Appendix A

Summary of Phase I Sampling Program for the DMTS Fugitive Dust Risk Assessment

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Introduction

The Phase I field study for the DeLong Mountain Regional Transportation System (DMTS) fugitive dust risk assessment consisted of five major elements that provided additional information to assess possible risk to the environment and human health from the DMTS. These elements were a marine assessment, a lagoon assessment, a freshwater aquatic assessment, a terrestrial assessment, and a spills assessment (evaluating historic petroleum spills). Information on the study design and objectives is provided in Exponent (2003a,b). Data tables are provided in Appendix C (inorganic chemical data) and Appendix D (organic chemical data).

The Phase I field study included three sampling events. The first Phase I sampling event was conducted in June 2003, during which sediment and surface water samples were collected at the port site prior to shipping activities. The second Phase I sampling event was conducted in July 2003, during which surface sediment, surface water, soil, tundra soil, and moss were collected along or adjacent to the DMTS road. The third Phase I sampling event was conducted in September 2003, during which sediment and surface water samples were collected at the port site during the shipping season. The following subsections describe the sampling and any modifications relative to the field sampling plan (Exponent 2003a).

June 2003 Sampling Event

Marine Assessment

Sediment and surface water samples were collected at the port site prior to 2003 shipping activities at the facility. Sediment and surface water samples were collocated at the same stations. The marine assessment evaluated the concentrations of chemicals of potential concern (CoPCs) in surface sediments and surface water at stations in the Chukchi Sea in the vicinity of the shiploader. The station locations were selected primarily on the basis of historical evaluations (RWJ 1997; Exponent 2003d) and offshore current patterns (prevailing current is northward) and were designed to allow evaluation of possible gradients of CoPC concentrations in relation to potential sources, as well as potential temporal changes in CoPC concentrations (i.e., by resampling stations from previous studies).

Thirty-two stations were sampled for surface sediment during the June 2003 sampling event (Figure A-1): 26 site stations and 6 reference area stations. The site stations were located on a grid that had been sampled historically in the vicinity of the port site (RWJ 1997; Exponent 2003c,d). The reference area stations were located upwind and upcurrent of the port facility. Metals and conventional analytes (Table A-1) were analyzed at 8 of the 26 site stations and at all of the reference area stations (Figure A-1). This subset of site locations represented a range of concentrations observed historically, at different distances and orientations relative to the shiploader, including locations beneath and downcurrent (north) of the shiploader that were expected to have the highest concentrations, based on data collected previously (RWJ 1997; Exponent 2003d). Lead, zinc, and cadmium analyses were conducted at all of the remaining site grid stations (Figure A-1).

Seven surface water stations were sampled during the June 2003 sampling event (Figure A-1): four site stations and three reference area stations. Sediment and surface water samples were collocated at the same stations. Metals and conventional analytes (Table A-1) were analyzed in surface water collected at all of the site and reference area stations (Figure A-1).

Table A-2 provides a summary of the general characteristics of each station sampled at the site and reference areas. Station locations were established on the basis of station location coordinates from historical sampling locations (RWJ 1997; Exponent 2003d) and the specifications provided in the work plan (Exponent 2003b). Sediment and surface water were sampled for chemical analysis according to the field methods described in the Phase I field sampling and analysis plan (Exponent 2003a). All sampling equipment for sediment and surface water collection was constructed of either stainless steel or Teflon®, respectively, and was decontaminated prior to sampling according to the procedures described in the field sampling and analysis plan (Exponent 2003a). Undisturbed surface sediment was collected from the upper 0–2 cm interval using either an Ekman grab sampler, a modified petite-Ponar grab sampler, or by divers. Surface water was collected from approximately 1 m below the water surface using a depth integrated sampler. The samples were placed into appropriate chemically cleaned containers and held at 4°C during shipment and prior to testing. Field

duplicates and replicates were collected at a frequency of 1 per 20 samples. The samples were sent to Columbia Analytical Services, Inc. (Kelso, Washington) for analysis.

The following modifications were made to the Phase I sampling strategy for the June 2003 marine assessment described in the field sampling and analysis plan (Exponent 2003a):

- Multiple attempts (i.e., 28 attempts) were made at Station NMS to obtain an undisturbed surface sediment sample. Rocks, gravel, and sand prevented the jaws of the grab sampler (i.e., Ekman) from closing, thereby allowing the sediment to wash out of the grab sampler. Station NMS was repositioned to the southeast on line with the other grid stations and renamed NMS-ext.

- The full list of metals and conventional analytes (Table A-1) was analyzed at Station NMN rather than the planned subset of lead, zinc, and cadmium.

- Because of the limited percent fines and high gravel content found at Station NMT, only lead, zinc, and cadmium analyses were performed at this station. Instead, the full list of metals and conventional analytes was analyzed at Station NMU, which is located immediately to the north of Station NMT on the sampling grid (see Figure A-1).

- During the field event, because of an agency request, three additional reference area stations were added at locations with water depths more similar to some of the onsite stations. Sediment was collected at all six reference area stations, and surface water samples were analyzed at three of the six reference area stations.

The quality and usability of the data generated from this field event were not affected by any of these modifications and substitutions.

July 2003 Sampling Event

Lagoon Assessment

Sediment and surface water samples were collected from coastal lagoons to the north and west (prevailing downwind) of the port facilities. Sediment and surface water samples were collocated at the same stations. The station locations were selected to allow evaluation of worst-case lagoon conditions, as well as possible gradients of CoPC concentrations in relation to potential sources, and potential temporal changes in CoPC concentrations (i.e., by resampling stations from previous studies [RWJ 1997; Exponent 2003c]).

Eleven stations were sampled for sediment and surface water (Figure A-2): eight site stations were located in three lagoons to the north of the port facilities and three reference area stations were located in one lagoon to the south of the port facilities (i.e., in the prevailing upwind direction from the DMTS). Metals and conventional analytes (Table A-1) were analyzed at all of the site and reference area stations.

Table A-3 provides a summary of the general characteristics of each station sampled at the site and at the reference area. Station locations were established on the basis of station location coordinates from historical sampling locations (RWJ 1997; Exponent 2003d), a request from a local community, and the specifications provided in the work plan (Exponent 2003b). Sediment and surface water were sampled for chemical analysis according to the field methods described in the field sampling and analysis plan (Exponent 2003a). All sampling equipment for sediment and surface water collection was constructed of either stainless steel or Teflon®, respectively, and was decontaminated prior to sampling according to the procedures described in the field sampling and analysis plan (Exponent 2003a). Undisturbed surface sediment was collected from the upper 0–2 cm interval using an Ekman grab sampler. Surface water was collected using a depth integrated sampler. The samples were placed into appropriate chemically cleaned containers and held at 4°C during shipment and prior to testing. Field duplicates and replicates were collected at a frequency of 1 per 20 samples. The samples were sent to Columbia Analytical Services, Inc. (Kelso, Washington) for analysis.

The following modifications were made to the Phase I sampling strategy for the lagoon assessment described in the field sampling and analysis plan (Exponent 2003a):

- Four lagoon stations were added to the study design. These stations are in the Ipiavic Lagoon located north-northwest of the port facility (see Figure A-2).

The quality and usability of the data generated from this field event were not affected by this additional scope.

Freshwater Aquatic Assessment

Sediments were collected from tundra ponds and streams located along the DMTS between the port and the mine. Surface water samples were also collected from the tundra ponds. Sediment and surface water samples were collocated at the same stations. The tundra pond stations were located in ponds at varying distances from the road (i.e., pond transects) and at varying distances from the port site to evaluate gradients of CoPC concentrations in relation to potential sources (see Figure A-3).

Nine tundra ponds were sampled with one station in each of the tundra ponds. Four site stations were located in tundra ponds downwind of the DMTS and five reference area stations were located in the prevailing upwind direction from the DMTS and separated from the DMTS by topography (i.e., the reference area was located in the next valley to the south of the DMTS). Twenty freshwater stream stations were sampled for the freshwater assessment (Figure A-3). Fifteen site stations were located on 4 streams along the DMTS road (including stations upstream and downstream of the DMTS road) and 5 reference area stations were located on 5 streams in the prevailing upwind direction from the DMTS and separated from the DMTS by topography (i.e., the reference area was located in the next valley to the south of the DMTS). Surface water was also collected at all of the tundra pond site stations and at three of the reference area tundra pond and stream stations. Sediment sample stations on the freshwater streams that are near the DMTS road coincided with stations at which Teck Cominco regularly collects water samples and therefore no additional surface water samples were collected at these locations during the sampling event. Metals and conventional analytes (Table A-1) were analyzed at all of the site and reference area stations.

Table A-3 provides a summary of the general characteristics of each station sampled at the site and at the reference area. Sediment and surface water were sampled for chemical analysis according to the field methods described in the field sampling and analysis plan (Exponent 2003a). All sampling equipment for sediment and surface water collection was constructed of either stainless steel or Teflon®, respectively, and was decontaminated prior to sampling according to the procedures described in the field sampling and analysis plan (Exponent 2003a). Undisturbed surface sediment was collected from the upper 0–2 cm interval using an Ekman grab sampler. Surface water was collected using a depth integrated sampler. The samples were placed into appropriate chemically cleaned containers and held at 4°C during shipment and prior to testing. Field duplicates and replicates were collected at a frequency of 1 per 20 samples. The samples were sent to Columbia Analytical Services, Inc. (Kelso, Washington) for analysis.

The following modifications were made to the Phase I sampling strategy for the freshwater aquatic assessment described in the field sampling and analysis plan (Exponent 2003a):

- Based on onsite reconnaissance of actual tundra pond locations along the DMTS road, the areas proposed for tundra pond sampling were relocated along the road to the southwest. The stations were still located as close as possible to port facilities and on the downwind (northwest) side of the road.
- Due to conditions encountered in the field, Station TP2-1000 was actually located 850 m from the DMTS road.

- One of the streams in the reference area (Station ST-REF-3) was dry (i.e., no water). Station ST-REF-3 was relocated to another stream within the same valley.

The quality and usability of the data generated from this field event were not affected by this modification.

Terrestrial Assessment

The terrestrial assessment evaluated the CoPC concentrations in surface soils collected along the length of the DMTS road between the port and mine, and in tundra soils collected on four transects extending to the downwind (northwest) side of the DMTS road. Moss samples were also collected at each of the transect stations and were collocated with the tundra soil samples. The terrestrial transects began at the edge of the road with a road shoulder sample, and extended out into the tundra toward the downwind (northwest) side of the road (see Figure A-4). The road shoulder stations were collocated with stations sampled in the 2001 field program (Exponent 2002a).

Seventeen road shoulder soil samples (12 site stations located on the DMTS road shoulder and 5 reference area stations[1]) were collected along the DMTS road between the port and mine. Twenty-two tundra soil samples (12 site stations and 10 reference area stations) were collected along the terrestrial transects that extended out to the northwest from the DMTS road (Figure A-4). Moss samples were also collected at 20 of the 22 tundra soil stations. Metals and conventional analytes (Table A-1) were analyzed at all of the site and reference area stations.

Table A-3 provides a summary of the general characteristics of each station sampled at the site and at the reference area. Road shoulder soil and tundra soil were sampled for chemical analysis according to the field methods described in the field sampling and analysis plan (Exponent 2003a). Composite surface soil samples were collected by hand from the shoulder of the DMTS road at the toe of the embankment and at the material sites. Tundra soil samples were also collected by hand at a single location at all terrestrial transect stations.

Moss collection methods used for previous studies were followed in this sampling effort, with some minor modifications. A single composite sample of stair-step moss (*Hylocomium splendens*) was collected at each terrestrial transect sampling station along the DMTS road. Moss samples were collected, aged, and processed in accordance with established National Park Services procedures (Exponent 2002).

The soil, tundra soil, and moss samples were placed into appropriately cleaned containers and held at 4°C during shipment and prior to testing. Field duplicates and replicates were collected at a frequency of 1 per 20 samples. The samples were sent to Columbia Analytical Services, Inc. (Kelso, Washington) for analysis.

[1] Source for road material during construction and the primary source for subsequent road repairs and maintenance.

The following modifications were made to the Phase I sampling strategy for the terrestrial assessment described in the field sampling and analysis plan (Exponent 2003a):

- The road shoulder and tundra soil samples were collected by hand using a new, clean pair of latex gloves for each sample rather than a stainless-steel spade or spoon.
- Despite walking the grid pattern specified in the field sampling and analysis plan (Exponent 2003a), field staff located no moss (*Hylocomium splendens*) samples at Station C1T2-10N on terrestrial transect TT1. Terrestrial transect TT1 was relocated slightly to the east in order that moss samples could be collected at the 100-ft and 1,000-ft stations on this transect.
- An additional moss sample was collected at the reference area.

Because the substituted methods are similar to the methods specified in the field sampling plan (Exponent 2003a), the quality and usability of the data generated from this field event were not affected by any of the substitutions. In addition, the relocation of stations from those proposed in the study design did not affect the quality and usability of the data.

Former Spills Assessment

Tundra soil and inorganic soil were collected along a transect associated with historical spills of non-metals materials at the port facility (Figure A-5). These samples were collected to assist with the evaluation of selected fuel-related organic chemicals in soil, tundra soil, and groundwater at the former Tank 2 spill site.

Eleven samples were collected for the former spills assessment; 8 site samples were located near the former Tank 2 spill site and 3 reference area samples were located in the prevailing upwind direction from the DMTS and separated from the DMTS by topography (i.e., the reference area was located in the next valley to the south of the DMTS). These tundra and inorganic soil samples were analyzed for the organic compounds listed in Table A-1. Results tables are provided in Appendix D.

Table A-3 provides a summary of the general characteristics of each station sampled at the site and at the reference area. Tundra soil and inorganic soil were sampled for chemical analysis according to the field methods described in the field sampling and analysis plan (Exponent 2003a). Samples at the former Tank 2 spill site were collected from three intervals. At each station, a shallow tundra soil sample (e.g., 0–2 cm) was collected. The deeper tundra soil sample was composited over the remaining depth of the organic tundra soil interval. An inorganic soil sample was collected at depth, below the organic tundra soil layer (exact interval depths are provided in Table A-3). The Tank 2 spill site soil samples were collected by digging a small trench down to just above the target sampling depth and using a decontaminated stainless-steel spade or spoon to collect the soil sample.

The soil and tundra soil samples were placed into appropriately cleaned containers and held at 4°C during shipment and prior to testing. Field duplicates and replicates were collected at a frequency of 1 per 20 samples. The samples were sent to Columbia Analytical Services, Inc. (Kelso, Washington) for analysis.

The following modifications were made to the Phase I sampling strategy for the former spills assessment described in the field sampling and analysis plan (Exponent 2003a):

- One groundwater sample was to be collected from each of the five monitoring wells that are located near Tank 2 at the port facility. However, the monitoring wells did not contain any water and therefore could not be sampled.
- The spills assessment transect was located in a wetland. The ground was completely saturated with water. The inorganic soil layer could not be reached at Station SA-1 because the hole continued to fill with water.

The quality and usability of the data generated from this field event were not affected by any of these modifications. The data collected were sufficient to assess the spill area.

September 2003

Marine Assessment

Sediment and surface water samples were collected at the port site during the 2003 shipping season at the facility. Marine samples were collected prior to shipping activities (i.e., June) and during shipping activities (i.e., September) to help evaluate possible seasonal variability in exposures in the marine environment.

Twenty-nine stations were sampled for surface sediment during the September 2003 sampling event (Figure A-1): 26 site stations and 3 reference area stations. The site stations were located on a grid that had been sampled historically in the vicinity of the port site (RWJ 1997; Exponent 2003c,d). The reference area stations were located upwind and upcurrent of the port facility. All of the September 2003 stations were collocated with the stations sampled in the June 2003 sampling event. The full list of metals and conventional analytes (Table A-1) was analyzed at 8 of the 26 site stations and at the 3 reference area stations (Figure A-1). Lead, zinc, and cadmium analyses were conducted at all of the remaining site grid stations (Figure A-1).

Seven surface water stations were sampled during the September 2003 sampling event (Figure A-1): four site stations and three reference area stations. Sediment and surface water samples were collocated at the same stations. Metals and conventional analytes (Table A-1) were analyzed in surface water collected at all of the site and reference area stations (Figure A-1).

Table A-2 provides a summary of the general characteristics of each station sampled at the site and at the reference area. Station locations were established on the basis of station location coordinates from historical sampling locations (RWJ 1997; Exponent 2003d) and the locations of the June 2003 sampling stations. Sediment and surface water were sampled for chemical analysis according to the field methods described in the field sampling and analysis plan (Exponent 2003a). All sampling equipment for sediment and surface water collection was constructed of either stainless steel or Teflon®, respectively, and was decontaminated prior to sampling according to the procedures described in the field sampling and analysis plan (Exponent 2003a). Undisturbed surface sediment was collected from the upper 0–2 cm interval using a grab sampler. Surface water was collected from approximately 1 m below the water surface using a depth integrated sampler. The samples were placed into appropriate, chemically cleaned containers and held at 4°C during shipment and prior to testing. Field duplicates and replicates were collected at a frequency of 1 per 20 samples. The samples were sent to Columbia Analytical Services, Inc. (Kelso, Washington) for analysis.

The following modifications were made to the Phase I sampling strategy for the September 2003 marine assessment described in the field sampling and analysis plan (Exponent 2003a):

- To match the sampling and analysis performed for the June 2003 sampling event, the following actions were taken:

  - Station NMS-ext was sampled rather than Station NMS.
  - The full list of metals and conventional analytes was analyzed at Stations NMN and NMU.
  - Lead, zinc, and cadmium analyses were performed at Station NMT.
- Three of the six reference area stations were sampled in September.

The quality and usability of the data generated from this field event were not affected by any of these modifications and substitutions.

References

Exponent. 2002. Fugitive dust data report, DeLong Mountain Regional Transportation System, Alaska. Draft. Prepared for Teck Cominco Alaska Incorporated, Anchorage, AK. Exponent, Bellevue, WA.

Exponent. 2003a. Phase I field sampling and analysis plan for the DMTS fugitive dust risk assessment. Prepared for Teck Cominco Alaska Incorporated, Anchorage, AK. Exponent, Bellevue, WA.

Exponent. 2003b. DMTS fugitive dust risk assessment work plan. Draft report. Prepared for Teck Cominco Alaska Incorporated, Anchorage, AK. Exponent, Bellevue, WA.

Exponent. 2003c. Port site characterization data report. Prepared for Teck Cominco Alaska Inc., Anchorage, AK. Exponent, Bellevue, WA.

Exponent. 2003d. Current and historical metals concentrations in marine sediment samples from the DMTS port site. Memorandum to Teck Cominco, April 2, 2003. Exponent, Bellevue, WA.

RWJ. 1997. Red Dog port site monitoring program. Prepared for Cominco Alaska, Inc., Anchorage, AK. RWJ Consulting, Chugiak, AK.

Figures

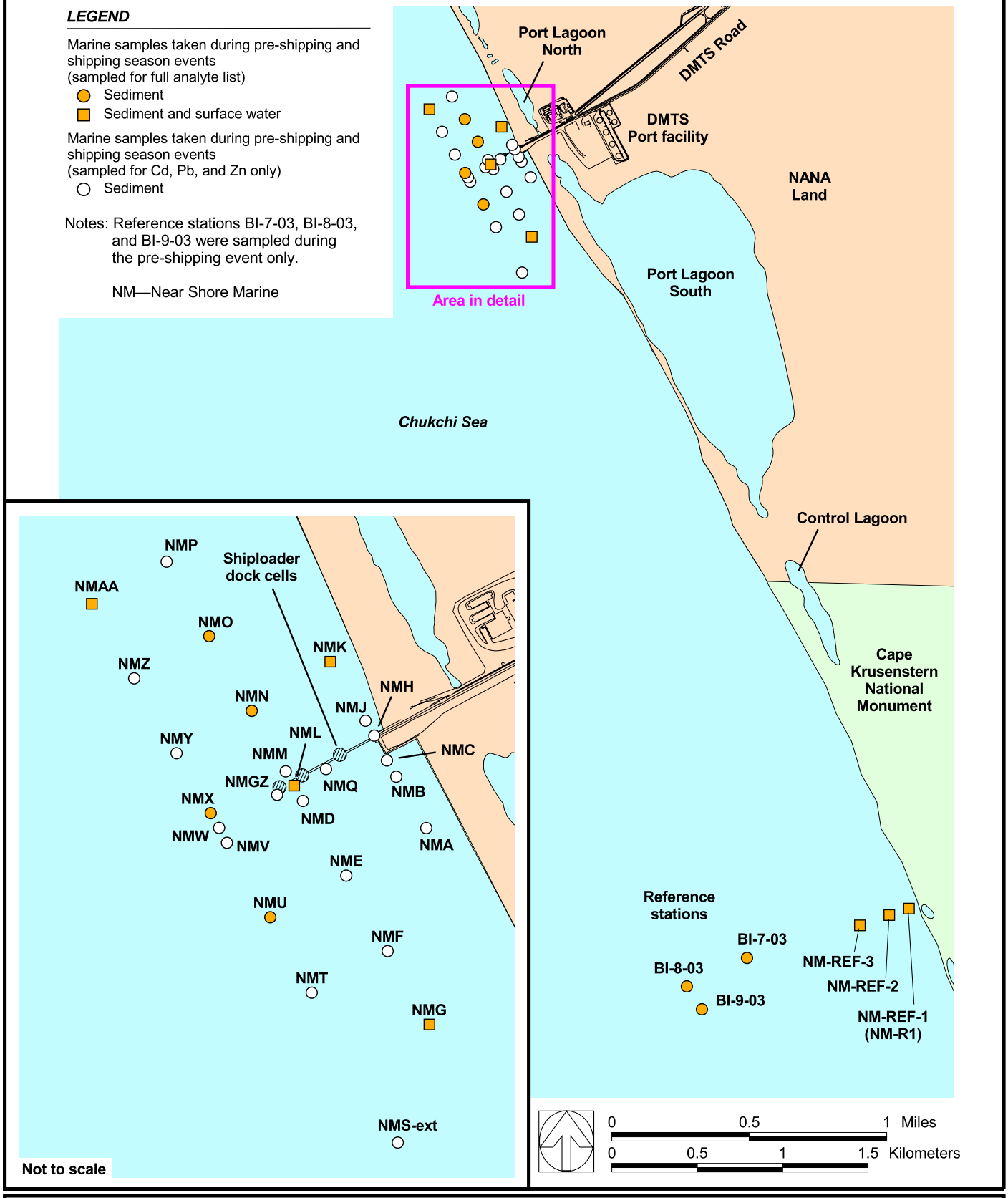

Figure A-1. Locations of marine sediment and surface water sample stations

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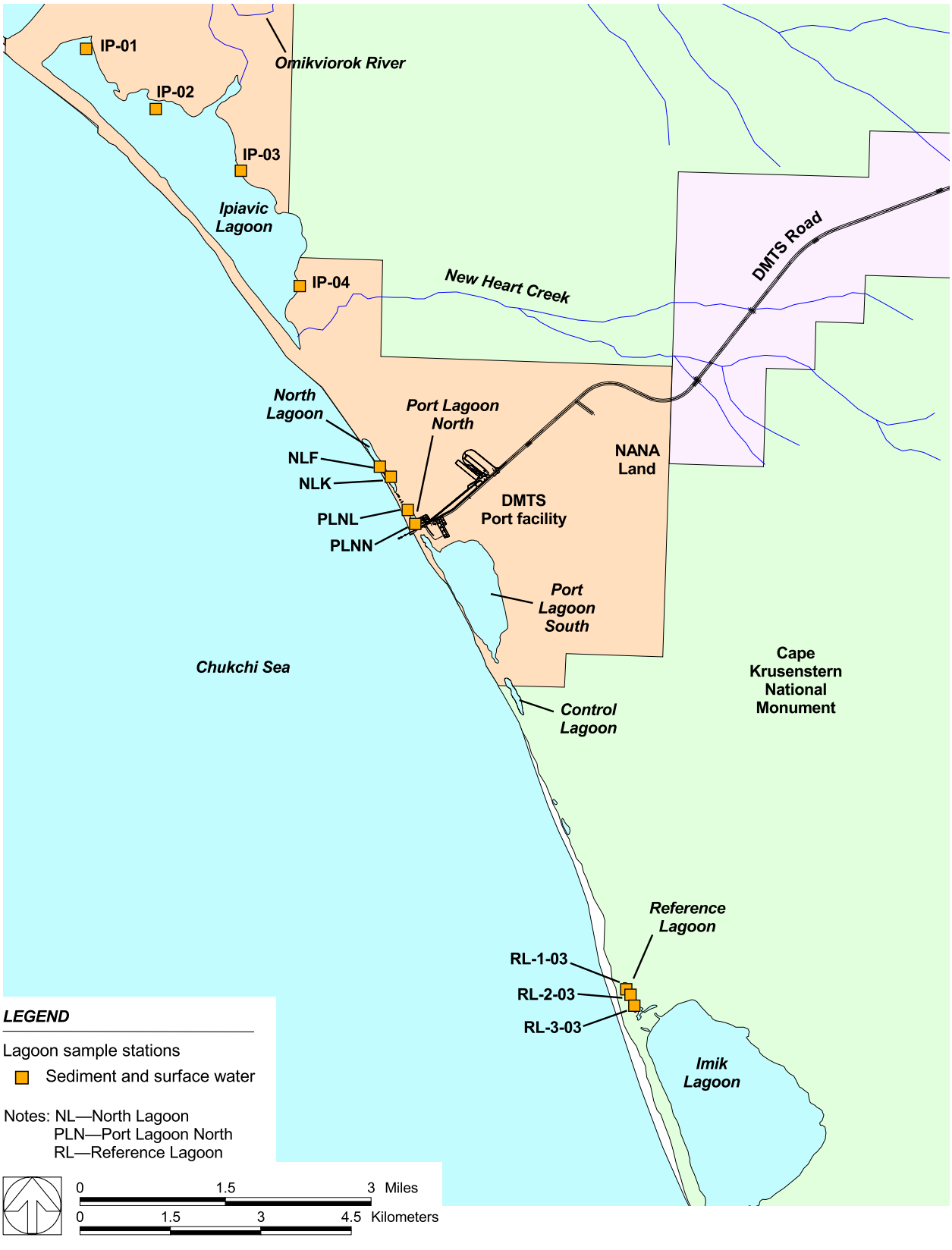

Figure A-2. Locations of lagoon sediment and surface water sample stations

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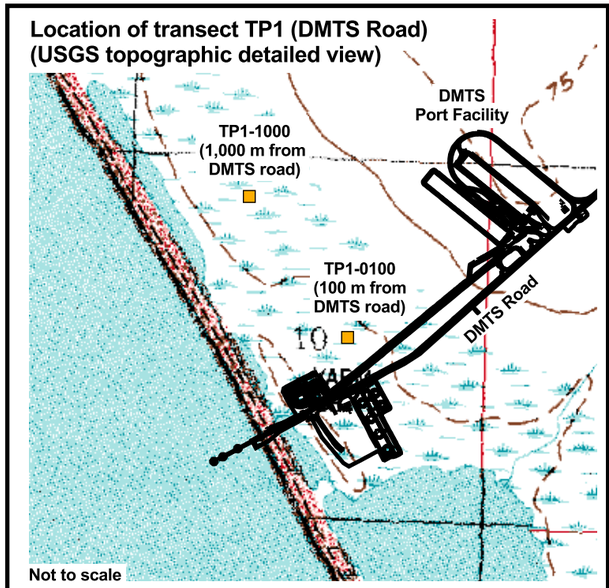

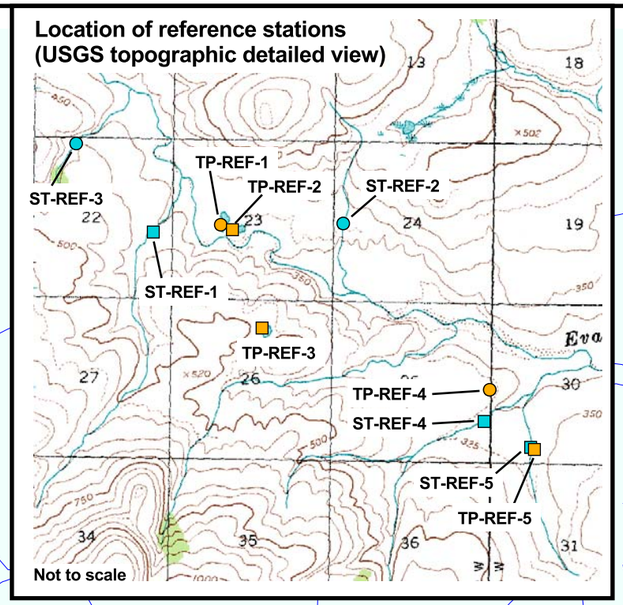

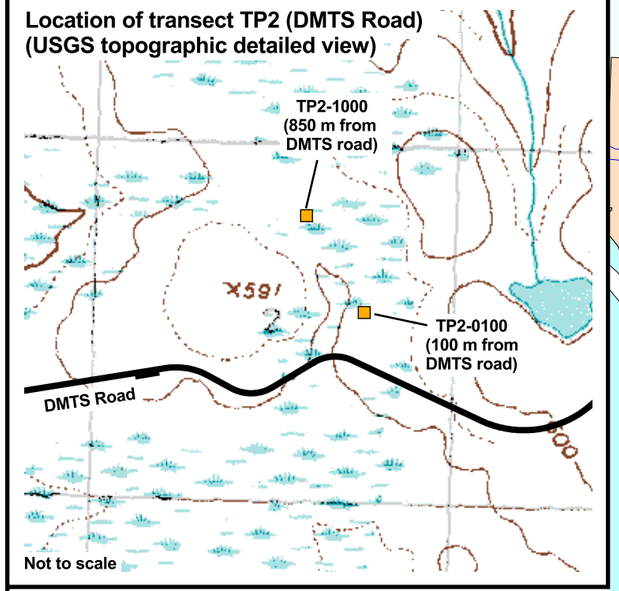

LEGEND

Sample types
- ○ Sediment
- □ Sediment and surface water

Station locations
- Tundra pond station
- Stream station*

Notes: * Surface water samples at stream stations will be collected separately as part of regular monitoring by Teck Cominco.

AC—Aufeis Creek
ARC—Anxiety Ridge Creek
D—Downstream
NF—North Fork
NHC—New Heart Creek
OR—Omikviorok River
R–Near road
SF—South Fork
ST—Stream
TP—Tundra Pond
U—Upstream

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Figure A-3. Freshwater aquatic sample stations

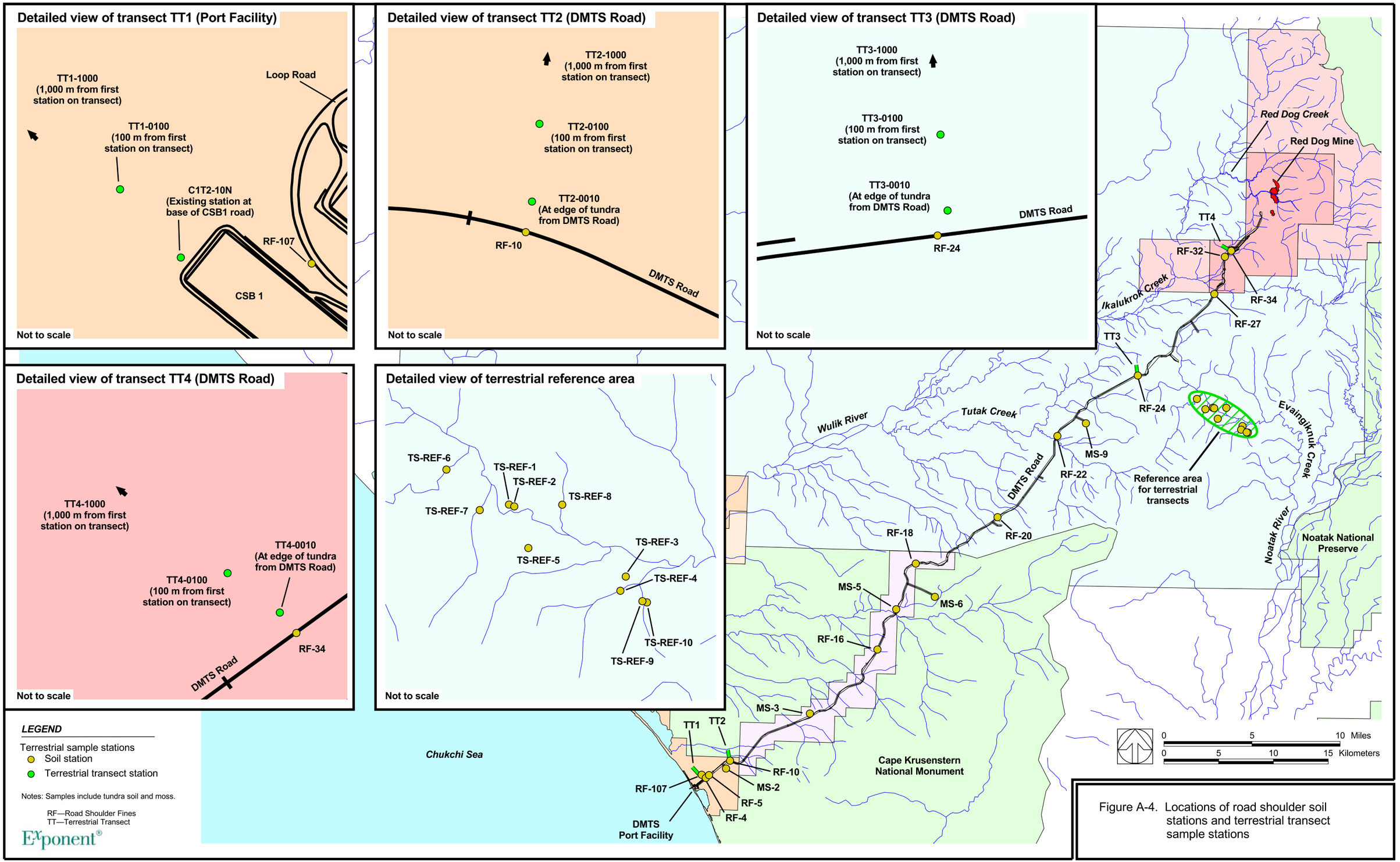

Figure A-4. Locations of road shoulder soil stations and terrestrial transect sample stations

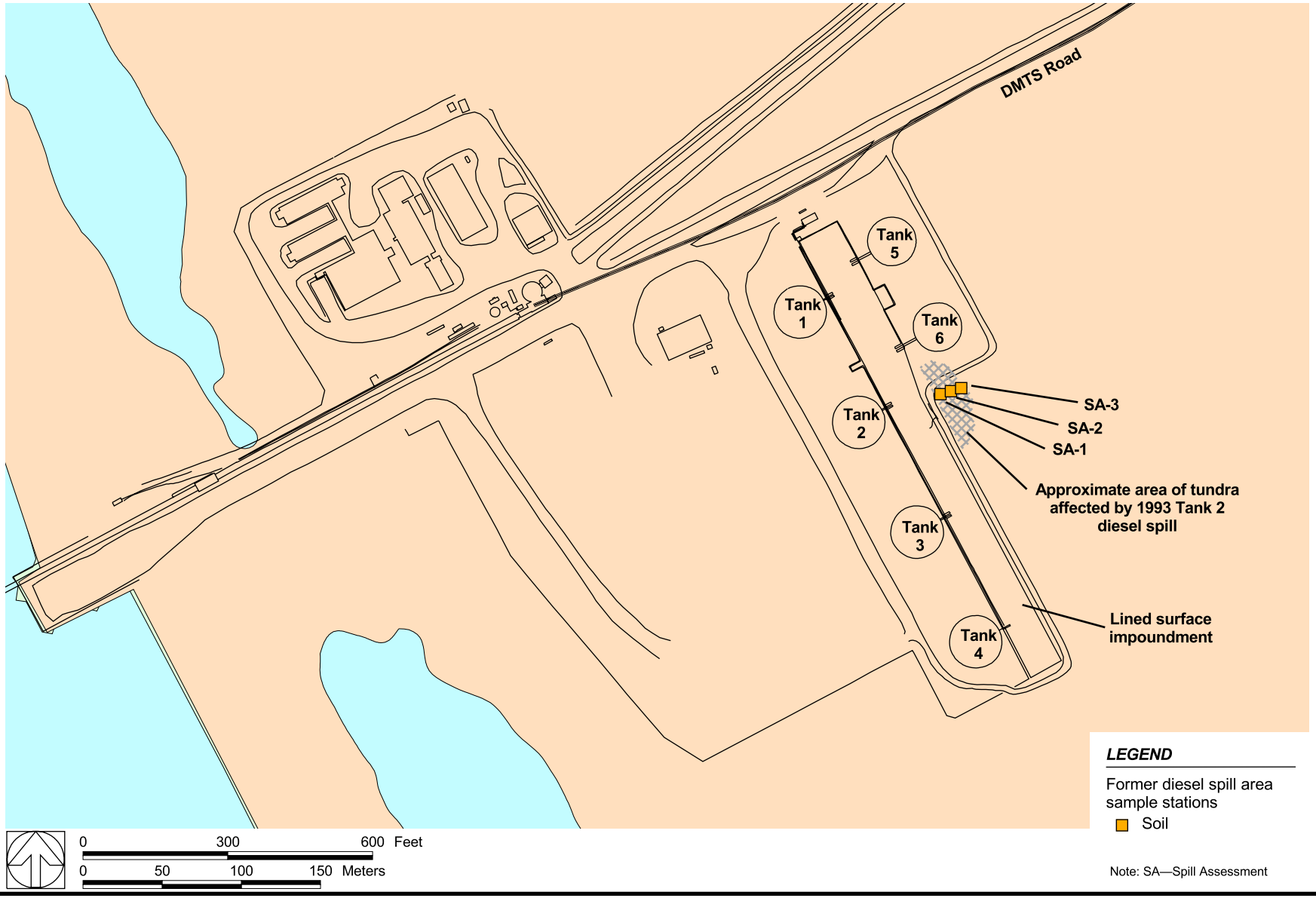

Figure A-5. Locations of soil sample stations at historical spill site

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Tables

Table A-1. Chemical analyses completed

Conventional Analytes	
	Total solids[a]
	Fluoride
Metals	
	Aluminum
	Antimony
	Arsenic
	Barium
	Cadmium
	Calcium[b]
	Chromium
	Cobalt
	Copper
	Iron
	Lead
	Magnesium[b]
	Manganese
	Mercury
	Molybdenum
	Nickel
	Selenium
	Silver
	Strontium
	Thallium
	Tin
	Vanadium
	Zinc
Organics[c]	
	Polycyclic aromatic hydrocarbons
	Benzene, toluene, ethylbenzene, and xylenes
	Diesel-range organics
	Residual-range organics

[a] For soil, tundra soil, and sediment samples only.

[b] For surface water samples only, to obtain hardness.

[c] Organic compounds were only analyzed in soil samples collected near storage Tank 2 at the port facility and at the terrestrial reference area.

Table A-2. Station locations, water depths, and general sample characteristics for sediments sampled at the Red Dog port facility and reference area in 2003 for the marine assessment

Event/Station	Location[a] Easting	Location[a] Northing	Water Depth (m)	Sample Interval (cm)	Sediment Characteristics
June 2003					
Port Facility					
NMA	412537.285277	4966950.651287	4.6	0–2	Coarse grained sand, normal odor; brown (7.5Y 4/2)
NMAA	410500.455667	4968124.242694	6.1	0–2	Well sorted, fine grained sand; worm casings on surface; normal odor; few shell fragments; dark gray brown (2.5 Y4/2)
NMB	412369.654981	4967249.118603	5.5	0–2	Small poorly sorted gravel with coarse sand and some silt; strong organic decomposing odor; very dark gray (2.5Y 3/1)
NMC	412311.556529	4967393.837510	5.5	0–2	Sandy silt with fine sand; normal odor; very dark gray (2.5Y 3/1) with very thin layer (<0.1 mm); dark gray brown on surface (2.5Y 4/2)
NMD	411805.168632	4967048.223807	6.1	0–2	Very coarse, mostly multicolored gravel and small to large rocks; <7% fine sand; little sand is grayish brown (2.5Y 5/2)
NME	411938.409256	4966641.052593	6.4	0–2	Medium and fine grained sand; normal odor; brown (7.5 YR 4/3)
NMF	411974.985063	4966101.634617	5.2	0–2	Fine grained sand with little silt; normal odor; few shell fragments; very dark gray brown (10YR 3/2)
NMG	412422.629780	4965771.885531	5.5	0–2	Silty sand; normal odor; 1 shell fragment; dark olive brown (2.5Y 3/3)
NMGZ	411638.576358	4967167.271172	--[b]	0–2	Very coarse, mostly multicolored gravel and small rocks; <5% fine sand; little sand is grayish brown (2.5Y 5/2)
NMH	412263.654676	4967424.719833	4.9	0–2	Very coarse, multicolored gravel and small to large rocks
NMJ	412168.951582	4967603.608018	1.8	0–2	Very coarse, mostly gravel and small rocks; no visible fines; station is close to beach, which is made up of similar material
NMK	411952.540654	4967947.641918	3.7	0–2	Well sorted, fine to medium grained sand; normal odor; dark gray brown (2.5Y 4/2)
NML	411767.115373	4967206.924116	--[b]	0–2	Very coarse, mostly multicolored gravel and large rocks; <5% fine sand; little sand is grayish brown (2.5Y 5/2)
NMM	411690.385617	4967337.623160	--[b]	0–2	Very coarse, mostly multicolored gravel and small rocks; coarser grained sand, which is dark gray (5Y 4/1)
NMN	411450.369427	4967686.117732	5.5	0–2	Well sorted, fine grained sand; normal odor; few shell fragments; very dark gray brown (2.5Y 3/2)

Table A-2. (cont.)

Event/Station	Location[a] Easting	Location[a] Northing	Water Depth (m)	Sample Interval (cm)	Sediment Characteristics
NMO	411219.917833	4968111.186716	5.5	0–2	Well sorted, fine grained sand; normal odor; few shell fragments; very dark gray brown (2.5Y 3/2)
NMP	410968.302261	4968529.647210	4.9	0–2	Coarse sand and gravel; normal odor; very dark gray (10YR 3/1)
NMQ	411926.804451	4967300.460472	5.2	0–2	Very coarse, mostly multicolored gravel and small to medium rocks; <2% sand; little sand is grayish brown (2.5Y 5/2)
NMS-ext	412365.961738	4965118.409732	7.9	0–2	Sand with very little silt; normal odor; dark gray brown (10 YR 4/2)
NMT	411840.171456	4965999.945969	7.6	0–2	Very coarse, multicolored gravel and small rocks
NMU	411617.364360	4966446.714453	7.6	0–2	Medium to fine grained sand with little silt; normal odor; little shrimp; small worm (Neris?); dark gray brown (2.5 Y 4/2)
NMV	411368.590927	4966868.726891	7.3	0–2	Well sorted, fine to medium grained sand; normal odor; dark gray brown (2.5Y 4/2)
NMW	411292.094711	4966922.535692	7.0	0–2	Well sorted, fine to medium grained sand; normal odor; dark gray brown (2.5Y 4/2)
NMX	411229.211833	4967049.115835	7.0	0–2	Well sorted, fine to medium grained sand; normal odor; small rock on surface; dark gray brown (2.5Y 4/2)
NMY	411013.851890	4967382.155184	7.0	0–2	Well sorted, fine to medium grained sand; normal odor; dark gray brown (2.5Y 4/2)
NMZ	410815.353958	4967842.780880	6.1	0–2	Well sorted, fine grained sand; normal odor; shell fragments; small clam shell; very dark gray brown (10 YR 3/2)
Reference Area					
BI-7-03	416688.241302	4951955.467671	9.8	0–2	Silty sand; well sorted fine to medium grained sand; normal odor; brown (10 YR 4/3)
BI-8-03	415532.385774	4951411.535658	11.9	0–2	Silty sand; well sorted fine to medium grained sand; normal odor; brown (10 YR 4/3)
BI-9-03	415821.349656	4950969.590898	11.9	0–2	Silty sand; well sorted fine to medium grained sand; normal odor; small shrimp on surface; brown (10 YR 4/3)
NM-REF-1	419797.038022	4952902.508253	2.4	0–2	Well sorted multicolored gravel with some very coarse grained sand; normal odor; little sand is dark gray (5Y 4/1)
NM-REF-2	419421.030677	4952777.172471	4.0	0–2	Silty sand, well sorted fine to medium grained; normal odor; olive gray (5Y 4/2)
NM-REF-3	418857.019658	4952582.205699	5.5	0–2	Silty sand, well sorted fine to medium grained; normal odor; few shell fragments; one piece of gravel; olive gray (5Y 4/2)

Table A-2. (cont.)

Event/Station	Location[a] Easting	Location[a] Northing	Water Depth (m)	Sample Interval (cm)	Sediment Characteristics
September 2003					
Port Facility					
NMA	412537.285277	4966950.651287	3.7	0–2	Coarse grained sand mixed with gravel; normal odor; very dark gray (2.5Y 3/1)
NMAA	410500.455667	4968124.242694	6.4	0–2	Well sorted, fine grained sand; small sand dollar on surface; normal odor; shell fragments; dark gray brown (2.5 Y4/2)
NMB	412369.654981	4967249.118603	4.0	0–2	Small poorly sorted gravel with some sand and a few large stones; normal odor; dark gray brown (10YR 4/2)
NMC	412311.556529	4967393.837510	6.1	0–2	Very coarse, mostly multicolored gravel; very little sand, which is dark gray (YR 4/1); normal odor; amphipod on surface
NMD	411805.168632	4967048.223807	7.6	0–2	Very coarse, mostly multicolored gravel; some fine sand, which is dark gray (5YR 4/1)
NME	411938.409256	4966641.052593	7.6	0–2	Small, well-sorted multicolored gravel with little sand; normal odor
NMF	411974.985063	4966101.634617	5.2	0–2	Fine grained sand with little silt; normal odor; small amphipod on surface; shell fragments; very dark gray brown (10YR 3/2)
NMG	412422.629780	4965771.885531	6.1	0–2	Silty sand; normal odor; clam spat on surface; dark olive brown (2.5Y 3/3)
NMGZ	411638.576358	4967167.271172	6.7	0–2	Very coarse, mostly multicolored gravel; some medium to coarse grained sand, which is dark gray (YR 4/1); normal odor
NMH	412263.654676	4967424.719833	2.4	0–2	Very coarse, multicolored gravel and small to large rocks; normal odor
NMJ	412168.951582	4967603.608018	3.4	0–2	Very coarse, mostly gravel and small rocks; no visible fines; station is close to beach, which is made up of similar material; normal odor
NMK	411952.540654	4967947.641918	3.7	0–2	Well sorted, fine to medium grained sand; normal odor; dark gray brown (2.5Y 4/2)
NML	411767.115373	4967206.924116	4.6	0–2	Very coarse, mostly multicolored gravel and rocks; some fine sand which is dark gray (5YR 4/1); normal odor; small mussel
NMM	411690.385617	4967337.623160	5.5	0–2	Very coarse, mostly multicolored gravel and small rocks; normal odor; coarser grained sand, which is dark gray (5Y 4/1) in one corner of grab sampler
NMN	411450.369427	4967686.117732	6.4	0–2	Well sorted, fine grained sand with a few small rocks on surface; normal odor; few shell fragments; very dark gray brown (2.5Y 3/2)
NMO	411219.917833	4968111.186716	4.9	0–2	Well sorted, fine grained sand; normal odor; very dark gray brown (2.5Y 3/2)
NMP	410968.302261	4968529.647210	5.5	0–2	Fine to medium grained sand with little gravel; normal odor; small fish; shell fragments; very dark gray (10YR 3/1)

Table A-2. (cont.)

Event/Station	Location[a] Easting	Location[a] Northing	Water Depth (m)	Sample Interval (cm)	Sediment Characteristics
NMQ	411926.804451	4967300.460472	5.2	0–2	Very coarse, mostly multicolored gravel and small to medium rocks; <2% sand; normal odor; little sand is grayish brown (2.5Y 5/2)
NMS-ext	412365.961738	4965118.409732	7.3	0–2	Sand with very little silt; normal odor; shell fragments; dark gray brown (10 YR 4/2)
NMT	411840.171456	4965999.945969	7.6	0–2	Angular to subrounded multicolored gravel and small rocks; normal odor
NMU	411617.364360	4966446.714453	7.6	0–2	Medium to fine grained sand with little silt; normal odor; shell fragments; dark gray brown (2.5 Y 4/2)
NMV	411368.590927	4966868.726891	6.7	0–2	Well sorted, fine to medium grained sand; normal odor; live sand dollar in grab; lots of shell fragments; dark gray brown (2.5Y 4/2)
NMW	411292.094711	4966922.535692	7.6	0–2	Well sorted, fine to medium grained sand with little coarse sand; normal odor; dark gray brown (2.5Y 4/2)
NMX	411229.211833	4967049.115835	6.7	0–2	Well sorted, fine to medium grained sand; normal odor; dark gray brown (2.5Y 4/2)
NMY	411013.851890	4967382.155184	7.6	0–2	Silty sand; normal odor; shell on surface; dark olive brown (2.5Y 4/3)
NMZ	410815.353958	4967842.780880	5.2	0–2	Well sorted, fine grained sand with some small rocks; normal odor; few shell fragments; very dark gray brown (10YR 3/2)
Reference Area					
NM-REF-1	419797.038022	4952902.508253	4.3	0–2	Silty sand, well sorted fine to medium grained; normal odor; dark olive brown (2.5Y 3/3)
NM-REF-2	419421.030677	4952777.172471	4.3	0–2	Silty sand, well sorted fine to medium grained; normal odor; few shell fragments; olive gray (5Y 4/2)
NM-REF-3	418857.019658	4952582.205699	5.2	0–2	Silty sand, well sorted fine to medium grained; normal odor; few shell fragments; olive gray (5Y 4/2)

[a] State plane coordinates (NAD 27, Alaska Zone 7).

[b] These samples were collected by a diver; no water depth information is available.

Table A-3. Station locations and general sample characteristics for soil and sediment sampled at or adjacent to the DMTS road and reference areas in 2003 for the lagoon, freshwater aquatic, terrestrial, and former spills assessments

Assessment	Station	Location[a] Easting	Location[a] Northing	Media	Sample Interval (cm)	Soil/Sediment Characteristics
Lagoon Assessment						
Site Stations						
	IP-01	394650.667464	4993809.968055	Sediment	0–2	Silt; strong sulfide odor; decaying organic material; roots; black (10YR 2/1) with very thin yellow brown layer on surface (10YR 5/4)
	IP-02	398433.742434	4990525.751602	Sediment	0–2	Silt with a little well-sorted, fine grained sand; faint sulfide odor; thin layer olive brown on surface; gray (2.5Y 4/1)
	IP-03	403065.970974	4987177.811002	Sediment	0–2	Silt; faint sulfide odor; decaying organic material; very dark gray (7.5YR 3/1) with thin layer of strong brown (7.5YR 5/8) on surface
	IP-04	406270.699373	4980902.797658	Sediment	0–2	Coarse grained sand; no silt; no odor; no organic debris; strong brown (7.5YR 5/8) and dark yellow brown (10YR 4/4) with white (10YR 8/1)
	NLF	410628.168510	4971080.805884	Sediment	0–2	Very coarse grained sand; poorly sorted with gravel; no odor; dominant color dark gray (5YR 4/1) with brown yellow (10YR 6/6), light olive brown (2.5Y 5/4) and white (5Y 8/1); multicolored
	NLK	411215.928929	4970526.866825	Sediment	0–2	Sandy silt; lots of organic material and vegetation; decaying odor; grayish brown (5Y 5/2)
	PLNL	412144.422289	4968718.326921	Sediment	0–2	Coarse grained, poorly sorted sand with some gravel; no odor; red water bug; a little vegetative material on surface with thin layer of very dark brown silt (10YR 2/2)
	PLNN	412549.912872	4967960.810329	Sediment	0–2	Vegetative mat on surface; decaying organic material; no odor; very dark brown (10YR 2/2)
Reference Area Stations						
	RL-1-03	424027.750705	4942649.232011	Sediment	0–2	Silt; submerged aquatic vegetation on surface; faint reducing odor; surface layer brown (7.5YR 4/3) with dark gray (7/5YR 4/1) beneath
	RL-2-03	424256.731217	4942353.288393	Sediment	0–2	Silt; submerged aquatic vegetation on surface; faint reducing odor; surface layer brown (7.5YR 4/3) with dark gray (7/5YR 4/1) beneath
	RL-3-03	424469.903743	4941749.488148	Sediment	0–2	Silt; submerged aquatic vegetation on surface; faint reducing odor; surface layer brown (7.5YR 4/3) with dark gray (7/5YR 4/1) beneath

Table A-3. (cont.)

Assessment	Station	Location[a] Easting	Location[a] Northing	Media	Sample Interval (cm)	Soil/Sediment Characteristics
Freshwater Aquatic Assessment						
Streams						
Site Stations						
	AC-D	437836.366260	4991010.366227	Sediment	0–2	Medium to coarse grained sand; no odor; very dark gray (5YR 3/1) and dark red gray (5YR 4/2)
	AC-NFU	448519.879503	4985929.771384	Sediment	0–2	Coarse sand with mixed size gravel; no odor; multiple colors, but predominate color is dark gray (5YR 4/1) with gray (5YR 5/1) and reddish brown (5YR 4/4)
	AC-R	441663.824743	4987766.482789	Sediment	0–2	Sandy silt; no odor; thin layer of light yellow brown on surface (10YR 6/4) with dark gray (10YR 4/1) beneath
	AC-SFU	446137.383980	4982201.827714	Sediment	0–2	Gravel and coarse grained sand with little silt; no odor; brown (7.5YR 4/3) with black gravel (7.5YR 2.5/1) and strong brown (7.5YR 5/8)
	ARC-D	569340.690841	5116547.722785	Sediment	0–2	Very coarse grained sand with some large stones and gravel; no odor; no organic debris; dominant color dark olive brown (2.5Y 3/3)
	ARC-R	569470.164956	5116539.873500	Sediment	0–2	Coarse sand with small multicolored gravel; no organic debris
	ARC-U	569633.175335	5116462.710931	Sediment	0–2	Medium grained sand with a little silt; no odor; no organic debris; dominant color dark olive brown (2.5Y 3/3)
	OR-D	467440.663335	5020819.272249	Sediment	0–2	Soft, silty sediment; no odor; no organic debris; caddis fly larvae and small graying (less than 1 inch) near station; thin layer of light brown (7.5YR 6/4) on surface with dark gray (7.5YR 4/1) underneath
	OR-NFU	479233.984625	5018068.861855	Sediment	0–2	Sand with little silt; no odor; no organic debris; olive gray (5Y 5/2 and 5Y 4/2)
	OR-R	472637.057729	5019872.880850	Sediment	0–2	Brown silt with some sand (10YR 5/3); lots of vegetative material (mostly roots); few pieces of gravel; no odor
	OR-SFU	476767.900273	5015277.731305	Sediment	0–2	Very coarse sand and gravel; multicolored; very similar to Station ARC-R; very thin layer of silt (less than 1 mm) on surface; dark brown (7.5YR 3/2) with specks of very dark gray (7.5YR 3/1) and strong brown (7.5 YR 5/6)
	NHC-D	418669.399187	4979204.324455	Sediment	0–2	Coarse grained sand; no silt; no odor; no organic debris; black (7.5YR 2.5/1)
	NHC-NFU	435036.444999	4975874.603978	Sediment	0–2	Silt; little organic debris on surface; normal odor; light brown (7.5YR 6/3) on surface with gray (7.5YR 5/1) underneath

Table A-3. (cont.)

Assessment	Station	Location[a] Easting	Location[a] Northing	Media	Sample Interval (cm)	Soil/Sediment Characteristics
	NHC-R	427269.586912	4977090.652991	Sediment	0–2	Sandy silt; no odor; light yellow brown on surface (10YR 6/4) with dark gray (10YR 4/1) underneath
	NHC-SFU	431620.972198	4973207.253941	Sediment	0–2	Lots of decaying vegetative matter; faint reducing odor; brown (7.5YR 3/3)
Reference Area Stations						
	ST-REF-1	566092.771925	5081005.971903	Sediment	0–2	Sandy silt; normal odor; olive brown (2.5Y 3/3)
	ST-REF-2	572361.671610	5081292.217442	Sediment	0–2	Coarse grained sand; no odor; flocculent rust-colored algae on sediment surface (10YR 5/8); sand yellow brow (10YR 5/4)
	ST-REF-3	563549.635261	5083924.300324	Sediment	0–2	Medium to coarse grained sand; no organic debris; no odor; dark yellow brown (10YR 4/4)
	ST-REF-4	577012.742182	5074753.437677	Sediment	0–2	Sandy silt; no odor; dark yellow brown (10YR 4/4)
	ST-REF-5	578546.855373	5073897.102112	Sediment	0–2	Silt; some decaying vegetative material; reducing odor; dark gray brown (2.5Y 4/2)
Tundra Ponds						
Site Stations						
	TP1-0100	413635.086402	4969002.829212	Sediment	0–2	Dense vegetative mat on surface; strong sulfide odor; sheen on overlying water; decaying organic material; very dark brown (10YR 2/2)
	TP1-1000	412193.990277	4971071.645385	Sediment	0–2	Silt; submerged aquatic vegetation; slight reducing odor; brown (7.5YR 4/3)
	TP2-0100	484443.075620	5035750.949735	Sediment	0–2	Silt; very dense vegetative mat; faint reducing odor; very dark brown (10YR 2/2) with yellow (10YR 7/6)
	TP2-1000	483594.879264	5037172.347615	Sediment	0–2	Silt; dense vegetative mat; reducing odor; dark brown (7.5YR 3/3)
Reference Area Stations						
	TP-REF-1	568318.264500	5081243.996808	Sediment	0–2	Silt; moist; lots of aquatic vegetation; normal odor; brown (10YR 4/3)
	TP-REF-2	568706.827860	5081078.958355	Sediment	0–2	Sandy silt; no odor; yellow brown (10YR 4/4)
	TP-REF-3	569681.800275	5077834.772675	Sediment	0–2	Silt with some large stones; clay layer beneath silt; no odor; dark gray (5YR 4/1)
	TP-REF-4	577192.871476	5075801.065263	Sediment	0–2	Silt; lots of organic debris; reducing odor; dark brown (10YR 4/4)
	TP-REF-5	578669.447016	5073828.645965	Sediment	0–2	Silt; some decaying vegetative material; reducing odor; dark gray brown (2.5Y 4/2)

Table A-3. (cont.)

Assessment	Station	Location[a] Easting	Location[a] Northing	Media	Sample Interval (cm)	Soil/Sediment Characteristics
Terrestrial Assessment						
Terrestrial Transects						
Site Stations						
	TT1-0010	414745.247234	4971356.219831	Tundra Soil	0–2	Dark gray dead vegetation; tan inorganic clay
	TT1-0100	414532.761305	4971595.020390	Tundra Soil	0–2	Decayed vegetative material; peaty; normal odor; brown (7.5YR 4/3)
	TT1-1000	412535.641991	4973723.390764	Tundra Soil	0–2	Silt; lots of submerged aquatic vegetation in grab; slight reducing odor; brown (7.5YR 4/3)
	TT2-0010	423750.354748	4975649.145019	Tundra Soil	0–2	Decayed vegetative material; peaty; visible dust; normal odor; brown (7.5YR 4/3)
	TT2-0100	423776.283694	4975921.284813	Tundra Soil	0–2	Decayed vegetative material; peaty; one small clear worm; normal odor; brown (7.5YR 4/3)
	TT2-1000	423129.478935	4978828.950355	Tundra Soil	0–2	Decayed vegetative material; peaty; normal odor; brown (7.5YR 4/3)
	TT3-0010	545908.706417	5090989.127490	Tundra Soil	0–2	Some sand; decayed vegetative material; visible dust; normal odor; brown (7.5YR 4/3)
	TT3-0100	545883.996638	5091254.648342	Tundra Soil	0–2	Decayed vegetative material; peaty; normal odor; brown (7.5YR 4/3)
	TT3-1000	545492.923249	5094233.984965	Tundra Soil	0–2	Peaty soil; mottled colors throughout, mixture of very dark brown (10YR 3/3) and dark yellow brown (10YR 4/4)
	TT4-0010	573788.806177	5128333.095460	Tundra Soil	0–2	Dry; dark brown vegetative mat over black gravel and sand (same material as berm beside road)
	TT4-0100	573605.604617	5128471.304772	Tundra Soil	0–2	Wet; very small, clear worm; very dark brown (10YR 2/2)
	TT4-1000	570939.570260	5129283.146564	Tundra Soil	0–2	Peaty soil with clay at 2 cm; angular rock fragments at 2.5 to 3 cm; very dark brown (10YR 2/2)
Reference Area Stations						
	TS-REF-1	568336.863994	5081251.577351	Tundra Soil	0–2	Decaying vegetative debris; normal odor; brown (10YR 4/3)
	TS-REF-2	568734.784912	5081117.794210	Tundra Soil	0–2	Decaying vegetative debris; normal odor; brown (7.5YR 4/4)
	TS-REF-3	577217.737885	5075781.055970	Tundra Soil	0–2	Moist; decaying vegetations; normal odor; dark brown (10YR 3/3)
	TS-REF-4	576810.701263	5074699.449321	Tundra Soil	0–2	Root fibers and organic material; normal odor; dark brown (10YR 3/3)
	TS-REF-5	569812.278839	5077950.541783	Tundra Soil	0–2	Peaty soil; rounded to subrounded gravels; dark gray shales, wacky, and quartz; dark yellow brown (10YR 3/4)

Table A-3. (cont.)

Assessment	Station	Location[a] Easting	Location[a] Northing	Media	Sample Interval (cm)	Soil/Sediment Characteristics
	TS-REF-6	563584.312902	5083919.829149	Tundra Soil	0–2	Dry; root fibers; normal odor; rich dark brown (10YR 3/3)
	TS-REF-7	566108.615249	5080838.848236	Tundra Soil	0–2	Very little peat; dead vegetation; moist; brown (7.5 YR 5/4)
	TS-REF-8	572383.136469	5081244.761760	Tundra Soil	0–2	Dry to moist; normal odor; decaying vegetation; dark brown (10YR 5/4)
	TS-REF-9	578483.391223	5073909.789403	Tundra Soil	0–2	Peaty soil; dead vegetation; roots; moist; earthy odor; very dark brown (7.5YR 2.5/2)
	TS-REF10	578827.587581	5073814.541361	Tundra Soil	0–2	Organic vegetation; roots; earthy odor; moist; brown (7.5YR 5/4)
Road Shoulder Site Stations						
	RF-4	416484.145613	4970372.004342	Inorganic Soil	0–2	Clay sand gravel; angular to subrounded 1-inch minus gravel fragments; black, maroon, green shale; minor quartz; minor calcite; 40% coarse; typical Material Site 2 material; grayish brown (10YR 5/2)
	RF-5	417415.920314	4971219.313986	Inorganic Soil	0–2	Surface grayish brown (10YR 5/3) with brown (10YR 5/2); silt clays with 10% coarse angular quartzite, sandstones; some organic inclusions; all 1-inch minus gray chert
	RF-10	423728.184783	4975541.852351	Inorganic Soil	0–2	Gray gravel on surface 1-inch minus angular gray chert; moist clays and silts; yellow sandstone, red shales; reddish brown (5YR 5/4) under gray gravel; no odor
	RF-16	467887.373288	5008845.076753	Inorganic Soil	0–2	Silt clay 99% fines; wet; minor organic debris; gray (10YR 5/1) with overlying layer of brown (10YR 4/3)
	RF-18	479364.639027	5034586.484081	Inorganic Soil	0–2	Moderately compact, moist, clay sand gravel; 30% coarse; angular to subrounded 1-inch minus gravels, black shales, gray cherts with minor quartz; light red brown (5YR 6/4) with overlying very pale brown (10YR 7/3)
	RF-20	503845.789395	5048485.845838	Inorganic Soil	0–2	Sandy clay with some gravel pieces; gray chert, yellow sandstone; Material Site 9-type material; 10% coarse; mottled light gray (10YR 7/2)
	RF-22	521780.693325	5072800.457302	Inorganic Soil	0–2	Sandy silty clay; wet with angular gravel fragments, gray chert 10% coarse yellow and gray sandstone; Material Site 9-type material; very pale brown (10YR 7/3)
	RF-24	545873.881578	5090901.412582	Inorganic Soil	0–2	Wet clays and silts with 30% angular gravel; 1-in. minus gray chert; yellowish sandstone, black shale; no odor; light gray (10YR 7/2)
	RF-27	568783.634301	5115333.372678	Inorganic Soil	0–2	Wet; muddy silty gravels 1-inch minus angular gravels (40 percent coarse); shales, sandstones, cherts; dark grayish brown (10YR 6/2)

Table A-3. (cont.)

Assessment	Station	Location[a] Easting	Location[a] Northing	Media	Sample Interval (cm)	Soil/Sediment Characteristics
	RF-32	571939.594381	5126486.260219	Inorganic Soil	0–2	Sandy, silty clay (50/50); small pieces of gray chert and quartzite gravels with black, green, and maroon shale fragments 1-inch minus less than 2 to 3%; no odor; brown (10YR 5/3)
	RF-34	573846.553646	5128261.605676	Inorganic Soil	0–2	Some road gravel fragments; black angular shales, cherts, sandstones 1-inch minus; lots of vegetation
	RF-107	415203.285725	4971335.195196	Inorganic Soil	0–2	Wet, silty gravel; silt clay gravel fragments of black mud stone; cherts; sandstone; angular to subrounded with some quartz and calcite; appears to be a mixture of Material Site 9 and Material Site 2 material; 10-20% coarse
Reference Area Stations						
	MS-2	422519.9369	4973193.713	Inorganic Soil	0–2	Black shale with some fines; brown shale; calcite veining; some quartz veining; black marble; no odor; brown (7.5YR 5/4)
	MS-3	447621.1676	4989682.054	Inorganic Soil	0–2	Black angular shales; oxidizing shales; limestones with large crystal calcite and quartz veins; marchsite nodules to 2-inches; fossils; reddish gray (10YR 5/1); composite sample gray
	MS-5	473481.8223	5020894.2	Inorganic Soil	0–2	Gray to black shales with rust colored limestone with fossils; calcite veining; marchesite 1/2-inch nodules; dark brown (7.5YR 3/2)
	MS-6	485063.8932	5024613.296	Inorganic Soil	0–2	Dark maroon, pale yellowish green, and black shales; light gray quartzite; some quartz; yellowish-green shales with more shale oxidized to rust color; composite sample reddish brown (5YR 5/3); normal odor
	MS-9	530323.4545	5076626.296	Inorganic Soil	0–2	Gray chert; yellow sandstone; pale green sandstone; fossils; chrionoids; quartz; faint petroleum odor from freshly fractured sandstone; composite sample brown yellow (10YR 6/8)
Former Spills Assessment Site Stations						
	SA-1	414152.023457	4967874.810686	Tundra Soil	0–2	Lots of decaying vegetative debris; saturated; some rocks; normal odor; very dark brown (10YR 2/2)
				Tundra Soil	2–25	Decaying vegetative debris throughout interval; saturated; faint oil odor; black (10YR 2/1) to very dark brown (10YR 2/2)
				Inorganic Soil	--[b]	

Table A-3. (cont.)

Assessment	Station	Location[a] Easting	Location[a] Northing	Media	Sample Interval (cm)	Soil/Sediment Characteristics
	SA-2	414173.649196	4967881.229951	Tundra Soil	0–2	Lots of root material; decaying vegetative debris; root fibers; less moisture than Station SA-1; normal odor; very dark brown (10YR 2/2)
				Tundra Soil	2–18	Lots of root material; decaying vegetative debris; root fibers; less moisture than Station SA-1; normal odor; very dark brown (10YR 2/2)
				Inorganic Soil	18–20	Clay, inorganic layer just above frozen ground; few root fibers; normal odor; less moisture than Station SA-1; very dark gray brown (10YR 3/2)
	SA-3	414195.108465	4967887.482747	Tundra Soil	0–2	Larger root material than at Station SA-2; normal odor; dark red brown (5YR 2.5/2)
				Tundra Soil	2–28	Smaller root fibers; same moisture content as found at second interval at Station SA-2; normal odor; dark red brown (5YR 2.5/2)
				Inorganic Soil	28–30	Clay, inorganic material just above frozen ground; few root fibers; normal odor; dark red brown (5YR 2.5/2)
Reference Area Station						
	TS-REF-9	569812.278839	5077950.541783	Tundra Soil	0–2	Peaty soil; dead vegetation; roots; moist; earthy odor; very dark brown (7.5YR 2.5/2)
				Tundra Soil	2–28	Peaty soil; dead vegetation; roots; moist; earthy odor; very dark brown (7.5YR 2.5/2) and brown (7.5YR 5/4)
				Inorganic Soil	28–38	Clay, inorganic layer just above frozen ground; normal odor; very dark gray brown (10YR 3/2)

[a] State plane coordinates (NAD 27, Alaska Zone 7).

[b] Because the ground was completely saturated (i.e., transect is located through wetland), the inorganic soil layer was never reached (i.e., the hole filled with water at 25 cm).