

**FINDINGS FROM POST-FIELD WORK MAGNETOMETER SURVEY
MERRICONEAG EXTENSION DEBRIS SITE, SITE 15
SWAMPY ROAD DEBRIS SITE, SITE 16
NAVAL AIR STATION BRUNSWICK, MAINE
29 February 2000**

A. Background

I performed a magnetometer survey of Sites 15 and 16 on 22 December 1999. The weather was partly cloudy to sunny and unseasonably warm. Fieldwork lasted from 1000 to 1700. The instrument used for this survey was a Schonstedt MAC-51Bx receiver. This instrument is commonly used by utility companies to detect buried utility lines and by explosive ordnance experts to detect subsurface ordnance items. This instrument was used because it could fulfill the objectives of this field effort, was easy for one person to properly use on uneven terrain, and was readily available. The effective depth of this instrument is approximately 4-5 feet depending on soil conditions, mass and shape of the buried anomalies, and interference from background conditions. More information about the magnetometer instrument used for this survey is available at <http://www.schonstedt.com/>

B. Summary of Findings

No ferrous anomalies were detected anywhere at Site 15. A number of ferrous anomalies were detected at Site 16. Most items were found lying immediately on the ground surface or beneath the leaves and organic cover; however, several items were discovered beneath the soil surface at shallow depths. All metal and other debris items discovered were related to both domestic (household) trash or golf course operations and maintenance. There were no buried drums or other items discovered during this survey that would have an environmentally threatening nature.

C. Methodology of Survey

1. **Instrument calibration and use.** The magnetometer instrument was calibrated at the start of each site's survey by placing two metal objects (metal pin flags), one horizontally on the ground and the other vertically in the ground. I then walked about 10' away, turned on the instrument and adjusted the sensitivity setting (either high or low), and slowly walked towards the pin flags while sweeping the instrument back and forth in front of me. I finally chose the "high" setting for the survey because it best detected the pin flags from a greater distance and also up close. Detections were indicated by a variable whining sound. When the wand is passed near or over a metal anomaly, pitch of the whining sound varies. The loudest sound level indicates location and closest proximity of the anomaly. After an anomaly is detected, the instrument is slowly passed over the spot in a 360° circle to pinpoint the precise location of the anomaly, then the wand is held vertically over the anomaly about 6" above ground surface, with the sensor pointed down in accordance with the manufacturer's recommended procedures. If a surface object was immediately evident, the item was moved about 6' away from the spot to prevent magnetometer interference and the spot was rechecked with the wand to check for an underlying anomaly. If no surface object was evident, a shovel was used to carefully scrape away forest litter and topsoil and invasive soil digging was performed until the anomaly was revealed. Alternate use of magnetometer and digging was performed to confirm digging in the right location. All subsurface magnetometer detections at Site 16 resulted in a find of the source metallic anomaly. There were no "false positive" readings during this survey. Sufficient digging

was performed until the anomaly could be adequately identified to determine its environmental significance and its potential to release hazardous substances. Large subsurface anomalies at Site 16 were left exposed in place due to their size and were flagged for future inspection if desired. Smaller subsurface anomalies were unearthed and left lying on the surface. Items found were then annotated on a rough sketched map (attached), marked in the field with blue or pink pin flags, and inventoried. Multiple small surficial items found in the same approximate location (e.g., cans, fence wire, fence posts, etc.) were piled together for inventory and recovery purposes.

2. Survey Coverage

a. Site 15: The Site 15 survey focused on the specific locations where debris items were previously identified in the Site Investigation report and several site visits. After magnetometer calibration, I surveyed a small triangular section of woods between the dirt road and the surface water impoundment where a small metal drum and metal debris were noted. I swept the wand 6" to 12" above ground surface as best as the trees and forest growth would allow, in a grid pattern with a 4' distance between paths. After surveying that area, I surveyed the base of the surface water impoundment dam. A number of detections were obtained and, upon closer inspection, the detections were caused by steel reinforcement contained within chunks of concrete used to make the dam. I also surveyed the drainage ditch south of the impoundment where a metal drum culvert was previously noted and removed. Other than an occasional beverage can, no additional metal debris items were visually found in the Site 15 area, and no subsurface anomalies were found with the magnetometer anywhere at Site 15.

b. Site 16: The Site 16 survey focused on the site area located north of the golf course path due to: (1) the magnitude of debris previously identified; (2) an SI report determination that surface debris negatively influenced previous magnetometer readings for subsurface anomalies; and (3) the small number and type of debris items previously found in the area south of the golf course path to the pond. After magnetometer calibration, I used a horizontal grid pattern to sweep the site with approximately 6' distance between grid paths in order to provide overlapping fields of coverage.

I started the field survey by walking along the golf course green access trail in the south and working my way north (Figure 1). While walking, I swept the wand from side to side for a span no less than 7' across, and 6" to 12" above ground surface. The grid size was chosen based on physical extension (arm reach + wand length) and, since the instrument provides increased sound levels at extended horizontal and vertical distances from objects, the area and probability of overlapped coverage was further increased. Survey instruments were not used to set grid lines; however, the area's lack of vegetation allowed easy visual reference to trees and other physical landmarks to verify path lines with overlapped coverage. Upon reaching the stream on the east edge or the access road/parking apron on the west edge, I moved north about 6" and then walked a parallel line easterly towards the golf course clubhouse or westerly towards the stream. I paid particular attention to ensure my magnetometer sweeps overlapped the previous path's coverage.

When walking was difficult and I needed to climb a steep grade or circumvent a dense conifer tree, I took an adjacent path and extended my arm with the wand into the difficult area to ensure no buried items were beneath the tree branches or embedded into the vertical slope. Once the obstacle or difficult terrain feature was surveyed, I re-established my path line, turned backwards, swept towards the obstacle for redundant coverage, turned forward, and then resumed my former path line.

My back-and-forth grid line sweep continued north from the stream to golf course maintenance building parking lot, and back to the stream until I reached a point at the far north end of the site where I no longer found anomalies. This point is correlated to the area on the map in the woods where the stream bends westward (Figure 1) about 50' north of the domestic cans and bottles designated as Item #18 on Figure 2. I then performed a visual inspection of the wooded area and stream bank from that point northwest to the stream culvert at Swampy Road. Other than an occasional beverage can, no additional metal debris items were visually found north of Item 18.

D. Inventory of Items Discovered (refer to sketch at Figure 2 for locations)

1. 5 gallon gas can (empty), 2½ gallon milk pail (empty), 1# coffee can, red fence post, gym locker door, soup can, fence wire, 3 metal wire fence posts with wire pieces attached
2. Telephone pole guy wire anchor
3. 1 gallon paint can (empty)
4. Perforated steel planking, approximately 1' deep
5. Perforated steel planking, approximately 2' deep
6. Large metal object (1' deep) with control rod device mounted on top indicating "low/med/high" adjustments. Looks like a tractor-towed grass mower deck attachment. Soup cans, bottles, light bulbs, bricks, and other domestic trash items about 2 meters downgradient from mower deck.
7. Steel fence post, about 6' long
8. 1 gallon paint can (empty)
9. Wood fence post with 3" diameter cast iron piping extended through it
10. Large flat rock causing strong metallic readings on the instrument. I exposed a 4' x 2' section with the shovel and struck it so I could see if it was either rock or concrete.
11. Metal fence post or steel pipe
12. Heavily rusted pieces of a flat metal object (possibly a metal drum)
13. Rotary blade grass cutter and
14. 4 quart metal motor oil can (empty) for oils and lubricants, glass bottles, rusted cans, and other domestic trash items about 2 meters upgradient from an older orange pin flag marked

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4. Perforated steel planking, approximately 1' deep
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6. Large metal object (1' deep) with control rod device mounted on top indicating "low/med/high" adjustments. Looks like a tractor-towed grass mower deck attachment. Soup cans, bottles, light bulbs, bricks, and other domestic trash items about 2 meters downgradient from mower deck.
7. Steel fence post, about 6' long
8. 1 gallon paint can (empty)
9. Wood fence post with 3" diameter cast iron piping extended through it
10. Large flat rock causing strong metallic readings on the instrument. I exposed a 4' x 2' section with the shovel and struck it several times to verify it as either rock or concrete.
11. Metal fence post or steel pipe approximately 1½' deep
12. Heavily rusted pieces of a flattened metal drum (empty)
13. Rotary blade grass cutter and wheel assembly
14. 4 quart metal motor oil can (empty) labeled "Oilzum motor oils and lubricants," glass bottles, rusted cans, and other domestic trash debris items approximately 2 meters upgradient from an older orange pin flag marked "SS2"
15. 2½' metal pipe, threaded end, approximately 1½" diameter
16. Steel pail-mounted mop ringer without the pail

17. Many larger metal debris items (all heavily rusted); pieces of three 5-gallon motor oil(?) cans; a child's metal toy wagon body; an old round 5 gallon gas can; many old glass bottles, rusted soup-sized cans, and domestic trash items.

18. Old soup-sized cans, old glass bottles, and domestic trash items

E. Conclusions

a. As indicated by the inventory of debris items found, most anomalies detected at Site 16 are items of a domestic solid waste nature that pose no adverse risks to human health, public welfare, or the environment. The remaining items detected were consistent with refuse items from golf course operations and maintenance activities. Only a few debris items found, such as broken glass, may present a safety hazard to trespassers.

b. All oil and gas cans found were completely empty of contents, residues, or odors of petroleum products. Due to the depth range capability of the magnetometer used, overlapping areas of coverage, and disposal pattern of debris items found, it can be assumed with a high degree of confidence that no buried drums—or other such metal containers with a potential for environmental significance—currently exist at Site 16.

c. All containers were found on the surface, empty of any contents, and are judged to have been empty for a long time by inspection of their condition. Had these containers been discarded full or partially filled of products, their impact on the environment would have been more evident in the site's initial investigation results. At this later date, and due to the non-continuing nature of these potential sources, environmental conditions could only improve in the time since these items were discarded.

d. Because no other subsurface anomalies were detected at less than 4-5 feet, it can also be assumed with a high degree of confidence that no imminent risks to human health or the environment currently exist at this site.

e. Due to the type and age of all items found at this site, it can also be assumed with a high degree of confidence that subsurface, non-ferric containers with a potential for containing environmentally hazardous liquids are also unlikely to exist at this site.

f. Although the magnetometer used for this post-field work survey differs from the instrument used in the initial site survey, the Schonstedt MAC-51Bx receiver met all objectives of this effort in either confirming or refuting the existence of buried drums at this site. Based on statements in the Site 16 Site Investigation report, quantifiable readings provided by the original instrument had limited use for subsurface anomalies due to the amount of interference caused by surficial debris items on Site 16. Test pits were subsequently used to investigate subsurface items at locations having the highest magnetic readings. Most surface debris items were removed in summer 1999. As such, this recent survey provides a higher degree of confidence for subsurface investigation due to minimal interference by surface anomalies. Results from this recent magnetometer survey are consistent with conclusions of the initial site survey "that considerable amounts of buried ferrous materials are not present."

F. Recommendations

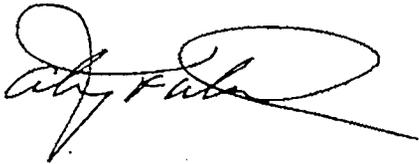
a. Based on agreement in our team's teleconference call on 9 Feb 00, recommend removal of subsurface debris found at Site 16 and magnetometer resurvey of the specific spots where subsurface debris was removed in order to confirm that no additional debris remains buried beneath those areas.

b. Also agreed in the 9 Feb 00 call, recommend a visual survey of the southern section of stream bank at Site 16. All visible debris items found on this "south" section will be identified and the approximate locations of such items graphically recorded. If any area of the site contains six or more surficial debris items within a 50' x 50' square area, then descriptions and locations of all items will be documented and the items removed for disposal. That area will then be surveyed with a magnetometer for subsurface debris items. If any subsurface anomalies are detected, additional debris items will be unearthed, recorded, and removed. The spot will then be resurveyed with the magnetometer for confirmation.

c. Recommend resampling the location that previously had the exceedance of lead during the April sampling event and confirming if lead contamination is still an environmental concern at that specific spot on Site 16.

d. Following completion of the additional field work and sampling results, recommend the NAS Brunswick IRP team approve a No Further Action Consensus Statement for Sites 15 and Site 16 based on the findings of this post-field work magnetometer survey and subsequent work. The potential for buried drums at this site will have been assessed by multiple magnetometer surveys and any likelihood for existence of buried drums is minimal. As there is no regulatory requirement to remove inert debris items from government or private property, further expenditure of public funds at these sites—beyond proposed actions at the southern section of Site 16—is not prudent.

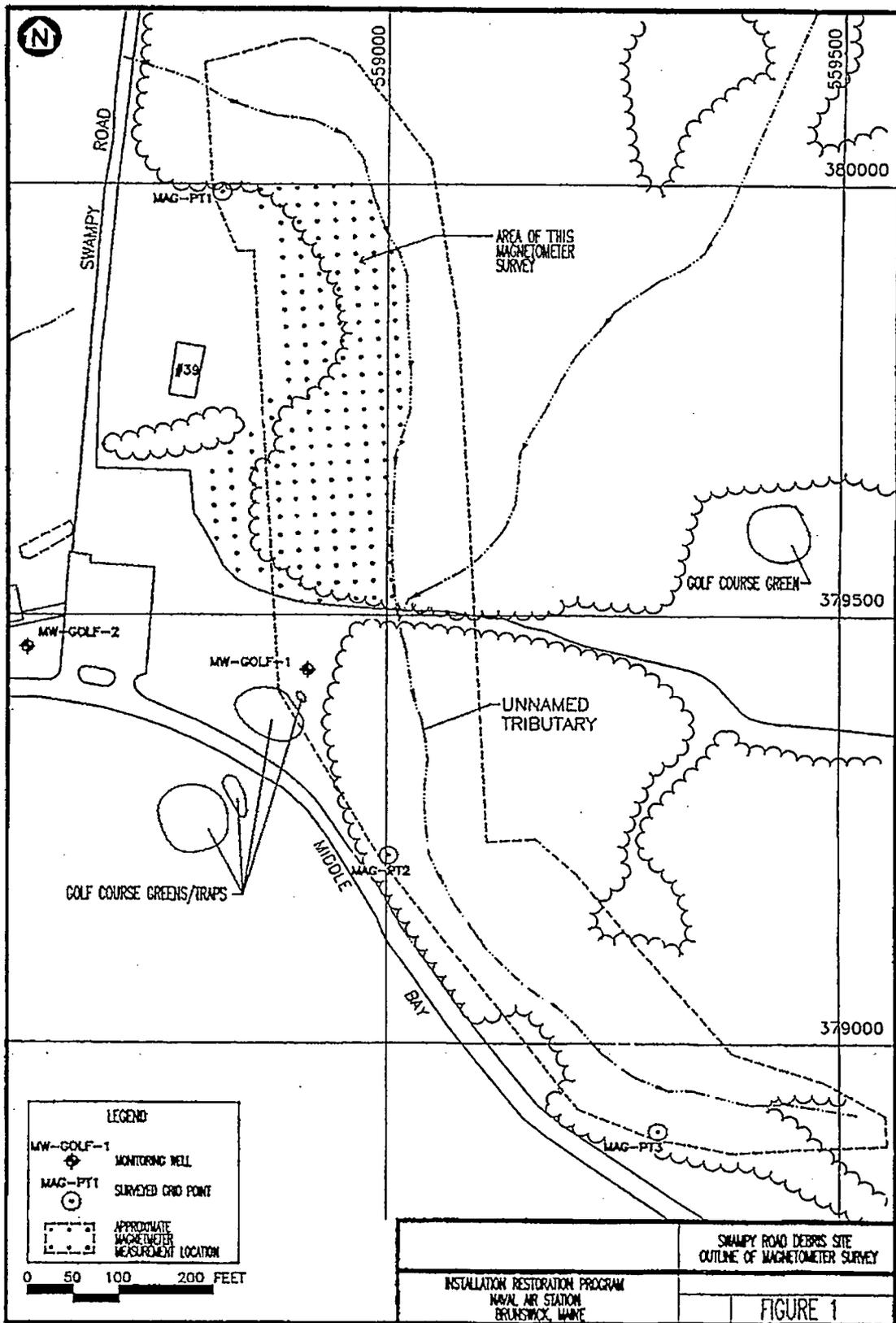
e. Recommended adding a clause in the Consensus Statement that would allow revisiting of these sites by regulatory agencies if a change in conditions should reveal a potential for adverse threats. If property transfer should occur sometime in the future, public law requires the Navy to disclose all environmental investigation results to the future property owners and a clause could be added to the Consensus Statement to reiterate this requirement.

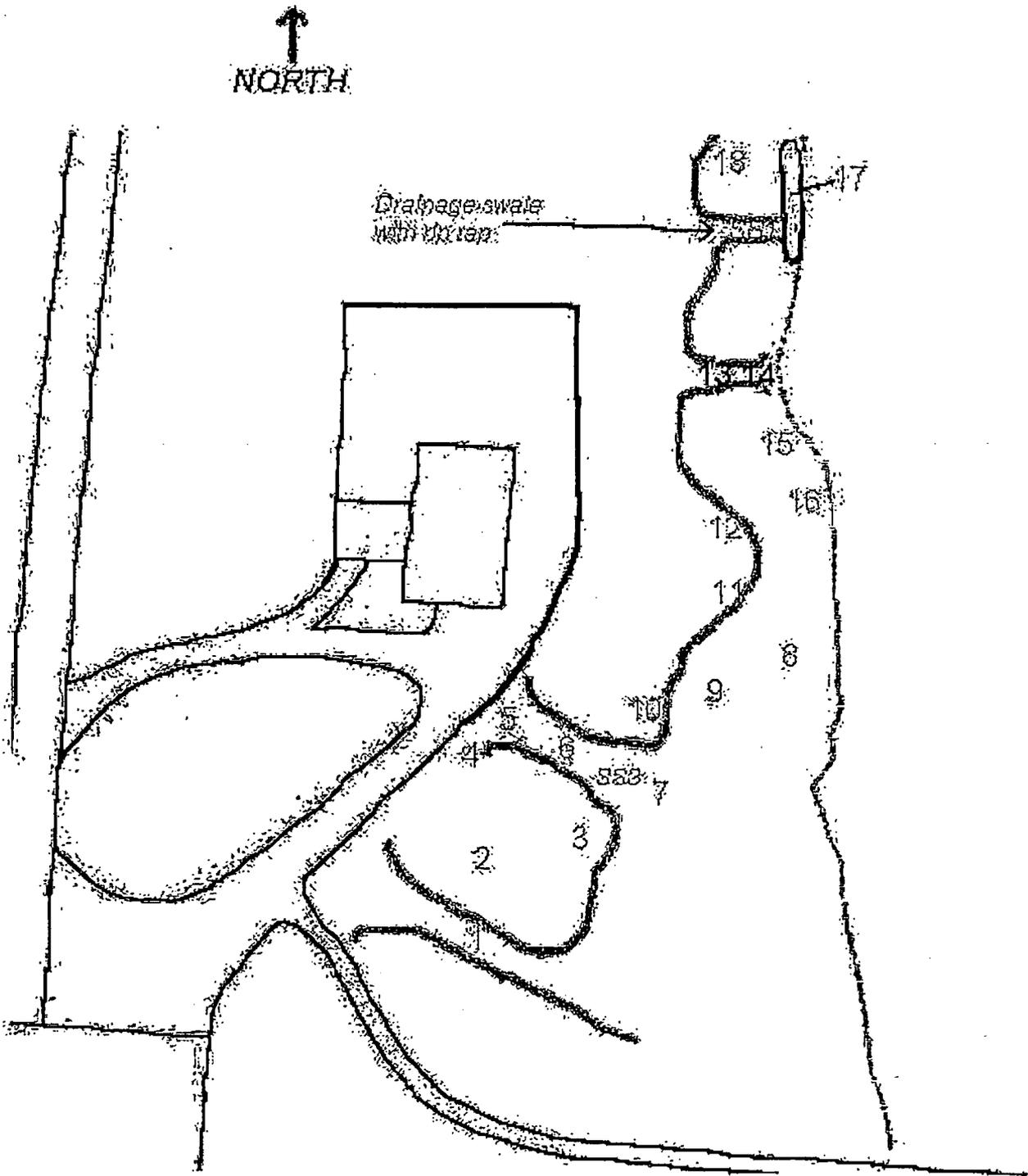


Anthony F. Williams
Installation Restoration Program Coordinator
Naval Air Station, Brunswick, Maine
(207) 921-1719
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2 Attachments:

1. Map of Survey Location
2. Sketch of Anomaly Locations





SWAMPY ROAD DEBRIS SITE, SITE 16

Figure 2 - Sketch of Anomaly Locations