Addendum No. 3
for Installation of Eight Monitoring Wells under Work Plan for Remedy Design Hydrogeologic Investigation for Site 07, Calf Pasture Point Naval Construction Battalion Center Davisville North Kingstown, Rhode Island

Contract Number N62472-92-D-1296
Task Order No. 0099

Prepared for

Department of the Navy
Engineering Field Activity Northeast
Naval Facilities Engineering Command
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Prepared by

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January 2004
Version: REVISED FINAL
EA Project No. 29600.99.3107

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1. INTRODUCTION, OBJECTIVE, AND SCOPE

This Work Plan Addendum No. 3 has been prepared by EA Engineering, Science, and Technology (EA) to add the location, rationale, and installation of eight (8) additional monitoring wells as recommended in the First Five-Year Review Report (EA 2003) for the Former Naval Construction Battalion Center (NCBC) Davisville facility, North Kingstown, Rhode Island, plus the well installation methods, to the investigative plan and field procedures (Final Work Plan dated June 2000) for the Remedy Design Hydrogeologic Investigation for the Installation Restoration (IR) Program Site 07 at NCBC Davisville. This work is being performed for the U.S. Navy, Engineering Field Activity Northeast (EFANE), Naval Facilities Engineering Command (NAVFAC), under the Base Realignment and Closure Act (BRAC) Contract No. N62472-92-D-1296, Contract Task Order 0099. This Work Plan Addendum is being submitted in a Revised Final version to further address coastal wetlands issues and to incorporate an assessment of the wetlands in the vicinity of each of the well locations as agreed to during a 21 January 2004 meeting with the Coastal Resources Management Council (CRMC), the Town, Rhode Island Department of Environmental Management (RIDEM), and EPA-Region I. On 18 November 2003, EA performed a site visit and assessment of the wetlands present in the vicinity of each of the well locations. The observations, conclusions, and recommendations of that assessment have been included as Appendix A of this Work Plan Addendum No. 3.

The work presented in this addendum will be performed in accordance with the Final Work Plan dated June 2000 for the Remedy Design Hydrogeologic Investigation.

The site description, history, organization, and base objective, scope, and methods are provided in the June 2000 Final Work Plan for this site. This Work Plan Addendum No. 3 addresses the need for additional data to refine the Conceptual Site Model (CSM) and the understanding of the hydrogeology from source area(s) southwest to the harbor 'cove' area and chlorinated volatile organic compounds (CVOC) plume migration in the central portion of the site as recommended in Sections 2.1.8 and 2.1.9 of the First Five-Year Review Report for the Former NCBC Davisville facility dated March 2003.

The objectives of this Addendum No. 3 are to:

- Expand the LTM network for ground water
- Based on the Draft Hydrogeologic Report and LTM data for Site 07, further evaluate the site hydrogeology: 1) the interval southwest from the source area to the harbor "cove" area and 2) the CVOC plume migration in the central portion of the site.

To accomplish these objectives, the following work will be performed:

- Installation of 8 new monitoring wells as presented in the First Five-Year Review Report (EA 2003). Refer to Table 1 and Figure 1 of this Addendum for the well designations, rationale, and locations.

2. ADDITIONAL FIELD PROCEDURES

Procedures for drilling and monitoring well installation and development are presented in this section. The drilling activity will be performed using the following guidelines:

- Obtain NCBC Davisville and Town of North Kingstown approval for drilling locations
- Obtain all NCBC Davisville, Rhode Island Economic Development Corporation (RIEDC) (401-295-0044) and Dig Safe (800-225-4977) clearances for drilling locations
- Mitigate potential contamination of the aquifer by the drilling equipment.

All field work described here in will also be performed in accordance with the QAPP (Appendix A of the June 2000 Final Work Plan) and the SHERP (Appendix B of the June 2000 Final Work Plan).

2.1 SUBSURFACE UTILITY CLEARANCE

NCBC Davisville, RIEDC, and Dig Safe clearance will be obtained prior to conducting any drilling activities. Location and marking of all underground utilities in the vicinity of each site will be done prior to any drilling. The drilling subcontractor will obtain required drilling permits necessary for completion of the field work. This clearance will be coordinated by the EA Project Manager.

2.2 DRILLING AND SUBSURFACE SOIL SAMPLING

Borings will be advanced for the installation of eight (8) monitoring wells: four (4) "shallow" (S) (soil/water-table interface) (MW07-27S, -37S, -38S, and -39S), and four (4) "deep" (D) zone (10-ft interval just above competent bedrock (MW07-35D, -37D, -38D, and -39D), anticipated to be gravelly sand and/or weathered bedrock) monitoring wells, as located on Figure 1. 39 I

This field activity is associated with an ongoing CERCLA action at Site 07; therefore, all work relating to the installation of ground-water wells will be done in accordance with the substantive requirements of: (1) Rules 6.01 and 6.14 of the CRMC and Rhode Island Department of Environmental Management's Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast, and (2) Rhode Island Coastal Resources Management Program (CRMP) *Redbook*, Section 210.3 Coastal Wetlands.

In complying with the substantive requirements of the aforementioned Rules and Regulations, access for drilling rigs will require the use of best management practices (BMP), including protective mats to mitigate rutting and related negative impacts during drilling and well installation activities at well locations in wet areas and along the access route (where wet areas are crossed). The BMP will also include the use of sediment and erosion controls and site restoration consisting of grading, seeding, and stabilization of disturbed areas (as needed and

possible during the current severe winter conditions). Disturbed wetlands will be restored immediately following this field activity (as possible during the current severe winter conditions). Additionally, all well drilling and development equipment will leave the site at the end of this activity. Related drill cuttings and development fluids will be contained and placed in 55-gal drums that will also be removed from the site and staged in the vicinity of the EA field office in accordance with Section 2.5 of this Work Plan Addendum. The monitoring well installation and development activities are not alterations to the wetland type and will only result in temporal impacts in the vicinity of each well location. No loss of wetland will occur associated with these activities.

Drilling for the monitoring wells will be performed using standard methods and BMP, including hollow-stem auger and/or drive and wash with 4- to 6-in. diameter steel casing which has been steam cleaned (in accordance with the Decontamination Procedure in Section 4.8 of the June 2000 Final Work Plan), prior to use at each boring. The following summarizes the methods for the drilling and installation of the monitoring wells:

- Drive and Wash Method for Overburden and Weathered Bedrock (D) Screened Monitoring Well – Drive and wash 4-in. diameter temporary steel casing to the top of competent bedrock, tri-cone drill 3 ft into rock to confirm rock, then obtain a 5-ft length of NX-core of the rock. The overburden will be sampled using a 2- to 3-in. inner diameter (ID) split-barrel sampler that is 18 in. or 24 in. in length. Such soil samples will be collected continuously from ground surface to the top of bedrock or refusal. Place bentonite to top of rock and then construct a 2-in. ID polyvinyl chloride (PVC) well with 10-ft length screen (6- to 10-slot) (unless otherwise determined by the EA Task Manager and Project Manager from the soil sample headspace vapor measurement data), appropriate filter sand, bentonite seal, and cement-bentonite grout the annular space as the temporary casing is removed. The monitoring well will be completed approximately 2–3 ft above ground with 4-in. ID steel protective casing and locking cap and a 2-ft x 2-ft cement pad at ground surface.

- Hollow-Stem Auger Method for Shallow Overburden (S) Screened Monitoring Well – Advance 6-in. diameter hollow-stem auger to 7 ft below the static water-table level. No soil samples will be collected from the shallow well, because soil samples will have been collected continuously from ground surface to the top of bedrock or refusal for the adjacent 'deep' well. Construct a 2-in. ID PVC well with 10-ft length screen (6- to 10-slot) (approximately 7 ft below the apparent water table and 3 ft above), appropriate filter sand, bentonite seal, and cement-bentonite grout the annular space as the hollow-stem auger is removed. The monitoring well will be completed approximately 2–3 ft above ground with 4-in. ID steel protective casing and locking cap and a 2-ft x 2-ft cement pad at ground surface.

Additional drilling, logging, and monitoring well construction and development procedure details are described in the following sections.

2.2.1 Water Source

Refer to Section 4.4.2 of the June 2000 Final Work Plan.

2.2.2 Soil Boring and Sampling

Refer to Section 4.4.1 of the June 2000 Final Work Plan. In addition, a flame ionization detector (FID) will be used in place of a photo ionization detector (PID) as a total volatile organic compounds (VOC) vapor screening instrument.

2.2.3 Borehole Logging – Soil

Refer to Section 4.4.3 of the June 2001 Final Work Plan. In addition, an FID will be used in place of a PID as a total VOC vapor screening instrument for headspace readings.

2.2.4 Borehole Logging – Bedrock

Bedrock borehole logging requirements are:

1. Logs will be prepared on a Log of Core Boring.
2. The core bit size shall be indicated on the first sheet of each Core Log Form.
3. Information will be recorded on the log in reference to the depth scale of the log.
4. The Geologist or Geotechnical Engineer will record drilling activities in chronological sequence and with respect to the depth scale in the "Drilling Log." Equipment changes will be documented with notation of time (24-hour clock), date of occurrence, and depth of boring at the time of occurrence.
5. Start and stop time (24 hour clock) for each core run will be recorded. Interruptions in coring shall be documented by time of occurrence and description of the problem and its resolution. Coring rates and depths of significant changes in coring rate shall be recorded.
6. The intervals of non-recovered core will be estimated and an evaluation of the reason for loss recorded.
7. Casing depth, changes in core bit size, and changes in color of circulating water/drilling fluid will be recorded. Quantitative estimates of discernable fluid losses and gains to the geological formation and the estimated interval over which they occur will be indicated.
8. A description of special problems and their resolutions will be recorded on the boring log, (e.g., hole caving, recurring problems at a particular depth, plugging of the core barrel, unrecovered tools).

9. A summary description of the completion of the monitoring well will be entered in the boring log.

10. Core runs will be numbered consecutively down the hole as performed and indicated on the log with horizontal lines at the appropriate depth and the core run number recorded in the lower left quadrant of the Core Log Form for the indicated core run.

11. Total core recovery will be measured to within 0.1 ft and recorded on the log.

12. Total core recovery as a percent of the length of the core run will be determined for each core run and recorded on the log.

13. The Rock Quality Designation (RQD) as a percent of the length of the core run will be calculated for each core run and recorded on the log. The RQD method of determining rock quality is as follows:

    The sum of the total length of core pieces recovered in each run that are at least 4 in. in length and which are hard and sound, divided by the total length of the run, represented as a percentage. If the core is broken by handling or by the drilling process, the fresh broken pieces will be fitted together and counted as one piece.

14. The angle of bedding and schistosity will be recorded as the dip angle as measured from the perpendicular to the core axis.

15. The angle of fracture, joint, fault, or seam surfaces shall be measured from the perpendicular to the core axis and graphically illustrated.

16. The dominant type of coatings or fillings present in fractures or seams will be recorded. Slickensides shall be identified as apparent dip-slip or strike-slip.

17. Standard rock symbols will be used in the graphic log to show major variations in lithology. Minor changes will be documented in the written lithologic log.

18. Rock cores will be visually described for the following parameters:

    - Lithology
    - Grain size and texture
    - Color
    - Bedding/Foliation/Banding
    - Weathering
    - Solution or void conditions.

2.2.4.1 Handling and Storage of Rock Core

Rock cores will be placed in wooden core boxes with the top and bottom of each run clearly labeled. Core will be placed with the top at upper left and bottom at lower right of the core box. For the standard hinged core box, the hinged side is designated the upper side of the box. Any breaks that are made to fit the core into the boxes will be marked.

Drilling fluid will be rinsed from the core using a brush and water. Wooden spacers showing the footage at the beginning of each run will be placed in the boxes. In addition, core boxes will be clearly marked on the inside and outside of top cover and each outside end to identify the job, the boring number, the numerical sequence of the box (e.g., 2 of 7), and the footage interval within the box. Each box of core will then be recorded using a digital camera. For scale during the photographing, a 5-ft rule or tape shall be temporarily placed along the wooden frame of the box just above the first length of core.
When it is necessary to split cores for detailed examination, the cores will be handled carefully and put back into the box in the same position they were prior to splitting.

2.2.5 Borehole Backfilling

If a borehole must be abandoned, bentonite chips will be placed in the borehole as the backfilling material from the bottom of the boring up to ground surface as the hollow-stem auger or temporary casing is removed. As the bentonite is placed, the depth to the top of the bentonite backfill will be measured/monitored with a weighted tape.

2.3 MONITORING WELLS

This section presents procedures for monitoring well installation and well material specifications.

2.3.1 Installation

2.3.1.1 Screened Interval

Refer to Section 2.2 for the screened intervals of the wells to be installed. The wells will be used as locations from which to collect ground-water samples and to measure depth to ground water. Well construction materials are specified in Section 2.3.2.

2.3.1.2 Construction

The screen and riser pipe, as specified in Section 2.3.2.1, will be installed through the driven casing with the screen positioned as described in Section 4.5. For the deep (D) borings/wells, the 5-ft cored rock portion of the hole will be backfilled with bentonite chips or pellets prior to placement of the PVC screen.

Following placement of the well screen, sand for the filter pack (specified in Section 2.3.2.2) will then be poured through the annular space between the well pipe and sides of the driven casing. If

drilling mud is used to maintain borehole stability during drilling and soil sampling, the mud will be thinned to approximately water viscosity prior to placement of the filter sand. The casing will be withdrawn incrementally as the sand is placed into the annular space. The sand will be placed to approximately 1–2 ft above the top of the screen. A weighted steel surveyor's tape, or similar, will be used to sound the top of the filter pack during emplacement of the sand pack.

Following placement of the sand, a bentonite seal (specified in Section 2.3.2.3) will be placed through the casing in a manner similar to the filter pack. The bentonite seal will be placed above the filter pack to prevent intrusion of the grout into the filter sand. The minimum thickness of the bentonite seal will be 2 ft. The bentonite seal will be allowed to hydrate a minimum of 1 hour before grouting begins. The quantities of sand and bentonite introduced to the well will be measured and compared to a calculated estimate of the materials required based on well/borehole dimensions.

Following placement of the bentonite seal, the casing will be withdrawn as the remainder of the annular space is sealed with a cement-bentonite grout (specified in Section 2.3.2.4). The grout will be placed in the annular space between the well casing and the boring (or steel casing) from the top of the bentonite seal to the ground surface. Grout will be placed by pumping through a tremie pipe with the lower end of the pipe approximately 3 ft above the top of the bentonite seal. Pumping will continue until undiluted grout flows from the annular space at the ground surface. Should the top of the bentonite seal occur within 5 ft of the ground surface, the grout will be poured into the borehole annular space from the ground surface.

Following completion of the grouting operation, each well will be completed by venting the side of the riser pipe approximately 6 in. from the top with a small drilled hole. A locking expandable cap and a surficial protective steel casing or box will be used to secure the well (Section 2.3.1.3).

2.3.1.3 Protection and Completion of Wells

Throughout the progress of the work, precautions will be taken to mitigate tampering with the well or entrance of foreign material into it. If rain occurs during construction of a well such that sheet flow across ground surface is probable, runoff will be prevented from entering the well during the construction by placing a temporary earthen berm around the well. The well will be further secured by placing a suitable cover over the well at the end of the day until the well construction activity resumes.

The riser pipe of each well will be completed above grade and will be surrounded by a 4- to 6-in. ID protective steel casing rising approximately 2–3 ft above ground level and set an approximately equal distance below the ground surface into the cement grout. The casing will be installed in a manner that does not hinder access to the monitoring well for purposes of obtaining samples or water level measurements.

A minimum 2-ft × 2-ft × 4-in. thick concrete pad, sloped away from the well, will be constructed around each well casing with the top outer edge at ground surface.

2.3.2 Well Construction Materials

2.3.2.1 Well Riser and Screen

Well riser pipe will consist of new 2-in. ID threaded, flush-joint, Schedule 40 PVC. The pipe will bear markings that will identify the material. No organic solvents or glue will be used in joining the pipe. The use of a Teflon tape on threaded joints is acceptable on an as-needed basis, and will be noted on the well construction log.

Well screens for the shallow and deep wells will consist of new, commercially fabricated, threaded, 10-ft, flush-joint, machine slotted, 6- to 10-slot, 2-in. ID PVC. The 6- to 10-slot screens will be used to mitigate turbidity of the future water samples to be collected from these wells. A threaded PVC cap or plug will be placed on the bottom of the well.
Well screens and riser will be steam-cleaned prior to installation unless they arrive and are maintained onsite in the factory-provided packaging.

2.3.2.2 Filter Pack

The annular space around the well screen will be backfilled with a clean, washed, silica sand to perform as a filter between the formation material and the well screen. It is anticipated that Grade 00 sand is an appropriate size for the 6- to 10-slot well screens. The grade/type of the filter pack that is used will be included on the well construction diagram.

2.3.2.3 Bentonite Seal

The well seal will be comprised of commercially manufactured bentonite pellets or granules, not exceeding 0.5 in. in diameter.

2.3.2.4 Grout Mixture

The cement grout will consist of Type I or II Portland cement (ASTM-C150) and water added in the proportion of no more than 7 gal per 94-lb bag of cement. Additionally, 3 percent by weight of granular bentonite will be added to the mixture to help reduce shrinkage.

2.3.3 Well Numbering and Labeling

Monitoring wells will be numbered sequentially for each well or well cluster location. The following suffixes will also be included: 'S' for wells completed in the shallow overburden zone and 'D' for wells completed in the deep overburden/weathered rock zone. A permanent monitoring well designation will be stenciled on each well with oil-based paint.

2.4 MONITORING WELL DEVELOPMENT AND BLADDER PUMP INSTALLATION

The monitoring wells will be developed no sooner than 48 hours after grouting is completed. Development protocol will be as follows:

1. Measure static water level. Water levels will be measured using a properly decontaminated water level indicator capable of measuring liquid depth to an accuracy of 0.01 ft.

2. Measure total well depth.

3. Develop the well by alternately surging (via a clean surge block, bailer, or small diameter submersible pump) and pumping to remove "fines" from the well screen and filter sand. When pumping results in discharged water that appears to be relatively clear of turbidity, the well will be surged. Continue this procedure until little or no sediment enters the well, but for no less than 2 hours. The well will be pumped using a decontaminated electric submersible pump (or centrifugal pump may be used, if the depth to water is less than 15–20 ft below grade). Temperature, pH, specific conductivity, dissolved oxygen (DO), and turbidity of the ground water will be monitored during pumping. Pumping will continue until these parameters have stabilized (less than $\pm$ 0.2 pH units variation and less than a 10 percent change for other parameters between 4 consecutive readings) and the water is clear and free of "fines." If the parameters have not stabilized after 3 hours of development, the EA Project Manager will be informed, who will in turn notify the Navy Project Manager.

   If well yield is too low to permit continuous pumping or bailing, the well will be bailed or pumped dry three times. The well will be allowed to recharge for up to 0.5 hr between each bailing or pumping session.

   If water was "lost" to the geological formation during drilling operations, at a minimum, a volume equivalent to the estimated amount "lost" will be removed during development.

4. Development water investigative derived waste (IDW) handling will be performed in accordance with the IDW procedures (Section 4.9.1 of the June 2000 Final Work Plan).

5. Install the dedicated adjustable-rate bladder pump in each well with the intake as determined by the EA Task Manager and Project Manager from the soil sample headspace vapor measurement data and as coordinated with the BRAC Cleanup Team (BCT).

2.4.1 Well Development Records

A Well Development Form will be prepared and completed for each monitoring well installed. The form will be prepared by the EA representative present during the well development operations. Information provided on the Well Development Form will include the following:

- Client, name of project and site, project number, well identification number, and date(s)
- Date, time, and elevation of the static water level and bottom of well before development
- Determination of the gallons of water per well volume
- Method used for development, to include: equipment; size, type, make of bailer and/or pump used during development; and decontamination procedures
- Time spent developing the well by each method, to include the typical pumping rate, as possible, if a pump was used in development
- Estimated volume and physical character of water removed, to include changes in clarity, color, particulates, and odor during development
- Volume and source of water added to the well
- Readings of pH, DO, PID or FID screening, specific conductance, temperature, and turbidity taken before, during, and at the end of development
- Name(s) of individual(s) developing well
- Location of the temporary storage area for the water removed during development.

2.5 INVESTIGATIVE DERIVED WASTE MANAGEMENT

This section addresses the procedures for handling, collection, and storage of IDW generated during field activities. Drill cuttings will be containerized in roll-offs (or in DOT-approved (17E) 55-gal drums, if there is an insufficient volume of material to justify the need for a roll-off) for temporary storage pending its disposition for proper disposal. Drilling mud, purging/ sampling water, and decontamination fluid will be containerized in DOT-approved (17H) 55-gal drums or roll-offs. This IDW will be managed in accordance with Rhode Island Department of Environmental Management (RIDEM) IDW Policy 95-01 (Guidelines for the Management of Investigative Derived Waste). Drums and roll-offs will be marked as IDW and be labeled with the contents (e.g., soil, ground water), the sample location or boring designation number, and the date of collection. Large volumes of purge water will be temporarily stored in 200- to 1,000-gal polyethylene tanks adjacent to the well from which it was generated. When possible, drums and unsecured roll-offs will be moved to a secure location in the vicinity of the EA field office trailer, northeast of Building 224. If roll-offs can be secured (i.e., locked), then they will remain at the central location on site pending proper disposal.

2.5.1 Sampling/Purge Water

Sampling/purge water that exhibits a headspace PID measurement less than or equal to 10 parts per million (ppm) will be spread on the ground in the immediate vicinity of the monitoring well where generated. IDW water that exhibits a headspace PID measurement of greater than 10 ppm will be containerized in DOT-approved (17H) 55-gal drums at the time of generation. The drums will be marked as IDW and labeled with the description of the drum contents, site name, boring/well number, and date the drum was filled. The drummed IDW water will be located in the vicinity of each monitoring well for temporary storage pending its disposition for proper disposal.

2.5.2 Decontamination Fluids

Liquid generated as a result of decontamination activities will be collected and containerized initially in DOT-approved (17H) 55-gal drums at the time of generation. The drums will be marked as IDW and labeled with the description of drum contents, related boring/well numbers, and the date the drum was filled. The drums will be located in the vicinity of each monitoring well for temporary storage pending their disposition for proper disposal.

2.5.3 Drill Cuttings (Soil)

Drill cuttings will be initially containerized in DOT-approved (17E) 55-gal drums and located in the vicinity of the boring/monitoring well, then consolidated in roll-offs located in the vicinity of the EA Field Office for temporary storage pending disposition for proper disposal. Drums will be marked as IDW and labeled with the contents (soil), the soil boring designation number, and the date of collection. The drums/roll-offs will be located in the vicinity of the EA Field Office for temporary storage pending their disposition for proper disposal.

Non-hazardous soil cuttings generated from drilling activities are planned to be transported to and disposed of at the Resource Conservation and Recovery Act (RCRA) Subtitle D facility at the Central Landfill in Johnston, Rhode Island. Soil IDW determined to be above the regulatory levels for disposal at the Central Landfill will be disposed of appropriately in accordance with state and federal regulations. One composited sample will be collected for analysis of Target Compound List (TCL) VOC (8260) and metals for characterization of the material for the landfill.

2.5.4 Other Decontamination Waste

Other wastes generated during decontamination activities, including discarded personal protective equipment, aluminum foil, and other debris, will be collected and containerized in DOT-approved (17E) 55-gal drums marked as IDW and labeled with the description of drum contents, related boring/well numbers, and the date the drum was filled. The drums will be located in the vicinity of each monitoring well for temporary storage pending their disposition for proper disposal.

2.6 DECONTAMINATION

2.6.1 Drill Rig and Downhole Drill Tools

Equipment (drilling tools/pipe, bits, temporary steel casing) that will be used during drilling activities will be steam cleaned prior to use and before starting each boring. Equipment will be kept off the ground on clean sawhorses, racks, or pallets. If blowing dust is a problem, equipment shall be covered with plastic sheeting during storage. Upon completion of the work, the portions of the drilling rig which came in contact with subsurface soil/drilling fluids will be steam cleaned.

2.6.2 Sampling Equipment

Re-used field monitoring and sampling equipment will be decontaminated prior to use and following sampling of each station by the procedure listed below. The following decontamination procedure will be used:

- Flush the equipment with potable water
- Flush with non-phosphate detergent solution
- Flush with tap water to remove all of the detergent solution
- Flush with distilled/deionized water
- Flush with isopropyl alcohol
- Flush with distilled/deionized water.

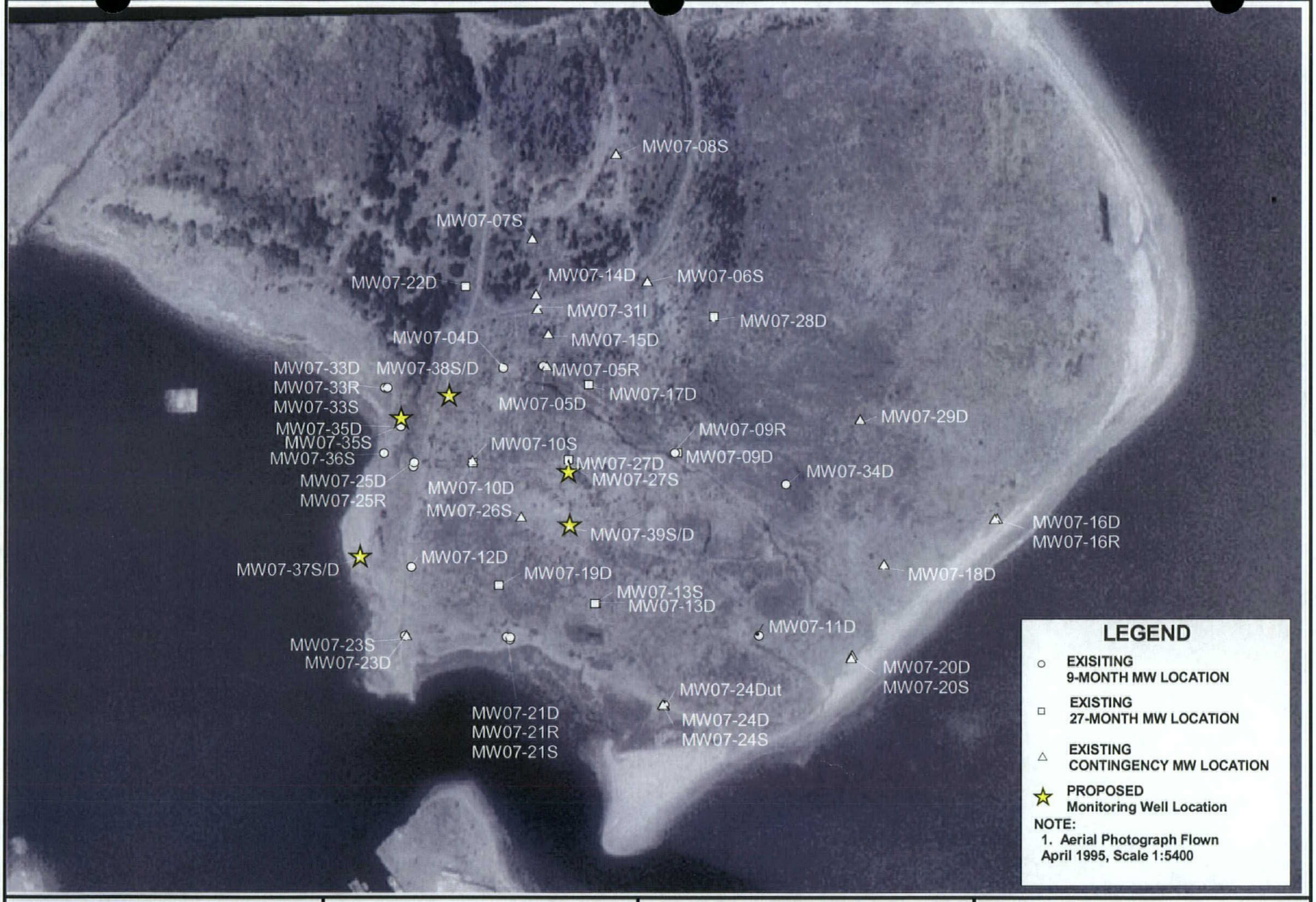
It is recommended that the detergent and isopropyl alcohol be used sparingly in the above sequence.

REFERENCES

EA Engineering, Science, and Technology. 2003. *First Five-Year Review Report for Former Naval Construction Battalion Center (NCBC) Davisville, North Kingstown, Rhode Island.* Final. March.

TABLE 1 RATIONALE FOR PLANNED LOCATIONS OF MONITORING WELLS, SITE 07, NCBC DAVISVILLE

Monitoring Well Designation	Rationale
MW07-35D	Evaluate hydrogeology and plume migration in western portion of the site.
MW07-37S	Evaluate hydrogeology and plume migration in southwestern portion of the site.
MW07-37D	Evaluate hydrogeology and plume migration in southwestern portion of the site.
MW07-38S	Evaluate hydrogeology and plume migration in western portion of the site.
MW07-38D	Evaluate hydrogeology and plume migration in western portion of the site.
MW07-39S	Evaluate hydrogeology and plume migration in the central portion of the site.
MW07-39D	Evaluate hydrogeology and plume migration in the central portion of the site.
MW07-27S	Evaluate hydrogeology and plume migration in the central portion of the site.



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

200 0 200 Feet

EFANE
SITE 07 NCBC DAVISVILLE
NORTH KINGSTOWN, RHODE ISLAND

LOCATIONS OF EXISTING AND PROPOSED LONG-TERM MONITORING WELLS

FIGURE 1

Appendix A

25 November 2003 Memo: Coastal Wetlands Assessment

DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, NORTHEAST
NAVAL FACILITIES ENGINEERING COMMAND
10 INDUSTRIAL HIGHWAY
MAIL STOP, #82
LESTER, PA 19113-2090

IN REPLY REFER TO
5090
Code EV23/FE
December 4, 2003

Mr. David Reis
Coastal Resources Management Council
Stedman Government Center - Suite 3
4808 Tower Hill Road
Wakefield, RI 02879-1900

Dear Mr. Reis:

SUBJECT: INSTALLATION OF 8 MONITORING WELLS AT SITE 07; FORMER NCBC DAVISVILLE, NORTH KINGSTOWN, RI

Enclosed is the Navy's evaluation of the locations for installation of 8 monitoring wells at the former NCBC Davisville's Site 07.

The Navy suggests a meeting at the site with USEPA, RIDEM, and CRMC to determine the best method of installing the monitoring wells while minimizing impacts to wetland areas.

An evaluation of the Wells previously installed under CERCLA will be performed at a later date.

If additional information is required, please contact Mr. Fred Evans at 610-595-0567, extension 159.

Sincerely,

Frederick J. Evans

FREDERICK J. EVANS
Remedial Project Manager
By direction of the
Commanding Officer

Copy to:
EPA Region 1 (Christine Williams)
RIDEM (Richard Gottlieb)
ToNK (Marilyn Cohen)
ToNK (Susan Licardi)
RIEDC (Steve King)
USDC, NOAA, NMR Branch (Dr. Kenneth Finkelstein)
NE Field Office, US Fish & Wildlife (Mr. Kenneth Carr)
COMSUBGRU TWO (A. Stackpole)
CSO Davisville (Dave Barney)
EA Engineering (Jim Shultz)
CDW Consultants (Kathleen Campbell)

25 November 2003

MEMORANDUM

TO:	Jim Shultz, CPG	**LOCATION:**	EA–Southborough
FROM:	Brian Lesinski, PWS,CPSSc	**LOCATION:**	EA–Warwick
SUBJECT:	Additional Monitoring Well Installation at Site 07 EA Project No. 29600.99.3110		

1. INTRODUCTION

EA completed an assessment of the eight proposed monitoring well locations at Site 07 (including an 18 November 2003 site visit) in response to Dave Reis' 17 November 2003 email. The assessment focused on the regulatory status of the proposed well locations pursuant to the Rhode Island Coastal Resources Management Program (CRMP) *Redbook*, specifically Sections 210.3, Coastal Wetlands. The proposed monitoring wells are at some of the U.S. Environmental Protection Agency (EPA)-requested locations and were recommended for installation in the First Five-Year Review of the former Naval Construction Battalion Center (NCBC) Davisville facility (dated March 2003) completed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. According to the CRMP *Redbook*, Allen Harbor is considered a Type 3 water with identified "coastal wetlands designated for preservation" along the eastern fringe.

The review was conducted by Brian Lesinski, PWS, CPSSc, a Professional Wetland Scientist (PWS) and Certified Professional Soil Scientist (CPSSc), and Sam Whitin of EA Engineering, Science, and Technology, Inc.

2. MONITORING WELL LOCATIONS

Each of the proposed well locations is described below. References are made to Figure 1 (Locations of Existing and Proposed Long-Term Monitoring Wells) as well as photographs that were taken during the 18 November 2003 site review and visit (Attachment A). A brief discussion of each location, site access, CRMP wetland regulatory status, mitigating measures, and considerations for the next steps is provided.

2.1 MW07-35D

This is the proposed location for a deep monitoring well (MW07-35D) adjacent to a pre-existing shallow monitoring well (MW07-35S) that was installed in October 2002 under the approved Long-Term Monitoring Plan (LTMP) for Site 07 (Figure 1). The area is located directly adjacent to high and low salt marsh communities along the eastern fringe of Allen Harbor and is a "coastal wetland designated for preservation." The existing well is located approximately 17 ft from the wetland boundary. Wetland flagging completed by others at the site on behalf of the Town's reuse plan includes this area within the regulated wetland in the area of flags CF-1 through CF-3 (Photos 1 and 2).

The existing well (MW07-35S) is elevated above the marsh community, and is accessible by an existing path off of the main access road. The area is characterized by non-wetland facultative woody species consisting of sumac, bittersweet, raspberry, and herbaceous species including goldenrod, grasses, and common reed (Photo 3). The elevation of the existing well is located approximately 5 ft higher than the surrounding high and low marsh communities which fringe Allen Harbor (Photo 4). High marsh areas are dominated by high tide bush, sweet gale, and common reed. Low marsh communities are characterized by smooth cordgrass, salt meadow grass, black rush, and high tide bush. Rack lines are visible in the high tide area.

During installation of the proposed deep monitoring well, EA will utilize best management practices (BMPs), including installation of hay bales along the wetland boundary to deter impacts to the wetland. Areas will be temporarily disturbed during drilling, but will be restored to pre-existing conditions to the maximum extent practicable. No loss of wetland associated with this activity will occur. Site restoration will include use of mats to reduce rutting, raking of ruts, seeding of bare areas for establishment of ground cover, etc. Once installed, the wells will be subject to quarterly monitoring as part of the approved Site 07 LTMP for the site.

2.2 MW07-37 S/D

This new monitoring well cluster is located within the low marsh community along the western fringe of Allen Harbor, within the coastal wetland as defined under Section 210.3 (Figure 1). The location of this shallow-deep well cluster was requested by EPA to provide additional data and, as stated previously, was recommended for installation in the First Five-Year Review of the former NCBC Davisville facility. EA originally initiated well installation activities at this location on 17 November 2003, but terminated these activities following a determination that additional information was needed to address CRMP requirements. The location of the proposed well is located approximately 40 ft landward from the edge of Allen Harbor, and 64 ft in from wetland flag No. CF-8 (delineated by others) delineating the wetland/coastal feature boundary (Photos 5 through 8).

The coastal wetland is characterized by high and low Type 1 salt marsh along the western fringe of Allen Harbor. The area is dominated by salt meadow grass, common reed, and smooth cordgrass communities. High marsh areas are characterized by high tide bush, sweet gale, and common reed.

At the time of this review (site visit), EA had initiated demobilization monitoring well drilling activity and equipment at this location. Later the same day, the drilling rig was demobilized and moved offsite. EA utilized BMPs, including mats, to reduce rutting at this site.

Recognizing the site's sensitivity, EA had initiated well installation using a number of BMPs to protect the environment including use of mats to reduce tire rutting and vegetation disturbance. Impacts to the wetland will be temporal (i.e., noise) associated with the installation, but no long-term loss or change in wetland type is expected as part of this action. Furthermore, once these two wells have been installed, vehicle access to this well location will be prohibited. Site restoration will include raking of ruts, soil stabilization (if needed) with straw or seeding, etc. No loss or change in wetland type is anticipated. Furthermore, the wells will be sampled at a 9-month frequency as part of the EPA/Rhode Island Department of Environmental Management- approved LTMP for the site.

2.3 MW07-38S/D

This is a proposed new well cluster located approximately 40 ft east of an existing unpaved access road that trends approximately north-south across Calf Pasture Point and Site 07 (Figure 1). The site is not located within a freshwater or coastal wetland as defined by Section 210.3, Coastal Wetlands, of the CRMP *Redbook*. The area is characterized by old field shrub and herbaceous cover, including goldenrod and *Andropogon* sp., that are dominant. Common woody shrub species include sweet gale, cherry, red cedar, and autumn olive. The well location is located approximately 120 ft east from the edge of the coastal wetlands/feature along Allen Harbor.

No additional BMPs are required at this location given its proximity to coastal wetlands and open nature. Only limited, temporal impacts are anticipated to be associated with the well installation. Furthermore, the site is located within walking distance (40 ft) of the existing access road.

2.4 MW07-39 S/D

A new deep and shallow well cluster is proposed at this site which is located 400 ft west of the access road (Figure 1). The proposed well location is not situated in coastal wetlands, but is located in close proximity to a contiguous freshwater wetland. Access to the cluster occurs via an existing path from the main access road. Portions of the access occur through regulated freshwater wetlands. Wetlands are characterized by a dominant sapling overstory of speckled alder. The proposed well location is situated in an open field cover type dominated by sweet gale, common reed, red cedar, and upland grasses (Photos 9 and 10). No impacts to wetlands are anticipated at this site other than access-related issues that will be limited to an existing path that was cleared in support of the previous Remedial Investigation of this CERCLA site.

EA will utilize numerous BMPs to minimize impacts to wetlands in establishing this well cluster. First, an existing access path will be utilized which was established in support of the previous Remedial Investigation of this CERCLA site. During monitoring well installation, the well and associated work area will be established at least 50 ft from the wetland boundary. Site restoration will include use of mats, raking of ruts, seeding for ground cover establishment, etc. No loss of wetland will occur associated with the installation of this monitoring well cluster. Impacts will be short-term and noise related. Access for sampling these two wells will occur on a 9-month frequency as part of the approved LTMP for the site.

2.5 MW07-27S

Similar to the MW07-35 location, this is the proposed location for a shallow monitoring well (MW07-27S) adjacent to a pre-existing deep monitoring well (MW07-27D). The site is not located within coastal wetlands as defined per Section 210.3 of the CRMP *Redbook*, but is located in close proximity (approximately 20 ft) from freshwater wetlands. Whether the freshwater wetland is isolated or contiguous to a coastal wetland has not been determined. Similar to MW07-39, the location is approximately 400 ft east of the existing north-south trending unpaved access road into Site 07. The existing well location is characterized by open field species including red cedar, grasses (*Andropogon* sp.), common reed, and sweet gale (Photos 11 and 12). The adjacent freshwater wetland is characterized by common reed, speckled alder, sweet gale, and willow. Standing water was observed in the wetland area approximately 30 ft from the existing monitoring well (MW07-27D).

Similar to the approach previously stated for MW07-35, EA will utilize BMPs to minimize impacts to wetlands in establishing MW07-27S. First, an existing access path will be utilized which was established in support of the previous Remedial Investigation of this CERCLA site. Site restoration will include use of mats, raking of ruts, seeding for ground cover establishment, etc. No loss of wetland will occur as a result of installation of this monitoring well cluster. Impacts will be short-term. Access for sampling these two wells will occur on a 9-month frequency as part of the approved LTMP for the site.

3. SUMMARY

The table below summarizes the results of the review:

Proposed Well Location	Within a Coastal Wetland? [(a)]	Existing Well Location?
MW07-35D	Meeting Suggested	Yes
MW07-37S/D	Yes	No
MW07-39S/D	No	No
MW07-27S	No	Yes
MW07-38S/D	No	No
(a) As defined by Section 210.3 of the CRMP *Redbook*.		

In accordance with the requirements of Section 300.12, Coastal Wetland Mitigation, of the CRMP *Redbook*, the proposed activity has complied with a number of the policies listed under Section 300.12.B:

1. Pursuant to 40 CFR 300.400(e), "No Federal, state or local permits are required for onsite response actions conducted pursuant to CERCLA Sections 104, 106, 120, 121 and 122." Onsite activities for which permits are not required include remedial investigation and long-term monitoring activities including monitoring well installation and abandonment. However, the Navy will be required to meet the substantive requirements of permit equivalencies for these activities, in this case, conformance with the polices outlined in the CRMP *Redbook*.

2. To the maximum extent practicable, utilization of existing well locations (i.e., MW07-35 and MW07-27) has been proposed to minimize impacts to wetlands and surrounding areas. Of the five monitoring well locations proposed, two are within an existing well location. Access to these two locations has already been established in support of the previous Remedial Investigation of this CERCLA site and through activities during the approved LTMP.

3. BMPs will be utilized to minimize impacts and protect resources. BMPs include the use of sediment and erosion controls, mats to reduce rutting, and site restoration consisting of grading, seeding, and stabilization of disturbed areas.

4. All activities completed as part of this action will be in conformance with Section 300.12.9 that states "in cases where the alteration is temporary, the disturbed wetland shall be restored to the satisfaction of the Council, immediately following the approved activity."

5. Per Section 210.3.C.5 of the CRMP *Redbook*, alterations to "coastal wetlands designated for preservation" abutting Type 3 waters are prohibited except for minor disturbances associated with residential docks and walkways, approved constriction or repair of structural shoreline features, or Council-approved restoration activities. Proposed activities are not alterations to the wetland type and will only result in temporal impacts associated with the establishment of a monitoring point.

4. CONCLUSIONS AND RECOMMENDATIONS

1. The activities included are associated with an ongoing CERCLA action at the site. Pursuant to CERCLA, the Navy is not required to obtain permits for actions which trigger the regulatory process, but is required to meet the "substantive requirements" of the State's permit requirements or policy.

2. No loss of wetland will occur associated with the proposed program. Additionally, the Navy has attempted to minimize impacts to wetlands and surrounding areas through the use of existing well locations, single access to multiple well locations, and BMPs.

3. Impacts associated with this project (monitoring well installation and development) will be short-term (temporal) in nature. The entire monitoring well installation and development program is expected to take 4-5 weeks.

4. A site meeting with the Coastal Resources Management Council, the Town, RIDEM, and EPA is suggested to assess wetland boundaries and discuss this project immediately. It is hoped that work at monitoring well locations MW07-38S/D, where there are no wetland issues, could commence immediately after the Coastal Resources Management Council's review of this information.

5. EA anticipates that detailed mapping of the wetlands at these monitoring well installation locations is not necessary, and that the information stated herein, along with the suggested site meeting and previously submitted Work Plan Addendum No. 3, should be sufficient for the Coastal Resources Management Council to consider the planned site work for approval and meet the substantive requirements of the CRMP permitting process.

BCL/mkp
Attachment

Attachment A

Site Photos

Photo #1. MW07-35D location looking west from Road towards existing well (note blue wetland flag in right front portion on frame).

Photo #2. MW07-35D location looking south (note blue wetland flag in left portion of frame).

Photo #3. MW07-35D location looking west towards coastal feature.

Photo #4. High/low marsh near MW07-35D looking towards MW07-37.

Photo #5. MW07-37 location looking north.

Photo #6. MW07-37 location looking south.

Photo #7. MW07-37 location looking west towards Allen Harbor.

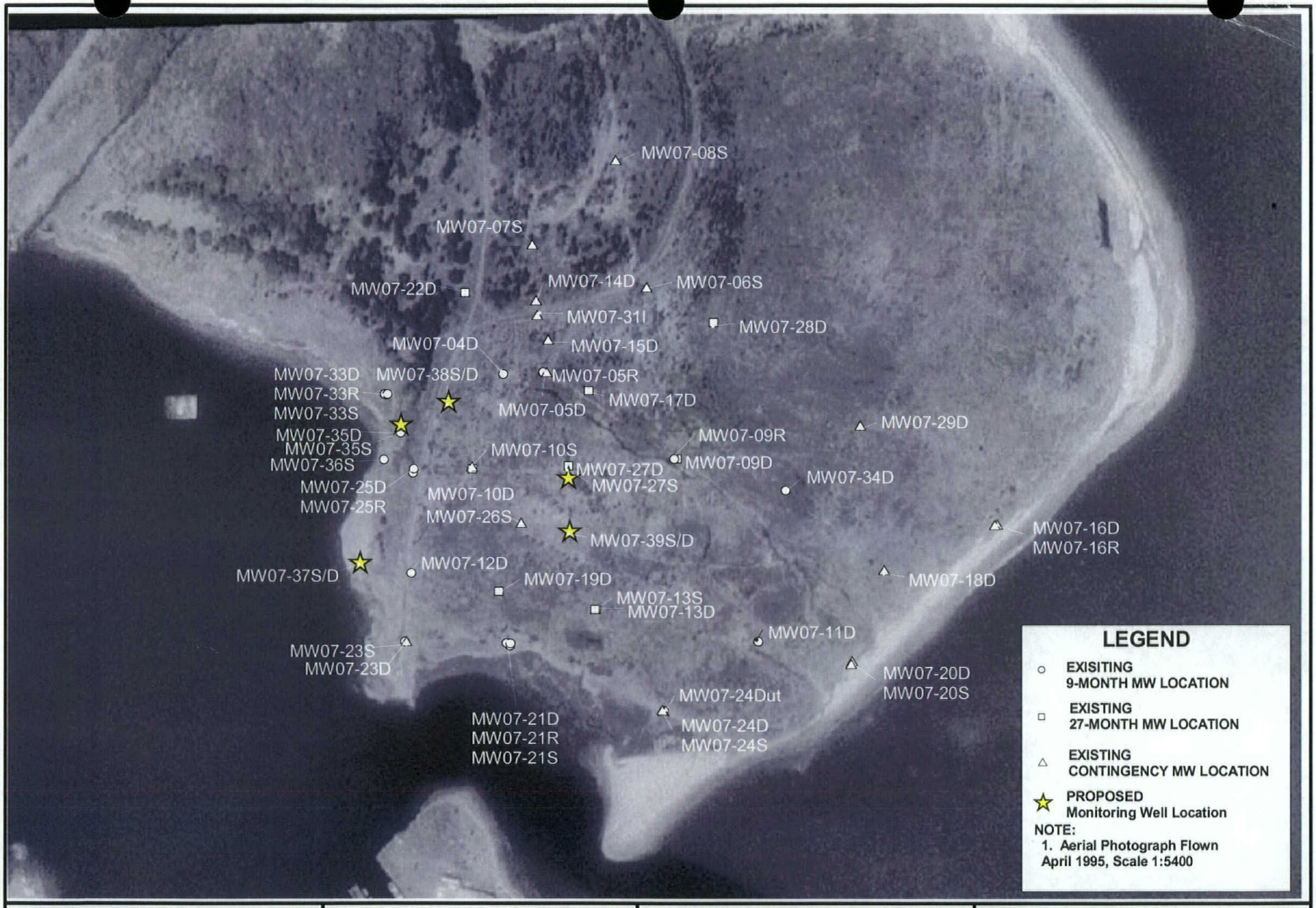
Photo #8. Peat layer erosion near MW07-37.

Photo #9. MW07-39 location looking northeast.

Photo #10. MW07-39 location looking south.

Photo #11. MW07-27 location looking north.

Photo #12. MW07-27 location looking south.



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LOCATIONS OF EXISTING AND PROPOSED LONG-TERM MONITORING WELLS

FIGURE 1