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ORDNANCE AND EXPLOSIVES (OE) CONFIRMATION SURVEY AND REMOVAL ACTION

MARE ISLAND DREDGE PONDS VALLEJO, CALIFORNIA

REVISED FINAL SUMMARY REPORT

April 12, 2002

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SUMMARY REPORT
ORDNANCE AND EXPLOSIVES (OE) CONFIRMATION SURVEY
AND REMOVAL ACTION
DREDGE PONDS AT MARE ISLAND

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ARAR - Applicable or Relevant and Appropriate Requirements
BAAQMD - Bay Area Air Quality Management District
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CCR - California Code of Regulations
CFR - Code of Federal Regulations
DDESB - Department of Defense Explosive Safety Board
DOD - Department of Defense
DOT - Department of Transportation
DRMO - Defense Reutilization and Marketing Office
DTSC - Department of Toxic Substances Control (State of California)
EFD SOUTHWEST – Naval Facilities Engineering Command, Southwest Division (Department of the Navy)
EOD – Explosive Ordnance Disposal
EPA – U.S. Environmental Protection Agency
ESQD - Explosive Safety Quantity-Distance
FSP - Field Sampling Plan
HAZMAT - Hazardous Material
HAZWOPER - Hazardous Waste Operations and Emergency Response
HASP - Health And Safety Plan
MILLIREM (m/R) – A measure of radiation dose; one millirem is one one-thousandth of a REM (Roentgen Equivalent Man); a chest X-ray is equivalent to 6 – 8 millirem
MINS - Mare Island Naval Shipyard
MK - (Mark) Military Equipment Designation Number
MPM – Most Probable Munition
NAVFAC - Naval Facilities Engineering Command
NAVSEA - Naval Sea Systems Command
OE - Ordnance and Explosives
OP - Ordnance Pamphlet
OPNAVINST - Chief of Naval Operations Instruction
OSH - Occupational Safety and Health
OSHA - Occupational Safety and Health Administration
PA - Preliminary Assessment
PPE - Personal Protective Equipment
PRG – Preliminary Remediation Goal
RAC – Risk Assessment Code
RCRA - Resource Conservation and Recovery Act

RI - Remedial Investigation

RWQCB - Regional Water Quality Control Board

SI – Site Investigation

SOP - Standard Operating Procedure

SSPORTS - Supervisor of Shipbuilding, Conversion, & Repair - Portsmouth VA Environmental Detachment, Vallejo

SWDIV - Southwest Division, Naval Facilities Engineering Command

TETRA TECH EM Inc. - Tetra Tech Environmental Management Inc. (formerly PRC Environmental Management, Inc.)

UXO - Unexploded Ordnance

WESTON – Roy F. Weston, Inc.

EXECUTIVE SUMMARY

The Dredge Ponds Ordnance and Explosives (OE) Confirmation Survey was conducted at the request of the California Department of Toxic Substances Control (DTSC) to help determine and support the basis of land use controls to be instituted upon transfer of the property from government control. The goal of the project was to provide an additional measure of assurance that the initial Unexploded Ordnance (UXO) Site Investigation and the associated UXO Intrusive Investigation had mitigated the immediate threat of uncontrolled releases and explosions in the dredge ponds by removing ordnance items hazardous to human health and the environment.

The Mare Island Dredge Ponds comprise seven managed dredge ponds (2N, 2M, 2S, 4N, 4M, 4S, and 7) and five unmanaged dredge ponds (1, 3E, 3W, 3NW, and 7S) that were utilized for the deposition of dredge material since the start of World War II. The ponds were created between 1930 and 1965 from dredge spoils generated by maintenance dredging of waterways along Mare Island Strait and cover a total of approximately 519 acres. Ordnance material present in sediments along the Mare Island shoreline originated from a common Navy practice that disposed of damaged or unwanted ordnance by throwing it overboard. Ordnance and other debris were carried with the dredge slurry through a system of pipes across Mare Island and were deposited at outfall points along the dredge pond berms.

Previous dredge pond ordnance and explosives (OE) related projects include the 1994-97 Unexploded Ordnance (UXO) Site Investigation and the 1998-2001 UXO Intrusive Investigation. The UXO Site Investigation was accomplished by trained Navy Explosive Ordnance Disposal personnel using handheld MK 26 magnetometers and MK 29 metal detectors. A total of 390 anomalies representing possible ordnance material were located during the search of the dredge ponds including 22 larger contacts that ranged in size up to 50 x 120 feet.

The UXO Intrusive Investigation of the 390 anomalies identified by the UXO Site Investigation resulted in recovery of 58,803 live ordnance items including 3,425 that contained high explosive material. The UXO Intrusive Investigation supported the dredge pond outfall/berm dispersion model since approximately 99.9% of all live ordnance was recovered from outfall locations while none was encountered in the pond bottoms. A large quantity of inert ordnance (47,528 items) and non-hazardous scrap (642,444 pounds) was also recovered. The predominant ordnance type in the dredge ponds was small arms ammunition which made up 92% of the total items recovered. The 20 mm Oerlikon high explosive round used in light anti-aircraft weapons

that first entered U.S. Navy service in 1942 represented approximately 5% or nearly all of the remaining items recovered. A small quantity of outfall soil having unacceptable levels of metals contamination was also removed and loaded for transport to authorized hazardous waste disposal facilities. The concentration of explosives constituents in soil never exceeded field screening action levels.

A critical factor in determining residual OE risk in the dredge ponds is the differentiation of OE versus UXO. OE is defined as bulk explosives, blasting caps, detonators, ammunition, and ammunition components, that have been abandoned, lost, discarded, or buried, and are no longer under accountable DOD record control. UXO is a subset of OE defined as fuzed ordnance that has been fired and subjected to all forces necessary to arm the fuze mechanism; UXO requires no additional action except impact or careless handling to cause functioning (and detonation) of the item. Since no ordnance items having explosive projectiles were ever launched or fired at Mare Island for training or testing, no items fitting the definition of UXO have ever been recovered from the dredge ponds. All recovered OE items have been unfired and their associated fuze components are frequently missing or inoperable due to corrosion. Therefore, the residual risk of OE items in the dredge ponds is far lower than that associated with a range or ordnance disposal site.

The OE Confirmation Survey supported previous UXO removal efforts in satisfying the minimum clearance requirements of the Department of Defense Explosives Safety Board (DDESB) as outlined in Naval Sea Systems Command (NAVSEA) OP 5 (Ammunition and Explosives Ashore) for the planned reuses of the dredge ponds. The confirmation survey and subsequent removal action were completed between September 2001 and January 2002 by Roy F. Weston, Inc. The geophysical survey was performed using an inductive time domain electro-magnetic (TDEM) instrument, the Geonics EM61 system. The EM61 is considered the state-of-the-art and is capable of detecting both ferrous and non-ferrous metals, whereas the previous survey that predominantly used the MK26 magnetometer could only detect ferrous targets.

The single and multiple towed array versions of the EM61 system were integrated with Differential Global Positioning System (DGPS) receivers to simultaneously record precise real-time position information with the acquired geophysical sensor data. Regulatory agency representatives witnessed equipment evaluation tests conducted at a test grid located in Dredge

Pond 7. Based on the ability of the equipment to detect the most probable dredge pond OE item (20 mm projectiles and complete rounds) at depths to 4 feet during testing, it was judged capable of reliably detecting 20 mm OE items during the survey to depths of at least 2 feet. Areas that could not be safely surveyed because of steep slopes or vegetation were subjected to a 100% visual surface survey for OE. No OE material was encountered during the visual survey which also included all flat berm areas as well as the entire bottom of Dredge Pond 3NW.

Tens of thousands of anomalies were identified in the preliminary review of the EM61 survey data, including many that likely represented "false targets" and others that indicated the presence of metallic debris not characteristic of typical dredge pond OE. Therefore a "knowledge-based" approach, successfully applied at other similar sites, was utilized to determine which of the detected survey anomalies most likely represented OE or "OE-like" material and to facilitate the elimination of those that did not.

The knowledge-based process prioritized anomalies based on a correlation of their recorded geophysical characteristics with the physical characteristics of prevalent dredge pond ordnance types. The physical anomaly data required to facilitate the process was acquired in November 2001 by excavating and removing all 342 survey anomalies in four representative anomaly definition and validation grids to a maximum depth of 4 feet. The grids were selected by a review of anomaly density maps generated from initial EM61 survey data and in consideration of other geographical parameters, such as pond area, soil conditions, outfall/non-outfall location, etc. A complete record was maintained for each anomaly during the excavation that included location, disposition, and pertinent physical parameters such as mass, composition, depth, orientation, etc. A total of 169 anomalies produced metallic debris while 173 anomalies were "false alarms". The high ratio of false alarms were recorded either in areas where soil had a high iron oxide content or in areas where rough terrain had resulted in excessive vibration/movement of the EM61 sensor array.

A single OE item (a 20 mm Oerlikon projectile) was recovered during the anomaly validation process. The item was transported to an onsite storage magazine for temporary storage pending thermal treatment at an onsite ordnance disposal range approved by the DDESB and regulatory agencies. Nine inert ordnance items (.30 caliber rifle bullets) and 220 pounds of other non-hazardous non-ordnance scrap was also recovered. No soil or groundwater suspected of chemical contamination by virtue of color, odor, texture, or location was noted during the

project.

Data from the validation grids enabled the development of an OE/OE-like anomaly definition to discriminate between anomalies that could represent OE and those that almost certainly do not. An "OE-like" anomaly is defined as an object of the same approximate size and weight (~0.25 lbs) as a 20 mm round or larger. Application of the OE anomaly definition effectively reduced the total number of remaining anomalies to 8,983 for a predicted Probability of Detection (Pd) of 95%. Another factor which enabled a further reduction in the number of predicted OE anomalies was the large false alarm ratio in the validation grids that ranged from 1.08 to 1.31. Applying a false alarm ratio of 1.31 (applicable for a 95% Pd) to the number of predicted OE anomalies reduced the number to 3,889. The data statistics indicated that fewer than 50 OE items may be remaining in the dredge ponds. The OE anomaly definition was then used to develop survey anomaly data and produce anomaly density maps which represented the most probable locations for detecting OE or OE-like targets.

The anomaly density maps were evaluated with regard to the established dredge outfall model of debris dispersion and the possible modes of OE redistribution away from the outfall points. Eight sites were identified as "high density anomalous areas"; containing a high density of OE-like targets and located in areas that fit the known dispersion patterns for outfall material. The 484 anomalies at these sites having the geophysical characteristics of dredge pond OE items were excavated during the OE removal action phase of the project performed in January 2002. Two additional 20 mm projectiles and five complete 20 mm rounds (projectile with cartridge case containing primer and propellant) were recovered during the removal in the eastern berm of Dredge Ponds 4N and 4M and the outfall region of Dredge Pond 7.

The fact that only eight OE items were identified out of the 826 OE-like anomalies excavated during the validation and removal phase conducted in high density anomalous areas provided a good indication that the number of OE items remaining in the ponds of less than 50 was indeed accurate. Based on records from the 1998-2001 OE removal and the estimated remaining OE items, the previous removal was greater than 99% effective. The remaining OE risk is considered to be extremely low and acceptable in view of the land use restrictions planned for the property after transfer from Government control.

ORDNANCE AND EXPLOSIVES (OE)
CONFIRMATION SURVEY AND REMOVAL ACTION
MARE ISLAND DREDGE PONDS
VALLEJO, CALIFORNIA

SUMMARY REPORT

1. INTRODUCTION

This summary report describes the Ordnance and Explosives (OE) Confirmation Survey conducted between September 2001 and January 2002 in the dredge ponds located at the former Mare Island Naval Shipyard (MINS) in Vallejo, California (Figure 1). Sections 1 through 4 describe the background of the project including site history, geographical setting, ecological concerns, available site characterization data, and an assessment of the risk posed by the possible presence of hazardous ordnance material. Sections 5 through 8 summarize the project objectives and describe major tasks regarding the confirmation survey, the knowledge-based anomaly validation process, final anomaly selection, and the subsequent removal action. Results of the anomaly survey are presented in Sections 9 through 13 including geophysical survey data, disposition of recovered material, quality assurance, site restoration efforts, and conclusions and recommendations.

1.1 PURPOSE

The purpose of the survey and removal action was to identify and remove Ordnance and Explosives (OE) material in the berms and near outfall areas of the ten dredge ponds located at Mare Island, Vallejo, California. The project constitutes the second independent 100% survey of pond berms/outfalls. The first survey was accomplished between 1994 and 1997 by MINS and the Superintendent of Shipbuilding, Conversion, and Repair Portsmouth, Virginia, Environmental Detachment Vallejo (SSPORTS). This second independent survey, performed by Roy F. Weston, Inc. (Weston), was required by the California Department of Toxic Substances

Control (DTSC) as an appropriate and necessary step in the process to assure the protection of human health and the environment and also to facilitate the transfer of the dredge ponds for commercial reuse.

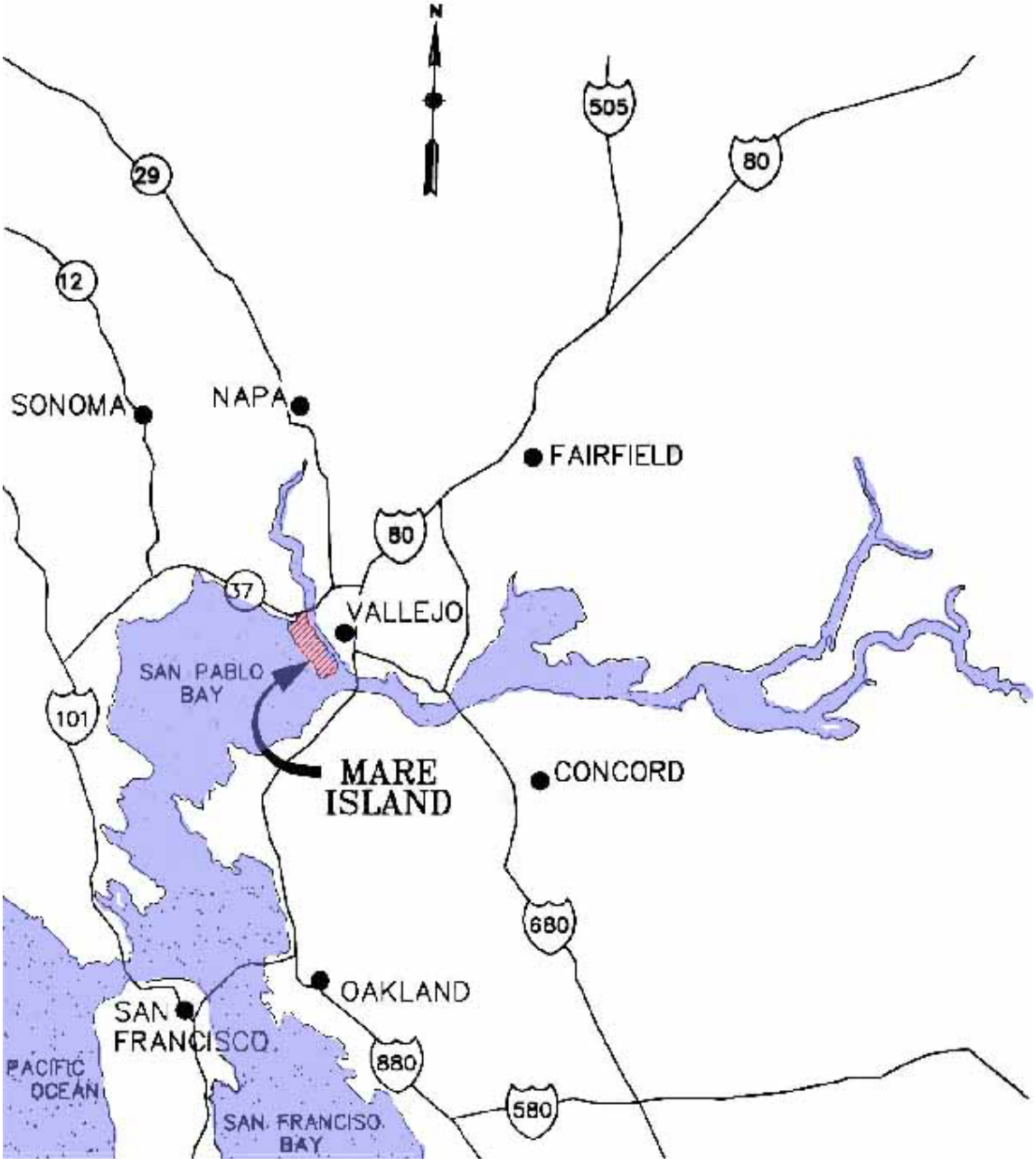


FIGURE 1 - MARE ISLAND LOCATION MAP

1.2 PROJECT DESCRIPTION

The predominant ordnance types recovered in the dredge ponds are 20 mm Oerlikon and 40 mm Bofors high explosive anti-aircraft rounds. Since the specific weapons that fired these rounds were not introduced into the U.S. Navy until the beginning of World War II, the emphasis of the survey was placed on those ponds that were utilized since 1942. Also note that all recovered dredge pond ordnance material has been classified as OE (ordnance that is unfuzed or unfired with the associated fuze components often missing or inoperable) and not as UXO (unexploded ordnance, implying fuzed ordnance that has been fired and subjected to all forces necessary to arm the fuze mechanism). The term "OE" used within the context of this report denotes ordnance items or other explosive constituents known or suspected to contain energetic material representing a potential physical hazard to humans. Ordnance that can safely be verified free of energetic material is termed "inert ordnance".

The scope of the OE confirmation survey and removal action covered the seven dredge ponds (2N, 2M, 2S, 4N, 4M, 4S, and 7 as shown on Figure 2) and five unmanaged dredge ponds (1, 3E, 3W, and 3NW) that were utilized for the deposition of dredge material since the start of World War II. Accessible live ordnance was considered a potential hazard at the site due to past dredge operations that resulted in the transport of OE from sites along Mare Island Strait to the dredge pond outfall locations.

The OE survey encompassed a 100% coverage of the pond berms, outfall locations, and bottoms adjacent to the berm toe (within 25 feet) utilizing Geonics EM61 geophysical search instruments. The survey covered a total area of approximately 150 acres as indicated on Figure 3 (Dredge Ponds 1, 3E, 3W, 3NW), Figure 4 (Dredge Ponds 2N, 2M, 4N, and 4M), Figure 5 (Dredge Ponds 2S and 4S), and Figure 6 (Dredge Pond 7). Survey anomalies representing possible OE were excavated, evaluated, and removed as necessary in limited areas during the associated anomaly validation process. Dredge Pond 7S and the sections of Dredge Pond 3E east of the Joy Survey Line (Figure 3) were not surveyed since they are not within the dredge pond early transfer boundaries.

Several dredge pond areas were excluded from the pond early transfer boundaries due to the presence of landfill debris or remaining outfall material that may contain radiological or

ordnance items. The border along these excluded areas was also surveyed to ensure that transferred pond areas are free of metallic landfill debris or remaining outfall material. Survey results provided assurance that a definitive boundary had been established.

The project complied with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) in Title 40 of the Code of Federal Regulations (CFR), Part 300, and California Health and Safety Code, Section 6.8. The removal work procedures also satisfied all explosive safety guidelines of NAVSEA OP 5 and DOD 4145.26-M relating to the handling and disposal of unexploded ordnance.

The intent, scope, and ordnance related processes and safety procedures relating to the anomaly validation phase of the project were identical to those contained in the Dredge Spoils Ponds Ordnance Intrusive Investigation work document (SSPORTS, 1998) that was previously reviewed and approved by the Department of Defense Explosives Safety Board in July 1998 (DDESB, 1998).

1.3 PROJECT ORGANIZATION

The site work was performed under the direction of the Weston Project Manager, assisted by a staff of engineers, technicians, geophysicists, surveyors, and UXO Specialists. All personnel directly involved with the OE survey were extensively trained in hazardous waste operations, ordnance safety, and environmental awareness. Each OE removal action worker was also certified by the Weston Senior UXO Manager to perform their specific work tasks as follows:

- ***Project Manager*** - Terry Iwagoshi was responsible for the overall planning, coordination, and safe accomplishment of all project tasks. He managed the OE survey and removal action, evaluated techniques used during the progress of the project, initiated engineering solutions for problems as they were encountered, supervised the documentation of project work, and generated reports.

- ***Survey Geophysicist*** - Brett Pasapane developed and validated the integrated geophysical survey equipment configurations used for the confirmation survey anomaly data collection. He also supervised the field data collection phase of the project.
- ***Anomaly Discrimination Geophysicist*** - Matt Gifford applied his experience and specialized data evaluation techniques to implement a "knowledge based" method of categorizing anomalies based on their geophysical characteristics which has been successfully utilized at other OE sites.
- ***Geophysical Survey Team Members*** - Conducted the survey of pond berms and outfall areas using an integrated EM61/DGPS system to locate remaining metallic anomalies. Team members worked under the guidance and oversight of the Survey Geophysicist.
- ***Site Safety Officer*** - Larry Maggini determined basic policy regarding implementation of the site specific Health and Safety Plan and provided oversight of the On-Site Health and Safety Coordinator.
- ***Unexploded Ordnance (UXO) Operations Manager*** - Wayne Wright provided overall support and guidance in developing and implementing the anomaly validation portion of the project.
- ***Senior UXO Specialist (SUXOS)*** - Dave Cruzen supervised all aspects of the OE removal action field work and also acted as Site Security Officer. Mr. Cruzen is qualified at the UXO Technician III level.
- ***UXO Specialists*** - Graduates of the U.S. Navy Explosive Ordnance Disposal (EOD) School at Indian Head, Maryland, with extensive field experience and qualified at the UXO Technician II or III level.
- ***OE Removal Team Members*** - Performed the excavation and removal of ordnance under the direct supervision of the UXO Specialist team leaders. Each removal team consisted of a UXO Specialist team leader, heavy equipment operator, and excavation specialists.

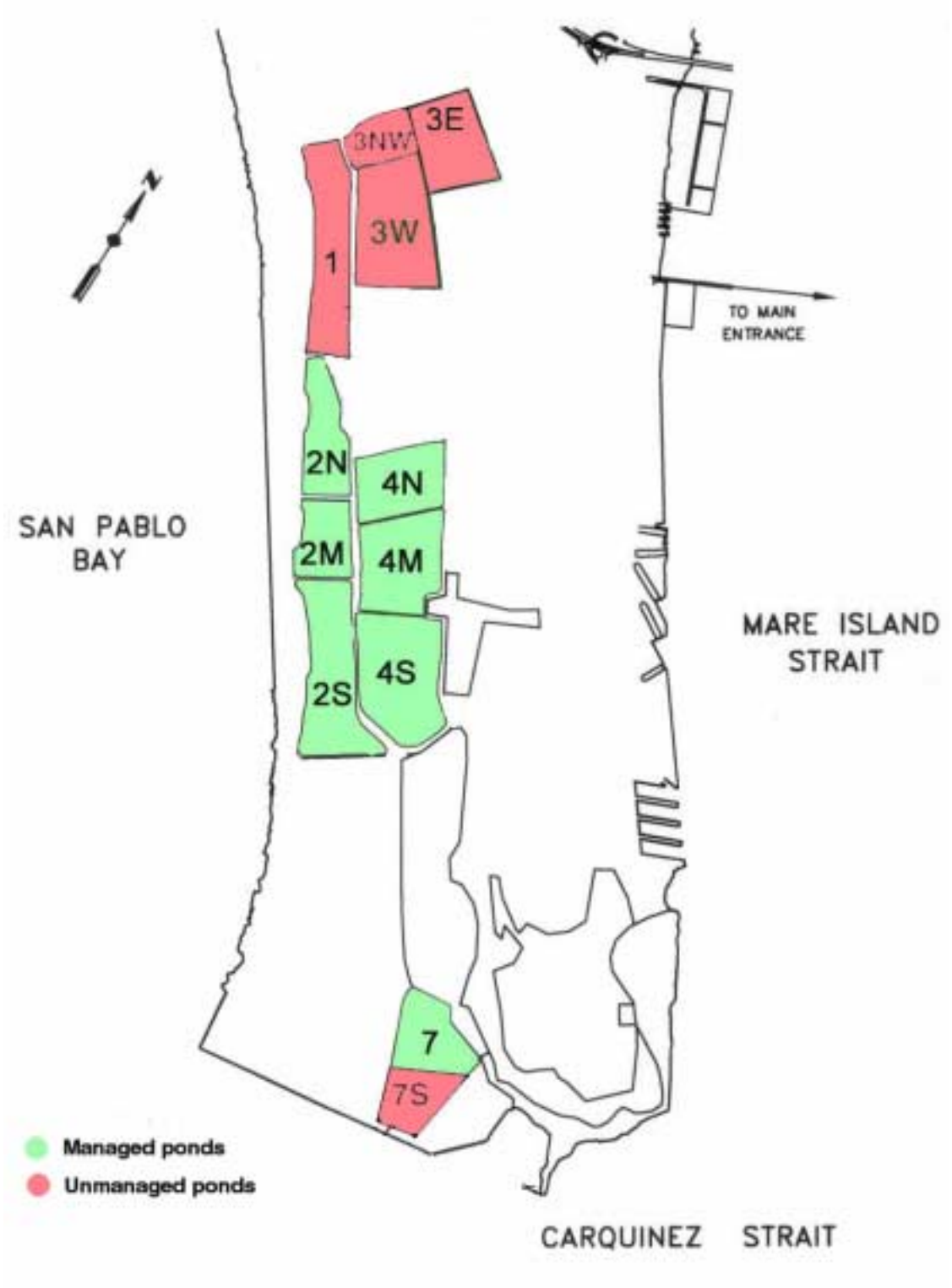


FIGURE 2 - DREDGE PONDS LOCATION MAP

FIGURE 3 - DREDGE PONDS 1, 3W, 3E, AND 3NW

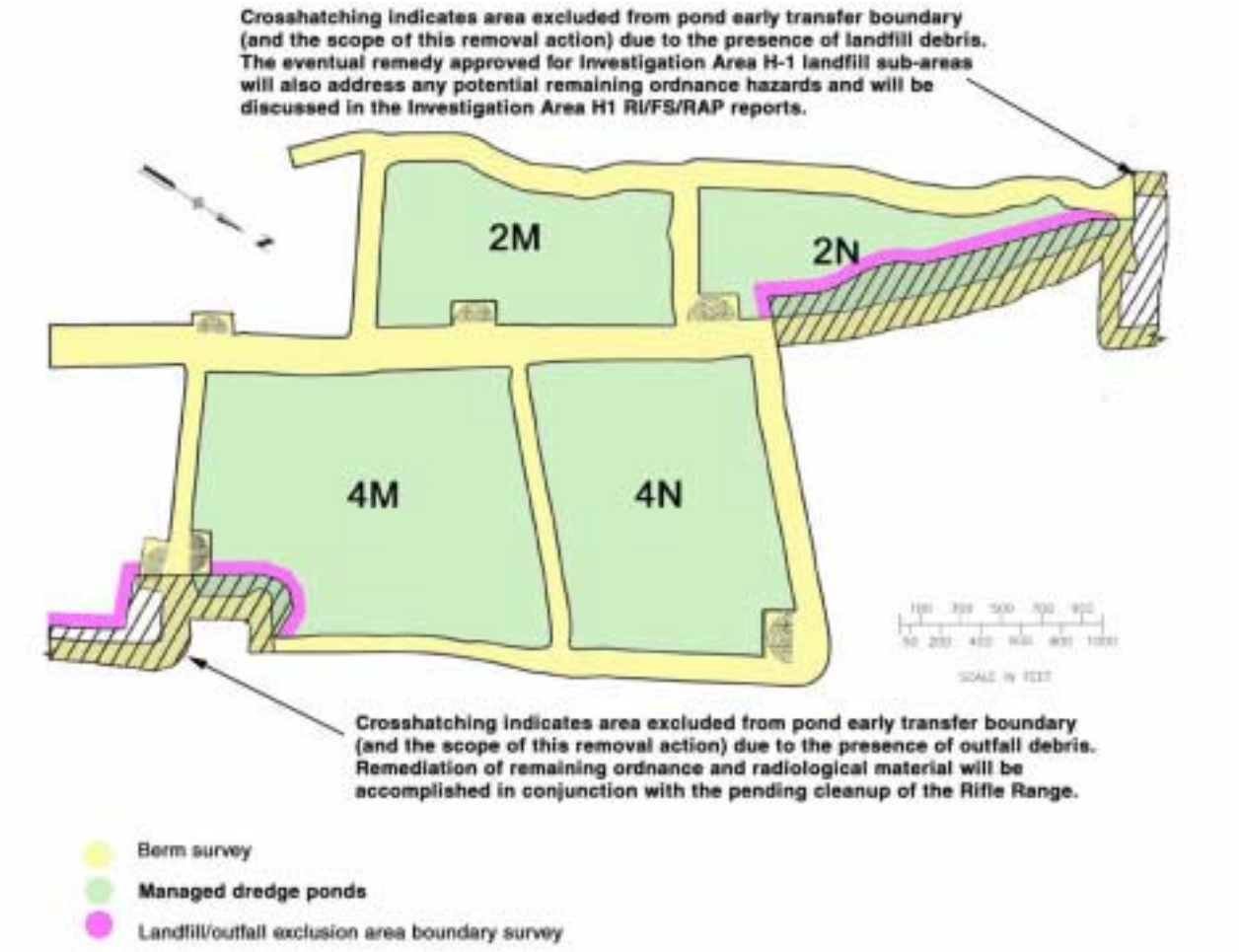


FIGURE 4 - DREDGE PONDS 2N, 2M, 4N, AND 4M

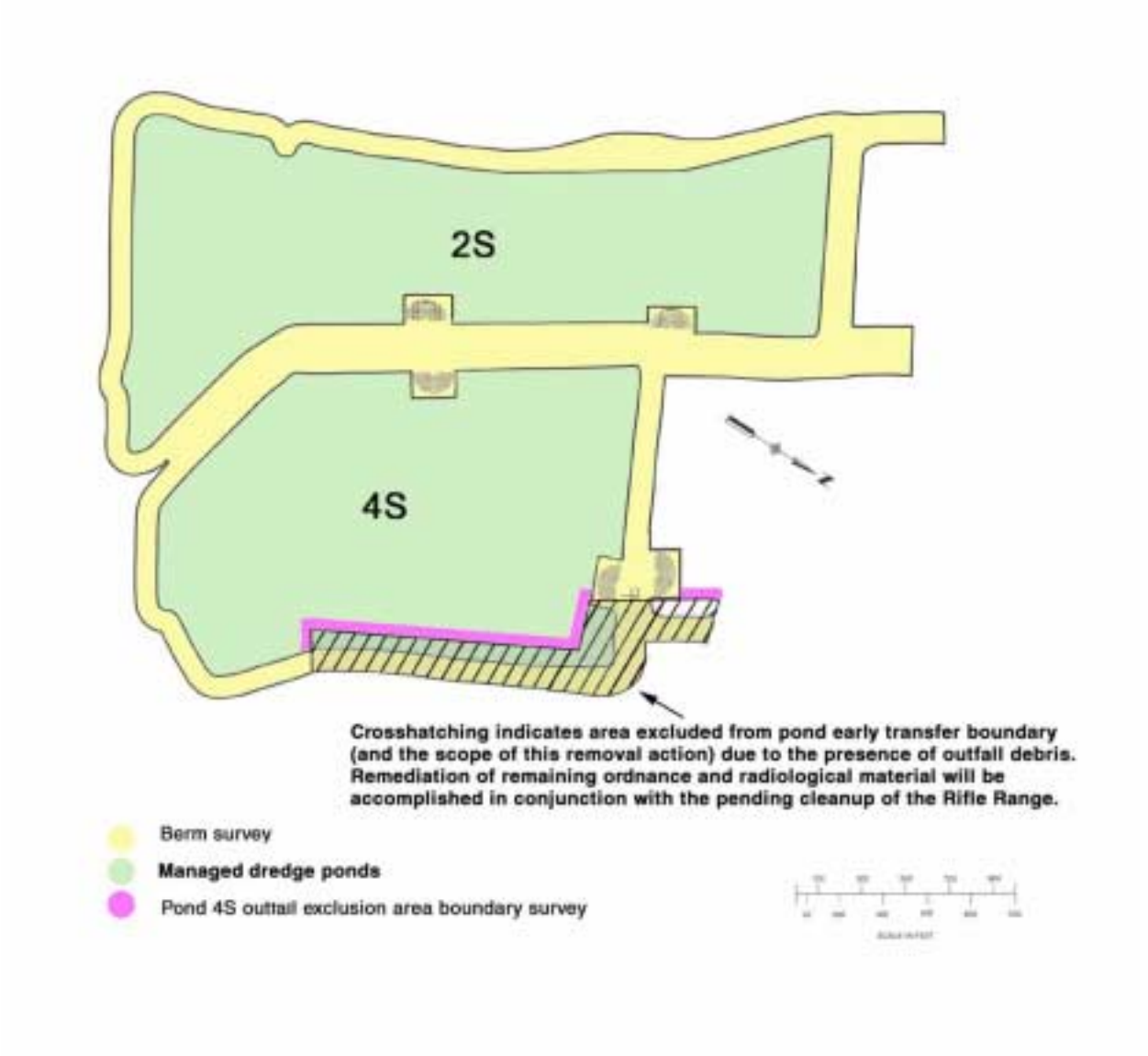


FIGURE 5 - DREDGE PONDS 2S AND 4S

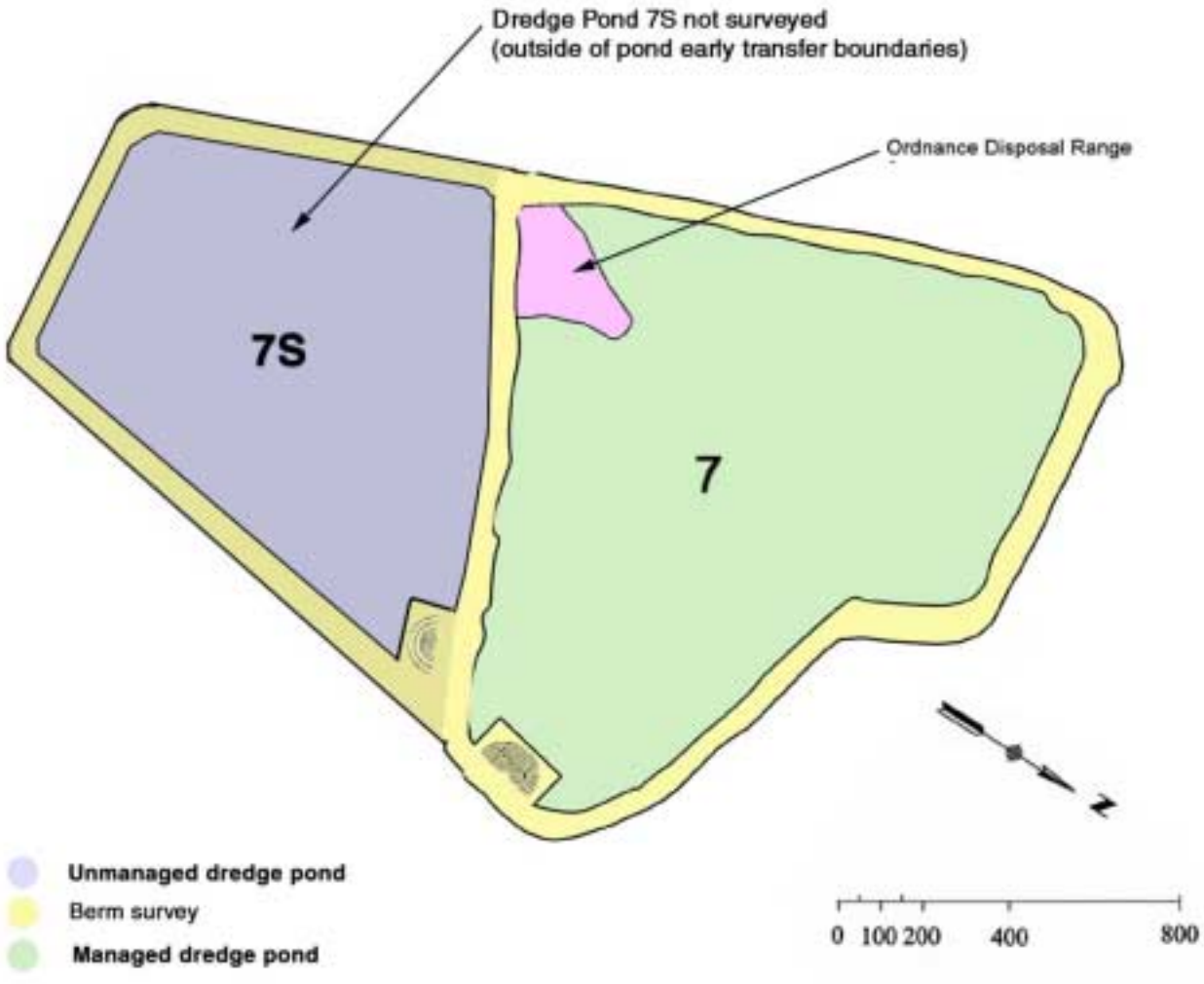


FIGURE 6 - DREDGE POND 7

1.4 PERSONNEL QUALIFICATIONS

1.4.1 SURVEY GEOPHYSICIST

Brett Pasapane has over 15 years of experience in the environmental consulting and geotechnical fields. His geophysical investigation experience includes magnetics, frequency, and time domain electromagnetic conductivity, seismic refraction and reflection, resistivity, spontaneous potential, magnetotellurics, ground penetrating radar (GPR), and various borehole geophysical techniques. He has extensive experience in UXO analysis and detection at sites, such as Aberdeen Proving Ground, Maryland, and Nansemond Ordnance Depot, Virginia.

1.4.2 ANOMALY DISCRIMINATION GEOPHYSICIST

Matt Gifford designed and built the OE Knowledgebase (OE-KB) program for the US Army Corps of Engineers, a software based system used to analyze geophysical data for detecting and discriminating buried unexploded ordnance. He designed the U-HUNTER program for the National Aeronautics and Space Administration's Jet Propulsion Laboratory, the Meandering Path program for the U.S. Army Corps of Engineers, and has given numerous presentations at professional conferences on UXO detection methodologies. He also has extensive UXO detection/discrimination experience with electromagnetic induction, total field magnetometers, gradiometers, and synthetic aperture radar as well as with the geophysical analysis of ordnance contaminated sites including analysis at the sites such as Kaho'olawe, Hawaii and Aberdeen Proving Ground, Maryland.

1.4.3 UNEXPLODED ORDNANCE OPERATIONS MANAGER

Wayne Wright is a retired Navy Lieutenant Commander with twenty years of active Naval EOD service involving the worldwide location, excavation, identification, render-safe, and disposal of conventional, chemical/biological, and nuclear weapons. In addition, he has over 10 years of experience in the commercial UXO industry, including the conduct of field operations as well as management functions. His experience includes the management and supervision of 400

personnel involved with UXO clearance and land restoration efforts in the Middle East following the 1991 Gulf War where they located, removed and disposed of over 34 million UXO and OE items.

2. SITE DESCRIPTION

The site history and physical characteristics are described in this section.

2.1 HISTORY AND BACKGROUND

Mare Island is located 25 miles northeast of San Francisco in Solano County, California. The former Mare Island Naval Complex occupies 5,600 acres on a peninsula bounded on the south by Carquinez Strait, on the west by San Pablo Bay, and on the east by Mare Island Strait (Napa River) which separates it from the city of Vallejo, California.

The ten dredge spoils ponds located along the western edge of Mare Island are divided geographically into two groups as shown in Figure 2. The northern group of ponds extends from the northern station boundary south for approximately 3/4 the length of the island. Dredge Ponds 7 and 7S are located at the southern end of Mare Island near Carquinez Strait. Table 1 indicates the approximate surface area of each dredge pond (total area of the ponds is approximately 519 acres).

TABLE 1 - DREDGE POND SURFACE AREAS

POND	1	2N	2M	2S	3W	3E	3NW	4N	4M	4S	7	7S
AREA (ACRES)	50	32	33	64	64	46	18	44	46	67	30	25

The system of pond numbering is not sequential since it evolved over time as new dredge pond areas were created and as ponds boundaries were modified to meet changing requirements. The numbering system suffix indicates the location of a pond relative to the other ponds in the system (i.e., Dredge Pond 3E is east of Dredge Pond 3W). Pond 3E was established in the early 1930's and used until the establishment of a second pond group became necessary in the 1940's.

Another large dredge pond was created between 1945 and 1948 in the area that now comprises Dredge Ponds 3W, 4N, 4M, 4S, and a portion of the Area H landfill site. Already separated by Dump Road, the pond boundaries moved north and south away from Dump Road as pond area was used to expand the landfill facility westward from Cedar Avenue to its current location. The southern boundary of Dredge Pond 3W was finalized by 1959, and the northern boundary of Dredge Pond 4N was established by 1970. The establishment of additional interior berms between 1980 and 1987 separated Dredge Pond 3NW from 3W and divided the southern pond group into Dredge Ponds 4S, 4M, and 4N. A second large dredge pond area that now comprises Dredge Ponds 1, 2N, 2M, and 2S was created between 1954 and 1959 to provide additional capacity. Dredge Pond 1 was created in the late 1960's, when a berm was constructed to separate it from the remaining pond area. Dredge Pond 2S was separated from the remainder of the pond by 1980, and an additional split created Dredge Ponds 2N and 2M between 1987 and 1990. Another pond area near Carquinez Strait was created between 1949 and 1951 and was later divided into ponds Dredge Ponds 7 and 7S.

The dredge spoils ponds lie a few feet above sea level and are generally flat, disrupted only by dredge pond berms (levees), extending up to 10 feet above grade. The dredge ponds and associated berms are primarily composed of the silty-clay and Younger Bay Mud bottom sediments found in the waters adjacent to Mare Island. Although initially constructed directly on low-lying San Pablo Bay wetlands adjoining Mare Island, the ponds now cover the original area with an estimated dredge sediment depth of 15 to 25 feet.

Mare Island was the home of Mare Island Naval Shipyard from 1854 until it was closed by Congress in 1996 after 142 years of service. The Shipyard's primary mission was to build, maintain, and repair Navy ships and submarines. An ordnance facility located at the southern end of Mare Island was also used by the Navy for munitions storage and production operations from 1857 until its closure in 1972. Ordnance was manufactured, received, maintained, renovated, demilitarized, subjected to quality assurance testing, and loaded on and off ships and other forms of transportation at Mare Island. However, no ordnance items having explosive projectiles were ever launched or fired at Mare Island for any purpose, including training or testing.

The dredge pond system located along the west side of Mare Island was created in several stages between 1914 and 1965 to support the maintenance dredging of Mare Island Strait waterways and ship berthing facilities at the Shipyard. Records indicate that during the 13 year period

between 1980 and 1993 alone, over 20,000,000 cubic yards of material were dredged. The dredge ponds were constructed on San Pablo Bay wetlands; sediments were dredged from Mare Island Strait waterways and transported across the island as a slurry through a piping system to the pond outfall points. Periodic maintenance operations to restore pond capacity allowed continued use of the ponds. As they became filled, dried sediments were removed from the pond bottom and used to elevate the pond perimeter berms.

The common historical practice for disposing of damaged or unwanted ordnance was to throw it overboard from a vessel, pier, or sea wall. This was particularly prevalent in the period during and immediately after World War II judging by the material recovered during the previously completed UXO Intrusive Investigation action. Ordnance material discarded in Mare Island Strait was dredged and transported with the dredge slurry to pond outfall points in 16-inch diameter pipelines. Because the ordnance material was much denser than the sediment slurry, it would settle and collect near the dredge outfall areas along with scrap metals and other heavier debris. This accumulation of heavier material over time became solidified together by rust and sediments into large outfall masses. The wide variety of ordnance material suspected to exist in the dredge ponds included propellants, small arms ammunition, primers, and high explosive loaded items, such as fuzes and small to medium caliber gun ammunition.

2.2 ECOLOGICAL CONCERNS

Although the wetlands bordering the ponds are a habitat for the endangered Salt Marsh Harvest Mouse (and as such require special protection against disturbance and destruction), the survey and the removal action in pond berms did not impact these endangered or threatened species. However, when appropriate, all or part of the mitigation measures implemented during the previous ordnance intrusive investigation were also applied to this project to ensure that there was no impact on adjacent wetland endangered species or habitat. These measures were as following:

1. All work crews underwent a training session on recognizing endangered and sensitive species; the proper methods of vegetation trimming to prevent habitat destruction; and the importance of avoiding any disturbance or damage.

2. Any area not presently containing vegetation was kept free of vegetation to discourage mouse presence.
3. Once the survey work was completed, any trimmed vegetation was either removed from the site or returned to provide cover at the direction of a competent biologist.
4. Any mouse sightings would have been reported to a designated competent biologist (no sightings or takes occurred). If Salt Marsh Harvest Mice were noted, all work would have stopped until the biologist could assure that all steps had been taken to avoid any incidental take of the species (none were observed). All actions to avoid a take (and any incidental take) would have been reported to U.S. Fish and Wildlife Service within 24 hours of the action.
5. All work crews were briefed by the site safety officer on the limits of the survey area and the limits of adjacent critical Salt Marsh Harvest Mouse habitat.
6. Disturbed sites were restored to their approximate original contours.

As stated previously, no endangered species habitat was disturbed by the project and no endangered/threatened species were observed. Restoration of the site was limited to the refilling of excavations and restoration to the original surface contour.

3. SUMMARY OF AVAILABLE SITE DATA

The following assessments, investigations, and inspections had been previously conducted to characterize the nature of the environmental hazards in the dredge ponds prior to the current confirmation survey:

- Ordnance Preliminary Assessment (PRC Environmental, Inc., 1994-1995)
- UXO Site Investigation (MINS/SSPORTS, 1994-1997)
- UXO Intrusive Investigation (SSPORTS/Weston, 1998-2001)
- Radiological Investigation (Weston, 2001)

A wide variety of unexploded ordnance items had been found deposited in dredge pond outfall areas even before the UXO Site Investigation (SI) geophysical search was started in 1994.

Ordnance recovered during previous emergency removal operations accomplished by Navy EOD personnel ranged from small arms ammunition to 3-inch powder cases mixed with a wide variety of industrial scrap and other general debris. These ordnance items are classified as hazardous substances due to their reactive and/or explosive characteristics as defined by CERCLA §101(14).

3.1 ORDNANCE PRELIMINARY ASSESSMENT (PA)

The Ordnance Preliminary Assessment (PA) completed by PRC Environmental, Inc. in 1995 identified the dredge ponds as a potential ordnance site because of ordnance already recovered from outfall locations and because of the past history involving the disposal of ordnance material from ships berthed along Mare Island Strait. The report theorized that ordnance would be concentrated in areas around the pipeline outfalls and along the perimeter berms because of the manner in which the ponds were used and periodically recycled by raising the pond berms to restore capacity. The PA recommended conducting additional investigations to identify the scope and magnitude of the ordnance hazard.

3.2 UNEXPLODED ORDNANCE SITE INVESTIGATION (SI)

The Ordnance SI was performed by MINS (summary report later completed by SSPORTS) to determine the magnitude and extent of UXO contamination in the areas of Mare Island suspected to contain ordnance based on experience and historical evidence. Based on personal observations, historical data, and dredge pond operational practices, a model was developed to predict the locations of ordnance material in the dredge ponds. Dense metallic debris including ordnance observed at current outfall locations was distributed within approximately 25 feet of the outfall point with virtually no dispersion extending into the ponds. Maintenance of the dredge ponds as they became filled with sediments was conducted by removing sediment from the pond bottom and using it to raise the surrounding berms to restore pond capacity. Therefore, some of the ordnance material in the pond bottoms at the outfalls may have been redeposited in a berm during pond maintenance, most likely near the outfall. The pond bottoms beyond approximately 180 feet from the outfalls were considered to have a very small probability of containing ordnance material.

Anomalies were searched for by visual observation and with a combination of geophysical search techniques including the use of handheld MK 26 magnetometers and MK 29 metal detectors by trained Navy EOD Mobile Unit Nine personnel. The MK 26 and MK 29 instruments are approved by both the North Atlantic Treaty Organization and U.S. military forces for the location of ordnance. A total area of approximately 121 acres considered most likely to contain ordnance was subjected to a 100% magnetometer search accomplished along overlapping 5 foot search lanes. The 100% search area included a 100 foot minimum radius around each active outfall location, all pond perimeter berms, and the adjacent pond bottom to a distance of 25 feet from the berms. When older outfalls no longer visible on the surface were identified by the detection of large concentrations of ferrous materials, the 100% search was expanded to include a 100 foot arc around those areas. The pond bottoms that comprise the remaining 355 acres of dredge spoils pond area were not believed to contain ordnance and were therefore searched in 5 foot wide lanes along 100 foot grid lines (yielding approximately a 10% search coverage).

Live ordnance recovered from the surface during the geophysical survey included: 5.56 mm, 7.62 mm, and .50 caliber small arms ammunition and expended cartridge cases; 20 mm, 40 mm, and 1.1 inch high explosive projectiles and expended cartridge cases; and various pyrotechnic (smoke and illumination) devices, such as MK 13 day/night flares and parachute flares. The small arms ammunition and explosive projectiles were recovered near the outfall areas of Dredge Ponds 2S, 3W, 3E, 4M, and 7, while the flares were recovered near the Dredge Pond 7 outfall. All recovered live ordnance was destroyed by Navy EOD personnel as emergency removal actions.

A total of 390 anomalies representing possible ordnance material were located during the search of the total 476 acre dredge pond area performed between July 1994 and October 1995. Approximately 90% of the identified anomalies were located on berms or at outfall points. Twenty two contacts represented larger anomalies that ranged in size up to 50 x 120 feet.

Based on preliminary SI geophysical data, an intrusive investigation of several specific dredge pond magnetic anomalies was performed by the Navy on October 24, 1995 at the request of the California Department of Toxic Substances Control (DTSC). Several magnetic anomalies documented during the SI magnetometer search of an area near the eastern berm of Dredge Pond

2N were suspected to represent a reported illegal dump site. The site appeared to fit details of an anonymous report to DTSC concerning the past dumping of barrels that contained hazardous waste. Various scrap items were unearthed during the one day intrusive excavation of six anomalies located in the landfill debris areas shown on Figure 4. No ordnance, drums, or other hazardous materials of any kind were encountered.

An expanded SI geophysical search was conducted in 1996 as an adjunct to the main site investigation to confirm that selected areas near the active ponds suspected to be historic dredge ponds did not present an ordnance hazard. One additional area believed to be a former dredge outfall was identified adjacent to Dredge Pond 7 during the expanded survey. That area was documented in the final SI summary report and was included in the scope of the contracted ordnance investigation. In summary, each successive ordnance investigation and field verification supported the conclusion that unexploded ordnance was present at the site and posed a realistic hazard.

3.3 UNEXPLODED ORDNANCE INTRUSIVE INVESTIGATION

The dredge spoils ponds were therefore considered to pose a hazard to public safety and the environment based on the history of ordnance contamination known and suspected to exist at the site. Engineering Field Activity West (EFA WEST) tasked SSPORTS to conduct an ordnance intrusive investigation of the Dredge Spoils Ponds in 1998. The scope of the investigation was to locate, excavate, identify, and evaluate the 390 anomalies documented by the UXO SI and to determine whether they posed an explosive hazard. The intrusive investigation began on June 1, 1998, and was completed in March 2001 by Roy F. Weston, Inc., the company selected by the Navy in September 1999 to privatize the SSPORTS Detachment.

The goal of the intrusive investigation was to mitigate the immediate threat of uncontrolled releases and explosions in the dredge ponds by locating ordnance items using current geophysical search technologies and removing them. This project goal was achieved, in consideration of known dredge sediment deposition characteristics and of historical pond maintenance practices, by the investigation and removal of all detected ordnance material within the Western Early Transfer Parcel. All anomalies detected during the UXO SI were investigated, identified, and removed or determined not to be hazardous to human health or the environment.

The removal supported the minimum clearance requirements of the DDESB as outlined in NAVSEA OP 5 (Ammunition and Explosives Ashore) for the planned reuses of the ponds as commercial dredge ponds and wildlife areas.

A total number of 58,803 live ordnance items were recovered including 3,425 that contained high explosive material. The total live ordnance count includes small arms ammunition, pyrotechnics, primers, etc., as well as the items containing high explosive that pose a risk to human health due to their reactive nature. The predominant ordnance type in the dredge ponds was small arms ammunition, which made up 92% of the total items recovered. The 20 mm Oerlikon high explosive round used in light anti-aircraft weapons that first entered U.S. Navy service in 1942 represented approximately 5% or nearly all of the remaining items recovered. Since no ordnance items having explosive projectiles were ever launched or fired at Mare Island for training or testing, no items fitting the definition of UXO have ever been recovered from the dredge ponds. All OE items have been unfired with their fuze components unarmed, missing, or inoperable due to corrosion from over fifty years of exposure to constantly changing environmental conditions.

Hazardous ordnance material was treated at an ordnance disposal range on Mare Island approved by the DDESB and regulatory agencies. 47,528 inert ordnance items and 642,444 pounds of other non-hazardous scrap were also recovered. Inert ordnance and scrap materials from the site were recycled whenever possible. Soil from the ponds with unacceptable levels of metals contamination were removed and loaded for transport to authorized hazardous waste disposal facilities. The concentration of explosives constituents never exceeded the field screening action levels established by the work plan. The results of the investigation also supported the dredge pond outfall/berm dispersion model, since approximately 99.9% of all live ordnance was recovered from outfall locations. No ordnance material of any kind was identified during the investigation of pond bottom anomalies; all items recovered from the pond bottoms (foundations, wire ropes, fasteners, etc.) were attributable to the World War II era radio antenna arrays once located throughout the dredge ponds.

A total of 424 low level radioactive items were also recovered during screening of outfall material for ordnance in Dredge Ponds 3W and 4S. The small items containing radium and strontium had been used as luminescent markers aboard ship until they were removed and apparently discarded overboard.

3.4 RADIOLOGICAL INVESTIGATION

Due to the number of radiological items recovered during the UXO intrusive investigation, an independent radiological survey and investigation of the dredge ponds was completed in 2001 by Weston at the Navy's request. The investigation focused on outfall locations where radiological material had been recovered previously. Numerous additional radiological items were recovered as a result of the survey and investigation.

Several OE items were also identified and removed during the re-excavation of a backfilled outfall excavation in Dredge Pond 3W. The items were located approximately five feet below the surface in a berm area adjacent to the southern outfall site in soil not previously disturbed by UXO intrusive investigation field operations. The location and depth of the items would have precluded detection by the geophysical search instruments used in support of the investigation.

4. SITE RISK ASSESSMENT

The normal risk assessment method for ordnance is based on a Military Standard (MIL-STD-882B) implemented by the Department of Defense Explosives Safety Board (DDESB). An ordnance risk assessment is based on two factors, "hazard severity" and "hazard probability". The ***hazard severity*** (*Catastrophic, Critical, Marginal,* or *Negligible*) is based on the types of ordnance that are known or suspected to exist at a site. The ***probability*** of an ordnance incident (*Frequent, Probable, Occasional, Remote,* or *Improbable*) is based on the location of the ordnance relative to the ground surface, distance to the nearest building, number of buildings within a given radius, the use of the buildings, and the types of barriers surrounding the area. Once the hazard severity and probability are determined, the site can then be assigned one of the following Risk Assessment Codes (RAC):

- *RAC 1* - Imminent hazard, emergency action required.
- *RAC 2* - Action required to mitigate hazard or to protect personnel.
- *RAC 3* - Action required to evaluate threat and a high priority confirmation study is appropriate.
- *RAC 4* - Action required to evaluate the threat and a confirmation study is appropriate.

- *RAC 5* - No action required.

Before the UXO Intrusive Investigation began in 1998, a *Critical* hazard severity and a *Probable* probability had resulted in a hazard rating of *RAC 2* being assigned to the dredge ponds. Since no known accessible OE material remained in the ponds after completion of the Intrusive Investigation, the hazard severity and accessibility factors in the hazard determination process effectively changed the assessment to a *Marginal* hazard severity and an *Occasional* probability resulting in a revised hazard rating of *RAC 4* for the dredge ponds. This assessment reflects the possibility of remaining buried 20 mm rounds that may not be detectable with current geophysical search technology.

The rationale for this project regarding remaining ordnance hazards is based on the justifications listed in paragraph (b)(2) of Section 300.415 of the National Contingency Plan (NCP):

Threats to Public Health or Welfare **-** A threat of explosion existed from buried ordnance and ordnance materials. Personnel performing intrusive work, such as utility excavation, soil boring, dredge pond berm maintenance, or other construction activity at the site, could be exposed to the threat. The threat of public contact would also exist whenever weather or erosion exposed previously buried ordnance.

The site is within one mile of day care and grammar schools, family housing, and other currently vacant facilities that are slated for conversion to public use. The planned reuse of Dredge Ponds 1, 3E, 3W, 3NW, and 7S will be as a wildlife area under the cognizance of the U.S. Fish and Wildlife Service. Dredge Ponds 2N, 2M, 2S, 4N, 4M, 4S, and 7 will be used as active dredge spoils ponds.

Threats to the Environment **–** Limited sampling of pond sediments was done by PRC Environmental, Inc., in support of the basewide Remedial Investigation and in support of the UXO Intrusive Investigation at selected outfall excavations. Sample analysis revealed no constituent levels of concern to human health. A small quantity of soil associated with outfall metal masses was removed for disposal during the UXO Intrusive Investigation (1998-2001) as a potential environmental hazard (due to elevated levels of lead and copper). Potential ordnance related contamination caused by the presence of explosive compounds trinitrotoluene (TNT),

cyclotrimethylene-trinitramine (RDX), or trinitrophenylmethyl-nitramine (Tetryl) was never detected by field screening. The removal of all suspect soil related to the outfall masses removed during the Intrusive Investigation is believed to have eliminated the credible sources of potential contamination. Nonetheless, project field screening criteria for the current project was designed to identify any remaining contaminated soil/water that might be encountered.

5. PROJECT OBJECTIVES AND SCOPE

The objective of this project was to provide the additional assurance to regulatory agencies that no detectable OE remained near the surface of the dredge pond berms that could endanger human health or the environment. The objective was achieved by conducting the following activities:

OE Confirmation Survey—The state-of-the-art geophysical survey was performed to confirm the findings of the previous site survey; the obtained data were used for anomaly density analysis, modeling of site conditions, and for predicting the frequency of OE occurrences.

OE Removal Action—Removal of anomalies selected using the model based on OE Confirmation Survey data to further confirm the validity of the model.

5.1 OE CONFIRMATION SURVEY

Conducting OE Confirmation Survey included the following tasks:

- Prepare the OE Confirmation Survey Work Plan
- Select the equipment with the adequate detection capability to meet the project objective
- Evaluate the selected equipment by performing a field test
- Collect geophysical data from the site
- Perform a visual survey in the areas where geophysical data cannot be collected due to physical constraints
- Perform density analysis of the collected geophysical data; identify anomalies; develop anomaly simulator process

- Select four validation grids for excavation
- Excavate validation grids to confirm the survey data
- Perform field screening of soil suspected of contamination
- Compare the number of recovered OE with the number of OE occurrences predicted by the anomaly simulator process
- Restore the site and dispose of the generated waste streams

These tasks were performed according to the OE Confirmation Survey Work Plan (WESTON, 2001a), and the results were presented to the Navy and DTSC. To provide further assurance in the safety of the dredge pond areas, DTSC requested a further evaluation of geophysical data and the removal of additional anomalies. To meet this objective, geophysical data were used for the creation of the Mare Island distribution model and the selection of additional removal areas based on the areas of highest anomaly density.

5.2 OE REMOVAL ACTION

The OE Removal Action consisted of the following tasks:

- Prepare the OE Removal Action Work Plan
- Excavate eight high anomaly density areas identified in the Mare Island distribution model
- Restore the site and dispose of the generated waste streams
- Compare the number of recovered OE to the number of predicted OE occurrences
- Prepare the Mare Island Dredge Ponds OE Confirmation Survey and Removal Action Summary Report

These tasks were performed in January and February 2002 according to the OE Removal Action Work Plan (WESTON, 2001c)

5.3 CONTAMINANT SCREENING

A secondary goal of the project was to identify and document any observed site chemical or radiological contamination. This was considered an appropriate concern based on the low level radiological material and chemical soil contaminants already encountered during the previous UXO Intrusive Investigation of dredge outfall material.

The radiological screening of all excavations and disturbed soil was accomplished using handheld Ludlum Model 19 micro-R meters and a Ludlum 2221 with a 44-10 probe (2 x 2 NaI) Excavated soil was spread in a layer not exceeding 12 inches to allow effective monitoring and location of any radiological anomalies that might be present.

Soil or water that was suspected of contamination by virtue of color, odor, texture, or location was to be field screened for copper, lead, zinc, TNT, RDX, Tetryl, and pH. These constituents were considered the most likely to result from the presence of subsurface ordnance material. No contaminant field screening was required during the project since no suspect soil or water was encountered.

5.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The OE removal complies with the regulatory requirements of CERCLA, as amended by SARA and the NCP. CERCLA requires that any required cleanup response actions to protect human health and the environment be cost-effective and in compliance with the pertinent Applicable or Relevant and Appropriate Requirements (ARARs) and To-Be-Considered Criteria (TBCs).

Generally, requirements may be either *applicable* or *relevant and appropriate*. Applicable requirements are federal, state, and local standards that regulate site activities. Relevant and applicable requirements meet all legal prerequisites and are site-specific. ARARs fall into three categories, depending on the specific site characteristics, location, and proposed actions:

- *Chemical-specific*—Establish numerical standards that limit the concentrations of substances in the medium of concern or medium affected by the action.
- *Location-specific*—Refer to restrictions placed on the concentration of substances or conduct of an action relating to site location.

- *Action-specific*—Deal with technology- or activity-based restrictions controlling the performance and design standards of a specific cleanup action.

TBCs are advisory, not mandatory, and their application is subject to discretion. TBCs are used when no requirements exist that are applicable to a particular situation or circumstance. They may also be used to set standards when ARARs do not adequately protect human health or the environment.

Chemical Specific

Health and Safety Code, Division 20 California Code of Regulations (CCR) Title 22 Section 66264.600 (Miscellaneous Units), Hazardous Waste Control—Provides classification of hazardous waste; regulates generators, transporters, and treatment, storage, and disposal facilities.

U.S. Army Toxic and Hazardous Material Agency (ASATHAMA) Report AMXTH-TE-CR-86096, OE Waste Identification—Adopts criterion of 12-percent explosive content as a measure of contaminated soil reactivity (hazardous waste vice explosive waste determination)

Location-Specific

16 United States Code (U.S.C.) Sections 1531-1543, Endangered Species Act (ESA)—Prohibits actions from jeopardizing the continued existence of protected species or degradation of critical habitat

Fish and Game Code, Division 3, California ESA—Requires consultation with state agencies where potential exists for impact to listed species

Public Resources Code (PRC) Division 20, California Water Code—Identifies water quality policy, planning, and protection

Action Specific

16 U.S.C. Section 661, Fish and Wildlife Coordination Act—Requires action be taken to protect fish or wildlife from harm where activities involve stream/river modification or affect fish/wildlife

16 U.S.C. Section 703, 50 Code of Federal Regulations (CFR) Parts 10, 16, 20, 21, Migratory Bird Treaty Act—Prohibits the taking, possession, buying, selling, or barter of listed migratory birds including feathers, eggs, etc. except as allowed

29 CFR Part 1910.120, Occupational Safety and Health Administration (OSHA)—Defines worker protection requirements for personnel involved in hazardous waste and emergency response actions

49 CFR Parts 100-199, Transportation of Hazardous Waste—Classifies live ordnance as "hazardous material" for manifesting purposes under U.S. DOT regulations

40 CFR Part 300, Public Affairs—Specifies public affairs efforts to support CERCLA response actions

PRC, Division 30, Waste Management—Regulates waste management practices in California

U.S. Army Corps of Engineers (USACE) Engineering Policy (EP) 110-1-16 (draft)— Provides guidance for selecting appropriate geophysical search technology based on physical properties of known ordnance and specific site conditions

Department of Defense (DOD) 6055.9-STD, Ammunition and Explosives Safety Standards— Specifies safety precautions and procedures for ordnance operations. Also applicable to the project are U.S. Navy Manual *NAVSEA OP5* (Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation and Shipping) and *DOD 4145.26-M* (DOD Contractors Safety Manual for Ammunition and Explosives) which govern the handling, storage, transportation, disposal, and cleanup requirements for unexploded ordnance.

Recovered unexploded ordnance is considered to be Resource Conservation and Recovery Act (RCRA) hazardous waste under *40 CFR 261.23 (a)(8).* The labeling and storage requirements of *40 CFR 262* and *22 CCR 66262* apply. All recovered OE will be stored in a magazine approved by the Department of Defense pending treatment by open burning/open detonation at the onsite disposal range. Because of the sporadic nature of OE recovery and disposal range scheduling, the RCRA 90 day rule may be waived pursuant to the impracticability waiver under *42 United States Code 9621 §121.d.4.C* of CERCLA. The storage of recovered ordnance before treatment will, in no case, exceed a period of one year.

The substantive portions of RCRA apply to the on-site disposal of OE material. Measures to prevent the release of contaminants to soil, water, and air in accordance with *40 CFR 264 Subpart X* will be implemented at the range. The onsite detonation of OE should not cause migration of explosion by-product contaminants. Any residual contamination from the detonation area will be remediated when Mare Island OE removal activities are completed and range operations are terminated. The agricultural burn day requirements of *Bay Area Air Quality Management District (BAAQMD) Regulation 5* for the open burning of propellants and explosives will be followed when scheduling range operations. A minimum 1,250 foot explosive safety arc will be established around the range during disposal operations to meet the requirements of *40 CFR 264.382*, *22 CCR 66264.382*, and *NAVSEA OP 5*.

6. OE CONFIRMATION SURVEY

This section describes activities conducted during the OE Confirmation Survey, such as geophysical surveys, visual surface searches, and anomaly validation activities.

6.1 GEOPHYSICAL SURVEY

This section describes the geophysical instrumentation used for the survey, the equipment selection criteria, specifications of the equipment as configured for the project, evaluation/confirmation measures taken to ensure satisfactory operation, a description of the techniques used to accomplish the survey, and a chronology describing how the survey field work progressed through completion.

6.1.1 SURVEY EQUIPMENT SELECTION CRITERIA

Several different equipment types were evaluated for use in the dredge pond environment that were capable of detecting buried metallic anomalies.

Ground Penetrating Radar (GPR)—Determines the presence of buried objects by directing a radar frequency electromagnetic signal into the soil and then detecting the reflected signatures. GPR is capable of detecting dredge pond ordnance types under appropriate soil conditions.

However, under the dredge pond conditions of high soil conductivity and the presence of shallow groundwater, the radar frequencies used by GPR are severely attenuated and render the detection capability of the instrument largely ineffective.

Geometrics G-858 Gradiometer—The Geometrics G-858 Cesium Vertical Gradiometer was also considered. The gradiometer utilizes two cesium magnetometer sensors mounted in a vertically opposed configuration to reduce localized background interference and optimize the detection of valid ferrous anomalies. The deciding factor against this selection was the inherent inability of magnetometer sensors to detect non-ferrous metals. Some of the potential dredge pond OE targets constructed predominantly of brass with only small ferrous components would not have been detected with the G-858.

Geonics EM61 Mk 2—Transmits an electromagnetic pulse into the soil that is absorbed and retransmitted by buried metallic objects. The system utilizes time-domain techniques to discriminate between moderately conductive earth materials and very conductive metallic targets. The instrument allows for the depth-to-target estimation and the rejection of near-surface target response and surface cultural features. The integration of the system with a DGPS receiver allows real-time detection and integration of anomaly physical parameters with precise location information. Demonstrated applications of the EM61 include the location of underground storage tanks, buried drums, pipelines, utilities, metallic hazardous waste, and ordnance. The EM61 has been the instrument of choice with both the military as well as state and federal regulatory agencies for recent OE projects. Also, since the original SI surveys had been accomplished using magnetometers (under the premise that non-ferrous ordnance would be located in proximity to other ferrous debris and therefore be detectable), the EM61 was considered a good choice to complement the earlier survey by providing the ability to also detect any remaining non-ferrous ordnance material.

6.1.2 SURVEY EQUIPMENT SPECIFICATIONS

An inductive Time Domain Electro-Magnetic (TDEM) instrument, the Geonics EM61, was selected for the survey because this type of equipment was expected to have greater detection capabilities for small items than magnetometer systems. Additionally, non-ferrous OE, such as World War II projectile fuzes, primers, burster tubes, and flare tubes, have been identified in the

dredge ponds (albeit in association with other ferrous OE and scrap metals). Therefore, the EM61 was considered an appropriate choice for this second geophysical survey of the ponds to complement the magnetometers used in the first survey. A single sensor EM61 system as well as a Multiple Towed Array Detection System (MTADS) comprised of a three-sensor EM61 array integrated with a DGPS receiver were used to accomplish the survey. The capabilities and operational limitations of the systems were defined during equipment performance verification tests conducted at a test grid in Dredge Pond 7. TDEM systems are used to map the apparent conductivity of the soil and near-surface objects. Discrete anomalies or peaks are representative of possible OE sources and can be mapped by recording the position of the EM instrument along with the sensor data in real time during the survey.

TDEM systems have been proven by both independent government evaluation and field implementation to be one of the most effective means for the detection of OE. Characteristic of all geophysical instruments, the percentage of detection is a function of the size and depth of acquired targets; larger and/or shallower targets can be more effectively located.

Tests conducted by the U.S. Army Corps of Engineers at Fort Ord, California indicate that the proximity of the target to the EM61 transmitter array is the dominant detection parameter to enable the location of smaller OE items, such as 20 mm rounds. To ensure detection of these smaller OE items, it is essential that complete coverage of the survey area is achieved. The concurrent DGPS position and geophysical sensor data allowed the generation of survey coverage maps, which graphically illustrated any gaps in sensor coverage. This facilitated the prompt resurvey of missed areas to eliminate data gaps. The process of differentially correcting the location of the DGPS receiver (and associated sensor array) was accomplished in real-time by utilizing a minimum of four GPS satellites.

EM61 Single Sensor Configuration—A single EM61 sensor coil assembly with a DGPS receiving antenna was mounted on a non-metallic cart. An equipment operator towed the cart and carried a backpack containing the datalogger, DGPS receiver, and battery packs. Figure 7 shows the single sensor configuration during the evaluation phase at the Dredge Pond 7 test grid.

FIGURE 7 – SINGLE SENSOR EM61 SYSTEM

EM61 Multiple-sensor Towed Array System (MTADS) —An integrated array of three EM61 sensor coil assemblies and common DGPS antenna was towed by a vehicle (either an All Terrain Vehicle or a self-leveling mower) that housed the DGPS receiver, data loggers, and battery packs. The transmit coil timing and receiver coil gating of each sensor were synchronized to minimize interference between sensors in the array. The position offset of the two lateral sensors from the centerline sensor and DGPS receiving antenna was compensated for in the processing software. Figure 8 shows the multiple sensor configuration during the pond perimeter survey of Dredge Pond 7.

FIGURE 8 – MULTIPLE SENSOR EM61 SYSTEM

6.1.3 SURVEY EQUIPMENT EVALUATION

A survey test grid was established near the ordnance disposal range located in the southwest corner of Dredge Pond 7where the soil conditions and background are representative of the other dredge pond areas covered by the survey. Eighteen seeded targets covering the range of potential dredge pond ordnance material (from 20 mm rounds to 8 inch projectiles) were placed in the grid at depths representing the expected detection capability of the survey equipment (1 to 10 feet). Special emphasis was placed on the seeding and detection of 20 mm rounds since they represent the most probable munition (MPM), the OE item of concern for the dredge ponds. The specific locations, identities, and depths of the test grid targets are available upon request but have not been included in this report in consideration of possible future use in evaluating new search technologies.

The survey equipment evaluation included the following steps:

- Survey and establish corners of the test grid
- Remove vegetation to support the survey
- Perform OE surface clearance of the test grid
- Seed inert OE targets
- Record target identification, position, depth, and orientation
- Establish DGPS locations targets
- Bury targets and reclaim ground surface to approximate pre-excavation conditions
- Assemble and check out survey equipment
- Collect geophysical target response data with each deployed equipment configuration
- Process digital geophysical data and identify anomalies of interest
- Recover anomaly locations using DGPS survey instrument
- Evaluate detection performance

Some of the equipment evaluation process steps had already been accomplished in support of previous OE removal efforts at Mare Island. The range preparations specific to this project were limited to a surface clearance and the placement of several additional 20 mm targets at varying depths and orientations.

The capability of each equipment configuration (single and multiple sensor arrays) to detect the anticipated OE items was demonstrated at the test range during an October 13, 2001, process witnessed by representatives of the involved regulatory agencies. Anomaly plots for the single and multiple sensor EM61 arrays are presented on Figures 9 and 10, respectively. All test range targets were located by both the single and multiple array EM61 configurations.

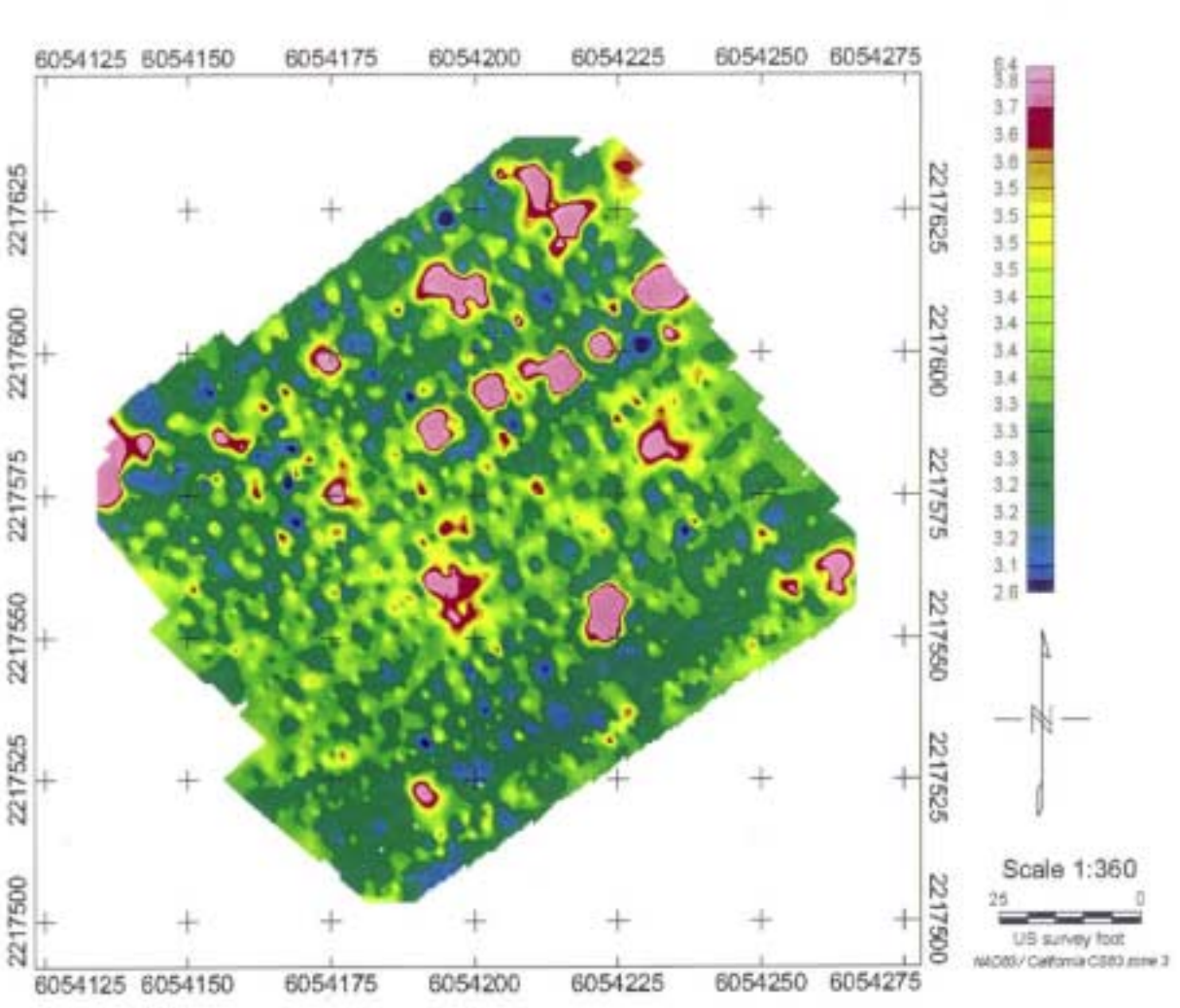


FIGURE 9 – OE TEST GRID SURVEY (SINGLE SENSOR)

6.1.4 SURVEY IMPLEMENTATION

The purpose of the confirmation survey was to locate and identify metallic anomalies indicative of potential ordnance 20 mm and larger. The survey began in October 2001 and was completed on November 30, 2001. It was conducted using the two EM61 sensor configurations; a single operator towed sensor and an integrated three sensor array towed by an all terrain vehicle or a self-leveling mower. The following areas were surveyed:

- Pond berms (all ponds)
- Outfall areas (all ponds)

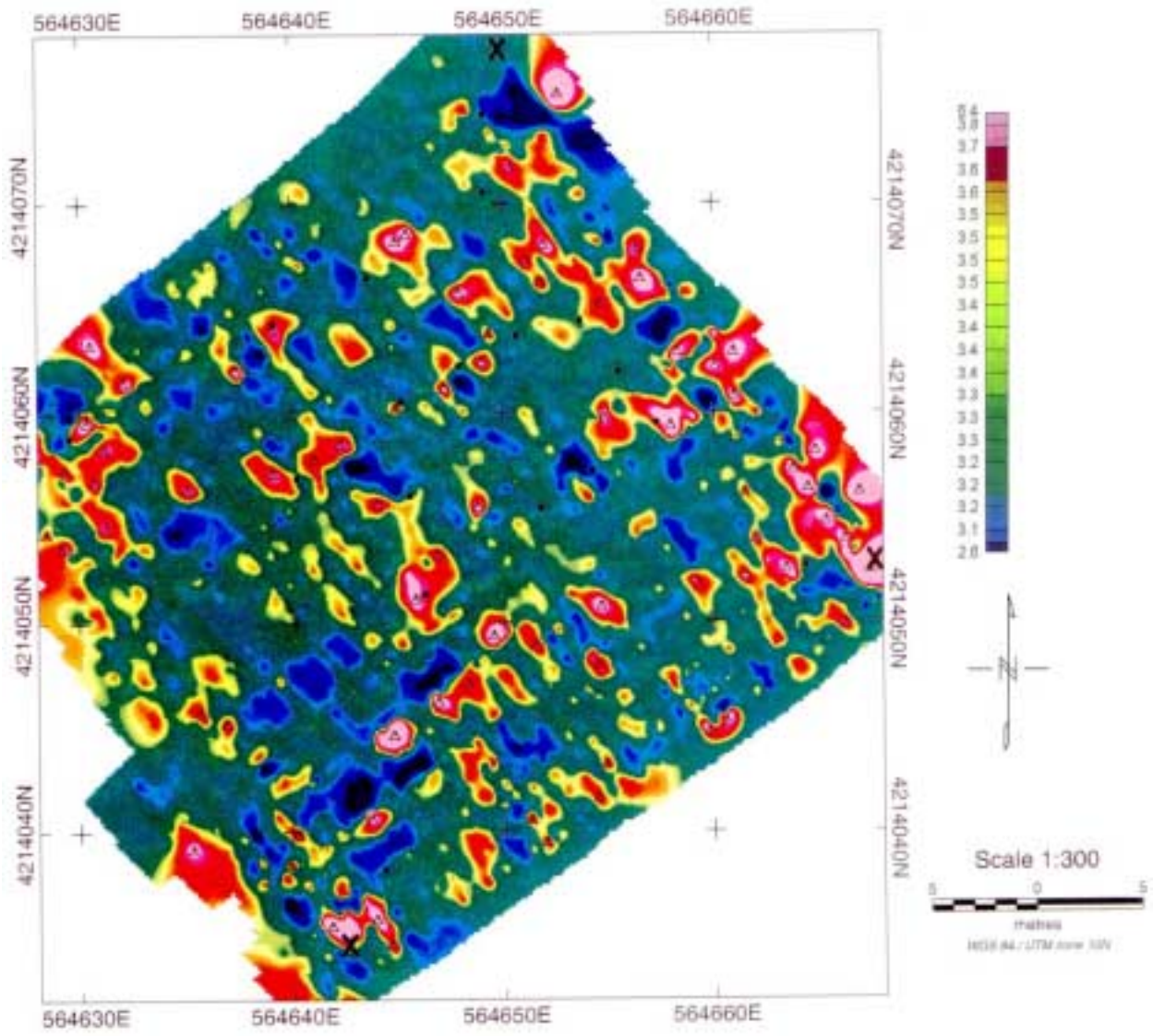


FIGURE 10 - OE TEST GRID SURVEY (MULTIPLE SENSOR)

- Pond bottom (Dredge Pond 3NW only)
- "Boundary area" survey along dredge pond sections excluded from transfer due to the presence of landfill/outfall debris (Dredge Ponds 1, 2N, 4M, and 4S only)

A Weston UXO Specialist was available during the all phases of the survey to ensure the safety of workers in the event that ordnance items were encountered on the surface. The flat tops and sloped sides of the berms were surveyed in addition to a 25 foot wide swath of the pond bottoms

adjacent to the berms. Dredge pond anomaly density maps for all surveyed areas are included in Appendix A.

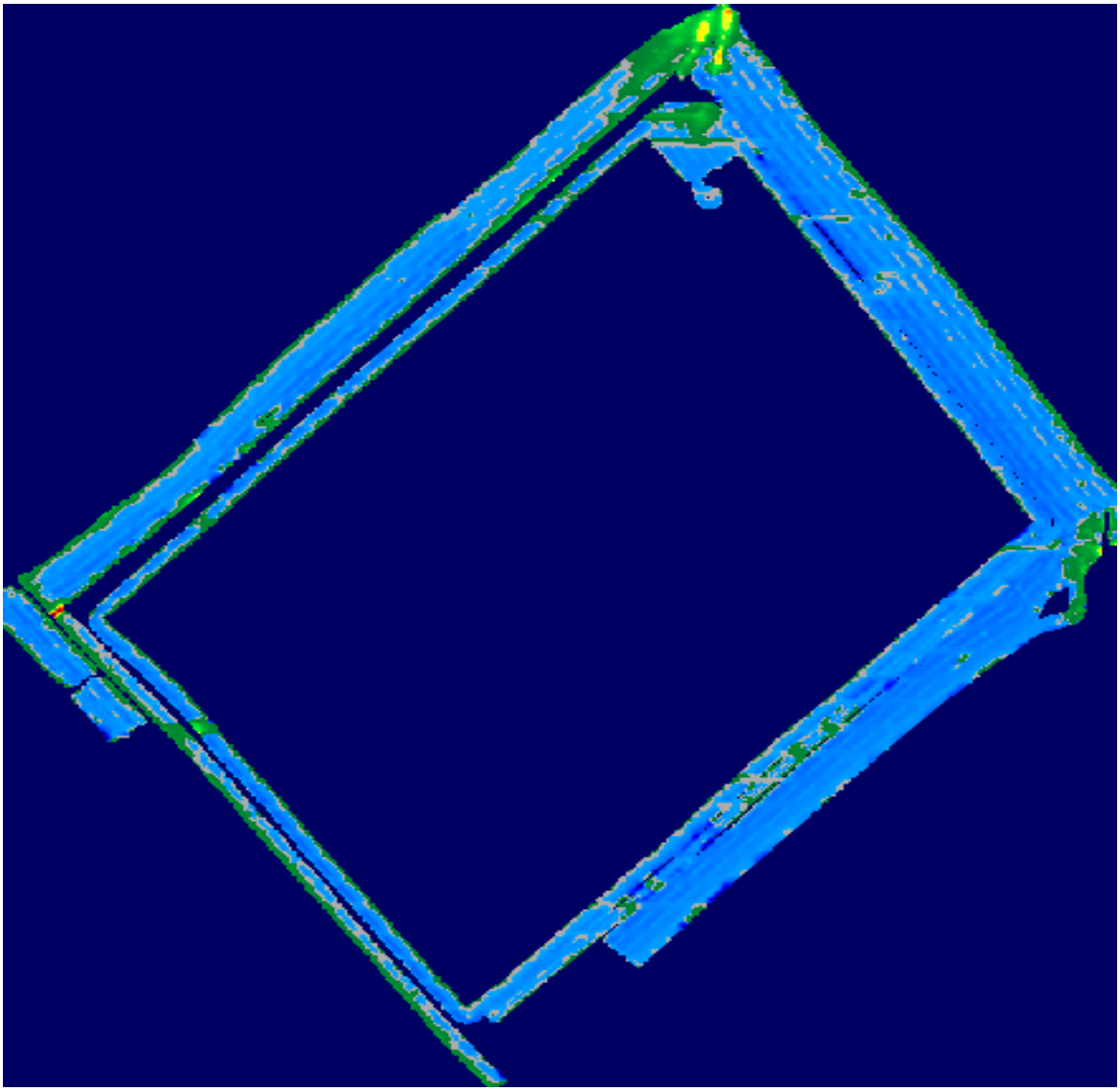


FIGURE 11 - EXAMPLE SURVEY MAP

A minimum horizontal location accuracy of ±18 inches was maintained as a standard during the survey. The results of the geophysical investigation were used to identify and map all suspected OE anomalies for subsequent investigation and identification. Remaining gaps or "holes" that are apparent in the survey data maps represent areas where unsafe berm slopes or the presence of significant vegetation prevented the use of either EM61 configuration. Figure 11 illustrates an example survey map showing data gaps as dark blue strips within the lighter blue surveyed berm

areas. These limited areas, together with all berm top areas and the entire bottom of Dredge Pond 3NW, were later subjected to a 100% visual surface search to ensure no accessible OE was present that could pose a hazard to humans or the environment. All berm top areas were included in the visual search (even those areas already surveyed by the EM61 system) to provide an additional assurance that no accessible OE was present.

6.1.5 OE VISUAL SURFACE SURVEY

A surface visual survey of all pond berm tops and the bottom of Dredge Pond 3NW was conducted in December 2001. The purpose of the berm survey was to provide an additional level of assurance that no exposed OE was present that could pose an immediate hazard to persons driving or walking along the pond berms. The bottom of Dredge Pond 3NW was also visually surveyed since it had not previously been surveyed as part of the 1995-1997 UXO SI and could not be sufficiently cleared of vegetation to enable an effective survey with either of the EM61 sensor configurations. No additional OE items were identified during the survey performed by Weston UXO Specialists.

6.2 ANOMALY VALIDATION

The "knowledge-based" anomaly evaluation and selection process was developed to define a "site anomaly" model and allow the creation of statistically accurate anomaly density maps and accurate estimates of remaining OE items in the ponds. The process was designed to prioritize anomalies based on a comparison of their geophysical characteristics to the physical characteristics of prevalent dredge pond ordnance types. A determination concerning, which of the survey anomalies most likely represented OE or "OE-like" material was then possible. The knowledge-based anomaly selection process is described in this section.

6.2.1 DENSITY ANALYSIS

The density analysis process was used to calculate the density of survey anomalies at each specific location within the dredge ponds. The analysis utilized the Meandering Path software developed by Gifford Integrated Sciences, Inc., for the U.S. Army Corps of Engineers. The

process enabled the calculation of the proximity of the entire sample set for each sampled point. Anomalies within the data were then automatically selected and the proximity of other anomalies were calculated for each sampled point. The sample proximity was then correlated with the anomaly proximity to determine an anomaly density. The calculated density along the sampled path was interpolated across the site using a gridding algorithm to produce a map of anomaly densities as shown in the example on Figure 12. Anomaly density maps for all surveyed areas are included in Appendix A.

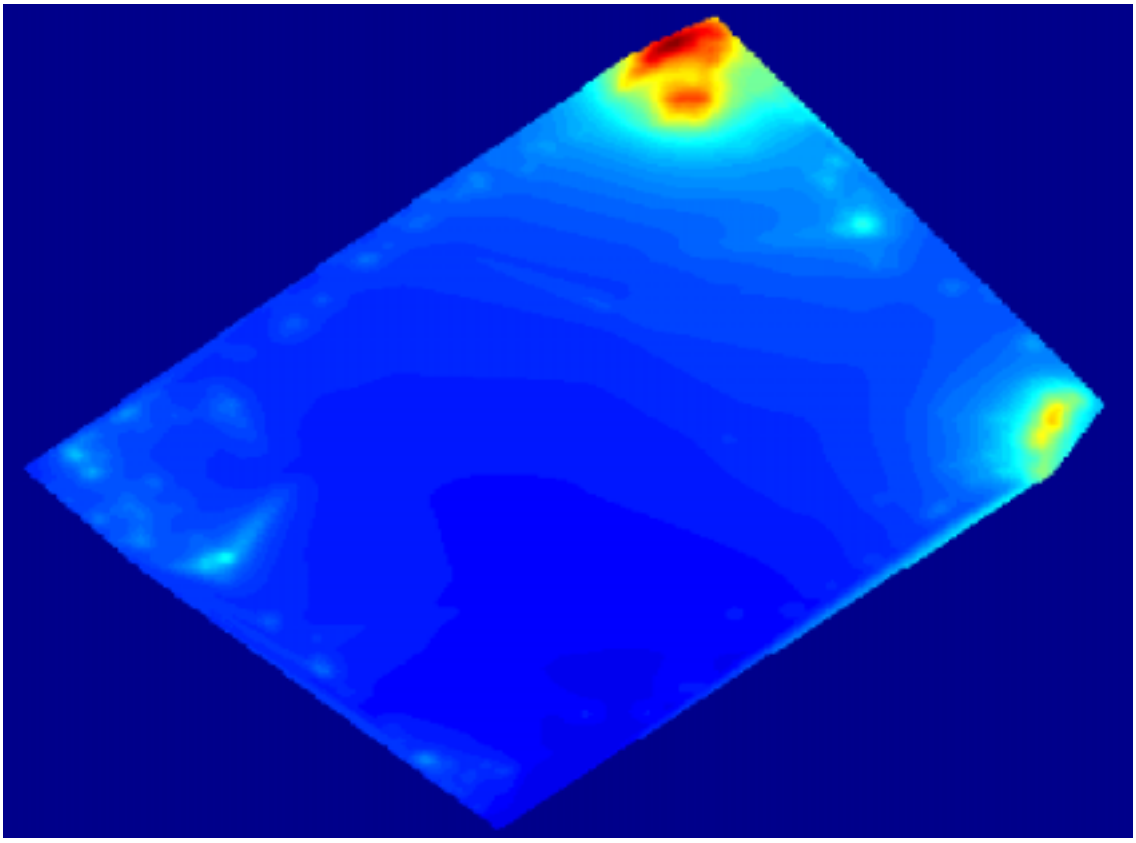


FIGURE 12 - EXAMPLE ANOMALY DENSITY MAP

6.2.2 SELECTION OF VALIDATION GRIDS

Four validation grids were selected from the anomaly density maps based on two criteria: areas that displayed a wide range of anomaly types and areas that had a high potential for containing OE. Because of the outfall OE distribution model discussed in Section 3.2, it was assumed that OE would likely be found in the higher anomaly concentration areas along the berms. These

areas are apparently the result of outfall metal concretions being moved by heavy equipment into the adjacent berm areas during the periodic recycling operations to restore pond capacity.

Anomalies were selected within each validation grid with the objective of selecting the entire distribution of anomalies detectable by the EM61 system. A representation of the raw data that accentuated the horizontal gradient was used to select the anomalies (example shown on Figure 13). Anomaly validation area maps are included in Appendix B.

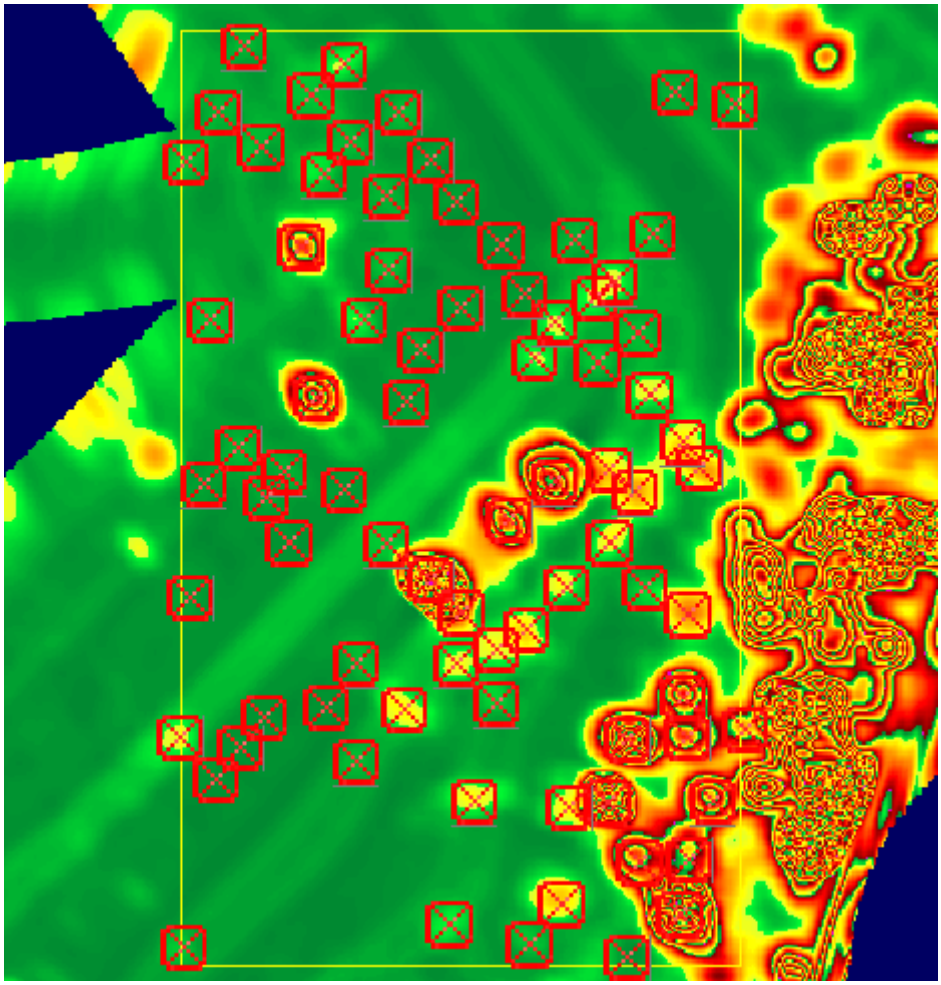


FIGURE 13 – EXAMPLE VALIDATION GRID ANOMALY MAP

6.2.3 VALIDATION GRID ANOMALY EXCAVATION

The initial site specific briefing presented to site workers on November 7, 2001, covered planned field work, health and safety information, environmental concerns, and the associated ordnance standard operating procedure (SOP). The location of any active underground utilities was

determined by notification of Underground Service Alert (USA) prior to excavation at each validation site. Field work supporting the anomaly validation process began on November 12, 2001, and was completed on November 21, 2001. Entry into a 1,250 foot Explosive Safety Quantity-Distance (ESQD) arc around each specific validation grid during intrusive work or OE handling was restricted to the four UXO Specialist team leaders and their team members as authorized by the Weston UXO Operations Manager. Additional daily safety briefings conducted by the SUXOS covered specific site safety topics as well as the physical characteristics and hazards associated with typical dredge pond ordnance types.

The positions of OE survey anomalies in each of the four 100 x 100 foot anomaly definition and validation grids were reacquired and marked using DGPS position information from the survey "dig sheets" generated during the survey data analysis. The location of each survey anomaly was then verified using handheld search instruments (MK26 and AN/19-2) prior to excavation. The AN-19/2 metal detector was effective on all metals to a depth of approximately 12 inches while the MK26 magnetometer was effective to a greater depth for ferrous anomalies only. Anomalies that could not be verified were excavated to a minimum depth of 2 feet and another attempt made to verify their location before being recorded as "not found". The average horizontal location error during the removal action was approximately 12-18 inches. The calibration and satisfactory operation of search instruments was verified daily according to the project work documents.

Anomalies were investigated using a combination of hand tools and heavy equipment. Manual techniques were used for the excavation of shallow anomalies and for final excavation of deeper anomalies after overburden had been removed by heavy equipment. Anomalies were excavated to a maximum depth of 4 feet. Each recovered item was examined by a UXO Specialist to determine whether it represented an OE hazard. Items, determined to be hazardous OE, were packaged, labeled, and transported to Magazine A180 for temporary storage pending thermal treatment at the onsite ordnance disposal range. This magazine has been specifically approved by the DDESB for the storage of deteriorated ordnance in quantities up to 1,000 lbs Net Explosive Weight (NEW). Ordnance and suspected ordnance was handled only by UXO Specialists or by trained and certified personnel under their direct supervision as specified by the SOP and the site specific Health and Safety Plan (Weston, 2001d).

Detailed information concerning the location and identification of all encountered material was recorded in the anomaly dig sheets during the excavation. A summary of anomaly data from the dig sheets is included as Appendix C. After the initial removal of each anomaly, the excavated soil and the bottom and sides of each excavation were verified to be clear of additional metallic items using MK 26 magnetometers and AN-19/2 metal detectors. Any additional contacts were investigated and removed before the excavation was refilled.

All disturbed soil and excavations were radiologically monitored simultaneously with the removal process to ensure the safety of site workers and the recovery of any radiological material that might have been encountered. Additional details concerning the radiological screening efforts are described in Section 5.2. Site soil and groundwater were also closely observed for changes in character (color, texture, odor, etc.) that might be indicative of the presence of chemical contaminants. Although the Work Plan protocol required field screening be performed when unexplained changes in the character of soil or groundwater were noted, no suspect soil or groundwater was encountered during project field work and therefore no field screening was required.

All 342 of the validation grid anomalies were excavated; non-OE metallic items were encountered at 169 of the anomalies and the remaining 173 anomalies proved to be false targets that yielded no discernable metallic items. The significant number of "false anomalies" that could not be reverified (from 51% to 56% in each of the validation grids) was attributed to either the presence of iron oxide pockets in the soil or the erratic movement of the EM61 sensor array over rough terrain features along the pond berms. Figure 14 illustrates the iron oxide pockets that were present in the dredge pond soil.

A total of 91 metallic items were recovered with a mass equal to or greater than that of a 20 mm round (~0.25 lbs). Approximately 90% of the excavated anomalies were recovered from a depth of 2 feet or less while the remainder were located at 3 to 4 feet below the surface. A single OE item, a 20 mm anti-aircraft round, was recovered during excavation of the validation grid in Dredge Pond 4M. The round was not associated with an identified validation anomaly but was observed on the surface approximately one foot outside the Dredge Pond 4M validation grid boundary.

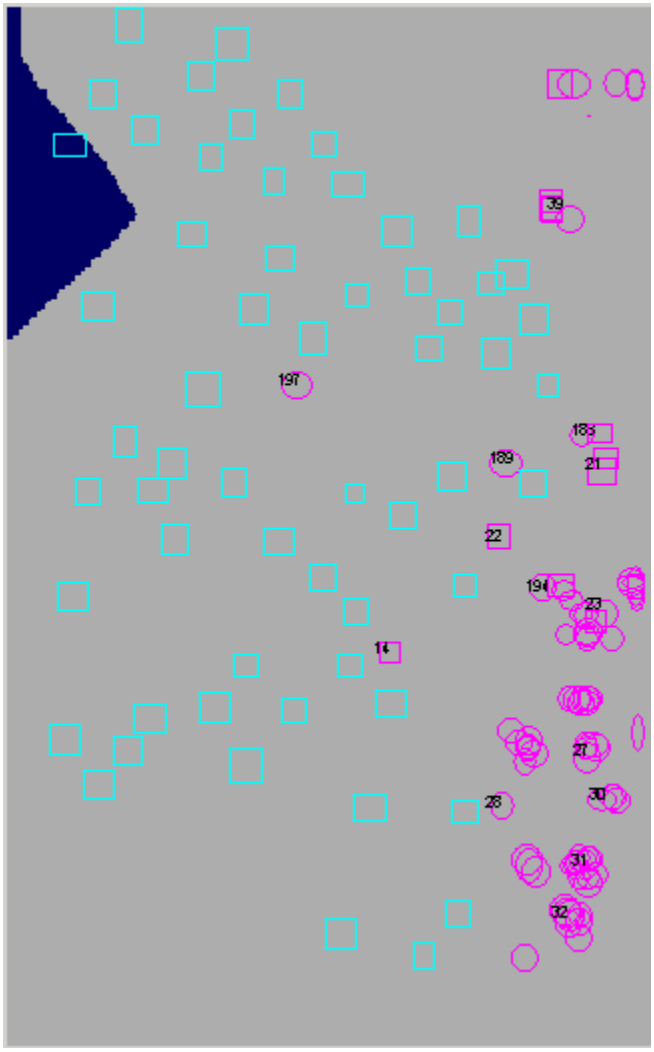
FIGURE 14 – IRON OXIDE POCKETS IN SOIL

6.2.4 ANOMALY DEFINITION PROCESS

A knowledge base was then created for the validation grids by correlating geophysical survey data with physical data describing the excavated validation anomalies. The purpose of the knowledge base was to provide a simple visual indicator of how well the process could both detect OE-like targets and discriminate out non-OE like targets (Figure 15).

The anomaly definition is the representation that allows for effective detection and discrimination of OE or OE-like targets. The process used to develop the dredge pond anomaly definition included the following steps:

1. Grid the data from the 4 different channels using the Renca-Cline algorithm.
2. Grid the data from the 4 different channels using the Shephard's algorithm.
3. Fuse the channels from Renca-Cline grids into a single representation by adjusting each channel up by 25 mV and adding them together.



COLOR CODE:

Blue squares - No targets found

Magenta squares - Targets < 0.25 lbs

Magenta circles - Targets > 0.25 lbs

FIGURE 15 – EXAMPLE VALIDATION GRID ANOMALY CLASSIFICATION

4. Fuse the channels from Shephard's grids into a single representation by adjusting each channel up by 25 mV and adding them together.
5. Subtract the Renca-Cline fusion from the Shephard's fusion.
6. Exaggerate the gradient and form the anomalies of the result file using the gradient focusing algorithm.
7. Void out all values less than a given level.

The Renca-Cline method is a 2-dimensional interpolation method based on creating triangles and estimating the partial derivatives at the nodes. The Shepard's method uses a scatter function to do the same task. The application of both methods results in a type of high pass function where the differences in the output fidelities of the two interpolation functions are exploited. The differences are such that it becomes possible to isolate anomalies of very low magnitude that would normally be hidden in the environmental and system noise. This process also smoothes out the response over the site allowing anomalies of all sizes to be viewed on an even plane.

Figure 16 illustrates an example of the anomaly selection criteria applied to targets in a validation grid.

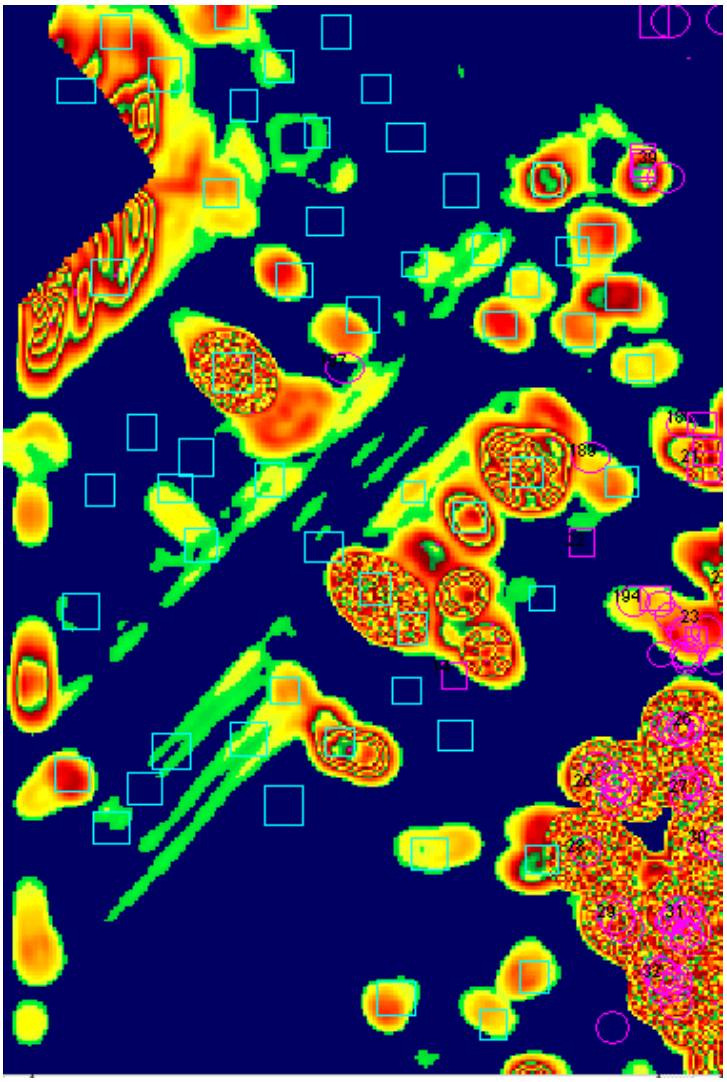


FIGURE 16 – APPLIED ANOMALY SELECTION CRITERIA (85% Pd)

The void parameter of the algorithm defined above was adjusted for each grid until 85%, 90%, and 95% of the required OE-like anomalies were detected (a Probability of Detection or Pd of 85%, 90%, and 95%). The total number of anomalies that would require selection to find the required OE-like targets was then determined.

Using the proposed anomaly definition, the three validation grids in Dredge Ponds 2N, 2S, and 4N would have required the selection of:

- ***85% Pd*** – 163 anomalies to find 77 OE like targets
- ***90% Pd*** – 171 anomalies to find 82 OE like targets
- ***95% Pd*** – 201 anomalies to find 87 OE like targets
- ***100% Pd*** – 260 anomalies to find 91 OE like targets (proposed anomaly plus randomly selecting noise bumps)

Figure 17 illustrates the 95% Pd anomaly map; compare with Figure 16 showing a Pd of 85%.

6.2.5 APPLICATION OF ANOMALY SIMULATOR

Based on the anomaly excavation data from the validation grids, an anomaly simulator was developed. This simulator does not use the proposed three-dimensional anomaly to be used in the project, but instead uses a one-dimensional approximation for use by a profile auto picker routine in the Meandering Path program. The simulator was tested on the validation grid data and provided a very good correlation relative to the number of anomalies selected for excavation.

The simulator was then applied to the complete data sets for each pond. The 85% Pd was developed using the simulator since it was always above the background noise regime. The remaining Pd percentages were then calculated using the validation grid false alarm ratios.

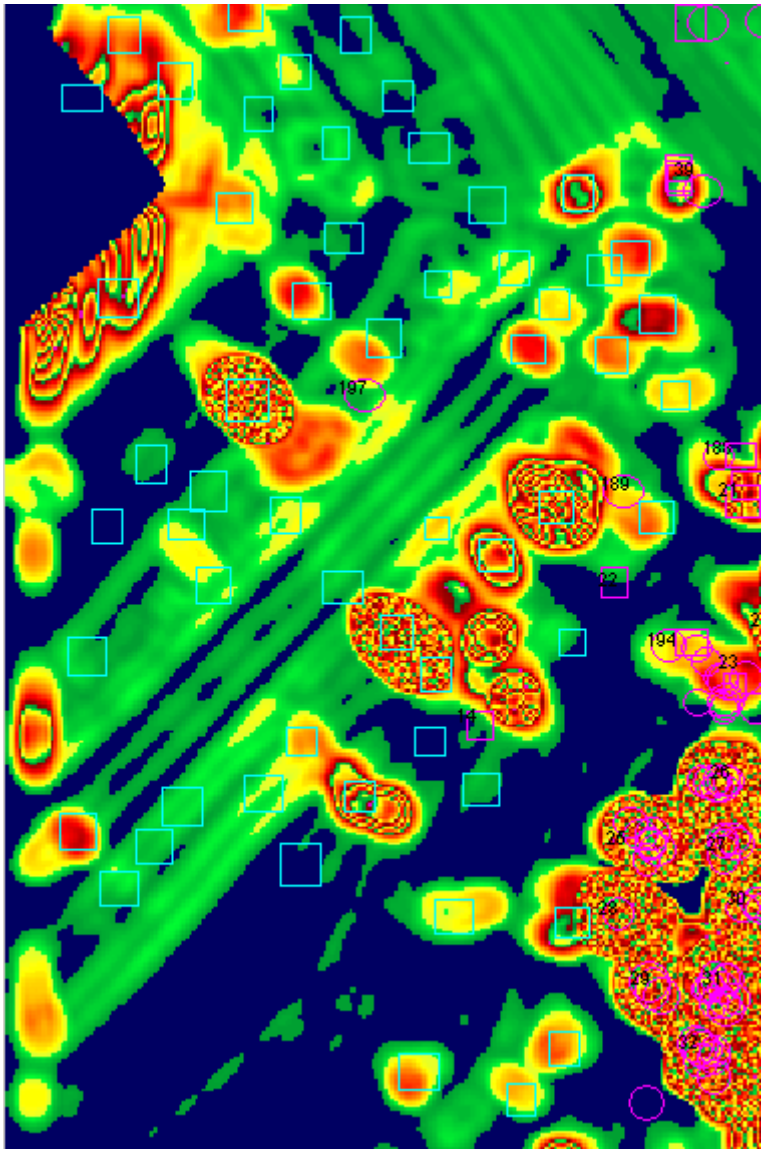


FIGURE 17 – APPLIED ANOMALY SELECTION CRITERIA (95% PD)

The following definitions apply to the projected OE data summarized in Table 2:

- ***"Total Anomalies"*** - the number of anomalies that have to be selected for excavation.
- ***"OE-like Targets"*** - the number of expected OE-like targets to be found in the excavated anomalies.
- ***"Potential OE"*** - the number of OE expected to be found in the excavated anomalies.

TABLE 2 – PROJECTED POTENTIAL OE

Pd	Pond 2M	Pond 2N	Pond 2S	Pond 4M	Pond 4N	Pond 4S	Pond 7	Total Anomalies	False Alarm Ratio	OE-like Targets	Potential OE
85%	968	1,803	1,151	1,137	1,171	460	595	7,285	1.11	3,453	38
90%	1,016	1,891	1,207	1,193	1,228	483	624	7,643	1.08	3,674	40
95%	1,194	2,223	1,419	1,402	1,444	567	734	8,983	1.31	3,889	43
100%	1,544	2,876	1,836	1,814	1,868	734	949	11,620	1.85	4,077	45

Note: The ***Potential OE*** value reflects a 1:91 ratio of OE to OE-like targets based on the single 20 mm projectile located at Dredge Pond 4N during the anomaly validation process.

A 95% Pd was used as the basis for determining those areas and specific anomalies to select for removal as described in the following section. The 95% Pd was considered the most conservative approach while still being practical to implement. The resultant site anomaly model represented the selection of those anomaly signatures that would result in a 95% probability of detection of OE-like items.

6.3 SELECTION OF REMOVAL ACTION ANOMALIES

The rationale and methods used to determine anomalous areas for excavation during the removal action are described in this section.

6.3.1 MARE ISLAND DISTRIBUTION MODEL

The data obtained during the geophysical survey and the knowledge-based anomaly validation process was then applied to the known facts concerning the origins and dispersion of OE material in the dredge ponds. The following principle factors were used to determine the Mare Island Distribution Model:

- Differentiation of impact area versus disposal site

- Dredge pond OE distribution model
- Modes of OE distribution

OE sites are generally classified as either impact areas or as disposal sites. An impact area will contain UXO and is distributed in a semi-random fashion around the site target areas such that each anomaly has a near equal probability of being UXO from a geophysical perspective. Examples of impact area sites include Fort Ord, California, and Kaho'olawe, Hawaii. Conversely, a disposal site may contain both OE (unfired ordnance) and UXO that has originated from practices related to the open burning/open detonation of ordnance.

Since no open burn/open detonation sites are present within the early transfer boundaries and since the Mare Island dredge ponds are exclusive disposal sites (no known ordnance impact events), OE should have been distributed in a non-random fashion by dredge spoils deposition. The fact that none of the 5,285 recovered dredge pond OE items have been fired supports the conclusion that there was one primary mode of OE placement: the deposition of OE and related scrap metal debris at dredge outfall locations during the maintenance dredging of berths along Mare Island Strait. This dredge pond OE distribution model has been supported by each ordnance and radiological operation accomplished to date, and confirmed by the most recent OE removal action.

The Mare Island OE distribution model was developed as a direct result of accumulated historical information and data collected during the first geophysical survey of the dredge ponds conducted in 1995-1997 using MK26 handheld magnetometers. Data collected during the current EM61 digital geophysical mapping survey requires both a refinement of the initial distribution model as well as a directed OE clearance in response to the new data. The refined distribution model was built on the original model that assumed all OE in the dredge ponds was originally deposited at the dredge outfall points. Subsequent to the primary OE deposition in the outfall points, physical process may then have occurred that resulted in the redistribution of some of the OE material.

Two redistribution processes or "modes" have been identified:

- *Mode 1*—The sediment at an active or abandoned outfall location is moved during levee maintenance operations. The top layer of the deposited outfall debris is scraped off with

the sediment during this activity and is redistributed in a nearby berm. The redistribution of OE in this mode would be accomplished using heavy earth moving equipment and would result in OE still being associated with other metal debris originating from the same outfall location. Any OE redistributed in this mode would be located in a "high-density anomalous area" caused by the presence of the colocated metal debris.

- *Mode 2*—Pond maintenance personnel collect OE at the outfall locations and re-deposited them at another pond location. The OE in this case would be moved by hand and would result in a single OE item or several stacked OE items being located together. The OE would not necessarily be associated with other metal debris and would likely be at or near the surface. The OE would also likely have been located near some substantial landmark, such as a pipe, weir, or outfall location that would have served as a point of reference to facilitate retrieval.

The original UXO SI geophysical survey and intrusive investigation provided supporting evidence for the refined OE deposition model. The current EM61 survey, together with subsequent data from the excavation of validation grid anomalies, contributes additional evidence in support of the model.

6.3.2 SELECTION OF REMOVAL AREAS

High-density anomalous areas were identified by the development and application of the OE anomaly definition to the dredge pond geophysical survey data. The Mare Island OE distribution model characterized the locations where OE material might be expected to exist in consideration of the two identified distribution modes. The final step, in determining which of the anomalies were suitable for excavation, was a correlation of the high density anomalous areas with those areas fitting either of the two OE distribution modes.

The selection process began by identifying 25 high density anomalous areas and applying the site anomaly model to the EM61 anomaly density maps. Figure 18 shows an example illustrating the selection of several high density anomalous areas within Dredge Pond 4M. The next step was to exclude those areas that were believed unlikely to represent OE in consideration of the two OE distribution modes discussed in Section 6.3.1:

- Weir areas
- Sites along the western pond berms
- Outfall locations already cleared of OE

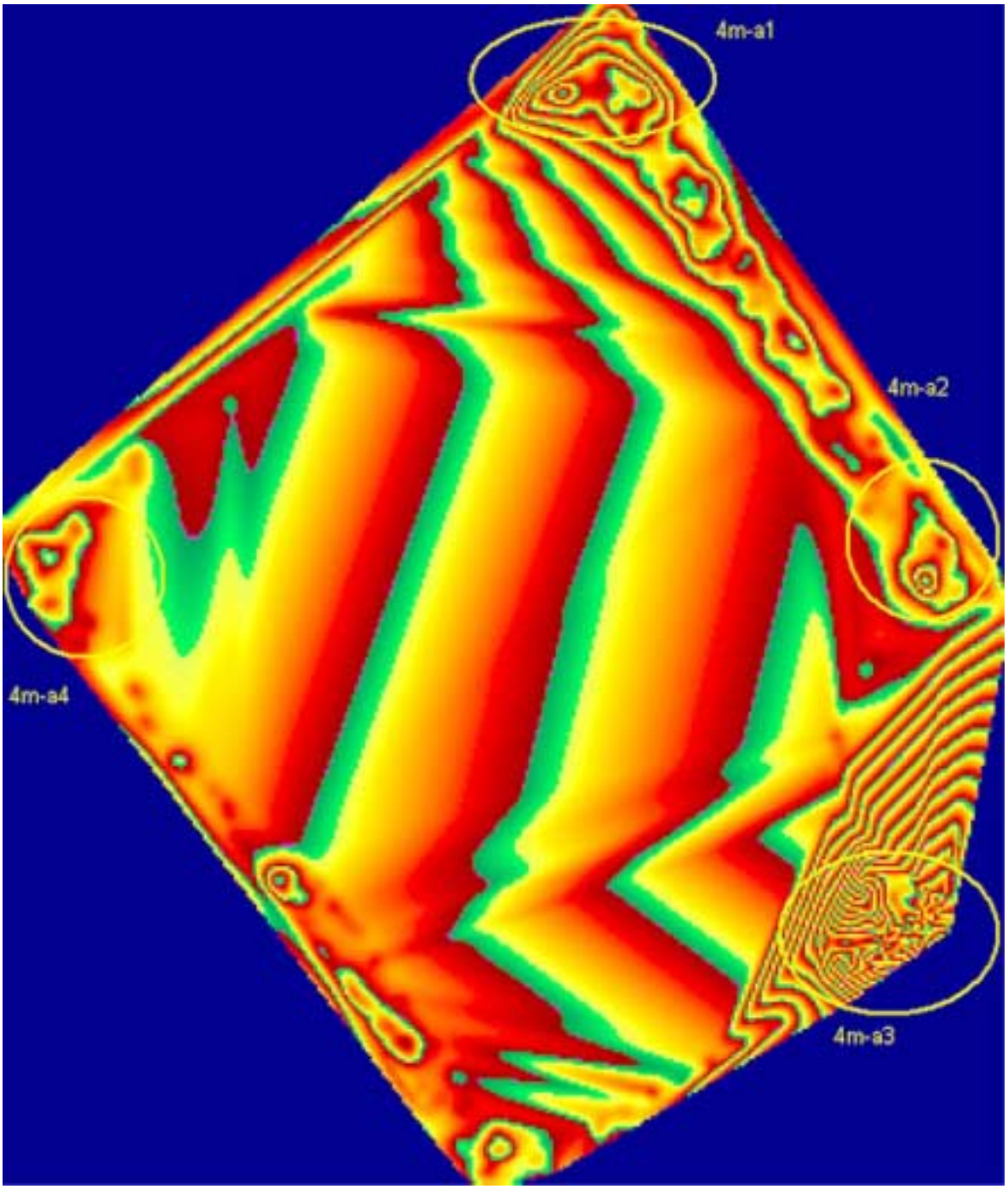


FIGURE 18 – ANOMALOUS AREA SELECTION

Weir Areas —Weirs are located directly opposite the outfall points in the ponds and therefore considered extremely unlikely to contain outfall material (directly deposited or from a Mode 1 redistribution by heavy equipment). The weir locations are known to have high anomaly densities attributable to remaining weir construction debris. Any OE resulting from Mode 2 redistribution (hand placement) of material should have been identified by the UXO SI survey or during the subsequent visual inspection of the pond berm.

Western Pond Berms —The western berms were also considered unlikely to contain OE since they are positioned opposite outfall points in the ponds and do not support a Mode 1 emplacement of material by heavy equipment during pond recycling operations. The 43 MK26 anomalies excavated during the UXO Intrusive Investigation and also the 325 EM61 validation grid anomalies that were excavated by the current OE survey support this reasoning since no OE was identified (with the exception of the single item discussed in the following paragraph).

OE was located at three non-outfall locations during the previous 1998-2001 investigation of documented UXO SI anomalies. Two of the 3 sites were independently identified and selected as high density anomalous areas (4M-A1 and 4M-A2 on Figure D1 of Appendix D) during the current OE survey. The third site where an unfuzed 81 mm mortar round had been recovered appeared to fit an OE deposition Mode 2 scenario since it was located on the surface, away from an outfall location, and was not associated with other metallic debris. This site was not selected for removal due to its location adjacent to a weir along the western berm of Dredge Pond 1 and because of its unique OE distribution characteristics (location and lack of associated debris).

The eastern berms represented a different situation in that two discrete anomaly densities were evident from analysis of available data. The low density areas along the eastern berms appeared to fit the same model as the western berms; review of UXO Intrusive Investigation MK26 anomaly records and EM61 validation grid data showed that a total of 301 anomalies (155 MK26 and 146 EM61) had been investigated without a single OE find. These areas and the higher density areas seemed to fit a Mode 1 (heavy equipment) dispersion model.

OE-Cleared Outfall Locations —The high anomaly density in pond bottom areas near the outfall points is attributable to metal debris generated by previous OE screening operations. The outfall material and associated soil in these areas has already been excavated and hand sorted to

remove all OE material. This level of clearance is considered more effective than the use of any geophysical instrument.

All facts being considered, the number of remaining anomalous areas that were considered most likely to represent OE were reduced to seven. These areas, designated as 2S-A1, 3N-A1, 3W-A1, 4N-A1, 4N-A2, 4M-A1, and 7-A1 on the figures in Appendix D, were chosen since they representee high density anomaly sites. In addition, an eighth high density anomalous area designated as 2N-A2 in Appendix D, was chosen to confirm the outfall distribution model since it represented a Western Levee site where OE was not considered likely to exist. Application of the site anomaly model to the selection process will provide a minimum 95% Pd for OE-like items in the anomalous areas.

7. OE REMOVAL ACTION

The OE removal action began on Monday January 21, 2002 and proceeded in accordance with the approved Removal Action Work Plan (Weston, 2001c) until its completion on January 25, 2002. The locations of anomalies designated for investigation and removal in each of the eight high density anomalous areas were identified using DGPS and marked with fiberglass flags. Field work was coordinated so that the excavation of anomalies in each area could be accomplished simultaneously while another group of anomalies were being marked in the next area.

The location of each anomaly was reverified using a MK26 magnetometer or AN-19/2 metal detector prior to beginning the excavation. When a target could not be located within 18 inches of the anomaly flag, the location was excavated to allow the detection of any metallic material to the 4 foot depth limit of the removal action. The position of each anomaly that could not be located was reverified and the anomaly status resolved before being closed out. Detected anomalies were excavated down to a depth of 4 feet; anomalies not exposed but still detectable at 4 feet were pursued to a maximum depth of 5 feet. Anomaly “dig sheets” identical to those used during the validation phase of the project were utilized to record all pertinent anomaly information (including the future disposition for recovered OE items).

OE removal teams included a UXO Specialist team leader, an equipment operator, and a spotter/laborer. A combination of heavy equipment and hand tools was utilized to remove overburden and expose the anomalies. Identified OE items were removed and evaluated by a UXO Specialist before being packaged and transported to Magazine A180 for temporary storage pending thermal treatment.

FIGURE 19 – AREA 4M-A1 OE REMOVAL SITE

A total of 484 anomalies were investigated in the eight designated high-density anomalous areas shown on Figures D1 and D2 of Appendix D. Seven OE items were recovered during the removal action (see Table 3), including five 20 mm rounds and two 20 mm projectiles. Figure 20 illustrates the single 20 mm projectile recovered from the surface in area 4M-A1 on January 22, 2002. The projectile was badly deteriorated and broke into pieces while being packaged for transport. This specific item had not been identified as a target anomaly, possibly due to its advanced stage of deterioration and low remaining mass. An additional 1,322 lbs of inert

metallic debris was also recovered during the removal action. A complete summary of anomaly "dig sheet" data recorded for each of the excavated anomalies is included as Appendix E.

TABLE 3 – RECOVERED OE SUMMARY

Pond	Validation Anomaly	Removal Anomaly	Item Description(s)
4N	N/A[1]		20 mm projectile
		4N-A1-13	20 mm round
4M		4M-A1-50	20 mm round
		N/A[2]	20 mm projectile
		4M-A1-148	20 mm projectile
7		7-A1-10	20 mm round
		7-A1-20	20 mm round
		7-A1-22	20 mm round

1. Recovered adjacent to Validation Grid 4N during evaluation/validation phase of the Confirmation Survey (not an identified anomaly).
2. Badly deteriorated projectile was not associated with an identified anomaly.

8. CONTAMINANT SCREENING

Field screening for potential site chemical contaminants was not required since no indications of suspect soil or water were observed during the project. Each excavation and all disturbed soil was monitored using handheld Ludlum Model 19 micro-R meters to identify any remaining low level radiological items that may have been present. No radiological anomalies warranting further investigation were encountered.

FIGURE 20 – AREA 4M-A1 20 MM PROJECTILE

9. DISPOSITION OF RECOVERED MATERIAL

Material recovered from the site was categorized as either hazardous ordnance material (OE), non-hazardous ordnance material (inert ordnance scrap), non-hazardous non-ordnance material, or hazardous non-ordnance material (e.g., radiological items, chemically contaminated soil, etc.).

Hazardous Ordnance Material—The recovered OE material identified by the UXO Specialists was packed with inert filler material into metal containers and sealed. The containers were then labeled and transported to Magazine A180 for temporary storage pending thermal treatment at the onsite disposal range. Recovered OE material is summarized in Table 3.

Non-Hazardous Ordnance Material—Ordnance related items inspected by UXO Specialists and determined not to pose an explosive hazard*)* were placed in a sealed container pending transfer for offsite recycling or disposal through an authorized ordnance scrap disposal contractor. Written certification by the SUXOS verifying the material to be non-hazardous is available. Recovered items are summarized in Table 4.

Non-Hazardous Non-Ordnance Material—Approximately 1,542 lbs of recovered general metallic scrap and debris was placed in bins for recycling or disposal.

H*azardous Non-Ordnance Material*—No hazardous materials, including low level radiological items, were encountered during the survey or removal.

TABLE 4 - RECOVERED ORDNANCE SCRAP SUMMARY

Validation Anomaly ID	Removal Anomaly ID	Dredge Pond	Description
	2NA2-42	2N	.45 caliber pistol cartridge case
DP2S10		2S	.30 caliber Rifle bullet
DP2S31		2S	.30 caliber Carbine bullet .30 caliber Rifle bullets (2 ea)
	2SA1-23	2S	.50 caliber machine gun cartridge case
	2SA1-26	2S	.50 caliber machine gun cartridge case
	3NA1-8	3NW	.30 caliber Rifle cartridge case
	3WA1-84	3W	40mm ammunition can cover
	3WA1-89	3W	.30 caliber Rifle cartridge case
	4MA1-75	4M	Brass large caliber projectile fuze cap
DP4N2		4N	.30 caliber Carbine cartridge case
DP4N25		4N	20 mm cartridge case
DP4N39		4N	.30 caliber Carbine bullets (2 ea)
DP4N188		4N	.30 caliber Carbine bullet
DP4N206		4N	.30 caliber Rifle bullet
	4NA2-16	4N	.30 caliber Rifle cartridge case
	7MA1-3	7	40mm Bofors cartridge case
	7MA1-4	7	5 inch projectile fuze protector
	7MA1-18	7	.30 caliber Rifle cartridge case

10. QUALITY ASSURANCE

A variety of quality control measures were implemented during the OE Survey and Removal Action.

The following inspections were accomplished during all phases of the project:

- Verify adequacy of initial and daily safety briefings (including OE Identification Training) attended by all field personnel.
- Initially and every 60 days, review training/qualification records of all field personnel and ensure they are trained, qualified, and certified to accomplish their assigned tasks as specified by the HASP and that the qualifications are current.
- Review Field Team Logbooks weekly for completeness and accuracy.
- Verify compliance with the HASP daily by document review and/or field observations.
- Assure appropriate site security (including establishment of adequate ESQD safety arcs when appropriate) daily by field observations.
- Review data management practices daily to verify the clarity and integrity of data.

During the EM61 survey, the following inspections were conducted:

- Daily verification of satisfactory EM61 operation and ability to acquire a test plot target.
- Daily verification that all EM61 instruments were within factory calibration period.

During the excavation and investigation of anomalies in the validation grids and during the OE removal action, the following inspections were conducted:

- The accuracy of anomaly DGPS locations was verified weekly.
- The adequacy of anomaly evaluation, identification, and recording was verified weekly (10% sampling) by a review of completed anomaly "dig sheets" and by observing anomaly removal operations to ensure that accurate and complete anomaly data was recorded.
- Satisfactory MK26 and AN-19/2 operation and ability to acquire a test plot target was verified daily.

- A verification that all MK26 instruments were within factory calibration period was accomplished daily.
- Site communications were verified daily by contacting the site administration facility.

No significant quality issues were noted during the project and program quality control objectives were satisfied.

11. SITE RESTORATION

All validation grid and removal action excavations were backfilled using native pond soil to restore their original surface contour. Care was taken not to disturb soil or vegetation in endangered species habitat areas adjacent to the ponds.

12. DEVIATIONS FROM THE WORK PLAN

The following areas included in the OE Confirmation Survey Work Plan were not surveyed at this time:

- Limited eastern berm slopes of Dredge Ponds 4M and 4N (unsafe slope to support use of geophysical survey equipment)
- Dredge Pond 3NW bottom (excessive vegetation and wildlife habitat concerns)
- Dredge Pond 7S berms and bottom (excessive vegetation, wildlife habitat concerns, and not within pond early transfer boundaries)
- Limited northern berm exterior slopes of Dredge Pond 7 (excessive vegetation and/or unsafe slope to support use of geophysical survey equipment)
- Dredge Pond 3E berms east of the Joy Survey Line (excessive vegetation, wildlife habitat concerns, and not within pond early transfer boundaries)
- "Historical dredge pond areas" adjacent to Dredge Ponds 3E and 3W (excessive vegetation, wildlife habitat concerns, and not within pond early transfer boundaries)
- Limited berm slopes and interior perimeters of Dredge Ponds 1, 3E, 3W, and 3NW (excessive vegetation and wildlife habitat concerns and/or unsafe slope to support use of geophysical survey equipment)
- Dredge Pond 1 landfill exclusion area boundary (excessive vegetation and wildlife habitat concerns)

13. CONCLUSIONS

The conclusions of the OE Confirmation Survey and the of the subsequent OE Removal Action are as follows:

- The OE Confirmation Survey and the modeling of the obtained data identified 8,983 total anomalies and 3,889 OE-like metallic anomalies over the 120-acres of surveyed dredge pond area. The anomaly validation process predicted the ratio of actual OE to OE-like anomalies of 1 to 91, equivalent to 43 OE items within the surveyed area.
- To further validate the model, 826 anomalies were investigated during the OE Confirmation Survey and OE Removal Action (approximately 10% of the total anomalies corresponding to a 95% probability of detection). Only eight 20 mm rounds were recovered. The ratio of actual OE to OE-like anomalies (1:103) is consistent with the predicted ratio of 1 to 91.
- Only 20 mm unfired anti-aircraft rounds were recovered during the OE Confirmation Survey and OE Removal Action. This is consistent with the previous UXO Intrusive Investigation, during which over 90% of the recovered 1,528 OE items were 20 mm unfired anti-aircraft rounds. None of the items removed during the current or prior investigations are classified as UXO. The OE removed from the dredge pond areas presents a minimal risk to the public compared to UXO, which are found at impact ranges and detonation sites.
- No identifiable soil contamination (stains, odors, changes in texture) was detected during the geophysical survey or the removal action.

The OE Confirmation Survey and Removal Action established the fact that the previous OE removal was greater than 99% effective. Conducting further removal actions will not be cost-effective compared with the resulting incremental reduction of risk to human health and the environment. The remaining OE risk is extremely low and acceptable, particularly in view of the land use restrictions planned for the property after transfer from Government control.

GLOSSARY OF TERMS

ANOMALY - An object or area suspected to represent OE material because of historical evidence and/or physical characteristics such as location, geophysical characteristics, or other properties.

CALIBER - The diameter of a small arms projectile as expressed in hundredths of an inch (e.g., a ".30 caliber" projectile is 0.30 inches in diameter)

DIFFERENTIAL GLOBAL POSITIONING SYSTEM (DGPS) - A radio receiving system which utilizes positioning data from a constellation of orbiting satellites together with correction data from a local fixed station to precisely determine location.

EXPLOSIVE - Chemical compound or mechanical mixture which, when subjected to heat, impact, friction, detonation or other suitable initiation, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases which exert pressures in the surrounding medium.

FUZE - The component of a projectile, bomb, or other explosive device designed to initiate the explosive sequence leading to detonation of the device's main charge. Fuzes usually contain very sensitive and energetic explosive materials.

HIGH EXPLOSIVE – A substance that, once initiated, reacts with virtually instantaneous and continuous speed through the total mass, causing very high blast pressures and a widespread shattering effect.

INERT - The term used to describe ordnance that does not contain explosive or other energetic material. Ordnance is considered to be live unless certified inert by competent authority (qualified Explosive Ordnance Disposal personnel).

MAGAZINE -Building or structure used for the storage of ammunition and explosives.

ORDNANCE - Any device (or component of a device) which contains or is designed to contain explosive material. This includes propellant, projectiles, bulk explosive, primers, fuzes, small arms ammunition, pyrotechnics, etc.

ORDNANCE AND EXPLOSIVES (OE) – Defined by the U.S. Army Corps of Engineers (USACE, 2000) as either: (1) Ammunition, ammunition components, or explosives that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried, or fired and are no longer under accountable record control of any DOD organization or activity; or (2) explosive soils (mixtures of explosives in soil, sand, clay, or other solid media at concentrations such that the mixture itself is explosive).

PROJECTILE - Component which is launched by a firing device (rifle, pistol, cannon, etc.) toward a target. Projectiles can be inert or can contain explosive materials (fuze, booster, main charge, etc.). Most projectiles 20 mm and larger contain explosives.

PROPELLANT - The rapidly burning explosive material contained in cartridge cases (small arms ammunition) and powder bags (larger caliber gun ammunition) which provides the energy to transport the projectile from the gun barrel to the target. Propellant found at Mare Island is comprised of powder "grains" ranging in size from fine particles (small arms ammunition) to cylinders approximately 2 inches in length and 7/8 inch in diameter (16 inch gun).

PYROTECHNICS - Ammunition containing compositions designed to produce illumination and/or smoke effects for marking, signaling, or incendiary purposes.

RDX (CYCLOTRIMETHYLENE-TRINITRAMINE) – A primary explosive constituent of many military high explosives when blended with other explosive ingredients, desensitizers, or plasticizers.

EXPLOSIVE SAFETY QUANTITY-DISTANCE – A safety zone established around explosive facilities or operations to minimize property damage and personnel injury in the event of an accidental detonation.

SMALL ARMS AMMUNITION - Ammunition up to .50 caliber designed for use in man portable weapons (rifles, pistols, shotguns, etc.) consisting of an integral cartridge case, primer, propellant, and inert (non-explosive) projectile that may contain small amounts of tracer or incendiary compounds.

TETRYL (TRINITROPHENYLMETHYL-NITRAMINE) - A relatively sensitive high explosive frequently used in ordnance devices as a booster to detonate the main charge.

TNT (TRINITROTOLUENE) - A main charge high explosive, used alone or in formulation with other compounds to obtain desired explosive properties.

REFERENCES

1. Unexploded Ordnance Site Investigation of Mare Island Naval Shipyard, Vallejo, California - Final Summary Report, SSPORTS Environmental Detachment Vallejo, April 28 1997

2. Mare Island Final Reuse Plan, City Of Vallejo, July 1994

3. Unexploded Ordnance Intrusive Investigation of the Dredge Spoils Ponds at Mare Island, Site-Specific Technical Work Document, SSPORTS Environmental Detachment Vallejo, December 3, 1997

4. Preliminary Assessment, Final Summary Report, Ordnance Sites, PRC Environmental Inc., September 1995

5. Memorandum, UXO Removal in the Dredge Ponds, Department of Defense Explosives Safety Board, July 14, 1998

6. Department of Defense (DOD) Standard 6055.9-STD (DOD Ammunition and Explosive Safety Standard, Department of Defense Explosive Safety Board)

7. Naval Sea Systems Command Ordnance Procedure 5 (NAVSEA OP 5) Volume 1, Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation and Shipping, Seventh Revision, 15 January 2001

8. Department of Defense 4145.26-M, "DOD Contractors Safety Manual for Ammunition and Explosives"

9. Technical Memorandum, Estimation of Ambient Metal Concentrations in Soils at Mare Island Naval Shipyard, PRC Environmental, Inc., December 14, 1995

10. Technical Memorandum, Estimation of Ambient Metal Concentration in Shallow Groundwater at Mare Island Naval Shipyard, PRC Environmental, Inc. dated November 22, 1996

11. EPA National AWQC for Saltwater Aquatic Life Protection (4-day average) (EPA 1980, 1984b, 1986, 1987, and 1989)

12. FEDERAL REGULATIONS

40 CFR 116.....Designation of Hazardous Substances
40 CFR 260-268.....Hazardous Waste Management
40 CFR 300.....National Contingency Plan
40 CFR 355.....Planning and Notification Procedures
40 CFR 370.....Reporting Requirements
40 CFR 372.....Chemical Release Reporting
29 CFR 1910.....Occupational Safety and Health Regulations (OSHA)
29 CFR 1926.....Excavations (Subpart P)
40 CFR 261.....Off-site Transportation of Hazardous Materials and Unexploded Ordnance
49 CFR.....Department of Transportation (DOT), Hazardous Materials Transport

13. U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1 of 3 September 1996

14. STATE REGULATIONS

22 CCR 66261 Identification of Hazardous Wastes
22 CCR 66264 Miscellaneous Units
22 CCR 66680 List of Hazardous Wastes

15. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Public Law 96-510

16. 40 CFR Part 300, 1990, National Oil and Hazardous Substances Pollution Contingency Plan, U.S. Code of Federal Regulations

17. Mare Island Dredge Ponds Ordnance and Explosives (OE) Confirmation Survey Work Plan, Final , Roy F. Weston, September 21, 2001a

18. Unexploded Ordnance Intrusive Investigation of the Dredge Spoils Ponds at Mare Island, Final Summary Report, Roy F. Weston, December 7, 2001b

19. Mare Island Dredge Ponds Ordnance and Explosives (OE) Removal Action Work Plan, Final, Roy F. Weston, November 28, 2001c

20. Mare Island Dredge Ponds Ordnance and Explosives (OE) Confirmation Survey and Removal Action Health and Safety Plan, Final, Roy F. Weston, September 21, 2001d

21. Dredge Spoils Ponds at Mare Island Radiological Investigation Summary Report, Final, Roy F. Weston, December 4, 2001e

APPENDIX A

EM61 ANOMALY DENSITY MAPS

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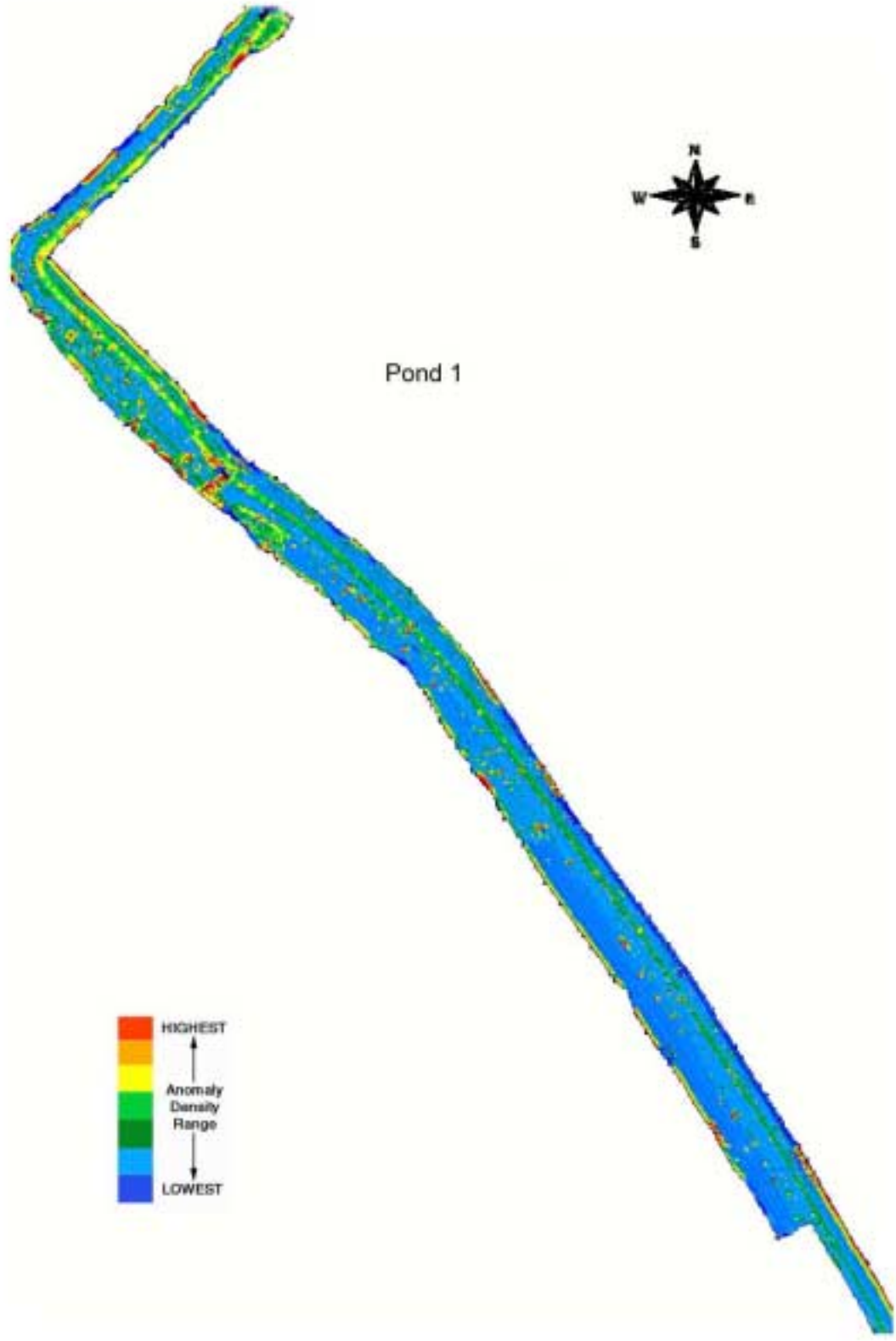

FIGURE A1 – POND 1 ANOMALY DENSITY MAP

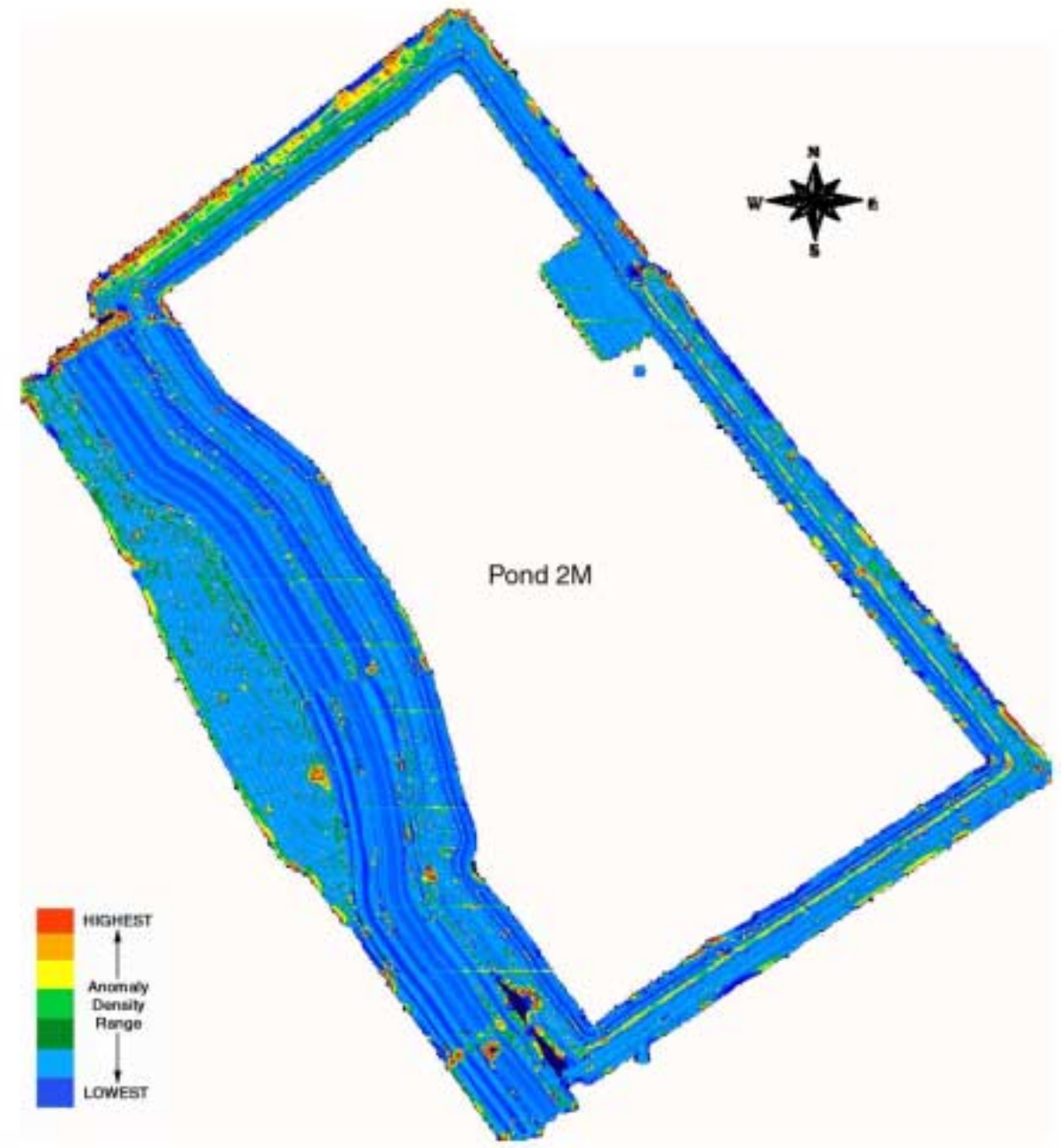

FIGURE A2 – POND 2M ANOMALY DENSITY MAP

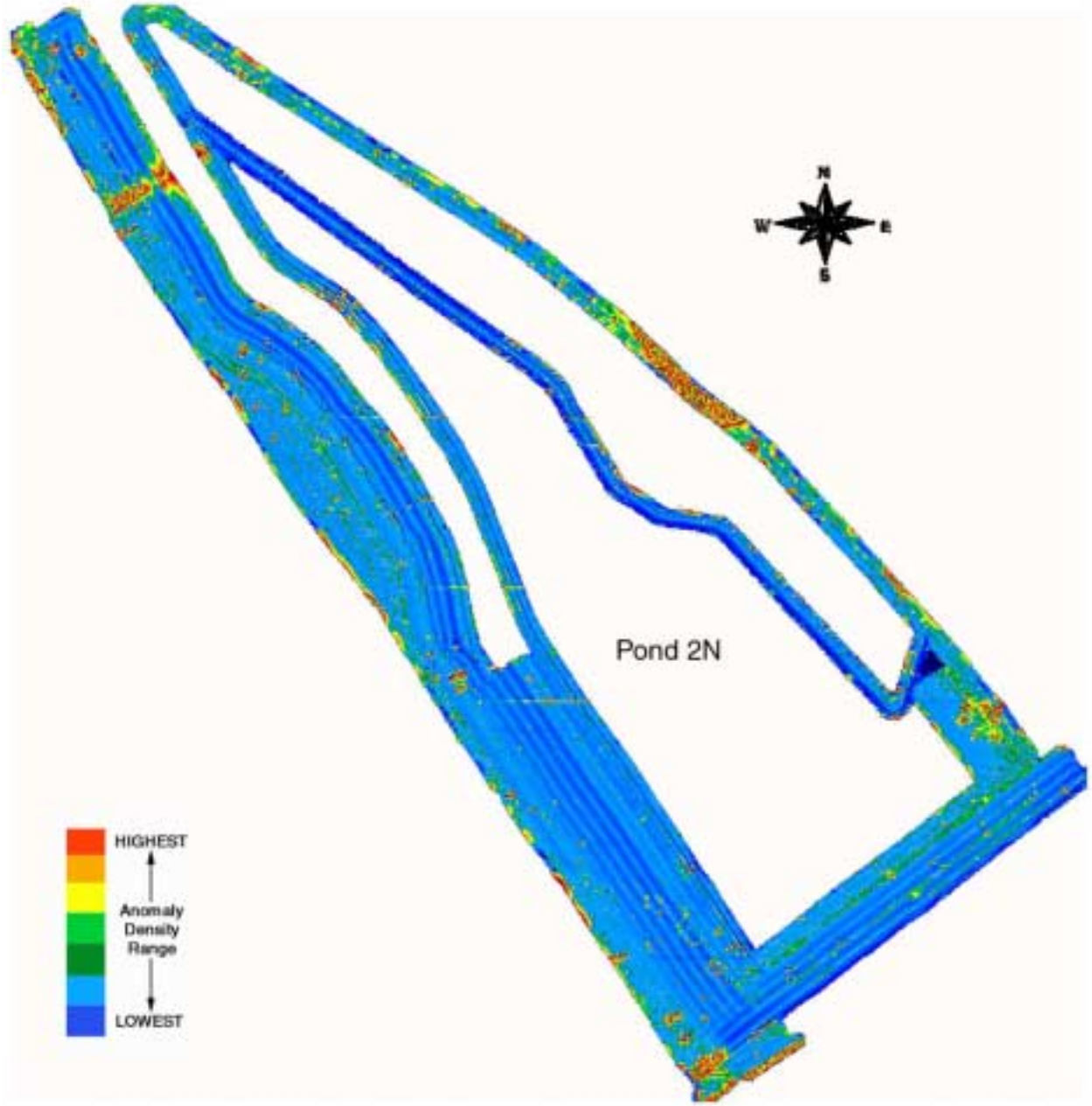

FIGURE A3 – POND 2N ANOMALY DENSITY MAP

FIGURE A4 – POND 2S ANOMALY DENSITY MAP

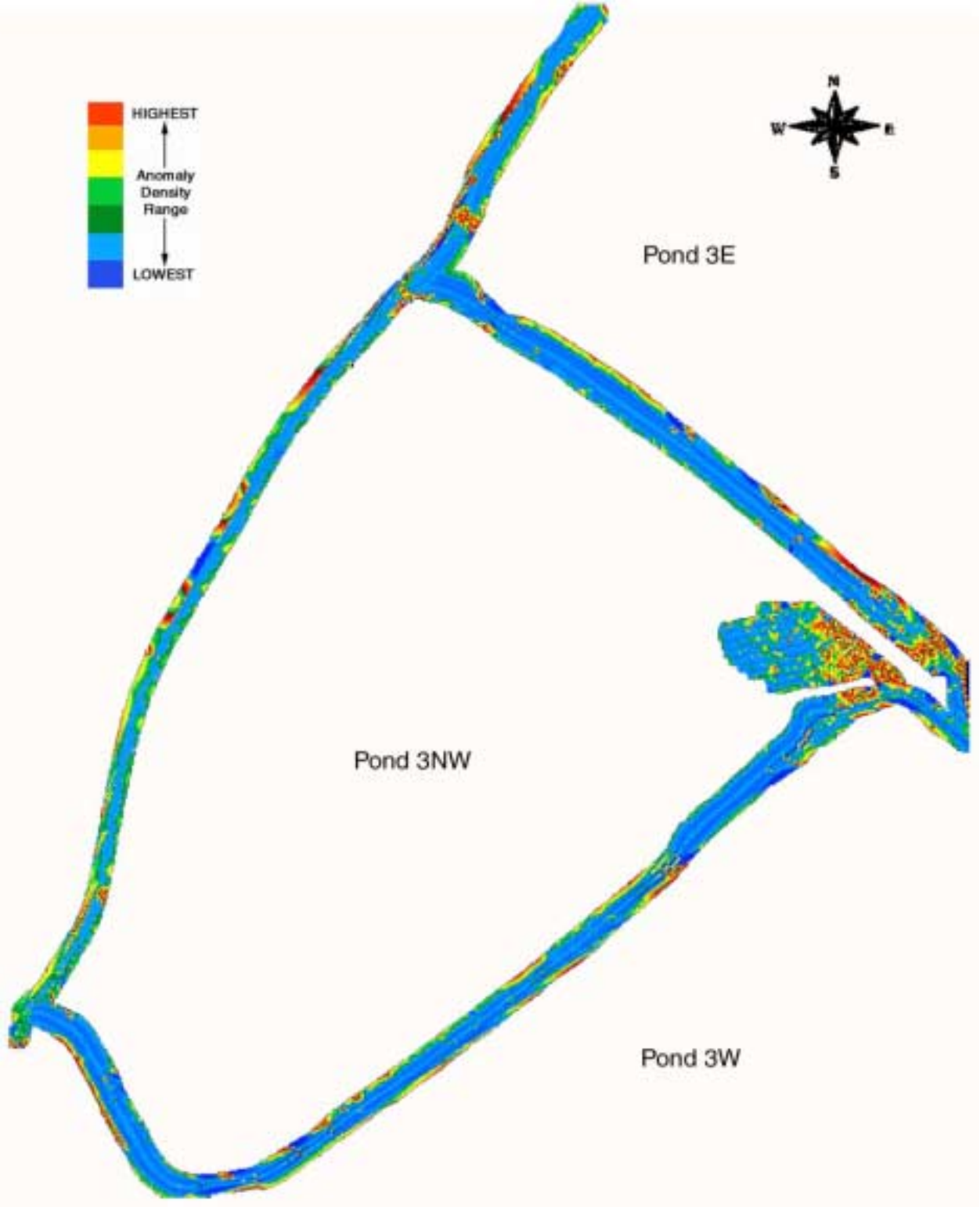

FIGURE A5 – POND 3NW/3E ANOMALY DENSITY MAP

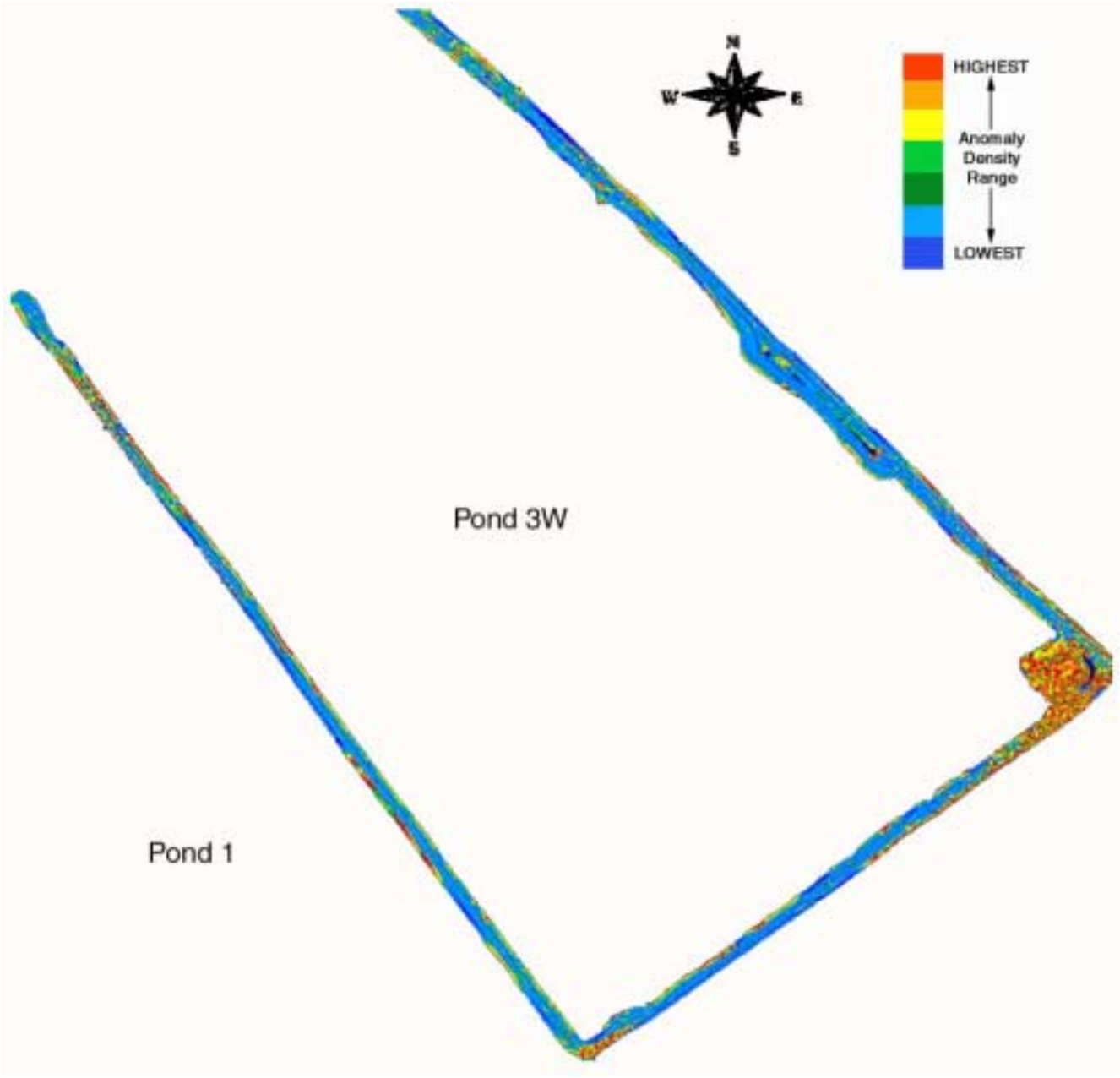

FIGURE A6 – POND 3W ANOMALY DENSITY MAP

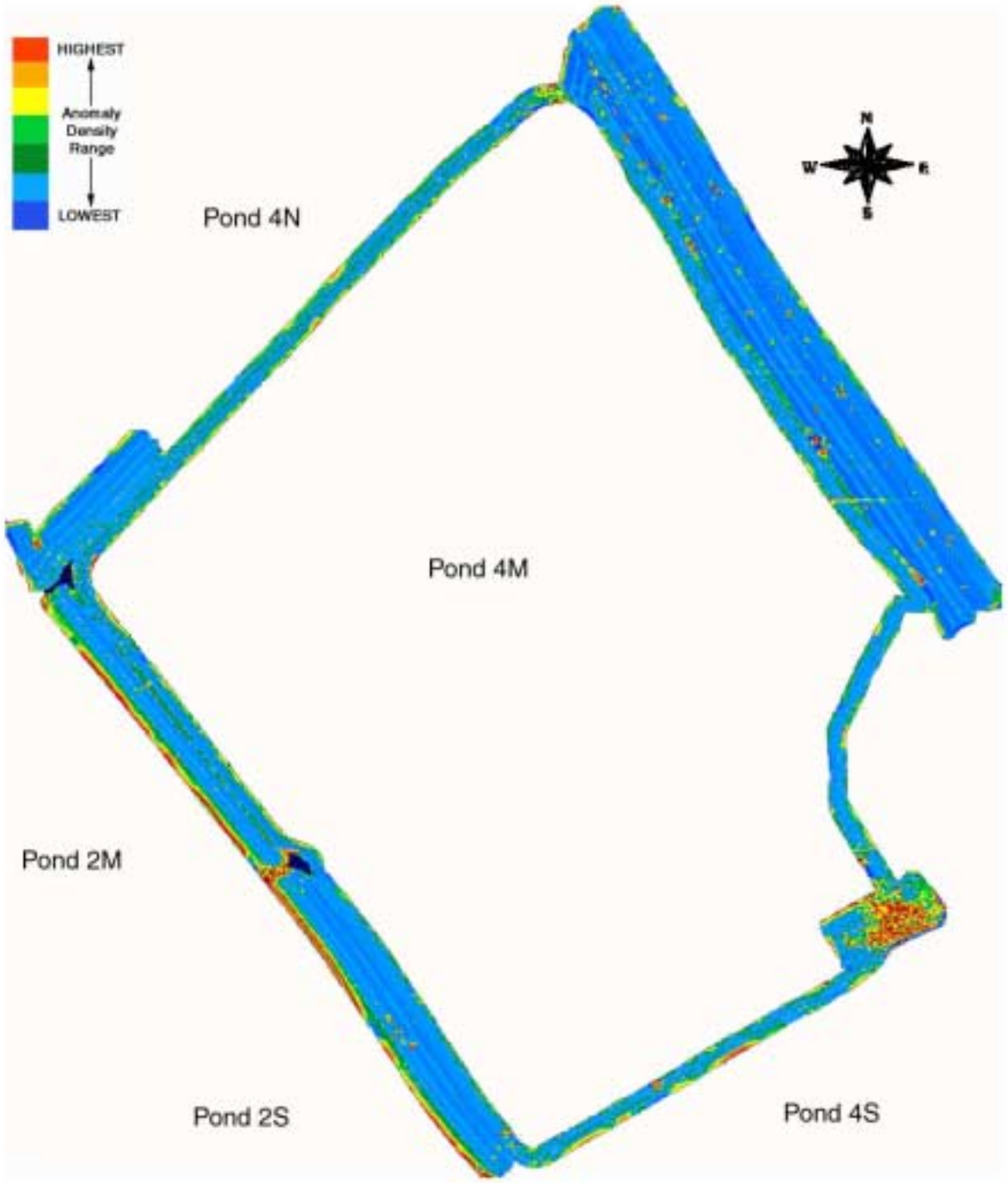

FIGURE A7 – POND 4M ANOMALY DENSITY MAP

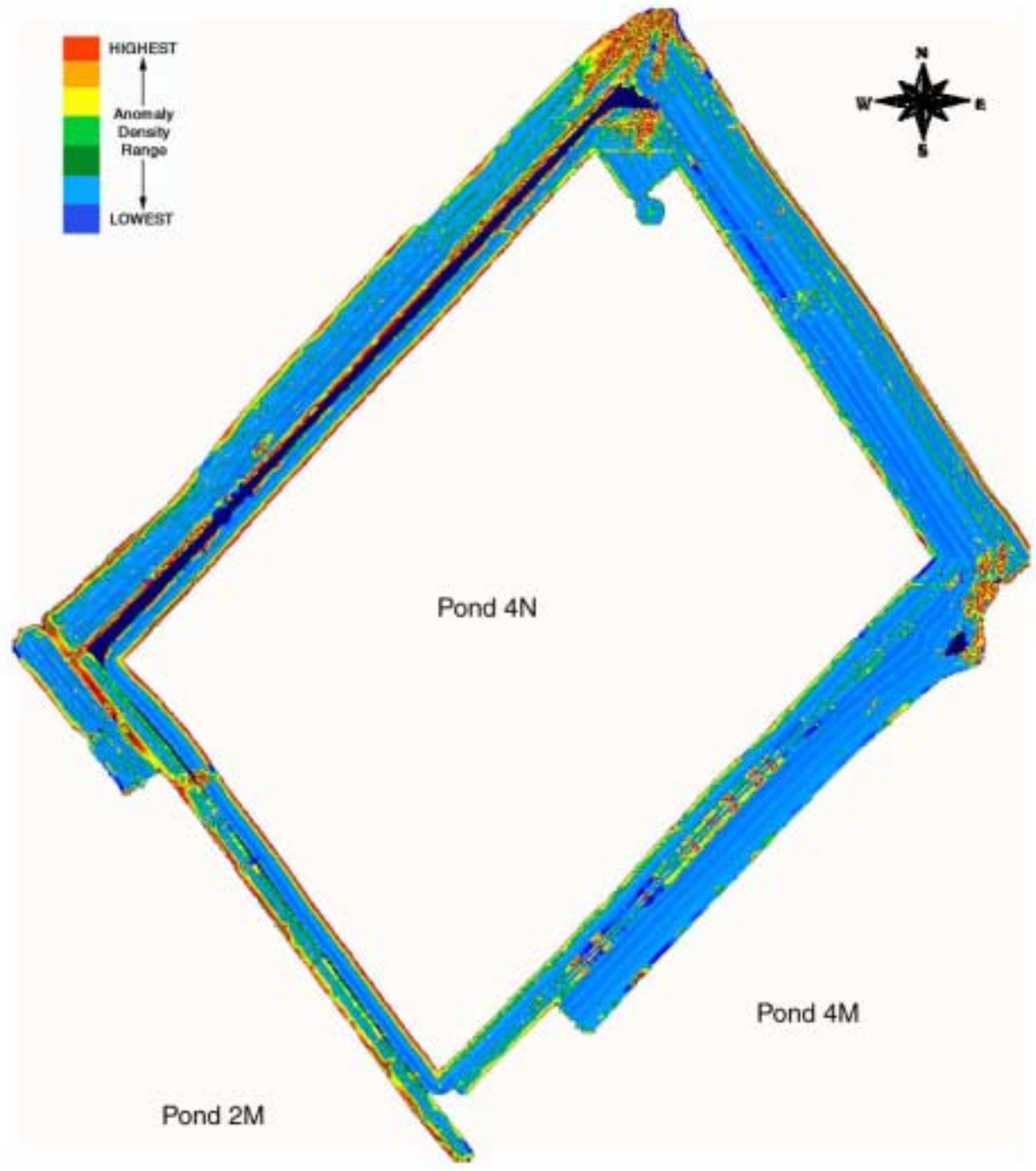

FIGURE A8 – POND 4N ANOMALY DENSITY MAP

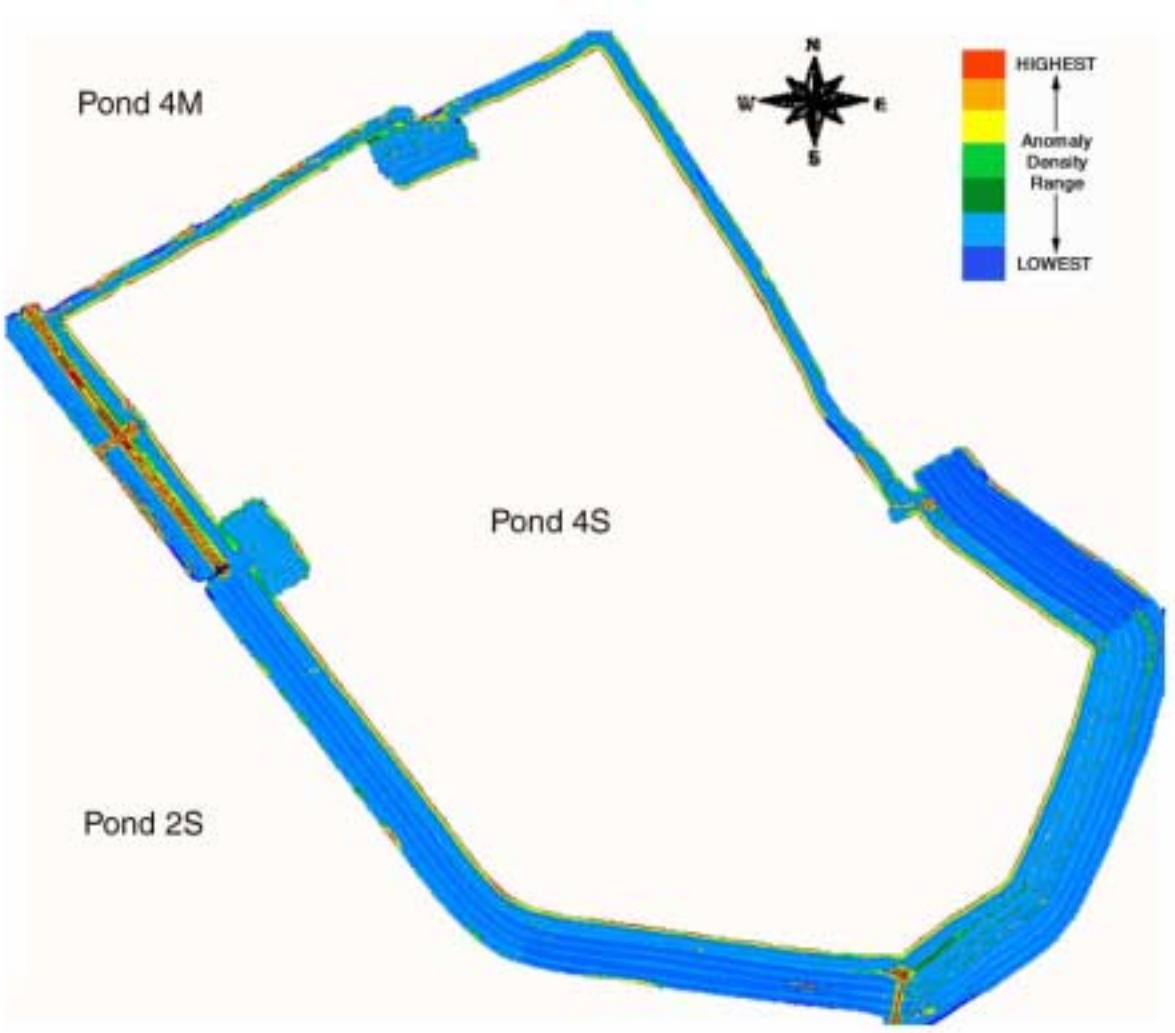

FIGURE A9 – POND 4S ANOMALY DENSITY MAP

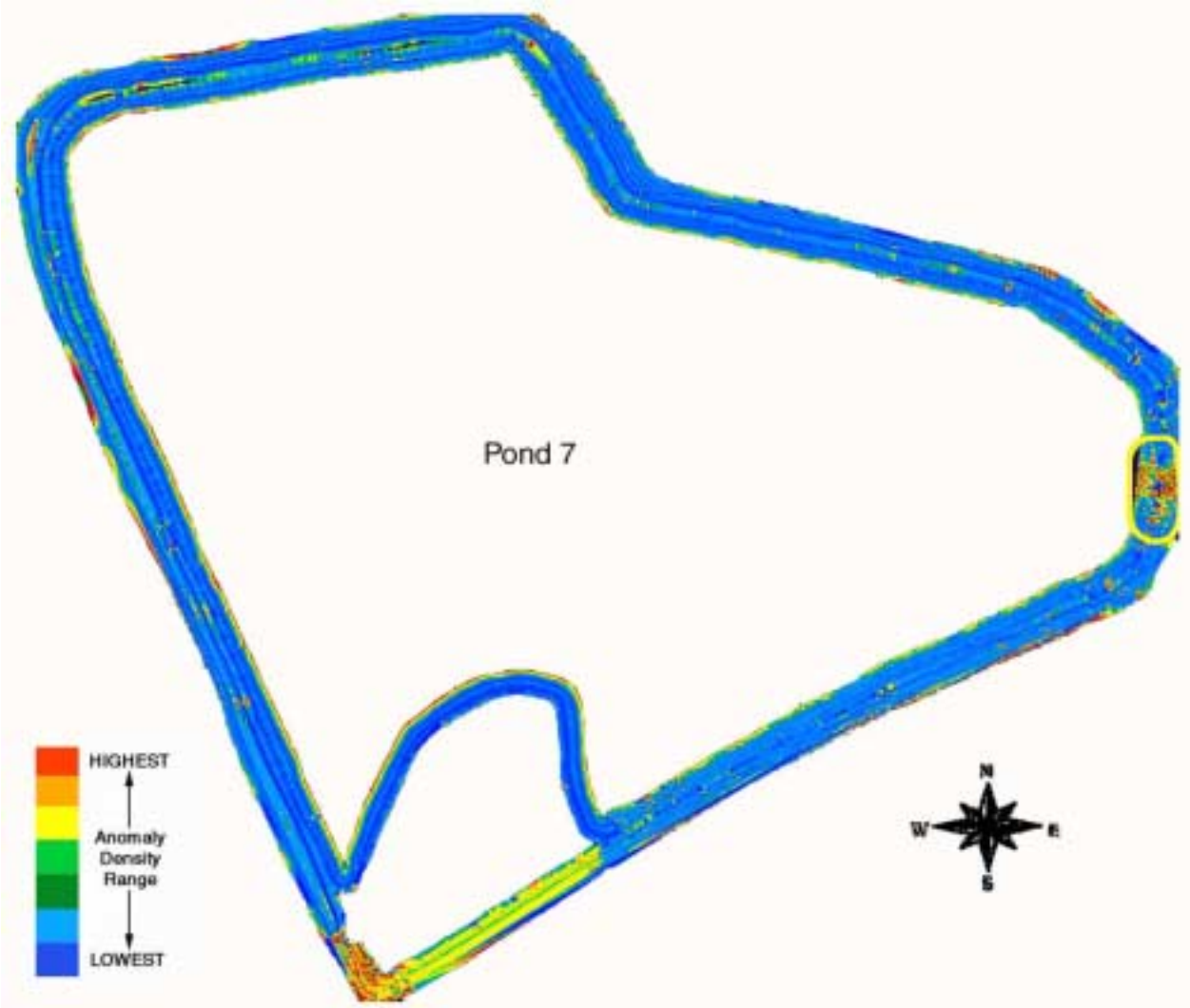

FIGURE A10 – POND 7 ANOMALY DENSITY MAP

APPENDIX B

ANOMALY VALIDATION MAPS

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FIGURE B1 –
VALIDATION GRID LOCATIONS

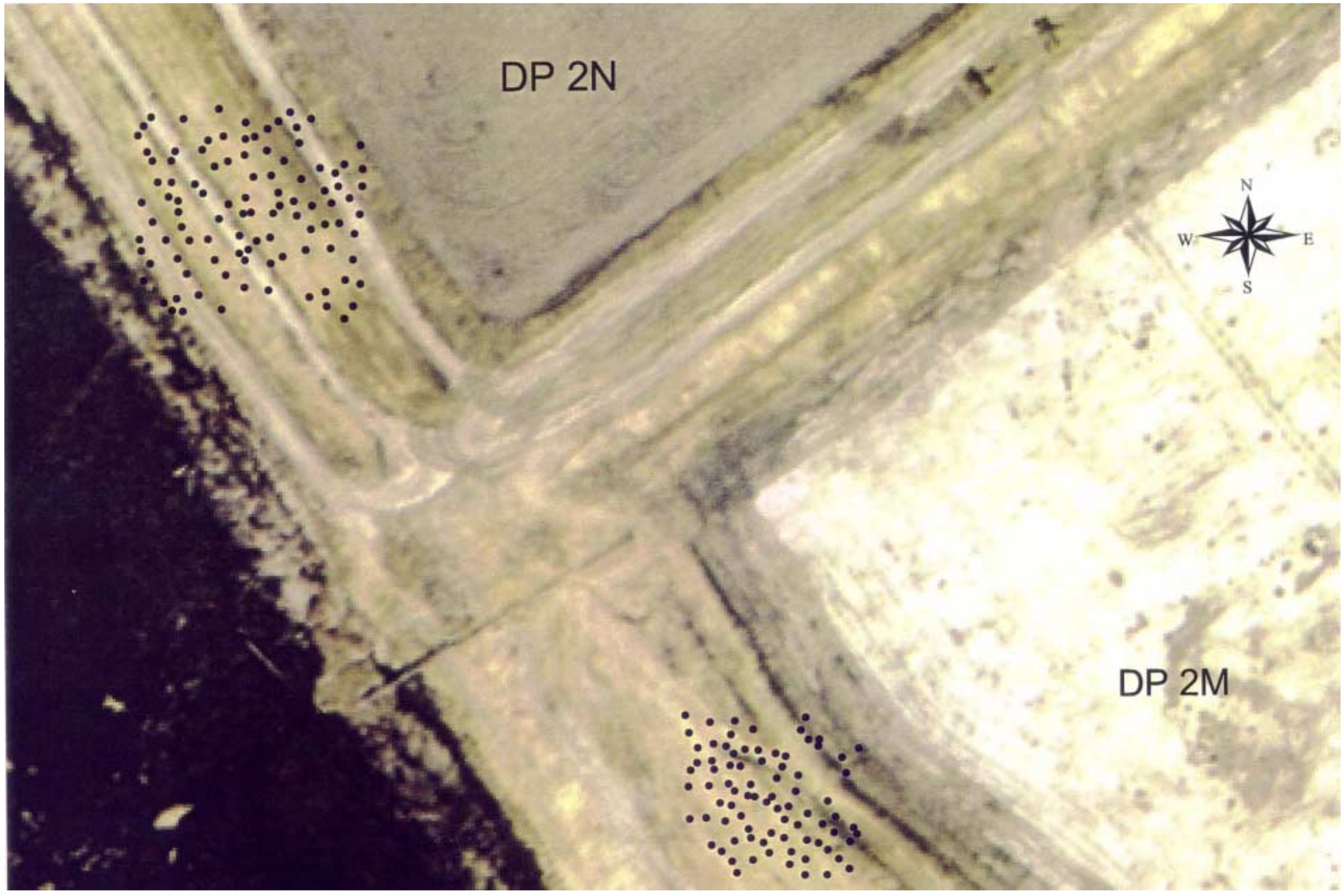


FIGURE B2 – PONDS
2M & 2N VALIDATION GRID LOCATION

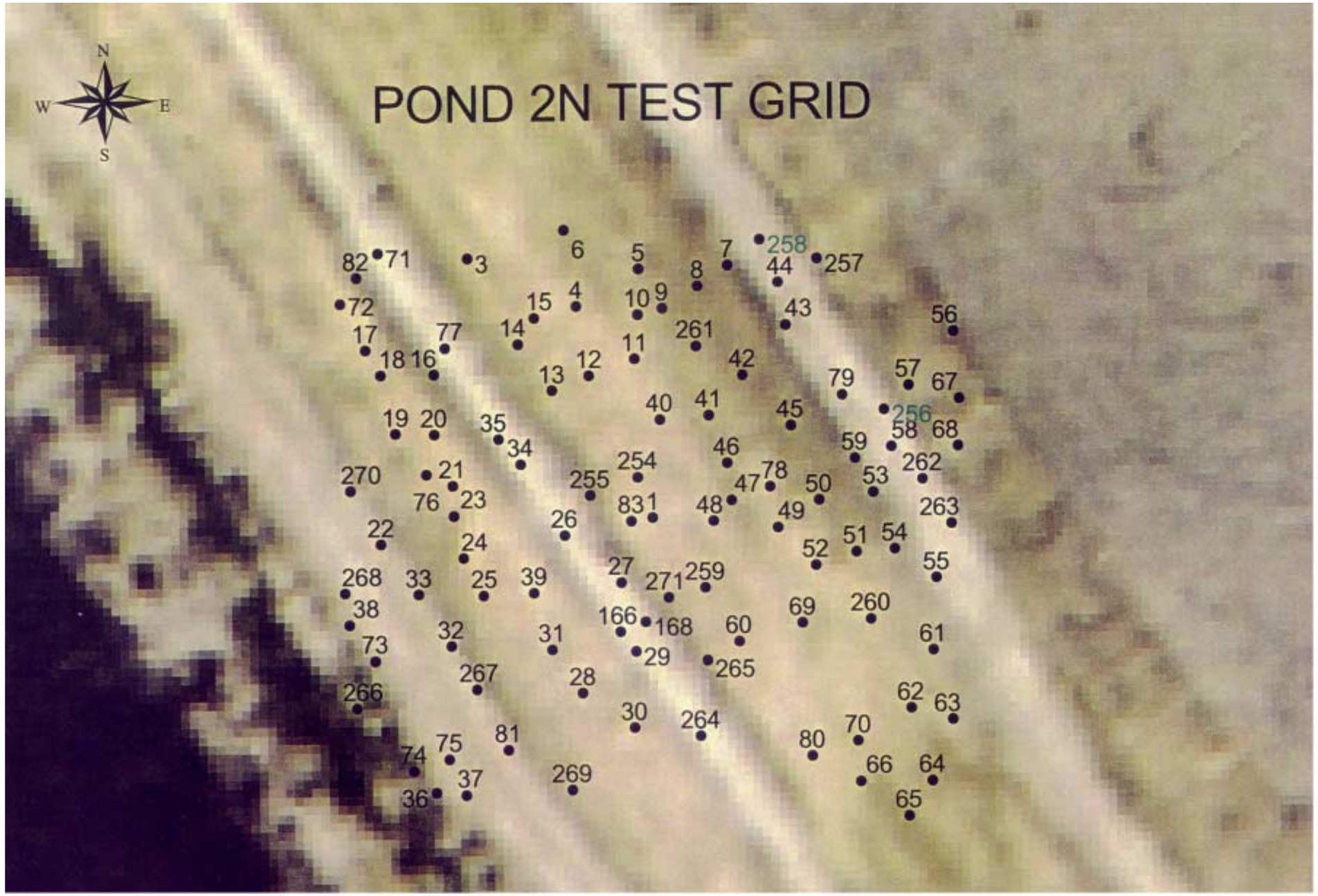


FIGURE B3 –
POND 2N VALIDATION GRID ANOMALIES

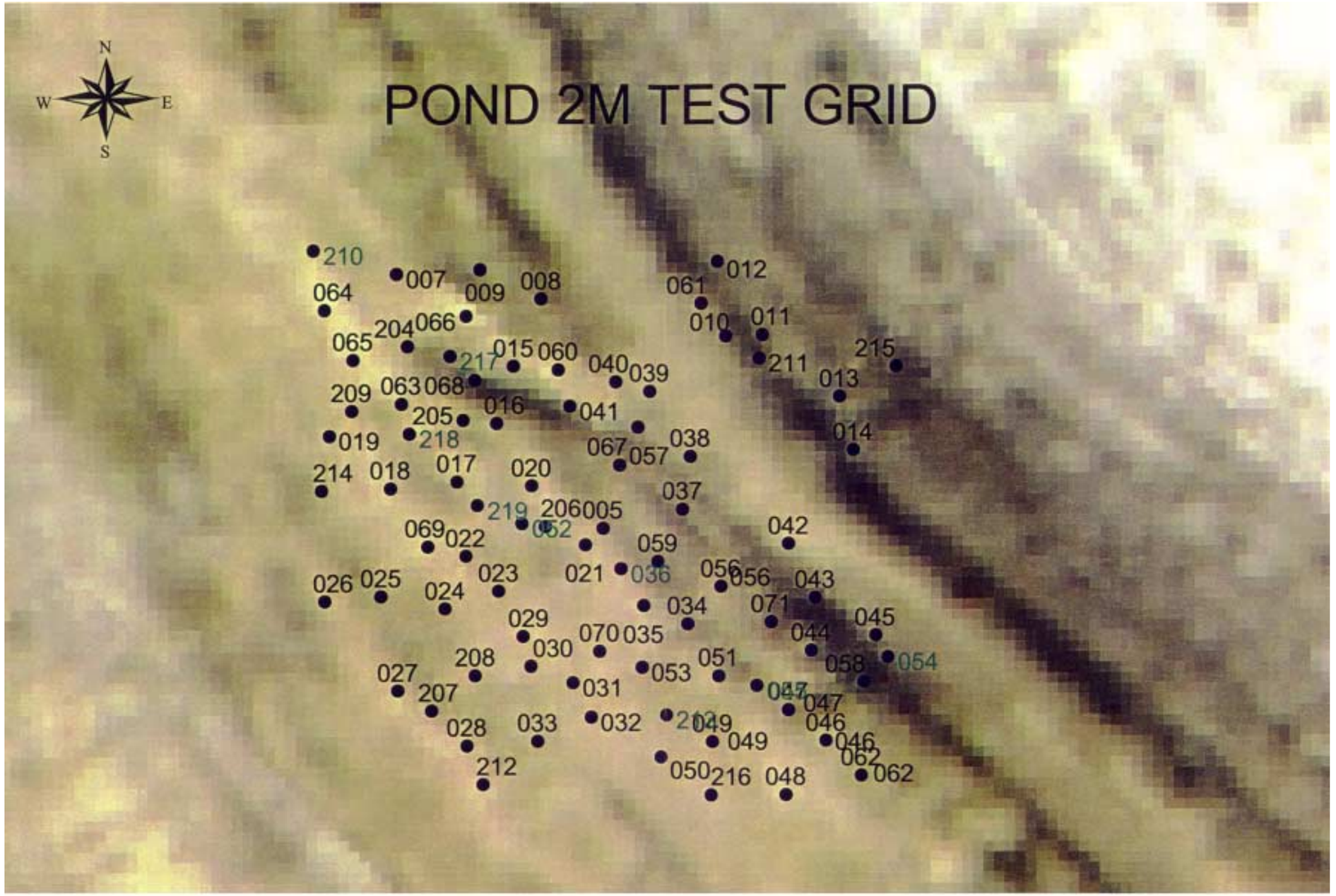


FIGURE B4 – POND
2M VALIDATION GRID ANOMALIES

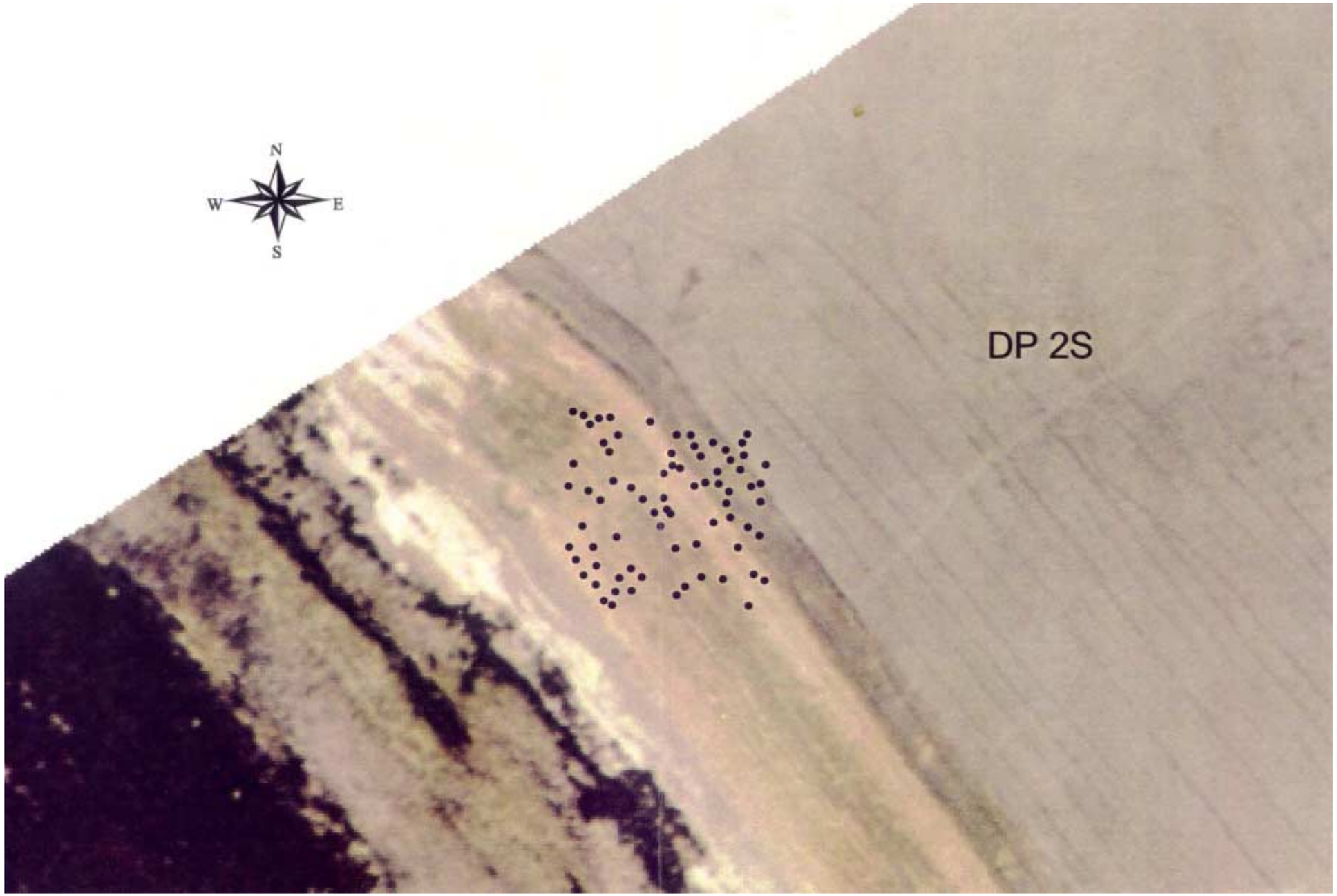


FIGURE B5 –
POND 2S VALIDATION GRID LOCATION

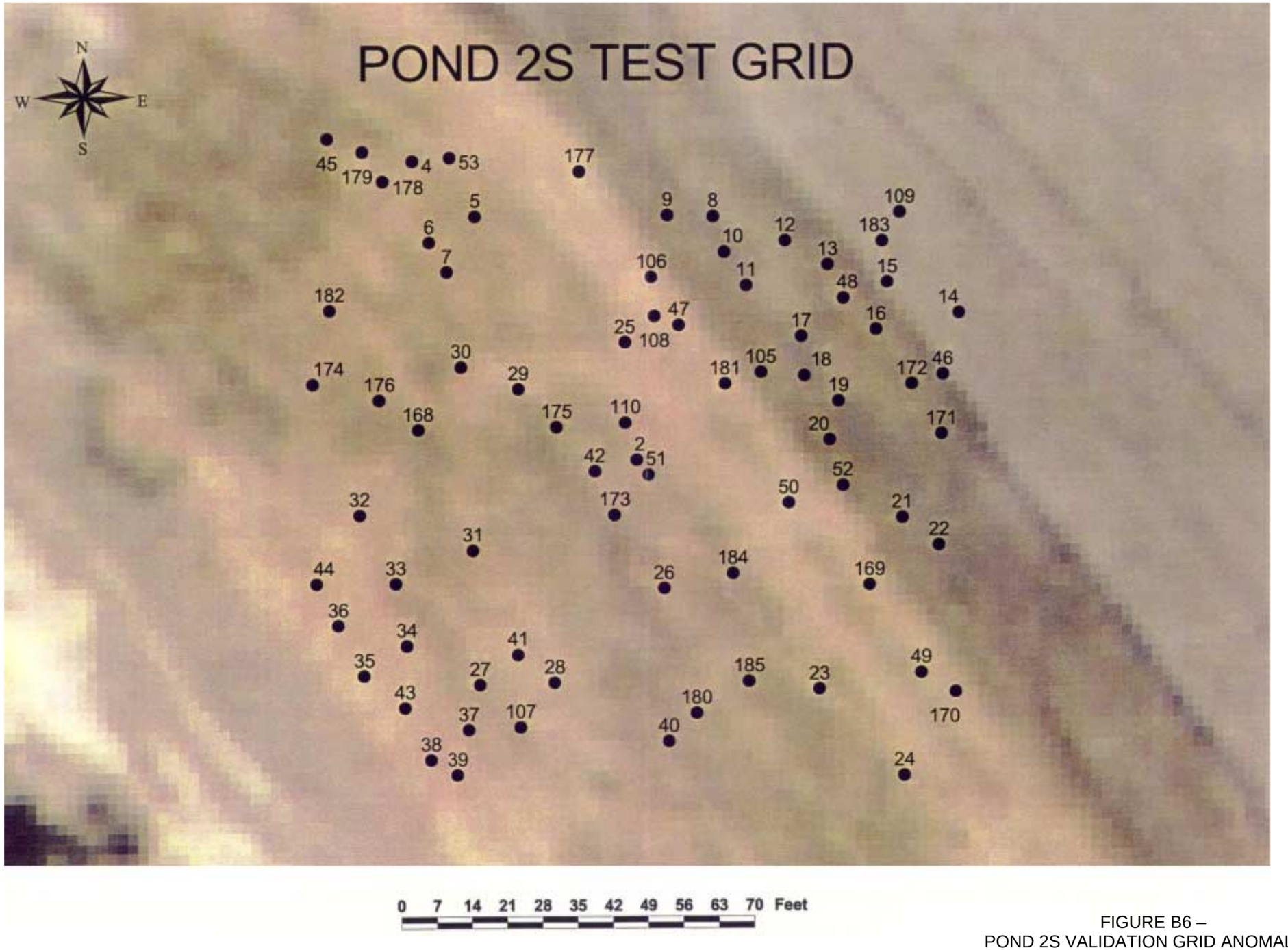


FIGURE B6 –
POND 2S VALIDATION GRID ANOMALIES

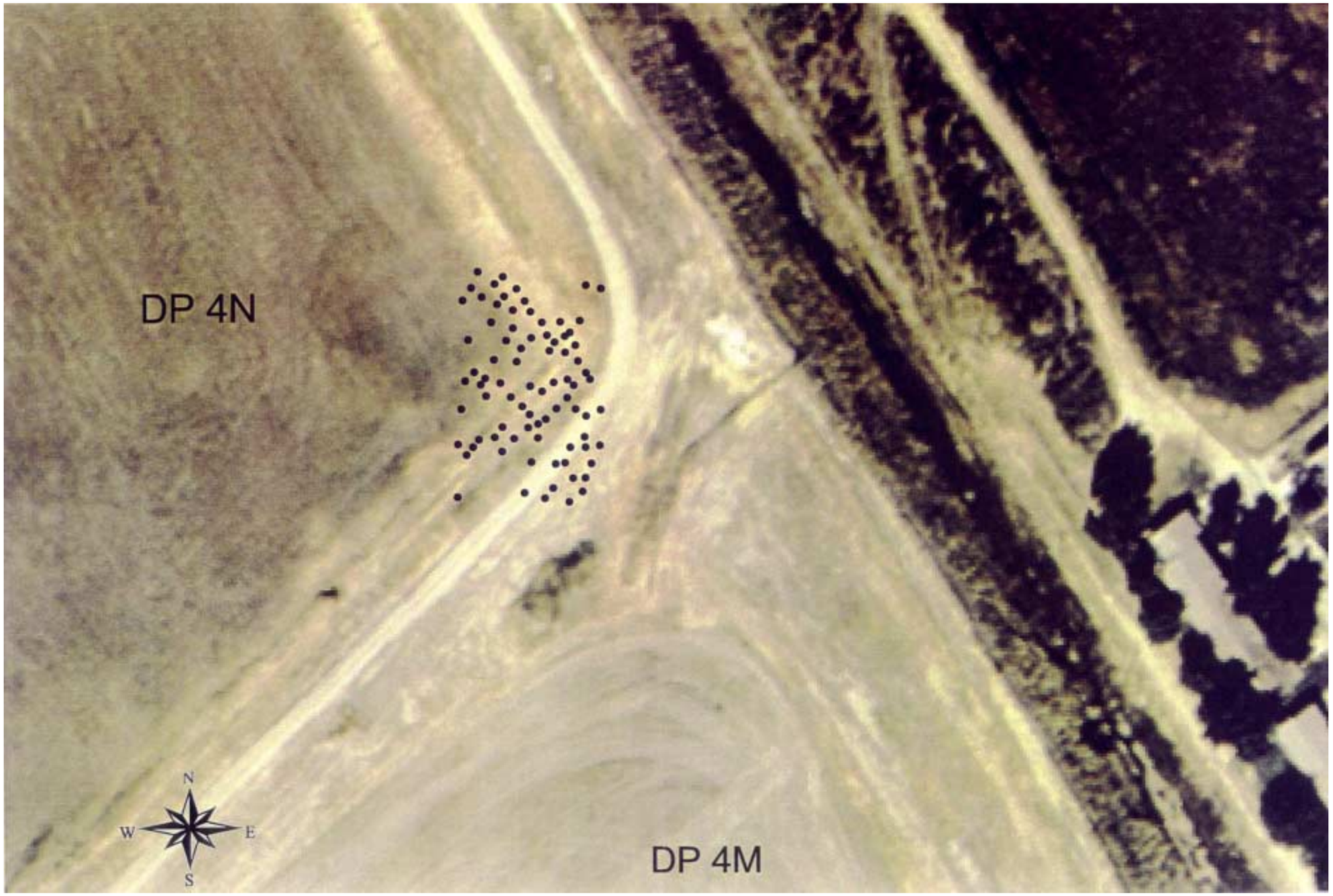


FIGURE B7 –
POND 4N VALIDATION GRID LOCATION

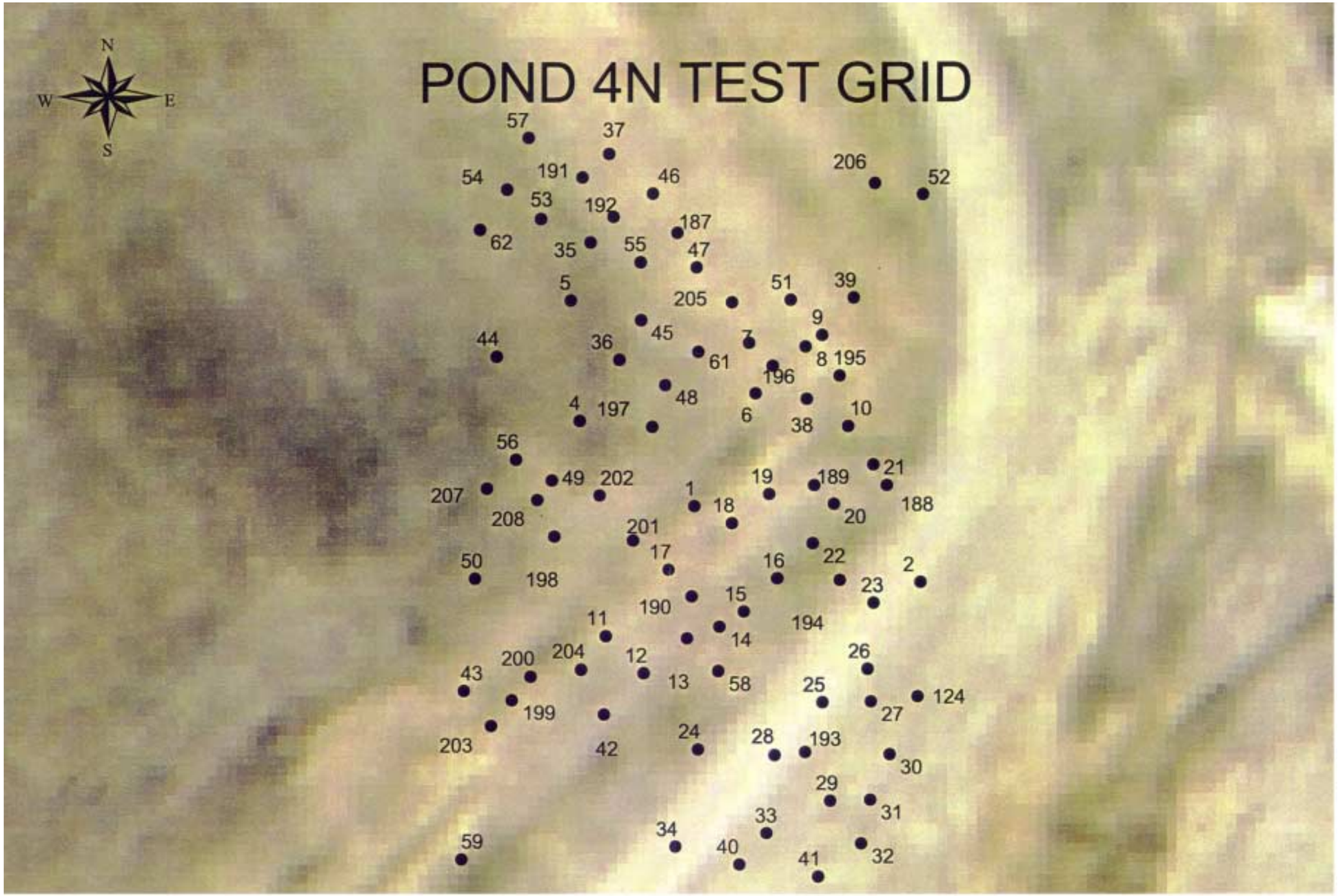


FIGURE B8 –
POND 4N VALIDATION GRID ANOMALIES

APPENDIX C

VALIDATION GRID ANOMALY DATA

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562481.88	4216215.8	DP2M5	1	DP2M	0.00	0.00	Not found
562469.38	4216230.4	DP2M7	1	DP2M	0.00	0.00	Not Found
562477.88	4216229.1	DP2M8	1	DP2M	0.00	0.00	None found
562474.25	4216230.8	DP2M9	1	DP2M	0.00	0.00	Not found
562488.75	4216227.3	DP2M10	1	DP2M	0.00	0.00	Not found
562490.88	4216227.4	DP2M11	1	DP2M	0.00	0.00	Not found
562488.13	4216231.6	DP2M12	1	DP2M	0.00	0.00	Not found
562495.5	4216223.9	DP2M13	1	DP2M	0.00	0.00	Not found
562496.38	4216220.8	DP2M14	1	DP2M	0.00	0.00	Not found
562476.38	4216225.1	DP2M15	1	DP2M	0.00	0.00	Not found
562475.5	4216221.8	DP2M16	1	DP2M	0.00	0.00	Not found
562473.25	4216218.3	DP2M17	1	DP2M	0.06	0.83	16 penny nail
562469.38	4216217.8	DP2M18	1	DP2M	0.00	0.00	Not found
562465.75	4216220.8	DP2M19	1	DP2M	0.00	0.00	Not found Excavated to 4'
562477.63	4216218.1	DP2M20	1	DP2M	0.00	0.00	Not found
562480.88	4216214.8	DP2M21	1	DP2M	0.00	0.00	Not Found
562473.88	4216213.9	DP2M22	1	DP2M	0.00	0.00	Not found Excavated to 4'
562475.88	4216211.9	DP2M23	1	DP2M	0.00	0.00	Not found : Excavated to 4'
562472.75	4216210.8	DP2M24	1	DP2M	0.00	0.00	Not found : Excavated to 5' 1 meter radius around flag
562469	4216211.4	DP2M25	1	DP2M	0.00	0.00	Not found : Excavated to 5' 1 meter radius around flag
562465.75	4216211	DP2M26	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562470.13	4216205.9	DP2M27	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562474.25	4216202.8	DP2M28	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562477.38	4216209.3	DP2M29	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562477.88	4216207.5	DP2M30	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562480.38	4216206.6	DP2M31	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562481.5	4216204.6	DP2M32	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562478.38	4216203.1	DP2M33	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562487	4216210.3	DP2M34	1	DP2M	0.00	0.00	Not found
562484.38	4216211.3	DP2M35	1	DP2M	0.00	0.00	Not found (rust on surface??)
562483	4216213.4	DP2M36	1	DP2M	0.00	0.00	Not found
562486.5	4216217	DP2M37	1	DP2M	0.00	0.00	Not found Excavated to 4'
562486.88	4216220.1	DP2M38	1	DP2M	0.00	0.00	Not Found
562484.38	4216223.9	DP2M39	1	DP2M	0.00	0.00	Not found
562482.38	4216224.4	DP2M40	1	DP2M	0.00	0.00	Not found
562479.75	4216222.9	DP2M41	1	DP2M	0.00	0.00	Not Found
562492.75	4216215.1	DP2M42	1	DP2M	0.00	0.00	Not Found
562494.38	4216212	DP2M43	1	DP2M	0.00	0.00	Not found
562494.25	4216208.9	DP2M44	1	DP2M	0.00	0.00	Not found
562498	4216209.9	DP2M45	1	DP2M	0.00	0.00	Not found
562495.25	4216203.6	DP2M46	1	DP2M	0.00	0.00	Not found
562493	4216205.4	DP2M47	1	DP2M	0.00	0.00	Not found
562493	4216200.4	DP2M48	1	DP2M	0.00	0.00	Not found
562488.63	4216203.4	DP2M49	1	DP2M	0.00	0.00	Not found
562485.63	4216202.4	DP2M50	1	DP2M	0.00	0.00	Not found

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562488.88	4216207.3	DP2M51	1	DP2M	0.00	0.00	Not found
562477.13	4216215.9	DP2M52	1	DP2M	0.00	0.00	Not Found
562484.38	4216207.6	DP2M53	1	DP2M	0.00	0.00	Not found
562498.75	4216208.6	DP2M54	1	DP2M	0.00	0.00	Not found
562491.13	4216206.8	DP2M55	1	DP2M	0.00	0.00	Not found
562488.88	4216212.5	DP2M56	1	DP2M	0.00	0.00	Not found
562483.75	4216221.8	DP2M57	1	DP2M	0.00	0.00	Not found
562497.38	4216207.1	DP2M58	1	DP2M	0.00	0.00	Not found
562485.13	4216213.9	DP2M59	1	DP2M	0.00	0.00	Not found
562479	4216225	DP2M60	1	DP2M	0.00	0.00	Not found
562487.25	4216229.1	DP2M61	1	DP2M	0.00	0.00	Not found
562497.38	4216201.6	DP2M62	1	DP2M	0.00	0.00	Not found
562469.88	4216222.8	DP2M63	1	DP2M	0.00	0.00	Not Found
562465.25	4216228.1	DP2M64	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562467	4216225.3	DP2M65	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562473.5	4216228	DP2M66	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562482.75	4216219.5	DP2M67	1	DP2M	0.00	0.00	Not Found
562474.13	4216224.3	DP2M68	1	DP2M	0.00	0.00	Not found
562471.63	4216214.4	DP2M69	1	DP2M	0.00	0.00	Not found: Excavated to 5'
562481.88	4216208.5	DP2M70	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562491.88	4216210.5	DP2M71	1	DP2M	0.00	0.00	Not found
562470.13	4216226.1	DP2M204	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562473.5	4216221.9	DP2M205	1	DP2M	0.00	0.00	Not Found Excavated to 4'
562478.5	4216215.8	DP2M206	1	DP2M	0.00	0.00	Not Found
562472.13	4216204.8	DP2M207	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562474.63	4216206.9	DP2M208	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562467	4216222.3	DP2M209	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562464.5	4216231.6	DP2M210	1	DP2M	0.00	0.00	Not found
562490.75	4216226	DP2M211	1	DP2M	0.00	0.00	Not Found Excavated to 4'
562475.25	4216200.5	DP2M212	1	DP2M	0.00	0.00	Not found: Excavated to 5' 1 meter radius around flag
562485.88	4216204.9	DP2M213	1	DP2M	0.00	0.00	Not found
562465.38	4216217.5	DP2M214	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562498.75	4216225.8	DP2M215	1	DP2M	0.00	0.00	Not Found
562488.63	4216200.3	DP2M216	1	DP2M	0.00	0.00	Not Found
562472.63	4216225.6	DP2M217	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562470.38	4216221	DP2M218	1	DP2M	0.00	0.00	Not found
562474.5	4216216.9	DP2M219	1	DP2M	0.00	0.00	Not found: Excavated to 4'
562377	4216329.9	DP2N1	1	DP2N	0.00	3.00	excavated 4' no anomaly found-2 pockets of rust
562363.38	4216348	DP2N3	1	DP2N	2.00	0.00	12" X 7" X 1/8" Flat metal on surface
562363.38	4216348	DP2N3	2	DP2N	0.00	2.50	Oxide deposits @ 2.5' Excavated to 2.5'
562363.38	4216348	DP2N3	3	DP2N	0.06	3.00	Coke can @ 3' 2 feet NW of flag
562371.25	4216344.8	DP2N4	1	DP2N	15.00	0.33	2" Diameter chain link 40" long
562371.25	4216344.8	DP2N4	2	DP2N	0.50	1.00	1" X 1" X 1/2" steel plate
562371.25	4216344.8	DP2N4	3	DP2N	2.00	1.00	1/2" X 6", 1/2' X 3" , 1/2" X 1" square rebar
562375.63	4216347.5	DP2N5	1	DP2N	0.01	1.50	Alum scrap sheet metal 2" X 2" X 1/32" & 1" X 2" X 1/32
562375.63	4216347.5	DP2N5	2	DP2N	0.06	1.00	2" X 3" X .5" chunk of steel
562375.63	4216347.5	DP2N5	3	DP2N	0.00	0.00	1/2" X 1/2" X 1/8" steel scrap & 3/4" X 3/4" X 1/8" Excavated to 4'

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562370.25	4216350.1	DP2N6	1	DP2N	1.00	1.00	1/2" 4" X 1/4" steel flat bar
562370.25	4216350.1	DP2N6	2	DP2N	1.00	1.00	1/2" X 4" X 1/2" steel plate
562382	4216347.9	DP2N7	1	DP2N	4.00	1.33	1/2" X 6" X 4" steel plate
562382	4216347.9	DP2N7	2	DP2N	2.00	2.00	1/2" X 4" X 3/8" steel
562379.88	4216346.4	DP2N8	1	DP2N	0.00	0.50	2" X 1" 1/4" steel chunk
562379.88	4216346.4	DP2N8	2	DP2N	2.00	1.00	3" X 3" X 3/4" steel plate
562379.88	4216346.4	DP2N8	3	DP2N	0.06	0.67	Rust pocket 1" diameter
562379.88	4216346.4	DP2N8	4	DP2N	0.06	1.00	3" X 4" X 3/8" steel plate
562377.38	4216344.8	DP2N9	1	DP2N	1.00	1.00	1/2" X 4" X 5" steel plate
562377.38	4216344.8	DP2N9	2	DP2N	0.50	0.00	1/2" X 4" X 3" Angle iron
562375.63	4216344.3	DP2N10	1	DP2N	0.01	0.33	2" X 3/8" aluminum strip
562375.5	4216341.1	DP2N11	1	DP2N	0.50	1.00	U-Bolt 8" X 1/2" steel
562372.25	4216339.9	DP2N12	1	DP2N	1.00	0.25	3/8" Flat Plate 4" X 4"
562369.63	4216338.8	DP2N13	1	DP2N	1.00	0.50	Star shape steel object 2' east of flag 1 lb
562369.63	4216338.8	DP2N13	2	DP2N	0.00	2.00	Rust layer at 2' w/small pockets: Mk 26 indicates initially four hits
562367.13	4216342	DP2N14	1	DP2N	0.00	0.00	Not Found : Mk 26 Initially indicated there were. Checked Mk 26 on test grid. Checked ok Excavated Iron Ioxid at 2' small 6" pocket 6" Dia X 1/2" thick
562368.25	4216343.9	DP2N15	1	DP2N	1.00	1.00	1.5" angle iron 5" long Excavated to 4' rust pockets present
562361.13	4216339.8	DP2N16	1	DP2N	0.00	0.00	Not Found
562356.25	4216341.4	DP2N17	1	DP2N	0.00	0.00	Not Found
562357.38	4216339.6	DP2N18	1	DP2N	0.31	1.17	carriage bolt, .5"x6"
562358.5	4216335.5	DP2N19	1	DP2N	0.00	0.00	Not Found
562361.25	4216335.5	DP2N20	1	DP2N	0.50	0.00	copper pipe, 1/2" X 8" On Surface
562362.63	4216331.9	DP2N21	1	DP2N	0.00	0.00	Not Found
562357.63	4216327.6	DP2N22	1	DP2N	0.00	0.00	Not Found
562362.75	4216329.8	DP2N23	1	DP2N	0.00	0.00	Not Found
562363.5	4216326.8	DP2N24	1	DP2N	0.00	0.00	Not Found
562365	4216324.1	DP2N25	1	DP2N	0.75	0.17	steel strap, .06"x36"x.75"
562370.75	4216328.5	DP2N26	1	DP2N	0.00	0.00	pile of scrap sheet metal, 6" x 6" x 4" at surface
562374.88	4216325.3	DP2N27	1	DP2N	0.00	0.00	Not Found Excavated to 4'
562372.25	4216317.4	DP2N28	1	DP2N	0.00	0.00	Not Found
562376	4216320.4	DP2N29	1	DP2N	0.00	0.00	Not Found
562376	4216315	DP2N30	1	DP2N	0.00	0.00	Not Found
562370	4216320.4	DP2N31	1	DP2N	0.00	0.00	Not Found
562362.75	4216320.5	DP2N32	1	DP2N	0.00	0.00	Not Found
562360.38	4216324.1	DP2N33	1	DP2N	0.00	0.00	Not Found
562367.5	4216333.5	DP2N34	1	DP2N	0.00	0.00	Not Found
562365.88	4216335.3	DP2N35	1	DP2N	0.00	0.00	Not Found
562361.88	4216310.1	DP2N36	1	DP2N	0.00	0.00	Not Found
562364	4216310	DP2N37	1	DP2N	0.00	1.50	pipe, 12"Lx1"dia.
562355.5	4216321.9	DP2N38	1	DP2N	0.00	0.00	Not Found
562368.63	4216324.4	DP2N39	1	DP2N	0.00	0.00	Not Found
562377.38	4216336.9	DP2N40	1	DP2N	1.00	1.00	2" X 3" X 4" steel plate
562377.38	4216336.9	DP2N40	2	DP2N	0.25	1.00	1" X 2" X 1/2" steel plate
562380.88	4216337.3	DP2N41	1	DP2N	1.00	0.25	3/4" X 10" Steel pipe
562380.88	4216337.3	DP2N41	2	DP2N	0.50	1.00	2 each 1" X 1" steel chunks

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562383.25	4216340.1	DP2N42	1	DP2N	1.00	1.00	1/2" X 15" steel rod
562383.25	4216340.1	DP2N42	2	DP2N	0.50	1.00	1" X 1" steel chunks (2 each)
562386.25	4216343.8	DP2N43	1	DP2N	0.75	0.08	1" X 8" Angle Iron
562386.25	4216343.8	DP2N43	2	DP2N	0.25	1.00	1" X 1" steel chunk
562385.63	4216346.8	DP2N44	1	DP2N	4.00	0.33	2" X 3" X 4" steel cable weight
562386.75	4216336.6	DP2N45	1	DP2N	5.00	0.25	10" X 10" steel : Excavated to 4'
562386.75	4216336.6	DP2N45	2	DP2N	1.00	0.25	13" X 3" steel strap : Excavated to 4'
562386.75	4216336.6	DP2N45	3	DP2N	0.75	1.00	3" X 14" steel strap: Excavated to 4'
562386.75	4216336.6	DP2N45	4	DP2N	0.25	0.50	4" X 4" Steel Plate : Excavated to 4'
562386.75	4216336.6	DP2N45	5	DP2N	0.00	0.00	1" X 1" X 1/8" - 2" X 2" X 1/8" Four pieces: Excavated to 4'
562386.75	4216336.6	DP2N45	6	DP2N	0.13	0.50	Bolt 3" X 3/4" : Excavated to 4'
562386.75	4216336.6	DP2N45	7	DP2N	0.25	1.00	Steel spike 1" X 8" X 1/4" Excavated to 4'
562382.25	4216333.9	DP2N46	1	DP2N	0.00	0.00	Not Found
562382.63	4216331.3	DP2N47	1	DP2N	1.00	0.00	scrap metal, 4"x8"
562382.63	4216331.3	DP2N47	2	DP2N	0.00	0.00	2" X 4" Scrapmetal
562381.38	4216329.8	DP2N48	1	DP2N	0.00	0.00	Not Found
562386	4216329.4	DP2N49	1	DP2N	0.25	1.50	scrap steel, 4"x4"x.125"
562386	4216329.4	DP2N49	2	DP2N	0.06	0.50	various scrap, 1"x1" 3 pieces Excavated to 1.5'
562388.88	4216331.4	DP2N50	1	DP2N	0.50	0.25	steel angle iron 3"x3"x9"
562388.88	4216331.4	DP2N50	2	DP2N	0.00	0.50	small scrap, 1"x2"x.5"
562388.88	4216331.4	DP2N50	3	DP2N	0.00	0.50	small scrap, 1"x1"x.125"
562391.63	4216327.8	DP2N51	1	DP2N	2.00	0.83	steel, 4"x12"x.5"
562391.63	4216327.8	DP2N51	2	DP2N	0.50	0.50	steel spike, .5"x5"
562391.63	4216327.8	DP2N51	3	DP2N	0.13	0.50	steel spike, .75"x4"
562391.63	4216327.8	DP2N51	4	DP2N	0.00	0.00	various small scrap, 1"x.125"x1"
562391.63	4216327.8	DP2N51	5	DP2N	0.19	0.58	pieces, N&E
562388.75	4216326.8	DP2N52	1	DP2N	0.13	0.42	steel scrap, 1"x3"
562388.75	4216326.8	DP2N52	2	DP2N	0.75	0.17	steel scrap, 4"x.25"x24"
562388.75	4216326.8	DP2N52	3	DP2N	0.06	0.33	washer w/rusted rivet, 2"dia.x.5"
562388.75	4216326.8	DP2N52	4	DP2N	0.16	0.50	various scrap .125" thick, 4"x1.5"/2"x2"/1"x3"
562388.75	4216326.8	DP2N52	5	DP2N	0.03	0.67	washer, 1.25" dia.
562388.75	4216326.8	DP2N52	6	DP2N	0.19	1.00	various scrap, 2"x2"x.75"/.5"x1"x1"/.125"x.5"x1"
562392.75	4216332	DP2N53	1	DP2N	0.19	1.00	steel rod, .75"x4" Excavated to 2'
562392.75	4216332	DP2N53	2	DP2N	0.25	1.00	steel spike, 1"x6"
562392.75	4216332	DP2N53	3	DP2N	0.13	1.00	small scrap, 1"x1"x.125"
562394.38	4216328	DP2N54	1	DP2N	0.50	0.17	steel scrap, 3"x10" Excavated to 2'
562394.38	4216328	DP2N54	2	DP2N	4.00	0.67	steel scrap, 4"x11"x.5" Excavated to 2'
562397.38	4216326	DP2N55	1	DP2N	0.13	0.17	steel scrap, 2"x4"
562397.38	4216326	DP2N55	2	DP2N	0.13	0.33	steel scrap, 2"x2"x,25" Excavated 2-3 Feet
562397.38	4216326	DP2N55	3	DP2N	0.25	0.58	small scrap, .75"x.75"x.25"
562398.25	4216343.5	DP2N56	1	DP2N	0.00	0.00	Not Found
562395.13	4216339.6	DP2N57	1	DP2N	0.00	0.00	Not Found
562394	4216335.3	DP2N58	1	DP2N	0.13	0.83	small scrap pieces, .5"x.5"x.125" Excavated to 2'
562391.38	4216334.4	DP2N59	1	DP2N	0.25	0.25	Alum. Bracket, 1.5"Wx8"L
562391.38	4216334.4	DP2N59	2	DP2N	0.13	1.00	small steel scrap, 1"x1"x.125"
562383.38	4216321.3	DP2N60	1	DP2N	0.00	0.33	steel scrap, 1"x.75"x.125"
562397.25	4216320.9	DP2N61	1	DP2N	0.13	0.29	steel stake, 12"x1" Excavated to 3'
562397.25	4216320.9	DP2N61	2	DP2N	0.03	2.00	steel scrap, .75"x.75"x.25"
562395.75	4216316.8	DP2N62	1	DP2N	0.06	0.33	chunks of steel scrap, 1"x1"x.5" 3 pieces Excavated to 4'

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562395.75	4216316.8	DP2N62	2	DP2N	0.02	0.33	small pieces of steel, .75"x.75" 2 pieces Excavated to 4'
562398.75	4216316	DP2N63	1	DP2N	8.00	0.33	steel scrap, 5"x12" folded Excavated to 4'
562398.75	4216316	DP2N63	2	DP2N	0.13	0.50	steel scrap, 2"x2"/1"x2.5"/.75"x.75" Excavated to 4'
562397.38	4216311.6	DP2N64	1	DP2N	0.13	0.08	alum. Scrap, 5"x8" folded
562397.38	4216311.6	DP2N64	2	DP2N	0.25	0.50	2 small pieces scrap, 1"x1"
562395.75	4216309.1	DP2N65	1	DP2N	0.50	1.00	re-rod, .75"thickx22" long
562392.25	4216311.5	DP2N66	2	DP2N	0.03	0.33	steel scrap, 1"x1"
562392.25	4216311.5	DP2N66	1	DP2N	0.02	0.50	aluminum riveted skin, 4"Wx8"L
562392.25	4216311.5	DP2N66	3	DP2N	0.75	0.50	steel scrap, 4"Wx8"L folded
562398.75	4216338.8	DP2N67	1	DP2N	0.13	1.00	steel scrap, 1"x1"x.125"
562398.75	4216335.4	DP2N68	1	DP2N	0.00	0.00	Not Found
562387.88	4216322.6	DP2N69	1	DP2N	0.06	0.50	small steel strap, 3/4"x4" Excavated to 4'
562387.88	4216322.6	DP2N69	2	DP2N	0.02	0.50	Aluminum, 2"x2" Excavated to 4'
562387.88	4216322.6	DP2N69	3	DP2N	0.09	0.17	steel strap, 1"x3"x0.5" Excavated to 4'
562392	4216314.4	DP2N70	1	DP2N	0.00	0.00	Not Found Excavated to 4'
562357	4216348.3	DP2N71	1	DP2N	0.00	0.00	Not Found
562354.38	4216344.6	DP2N72	1	DP2N	0.13	0.25	aluminum sheet, 1/16"x5"x6"
562357.38	4216319.4	DP2N73	1	DP2N	0.00	0.00	Not Found
562360.25	4216311.6	DP2N74	1	DP2N	0.00	0.00	Not Found
562362.75	4216312.5	DP2N75	1	DP2N	0.00	0.00	Not Found
562360.75	4216332.6	DP2N76	1	DP2N	0.00	0.00	Not Found
562361.88	4216341.6	DP2N77	1	DP2N	0.00	0.00	Not Found
562385.38	4216332.3	DP2N78	1	DP2N	0.63	1.00	4" X 8" X 1/2" folded angle iron scrap steel Excavated to 4'
562385.38	4216332.3	DP2N78	2	DP2N	0.13	0.00	2" X 2" X 1/8" / 1" X 1" X 1/8" various small steel scrap, excavated to 4'
562385.38	4216332.3	DP2N78	3	DP2N	0.50	0.50	4" X 14" X 1/2" steel plate : Excavated to 4'
562385.38	4216332.3	DP2N78	4	DP2N	0.03	0.00	3.5" X 6" Sheet metal : Excavated to 4'
562385.38	4216332.3	DP2N78	5	DP2N	0.01	0.00	5-6 various small steel scrap 1/2 X 1/2" X 1/8" : Excavated to 4'
562390.38	4216338.9	DP2N79	1	DP2N	0.01	0.00	1/2 X 1/2 X 1/8 steel scrap: Unknown depth: Excavated to 4'
562390.38	4216338.9	DP2N79	2	DP2N	0.50	0.00	4" X 4" X 1/8" Steel scrap unknown depth
562388.75	4216313.3	DP2N80	1	DP2N	0.00	0.00	Not Found
562367	4216313.3	DP2N81	1	DP2N	0.00	0.00	Not Found
562355.5	4216346.5	DP2N82	1	DP2N	0.00	0.00	Not Found
562375.5	4216329.6	DP2N83	1	DP2N	0.00	0.00	Not Found
562374.88	4216321.8	DP2N166	1	DP2N	0.00	0.00	Not Found
562376.63	4216322.5	DP2N168	1	DP2N	0.00	0.17	Not Found rust deposits
562375.88	4216332.8	DP2N254	1	DP2N	0.00	0.00	Not Found
562372.5	4216331.4	DP2N255	1	DP2N	0.00	0.00	Not Found
562393.38	4216337.9	DP2N256	1	DP2N	0.00	0.50	small scrap, .25"x.5"x.125" Excavated to 1'
562388.38	4216348.5	DP2N257	1	DP2N	0.00	0.00	Not Found
562384.25	4216349.8	DP2N258	1	DP2N	0.03	1.00	Pepsi Can @ 1' Crushed
562380.88	4216325	DP2N259	1	DP2N	0.00	0.00	Not Found

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562392.75	4216323	DP2N260	1	DP2N	0.25	0.33	re-rod, .75"x8" Excavated to 2'
562392.75	4216323	DP2N260	2	DP2N	0.01	0.50	small steel scrap, 1"x1"x.25" Excavated to 2'
562392.75	4216323	DP2N260	3	DP2N	0.19	0.67	steel scrap, .5"x1"x8" Excavated to 2'
562392.75	4216323	DP2N260	4	DP2N	0.19	0.50	steel scrap, 1"x.5"x5" Excavated to 2'
562392.75	4216323	DP2N260	5	DP2N	0.03	1.00	steel scrap, 1.5"x1.5"x.25" Excavated to 2'
562379.88	4216342.1	DP2N261	1	DP2N	0.01	1.00	6 8 pieces small scrap steel: Excavated to 4'
562396.25	4216333	DP2N262	1	DP2N	0.06	0.50	various pieces of small scrap, 1"x1"x.125" Excavated to 1.5'
562398.38	4216329.9	DP2N263	1	DP2N	0.06	0.50	various small scrap, 1"x1"3-4 pieces Excavated to 1.5'
562380.75	4216314.5	DP2N264	1	DP2N	0.00	0.00	Not Found
562381.13	4216319.9	DP2N265	1	DP2N	0.00	0.00	Not Found
562356.13	4216316	DP2N266	1	DP2N	0.00	0.00	Not Found
562364.63	4216317.5	DP2N267	1	DP2N	0.00	0.00	Not Found
562355.13	4216324.1	DP2N268	1	DP2N	0.00	0.00	Not Found
562371.63	4216310.5	DP2N269	1	DP2N	0.00	0.00	Not Found
562355.38	4216331.4	DP2N270	1	DP2N	0.25	0.50	steel flat bar, .5"x.25"x8"
562378.25	4216324.3	DP2N271	1	DP2N	0.00	0.00	Not Found
562858.13	4215713.4	DP2S2	1	DP2S	0.00	0.00	Not Found
562844.13	4215731.1	DP2S4	1	DP2S	0.00	0.00	Not Found
562848	4215727.9	DP2S5	1	DP2S	3.00	1.50	2" X 2" X 18" Angle Iron Excavated to 2.5'
562845.25	4215726.3	DP2S6	1	DP2S	0.00	0.00	Not Found
562846.38	4215724.5	DP2S7	1	DP2S	0.00	0.00	Not Found
562862.38	4215728.3	DP2S8	1	DP2S	0.00	0.00	Not Found Excavated to 4' depth 1 meter from flag no findings
562859.63	4215728.3	DP2S9	1	DP2S	1.00	3.00	4" x 3" scrap steel
562863.13	4215726.1	DP2S10	1	DP2S	0.06	3.00	7.62 MM Bullet
562864.5	4215724.1	DP2S11	1	DP2S	1.00	4.00	4" x 1.5" Shackle pin
562866.75	4215726.9	DP2S12	1	DP2S	0.00	0.00	Excavated 5' depth 1 meter radius around flag. Negative findings
562869.38	4215725.5	DP2S13	1	DP2S	0.00	0.00	Not Found
562877.38	4215722.8	DP2S14	1	DP2S	0.00	0.00	Not Found
562873	4215724.5	DP2S15	1	DP2S	0.00	0.00	Not Found
562872.38	4215721.6	DP2S16	1	DP2S	0.00	0.00	Not Found
562867.88	4215721.1	DP2S17	1	DP2S	0.00	0.00	Not Found
562868.13	4215718.8	DP2S18	1	DP2S	0.00	0.00	Not Found Excavated to 2'
562870.25	4215717.3	DP2S19	1	DP2S	0.00	0.00	Not Found
562869.75	4215714.9	DP2S20	1	DP2S	0.00	0.00	Not Found Excavated to 2'
562874.25	4215710.3	DP2S21	1	DP2S	0.00	0.00	Not Found
562876.5	4215708.6	DP2S22	1	DP2S	0.00	0.00	Not Found
562869.5	4215699.8	DP2S23	1	DP2S	0.00	0.00	Not Found
562874.75	4215694.6	DP2S24	1	DP2S	0.00	0.00	Not Found
562857.25	4215720.5	DP2S25	1	DP2S	0.50	0.50	2.5 X 4" X 4" X 1" diameter scrap steel Excavated to 2'
562860	4215705.6	DP2S26	1	DP2S	0.00	0.00	Not Found
562849	4215699.5	DP2S27	1	DP2S	50.00	1.00	1' x 1' mass of mixed metal at 1' depth
562853.5	4215699.8	DP2S28	1	DP2S	0.00	0.00	Not Found
562850.88	4215717.5	DP2S29	1	DP2S	0.50	1.00	1.5" X 12" Angle Iron Excavated to 2'

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562850.88	4215717.5	DP2S29	2	DP2S	0.50	1.00	1.5" X 6" Angle Iron Excavated to 2'
562847.38	4215718.8	DP2S30	1	DP2S	0.00	0.00	Not Found
562848.38	4215707.6	DP2S31	1	DP2S	1.00	3.00	Steel plate 1/16 X 4 X 10 Bent over
562848.38	4215707.6	DP2S31	2	DP2S	0.06	3.00	.30 Bullet
562848.38	4215707.6	DP2S31	3	DP2S	0.06	3.00	.30 Bullet
562848.38	4215707.6	DP2S31	4	DP2S	0.06	3.00	M1 Carbine Bullet
562841.5	4215709.6	DP2S32	1	DP2S	0.00	0.00	Not Found
562843.75	4215705.5	DP2S33	1	DP2S	0.00	1.00	1" X 1/8" Scrap metal
562844.5	4215701.8	DP2S34	1	DP2S	0.19	1.00	Powder can lid Aluminum
562842	4215699.9	DP2S35	1	DP2S	0.00	0.00	Excavated to 5' 1 meter from flag
562840.38	4215702.9	DP2S36	1	DP2S	0.00	0.00	Not Found
562848.38	4215696.8	DP2S37	1	DP2S	0.25	2.00	1/2 X 2" bolt
562848.38	4215696.8	DP2S37	2	DP2S	1.00	3.00	1" x 2" Scrap Metal
562848.38	4215696.8	DP2S37	3	DP2S	2.00	2.00	3" x 1" Brass fire nozzle
562846.13	4215694.9	DP2S38	1	DP2S	0.00	0.00	Not Found
562847.75	4215694	DP2S39	1	DP2S	0.06	2.00	Nail 1/4" X 5" Long
562847.75	4215694	DP2S39	2	DP2S	1.00	2.00	2" X 2" Scrap metal
562847.75	4215694	DP2S39	3	DP2S	1.00	2.00	2" x 3" Scrap metal
562860.5	4215696.4	DP2S40	1	DP2S	0.63	0.83	steel spanner wrench : Excavated to 1.5'
562851.25	4215701.4	DP2S41	1	DP2S	0.00	0.00	Not Found
562855.63	4215712.6	DP2S42	1	DP2S	0.00	0.00	Not Found
562844.5	4215698	DP2S43	1	DP2S	1.00	1.00	1/2" X 18" Round stock
562839	4215705.4	DP2S44	1	DP2S	0.00	0.00	Not Found
562839	4215732.4	DP2S45	1	DP2S	0.00	0.00	Not Found
562876.5	4215719	DP2S46	1	DP2S	0.00	0.00	Not Found
562860.5	4215721.6	DP2S47	1	DP2S	0.00	0.00	Not Found
562870.38	4215723.5	DP2S48	1	DP2S	0.00	0.00	Not Found
562875.63	4215700.9	DP2S49	1	DP2S	0.00	0.00	Not Found
562867.38	4215711	DP2S50	1	DP2S	0.00	0.00	Not Found
562858.88	4215712.5	DP2S51	1	DP2S	0.00	0.00	Not Found
562870.63	4215712.1	DP2S52	1	DP2S	0.00	0.00	Not Found
562846.38	4215731.4	DP2S53	1	DP2S	0.00	0.00	Not Found
562858.75	4215724.5	DP2S106	1	DP2S	0.00	0.00	Not Found
562851.5	4215697	DP2S107	1	DP2S	0.00	0.00	Not Found
562859	4215722.1	DP2S108	1	DP2S	0.00	0.00	Not Found
562873.63	4215728.8	DP2S109	1	DP2S	0.00	0.00	Not Found
562857.38	4215715.6	DP2S110	1	DP2S	0.00	0.00	Not Found Excavated to 5' 1 meter radius around flag
562844.88	4215714.9	DP2S168	1	DP2S	1.00	2.00	1.5" D x 3" L Pipe
562844.88	4215714.9	DP2S168	2	DP2S	1.00	2.00	1.5" D x 6" L Pipe
562844.88	4215714.9	DP2S168	3	DP2S	2.00	2.00	Scrapmetal 1" x 2"
562872.38	4215706.1	DP2S169	1	DP2S	0.00	0.00	Not Found
562877.75	4215699.8	DP2S170	1	DP2S	0.00	0.00	Not Found: Excavated to 1.5'
562876.5	4215715.4	DP2S171	1	DP2S	0.00	0.00	Not Found
562874.63	4215718.4	DP2S172	1	DP2S	0.00	0.00	Not Found
562856.88	4215710	DP2S173	1	DP2S	0.00	0.00	Not Found
562838.5	4215717.5	DP2S174	1	DP2S	0.06	0.67	16 penny nail: Excavated 2.5'
562853.25	4215715.3	DP2S175	1	DP2S	0.00	0.00	Not Found
562842.5	4215716.6	DP2S176	1	DP2S	0.00	0.00	Not Found
562854.25	4215730.8	DP2S177	1	DP2S	1.00	1.17	Nut 1.5" Thick X 4" Diameter : Excavated to 2'
562842.38	4215729.9	DP2S178	1	DP2S	0.00	0.00	Not Found
562841.13	4215731.6	DP2S179	1	DP2S	0.00	0.00	Not Found
562862.13	4215698.1	DP2S180	1	DP2S	0.00	0.00	Not Found

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562863.38	4215718.1	DP2S181	1	DP2S	0.00	0.00	Not Found
562839.38	4215722	DP2S182	1	DP2S	0.00	0.00	Not Found
562872.63	4215727	DP2S183	1	DP2S	0.00	0.00	Not Found
562864.13	4215706.6	DP2S184	1	DP2S	0.00	0.00	Not Found
562865.25	4215700.1	DP2S185	1	DP2S	0.00	0.00	Not Found
563073.88	4216554.4	DP4N1	1	DP4N	0.00	0.00	Not Found
563088	4216550	DP4N2	1	DP4N	5.00	0.50	Steel Plate 5"X 7" X.5" All dug with bucket Large debris field
563088	4216550	DP4N2	2	DP4N	3.00	0.50	Copper pipe 1" 5" w/2 disks 1/2" thick 3" diameter
563088	4216550	DP4N2	3	DP4N	3.50	0.50	Steel plate 5" 4" oval 1/2" thick
563088	4216550	DP4N2	4	DP4N	0.75	0.00	steel bracket stirrup 1" wide 5" long
563088	4216550	DP4N2	5	DP4N	0.75	0.00	steel plate 3" X .5" thick
563088	4216550	DP4N2	6	DP4N	0.03	3.00	M1 30 Cal Carbine casing
563088	4216550	DP4N2	7	DP4N	1.50	3.00	Steel Rod 1.5" X 4"
563088	4216550	DP4N2	8	DP4N	3.50	3.00	Steel plate 5" X 6"
563066.63	4216559.5	DP4N4	1	DP4N	0.00	0.00	Not Found
563065.88	4216567	DP4N5	1	DP4N	0.00	0.00	Not Found
563077.5	4216561.5	DP4N6	1	DP4N	0.00	0.00	Not Found
563078.5	4216563.3	DP4N7	1	DP4N	0.00	0.00	Not Found
563080.5	4216564.5	DP4N8	1	DP4N	0.00	0.00	Not Found
563081.5	4216565.3	DP4N9	1	DP4N	0.03	0.33	Pen tip Rust (Iron Oxide) also present
563083.25	4216559.6	DP4N10	1	DP4N	0.00	0.00	Not Found
563068.63	4216546.1	DP4N11	1	DP4N	0.00	0.00	Not Found
563071	4216543.9	DP4N12	1	DP4N	0.00	0.00	Not Found
563073.63	4216546.1	DP4N13	1	DP4N	0.00	0.00	Not Found
563075.63	4216546.9	DP4N14	1	DP4N	0.00	0.25	16P Nail
563077.13	4216547.9	DP4N15	1	DP4N	0.03	0.00	surface 1" long wire
563079.13	4216550	DP4N16	1	DP4N	0.00	0.00	Not Found
563072.38	4216550.4	DP4N17	1	DP4N	0.00	0.00	Rust Pocket Layer
563076.25	4216553.4	DP4N18	1	DP4N	0.00	0.00	Rust Layer
563078.5	4216555.3	DP4N19	1	DP4N	0.00	0.00	Rust Layer @ 10"
563082.5	4216554.8	DP4N20	1	DP4N	0.00	0.00	Not Found
563085.75	4216556	DP4N21	1	DP4N	0.06	0.33	Small metal piece 1/2" X 1"
563085.75	4216556	DP4N21	2	DP4N	0.03	0.33	Small copper piece 1/2" X 2"
563081.25	4216552.3	DP4N22	1	DP4N	0.03	0.25	Small wire 1" long
563085.13	4216548.6	DP4N23	1	DP4N	1.00	0.00	Steel Bracket 1.5" x3"
563085.13	4216548.6	DP4N23	2	DP4N	3.00	0.42	Steel bracket 2"x10"
563085.13	4216548.6	DP4N23	3	DP4N	1.00	0.04	Steel Bracket 2" x 1"x.5"
563085.13	4216548.6	DP4N23	4	DP4N	4.50	0.25	Copper Ring 8" Diameter 1/2" thick 2" inside out
563085.13	4216548.6	DP4N23	5	DP4N	0.03	0.25	Steel wire 2" long
563085.13	4216548.6	DP4N23	6	DP4N	1.00	0.25	Steel Bolt 4" long 1" dia
563085.13	4216548.6	DP4N23	7	DP4N	1.31	0.25	Steel handle 5" long1/4" thick 2" wide
563085.13	4216548.6	DP4N23	8	DP4N	0.50	0.17	Steel punch 1" x 1"
563085.13	4216548.6	DP4N23	9	DP4N	0.50	0.33	Piece bike pedel
563085.13	4216548.6	DP4N23	10	DP4N	2.50	2.50	Shuffle board puck 1.25" x 3.5"
563085.13	4216548.6	DP4N23	11	DP4N	0.00	0.17	Not Found
563074.5	4216539.3	DP4N24	1	DP4N	0.00	0.00	Rust layer @ 6"
563082.13	4216542.4	DP4N25	1	DP4N	1.00	0.00	1/4 20 bolt 9" on surface
563082.13	4216542.4	DP4N25	2	DP4N	3.00	0.00	2" 18" pipe on surface
563082.13	4216542.4	DP4N25	3	DP4N	1.00	0.00	5" x 4" Angle Iron on surface
563082.13	4216542.4	DP4N25	4	DP4N	1.00	0.04	10" wire
563082.13	4216542.4	DP4N25	5	DP4N	1.00	0.08	1" x 1" scrap metal

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
563082.13	4216542.4	DP4N25	6	DP4N	3.00	0.67	3" x 10" T-valve
563082.13	4216542.4	DP4N25	7	DP4N	1.00	0.50	20 MM casing (empty)
563084.88	4216544.5	DP4N26	1	DP4N	2.00	0.00	8" metal hook ON SURFACE
563084.88	4216544.5	DP4N26	2	DP4N	1.13	0.17	2"x3" Angle Iron
563084.88	4216544.5	DP4N26	3	DP4N	1.00	0.33	2.5" bolt
563084.88	4216544.5	DP4N26	4	DP4N	1.00	0.50	12" .5" rebar
563084.88	4216544.5	DP4N26	5	DP4N	1.00	0.50	Sheet metal 2"x6"
563084.88	4216544.5	DP4N26	6	DP4N	1.00	0.50	Scrap metal 1" x 8"
563084.88	4216544.5	DP4N26	7	DP4N	1.00	1.00	Scrap metal 2" x 8"
563085.13	4216542.5	DP4N27	1	DP4N	3.00	0.50	Steel Elbow 3" x 6"
563085.13	4216542.5	DP4N27	2	DP4N	3.00	1.00	
563085.13	4216542.5	DP4N27	3	DP4N	1.00	1.50	2" Nut
563085.13	4216542.5	DP4N27	4	DP4N	1.00	0.50	1" x 8" Steel Bar
563085.13	4216542.5	DP4N27	5	DP4N	5.00	0.17	4" round brass plug
563081.13	4216539.3	DP4N28	1	DP4N	1.00	3.00	1" x 6" Sheet metal
563082.75	4216536.3	DP4N29	1	DP4N	2.00	0.67	2" x 14" Pipe
563082.75	4216536.3	DP4N29	2	DP4N	1.00	1.00	2" X 2" Angle Iron
563082.75	4216536.3	DP4N29	3	DP4N	5.00	3.00	Misc metal debris angle iron, bolts, nuts etc.
563086.38	4216539.3	DP4N30	1	DP4N	1.00	0.50	Brass nut 3" Dia
563086.38	4216539.3	DP4N30	2	DP4N	1.00	0.50	10 X 1" Pipe
563086.38	4216539.3	DP4N30	3	DP4N	1.00	0.50	Copper Wire
563086.38	4216539.3	DP4N30	4	DP4N	0.06	1.50	Dog Tag
563086.38	4216539.3	DP4N30	5	DP4N	2.00	3.00	Brass valve 8" X 3"
563085.25	4216536.4	DP4N31	1	DP4N	1.00	0.17	Steel Nut & bolt 2" X 1"
563085.25	4216536.4	DP4N31	2	DP4N	1.00	0.17	Steel Nut & bolt 2" X 2"
563085.25	4216536.4	DP4N31	3	DP4N	3.00	0.25	2" X 4" piece of lead
563085.25	4216536.4	DP4N31	4	DP4N	1.00	0.17	Steel Bolt
563085.25	4216536.4	DP4N31	5	DP4N	1.00	0.25	1" 1.5" Scrap metal
563085.25	4216536.4	DP4N31	6	DP4N	1.00	0.25	1" x 1.5" Scrap metal
563085.25	4216536.4	DP4N31	7	DP4N	1.00	0.17	1" x 1.5" Scrap metal
563085.25	4216536.4	DP4N31	8	DP4N	12.00	0.83	6" X 3" X "4" Wedge
563085.25	4216536.4	DP4N31	9	DP4N	3.50	0.50	6" x 4" Steel plate
563085.25	4216536.4	DP4N31	10	DP4N	1.50	0.42	Semi circular steel plate 8" X 2"
563085.25	4216536.4	DP4N31	11	DP4N	0.00	1.00	2" x 2" Steel Plate
563085.25	4216536.4	DP4N31	12	DP4N	1.50	3.00	4" X 6" Scrap metal
563084.75	4216533.6	DP4N32	1	DP4N	2.50	0.17	1.5" Diameter 14" long steel pipe. Misc metallic debris. All metallic objects found 360 degrees of marker# 32 1 meter, search did not exceed 1 meter beyond marker.
563084.75	4216533.6	DP4N32	2	DP4N	2.00	0.25	1/4" X 2.5" flat steel bar
563084.75	4216533.6	DP4N32	3	DP4N	3.00	1.00	1" Dia 15" length pipe
563084.75	4216533.6	DP4N32	4	DP4N	3.00	1.50	3" Diameter 6" length bolt & stud
563084.75	4216533.6	DP4N32	5	DP4N	2.00	0.17	Hammer head
563084.75	4216533.6	DP4N32	6	DP4N	5.00	0.17	Steel wedge 18" long
563084.75	4216533.6	DP4N32	7	DP4N	6.00	0.33	Rock
563084.75	4216533.6	DP4N32	8	DP4N	1.00	0.50	Crosby Clip
563084.75	4216533.6	DP4N32	9	DP4N	2.00	0.25	2-3" studs
563078.88	4216534.1	DP4N33	1	DP4N	0.00	0.00	Negative Find
563073.25	4216533.1	DP4N34	1	DP4N	0.00	0.00	Not Found
563067	4216570.6	DP4N35	1	DP4N	0.00	0.00	Not found
563069	4216563.4	DP4N36	1	DP4N	0.00	0.00	Not found
563068	4216576.1	DP4N37	1	DP4N	0.00	0.00	Not Found
563080.63	4216561.3	DP4N38	1	DP4N	0.00	0.00	Not Found

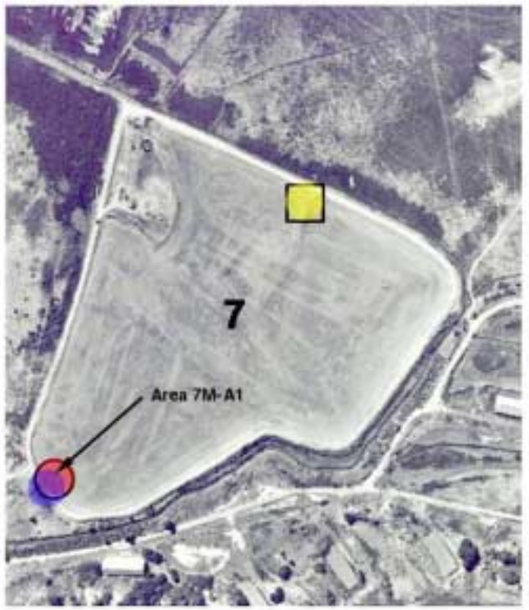
Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
563083.38	4216567.6	DP4N39	1	DP4N	0.31	0.33	Small piece steel (flat)
563083.38	4216567.6	DP4N39	2	DP4N	0.06	0.33	M1 Carbine FMJ w/Lead core Projectile
563083.38	4216567.6	DP4N39	3	DP4N	0.06	0.50	M1 Carbine FMJ w/Lead core Projectile
563083.38	4216567.6	DP4N39	4	DP4N	0.19	0.50	3/" X 1.5" bolt
563077.25	4216532.1	DP4N40	1	DP4N	0.00	0.00	Not Found
563082.13	4216531.5	DP4N41	1	DP4N	1.00	1.50	2" X 1" Scrap metal
563068.63	4216541.3	DP4N42	1	DP4N	0.00	0.00	Not Found
563059.88	4216542.5	DP4N43	1	DP4N	0.00	0.00	Not Found
563061.38	4216563.4	DP4N44	1	DP4N	0.00	0.00	Not Found
563070.25	4216565.9	DP4N45	1	DP4N	0.00	0.00	Not Found
563070.75	4216573.8	DP4N46	1	DP4N	0.00	0.00	Not Found
563073.63	4216569.3	DP4N47	1	DP4N	0.00	0.00	Not Found
563071.88	4216561.9	DP4N48	1	DP4N	0.00	0.00	Not Found
563065	4216555.8	DP4N49	1	DP4N	0.00	0.00	Not Found
563060.38	4216549.5	DP4N50	1	DP4N	0.00	0.00	Not Found
563079.5	4216567.4	DP4N51	1	DP4N	0.00	0.00	Not Found
563087.5	4216574.1	DP4N52	1	DP4N	1.00	0.50	1/2" 12" Copper tube folded in half
563087.5	4216574.1	DP4N52	2	DP4N	1.00	0.00	1/2 X 6" Iron Spike
563087.5	4216574.1	DP4N52	3	DP4N	1.00	0.00	2" X 2.5" Angle Iron
563087.5	4216574.1	DP4N52	4	DP4N	0.50	0.00	1" X 2" Angle Iron
563087.5	4216574.1	DP4N52	5	DP4N	0.60	0.50	Chunk of Iron
563087.5	4216574.1	DP4N52	6	DP4N	1.00	0.25	2" X 1.5" steel rod
563087.5	4216574.1	DP4N52	7	DP4N	0.16	0.25	3 pieces small wire 3" - 7"
563063.88	4216572	DP4N53	1	DP4N	0.00	0.00	Not Found Iron Oxide present on the surface
563063	4216577	DP4N54	1	DP4N	0.00	0.00	Not Found
563070.13	4216569.5	DP4N55	1	DP4N	0.00	0.00	Not Found
563062.75	4216557	DP4N56	1	DP4N	0.00	0.00	Not Found Sprinkling of Iron Oxide present on surface
563061.75	4216573.8	DP4N57	1	DP4N	0.00	0.00	Not Found
563075.63	4216544.1	DP4N58	1	DP4N	0.00	0.00	Not Found
563060	4216532	DP4N59	1	DP4N	0.00	1.00	Pocket of rust 13" X 9" X 2"
563073.88	4216564	DP4N61	1	DP4N	0.00	0.00	Not found
563060.13	4216571.3	DP4N62	1	DP4N	0.00	0.00	Not Found
563088	4216542.9	DP4N124	1	DP4N	2.00	0.50	1/2 Inch X 2" steel bar
563088	4216542.9	DP4N124	2	DP4N	2.00	1.00	4" 6" Angle Iron
563088	4216542.9	DP4N124	3	DP4N	1.00	1.00	3" Diameter round scrap steel
563088	4216542.9	DP4N124	4	DP4N	1.00	2.00	2" 1" steel screw
563088	4216542.9	DP4N124	5	DP4N	1.00	2.00	2" Steel Nut
563088	4216542.9	DP4N124	6	DP4N	1.00	3.00	2" X 3" steel scrap
563072.38	4216571.4	DP4N187	1	DP4N	0.00	0.00	Particulate Iron Oxide also present on surface
563084.88	4216557.3	DP4N188	1	DP4N	0.13	0.00	Surface M1 Carbine, Projo, FMJ Lead Core
563084.88	4216557.3	DP4N188	2	DP4N	0.50	0.00	Small copper piece 1/2" X 3/4"
563081.25	4216555.9	DP4N189	1	DP4N	2.00	0.33	Fence post metal 4" X 2" folded over
563073.88	4216548.8	DP4N190	1	DP4N	0.00	0.00	Not Found
563066.38	4216574.6	DP4N191	1	DP4N	0.00	0.00	Not Found : Oxide particulates present
563068.38	4216572.3	DP4N192	1	DP4N	0.00	0.00	Not Found
563079.25	4216539	DP4N193	1	DP4N	0.00	0.00	Not Found
563083	4216550	DP4N194	1	DP4N	2.00	0.08	Fire nozzle 5" long 2" diameter copper
563083	4216550	DP4N194	2	DP4N	0.06	0.04	small copper scrap 1" X .25"
563082.63	4216562.8	DP4N195	1	DP4N	0.00	0.00	Not Found
563077	4216564.6	DP4N196	1	DP4N	0.00	0.00	Not Found
563071.13	4216559.3	DP4N197	1	DP4N	1.00	0.25	Hoe head steel

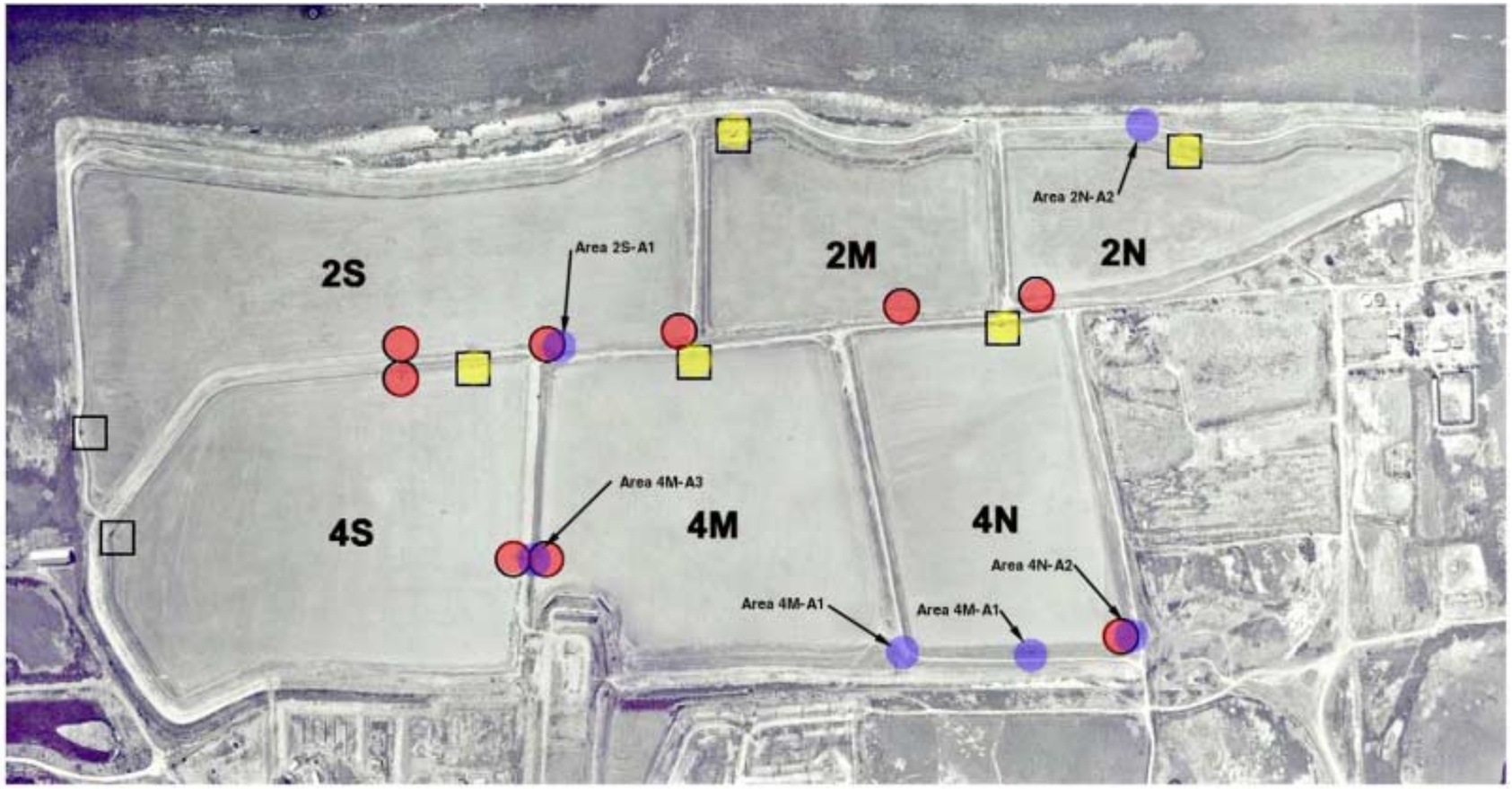
Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
563065.25	4216552.3	DP4N198	1	DP4N	0.00	0.00	Not Found
563062.88	4216542	DP4N199	1	DP4N	0.00	0.00	Not found
563064	4216543.5	DP4N200	1	DP4N	0.00	0.00	Not Found
563070.13	4216552.1	DP4N201	1	DP4N	0.00	0.00	Not Found
563068	4216554.9	DP4N202	1	DP4N	0.00	0.00	Not Found
563061.63	4216540.4	DP4N203	1	DP4N	0.00	0.00	Not Found
563067.13	4216544	DP4N204	1	DP4N	0.00	0.00	Not Found
563075.88	4216567.1	DP4N205	1	DP4N	0.00	0.00	Not Found
563084.5	4216574.8	DP4N206	1	DP4N	0.50	0.50	1/2" l X 3/4" w X 1/4" thick piece metal
563084.5	4216574.8	DP4N206	2	DP4N	0.19	0.50	30 Cal bullet, FMJ w/Lead Core
563061	4216555.1	DP4N207	1	DP4N	0.00	0.00	Not Found
563064.13	4216554.5	DP4N208	1	DP4N	0.00	0.00	Not Found

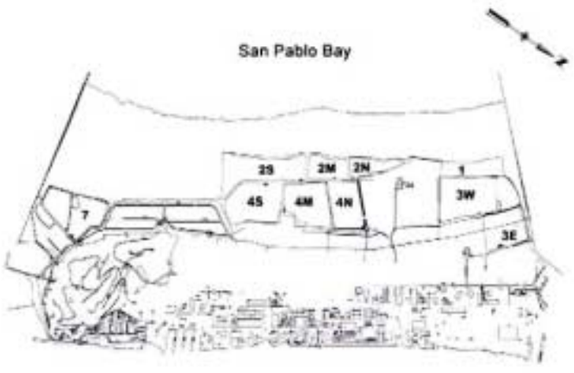
APPENDIX D

REMOVAL ACTION ANOMALY MAPS

APPENDIX D
TABLE OF CONTENTS







Outfall Location

Weir Location

High Density Anomalous Area

FIGURE D1 –
REMOVAL ACTION SCOPE (1/2)

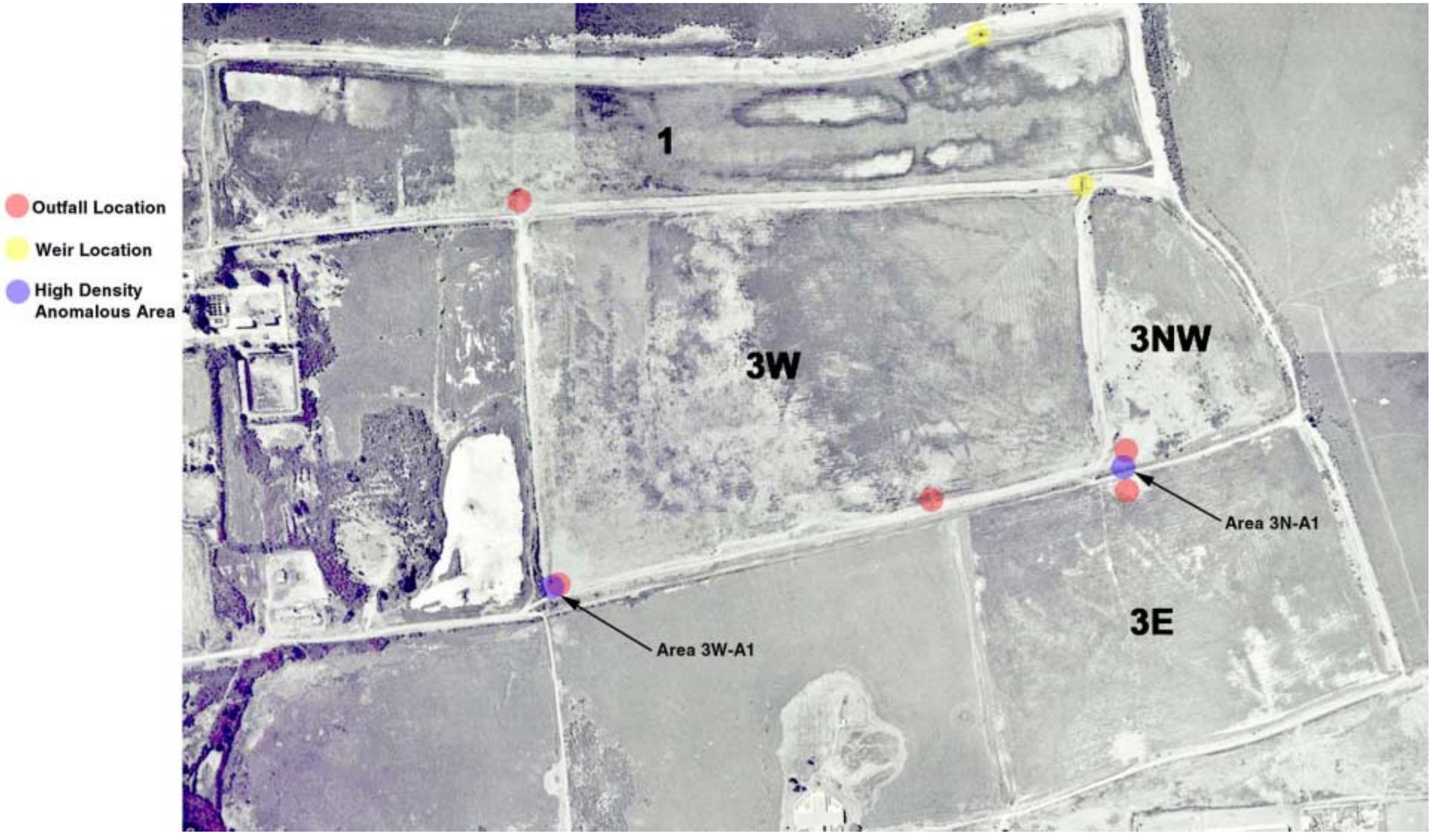


FIGURE D2 –
REMOVAL ACTION SCOPE (2/2)

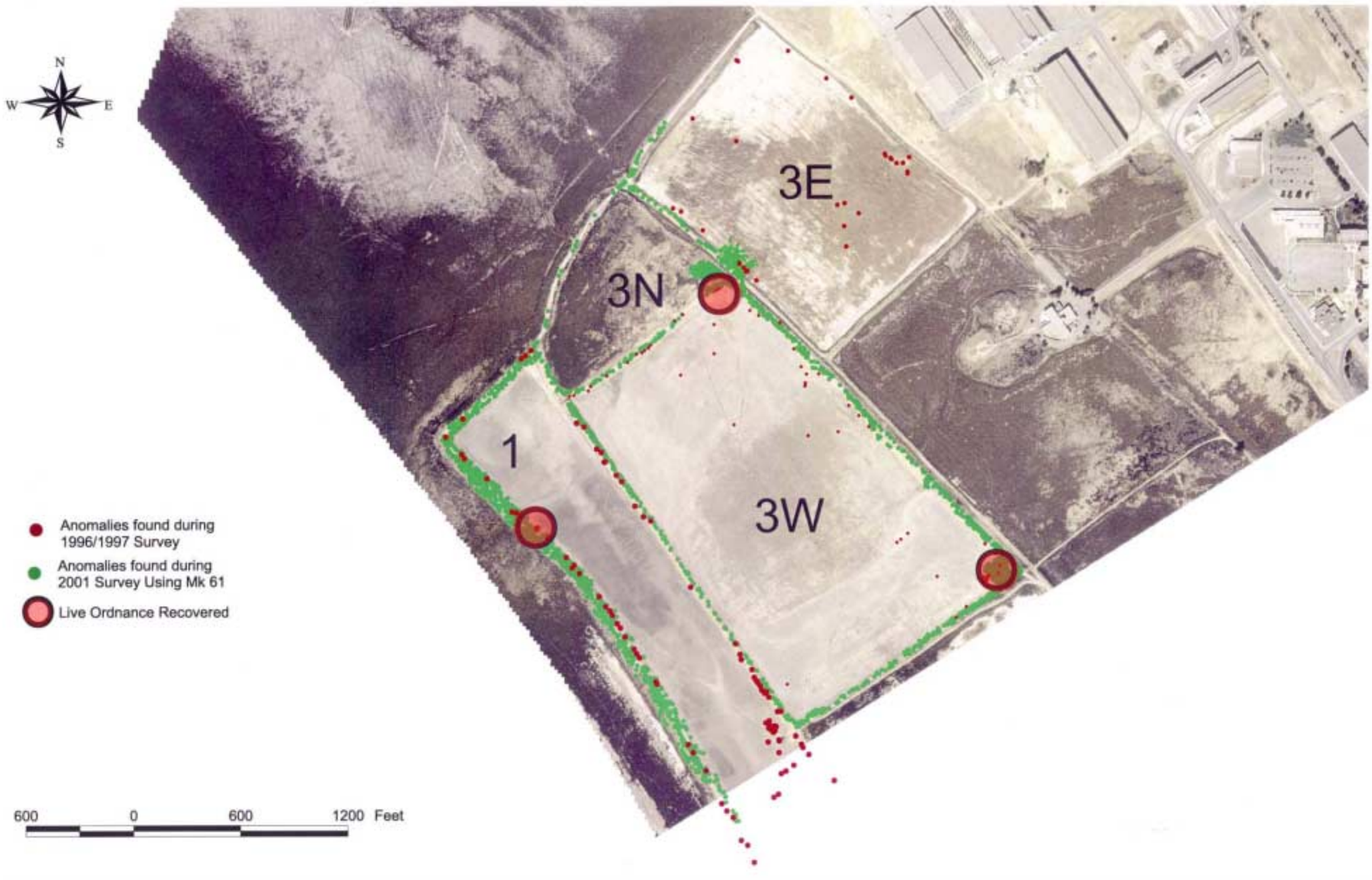


FIGURE D3 – POND
1/3E/3W/3NW ANOMALY CORRELATION

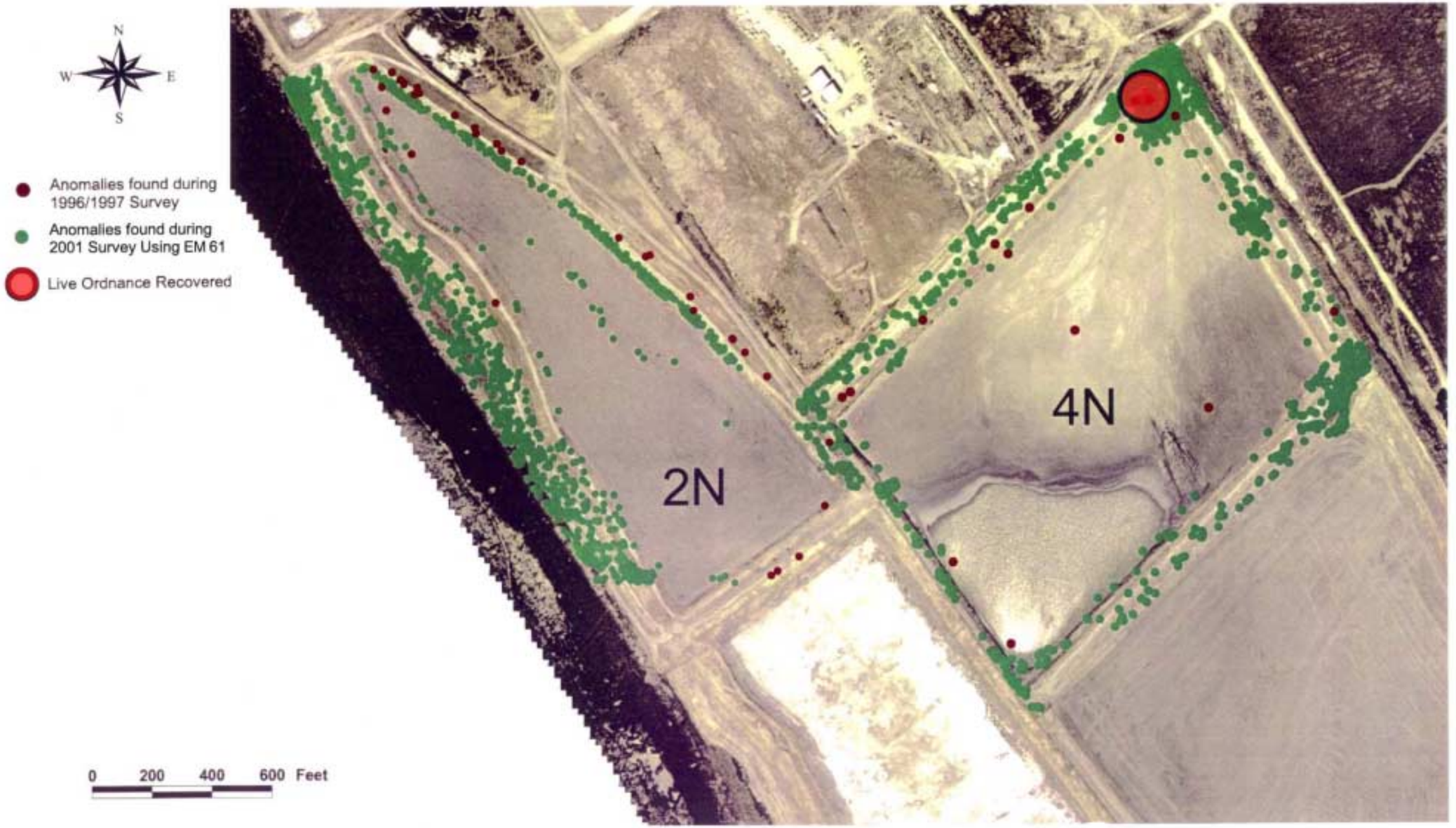


FIGURE D4 –
POND 2N/4N ANOMALY CORRELATION

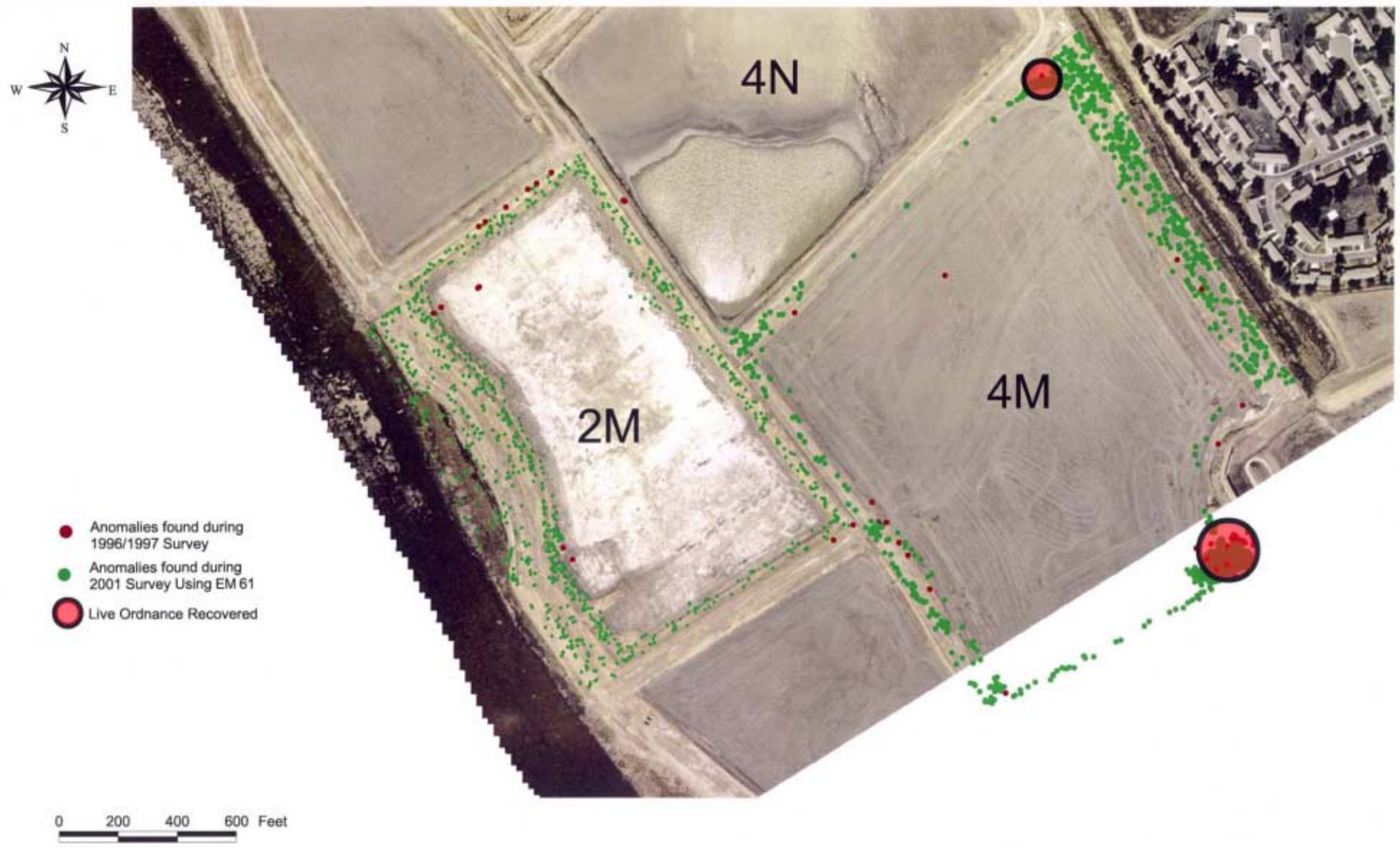


FIGURE D5 –
POND 2M/4M ANOMALY CORRELATION

FIGURE D6 –
POND 2S/4S ANOMALY CORRELATION

FIGURE D7 – POND
7 ANOMALY CORRELATION

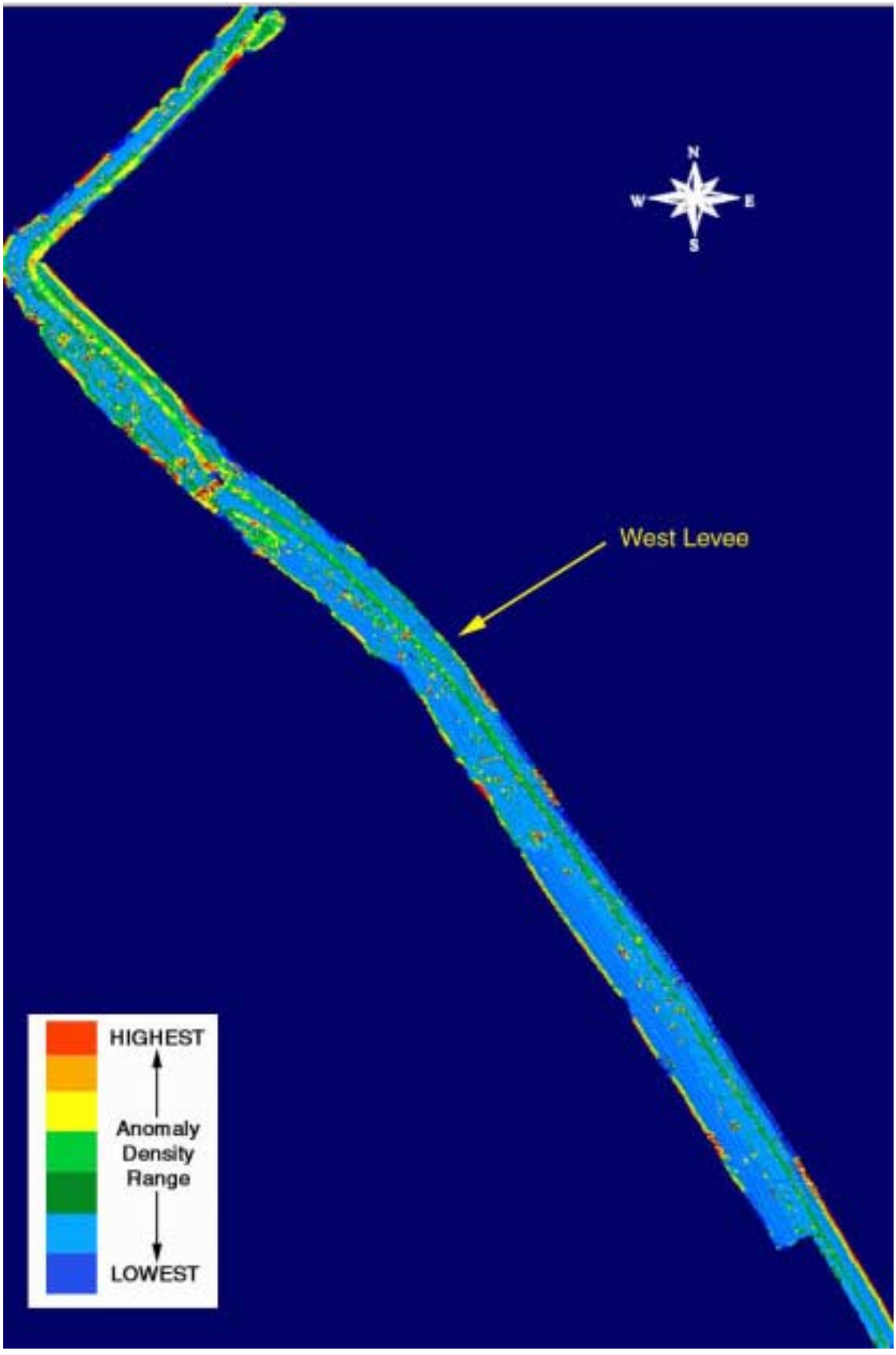


FIGURE D8 – POND 1 GEOPHYSICAL DATA

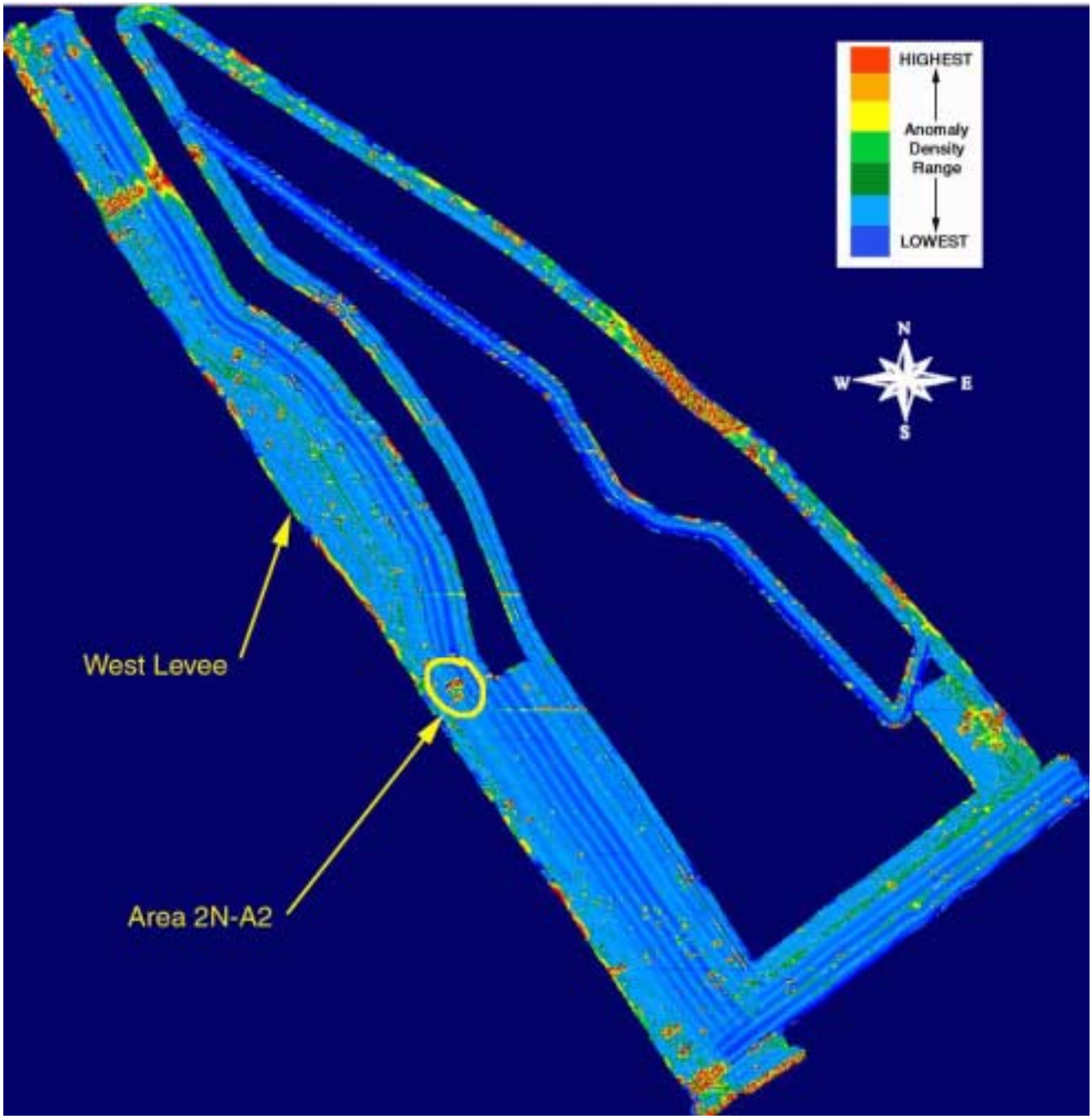


FIGURE D9 – POND 2N GEOPHYSICAL DATA

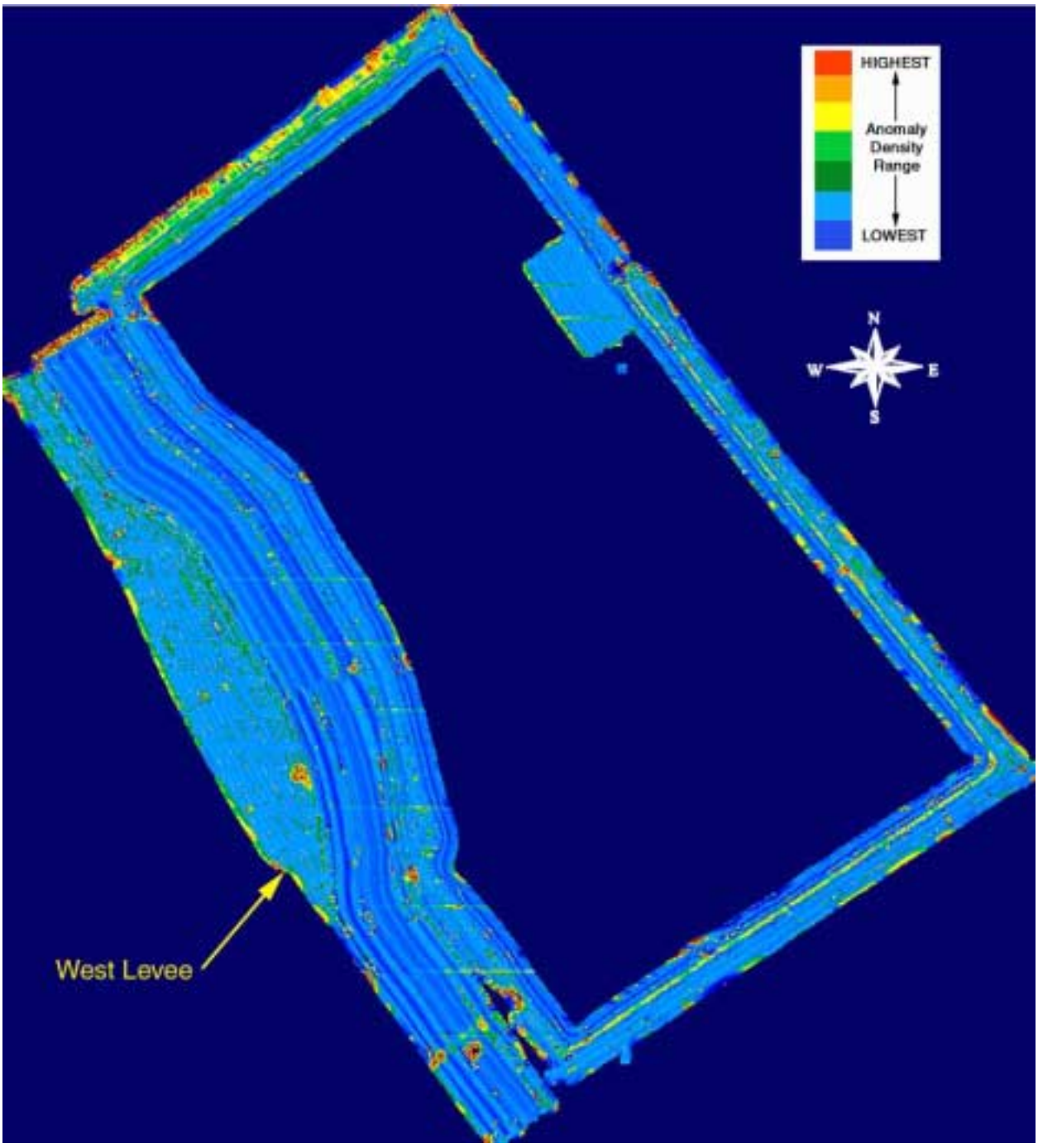


FIGURE D10 – POND 2M GEOPHYSICAL DATA

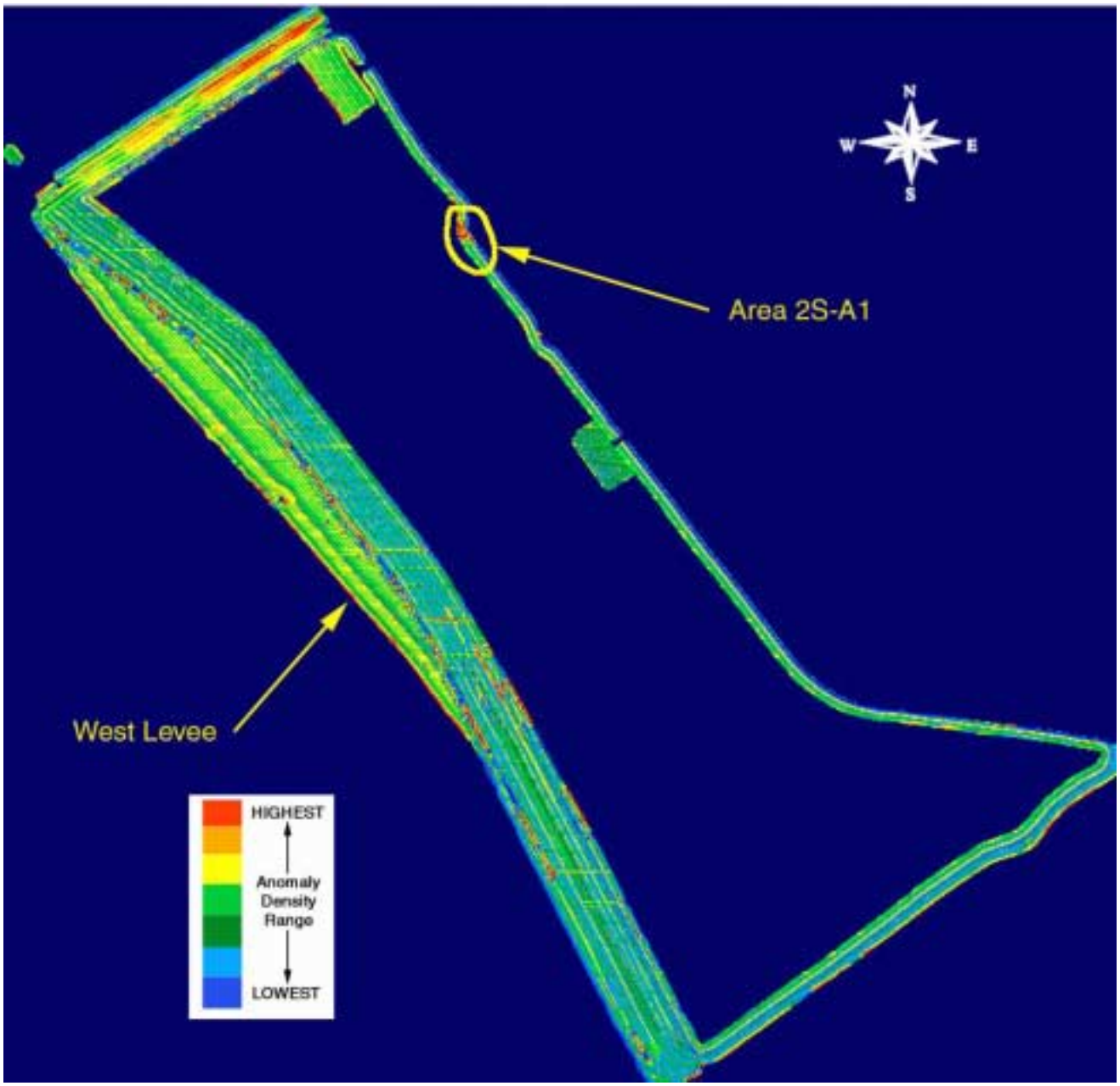


FIGURE D11 – POND 2S GEOPHYSICAL DATA

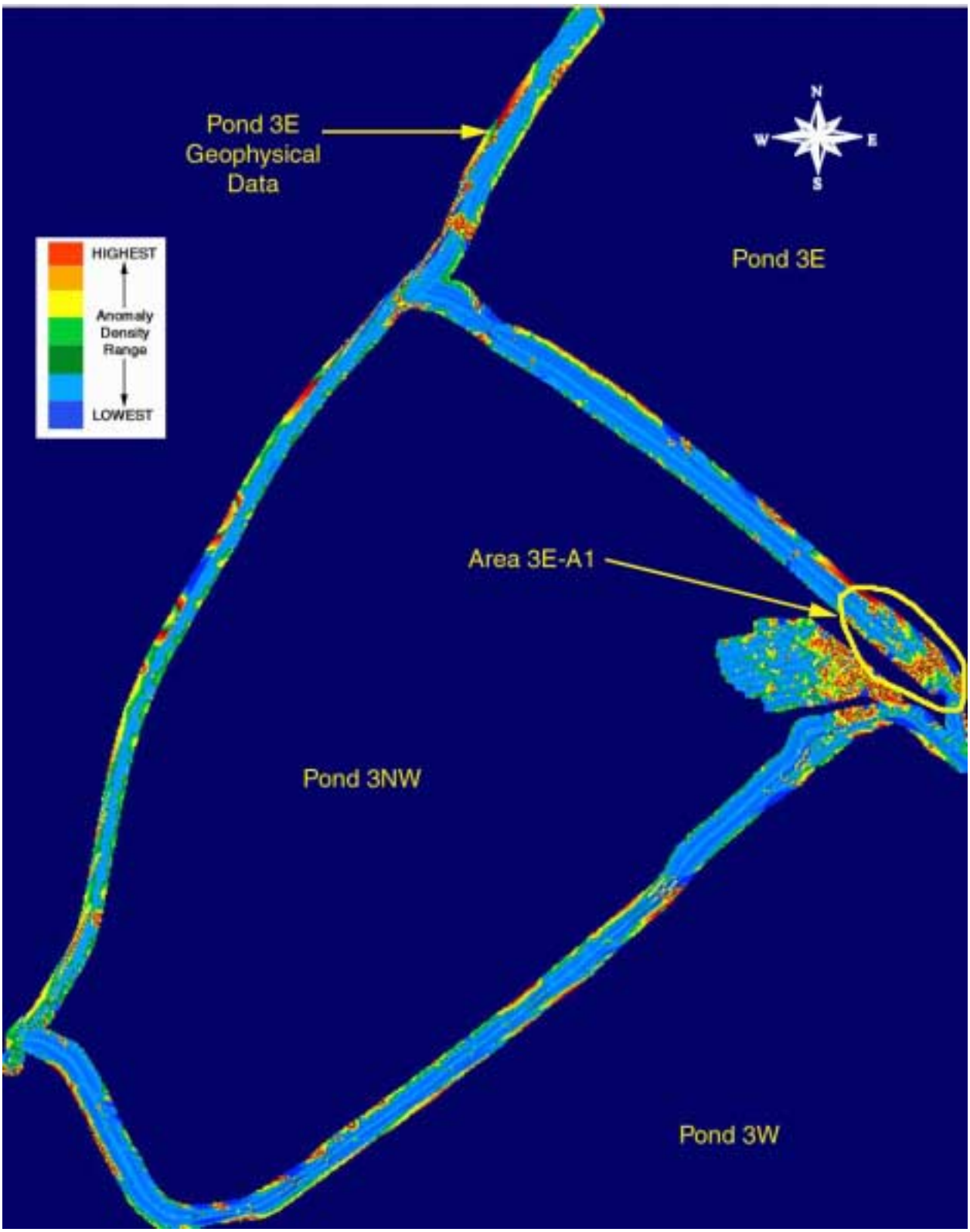


FIGURE D12 – POND 3E/3NW GEOPHYSICAL DATA

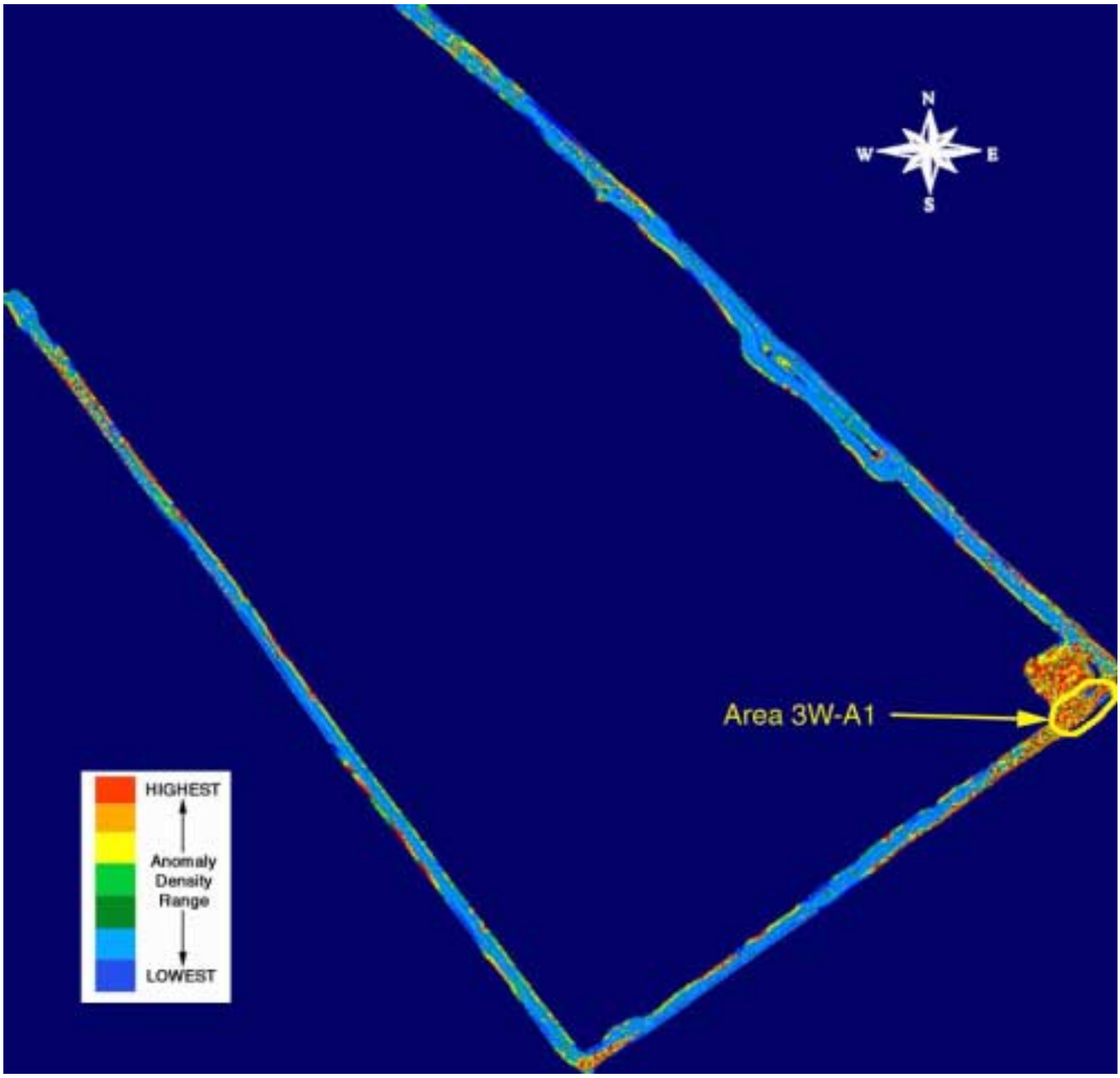


FIGURE D13 – POND 3W GEOPHYSICAL DATA

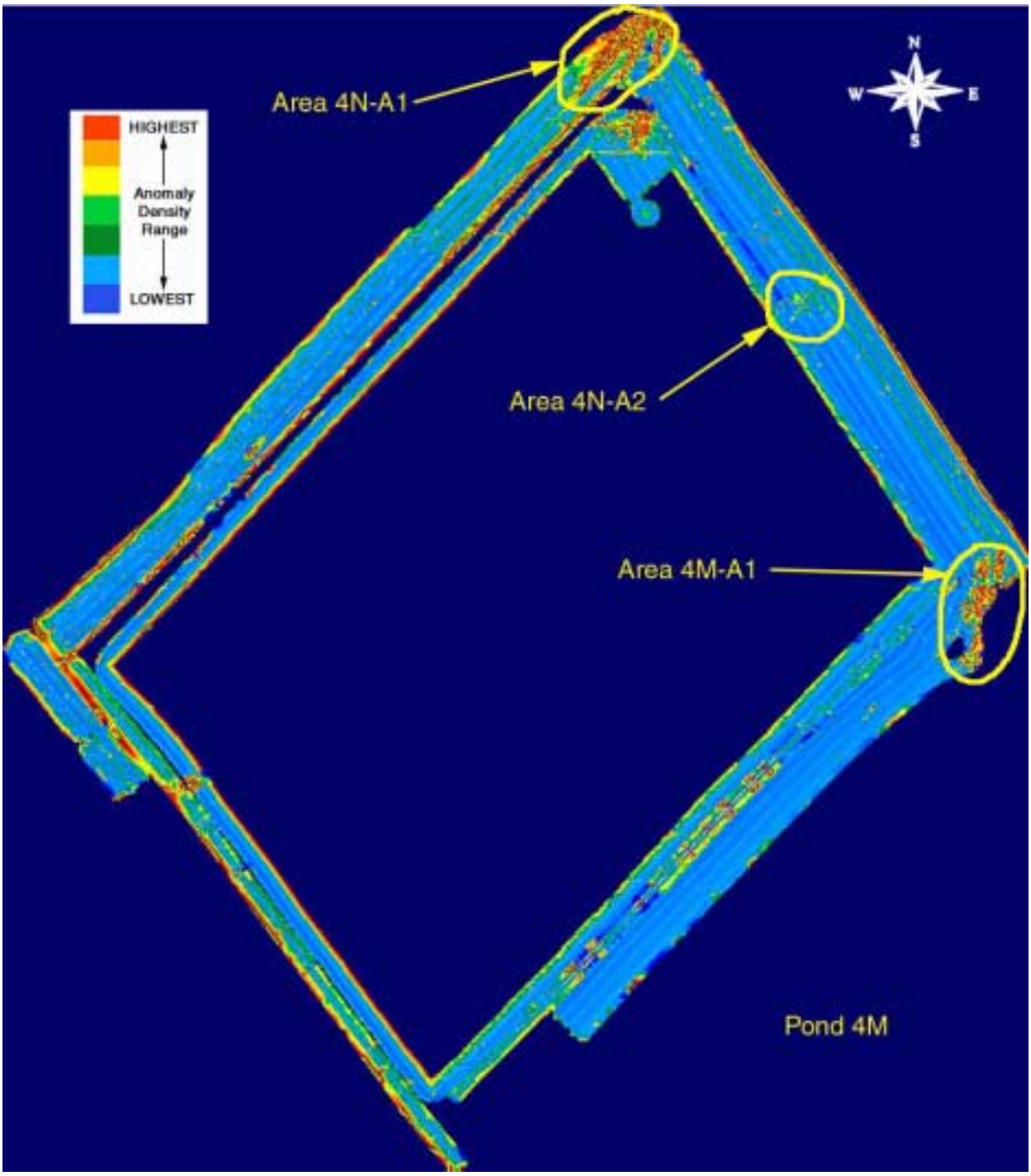


FIGURE D14 – POND 4N GEOPHYSICAL DATA

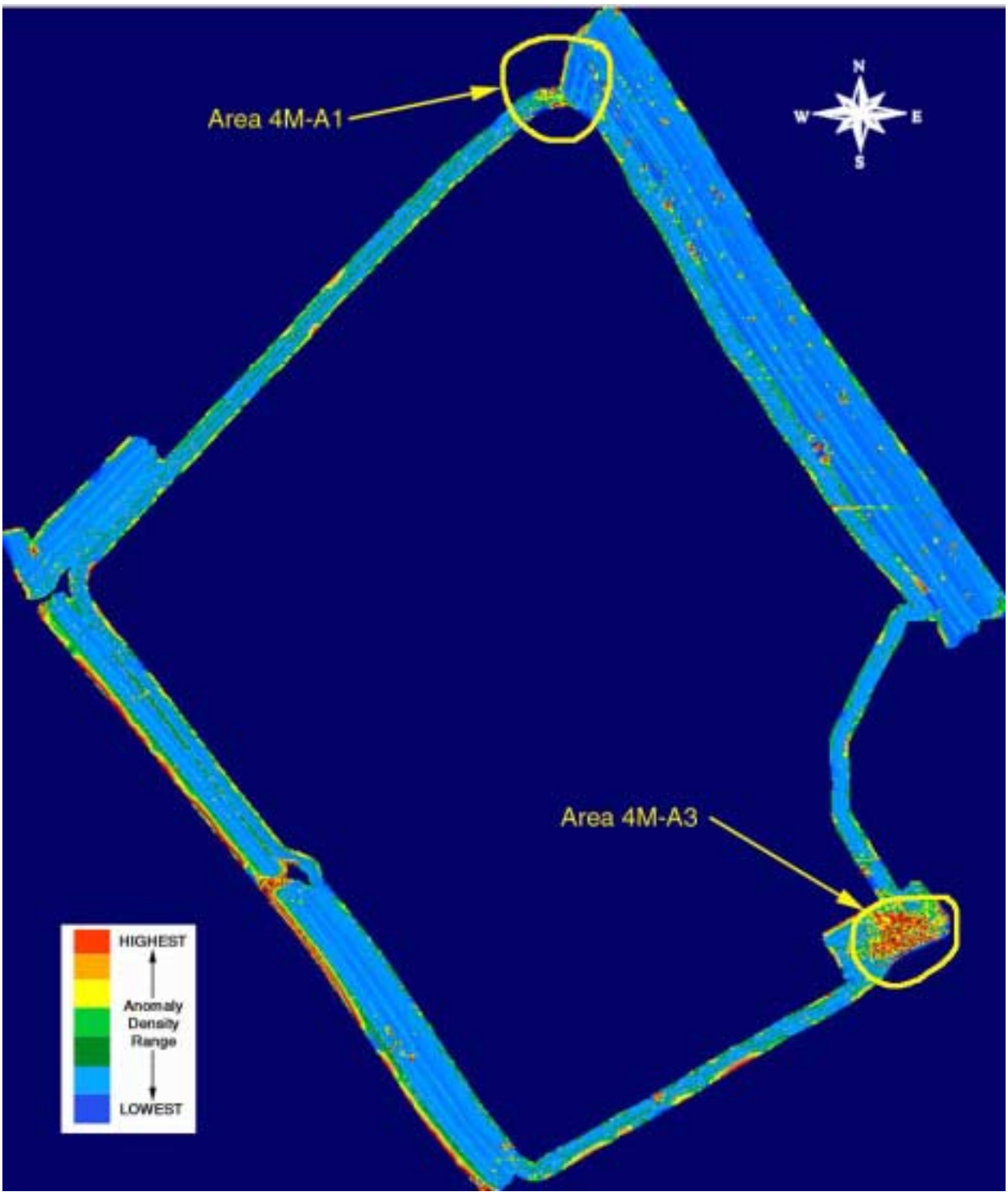


FIGURE D15 – POND 4M GEOPHYSICAL DATA

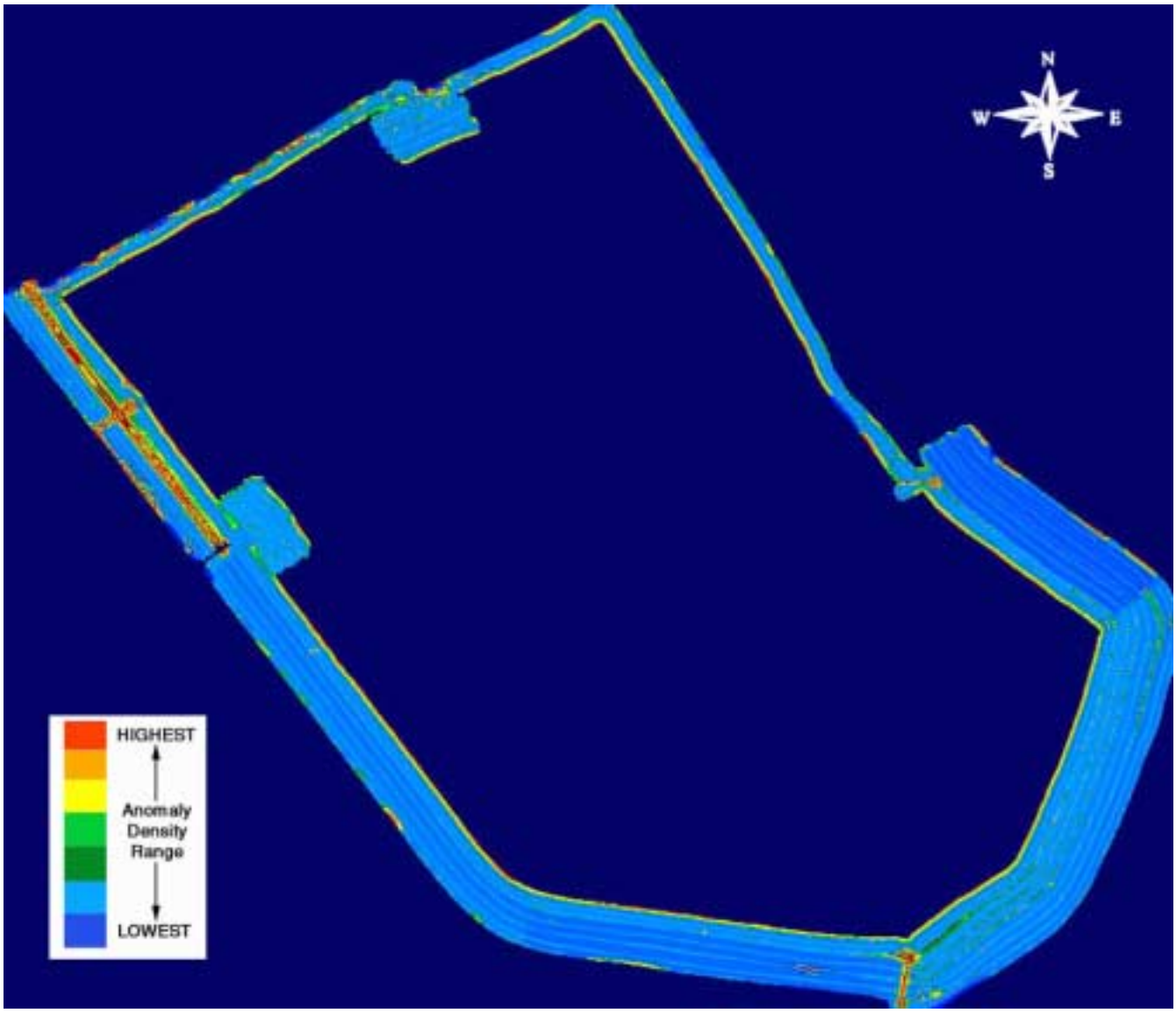


FIGURE D16 – POND 4S GEOPHYSICAL DATA

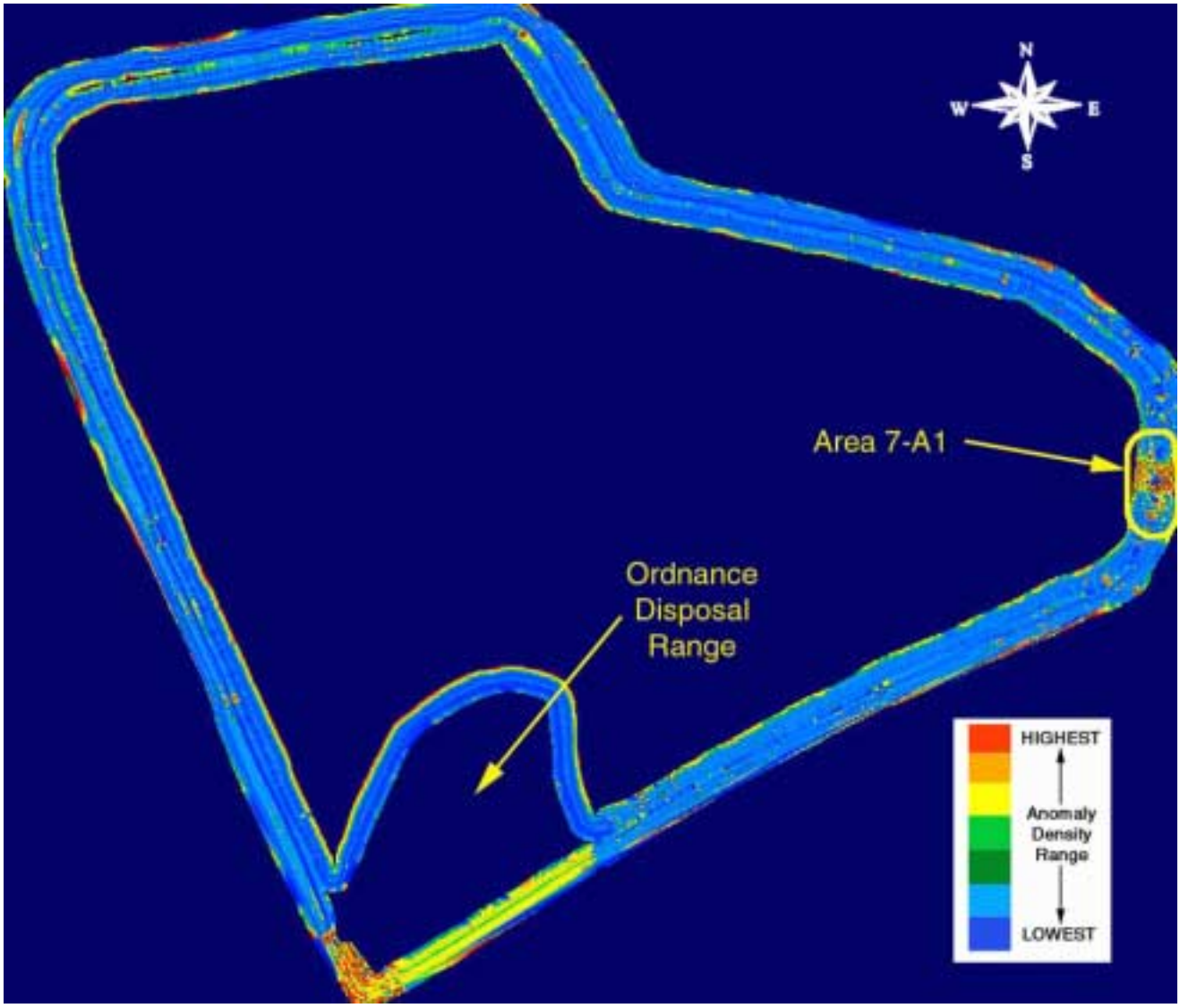


FIGURE D17 – POND 7 GEOPHYSICAL DATA

APPENDIX E

REMOVAL ACTION ANOMALY DATA

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562315	4217491			3WA1	0.00	0.00	
4216482	562249.3	2n_a2_1	1	2Na2	0.00	0.50	Not Found
4216484	562249.1	2n_a2_10	1	2Na2	0.00	0.00	Not Found
4216485	562260.3	2n_a2_11	1	2Na2	0.00	0.00	Not Found
4216466	562266.5	2n_a2_12	1	2Na2	0.00	0.00	Not Found
4216471	562258.8	2n_a2_13	1	2Na2	0.00	0.00	Not Found
4216479	562248.9	2n_a2_14	1	2Na2	0.00	0.00	Not Found
4216481	562247.1	2n_a2_15	1	2Na2	0.00	0.00	Not Found
4216471	562248.4	2n_a2_16	1	2Na2	0.00	0.00	Not Found
4216469	562247.1	2n_a2_17	1	2Na2	0.00	0.00	Not Found
4216476	562250.1	2n_a2_18	1	2Na2	0.00	0.00	Not Found
4216478	562248.8	2n_a2_19	1	2Na2	0.00	0.00	Not Found
4216466	562248.9	2n_a2_2	1	2Na2	0.00	0.00	Not Found
4216485	562252	2n_a2_20	1	2Na2	0.00	0.00	Scrap Metal
4216474	562264.4	2n_a2_21	1	2Na2	0.00	0.00	Not Found
4216466	562257.6	2n_a2_22	1	2Na2	0.00	0.00	Not Found
4216482	562255.9	2n_a2_23	1	2Na2	0.00	0.00	1/4" Washer
4216476	562247.1	2n_a2_24	1	2Na2	0.00	0.00	Not Found
4216467	562247	2n_a2_25	1	2Na2	0.00	0.00	Not Found
4216468	562264.9	2n_a2_26	1	2Na2	0.00	0.00	Not Found
4216486	562251	2n_a2_27	1	2Na2	0.00	0.00	Not Found
4216474	562251.9	2n_a2_28	1	2Na2	0.00	0.00	Not Found
4216481	562252.8	2n_a2_29	1	2Na2	0.00	0.00	Nails in wood on the surface
4216483	562247.1	2n_a2_3	1	2Na2	0.00	0.00	Not Found
4216485	562254	2n_a2_30	1	2Na2	0.00	0.00	Not Found
4216473	562262	2n_a2_31	1	2Na2	0.00	0.00	Welding Rod; Nail; Electrical Cable
4216470	562263.4	2n_a2_32	1	2Na2	0.00	0.00	Rust Pocket
4216469	562261.6	2n_a2_33	1	2Na2	0.00	0.00	Too close to monitoring wells. Within 5'
4216486	562255.5	2n_a2_34	1	2Na2	0.00	0.00	Scrap Metal
4216473	562247.8	2n_a2_35	1	2Na2	0.00	0.00	Not Found
4216472	562250.3	2n_a2_36	1	2Na2	0.00	0.00	Not Found
4216474	562256.8	2n_a2_37	1	2Na2	0.00	0.00	Rust Pocket
4216471	562266.8	2n_a2_38	1	2Na2	0.00	0.00	Rust Pocket
4216468	562251.3	2n_a2_39	1	2Na2	0.00	0.00	Not Found
4216467	562262.9	2n_a2_4	1	2Na2	0.00	0.00	Not Found
4216479	562253.3	2n_a2_40	1	2Na2	0.00	0.00	Not Found
4216479	562255.4	2n_a2_41	1	2Na2	0.00	0.00	Not Found
4216479	562257.4	2n_a2_42	1	2Na2	0.00	0.00	.45 Cal Casing
4216479	562257.4	2n_a2_42	2	2Na2	0.00	0.00	Welding Rod
4216470	562260.4	2n_a2_43	1	2Na2	0.00	0.00	Location too close to well head
4216476	562254.9	2n_a2_44	1	2Na2	0.00	0.00	Location too close to well head
4216478	562260.4	2n_a2_45	1	2Na2	0.00	0.00	Morrison matting on surface
4216480	562260.4	2n_a2_46	1	2Na2	0.00	0.00	Morrison Matting on surface

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
4216484	562256.6	2n_a2_5	1	2Na2	0.00	0.00	Not Found
4216470	562253.6	2n_a2_6	1	2Na2	0.00	0.00	Not Found
4216466	562253.8	2n_a2_7	1	2Na2	0.00	0.00	Pepsi Can
4216479	562250.5	2n_a2_8	1	2Na2	0.00	0.00	Not Found
4216482	562251.1	2n_a2_9	1	2Na2	0.00	0.00	Not Found
583154.7	1487726	2s_a1_1	1	2s	100.00	0.50	@ 8 oz scrap iron 4" x3" cylindrical outfall debris solidified iron rust
583171.9	1487727	2s_a1_10	1	2s	1.00	2.00	4" diameter scrap metal
583193.1	1487718	2s_a1_11	1	2s	10.00	1.00	misc scrap
583192.1	1487723	2s_a1_12	1	2s	5.00	1.00	scrap iron pipe 6" diameter 8 inches long
583174.6	1487717	2s_a1_13	1	2s	15.00	2.00	multiple items of scrap iron
583153.4	1487711	2s_a1_14	1	2s	10.00	2.50	Misc scrap metal and 14" piece of 2.5" pipe (painted violet)
583159.3	1487708	2s_a1_15	1	2s	5.00	1.00	stainless steel bracket at 3 ft light debris
583182.7	1487723	2s_a1_16	1	2s	10.00	1.00	3/8" x 3" bolt; screw driver 8"; 3"x3"x4" angle iron 12" x12" x 12" debris field
583174.9	1487722	2s_a1_17	1	2s	4.00	1.00	scrap iron bracket; 5" x 1" piece of scrap iron, small metal debris in all directions
583142	1487725	2s_a1_18	1	2s	0.00	1.00	welding rod
583133.7	1487730	2s_a1_19	1	2s	0.00	4.00	Nothing found
583168.3	1487723	2s_a1_2	1	2s	10.00	1.00	scrap iron pipe 6" diameter x 8" long misc scrap iron
583154.5	1487703	2s_a1_20	1	2s	10.00	2.00	outfall debris solidified iron rust scrap
583184.9	1487717	2s_a1_21	1	2s	0.06	0.83	welding rod 10" long
583162.1	1487725	2s_a1_22	1	2s	3.00	1.00	2" x 2" iron pipe; misc scrap iron
583164.7	1487718	2s_a1_23	1	2s	0.00	3.00	1 ea 50 cal cartridge case
583164.7	1487718	2s_a1_23	2	2s	0.00	3.00	12" x 12" piece of scrap iron. Light debris instrumentation indication at 5 '
583169.2	1487705	2s_a1_24	1	2s	130.00	2.00	Iron pipe 6" x 2" and multiple items of scrap iron
583183.2	1487704	2s_a1_25	1	2s	1.00	0.50	coil spring 6" diameter
583170.6	1487714	2s_a1_26	2	2s	0.00	1.00	Iron spike Misc scrap metal
583170.6	1487714	2s_a1_26	1	2s	0.00	1.00	50 cal cartridge case
583163.5	1487704	2s_a1_27	1	2s	0.00	2.00	large amount misc scrap metal
583145	1487705	2s_a1_28	1	2s	1.00	1.00	scrap metal at 1 foot; 1.5" pipe at 1.5 feet
583140.7	1487714	2s_a1_29	1	2s	0.00	2.50	Light debris welding rod; nails; spikes; pipe
583172	1487710	2s_a1_3	1	2s	100.00	4.00	scrap metal: pipe; cable; nuts; bolts; other metals Debris field large amount of material at 2' 4' depth one meter in all directions
583151.1	1487723	2s_a1_30	1	2s	0.00	3.50	debris field misc metal large amount of

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
							scrap metal
583132.2	1487707	2s_a1_4	1	2s	0.13	0.50	1" x 4" scrap metal
583135.5	1487722	2s_a1_5	1	2s	0.31	0.50	Iron bolt 1" x 8"
583165	1487710	2s_a1_6	1	2s	0.00	3.00	Debris field of scrap metal 1 meter in all directions
583187.7	1487706	2s_a1_7	1	2s	0.50	0.83	scrap iron 4" valve handle
583133.8	1487725	2s_a1_8	1	2s	5.00	0.50	1.5" x 18" pipe
583143.8	1487733	2s_a1_9	1	2s	2.00	1.00	outfall debris rust scrap iron
561815.9	4217997	3n_a1_1	1	3NA1	0.00	0.00	Not Found
561812.3	4217997	3n_a1_10	1	3NA1	0.00	0.00	Not Found
561812.5	4218002	3n_a1_11	1	3NA1	0.00	1.00	Flashlight; Aluminum scrap; nail
561817.4	4218001	3n_a1_12	1	3NA1	2.00	2.00	Chunk of metal
561830.8	4218012	3n_a1_13	1	3NA1	0.00	0.00	Scrap steel pocket
561837.3	4218010	3n_a1_14	1	3NA1	0.00	0.00	Not Found
561834.5	4218011	3n_a1_15	1	3NA1	0.00	0.00	Scrap steel pocket
561832.6	4218009	3n_a1_16	1	3NA1	0.00	0.00	Scrap steel pocket
561828.1	4218009	3n_a1_17	1	3NA1	0.00	0.00	Scrap metal pocket; "C" Clamp; Steel plug 3 lbs; Electrical wire; Stainless Steel Clamp
561823.8	4218007	3n_a1_18	1	3NA1	0.00	0.00	Steel spacer; Clamp, Key; Nails, Scrap
561826	4218005	3n_a1_19	1	3NA1	0.00	0.00	Not Found
561819	4217997	3n_a1_2	1	3NA1	0.50	1.00	6' copper wire
561822	4218004	3n_a1_20	1	3NA1	0.00	0.00	Not Found
561821	4218002	3n_a1_21	1	3NA1	0.25	2.00	Scrap Metal
561841.1	4218038	3n_a1_22	1	3NA1	0.00	0.50	1/2" X 6" Stud
561846	4218039	3n_a1_23	1	3NA1	0.00	0.00	Not Found
561842.5	4218040	3n_a1_24	1	3NA1	0.00	0.00	10" Steel Pipe x 1.5" Diameter
561832.6	4218047	3n_a1_25	1	3NA1	0.00	1.00	1/2" Steel Bar 12" Long
561845	4218043	3n_a1_26	1	3NA1	0.00	0.00	3' x 1/2" Bar Steel; 6" Diameter x 1/2 inch Steel Plate
561845	4218035	3n_a1_27	1	3NA1	0.00	0.50	1/2" Rebar x 12" long
561854.6	4218036	3n_a1_28	1	3NA1	0.00	2.00	1.5" Stranded cable 6' long
561831.3	4218053	3n_a1_29	1	3NA1	0.00	0.00	Not Found
561821.8	4218000	3n_a1_3	1	3NA1	0.00	0.00	Not Found
561831.8	4218043	3n_a1_30	1	3NA1	0.00	0.00	Not Found
561833.9	4218041	3n_a1_31	1	3NA1	0.00	0.00	Not Found
561841.5	4218053	3n_a1_32	1	3NA1	0.00	0.00	Not Found
561834.3	4218049	3n_a1_33	1	3NA1	0.00	0.00	Not Found
561835.8	4218046	3n_a1_34	1	3NA1	0.00	1.00	5" x 1/2" Steel bolt
561848.3	4218041	3n_a1_35	1	3NA1	0.00	1.00	1/2" x 10" Steel Rebar
561849.4	4218043	3n_a1_36	1	3NA1	20.00	3.00	Scrap metal
561851.6	4218041	3n_a1_37	1	3NA1	0.00	0.00	Not Found
561852.9	4218039	3n_a1_38	1	3NA1	0.00	1.50	Bits, Pieces of nails; Scrap; 10" Telephone pole spike

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
561839.8	4218050	3n_a1_39	1	3NA1	0.00	0.00	Not Found
561813.1	4218008	3n_a1_4	1	3NA1	0.00	0.00	Electrical connector
561842.4	4218049	3n_a1_40	1	3NA1	0.00	0.00	Not Found
561838.9	4218045	3n_a1_41	1	3NA1	0.00	0.00	Not Found
561858	4218040	3n_a1_42	1	3NA1	0.00	0.00	Not Found
561853.5	4218035	3n_a1_43	1	3NA1	0.00	0.00	1.5" Stranded Cabling, 6 feet long
561852.1	4218033	3n_a1_44	1	3NA1	0.00	0.00	Pocket of rust
561844.6	4218047	3n_a1_45	1	3NA1	0.00	0.00	Not Found
561845.9	4218044	3n_a1_46	1	3NA1	0.00	0.00	Not Found
561835.1	4218040	3n_a1_47	1	3NA1	0.00	0.00	Not Found
561838.8	4218037	3n_a1_48	1	3NA1	2.00	3.00	"Steel Brick" 3" x 6" x 3"
561843.1	4218052	3n_a1_49	1	3NA1	0.00	0.00	Not Found
561818.3	4218007	3n_a1_5	1	3NA1	0.00	0.00	Not Found
561838.4	4218049	3n_a1_50	1	3NA1	0.00	0.00	Not Found
561841.9	4218046	3n_a1_51	1	3NA1	0.00	1.50	2" double mail brass union
561842.6	4218044	3n_a1_52	1	3NA1	0.00	1.00	Bits & pieces of Scrap metal; 7" Square brass box cover
561847.1	4218037	3n_a1_53	1	3NA1	1.00	2.00	A bunch of rusted nails and a "U"-Bolt
561844.5	4218031	3n_a1_54	1	3NA1	0.00	0.00	Not Found
561858.1	4218032	3n_a1_55	1	3NA1	0.00	4.00	Buried Dredge Piping
561836.1	4218050	3n_a1_56	1	3NA1	0.00	3.50	18" Diameter x 3' long Steel Pipe (Dredge Piping)
561836.1	4218053	3n_a1_57	1	3NA1	0.00	1.00	2.5" Stranded Steel Cable, 25' long
561832	4218055	3n_a1_58	1	3NA1	0.00	0.00	Not Found
561819.1	4218000	3n_a1_6	1	3NA1	0.00	0.50	Wire 6' Brass
561819.1	4218005	3n_a1_7	1	3NA1	3.00	1.00	Aluminum scrap 1 lb; Brass Fire Hose Connection 2 lbs
561826.3	4218010	3n_a1_8	1	3NA1	0.00	0.00	.30 cal casing (empty)
561826.3	4218010	3n_a1_8	2	3NA1	0.00	0.00	A ball of scrap steel; Phone Jack; Air hose connector; Fire hose connector
561829.6	4218005	3n_a1_9	1	3NA1	0.00	0.00	Not Found
562300.8	4217486	3w_a1_1	1	3WA1	0.00	2.50	Misc scrap: Debris field: indications below 4'
562316.6	4217491	3w_a1_10	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562315.9	4217488	3w_a1_11	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562313.9	4217493	3w_a1_12	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562314.9	4217496	3w_a1_13	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562311	4217496	3w_a1_14	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562316.6	4217498	3w_a1_15	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562321.8	4217499	3w_a1_16	1	3WA1	0.00	0.00	Heavy Metal Scrap; Debris Field; Indications below 4'

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
562323.8	4217500	3w_a1_17	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562323.8	4217498	3w_a1_18	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562321	4217496	3w_a1_19	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562314.8	4217497	3w_a1_2	1	3WA1	0.00	2.50	Misc scrap; Debris field
562302.1	4217482	3w_a1_20	1	3WA1	0.00	0.00	Heavy Metal Scrap; Debris Field; Indications below 4'
562300.6	4217484	3w_a1_21	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562318.3	4217500	3w_a1_22	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562312.3	4217500	3w_a1_23	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562310.6	4217498	3w_a1_24	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562308.5	4217497	3w_a1_25	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562306.9	4217495	3w_a1_26	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562305.1	4217493	3w_a1_27	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562302.8	4217488	3w_a1_28	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562305	4217487	3w_a1_29	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562312.5	4217487	3w_a1_3	1	3WA1	0.00	2.50	Misc Scrap; Debris field; Indications below 4 feet
562304.3	4217484	3w_a1_30	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562307.8	4217486	3w_a1_31	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562311.5	4217489	3w_a1_32	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562313.4	4217490	3w_a1_33	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562318.4	4217491	3w_a1_35	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562318	4217496	3w_a1_36	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562315.8	4217494	3w_a1_37	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562316.6	4217502	3w_a1_38	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562310.4	4217516	3w_a1_39	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562320.5	4217500	3w_a1_4	1	3WA1	0.00	2.50	Heavy Misc Scrap; Debris field; Indications below 4'
562318.6	4217520	3w_a1_40	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field;

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
							Indications below 4'
562325.9	4217520	3w_a1_41	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562321.9	4217520	3w_a1_42	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562317.4	4217518	3w_a1_43	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562311.4	4217500	3w_a1_44	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562328.8	4217520	3w_a1_45	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562327	4217509	3w_a1_46	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562320	4217513	3w_a1_47	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562310.8	4217502	3w_a1_48	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562311.1	4217509	3w_a1_49	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562302.6	4217491	3w_a1_5	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562308.9	4217514	3w_a1_50	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562311.8	4217515	3w_a1_51	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562314.3	4217516	3w_a1_52	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562312.5	4217512	3w_a1_53	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562316.5	4217514	3w_a1_54	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562314.5	4217512	3w_a1_55	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562314.4	4217500	3w_a1_56	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562316.3	4217498	3w_a1_57	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562310.8	4217497	3w_a1_58	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562325.3	4217506	3w_a1_59	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562306.1	4217490	3w_a1_6	1	3WA1	0.00	0.00	Heavy Metal Scrap; Debris Field; Indications below 4'
562321.8	4217496	3w_a1_60	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562318.1	4217496	3w_a1_61	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562317.4	4217500	3w_a1_62	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562314	4217505	3w_a1_63	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field;

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
							Indications below 4'
562314.1	4217502	3w_a1_64	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562324.9	4217507	3w_a1_65	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562323.5	4217514	3w_a1_66	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562339.1	4217519	3w_a1_67	1	3WA1	50.00	2.50	Iron bracket 8' x 5"; 1/2 x 4" bolt; Debris field at 4' Misc scrap 40 lbs
562336	4217509	3w_a1_68	1	3WA1	0.00	2.50	Misc scrap Iron at 6"; 13"x 2" Bolt 2 lb at 1'; Debris field @ 4'; Indication below 4'
562323.4	4217501	3w_a1_69	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562307.8	4217489	3w_a1_7	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562324.8	4217503	3w_a1_70	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562328.4	4217502	3w_a1_71	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562333.9	4217513	3w_a1_72	1	3WA1	1.50	2.50	1" Gate valve 1 lb @ 6"; Rivet 2" x 1" @ 3 ft 8 oz; Misc debris
562332.5	4217509	3w_a1_73	1	3WA1	50.00	2.50	iron strap 1" x 2' 1 Lb @ 6"; 2" ball valve 5 Lbs @ 1 foot; misc scrap @ 2'; Debris field; Indications below 4'
562311.9	4217505	3w_a1_74	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562330.3	4217503	3w_a1_75	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562322.4	4217503	3w_a1_76	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562316.1	4217494	3w_a1_77	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562324.5	4217500	3w_a1_78	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562318.6	4217504	3w_a1_79	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562308.4	4217492	3w_a1_8	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562323.3	4217507	3w_a1_80	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562329.1	4217505	3w_a1_81	1	3WA1	0.00	2.50	Cresent wrench 8 oz @ 1 ft; Pliers 8 oz @ 1'; metal plate 5 lbs @ 2'; misc scrap @ 3'; debris field @ 4'; Indications below 4'
562334.4	4217505	3w_a1_82	1	3WA1	120.00	2.50	Pipe 2' feet long 3" diameter 10 lbs @ 1'; Misc scrap 50 lbs @ 2'; Debris field 50 Lbs @ 2'; Indications below 4'
562336.8	4217515	3w_a1_83	1	3WA1	10.00	2.50	Iron spike 4"; railroad spike 1 lb @ 1'; iron plate 8" Dia. 3 lbs at 1'; Misc metal scrap 2'; debris field @ 3';

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
							Indication below 5'
562335.5	4217512	3w_a1_84	1	3WA1	0.00	2.50	cooper tubing 6' at 6"; 40 MM Ammo can top 1' by 1' 5 lbs; Debris field at 3 ft; Indications below 4'
562339.1	4217516	3w_a1_85	1	3WA1	0.00	2.50	12" diameter steel culvert 8' long weight unknown; Misc scrap metal
562320.5	4217502	3w_a1_86	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562317.8	4217507	3w_a1_87	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562320.1	4217508	3w_a1_88	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562331.8	4217515	3w_a1_89	1	3WA1	0.00	2.50	.30 cal spent cartridge case @ 1'
562331.8	4217515	3w_a1_89	2	3WA1	5.00	2.50	Metal strapping @ 1ft; Iron bracket @ 1'; Misc scrap @ 2'; Indications below 4'
562314.4	4217499	3w_a1_9	1	3WA1	0.00	2.50	Heavy Metal Scrap; Debris Field; Indications below 4'
562327.6	4217513	3w_a1_90	1	3WA1	20.00	2.50	Iron platter 6" diameter 5 lbs @ 2'; Misc scrap 10 lbs 2 3'; Debris field @ 4'; Indications below 4'
562329.6	4217509	3w_a1_91	1	3WA1	50.00	2.50	lead 20 lbs @ 1'; Tools 1 lb at 1'; Five various 10 lbs @ 3'; cable 10 lbs @ 3'; Misc scrap @ 4'; Indications below 4'
562331.3	4217506	3w_a1_92	1	3WA1	20.00	2.50	Nuts and bolts 10 lbs @ 1'; Strap iron 2" x 1 ft 10 Lbs @ 2'; Misc scrap @ 3'; Debris field; indications below4 ft
4216528	563111.8	4m_a1_1	1	4ma1	0.00	0.00	Not found Clear to 4 '
4216525	563108.5	4m_a1_10	1	4ma1	0.00	0.00	Clear to 4 feet not. Not found
4216556	563095.4	4m_a1_100	1	4ma1	0.00	0.00	Scrap Metal
4216577	563105.5	4m_a1_101	1	4ma1	0.00	0.00	Rust Pocket
4216574	563111.8	4m_a1_102	1	4ma1	0.00	0.00	Rust Pocket
4216573	563110	4m_a1_103	1	4ma1	0.00	0.00	ReBar 1/2" x 4"
4216572	563109.6	4m_a1_104	1	4ma1	0.00	0.00	Scrap metal
4216542	563109.9	4m_a1_105	1	4ma1	0.00	0.00	Clear to 4' Nothing Found
4216536	563101.4	4m_a1_106	1	4ma1	0.00	0.50	Rust Deposit
4216541	563101.5	4m_a1_107	1	4ma1	0.13	0.50	1/2" x 2" Bolt
4216534	563089.4	4m_a1_108	1	4ma1	0.00	0.00	Scrap
4216557	563102.9	4m_a1_109	1	4ma1	0.00	0.00	Dredge pipe
4216503	563110.1	4m_a1_11	1	4ma1	0.00	0.00	not found
4216569	563108.5	4m_a1_110	1	4ma1	0.00	0.00	Rust Pocket
4216542	563097.1	4m_a1_111	1	4ma1	0.00	0.00	Dredge Pipe
4216546	563099.3	4m_a1_112	1	4ma1	0.00	0.00	Dredge Pipe
4216544	563098.9	4m_a1_113	1	4ma1	0.00	0.00	Dredge Pipe
4216561	563089.9	4m_a1_114	1	4ma1	0.00	0.00	Scrap Metal
4216558	563091.1	4m_a1_115	1	4ma1	0.00	0.00	Scrap Metal
4216558	563088.1	4m_a1_116	1	4ma1	0.00	0.00	Scrap Metal

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
4216537	563090.6	4m_a1_117	1	4ma1	0.00	0.00	Chrome Pipe 1/2" x 16"
4216534	563100.5	4m_a1_118	1	4ma1	0.00	0.00	Clear to 4' Nothing Found
4216554	563108.4	4m_a1_119	1	4ma1	0.00	0.00	Scrap Metal
4216503	563107.8	4m_a1_12	1	4ma1	0.19	0.00	misc scrap: on surface: clamp 4" x 1" plate 2" x2"
4216562	563107.9	4m_a1_120	1	4ma1	0.00	0.00	Nothing Found
4216547	563093.4	4m_a1_121	1	4ma1	0.00	0.00	Brass threaded pipe with fittings 20" x 1/2"
4216544	563094.1	4m_a1_122	1	4ma1	0.00	0.00	3/4" steel shackle, Scrap metal
4216555	563093	4m_a1_123	1	4ma1	0.00	0.00	Eye Bolt and steel screw
4216548	563088.8	4m_a1_124	1	4ma1	0.00	0.00	Steel Staging Pipe 2' Long
4216553	563088	4m_a1_125	1	4ma1	0.00	0.00	Brass screw and nut, stainless steel rod, scrap metal
4216554	563089.9	4m_a1_126	1	4ma1	0.00	0.00	Rust pocket
4216565	563098.5	4m_a1_127	1	4ma1	0.00	0.00	Scrap metal, Steel wedge
4216566	563093.8	4m_a1_128	1	4ma1	0.00	0.00	Metal bolt 8"x1/2", 4 lb block of metal, welding rod
4216565	563092	4m_a1_129	1	4ma1	0.00	0.00	Scrap metal, Chisel
4216508	563110.1	4m_a1_13	1	4ma1	0.00	0.00	not found cleared to 4 '
4216571	563093.4	4m_a1_130	1	4ma1	0.00	0.00	Scrap metal
4216572	563098	4m_a1_131	1	4ma1	0.00	0.00	Sheet metal , Screw head
4216539	563094.5	4m_a1_132	1	4ma1	0.00	0.00	Scrap metal
4216540	563092	4m_a1_133	1	4ma1	0.00	1.00	Threaded Screw; Steel Pin; Rigging Cable
4216540	563088.9	4m_a1_134	1	4ma1	1.00	1.00	Steel Pipe 1/2" X
4216545	563091.9	4m_a1_135	1	4ma1	50.00	0.00	Brass Block
4216544	563090	4m_a1_136	1	4ma1	10.00	0.00	steel "O" Ring
4216550	563087.6	4m_a1_137	1	4ma1	0.00	0.00	Welding Rods
4216550	563089.3	4m_a1_138	1	4ma1	0.00	0.00	1/2" Steel Pipe; 1/2" Eye Bolt
4216552	563088.9	4m_a1_139	1	4ma1	0.00	0.00	Scrap Metal
4216505	563110.1	4m_a1_14	1	4ma1	0.00	0.00	not found Cleared to 4'
4216549	563091.6	4m_a1_140	1	4ma1	0.00	0.00	Fresh H20 Valve Wheel; Scrap metal
4216553	563092.4	4m_a1_141	1	4ma1	0.00	0.00	Scrap Steel
4216547	563095.3	4m_a1_142	1	4ma1	0.00	0.00	Scrap metal
4216557	563109	4m_a1_143	1	4ma1	0.00	0.00	Not Found
4216561	563091.5	4m_a1_144	1	4ma1	0.00	0.00	1 Chunk piece of metal; Steel Bar 1/2" x 8"
4216564	563096.5	4m_a1_145	1	4ma1	0.00	0.00	Angle Iron 8"; 2" Elbow
4216569	563096.1	4m_a1_146	1	4ma1	0.00	0.00	Lead Zinc Anode, Scraper, Scrap metal; Nut
4216568	563093.1	4m_a1_147	1	4ma1	3.00	0.00	Steel Pipe 2.5" x 2'; Stock Pipe 8" x 1/2"
4216562	563093.8	4m_a1_148	1	4ma1	0.00	0.50	20 MM With Fuse
4216536	563092.5	4m_a1_149	1	4ma1	0.50	0.00	Scrap metal
4216529	563072.4	4m_a1_15	1	4ma1	0.63	1.00	Iron spike 4.5" x 1/2"
4216550	563101.1	4m_a1_150	1	4ma1	0.00	0.00	Dredge Pipe

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
4216553	563098.3	4m_a1_151	1	4ma1	0.00	0.00	Scrap Metal
4216552	563094.3	4m_a1_152	1	4ma1	2.00	0.00	1 Piece Zinc; Scrap steel
4216559	563094.9	4m_a1_153	1	4ma1	0.00	0.00	Pipe Tee Joint Steel; Scrap metal
4216572	563104.3	4m_a1_154	1	4ma1	0.00	0.00	Dredge Pipe
4216569	563104	4m_a1_155	1	4ma1	0.00	0.00	Dredge Pipe
4216565	563103.3	4m_a1_156	1	4ma1	0.00	0.00	Dredge Pipe
4216526	563072.6	4m_a1_16	1	4ma1	0.00	0.00	not found
4216507	563093.5	4m_a1_17	1	4ma1	0.00	1.00	copper tube 1/4" / light debris
4216524	563085.9	4m_a1_18	1	4ma1	0.00	0.00	surface scrap metal
4216526	563076.6	4m_a1_19	1	4ma1	0.00	0.00	not found
4216527	563110.4	4m_a1_2	1	4ma1	0.00	0.00	Clear to 4 feet not found
4216530	563083.1	4m_a1_20	1	4ma1	3.00	0.00	Misc scrap metal
4216511	563096.6	4m_a1_21	1	4ma1	1.00	0.00	copper strap, s. s. strap; 1"x12" bolt
4216508	563104.5	4m_a1_22	1	4ma1	0.06	0.50	scrap metal 3" x4" plate; metal wire 6" long
4216507	563106	4m_a1_23	1	4ma1	0.06	0.50	Scrap metal punch 1" diameter: clear below
4216511	563107.3	4m_a1_24	1	4ma1	0.00	0.00	not found Clear to 4'
4216513	563107.8	4m_a1_25	1	4ma1	0.00	0.00	not found Clear to 4'
4216527	563107.8	4m_a1_26	1	4ma1	0.25	1.00	scrap iron
4216532	563105.9	4m_a1_27	1	4ma1	0.00	0.00	Not found: Clear to 4'
4216510	563075.1	4m_a1_28	1	4ma1	0.00	0.00	not found Clear to 4'
4216508	563081.8	4m_a1_29	1	4ma1	0.00	0.00	light debris solidified rust
4216523	563110.6	4m_a1_3	1	4ma1	0.00	0.00	Clear to 4 feet not. Not found
4216518	563084	4m_a1_30	1	4ma1	0.00	1.00	Beer can
4216520	563083.9	4m_a1_31	1	4ma1	0.25	1.00	Scrap metal 1" x 5"
4216525	563081.6	4m_a1_32	1	4ma1	1.00	1.00	scrap metal sheet
4216517	563093.6	4m_a1_33	1	4ma1	0.00	1.50	scrap light debris
4216508	563100.4	4m_a1_34	1	4ma1	0.00	0.00	Beer can
4216510	563105.1	4m_a1_35	1	4ma1	0.00	0.00	Bolt 4" x 1"
4216510	563101.8	4m_a1_36	1	4ma1	0.06	1.00	Beer can Clear to 1'
4216513	563104.9	4m_a1_37	1	4ma1	0.00	0.00	scrap metal plates 6" x 6"
4216512	563101.3	4m_a1_38	1	4ma1	0.00	0.00	Beer can
4216510	563099.9	4m_a1_39	1	4ma1	0.50	0.00	Wire reinforced hose and 3'x3' metal scrap
4216527	563082.4	4m_a1_4	1	4ma1	0.06	0.00	Bolt 4" x 1/2 inch on surface
4216512	563099.4	4m_a1_40	1	4ma1	1.38	0.00	metal scrap 2" x 2"
4216522	563075.6	4m_a1_41	1	4ma1	0.00	0.00	not found
4216523	563072.6	4m_a1_42	1	4ma1	0.00	0.00	Scrap pipe
4216510	563078	4m_a1_43	1	4ma1	0.00	0.00	Nothing to 4'
4216501	563073.5	4m_a1_44	1	4ma1	0.00	0.00	Nothing to 4'
4216531	563087	4m_a1_45	1	4ma1	1.00	0.50	Scrap metal 2' x 1"
4216528	563080	4m_a1_46	1	4ma1	0.00	0.00	Not found
4216529	563078.9	4m_a1_47	1	4ma1	0.31	1.00	Scrap Iron strap 1.5" x 8"
4216527	563078.4	4m_a1_48	1	4ma1	2.00	0.00	Scrap Iron 7" x 2"

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
4216515	563093.1	4m_a1_49	1	4ma1	10.00	3.00	Scrap metal Clear beyond 3'
4216507	563108.4	4m_a1_5	1	4ma1	0.00	0.00	Clear to 4 feet not. Not found
4216517	563088.3	4m_a1_50	1	4ma1	10.00	2.00	20 MM Complete without fuse In debris field
4216516	563086.9	4m_a1_51	1	4ma1	0.00	3.00	Debris field Misc scrap
4216510	563092.1	4m_a1_52	1	4ma1	0.00	1.50	Scrap metal circular plate 8" diameter, Misc scrap metal Clear beyond 2'
4216506	563087.9	4m_a1_53	1	4ma1	0.00	1.00	Light scrap metal
4216507	563096	4m_a1_54	1	4ma1	0.63	0.00	scrap iron
4216508	563078.5	4m_a1_55	1	4ma1	0.00	0.00	5" x 8" scrap metal
4216507	563076.1	4m_a1_56	1	4ma1	0.00	0.00	Not found
4216504	563075.5	4m_a1_57	1	4ma1	0.00	0.00	not found
4216531	563092.4	4m_a1_58	1	4ma1	50.00	4.00	Debris field misc scrap metal
4216528	563092.4	4m_a1_59	1	4ma1	50.00	4.00	Debris field misc scrap metal
4216531	563110.1	4m_a1_6	1	4ma1	0.00	0.00	Clear to 4 feet not. Not found
4216526	563091.6	4m_a1_60	1	4ma1	0.00	4.00	Debris field misc scrap metal
4216522	563092.8	4m_a1_61	1	4ma1	1.00	0.00	Scrap sheet metal 2' x 4"
4216521	563090.8	4m_a1_62	1	4ma1	50.00	2.50	Debris field
4216521	563088.9	4m_a1_63	1	4ma1	20.00	2.50	Debris field: Solidified rust: Iron scrap
4216523	563088.9	4m_a1_64	1	4ma1	100.00	2.50	Debris Field
4216524	563088	4m_a1_65	1	4ma1	7.00	0.50	Scrap metal strap 2" x 3"
4216501	563078.5	4m_a1_66	1	4ma1	0.50	0.50	Scrap metal plate 1" x 1.5"
4216503	563077.8	4m_a1_67	1	4ma1	0.50	0.50	Metal bar 8" x 1"
4216505	563079.5	4m_a1_68	1	4ma1	0.50	0.50	Metal Banding 3/4" by 5'
4216507	563083.3	4m_a1_69	1	4ma1	0.00	1.00	Light scrap debris
4216524	563105.8	4m_a1_7	1	4ma1	0.00	0.00	Clear to 4 feet not. Not found
4216509	563083.9	4m_a1_70	1	4ma1	0.00	2.00	Light debris scrap metal
4216510	563084	4m_a1_71	1	4ma1	0.00	2.00	Light debris, nail, wire, rust
4216508	563088.6	4m_a1_72	1	4ma1	0.13	1.00	scrap metal 1" x 4"
4216510	563086.4	4m_a1_73	1	4ma1	0.00	1.50	Light debris: Clear beyond 3'
4216513	563086.4	4m_a1_74	1	4ma1	50.00	2.00	Debris field misc scrap
4216513	563089.5	4m_a1_75	1	4ma1	0.00	2.50	Brass fuze protector large caliber clear below 3'
4216513	563089.5	4m_a1_75	2	4ma1	0.00	2.50	Debris Field Misc Scrap
4216513	563092.8	4m_a1_76	1	4ma1	0.00	2.00	Light debris
4216508	563098.3	4m_a1_77	1	4ma1	1.00	0.00	Sound powered phone box
4216566	563107.3	4m_a1_78	1	4ma1	0.00	0.00	not found clear to 4'
4216574	563088.8	4m_a1_79	1	4ma1	0.00	0.17	Metal tag 1/2" x 4" x 1/16"
4216527	563103.3	4m_a1_8	1	4ma1	0.00	0.00	Clear to 4 feet not. Not found
4216536	563110.5	4m_a1_80	1	4ma1	0.00	0.00	not found clear to 4'
4216539	563111.3	4m_a1_81	1	4ma1	0.00	1.00	wire 1/4" x 6"
4216566	563087.9	4m_a1_82	1	4ma1	2.00	1.00	
4216569	563090	4m_a1_83	1	4ma1	2.00	1.00	Pieces brass; washer; Scrap pocket
4216536	563087.9	4m_a1_84	1	4ma1	0.63	1.50	Scrap parts
4216535	563105.4	4m_a1_85	1	4ma1	0.00	0.00	Not Found

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
4216555	563098.5	4m_a1_86	1	4ma1	0.00	0.00	Not Found
4216556	563088.6	4m_a1_87	1	4ma1	0.00	0.00	Scrap steel pipe 1/4" x 10"
4216571	563098.8	4m_a1_88	1	4ma1	0.00	0.00	Scrap Metal
4216576	563092.1	4m_a1_89	1	4ma1	0.00	0.00	Scrap metal
4216522	563102.9	4m_a1_9	1	4ma1	0.00	0.00	Clear to 4 feet not. Not found
4216574	563094.8	4m_a1_90	1	4ma1	0.00	0.00	Scrap metal
4216566	563089.8	4m_a1_91	1	4ma1	0.00	0.00	Scrap metal
4216564	563088.9	4m_a1_92	1	4ma1	0.00	0.00	Threaded steel screw; 1/2" Circle Paper weight
4216540	563103.6	4m_a1_93	1	4ma1	0.00	0.00	1/2" steel nut
4216540	563106.9	4m_a1_94	1	4ma1	0.00	0.00	Clear to 4' Not Found
4216544	563108.8	4m_a1_95	1	4ma1	0.00	0.00	Clear to 4' not found
4216546	563110.9	4m_a1_96	1	4ma1	0.00	0.00	Clear to 4' Not Found
4216549	563110.8	4m_a1_97	1	4ma1	0.00	0.00	clear to 4' Nothing found
4216559	563111.1	4m_a1_98	1	4ma1	0.00	0.00	Not Found
4216559	563107.3	4m_a1_99	1	4ma1	0.00	0.00	Not Found
562879	4216857	4n_a1_13	2	4na1	30.00	2.50	Debris Field @ 1' 25 lbs; Hole clear @ 4'
562879	4216857	4n_a1_13	1	4na1	0.00	2.50	Live 20 MM HE (Partial projectile) @ 6"
562881.9	4216860	4n_a1_17	1	4na1	0.00	0.00	Not Found
562884.5	4216867	4n_a1_34	1	4na1	0.00	0.00	Not Dug In boundary
562883.3	4216864	4n_a1_35	1	4na1	0.00	0.00	A strip of aluminum
562888.9	4216872	4n_a1_42	1	4na1	0.00	0.00	Not Found
562888.5	4216868	4n_a1_43	1	4na1	0.00	0.00	Not Found
562879	4216857	4n_a1_53	1	4na1	2.00	1.00	flat stock 2" x 3" stainless
562877.1	4216854	4n_a1_54	1	4na1	0.00	0.00	Not Found
562855.9	4216833	4n_a1_58	1	4na1	0.00	0.00	Not Found Hole clear to 4 feet
562861.1	4216842	4n_a1_60	1	4na1	0.00	0.00	Excavated to 4 feet. Hole is clear
562855.6	4216836	4n_a1_61	1	4na1	1.06	0.00	1/4" copper tube @ 1' 1 oz; 2" Iron pipe @ 1.5' 1 lb; Hole clear to 4'
562852.8	4216833	4n_a1_65	1	4na1	4.06	0.00	1" Joint Rivet@ 6" 1 oz; Misc Nuts & Bolts @ 1' 3 lbs; Misc scrap @ 1' 1 Lb; Hole clear to 4'
562859.4	4216840	4n_a1_70	1	4na1	15.00	2.00	Iron Pipe 3" x 2.5'; Iron shackle 4"; Misc scrap at 3'
562877.8	4216859	4n_a1_73	1	4na1	0.00	0.00	Not Dug in boundary
562875	4216857	4n_a1_76	1	4na1	0.00	0.00	Not Dug in boundary
4216713	562980.5	4n_a2_1	1	4na2	0.00	0.00	Dry Hole: On slope no signal & no metal
4216715	562994.9	4n_a2_10	1	4na2	0.00	0.00	1/2 Inch Nut and a piece of scrap metal 1 & 1/2 Inch square
4216713	562993.5	4n_a2_11	1	4na2	0.00	0.00	2 Inch by 3 Inch Rusted sheet metal on surface
4216722	562980.1	4n_a2_12	1	4na2	0.00	0.00	10 Inch strip of copper sheet 2 each 5 Inch lengths of wire
4216720	562982.8	4n_a2_13	1	4na2	0.00	1.00	1 Inch Washer 1 Inch by 3 inch bolt

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
4216718	562989	4n_a2_14	1	4na2	0.00	0.50	A bunch of scrap metal
4216718	562998.8	4n_a2_15	1	4na2	0.00	0.00	2.5 Inch by 1/2 inch bolt 2 inch by 1/2 inch nipple
4216720	562989.3	4n_a2_16	1	4na2	0.00	0.00	30 cal cartridge casing no power
4216713	562988.6	4n_a2_17	1	4na2	0.00	0.67	Pocket of rusted scrap metal (nuts, nails, wire and strap)
4216719	562997.9	4n_a2_18	1	4na2	0.00	0.33	3.5 Inch long wire 2 Inch by 3/8 inch Bolt and nut
4216728	562984.4	4n_a2_19	1	4na2	0.00	0.33	Piece o brass
4216725	562985.6	4n_a2_2	1	4na2	0.00	0.50	Pieces of scrap wire
4216728	562991	4n_a2_20	1	4na2	0.00	0.67	2 Inch Nut
4216728	562997.3	4n_a2_21	1	4na2	0.00	1.00	Dry Hole nothing found
4216724	562984.3	4n_a2_22	1	4na2	0.00	1.00	A big pocket of scrap metal
4216721	562986.5	4n_a2_23	1	4na2	0.00	0.33	2 Inch by 2" by 1 inch padlock (brass) 2 each 1/2 inch nut and nails
4216714	562985.8	4n_a2_24	1	4na2	0.00	1.00	Bits and pieces of scrap metal
4216709	562982.4	4n_a2_25	1	4na2	0.00	0.00	Dry hole on the wall
4216713	562984	4n_a2_26	1	4na2	0.00	1.00	Pocket of rusted scrap metal
4216718	562984.6	4n_a2_27	1	4na2	0.00	0.00	Bits and pieces of scrap metal and lug nut
4216716	562987.3	4n_a2_28	1	4na2	0.00	1.00	A bunch of rusted nails & 3.5 inch by 1/2 inch bolt.
4216712	562989.4	4n_a2_29	1	4na2	0.00	0.67	6 inch piece of wire
4216724	562997.6	4n_a2_3	1	4na2	0.00	0.50	Wire 5 feet long
4216708	562988.5	4n_a2_30	1	4na2	0.00	0.50	3 inch by 1/2 inch by 1/8 inch hacksaw blade
4216708	562992.1	4n_a2_31	1	4na2	0.00	1.00	1 cubic inch of rusted scrap metal
4216712	562992.5	4n_a2_32	1	4na2	0.00	0.00	2.5" by 45 degree plumbing coupling on surface
4216716	562998.5	4n_a2_33	1	4na2	0.00	0.33	Pieces of scrap metal; 3/8 " U-bolt; 1/2" Rebar; 4" length of wire
4216721	562996.1	4n_a2_34	1	4na2	0.00	0.50	A piece of wire 4" long
4216722	562998.4	4n_a2_35	1	4na2	0.00	0.50	1/2 Inch by 3 inch Bolt
4216726	562997.3	4n_a2_36	1	4na2	0.00	1.00	1/2 inch brass bolt; nail
4216725	562995.9	4n_a2_37	1	4na2	0.00	1.00	A chunk of scrap metal 5" by 7" by 1.5" 1/2" bolt and nut
4216717	562991	4n_a2_38	1	4na2	0.00	0.33	Bits and pieces of nails, wire and a nut
4216720	562991.6	4n_a2_39	1	4na2	0.00	0.33	1/2 inch washer and a 1/2 inch nut
4216725	562994.1	4n_a2_4	1	4na2	0.00	1.00	2 each 2 inch nuts
4216721	562994.1	4n_a2_40	1	4na2	0.00	0.33	3" by 7" by 3/8" scrap metal
4216723	562991.6	4n_a2_41	1	4na2	0.00	1.00	Staging clamp
4216722	562989.9	4n_a2_42	1	4na2	0.00	1.00	1/2" nut
4216724	562988.6	4n_a2_43	1	4na2	0.00	0.67	Bits & pieces of scrap metal
4216726	562989.1	4n_a2_5	1	4na2	0.00	1.00	Bits & Pieces of Nails
4216722	562983.5	4n_a2_6	1	4na2	0.00	0.50	3/4 inch by 3 inch stud Bunch of Rusted scrap metal
4216718	562982	4n_a2_7	1	4na2	0.00	1.00	2 Inch Shackle; Welding Rod; Wing

Easting	Northing	Anomaly No.	Item No.	Dredge Pond	Weight (lbs)	Depth (ft)	Description
							Nut
4216719	562985.9	4n_a2_8	1	4na2	0.00	1.00	Bits and Pieces of scrap metal
4216718	562992.6	4n_a2_9	1	4na2	0.00	0.50	1/2 Inch U bolt
4214199	564964.4	7m_a1_1	1	7	2.00	1.50	Brass Fire Hose Fitting (coupling) @ 1.5'; small pieces of scrap Iron. Indications below 4'
4214202	564971.8	7m_a1_10	1	7	0.00	2.50	20 MM no fuse
4214200	564966.1	7m_a1_11	1	7	0.25	3.50	Scrap metal
4214202	564962.3	7m_a1_12	1	7	13.00	1.00	Bronze saw blade on Surface; Steel reinforced concrete at 2 feet; Clear below 4'
4214202	564958.4	7m_a1_13	1	7	5.00	0.50	Shackle, Angle Iron; Nut @ 6" Hole clear @ 4'
4214204	564961.5	7m_a1_14	1	7	0.00	0.50	1" x 3" Bolt @ 6"; Light scrap; Indications below 4'
4214207	564962.3	7m_a1_15	1	7	0.00	0.00	Light scrap, Indications below 4'
4214206	564969.6	7m_a1_16	1	7	5.00	0.50	Scrap Iron (3"x3"x3") @ 6"; Hole clear @ 4'
4214206	564971.8	7m_a1_17	1	7	1.50	0.00	Rebar/wire @ 6" 8 oz; Iron hook @ 4' 1 lb; Debris field @ 4'; Indications below 4'
4214206	564967.3	7m_a1_18	1	7	0.00	2.00	.30 Cal Spent cartridge case @ 2'; Indications below 4'
4214206	564967.3	7m_a1_18	2	7	3.00	1.00	2' Long Iron cable @ 1'; Indications below 4'
4214205	564964	7m_a1_19	1	7	1.00	1.00	Iron Pipe @ 1'; Hole clear @ 4'
4214202	564969.8	7m_a1_2	1	7	1.00	3.00	Steel scrap
4214198	564970.5	7m_a1_20	1	7	0.00	2.50	20 MM no fuse
4214200	564969.8	7m_a1_21	1	7	0.00	3.00	1" Dia Steel Bar 3' long
4214203	564971.3	7m_a1_22	2	7	10.00	1.00	1" Dia wheel @ 1'; Misc scrap thru-out; Indications below 4'
4214203	564971.3	7m_a1_22	1	7	0.00	3.00	20 MM HE Round, Live & Complete @ 3'; Indications below 4'
4214202	564964.8	7m_a1_23	1	7	0.00	1.50	3" x 3" Steel plate scrap
4214199	564960.8	7m_a1_3	2	7	5.00	2.00	Light scrap metal thru-out. 5" x 5" cable clamp @ 2'
4214199	564960.8	7m_a1_3	1	7	3.00	3.00	40 MM cartridge case (empty/Inert) @ 3'
4214200	564959.1	7m_a1_4	2	7	0.00	0.00	Light scrap metal throughout
4214200	564959.1	7m_a1_4	1	7	3.00	3.00	5" Fuze Protector @ 3'
4214198	564958.6	7m_a1_5	1	7	5.00	3.00	4"x4" Scrap Iron Indications below 4'
4214195	564958.6	7m_a1_6	1	7	0.00	0.00	Light scrap metal thru-out. Indications past 4'
4214191	564960	7m_a1_7	1	7	0.00	0.00	Light scrap metal thru-out. Indications below 4'
4214189	564971.3	7m_a1_8	1	7	0.50	2.50	Wire rope @ 6" Clear at 4'
4214189	564968.5	7m_a1_9	1	7	0.00	2.50	Light Metal Scrap thru-out: Indications past 4'