

# NAS Brunswick Environmental Restoration News

WINTER  
2007/2008

## Upcoming RAB Meetings

The Restoration Advisory Board (RAB) consists of representatives of the community as well as State and Federal regulators, who advise the Navy on environmental cleanup issues and strategies for Naval Air Station (NAS) Brunswick. These meetings are public and you are invited to attend the RAB Meetings to learn more about the Navy's work at NAS Brunswick.

The RAB Meetings are held in the evenings from 7:00 PM to 9:00 PM, within the Town of Brunswick at various locations. The RAB Meeting location is published in the Times Record in advance of each NAS Brunswick RAB meeting. During the December 2007 RAB Meeting, the meeting dates will be established for 2008.

## **RAB Meetings for 2008**

19 March 2008  
11 June 2008  
15 October 2008  
03 December 2008



## **Restoration Advisory Board Co-Chair's Message**

This is the second of the recently reintroduced community newsletters. For those who are not familiar with the environmental problems, the Naval Air Station was listed by the Environmental Protection Agency (EPA) as a major "Superfund" site in 1987 when it was added to the National Priorities List by the Environmental Protection Agency (EPA). At that time over a dozen toxic sites had been identified, the worst of which was the "Eastern Plume," which posed an immediate threat to Mere Brook and Harpswell Cove. In response to this concern, a group of residents formed the Brunswick Area Citizens for a Safe Environment (BACSE).

Although initially the Navy was not required to include the public in the remediation process, it chose to do so, and to include BACSE in the Technical Review Committee in the early 1990's. When the Navy formed the Restoration Advisory Board (RAB), BACSE was made a member and I was appointed the co-chair of the board.

Similar sites with RAB oversight exist in the US, and over the last sixteen years our local (RAB) has consistently been recognized as one of the best functioning in the country. While other RABs have gotten mired in arguing and legal action, members of the Brunswick group made a commitment to work cooperatively and remain focused on the common goal of public safety. All of the base commanders have actively worked to make this happen. The attitude of the Navy was not, "What information will be given to the RAB," but "How fast can we get it to them?"

There are still issues to be addressed. For example, the "Eastern Plume" remains a major threat to Mere Brook and Harpswell Cove and will need continued monitoring and possibly additional upgrades to its treatment system. Also, if full remediation of contaminated groundwater cannot be achieved by 2011 when the Navy leaves, ground water use must continue to be restricted to protect the public.

After the base closes and the local redevelopment authority has completed its work, the RAB will need to continue its oversight. It is not likely that the environmental damage done to the groundwater and soil during the Navy's tenure will be completely eliminated within the next 50-100 years, and long-term monitoring will still be needed. Public involvement in the process is crucial. All of us want a clean and safe environment for our children and our grandchildren. You can make a difference in their lives by being involved. Please consider attending the Restoration Advisory Board meetings to learn more. Your participation will be welcomed.

Thomas Fusco  
Co-Chairman  
NAS Brunswick Restoration Advisory Board  
17 July 2007



# Geology of the Eastern Plume

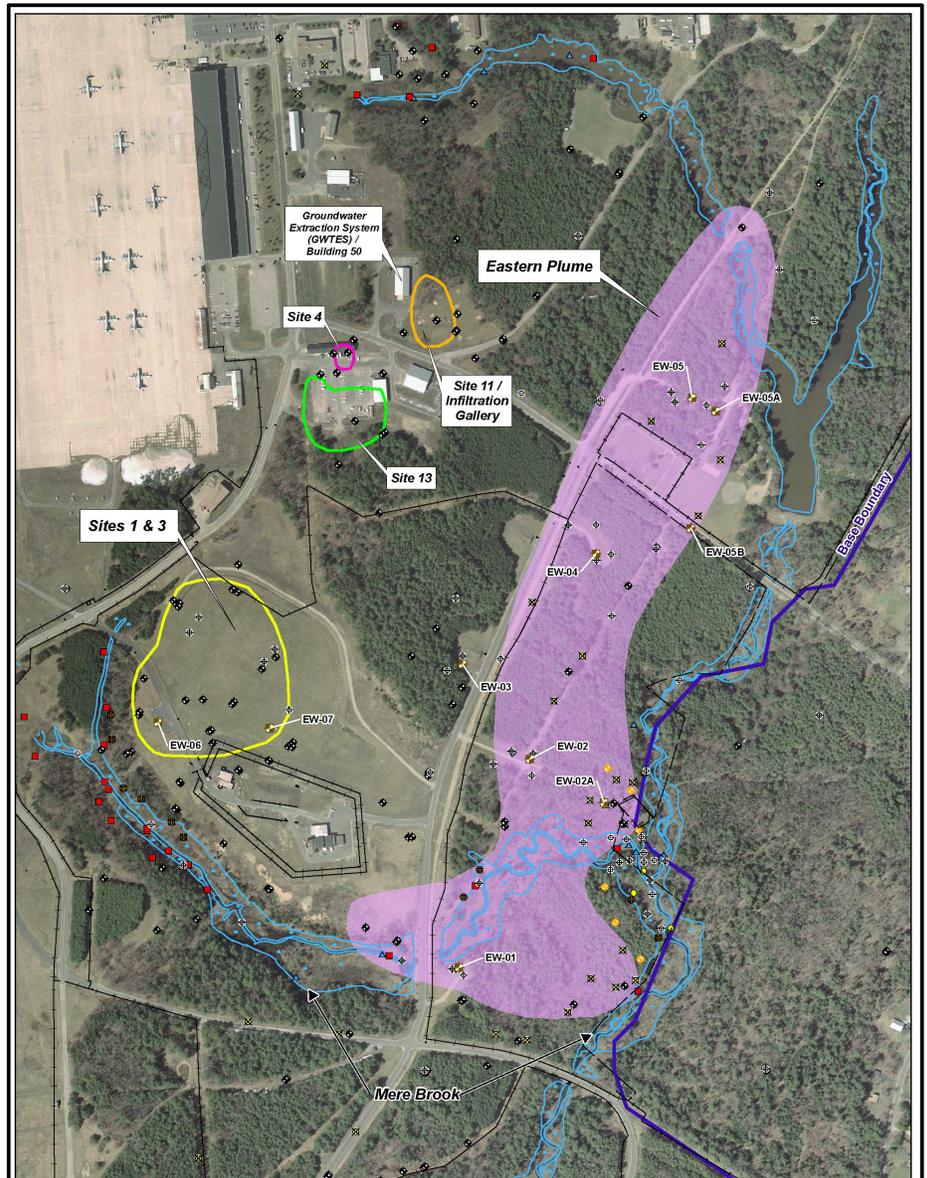
## INTRODUCTION

This article is a brief overview of the geology and contaminant distribution of the Eastern Plume area at Naval Air Station Brunswick, Maine (as shown below) as it is currently understood by project stakeholders. The Eastern Plume was subject to considerable public and media scrutiny during the 1990's and is the largest area of contaminants on base. This overview is based on the subsurface data collected during the past five years and summarized in the Remedial Investigation reports and integrated into our understanding of the site geology of the Eastern Plume. Groundwater data collected during the Long-Term Monitoring Program have also been used to develop our understanding of site conditions, and is continually used to refine the conceptual computerized site model.

## HISTORY OF EASTERN PLUME

The Eastern Plume is located in the eastern-central portion of NAS Brunswick base and extends north-south along the Weapons Compound Road for approximately 0.6 miles. The northern portion of the Plume is located in the woods north of Old Gurnet Road. There are two surface water bodies located in this area (Mere Brook and Merriconeag Stream). The Eastern Plume contains dissolved phase chlorinated volatile organic compounds (CVOC) associated with solvent disposal activities at three sites: Site 4 Acid Caustic Pit, Site 11 Fire Training Area, and Site 13 Defense Reuse and Marketing Office.

The primary CVOCs that comprise the Eastern Plume include 1,1,1-trichloroethane (1,1,1-TCA) and trichloroethene (TCE), among others. The source areas of these three sites have been thoroughly investigated, and source removal actions were completed in the early 90s. In June 1995, a groundwater treatment system was placed in operation, consisting of five groundwater extraction wells screened through the shallow and deep zones in the overburden aquifer, to remediate both the northern and southern lobes of the Eastern Plume, to provide hy-



Contract No. N624R-02-D-0810			<b>LEGEND</b> Proposed Locations ● Test Boring Location Existing Locations ✕ Existing Direct Push □ Existing Extraction Well ◆ Existing Monitoring Well ○ Existing Piezometer ○ Optional Piezometer ● Seep Location ■ Sediment/Leachate Location ▲ Surface Water Location --- Base Boundary ● Site 4 ● Site 11 ● Site 13 --- Sites 1 and 3 Boundary ■ Eastern Plume (Sept 2005)	<b>Eastern Plume Location</b>  <b>Naval Air Station Brunswick, Maine</b>
Description Site Location of Eastern Plume in NASB Brunswick, ME				
Coordinate system NAD 1983, UTM, Zone 19N in meters		ECC GIS Server C:\NAVY_GIS\07_Brunswick\Site1end3 MapDocument\EP_Sep07.mxd File:EasternPlume_SiteLocation.mxd		
Note		0 200 400 800 Feet		
Sources Naval Base Boundary provided by the Navy.				
Date 8-JAN-2008	Rev.	Date	App. By	
DB J. Kim				
CB G. Calderone				
AB				

## ***Eastern Plume Geology (continued)***

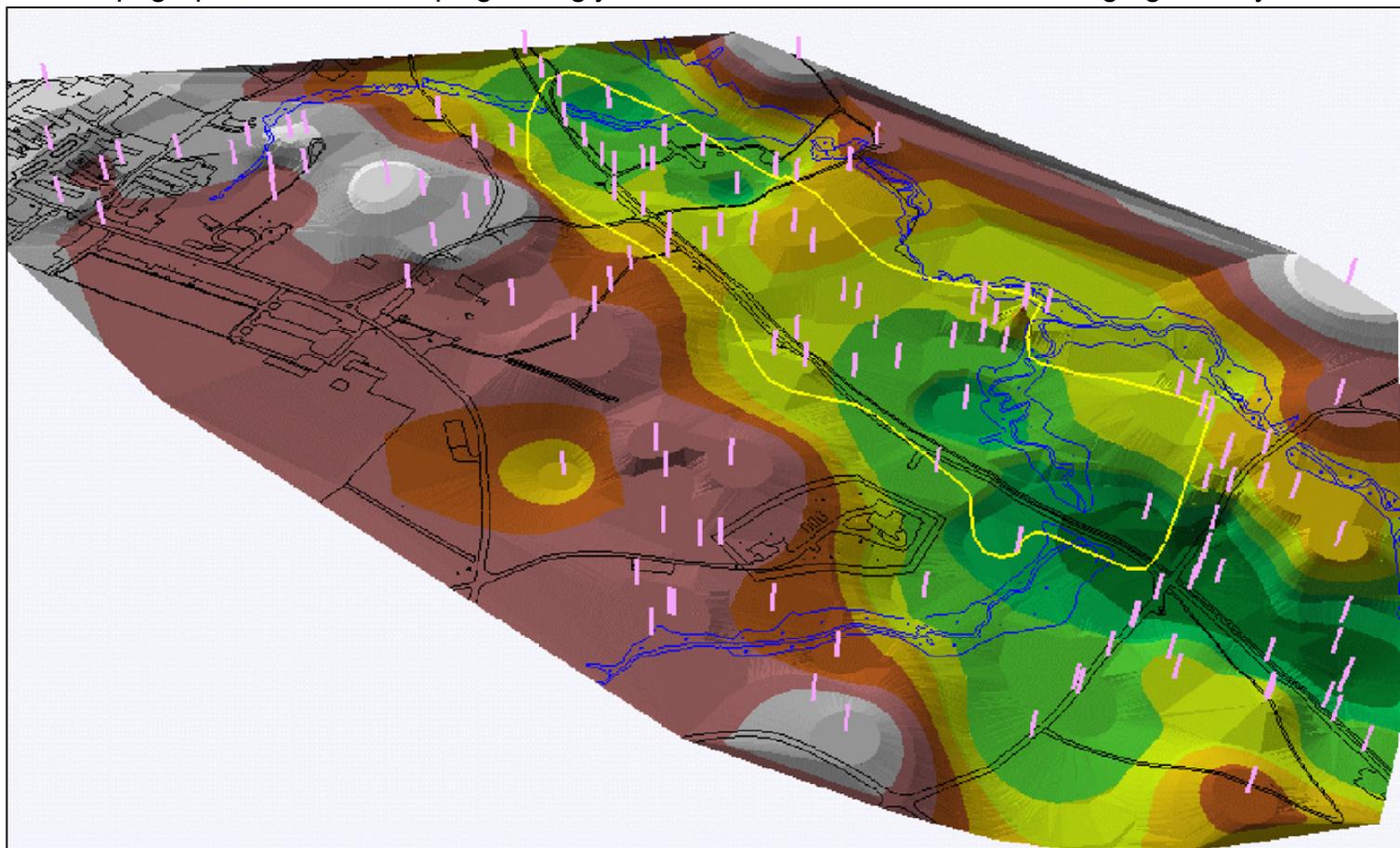
draulic control the CVOC plume and to remove the dissolved phase contaminants. The extraction wells remove the impacted groundwater from the Plume area and this groundwater is then treated in the on-site Groundwater Extraction Treatment System. One well was taken out of service due to well collapse in 2003. Since December 2004, a total of four active extraction wells have been operational (EW-01, EW-02A, EW-04 and EW-05A). In July 2007, an additional extraction well, EW-05B, was installed. This new well is expected to become operational in Spring 2008.

### **OVERBURDEN GEOLOGY**

The geology of the portion of Naval Air Station Brunswick that includes the Eastern Plume is comprised of interbedded sand, silt, and clay units that overlie the undulating bedrock surface and some occasional discontinuous till. The majority of the overburden units at the Eastern Plume, with the exception of the upper sand and till, are part of the Presumpscot Formation, which is comprised of water-laid clay, silt, and sand with some minor gravel units. The formation exhibits a general coarsening upwards sequence. Three major overburden layers are present within the Eastern Plume: upper sand, transition (which contains a sandy interval often referred to as the lower sand) and clay. Both the upper and lower sands have been targeted by remedial extraction at the Eastern Plume since remedial operations (i.e., groundwater pump and treat) were started in 1995.

### **BEDROCK GEOLOGY**

The bedrock underlying the site has been mapped as the metamorphic Cape Elizabeth Formation, comprised of a micaceous schist, with mineral crystallized veins up to several feet thick. Regional bedrock features have been identified which trend to the north-northeast. The results of the geophysical investigations at Site 11 and areas to the east show the top of bedrock surface with significant topographic relief and sloping strongly to the east. Bedrock elevations range generally be-



**3-D Model of Eastern Plume**

# Eastern Plume Geology (continued)

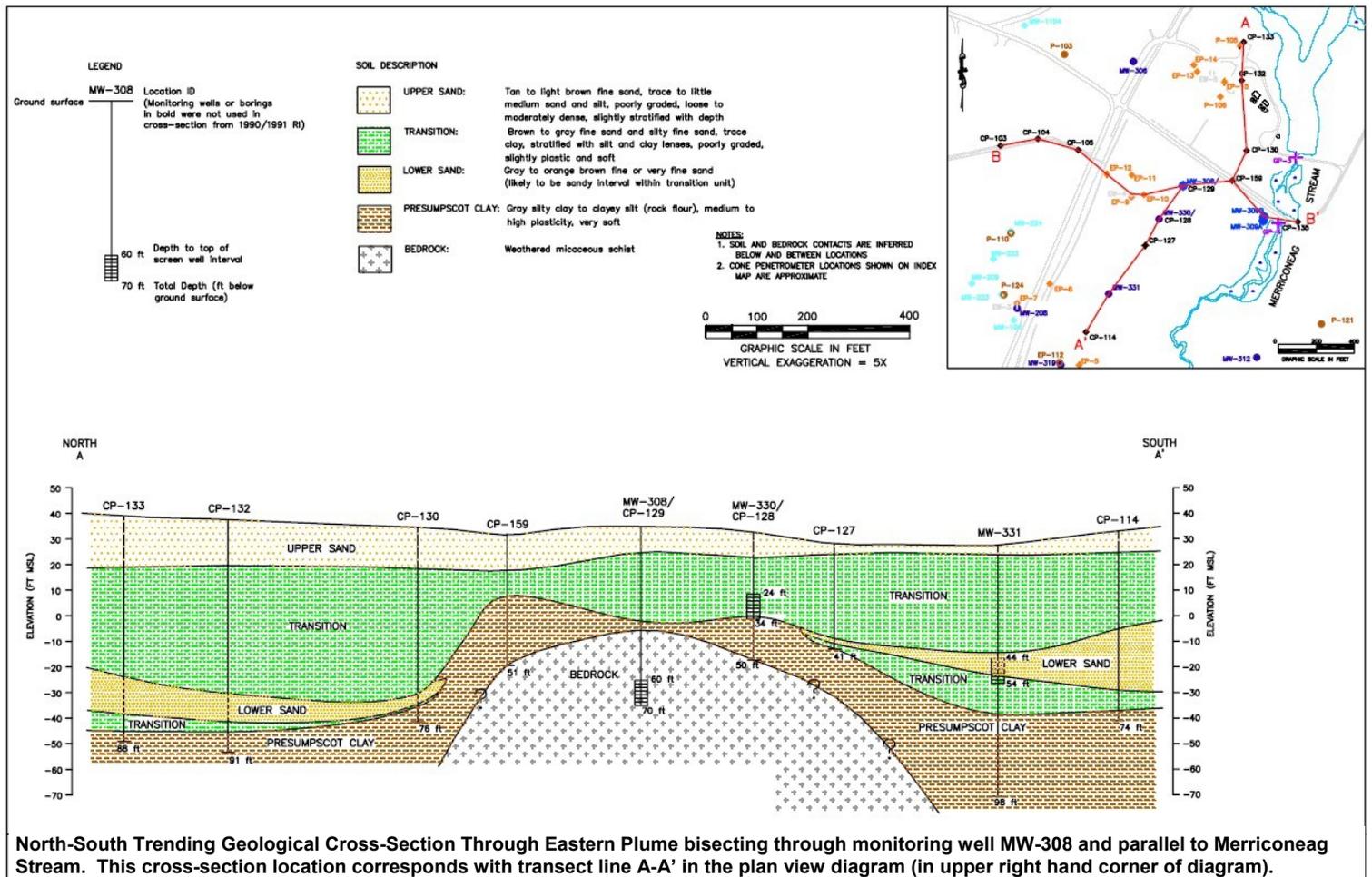
tween 0 and 40 ft mean sea level and found to drop to approximately 50 ft below mean sea level in some areas of the site.

## HYDROGEOLOGY

The groundwater flow system in the upper sand unit is unconfined. The majority of groundwater flow in the transition unit occurs within the lower sand interval. Groundwater flows laterally through the upper sand, while downward groundwater flow is much slower due to the presence of the underlying transition unit. Groundwater migrates in the upper sand toward surface water-bodies (Mere Brook and Merriconeag Stream) and some portion discharges to these streams and associated wetlands.

In the Southern Boundary area of the Eastern Plume (south of Mere Brook and extending south of New Gurnett Road), shallow groundwater flow has easterly and northeasterly components. Deep groundwater flow in this area is predominantly to the southeast and east, toward Mere Brook. Groundwater extraction has been occurring since 1995 to reduce volatile organic compound (VOC) concentrations and maintain hydraulic control of the Eastern Plume.

In the summer of 2007, the Navy conducted an extensive investigation of the shallow groundwater in the flood plain of Mere Brook and Merriconeag Stream on the eastern portion of the Eastern Plume. The preliminary results of this investigation indicate the primary contaminants present in the Eastern Plume, including the compound 1,4-dioxane, are migrating and discharging to some degree into the surface water. In addition, the EPA has conducted a fish tissue study in Mere Brook to investigate the potential impact of the Eastern Plume on surface water and aquatic life. The results of both investigations are anticipated to be available for public review in Spring 2008.



# New Eastern Plume Extraction Well Installed

In July 2007, the Navy installed an extraction well in the northern end of the Eastern Plume Operable Unit (OU). The new extraction well, identified as EW-05B, is shown in the photo below.

The new extraction well was installed to meet the following objectives:

- Extract groundwater in the area of monitoring point P-106 in the Eastern Plume that has historically exhibited the highest VOC concentrations in the Eastern Plume.
- Reduce concentrations of contaminants in the northern portions of the Eastern Plume.
- Maintain hydraulic control of the Plume boundary in the vicinity of the northeastern portion where higher VOC concentrations have been reported.

Extraction well EW-05B was installed and developed between 11-16 July 2007 and is the first of two additional extraction wells to be installed for the Eastern Plume “pump and treat” system which consists of four other operational extraction wells.

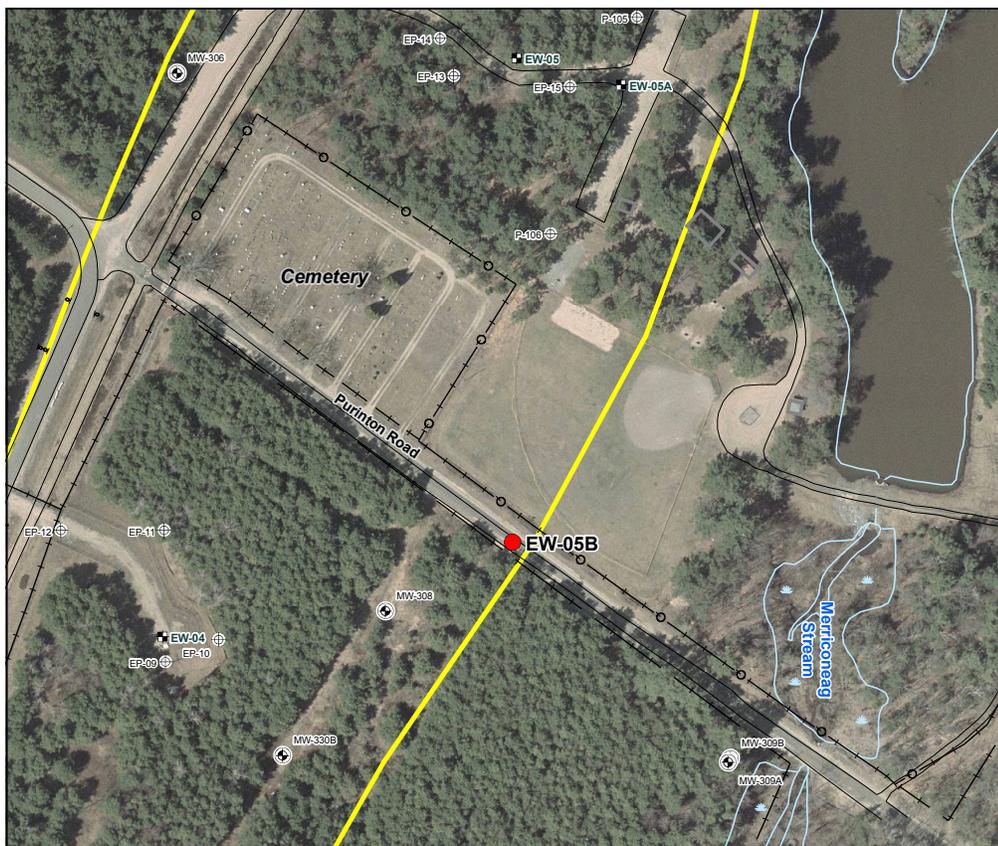
The new extraction well was installed through a 12-inch diameter borehole using a dual rotary drill rig as shown in the photo above. The dual rotary rig utilizes a lower rotary drive unit to advance casing through unconsolidated overburden. The well was installed to a depth of 77 feet below ground surface with a 10-foot screen length in order to extract groundwater from the lower sand unit within the Eastern Plume. The new extraction well is anticipated to be placed in operation in Spring 2008.



**Extraction Well Installation**



Photos of existing extraction well EW-5A showing vault construction & piping systems. Groundwater is pumped & treated using an air stripper and carbon filtration systems before it is discharged to the on-site infiltration gallery.



**New Extraction Well Location**

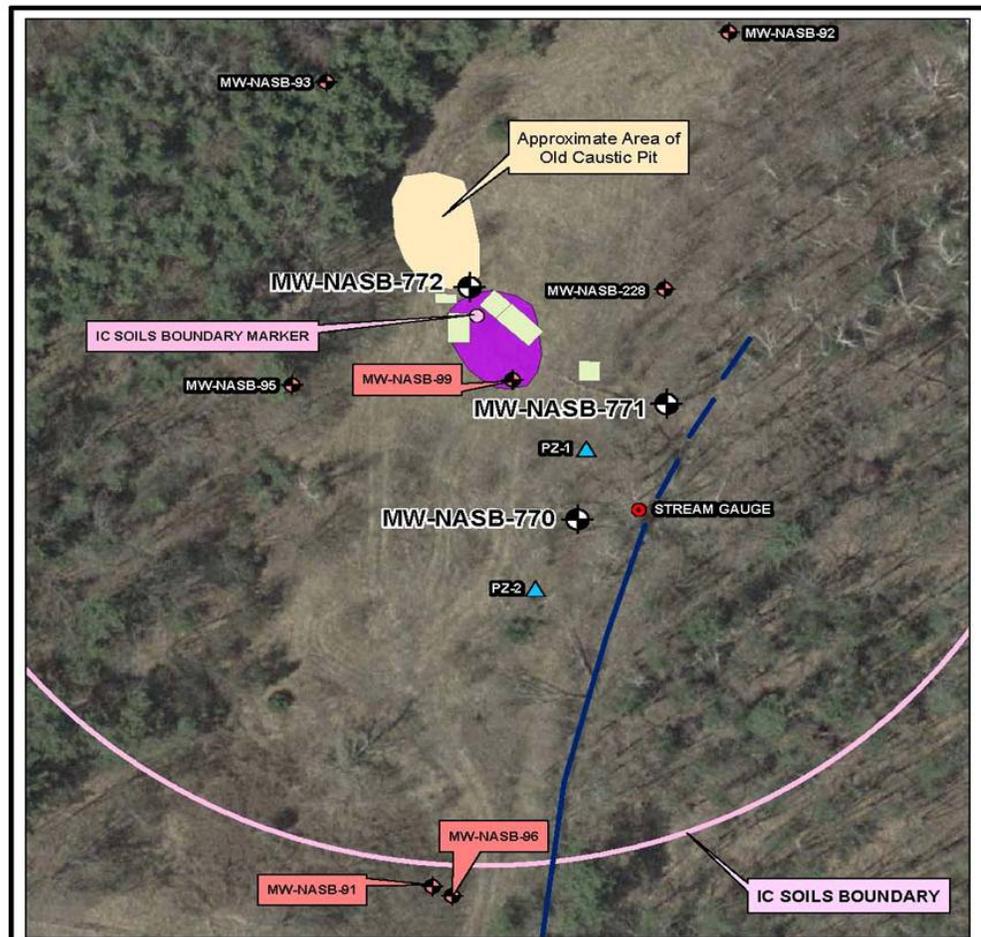
## New Monitoring Wells at Site 7

The Old Acid Caustic Pit Site 7 is the former location for acid and caustic liquid waste disposal used from 1952 to 1969 for disposal of battery acids, caustics, and solvents. As per the 2002 Record of Decision, the Site 7 remedy requires institutional controls with groundwater monitoring. Long-Term monitoring has been on-going at Site 7 since 2005.



**New Monitoring Well**

Three new monitoring wells were installed in June 2007 to refine the groundwater monitoring well network at the site. These new monitoring wells have been added to the Long-Term Monitoring Program and will provide additional water quality data in the immediate vicinity of the former source area at Site 7. The location of the three new monitoring wells, MW-NASB-770, MW-NASB-771, and MW-NASB-772, are shown in Figure 1. These well locations were selected based on historical groundwater elevation data, past and recent gauging data, interpreted groundwater flow direction at Site 7, and input from the project stakeholders. These new wells will allow us to develop a more refined groundwater flow pattern, and will provide more accurate data to assess the effectiveness of the natural attenuation process for metals.



## Administrative Record & Geographical Information System

The Administrative Record is a collection of documents and other materials that forms the basis for remedy selection under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) response action implemented at an installation restoration program (IRP) site. The "Admin Record", contains documents such as remedial investigation reports, Remedial Action Memoranda, Proposed Remedial Action Plans (PRAPs), Records of Decisions (RODs), monitoring event reports, work plans, meeting minutes, and official correspondence. An updated Admin Record for NAS Brunswick was released in February 2007 and contains records generated through the end of December 2006. The Admin Record is available for public review at the Curtis Memorial Library, in Brunswick, Maine.

Geographic Information System (GIS) is an information database system used to input, store, retrieve, analyze, and display geographically referenced data or spatial data. The Navy and project stakeholders have been using the Brunswick GIS since 1998 to assist with decision making, analyzing data, and presenting information visually to the public at Restoration Advisory Board meetings. The Navy completed an update to the NAS Brunswick GIS in 2006. It is available from the Navy on CD and is part of the Admin Record available at the Curtis Memorial Library. The 2006 update includes the addition of data from the Long-Term Monitoring program associated with IRP sites, groundwater contour maps, updated base map layers, etc. The NAS Brunswick GIS is updated periodically.

## ***Recently Completed and Upcoming Field Activities***

Naval Air Station (NAS) Brunswick occupies 3,094 acres within the Town of Brunswick, south of the Androscoggin River and Route 1. Past Navy activities (either leaks, spills, or other activities that were acceptable practices at the time) have left behind chemicals in the soil, groundwater, and sediment at certain areas of the Naval Air Station. These areas are being investigated and/or remediated through various Navy programs such as the Installation Restoration Program or the Military Munitions Response Program (MMRP).

There are 18 Installation Restoration Sites within the Naval Air Station that have been, or are being, investigated and cleaned up, in addition to the MMRP sites and petroleum sites. Recent work has included updating Long-Term Monitoring (LTM) Plans, conducting LTM Plans, sampling events, conducting clean up by utilizing in-situ bioremediation technology at the base's Naval Exchange (NEX) Gasoline Service Station, and removing soil and former landfilled materials (ash and dump materials) from Site 9. The Navy has begun to investigate areas of concern (AOCs) under the MMRP. Several of these MMRP AOCs have had Preliminary Assessments completed recently.

### **Completed in 2007**

- Installed a new extraction well EW-5B in the Eastern Plume, July 2007
- Conducted Mere Brook Fish Tissue sampling event, June - August 2007
- Conducted Mere Brook and Merriconeag Groundwater Investigations in flood plain areas
- Began development of the revised Site Inspection Work Plans of MMRP Areas of Concern, June - September 2007
- Installed 3 new monitoring wells at Site 7, July 2007
- Installed 1 new monitoring well in the southwestern area of Site 9, July 2007
- Continued In-situ bioremediation at the Navy Exchange Service Station, 2007
- Conducted sampling event at the Navy Exchange Service Station, October 2007
- Continued Removal Action of the Ash Landfill/Dump Area at Site 9, September 2007
- Completed Long Term Monitoring sampling events at all Installation Restoration sites, April and September 2007
- Old Navy Fuel Farm Groundwater Sampling
- Monthly Groundwater Extraction System Sampling

### **Upcoming in 2008**

- Complete Removal Actions of the Ash Landfill/Dump Area at Site 9
- Conduct Remedial Investigation of Site 2 and the Area North of Site 2
- Conduct Remedial Investigation of Site 17
- Complete revised Site Inspection Work Plan of MMRP AOCs & begin field investigations
- Eastern Plume 1,4-Dioxane Remedial Investigation Activities
- Site 9 Direct Push Investigation –2008
- Extraction Well EW-5B vault & piping installation – January 2008
- Site 17 Remedial Investigation Field Activities – 2008
- Old Navy Fuel Farm Groundwater Sampling - Spring/Fall 2008
- Long-Term Monitoring at Installation Restoration Program Sites – Spring and Fall 2008
- Monthly Groundwater Extraction Treatment System Sampling – on-going into 2008
- Base-Wide Background Study Field Work – 2008
- Site 2 Supplemental Remedial Investigation Field Work – 2008

## Environmental Clean-up Information & Public Participation

### New web site for NAS Brunswick Environmental Clean-Up Program

In November 2007, the Navy developed an NAS Brunswick Environmental Clean-Up Program website in order to facilitate communication amongst all project stakeholders, interested parties, the Restoration Advisory Board (RAB), and particularly the public and local community members.

The web site is accessible to the public from any location with a computer and Internet connection. The site provides access to numerous resources to ensure the continued success of Clean-Up Program activities at NAS Brunswick.

The New NAS Brunswick Environmental Clean-Up Program Web Site address is: <http://nasbrunswick.navy-env.com/>

The NAS Brunswick Restoration Advisory Board (RAB) consists of representatives from the state and federal regulatory agencies and of the community who meet quarterly to advise the Navy on investigation and cleanup actions. All members of the public are welcome. **Please contact Mr. John James, NAS Brunswick Public Affair Director if you have questions, or would like more information.**

## Website Links

Naval Air Station Brunswick -

<http://www.cnic.navy.mil/brunswick>

NAS Brunswick Environmental Clean-Up Program Website

<http://nasbrunswick.navy-env.com/>

Navy's BRAC Program Management Office (PMO) -

<http://www.bracpmo.navy.mil/>

DoD Base Realignment and Redevelopment Manual -

[http://www.dod.mil/brac/pdf/4165-66-M\\_BRRM.PDF](http://www.dod.mil/brac/pdf/4165-66-M_BRRM.PDF)

US DoD Base Realignment and Closure 2005 Website -

<http://www.defenselink.mil/brac/index.html>

Mid-coast Regional Redevelopment Authority -

<http://www.mrra.us/>

Brunswick Area Citizens for a Safe Environment -

<http://www.curtislibrary.com/BACSE/>

## FOR MORE INFORMATION

The Navy welcomes your input. If you have questions or concerns, or want more information please contact:

### John James

Public Affairs Director

Naval Air Station Brunswick  
Brunswick, Maine

Phone (207) 921-2000

Email [john.james@navy.mil](mailto:john.james@navy.mil)

## Information Repository

For over 15 years, the Navy has maintained an information repository (i.e., Administrative Record) for NAS Brunswick that contains project documents and other reference materials related to the investigation and clean up program for the Base. Information is available in both paper and electronic forms. The repository is updated periodically as new information becomes available.

### Curtis Memorial Library

23 Pleasant Street  
Brunswick, Maine 04011  
(207) 725-5242

[www.curtislibrary.com](http://www.curtislibrary.com)

### Hours:

Mon-Thurs, 9:30 AM to 8:00 PM

Friday, 9:30 AM to 6:00 PM

Saturday, 9:30 AM to 5:00 PM  
(Jun – Aug until 1:00 PM)

Sunday, 12:00 PM to 4:00 PM  
(Jun – Aug - closed)

