

TECHNICAL MEMORANDUM

To: Mr. John Halverson, ADEC Contaminated Sites Program

From: Ms. Molly Welker, Bristol Project Manager

Date: November 20, 2009

Re: Request for Site 7 Landfill Closure at Northeast Cape, St. Lawrence Island, Alaska

Background

In 2009, Bristol Environmental Remediation Services (Bristol) was contracted by the U.S. Army Corps of Engineers, Alaska District (USACE), to conduct remediation activities at the Northeast Cape St. Lawrence Island former military installation under the Formerly Used Defense Site Program. Included in the Scope of Work was the removal of containerized waste and recapping of the Site 7 Cargo Beach Road Landfill (Site 7 Landfill). The final remedy for Site 7 also includes final closure, deed notation, implementation of land use controls, and visual monitoring.

The Site 7 Landfill is at the Northeast Cape former military facilities on St. Lawrence Island (Figure 1). St. Lawrence Island is located in the Bering Sea, approximately 135 air miles southwest of Nome, Alaska, at 63 degrees (°) 19 minutes (') north latitude and 168° 58' west longitude. The legal description of Site 7 Landfill is Township 25 South, Range 54 West, Section 15, North ½ South ½ of the Kateel River Meridian. The site is a part of a former military defense site that was occupied from the 1950s to the early 1970s. The facility functioned as a surveillance station, providing radar coverage for the Alaskan Air Command, and was later used for the North American Air Defense Command. It was part of an Alaska-wide early warning system constructed to reduce potential vulnerability to bomber attack across the polar region.

The Site 7 Landfill is an unpermitted landfill that was used as the installation's main solid waste disposal area from 1965, until closure in 1974. The dump contains a wide variety of non-hazardous materials. The landfill appears to have been created by dumping debris off the sides of a topographic mound. The debris was apparently covered by grading soil out from the top of the mound. The landfill covers approximately 500,000 square feet. The remedy for the Site 7 Landfill included the following major components:

- Exposing underlying drums/debris by digging through the areas with mapped metallic anomalies (an estimated 150,000 square feet) to determine if drums were present;
- Removal of 182 55-gallon drums with liquid or sludge contents, characterization of the waste contents, and proper disposal;

- Removal of 100 tons of incidental contaminated soils associated with identified drums to the extent severely stained soils were evident, characterization of the soils for disposal, and transporting off-site for proper disposal;
- Capping of entire landfill with 2 feet of granular borrow material obtained from a local borrow area;
- Stabilizing the site by grading it to encourage storm water run-off;
- Fertilizing and revegetating the site with an approved grass mixture from the Alaska Plant Materials Center to prevent erosion;
- Surveying the completed landfill boundary;
- Deed notation to implement land use controls to limit groundwater use and preventing construction of buildings on top of the landfill; and
- Performing visual monitoring of the capped area for settlement and erosion over a period of five years, with additional periodic reviews as necessary.

Test Pit, Trenching, and Excavation Activities

In 2007, a geophysical survey was conducted at the Site 7 Landfill by R&M Consultants, Inc., for the USACE. Areas within the landfill that displayed high levels of magnetic activity were examined by Bristol for the presence of drums. Bristol initially completed 11 test pits and/or trenches in these magnetic anomaly areas (see Figure 3 and Photograph 1). After the initial test pits were completed, all of the magnetic anomalies were investigated, solid wastes were turned over, and if any drums were filled with liquid, they were removed. Some anomalies proved to be small, isolated metal debris and this debris was not moved. During the excavation, Bristol encountered over 1,000 empty drums that were crushed and placed back in the landfill. The total area, over 150,000 square feet, that was eventually excavated by Bristol in 2009 is shown in Figure 4.



Photograph 1. A 100-square-foot by 4-foot-deep investigation trench in area of metallic anomalies.

Drum Removal

Drum removal at the Site 7 Landfill occurred between July 12, 2009, and August 3, 2009. Bristol recovered, drained, cleaned, and crushed a total of 182 drums. Fifty of the 55-gallon drums were disposed of offsite. The other 132 drums were placed back in the landfill after they were drained, cleaned, and crushed.

Excavation was performed using a Hitachi 120 excavator (Photograph 2). An environmental scientist and laborer were on-site with the excavator operator, as well as a Quality Assurance Representative from the Corps of Engineers. The environmental scientist and laborer identified the metallic anomaly areas, monitored the excavation progress for drums and other waste streams, and completed waste characterization activities at the site. The USACE Quality Assurance Representative was also present during the entire excavation task.

The excavation areas were chosen based on the metallic anomalies and the information yielded from test pits and trenching. Surface material was excavated and staged along the section of landfill being worked on. Debris was moved and piled until a drum was found. Upon discovery, the drum was checked with the aid of a drum thief. Drums found to have retrievable petroleum product, or residue determined to not be water, were moved to the Hazardous Waste Accumulation Point (HWAP) or were pumped in place into empty barrels and moved to the HWAP (Photograph 3).



Photograph 2. Excavation of soil and drums from the Site 7 Landfill.



Photograph 3. Field crew pumping liquid out of a corroded drum in the landfill.

Oil found in drums was drained and put in new containers for eventual petroleum recycling. Fifty drums were shipped off-island for disposal, and the rest of the drums were cleaned and returned to the landfill prior to capping. Drums that were extremely corroded or crushed were thoroughly cleaned on the outside and filled with Oil-Dri[®] absorbent, before being returned to the landfill (Photograph 4).



Photograph 4. Crushed drum that was cleaned, coated with Oil-Dri[®] absorbent, and returned to landfill.

During the drum removal task 2,150 gallons of oily sludge, oil, and oily water were properly contained and shipped off site for disposal.

Removal of Additional Waste Streams

During the course of excavation, other wastes were encountered and subsequently removed from the landfill. The three additional waste streams were polychlorinated-biphenyl-contaminated light ballasts, lead batteries, and antifreeze. All items were properly packaged, labeled, and manifested for shipment to off-site waste management facilities.

Several broken batteries and a few intact batteries were discovered and set aside. The batteries were brought to the HWAP. The broken batteries were placed in large plastic totes, and labeled and manifested for disposal. The intact batteries were placed in open-top drums, and labeled and manifested for recycling. Over 4,400 pounds of intact and broken batteries were removed and shipped off-island for proper disposal or recycling. One drum full of light ballasts was shipped offsite for proper disposal.

One drum containing a small amount of antifreeze was discovered. The antifreeze was transferred to a new drum and sampled. The antifreeze was then labeled and manifested for proper disposal to an off-site waste management facility.

Stained Soil Removal

During the course of drum removal, damaged drums were encountered. The condition of some of the drums was such that, occasionally, product leaked onto the soil; that soil was excavated and removed. Oil-stained soil was also found in areas where drums were absent, and over 100 tons of petroleum, oil, and lubricants (POL)-contaminated soil were removed, placed in eight 20-foot containers, and manifested for off-island disposal.

Landfill Cap

Material hauling for the landfill cap began July 8, 2009, using two 40-ton rock trucks. The fill material was hauled from a formerly used borrow pit just south of the Main Operations Complex. Material was initially stockpiled at the landfill in areas that did not coincide with magnetic anomalies during the excavation and drum-removal phase. Capping activities began on July 28, 2009, and proceeded until August 14, 2009.

Bristol placed each section of fill material in a series of four lifts to a minimum thickness of 24 inches above the trash and debris. A lift was spread and repeatedly track-walked with the equipment prior to laying each subsequent lift (Photograph 5). Work progressed section by section, until the entire landfill was covered with fill material, tracked-walked, and graded. Appropriate grading was done to ensure minimal erosion of the cap. Grade was set by a dozer operator with oversight from the foreman and site superintendent.



Photograph 5. Laying down and track-walking 6-inch lifts for a minimum of a 24-inch landfill cap.

All miscellaneous debris, the washed and crushed drums that were returned to the landfill, and disturbed soil from the excavation task, were graded prior to the cap being placed. Grade played an important role in determining the thickness of the cap. As stated above, the minimum thickness of material overlying trash and debris was set at 24 inches; however, some of these areas required more material in order to set grade.

Quality control measures taken in the field to ensure appropriate cap thickness consisted of excavating test pits through the capping material to its interface with the debris. The thickness of the material was noted, and fill stakes were placed at all locations that required additional material (Photograph 6).



Photograph 6. Measurement showing a 2-foot-thick cap in a test pit in the landfill.

Professional land surveys were conducted before and after the completion of the Site 7 Landfill cap. The post-landfill cap survey is shown on Figure 5.

Stabilization and Revegetation

In addition to grading to encourage water runoff, seeding and fertilization were done to prevent erosion. Bristol performed final seeding of the landfill cap on August 13, 2009. The landfill cap was spread with native plant seed adapted to the St. Lawrence Island environment in accordance with the manufacturer's instructions. The seed mixture was approved by the Alaska Plant Materials Center and proportioned by weight: 70 percent tufted hairgrass and 30 percent red fescue.

Seed was applied at a uniform rate of one pound per 100 square feet. Fertilizer was applied at a rate of 450 pounds per acre, and had a nitrogen-phosphorus-potassium ratio of 20 percent nitrogen; 20 percent phosphorus; and 10 percent potassium. Bristol did not water seeded areas; however, seeding was completed during days of light precipitation. As of September 11, 2009, grass seed had taken root and was growing on the landfill cap (Photograph 7).



Photograph 7. Germinated grass seed on landfill (September 11, 2009).

Deed Notification

A document will be recorded with the Alaska Department of Natural Resources Recorder's Office in Fairbanks, Alaska. The intent of the document will be to place an institutional control on record to limit groundwater use, and prevent construction of buildings on top of the landfill. The legal description and recording district for the Site 7 Landfill used for indexing purposes at the Recorder's Office will be Cape Nome District: Township 25 South, Range 54 West, Section 15, North ½ South ½ of the Kateel River Meridian.

Request for Closure

Based on the information provided in this memorandum, Bristol formally requests that the Alaska Department of Environmental Conservation Contaminated Sites Program approve the closure of the Site 7 Landfill (Photograph 8). The USACE will visually monitor the capped area for settlement and erosion over the next five years, with additional periodic reviews as necessary.



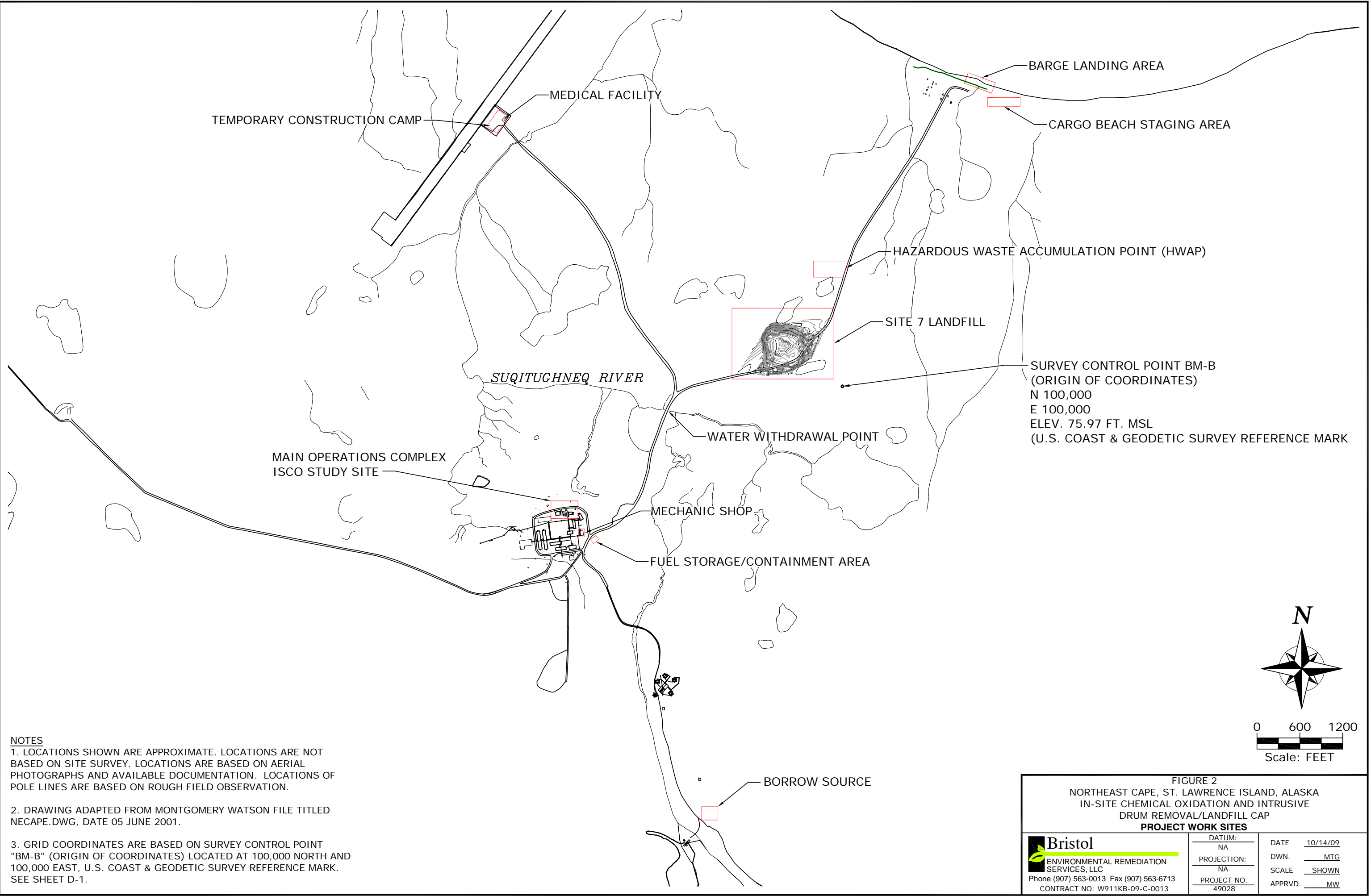
Photograph 8. View looking north at the capped Site 7 Landfill (August 18, 2009).

Drawing: O:\JCS\49028 NECAPE LANDFILL\CAD-ENV\FIG1\FIGURES-TM-NOV09\DWG\49028-FIG1_NOV09.DWG - Layout: 49028-FIG1_NOV09
 User: RJAMES Nov 10, 2009 - 11:13am Xrefs: - Images: NEL.JPG NECAPE.JPG



FIGURE 1
NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA
IN-SITU CHEMICAL OXIDATION AND INTRUSIVE
DRUM REMOVAL/LANDFILL CAP
LOCATION MAP

<p>Bristol ENVIRONMENTAL REMEDIATION SERVICES, LLC Phone (907) 563-0013 Fax (907) 563-6713 CONTRACT NO: W911KB-09-C-0013</p>	DATUM: NA	DATE 11/04/09
	PROJECTION: NA	DWN. MTG
	PROJECT NO. 49028	SCALE SHOWN
		APPRVD. MW



TEMPORARY CONSTRUCTION CAMP

MEDICAL FACILITY

BARGE LANDING AREA

CARGO BEACH STAGING AREA

HAZARDOUS WASTE ACCUMULATION POINT (HWAP)

SITE 7 LANDFILL

SURVEY CONTROL POINT BM-B
 (ORIGIN OF COORDINATES)
 N 100,000
 E 100,000
 ELEV. 75.97 FT. MSL
 (U.S. COAST & GEODETIC SURVEY REFERENCE MARK)

SUQITUGHNEQ RIVER

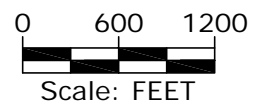
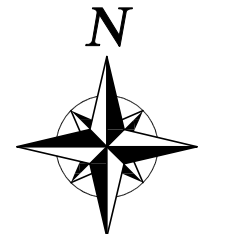
WATER WITHDRAWAL POINT

MAIN OPERATIONS COMPLEX
 ISCO STUDY SITE

MECHANIC SHOP

FUEL STORAGE/CONTAINMENT AREA

BORROW SOURCE







- NOTES**
1. LOCATIONS SHOWN ARE APPROXIMATE. LOCATIONS ARE NOT BASED ON SITE SURVEY. LOCATIONS ARE BASED ON AERIAL PHOTOGRAPHS AND AVAILABLE DOCUMENTATION. LOCATIONS OF POLE LINES ARE BASED ON ROUGH FIELD OBSERVATION.
 2. DRAWING ADAPTED FROM MONTGOMERY WATSON FILE TITLED NECAPE.DWG, DATE 05 JUNE 2001.
 3. GRID COORDINATES ARE BASED ON SURVEY CONTROL POINT "BM-B" (ORIGIN OF COORDINATES) LOCATED AT 100,000 NORTH AND 100,000 EAST, U.S. COAST & GEODETIC SURVEY REFERENCE MARK. SEE SHEET D-1.

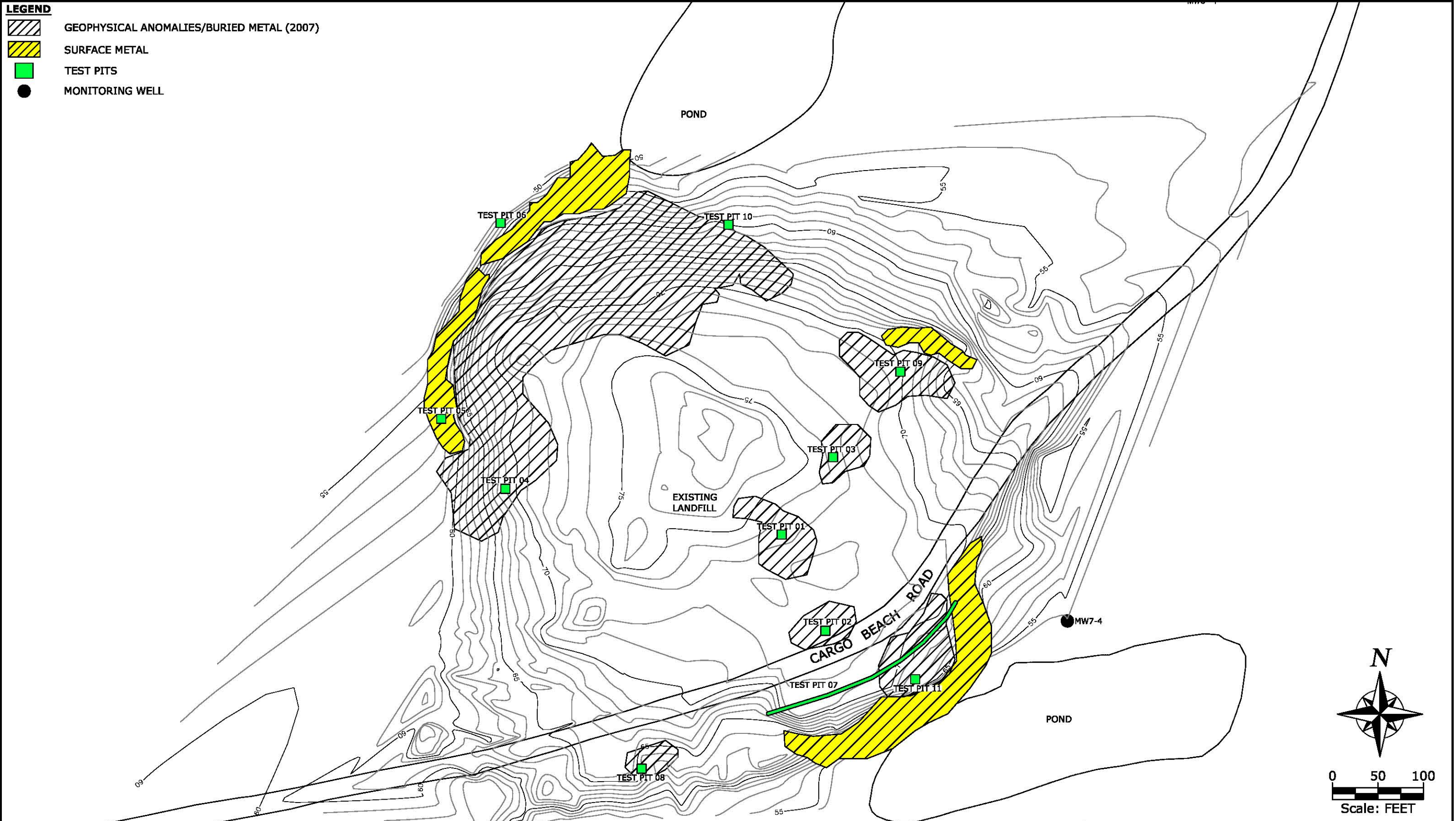
FIGURE 2
 NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA
 IN-SITE CHEMICAL OXIDATION AND INTRUSIVE
 DRUM REMOVAL/LANDFILL CAP
PROJECT WORK SITES

<p>Bristol ENVIRONMENTAL REMEDIATION SERVICES, LLC Phone (907) 563-0013 Fax (907) 563-6713 CONTRACT NO: W911KB-09-C-0013</p>	DATUM:	DATE
	NA	10/14/09
	PROJECTION:	DWN.
	NA	MTG
PROJECT NO.	SCALE	APPRVD.
49028	SHOWN	MW

Drawing: O:\JOBS\49028 NECAPE LANDFILL\CAD-ENV\FIGURES-TM-NOV09\DWG\49028-FIG2_NOV09.DWG - Layout: 49028-FIG2_NOV09(1200SC)
 User: MGARCIA Nov 20, 2009 - 3:07pm Xrefs: - Images:


LEGEND

-  GEOPHYSICAL ANOMALIES/BURIED METAL (2007)
-  SURFACE METAL
-  TEST PITS
-  MONITORING WELL





Drawing: C:\JOBS\49028 NECAPE LANDFILL\CAD-ENV\FIG3\FIGURES-TM-NOV09\DWG\49028-FIG3_NOV09.DWG - Layout: 49028-FIG3_NOV09
 User: RJAMES Nov 10, 2009 - 11:18am Xrefs: - Images: NE1.JPG

FIGURE 3
 NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA
 IN-SITU CHEMICAL OXIDATION AND INTRUSIVE
 DRUM REMOVAL/LANDFILL CAP
 PRE-CONSTRUCTION SURVEY, TEST PITS, AND MAGNETIC ANOMALIES

 Bristol ENVIRONMENTAL REMEDIATION SERVICES, LLC Phone (907) 583-0013 Fax (907) 583-6713 CONTRACT NO: W911KB-09-C-0013	DATUM: NA	DATE <u>11/04/09</u>
	PROJECTION: NA	DWN. <u>MTG</u>
	PROJECT NO. 49028	SCALE <u>SHOWN</u>
		APPRVD. <u>MW</u>

SOURCE:
 GEOPHYSICAL SURVEY NORTHEAST CAPE,
 R&M CONSULTANTS, INC., NOVEMBER 2007
 PRE-CONSTRUCTION SURVEY,
 PERFORMED BY ECO-LAND, LLC., JULY 2009

LEGEND

-  EXTENT OF EXCAVATION
-  GEOPHYSICAL ANOMALIES/BURIED METAL (2007)

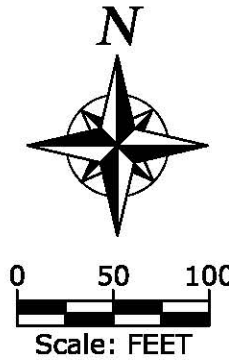



FIGURE 4
NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA
IN-SITU CHEMICAL OXIDATION AND INTRUSIVE
DRUM REMOVAL/LANDFILL CAP
EXTENT OF SITE 7 EXCAVATION

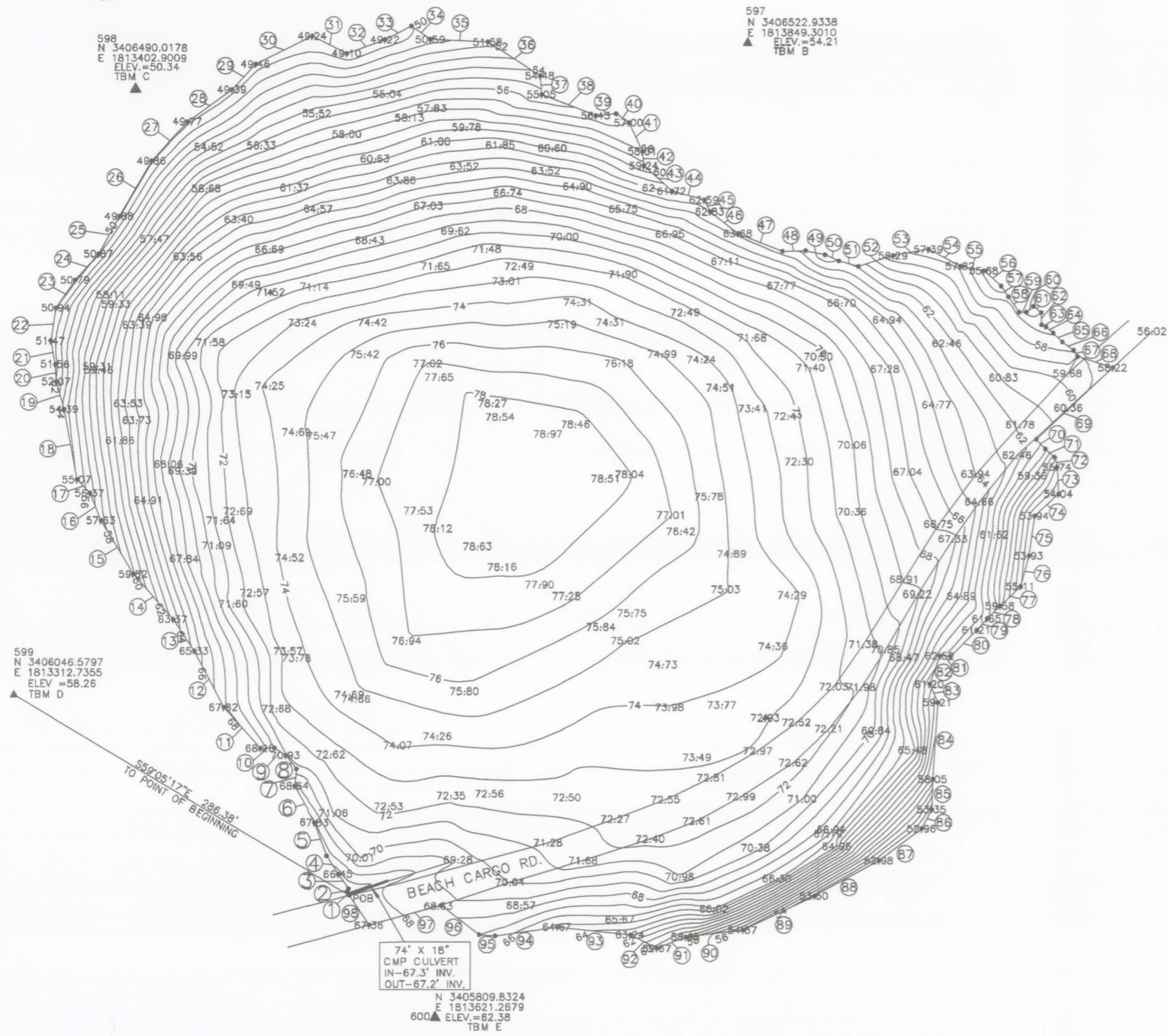
 Bristol ENVIRONMENTAL REMEDIATION SERVICES, LLC Phone (907) 583-0013 Fax (907) 583-6713 CONTRACT NO: W911KB-09-C-0013	DATUM: NA	DATE <u>11/04/09</u>
	PROJECTION: NA	DWN. <u>MTG</u>
	PROJECT NO. 49028	SCALE <u>SHOWN</u>
		APPRVD. <u>MW</u>

Drawing: C:\DOCUMENTS AND SETTINGS\RJAMES\DESKTOP\49028-FIG4_NOV09.DXF - Layout: 49028-FIG4_NOV09
User: RJAMES Nov 10, 2009 - 11:27am Xrefs: - Images:

NORTHEAST CAPE ST. LAWRENCE ISLAND AREA 7 DUMPSITE TOPOGRAPHIC SURVEY

2 N 3406599.5178
E 1814303.8993
ELEV.=47.33
TBM A
N.E. SITE CORNER

"AS-BUILT" POST CONSTRUCTION
SURVEY CONDUCTED AUGUST 2009



CAP EXTERIOR BOUNDARY

LINE	BEARING	DISTANCE	L52	N73°07'35"E	26.60'
L1	N28°32'36"W	2.93'	L53	N79°30'05"E	26.08'
L2	N21°22'42"E	2.45'	L54	S61°54'38"E	26.14'
L3	N33°57'38"W	13.07'	L55	S79°23'12"E	17.67'
L4	N32°49'17"W	15.88'	L56	S47°57'04"E	16.94'
L5	N19°46'58"W	26.06'	L57	S34°24'23"E	9.44'
L6	N29°05'35"W	30.43'	L58	S34°44'55"E	13.63'
L7	N06°00'51"E	12.62'	L59	S89°38'11"E	5.37'
L8	N38°18'48"W	12.64'	L60	N50°32'36"E	6.62'
L9	N57°04'08"W	9.94'	L61	S51°27'08"E	7.36'
L10	S89°23'29"W	10.16'	L62	S01°04'55"E	8.93'
L11	N41°26'46"W	40.32'	L63	S66°26'11"E	3.77'
L12	N27°35'53"W	46.53'	L64	S50°49'49"E	6.93'
L13	N33°47'06"W	27.78'	L65	S46°27'39"E	9.54'
L14	N41°26'30"W	43.92'	L66	S53°18'19"E	10.28'
L15	N31°07'02"W	45.98'	L67	S31°48'16"E	5.40'
L16	N22°15'41"W	21.60'	L68	S72°29'07"E	27.14'
L17	N43°19'16"W	13.79'	L69	S46°57'44"W	76.81'
L18	N10°25'34"W	52.45'	L70	S42°37'30"E	9.65'
L19	N15°23'28"W	21.02'	L71	S50°02'17"E	9.55'
L20	N03°19'58"W	12.67'	L72	S13°58'06"E	7.41'
L21	N11°34'52"W	17.39'	L73	S03°08'19"E	19.72'
L22	N09°20'45"E	24.66'	L74	S47°51'29"W	23.91'
L23	N34°59'14"E	24.90'	L75	S07°57'25"W	29.46'
L24	N41°59'04"E	25.65'	L76	S14°40'57"W	23.19'
L25	N29°00'39"E	31.60'	L77	S46°39'26"W	20.55'
L26	N30°25'15"E	46.96'	L78	S45°43'44"W	13.39'
L27	N42°30'07"E	38.95'	L79	S42°01'07"W	11.15'
L28	N54°17'17"E	40.21'	L80	S44°27'48"W	27.23'
L29	N42°54'40"E	25.48'	L81	N87°39'22"W	7.63'
L30	N63°58'15"E	46.40'	L82	S20°01'34"W	22.02'
L31	S62°58'40"E	28.16'	L83	S23°50'30"E	14.71'
L32	N70°26'04"E	29.62'	L84	S03°27'53"W	56.29'
L33	N62°16'12"E	21.38'	L85	S01°49'55"W	22.11'
L34	S54°47'26"E	17.11'	L86	S27°03'15"W	15.87'
L35	S87°17'19"E	41.81'	L87	S53°07'43"W	39.00'
L36	S56°29'41"E	45.38'	L88	S61°25'12"W	54.00'
L37	S04°52'45"E	13.78'	L89	S64°38'43"W	57.97'
L38	S68°24'45"E	42.55'	L90	S83°03'01"W	42.26'
L39	N85°15'58"E	14.76'	L91	S68°28'15"W	22.79'
L40	S55°05'53"E	11.41'	L92	N62°42'14"W	21.90'
L41	S25°49'25"E	23.08'	L93	N83°38'44"W	54.22'
L42	S04°49'43"E	10.64'	L94	S82°07'16"W	45.99'
L43	S47°43'22"E	27.74'	L95	N85°33'28"W	11.81'
L44	S74°42'33"E	24.46'	L96	N52°28'10"W	35.08'
L45	S26°15'00"E	9.52'	L97	S74°47'15"W	54.31'
L46	S51°52'36"E	26.06'	L98	N33°53'49"W	26.34'
L47	S67°50'01"E	34.86'			
L48	N88°03'49"E	16.85'			
L49	S77°31'24"E	14.79'			
L50	S65°47'35"E	11.19'			
L51	S74°46'50"E	14.75'			

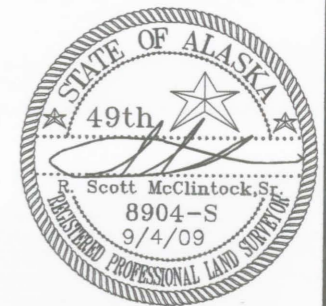
TOTAL SURFACE AREA:
342,832.52 SQ. FT./ 7.87 ACRES

* SURVEYOR'S CERTIFICATE *

I HEREBY CERTIFY THAT I AM PROPERLY REGISTERED AND LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF ALASKA, THAT THIS PLAT REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT ALL DIMENSIONS, RELATIVE BEARINGS, RELATIVE ELEVATIONS AND OTHER DETAILS ARE CORRECT.

DATE: 09/08/09

R. Scott McClintock, Sr.
R. SCOTT MCCLINTOCK, SR.



** LEGEND **

- Ⓢ--INDICATES EXTERIOR CAP BOUNDARY LINE COURSE
- ▲--INDICATES 5/8"X 30" REBAR CONTROL MONUMENT
- 55.52--INDICATES SURVEYED SPOT ELEVATION

** SURVEY NOTES **

1. THIS SURVEY WAS CONDUCTED USING RTK/GPS SURVEYING TECHNIQUES.
2. COORDINATES ARE ALASKA STATE PLANE ZONE 9 REDUCED TO HORIZONTAL GROUND IN US SURVEY FEET.
3. ELEVATIONS AND COORDINATES ARE BASED UPON A SINGLE POINT STATIC OBSERVATION USING NGS OPUS SOLUTION.
4. CONTOUR INTERVAL IS ONE FOOT.



SURVEYING & MAPPING
P.O. BOX 1444 NOME, ALASKA 99762
(907) 443-6068

Figure 5

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE CONTAMINATED SITES REMEDIATION PROGRAM

SEAN PARNELL, GOVERNOR

555 Cordova Street
Anchorage, AK 99501-2617
Phone: (907) 269-7556
Fax: (907) 269-7649
<http://www.state.ak.us/dec/>

File No: 475.38.013

December 7, 2009

Bristol Environmental Remediation Services, LLC
Attention: Ms. Molly Welker; Project Manager
111 W. 16th Avenue, Third Floor
Anchorage, AK 99501-5109

Subject: Technical Memorandum Requesting Closure for NE Cape Landfill Site 7

Dear Ms. Welker:


Thank you for providing the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Program (CSP) with the Nov.20, 2009 technical memorandum regarding the remediation work conducted during the 2009 season at the Site 7 Landfill at NE Cape.

On page 8 of the memorandum, Bristol formally requests that the ADEC CSP approve the closure of the Site 7 Landfill. However, at this point in time it is premature to make a closure determination for the site. Typically the Corps of Engineers submits Formerly Used Defense Site project closure reports after all the necessary field work and reporting has been completed.

I look forward to receiving and reviewing the draft and final site remediation reports from Bristol in the coming months.

If you have any questions please call me at 269-3053.

Sincerely,


Curtis Dunkin
Project Manager



cc: Carey Cossaboom, ACOE
John Halverson, ADEC