

N60087.AR.002341
NAS BRUNSWICK
5090.3a

FINAL RESOURCE CONSERVATION AND RECOVERY ACT PARTIAL CLOSURE REPORT
FOR GOLF COURSE AREA PARCEL WITH TRANSMITTAL LETTER NAS BRUNSWICK ME
4/6/2011
NAS BRUNSWICK

**ENVIRONMENTAL DEPARTMENT
NAVAL AIR STATION
437 HUEY DRIVE
BRUNSWICK, ME 04011**

April 6, 2011

Mr. Edward Vigneault
Maine Department of Environmental Protection
Division of Oil and Hazardous Waste Facilities Registration
17 State House Station
Augusta, ME 04333-0017

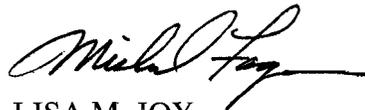
Subj: Final RCRA Partial Closure Report for Golf Course Area Parcel

Dear Mr. Vigneault:

A copy of the Final RCRA Partial Closure Report for Golf Course Area Parcel at Naval Air Station Brunswick is provided as Enclosure (1).

If you have any questions, please contact Mr. Mike Fagan at 921-1717 or via e-mail at michael.fagan1@navy.mil.

Sincerely,



LISA M. JOY
Environmental Director

Enclosure: (1) Final RCRA Partial Closure Report for Golf Course Area Parcel

Copy to:
NAVFAC Mid-Atlantic (B. Abraham)
NAS Brunswick (M. Fagan/D. Smith)
EPA Region I (M. Daly)
MRRA (V. Boundy)
Curtis Memorial Library (L. Oliver)
Lepage Environmental (C. Lepage)
BRAC PMO NE (P. Burgio)

RCRA PARTIAL CLOSURE REPORT
for
GOLF COURSE AREA
NAVAL AIR STATION BRUNSWICK, MAINE
USEPA IDENTIFICATION NUMBER ME8170022018
APRIL 2011

1. INTRODUCTION

The purpose of this report is to present the findings and conclusions of the investigation conducted to determine if the Maine Department of Environmental Protection (MEDEP) RCRA or hazardous waste closure requirements have been completed for the Golf Course Area at Naval Air Station Brunswick (NAS Brunswick).

2. PROPERTY DESCRIPTION

The Golf Course Area measures approximately 266 acres and is located in the extreme southwestern portion of NAS Brunswick, bordering the southwestern boundary of the base (Figure 1). The area is bordered to the north by the West Base Area (on both sides of the northwest corner of the Golf Course Area) and the Runways Area; to the northeast by the Weapons/Magazine Area; to the east by Merriconeag Stream, and the Weapons/Magazine Area beyond; and to the south and west by Harpswell Cove and Town of Brunswick land and town residential areas beyond. The majority of the western boundary coincides with the fenced boundary of the NAS Brunswick base (Figure 2). The southern portion of the Golf Course Area encompasses the northwest area of Harpswell Cove.

The Golf Course Area is comprised primarily of tree-covered, undeveloped land; the northernmost portion includes the landscaped, open areas of the Mere Creek Golf Course (the golf course). In the southern portion of the Golf Course Area tidal marsh is located west of Merriconeag Stream and Harpswell Cove. The golf course, which was operated by the NAS Brunswick Morale, Welfare, and Recreation (MWR) Department, is a nine-hole, public golf course and driving range, built in 1958. The course covers approximately 135 acres and is located primarily in the northern portion of the RCRA Partial Closure Golf Course Area. The remaining portion lies within the Runways Area and Airfield Parking Apron Area to the north. In the extreme southern portion of the Golf Course Area several recreational trails run parallel to the NAS Brunswick base boundary.

Middle Bay Road, a two-lane, asphalt-paved roadway, runs through the golf course from the northwest portion of the Golf Course Area toward the southeast, to its intersection with Merriconeag Road, which is oriented in a southwest-northeast direction (Figure 2). These two roads are the only paved roads in the Golf Course Area and formerly provided access to the southern portion of the NAS Brunswick base through the now-closed Dyer's gate.

Several buildings are associated with the golf course; these buildings have been addressed by separate closure reports as discussed below. Building 78 (Golf Clubhouse) is located approximately 200 feet east of the Golf Course Area's western boundary, immediately north of Middle Bay Road. Swampy Road, an unpaved access road, intersects Middle Bay Road immediately east of Building 78 and continues north into the adjoining parcel. A golf driving-range and an outdoor skating area and associated warming shack (in disrepair) are located immediately northwest of Building 78. Building 34 (Golf Shed) is located just east of the intersection of Middle Bay Road and Swampy Road. Buildings 22 (Golf Maintenance Awning), 39 (Golf Maintenance Building) and 18 (Golf Cart Storage) are all located north of Building 34 (Golf Shed) on the east side of Swampy Road. Building 309 (Pumphouse) is located just north of Merriconeag Road.

As shown in Figure 2, the topography of the central portion of the Golf Course Area is relatively

flat, with elevations near 40 feet above mean sea level (msl). From the central portion of the Golf Course Area, the land surface generally slopes toward the east/southeast, with the lowest elevation (approximately 0 feet msl) near Merriconeag Stream, which forms the eastern boundary of the area. The highest topographic elevations are in the northwest corner of the Golf Course Area, approximately 60 feet msl. Along the unnamed tributary to Merriconeag Stream, in the northern portion of the Golf Course Area, the topography slopes toward the stream on either side.

Most of the Golf Course Area lies within the Mere Brook/Harpswell Cove Watershed, with the exception of an area located on the western side that drains to the Middle Bay Cove Watershed (Navy, 2010). Several small water bodies are located within the Golf Course Area. In the northwestern-most portion of the area, small tributaries to Merriconeag Stream flow southward and merge, just southeast of Building 39. Here, the flow continues southeast to a ponded area adjacent to Building 309, where the water is used for golf course irrigation purposes. At the outlet of the ponded area, the flow continues eastward until it empties into the relatively narrow and deeply cut Merriconeag Stream, which forms the eastern boundary of the Golf Course Area. Several small, unnamed ponds/ponded areas are located in the southeastern portion of the Golf Course Area, with outlets that discharge into Merriconeag Stream. Before discharging to Harpswell Cove, Merriconeag Stream flows through a tidal marsh area. Harpswell Cove is an estuary and a part of Casco Bay. It is surrounded by expansive salt marsh and some mudflat habitats (Navy, 2010).

The buildings listed below are located within the bounds of the Golf Course Area, as shown in Figure 2, but have been addressed under separate RCRA Partial Closure Reports. These buildings are therefore not included in this RCRA closure investigation, although the land surrounding these buildings and the underlying groundwater are addressed as part of this report. The buildings include:

- Building 22 (Golf Maintenance Building Awning) and Building 39 (Golf Maintenance Building) (Tetra Tech, 2011a);
- Building 34 (Golf Shed), Building 78 (Golf Clubhouse) (Tetra Tech, 2010a);
- Building 18 (Golf Cart Storage) (Tetra Tech, 2010b); and
- Building 309 (Pumphouse) (Tetra Tech, 2011b).

Also excluded from this RCRA closure investigation are the following:

- IRP Site 15 (Merriconeag Extension Debris Area), which is located in the southern portion of the Golf Course Area, but has been investigated under the IRP. At Site 15, concrete rubble and soil debris have been deposited, forming a dam that creates a 0.75-acre pond on a small, unnamed stream that drains to the north end of Harpswell Cove. Further information is provided in Section 3.
- The abandoned-in-place, aviation-fuel pipeline (Casco Bay Pipeline) which crosses the central portion of the Golf Course Area (Figure 2). The pipeline closure has been addressed under a separate program. A brief summary of available information regarding the pipeline is presented for informational purposes.

Photographs of the Golf Course Area are provided in the attachment to this report.

3. PROPERTY HISTORY AND RECORDS RESEARCH

The Tetra Tech NUS, Inc. (Tetra Tech) project team interviewed NAS Brunswick Environmental Department personnel and performed records research at both NAS Brunswick and the MEDEP office in Augusta, Maine to collect available information concerning the Golf Course Area, including past use and operations in this area.

Records reviewed include historical aerial photographs, the NAS Brunswick Other Environmental

Liabilities (OEL) Database, area-specific reports, facility plans and drawings, and hazardous waste records. Aerial photographs dated 1953, 1958, 1978, 1981, 1984, 1989, 1993 and 1997 (Sewall, 1953, 1958, 1978, 1981, 1984, 1989, 1993 and 1997) were reviewed. Additional aerial photographs for the parcel dated 1940, 1959, 1965, 1966, 1972, 1978, and 1980 were also reviewed (U.S. EPA, 1987). Public Works Department (PWD) site base maps dated 1943, 1946, 1952, 1956, 1957, 1969, 1975, 1978, 1979, 1989, and 2006 (PWD, 1943, 1946, 1952, 1956, 1957, 1975, 1978, 1979, 1989, and 2006) and site building lists for 1950, 1965, 1976, 2008, and 2009 (PWD, 1950, 1965, 1976, 2008, and 2009) were also reviewed.

Observations based upon the historical records review are summarized below.

- In the historical aerial photograph dated 1940, the Golf Course Area is largely undeveloped and wooded. Merriconeag Stream and the unnamed stream to the west are each visible in their approximate current course. A roadway is visible running north-south through the Golf Course Area and approximately coinciding with the current Merriconeag Road. The intersection with Middle Bay Road is located further to the south than its current location. The northern portion of the area appears to be sparsely developed, with possible residential and agricultural use.
- The 1946 historical plan does not provide coverage of the Golf Course Area. According to this plan, the Golf Course Area was not part of the NAS Brunswick base at this time. Mere Brook is shown in a location further north than its current location. It was most likely diverted around the southern portion of the airfield when the runway landing strips were modified in the early 1950s.
- In the 1953 historical aerial photograph, several small buildings are visible in the vicinity of the intersection of Middle Bay Road and Swampy Road. It also appears that construction of the golf course is ongoing, and a building is visible north of the current location of Building 309 (Pumphouse). It appears that much of the land in the golf course vicinity has been cleared at some time prior to this photograph. The Casco Bay Pipeline corridor is visible as a cleared area.
- The 1956 historical plan is the earliest to show the Golf Course Area. The NAS Brunswick base boundary has been modified from the 1946 historical plan and indicates that the Golf Course Area is within the base boundaries. According to historical information, between 1952 and 1956, the southern and eastern boundaries of NAS Brunswick were relocated. The 1956 plan shows Merriconeag Road, Middle Bay Road, and Swampy Road in their approximate current locations. In the approximate location of current Building 34 (Golf Shed), the plan indicates a possible building labeled "Parcel 654."
- Beginning with the 1957 historical plan, Buildings 305 (Clubhouse) and 306 (Shed) are shown southwest of the current location of Building 18. Building 309 is shown in its current location, and the area to the east, south and west is labeled as a golf course. The small ponds in the area of Building 309 are shown, and a dam is shown adjacent to the west side of Merriconeag Road. A structure labeled 312 is shown on the west side of Merriconeag Road, south of its intersection with Middle Bay Road. Historical building indexes do not reference a Building 312.
- On the 1969 historical plan, the area northwest of the intersection of Swampy Road and Middle Bay Road is labeled as "planned golf course area".
- On the 1978 historical base map, an additional building, Building 308, is shown east of Buildings 305 and 306. The 1976 historical building index lists Building 308 as a pumphouse (water).
- No further changes are noted until the 1981 aerial photograph, which shows Building 78 (Golf Clubhouse) in its current location, and former Buildings 305 and 306 are no longer shown.
- In the 1984 aerial photograph, Building 39 is shown to the north of the current Building 34 location.
- In the 1989 aerial photograph, the outdoor skating rink and warming hut are present to

- the northwest of Building 78. Building 22 (Golf Maintenance Building Awning) is present in its current location, to the west of Building 39.
- The 1997 aerial photograph is the earliest to show Building 18 (Golf Cart Storage). No further changes are noted after 1997. Building 34 (Golf Shed) is not shown on any of the available historical maps or aerial photographs.

Hazardous waste generation by the golf course operations is discussed in the Building 39 (Golf Maintenance Building) RCRA Partial Closure Report (Tetra Tech, 2011a). Liquid pesticides and herbicides were stored at Building 22 and mixed in the Building 39 pesticide mixing room. The mixing and application of pesticides in the golf course area was performed under the supervision of a trained pesticide applicator. According to NAS Brunswick Environmental Department personnel, no liquid hazardous waste was generated, as all the material was consumed during application.

An approximately 3,400-foot segment of abandoned-in-place aviation-fuel pipeline, the Casco Bay Pipeline, runs approximately north-south through the Golf Course Area (Figure 2). This pipeline system consists of two separate pipes that were used to transfer jet propulsion fuel (primarily JP-5) from the Defense Fuel Support Point (DFSP)-Casco Bay facility to the Old Navy Fuel Farm (ONFF) during the period from about 1952 until 1991. The pipelines are constructed of two separate carbon-steel pipes with welded joints, and are set approximately 3 feet apart. The pipes are covered in an exterior tar coating, impregnated with asbestos. In 1991, the pipeline was taken out of service, drained, cleaned, and pressurized with nitrogen, until 1995, when the NASB ONFF was dismantled (GZA, 1997).

The Community Environmental Response Facilitation Act (CERFA) report, Identification of Uncontaminated Property at the Naval Air Station Brunswick, Maine, designated the Golf Course Area as Areas A-4 (the majority of the Golf Course Area) and B-7 (the extreme northern area, including the northern portion of the driving range) (Tetra Tech, 2006). The report determined these areas to be among those with the potential for classification as Category 1 or 3 CERFA properties. Category 1 is defined as an uncontaminated area where no hazardous substances or petroleum products or their derivatives are known to have been released or disposed. Category 3 is defined as an area of potential release and/or disposal - a real property on which there is potential for hazardous substances and/or petroleum products or their derivatives to have been released or disposed, and some level of further assessment or evaluation is required. These classifications of the Golf Course Area were based on the proximity of the area to IRP Sites and the potential for undocumented releases from historical operations (Tetra Tech, 2006).

Portions of the Golf Course Area are mapped within designated NAS Brunswick Archery Hunting areas (PWD, 2008c). A majority of the area south of the golf course is designated as a hunting area (Areas 2a, 2b and 2c).

Several archaeologically-sensitive areas and identified Native American sites are located within the Golf Course Area (NAVFAAC, 2010).

According to NAS Brunswick records (PWD, 2008b; Environmental Department, 2009), there are no ASTs or underground storage tanks (USTs) associated with the Golf Course Area, other than one associated with Building 78 (Clubhouse) and four associated with Building 39 (Golf Maintenance). These ASTs planned for cleaning and closure in early April 2011 and will be transferred to the Maine Regional Redevelopment Authority (MRRA) as part of the Mere Creek Golf Course.

NAS Brunswick Tank Number	Tank Capacity and Material	Stored Product	Installation Date	Status/Removal Date
A39.1	275 gallon SWS	heating oil (inside building)	unknown	inactive/NA
A39.2	250 gallon DWS	gasoline	1995	inactive/NA
A39.3	250 gallon DWS	diesel	1995	inactive/NA
A39.4	250 gallon DWD	waste oil	1995	inactive/NA
A78.0	500 gallon DWS	No.1 fuel oil	1995	active/NA

SWS single-walled steel
DWS double-walled steel
NA not applicable (not removed)

According to NAS Brunswick records, a steel chamber oil/water separator (O/W separator) with an oil capacity of 5,000 gallons is located northeast of Building 39 (Golf Maintenance) (Figure 2). The O/W separator treats stormwater from parking area north of Building 39, where three AST (A39.2, A39.3, and A39.4) are located, and discharges through an outfall into the unnamed tributary to Merriconeag Stream, located east of Building 39. The O/W separator receives no discharge from the interior of Buildings 18, 22 or 39, and is serviced annually as part of the base O/W separator maintenance program. The servicing of the O/W separator included removal of accumulated petroleum products and excessive sludge, and proper disposal of all collected petroleum-contaminated water, petroleum products, and sludge. This O/W separator was cleaned on March 29, 2011 during the most recent cleaning event (Clean Harbors, 2011). The water and sludges removed from the O/W separators during this base-wide cleaning event are collectively disposed of as non-hazardous, oil-contaminated liquid and solids (Clean Harbors, 2010).

One drinking water supply well is located in the Golf Course Area. Potable water is provided to Building 78, the clubhouse and associated restaurant, by a public, domestic water-supply well (PWSID 94492101), located near the southeastern exterior of the building (Navy, 2006).

The area is not served by the base-wide sanitary sewer system; within the Golf Course Area, there is one septic tank system, serving Building 78 (Navy, 2006). Since this building was used as a clubhouse, there is no record of hazardous waste generated, and there is no record of releases at this location (Tetra Tech, 2010a) it is unlikely that this septic tank system is a source of contamination.

According to MEDEP and NAS Brunswick spill records, no spills were reported for the Golf Course Area (Environmental Department, 1999; Environmental Department 2005; and MEDEP, 2010a).

The NAS Brunswick Transformer Database lists one pole-mounted, non-PCB, electrical transformer for the Golf Course Area, located near Building 78 (PWD, 2009). Information for the transformer is listed below.

Transformer	Manufacturer	Serial No. ⁽¹⁾	Manufacture Date	Notes
15 kVa, 14 gallons	Westinghouse	6518373	1965	non-PCB <1ppm

(1) The first two digits of the serial number denote the year of manufacture (EES, 1998)
ppm parts per million
< less than

According to the database, this transformer is owned by Central Maine Power (CMP). Based on the serial number, the transformer was manufactured at the Westinghouse - Athens, Georgia plant, which never produced PCB-containing transformers (EES, 1998).

The Site 5 (Orion Street Asbestos Disposal Area) is located north of the northeastern corner of the Golf Course Area. Site 5 consisted of an approximate 0.25-acre area where asbestos containing pipes were buried from a building demolition. The pipes were removed and placed in the Sites 1 and 3 Landfills. In 1993, a Record of Decision (ROD) indicated no Further Action was required at Site 5. Therefore, based upon this information it is unlikely that Site 5 would have impacted environmental conditions in the Golf Course Area (U.S. EPA, 2011).

Surface water runoff and shallow groundwater flow within most of this area is generally east-southeast toward Merriconeag Stream, according to hydrogeologic information obtained relating to the IRP Eastern Plume Site and the Background Study (Tetra Tech, 2011c). Surface water flow is to the south/southeast to Merriconeag Stream.

As part of the Background Study for NAS Brunswick, recent soil and groundwater data were collected from nine soil boring locations and eight monitoring wells installed within the Golf Course Area in 2010 (Tetra Tech, 2011c). The soil and groundwater sampling locations within the Golf Course Area are shown on Figure 3 and are summarized below.

Location	Sample ID ⁽¹⁾
northwestern area – south of Middle Bay Road and west of former Merriconeag Road southern extension	BG-SB-06, -07 and -08
	BG-MW-06, -07 and -08
southwestern area – southeast of former Merriconeag Road southern extension	BG-SB-09, -10 and -11
	BG-MW-09, -10 and -11
eastern area - west of Merriconeag Stream and south of golf course	BG-SB-12, -13 and -14
	BG-MW-12 and -13

(1) Well ID prefix "NASB-" not shown.

The background sample collection locations within the Golf Course Area are from undeveloped, forested areas and were selected for inclusion in the background study because no known or suspected releases or disposal of petroleum or hazardous substances have been identified (Tetra Tech, 2009).

In surface soil samples within the Golf Course Area, concentrations of several compounds were detected at concentrations greater than the 95 percent Upper Prediction Limits (UPLs), including several polycyclic aromatic hydrocarbons (PAHs), benzo(k)fluoranthene, dibenzo(a,h)anthracene, fluoranthene, phenanthrene, and pyrene, and two metals, iron and lead. These concentrations were all within two times the corresponding background UPL. The pesticide, 4,4'-DDT, and the PAH, acenaphthylene, were detected at relatively low concentrations in the Golf Course Area surface soil, however no background UPLs were calculated, due to the low frequency of detection and concentrations that are below the Maine Remedial Action Guidelines (RAGs) (MEDEP, 2010b). Only one iron concentration in one surface soil sample (NASB-BG-SB-11) exceeded both the UPL and RAG (MEDEP, 2010b).

In subsurface soil samples within the Golf Course Area, only the metal, arsenic, was detected at a concentration exceeding both the background UPL and the RAG, at location NASB-BG-SB-12.

In groundwater samples collected in the fall of 2009 and the spring of 2010 from monitoring wells located within the Golf Course Area, none of the analyte concentrations exceeded applicable regulatory criteria. In the fall 2009 sampling event, metals analytical results indicated concentrations of aluminum and nickel (in total metals results), and dissolved magnesium and dissolved zinc (in filtered metals results) greater than the corresponding background UPLs. These concentrations were all less than 1.5 times the background UPL. Total vanadium, dissolved copper, and dissolved lead were detected in groundwater at relatively low concentrations; however, due to the overall low frequency of detections, a background UPL was

not calculated. Total magnesium concentrations were slightly greater than the background UPL (less than 1.2 times) for samples collected in spring 2010. Also during the spring sampling event, total cadmium and total mercury were detected at low concentrations, however, due to the low frequency of detection, a background UPL was not calculated.

4. SITE VISIT AND INVESTIGATION

A site visit was conducted on March 29, 2011 by Mindi Messmer and James Forrelli, P.E., of Tetra Tech. The purpose of this visit was to verify information gathered during the records research and to collect additional information as necessary to prepare this closure report. The Golf Course Area was visually inspected for signs of hazardous waste generation or storage. Site visit observations are summarized below:

- At the time of the inspection, no active use of the existing buildings (Building 18, 22, 34, 39, 78, and 309) was observed.
- Other existing improvements at the Golf Course Area include Middle Bay Road, Swampy Road (unpaved), Merriconeag Road, the golf course, recreational trails along the southern border of the area (discussed previously), the unnamed ponds adjacent to Building 309, and the abandoned Casco Bay Pipeline corridor.
- Most of the area is wooded and undeveloped, except for the landscaped portions of the golf course, which comprises the northern portion of the area.
- An O/W separator was observed northeast of Building 39. The O/W separator discharges east of the parking lot to an unnamed tributary located to the east.
- Several pieces of landscape maintenance equipment and machinery were observed in the vicinity of Building 39. According to NAS Brunswick Environmental Department personnel, the equipment and machinery will be transferred to MRRA as part of the Mere Creek Golf Course.
- Stockpiled material was observed in a staging area on the west side of Building 39. Most of this material (approximately 20 cubic yards) consists of street sweepings generated during the removal of sand that was applied to roadways at the base in winter. According to NAS Brunswick MWR personnel, this material is used as fill material for golf course repairs. Two smaller stockpiles (less than 3 cubic yards) of sand and asphalt material, also reported to be used in golf course maintenance activities, were observed.
- No evidence of current or past hazardous waste generation was observed.
- No evidence of hazardous waste residues was observed.
- No signs of a past release (staining, unusual odors, etc.) were observed.
- No hazardous waste storage areas or hazardous waste accumulation areas were observed, with the exception of the storage sheds outside of Building 39 that were addressed in the respective closure report (Tetra Tech, 2011a).
- Three double-walled-steel ASTs (A39.2, A39.3 and A39.4) were observed on the northern side of Building 39. The ASTs were used for storage of gasoline, diesel fuel, and waste oil, respectively.
- One double-walled-steel AST (A78.0) was observed on the northern side of Building 78. The AST was used for No.1 heating oil.
- A pole-mounted-style transformer was observed in the vicinity of Building 78, southwest of the building and south of Middle Bay Road.

5. HAZARDOUS WASTE GENERATION AND STORAGE

Based on the records research, site visit observations, and NAS Brunswick Environmental Department personnel interviews, no hazardous waste generation, hazardous waste accumulation, or hazardous waste storage was conducted at the Golf Course Area, other than as reported in RCRA Partial Closure Reports for Buildings 22 (Golf Maintenance Awning) and 39 (Golf Maintenance Building) (Tetra Tech, 2011a) and for Building 309 (Golf Pump House) (Tetra Tech, 2011b).

6. OTHER ENVIRONMENTAL CONSIDERATIONS

Other than those referenced in the reports listed in Section 1 for the Golf Course buildings, and those discussed in Sections 3 and 4, no ASTs or USTs have been utilized at the Golf Course Area, according to NAS Brunswick records, and no additional tanks were observed during the site visit. One O/W separator was identified adjacent to Building 39, as discussed in Sections 3 and 4, and is included in the base-wide O/W separator clean-out program.

7. LIMITATIONS

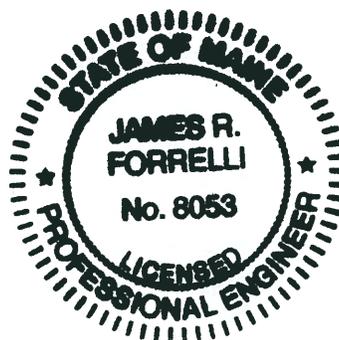
This investigation of the hazardous waste closure requirements applies to the Golf Course Area (as shown on Figure 2) only, with exclusions noted in Section 2.

8. CERTIFICATION

Based on the findings of this investigation, with the exception of five ASTs located within the Golf Course Area that are planned for cleaning and closure in early April 2011, the hazardous waste closure of the Golf Course Area was completed in accordance with the provisions of MEDEP Regulations Chapter 851, Standards for Generators of Hazardous Waste, Section 11.

James R. Forrelli

James Forrelli, P.E.
Senior Project Engineer
Tetra Tech NUS, Inc.



REFERENCES

ABB (ABB Environmental Services, Inc.), 1993. Site Inspection Data Package, Swampy Road Debris Site, Merriconeag Extension Debris Site, Naval Air Station, Brunswick, Maine. January.

Clean Harbors (Clean Harbors Environmental Services), 2010. Site Services Multi-task Worksheet. Brunswick Naval Air Station. June 3.

Clean Harbors (Clean Harbors Environmental Services), 2011. Site Services Multi-task Worksheet. Brunswick Naval Air Station. March 29.

E.C. Jordan, 1990. Draft Final Remedial Investigation Report, Naval Air Station, Brunswick, Maine. August.

EES (Elizabethton Electric System), 1998. QuickSheet Data Table, PCB Information. Prepared by Elizabethton Electric System, June 1998. <http://www.eesonline.org/programs/pcbdata.html>.

Environmental Department, 1999. Environmental Incident Log, Book No. 1, July 1988-November 1999. Naval Air Station Brunswick, Maine.

Environmental Department, 2005. Environmental Incident Log, Book No. 2, December 1999-July 2005. Naval Air Station Brunswick, Maine.

Environmental Department, 2009. Master/Historical Aboveground and Underground Storage

Tank Inventory. NAS Brunswick, Maine. February.

GZA GeoEnvironmental, 1997. Environmental Baseline Survey, Defense Fuel Support Point – Casco Bay Terminal, Casco Bay-to-Brunswick Naval Air Station Pipeline, South Harpswell, Maine. November.

Maine CDC Maine Center for Disease Control and Prevention (Maine CDC), Department of Human Services, 2010. Maine CDC Maximum Exposure Guidelines (MEGs) for Drinking Water. Effective date October 21, 2010.

Maine Geographical Information System (Maine GIS), 2001. April.

MEDEP (Maine Department of Environmental Protection), 2010a. MEDEP Spills Database. Maine Department of Environmental Protection, Augusta, Maine.

MEDEP, 2010b. Maine Remedial Action Guidelines for Residential Soil. January.

NAVFAC, 2000. Findings from Post-Field Work Magnetometer Survey, Merriconeag Extension Debris Site, Site 15; Swampy Road Debris Site, Site 16; Naval Air Station Brunswick, Maine. February.

NAVFAC, 2010. MODIFICATION 01, Comprehensive Archaeological Identification Survey at NAS Brunswick, Brunswick, Maine. June 30, 2010.

Navy (Department of the Navy, Base Realignment and Closure Program Management Office), 2006. “Final (Revision 2) Environmental Condition of Property Report for the Naval Air Station, Brunswick, Maine,” NAS Brunswick, Maine. May 30.

Navy, 2010. Final Environmental Impact Statement for the Disposal and Reuse of Naval Air Station Brunswick, Maine. November.

PWD (Public Works Department), 1943. “US Naval Air Station, Brunswick, Maine, Building Site Plan Showing Locations of Underground Water Distribution Lines and Hydrants,” NAS Brunswick, Maine. September 4.

PWD, 1946. “Map of US Naval Air Station, Brunswick, Maine, Showing conditions on June 30, 1946,” NAS Brunswick, Maine. June 30.

PWD, 1952. “Map of US Naval Air Station, Brunswick, Maine, Showing conditions on June 30, 1952,” NAS Brunswick, Maine. June 30.

PWD, 1956. General Station Map, Enclosure 2. , NAS Brunswick, Maine.

PWD, 1957. “Map of US Naval Air Station, NAS Brunswick, Maine.

PWD, 1965. “Index of Structures, Department of the Navy Bureau of Yards & Docks Department” US Naval Air Station Brunswick, Maine. Updated May 13.

PWD, 1969. “General Development Map, Existing and Planned Pre-M-Day” US Naval Air Station Brunswick, Maine. Y&D Drawing No. 747252. Last update March 23, 1972 to include NRMCB-27.

PWD, 1975. “General Development, Existing and Planned, Operations Area,” US Naval Air Station, Brunswick, Maine, NAS Brunswick, Maine. Updated December 2.

PWD, 1976. “Index of Structures, Naval Facilities Engineering Command, Northeast Division

Drawing No. 747 256" Naval Air Station Brunswick, Maine. Updated September 21.

PWD, 1978. "Repair Storage Magazines, Area Location & Index of Drawings, Drawing No. 2030672" US Naval Air Station, Brunswick, Maine, NAS Brunswick, Maine. Updated August 22.

PWD, 1979. "Department of the Navy Bureau of Yards & Docks, Naval Air Station, Brunswick, Maine, Existing Conditions Map, Operations Area, Y&D Dwg. No. 925130" US Naval Air Station, Brunswick, Maine, NAS Brunswick, Maine. Updated June 12.

PWD, 1989. "Existing Conditions Map. Public Works Department Drawing No. 2157" NAS Brunswick, Maine. Revised April 2.

PWD, 2006. Brunswick Naval Air Station, NAS Brunswick, Maine.

PWD, 2008a. "Draft NAS Brunswick, Facility List," US Naval Air Station, Brunswick, Maine, NAS Brunswick, Maine. March.

PWD, 2008b. Revised Oil/Water Separator List, Table J-C4(a). NAS Brunswick, Maine. January 1.

PWD, 2008c. "NAS Brunswick Archery Hunting Areas," US Naval Air Station, Brunswick, Maine, NAS Brunswick, Maine. March. 2008.

PWD, 2009. "NAS Brunswick, Facility List," US Naval Air Station, Brunswick, Maine, NAS Brunswick, Maine. March.

PWD, 2009. Master Transformer Database. NAS Brunswick, Maine. June 24.

Sewall (James W. Sewall Company), 1940. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. September 28.

Sewall (James W. Sewall Company), 1953. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. June 29.

Sewall, 1958. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. October 9.

Sewall, 1959. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. October 9.

Sewall, 1978. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. November 22.

Sewall, 1981. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. October 17.

Sewall, 1984. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. April 23.

Sewall, 1989. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. April 2.

Sewall, 1993. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME. November 8.

Sewall, 1997. NAS Brunswick Aerial Photographs. James W. Sewall Company, Old Town, ME.

May 27.

Tetra Tech (Tetra Tech NUS, Inc.), 2006. Draft Community Environmental Response Facilitation Act (CERFA) Identification of Uncontaminated Property at the Naval Air Station Brunswick, Maine. Tetra Tech NUS, Inc., King of Prussia, Pennsylvania. May.

Tetra Tech, 2009. Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan), Background Study, Naval Air Station Brunswick, Maine. Prepared for: Naval Facilities Engineering Command. Mid-Atlantic Division. July.

Tetra Tech, 2010a. Final RCRA Partial Closure Report for Building 34 – Golf Shed and Building 78 – Golf Clubhouse, Naval Air Station Brunswick, Maine. Tetra Tech NUS, Inc, King of Prussia, Pennsylvania. December.

Tetra Tech, 2010b. Final RCRA Partial Closure Report for Building 18 – Golf Cart Storage, Naval Air Station Brunswick, Maine. Tetra Tech NUS, Inc, King of Prussia, Pennsylvania. December.

Tetra Tech, 2011a. Final RCRA Partial Closure Report for Building 22 – Golf Maintenance Awning) and Building 39 – Golf Maintenance Building, Naval Air Station Brunswick, Maine. Tetra Tech NUS, Inc, King of Prussia, Pennsylvania. March.

Tetra Tech, 2011b. Final RCRA Partial Closure Report for Building 309 – Pumphouse, Naval Air Station Brunswick, Maine. Tetra Tech NUS, Inc, King of Prussia, Pennsylvania. March.

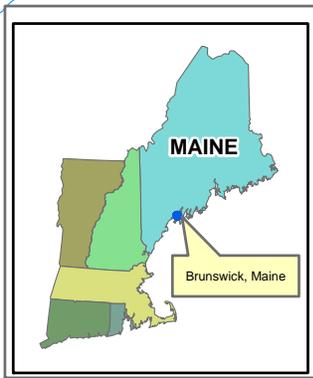
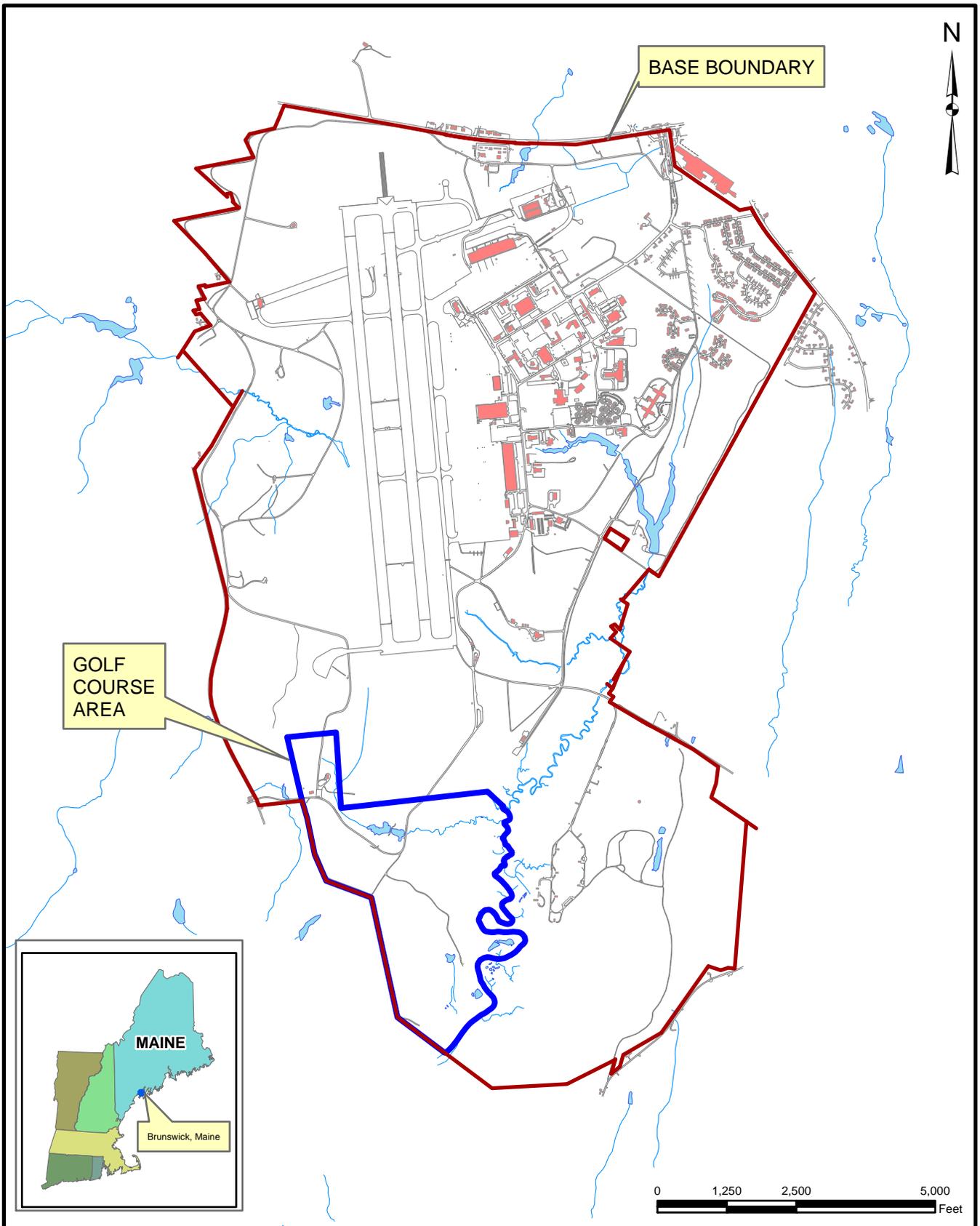
Tetra Tech, 2011c. Background Study for Naval Air Station Brunswick, Naval Air Station Brunswick, Brunswick, Maine. Prepared for Naval Facilities Engineering Command, Mid-Atlantic. January.

U.S. EPA (United States Environmental Protection Agency), 1987. Volume 1 and 2, Site Analysis Brunswick Naval Air Station, Brunswick, Maine. April.

U.S. EPA, MEDEP and Department of the Navy, 2001. Naval Air Station Brunswick, Maine Installation Restoration Program Consensus Statement, July.

U.S. EPA, 2010. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. <http://www.epa.gov/region9/superfund/prg/>. May.

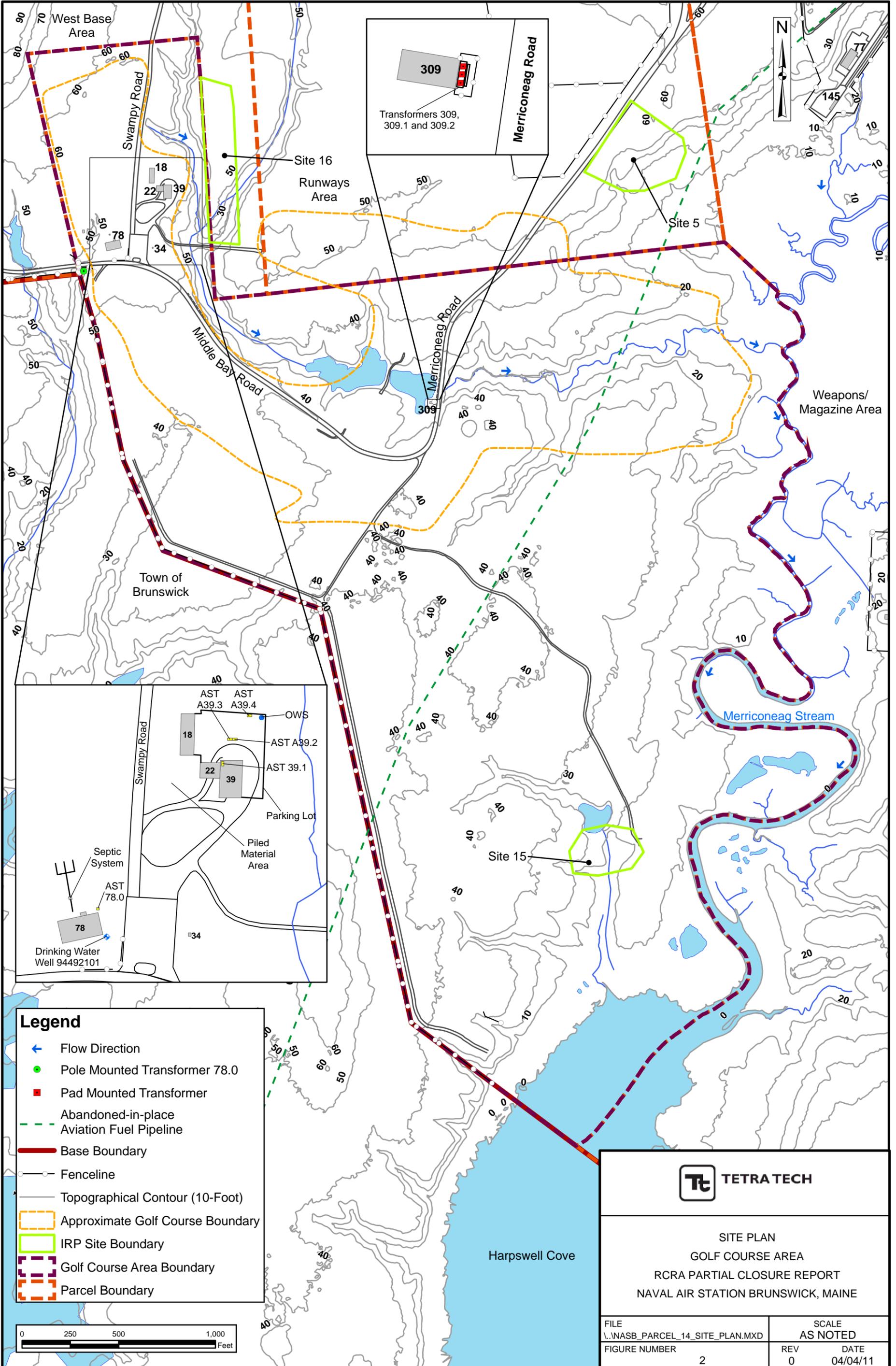
U.S. EPA, 2011. Naval Air Station Brunswick, Maine – Status Overview of Environmental Programs, March.



Tetra Tech NUS, Inc.

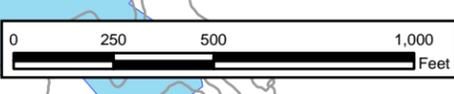
SITE LOCATION MAP
 GOLF COURSE AREA
 RCRA PARTIAL CLOSURE REPORT
 NAVAL AIR STATION BRUNSWICK, MAINE

SCALE AS NOTED	
FILE I:\02258\CP.DRNASB_PARCEL_14_LOCUS.MXD	
REV 0	DATE 03/31/11
FIGURE NUMBER 1	



Legend

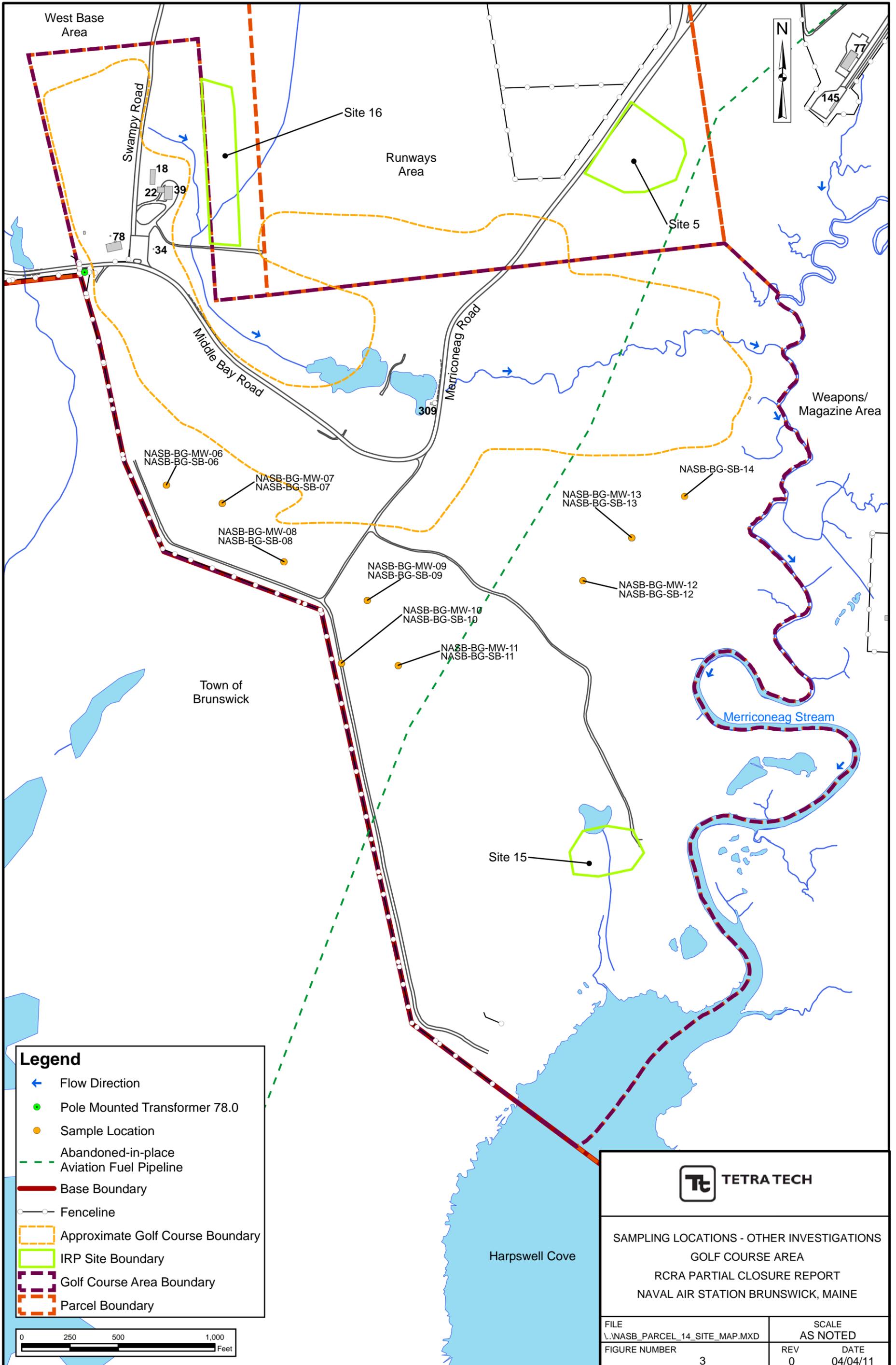
- Flow Direction
- Pole Mounted Transformer 78.0
- Pad Mounted Transformer
- Abandoned-in-place Aviation Fuel Pipeline
- Base Boundary
- Fenceline
- Topographical Contour (10-Foot)
- Approximate Golf Course Boundary
- IRP Site Boundary
- Golf Course Area Boundary
- Parcel Boundary



TETRA TECH

SITE PLAN
 GOLF COURSE AREA
 RCRA PARTIAL CLOSURE REPORT
 NAVAL AIR STATION BRUNSWICK, MAINE

FILE I:\NASB_PARCEL_14_SITE_PLAN.MXD	SCALE AS NOTED
FIGURE NUMBER 2	REV 0
	DATE 04/04/11



Legend

- ← Flow Direction
- Pole Mounted Transformer 78.0
- Sample Location
- - - Abandoned-in-place Aviation Fuel Pipeline
- Base Boundary
- Fenceline
- - - Approximate Golf Course Boundary
- IRP Site Boundary
- Golf Course Area Boundary
- Parcel Boundary



Tetra Tech

SAMPLING LOCATIONS - OTHER INVESTIGATIONS
 GOLF COURSE AREA
 RCRA PARTIAL CLOSURE REPORT
 NAVAL AIR STATION BRUNSWICK, MAINE

FILE I:\NASB_PARCEL_14_SITE_MAP.MXD	SCALE AS NOTED
FIGURE NUMBER 3	REV DATE 0 04/04/11

PHOTOGRAPHS



No. 1 Golf Course Area, NAS Brunswick March 29, 2011
Mere Creek Golf Course – view looking west from south side of Middle Bay Road



No. 2 Golf Course Area, NAS Brunswick March 29, 2011
Mere Creek Golf Course from south of Middle Bay Road – view looking east west



No. 3 Golf Course Area, NAS Brunswick November 3, 2010
Building 78 Club Clubhouse – view looking southwest from maintenance area



No. 4 Golf Course Area, NAS Brunswick November 3, 2010
Outdoor skating area northeast of Building 78 Club Clubhouse; warming shack (in disrepair) visible at left of frame



No. 5 Golf Course Area, NAS Brunswick November 3, 2010
Building 18, 22 and 39 – view from southeast; material stockpiles in center of frame



No. 6 Golf Course Area, NAS Brunswick November 3, 2010
O/W Separator at paved area north of Building 39 – view looking east; waste oil AST 39.4 at right of frame



No. 7 Golf Course Area, NAS Brunswick March 29, 2011
Double-walled, steel gasoline and diesel ASTs at paved area north of Building 39



No. 8 Golf Course Area, NAS Brunswick March 29, 2011
Golf Pump House southeast elevation; photograph taken following loose paint removal