CORRECTIVE ACTION PLAN

FOR

WETSIG YACHTS FACILITY
4022 MARKET STREET
WILMINGTON, NORTH CAROLINA
NEW HANOVER COUNTY

CES PROJECT NO. 02106

LATITUDE: 34° 14' 20" North, LONGITUDE: 77° 53' 36" West

MARCH 21, 2005

PREVIOUS PROPERTY OWNER:
WETSIG YACHTS
4022 MARKET STREET
WILMINGTON, NC
(910) 762-9703

CURRENT PROPERTY OWNER:
BRANCH BANKING AND TRUST COMPANY, INC.
6800 SOUTH COLLEGE ROAD
WILMINGTON, NC
(910) 313-2040

CONSULTANT:
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RELEASE INFORMATION: RELEASES OF ARSENIC AND CHROMIUM INTO SOILS AND ARSENIC INTO GROUNDWATER OCCURRED APPARENTLY AS A RESULT OF THE LONGTIME, PREVIOUS OPERATION OF A FERTILIZER BAGGING PLANT ON THE SUBJECT PROPERTY.

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NEW HANOVER COUNTY

CES PROJECT NO. 02106

PREPARED FOR

BRANCH BANKING AND TRUST COMPANY, INC.
WILMINGTON, NC

MARCH 21, 2005

1.0 PURPOSE:

The purpose of this report is to satisfy requirements pursuant to the North Carolina Oil Pollution and Hazardous Substances Control Act (NCGS 143-215.84) and groundwater regulations under Title 15A of the North Carolina Administrative Code, Chapter 2, Subchapter 2L (15A NCAC 2L), Section 0.0106.

2.0 LOCATION/AUTHORIZATION:

The collection of data and preparation of this report were authorized by Mr. Sonny Wall of Branch Banking and Trust Company, Inc., lien holder of the property. The subject facility is located at 4022 Market Street, Wilmington, North Carolina, in New Hanover County. **Figure 1** is a vicinity map and **Figure 2** is a site map depicting monitoring well locations and other pertinent features. **Figure 3** is a tax map depicting adjacent properties.

3.0 SOURCE INFORMATION/BACKGROUND:

From circa 1900 to 1980, the site operated as a fertilizer bagging plant. Thereafter, a garden center and numerous mechanical repair operations existed at the site, in addition to the primary occupant, Wetsig Yachts, a fiberglass boat building facility. On the basis of available information, it appears that the compounds detected in subsurface media at the site are in association with prior operations at the former fertilizer facility (Ref. 5). Several previous reports have been prepared and submitted to relevant regulatory agencies for review and technical oversight. These reports include:

A) *Phase I Environmental Site Assessment Report*, August 21, 2002 (Clark Environmental Services, P.C. (CES)). In summary, the three most significant findings warranting further

inquiry were: the long-term operation of fertilizer manufacturing operations and the potential impacts caused by these operations; the prior operation of a small diesel underground storage tank (UST) and potential impacts caused by possible leakage of fuel; and, the localized presence of "oily stained soils", particularly in the area of the Marine Mechanix boat repair operation. It was recommended that a Phase II subsurface investigation be performed to address these three issues.

B) *Phase II Environmental Site Assessment Report*, December 2, 2002 (CES). The Phase II investigation consisted of a limited soil and groundwater investigation. The concentrations of two metals, arsenic and chromium, slightly exceeded NCDENR, Division of Waste Management (DWM), Superfund Section, Inactive Hazardous Sites Branch (IHSB), Soil Remediation Goals for Unrestricted Land Use (arsenic), and NCDENR, Division of Water Quality (DWQ), Soil-to-Groundwater Cleanup Levels (chromium).

Arsenic was identified in the groundwater sample from one well (MW3) at a concentration which exceeds the 15A NCAC 2L standard. A copy of the Phase II report was submitted to the following regulatory agencies, and responses were received from each agency:

i. Dr. Charles Stehman, P.G., Environmental Regional Supervisor I, NCDENR, DWQ, Aquifer Protection Section, Wilmington Regional Office (WiRO);
ii. Ms. Charlotte Jesneck, Head, NCDENR, DWM, Superfund Section, IHSB, Raleigh Central Office; and
iii. Mr. David Holsinger, Regional Supervisor, NCDENR, DWM, Underground Storage Tank Section, WiRO.

CES addressed all requests for further investigations as described below:

C) *Soils and Groundwater Issues*, dated June 17, 2003 (CES letter report submitted to Mr. John Powers, Superfund Section). The requested additional soil sampling for metals in multiple areas did not detect further exceedences of respective standards. The requested re-sampling of one monitoring well revealed the persistent presence of dissolved arsenic above 15A NCAC 2L standards.

D) *Phase II Limited Site Assessment*, dated July 31, 2003 (mandated report submitted to NCDENR, UST Section). The re-sampling of soil and sampling of groundwater at the former heating oil tank pit did not reveal the presence of compounds at levels in excess of applicable "soil-to-groundwater" standards or the 15A NCAC 2L standards.

E) *Asbestos Findings*, dated August 6, 2003 (CES letter report submitted to Ms Pat Wylie, Human Ecology and Epidemiology Section). Asbestos was not found to be present in the soils of the site, though one piece of "mastic" was found to contain chrysotile. It was also determined that the exterior of the building has areas covered by transite siding which contains chrysotile. No further actions were requested. Upon future demolition of the building, siding materials should be properly handled and disposed.

F) *Groundwater Issues*, dated October 20, 2003 (CES letter report submitted to Mr. John Powers, Superfund Section). At both newly installed monitoring wells, arsenic was detected at concentrations in excess of the 15A NCAC 2L standards. The horizontal and vertical extents remained undefined.

G) *Groundwater Issues*, dated December 5, 2003 (CES copy of above letter report submitted to Dr. Charles Stehman at the Wilmington Regional Office, Groundwater Section (currently known as the Aquifer Protection Section)). The only documented, outstanding regulatory issue pertains to the presence of elevated levels of arsenic in groundwater and the presence of slight exceedences of regulatory thresholds for arsenic and chromium in soils. The site is being regulated by the NCDENR, WiRO, Aquifer Protection Section, as described in a letter from the Superfund Section, dated November 14, 2003 (**Appendix I**).

H) *Comprehensive Site Assessment (CSA)*, November 15, 2004 (CES). The CSA investigation consisted of a groundwater investigation for the delineation of the dissolved arsenic plume. Multiple shallow and deep monitoring wells were installed and sampled. The arsenic plume appears to be of low concentration and to be delineated on-site. For the soil samples, taken during previous studies, the concentrations for two metals, arsenic and chromium, slightly exceeded applicable action levels. The soil plume was adequately delineated previously, and no further soil investigation was deemed warranted during the CSA phase of work. The CSA report summarizes all other previous issues addressed at the site, including those not related to the arsenic investigation.

4.0 SITE-SPECIFIC DOCUMENTATION:

4.1 SHALLOW SUBSURFACE GEOLOGY:

During drilling for the monitoring well installations, the borings typically contained light brown, very fine sandy silt (0-5 feet); light grey fine sand (5-8 feet); and light grey slightly clayey fine sand (8-12 feet). In the two deeper wells, the fine sands extended to considerable depths: at DMW1, a layer of shell hash and sandy clay were encountered at 32 feet; and, at DMW2, a layer of shell hash and clayey sand were encountered at about 42 feet.

4.2 HYDROGEOLOGY:

4.2.1 Groundwater Depth:

Depth to water measurements were collected on several occasions and water levels in the shallow monitoring wells generally ranged from approximately 3 to 12 feet BGS. All water level elevations are relative to an assumed 100 foot benchmark. In the two deep wells (DMW1 and DMW2), the groundwater elevation was similar, but slightly lower. A summary of well construction and water level data is presented in **Table 1**.

4.2.2 Groundwater Flow Direction:

4.2.2.1 Horizontal Movement:

The groundwater flow direction in the surficial aquifer is depicted on the potentiometric surface elevation contour map, based on measurements taken on February 9, 2005 (**Figure 4**). Based on prior information, the hydraulic gradient was calculated to be approximately 0.0063 feet per foot (ft/ft) for the shallow zone oriented toward the southwest, and an apparent gradient (based on only two data points) of 0.0091 ft/ft for the deeper zone (Ref. 5).

4.2.2.2 Vertical Movement:

The most recent static water level elevations in paired shallow and deep wells (MW7/DMW1 and MW12/DMW2) were compared and the static water level elevations in the shallow wells were slightly higher than the water levels in the deeper wells. The data suggests that a significant head potential for downward flow does not exist between the shallow subsurface and deeper, underlying strata. As no vertical hydraulic conductivity measurements were performed, no conclusions are drawn regarding vertical groundwater flow.

4.2.3 Properties of the Surficial Aquifer:

During the *CSA* investigation, short-term pumping and recovery test data was collected and used to calculate a hydraulic conductivity of 0.0472 ft/day for the shallow zone and 3.658 ft/day for the deeper zone (Bouwer and Rice Method). These data were evaluated with potentiometric head data to estimate a horizontal groundwater flow velocity of 8.77×10^{-4} ft/day for the shallow zone and 0.089 ft/day for the deeper zone, based on an apparent gradient. A copy of the evaluation is included in the *CSA* (Ref. 5).

4.3 EXTENT OF CONTAMINATION AND REGULATORY REQUIREMENTS:

4.3.1 Soil Contamination:

Previously, soil samples were collected at target depths based on field observations of the composition and texture of the soil column. The soil samples were analyzed by various laboratory methods, based on the most likely suspect contaminants for each area. The target compounds generally included federally-listed hazardous constituents. **Table 2** includes a summary

of soil sampling results. Boring logs are contained within previous reports. **Figure 5** depicts the estimated horizontal extent of soil contamination in excess of applicable North Carolina standards, based on the historical sampling results, and the respective source areas are denoted with reference to the buildings.

4.3.1.1 Inert Debris Landfill Area - Southwest Corner:

The area consists of a hummocky ground surface, reportedly overlying multiple buried piles of concrete and brick debris. A total of six borings were sampled at various depths. The samples were analyzed for eight RCRA metals plus copper, nickel and asbestos.

The laboratory results for each of the samples revealed detections of numerous target metals; however, only four borings contained levels of a metal which represent exceedences of standards. Arsenic results for samples SB13 (6.48 mg/kg) and SB15 (5.4 mg/kg) revealed slight exceedences of the NCDWM Soil RG (4.4 mg/kg). The results for chromium at SB13 (28.4 mg/kg), SB14 (27.6 mg/kg), SB15 (32.8 mg/kg) and SB26 (28.1 mg/kg) indicated concentrations that slightly exceeded the NCDENR, DWQ Soil-to-Groundwater Cleanup Level of 27 mg/kg (see **Figure 5**).

4.3.1.2 Building A - Loading Dock Areas:

The area parallel to the former fertilizer plant building is gently sloped toward the existing railroad track and it is known that a railroad spur previously existed immediately behind the loading docks and Building A. Reportedly, portions of that track may remain in the subsurface. Multiple borings were advanced along this feature. Soil samples SB2 and SB25 were found to contain elevated levels of arsenic at respective concentrations of 5.51 mg/kg and 4.79 mg/kg, both of which slightly exceed the arsenic applicable RG of 4.4 mg/kg. One boring (SB29) in front of Building A contained a slight exceedence of the arsenic RG at 4.49 mg/kg (**Figure 5**).

4.3.3 <u>Dissolved Groundwater Contamination:</u>

Shallow monitoring wells (MW1-MW5) were initially installed to target potential source areas. Samples from MW3 in November 2002 indicated that

arsenic (originally detected at 78.6 μg/L) was detected in both the non-filtered (34.4 μg/L) and filtered (37.9 μg/L) samples, and in the April 2003 filtered sample (34.4 μg/L), at levels in excess of the 15A NCAC 2L standard (10 μg/L). Detections at MW1 and MW2 were absent upon re-sampling utilizing field filtering protocols. Based on the results, it appears that the arsenic detected in MW3 likely represents dissolved arsenic.

Additional shallow monitoring wells were installed in order to delineate the documented contaminants. Monitoring wells MW6 and MW7 were installed and sampled via field-filtering procedures and yielded elevated levels of arsenic; thus, monitoring wells MW8-10, and downgradient wells MW11 and MW12, were installed to complete delineation. The wells were sampled for metals using both field-filtered and non-filtered protocols. None of these follow-up delineation well samples contained arsenic. The estimated extent of dissolved arsenic contamination is depicted on **Figure 6**. The results for the chromium analysis did not indicate exceedences of the 15A NCAC 2L standard in any sample. **Table 3** is a summary of groundwater sampling results, and recent laboratory analyses are included in **Appendix II**.

4.4 POTENTIAL RECEPTORS:

4.4.1 Water Supply Wells:

All potable water for the site and surrounding properties is supplied by the city of Wilmington Public Utilities Department (Ref. 24). On the basis of a visual survey for water meters and pump houses, one private irrigation water supply well was identified to be present approximately 500 feet upgradient to the subject property (**Figure 3**).

4.4.2 Public Water Supplies:

The residences and businesses in proximity to the subject facility utilize municipal water supplies. The city of Wilmington obtains its public water supply from the Cape Fear River, at an intake located approximately 20 miles upstream from Wilmington (Ref. 24).

4.4.3 Wellhead Protection Areas:

At the time of this assessment, a designated wellhead protection area, as defined in 42 USC 300h-7(e), is not reported to exist within 1,500 feet of the source area. According to municipal authorities, a wellhead protection area program is not planned for implementation by New Hanover County because the city intends to solely utilize surface water as its water source (Ref. 24).

4.4.4 Surface Water Bodies:

There are no surface water bodies at the subject property. A shallow storm ditch is positioned near the southeast corner of the subject property (**Figure 2**). The nearest surface water body is a stormwater retention pond, located approximately 200 feet upgradient with respect to the subject property (**Figure 3**).

4.4.5 Subsurface Structures:

Currently, the site utilizes municipal water and sanitary sewer service. Reportedly, there are two water lines servicing the site. A 6-inch water line exists in front of the building, on the south side of the railroad track, that is connected to a water main along Kerr Avenue (**Figure 2**). In addition, reportedly, the site's main water line extends from Market Street, along Wetsig's entrance road, and bifurcates near the entrance to the property. Other small, on-site lines are known to be present (Ref. 5). It is known that subsurface power and telephone lines extend along the site's entrance road and are present in various locations at the site, particularly between the buildings.

A storm drain pipe was observed to extend under the northern railroad track near the northwest corner of the subject site, and to drain in a southeastward direction. In addition, a storm drain pipe was observed to extend under the northern railroad track in front of the main building. The pipe extends under the east edge of the Wetsig building, and drains southeastwardly under the southern railroad track. Off-site, the west side of Wetsig Road consists of a very swampy, wet area. Evidence of a possible outfall area, indicated by stained vegetation, was visible at the tracks, but no outfall pipe was observed. There are no known basins or water bodies at the site.

4.4.6 Land Use:

The area within a 1,500-foot radius of the subject facility includes undeveloped, commercial and a few residential properties. The tax map depicted on **Figure 3** shows the subject property and properties in the immediate area of the site.

4.4.7 Adjacent Property Owners and Occupants:

The names and addresses of property owners adjacent to the source area have been tabulated and are presented in **Table 1** of the *CSA* (Ref. 5), which is on-file at NCDWQ, WiRO.

5.0 CORRECTIVE ACTION APPROACH:

Groundwater contamination is subject to corrective action under 15A NCAC 2L .0106. Options for corrective action range from "active remediation to standards" to "monitoring of contaminant concentrations" to ensure that any potential impact to receptors is mitigated. An integration of options is also possible.

5.1 BACKGROUND DISCUSSION:

The mobility and toxicity of arsenic are governed by its valence state and chemical form. Arsenic has several different species that exist in natural conditions, arsenic (-3), arsenic (0), arsenic (+3) known as As (III), and arsenic (+5) known as As (V). Arsenic (-3) and arsenic (0) are rare in nature. As (III) and As (V) are the species of concern in most natural conditions. As (III) is the more mobile (with a higher solubility) and toxic species. These species are generally present as anionic compounds in solution, arsenate and arsenite, respectively. A number of inorganic arsenic compounds exist, including hydrides, halides, oxides, acids, and sulfides (Ref. 29).

There are a number of geochemical factors that affect the species of arsenic and, therefore, the solubility and mobility of arsenic in natural waters. The oxidation-reduction (redox) potential is the most important factor under normal circumstances. As (III) is found under reducing conditions, which covers most natural groundwater conditions. Arsenic solubility generally increases as redox potential decreases (Ref. 17). The measurement of the redox potential in most natural settings has limited utility unless a predominant reactive species is known (Ref. 7); however, general conditions can be extrapolated from the readings.

Dissolved oxygen (D.O.) is an oxidizing agent and has a direct effect on the redox potential (Ref. 23). Generally, higher D.O. concentrations indicate more oxidizing conditions.

If sulfate is available in a hydrogeologic system and is reduced to sulfide, arsenic may be precipitated as insoluble arsenic sulfide or co-precipitated with iron sulfides (Ref. 29). High arsenic concentrations are generally only found where sulfate concentrations are low (Ref. 13).

Total and ferrous iron are used primarily to determine the ferric iron content. Some microorganisms can cause the release of adsorbed arsenic through the reduction of both ferric iron and manganese (IV) (Ref. 17).

Total organic carbon (TOC) content helps control the redox conditions in groundwater environments (Ref. 13). The decay of the organics generally leads to a more reducing environment which leads to greater solubility of arsenic. The reduction of ferric iron is generally coupled with the oxidation of organic carbon in anoxic conditions (Ref. 26).

The solubility of arsenic decreases as pH increases until a pH of 6-7 is reached, then begins to increase with increasing pH (Ref. 9). A pH of 6 or 7 is optimal for adsorption of arsenic to the solid matrix.

Alkalinity indicates the capacity of a water to neutralize an acid. It represents a measure of how much acid can be added before causing a change in the pH of a water. Alkalinity has a direct effect on the pH of a system, which is an important parameter in determining the solubility of arsenic (Ref. 32). Alkalinity serves to stabilize the pH, which otherwise would be relatively acidic due to free carbon dioxide which forms carbonic acid in water systems (Ref. 27). Alkalinity is also directly related to sulfate reduction, with alkalinity increasing as sulfate is reduced (Ref. 8).

A number of these parameters were analyzed for during this investigation (discussed further in Section 5.5). The results are summarized in **Tables 3** through **5**. These were used to determine the site specific conditions that will affect the mobility of arsenic at the site.

5.2 AGGRESSIVE CLEANUP OPTIONS FOR NON-VOLATILE CONTAMINANTS:

There are a number of technologies and other remedial options that are utilized to remove arsenic from groundwater and soil. Proven options and technologies are outlined below.

5.2.1 Groundwater Remedial Options:

Precipitation/co-precipitation is an ex-situ pump-and-treat process which involves the mixing of treatment chemicals into the extracted formation water, which then forms a solid matrix through precipitation or co-precipitation. This may involve pH adjustment or oxidation in addition to the main process for maximum dissolution of arsenic. Clarification or filtration is then used to remove the solid precipitate. This generates a sludge residual, which in itself may be a hazardous waste, that then requires treatment and disposal. The effectiveness of this process is less likely to be affected by other groundwater characteristics as compared to other pump-and-treat technologies (Ref. 30).

Adsorption (ex-situ, pump-and-treat) involves running the formation water through a column that is packed with absorption media. The contaminants are

adsorbed to the matrix as they pass through the column reducing the dissolved concentration. This also may involve pH adjustment or oxidation in addition to the main process. The column is periodically replaced as adsorption sites are filled. A number of different media can be utilized as sorbents. The used media may be considered a hazardous waste, that then requires treatment and disposal (Ref. 30).

Ion exchange (ex-situ, pump-and-treat) involves the exchange of ions which are held on the surface of a solid with ions of similar charge in a solution. The setup is similar to the adsorption process. The formation water is passed through a column filled with media conducive to ion exchange with the targeted contaminant. The column must be periodically regenerated to replenish the exchange ions, and increase the effectiveness of the treatment. The resulting waste products may need treatment and disposal (Ref. 30).

Membrane filtration (ex-situ, pump-and-treat) separates the target contaminant from the water by passing the water through a membrane with pore sizes of the appropriate size to catch the target constituents. This process generates more waste than the other processes mentioned above. The membranes need to be replaced frequently and the spent membranes require treatment and disposal (Ref. 30).

Permeable reactive barriers are an in-situ groundwater treatment process. Barriers containing a reactive matrix are installed in the ground in the path of a dissolved contaminant plume. The groundwater passes through the barrier and the contaminants are removed by precipitation, degradation, adsorption, or ion exchange (as described in the pump-and-treat technologies above) (Ref. 29).

5.2.2 Soil Remedial Options:

A possible remedial alternative for contaminated soil is excavation and disposal off-site. The removed soil is not additionally treated in any way, and the only costs are for the removal of the soil, backfilling, and the disposal costs of the soil, which can be high if the removed soil is classified as a hazardous waste. This can also affect (reduce) groundwater concentrations, as it removes potential source material.

A common in-situ or ex-situ soil treatment is solidification/stabilization. This process binds or encapsulates contaminants, reducing the hazard by converting them into less soluble, mobile, and/or toxic forms. This also may involve pH adjustment or oxidation in addition to the main process. Cement and lime are frequently used as binders for this treatment method. Ex-situ

treatment is the more common method, though in-situ is becoming more frequent (Ref. 29).

Vitrification is a high temperature treatment (in-situ or ex-situ) which reduces the mobility of metals by incorporating them into a leach-resistant solid mass, generally a glass matrix. Some of the metals may also volatilize during treatment, which would reduce their concentrations in the soil. The maximum demonstrated in-situ treatment depth is 20 feet. In-situ treatment uses resistance heating by passing a current through the soil from an array of installed electrodes. Ex-situ treatment can use a number of different energy sources to supply the required heat (Ref. 29).

Soil washing/acid extraction requires removal of the soil from the ground for treatment. Some contaminants preferentially adsorb to the fine grained soil fraction, which is the basis of this treatment method. The soil is put into a wash solution, and the fines fraction are separated and removed, reducing the amount of contamination in the remaining soil. The fines fraction must then be treated again to remove or immobilize the arsenic. The wash water also requires treatment and/or disposal (Ref. 29).

Soil flushing is an in-situ process which involves the injection or spraying of water or a chemical, or some combination thereof, onto the contaminated area or injecting it into the ground. This mobilizes the contaminants from the soil, and, after passing through the contaminated zone, the treatment solution is collected for treatment, disposal, etc. (Ref. 29).

5.2.3 Soil and/or Groundwater Remedial Options:

Electrokinetics is a process that applies a low-voltage direct-current across a section of contaminated soil. Electrodes are introduced into the soil, charged, and any ions present are mobilized by the current. Ions flow through the outer casing of the electrodes and are then removed for treatment. The successful removal of the contaminants depends on moisture content, contaminant characteristics, metallic debris in the soil, etc. This process can remediate both soil and groundwater and be applied both in-situ or ex-situ (Ref. 29).

Phytoremediation is an in-situ process which involves the use of different plant species to remove metals from the soil or groundwater. The plants hyper-accumulate the metal in their tissue and then they can be harvested and disposed of off-site (Ref. 16). Research for identifying the best species for uptake of arsenic is ongoing (Ref. 29).

5.3 DISCUSSION DESCRIBING TECHNOLOGY OPTIONS AND SELECTION JUSTIFICATION:

5.3.1 Implement Remedial Option Which Utilizes the Best Available Technology to Physically Remove Contaminants:

This option is the most aggressive, most expensive and involves the utilization of one or more mass removal technologies singularly or in combination. The following types were considered:

5.3.1.1 Groundwater Recovery/Treatment (Pump-and-Treat):

All the pump-and-treat remedial system options outlined in Section 5.2.1 are theoretically capable of remediating groundwater to the 15A NCAC 2L standard for arsenic (Ref. 30); however, in practice, obtaining cleanup to the standards may not be technologically possible due to inherent inefficiencies in the groundwater removal process, and due to site-specific limitations. It is more likely that the rate of contaminant removal would decrease after an initial period when the majority of contaminant mass is removed. At this point, the slope of the curve of decontamination versus time becomes flat, indicating that continued pumping efforts would no longer be effective in removing a significant amount of additional dissolved contaminants.

The initial startup and maintenance costs of pump-and-treat over time are generally expensive. Basic problems with the use of this technology as a stand-alone method include the fact that vadose soil contaminants are not actively removed (remain a possible source), and passive hydraulic flushing of residual contaminants (soil washing) is a very slow, long-term process. 15A NCAC 2L allows for a termination request based on an asymptotic value of decontamination being reached. This fact would significantly reduce the expected period of operation (and, therefore, long-term cost).

Precipitation/co-precipitation generally requires skilled operators for continued operation and maintenance; therefore, it only becomes cost effective when treating large amounts of water. Adsorption and ion exchange are more effective for smaller scale projects such as this one; however, the initial startup costs for system installation make these options infeasible when evaluated with site-specific risk factors and actual benefits achieved by employing these technologies. Additionally, membrane filtration produces a large amount of residuals that could require additional treatment and disposal, coupled with somewhat higher operating costs (Ref. 29).

5.3.1.2 Other Groundwater Treatment Options:

Permeable reactive barriers generally have lower operation and maintenance costs than any of the ex-situ groundwater remediation technologies. There is, however, limited information on the application of this process to the remediation of arsenic, as well as typically requiring many years before remediating the target contaminants to below the applicable standard at a site. If the hydraulic conductivity of the formation is higher than the barrier, this can cause water to flow around the barrier rather than through it. Alternatively, low conductivities can lead to excessively long treatment times. The barrier can also be plugged by precipitates and bacterial growth, reducing the effectiveness of the treatment (Ref. 29). Due to lack of supporting data for this process on remediating arsenic, as well as the predicted long-term treatment time (based on the groundwater velocity calculated for the site from Ref. 5), this is not considered a viable treatment alternative at the site.

Phytoremediation tends to have low initial maintenance and other costs compared to other options. The effectiveness of the technology is affected by a wide range of natural factors that are beyond human control at a site, including weather, competing plant species, pests, etc. Additionally, the process is generally only effective for shallow (top 6-12 inches) contaminants (Ref. 6). The plant uptake of the arsenic can also introduce the contaminant into the food chain if the plants are consumed. The harvested plants may also require additional treatment before disposal if the contaminant has been sufficiently concentrated in the plant's tissues. Depending on the species, the removal of contaminants may be a long-term process (Ref. 29). The process is quieter than most other remedial options (Ref. 6). There is also limited data on the use of phytoremediation at arsenic-contaminated sites. Due to lack of supporting data for this process on remediating arsenic, as well as the unpredictability of success related to uncontrollable factors, and the inability of the plants to penetrate to the depth of groundwater, this is not considered a viable treatment alternative at the site at this time.

Electrokinetics works well in clayey soils, with fairly soluble contaminants. The shallow soils at the site are generally silty rather than clayey, and there is believed to be significant amounts of metal debris located in the soils at the site in connection with the former railroad line that extended up to the main building. Large amounts of metal debris significantly affect the efficiency of this process to the removal of target contaminants (Ref. 30). Based on an evaluation of

contributing factors, site conditions are not considered conducive to efficient function of an electrokinetic system, and it is, therefore, not considered a viable alternative at this time.

5.3.1.3 Physical Containment/Isolation:

This method of corrective action may include establishing physical barriers around the contaminated area to prevent migration. It can also be used on a limited basis to provide transport control, and is most often utilized in the protection of contaminant receptors. Because of the relatively limited extent of dissolved contamination, and the lack of significantly threatened potential receptors, this corrective action methodology is not considered necessary at this time. Should monitoring indicate that contamination is migrating toward any future receptors, this may be a potential option to provide receptor protection, but would need to be evaluated with respect to other possible protection strategies prior to implementation.

5.3.1.4 In-situ Soil Treatment:

Electrokinetics works well in fairly wet, clayey soils, with fairly soluble contaminants (Ref. 30). Adding water to dry soils may flush the contaminants out of the treatment zone (Ref. 29). The shallow soils at the site are generally silty rather than clayey, and there are believed to be significant amounts of metal debris located in the soils at the site in connection to the former railroad line that extended up to the main building. The site conditions are not conducive to efficient function of an electrokinetic system for soil remediation at the site.

Solidification/stabilization is generally the least expensive active soil treatment for arsenic. The process is readily commercially available and typically does not generate a residual that requires further treatment prior to disposal. In-situ treatment may be more expensive. Thorough mixing of the soil is necessary to ensure that all particles are coated with the chosen binder (Ref. 29). This may not be possible with the soil remaining in place. Ex-situ treatment may be more expensive than excavation and disposal, as it requires an extra treatment step, and the treated soil would still require disposal. There is also little data on the long-term stability of the treated soil.

Vitrification requires large amounts of energy which can increase operating costs, is more cost effective for removal of a number of different contaminants, and may generate off-gases that require

treatment. Additionally, glass-forming materials in the soil matrix are necessary, as well as requiring that the organic content in the soil be low. Performance is also affected by the amount of metal debris in the ground. Vitrification is generally limited to lower arsenic soil concentrations (Ref. 29). While the soil is generally composed of sandy silts, and the arsenic concentrations are relatively low, there is a large amount of metal debris in the ground which would affect the efficiency of in-situ vitrification treatment. Ex-situ treatment has the additional costs of the excavation and subsequent disposal of the treated soil. The site conditions and added costs for ex-situ treatment are not conducive to using vitrification as a soil treatment at the site.

Soil flushing works best when a single contaminant is targeted. The soil characteristics affect the performance of the process. The treatment may cause some contaminants to precipitate and clog the matrix, reducing the effectiveness of the flushing process. The process does not work well at low temperatures. Spent flushing fluids may require treatment prior to disposal. Soil flushing may also cause contaminants to mobilize migrating and affecting prior uncontaminated areas. Performance data for using soil flushing for treatment of arsenic contaminated soil is very limited (Ref. 29). Due to the relatively unproven success of using this process, as well as the possibility of mobilizing the arsenic and affecting currently unaffected areas of the site make this treatment method inappropriate at this time.

5.3.1.5 Ex-situ Soil Treatment:

Soil washing/acid extraction requires a high percentage of fines (clays and silts). The costs for treatment are in addition to the costs for excavation and subsequent disposal. The process does work well with simple contaminant mixtures such as those found at the site. It is beneficial in that it reduces the amount of material that requires further treatment, although its usefulness is limited to soils that have a range of particle sizes. The soil at the site does not have a wide size range distribution. The high percentage of fines documented at the site in the first five feet of depth reduce the effectiveness of the process, which requires a separation of grain sizes. Since the treated soil would be mostly fines, effective separation could not occur. Additionally, the soil moisture content must be low, and the process does not work well in cold weather (Ref. 29). Given the extra cost for the additional treatment, as compared to the excavation and disposal option, this treatment method is not considered feasible at this time.

5.3.1.6 Excavation/Disposal of Soil:

This involves a one-time major disruption to the site and involves the excavation, removal and proper disposal of all soils from the affected area. There is, potentially, a significant portion of contaminated soil that is inaccessible as it is located beneath the boat assembly building. The costs of soil disposal, which may be considered a hazardous waste, is expensive and does nothing to immobilize the arsenic contained in the excavated material. It also does nothing to remediate the groundwater contamination.

5.3.1.7 Capping:

This involves emplacing an impermeable barrier over areas characterized by soil contamination. Capping generally serves to reduce the amount of precipitation infiltrating contaminated soils, thereby reducing the amount of leachable contaminants infiltrating into groundwater. Capping also serves as a physical barrier to prevent exposure to contaminated media.

The application of one or more of the above technologies in most cases commits to long-term operation, maintenance, and monitoring of mechanical systems operating under relatively harsh environmental conditions. It is, therefore, important (in minimizing long-term expenditure) to set specific, attainable goals for the systems, to use quality equipment, to keep the systems as simple and inexpensive to maintain as is practical, and to provide this upkeep on a regular basis.

5.4 SELECTED REMEDIAL OPTION:

The fact that there are no threatened receptors in the vicinity of the site suggests that the significant capital expenditures for these options do not appear warranted at this time. Additionally, the contaminants do not appear to be mobile as the contamination does not appear to have migrated significantly downgradient since the fertilizer manufacturing facility started operation. Evaluations of migration potential through advective transport (**Appendix III**) using the shallow groundwater velocity calculated in the *CSA* (Ref. 5), and not taking into account any of the other characteristics that may influence the mobility of arsenic, suggest that the arsenic transport is relatively slow (~0.32 ft/yr) at the site.

While aggressive cleanup does not appear warranted at the site at this time, it should be noted that, if site conditions change and receptors become at risk, the limited application of one or more of the previously mentioned technologies may be necessary as a contingency to this *Corrective Action Plan*. It should also be noted that long-term, extensive monitoring requirements may be necessary to successfully implement

the non-aggressive (monitoring-only) remedial option. Institutional controls limiting access to, and future usages of, the site should also be implemented, reducing the possibility of future exposure or threats to potential receptors.

The selected proposal is to monitor attenuation of soil and groundwater contaminants over time, and monitor the identified potential receptors. This method is supported by evaluations that document evidence that the contaminants have not migrated off-site despite the presumed long-term existence of contaminants at this site (~100 years), which suggests that the plume is at a near steady state. These evaluations are discussed in greater detail below.

A monitoring regimen is proposed to provide a mechanism for protection of future potential receptors. The monitoring regimen will include periodic groundwater sampling, evaluations of groundwater flow and analytical data, and data compilation (reporting). In addition, the receptors which may be potentially threatened by the release, (i.e., upgradient irrigation well and off-site monitoring wells) would be checked at regular intervals for evidence of impacts so that abatement actions could be immediately taken, if they were to develop.

This plan proposes to be opted for Division consideration under 15A NCAC 2L .0106 (l) with specific conditions, including the protection of receptors, and implementation of contingencies, if conditions warrant. Each of the criteria required under this option are addressed.

5.5 RECEPTOR PROTECTION:

The identified potential receptors previously discussed in Section 4.4 warrant regular monitoring throughout the corrective action process, with contingency plans in place in case future threats of impacts, or documented impacts, occur. Each are discussed below:

5.5.1 Water Supply Wells: One irrigation well is located approximately 500 feet upgradient of documented contamination. If this well were brought into use for human consumptive purposes in the future, it might become necessary to develop monitoring contingencies to further evaluate potential risks; however, based on previous potentiometric surface contour maps that have been constructed, and the current map (**Figure 4**), the well is located upgradient and is not believed to be significantly threatened.

5.5.2 Public Water Supplies: No water supply sources are located in the vicinity of the site.

5.5.3 Wellhead Protection Areas: No wellhead protection areas are located in the vicinity of the site.

5.5.4 Surface Water Bodies: There is a retention pond located approximately 300 feet upgradient with respect to the dissolved arsenic plume area. Based on numerous potentiometric surface contour maps indicating groundwater flow direction, the pond is clearly located upgradient and, thus, is not considered a potential receptor.

5.5.5 Subsurface Structures: No subsurface structures are located within the area of contamination. A storm drain line exists adjacent (upgradient) to the area of soil contamination and the dissolved arsenic plume. This structure will be visually inspected during monitoring events for evidence of impact. Additionally, a surface water sample will be collected in the event that water is observed discharging from the structure during monitoring.

5.5.6 Land uses: The land use of the site and adjacent properties may change in the foreseeable future; thus, ramifications of site redevelopment and development of adjacent properties must be considered a potential future risk. Any risks associated with such development on adjacent properties would have to be evaluated and abated as conditions change. Institutional controls should be implemented now for the site, to reduce the potential for future exposure. Currently, the downgradient adjacent property is undeveloped woods, and the site usage is light industrial. As such, children and other high risk groups generally are not likely to visit the site.

5.5.7 Adjacent properties: The plume appears to be contained on-site; however, it remains unknown if it might migrate off-site in the future; thus, downgradient monitoring wells should remain for future monitoring events. One additional sentinel monitoring well is proposed (**Figure 4**) to supplement the monitoring network.

5.5.8 Receptor Protection Plan:

5.5.8.1 Monitoring Program:

The monitoring frequency is proposed at quarterly intervals during the first year, and annually thereafter, until closure can be negotiated with NCDENR. During each monitoring event, potential receptors will be inspected and data evaluated to determine if conditions have changed, and if threats exist.

5.5.8.2 Contingency Plan:

If impacts are documented to exist at any receptor, NCDENR will be notified, and investigations to isolate where impacts are

occurring will be immediately implemented and appropriate corrective measures taken.

5.6 CORRECTIVE ACTION APPROACH:

This plan seeks approval under 15A NCAC 2L .0106(l) and consists of implementation of monitored natural attenuation. The reasons for this request include the fact that the plume appears to encompass a relatively small area (and appears to be at steady-state), the absence of threatened potential receptors, the fact that historical plume migration appears minimal, and the fact that the cost of an aggressive physical groundwater restoration method addressing the entire estimated area of contamination is expected to exceed any short-term benefit to the public. The following specifically addresses each item under 15A NCAC 2L .0106(l)(1)-(10):

(1) Demonstrate that all sources of contamination and free product have been removed or controlled pursuant to Paragraph (f) of this Rule;

The fertilizer plant ceased operations circa 1980. Residual arsenic and chromium contaminated soil remains in-place; however, the documented levels are only slightly above their respective cleanup goal for protection of groundwater.

This suggests that only a limited amount of secondary source material remains. These facts, combined with the absence of threatened receptors, and the apparent low mobility of contaminants (discussed below) in groundwater suggests that the expense to remove or remediate these soils may outweigh any benefit realized. If it is found through site monitoring that arsenic levels increase in groundwater, contingencies will be carried out (i.e., capping) to minimize further impact, or to provide for physical removal or active remediation of affected materials.

(2) Demonstrate that the contaminant has the capacity to degrade or attenuate under the site specific conditions;

Evaluation of historical monitoring results suggests that the plume is at equilibrium in the shallow subsurface (does not appear to be migrating further downgradient than has been documented). Calculations using the shallow groundwater velocity estimate from short-term testing indicate a relatively slow advective transport rate. The calculated velocity rate is included in **Appendix III**.

Field and laboratory parameters were measured in eight shallow monitoring wells (MW2, MW3, MW6 - MW9, MW11 and MW12) and one deeper zone

well (DMW1) and evaluated to determine if evidence exists supporting a relatively immobile dissolved arsenic plume. Parameters such as D.O., pH, specific conductivity, temperature and redox potential were measured in the field, and samples were collected for total and ferrous iron, sulfate, alkalinity and TOC analyses by a certified laboratory. The results are summarized in **Tables 4** and **5**.

The D.O. concentrations were moderately high in both interplume wells and wells outside of the plume. Higher D.O. concentrations would indicate more oxidizing conditions at the site, which reduces the mobility of the arsenic (Ref. 17).

The pH measurements (~4 to 6 standard units, based on February 9, 2005 measurements) indicate slightly acidic conditions at the site. Arsenic is more soluble under more acidic conditions than under more neutral conditions (pH of 6 or 7)(Ref. 9).

The redox potential measurements indicate that slightly oxidizing conditions appear to exist at the site (**Table 6**). This suggests that the less soluble and, thus, less mobile form of arsenic is likely present at the site (Ref. 17), reducing the likelihood of significant migration of the arsenic off-site. Slightly higher potentials are seen off-site in the downgradient direction, possibly creating a buffer to migration.

The laboratory indicators, total and ferrous iron, alkalinity, TOC and sulfate, did not show a direct correlation with the distribution of the dissolved arsenic plume. Therefore, no inferences are drawn from these parameters. Sulfate was found to be present in all the wells sampled during this investigation. The levels were generally fairly low, though moderately high concentrations were noted in several wells. This suggests only slight evidence that the mobility of arsenic is reduced due to the presence of sulfate. The dissolved ferric iron concentrations were found to be fairly low despite iron's ready availability in the soil. This suggests only a slight mobilizing effect on the arsenic. The iron that is present at the site appears to be ferric, further suggesting more oxidizing and, thus, less mobile arsenic conditions. The dissolved carbon content appears low, though the soil contains appreciable amounts of organic carbon content. This suggests that the breakdown of the carbon only slightly increases arsenic's mobility. The alkalinity is moderate which helps keep the pH stabilized and from becoming more acidic, thereby increasing the arsenic mobility.

The results of the biodegradation indicator analysis suggests only limited evidence that the mobility of arsenic is being affected based on evaluation of these parameters. The primary factor influencing the mobility is the hydraulic conductivity at the site which appears relatively low. Additionally, there is evidence that the conditions at the site are fairly oxidizing, which also reduces mobility.

Based on the data obtained to date, documented arsenic contamination appears limited to the site property. Monitoring data suggests that the plume is likely at steady-state; therefore, contamination is not expected to migrate appreciably further downgradient than already documented. Long-term monitoring is necessary for verification.

(3) Demonstrate that the time and direction of contaminant travel can be predicted with reasonable certainty;

Short-term pumping tests were performed in the shallow and deeper intervals during the CSA (Ref. 5) investigation.

The test evaluations yielded a groundwater velocity in the upper zone of 8.77 x 10^{-4} ft/day and an apparent velocity (based on two data points) of 0.089 ft/day in the lower zone. Advective transport estimates utilizing the calculated shallow zone velocity, suggest that the dissolved arsenic plume would have moved a maximum of 32 ft. in the approximate 100 years since the start of fertilizer plant operations.

The primary groundwater flow direction in the shallow subsurface is southwest across the site (**Figure 4**). Based on the fact that contamination has likely been in existence for a long time at the site, and because of the limited documented extent, it is suggested that lateral net contaminant migration is minimal in the shallow subsurface. This may be due to contaminant migration being significantly retarded with respect to advective groundwater flow, as influenced by the various parameters discussed above, or a combination of these. Monitoring over an extended period will be required for verification.

Expected transport in the lower zone is less certain because of the limited data available at this time; however, no contamination has been documented in the wells located downgradient of the plume in this zone. The potentiometric head data from the deeper zone wells, as compared to the nearest shallow zone wells, indicate similar elevations in the two zones. This data suggests that a significant downward vertical head potential does not exist at the site. Additional conclusions regarding vertical migration may also be made based on future monitoring data.

(4) Demonstrate that contaminant migration will not result in any violation of applicable groundwater standards at any existing or foreseeable receptor;

Based on the orientation and estimated extent of documented contamination and the position and distance of identified potential receptors, threats of impacts to the receptors are thought negligible. The only potential receptor that exists in the vicinity of the plume is a storm drain line, which is outside (and upgradient of) the estimated plume boundary. This storm water drain line will be monitored. Additionally, monitoring will be required with respect to all receptors to ensure conditions do not change. If conditions were to develop where any current or future receptors became threatened, actions to protect these receptors would ensue.

One irrigation well is located approximately 500 feet northeast of the source area. This well is constructed upgradient of the plume boundary, well outside the documented extent of contamination. If the irrigation well is brought into use in the future (an unlikely scenario), a monitoring program will be implemented to include sampling the well during each monitoring event.

(5) Demonstrate that contaminants have not and will not migrate onto adjacent properties or that:

A) such properties are served by an existing public water supply system dependent on surface waters or hydraulically isolated groundwater, or
B) the owners of such properties have consented in writing to the request;
C) the downgradient properties are at potential risk; however, there are no known impacts at the present time.

Based on the site investigation, it appears that the dissolved contaminant plume is confined to the subject property, and, based on the mapped configuration, the contaminant plume is approximately 100 feet from the adjacent private property to the southwest. This property, which is hydraulically downgradient, is across the railroad right-of-way from the site and is vacant. The documented extent of the contaminant plume is approximately 500 feet from the adjacent property to the west, and 150 feet from southeastern adjacent property. The property to the northeast is thought to be upgradient, based on data gathered to date, and is 200 feet away. Only the property to the southwest is believed to have a foreseeable potential to be impacted by site contamination. A sentinel monitoring well is proposed (**Figure 4**), in conjunction with the existing downgradient wells, to monitor the potential for off-site migration.

Water supplies for the subject property and available to the surrounding area are provided by the city of Wilmington, which draws water from the Cape Fear River at an intake that is hydraulically isolated from the area of the site (Ref. 24).

(6) Demonstrate that, if the contaminant plume is expected to intercept surface waters, the groundwater discharge will not possess contaminant concentrations that would result in violations of standards for surface water contained in 15A NCAC 2B .0200;

The nearest surface water occurs as a manmade retention pond to the north of the site. At present, the pond is located in the upgradient direction from the plume area. Based on the existing groundwater flow direction (**Figure 4**), in conjunction with the low levels of dissolved arsenic which have been documented at the site, migration to the pond is not expected. In the event that the groundwater flow conditions change substantially (an unlikely scenario, based on multiple monitoring events), monitoring of this receptor may be recommended as part of corrective action to ensure impacts do not develop. A contingency plan for impact abatement will be negotiated with DWQ in the event it is necessary.

(7) Demonstrate that the person making the request will put in place a groundwater monitoring program sufficient to track the degradation and attenuation of contaminants and contaminant by-products within and downgradient of the plume and to detect contaminants and contaminant by-products prior to their reaching any existing or foreseeable receptor at least one year's time of travel upgradient of the receptor and no greater than the distance the groundwater at the contaminated site is predicted to travel in five years;

The monitoring program is proposed to consist of sampling monitoring wells MW3, MW6, MW7, MW11, MW12, the proposed sentinel well, and deep wells DMW1 and DMW2. A surface water sample will be collected from the storm drain system if water is found to be discharging during the monitoring events. The sampling frequency is proposed to be quarterly the first year, then annually thereafter, until closure can be obtained. The data will be evaluated after each event and the site conditions re-evaluated as data warrants. A brief monitoring report will be completed after each sampling event for submittal to the NCDWQ. No potential receptors have been identified downgradient of the site, with the exception of the downgradient off-site property boundary. Based on the estimated groundwater flow velocity, the downgradient property boundary is located 200 to 300 years downgradient. An additional monitoring well (sentinel well) is proposed for the monitoring program downgradient of the inert debris landfill area.

All potential receptors are proposed to be monitored periodically during corrective action, and contingencies will be taken to protect them in the event that they are necessary. These actions would only be taken after negotiating with DWQ and other applicable parties (i.e., utility companies).

(8) Demonstrate that all necessary access agreements needed to monitor groundwater quality pursuant to (7) above have been or can be obtained;

One additional access agreement will be required to install the proposed sentinel well. Since the owner of the adjacent downgradient property previously allowed access to that property for monitoring well installation and sampling purposes, no problems with future access are anticipated. A more comprehensive access agreement may be necessary with the current downgradient land owner, as a condition of possible future sale of the site, to ensure that long-term monitoring/corrective actions can be carried out.

(9) Demonstrate that public notice of the request has been provided in accordance with Rule .0114 (b) of this Subchapter; and,

Public notice is being submitted to each party via registered mail. Copies of receipts will be forwarded to the DWQ, WiRO upon return (**Appendix VI**).

(10) Demonstrate that the proposed corrective action plan would be consistent with all other environmental laws.

This plan is believed to be consistent with all environmental laws.

5.7 PROPOSED MONITORING PROGRAM/RE-EVALUATIONS:

CES recommends annual sampling for the remainder of the corrective action phase at the site. The proposed components include the sampling of the deeper monitoring wells, the three interplume wells, the two downgradient shallow wells and the proposed sentinel well. Monitoring is proposed to continue until such time that site closure can be negotiated with DWQ. All water samples will be submitted to a North Carolina certified laboratory for analysis for dissolved arsenic, using both filtered and non-filtered protocols. Arsenic and chromium should be analyzed in the samples from the proposed sentinel well.

5.7.1 Year One:

The following activities will be performed quarterly:

- Sample six shallow monitoring wells (MW3, MW6, MW7, MW11, MW12 and the proposed sentinel well) and the two deep monitoring wells (DMW1 and DMW2).

- Construct groundwater contour maps;
- Prepare/submit Quarterly Monitoring Reports.

Year Two:

Perform same monitoring activities on an annual basis until site closure can be negotiated with DWQ.

5.8 TERMINATION AND CLOSURE:

Monitoring should continue until levels are documented to be below 15A NCAC 2L standards, or until such time that it is apparent that no significant risks will result from leaving the remaining contamination in place. This will be negotiated with NCDWQ prior to closure request.

6.0 CONCLUSIONS AND RECOMMENDATIONS:

Soil contamination has been documented to exist at concentrations only slightly above applicable groundwater protection action levels; therefore, only limited secondary source material appears to be present. Removal of these materials is not proposed at this time. Removal and/or treatment is proposed as a contingency at a later date, if necessary.

The horizontal extent of dissolved contamination appears to be defined and is of limited extent, based on data from the field investigation. The vertical extent of contamination appears defined with respect to target compounds, as the lower aquifer zone does not appear to be impacted and a significant downward head potential does not appear to exist.

Potential receptors identified to exist in the vicinity of the site include an irrigation well, a retention pond, and a storm drain line. All of these features appear to be hydraulically upgradient, and are, therefore, not considered to be at risk at this time. The storm drain will be closely monitored since it is located in relative close proximity to the plume.

Because of the limited extent of documented contamination, and since evidence of limited migration has been documented, coupled with the fact that no significant threat is believed to exist at this time to any receptors in the vicinity, a monitoring only corrective action is proposed at this time.

A monitoring plan has been proposed that will detect contamination migrating off-site, to include the installation of one sentinel monitoring well. If conditions change significantly and receptors are identified to be threatened, contingency plans will be developed and negotiated with NCDWQ, to include any of the possible treatment options described herein. Applicable engineering reports will be prepared based on the chosen technology.

Corrective action is proposed to continue until closure can be negotiated with NCDWQ, based on site decontamination and risk evaluation to potential receptors.

Based on the findings of this investigation, the following recommendations are made:

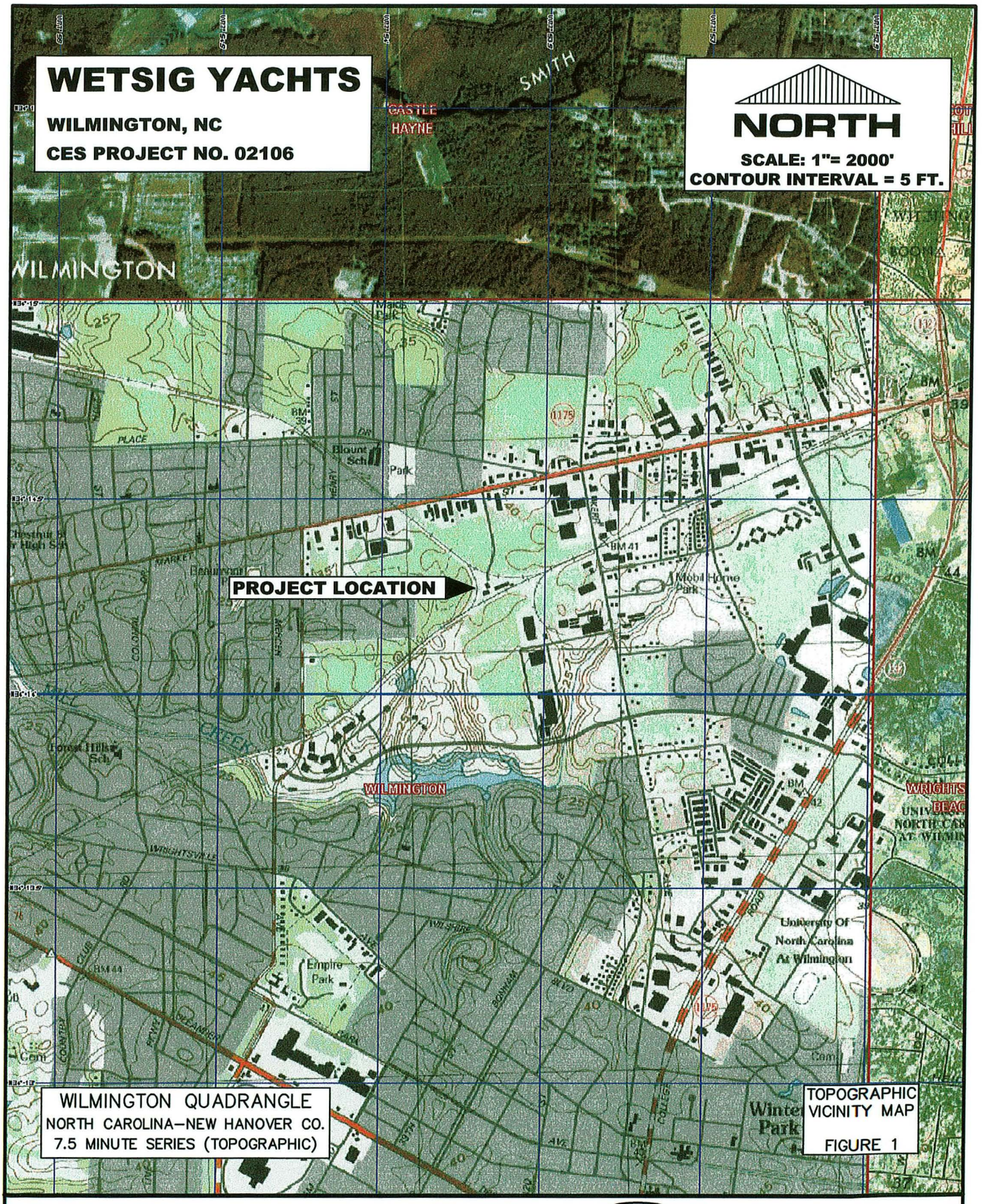
6.1 Submit this report to the NCDWQ, Aquifer Protection Section, Wilmington Regional Office;

6.2 Perform monitoring and reporting, to monitor concentration trends in groundwater in accordance with Aquifer Protection Section guidance; and,

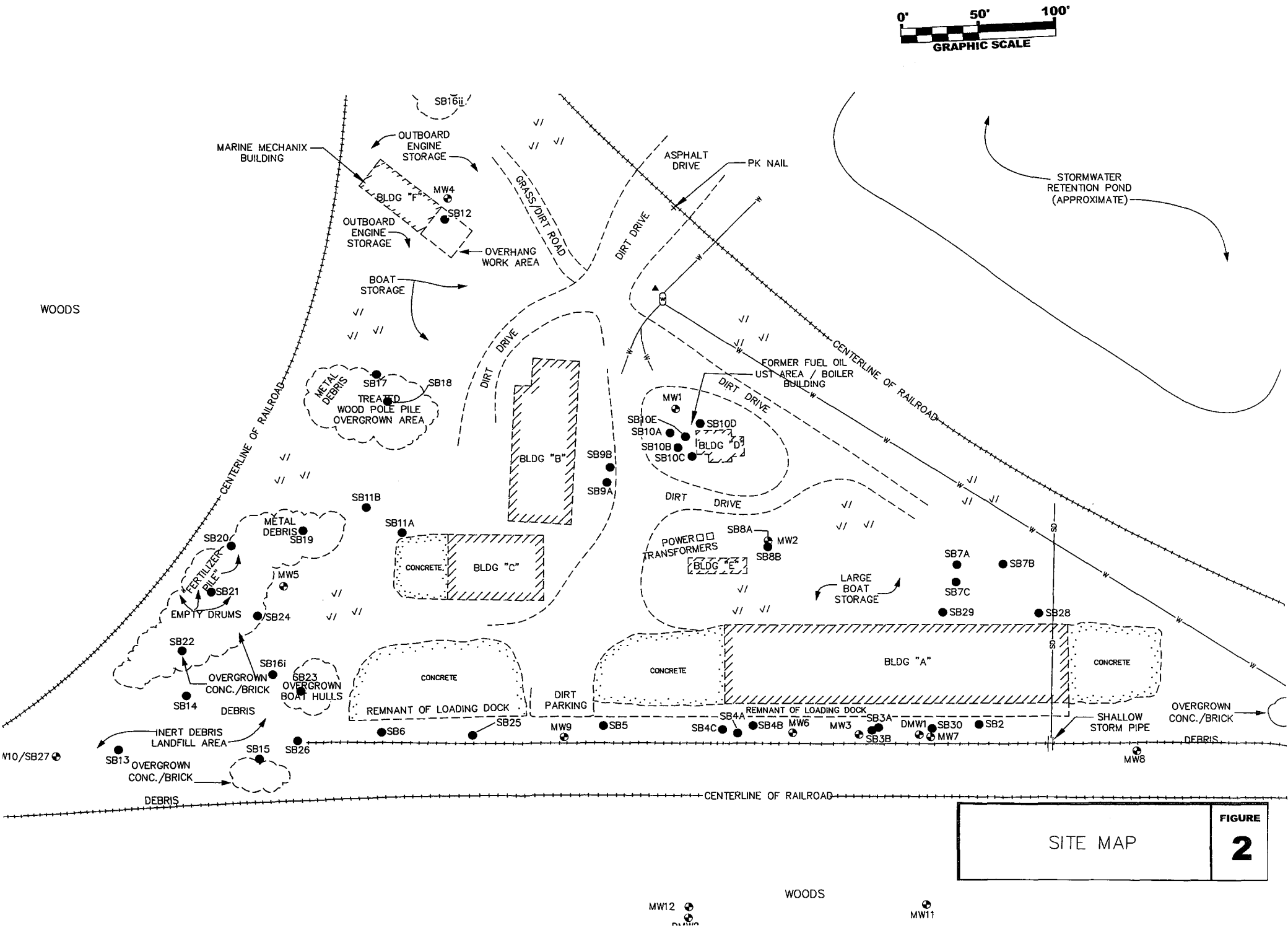
6.3 Evaluate the status of the site conditions after each monitoring event and recommend appropriate contingencies, if necessary, until site closure can be sought.

7.0 LIMITATIONS:

Information obtained and presented as part of this investigation is based on available data in an effort to understand and/or correct an existing problem. The validity of any resulting conclusions is limited by methodological constraints and by the lack of a statistically significant number of data points. There is no warranty, expressed or implied, that additional or new information and/or additional measures will not be required to ultimately solve the problem. Additionally, Clark Environmental Services, Inc. (CES) assumes no responsibility for the validity of subjective or interpolated interpretations, whether or not implied or indicated although an attempt is made to qualify such.

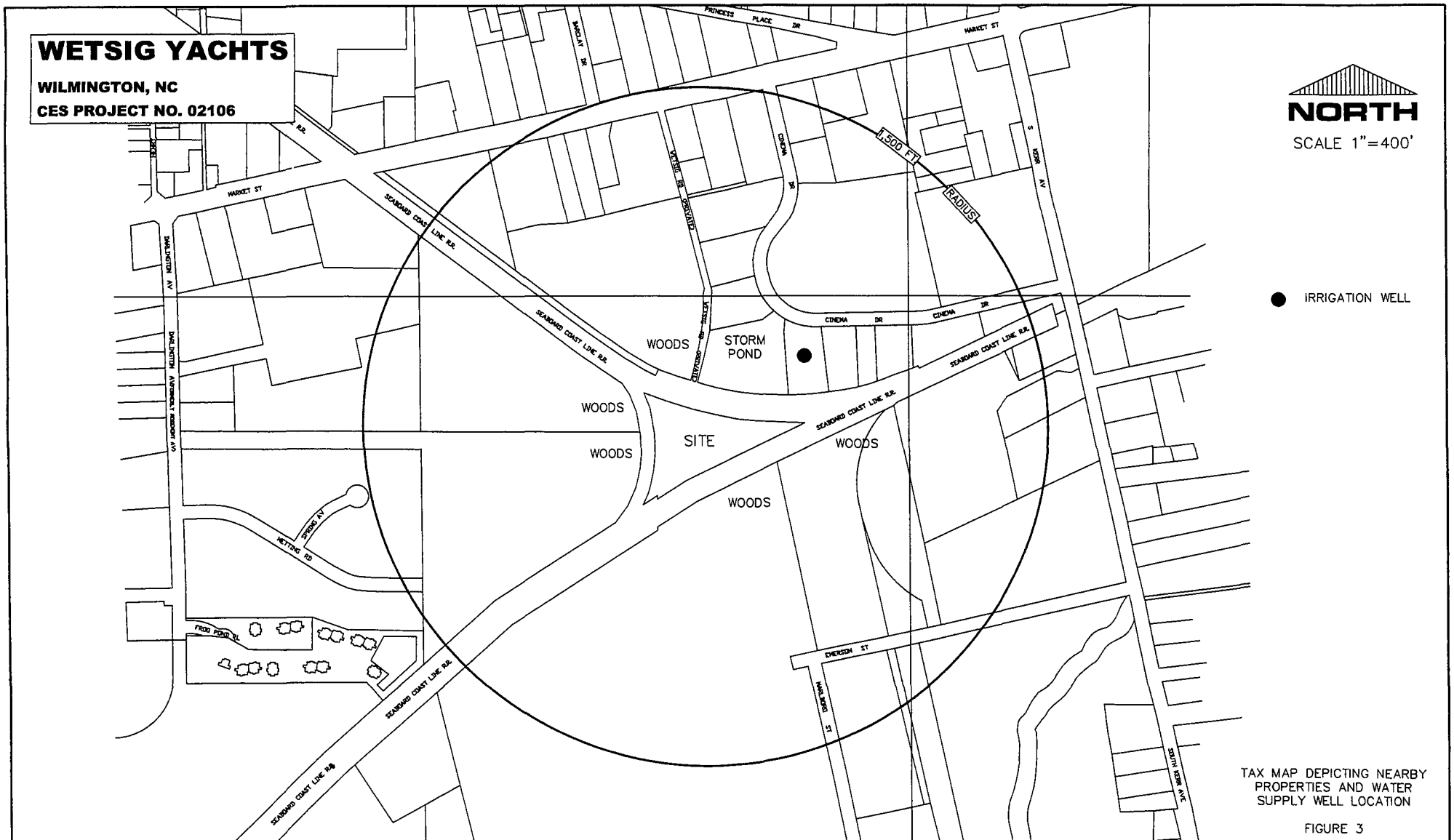


THE CLARK GROUP



SITE MAP

FIGURE 2



TAX MAP DEPICTING NEARBY PROPERTIES AND WATER SUPPLY WELL LOCATION

FIGURE 3

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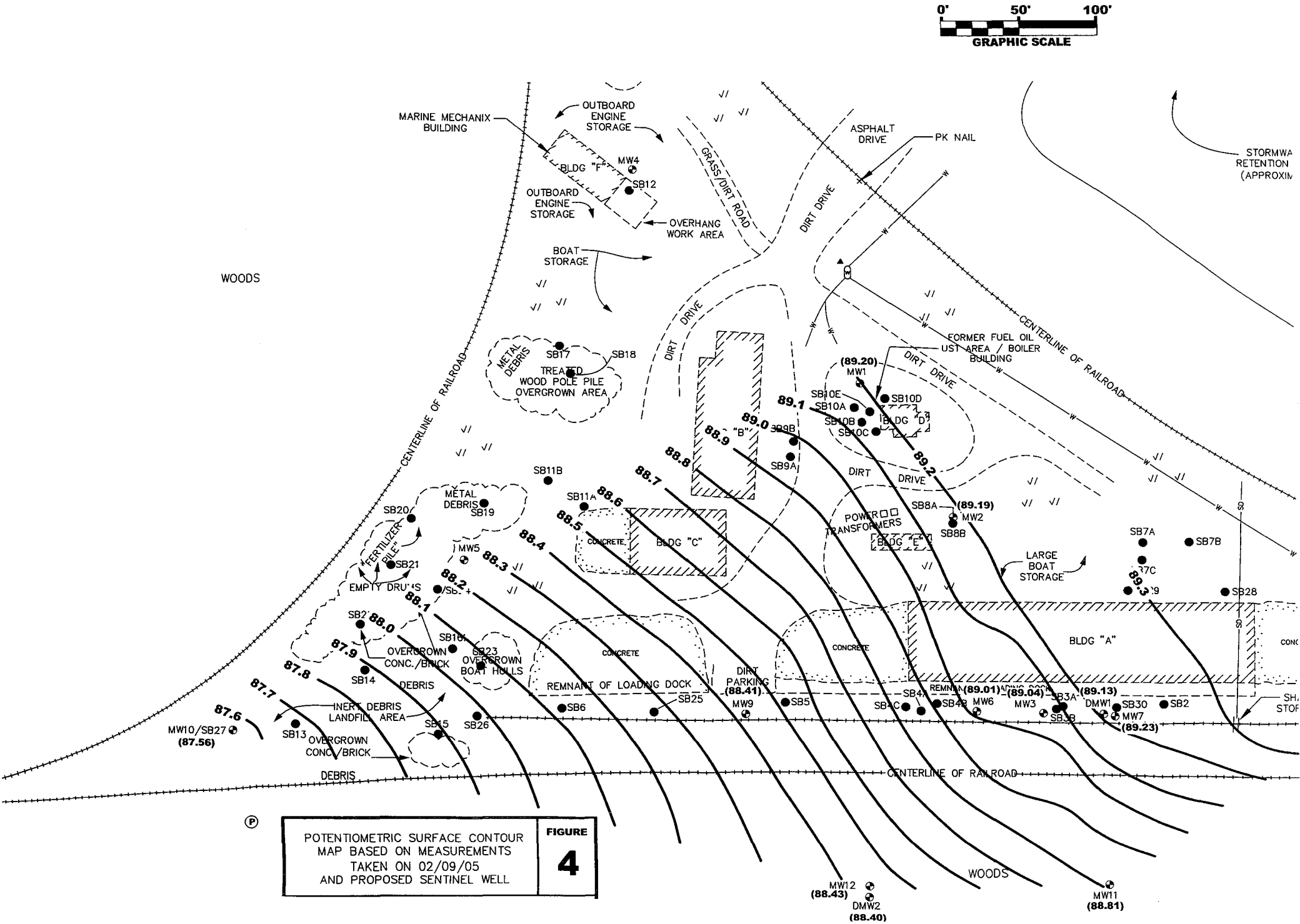
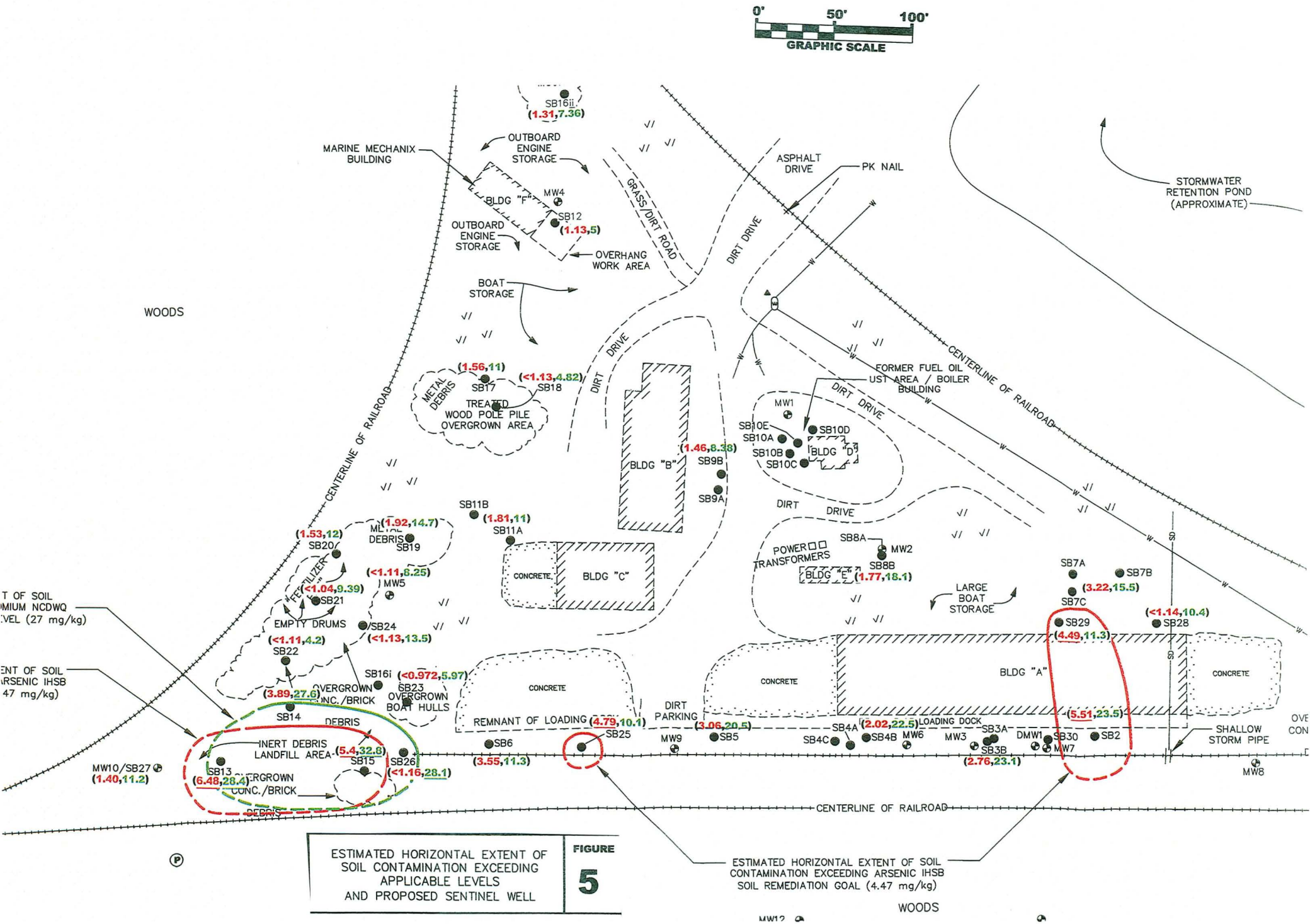


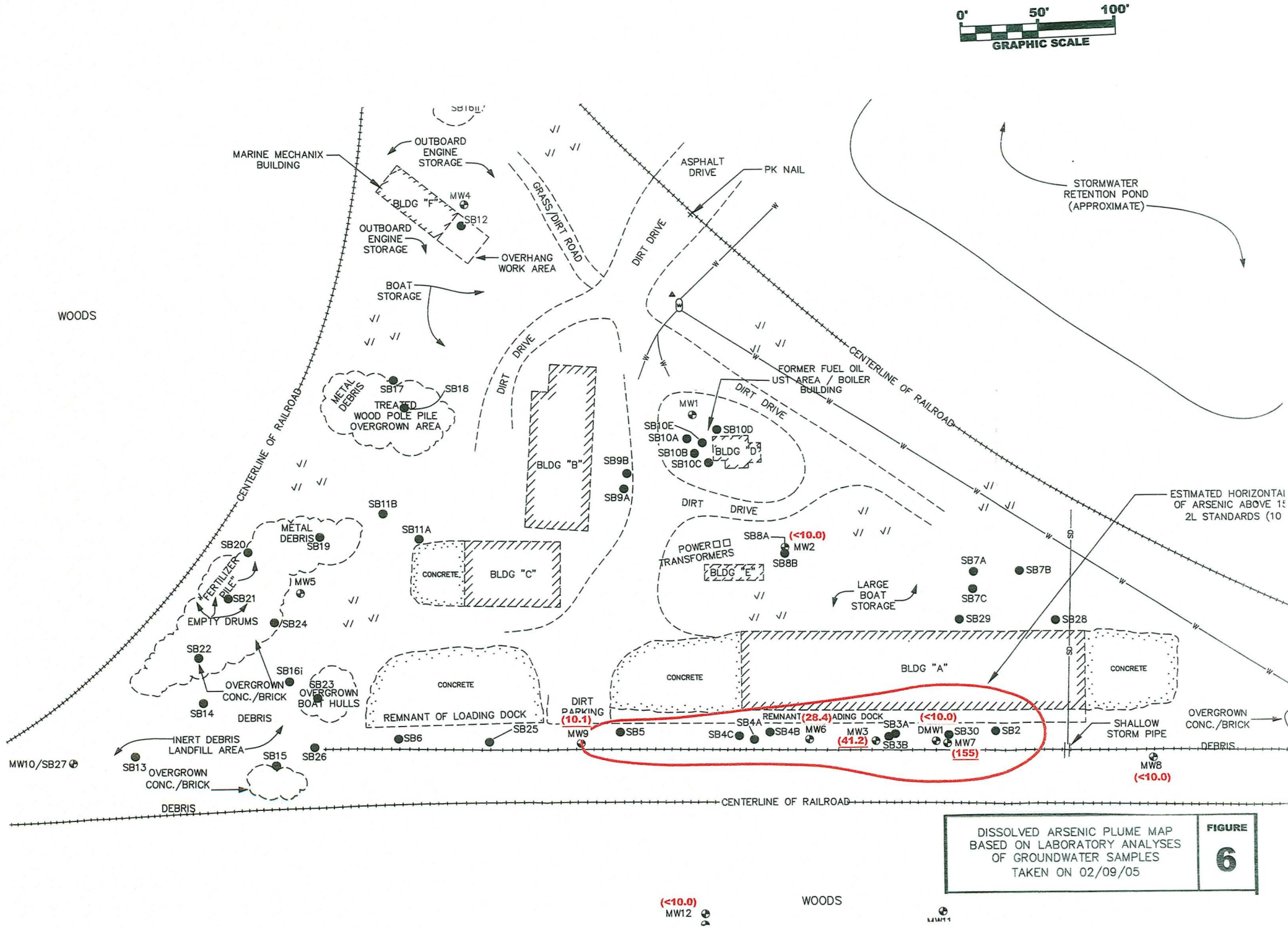
POTENTIOMETRIC SURFACE CONTOUR MAP BASED ON MEASUREMENTS TAKEN ON 02/09/05 AND PROPOSED SENTINEL WELL

FIGURE 4



ESTIMATED HORIZONTAL EXTENT OF SOIL CONTAMINATION EXCEEDING APPLICABLE LEVELS AND PROPOSED SENTINEL WELL

FIGURE 5



DISSOLVED ARSENIC PLUME MAP BASED ON LABORATORY ANALYSES OF GROUNDWATER SAMPLES TAKEN ON 02/09/05

FIGURE 6

TABLES

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS AND GROUNDWATER LEVEL DATA
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

WELL ID	DATE INSTALLED	DATE WATER LEVEL MEASURED	TOTAL DEPTH	SCREENED INTERVAL	TOP OF CASING ELEVATION	DEPTH TO WATER FROM TOP OF CASING	FREE PRODUCT THICKNESS	POTENTIOMETRIC HEAD ELEVATION
MW1	09/25/02	10/02/02	11.5	1.5 - 11.5	97.87	5.97	0	91.90
MW1	09/25/02	10/31/02	11.5	1.5 - 11.5	97.87	6.98	0	90.89
MW1	09/25/02	04/30/03	11.5	1.5 - 11.5	97.87	5.42	0	92.45
MW1	09/25/02	08/14/03	11.5	1.5 - 11.5	97.87	5.30	0	92.57
MW1	09/25/02	01/20/04	11.5	1.5 - 11.5	97.87	7.10	0	90.77
MW1	09/25/02	04/16/04	11.5	1.5 - 11.5	97.87	7.28	0	90.59
MW1	09/25/02	08/04/04	11.5	1.5 - 11.5	97.87	6.75	0	91.12
MW1	09/25/02	02/09/05	11.5	1.5 - 11.5	97.87	8.67	0	89.20
MW2	09/25/02	10/02/02	12	2 - 12	97.81	6.02	0	91.79
MW2	09/25/02	10/31/02	12	2 - 12	97.81	7.07	0	90.74
MW2	09/25/02	04/30/03	12	2 - 12	97.81	5.43	0	92.38
MW2	09/25/02	08/14/03	12	2 - 12	97.81	5.35	0	92.46
MW2	09/25/02	01/20/04	12	2 - 12	97.81	7.13	0	90.68
MW2	09/25/02	04/16/04	12	2 - 12	97.81	7.31	0	90.50
MW2	09/25/02	08/04/04	12	2 - 12	97.81	6.56	0	91.25
MW2	09/25/02	02/09/05	12	2 - 12	97.81	8.62	0	89.19
MW3	09/25/02	10/02/02	12	2 - 12	97.03	5.58	0	91.45
MW3	09/25/02	10/31/02	12	2 - 12	97.03	6.58	0	90.45
MW3	09/25/02	04/30/03	12	2 - 12	97.03	4.87	0	92.16
MW3	09/25/02	08/14/03	12	2 - 12	97.03	4.95	0	92.08
MW3	09/25/02	01/20/04	12	2 - 12	97.03	6.59	0	90.44
MW3	09/25/02	04/16/04	12	2 - 12	97.03	6.72	0	90.31
MW3	09/25/02	08/04/04	12	2 - 12	97.03	6.23	0	90.80
MW3	09/25/02	02/09/05	12	2 - 12	97.03	7.99	0	89.04
MW4	09/25/02	10/02/02	12	2 - 12	98.66	6.74	0	91.92
MW4	09/25/02	10/31/02	12	2 - 12	98.66	7.85	0	90.81
MW4	09/25/02	04/30/03	12	2 - 12	98.66	6.31	0	92.35
MW4	09/25/02	08/14/03	12	2 - 12	98.66	9.11	0	89.55
MW4	09/25/02	01/20/04	12	2 - 12	98.66	7.87	0	90.79
MW4	09/25/02	04/16/04	12	2 - 12	98.66	8.13	0	90.53
MW4	09/25/02	08/04/04	12	2 - 12	98.66	8.30	0	90.36
MW5	09/25/02	10/02/02	12	2 - 12	100.20	9.18	0	91.02
MW5	09/25/02	10/31/02	12	2 - 12	100.20	10.39	0	89.81
MW5	09/25/02	04/30/03	12	2 - 12	100.20	8.73	0	91.47
MW5	09/25/02	08/14/03	12	2 - 12	100.20	9.05	0	91.15
MW5	09/25/02	01/20/04	12	2 - 12	100.20	10.40	0	89.80
MW5	09/25/02	04/16/04	12	2 - 12	100.20	10.71	0	89.49
MW5	09/25/02	08/04/04	12	2 - 12	100.20	11.69	0	88.51
MW6	08/11/03	08/14/03	11.5	1.5 - 11.5	97.08	5.13	0	91.95
MW6	08/11/03	01/20/04	11.5	1.5 - 11.5	97.08	6.74	0	90.34
MW6	08/11/03	04/16/04	11.5	1.5 - 11.5	97.08	6.91	0	90.17
MW6	08/11/03	08/04/04	11.5	1.5 - 11.5	97.08	6.64	0	90.44
MW6	08/11/03	02/09/05	11.5	1.5 - 11.5	97.08	8.07	0	89.01
MW7	08/11/03	08/14/03	11.5	1.5 - 11.5	97.00	4.73	0	92.27
MW7	08/11/03	01/20/04	11.5	1.5 - 11.5	97.00	6.45	0	90.55
MW7	08/11/03	04/16/04	11.5	1.5 - 11.5	97.00	6.57	0	90.43
MW7	08/11/03	08/04/04	11.5	1.5 - 11.5	97.00	5.83	0	91.17
MW7	08/11/03	02/09/05	11.5	1.5 - 11.5	97.00	7.77	0	89.23
MW8	01/16/04	01/20/04	12	2 - 12	96.99	6.30	0	90.69
MW8	01/16/04	04/16/04	12	2 - 12	96.99	6.42	0	90.57
MW8	01/16/04	08/04/04	12	2 - 12	96.99	5.27	0	91.72
MW8	01/16/04	02/09/05	12	2 - 12	96.99	7.63	0	89.36

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS AND GROUNDWATER LEVEL DATA
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

WELL ID	DATE INSTALLED	DATE WATER LEVEL MEASURED	TOTAL DEPTH	SCREENED INTERVAL	TOP OF CASING ELEVATION	DEPTH TO WATER FROM TOP OF CASING	FREE PRODUCT THICKNESS	POTENTIOMETRIC HEAD ELEVATION
MW9	01/16/04	01/20/04	12	2 - 12	96.46	6.39	0	90.07
MW9	01/16/04	04/16/04	12	2 - 12	96.46	6.63	0	89.83
MW9	01/16/04	08/04/04	12	2 - 12	96.46	7.04	0	89.42
MW9	01/16/04	02/09/05	12	2 - 12	96.46	8.05	0	88.41
MW10	01/16/04	01/20/04	12	2 - 12	99.27	10.29	0	88.98
MW10	01/16/04	04/16/04	12	2 - 12	99.27	10.65	0	88.62
MW10	01/16/04	08/04/04	12	2 - 12	99.27	11.68	0	87.59
MW10	01/16/04	02/09/05	12	2 - 12	99.27	11.71	0	87.56
MW11	04/13/04	04/16/04	11.5	1.5 - 11.5	94.80	4.76	0	90.04
MW11	04/13/04	08/04/04	11.5	1.5 - 11.5	94.80	4.61	0	90.19
MW11	04/13/04	02/09/05	11.5	1.5 - 11.5	94.80	5.99	0	88.81
MW12	04/14/04	04/16/04	1.5	1.5 - 11.5	93.15	3.40	0	89.75
MW12	04/14/04	08/04/04	1.5	1.5 - 11.5	93.15	3.74	0	89.41
MW12	04/14/04	02/09/05	1.5	1.5 - 11.5	93.15	4.72	0	88.43
DMW1	05/19/04	05/24/04	32	22 - 32	97.25	7.50	0	89.75
DMW1	05/19/04	08/04/04	32	22 - 32	97.25	6.21	0	91.04
DMW1	05/19/04	02/09/05	32	22 - 32	97.25	8.12	0	89.13
DMW2	05/19/04	05/24/04	43.5	33.5 - 43.5	93.85	4.97	0	88.88
DMW2	05/19/04	08/04/04	43.5	33.5 - 43.5	93.85	4.53	0	89.32
DMW2	05/19/04	02/09/05	43.5	33.5 - 43.5	93.85	5.45	0	88.40

Notes:

1. All elevations are based on an arbitrary assumed benchmark elevation of 100.00'
2. Depths are in feet below ground surface as measured from the top of casing
3. All units are in feet unless otherwise indicated

TABLE 2
SUMMARY OF SOIL SAMPLING RESULTS
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

ANALYTICAL METHOD			3550	5030	RCRA METALS											8151	8061	600	IC 300.0
SAMPLING INFORMATION AND REGULATORY PROGRAM REFERENCE																			
SAMPLE ID	DATE COLLECTED	SAMPLE DEPTH (ft BGS)	TOTAL PETROLEUM HYDROCRABONS (HIGH BOILING POINT)	TOTAL PETROLEUM HYDROCRBONS (LOW BOILING POINT)	ARSENIC	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MERCURY	NICKEL	SELENIUM	SILVER	HERBICIDES, µg/kg	PESTICIDES, µg/kg	ASBESTOS, PERCENT	NITRATES
NC DWM ACTION LEVELS			10	10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NC DWQ ACTION LEVELS			40	10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS
NC DWQ SOIL TO GROUNDWATER CLEANUP LEVELS			NS	NS	NS	848	NS	27	NS	NS	270	NS	NS	NS	0.23	NS	NS	NA	NS
NC DWM SOIL RGs			NS	NS	4.4	NS	7.4	24,000	620	NS	400	4.6	320	78	78	VAR	VAR	NS	NS
FEDERAL LISTED HAZARDOUS CONSTITUENT (Y/N)			N	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	NA	N
SB1	09/09/02	0-2	NT	NT	<1.13	62.5	2.82	6.64	32.1	NT	58.1	0.0456	<4.53	<1.13	<1.13	NT	NT	ND	1
SB2	09/09/02	1-2	NT	NT	**5.51**	32.9	1.19	23.5	8.01	NT	26	0.0391	<4.32	<1.08	<1.08	NT	NT	CHRY	NT
SB3	09/09/02	1.5-3.5	NT	NT	2.76	18.3	<0.983	23.1	7.44	NT	14.9	0.314	<3.93	<0.983	<0.983	BQL	BQL	CHRY	NT
SB4	09/09/02	2-3	NT	NT	2.02	16.1	1.64	22.5	5.77	NT	8.88	0.139	<4.31	<1.08	<1.08	NT	NT	ND	NT
SB5	09/09/02	1-3	NT	NT	3.06	15.3	<1.16	20.5	3.73	NT	7.46	0.0358	<4.62	<1.16	<1.16	NT	NT	ND	NT
SB6	09/09/02	1-2	NT	NT	3.55	24.5	<1.11	11.3	6.58	NT	12.2	0.0716	<4.43	<1.11	<1.11	NT	NT	ND	NT
SB7	09/11/02	1-3	NT	NT	3.22	37.8	<1.07	15.5	9.5	NT	19	0.204	<4.27	<1.07	<1.07	NT	NT	CHRY	NT
SB8	09/11/02	1-2	NT	NT	1.77	29.1	1.27	18.1	15.9	NT	30.3	0.108	<4.39	<1.10	<1.10	NT	NT	CHRY	NT
SB9	09/11/02	0.5-2	NT	NT	1.46	<10.0	<1.00	8.38	2.12	NT	4	0.0242	<4.00	<1.00	<1.00	NT	NT	ND	NT
SB10	09/11/02	4-5	**13**	<6.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SB11	09/11/02	1-3	NT	NT	1.81	<10.5	<1.05	11	1.48	NT	4.93	<0.0227	<4.22	<1.05	<1.05	BQL	BQL	ND	NT
SB12	09/11/02	0-2	28	<6.8	1.13	<10.8	2.77	5	17.1	NT	14.4	<0.0208	<4.31	<1.08	<1.08	NT	NT	CHRY	NT
SB13	09/26/02	4-6	NT	NT	**6.48**	31.5	<1.11	**28.4**	85.3	NT	20	0.183	<4.42	<1.11	<1.11	NT	NT	ND	NT
SB14	09/26/02	3-6	NT	NT	3.89	26.9	<1.11	**27.6**	8.33	NT	18.9	0.0494	<4.43	<1.11	<1.11	NT	NT	ND	NT
SB15	09/26/02	0-3	NT	NT	**5.4**	27.7	1.22	**32.8**	16.3	NT	10.8	0.207	<3.98	<0.995	<0.995	NT	NT	ND	NT
MW5	09/26/02	0-2	NT	NT	<1.11	<11.1	<1.11	8.25	2.1	NT	5.1	0.024	<4.42	<1.11	<1.11	NT	NT	ND	NT
SB16ii	04/30/03	1-3	NT	NT	1.31	<10.8	<1.08	7.36	NT	NT	5.77	0.0911	NT	<1.08	<1.08	NT	NT	NT	NT
SB17	04/30/03	1-3	NT	NT	1.56	<11.3	<1.13	11	NT	NT	4.09	<0.0218	NT	1.29	<1.13	NT	NT	NT	NT
SB18	04/30/03	1-2	NT	NT	<1.13	<11.3	<1.13	4.82	NT	NT	4.33	0.041	NT	<1.13	<1.13	NT	NT	NT	NT
SB19	04/30/03	1-2.5	NT	NT	1.92	17.8	<1.00	14.7	NT	NT	5.46	0.0334	NT	1.64	<1.00	NT	NT	NT	NT
SB20	04/30/03	1-3	NT	NT	1.53	17	<1.19	12	NT	NT	3.97	0.0393	NT	1.37	<1.19	NT	NT	NT	NT
SB21	04/30/03	1-2.5	NT	NT	<1.04	<10.4	<1.04	9.39	NT	NT	3.92	0.0232	NT	<1.04	<1.04	NT	NT	NT	NT

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TABLE 2
SUMMARY OF SOIL SAMPLING RESULTS
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

ANALYTICAL METHOD			3550	5030	RCRA METALS											8151	8061	600	IC 300.0
SAMPLING INFORMATION AND REGULATORY PROGRAM REFERENCE																			
SAMPLE ID	DATE COLLECTED	SAMPLE DEPTH (ft BGS)	TOTAL PETROLEUM HYDROCRABONS (HIGH BOILING POINT)	TOTAL PETROLEUM HYDROCRBONS (LOW BOILING POINT)	ARSENIC	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MERCURY	NICKEL	SELENIUM	SILVER	HERBICIDES, µg/kg	PESTICIDES, µg/kg	ASBESTOS, PERCENT	NITRATES
NC DWM ACTION LEVELS			10	10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
NC DWQ ACTION LEVELS			40	10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS
NC DWQ SOIL TO GROUNDWATER CLEANUP LEVELS			NS	NS	NS	848	NS	27	NS	NS	270	NS	NS	NS	0.23	NS	NS	NA	NS
NC DWM SOIL RGs			NS	NS	4.4	NS	7.4	24,000	620	NS	400	4.6	320	78	78	VAR	VAR	NS	NS
FEDERAL LISTED HAZARDOUS CONSTITUENT (Y/N)			N	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	NA	N
SB22	04/30/03	1-3	NT	NT	<1.11	<11.1	<1.11	4.2	NT	NT	3.31	0.0517	NT	<1.11	<1.11	NT	NT	NT	NT
SB23	04/30/03	1-2.5	NT	NT	<0.972	13.6	<0.972	5.97	NT	NT	4.37	<0.0221	NT	<0.972	<0.972	NT	NT	NT	NT
SB24	04/30/03	1-2.5	NT	NT	<1.13	<11.3	<1.13	13.5	NT	NT	4.5	0.0352	NT	<1.13	<1.13	NT	NT	NT	NT
SB25	01/16/04	1-3	NT	NT	**4.79**	NT	NT	10.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SB26	01/16/04	1-3	NT	NT	<1.16	NT	NT	**28.1**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SB27/MW10	01/16/04	2-4	NT	NT	1.40	NT	NT	11.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SB28	01/16/04	5-7	NT	NT	<1.14	NT	NT	10.4	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SB29	01/16/04	3-5	NT	NT	**4.49**	NT	NT	11.3	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SB30	02/09/05	5	NT	NT	NT	NT	NT	NT	NT	2,820	NT	NT	NT	NT	NT	NT	NT	NT	NT

Notes:

1. Abbreviations: NS represents no available action level, clean-up level, screening level or level listed in a referenced document; NT represents not tested; ft BGS represents feet below ground surface, CHRY represents presence of asbestos mineral chrysotile; BQL represents below quantitation level; ND represents not detected; VAR represents variable level.
2. Results reported in milligrams per kilogram (mg/kg), unless specified micrograms per kilogram (µg/kg).
3. Bold result represents concentrations in excess of actions levels, soil-to-groundwater cleanup level, or soil remediation goals; shaded result represents Federally listed hazardous constituent which also exceeds cited regulatory levels.
4. NC DWM Action Levels: North Carolina Department of Environment and Natural Resources (NCDENR) Division of Waste Management (DWM), Underground Storage Tank (UST) Section *Guidelines for Assessment and Corrective Action,* July 1, 2001
5. NC DWQ Action Levels and NC DWQ Soil-to-Groundwater Cleanup Levels, taken from the NCDENR, Division of Water Quality (DWQ) Groundwater Section *Guidelines for Investigation and Remediation of Soil and Groundwater* - July 2000.
6. NC DWM Soil RG's: NCDENR, DWM Superfund Section Inactive Hazardous Sites Branch, *Guidelines for Assessment and Cleanup*, Soil Remediation Goals - August 2004.
7. Listed hazardous constituent (Y/N): represents that the constituent is/is not contained in Appendix VIII of 40 CFR, Part 261.

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TABLE 3
SUMMARY OF GROUNDWATER SAMPLING RESULTS
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

		CONTAMINANTS OF CONCERN																
ANALYTICAL METHOD		6210D/602								610	6010B							7470
CONTAMINANT OF CONCERN ->		BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	MTBE	DIPE	NAPHTHALENE	TRICHLOROFLUOROMETHANE	NAPHTHALENE	ARSENIC	BARIUM	CADMIUM	CHROMIUM	LEAD	SELENIUM	SILVER	MERCURY
WELL ID	DATE COLLECTED																	
15A NCAC 2L STANDARD		1	1,000	29	530	200	70	21	2,100	21	10	2,000	5	50	15	50	18	1.1
MW1-unf	10/02/02	<1	<1	<1	<3	69	<1	<1	<1	<10	**11.1**	<100	<10	<10	<10	<10	<10	<0.3
MW1-unf	11/01/02	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	NT	NT	NT	NT	NT
MW1-f	11/01/02	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	NT	NT	NT	NT	NT
MW1-unf	04/30/03	<1	<1	<1	<4	7.8	<1	NT	NT	<10	NT	NT	NT	NT	<5	NT	NT	NT
MW2-unf	10/02/02	<0.5	<0.5	<0.5	<1.5	<0.5	<0.5	<0.5	0.5	NT	**13.4**	<100	<10	<10	<10	<10	<10	<0.3
MW2-unf	11/01/02	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	NT	NT	NT	NT	NT
MW2-f	11/01/02	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	NT	NT	NT	NT	NT
MW2-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
MW2-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
MW3-unf	10/02/02	<0.5	<0.5	<0.5	<1.5	<0.5	<0.5	<0.5	<0.5	NT	**78.6**	<100	<10	14.5	<10	<10	<10	<0.3
MW3-unf	11/01/02	NT	NT	NT	NT	NT	NT	NT	NT	NT	**34.4**	NT	NT	NT	NT	NT	NT	NT
MW3-f	11/01/02	NT	NT	NT	NT	NT	NT	NT	NT	NT	**37.9**	NT	NT	NT	NT	NT	NT	NT
MW3-f	04/30/03	NT	NT	NT	NT	NT	NT	NT	NT	NT	**34.4**	NT	NT	NT	NT	NT	NT	NT
MW3-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	**42.8**	NT	NT	NT	NT	NT	NT	NT
MW3-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	**41.2**	NT	NT	NT	NT	NT	NT	NT
MW4-unf	10/02/02	<0.5	<0.5	<0.5	<1.5	2	<0.5	<0.5	<0.5	<10	<10	<100	<10	<10	<10	<10	<10	<0.3
MW5-unf	10/02/02	<0.5	<0.5	<0.5	<1.5	<0.5	<0.5	<0.5	<0.5	NT	<10	<100	<10	<10	<10	<10	<10	<0.3
MW6-unf	08/14/03	NT	NT	NT	NT	NT	NT	NT	NT	NT	**50.2**	NT	NT	NT	NT	NT	NT	NT
MW6-f	08/14/03	NT	NT	NT	NT	NT	NT	NT	NT	NT	**45.7**	NT	NT	NT	NT	NT	NT	NT
MW6-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	**26.4**	NT	NT	NT	NT	NT	NT	NT
MW6-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	**28.4**	NT	NT	NT	NT	NT	NT	NT
MW7-unf	08/14/03	NT	NT	NT	NT	NT	NT	NT	NT	NT	**173**	NT	NT	NT	NT	NT	NT	NT

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TABLE 3
SUMMARY OF GROUNDWATER SAMPLING RESULTS
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

		CONTAMINANTS OF CONCERN																
ANALYTICAL METHOD		6210D/602								610	6010B							7470
CONTAMINANT OF CONCERN ->		BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	MTBE	DIPE	NAPHTHALENE	TRICHLOROFLUOROMETHANE	NAPHTHALENE	ARSENIC	BARIUM	CADMIUM	CHROMIUM	LEAD	SELENIUM	SILVER	MERCURY
WELL ID	DATE COLLECTED																	
15A NCAC 2L STANDARD		1	1,000	29	530	200	70	21	2,100	21	10	2,000	5	50	15	50	18	1.1
MW7-f	08/14/03	NT	NT	NT	NT	NT	NT	NT	NT	NT	**140**	NT	NT	NT	NT	NT	NT	NT
MW7-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	**152**	NT	NT	NT	NT	NT	NT	NT
MW7-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	**155**	NT	NT	NT	NT	NT	NT	NT
MW8-f	01/20/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT
MW8-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
MW8-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
MW9-f	01/20/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT
MW9-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	**11.4**	NT	NT	NT	NT	NT	NT	NT
MW9-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	**10.1**	NT	NT	NT	NT	NT	NT	NT
MW10-f	01/20/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT
MW11-unf	04/16/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	5.54	NT	NT	NT	NT
MW11-f	04/16/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT
MW11-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
MW11-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
MW12-unf	04/16/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	1.96	NT	NT	NT	NT
MW12-f	04/16/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT
MW12-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
MW12-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
DMW1-unf	05/24/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT
DMW1-f	05/24/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT
DMW1-unf	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT
DMW1-f	02/09/05	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10.0	NT	NT	NT	NT	NT	NT	NT

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TABLE 3
SUMMARY OF GROUNDWATER SAMPLING RESULTS
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

		CONTAMINANTS OF CONCERN																
ANALYTICAL METHOD		6210D/602								610	6010B							7470
CONTAMINANT OF CONCERN ->		BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	MTBE	DIPE	NAPHTHALENE	TRICHLOROFLUOROMETHANE	NAPHTHALENE	ARSENIC	BARIUM	CADMIUM	CHROMIUM	LEAD	SELENIUM	SILVER	MERCURY
WELL ID	DATE COLLECTED																	
15A NCAC 2L STANDARD		1	1,000	29	530	200	70	21	2,100	21	10	2,000	5	50	15	50	18	1.1
DMW2-unf	05/24/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT
DMW2-f	05/24/04	NT	NT	NT	NT	NT	NT	NT	NT	NT	<10	NT	NT	<10	NT	NT	NT	NT

Notes:

1. Results reported in micrograms per liter (µg/L) unless otherwise noted
2. Unf/f represents unfiltered and filtered samples
3. 15A NCAC 2L standards includes interim groundwater standards
4. Bold represents an exceedance of 15A NCAC 2L standard
5. < represents below laboratory detection limit
6. NT represents not tested/not analyzed
7. MTBE represents methyl tertiary butyl ether
8. DIPE represents diisopropyl ether

THE CLARK GROUP

TABLE 4
SUMMARY OF SELECTED GROUNDWATER LABORATORY PARAMETERS
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

WELL NO.	SAMPLE DATE	NITRATE	SULFATE	TOTAL IRON	FERROUS IRON	FERRIC IRON	TOTAL ORGANIC CARBON	ALKALINITY	pH (SU)
MW1	10/02/02	2.72	NT	NT	NT	NT	NT	NT	NT
MW2	10/02/02	6.18	NT	NT	NT	NT	NT	NT	NT
MW2	02/09/05	NT	242	0.210	<0.200	0.210	6.9	132	NT
MW3	10/02/02	0.73	NT	NT	NT	NT	NT	NT	NT
MW3	02/09/05	NT	67	0.106	<0.200	<0.200	6.0	28	NT
MW4	10/02/02	1.70	NT	NT	NT	NT	NT	NT	NT
MW5	10/02/02	0.22	NT	NT	NT	NT	NT	NT	NT
MW6	02/09/05	NT	48	0.635	<0.200	0.635	3.9	22	NT
MW7	02/09/05	NT	187	0.226	<0.200	0.226	8.0	36	NT
MW8-f	01/20/04	NT	NT	NT	NT	NT	NT	NT	6.27
MW8	02/09/05	NT	32	0.138	<0.200	<0.200	5.1	152	NT
MW9-f	01/20/04	NT	NT	NT	NT	NT	NT	NT	4.23
MW9	02/09/05	NT	230	0.259	<0.200	0.259	6.4	36	NT
MW10-f	01/20/04	NT	NT	NT	NT	NT	NT	NT	5.46
MW11	02/09/05	NT	32	2.60	<0.200	2.60	6.7	<2.0	NT
MW12	02/09/05	NT	30	0.397	<0.200	0.397	4.7	<2.0	NT
DMW1	02/09/05	NT	30	0.734	<0.200	0.734	3.2	4	NT

Notes:
1. Units are milligrams per liter (mg/L) unless otherwise stated
2. SU represents standard units
3. NT represents not tested/not analyzed

TABLE 5
SUMMARY OF SELECTED GROUNDWATER FIELD PARAMETERS
WETSIG YACHTS FACILITY
INCIDENT NO. PENDING, CES PROJECT NO. 02106

WELL NO.	SAMPLE DATE	REDOX POTENTIAL (mV)	pH (Std. Units)	DISSOLVED OXYGEN (mg/L)	TEMPERATURE (°C)	CONDUCTIVITY (µmhos)	TURBIDITY (0-4)	TOTAL IRON (ppm)	SALINITY (‰)
MW1	10/02/02	NM	8.2	1.97	24.3	308	NM	NM	NM
MW1	04/16/04	152	NM	1.01	17.0	215	1	1	0.2
MW2	10/02/02	NM	7.4	1.06	23.9	283	NM	NM	NM
MW2	04/16/04	147	NM	0.91	16.7	313	0	0	0.2
MW2	02/09/05	175	6.1	3.58	17.0	600	NM	NM	NM
MW3	10/02/02	NM	8.2	1.26	25.2	343	NM	NM	NM
MW3	04/16/04	122	5.1	1.18	18.8	186	0	2	0.2
MW3	02/09/05	154	5.6	4.78	17.1	250	NM	NM	NM
MW4	10/02/02	NM	9.1	2.07	24.5	252	NM	NM	NM
MW4	04/16/04	202	NM	2.35	16.9	191	0	10	0.3
MW5	10/02/02	NM	9.5	3.13	24.0	161	NM	NM	NM
MW5	04/16/04	212	NM	2.98	17.1	152	0	8	0.2
MW6	08/14/03	NM	5.8	4.31	30.0	840	NM	NM	NM
MW6	04/16/04	152	4.7	1.35	18.0	178	0	4	0.2
MW6	02/09/05	175	5.1	6.16	17.7	210	NM	NM	NM
MW7	08/14/03	NM	6.0	6.08	25.5	800	NM	NM	NM
MW7	04/16/04	121	5.3	1.20	19.9	580	3	4	0.5
MW7	02/09/05	162	5.3	5.67	18.0	432	NM	NM	NM
MW8	04/16/04	96	6.5	4.03	17.9	265	0	>10	0.4
MW8	02/09/05	128	6.9	7.02	16.5	283	NM	NM	NM
MW9	04/16/04	183	4.5	3.17	17.8	247	0	6	0.2
MW9	02/09/05	159	5.4	4.05	16.8	280	NM	NM	NM
MW10	04/16/04	168	5.1	2.42	17.8	131	0	6	0.2
MW11	04/16/04	147	3.9	2.25	18.2	222	1	10	0.1
MW11	02/09/05	246	4.3	6.00	15.2	100	NM	NM	NM
MW12	04/16/04	177	3.8	2.40	17.9	330	1	10	0.3
MW12	02/09/05	209	4.6	7.07	15.4	205	NM	NM	NM
DMW1	05/24/04	67	6.8	2.95	24.6	130	23.1*	3	0
DMW1	02/09/05	116	7.1	3.72	20.2	142	NM	NM	NM
DMW2	05/24/04	163	5.1	2.28	25.6	320	15.7*	0.02	0

Notes:

1. Turbidiity scale: 0-None, 1-Faint, 2-Moderate, 3-Moderately Strong, 4-Strong
2. Redox represents oxidation reduction
3. mV represents millivolts
4. ‰ represents parts per thousand
5. µmhos represents micromhos
6. mg/L represents milligrams per liter
7. ppm represents parts per million
8. °C represents degrees Celsius
9. Std. Units represents standard units
10. NM represents not measured
11. * measurements taken using a turbidity meter and reported in nephelometric turbidity units (NTUs)

FIGURES

APPENDICES

APPENDIX I

RELEVANT CORRESPONDENCE

Michael F. Easley, Governor
William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director
Division of Water Quality

November 30, 2004

Branch Bank and Trust (BB&T)
Mr. John Rybak, Environmental Risk Manager
5130 Parkway Plaza Blvd.
Charlotte, NC 28217

Subject: Comprehensive Site Assessment Report
Wetsig Yacht Site
Wilmington, New Hanover County

Dear Mr. Rybak:

On November 16, 2004, the Division of Water Quality (the Division) received a Comprehensive Site Assessment Report for the Wetsig Yacht property in Wilmington, North Carolina, which was prepared for BB&T by Clark Environmental Services, PC. Thank you very much for providing us with this report. This report is a follow-up to preliminary groundwater sampling results performed at the site which indicated rsenic contamination in groundwater.

The assessment included the construction and sampling of seven new monitoring wells, which provide a complete delineation of the vertical and horizontal extent of the arsenic contamination in groundwater. The results of this work did not find any additional arsenic contamination in groundwater beyond that found in the initial study submitted to this office approximately a year ago. The assessment information indicates that the arsenic contamination is very localized and restricted to the tracks area immediately adjacent to the former warehouse referred to as "Building A."

The report also a provides a summary of soil analyses for the site which indicate residual arsenic slightly in excess of standards established by the Division of Waste Management at two locations and residual chromium in soils slightly in excess of standards established by the Division of Water Quality at one location.

At this time there is no party who can be held responsible for the conditions described above, which are not serious or threatening, but still would require performance of some corrective action by a responsible party should that party be identified. Thus, as I have stated in previous correspondence, any future purchaser of the property with prior knowledge of the existing contamination at the property will assume responsibility for regulatory requirements related to that known contamination.

Presumably, your interest in this property involves a real estate transaction. With the complete delineations of soil and groundwater contamination, the appropriate continuation activity that would minimize the liability of any future purchaser would be design and implementation of the Corrective Action plan which is referenced in your consultants November 16, 2004 correspondence.

Please advise this office of your decision to proceed with a corrective action. Should you have questions regarding this letter, please call me at the Wilmington office of the Division of Water Quality at (910) 395-3900 ext. 242.

Yours very truly,

Charles F. Stehman Ph.D., P.G.
Environmental Regional Supervisor

CFS/
cc: WiRO-GWS
BB&T, Mr. Sonny Wall
Ms. Joanne Shadroui, Clark Environmental Services, P.C.
Ms. Charlotte Jesnick, Inactive Hazardous Sites Branch

S:\GWS\cfs\ Wetsig Yacht Facility.Nov04

APPENDIX II

SAMPLING RECORDS, LABORATORY RESULTS AND CHAIN OF CUSTODY FORMS

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	MW2
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	10:50
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	12.00
D	DEPTH TO LIQUID (MEASURED FEET)	8.62
E	TOTAL LIQUID FEET IN WELL (C-D)	3.38
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	1.65
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	2.00

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611
10.00	4.080
12.00	5.876
18.00	13.220
24.00	23.502
36.00	52.880

COMMENTS: None

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	MW3
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	14:25
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	12.00
D	DEPTH TO LIQUID (MEASURED FEET)	7.99
E	TOTAL LIQUID FEET IN WELL (C-D)	4.01
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	1.96
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	2.00

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611
10.00	4.080
12.00	5.876
18.00	13.220
24.00	23.502
36.00	52.880

COMMENTS: None

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	MW6
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	15:05
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	11.50
D	DEPTH TO LIQUID (MEASURED FEET)	8.07
E	TOTAL LIQUID FEET IN WELL (C-D)	3.43
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	1.68
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	1.75

PARAMETER	READING
pH	5.8
SPECIFIC CONDUCTIVITY (mS)	840
WATER TEMPERATURE (°C)	30
DISSOLVED OXYGEN (mg/L)	4.31

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611
10.00	4.080
12.00	5.876
18.00	13.220
24.00	23.502

COMMENTS: None

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	MW7
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	13:50
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	11.50
D	DEPTH TO LIQUID (MEASURED FEET)	7.77
E	TOTAL LIQUID FEET IN WELL (C-D)	3.73
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	1.82
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	2.00

PARAMETER	READING
pH	6.0
SPECIFIC CONDUCTIVITY (mS)	800
WATER TEMPERATURE (°C)	25.5
DISSOLVED OXYGEN (mg/L)	6.08

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611
10.00	4.080
12.00	5.876
18.00	13.220
24.00	23.502

COMMENTS: None

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	MW8
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	11:35
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	12.00
D	DEPTH TO LIQUID (MEASURED FEET)	7.63
E	TOTAL LIQUID FEET IN WELL (C-D)	4.37
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	2.14
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	2.50

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611
10.00	4.080
12.00	5.876
18.00	13.220
24.00	23.502
36.00	52.880

COMMENTS: None

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	MW9
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	15:30
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	12.00
D	DEPTH TO LIQUID (MEASURED FEET)	8.05
E	TOTAL LIQUID FEET IN WELL (C-D)	3.95
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	1.93
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	2.00

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611
10.00	4.080
12.00	5.876
18.00	13.220
24.00	23.502
36.00	52.880

COMMENTS: None

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	MW11
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	16:55
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	11.50
D	DEPTH TO LIQUID (MEASURED FEET)	5.99
E	TOTAL LIQUID FEET IN WELL (C-D)	5.51
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	2.69
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	2.75

PARAMETER	READING
pH	3.9
SALINITY (‰)	0.1
IRON (mg/L)	10
SPECIFIC CONDUCTIVITY (mS)	222
WATER TEMPERATURE (°C)	18.2
DISSOLVED OXYGEN (mg/L)	2.25
REDOX POTENTIAL (mV)	147

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611
10.00	4.080

COMMENTS: None

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	MW12
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	16:05
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	11.50
D	DEPTH TO LIQUID (MEASURED FEET)	4.72
E	TOTAL LIQUID FEET IN WELL (C-D)	6.78
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	3.32
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	3.30

PARAMETER	READING
pH	3.8
SALINITY (‰)	0.3
IRON (mg/L)	10
SPECIFIC CONDUCTIVITY (mS)	330
WATER TEMPERATURE (°C)	17.9
DISSOLVED OXYGEN (mg/L)	2.4
REDOX POTENTIAL (mV)	177

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611
10.00	4.080

COMMENTS: None

CLARK ENVIRONMENTAL SERVICES, P.C.
GROUNDWATER WELL SAMPLING RECORD

PROJECT NAME:	Wetsig Yachts	WELL NO.:	DMW1
LOCATION:	4022 Market St., Wilmington, NC	DATE:	02/09/05
CES PROJECT NO.:	02106	TIME:	13:15
PERSONNEL:	F. Beecher, P. Richter	WEATHER:	Cloudy, 65°

A	WELL DIAMETER (INCHES MEASURED)	2
B	GALLONS/FOOT	0.163
C	TOTAL WELL DEPTH (MEASURED FEET)	32.00
D	DEPTH TO LIQUID (MEASURED FEET)	8.12
E	TOTAL LIQUID FEET IN WELL (C-D)	23.88
F	NO. WELL VOLUMES DESIRED (SITE SPECIFIC, USUALLY 3)	3
G	TOTAL GALLONS TO PURGE (B x E x F)	11.68
H	PURGING METHOD (BAILER OR PUMP TYPE)	PUMP
I	BAILER VOLUME (MEASURED/CALCULATED)	
J	NO. BAILS REQUIRED (G ÷ I,IF BAILED)	
K	NO. BAILS TAKEN (COUNTED)	
L	GALLONS PURGED (MEASURED/CALCULATED)	12.00

PARAMETER	READING
pH	6.8
SALINITY (‰)	0
IRON (mg/L)	3
TURBIDITY (Ntu)	23.1
SPECIFIC CONDUCTIVITY (mS)	130
WATER TEMPERATURE (°C)	24.6
DISSOLVED OXYGEN (mg/L)	2.95
REDOX POTENTIAL (mV)	67

PER FOOT WELL VOLUMES	
WELL DIAMETER (IN INCHES)	GALLONS (PER FOOT)
1.00	0.041
1.25	0.064
1.50	0.092
2.00	0.163
4.00	0.653
6.00	1.469
8.00	2.611

COMMENTS: None

PARADIGM ANALYTICAL LABORATORIES, INC.
5500 Business Drive
Wilmington, North Carolina 28405
(910) 350-1903
Fax (910) 350-1557

Ms. Ginny Henderson
Clark Environmental
PO Box 10136
Wilmington NC 28405

Report Number: G211-1782

Client Project: Wetsig 02106

Dear Ms. Henderson:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,
Paradigm Analytical Laboratories, Inc.

2/22/05

Laboratory Director Date
J. Patrick Weaver

N.C. Certification #481 S.C. Certification #99029

Analytical Results

Client Sample ID:	MW2	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-1	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	**132**	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**242**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**6.9**	0.5	mg/L	SM5310-B	2/16/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: AF

Analytical Results

Client Sample ID:	MW3	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-3	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	**28**	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**67**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**6.0**	0.5	mg/L	SM5310-B	2/16/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: JF

Analytical Results

Client Sample ID:	MW6	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-5	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	**22**	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**48**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**3.9**	0.5	mg/L	SM5310-B	2/16/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: JF

Analytical Results

Client Sample ID:	MW7	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-7	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	**36**	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**187**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**8.0**	0.5	mg/L	SM5310-B	2/16/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: AF

Analytical Results

Client Sample ID:	MW8	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-9	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	**152**	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**32**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**5.1**	0.5	mg/L	SM5310-B	2/16/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: AF

Analytical Results

Client Sample ID:	MW9	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-11	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	**36**	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**230**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**6.4**	0.5	mg/L	SM5310-B	2/17/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: AF

Analytical Results

Client Sample ID:	MW11	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-13	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	BQL	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**32**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**6.7**	0.5	mg/L	SM5310-B	2/17/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: AF

Analytical Results

Client Sample ID:	MW12	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-15	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	BQL	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**30**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**4.7**	0.5	mg/L	SM5310-B	2/17/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: JF

Analytical Results

Client Sample ID:	DMW1	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-17	Matrix:	Water
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
Alkalinity	**4**	2.0	mg/L	310.1	2/14/05	EnviroChem
Sulfate	**30**	5	mg/L	375.4	2/16/05	EnviroChem
TOC	**3.2**	0.5	mg/L	SM5310-B	2/17/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Reviewed By: AT

Results for Metals

Client Sample ID:	MW2	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 10:50
Lab Sample ID:	G211-1782-1	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05
Iron	**0.210**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: AF

Results for Metals

Client Sample ID:	MW3	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 14:25
Lab Sample ID:	G211-1782-3	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	**0.0428**	0.0100	10	MG/L	6020	2/21/05
Iron	**0.106**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: AF

Results for Metals

Client Sample ID:	MW6	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 15:05
Lab Sample ID:	G211-1782-5	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	**0.0264**	0.0100	10	MG/L	6020	2/21/05
Iron	**0.635**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By:

Results for Metals

Client Sample ID:	MW7	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 13:50
Lab Sample ID:	G211-1782-7	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	**0.152**	0.0100	10	MG/L	6020	2/21/05
Iron	**0.226**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: AF

Results for Metals

Client Sample ID:	MW8	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 11:35
Lab Sample ID:	G211-1782-9	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05
Iron	**0.138**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: AF

Results for Metals

Client Sample ID:	MW9	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 15:30
Lab Sample ID:	G211-1782-11	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	**0.0114**	0.0100	10	MG/L	6020	2/21/05
Iron	**0.259**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: AJF

Results for Metals

Client Sample ID:	MW11	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 16:55
Lab Sample ID:	G211-1782-13	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05
Iron	**2.60**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By:

Results for Metals

Client Sample ID:	MW12	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 16:05
Lab Sample ID:	G211-1782-15	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05
Iron	**0.397**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By:

Results for Metals

Client Sample ID:	DMW1	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 13:15
Lab Sample ID:	G211-1782-17	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05
Iron	**0.734**	0.100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By:

Results for Metals

Client Sample ID:	SB30	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 12:30
Lab Sample ID:	G211-1782-19	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	SOIL
Batch ID:	2362	Solids	85.80
Report Basis:	Dry		

Metals	Result	RL	DF	Units	Method	Date Analyzed
Iron	**2820**	11.0	10	MG/KG	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By:

Results for Metals

Client Sample ID:	MW2	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 10:50
Lab Sample ID:	G211-1782-1_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	**0.210**	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By: AF

Results for Metals

Client Sample ID:	MW3	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 14:25
Lab Sample ID:	G211-1782-3_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	BQL	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By: AF

Results for Metals

Client Sample ID:	MW6	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 15:05
Lab Sample ID:	G211-1782-5_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	**0.635**	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By: AF

Results for Metals

Client Sample ID:	MW7	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 13:50
Lab Sample ID:	G211-1782-7_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	**0.226**	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By: AF

Results for Metals

Client Sample ID:	MW8	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 11:35
Lab Sample ID:	G211-1782-9_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	BQL	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By:

Results for Metals

Client Sample ID:	MW9	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 15:30
Lab Sample ID:	G211-1782-11_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	**0.259**	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By: AFF

Results for Metals

Client Sample ID:	MW11	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 16:55
Lab Sample ID:	G211-1782-13_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	**2.60**	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By: JF

Results for Metals

Client Sample ID:	MW12	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 16:05
Lab Sample ID:	G211-1782-15_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	**0.397**	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By: AF

Results for Metals

Client Sample ID:	DMW1	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 13:15
Lab Sample ID:	G211-1782-17_	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	Water

Metals	Result	Report Limit	DF	Units	Method	Date Analyzed
Ferrous Iron	BQL	0.200	1	MG/L	SM3500-Fe	2/22/05
Ferric Iron	**0.734**	0.200	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor

Reviewed By:

Results for Metals

Client Sample ID:	MW2 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 10:50
Lab Sample ID:	G211-1782-2	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: JF

Results for Metals

Client Sample ID:	MW3 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 14:25
Lab Sample ID:	G211-1782-4	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	**0.0412**	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: GF

Results for Metals

Client Sample ID:	MW6 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 15:05
Lab Sample ID:	G211-1782-6	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	**0.0284**	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By:

Results for Metals

Client Sample ID:	MW7 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 13:50
Lab Sample ID:	G211-1782-8	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	**0.155**	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: AF

Results for Metals

Client Sample ID:	MW8 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 11:35
Lab Sample ID:	G211-1782-10	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: _____

Results for Metals

Client Sample ID:	MW9 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 15:30
Lab Sample ID:	G211-1782-12	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	**0.0101**	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: AF

Results for Metals

Client Sample ID:	MW11 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 16:55
Lab Sample ID:	G211-1782-14	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By:

Results for Metals

Client Sample ID:	MW12 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 16:05
Lab Sample ID:	G211-1782-16	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By:

Results for Metals

Client Sample ID:	DMW1 (dissolved)	Analyzed By:	RML
Client Project ID:	Wetsig 02106	Date Collected:	2/9/2005 13:15
Lab Sample ID:	G211-1782-18	Date Received:	2/10/05
Lab Project ID:	G211-1782	Matrix:	WATER
Batch ID:	2374		

Metals Dissolved	Result	RL	DF	Units	Method	Date Analyzed
Arsenic	BQL	0.0100	10	MG/L	6020	2/21/05

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
J = Between MDL and RL

Reviewed By: AF

Analytical Results

Client Sample ID:	SB30	Date Collected:	2/9/05
Client Project ID:	Wetsig 02106	Date Received:	2/10/05
Lab Sample ID:	G211-1782-19	Matrix:	Soil
Lab Project ID:	G211-1782		

Analyte	Result	RL	Units	Method	Date Analyzed	Analyst
TOC	BQL	3520	mg/kg	SM 5310 B	2/17/05	EnviroChem

Comments
BQL = Below Quantitation Limits
DF = Dilution Factor
RL = Report Limit

Samples reported on dry weight basis.
MDL and PQL adjusted for dry weights.

Reviewed By: _____

List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation Limit

DF = Dilution Factor

Dup = Duplicate

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% soilds = Percent Solids

Special Notes:

1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.

2) Uncertainty for all reported data is less than or equal to 30 percent.

MI34.011404.1

PARADIGM ANALYTICAL LABORATORIES, INC.
5500 Business Drive, Wilmington, NC 28405
Phone: (910)-350-1903 FAX: (910)-350-1557

Chain-of Custody Record & Analytical Request

COC# 50293
Page 1 **of** 1

Client: CES
Address: Wilmington, NC
Address:
Quote #:

Project ID: Wetsig 02106
Contact: Ginny
Phone: 602-3900
Fax: 602-3975

Date: 2-10-05
Turnaround: Standard
Job Number:
P.O. Number: 02106-030

Report To:
Invoice To:

Sample ID	Date	Time	Matrix	Preservatives: HNO_3	H_2SO_4	Ice		Analyses: Arsenic Filtered	Arsenic Unfiltered	Sulfide	Total Iron	Ferric + Ferrous Iron	TOC	Alkalinity				Comments: Please specify any special reporting requirements
																		Please include narrative
MW2	2-9-05	10:50	Water					X	X	X	X	X	X	X				Also please report Fe^{+3}
MW3		2:25																concentration in addi-
MW6		3:05																tion to total + Fe^{+2}
MW7		1:50																Thanks
MW8		11:35																Will filter the As
MW9		3:30																unpreserved in the
MW11		4:55																lab.
MW12		4:05																
DMW1		1:15																G211-1782
SB30		12:30	Soil															

Relinquished By	Date	Time	Received By	Date	Time	Temperature	State Certification Requested
Frank Beecher	2-10-05	0935	Julie Ferrer	2/10/05	0935	on ice 0.3 0.6°C	NC X SC ____ Other ____

SEE REVERSE FOR TERMS AND CONDITIONS

ORIGINAL

PARADIGM ANALYTICAL LABORATORIES, INC.

N.C. Certification #481 S.C. Certification #99029

APPENDIX III

TRANSPORT CALCULATIONS

PROJECT: Wetsig Yachts, Wilmington, NC CES Project No. 02106 COMPUTED BY: G. Henderson DATE: 2-17-05

SHEET 1 OF 1 CHECKED BY: S. [illegible] DATE: 3/14/05

DESCRIPTION: Maximum Migration Extent Calculation

Velocity of Groundwater in Shallow Zone: (from CSA)

$V_S = 8.77 \times 10^{-4}$ ft/day

Length of Time Contamination Present in Source Zone:

$t \approx 100$ yrs

$$Max = V_S \times t = 8.77 \times 10^{-4} \text{ ft/day} \times 365 \text{ days/yr} \times 100 \text{ yrs}$$

$$= \boxed{32.01 \text{ ft}}$$

APPENDIX IV

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REFERENCES

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