<0.010
Endrin Aldehyde	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Endrin ketone	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Methoxychlor	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Mirex	mg/Kg		0.005	<0.005	0.050	<0.050	<0.050	<0.050	<0.050
Hexachlorobenzene	mg/Kg		0.05	<0.05	0.50	<0.50	<0.50	<0.50	<0.50
PCBs	mg/Kg		0.05	<0.05	0.50	<0.50	<0.50	<0.50	<0.50
Aroclor 1254	mg/Kg		0.1	<0.1	1.0	<1.0	<1.0	<1.0	<1.0
Surrogate	Unit	Acceptable Limits							
Decachlorobiphenyl	%	50-130		100		89		101	

Certified By:

Kelly Hogue



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 10X432562

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CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

OC Pesticides and PCBs in Soil

DATE SAMPLED: Sep 01, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 15, 2010

SAMPLE TYPE: Soil

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1971606 Results are based on the dry weight of the soil.
Due to the high moisture content the sample was air dried prior to extraction.

1971621-1971639 Results are based on the dry weight of the soil.
Due to the high moisture content the sample was air dried prior to extraction.
Sample was diluted and Reporting Detection Limit raised due to chromatographic interference.

Certified By:

Certificate of Analysis

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CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Polycyclic Aromatic Hydrocarbons in Soil (CCME)						
DATE SAMPLED: Sep 01, 2010		DATE RECEIVED: Sep 02, 2010		DATE REPORTED: Sep 15, 2010		SAMPLE TYPE: Soil
Parameter	Unit	G / S	RDL	GQ 02 1971606	GQ 25 1971621	GQ 50 1971639
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.02	<0.02	<0.02	<0.02
Acenaphthene	mg/kg		0.005	<0.005	<0.005	<0.005
Acenaphthylene	mg/kg		0.005	<0.005	<0.005	<0.005
Acridine	mg/Kg		0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.04	<0.04	<0.04	<0.04
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	mg/kg		0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.02	<0.02	<0.02	<0.02
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg		0.04	<0.04	<0.04	<0.04
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05
Quinoline	mg/Kg		0.05	<0.05	<0.05	<0.05
% Moisture	%			17	14	13
Surrogate	Unit	Acceptable Limits				
Nitrobenzene-d5	%	50-140		101	113	106
2-Fluorobiphenyl	%	50-140		85	90	83
Terphenyl-d14	%	50-140		94	101	93

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
 1971606-1971639 Results are based on the dry weight of the soil.

Certified By:



Quality Assurance

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

ATTENTION TO: CHYANN KIRBY

Soil Analysis																
RPT Date: Sep 15, 2010			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Available Metals in Soil																
Aluminum	90920	1964787	4770	5070	6.1%	< 10	101%	90%	110%	96%	90%	110%	106%	70%	130%	
Antimony	90920	1964787	< 2	< 2	0.0%	< 2	100%	90%	110%	99%	90%	110%	86%	70%	130%	
Arsenic	90920	1964787	7	8	13.3%	< 2	97%	90%	110%	96%	90%	110%	111%	70%	130%	
Barium	90920	1964787	18	18	0.0%	< 5	96%	90%	110%	103%	90%	110%	107%	70%	130%	
Beryllium	90920	1964787	< 2	< 2	0.0%	< 2	99%	90%	110%	102%	90%	110%	99%	70%	130%	
Boron	90920	1964787	16	20	22.2%	< 5	102%	90%	110%	91%	90%	110%	88%	70%	130%	
Cadmium	90920	1964787	0.8	0.8	0.0%	< 0.3	98%	90%	110%	102%	90%	110%	103%	70%	130%	
Chromium	90920	1964787	11	12	8.7%	< 2	104%	90%	110%	108%	90%	110%	97%	70%	130%	
Cobalt	90920	1964787	3	4	28.6%	< 1	108%	90%	110%	104%	90%	110%	92%	70%	130%	
Copper	90920	1964787	36	42	15.4%	< 2	107%	90%	110%	103%	90%	110%	91%	70%	130%	
Iron	90920	1964787	12500	16400	27.0%	< 50	105%	90%	110%	104%	90%	110%	99%	70%	130%	
Lead	90920	1964787	749	624	18.2%	< 0.5	99%	90%	110%	102%	90%	110%	102%	70%	130%	
Manganese	90920	1964787	813	763	6.3%	< 2	108%	90%	110%	108%	90%	110%	106%	70%	130%	
Molybdenum	90920	1964787	< 2	< 2	0.0%	< 2	98%	90%	110%	87%	80%	120%	94%	70%	130%	
Nickel	90920	1964787	9	11	20.0%	< 2	108%	90%	110%	109%	90%	110%	95%	70%	130%	
Selenium	90920	1964787	< 1	< 1	0.0%	< 1	101%	90%	110%	97%	90%	110%	99%	70%	130%	
Silver	90920	1964787	< 0.5	< 0.5	0.0%	< 0.5	100%	90%	110%	88%	80%	120%	101%	70%	130%	
Strontium	90920	1964787	16	15	6.5%	< 5	96%	90%	110%	98%	90%	110%	105%	70%	130%	
Thallium	90920	1964787	0.1	0.1	0.0%	< 0.1	100%	90%	110%	103%	90%	110%	104%	70%	130%	
Tin	90920	1964787	13	15	14.3%	< 2	95%	90%	110%	100%	90%	110%	97%	70%	130%	
Uranium	90920	1964787	1.0	1.0	0.0%	< 0.1	95%	90%	110%	104%	90%	110%	117%	70%	130%	
Vanadium	90920	1964787	11	12	8.7%	< 2	99%	90%	110%	102%	90%	110%	97%	70%	130%	
Zinc	90920	1964787	33	32	3.1%	< 5	109%	90%	110%	110%	90%	110%	98%	70%	130%	
Mercury and Hexavalent Chromium Analysis in Soil																
Mercury	1	1971606	<0.05	<0.05	0.0%	< 0.05	113%	70%	130%		70%	130%	93%	70%	130%	
Chromium, Hexavalent	1	1965291	<0.5	<0.5	0.0%	< 0.5	96%	80%	120%	93%	80%	120%		80%	120%	
Soil Analysis - Total Organic Carbon (W-B Wet Oxidation)																
Total Organic Carbon	6159	1606	0.17	0.15	12.5%	< 0.15	100%	90%	110%				106%	90%	110%	

Certified By:



Quality Assurance

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

ATTENTION TO: CHYANN KIRBY

Trace Organics Analysis

RPT Date: Sep 15, 2010			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Atlantic RBCA Tier 1 Hydrocarbons in Soil - Low Level HC (Version 3.0)																
Benzene	1	1971639	< 0.005	<0.005	0.0%	< 0.005	87%	60%	140%	76%	60%	140%	92%	30%	130%	
Ethylbenzene	1	1971639	< 0.01	<0.01	0.0%	< 0.01	83%	60%	140%	83%	60%	140%	95%	30%	130%	
Toluene	1	1971639	< 0.04	< 0.04	0.0%	< 0.04	83%	60%	140%	80%	60%	140%	94%	30%	130%	
Xylene (Total)	1	1971639	< 0.05	< 0.05	0.0%	< 0.05	85%	60%	140%	85%	60%	140%	96%	30%	130%	
C6-C10 (less BTEX)	1	1971639	< 3	< 3	0.0%	< 3	94%	60%	140%	88%	60%	140%	74%	30%	130%	
>C10-C16 Hydrocarbons	1		<15	<15	0.0%	< 15	101%	70%	130%	102%	60%	140%	122%	30%	130%	
>C16-C21 Hydrocarbons	1		<15	<15	0.0%	< 15	87%	70%	130%	102%	60%	140%	122%	30%	130%	
>C21-C32 Hydrocarbons	1		<15	<15	0.0%	< 15	86%	60%	140%	102%	60%	140%	122%	30%	130%	
Polycyclic Aromatic Hydrocarbons in Soil (CCME)																
1-Methylnaphthalene	1	1971621	< 0.05	< 0.05	0.0%	< 0.05	76%	50%	140%	83%	50%	140%	78%	50%	140%	
2-Methylnaphthalene	1	1971621	< 0.02	< 0.02	0.0%	< 0.02	102%	50%	140%	84%	50%	140%	75%	50%	140%	
Acenaphthene	1	1971621	< 0.005	< 0.005	0.0%	< 0.005	103%	50%	140%	97%	50%	140%	96%	50%	140%	
Acenaphthylene	1	1971621	< 0.005	< 0.005	0.0%	< 0.005	104%	50%	140%	91%	50%	140%	93%	50%	140%	
Acridine	1	1971621	< 0.05	< 0.05	0.0%	< 0.05	118%	50%	140%	68%	50%	140%	70%	50%	140%	
Anthracene	1	1971621	< 0.04	< 0.04	0.0%	< 0.04	90%	50%	140%	84%	50%	140%	82%	50%	140%	
Benzo(a)anthracene	1	1971621	< 0.01	< 0.01	0.0%	< 0.01	93%	50%	140%	82%	50%	140%	79%	50%	140%	
Benzo(a)pyrene	1	1971621	< 0.01	< 0.01	0.0%	< 0.01	94%	50%	140%	109%	50%	140%	83%	50%	140%	
Benzo(b)fluoranthene	1	1971621	< 0.05	< 0.05	0.0%	< 0.05	79%	50%	140%	80%	50%	140%	96%	50%	140%	
Benzo(b+j)fluoranthene	1	1971621	< 0.01	< 0.01	0.0%	< 0.01	87%	50%	140%	87%	50%	140%	91%	50%	140%	
Benzo(e)pyrene	1	1971621	< 0.05	< 0.05	0.0%	< 0.05	113%	50%	140%	66%	50%	140%	64%	50%	140%	
Benzo(ghi)perylene	1	1971621	< 0.01	< 0.01	0.0%	< 0.01	115%	50%	140%	107%	50%	140%	105%	50%	140%	
Benzo(k)fluoranthene	1	1971621	< 0.01	< 0.01	0.0%	< 0.01	102%	50%	140%	69%	50%	140%	112%	50%	140%	
Chrysene	1	1971621	< 0.01	< 0.01	0.0%	< 0.01	92%	50%	140%	117%	50%	140%	87%	50%	140%	
Dibenzo(a,h)anthracene	1	1971621	< 0.006	< 0.006	0.0%	< 0.006	106%	50%	140%	96%	50%	140%	95%	50%	140%	
Fluoranthene	1	1971621	< 0.05	< 0.05	0.0%	< 0.05	96%	50%	140%	86%	50%	140%	87%	50%	140%	
Fluorene	1	1971621	< 0.02	< 0.02	0.0%	< 0.02	106%	50%	140%	101%	50%	140%	103%	50%	140%	
Indeno(1,2,3)pyrene	1	1971621	< 0.01	< 0.01	0.0%	< 0.01	114%	50%	140%	108%	50%	140%	81%	50%	140%	
Naphthalene	1	1971621	< 0.01	< 0.01	0.0%	< 0.01	107%	50%	140%	104%	50%	140%	96%	50%	140%	
Perylene	1	1971621	< 0.05	< 0.05	0.0%	< 0.05	85%	50%	140%	80%	50%	140%	76%	50%	140%	
Phenanthrene	1	1971621	< 0.04	< 0.04	0.0%	< 0.04	110%	50%	140%	87%	50%	140%	87%	50%	140%	
Pyrene	1	1971621	< 0.05	< 0.05	0.0%	< 0.05	105%	50%	140%	92%	50%	140%	86%	50%	140%	
Quinoline	1	1971621	< 0.05	< 0.05	0.0%	< 0.05	87%	50%	140%	105%	50%	140%	85%	50%	140%	
OC Pesticides and PCBs in Soil																
alpha-BHC	1		< 0.050	< 0.050	0.0%	< 0.050	101%	60%	140%	102%	60%	140%	102%	60%	140%	
beta-BHC	1		< 0.050	< 0.050	0.0%	< 0.050	96%	90%	110%	90%	80%	120%	112%	80%	120%	
Gamma-BHC (Lindane)	1		< 0.0030	< 0.0030	0.0%	< 0.0030	98%	60%	140%	91%	60%	140%	114%	60%	140%	
delta-BHC	1		< 0.050	< 0.050	0.0%	< 0.050	104%	80%	120%	85%	80%	120%	112%	80%	120%	
Heptachlor	1		< 0.050	< 0.050	0.0%	< 0.050	102%	60%	140%	82%	60%	140%	96%	60%	140%	

Quality Assurance

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 PROJECT NO: GRQ - Marine

AGAT WORK ORDER: 10X432562
 ATTENTION TO: CHYANN KIRBY

Trace Organics Analysis (Continued)

RPT Date: Sep 15, 2010		DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Aldrin	1		< 0.050	< 0.050	0.0%	< 0.050	97%	60%	140%	97%	60%	140%	97%	60%	140%
Heptachlor Epoxide	1		< 0.0060	< 0.0060	0.0%	< 0.0060	98%	60%	140%	89%	60%	140%	112%	60%	140%
Alpha-Chlordane	1		< 0.020	< 0.020	0.0%	< 0.020	104%	60%	140%	90%	60%	140%	114%	60%	140%
Gamma-Chlordane	1		< 0.020	< 0.020	0.0%	< 0.020	96%	60%	140%	104%	60%	140%	97%	60%	140%
Endosulfan I	1		< 0.050	< 0.050	0.0%	< 0.050	98%	90%	110%	102%	90%	110%	96%	80%	120%
Endosulfan II	1		< 0.050	< 0.050	0.0%	< 0.050	104%	60%	140%	90%	60%	140%	97%	60%	140%
Endosulfan Sulfate	1		< 0.050	< 0.050	0.0%	< 0.050	104%	80%	120%	86%	80%	120%	114%	80%	120%
Dieldrin	1		< 0.0070	< 0.0070	0.0%	< 0.0070	97%	60%	140%	85%	60%	140%	114%	60%	140%
p,p'-DDE	1		< 0.010	< 0.010	0.0%	< 0.010	96%	60%	140%	97%	60%	140%	120%	60%	140%
o,p'-DDE	1		< 0.010	< 0.010	0.0%	< 0.010	120%	60%	140%	92%	60%	140%	114%	60%	140%
Endrin	1		< 0.020	< 0.020	0.0%	< 0.020	112%	60%	140%	91%	60%	140%	98%	60%	140%
DDD (o,p')	1		< 0.020	< 0.020	0.0%	< 0.020	102%	90%	110%	90%	90%	110%	96%	60%	140%
p,p'-DDD	1		< 0.010	< 0.010	0.0%	< 0.010	97%	60%	140%	87%	60%	140%	97%	60%	140%
p,p'- DDT	1		< 0.010	< 0.010	0.0%	< 0.010	97%	60%	130%	90%	60%	130%	96%	60%	130%
o,p'-DDT	1		< 0.010	< 0.010	0.0%	< 0.010	96%	60%	140%	85%	60%	140%	112%	60%	140%
Endrin Aldehyde	1		< 0.050	< 0.050	0.0%	< 0.050	104%	80%	120%	87%	80%	120%	114%	80%	120%
Endrin ketone	1		< 0.050	< 0.050	0.0%	< 0.050	102%	80%	120%	90%	80%	120%	120%	80%	120%
Methoxychlor	1		< 0.050	< 0.050	0.0%	< 0.050	96%	60%	140%	91%	60%	140%	120%	60%	140%
Mirex	1		< 0.050	< 0.050	0.0%	< 0.050	97%	70%	130%	92%	70%	130%	104%	70%	130%
Hexachlorobenzene	1		< 0.50	< 0.50	0.0%	< 0.50	104%	60%	140%	90%	60%	140%	102%	60%	140%
PCBs	1		< 0.50	< 0.50	0.0%	< 0.50	96%	60%	140%	112%	60%	140%		60%	140%


 Certified By: _____

Method Summary

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

ATTENTION TO: CHYANN KIRBY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Particle Size Distribution (<12.5mm, -4 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<9.5mm, -3 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<4.75mm, -2 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<2mm, -1 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1mm, 0 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1/2mm, 1 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1/4mm, 2 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1/8mm, 3 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE

Method Summary

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

ATTENTION TO: CHYANN KIRBY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Particle Size Distribution (<1/16mm, 4 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1/32mm, 5 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1/64mm, 6 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1/128mm, 7 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1/256mm, 8 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (<1/512mm, 9 PHI)	INOR-121-6034	ASTM D-422-63 & ODCA, 1976	SIEVE & PIPETTE
Particle Size Distribution (Gravel)	INOR-121-6031	Canadian Society of Soil Science - SSMA	HYDROMETER
Particle Size Distribution (Sand)	INOR-121-6031	Canadian Society of Soil Science - SSMA	HYDROMETER
Particle Size Distribution (Silt)	INOR-121-6031	Canadian Society of Soil Science - SSMA	HYDROMETER
Particle Size Distribution (Clay)	INOR-121-6031	Canadian Society of Soil Science - SSMA	HYDROMETER
Particles >75um	INOR-121-6031, INOR-121-6034	ASTM D-422-63 & ODCA, 1976, SSMA	CALCULATED
Classification	INOR-121-6031, INOR-121-6031	Atlantic RBCA	CALCULATED
Mercury	INOR-121-6101 & INOR-121-6107	Based on EPA 245.5 & SM 3112B	CV/AA
Chromium, Hexavalent	INOR-121-6029	SSSA 5:25 p. 683	SPECTROPHOTOMETER
Total Organic Carbon	SOIL 0480; SOIL 0110; SOIL 0120	NELSON 1996; SHEPPARD 2007	COLOR
Total Inorganic Carbon		ASA 11 - 2.2	CVAAS

Method Summary

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

ATTENTION TO: CHYANN KIRBY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons	ORG-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons	VOL-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	Topp, G.C. 1993. Soil Water Content. CSSS	GRAVIMETRIC
Isobutylbenzene - EPH	VOL-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	VOL-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
alpha-BHC	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
beta-BHC	ORG 5508	EPA SW-846 3541 & 8081A	GC/ECD
Gamma-BHC (Lindane)	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
delta-BHC	TO 0110	EPA SW-846 355	GC/ECD
Heptachlor	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
Aldrin	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
Heptachlor Epoxide	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
Alpha-Chlordane	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
Gamma-Chlordane	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
Endosulfan I	TO 0110	EPA SW-846 355	GC/ECD
Endosulfan II	ORG 5009	EPA SW-846 3550 & 8081	GC/MS & GC/ECD
Endosulfan Sulfate	TO 0110	EPA SW-846 355	GC/ECD
Dieldrin	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
p,p'-DDE	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
o,p'-DDE	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
Endrin	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD

Method Summary

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432562

PROJECT NO: GRQ - Marine

ATTENTION TO: CHYANN KIRBY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
DDD (o,p')	ORG-91-5113	EPA SW - 846 3541/8081	GC/ECD
p,p'-DDD	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
p,p'- DDT	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
o,p'-DDT	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
Endrin Aldehyde	TO 0110	EPA SW-846 355	GC/ECD
Endrin ketone	TO 0110	EPA SW-846 355	GC/ECD
Methoxychlor	ORG 5513	EPA SW-846 3541,3550B, 3620B,8081A,8082	GC/ECD
Mirex	ORG 5009	EPA SW-846 3550 & 8081	GC/ECD
Hexachlorobenzene	ORG 5508	EPA SW-846 3510C & 8270	GC/MS
Decachlorobiphenyl	ORG-120-5106, ORG-120-5108	EPA SW846 3510C/8080/8010, 8081A	GC/ECD
PCBs	ORG-120-5107	EPA SW-846 8081A & 8082	GC/ECD
Aroclor 1254	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b+j)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(k)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
% Moisture			GRAVIMETRIC
Nitrobenzene-d5	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Fluorobiphenyl	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS



AGAT Laboratories

Unit 122 - 11 Morris Dr.
 Dartmouth, Nova Scotia
 B3B 1M2
 http://webearth.agatlabs.com

Phone: 902-468-8718
 Fax: 902-468-8924
 www.agatlabs.com

Laboratory use Only

Arrival Condition: Good Poor (complete 'notes')
 Arrival Temperature: 7°C AGAT Job Number: 10432562
 Notes:

Drinking Water Sample (y/n): No Reg. No. _____

Waterworks Number: _____

Report To:

Company: AMEC Earth & Environmental
 Contact: Chyann Kirby
 Address: 580 Main Street, Suite 105, Hillyard Place,
 Building B, Saint John, New Brunswick E2K 1J5
 Phone: 506.652.9497 FAX: 506.652.9517

PO #: TV01017
 AGAT Quotation: 10-192
 Client Project #: GRQ - Marine

Invoice to: (Same Y/N) - Circle

Company:

Contact:

Address:

Phone:

Fax:

PO#/Credit Card #:

Report Information

1. Name: Chyann Kirby
 Email: chyann.kirby@amec.com
 2. Name:
 Email:

Regulatory Requirements (Check):

- List Guidelines on Report
- PIR
- Do Not List Guidelines on Report
- Site Info (check all that apply):
 - Tier 1
 - Tier 2
 - Gas
 - Res
 - Com
 - Fuel
 - Lub
 - CCME
 - CDWQ
 - Ind
 - NSDFOSP
 - Com
 - HRM 101
 - ResP
 - Storm Water
 - Ag
 - HRM 101
 - FWAL
 - Waste Water
 - Sediment

Other:

COMMENTS - Site/Sample Info, Sample Containment

Sample jars labelled "A" and "B" for each sample.

Report Format

- Single PDF sample per page
 - Multiple PDF samples per page
 - Excel Format Included
- Regular TAT: 5 - 7 days
 Rush TAT: 1 day 2 days
 3 - 4 days
- Date Required: _____
 Time Required: _____

Turnaround Time (TAT) Business Days

DATE / TIME SAMPLED	SAMPLE MATRIX	# OF CONTAINERS	Metals (Code 121-349)	Hexavalent Chromium (Code 93-021)	Mercury (Code 121-325)	TPH/BTEX (PRI) Tier 1 (Code 120-104)	PAH (low level) (CCME) Code 120-1277	PCB (Code 120-1311)	Particle Size (Code 121-337)	TIC/TOC (Codes 121-376 and 58-109)	Mercury (Code 121-325)	TPH/BTEX (PRI) Tier 1 (Code 120-104)	Particle Size (Code 121-337)	TIC/TOC (Codes 121-376 and 58-109)	Hazardous (Y/N)	Lab Sample #
1-Sep-10	sed./sol	2 x 250mL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N	
1-Sep-10	sed./sol	2 x 250mL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N	
1-Sep-10	sed./sol	2 x 250mL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N	
1-Sep-10	sed./sol	2 x 250mL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N	
1-Sep-10	sed./sol	2 x 250mL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N	
1-Sep-10	sed./sol	2 x 250mL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N	
*SEE QUOTATION FOR SPECIFICS ON SEDIMENT ANALYSES REQUESTED																
Date/Time: _____ Special Instructions: _____																
Date/Time: <u>04-Sep-10</u>																
Date/Time: <u>17-15</u>																

Sample Relinquished By (print name & sign)

Beth Carneron

Sample Relinquished By (print name & sign)
