

TECHNICAL MEMORANDUM

DATE: September 5, 2008

TO: Mr. Carey Cossaboom, Project Manager, U.S. Army Corps of Engineers, Alaska District

FROM: Matthew Faust, Project Manager, Bristol Environmental Remediation Services, LLC

RE: Monitoring Well Decommissioning Report
Contract No. W911KB-08-P-0074
Gambell, Alaska

Bristol Environmental Remediation Services, LLC (Bristol) has prepared this Technical Memorandum (Tech Memo) at the request of the U.S. Army Corps of Engineers (USACE). The Tech Memo presents the results of the groundwater monitoring well decommissioning project that was conducted at the Gambell Formerly Used Defense Site (FUDS) by Bristol in August 2008.

SITE DESCRIPTION

The Gambell FUDS is located on the northwest tip of Saint Lawrence Island, near the village of Gambell. Gambell is located at latitude 63 degrees (°), 46 minutes ('), 49 seconds (") North, and longitude 171° 43' 46" West, approximately 200 miles southwest of Nome, Alaska, and 700 miles northwest of Anchorage, Alaska (Figure 1). The site was operated by the military as a radar and communications facility from 1948 until the late 1950s (USACE, 2005).

The Gambell FUDS encompasses approximately 2.7 square miles. The site includes areas around Troutman Lake and extends from the ocean to the top of Sevuokuk Mountain. Environmental investigation efforts have been conducted at the site from the 1980s through the present (USACE, 2005). Environmental remediation efforts under the FUDS program have been completed at the site.

SCOPE OF WORK

The scope of work for this project was to properly abandon and decommission all remaining groundwater monitoring wells located at the Gambell FUDS in accordance with applicable Alaska Department of Environmental Conservation (ADEC) guidance (ADEC, 1992).

Approximately 21 monitoring wells were reportedly located at the site at the beginning of site activities. Monitoring well locations are listed on Table 1 and are shown on Figure 2.

COMPLETED TASKS

Bristol personnel mobilized to Gambell from Anchorage, Alaska on August 19 and met with personnel from Bristol's subcontractor, the Native Village of Gambell (NVG), to go over the Work Plan and the Site Health and Safety Plan (Bristol, 2008). On August 20 and 21, Bristol and the NVG crew located and decommissioned 17 monitoring wells. On August 22, the NVG crew consolidated well construction materials accumulated during the decommissioning activities, and Bristol personnel demobilized from Gambell back to Anchorage. All well construction materials have been temporarily staged in Conexes along with other debris from Gambell, and will be transported to the Columbia Ridge Landfill in Arlington, Oregon for disposal.

Monitoring wells were located using a global positioning system (GPS) unit and aerial photographs. Bristol's procedure for decommissioning the wells was to first pull the protective steel casing from the ground using a chain attached to a loader bucket. Once the protective casing had been removed, the polyvinyl chloride (PVC) well casing was removed using the same method. Once the PVC had been removed, each bore hole was backfilled with bentonite pellets, taking care to minimize void spaces. The bentonite was then hydrated to plug the bore hole.

Photographs illustrating site activities are included as Attachment 1. Field notes detailing site activities are included as Attachment 2.

Bristol and the NVG crew were unable to locate four of the 21 monitoring wells reported to be located at the site. Two of these wells (MW-5 and MW-7) were located on the North Beach of the gravel spit on the northeastern tip of Saint Lawrence Island, while the other two (MW-25 and MW-27) were located within the community of Gambell (Figure 2).

Monitoring wells MW-5 and MW-7 appear to have been located below the storm surge line on the North Beach (Figure 2). This determination was made by Bristol personnel using aerial photographs and a GPS unit. The monitoring wells were reported to have been constructed as aboveground completions protected by stick-up steel casings. For each of the two wells, a search grid with dimensions of 100-feet by 100-feet was established. Each grid was centered on the reported location of the well (as determined using the GPS unit) and was screened using a metal detector in east to west and north to south passes. All anomalies indicated by the metal detector were investigated by hand-digging and determined to be metal debris unrelated to the monitoring wells. Each grid was also investigated by using a backhoe to dig down approximately one to two feet below the ground surface at the reported location of the well. No evidence of either monitoring well was found.

Monitoring wells MW-25 and MW-27 were located within the community of Gambell (Figure 2). The monitoring wells were reported to have been constructed as flush-mount completions protected by steel covers. For each of the two wells, a search grid with dimensions of 120 feet by 120 feet was established. Each grid was centered on the reported location of the well (as determined using the GPS unit) and was screened using a metal detector in east to west and north to south passes. All anomalies indicated by the metal detector were investigated by hand-digging and determined to be metal debris unrelated to the monitoring wells. Due to the presence of shallow utilities in the area, a decision was made by Bristol to not investigate the area using heavy equipment. No evidence of either monitoring well was found.

SUMMARY

Between August 20 and 21, 2008, Bristol and the NVG crew decommissioned 17 monitoring wells at the Gambell FUDS. Bristol and the NVG crew looked for four other monitoring wells, but was unable to locate them. All accumulated debris will be disposed of at the Columbia Ridge Landfill in Arlington, Oregon.

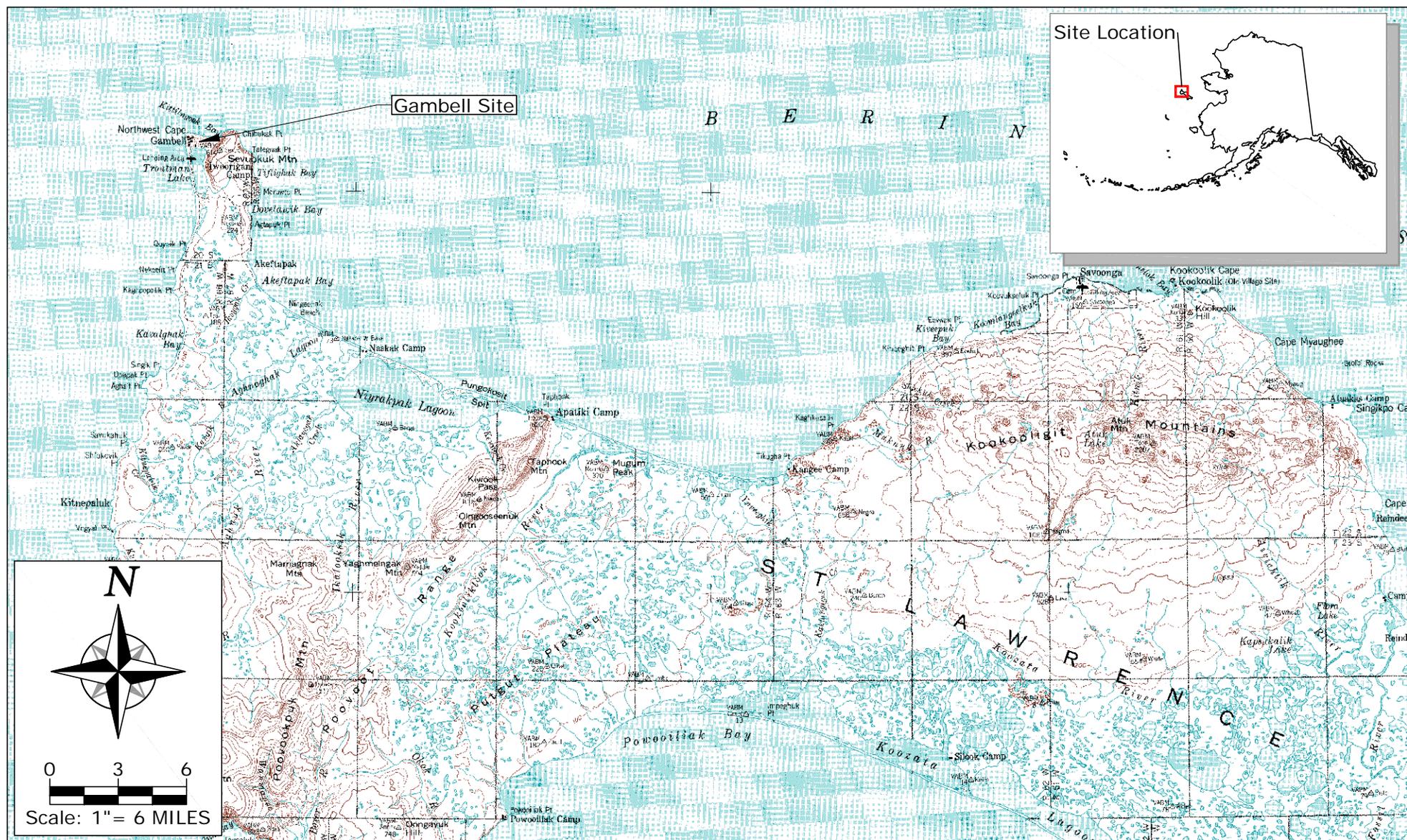
REFERENCES

Alaska Department of Environmental Conservation. 1992 (April). *Guidance No. 001 – Recommended Practices for Monitoring Well Design, Installation, and Decommissioning.*

Bristol Environmental Remediation Services, LLC. 2008 (June 20). *Technical Memorandum, Contract No. W911KB-08-P-0074, Monitoring Well Decommissioning, Gambell, Alaska, Work Plan*

U.S. Army Corps of Engineers. 2005 (June). *Decision Document, Gambell Formerly Used Defense Site, F10AK0696, St. Lawrence Island, Alaska.*

FIGURES



Source: USGS National Atlas Sheet Number 42-43

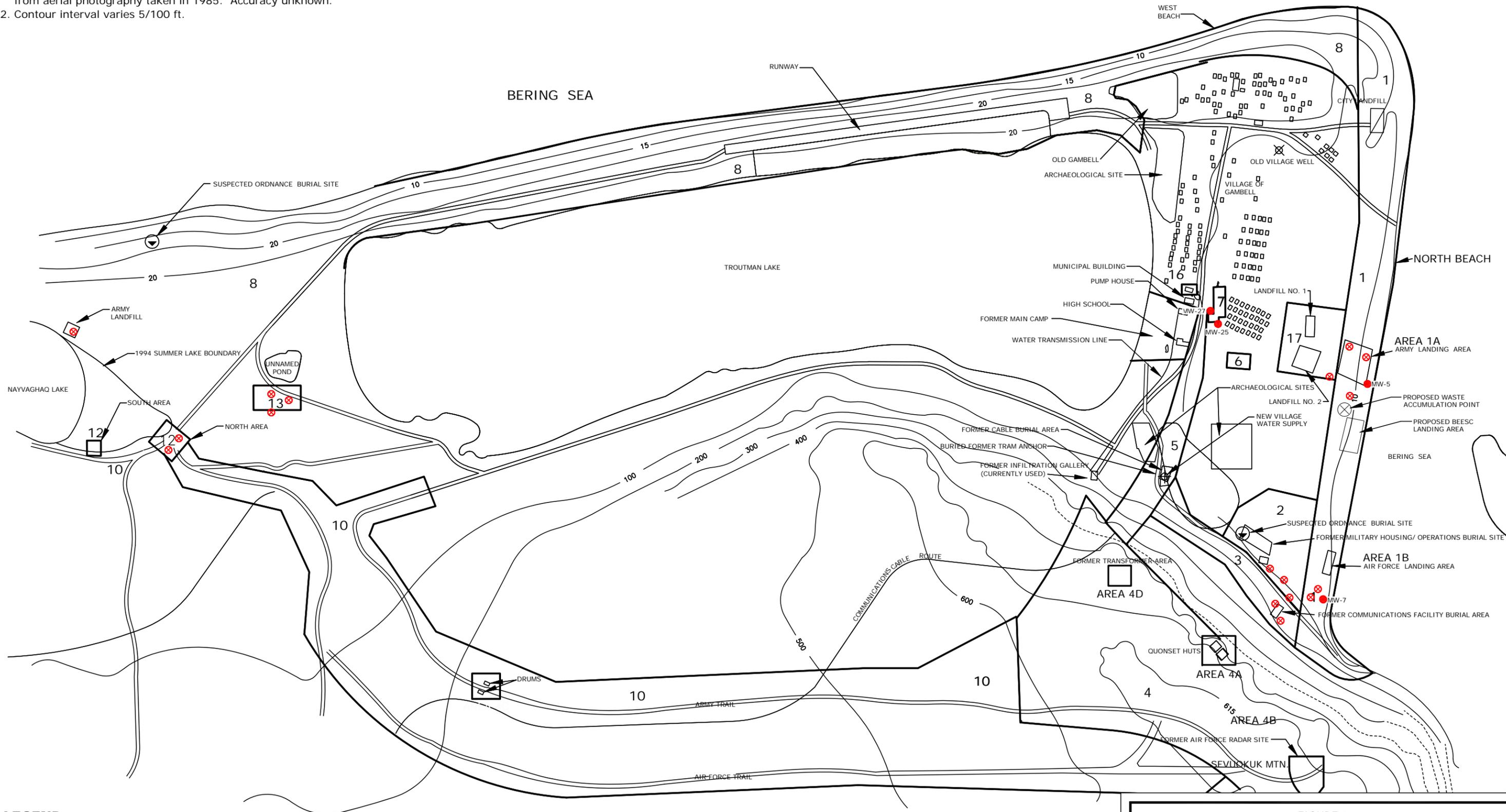
FIGURE 1
 GAMBELL, ST. LAWRENCE ISLAND, ALASKA
 MONITORING WELL DECOMMISSIONING
 VICINITY MAP

Bristol
 ENVIRONMENTAL REMEDIATION
 SERVICES, LLC
 Phone (907) 563-0013 Fax (907) 563-6713
 Project No: 49003

| | | |
|-------------------|---------------------------|-------------------|
| DATUM: NA | DATE 06/20/08 DWN. MTG | SHEET 1 |
| PROJECTION: NA | SCALE SHOWN | of |
| | APPRVD. SAJ | 2 |

NOTES:

1. Mapping taken from Chemical Data Acquisition Plan by Ecology & Environment (1993). Mapping believed to be sketched from aerial photography taken in 1985. Accuracy unknown.
2. Contour interval varies 5/100 ft.



LEGEND

- APPROXIMATE LOCATION OF MONITORING WELL DECOMMISSIONED IN AUGUST 2008
- APPROXIMATE LOCATION OF MONITORING WELL NOT LOCATED IN AUGUST 2008

SOURCE: U.S. ARMY ENGINEERING DISTRICT, ALASKA
 ST. LAWRENCE ISLAND, AK
 FIGURE 1-3, GAMBELL REMEDIAL INVESTIGATION
 (SITE 5)-MWH MONTGOMERY WATSON, INC.

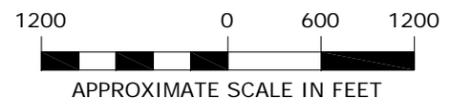


FIGURE 2
 GAMBELL, ST. LAWRENCE ISLAND, ALASKA
 MONITORING WELL DECOMMISSIONING
 MONITORING WELL LOCATIONS

| | | | |
|--|-------------|---------------|----------|
| <p>Bristol ENVIRONMENTAL REMEDIATION SERVICES, LLC Phone (907) 563-0013 Fax (907) 563-6713 Project No: 49003</p> | DATUM: | DATE 06/20/08 | SHEET |
| | NA | DWN. MTG | 2 |
| | PROJECTION: | SCALE SHOWN | of |
| | NA | APPRVD. SAJ | 2 |

Drawing: O:\JOBS\49003 GAMBELL MONITORING WELL DECOMMISSIONING\FIG2\MWL_JUNE08.DWG - Layout: 49003_FIG2_MWL_JUNE08
 User: MGARCIA Sep 08, 2008 - 12:51pm Xrefs: - Images:

TABLE

Table 1 - Approximate Monitoring Well Locations

| Well ID | North Latitude | West Longitude | Notes |
|----------------|-----------------------|-----------------------|--|
| MW-1 | 63.781356° | 171.7149255° | Decommissioned |
| MW-2 | 63.781983° | 171.7136754° | Decommissioned |
| MW-3 | 63.782303° | 171.7167222° | Decommissioned |
| MW-4 | 63.782614° | 171.7157427° | Decommissioned |
| MW-5 | 63.782632° | 171.7142623° | Not found during August 2008 site activities |
| MW-6 | 63.781235° | 171.6986545° | Not found during August 2008 site activities |
| MW-7 | 63.781432° | 171.697668° | Decommissioned |
| MW-8 | 63.781016° | 171.6978684° | Decommissioned |
| MW-9 | 63.779763° | 171.6953778° | Decommissioned |
| MW-10 | 63.779493° | 171.696521° | Decommissioned |
| MW-11 | 63.779979° | 171.6976435° | Decommissioned |
| MW-12 | 63.780023° | 171.6995515° | Decommissioned |
| MW-13 | 63.77942° | 171.6999017° | Decommissioned |
| MW-17 | 63.741088° | 171.7076646° | Decommissioned |
| MW-18 | 63.741363° | 171.7085022° | Decommissioned |
| MW-19 | 63.737655° | 171.7164491° | Decommissioned |
| MW-20 | 63.744871° | 171.7115767° | Decommissioned |
| MW-21 | 63.745254° | 171.7108938° | Decommissioned |
| MW-22 | 63.744751° | 171.7100725° | Decommissioned |
| MW-25 | 63.777664° | 171.7174244° | Not found during August 2008 site activities |
| MW-27 | 63.777449° | 171.7185506° | Not found during August 2008 site activities |

Notes:

° = degrees

ID = identification

ATTACHMENT 1

Site Photographs



Photograph No. 1

Direction: South

Description: Removing protective well cover from MW-12.

Date: 8/20/08

Photographer: L. MacDonald



Photograph No. 2

Direction: West

Description: Pulling PVC well casing from MW-22.

Date: 8/20/08

Photographer: L. MacDonald



Photograph No. 3

Date: 8/20/08

Direction: NA

Photographer: L. MacDonald

Description: Bentonite pellets in MW-3 (prior to hydration of pellets) following removal of well casing.



Photograph No. 4

Date: 8/20/08

Direction: East

Photographer: L. MacDonald

Description: NVG personnel looking for MW-7. Crew utilized a metal detector, heavy equipment, and hand-digging while attempting to find MW-5 and MW-7.



Photograph No. 5

Date: 8/21/08

Direction: West

Photographer: L. MacDonald

Description: NVG personnel looking for MW-27. Crew utilized a metal detector and hand-digging while attempting to find MW-25 and MW-27.



Photograph No. 6

Date: 8/21/08

Direction: East

Photographer: L. MacDonald

Description: NVG heavy-equipment operator consolidating well construction materials at the end of the monitoring well decommissioning effort.

ATTACHMENT 2

Field Notes

Gambell 2008 #49003

8-18-08

LV UVA 2 @ 5:30 AM

ARR. ARL 11:30 AM

Work with MATT
SHOP FOR "STUFF" (8)

8-19-08 work at EAM

Get SAFETY Supplies.

Air Port 9:05. HOME

2 PM. 2 HOUR LAYOVER.

Gambell AT 5:30. work

with Richard. Get settled

work on PLANS, Check Wells (10)

8/20/08 Meet with Richard
and Rubin. DISCUSS Project
SAFETY Meeting with NALENT
CREW.

First PIC - MW 09

2nd PIC MW 09 - Gone

3rd PIC MW 09 Bentonite

MW 09 cover
out & covered

second set

Pic's MW - 11 out

Richard & Rubin DON'T WAIT

They need to wait for PIC'S

third set MW 12 - out

4th MW 13 out

5th MW 10 out

6th MW 08 out

7th MW 06 out

#6-Culvert cover

8th CAN'T FIND #7

8th Set DRIVING FOR MW 07

9th MW 02 - out

10th MW 01 = out

11th set MW 04 out

12th set MW 03 out

MW's #25 & 27 can't find

13th MW - 19 out Culvert

14th MW - 17 Culvert out

15th MW - 16 Culvert out

16th MW 22 out

17th MW - 21 LAYING ON

GROUND ALREADY - out

18th MW - 20 out

Covered ALL = 17 MW'S

8-21-08 CON'd

Site File. ON Beach

AltoA. NO Reference except
GPS MW-05-100 ft SQ Search
FOR well NO LUCK RANGP Stone

only MARSTON MATTHS

AND ① 22 shell

Good GRID Pics

Site MW-07 = Set up

100' SQ GRID ON GPS Like

ON MW-05 = MARSTON MATTHS

RAN GPS TWICE. NO LUCK

Just Pieces OF MATTH

Pics - Start to Pick

UP DeBRIS FROM MW 5

①

8-27-08 Pick up DeBRIS.

Del to NALEUP site.

Re Package Loose STUFF

IN SUPER SAC'S.

ALL Debris Picked up

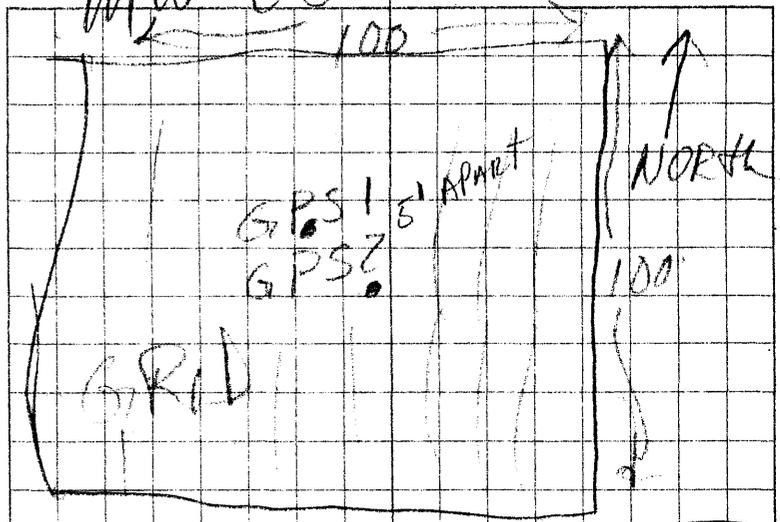
AND ALL sites BACK

TO ORIGINAL Levels.

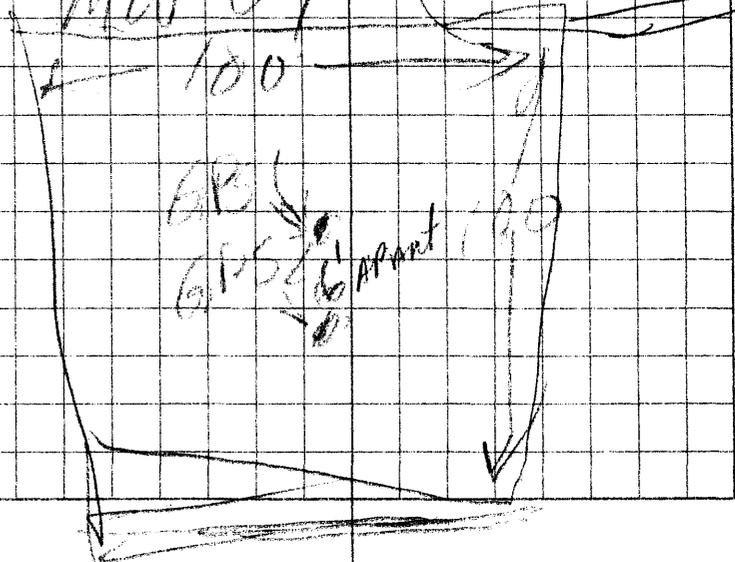
CATCH BERING AIR AT 11 AM

GRID

MW-05 8-21-08



MW-07



Bristol

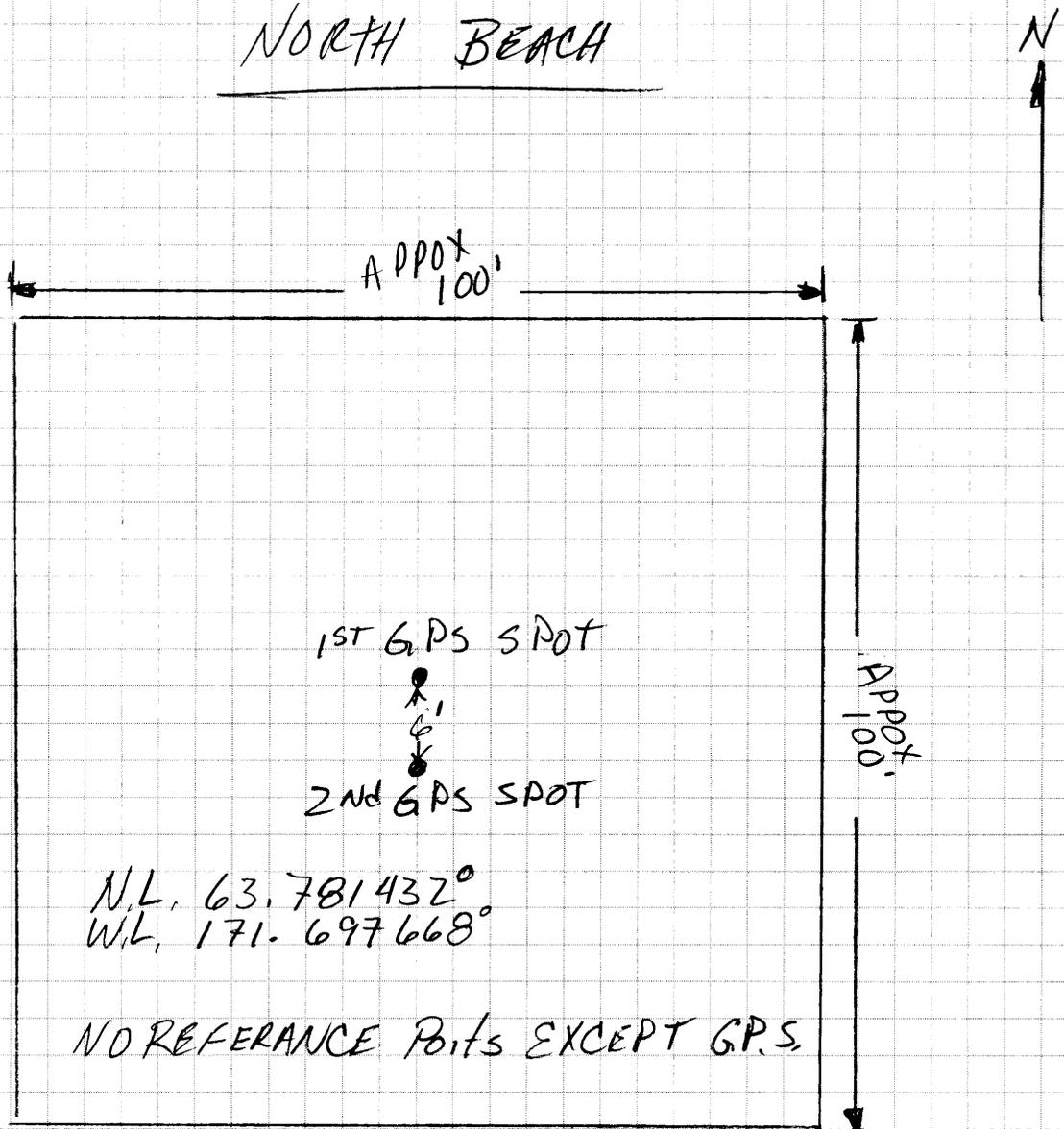
ENVIRONMENTAL & ENGINEERING
SERVICES CORPORATION

BERS Job. No. 49003

USACE CONTRACT # W911KB-08-P-0074

| | | |
|--|----------------------|----------------------------|
| Project: <u>Gambell Monitoring Wells</u> | Computed: <u>LFM</u> | Date: <u>8-22-08</u> |
| Subject: <u>MW-07</u> | Checked: | Date: |
| Task: <u>TRY TO LOCATE MW-07</u> | | Sheet <u>1</u> of <u>1</u> |

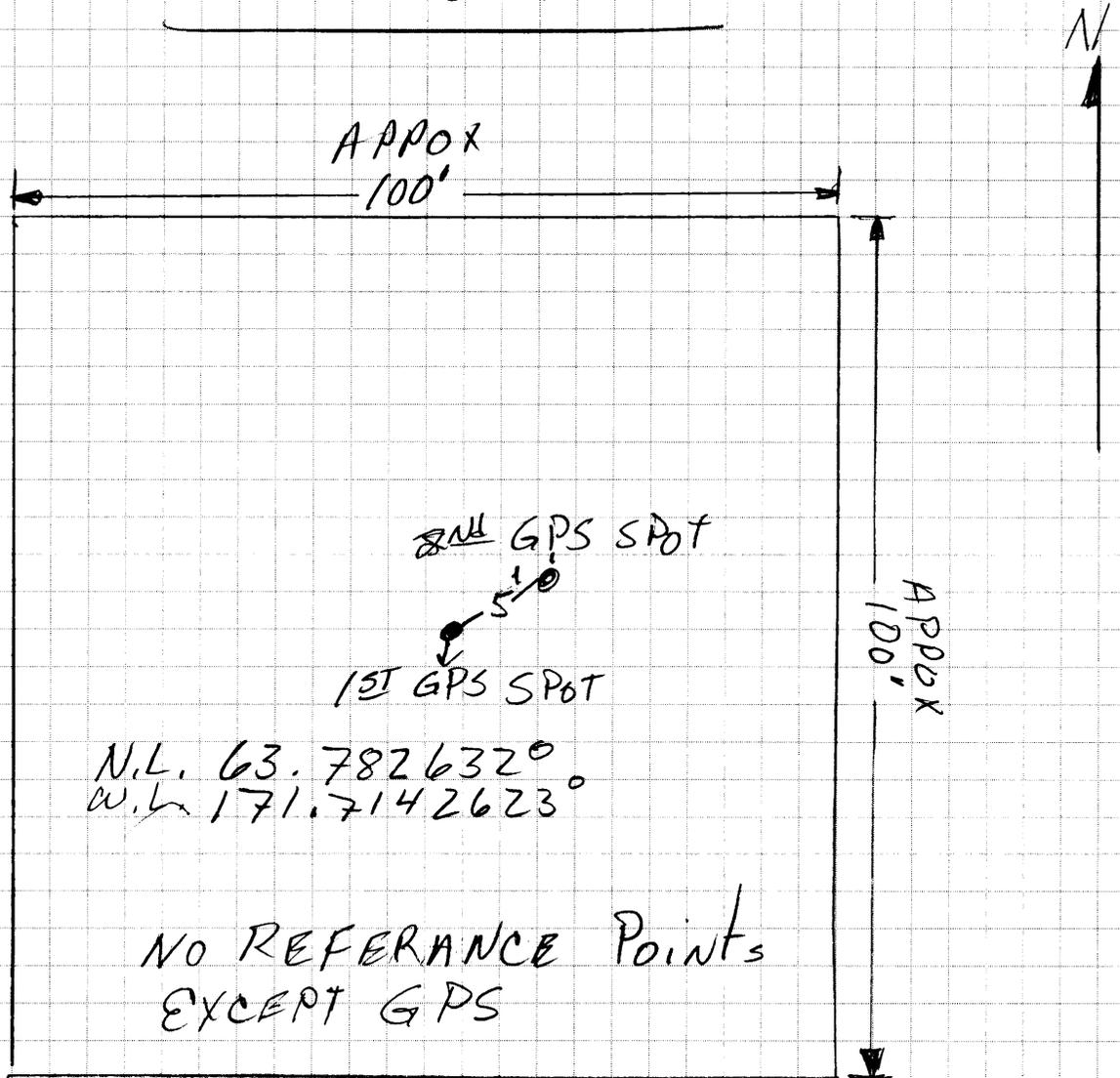
NORTH BEACH



THIS GRID WAS SWEEPED EAST/WEST AND NORTH/SOUTH WITH METAL DETECTORS

| | | |
|--|-------------------------|----------------------------|
| Project: <u>Gambell Monitoring Wells</u> | Computed: <u>L.F.M.</u> | Date: <u>8-22-08</u> |
| Subject: <u>MW-05</u> | Checked: | Date: |
| Task: <u>TRY TO LOCATE MW-05</u> | | Sheet <u>1</u> of <u>1</u> |

NORTH BEACH



THIS GRID WAS SWEEPED EAST/WEST
AND NORTH/SOUTH WITH METAL DETECTORS

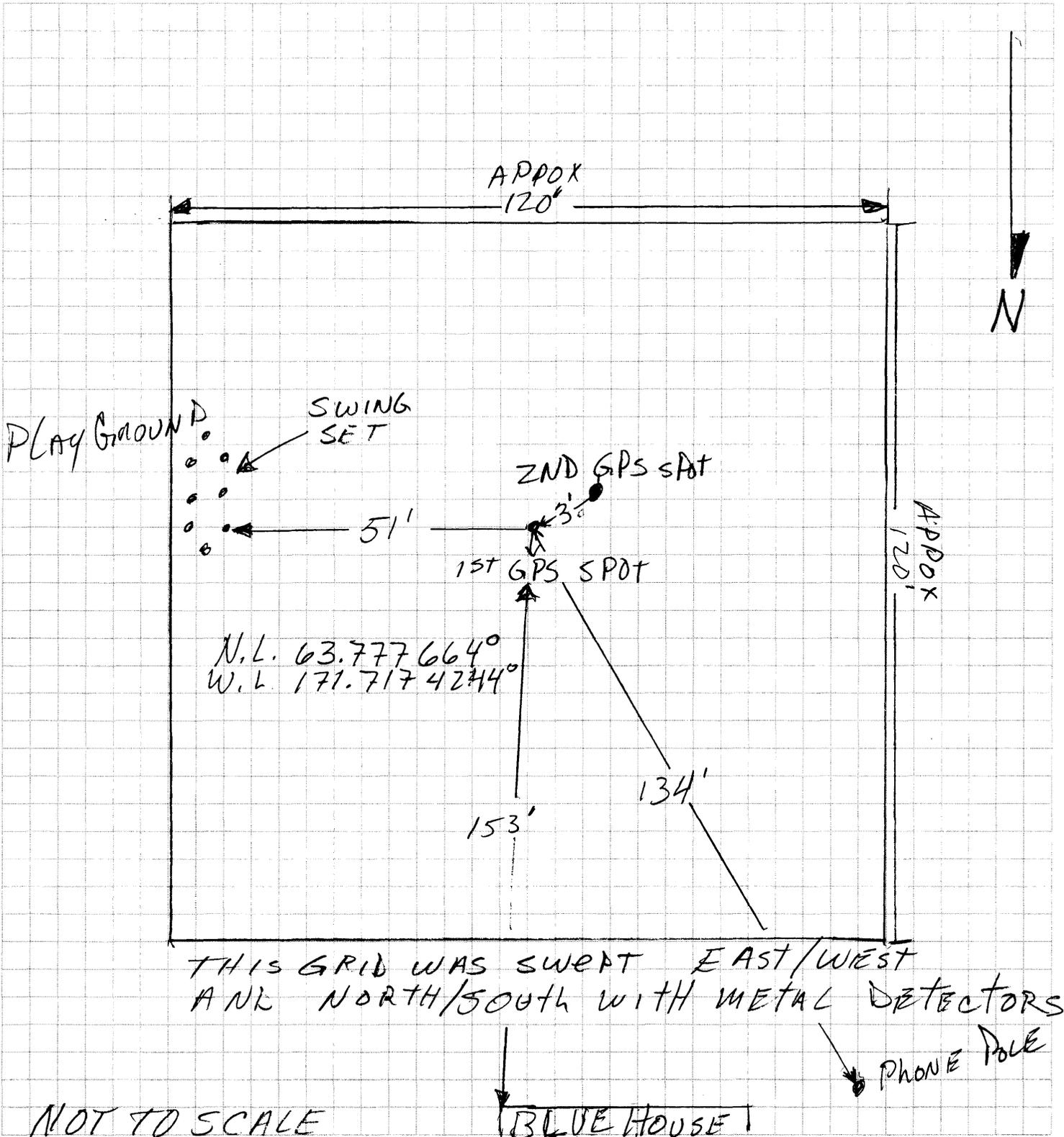
NOT TO SCALE

Bristol

ENVIRONMENTAL & ENGINEERING
SERVICES CORPORATION

BERS Job. No. 49003
USACE CONTRACT# W911KB-08-P-007

| | | |
|--|-------------------------|----------------------------|
| Project: <u>Gambell Monitoring Wells</u> | Computed: <u>L.F.M.</u> | Date: <u>8-21-08</u> |
| Subject: <u>MW-25</u> | Checked: | Date: |
| Task: <u>TRY TO LOCATE MW-25</u> | | Sheet <u>1</u> of <u>1</u> |

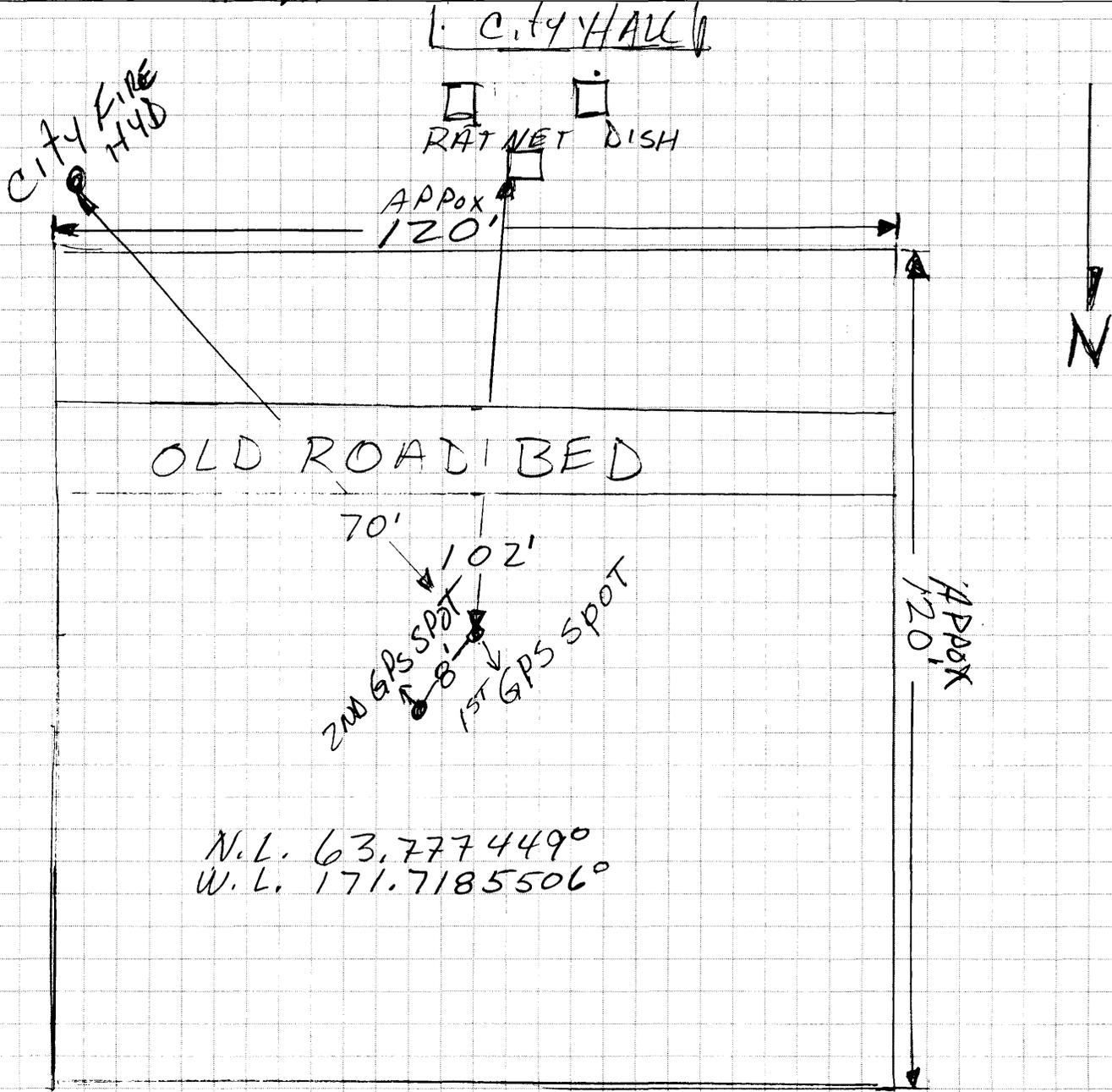


Bristol

ENVIRONMENTAL & ENGINEERING
SERVICES CORPORATION

BERS Job. No. 49003
USACE CONTRACT # W911KB-08-P-0074

| | | |
|--|-------------------------|----------------------------|
| Project: <u>Gambell MONITORING Wells</u> | Computed: <u>L.F.M.</u> | Date: <u>8-21-08</u> |
| Subject: <u>MW-27</u> | Checked: | Date: |
| Task: <u>TRY TO LOCATE MW-27</u> | | Sheet <u>1</u> of <u>1</u> |



THIS GRID WAS SWEEPED EAST/WEST
AND NORTH/SOUTH WITH METAL DETECTORS

NOT TO SCALE