Town of Surfside
Special Town Commission Meeting
AGENDA
February 12, 2015
7 p.m.
Town Hall Commission Chambers - 9293 Harding Ave, 2nd Floor
Surfside, FL 33154

Rule 7.05 Decorum. Any person making impertinent or slanderous remarks or who becomes boisterous while addressing the commission shall be barred from further appearance before the commission by the presiding officer, unless permission to continue or again address the commission is granted by the majority vote of the commission members present. No clapping, applauding, heckling or verbal outbursts in support or opposition to a speaker or his or her remarks shall be permitted. Signs or placards may be disallowed in the commission chamber by the presiding officer. Persons exiting the commission chambers shall do so quietly.

1. **Opening**
   A. **Call to Order**
   B. **Roll Call of Members**
   C. **Pledge of Allegiance**

2. **Urging Resolution on Sand Chemical Testing** – Mayor Daniel Dietch

   A RESOLUTION OF THE TOWN OF SURFSIDE URGING THE STATE OF FLORIDA LEGISLATURE AND THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION ("FDEP") TO ESTABLISH CHEMICAL TESTING STANDARDS PRIOR TO ISSUING A COASTAL CONSTRUCTION CONTROL LINE PERMIT ("CCCL") WHICH AUTHORIZES THE TRANSFER AND PLACEMENT OF EXCAVATED SAND SEAWARD OF THE CCCL ONTO A PUBLIC BEACH; RECOMMENDING ADDITIONAL CHEMICAL TESTING STANDARDS; ENCOURAGING SUPPORT FROM PUBLIC OFFICIALS AND UNITS OF GOVERNMENT TO SUPPORT THIS INITIATIVE; PROVIDING DIRECTION TO THE TOWN CLERK; PROVIDING FOR INCORPORATION OF RECITALS; PROVIDING FOR AN EFFECTIVE DATE.

3. **Beach Sand Quality Ordinance** – Mayor Daniel Dietch

AN ORDINANCE OF THE TOWN COMMISSION OF THE TOWN OF SURFSIDE, FLORIDA AMENDING ARTICLE I OF CHAPTER 34 "ENVIRONMENT" AND SPECIFICALLY CREATING SECTIONS 34-2 to 34-8 "BEACH SAND QUALITY" OF THE TOWN OF SURFSIDE CODE OF ORDINANCES; AMENDING CHAPTER 14 "BUILDING" OF THE TOWN OF SURFSIDE CODE OF ORDINANCES AND SPECIFICALLY AMENDING SECTION 14-28 "ISSUANCE OF BUILDING PERMITS"; AMENDING CHAPTER 90 "ZONING" AND SPECIFICALLY SECTION 90.5 "COMPLIANCE WITH REGULATIONS"; PROVIDING FOR INCLUSION IN THE CODE; REPEALING ALL ORDINANCES OR PARTS OF ORDINANCES IN CONFLICT HEREWITH; AND PROVIDING FOR AN EFFECTIVE DATE.

4. **Sand Relocation Options** – Guillermo, Olmedillo, Town Manager

5. **Adjournment**

Respectfully submitted,

Guillermo Olmedillo
Town Manager

THIS MEETING IS OPEN TO THE PUBLIC. IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT OF 1990, ALL PERSONS THAT ARE DISABLED; WHO NEED SPECIAL ACCOMMODATIONS TO PARTICIPATE IN THIS MEETING BECAUSE OF THAT DISABILITY SHOULD CONTACT THE OFFICE OF THE TOWN CLERK AT 305-861-4863 EXT. 226 NO LATER THAN FOUR DAYS PRIOR TO SUCH PROCEEDING.

IN ACCORDANCE WITH THE PROVISIONS OF SECTION 286.0105, FLORIDA STATUTES, ANYONE WISHING TO APPEAL ANY DECISION MADE BY THE TOWN OF SURFSIDE COMMISSION, WITH RESPECT TO ANY MATTER CONSIDERED AT THIS MEETING OR HEARING, WILL NEED A RECORD OF THE PROCEEDINGS AND FOR SUCH PURPOSE, MAY NEED TO ENSURE THAT A VERBATIM RECORD OF THE PROCEEDINGS IS MADE WHICH RECORD SHALL INCLUDE THE TESTIMONY AND EVIDENCE UPON WHICH THE APPEAL IS TO BE BASED.

AGENDA ITEMS MAY BE VIEWED AT THE OFFICE OF THE TOWN CLERK, TOWN OF SURFSIDE

TOWN HALL, 9293 HARDING AVENUE. ANYONE WISHING TO OBTAIN A COPY OF ANY AGENDA ITEM SHOULD CONTACT THE TOWN CLERK AT 305-861-4863. A COMPLETE AGENDA PACKET IS ALSO AVAILABLE ON THE TOWN WEBSITE AT www.townofsurfsidefl.gov

TWO OR MORE MEMBERS OF OTHER TOWN BOARDS MAY ATTEND THIS MEETING.

THESE MEETINGS MAY BE CONDUCTED BY MEANS OF OR IN CONJUNCTION WITH COMMUNICATIONS MEDIA TECHNOLOGY, SPECIFICALLY, A TELEPHONE CONFERENCE CALL. THE LOCATION 9293 HARDING AVENUE, SURFSIDE, FL 33154, WHICH IS OPEN TO THE PUBLIC, SHALL SERVE AS AN ACCESS POINT FOR SUCH COMMUNICATION.

TOWN OF SURFSIDE DISCUSSION ITEM

Agenda #: 2
Agenda Date: February 12, 2015
From: Daniel Dietch, Mayor
Subject: Urging Resolution on Sand Chemical Testing

Objective: For the Town Commission to approve the resolution to urge the Florida Department of Environmental Protection (FDEP) to require chemical testing of excavated sand prior to issuing a Coastal Construction Control Line Permit ("CCCL").

Background: The Sand Project Community Monitoring Committee ("Committee") recommended that the Town Commission adopt an Urging Resolution which requests the State to adopt chemical testing standards and requirements for sand transferred/placed on the beach in Florida. At the September 11, 2014 Meeting, members of the Commission accepted the recommendations of the Committee, as amended, and requested that this resolution move forward.

Consideration: FDEP issues permits which authorize excavation and placement of sand seaward of the CCCL, pursuant to 161.053, *Florida Statutes.* FDEP defines "beach quality sand" as sand which is similar to the native beach sand in both coloration and grain size and is free of construction debris, rocks, clay or other foreign matter, pursuant to Rule 62B-33.002, F.A.C. FDEP does not require or conduct tests to determine if there is chemical contamination in the sand. FDEP is currently conducting workshops to update the CCCL permitting rule, Rule 62B-33, F.A.C., and is creating a CCCL Applicant's Handbook. For the protection of public health, safety and welfare, I urge the Town of Surfside to move forward with the Committee's recommendation to pass this resolution to urge FDEP and the State of Florida to conduct chemical testing of sand prior to placing it seaward of the CCCL, as well as urge municipalities, counties, and other interested parties throughout Florida to join in support of this resolution.

RESOLUTION NO. 15 - _____

A RESOLUTION OF THE TOWN OF SURFSIDE URGING THE STATE OF FLORIDA LEGISLATURE AND THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION ("FDEP") TO ESTABLISH CHEMICAL TESTING STANDARDS PRIOR TO ISSUING A COASTAL CONSTRUCTION CONTROL LINE PERMIT ("CCCL") WHICH AUTHORIZES THE TRANSFER AND PLACEMENT OF EXCAVATED SAND SEAWARD OF THE CCCL ONTO A PUBLIC BEACH; RECOMMENDING ADDITIONAL CHEMICAL TESTING STANDARDS; ENCOURAGING SUPPORT FROM PUBLIC OFFICIALS AND UNITS OF GOVERNMENT TO SUPPORT THIS INITIATIVE; PROVIDING DIRECTION TO THE TOWN CLERK; PROVIDING FOR INCORPORATION OF RECITALS; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Florida Department of Environmental Protection (FDEP) issues permits which authorize excavation and placement of sand seaward of the Coastal Construction Control Line (CCCL), pursuant to 161.053, *Florida Statutes*; and

WHEREAS, FDEP Permit No. DA-631-S undertook the excavation and completed transfer of sand onto the Town of Surfside beach from 96th Street to 88th Street prior to May 1, 2014; and

WHEREAS, community concerns were raised regarding the chemicals of concern contained in the transferred sand due to a portion of the sand being excavated beneath a site which was constructed over 75 years ago and continuously operated; and

WHEREAS, in compliance with FDEP rules, the sand was transferred and placed onto the beach in accordance with FDEP Permit No. DA-631-S without chemical analysis being performed on the sand transferred and placed on the beach; and

WHEREAS, FDEP guidelines state that sandy material excavated seaward of the CCCL or 50-foot setback shall be maintained on site seaward of the CCCL or 50-foot setback and shall be placed in the immediate area of construction unless otherwise specifically authorized by the Department, as provided by Rule 62B-33.005(6), F.A.C.; and

WHEREAS, FDEP defines beach quality sand as sand which is similar to the native beach sand in both coloration and grain size and is free of construction debris, rocks, clay or other foreign matter, pursuant to Rule 62B-33.002(8), F.A.C.; and

WHEREAS, FDEP is currently amending Rule 62B-33, F.A.C., Rules and Procedures for Coastal Construction and Excavation and is proposing the creation of a CCCL Applicant's Handbook; and

WHEREAS, the Town of Surfside participated in the FDEP Second Rule Workshop on February 12, 2015 to discuss the proposed amendments to Rule 62B-33, F.A.C. and creation of the CCCL Applicant's Handbook; and

WHEREAS, the cost of testing the excavated material is an inexpensive and minor cost consideration in conjunction with the overall cost of a development project east of the CCCL; and

WHEREAS, the Town Commission of the Town of Surfside created a Sand Project Community Monitoring Committee ("Community Monitoring Committee") in response to community concerns with activity associated with the activities conducted consistent with FDEP Permit No. DA-631; and

WHEREAS, a priority of the Town is to ensure the health, safety and welfare of the public while also seeking opportunities to preserve its beach to mitigate the impacts associated with climate change as well as to sustain this valuable resource as an economic development asset; and

WHEREAS, a priority of the Community Monitoring Committee was to address the chemical analysis of the sand to ensure the health, safety and welfare of the public; and

WHEREAS, the Town Commission, upon receiving concerns about the chemical composition of the transferred sand, immediately authorized retaining the services of an expert toxicologist (Dr. Christopher Teaf, President of Hazardous Substance and Waste Management Research, Inc. "HSWMR" and Member of the Faculty of Florida State University) to provide analysis of chemical testing results and to address health risks concerns raised by the residents of the Town of Surfside; and

WHEREAS, in addressing a priority of the Community Monitoring Committee, Dr. Teaf assisted the Committee in developing a recommended list of analytical categories that are not currently required under Rule 62B-33, F.A.C, with appropriate supplementary tests to be identified and implemented based upon the sand source site historical information:

- "RCRA 8" metals with extraction by USEPA Method 3050 and analysis by USEPA Method 6010 or 200.7 (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver). Data to be expressed in mg/kg.
- Total Recoverable Petroleum Hydrocarbons (TRPH) by Florida Department of Environmental Protection (FDEP) FL-PRO method. Data to be expressed in mg/kg.
- Chlorinated hydrocarbon pesticides by USEPA Method 8081, specifically aldrin, chlordane, dieldrin, endrin, heptachlor, and the DDT/DDD/DDE group. Data to be expressed in mg/kg.
- Polychlorinated biphenyls (PCBs) by USEPA Method 8082 (i.e., Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260). Data to be expressed in mg/kg.

- As an alternative approach, USEPA Method 8270 may be used to capture the analysis listed in both the third and fourth categories, though that method is capable of identifying a much larger universe of substances that the individual methods cited.
- If there is site-specific knowledge which suggests that assessment of the leaching potential for a particular sand source is warranted, the appropriate test method will be the Synthetic Precipitation Leaching Procedure (SPLP; USEPA Method 1312).
- Specific protocols and sample numbers should be developed on a site-specific basis, based upon discussions between Florida DEP and the entity that is proposing the beach renourishment. Chemical testing results shall be consistent with naturally occurring background levels.

WHEREAS, pursuant to the September 11, 2014 Final Report, the Community Monitoring Committee recommended to and accepted by the Town Commission that the Town support and move forward an Urging Resolution requesting a change in FDEP regulations regarding chemical testing of sand transfer onto the beach as part of a CCCL permit or similar permits issued by FDEP for placement of sand on a public beach urging the Florida Legislature and FDEP to amend the appropriate sections of the Florida Statues and rules and regulations of FDEP to require chemical testing of all sand placed east of the CCCL; and

WHEREAS, the Town of Surfside urges Members of the Miami-Dade County Delegation of State of Florida Legislators, the Board of County Commissioners of Miami-Dade County, Miami-Dade County Department of Regulatory and Economic Resources ("DERM"), all municipalities in Miami-Dade County, the Miami-Dade County League of Cities, the Florida League of Cities, and all other coastal municipalities and counties of Florida to support this resolution; and

NOW THEREFORE, BE IT RESOLVED BY THE TOWN COMMISSION OF THE TOWN OF SURFSIDE, FLORIDA, AS FOLLOWS:

Section 1. Recitals Adopted. That each of the above stated recitals are hereby adopted, confirmed, and incorporated herein.

Section 2. Support by the Town of Surfside Town Commission for Recommended Baseline Analytical Profile. The Town Commission strongly urges and recommends the FDEP require that minimum chemical testing standards are established by the State of Florida:

- "RCRA 8" metals with extraction by USEPA Method 3050 and analysis by USEPA Method 6010 or 200.7 (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver). Data to be expressed in mg/kg.

- Total Recoverable Petroleum Hydrocarbons (TRPH) by Florida Department of Environmental Protection (FDEP) FL-PRO method. Data to be expressed in mg/kg.
- Chlorinated hydrocarbon pesticides by USEPA Method 8081, specifically aldrin, chlordane, dieldrin, endrin, heptachlor, and the DDT/DDD/DDE group. Data to be expressed in mg/kg.
- Polychlorinated biphenyls (PCBs) by USEPA Method 8082 (i.e., Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260). Data to be expressed in mg/kg.
- As an alternative approach, USEPA Method 8270 may be used to capture the analysis listed in both the third and fourth categories, though that method is capable of identifying a much larger universe of substances that the individual methods cited.
- If there is site-specific knowledge which suggests that assessment of the leaching potential for a particular sand source is warranted, the appropriate test method will be the Synthetic Precipitation Leaching Procedure (SPLP; USEPA Method 1312).
- Specific protocols and sample numbers should be developed on a site-specific basis, based upon discussions between Florida DEP and the entity that is proposing the beach renourishment. Chemical testing results shall be consistent with naturally occurring background levels.

Section 3. Direction to Town Clerk. The Town Clerk is hereby directed to transmit a copy of this Urging Resolution to: the Governor of the State of Florida, the Secretary of the Florida Department of Environmental Protection, Members of the Miami-Dade County Delegation of State of Florida Legislators, the Board of County Commissioners of Miami-Dade County, Miami-Dade County Department of Regulatory and Economic Resources ("DERM"), all municipalities in Miami-Dade County, the Miami-Dade County League of Cities, and the Florida League of Cities.

Section 4. Implementation. The Town Manager is hereby authorized to take any and all action necessary to implement this Resolution.

Section 5. Effective Date. This Resolution shall become effective immediately upon its adoption.

PASSED AND ADOPTED this _____ day of _____, 2015.

Motion by _____,

Second by _____.

Motion by _____.

Second by _____.

FINAL VOTE ON ADOPTION:

Commissioner Barry Cohen ____
Commissioner Michael Karukin ____
Commissioner Marta Olchyk ____
Vice Mayor Eli Tourgeman ____
Mayor Daniel Dietch ____

_____
Daniel Dietch, Mayor

ATTEST:

_____
Sandra Novoa, Town Clerk

APPROVED AS TO FORM AND LEGAL SUFFICIENCY FOR THE TOWN OF SURFSIDE ONLY:

Linda Miller
Linda Miller, Town Attorney

TOWN OF SURFSIDE DISCUSSION ITEM

Agenda #: 3
Agenda Date: February 12, 2015
From: Daniel Dietch, Mayor
Subject: Beach Sand Quality Ordinance

Objective: For the Town Commission to approve the ordinance to require that sand excavated seaward of the Coastal Construction Control Line (CCCL) is chemically tested by protocols developed by the Town's subject matter experts, and that the sand excavated and placed seaward of the CCCL meets specific physical characteristics prior to placement above mean high water.

Background: At the January 13, 2015 meeting, the Town Commission directed the Office of the Town Attorney to develop Surfside specific regulations to address the physical and chemical characteristics of sand placed on the beach as part of coastal development projects. This policy direction is consistent with the recommendations of the Sand Project Community Monitoring Committee, as amended, which was accepted by the Town Commission. As part of drafting the proposed Beach Sand Quality Ordinance, the Town conducted a meeting with members of the public on January 21, 2015 to discuss the ordinance, and has also received input from the Town's experts, representatives from state, county and federal agencies.

Consideration: It is the State's responsibility to properly manage Florida's beaches, and to provide for beach restoration and nourishment projects to restore critically eroded beaches. Beachfront developers must submit a CCCL permit to FDEP for review prior to excavation or construction. If developers excavate sand east of the CCCL (which is located approximately midway between Collins Avenue and the ocean), the sand must be placed on site and/or on the beach, unless specifically authorized otherwise by the FDEP. The Town of Surfside has the authority to promulgate setbacks, building codes and zoning codes stricter than the State's requirements. The Beach Sand Quality Ordinance sets forth requirements for the physical characteristics and chemical composition of sand excavated east of the CCCL that exceed the current requirements of FDEP. Consistent with the proposed Beach Sand

Quality Ordinance the Developer must pay for the cost of the testing as well as the cost for the Town to conduct appropriate oversight over the sand transfer-related activities. The Ordinance creates Sections 34-2 to 34-8 in Chapter 34 "Environment," and amends Section 14-28 in Chapter 14 "Building" and Section 90.5 in Chapter 90 "Zoning."

ORDINANCE NO. 15 – _____

AN ORDINANCE OF THE TOWN COMMISSION OF THE TOWN OF SURFSIDE, FLORIDA AMENDING ARTICLE I OF CHAPTER 34 "ENVIRONMENT" AND SPECIFICALLY CREATING SECTIONS 34-2 to 34-8 "BEACH SAND QUALITY" OF THE TOWN OF SURFSIDE CODE OF ORDINANCES; AMENDING CHAPTER 14 "BUILDING" OF THE TOWN OF SURFSIDE CODE OF ORDINANCES AND SPECIFICALLY AMENDING SECTION 14-28 "ISSUANCE OF BUILDING PERMITS"; AMENDING CHAPTER 90 "ZONING" AND SPECIFICALLY SECTION 90.5 "COMPLIANCE WITH REGULATIONS"; PROVIDING FOR INCLUSION IN THE CODE; REPEALING ALL ORDINANCES OR PARTS OF ORDINANCES IN CONFLICT HEREWITH; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Florida Department of Environmental Protection (FDEP) issues permits which authorize excavation and placement of sand seaward of the Coastal Construction Control Line (CCCL), pursuant to 161.053, *Florida Statutes*; and

WHEREAS, the FDEP cannot contravene zoning or building codes established by a municipality which are equal to, or more strict than, those requirements provided in Section 161.053(4)(b), *Florida Statutes;* and

WHEREAS, FDEP requires that sandy material excavated seaward of the CCCL or 50-foot setback shall be maintained on site seaward of the CCCL or 50-foot setback and shall be placed in the immediate area of construction unless otherwise specifically authorized by the Department, as provided by Rule 62B-33.005(6), F.A.C.; and

WHEREAS, FDEP guidelines state that only beach compatible sand shall be placed on the beach; and

WHEREAS, FDEP defines beach quality sand as sand which is similar to the native beach sand in both coloration and grain size and is free of construction debris, rocks, clay or

other foreign matter, pursuant to Rule 62B-33.002(8), F.A.C.; and

WHEREAS, the Town Commission of the Town of Surfside established the Sand Project Community Monitoring Committee (Committee) in June 2014 to serve as a resource to the Town Administration as it addressed issues and concerns related to a recently completed sand transfer project, and to provide an opportunity for the community to be involved in an educational initiative pertaining to beach management and beach opportunities going forward; and

WHEREAS, to address health risk concerns raised by residents of the Town, the Town Commission retained the services of subject matter experts, including expert independent toxicologists to provide analysis and protocols for chemical testing of excavated sand, and to recommend sand criteria related to physical characteristics of excavated sand to be placed east of the CCCL; and

WHEREAS, the subject matter experts recommended a testing protocol that is more comprehensive than the FDEP's criteria for placement of excavated sand east of the CCCL; and

WHEREAS, the Town affirms its desire to protect the health of its residents and visitors by promulgating regulations that are more comprehensive than the requirements of FDEP for sand placed on the beach as a result of coastal construction, pursuant to Rule 62-41.007, F.A.C.; and

WHEREAS, through these regulations, the Town will require that sand excavated seaward of the CCCL is tested via a protocol developed by the subject matter experts, and that sand excavated and placed seaward of the CCCL meets certain physical characteristics prior to placement above mean high water; and

WHEREAS, sand to be excavated and placed seaward of the CCCL shall be in compliance with the Beach Sand Quality regulations prior to issuance of a building permit; and

WHEREAS, the Town will supervise an independent soil technician or inspector with knowledge of soil mechanics and earthwork operations under the direction of the Town's Building Department to collect the sand samples obtained from an applicant's site during the sifting and placement of excavated sand, who will also observe and report to the Town that the sand is clean and free of construction debris and other physical contamination; and

WHEREAS, the cost for compliance with the new beach sand quality requirements for applicants shall be incurred by the applicants. Applicants shall pay for the cost of the Town's collection of the sand samples from the Applicant, and Town's submission of the samples to a qualified, licensed and regulated lab that meets industry standards to test the excavated sand; as well as pay money through cost recovery to reimburse the Town's independent consultants and professionals to evaluate the sand quality testing results, with applicants charged for such services as established in Sec. 90-11 of the Town Code; and

WHEREAS, the Town Commission held its first public hearing regarding this Ordinance on February 12, 2015; and

WHEREAS, the Planning and Zoning Board, as the local planning agency for the Town, held its hearing on the proposed amendments on February 26, 2015 with due public notice and input; and

WHEREAS, the Town Commission shall have conducted a second duly noticed public hearing on this Ordinance as required by law on April 14, 2015.

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COMMISSION OF THE TOWN OF SURFSIDE, FLORIDA:

Section 1. Recitals. The foregoing "WHEREAS" clauses are ratified and confirmed as being true and correct and are made a specific part of this Ordinance.

Section 2. Code Amendment. The Code of Ordinances of the Town of Surfside, Florida is hereby amended to create Sections 34-2 through 34-8 to read as follows:

Section-34-2. Beach Sand Quality.

It is hereby declared and determined that preserving and enhancing the quality of the Town of Surfside's beaches is essential to serve and benefit the Town's residents and visitors. The chemical and physical composition of beach sand must not interfere with the health, safety or welfare of the public.

Section 34-3. Definitions.

Applicant: An individual, corporation or other authorized legal entity filing an application to FDEP for a permit that requires excavation of sand seaward of the Coastal Construction Control Line.

Beach nourishment: The maintenance of a restored beach by the replacement of sand to mitigate erosion, often referred to as "beach renourishment."

Beach restoration: The placement of sand on an eroded beach for the purposes of restoring it as a recreational beach and providing storm protection for upland properties.

Coastal Construction Control Line: A line established by the Florida Department of Environmental Protection that defines that portion of the beach-dune system which is subject to severe fluctuations based on a 100-year storm surge, storm waves, or other predictable weather conditions, as established pursuant to the provisions of Section 161.053, *Florida Statutes.*

Construction Debris: The material resulting from the demolition of a structure. Construction debris shall not include such material which has been sorted, cleaned and otherwise processed such that it meets the suitability criteria for armoring materials set forth under FDEP rules.

Contaminants: Any substance or matter that does not meet the criteria as enumerated in the testing protocols pursuant to Sec. 34-4 of the Code of Ordinances.

Dune: A mound, bluff or ridge of loose sediment, usually sand-sized sediment, lying upland of the beach and deposited by any natural or artificial mechanism, which may be bare or covered with vegetation and is subject to fluctuations in configuration and location.

Erosion Control Line: The line which represents the landward extent of the claims of the state in its capacity as sovereign titleholder of the submerged bottoms and shores of the Atlantic Ocean, the Gulf of Mexico, and the bays, lagoons and other tidal reaches thereof on the date of the recording of the survey as authorized by Florida law.

Excavated Sand: Naturally occurring material that is to be removed and placed pursuant to the Coastal Construction Control Line permit through the mechanical or manual removal or alteration of consolidated or unconsolidated soil or rock material from or within the beach and dune system, pursuant to Section 161.053, *Florida Statutes* and Rule 62B-33, F.A.C.

Hardpack: The sand road west of the Erosion Control Line used by public safety and other authorized vehicles, pursuant to Sec. 90-60.1(5) of the Town Code of Ordinances.

Mean High Water: The average height of the high waters over a 19-year period. For shorter periods of observation, "mean high water" means the average height of the high waters after corrections are applied to eliminate known variations and to reduce the result to the equivalent of a mean 19-year value. The mean high water line is the intersection of the tidal plane of mean high water with the shore.

Renourishment Sand: Replacement sand used for beach nourishment or beach restoration.

Sand: Material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system.

Seasonal High-Water Line: The line formed by the intersection of the rising shore and the elevation of 150 percent of the local mean tidal range above local mean high water.

Section 34-4. Testing protocols for the chemical composition of excavated sand seaward of the Coastal Construction Control Line.

Prior to placing excavated sand seaward of the Coastal Construction Control Line, the applicant must comply with testing pursuant to the "Testing Protocols for the chemical composition of excavated sand seaward of the Coastal Construction Control Line," as listed in Appendix A, and made a part of this Ordinance. These tests may be reassessed for periodic updates and review.

Appendix A

Testing Protocols for the Chemical Composition of Excavated Sand Seaward of the Coastal Construction Control Line

Pursuant to Section 34-4 of the Town Code of Ordinances, prior to placing excavated sand seaward of the Coastal Construction Control Line, the applicant must comply with the following protocols on the chemical composition of the excavated sand:

A. Provide to the Town proof of a Phase 1 Environmental Site Assessment on applicant's property and where practicable, applicant's adjacent property. This must be completed within one year prior to the application, and must be in compliance with applicable American Society of Testing and Materials standards. Applicant may also be required to conduct a Phase 2 Environmental Site Assessment based on results from the applicant's Phase 1 Environmental Site Assessment.

B. Applicant must comply with the following tests in (B)(1-5). Data to be expressed in mg/kg or in the relevant unit of measure.
   1. Resource Conservation and Recovery Act ("RCRA') 8 metals with extraction by United States Environmental Protection Agency ("USEPA") Method 3050 and analysis by USEPA Method 6010 or 200.7 (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).
   2. Total Recoverable Petroleum Hydrocarbons (TRPH) by Florida Department of Environmental Protection (FDEP) FL-PRO method.
   3. Chlorinated hydrocarbon pesticides by USEPA Method 8081, specifically aldrin, chlordane, dieldrin, endrin, heptachlor, and the DDT (dichlorodiphenyltrichloroethane)/DDD (dichlorodiphenyldichloroethane) /DDE (dichlorodiphenyldichloroethylene) group.
   4. Polychlorinated biphenyls (PCBs by USEPA Method 8082 (i.e. Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260).

   Alternatively, USEPA Method 8270 may be used to capture the analysis in the tests in the #3 and #4 categories. Data to be expressed in mg/kg. However, use of USEPA Method 8270 will involve reporting many more substances that the individual methods specified.

   5. If there is site specific knowledge from the applicant, Town, or FDEP which suggests that assessment of the leaching potential for a particular sand source is warranted, the

applicant must apply the Synthetic Precipitation Leaching Procedure (SPLP; USEPA Method 1312).

C. Location and Quantity of Samples: The applicant shall propose a sampling plan for excavated sand to be placed seaward of the Coastal Construction Control Line to comply with tests within (B). The applicant must provide adequate documentation to demonstrate that the location and quantity of samples is a fair and reasonable representation of the site. The Town's independent expert or designee must review the sampling plan and find it to be a fair and reasonable representation of the site.

D. Submission of Results: The Town's independent expert will approve the collection methodology and attest the samples were submitted to a certified analytical laboratory for analysis, with appropriate chain of custody documentation.

E. Evaluation of Results: The samples collected from the sampling plan will be compared to the Miami-Dade County DERM Residential Soil Cleanup Target Levels and to the Minimum Variable Unbiased Estimator (MVUE) value, if available, from the November 7, 2004 document entitled "Natural Background Soil Concentrations for the Barrier Islands of Miami-Dade County. The acceptable concentration will be the less restrictive of the two comparisons, with the exception of Arsenic. Arsenic levels shall be consistent with naturally occurring arsenic levels on the barrier island beaches in Miami-Dade County, based on a Minimum Variance Unbiased Estimate (MVUE) of 5.2 mg/kg and the upper tolerance level (95% limit) of 11.3 mg/kg. Any values above these limits are unacceptable unless reviewed and concurred by the Town's independent toxicologist for acceptability.

Appropriate Quality Assurance/Quality Control (QA/QC) procedures must be followed by the firm selected for the sampling, per the applicable FDEP standard protocols FDEP SOP FS 3000 Soil and FDEP SOP FQ 1000 Field Quality Control Requirements.

Section 34-5. Testing protocols for the physical composition of excavated sand seaward of the Coastal Construction Control Line.

Prior to placing excavated sand seaward of the Coastal Construction Control Line, the applicant must satisfy the requirements of "Criteria for Physical Composition of Sand excavated sand seaward of the Coastal Construction Control Line" as listed in Appendix B, and made a part of this Ordinance. These requirements may be reassessed for periodic updates and review.

Appendix B

Criteria for Physical Composition of Sand excavated sand seaward of the Coastal Construction Control Line

A. The following physical sand characteristic standards are required for excavated sand seaward of the Coastal Construction Control Line placed between the seasonal high water line to the limit of the seaward side of the dune.
   1. Munsell value of 6 or greater with a chroma of 3 or lower when wet.
   2. Mean grain size between 0.30 mm and 0.55 mm.
   3. Silt content less than 5% (passing a #230 sieve).
   4. No material greater than 5% retained on #4 sieve.
   5. Sand shall be free of construction debris or other foreign material.

B. The following protocols for sampling and analysis shall be employed:

   1. One core boring shall be analyzed for every 3,000 cubic yards of sand to be excavated, as reasonably available to implement on site.
   2. Sediment samples will be extracted from the core borings at irregular intervals based on distinct stratigraphic layers in the sediment sequence. Samples that are representative of the material defined within the area will be extracted and analyzed,
   3. Composite data will represent the average physical characteristics of the material to be placed.
   4. An average of the representative layer, weighted by effective length, will be calculated for each core, producing the core composite. The composites will then be averaged and weighted by effective length to calcite the composite of the entire sand source.

C. The composite of the source as a whole shall satisfy the aforementioned criteria for material to be deemed eligible for placement along the Town's beach.

Section 34-6. Charges for consulting services for beach sand quality testing

The cost for compliance with the Town's beach sand quality requirements shall be incurred by the applicant. Applicant shall pay the cost of the collection of the sand from the Applicant's site and the submission of the samples for tests to a qualified, licensed, and regulated lab that meets industry standards to test the sand; as well as pay money through cost recovery to pay for the Town's independent consultants and professionals to evaluate the sand quality testing results from the lab. Charges for consulting services for applicants are established in Section 90-11 of the Town Code of Ordinances, and shall apply to the beach sand quality testing required by Sections 34-4 and 34-5.

Section 34-7. Lack of compliance.

In the event that sand to be excavated seaward of the Coastal Construction Control Line does not meet the Town's standards as described herein, then the applicant may request from FDEP removal and relocation of the non-compliant sand in an approved upland area and must replace it

with an equal or greater volume of sand from an FDEP approved sand source, which will be subject to the same testing protocols as set forth herein.

Section 34-8. Exclusions.

Sections 34-2 to 34-7 do not apply to sand for beach nourishment or beach restoration projects authorized by Miami-Dade County, the State of Florida, or federal authorities.

Section 3. Code Amendment. The Code of Ordinances of the Town of Surfside, Florida Section 14-28 "Issuance of building permits" is amended to add paragraph (d) to read as follows:

Section 14-28. Issuance of building permits.

(d) Applications for building permits that require excavation of sand seaward of the Coastal Construction Control Line must comply with the Beach Sand Quality regulations as described in Sec. 34-2 to 34-8 of the Town Code of Ordinances.

Section 4. Code Amendment. The Code of Ordinances of the Town of Surfside, Florida Section 90.5 "Compliance with Regulations" is amended to add paragraph (12) to read as follows:

Section 90.5. Compliance with regulations.

(12) No building that requires a permit to place excavated sand seaward of the Coastal Construction Control Line shall be erected or moved unless applicant has complied with Sections 34-2 to 34-8 and Section 14-28 of the Town Code of Ordinances.

Section 5. Severability. If any section, subsection, clause or provision of this Ordinance is declared invalid or unconstitutional by a court of competent jurisdiction, the remainder shall not be affected by such invalidity.

Section 6. Conflict. All sections or parts of sections of the Town of Surfside Code of Ordinances in conflict herewith are intended to be repealed to the extent of such conflict.

Section 7. Inclusion in the Code of Ordinances. It is the intention of the Town Commission, and it is hereby ordained that the provisions of this Ordinance shall become and made

a part of the Town of Surfside Code of Ordinances, that the sections of this Ordinance may be renumbered or re-lettered to accomplish such intentions; and the word "ordinance" may be changed to "Section" or other appropriate word.

Section 8. Effective Date. This Ordinance shall be effective adoption on second reading.

_____
Daniel Dietch, Mayor

ATTEST:

_____
Sandra Novoa, CMC, Town Clerk

APPROVED AS TO FORM AND LEGALITY FOR THE USE AND BENEFIT OF THE TOWN OF SURFSIDE ONLY:

Linda Miller

Linda Miller, Town Attorney

PASSED and **ADOPTED** on first reading this ____ day of _____, 2015.

PASSED and **ADOPTED** on second reading this ____ day of _____, 2015.

VOTE ON ADOPTION:

Commissioner Barry R. Cohen	yes _____ no _____
Commissioner Michael Karukin	yes _____ no _____
Commissioner Marta Olchyk	yes _____ no _____
Vice Mayor Eli Tourgeman	yes _____ no _____
Mayor Daniel Dietch	yes _____ no _____

Town of Surfside
Commission Communication

Agenda Item: 4

From: Guillermo Olmedillo, Town Manager

Agenda Date: February 12, 2015

Subject: Sand Relocation Options

Background: The Manager's Report presented at the Town Commission meeting of January 13, 2015, included additional information on cost and specifications to carry out the recommended option of the Sand Project Community Monitoring Committee (SPCMC). (**Exhibits 1 and 2**).

At this meeting, the Town Commission agreed with the recommendation from a member of the former SPCMC to schedule a Special meeting for February 12, 2015 dedicated exclusively to sand issues.

There are three options available to determine the final location of the Surf Club Project excavated sand:

- Option 1 is to maintain the status quo.
- Option 2 is to move the layer of sand, approximately 18", and place it on top of the existing dunes, using the estimated cost and specifications presented by CB&I, as the basis to prepare an RFP.
- Option 3 is to place the sand on top of the existing dunes, however, using staff's cost estimate as the basis to prepare an RFP.

Further description is presented below for your consideration.

OPTION 1. Maintain the Present Status

- The subject sand has been tested and reports have been submitted by qualified experts certifying that the excavated sand meets all health safety and compatibility standards. (Attached is the series of reports that were prepared for that purpose **Exhibit 3**). Additionally, on February 5, 2015, we received a communication from Joseph Mark Higginbotham, MS, PhD. Deputy State Toxicologist, Bureau of Epidemiology, Division of Disease Control and Health Protection, Florida Department of Health, concluding that:

  "Based on the information I have (the Landscience, Inc. Soil Assessment Report, December 2014), the maximum lead concentration found in the sand samples (Table 1, CSS-4 = 5.24 mg/kg) is approximately 76 times below the Florida Department of Environmental Protection (FDEP) Soil Cleanup Target Level (SCTL). Even the most conservative, health protective scenario of residential use SCTL for Pb is set at 400 milligrams Pb per kilogram soil (or sand in this case). These SCTLs are based on protection of human health and are set conservatively low to protect human health." So, it is my opinion that this maximum level of Pb in the sand (5.4 mg/kg), would not pose a health risk to the public to any greater degree than the inherent risk of visiting the beach, even for sensitive sub-populations such as children or the elderly.

- And, Dr. Christopher Teaf in his January 22, 2015 e-mail to Interim Town Manager Di Censo and Assistant Town Attorney Graham concluded that:

  "*There is no contemporary data from the Surf Club with which to compare those results, but the maximum (9.8 mg/kg) is over 40 times less than the Florida DEP and the Miami-Dade County DERM default, health-protective soil criterion of 400 mg/kg. They also are quite representative of urban sands and soils from areas such as the Town of Surfside. No human health threat is or was posed by the lead concentration in those samples of the renourishment sand."*

- The Town will not incur any additional expenses.
- The sand is in place, after been sifted and turned.
- The relocation of the Surf Club project sand has been concluded pursuant to valid permits. (DA-631 conclusion to Letter of Assistance from FDEP).
- The Town retains the sand within its boundaries.

OPTION 2. Relocate the sand to the dunes using the CB&I construction estimate and specifications. (Exhibit 2)

- This is the recommended option of the Sand Project Community Monitoring Committee.

- The specifications include planting seedlings 18" on center; and no irrigation.
- The Town retains the sand within its boundaries.
- There are two potential sources of funding, General Fund Reserves or re-purposing a portion of the monetary contribution proffer contained in Condition 17 of the Development Order authorizing the development of the Surf Club Project. (Resolution 13-Z-06)
- Timing is an issue. In order to spend public funds the Town has to amend the present budget, since this line item is not included in it, apply for a permit with DEP/DERM, prepare and issue an RFP with the conditions contained in the permit, obtain bids and award the contract to the successful bidder. I do not believe that this can be accomplished prior to May 1, 2015. The physical movement of the sand will have to wait until November 2015. The estimated time is 4-6 months to be able to proceed with the physical transfer of sand.
- The Town will seek assistance to abbreviate the length of the process. During initial conversations with the Florida Department of Environmental Protection (FDEP) the Town was informed that the permittee may apply for a modification of the existing permit, saving a significant amount of time in the process.
- The footprint width of the area where the sand is located is approximately 2.4 times wider than the dune area width footprint. Therefore, the height of the existing dunes will be increased by approximately 40 inches, possibly blocking the ocean view from some existing pool decks and it will also deter survival of the existing vegetation.

OPTION 3. Move the sand to the dunes using staff's construction estimate and specifications that are based on our experience when a section of the dune area burned down. (Exhibit 1)

- The same funding issue, timing issue and the height of the dune issue remain as in the previous options.

Sand Placement Dune Restoration Estimate

Items	Description	Cost
Permit Fees	FDEP CCCL Program permit fees	$1,000.00
Permitting Consultant	Document preparation, plans and surveys	$30,000.00
Equipment Contract	Pushing sand into the dunes	$125, 000.00
Walking path	Rebuilding walking path surface, labor and materials	$45, 990.00
Walking path	Remove and replace posts and ropes, labor and materials	$30, 000.00
Dune vegetation	Plants and planting labor	$550,000.00
Dune irrigation	Dune irrigation	$45, 000.00
		$826, 990

** no contingencies, general conditions or mobilization costs are included
4400 lf of dune
220, 000 sf of dune

EXHIBIT 1

CB&I Environmental & Infrastructure, Inc.
2481 NW Boca Raton Blvd
Boca Raton, FL 33431
Tel: +1 561 391 8102
Fax: +1 561 391 9116
www.CBI.com

August 11, 2014

Michael Crotty
Town Manager
Town of Surfside
9293 Harding Avenue
Surfside, FL 33154

Subject: Opinion of Probable Construction Costs

Dear Mr. Crotty:

This letter is in response to your request to more fully describe and develop probable construction costs for the various options discussed during the Sand Project Community Monitoring meeting on August 5. These options included:

1. Tilling the beach.
2. Scraping the new sand off the beach and placing it in the dunes or street access areas.
3. Cover the Surf Club sand with more sand from an upland source.
4. Scrape, remove, and replace the Surf Club sand.
5. Scrape the Surf Club sand into the ocean.
6. Scrape the Surf Club sand and place it in Bal Harbor or City of Miami Beach.

These costs are based on similar projects put out to bid over the last 2 years in southeast Florida and the central east coast of Florida. The costs express an opinion of the probable construction cost should the Town put the work out to bid.

1. Tilling the Beach

Tilling the beach involves a dragging a beach tiller behind a bulldozer to mechanically mix the sand placed by the Surf Club with the pre-existing beach sand. A beach tiller is composed of numerous 3-foot long "teeth" that extend below the beach surface, which when dragged lifts and mixes the sand. This work would be performed only after the FDEP has determined that Surf Club has removed all non-beach compatible material (material greater than ¾") from the beach. This work would have to be performed outside of sea turtle nesting season. A current County permit allows beach tilling between November 1 and April 15. A similar construction window can be anticipated if the Town were to undertake this effort.

The benefit of beach tilling is that it will mix the Surf Club sand with the pre-existing sand, lightening the color of the sand by averaging the color of the darker new sand and whiter pre-existing sand. It is the least expensive option. Beach tilling will not address some residents concern about the overall quality of the material or completely address their color concerns. A Coastal Construction Control Line (CCCL) permit to allow tilling should be relatively easy to obtain.

We have observed unit costs for beach tilling as high as $4,400/acre to as low as $455/acre. Looking at the average for several projects, a probable construction cost to till the beach of $750/acre was applied. The beach acreage to be tilled is estimated at 6.5 acres, assuming tilling from the seaward edge of the dunes to mean high water and from 96th St to 87th Terrace. Thus, the cost for beach tilling is approximately $5,000.

2. Scraping the Surf Club sand off the beach and placing it in the dunes or street access areas.

Scraping the Surf Club sand off the beach and placing it in the dunes or street access areas seaward of the Coastal Construction Control Line (CCCL) would address some residents' concerns about the color of the beach. As with tilling (and all other alternatives), this work would have to be conducted outside of sea turtle nesting season and after FDEP determination that the Surf Club has removed all non-beach compatible material from the sand that they placed along the beach. It must be recognized that by November 1, it may be difficult to separate the Surf Club sand from the pre-existing sand due to natural mixing of material, especially if the Town is impacted by large wave events.

Given the limited sand offshore sand resources in southeast Florida, it is recommended that the Town retain as much sand as possible within the Town's boundaries. This alternative meets this objective. Placing the material within the dune system would improve storm damage protection.

The cost to scrape the beach and place it in the dunes is approximately $156,000. The breakdown of this cost is shown in Table 1. This alternative assumes that the existing dune vegetation is buried and must be replanted. It is assumed that a bulldozer will simply push material up the face of the beach and into the dune. Some excavation of the material, placement in trucks and hauling a short distance to the street ends is also included.

Table 1. Opinion of Probable Cost to Scrape the Beach and Place Sand in the Dune

Item	Quantity	Units	Unit Cost	Unit Total
Mobilization/Demobilization	1	LS	$25,000.00	$25,000.00
Scrape Sand into Dunes	10,000	cy	$1.50	$15,000.00
Load and Transport to Accesses	1,000	cy	$2.25	$2,250.00
Dune Vegetation	9.1	acres	$11,700.00	$106,470.00
Site Restoration	1	LS	$2,500.00	$2,500.00
Surveys	2	LS	$2,500.00	$5,000.00
Total				$156,220.00

The placement of sand in currently vegetated dunes could damage or destroy the existing dune vegetation. The concept of thin layers or "lifts" (4" to 12") was discussed as being a method to limit the impact to vegetation though it also limits the volume of sand that can be placed in the dunes. Constructing one lift in November and a second lift in March could allow vegetation to grow through the lift. However, there is not much guidance as to vegetation survivability verses the thickness of the lift. Normally, the material is placed in one lift event and followed by dune revegetation. However, a cost is provided in Table 2 for general comparison purposes.

Table 2. Opinion of Probable Cost to Scrape the Beach and Place Sand in the Dune in Two Lifts

Item	Quantity	Units	Unit Cost	Unit Total
Mobilization/Demobilization	2	LS	$25,000.00	$50,000.00
Scrape Sand into Dunes	10,000	cy	$4.75	$47,500.00
Load and Transport to Accesses	1,000	cy	$2.25	$2,250.00
Dune Vegetation	0.0	acres	$0.00	$0.00
Site Restoration	1	LS	$2,500.00	$2,500.00
Surveys	2	LS	$2,500.00	$5,000.00
Total				$107,250.00

The cost of revegetating the dune is based on costs for a contractor to perform similar work. A less expensive solution for revegetating the dunes can be to mobilize a group such as the Youth Environmental Alliance.

3. Cover the Surf Club sand with more sand from an upland source

Covering the Surf Club sand with more sand from an upland source that is lighter in color would resolve the immediate concerns. Over time, there will be mixing of the whiter upland sand with the sand that's on the beach, including the sand placed by the Surf Club. The white sand would gradually become darker as it mixes with the Surf Club sand though the final result will be a lighter color than currently exists on the beach. This approach has the added benefit of placing additional sand in the system, which provides greater storm damage protection.

The volume of sand that could be placed from an upland sand source may be limited by the remaining volume within the previously approved template. This approach assumes that the sand is placed above mean high water in order to limit the permitting effort. It is unlikely that a permit to place sand below mean high water could be obtained in time for material to be placed prior to May 2015.

The upland sand would be tested prior to placement on the beach to ensure that it meets both FDEP requirements for beach compatible material and the Town residents' color preference.

An accurate volumetric estimate of the fill volume that could be placed within the template was not available at this time. It was assumed that a 0.5-foot thick layer could be placed from the base of the dune down to the mean high water line (~50 feet) and along the length of the Town (~1 mile). This assumption provides an accommodation volume of approximately 5,000 cubic yards (6,750 tons).

There are several mines that can provide upland sand. When cost is not the primary concern, we recommend that the Ortona mine be used due to its bright color and physical characteristics. The Ortona mine is located approximately 120 driving miles from the Town. Locating a mine within 50 miles of the Town would significantly decrease the cost as the unit cost to transport one ton of sand one mile is $0.16. The cost to purchase and transport sand from the Ortona mine is shown in Table 3.

Table 3. Opinion of Probable Cost to Cover the Surf Club Sand with White Sand

Item	Quantity	Units	Unit Cost	Unit Total
Mobilization/Demobilization	1	LS	$75,000.00	$75,000.00
Supply Sand	6,750	Ton	$9.00	$60,750.00
Transport Sand	6,750	Ton	$20.90	$141,075.00
Place Sand	6,750	Ton	$2.00	$13,500.00
Sediment Sampling	2	Each	$400.00	$800.00
Scarp Management	5,300	LF	$0.70	$3,710.00
Beach Tilling	7	Acre	$500.00	$3,500.00
Site Restoration	1	LS	$2,500.00	$2,500.00
Surveys	2	LS	$2,000.00	$4,000.00
Total				$304,835.00

Using a sand source located within Miami-Dade County could reduce this cost by as much as $100,000. However, the quality of the sand would have to be carefully reviewed.

4. Scrape, remove and replace the Surf Club sand with upland sand

The state would require that any sand that was scraped and removed from the beach would have to be replaced by beach compatible sand. This option obviously addresses the concerns with the Surf Club sand. However, this option assumes that the beach is still "layered" and that the Surf Club sand can be easily distinguished from the pre-existing beach sand. Given that this alternative could not be instituted prior to November 1 due to limitations of sea turtle nesting, there is a chance that the pre-existing sand and the Surf Club sand will be well-mixed.

Assuming that the beach is still sufficiently layered to remove the Surf Club sand, this option provides additional room within the likely permitted template, which was a potential restriction in Alternative 3.

The cost of this alternative is much greater than Alternative 3 because the Surf Club sand must be excavated and then trucked to a landfill. The closest landfill is located in Hallandale, approximately 10 miles from the Town. It is assumed that the sand can be used as cover for the landfill and the landfill would not charge a tipping fee.

The cost to scrape, remove and replace the Surf Club sand with sand from the Ortona mine is shown in Table 4. This assumes that 14,000 cubic yards (18,900 tons) will be scraped and removed from the beach. This is similar to the volume placed by the Surf Club. Should a sand source within 50 miles of the Town of Surfside be used, then the cost of this alternative would be reduced from approximately $800,000 to $580,000.

Table 4. Opinion of Probable Cost to Cover the Surf Club Sand with Ortona Sand

Item	Quantity	Units	Unit Cost	Unit Total
Mobilization/Demobilization	1	LS	$100,000.00	$100,000.00
Remove Surf Club Sand	18,900	Ton	$4.00	$75,600.00
Supply Sand	18,900	Ton	$9.00	$170,100.00
Transport Sand	18,900	Ton	$20.90	$395,010.00
Place Sand	18,900	Ton	$2.00	$37,800.00
Sediment Sampling	5	Each	$400.00	$2,000.00
Scarp Management	5,300	LF	$0.70	$3,710.00
Beach Tilling	13	Acre	$500.00	$6,500.00
Site Restoration	1	LS	$2,500.00	$2,500.00
Surveys	2	LS	$2,000.00	$4,000.00
Total				$797,220.00

5. Scrape the Surf Club sand into the ocean

The option to scrape the sand from the beach into the ocean is the easiest one from a construction perspective but poses a greater challenge from a permitting perspective. The placement of sand below mean high water requires a Joint Coastal Permit (JCP) application. As these types of projects are generally more complex than upland projects, the review time increases. Placing sand below mean high water also required Federal authorization. Obtaining a permit to scrape the Surf Club sand into the ocean may not be obtained prior to the start of the 2015 sea turtle nesting season.

Even if this option were employed, natural mixing and movement of sand from the offshore section to the dry beach and back could still result in the Surf Club sand being redeposited along the dry beach, though at lower densities than currently exists. Thus, the beach would appear brighter in color following scraping but could darken over time.

This option would still retain sand within the Town of Surfside, an approach that is strongly recommended.

The estimated construction cost for scraping sand into the ocean is shown in Table 5.

Table 5. Opinion of Probable Cost to Scrape the Surf Club Sand into the Ocean

Item	Quantity	Units	Unit Cost	Unit Total
Mobilization/Demobilization	1	LS	$10,000.00	$10,000.00
Scrape Sand into Ocean	18,900	Ton	$2.00	$37,800.00
Beach Tilling	13	Acre	$500.00	$6,500.00
Surveys	1	LS	$2,000.00	$2,000.00
Total				$56,300.00

6. **Scrape and remove the Surf Club Sand and place it below mean high water in Bal Harbor or City of Miami Beach**

The primary drawback of Alternative 5, is that neither the Town nor County holds a permit allowing this work to proceed. However, the County holds a permit to place beach compatible sand below mean high water in six discrete locations within the County. One of these permitted locations is in Bal Harbor (within 2,00 feet of the Haulover Inlet), four are located within City of Miami Beach (27th, 44th, 55th , and 65th Streets) and one within Sunny Isles. The FDEP has indicated that they would be amenable to allowing the Surf Club sand to be scraped from the beach and placed within the Bal Harbor or City of Miami Beach sites. This would need to be discussed further with the County, Bal Harbor and City of Miami Beach.

It would be preferable from a coastal engineering perspective to place the sand in Bal Harbor if this option was exercised. The net movement of sand is from north to south so any sand placed in Bal Harbor would work its way south to Surfside. During the public comment period of the August 5 Sand Committee meeting, a member of the public expressed a preference for the sand to be placed to the south to avoid the Surf Club sand moving through the Town in the future.

It is likely that this option could be permitted and constructed prior to the start of the 2015 sea turtle nesting season.

The cost of this option was based on trucking the sand to 55th Street as it has a larger available volume within the permitted template. Given that there are two separate sites, the cost of surveys and site restoration have doubled, though their impact on total cost is minimal. The length of scarp management has increased and the area of beach tilling has also increased. The opinion of the probable construction cost is shown in Table 6.

Table 6. Opinion of Probable Cost to Scrape the Surf Club Sand and Place it at 55th Street

Item	Quantity	Units	Unit Cost	Unit Total
Mobilization/Demobilization	1	LS	$25,000.00	$25,000.00
Remove Surf Club Sand	18,900	Ton	$2.70	$51,030.00
Place Sand	18,900	Ton	$2.00	$37,800.00
Scarp Management	7,300	LF	$0.70	$5,110.00
Beach Tilling	19	Acre	$500.00	$9,500.00
Site Restoration	2	LS	$2,500.00	$5,000.00
Surveys	4	LS	$2,000.00	$8,000.00
Total				$141,440.00

Chateau Sand

The Chateau currently holds a permit to place 20,855 cubic yards (approximately 28,155 tons) of sand excavated from their property along the Town's shoreline. The characteristics of the Chateau sand are

assumed to be similar to the Surf Club sand. Given that the FDEP requires that the Chateau place the sand they excavated seaward of the CCCL and the Chateau has a permit to do so, a similar situation to that encountered following placement of the Surf Club sand is imminent. It is recommended that the Town engage the Chateau and discuss potential options prior to the Chateau placing the sand along the Town's beaches. Note that the Chateau is required by permit to place an equivalent volume of sand excavated from seaward of the CCCL along the beach. This sand has already been excavated and stockpiled. The Chateau is waiting for the completion of sea turtle nesting season to return this sand to the beach. While the Chateau already holds a permit to place the sand along the beach, there are still several options available as outlined below.

1. Request that the Chateau place sand that meets the Town's approval from an upland borrow source rather than the sand actually excavated from their property. Note that there is an increase in cost to the Chateau associated with this option, as shown in Table 7. No additional permits should be required to affect this change though additional coordination with the FDEP will be required. This option could provide the whiter sand discussed in Alternatives 3 and 4 above.

Table 7. Opinion of Probable Cost to Dispose of Already Excavated Sand and Provide White Sand

Item	Quantity	Units	Unit Cost	Unit Total
Mobilization/Demobilization	1	LS	$75,000.00	$75,000.00
Supply Sand	28,155	Ton	$9.00	$253,395.00
Transport Sand	28,155	Ton	$20.83	$586,468.65
Place Sand	28,155	Ton	$2.00	$56,310.00
Dispose of Excavated Sand	28,155	Ton	$2.00	$56,310.00
Sediment Sampling	7	Each	$400.00	$2,800.00
Scarp Management	5,300	LF	$0.70	$3,710.00
Beach Tilling	13	Acre	$500.00	$6,500.00
Site Restoration	1	LS	$2,500.00	$2,500.00
Surveys	2	LS	$2,000.00	$4,000.00
Total				$1,046,993.65

2. Request that Chateau place the material in the Town's dunes and access areas rather than along the beach. The volume available for placement in the dunes may be limited and may require a separate CCCL permit.

3. Request that the Chateau place sand below mean high water in one of the County's pre-approved disposal locations (Alternative 6 above).

Options 2 and 3 do not address any issues with the sand already placed by the Surf Club.

Summary

The Town has several alternatives available to address the concerns with the color of the sand placed along the beach by the Surf Club. These alternatives vary in construction cost, level of effort to permit, and eventual effectiveness (color) of the beach sand. A summary of the costs is provided in Table 8.

Table 8. Summary of Alternative Cost, Permitting Effort and Effectiveness

Alternative	Description	Cost	Permit Effort	Effectiveness
1	Till the beach	$5,000.00	Low	Low
2	Scraping the Surf Club sand off the beach and placing it in the dunes or street access areas	$156,220.00	Medium	Medium
3	Cover the Surf Club sand with more sand from an upland source	$304,835.00	Low	Medium
4	Scrape, remove and replace the Surf Club sand with upland sand	$797,220.00	Low	High
5	Scrape the Surf Club sand into the ocean	$56,300.00	High	Medium
6	Scrape and remove the Surf Club Sand and place it below mean high water in Bal Harbor or City of Miami Beach	$141,440.00	Medium	High

Please call me if you have any questions.

Sincerely,

G. J Thomson

Gordon Thomson, PE, D.CE.
CB&I Environmental & Infrastructure, Inc.

Please Reply To: Gordon Thomson
Phone: 561.361.3147
E-Mail Address: Gordon.Thomson@cbi.com

cc: Joseph Kroll, Town of Surfside

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From: Higginbotham, Joseph M <Joseph.Higginbotham@flhealth.gov>
Sent: Thursday, February 05, 2015 5:08 PM
To: Jane Graham; Elmir, Samir
Cc: Linda Miller; Guillermo Olmedillo; Rosendo Prieto
Subject: RE: request for opinion on lead in Surfside sand based off expert reports

Dear Ms. Graham,

Based on the information I have (the Landscience, Inc. Soil Assessment Report, December 2014) , the maximum lead concentration found in the sand samples (Table 1, CSS-4 = 5.24 mg/kg) is approximately 76 times below the Florida Department of Environmental Protection (FDEP) Soil Cleanup Target Level (SCTL). Even the most conservative, health protective scenario of residential use SCTL for Pb is set at 400 milligrams Pb per kilogram soil (or sand in this case). These SCTLs are based on protection of human health and are set conservatively low to protect human health.

So, it is my opinion that this maximum level of Pb in the sand (5.4 mg/kg), would not pose a health risk to the public to any greater degree than the inherent risk of visiting the beach, even for sensitive sub-populations such as children or the elderly.

If you were to have any health concerns regarding the beach sand or symptoms for yourself or others it is always good advice to visit your physician. Your physician can provide blood tests for Pb and then compare those levels found in blood to levels that are regarded as normal. For Florida, a level of 10 micrograms Pb per deciliter of blood (ug/dL) or less is considered normal. The level of Pb in the sand does not necessarily reflect the level of Pb in a person's blood.

I have just briefly reviewed the documents you have provided with this email. The maximum Pb value in the two Terracon sampling reports is 9.8 mg/kg. This is still about 41 times below the residential SCTL and would not be likely to lead to adverse health effects.

Regards,

Mark

Joseph Mark Higginbotham, MS, PhD
Deputy State Toxicologist
Bureau of Epidemiology, Division of Disease Control and Health Protection, Florida Department of Health
Office Phone: (850) 245-4960
Fax: (850) 414-9069
Confidential Fax: (850) 414-6894
Mailing address:
4052 Bald Cypress Way, Bin A12
Tallahassee, FL 32399-1720
New email: joseph.higginbotham@flhealth.gov

From: Jane Graham [mailto:jgraham@townofsurfsidefl.gov]
Sent: Thursday, February 05, 2015 4:19 PM

To: Elmir, Samir; Higginbotham, Joseph M
Cc: Linda Miller; Guillermo Olmedillo; Rosendo Prieto
Subject: request for opinion on lead in Surfside sand based off expert reports

Dear Dr. Elmir and Dr. Higgonbottom,

Thank you both for taking the time to speak with me yesterday. We really appreciate it. I tried reaching you both just now but I had no luck.

The Town of Surfside would like to request an opinion regarding the public health and safety of lead levels on the beach, based off the attached documents from our experts.

As you can see from the attached documents, the data shows that the results for lead were "considerably less than the respective Florida Department of Environmental Protection default residential Soil Cleanup Target Levels based upon direct exposure considerations ((barium, chromium, lead, selenium)." (Report from Dr. Teaf to John Di Censo, December 2, 2014).

Could one of you please opine specifically on the question of lead to clarify any potential health risks? Time is of the essence as we are finalizing our documents for the sand meeting next week.

Thanks. We greatly appreciate it.

Sincerely,

Jane Graham

Jane Graham
Assistant Town Attorney
Town of Surfside
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From: Christopher Teaf <cteaf@hswmr.com>
Sent: Thursday, January 22, 2015 6:05 PM
To: John Di Censo; Jane Graham
Subject: Surfside beaches

Mr. Di Censo and Ms. Graham,

I appreciate the opportunity to talk with you this afternoon. This email seeks to answer a question that I understand was raised recently regarding sand quality on the Surfside beach. I refer you also to the correspondence, technical documentation, and presentation materials that I have prepared over the past 7 months in my evaluation of the project.

The question was approximately as follows: "Specifically with respect to lead, has the quality of the renourishment sand that was placed on the Surfside beach changed in quality between the time it was excavated from the Surf Club site until the time it was deposited on the Surfside beach."

Answer: *There were no samples collected, to my knowledge, of sand during or immediately following the excavation process at the Surf Club. The earliest reliable and properly collected/handled/analyzed data is that chemical quality of the sand was that done by Terra Con in late-April of 2014. That showed lead concentrations in sand ranging from 2.8 to 9.8 mg/kg (average 7.4 mg/kg), as detailed in several site-specific Terra Con reports dated in May, 2014 and as discussed in my letter to Mr. Crotty dated May 20, 2014. There is no contemporary data from the Surf Club with which to compare those results, but the maximum (9.8 mg/kg) is over 40 times less than the Florida DEP and the Miami-Dade County DERM default, health-protective soil criterion of 400 mg/kg. They also are quite representative of urban sands and soils from areas such as the Town of Surfside. No human health threat is or was posed by the lead concentration in those samples of the renourishment sand.*

A related question might be "Specifically with respect to lead, has the quality of the renourishment sand that was placed on the Surfside beach changed in quality between the time it was placed on the beach until the present."

Answer: *A comparison of the lead concentration reported for the April 2014 Terra Con samples can be made with the November 2014 renourishment sand samples collected and analyzed by LandScience, as presented in their December 2014 report. In that sampling event there were 6 renourishment sand samples collected that ranged from 1.75 to 5.24 mg/kg (average 3.3 mg/kg). The maximum (5.24 mg/kg) is over 76 times less than the Florida DEP and the Miami-Dade County DERM default, health-protective soil criterion of 400 mg/kg. They also are quite representative of urban sands and soils from areas such as the Town of Surfside. No human health threat is or was posed by the lead concentration in those samples of the renourishment sand. There is no material difference between the April 2014 lead concentrations as compared to the November 2014 lead concentrations. In addition to the "totals analysis" conducted for lead and other metals, a Synthetic Precipitation Leaching Procedure (SPLP) test was conducted to assess the leaching potential of lead and the other metals from the sand. As noted in my December 2, 2014 report: "The SPLP method was designed by USEPA as a way to evaluate effects of acid rain on land-disposed wastes, specifically to assess the likelihood that groundwater would be affected by leaching. It is used in that fashion by Florida DEP and by Miami-Dade County as well. Typically, when groundwater is not reasonably expected to be used as a drinking water source due to low production rates or poor water quality issues (e.g., natural chlorides, total dissolved solids [TDS], taste, or odor characteristics), comparison between SPLP data and the Florida DEP "Low Yield/Poor Quality"*

criterion is made (DEP, 2005; Chapter 62-777, F.A.C.). That "Low Yield/Poor Quality" criterion is equal to 10x the applicable chemical-specific groundwater criterion." There was no instance in which the SPLP results exceeded the defined criterion for lead or any other metal. No human health threat is or was posed by the lead concentration in those leaching samples from the renourishment sand.

I hope that this information is helpful to you, and please let me know if there are copies of my previous submittal to the Town of Surfside that you may need.

Regards,

Chris

****

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December 2, 2014

Mr. John Di Censo
Town Manager
Town of Surfside
9293 Harding Ave.
Surfside, FL 33154

Dear Mr. Di Censo:

This letter report represents my technical analysis and conclusions regarding sand samples collected from the beachfront at locations between 88th Street and 95th Street in the Town of Surfside on October 31, 2014 by LandScience, Inc. and analyzed by the Florida Spectrum Environmental Services laboratory report dated November 10, 2014. My conclusions are as follows:

- *for Total Recoverable Petroleum Hydrocarbons, all results were either below detection limits or were considerably less than the respective Florida Department of Environmental Protection (FDEP) residential Soil Cleanup Target Level based upon direct exposure considerations;*

- *chemical analysis of the sand samples for arsenic is consistent with natural background for this and other areas of coastal Florida, as indicated by a body of sampling data from a number of reputable sources. Such arsenic background ranges from less than 1 mg/kg to over 15 mg/kg in Miami-Dade County with a central tendency estimate of 5.2 mg/kg. Samples collected from both control sand locations and renourishment sand locations (2.39 mg/kg to 6.46 mg/kg) fall in the low to middle of the background range;*

- *for other metals, all results were either below detection limits (cadmium, mercury, silver) or were considerably less than the respective Florida Department of Environmental Protection (FDEP) default residential Soil Cleanup Target Levels based upon direct exposure considerations (barium, chromium, lead, selenium);*

- *for organochlorine pesticides, including common termiticides,, all results were either below detection limits (19 substances) or were considerably less than the respective Florida Department of Environmental Protection (FDEP) default residential Soil Cleanup Target Level based on direct exposure considerations (4,4'-DDT in one sample only);*

- *for polychlorinated biphenyls (PCBs), all results were either below detection limits (6 substances) or were considerably less than the respective Florida Department of Environmental Protection (FDEP) default residential Soil Cleanup Target Level based upon direct exposure considerations (PCB-1254 in one sample only);*

- *results of Synthetic Precipitation Leaching Procedure (SPLP) testing were either below detection limits (cadmium, mercury, selenium, silver), or were very low in the context of their applicable protective guidelines (arsenic, barium, chromium, lead); and,*

- *there are no significant health risks posed to children, to adults, or to pets by the observed background concentrations of petroleum hydrocarbons, arsenic, other metals, organochlorine pesticides, or PCBs in the beach sand.*

The technical bases for those conclusions are provided in detail in the following sections. In preparation of this analysis, I have reviewed the following information sources:

- Beach sand chemical testing data, Town of Surfside, from LandScience, Inc. and Florida Spectrum Environmental Services, Inc. as reported on November 11 2014 for sand samples collected October 31, 2014;

- Correspondence and supplementary material from Dr. Samir Elmir, Florida Department of Health in Miami-Dade, to Michael P. Crotty, Town Manager, Town of Surfside, dated May 14, 2014, regarding arsenic concentrations in beach sand at the Surf Club location (FDOH, 2014);

- Review of information and personal communication with Mr. Wilbur Mayorga, P.E., Chief, Environmental Monitoring and Restoration Division of the Miami-Dade County Department of Environmental Resources Management (DERM) regarding natural and anthropogenic (human-related) background arsenic concentrations in Miami-Dade County soil and sediment, including beach sand;

- Review of data from Kimley-Horn beach sand investigation (May, 2014) and associated Geosyntec correspondence;

- Scientific literature, technical reports on naturally occurring or anthropogenic arsenic concentrations in Florida soils and marine sediment/sand and health-based guidelines for potential exposures to selected analytes of interest to this study; and,

- My letter to Michael Crotty dated May 20, 2014. Portions of that letter are reproduced here for completeness.

My Summary and Conclusions at the end of this letter report are directed toward an evaluation of the extent to which the available data permit a conclusion regarding quality of renourishment beach sand on Town of Surfside beaches.

Data Presentation and Discussion

Laboratory analysis was performed on eight (8) samples of beach sand collected by LandScience on October 31, 2014, related to a beach renourishment project conducted in the Town of Surfside near the Surf Club. Six (6) composite sand samples, each consisting of 6 subsamples, were collected from areas where renourishment sand was placed in early 2014, and two (2) similar composite samples were collected from control locations located north (Haulover Park) and south (North Shore Open Space Park) of the renourishment area, as described by LandScience (2014). Sand samples were analyzed for "total concentrations", expressed in milligrams per kilogram (mg/kg) for the following analyte categories:

- Total Recoverable Petroleum Hydrocarbons (TRPH);
- Eight (8) RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver);
- 20 chlorinated hydrocarbon pesticides; and,
- Seven (7) polychlorinated biphenyl isomers (PCBs).

No substance in any sand sample, with the exception of arsenic, exceeded its Florida Department of Environmental Protection (DEP) default residential Soil Cleanup Target Level (SCTL), as shown on Table 1 (attached). Arsenic ranged from 3.8 to 6.46 mg/kg in the renourishment sand samples (mean 5.4 mg/kg), and from 1.8 to 2.39 mg/kg in the control sand samples. The DEP default residential SCTL for arsenic is 2.1 mg/kg. As discussed subsequently in this letter, the 2.1 mg/kg guideline assumes simultaneous oral, dermal, and inhalation exposure for 350 days/year and for 30 years, including both children and adults. That level represents a conservative, acceptable health-based target level with a reasonable margin of safety that is quite unlikely to underestimate risks. The present detected values were less than the values of 7.0 to 7.8 mg/kg previously reported for renourishment sand by Terracon (2014). The detected values in renourishment sand and control sand were in the range found on barrier islands in Miami-Dade County, and soils in the County.

Based on evaluation of the previous similar data for sand samples, the Florida Department of Health (FDOH) concluded that there was not a significant increased health risk related to exposure to arsenic in the beach sand, even assuming lifetime exposure (FDOH, 2014). The FDOH statement supplemented the earlier conclusions of Dr. Samir Elmir, Ph.D, P.E., Director of Environmental Health & Engineering Services for the Florida Department of Health in Miami-Dade. In addition, Mr. Wilbur Mayorga, P.E., Chief of the Environmental Monitoring and Restoration Division of the Miami-Dade County Department of Environmental Resources Management (DERM) has concluded that the test results are consistent with naturally occurring arsenic levels on the barrier islands in Miami-Dade County, which showed a Minimum Variance Unbiased Estimate (MVUE) of 5.2 mg/kg and a maximum of 15.1 mg/kg (Mayorga,

2004; Mayorga, 2014; Surfside, 2014). As noted in the following section, naturally occurring background is indicative of conditions that are geological in origin and do not represent human activities. These issues also were discussed in greater detail in my May 20, 2014 letter to Mr. Crotty.

Subsequent to my May 20, 2014 letter, an opinion letter on the arsenic subject was submitted by Geosyntec (2014). That letter identified additional analytical data for arsenic in 14 sand samples collected by Kimley-Horn (2014) at various locations from South Pointe to Haulover Inlet. Those sand samples excluded any locations on which the Surf Club renourishment sand had been placed within the Town of Surfside. Arsenic concentrations in those sand samples ranged from 2.0 to 11.0 mg/kg. Two of the May, 2014 Kimley-Horn locations were approximately coincident with control sand locations collected by LandScience in October, 2014. The Kimley-Horn samples exhibited greater arsenic concentrations at both locations in comparison to those reported by LandScience. Geosyntec concluded that the Kimley-Horn sand samples, as well as those collected by Terracon in the Town of Surfside, exhibited conditions that were "consistent with naturally occurring levels common to marine sands." The same can be said for all of the LandScience samples.

In addition to totals analysis for metals and selected organic substances as described previously, at the direction of the Sand Committee a Synthetic Precipitation Leaching Procedure (SPLP; USEPA Method 1312) test was conducted on sand samples for the RCRA metals, under the direction of LandScience (2014). The SPLP method was designed by USEPA as a way to evaluate effects of acid rain on land-disposed wastes, specifically to assess the likelihood that groundwater would be affected by leaching. It is used in that fashion by Florida DEP and by Miami-Dade County as well. Typically, when groundwater is not reasonably expected to be used as a drinking water source due to low production rates or poor water quality issues (e.g., natural chlorides, total dissolved solids [TDS], taste, or odor characteristics), comparison between SPLP data and the Florida DEP "Low Yield/Poor Quality" criterion is made (DEP, 2005; Chapter 62-777, F.A.C.). That "Low Yield/Poor Quality" criterion is equal to 10x the applicable chemical-specific groundwater criterion. SPLP data are not used by any agency of which I am aware in the assessment of direct contact exposure considerations. Rather, the chemical-specific SCTL is used for that purpose. A comparison among the sand sample data and the applicable criteria is presented in Table 1.

In one or more sand samples, the SPLP results showed detectable concentrations of arsenic, barium, chromium, and/or lead. However, in no instance did any reported SPLP concentration exceed its "Low Yield/Poor Quality" criterion.

Arsenic in Soils and Marine Sands as a Natural Background Issue

Natural background concentrations of arsenic in Florida soil have been reported to range from less than one mg/kg to greater than 60 mg/kg, depending upon soil type and geographic location (e.g., Brinkman and Ryan, 1998; Chen et al., 1999a; Chen et al.,

1999b; Chen et al., 2001; Gustavsson et al., 2001; Ma et al., 1997; Mayorga, 2004; Miami-Dade County, 2014). These soil types include upland environments, wetlands, and materials derived from aquatic environments (e.g., sediments, beach sand).

The natural occurrence of arsenic in the aquatic environment is commonly associated with marine organisms and the shelly, sedimentary layers that are of marine origin (Lunde, 1977; Cai et al., 2002), and uncontaminated coastal area marine sediments regularly contain from about 5 to 15 mg/kg arsenic (Neff, 1997; Moore and Ramamoorthy, 1984). Background sediments from Biscayne Bay and other Florida estuaries or coastal areas contain natural background levels of arsenic ranging from less than 10 mg/kg to over 60 mg/kg (Schropp and Windom, 1988; Windom et al., 1989; Schropp et al., 1990; USEPA, 2001). Valette-Silver et al. (1999) collected sediments from Biscayne Bay near the mouth of the Miami River and reported an average arsenic concentration of 5.1 ug/g (5.1 mg/kg), with a range of about 3 to 23 mg/kg. Those authors also sampled bivalve molluscs (oysters or mussels) from local Florida coastal waters, reporting arsenic concentrations in those specimens from approximately 5 to 65 mg/kg. Finally, the authors reported a median unadjusted total arsenic value of 16 mg/kg for southeastern U.S coastal sediments. Similar observations have been made regarding sediments in other states along the East Coast (e.g., NJ; Barringer et al., 2013).

There is little doubt or disagreement that results presented for the Surfside beach samples are consistent with generally expected arsenic levels in Florida soils/sediments that may be characterized by limestone deposits and coastal marine, seashell-derived material. Based on results of a DEP-sponsored study of different soil types across the state (Chen et al., 2001; Chen et al., 2002) and a Miami-Dade County beaches and coastal barrier islands study (Mayorga, 2004), arsenic concentrations in Surfside beach sand are consistent with local naturally occurring background conditions. They are the natural concentration ranges that would exist even if no human beings were present.

Human Health Considerations

A variety of national and international environmental and health organizations, as well as independent toxicologists, have evaluated occurrence, exposure potential and toxicology of environmental arsenic forms (e.g., ATSDR, 2007; Hughes et al., 2011; NAS, 2014; USEPA, 2005; USEPA, 2007). Those scientific and health-based assessments have concluded that, while arsenic certainly has the capability in some circumstances to cause adverse health effects, likelihood of effects is strongly influenced by important aspects of observed arsenic concentration, chemical form, and exposure potential.

Because arsenic is naturally occurring and ubiquitous in the environment at various concentrations, humans are exposed to the substance from a number of sources, including through our normal diet (Adams et al., 1994; ATSDR, 2007; ATSDR, 1990; Borum and Abernathy, 1994; USEPA, 2005; USEPA, 2007; WHO, 2001). ATSDR (2007) states that the highest dietary levels of arsenic are found in seafood, meats, and grains. Typical U.S. dietary levels of arsenic range from 0.02 mg/kg in grains and cereals to

0.14 mg/kg in meat, fish and poultry (Gartrell et al., 1986). Shellfish and saltwater fish typically contain the highest levels of total arsenic (average about 4 to 5 mg/kg, maximum up to 170 mg/kg). It has been observed that the organic arsenic forms which are typically present in seafood can dramatically elevate arsenic levels in human urine, though these organic arsenic forms are generally considered to be less harmful than inorganic arsenic forms at similar concentrations. Common foods which contain more than 50 micrograms of arsenic/kilogram of food (ug/kg; a microgram is one millionth of a gram) include tuna (fresh, canned, and casserole), fish sticks, fried shrimp, fried haddock, clam chowder, turkey breast, rice, mushrooms, and olive oil or safflower oil (Adams et al., 1994). A substantial portion of the arsenic in fish tissue is present in the essentially nontoxic trimethylated form known as arsenobetaine (90-100% of fish arsenic; Nriagu, 1994); however, dairy products, meat, poultry, and cereals contain a majority of their arsenic in an inorganic form (Borum and Abernathy, 1994). There is good evidence that arsenic actually may be a necessary human nutrient at some level in some species, because it appears to play an essential role in the normal metabolic processes of man and other mammals (ATSDR, 2007; NRC, 1989; Uthus, 1994; Uthus, 1997; USEPA, 2014a). However, a recommended daily intake quantity for arsenic in any form has not yet been established.

When all sources of exposure (food, water, air, and soil) are combined in an intake analysis, ATSDR (2007) estimated that the U.S. general population consumes approximately 46 micrograms of arsenic per day (46 ug/day), most of which is in organic forms. Borum and Abernathy (1994) calculated that humans ingest between 10 and 20 ug of inorganic arsenic per day, and ATSDR (1990) put this figure at an average of 50 ug/day (range 8 to 104 ug/day), of which about 30% is in the inorganic form (~70% organic forms). People who eat large amounts of seafood may consume 50 ug or more of arsenic per day from that source alone (Adams et al., 1994). Cigarette smokers may be exposed to higher arsenic quantities than the general population due to its presence in tobacco products.

The significance of arsenic contact and subsequent intake differs according to the route of potential exposure (ATSDR, 2007; Hughes et al., 2011; Teaf and Covert, 2012). From an environmental perspective, particularly regarding exposure to soils and sediments, ingestion is the principal route, and it dominates the calculation of protective exposure limits. Dermal and inhalation pathways contribute much less for separate reasons. Dermal absorption of arsenic is considerably less efficient than oral absorption, and airborne arsenic in association with soils, even in situations where the soils are uncovered and subject to wind erosion, typically represents a minor intake route.

As a point of reference for the sand data characterization as described previously, a discussion of the Florida Department of Environmental Protection (DEP) Soil Cleanup Target Level (SCTL) is warranted. It must be recognized that the type, frequency, and intensity of potential exposure, not just the concentration of a substance in soil, is critical to an appropriate evaluation of potential health risks. In that regard, the default residential SCTL is not strictly an appropriate criterion to use for potential beach exposures, since residents don't actually live on the beach itself, though they may visit

frequently. That SCTL value often is cited as an appropriate guideline for comparisons to all types of soil samples, though in this instance that is not appropriate.

The present default direct exposure residential SCTL for arsenic is 2.1 mg/kg (DEP, 2005), a value which is based on a 30 year unrestricted childhood/adult aggregate residential exposure scenario which assumes a soil ingestion rate of about 120 mg/day for 350 days/year and a target cancer risk of $1x10^{-6}$ ("one–in-one-million"; a population increase of one cancer in one million individuals beyond the baseline expected cancer rate, assuming lifetime exposure). The DEP process, and that of other toxicologists as well, simultaneously considers that there is a possibility of a "childhood only" exposure scenario, typically assuming an age range up to six years. Considering daily exposure for that entire childhood period, and addressing potential noncancer health effects for arsenic, the childhood scenario yields a protective arsenic soil concentration of 78 mg/kg, a value much greater than the concentrations that have been reported for the beach sand. Thus, children are not at significant risk. Because agencies, in this case DEP or Miami-Dade DERM, use the more restrictive of the two possible exposure scenarios, the 2.1 mg/kg value becomes the default, even though a considerably less restrictive concentration is specifically protective of a childhood scenario. Similarly, in response to potential concerns that toxic effects from arsenic aside from a cancer risk may represent a hazard, a scenario which considers only potential noncarcinogenic effects for the 30 year childhood/adult residential soil exposure circumstance yields a protective concentration for arsenic in excess of 400 mg/kg. Again that value is far greater than the concentrations observed in the beach sand, demonstrating that other possible effects from arsenic are not significant.

DEP also has developed a direct exposure SCTL of 12 mg/kg for arsenic where contact is expected to occur under commercial/industrial circumstances (DEP, 2005). This scenario is based on 25 year adult worker exposure considerations, assuming the potential for oral, dermal, and inhalation routes of exposure, with a soil ingestion rate of 50 mg/day for 250 days/year and a target cancer risk of $1x10^{-6}$. The commercial/industrial criterion, while the exposure assumptions may be more comparable to frequency of beach sand ingestion exposure, also is not be entirely appropriate since the ancillary exposure pathways (i.e., inhalation, dermal) are not comparable between workers and beachgoers (more intense for commercial/industrial).

Finally, DEP has developed and employed a provisional recreational exposure scenario for arsenic of 5.5 mg/kg (DEP, 2006), based on a conservative child/adolescent exposure scenario of 14 years duration, assuming all three exposure routes, a soil ingestion rate of 129 mg/day for 200 days/year, and a target cancer risk goal of $1x10^{-6}$. That 5.5 mg/kg value, or similar guidelines, has been applied at sites with various nonresidential, recreational aspects, such as rails-to-trails facilities, parks, and schools.

The provisional recreational "park" criterion is conceptually the most applicable in this instance, with the understanding that a single criterion may not encompass the range of potential exposures, since beach use is highly variable. As noted, DEP has used a similar scenario in evaluating potential school facilities as well in the past, and the exposure parameters for adults are most similar to the conservative commercial

industrial exposure scenario (e.g., 5 days per week, 50 weeks per year, 25 years duration, with oral/dermal/inhalation possibilities). The detected arsenic concentrations in the renourishment beach sand at Surfside are in the range of both the provisional recreational criterion and the default commercial/industrial guideline. This indicates that there is not a significant health risk from exposure to those levels of arsenic in the sand. In that conclusion, I concur with the previously identified opinions of the Florida Department of Health representatives.

It also should be noted that a review of 35 states other than Florida that report residential cleanup targets or health-based protective criteria for arsenic in soil, shows that at least 20 of those states utilize a default screening target concentration that exceeds 2.1 mg/kg, with values ranging from 3.9 mg/kg to 24 mg/kg. In addition, the states of AZ, CT, IL, IA, KS, KY, MA, MN, MO, NH, NJ, NY, PA, RI, WA employ protective soil cleanup guidelines ranging from 7 to 40 mg/kg, based upon natural background considerations (Teaf et al., 2010; Teaf and Covert, 2012). At a number of Florida sites, the U.S. EPA has implemented soil cleanup targets of 20 mg/kg or more in residential or other unrestricted land use cases. Thus, while the Florida DEP and some local jurisdictions have exercised their prerogative to set a highly conservative guideline with respect to default protective soil arsenic concentrations, an exceedance of the 2.1 mg/kg residential criterion does not indicate that hazards to human health exist.

As an example of the foregoing, a study was conducted in Florida by the Department of Health in partnership with the federal Agency for Toxic Substances and Disease Registry (FDOH/ATSDR, 1996b). That study involved the Barker Chemical Site in Inglis, Levy County, FL. The site was an inactive chemical facility that formerly produced phosphate fertilizer from ore that had an elevated arsenic content. Disposal of waste from that facility resulted in soil in some residential areas that was contaminated with relatively high levels of arsenic. Preliminary studies of soil in residential areas of Inglis revealed arsenic concentrations up to 3,000 mg/kg. Other studies undertaken by the U.S. EPA at Inglis detected arsenic concentrations in soil up to 687 mg/kg in residential areas (FDOH/ATSDR, 1996a). The Florida Department of Health performed both hair and urine analysis for arsenic for 25 residents of the area including children, who were judged to have had the greatest soil exposure potential. The Department of Health reported no detectable arsenic in over 83% of urine samples, with the detected values being within the normal reference range (<50 ug arsenic/gram creatinine) for those where it was detected. Similar results were found for the analysis of arsenic in hair samples. The Florida Department of Health concluded that none of the test participants had results indicating excessive exposure to environmental arsenic and recommended that no further public health activities were warranted. Thus, even at relatively extreme arsenic soil concentrations, persistent exposure and absorption could not be demonstrated. Other studies in states where arsenic in soils is naturally elevated have yielded similar results for adults and children, demonstrating very limited potential risks from soil exposure (Boyce et al., 2008; Teaf et al., 2010).

Occasionally, a question is posed regarding contact with soil by pets. I am not aware of evidence to suggest that cats, dogs, or other pets are more sensitive to arsenic than human beings. In fact, metabolic data for dogs and humans suggest that humans are

the more sensitive species (Hughes et al., 2011). Background soil concentrations, or levels set for protection of humans, are considered to be protective of pets as well.

Summary and Conclusions

The observed concentrations of arsenic in the renourishment beach sand tested near the Surf Club in the Town of Surfside, and the similarity between those concentrations and local background arsenic concentrations, demonstrates a condition consistent with naturally occurring sources. For reasons outlined in this letter, the observed concentrations of arsenic and other substances, coupled with an understanding of potential exposure circumstances related to the beach sand and a comparison to various health-based concentrations for the tested substances, do not represent significant human health risks.

Please call Bruce Tuovila or me at (850) 681-6894 when you have had an opportunity to review these materials, so we can address any questions or comments that you may have.

Sincerely,

Christopher M. Teaf, Ph.D.
President & Director of Toxicology

CMT:bt

Attachments
Table 1
References Cited

Chemical Class	Units	SCTL Criterion*	Leachability Criterion**	CCSS-1	*Qualifier*	CCSS-2	*Qualifier*	CSS-1	*Qualifi*
TRPH	*mg/kg*	460	2400	0.190	U	6.70		0.190	U
Metals	*mg/kg*								
Arsenic		2.1	see SPLP	2.39		1.80		6.46	
Barium		120	16,000	5.44		5.93		8.41	
Cadmium		82	75	0.00380	U	0.00380	U	0.00380	U
Chromium		210	380	4.42		3.07		4.99	
Lead		400	see SPLP	0.559		0.317		4.85	
Mercury		3	21	0.0270	U	0.0270	U	0.0270	U
Selenium		440	52	0.661		0.794		0.618	
Silver		410	170	0.00550	U	0.00550	U	0.00550	U
Organochlorine Pesticides	*mg/kg*								
4,4'-DDE		2.9	180	0.000144	U	0.000144	U	0.000144	U
4,4'-DDT		2.9	110	0.000239	U	0.000239	U	0.000239	U
4,4'-DDD		4.2	58	0.000126	U	0.000126	U	0.000126	U
Aldrin		0.06	2	0.000153	U	0.000153	U	0.000153	U
alpha-BHC		0.1	0.003	0.0000659	U	0.0000659	U	0.0000659	U
beta-BHC		0.5	0.01	0.000154	U	0.000154	U	0.000154	U
delta-BHC		24	2	0.000177	U	0.000177	U	0.000177	U
gamma-BHC (Lindane)		0.7	0.09	0.000148	U	0.000148	U	0.000148	U
Chlordane		2.8	96	0.000269	U	0.000269	U	0.000269	U
Dieldrin		0.06	0.02	0.000196	U	0.000196	U	0.000196	U
Endosulfan I		450	38	0.000196	U	0.000196	U	0.000196	U
Endosulfan II		450	38	0.000196	U	0.000196	U	0.000196	U
Endosulfan sulfate		450	38	0.000206	U	0.000206	U	0.000206	U
Endrin		25	10	0.000156	U	0.000156	U	0.000156	U
Endrin aldehyde		NA	NA	0.000260	U	0.000260	U	0.000260	U
Endrin ketone		NA	NA	0.000324	U	0.000324	U	0.000324	U
Heptachlor		0.2	230	0.000183	U	0.000183	U	0.000183	U
Heptachlor epoxide		0.1	6	0.000174	U	0.000174	U	0.000174	U
Methoxychlor		420	1600	0.000149	U	0.000149	U	0.000149	U
Toxaphene		0.9	310	0.00893	U	0.00893	U	0.00893	U
Polychlorinated Biphenyls	*mg/kg*								
PCB-1016		0.5***	170***	0.00129	U	0.00129	U	0.00129	U
PCB-1221		0.5	170	0.000739	U	0.000739	U	0.000739	U
PCB-1232		0.5	170	0.00195	U	0.00195	U	0.00195	U
PCB-1242		0.5	170	0.000775	U	0.000775	U	0.000775	U
PCB-1248		0.5	170	0.000480	U	0.000480	U	0.000480	U
PCB-1254		0.5	170	0.000786	U	0.000786	U	0.000786	U
PCB-1260		0.5	170	0.00144	U	0.00144	U	0.00144	U
SPLP Metals	*mg/L*								
Arsenic		NA	0.10	0.00138	U	0.00138	U	0.00900	
Barium		NA	20	0.000236		0.0880		0.0610	
Cadmium		NA	0.05	0.000211	U	0.000211	U	0.000211	U
Chromium		NA	1.0	0.000751	U	0.000751	U	0.00800	
Lead		NA	0.15	0.00292	U	0.00292	U	0.0380	
Mercury		NA	0.02	0.0000630	U	0.0000630	U	0.0000630	U
Selenium		NA	0.5	0.00455	U	0.00455	U	0.00455	U
Silver		NA	1.0	0.000260	U	0.000260	U	0.000260	U

* *Default Residential Soil Cleanup Target Level (SCTL) per 62-777, F.A.C; Florida DEP, 2005*
** *Low Yield / Poor Quality per 62-777, F.A.C; Florida DEP, 2005*
*** *Total for PCB mxsture*
U Below Laboratory Reported Method Detection Limit (MDL)
I Between Laboratory Reported Method Detection Limit (MDL) and Practical Quabtitation Limit (PQL)
NA Not Applicable

References Cited

Adams, M.A. et al. 1994. Dietary intake and hazards of arsenic. Chapter 4. In: Chappell, et al. (eds). Arsenic: Exposure and Health. Science and Technology Letters, Essex, UK.

ATSDR (Agency for Toxic Substances and Disease Registry). 1990. Case Studies in Environmental Medicine: Arsenic. Atlanta, GA. June, 1990.

ATSDR (Agency for Toxic Substances and Disease Registry). 2007. Toxicological Profile for Arsenic. Atlanta, GA. August, 2007.

Barringer, J.L. et al. 2013. Arsenic in New Jersey Coastal Plain Streams, Sediments, and Shallow Groundwater: Effects of Different Geological Sources, and Anthrpogenic Inputs on Biogeochemical and Physical Mobilization Processes. Prepared in cooperation with the NJ Department of Environmental Protection. Scientific Investigations Report 2013-5107.

Borum, D.R. and C.O. Abernathy. 1994. Human oral exposure to inorganic arsenic. Chapter 3 in Chappell et al. (eds.). Arsenic: Exposure and Health. Science and Technology Letters. Essex, UK.

Boyce, C.P. et al. 2008. Probabilistic analysis of human health risks associated with background concentrations of inorganix arsenic: Use of a margin of exposure approach. Human and Ecological Risk Assessment 14: 1159-1201.

Brinkman, R. and J. Ryan. 1998. Background concentration of metals in Florida soils. Florida Center for Solid and Hazardous Waste Management, Gainesville, FL. Report #97-6.

Cai, Y., Cabrera, J.C., Georgiadis, M., et al. 2002. Assessment of arsenic mobility in the soils of some golf courses in South Florida. Sci. Total Environ. 291:123-134.

Chen, M., L.Q. Ma and W.G. Harris. 1999a. Baseline concentrations of 15 trace elements in Florida surface soils. Journal of Environmental Quality. 28(4): 1173-1181.

Chen, M., L.Q. Ma, W.G. Harris and A.G. Hornesby. 1999b. Background concentrations of metals in Florida surface soils. Taxonomic and geographic distributions of total-total and total-recoverable concentrations of selected trace metals. Florida Center for Solid and Hazardous Waste Management, Gainesville, FL. Report #99-7

Chen, M, L.Q. Ma, C.G. Hoogeweg and W.G. Harris. 2001. Arsenic background concentrations in Florida, U.S.A. surface soils: determination and interpretation. Environmental Forensics 2: 117-126.

Chen, M., Ma, L.Q., Harris, W.G. 2002. Arsenic concentrations in Florida surface soils: Influence of soil type and properties. Soil Sci. Soc. Am. J. 66:632-640.

DEP (Florida Department of Environmental Protection). 2005. Final Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C. February, 2005.

DEP (Florida Department of Environmental Protection). 2006. Rails to trails program assessment guidelines. Presented by Ligia Mora-Applegate. May 23, 2006.

DEP (Florida Department of Environmental Protection. 2014. Correspondence and technical reports related to sand testing. April-May 2014.

FDOH (Florida Department of Health)/ATSDR (Agency for Toxic Substances and Disease Registry). 1996a. Health Consultation. Barker Chemical Site, Inglis, Levy County, Florida. August 8, 1996.

FDOH (Florida Department of Health)/ATSDR (Agency for Toxic Substances and Disease Registry). 1996b. Exposure Investigation Report, Barker Chemical Site, Inglis, Levy County, Florida. August 13, 1996.

FDOH (Florida Department of Health). 2014. E-mail from Dr. Samir Elmir, Miami Dade Health Department, to Michael P. Crotty, Town Manager, Town of Surfside, regarding arsenic found in beach sand at the Surf Club. May 14, 2014.

Gartrell, M.J. et al. 1986. Pesticides, selected elements, and other chemicals in adult total diet samples, October 1980-March 1982. J. Assn. Off. Anal. Chem. 69:146; as cited in ATSDR, 2007.

Geosyntec. 2014. Correspondence from Dr. Keith Tolson, dated May 24, 2014.

Gustavsson, N. et al. 2001. Geochemical Landscapes of the Conterminous United States – New Map Presentations for 22 Elements. U.S. Geological Survey Professional Paper 1648. November, 2001.

Hughes, M.F. et al. 2011. Arsenic exposure and toxicology: A historical perspective. Toxicological Sciences 123(2): 305-332.

Kimley-Horn. 2014. Laboratory data reports and sample location figures. May, 2014

LandScience. 2014. Personal communication, laboratory data report, and sampling location figures. November, 2104.

Lunde, G. 1977. Occurrence and transformation of arsenic in the marine environment. Environmental Health Perspectives 19: 47-52.

Ma, L.Q., F. Tan, and W.G. Harris. 1997. Concentrations and distributions of eleven metals in Florida soils. Journal of Environmental Quality. 26(3): 769-775.

Mayorga, W. 2004. Memorandum from Wilbur Mayorga, Pollution Remediation Section, to Jose Gonzales, Pollution Control Division, regarding natural background soil concentrations for the barrier islands of Miami-Dade County. November 7, 2004.

Mayorga, W. 2014. Personal communication. May, 2014.

Miami-Dade County. 2014. Miami-Dade County Anthropogenic Background Study. Miami-Dade Environmental Monitoring and Restoration Division. April 3, 2014.

Moore, J.W. and S. Ramamoorthy. 1984. Heavy Metals in Natural Waters. Springer Verlag. New York, NY.

Neff, J.M. 1997. Ecotoxicology of arsenic in the marine environment. Environ. Toxicol. Chem. 16(5):917-927.

NAS (National Academy of Sciences). 2014. Critical Aspects of EPA's IRIS Assessment of Inorganic Arsenic. Interim Report.

NRC (National Research Council). 1989. Recommended Dietary Allowances. 10th Edition. National Research Council/National Academy Press, Washington, D.C.

Nriagu, J.O. (ed). 1994. Arsenic in the Environment, Part II: Human Health and Ecosystem Effects. Wiley Interscience, New York, NY.

Schropp, S.J. and H.L. Windom. 1988. A Guide to the Interpretation of Metal Concentrations in Estuarine Sediments. April 1988.

Schropp, S.J. et al. 1990. Interpretation of metal concentrations in estuarine sediments of Florida using aluminum as a reference element. Estuaries 13(3):227-235.

Surfside (Town of Surfside). 2014. Update. Sand Testing Results. May 14, 2014.

Teaf, C.M., and D.J. Covert. 2012. Risk considerations related to arsenic exposure: Drinking water ingestion versus dietary intake or soil exposure. Proceedings of the Annual International Conference on Soils, Sediments, Water and Energy. Volume 17(1): 114-122.

Teaf, C.M., D.J. Covert, P.A. Teaf, E. Page, and M.J. Starks. 2010. Arsenic Cleanup Criteria for Soils in the US and Abroad: Comparing Guidelines and Understanding Inconsistencies. Soil & Sediment Contamination Volume 15, Chapter 9, pp. 94-102..

Terracon (Terracon Consultants, Inc.). 2014. Beach sand chemical testing, Town of Surfside, Miami-Dade County, Florida. May 9, 2014.

USEPA (U.S. Environmental Protection Agency). 2001. Florida's Inshore Marine Monitoring and Assessment Program (IMAP). Annual Report, Year Two. Environmental Research laboratory Office of Research and Development. U.S. EPA Gulf Breeze, Florida 32561. IMAP Annual Report 2000/2001. May 9, 2001.

Available on the website located at http://www.floridamarine.org/features/categroy_sub.asp?id=3448.

USEPA (U.S. Environmental Protection Agency). 2005. Toxicological Review of Ingested Inorganic Arsenic.

USEPA (U.S. Environmental Protection Agency). 2007. Inorganic arsenic. TEACH Chemical Summary.

USEPA (U.S. Environmental Protection Agency). 2014a. Integrated Risk Information System – Inorganic Arsenic. Available on the website located at http://www.epa.gov/iris/subst/0278.htm.

Uthus, E.O. 1994. Arsenic essentiality studies and factors affecting its importance. pp. 199-208. In: Chappell, et al. (eds). Arsenic: Exposure and Health. Science and Technology Letters, Essex, UK.

Uthus, E.O. 1997. Arsenic: Essentiality and estimation of a possible requirement. Annual Meeting of the Society for Risk Analysis, Washington, DC. December 7-10, 1997.

Valette-Silver, N.J., Riedel, G.F., Crecelius, E.A. 1999. Elevated arsenic concentrations in bivalves from the southeast coasts of the USA. Marine Environ. Res. 48:311-333.

Windom, H.L., Schropp, S.J., Calder, F.D., et al. 1989. Natural trace metal concentrations in estuarine and coastal marine sediments of the southeastern United States. Environ. Sci. Technol. 23(3):314-320.

WHO. 2001. Environmental Health Criteria 224: Arsenic and Arsenic Compounds. World Health Organization, Geneva, Switzerland.

Terracon

May 9, 2014

Town of Surfside
9293 Harding Avenue
Surfside, Florida 33154

Attention: Mr. Ross Prieto - Building Official

Re: Beach Sand Chemical Testing
Town of Surfside
Miami-Dade County, Florida
Project No. H8141017

Dear Mr. Prieto:

Pursuant to your written authorization Terracon Consultants, Inc. (Terracon) has performed sampling and laboratory testing and analysis of two soil samples recovered from the beach in the Town of Surfside. This letter summarizes the sampling procedure and furnishes the results of the chemical analyses performed.

On May 6, 2014 a Terracon representative recovered two samples of sand from the beach at the approximate locations prescribed by you. We understand that the soil was imported to the subject site for a beach renourishment project that extended from 88th Street to 96th street in the Town of Surfside. Based on discussions with you, we further understand that the sand was obtained from a site located at 9011 Collins Avenue, Miami which supported a structure built in 1935 and demolished early this year. The structure served as a social club with a pool deck. The material from the source site was excavated, transported to the beach and placed starting at the south limit of the project (88th Street) and working due north towards 96th Street. The terminal depth of excavation at the source site was approximately 15 feet below grade.

The samples were recovered over a depth of 12-inches (as measured from the surface grade) using a stainless steel scoop. The sample locations were as follows:

Sample No. 88 (88th Street) – 8' south and 4' east of emergency pole # 16.
Sample No. 94 (94th Street) – 12' south and 5' east of emergency pole # 5.

The samples were transported to Pace Analytical Services, Inc. where they were analyzed for Total Recoverable Petroleum Hydrocarbons (TRPH) using the FL-PRO method and fourteen metals using EPA Method 6010 (preparation per method EPA 3050). The metals analysis included Arsenic (As), Aluminum (Al), Barium (Ba), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni), Selenium (Se), Silver (Ag), and Zinc (Zn).

Results of the analyses are tabulated on the attached sheet and compared with the soil cleanup target levels (SCTLs) presented in Florida Administrative Code Chapter 62-777 (Contaminated

Site Cleanup Criteria Rule, Risk Impact Statement) for residential and commercial use settings. Review of the analytical results shows that all parameters, save for arsenic, have concentrations below the residential and commercial SCTLs. The concentrations of arsenic were 7.8 and 7.0 for sample Nos. 88 and 94, respectively. The concentrations are above the SCTL of 2.1 mg/kg for residential exposure settings but below the 12 mg/Kg threshold for commercial use settings.

Results of several studies on the background concentrations of chemicals in soils in Miami-Dade County were recently presented by Mr. Wilbur Mayorga, M.S.,P.E. of Environmental Monitoring and Restoration Division (DERM) on February 27, 2014 to the 'Contaminated Media Forum – Background Work Group' and were published in the Miami-Dade County website (http://www.miamidade.gov/environment/research-reports.asp). Review of the results presented in this study shows that anthropogenic background concentration for arsenic in soil in the project area is 5.2 mg/kg, which is of the same order of magnitude found in the samples that we analyzed.

Based on the sequence of events during the excavation and filling for the renourishment project, one can infer that the shallow excavated material was placed near the southern limits of the renourishment area and the deeper material near its northern limits. Consequently, it is believed that the sand sampled near 88th Street and that sampled near 94th Street are representative of the shallow and deep portions of the cut, respectively. Based on our understanding of the sequence of events during excavation, the similarity of the two sand samples in terms of arsenic concentrations and their close proximity to the values reported in the literature as 'background' for the area, leads us to believe that the concentrations measured in the laboratory tests reflect background levels.

Terracon appreciates the opportunity to assist you on this project. Should you require any clarification or amplification, please contact us.

Very truly yours,
TERRACON

Juan Ramirez, P.E.
Project Engineer
FL Registration No. 76173

Thomas J. Tepper, P.E
Senior Engineer
FL Registration No. 27451

ATTACHMENT:

ANALYTICAL RESULTS

METAL	RESULT (mg/kg)		RESIDENTIAL LIMITS (mg/kg)	COMMERCIAL /INDUSTRIAL LIMITS (mg/kg)
	Sample No 88	Sample No 94		
TRPH	2.7 U	2.6 U	460	2700
Arsenic (As)	7.8	7.0	2.1	12
Aluminum (Al)	271	165	80,000	*
Barium (Ba)	12.5	8.7	120**	130,000
Cadmium (Cd)	0.073	0.028 I	82	1700
Chromium (Cr)	5.6	5.3	210	470
Copper (Cu)	3.6	0.85	150**	89,000
Iron (Fe)	1410	1170	53,000	*
Lead (Pb)	9.5	2.8	400	1,400
Manganese (Mn)	18.2	12.8	3,500	43,000
Mercury (Hg)	0.010	0.0043 U	3	17
Nickel (Ni)	0.44	0.26	340**	35,000
Selenium (Se)	0.40 U	0.38 U	440	11,000
Silver (Ag)	0.13 U	0.13 U	410	8,200
Zinc (Zn)	22.2	6.6	26,000	630,000

* Contaminant is not a health concern for this exposure scenario.
** Direct exposure value based on acute toxicity considerations.
U Indicates that the compound was analyzed for, but not detected.
I Indicates that the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Terracon

May 5, 2014

Town of Surfside
9293 Harding Avenue
Surfside, Florida 33154

Attention: Mr. Ross Prieto - Building Official

Re: Beach Sand Chemical Testing
Town of Surfside
Miami-Dade County, Florida
Project No. H8141017

Dear Mr. Prieto:

Pursuant to our written authorization Terracon Consultants, Inc. (Terracon) has completed laboratory testing and analysis of the beach sand soil samples delivered to our laboratory by a Town of Surfside representative. This letter summarizes the chemical analysis performed on one of the samples.

We understand that soil samples delivered to our laboratory were sampled (sampling procedures unknown) from in-place fill that was used for a beach renourishment project in the Town of Surfside and require chemical testing. Three samples were delivered in 5-gallon buckets labeled sample No. 88, 92 and 96. A sample was recovered from bucket labeled No. 88 and was bottled in a 250 milliliter glass container and transported to Pace Analytical Services, Inc. where it was analyzed for Total Recoverable Petroleum Hydrocarbons (TRPH) using the FL-PRO method and fourteen metals using EPA Method 6010 (preparation per method EPA 3050). The metals analysis included Arsenic (As), Aluminum (Al), Barium (Ba), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni), Selenium (Se), Silver (Ag), and Zinc (Zn).

Results of the analyses are tabulated on the attached sheet and compared against the soil cleanup target levels (SCTLs) presented in Florida Administrative Code Chapter 62-777 (Contaminated Site Cleanup Criteria Rule, Risk Impact Statement) for residential and commercial use settings. Review of the analytical results shows that all parameters, save for arsenic, have concentrations below the residential and commercial SCTL levels. The detected concentration for arsenic is 8.9 mg/Kg which is above the SCTL of 2.1 mg/kg for residential exposure limit, but below the 12 mg/Kg threshold for commercial use settings. Terracon recommends performing additional testing on specimens properly sampled from in-place to avoid the potential for cross-contamination.

Terracon appreciates the opportunity to assist you on this project. Should you require any clarification or amplification, please contact us.

Very truly yours,
TERRACON

Juan Ramirez, P.E.
Project Engineer
FL Registration No. 76173

JUAN CARLOS RAMIREZ
LICENSE
No. 76173
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Thomas J. Tepper, P.E
Senior Engineer
FL Registration No. 27451

ATTACHMENT:

ANALYTICAL RESULTS

METAL	RESULT (mg/kg)	RESIDENTIAL LIMITS (mg/kg)	COMMERCIAL /INDUSTRIAL LIMITS (mg/kg)
TRPH	2.5 **U**	460	2700
Arsenic (As)	8.9	2.1	12
Aluminum (Al)	280	80,000	*
Barium (Ba)	12.1	120**	130,000
Cadmium (Cd)	0.056	82	1700
Chromium (Cr)	5.5	210	470
Copper (Cu)	3.3	150**	89,000
Iron (Fe)	1580	53,000	*
Lead (Pb)	9.8	400	1,400
Manganese (Mn)	20.1	3,500	43,000
Mercury (Hg)	0.0063 **I**	3	17
Nickel (Ni)	0.33	340**	35,000
Selenium (Se)	0.36 **U**	440	11,000
Silver (Ag)	0.12 **U**	410	8,200
Zinc (Zn)	22.0	26,000	630,000

* Contaminant is not a health concern for this exposure scenario.
** Direct exposure value based on acute toxicity considerations.
U Indicates that the compound was analyzed for, but not detected.
I Indicates that the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

LANDSCIENCE
Environmental Consultants and Engineers

December 10, 2014

Mr. John Di Censo
Town of Surfside
Municipal Building
9293 Harding Avenue
Surfside, FL 33154

Subject: Soil Assessment Report for the
Town of Surfside Coastal Area
Located at between 88th Street and 95th Street
Surfside, Miami-Dade County, FL
LandScience Project Number: 2146811

Dear Mr. John Di Censo,

Please find attached two copies of this Soil Assessment Report (1 hard copy and 1 cd copy) are attached for your review.

LandScience appreciates the opportunity to assist you on this project. We look forward to providing you with our services again in the near future. Please feel free to contact us if you have questions concerning the report.

Yours Very Truly,

LandScience, Inc.

Andrew Whitaker
Project Manager

Rob Ludicke, M.Sc., REP # 5985
President

SOIL ASSESSMENT REPORT

for the

TOWN OF SURFSIDE COASTAL AREA
Located Between 88th Street and 95th Street
Surfside, Miami-Dade County, Florida

Prepared for

TOWN OF SURFSIDE
Municipal Building
9293 Harding Avenue
Surfside, Florida 33154

Prepared by

LANDSCIENCE, INC.
12570 Northeast 7th Avenue
North Miami, Florida 33161

December 2014
LandScience Project No. 2146811

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1.0 INTRODUCTION

This report presents a summary of activities and results of a Soil Assessment Report conducted for the following property:

Town of Surfside Coastal Area
Located Between 88th Street and 95th Street
Surfside, Miami-Dade County, Florida

The report presents the information gathered during the assessment, the methodologies utilized, and an evaluation of the information. It also includes our conclusions concerning environmental conditions at the above referenced property, and our recommendations for further environmental assessment, if necessary. Unless otherwise noted, the above referenced property will be referred to as the "subject property" throughout this report. This section presents a description of the subject property, the project background and objectives, and the scope of work performed.

During October 2014, LandScience was authorized to conduct a Soil Assessment of the Town of Surfside coastal sands between 88th Street and 95th Street. The Soil Assessment was conducted in accordance with LandScience's Proposal Number 2148838, dated October 9, 2014, and in general accordance with the American Society for Testing and Materials document *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process* (ASTM E 1903 02). **Figure 1** is a 2013 aerial photograph showing the study area.

This Soil Assessment is not intended to be a comprehensive subsurface assessment of the entire area. The intent of the Soil Assessment is to assist the client in understanding the implications of existing environmental concerns that may be present at the subject property based on a reasonable level of field exploration and on the laboratory test data presented in this report. LandScience makes no final judgment nor is responsible for the independent conclusions, opinions, or recommendations made by others.

1.1 Site Description

The subject property, coastal areas in the vicinity of 85th Street (North Shore Open Space Park), between 88th Street and 95th Street, and approximately 100 feet north of the Haulover Inlet, is located in Section 35, Township 52 South, Range 42 East, in Surfside, Miami-Dade County, Florida.

1.2 Project Background and Objectives

Review of a Beach Sand Chemical Testing report prepared by Terracon and dated May 9, 2014, indicated that Terracon identified arsenic impacted sand along the stretch of beach between 88th and 95th Streets in the town of Surfside, which was re-nourished with imported sand from the Surf Club reconstruction project during April 2014.

Based on this information, LandScience was retained to conduct a soil assessment in and effort to determine the suitability of the re-nourishment sand for placement in the dune field at selected appropriate locations immediately to the west of the Surfside beach.

1.3 Scope of Work

The scope of work for the Soil Assessment consisted of the following:

- The collection of forty-eight (48) soil samples from the 0 to 1 foot interval below land surface (bls) combined into eight (8) composite soil samples (6 composite soil samples from the study area and 2 composite soil samples from the control areas to the north and south of the study area) using a stainless-steel hand auger. Please note that upon initial sample collection it was determined that due to the well sorted and

dry conditions of the soil/sand, the stainless-steel auger was not able to collect the samples; therefore, grab samples were collected by hand.

- Laboratory analysis of the eight (8) composite soil samples for 8 Resource Conservation Recovery Act (RCRA) metals by Environmental Protection Agency (EPA) Method 6010, total recoverable petroleum hydrocarbons (TRPHs) by the Florida Department of Environmental Protection (FDEP) FL-PRO Method, chlorinated pesticides by EPA Method 8081, and polychlorinated biphenyls (PCBs) by EPA Method 8082.

- In addition, the six (6) composite soil samples from the 0 to 1 foot interval bls were analyzed for 8 RCRA metals using the Synthetic Precipitation Leachate Procedure (SPLP) Method.

- The preparation of a Soil Assessment Report summarizing all field activities and laboratory analytical results.

1.4 Health and Safety Plan

LandScience developed a Health and Safety Plan specific to the subject property as required by the Occupational Safety and Health Administration (OSHA) in accordance with Waste Operations and Emergency Response 29 CFR 1910.120. The Health and Safety Plan was prepared to reduce the risk of physical or chemical exposure that may affect on-site workers in the work area.

2.0 SOIL ASSESSMENT ACTIVITIES

This section is a discussion of soil assessment activities conducted at the subject property on October 31, 2014.

2.1 Soil Sampling and Analysis

On October 31, 2014, a representative of LandScience collected soil samples, SS-1 through SS-48 at the subject property. Specifically, soil samples, SS-1 through SS-6 [Control Composite Soil Sample (CCSS) 1], were collected from the control area to the south in the vicinity of 85th Street (North Shore Open Space Park); soil samples, SS-7 through SS-42 [Composite Soil Samples (CSS) 2 through 7] were collected from in the study area between 88th Street and 95th Street; and soil samples, SS-43 through SS-48 (CCSS-8), were collected from the control area to the north approximately 100 feet north of the Haulover Inlet. The approximate soil sample locations are depicted on **Figures 2a** through **2h**.

Soil samples were collected at the 0-1 foot bls interval from each location by hand. Prior to the collection of the soil samples, the LandScience representative donned a new, unused nitrile glove. The soil samples from each composite set were placed into a plastic re-sealable bags for mixing. The soil samples were then introduced into pre-cleaned sample containers, placed on ice, and transported to Florida Spectrum Environmental Services, Inc., for laboratory analysis. Composite soil samples, CCSS-1, CCSS-2, and CSS-2 through CSS-7 were analyzed for 8 RCRA metals by EPA Method 6010, organochlorine pesticides by EPA Method 8081, TRPHs by the FL-PRO Method, and for PCBs by EPA Method 8082. Chain of custody documentation accompanied the samples to the laboratory.

3.0 SOIL ASSESSMENT RESULTS

3.1 Soil Analytical Results

The laboratory soil analytical results indicated the following:

Heavy Metals

Concentrations of arsenic were detected in composite soil samples, CCSS-1, CSS-1, CSS-2, CSS-3, CSS-4, CSS-5, and CSS-6, at levels which exceeded the soil cleanup target level for residential properties as established by the FDEP in Chapter 62-777, of the Florida Administrative Code (F.A.C.), Table II, *Soil Cleanup Target Levels (SCTLs),* but were below the FDEP SCTLs for commercial properties. The concentrations of the remaining heavy metals tested in CCSS-1, CSS-1, CSS-2, CSS-3, CSS-4, CSS-5, and CSS-6 were either below the method detection limits or the FDEP SCTLs.

Heavy metal concentrations in composite soil sample, CCSS-2, were either below the method detection limits, or the FDEP SCTLs.

Organochlorine Pesticides

Organochlorine pesticide concentrations in composite soil samples, CCSS-1, CSS-1, CSS-2, CSS-3, CSS-4, CSS-5, CSS-6, and CCSS-2, were either below the method detection limits, or the FDEP SCTLs.

Total Recoverable Petroleum Hydrocarbons

TRPH concentrations in composite soil samples, CCSS-1, CSS-1, CSS-2, CSS-3, CSS-4, CSS-5, CSS-6, and CCSS-2, were either below the method detection limits, or the FDEP SCTLs.

Polychlorinated Biphenyls

PCB concentrations in composite soil samples, CCSS-1, CSS-1, CSS-2, CSS-3, CSS-4, CSS-5, CSS-6, and CCSS-2, were either below the method detection limits, or the FDEP SCTLs.

Heavy Metal SPLP

Heavy metal concentrations using the SPLP method in composite soil samples, CCSS-1, CSS-2, CSS-3, and CCSS-2, were either below the method detection limits, or below the leachability based on groundwater criteria [e.g., groundwater cleanup target levels established by the FDEP in Chapter 62-777, of the F.A.C., Table I, *Groundwater Cleanup Target Levels (GCTLs)*].

However, lead concentrations using the SPLP method in composite soil samples, CSS-1, CSS-4, CSS-5, and CSS-6, were detected at levels which exceeded the FDEP GCTLs, but were below the FDEP "Low Yield/Poor Quality" criterion as established in Chapter 62-777, of the F.A.C., which is equal to 10 times the applicable chemical-specific groundwater criterion.

The laboratory analytical results are depicted in **Figures 3a-3h** through **Figures 6a-6h**, and are summarized in **Table 1** through **Table 4**. A copy of the laboratory data report including chain of custody documentation is included in **Appendix A**.

4.0 CONCLUSIONS AND RECOMMENDATIONS

This section summarizes conclusions based on the information obtained during the Soil Assessment of the Town of Surfside Coastal Areas between 88th Street and 95th Street in Surfside, Miami-Dade County, Florida.

The laboratory analytical results indicated that the Surfside beach sand has not been impacted by organochlorine pesticides, polychlorinated biphenyls, total recoverable petroleum hydrocarbons, or arsenic, barium, chromium, lead, mercury, selenium, or silver at levels which will require further assessment or remediation.

The laboratory analytical results indicated that arsenic concentrations ranged from 3.8 to 6.46 mg/Kg in the re-nourishment sand samples (mean 5.4 mg/Kg), and from 1.8 to 2.39 mg/Kg in the control sand samples. Therefore, the arsenic concentrations present in the re-nourishment sand and control sand were consistent with natural background for this and other areas of coastal Florida, as indicated by a body of sampling data from LandScience and a number of reputable sources [i.e., Kimley-Horn (2014), Terracon (2014)]. Such arsenic background ranges from less than 1 mg/kg to over 15 mg/kg in Miami-Dade County with a central tendency estimate of 5.2 mg/Kg. Samples collected from both control sand locations and re-nourishment sand locations (1.8 mg/Kg to 6.46 mg/Kg) fall in the low to middle of the background range. It should be noted that naturally occurring background is indicative of conditions that are geological in origin and do not represent human activities.

Furthermore, based on evaluation of the previous similar data for sand samples, the Florida Department of Health (FDOH) concluded that there was not a significant increased health risk related to exposure to arsenic in the beach sand, even assuming lifetime exposure (FDOH, 2014). The FDOH statement supplemented the earlier conclusions of Dr. Samir Elmir, Ph.D, P.E., Director of Environmental Health & Engineering Services for the Florida Department of Health in Miami-Dade. In addition, Mr. Wilbur Mayorga, P.E., Chief of the Environmental Monitoring and Restoration Division of the Miami-Dade County Department of Regulatory and Economic Resources (DRER) has concluded that the test results are consistent with naturally occurring arsenic levels on the barrier islands in Miami-Dade County, which showed a Minimum Variance Unbiased

Estimate (MVUE) of 5.2 mg/kg and a maximum of 15.1 mg/kg (Mayorga, 2004; Mayorga, 2014; Surfside, 2014).

Based on this information, it is the opinion of LandScience that the Surfside re-nourishment sand is suitable for placement in the dune field at selected appropriate locations immediately to the west of the Surfside beach.

5.0 REFERENCES

Reports

Florida Department of Environmental Protection, December 2005, *Chapter 62 of the Florida Administrative Code (FAC 62) Part 777*

American Society for Testing and Materials, *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process (ASTM E 1903 02).*

Kimley-Horn, *2014 Laboratory data reports and sample location figures. May, 2014.*

FDOH (Florida Department of Health)/ATSDR (Agency for Toxic Substances and Disease Registry), *1996a. Health Consultation. Barker Chemical Site, Inglis, Levy County, Florida. August 8, 1996.*

FDOH (Florida Department of Health)/ATSDR (Agency for Toxic Substances and Disease Registry), *1996b. Exposure Investigation Report, Barker Chemical Site, Inglis, Levy County, Florida. August 13, 1996.*

FDOH (Florida Department of Health), *2014 E-mail from Dr. Samir Elmir, Miami Dade Health Department, to Michael P. Crotty, Town Manager, Town of Surfside, regarding arsenic found in beach sand at the Surf Club. May 14, 2014.*

Mayorga, W., *2004 Memorandum from Wilbur Mayorga, Pollution Remediation Section, to Jose Gonzales, Pollution Control Division, regarding natural background soil concentrations for the barrier islands of Miami-Dade County, November 7, 2004.*

Mayorga, W., *2014 Personal communication between Dr. Christopher Teaf and Wilbur Mayorga, May, 2014.*

Miami-Dade County, *2014 Miami-Dade County Anthropogenic Background Study. Miami-Dade Environmental Monitoring and Restoration Division. April 3, 2014.*

Terracon (Terracon Consultants, Inc.), *2014 Beach sand chemical testing, Town of Surfside, Miami-Dade County, Florida. May 9, 2014.*

6.0 LIMITATIONS OF STUDY

The assessment procedure was based on the client's agreement in a level of investigation considered to be prudent from a risk management philosophy and guided by common sense, professional judgment, and evaluation techniques being developed and used by governmental agencies for the investigation of properties subject to possible contamination. LandScience exercised the same degree of care and skill generally exercised by environmental professionals under similar circumstances and conditions. No other warranty is expressed or implied.

Observations and conclusions presented are not scientific certainties, but are solely professional opinions based upon the information available to us which may be incomplete or inaccurate. The services provided herein are in no way intended to be legal advice and should not be relied upon in any way for legal interpretations.

This study and report were prepared on the behalf of and exclusively for the Town of Surfside, solely for their use and reliance in the environmental assessment of the site. In the event this report and the findings herein, in whole or in part, are to be disseminated or conveyed to any other party or entity or used or relied on by any other party or entity, the Town of Surfside and LandScience will require an agreement on the part of said party or entity as to the provisions of the Limitation of Professional Liability and Limitation of Action found in the proposal agreement between the Town of Surfside and LandScience. Those provisions are as follows:

LIMITATION OF PROFESSIONAL LIABILITY and LIMITATION OF ACTION:

The Client, it successors, assigns and all persons or entities receiving and/or relying upon this report or any portion thereof, agree to limit any and all total liability for claims, for damages, cost of defense, or expenses to be asserted against LandScience as a result of its preparation of this report to a sum not to exceed an aggregate limit up to a maximum of $1,000,000 for a period of one year following project initiation. After one year the limits of all liability will not exceed the amount paid to LandScience for its services.

TABLES

TABLE 1
SOIL ANALYTICAL SUMMARY
FOR HEAVY METALS

Facility Name: Town of Surfside Coastal Areas
Facility Address: Between 88th Street and 95th Street

Sample			Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Location	Date	Depth (Ft.)								
CCSS-1	10/31/2014	0 -1	2.39	5.44	0.00380U	4.42	0.559	0.0270U	0.661	0.00550U
CCSS-2	10/31/2014	0 -1	1.80	5.93	0.00380U	3.07	0.317	0.0270U	0.794	0.00550U
CSS-1	10/31/2014	0 -1	6.46	8.41	0.00380U	4.99	4.85	0.0270U	0.618	0.00550U
CSS-2	10/31/2014	0 -1	4.57	5.38	0.00380U	4.07	2.01	0.0270U	0.553	0.00550U
CSS-3	10/31/2014	0 -1	3.80	5.80	0.00380U	3.80	1.75	0.0270U	0.600	0.00550U
CSS-4	10/31/2014	0 -1	5.84	8.95	0.00380U	4.08	5.24	0.0270U	0.556	0.00550U
CSS-5	10/31/2014	0 -1	5.39	7.29	0.00380U	4.04	3.54	0.0270U	0.699	0.00550U
CSS-6	10/31/2014	0 -1	6.44	8.72	0.00380U	4.07	2.62	0.0270U	0.581	0.00550U
FDEP SCTL	Leachability		***	1,600	7.5	38	***	2.1	5.2	17
FDEP SCTL	Direct Exposure Residential		2.1	120	82	210	400	3	440	410
FDEP SCTL	Direct Exposure Commercial		12	130,000	1,700	470	1,400	17	11,000	8,200

LEGEND:
Concentrations in milligrams per kilogram (mg/Kg).
U indicates compound was analyzed but not detected.
*** Leachability values may be derived using the SPLP Test to calculate site-specific SCTLs or may be determined using TCLP in the event oily wastes are present.
FDEP = Florida Department of Environmental Protection.
SCTL = Soil Cleanup Target Level.
Items in bold exceed FDEP SCTLs.

TABLE 2
SOIL ANALYTICAL SUMMARY
FOR ORGANOCCHLORINE PESTICIDES

Facility Name: Town of Surfside Coastal Areas
Facility Address: Between 88th Street and 95th Street

Sample			4,4'-DDT
Location	Date	Depth (Ft.)	
CCSS-1	10/31/2014	0 - 1	0.000239U
CCSS-2	10/31/2014	0 - 1	0.000239U
CSS-3	10/31/2014	0 - 1	0.000239U
CSS-4	10/31/2014	0 - 1	0.0138
CSS-5	10/31/2014	0 - 1	0.000239U
CSS-6	10/31/2014	0 - 1	0.000239U
FDEP SCTL	Leachability		**11**
FDEP SCTL	Direct Exposure Residential		**2.9**
FDEP SCTL	Direct Exposure Commercial		**15**

LEGEND:
Concentrations in milligrams per kilogram (mg/Kg).
U indicates compound was analyzed but not detected.
FDEP = Florida Department of Environmental Protection.
SCTL = Soil Cleanup Target Level.
Items in **bold** exceed FDEP SCTLs.
Only constituents with concentrations above the method detection limits are shown on table.

TABLE 3
SOIL ANALYTICAL SUMMARY
FOR POLYCHLORINATED BIPHENYLS

Facility Name: Town of Surfside Coastal Areas
Facility Address: Between 88th Street and 95th Street

Sample			PCB-1254
Location	Date	Depth (Ft.)	
CCSS-1	10/31/2014	0 - 1	0.000786U
CCSS-2	10/31/2014	0 - 1	0.0863
CSS-3	10/31/2014	0 - 1	0.000786U
CSS-4	10/31/2014	0 - 1	0.000786U
CSS-5	10/31/2014	0 - 1	0.000786U
CSS-6	10/31/2014	0 - 1	0.000786U
FDEP SCTL	Leachability		**17**
FDEP SCTL	Direct Exposure Residential		**0.5**
FDEP SCTL	Direct Exposure Commercial		**2.6**

LEGEND:
Concentrations in milligrams per kilogram (mg/Kg).
U indicates compound was analyzed but not detected.
FDEP = Florida Department of Environmental Protection.
SCTL = Soil Cleanup Target Level.
Items in **bold** exceed FDEP SCTLs.
Only constituents with concentrations above the method detection limits are shown on table.

TABLE 4
SOIL ANALYTICAL SUMMARY
FOR TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Facility Name: Town of Surfside Coastal Areas
Facility Address: Between 88th Street and 95th Street

Sample			TRPH
Location	Date	Depth (Ft.)	
CCSS-1	10/31/2014	0 - 1	0.190U
CCSS-2	10/31/2014	0 - 1	6.70
CSS-3	10/31/2014	0 - 1	0.190U
CSS-4	10/31/2014	0 - 1	5.68
CSS-5	10/31/2014	0 - 1	12.9
CSS-6	10/31/2014	0 - 1	2.00
FDEP SCTL	Leachability		**340**
FDEP SCTL	Direct Exposure Residential		**460**
FDEP SCTL	Direct Exposure Commercial		**2,700**

LEGEND:
Concentrations in milligrams per kilogram (mg/Kg).
U indicates compound was analyzed but not detected.
FDEP = Florida Department of Environmental Protection.
SCTL = Soil Cleanup Target Level.
Items in **bold** exceed FDEP SCTLs.

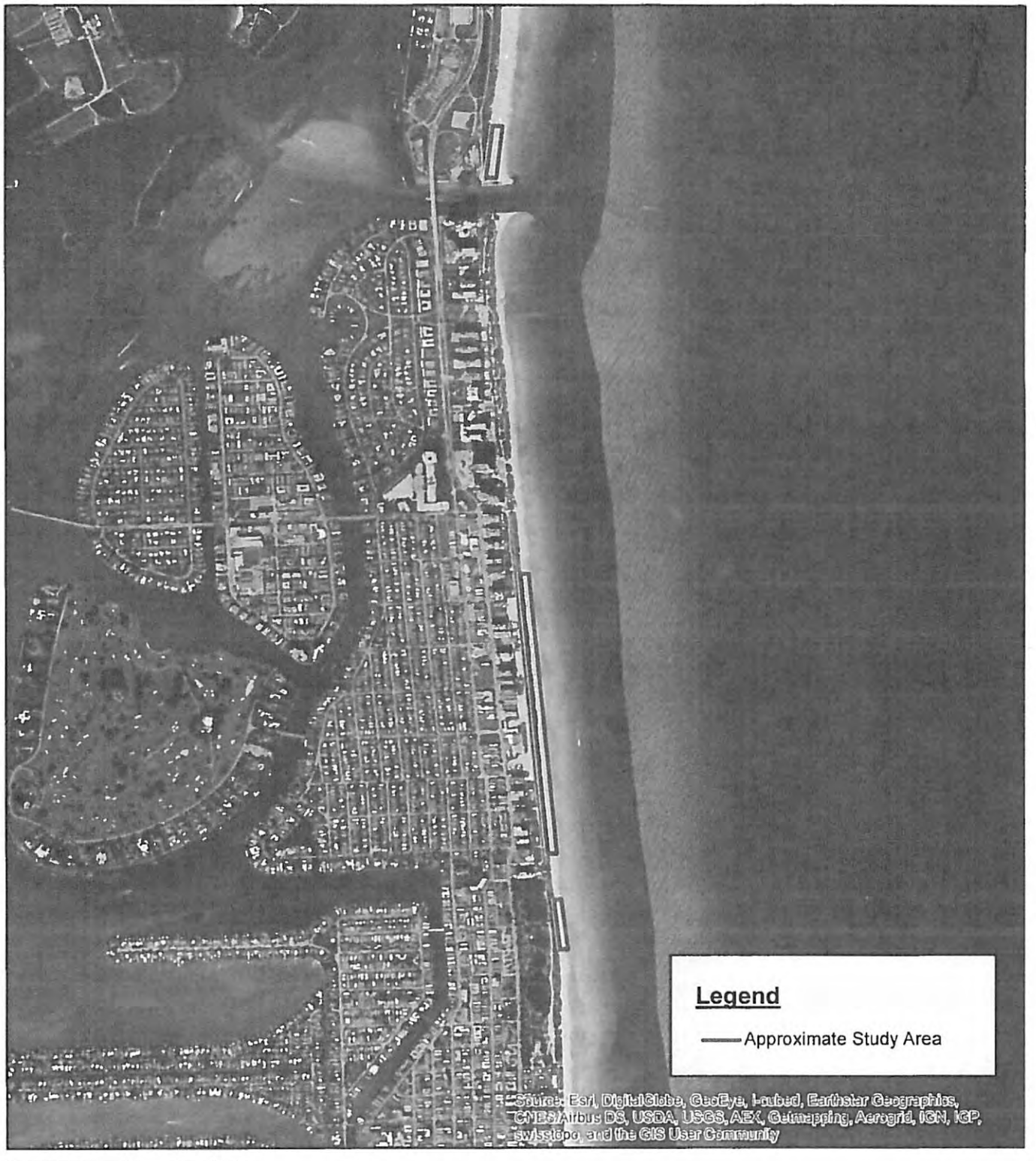
TABLE 5
SOIL ANALYTICAL SUMMARY
FOR HEAVY METALS BY SPLP

Facility Name: Town of Surfside Coastal Areas
Facility Address: Between 88th Street and 95th Street

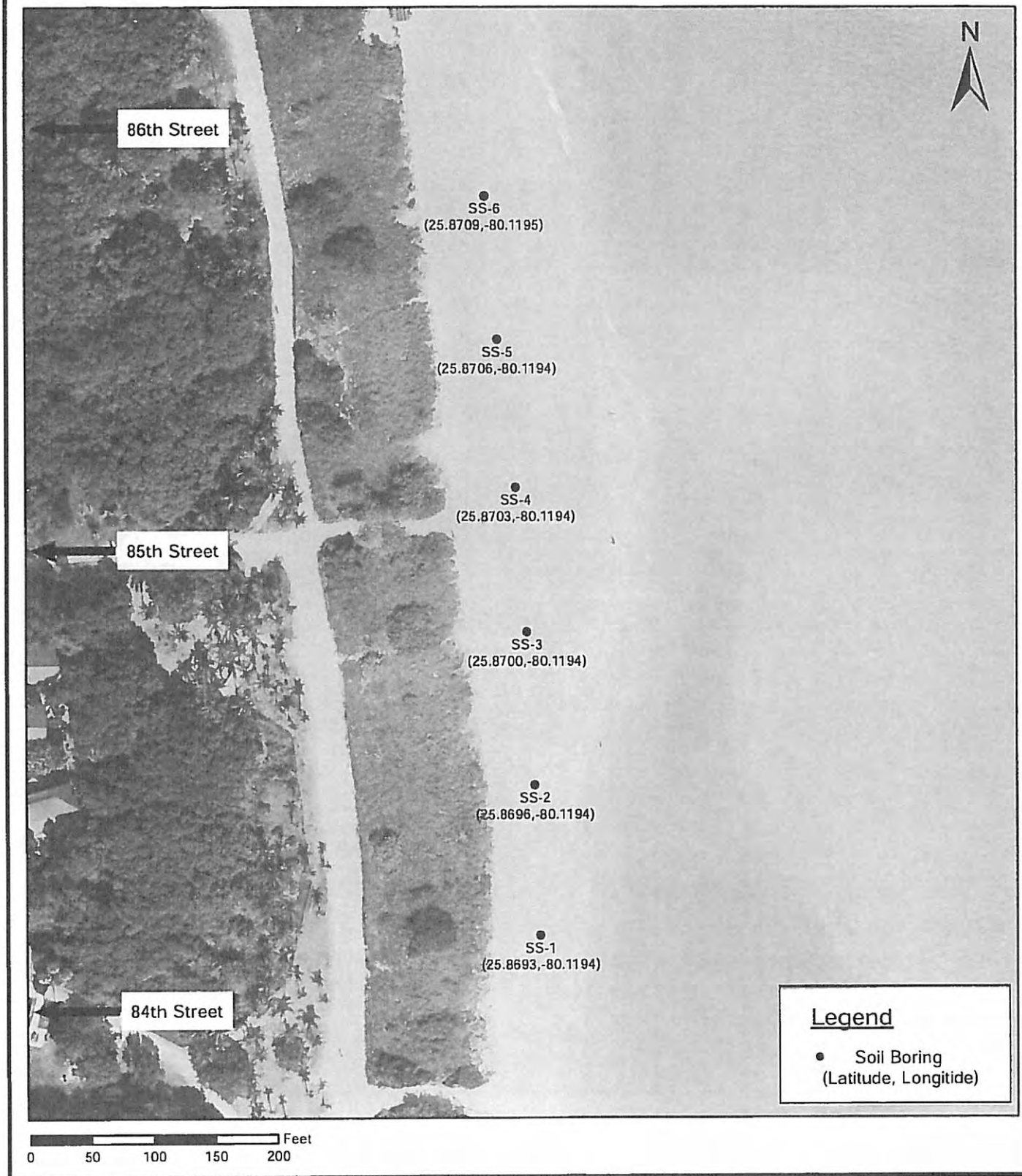
Sample Location	Sample Date	Depth (Ft.)	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
CCSS-1	10/31/2014	0 -1	1.38U	49.0	0.211U	0.751U	2.92U	0.0630U	4.55U	0.260U
CCSS-2	10/31/2014	0 -1	1.38U	88.0	0.211U	0.751U	2.92U	0.0630U	4.55U	0.260U
CSS-1	10/31/2014	0 -1	9.00	61.0	0.211U	8.00	38.00	0.0630U	4.55U	0.260U
CSS-2	10/31/2014	0 -1	3.00I	61.0	0.211U	3.00	12.0	0.0630U	4.55U	0.260U
CSS-3	10/31/2014	0 -1	1.38U	34.0	0.211U	3.00	10.0	0.0630U	4.55U	0.260U
CSS-4	10/31/2014	0 -1	10.0	64.0	0.211U	11.0	50.0	0.0630U	4.55U	0.260U
CSS-5	10/31/2014	0 -1	4.00	40.0	0.211U	5.00	20.0	0.0630U	4.55U	0.260U
CSS-6	10/31/2014	0 -1	4.00	37.0	0.211U	5.00	17.0	0.0630U	4.55U	0.260U
FDEP GCTLs			10	2,000	5	100	15	2	50	100
FDEP Low Yield/Poor Quality Criterion			100	20,000	50	1,000	150	20	500	1,000

LEGEND:
Concentrations in micrograms per liter (ug/L).
U indicates compound was analyzed but not detected.
I indicates concentration between Method Detection Limit and Practical Quantitative Limit
FDEP = Florida Department of Environmental Protection.
GCTL = Groundwater Cleanup Target Level.
Items in bold exceed FDEP Low Yield/Poor Quality Criterion

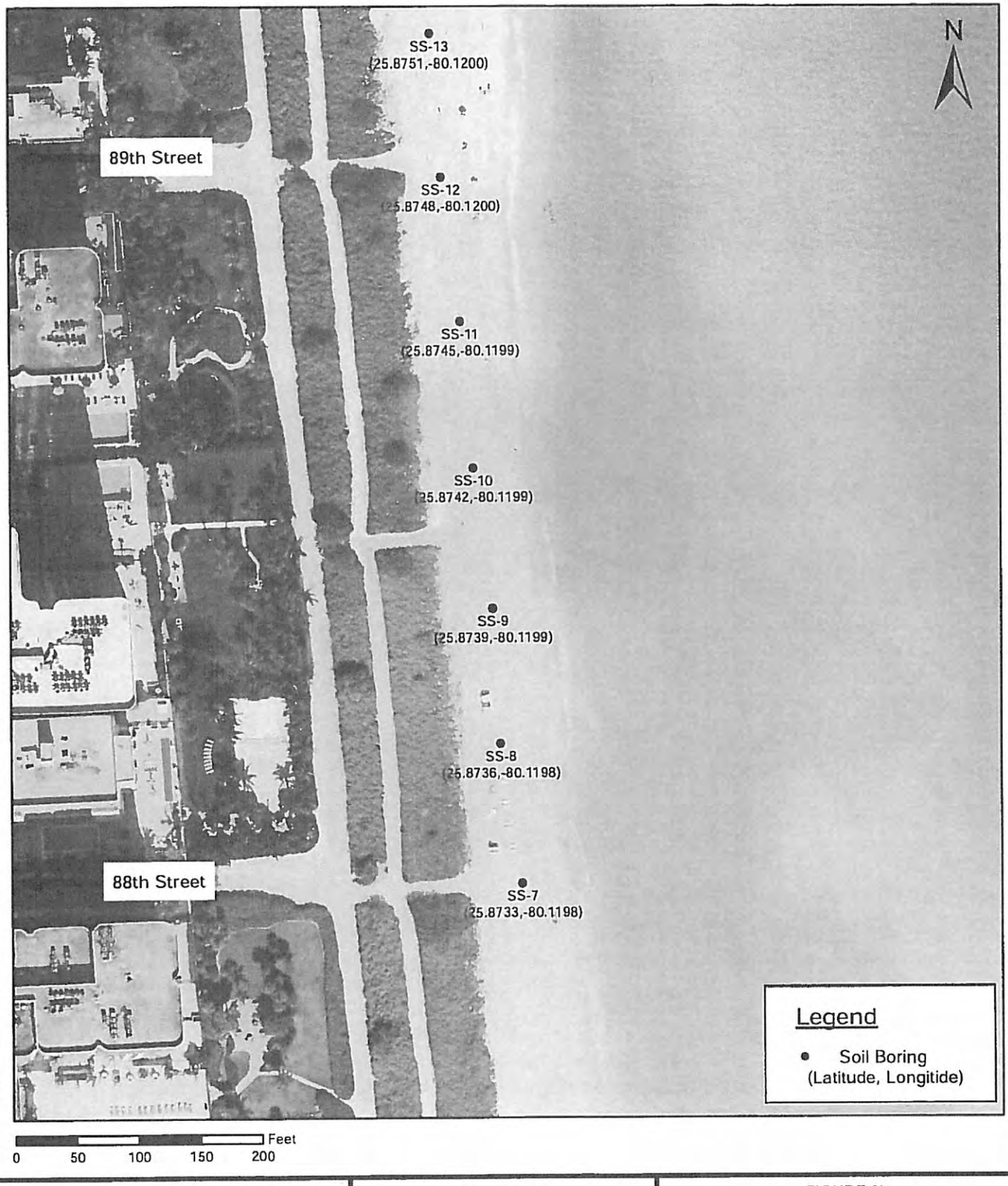
FIGURES



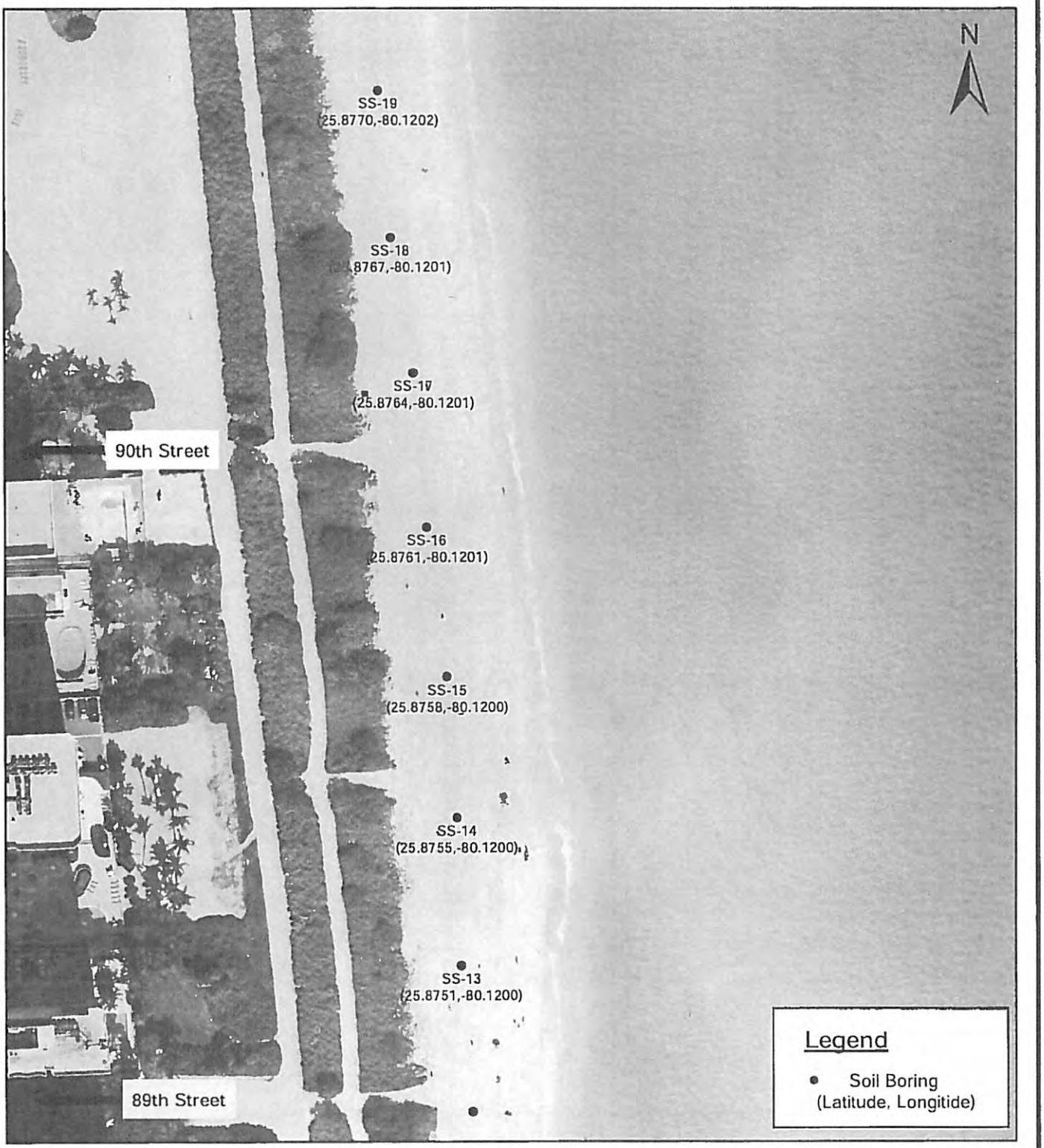
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	**FIGURE 1** **AREA MAP (2013 AERIAL PHOTOGRAPH) SHOWING STUDY AREA** City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



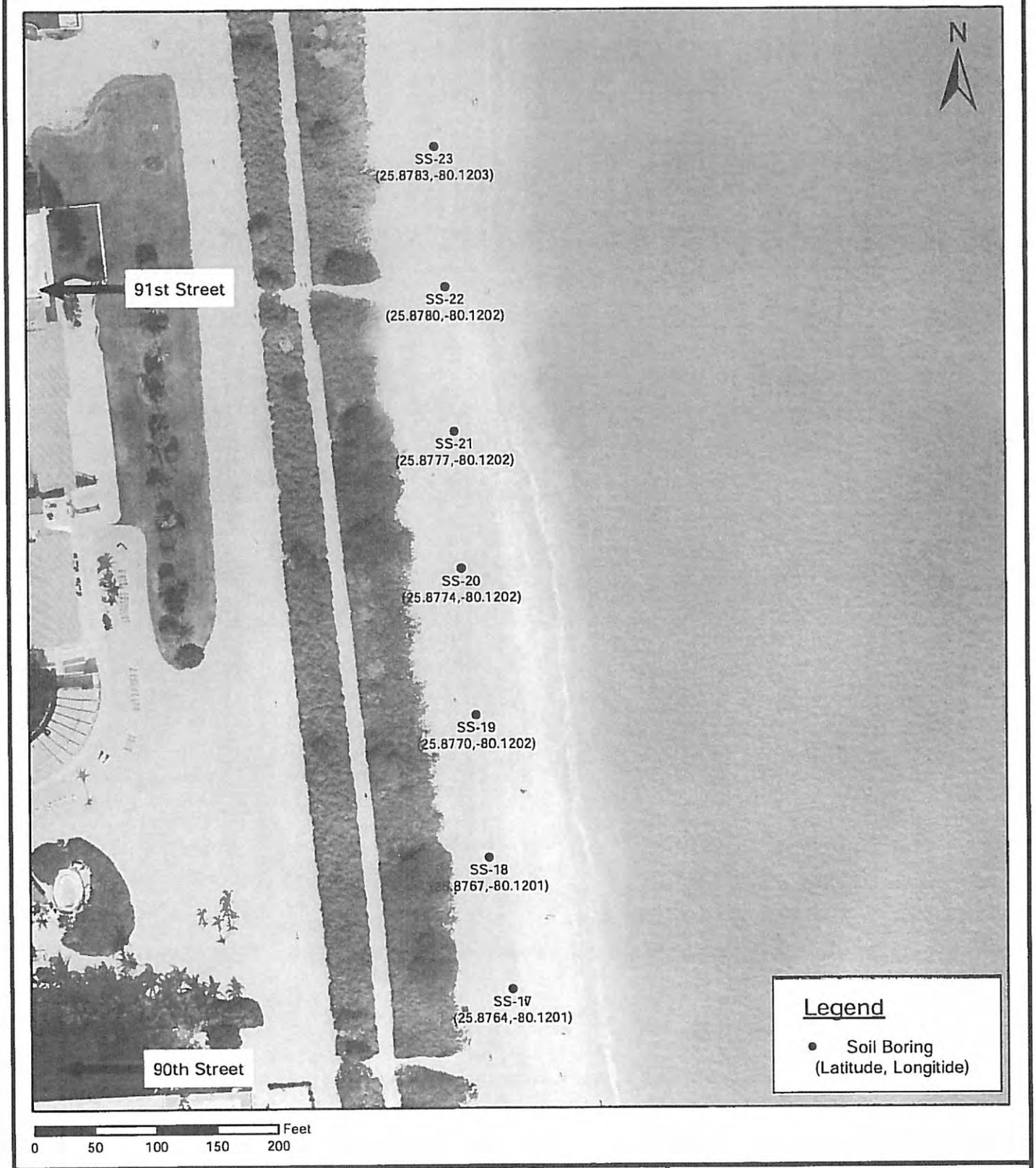
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 2a SOIL BORING LOCATIONS October 31, 2014 (From 84th Street to 86th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



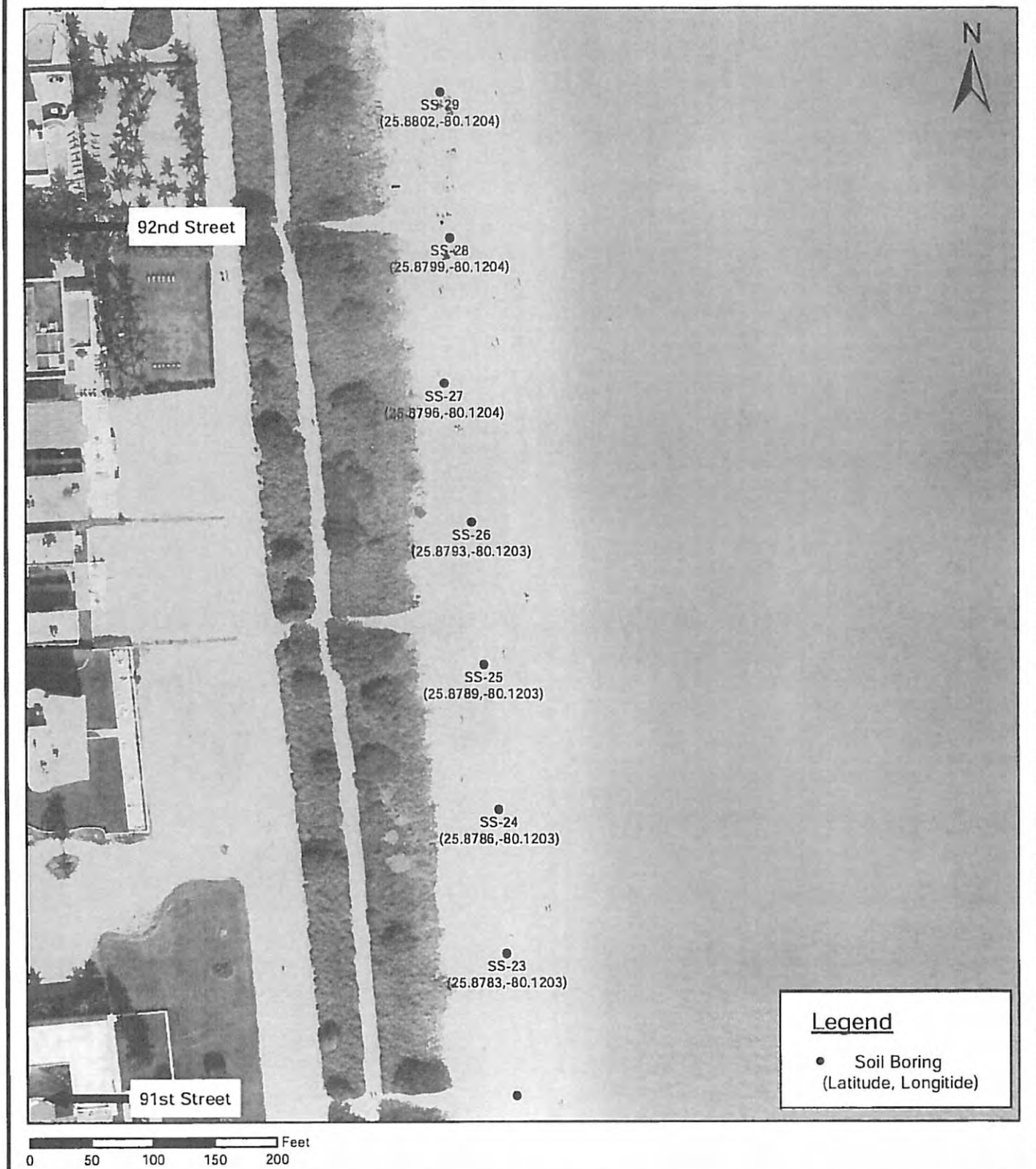
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 2b SOIL BORING LOCATIONS October 31, 2014 (From 88th Street to 89th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



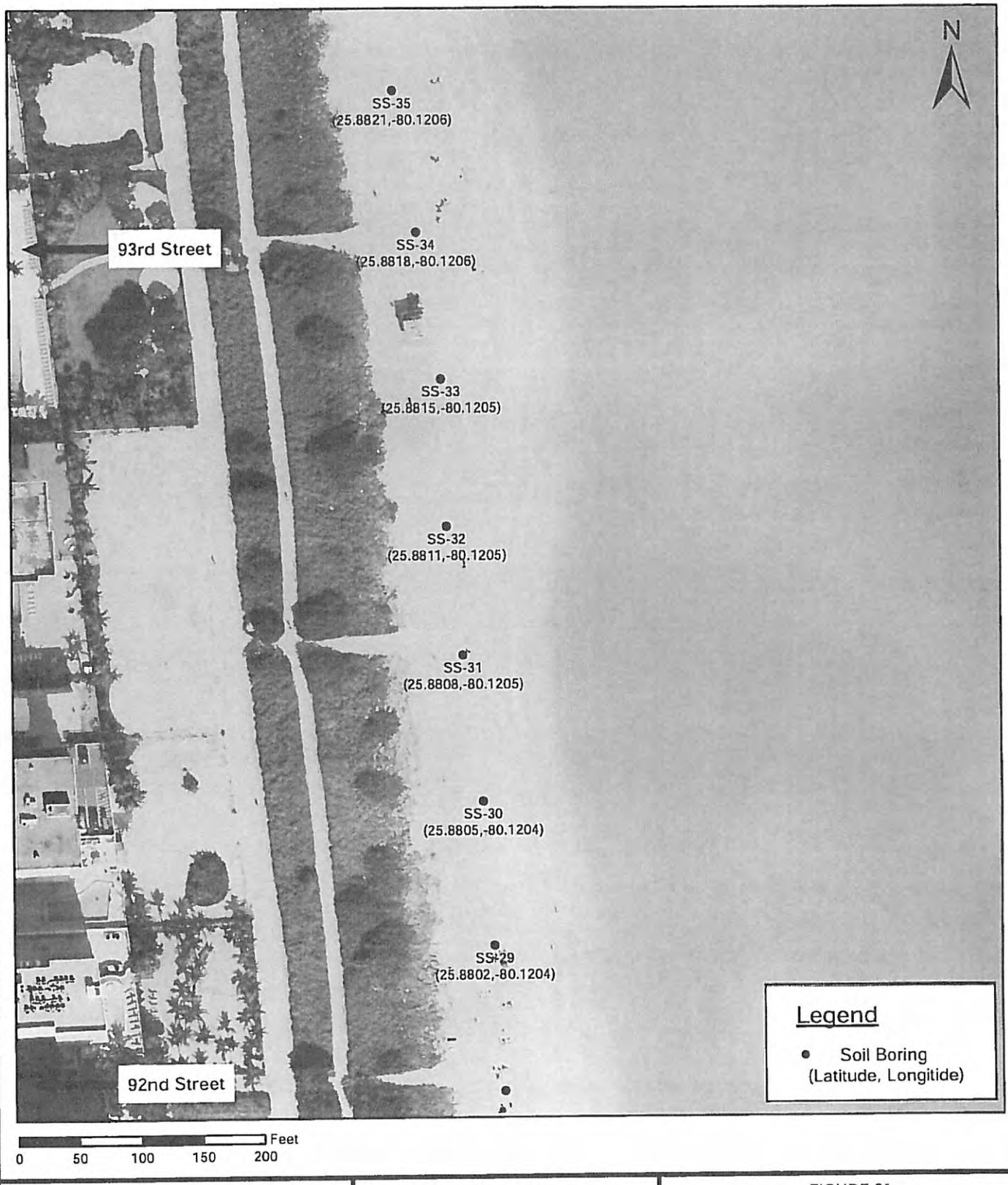
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 2c SOIL BORING LOCATIONS October 31, 2014 (From 89th Street to 90th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



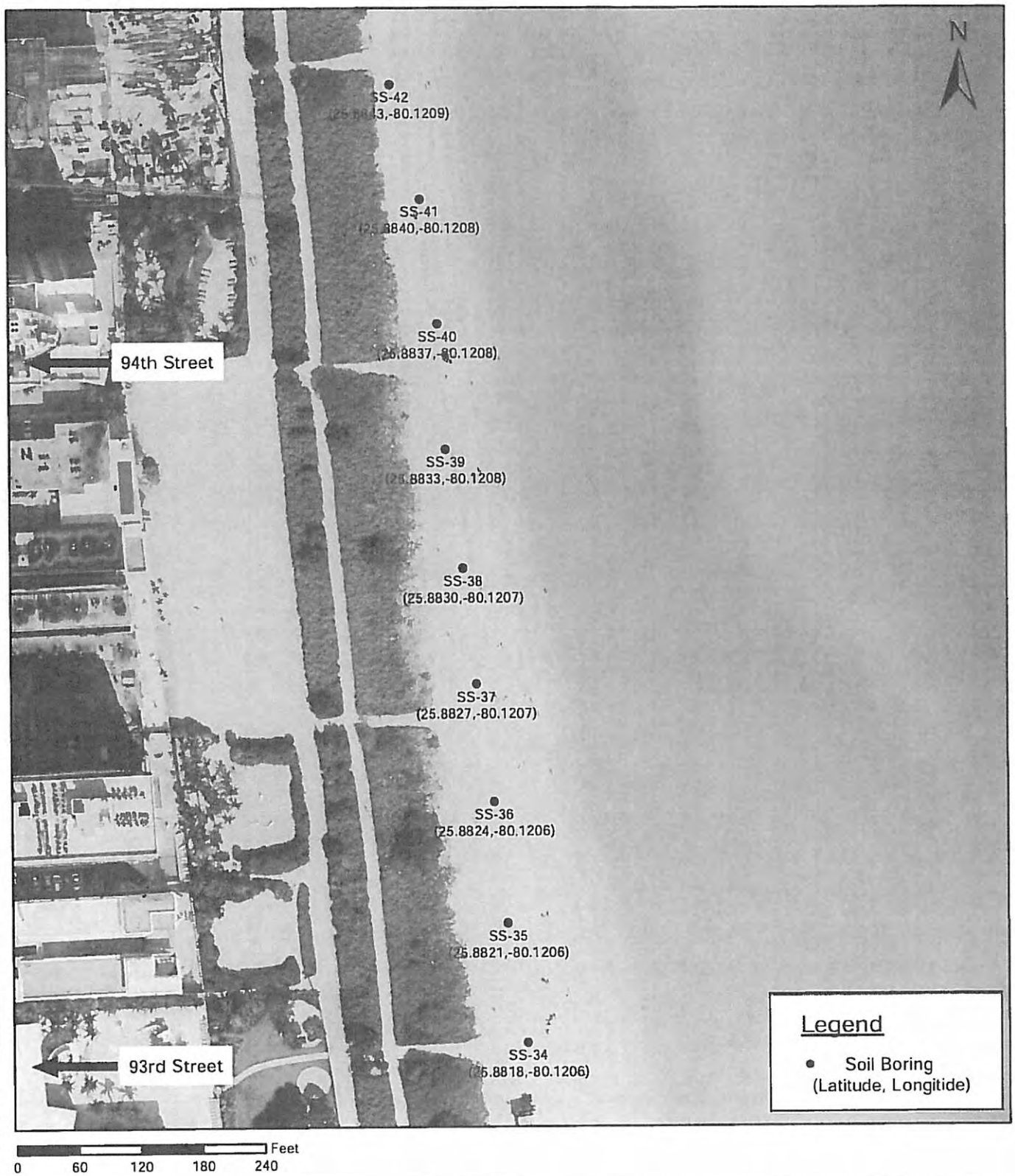
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 2d SOIL BORING LOCATIONS October 31, 2014 (From 90th Street to 91st Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



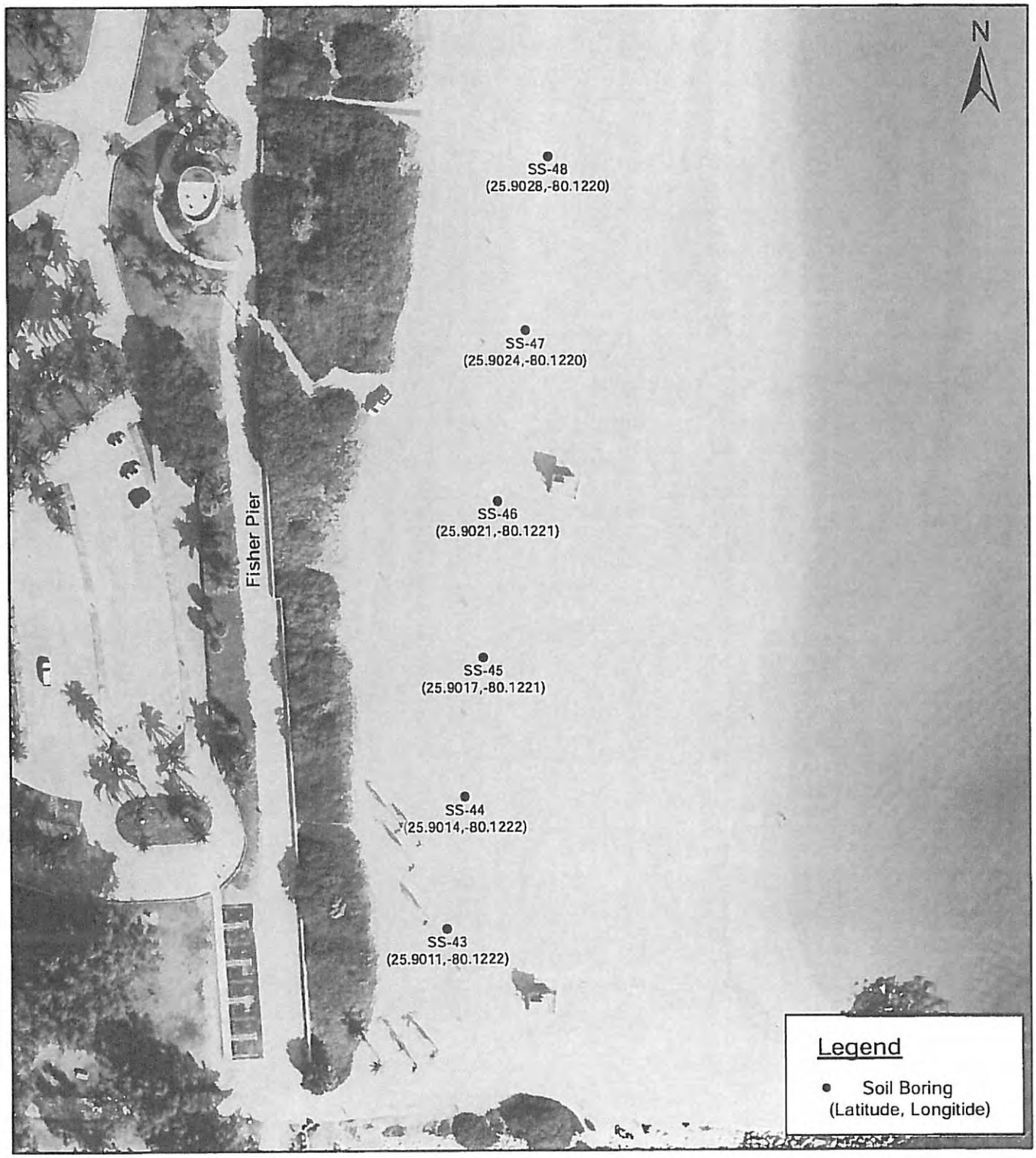
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 2e SOIL BORING LOCATIONS October 31, 2014 (From 91st Street to 92nd Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



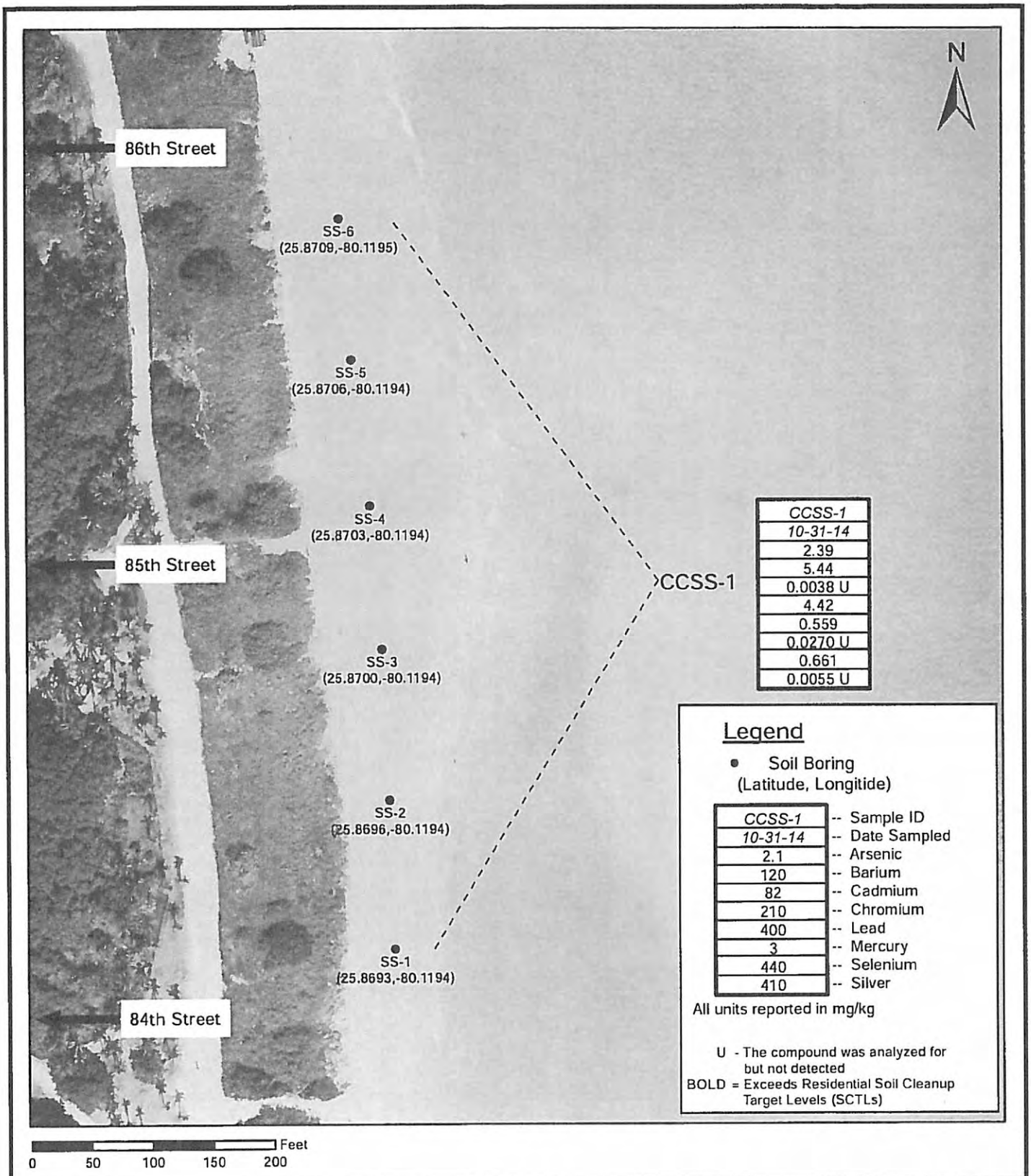
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 2f SOIL BORING LOCATIONS October 31, 2014 (From 92nd Street to 93rd Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



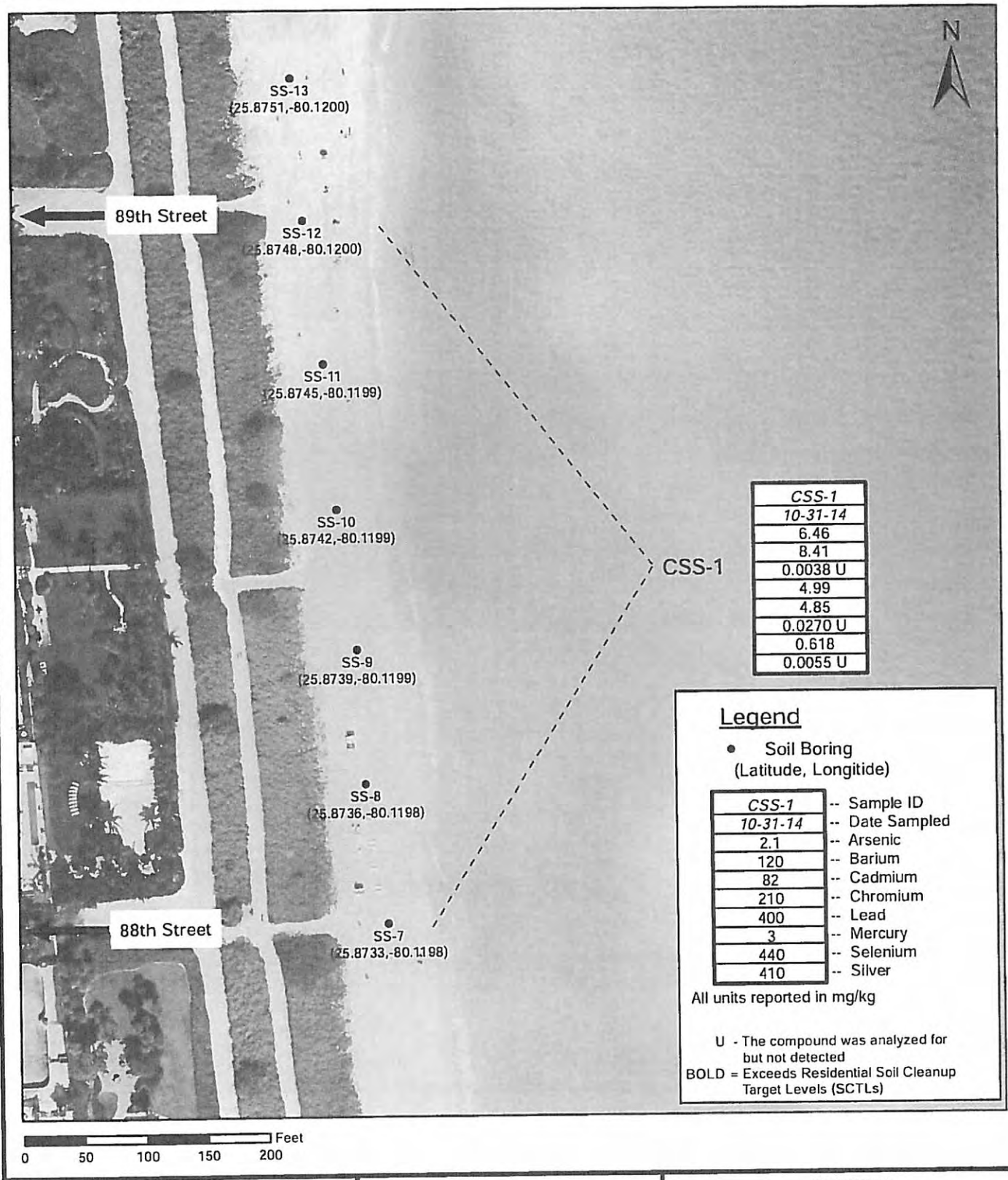
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 2g SOIL BORING LOCATIONS October 31, 2014 (From 93rd Street to 94th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



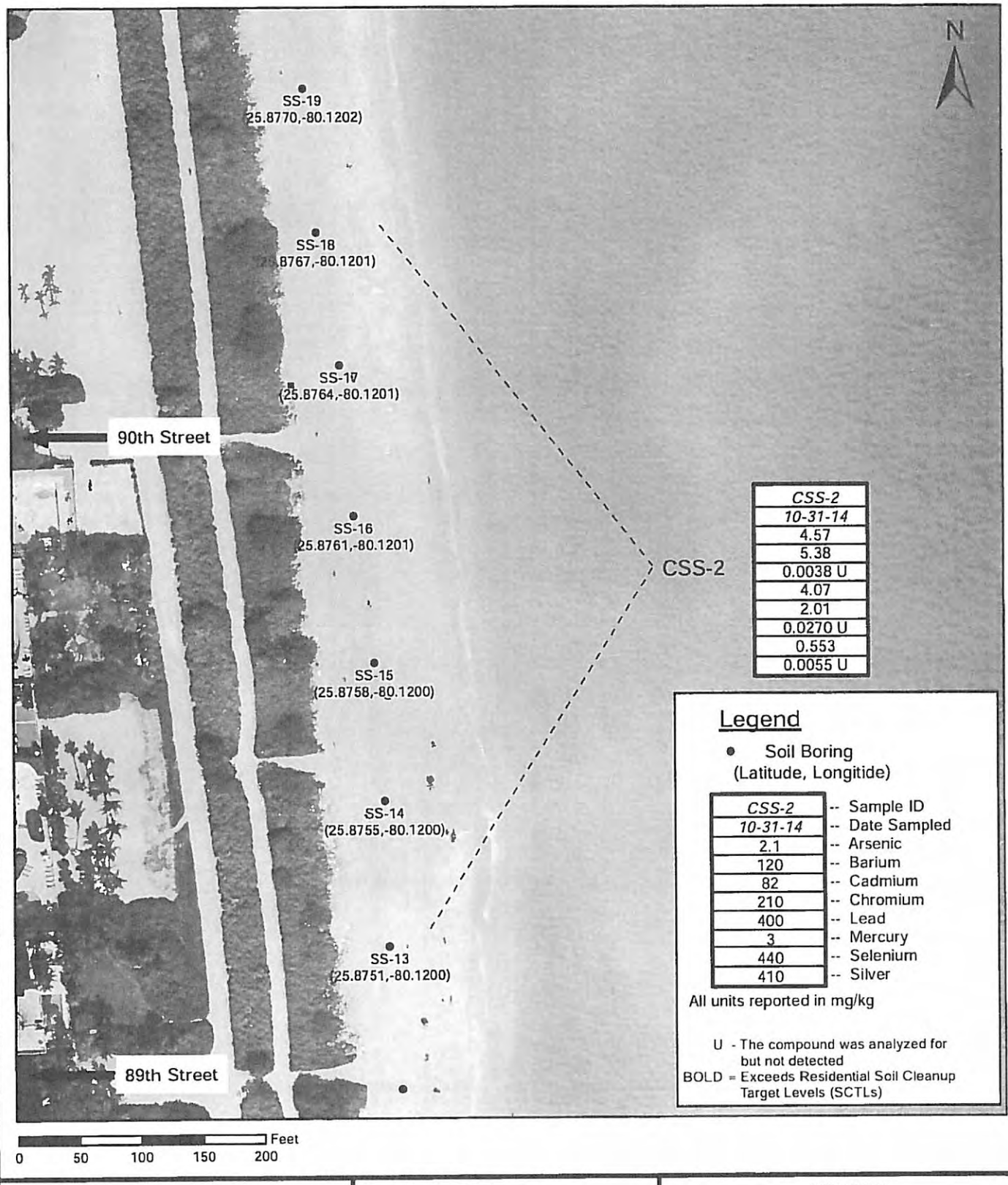
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 2h SOIL BORING LOCATIONS October 31, 2014 (Fisher Pier) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 3a HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 84th Street to 86th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 3b HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 88th Street to 89th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



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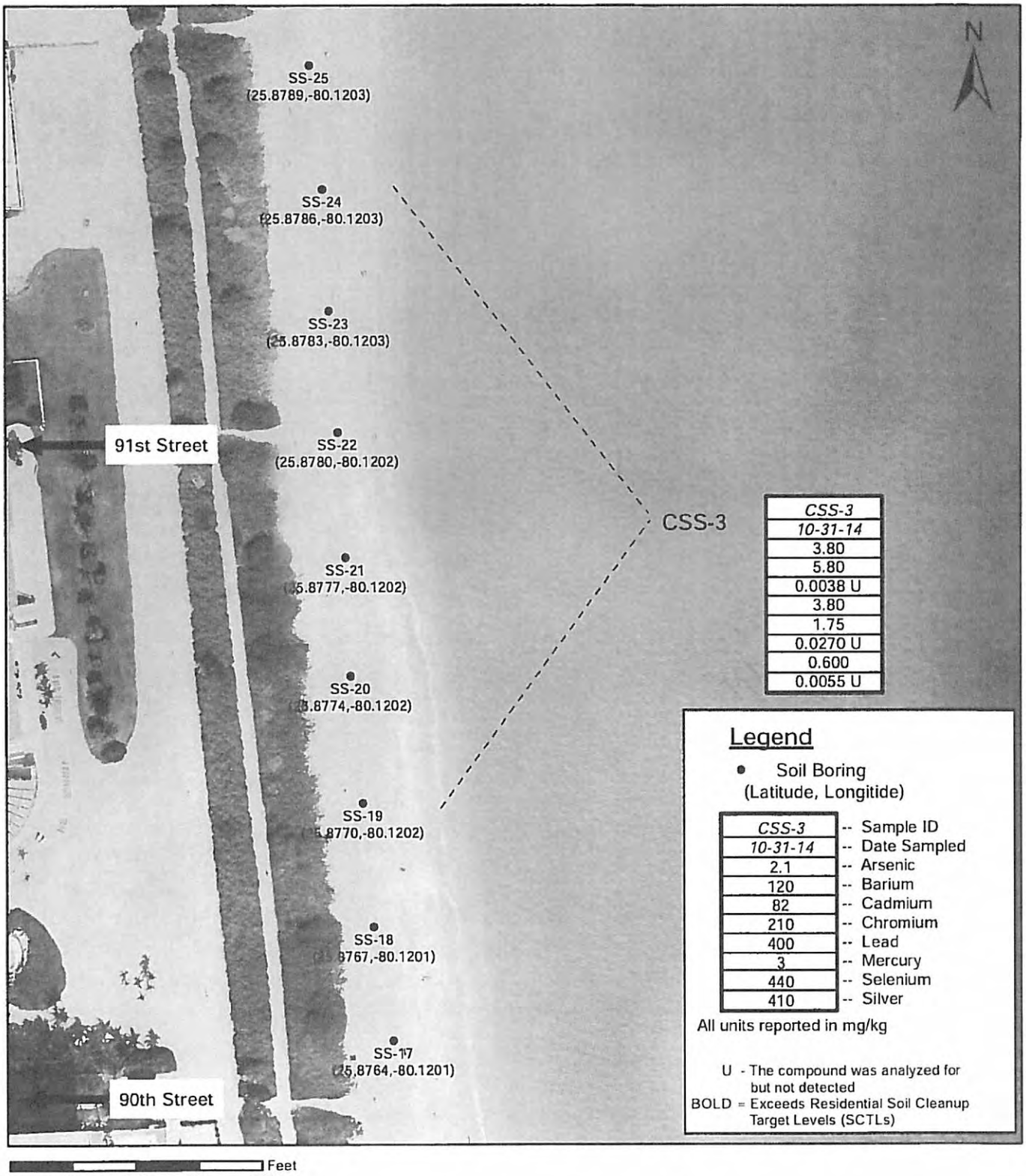
Miami, Florida

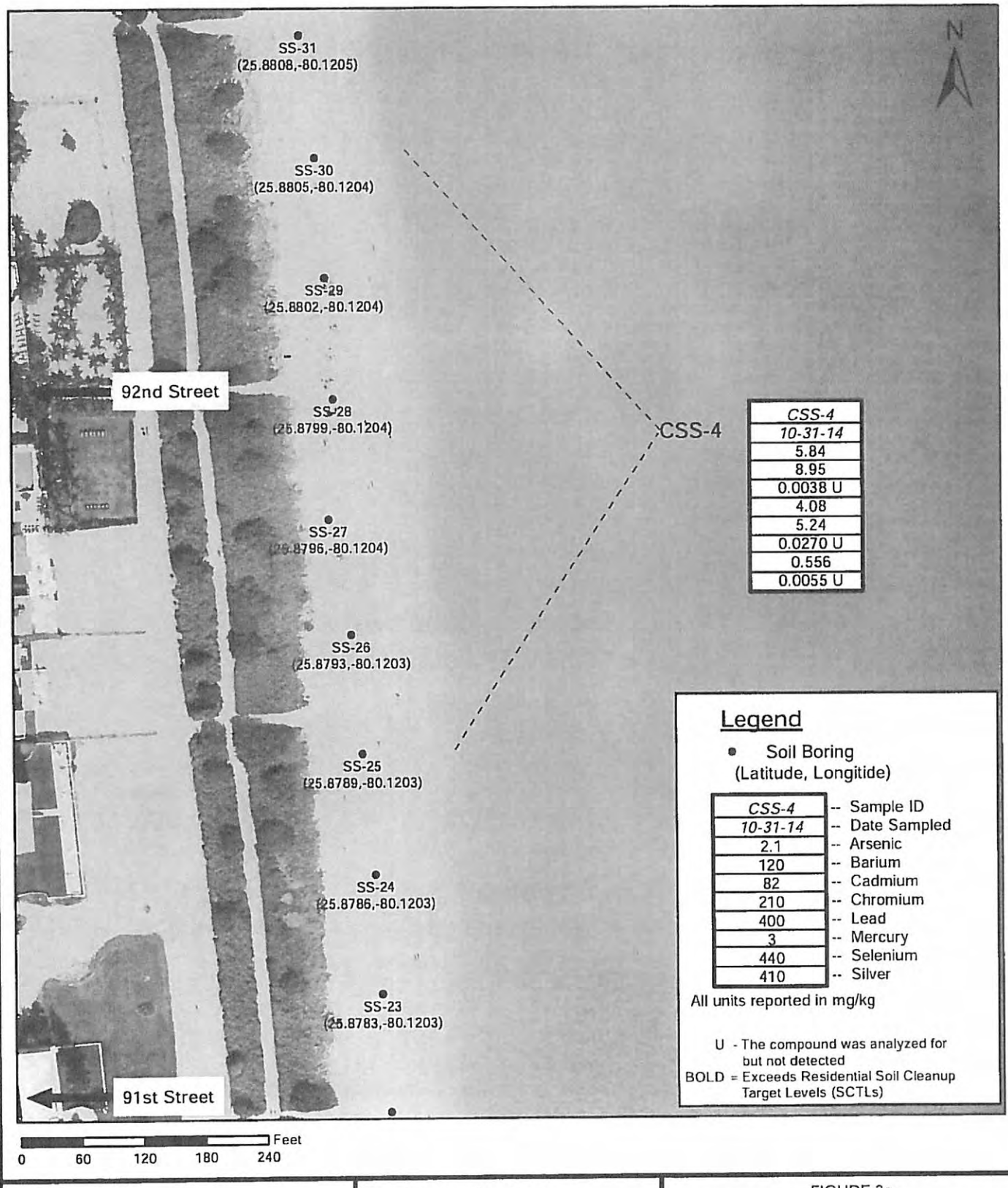
Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 3c
HEAVY METAL CONCENTRATIONS IN SOIL
October 31, 2014
(From 89th Street to 90th Street)

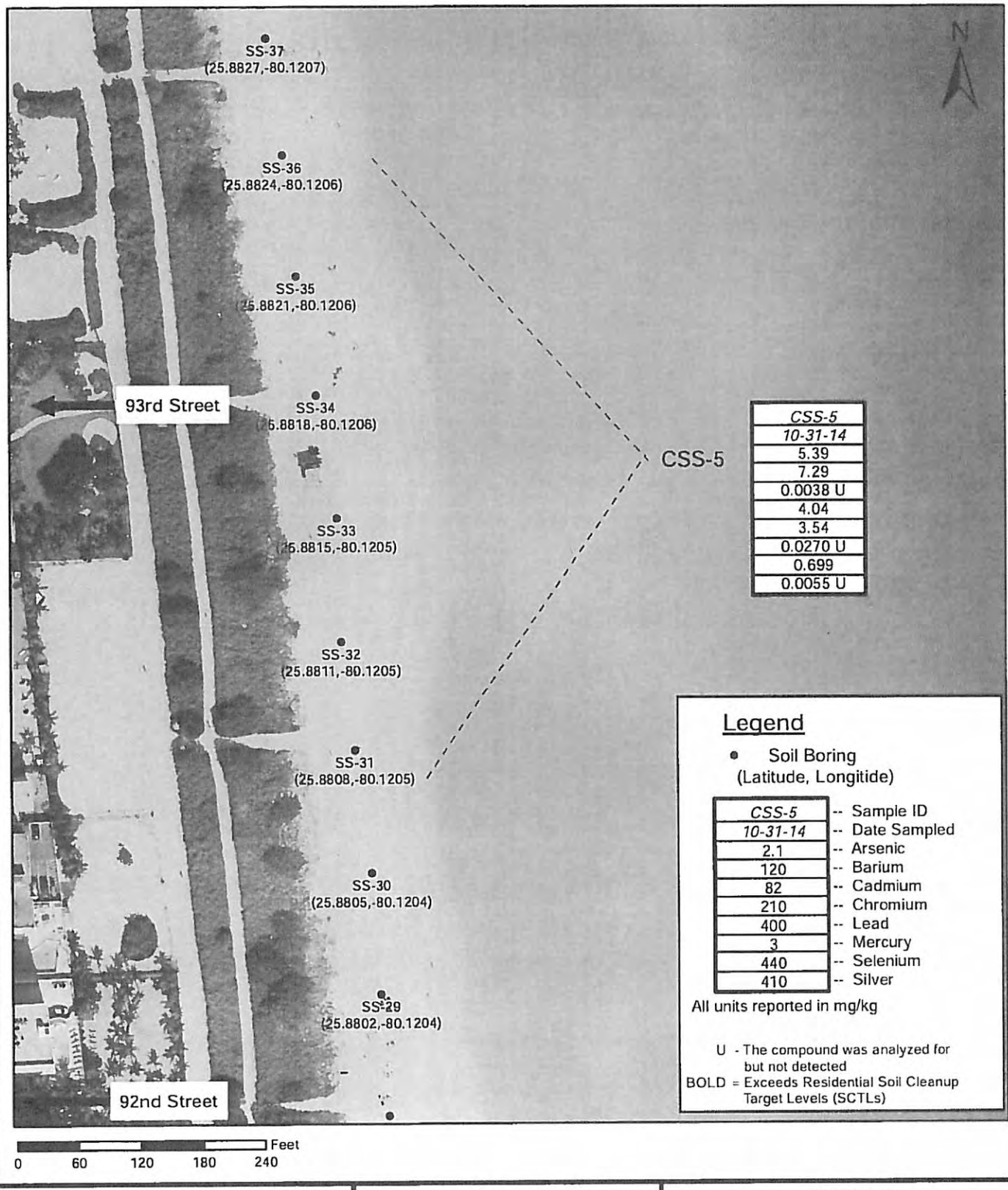
City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



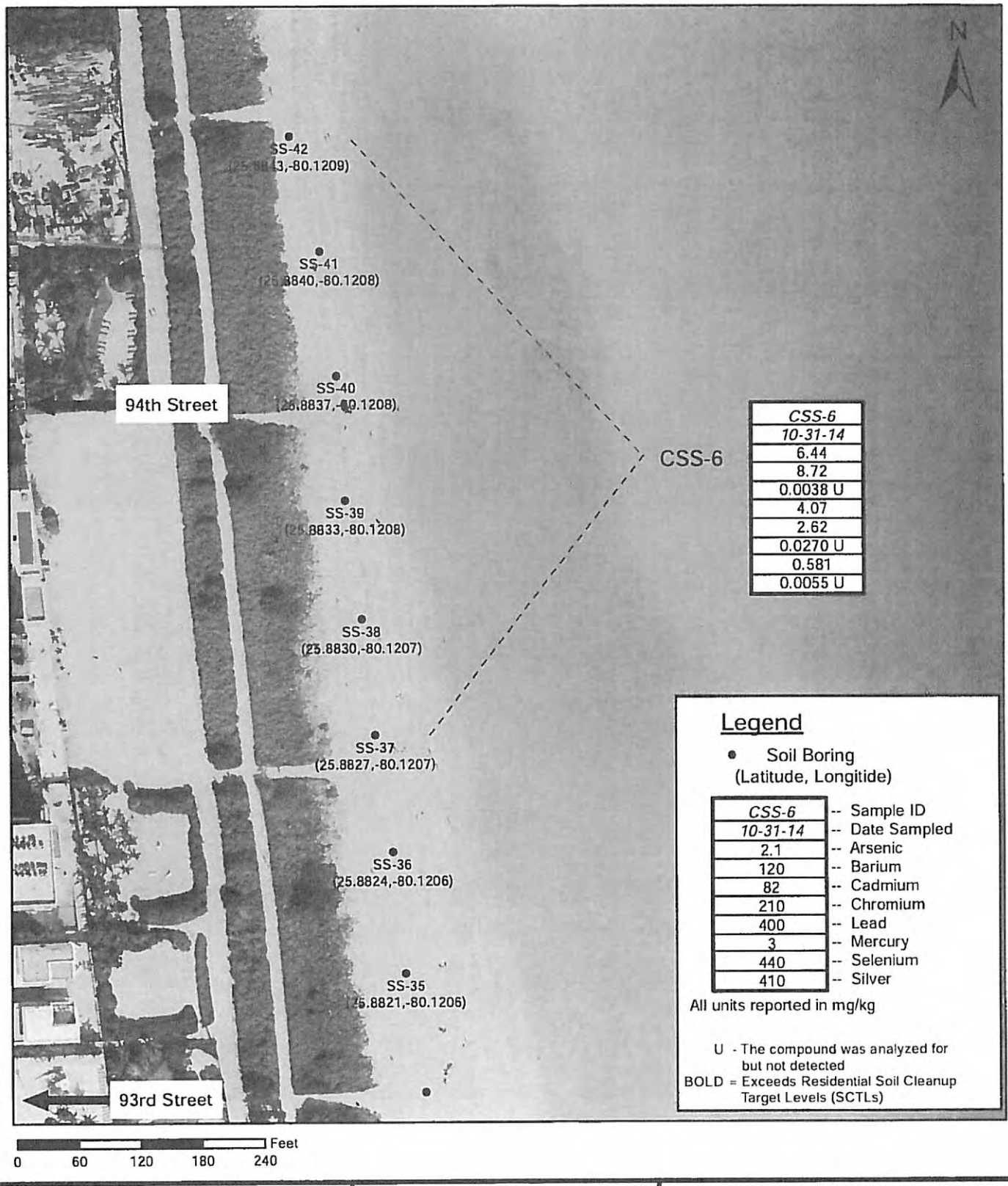
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 3d HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 90th Street to 91st Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



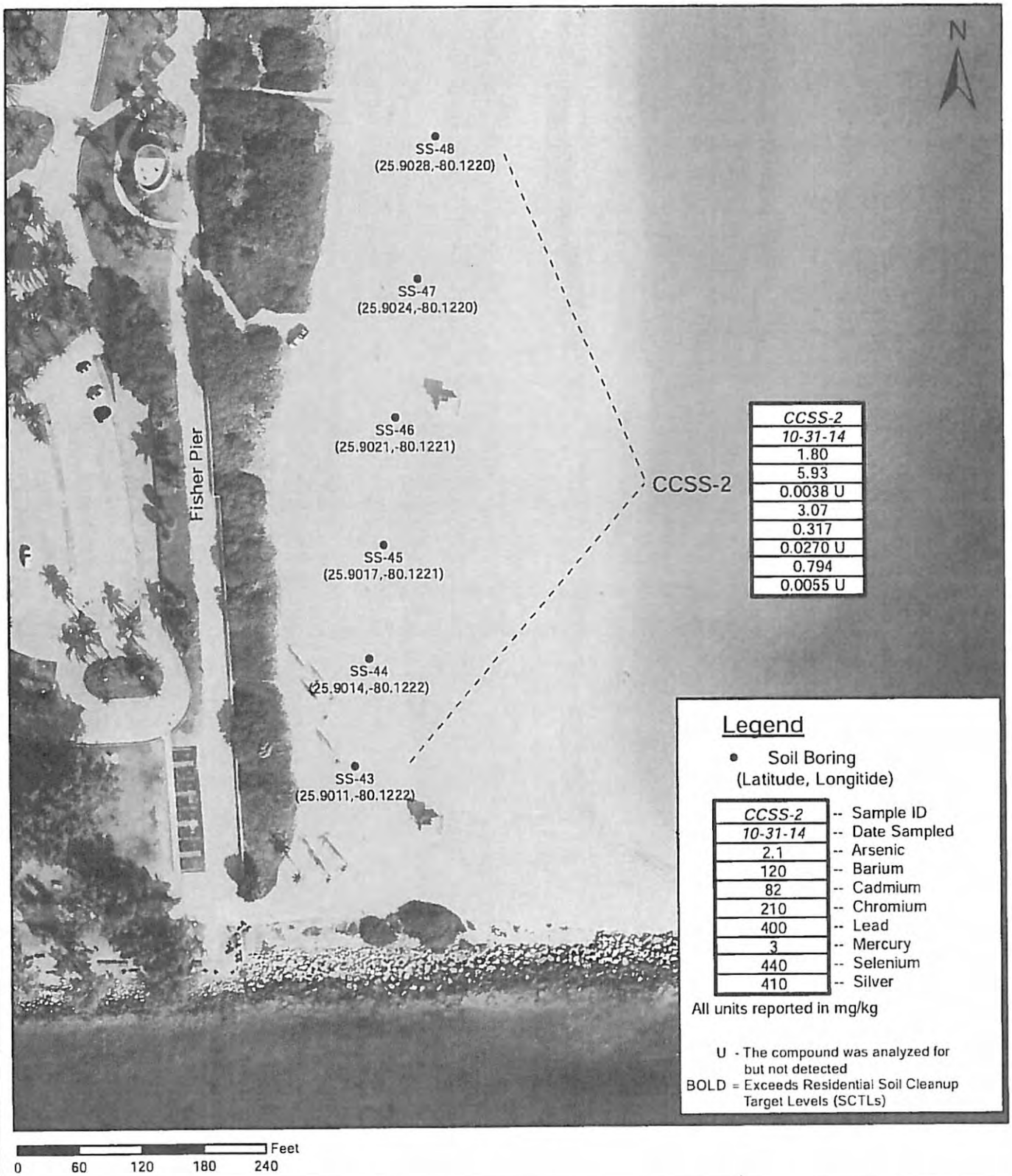
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 3e HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 91st Street to 92nd Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



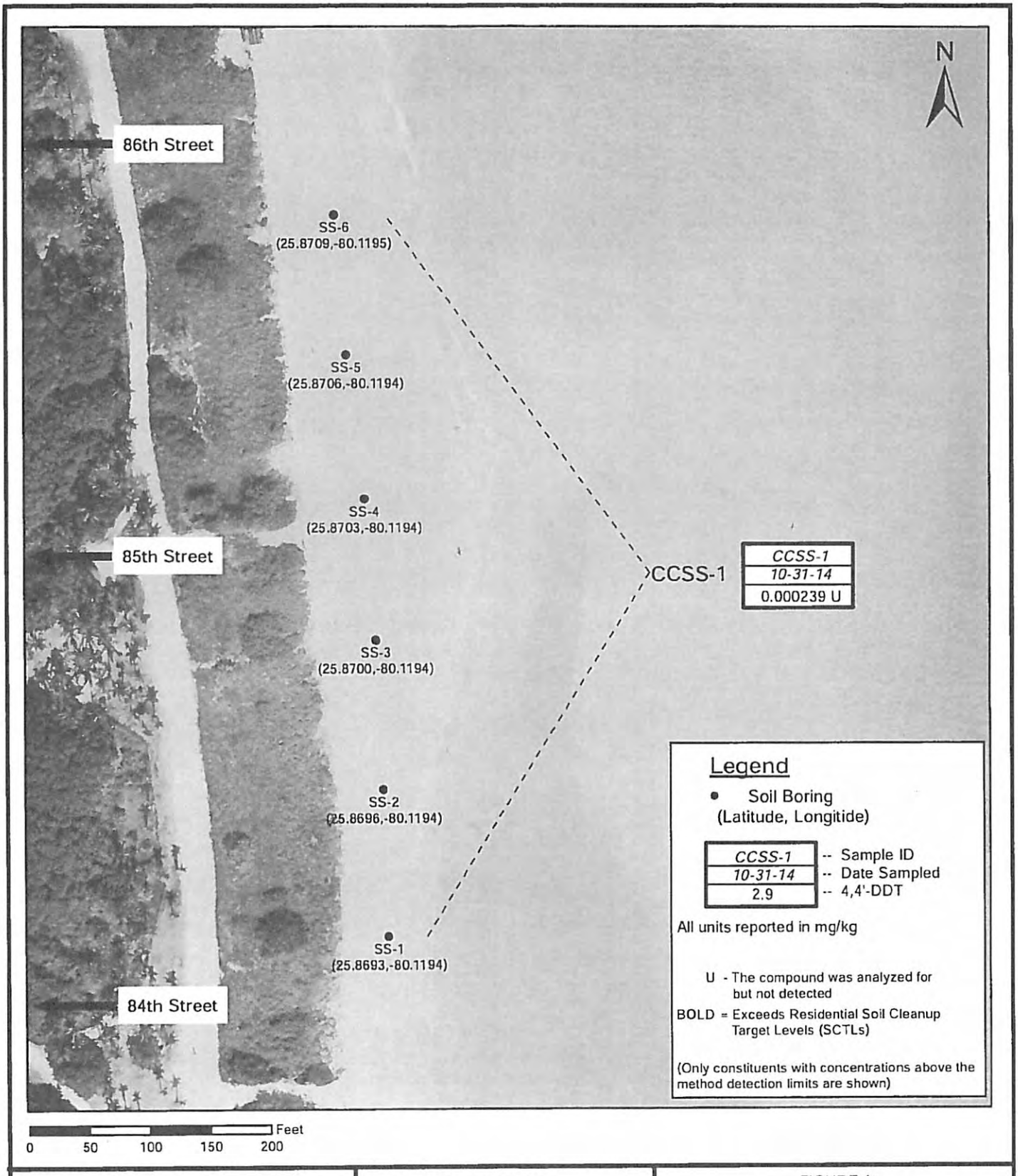
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 3f HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 92nd Street to 93rd Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



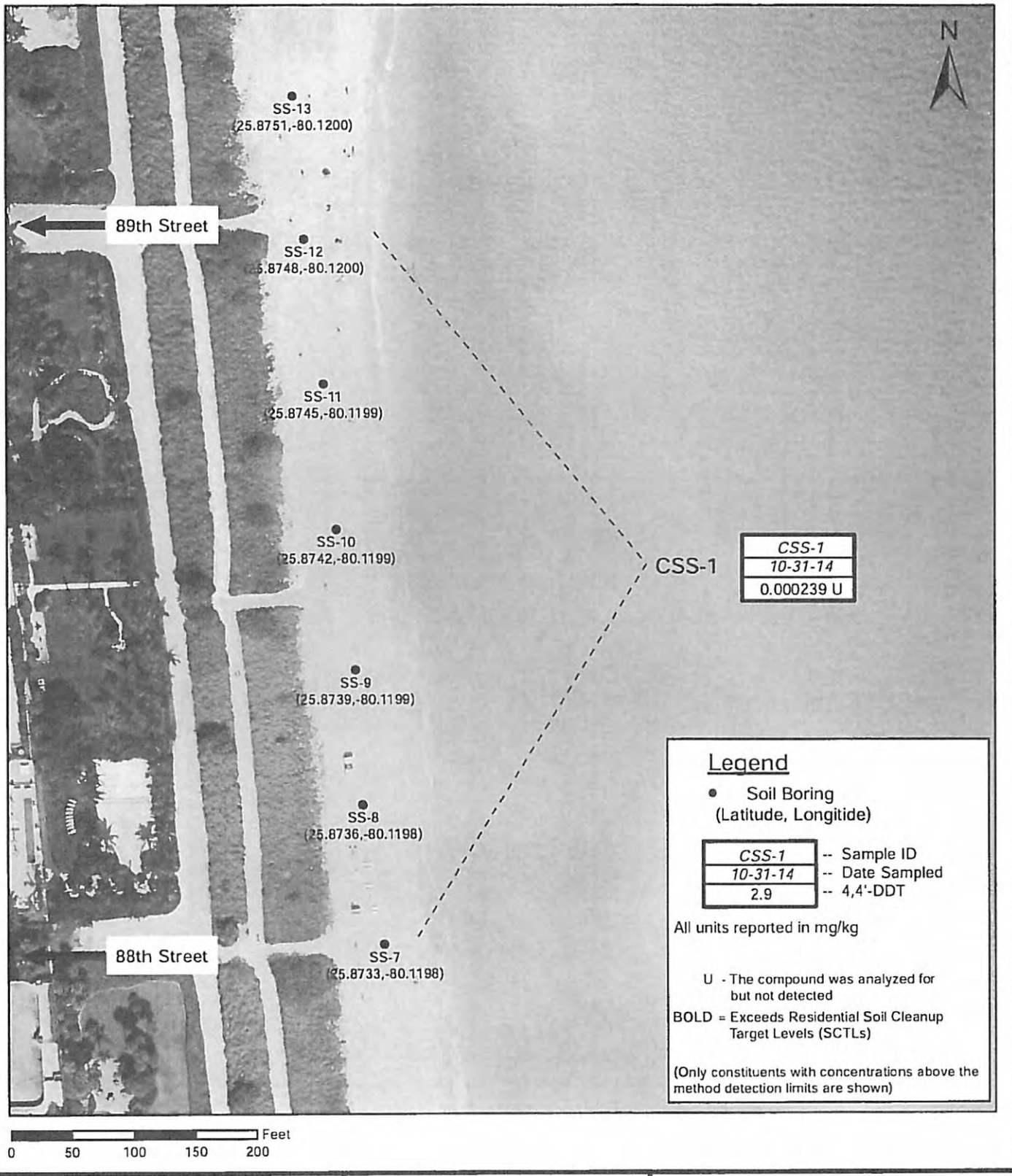
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 3g HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 93rd Street to 94th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 3h HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (Fisher Pier) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 4a ORGANOCHLORINE PESTICIDE CONCENTRATIONS IN SOIL October 31, 2014 (From 84th Street to 86th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida

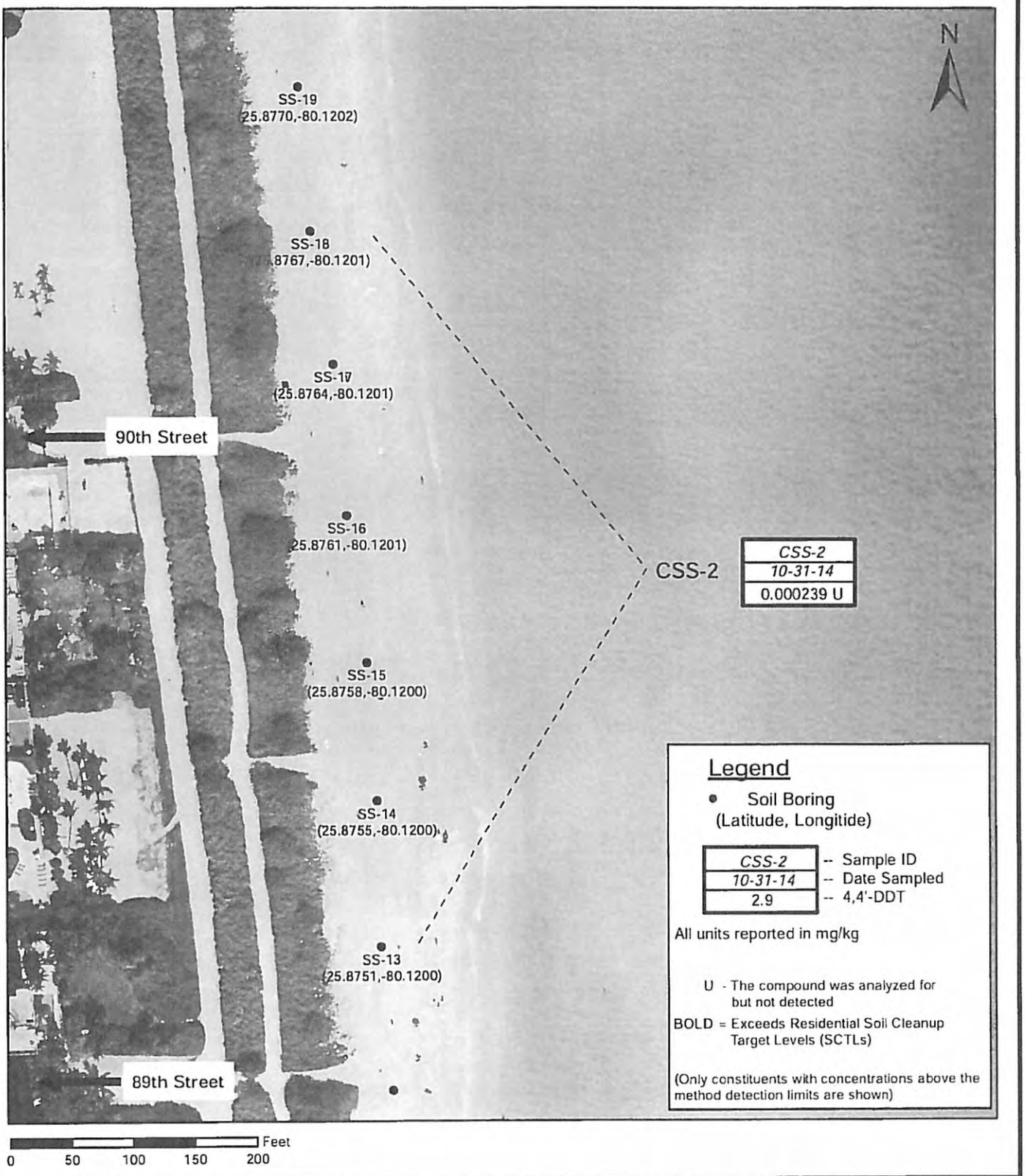


LANDSCIENCE
Miami, Florida

Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 4b
ORGANOCHLORINE PESTICIDE CONCENTRATIONS IN SOIL
October 31, 2014
(From 88th Street to 89th Street)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida

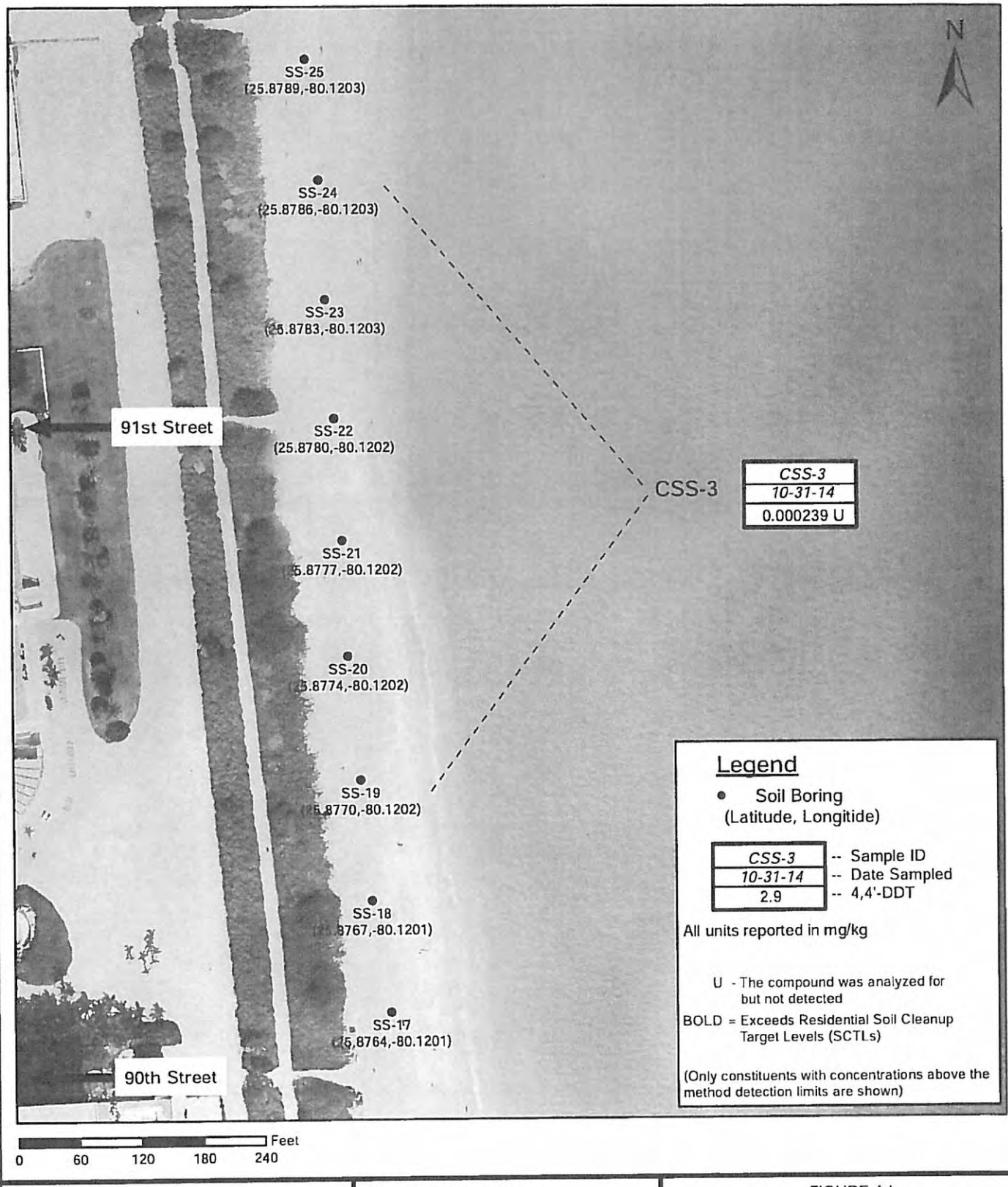


LANDSCIENCE
Miami, Florida

Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 4c
ORGANOCHLORINE PESTICIDE CONCENTRATIONS IN SOIL
October 31, 2014
(From 89th Street to 90th Street)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



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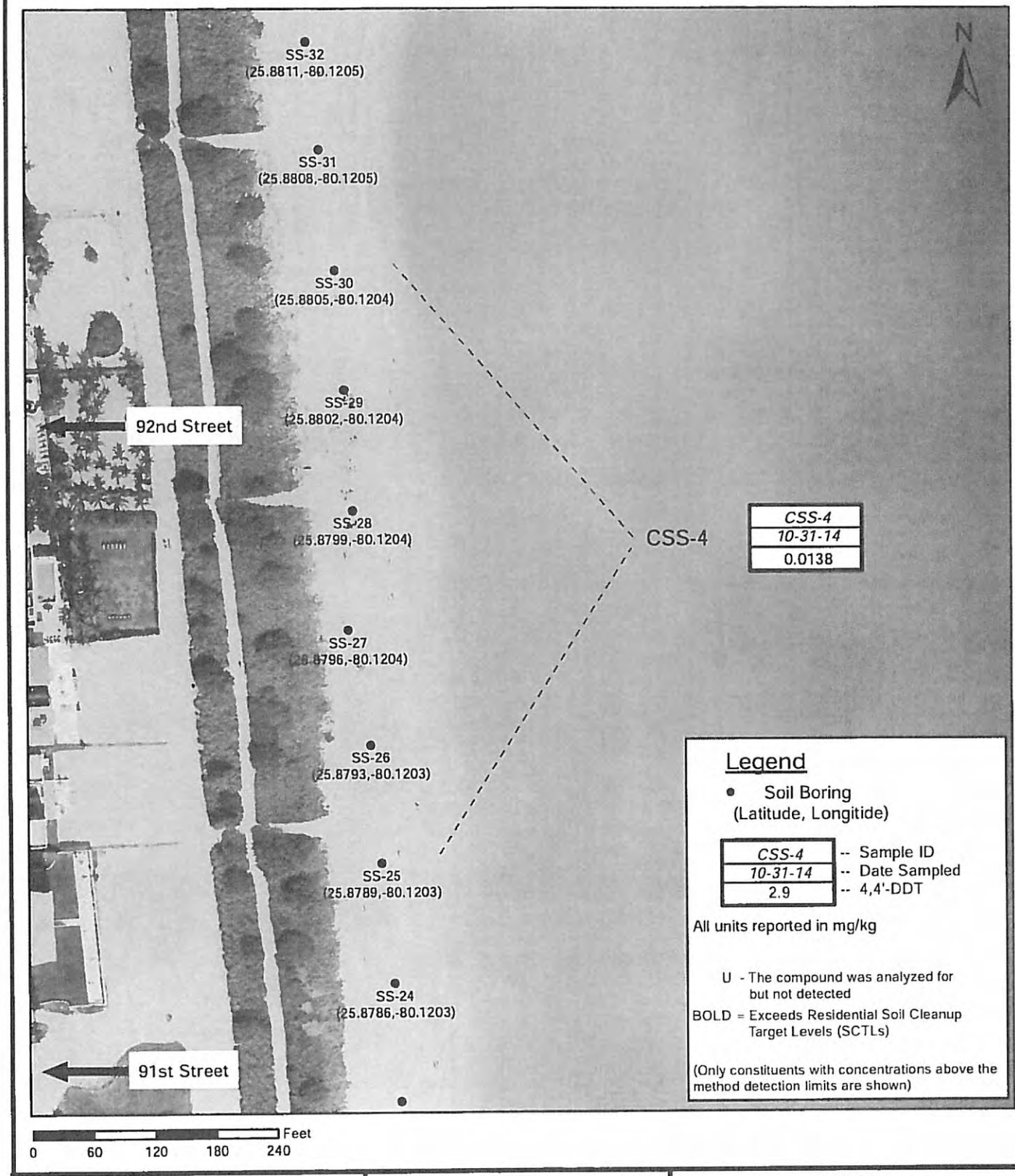
Miami, Florida

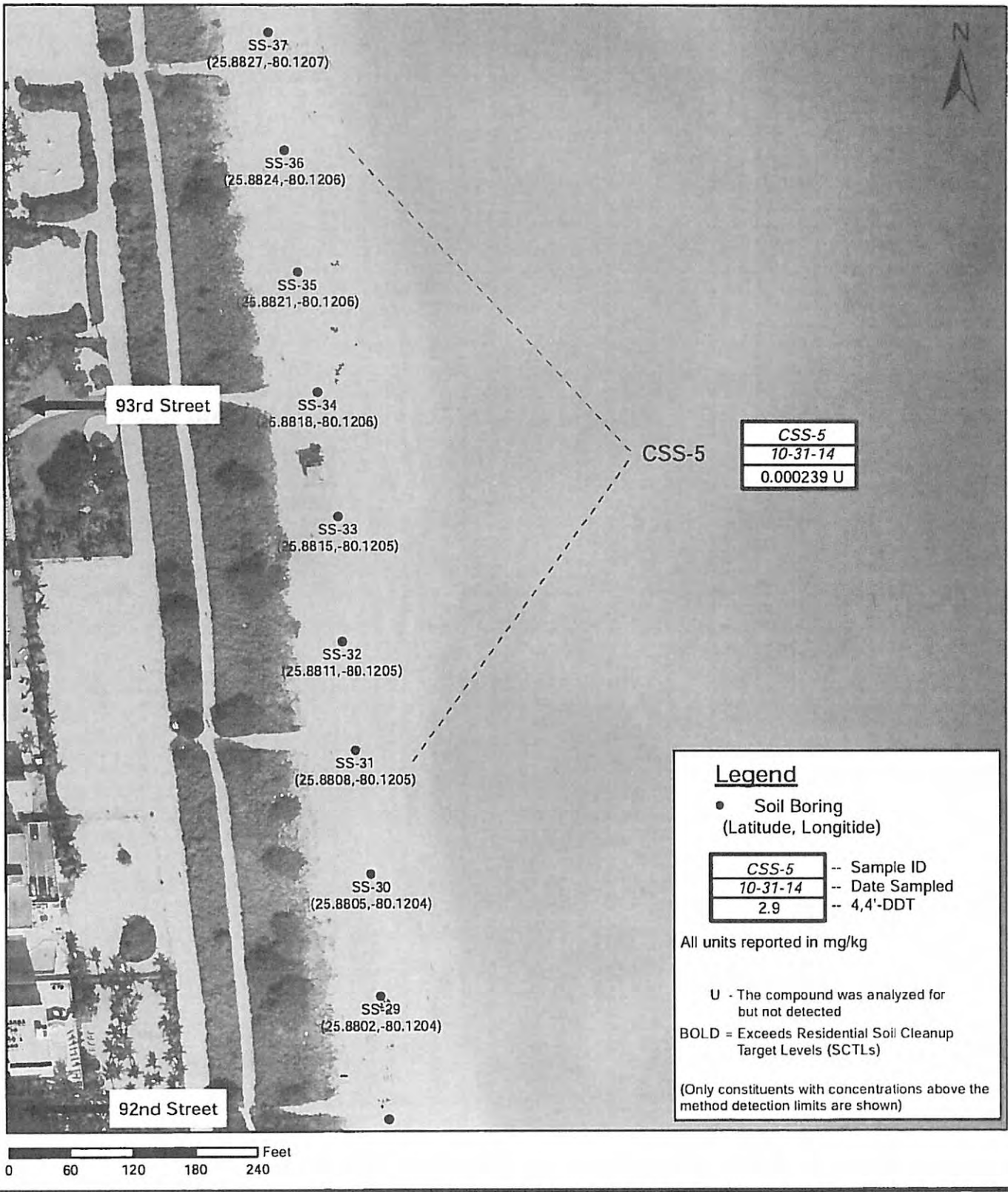
Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 4d
ORGANOCHLORINE PESTICIDE CONCENTRATIONS IN SOIL
October 31, 2014
(From 90th Street to 91st Street)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 4e ORGANOCHLORINE PESTICIDE CONCENTRATIONS IN SOIL October 31, 2014 (From 91st Street to 92nd Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



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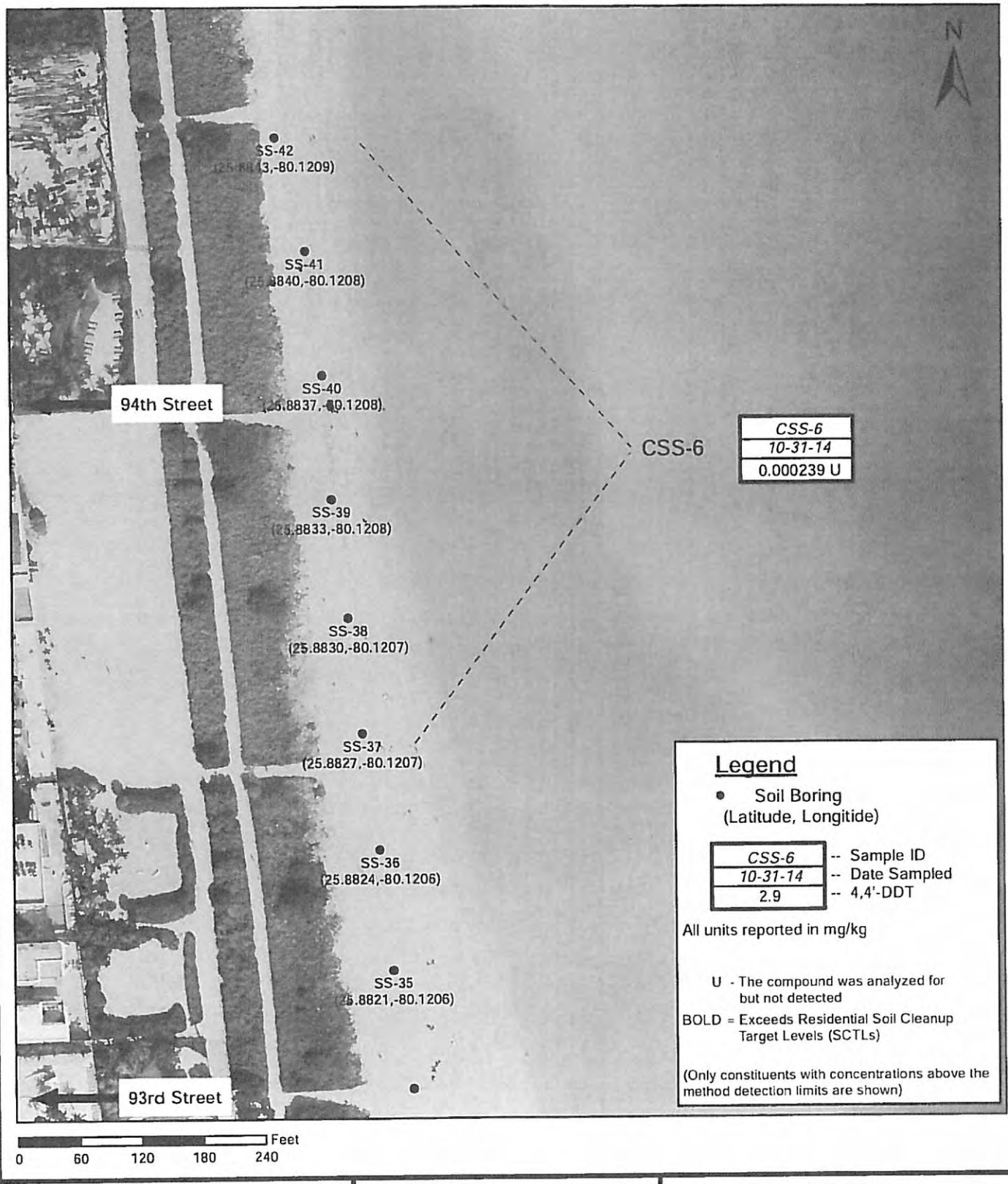
Miami, Florida

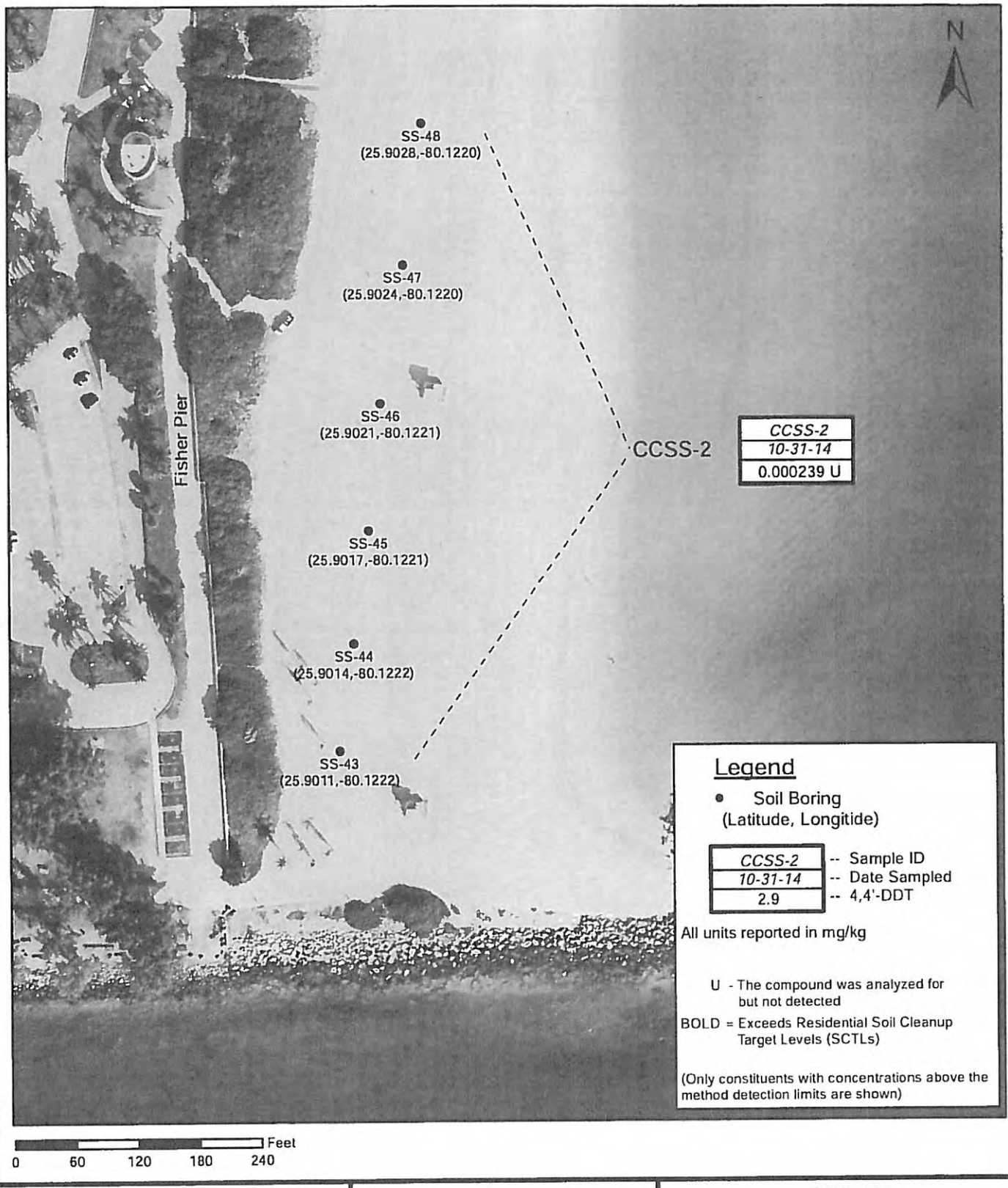
Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 4f
ORGANOCHLORINE PESTICIDE CONCENTRATIONS IN SOIL
October 31, 2014
(From 92nd Street to 93rd Street)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 4g ORGANOCHLORINE PESTICIDE CONCENTRATIONS IN SOIL October 31, 2014 (From 93rd Street to 94th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



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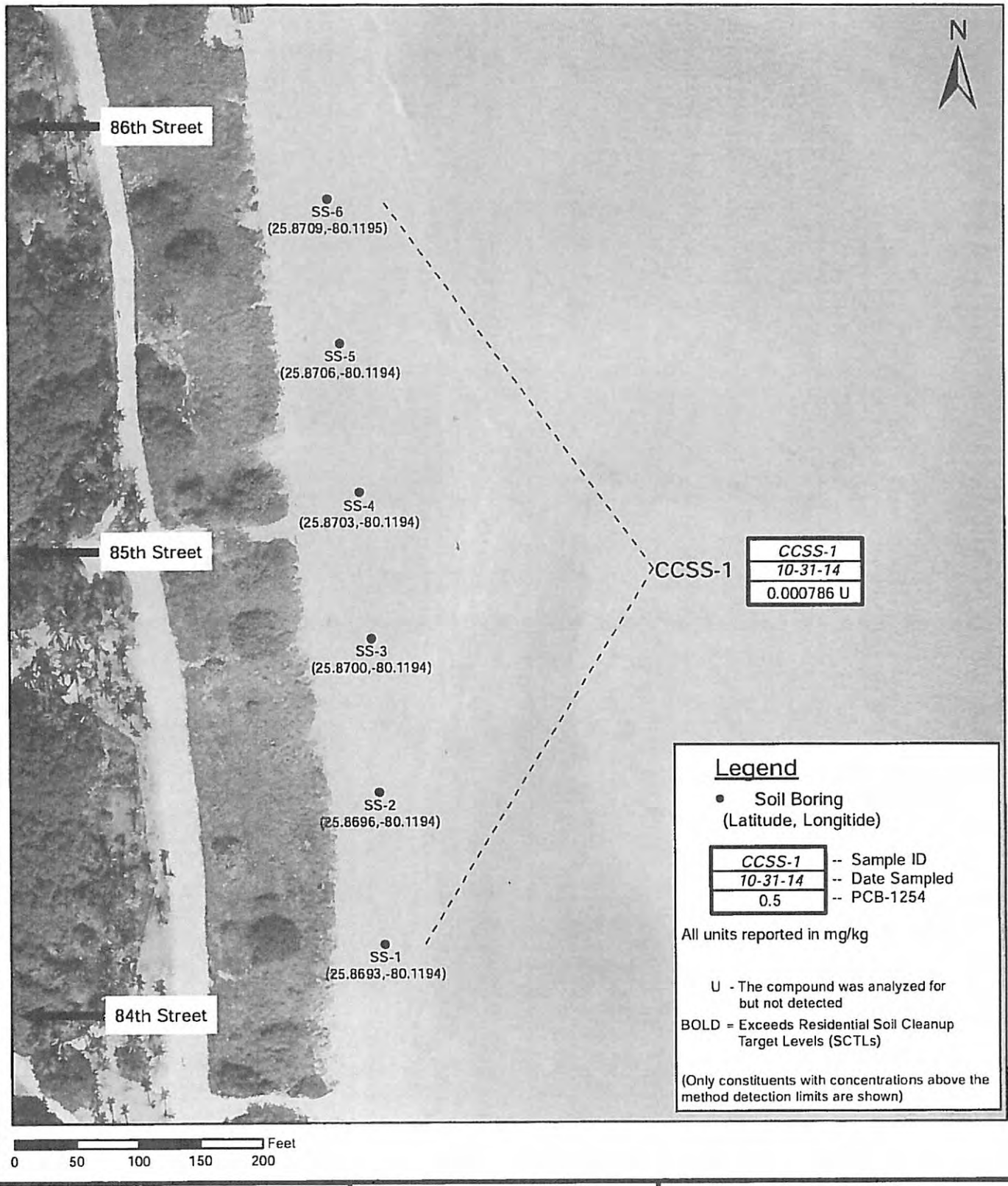
Miami, Florida

Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 4h
ORGANOCHLORINE PESTICIDE CONCENTRATIONS IN SOIL
October 31, 2014
(Fisher Pier)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



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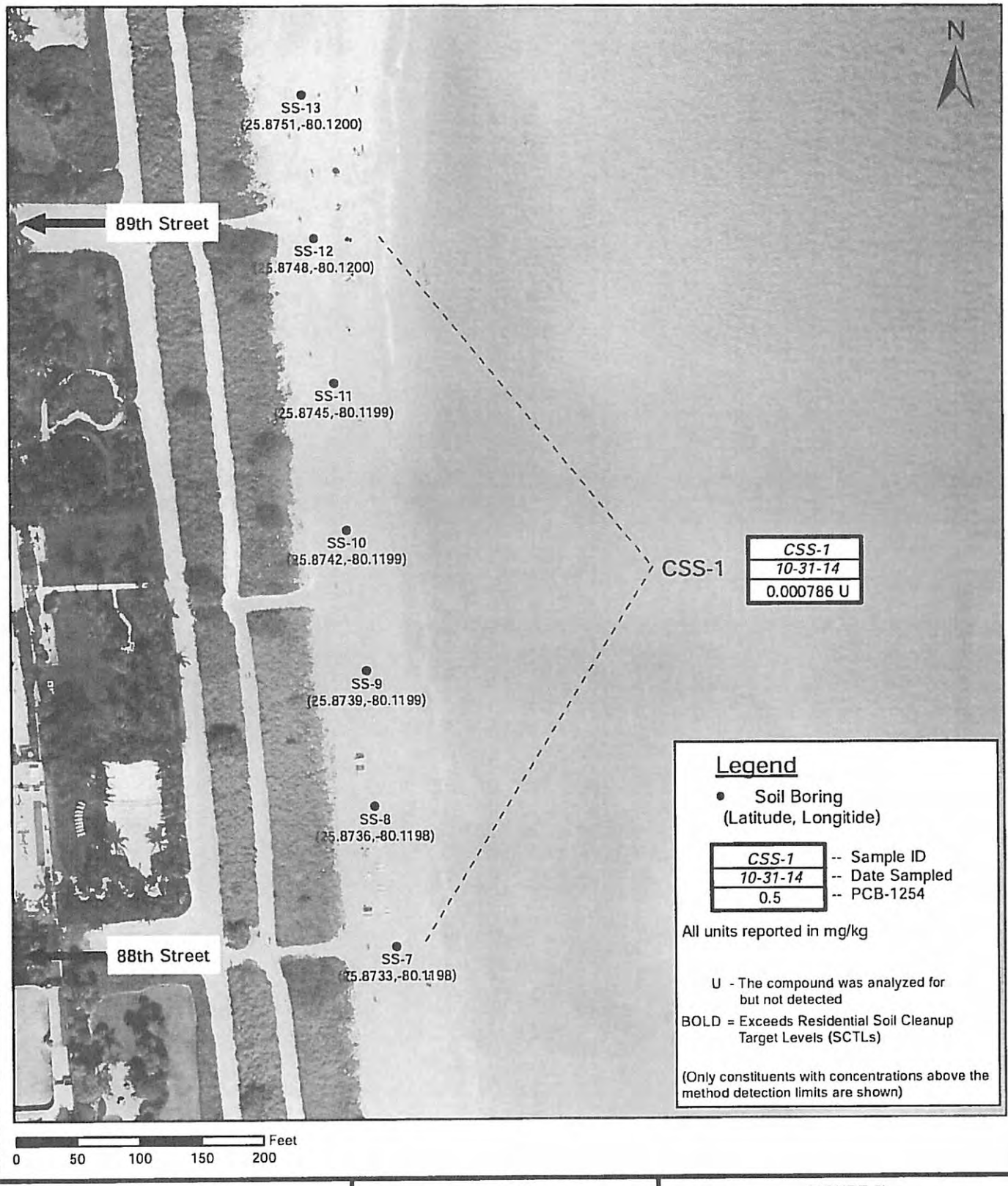
Miami, Florida

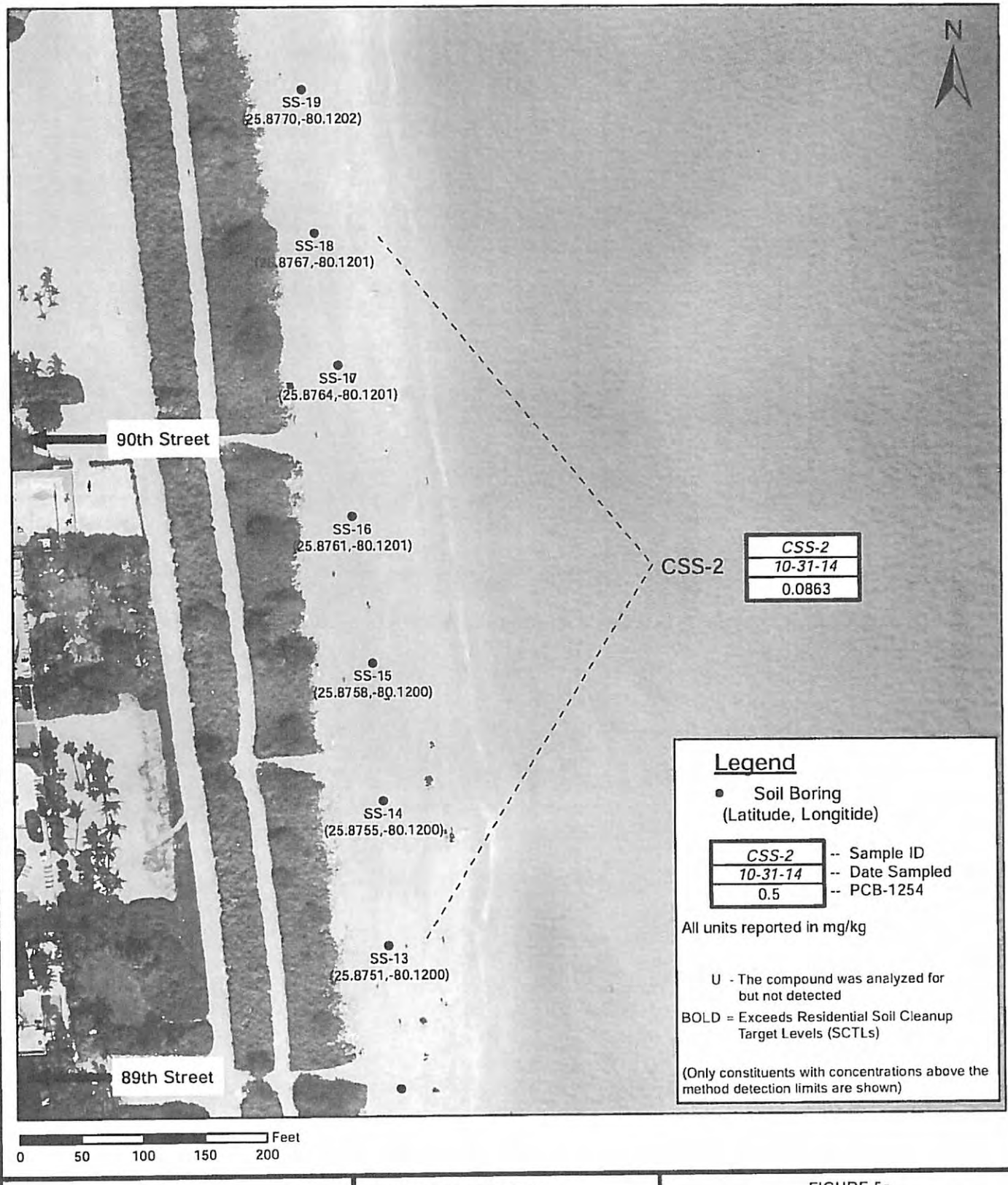
Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 5a
POLYCHLORINATED BIPHENYL CONCENTRATIONS IN SOIL
October 31, 2014
(From 84th Street to 86th Street)

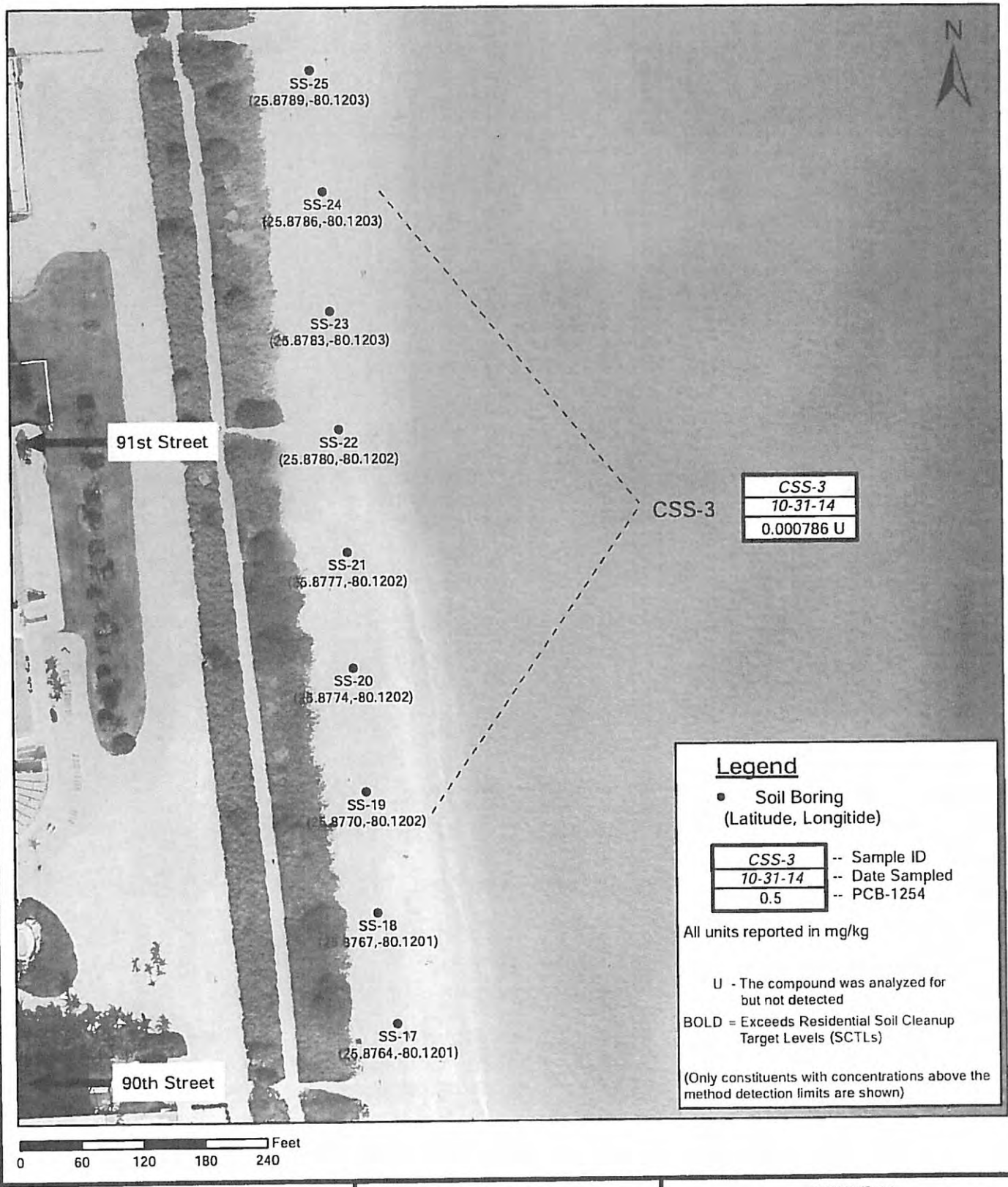
City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 5b POLYCHLORINATED BIPHENYL CONCENTRATIONS IN SOIL October 31, 2014 (From 88th Street to 89th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 5c POLYCHLORINATED BIPHENYL CONCENTRATIONS IN SOIL October 31, 2014 (From 89th Street to 90th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



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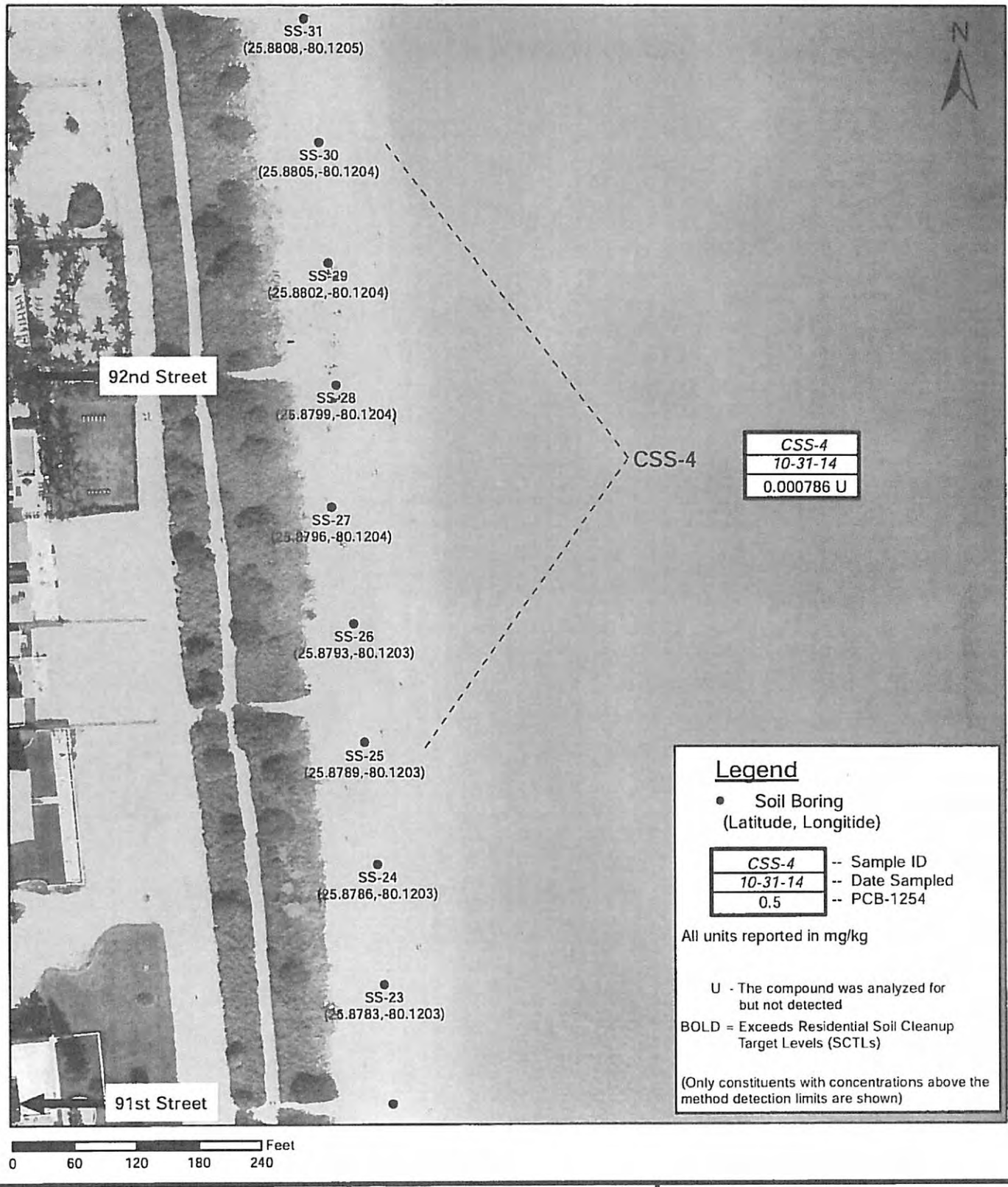
Miami, Florida

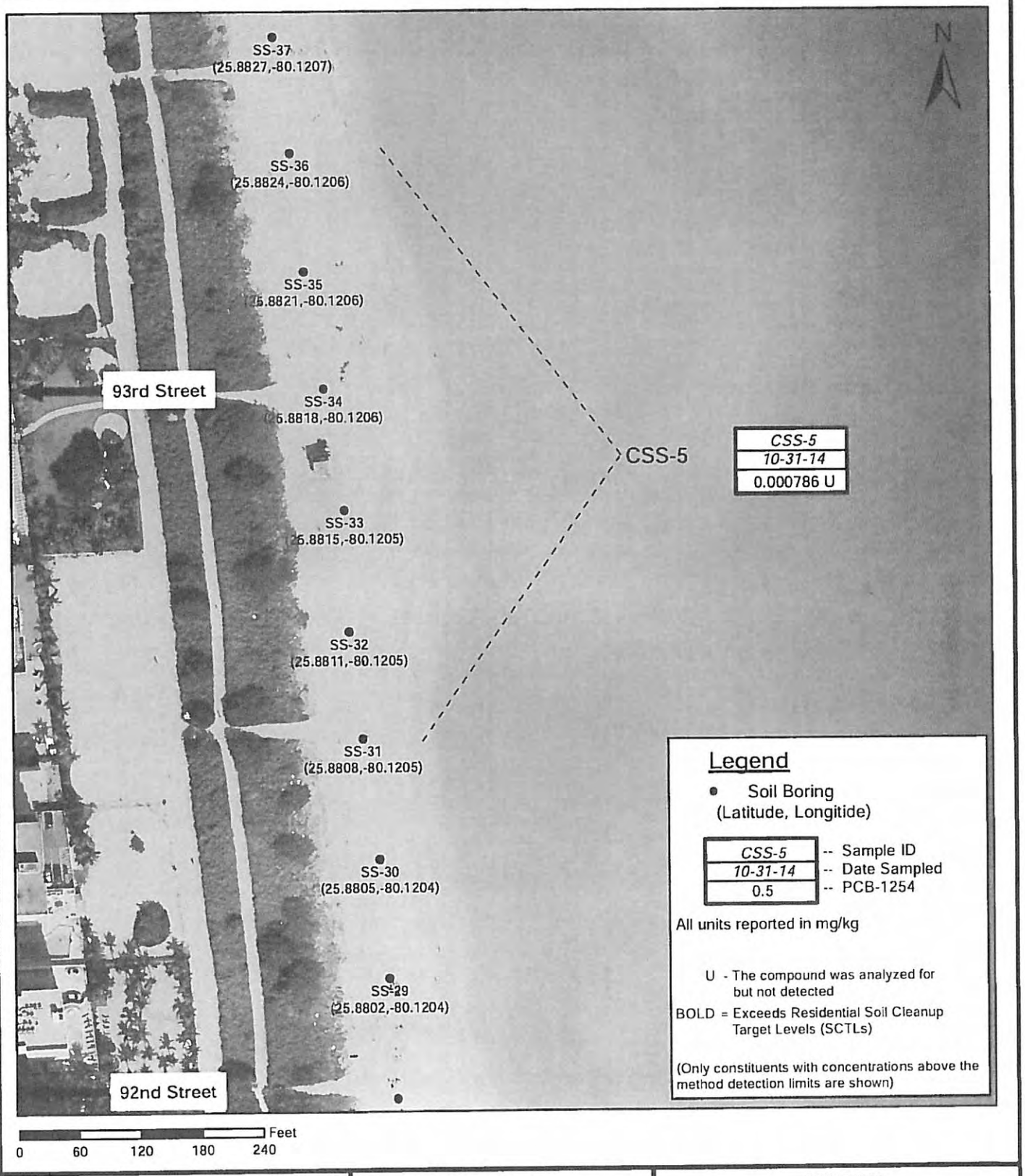
Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 5d
POLYCHLORINATED BIPHENYL CONCENTRATIONS IN SOIL
October 31, 2014
(From 90th Street to 91st Street)

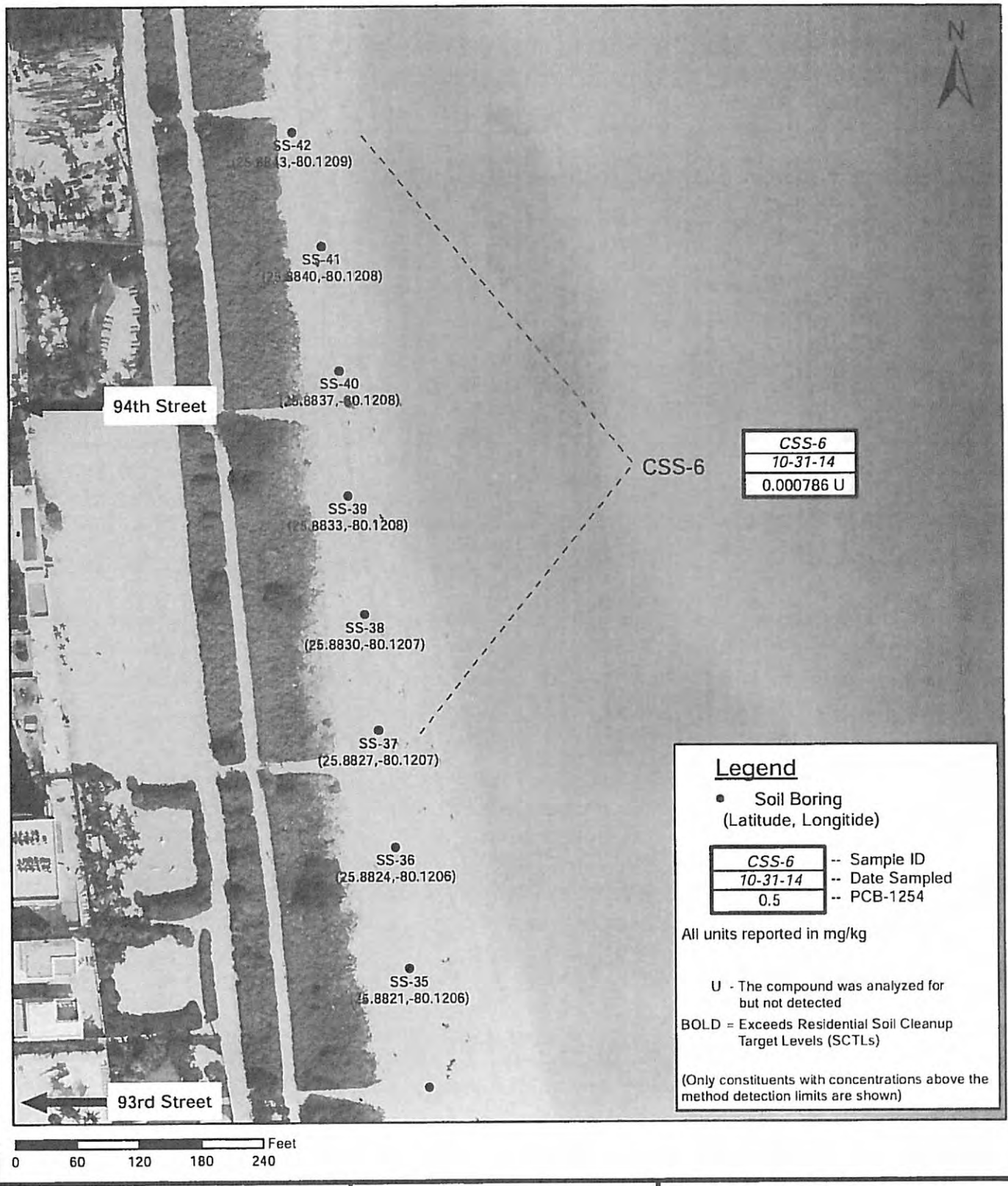
City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 5e POLYCHLORINATED BIPHENYL CONCENTRATIONS IN SOIL October 31, 2014 (From 91st Street to 92nd Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 5f POLYCHLORINATED BIPHENYL CONCENTRATIONS IN SOIL October 31, 2014 (From 92nd Street to 93rd Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



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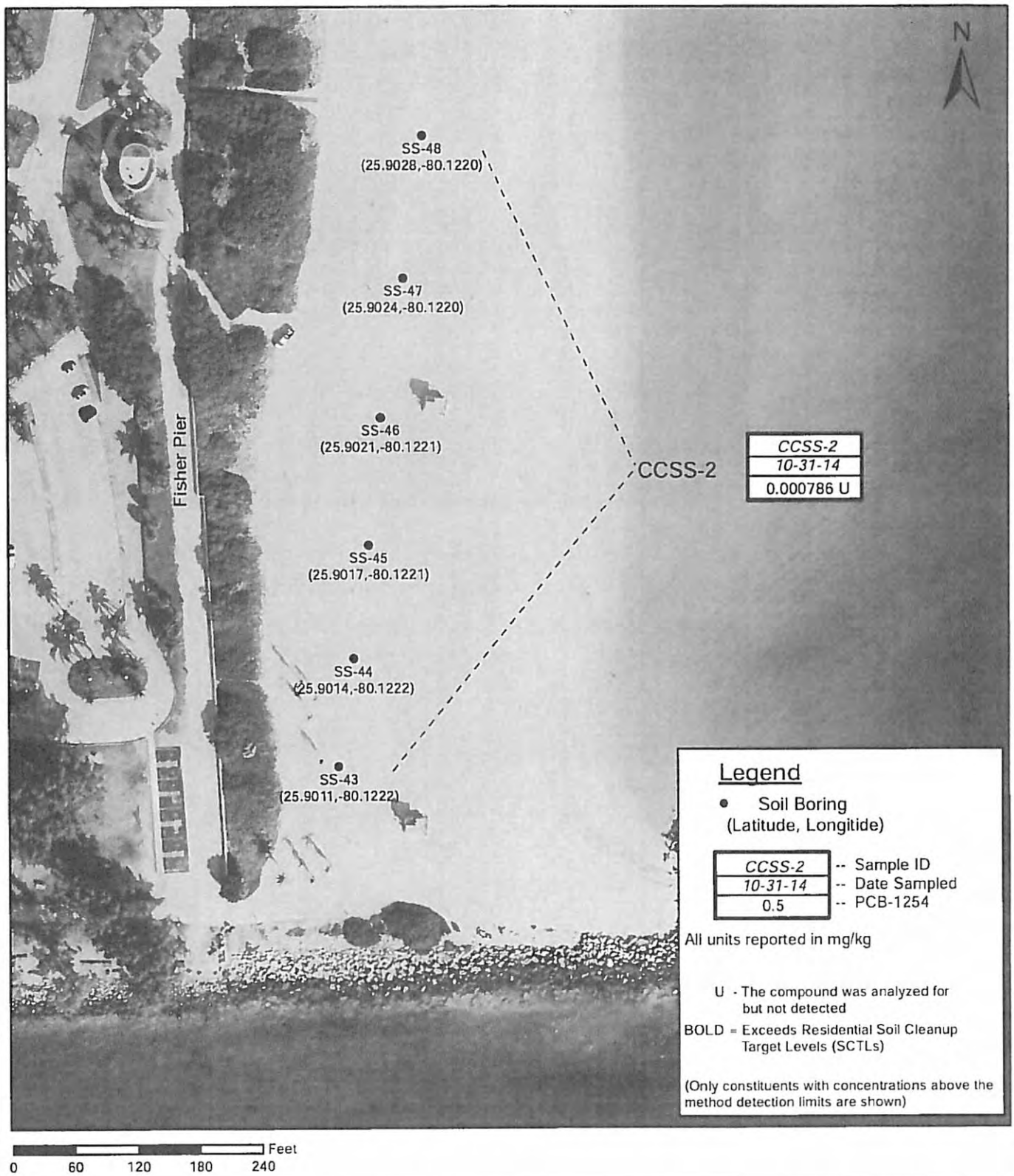
Miami, Florida

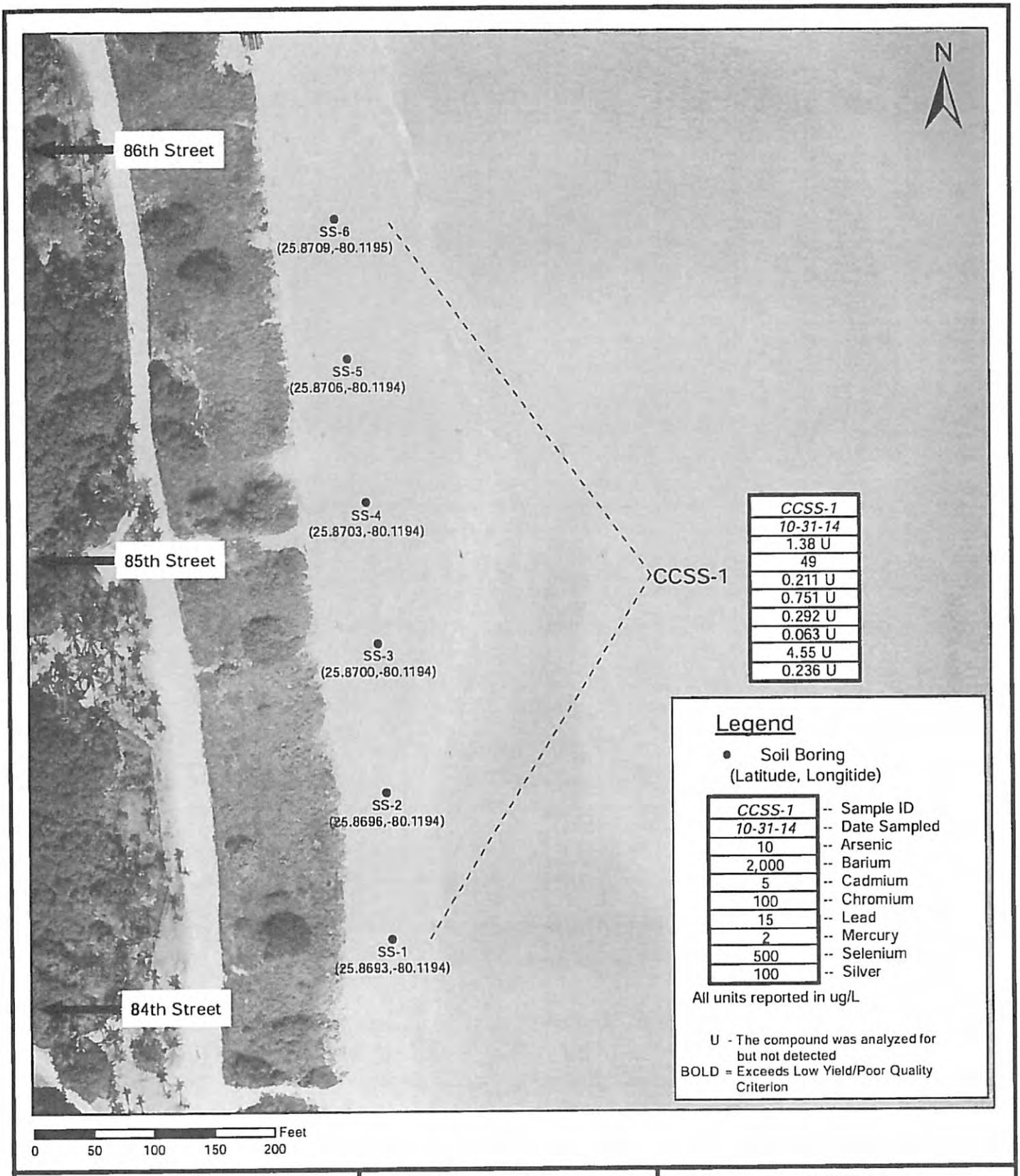
Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 5g
POLYCHLORINATED BIPHENYL CONCENTRATIONS IN SOIL
October 31, 2014
(From 93rd Street to 94th Street)

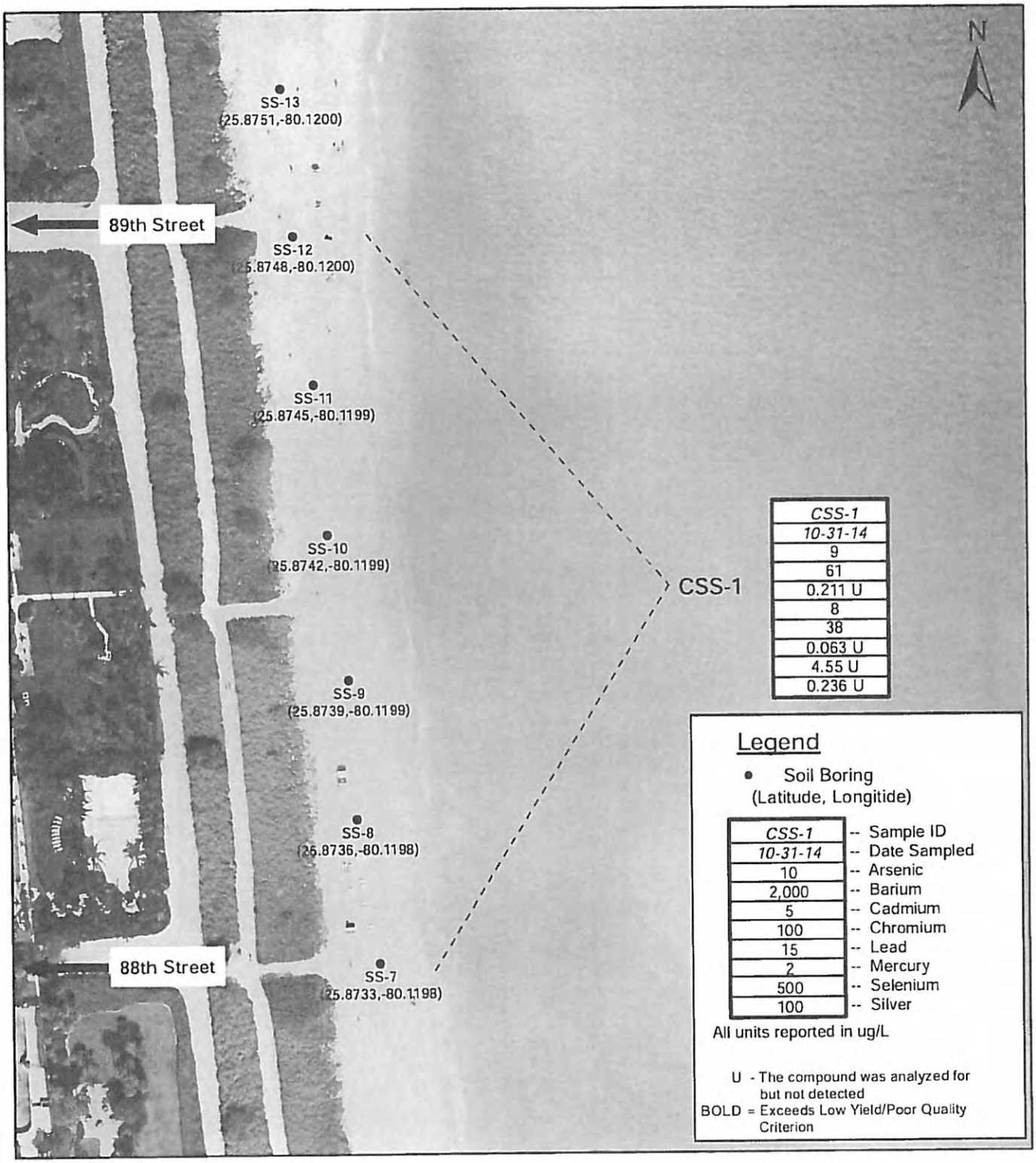
City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



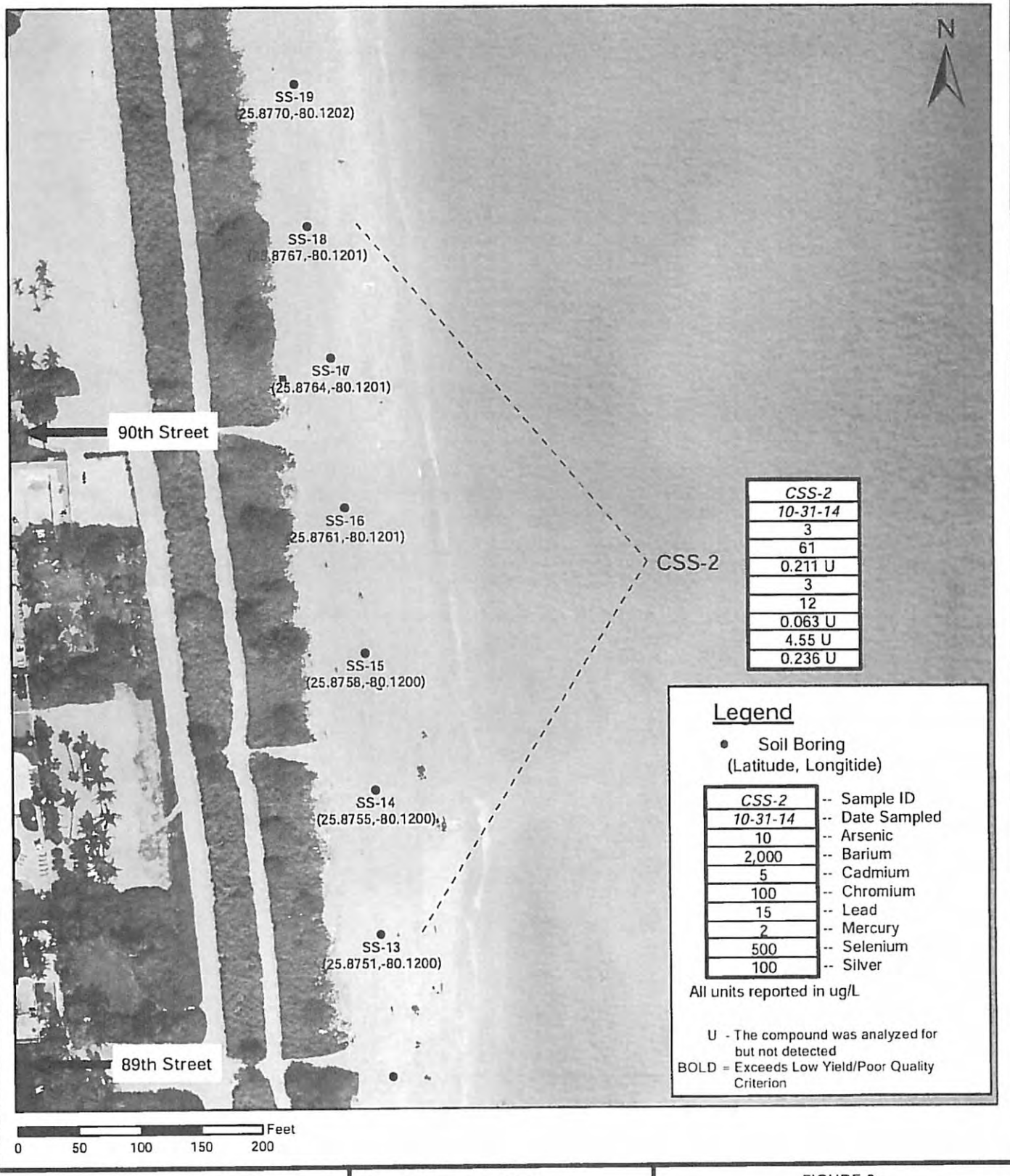
LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 5h POLYCHLORINATED BIPHENYL CONCENTRATIONS IN SOIL October 31, 2014 (Fisher Pier) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 6a SPLP HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 84th Street to 86th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 6b SPLP HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 88th Street to 89th Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



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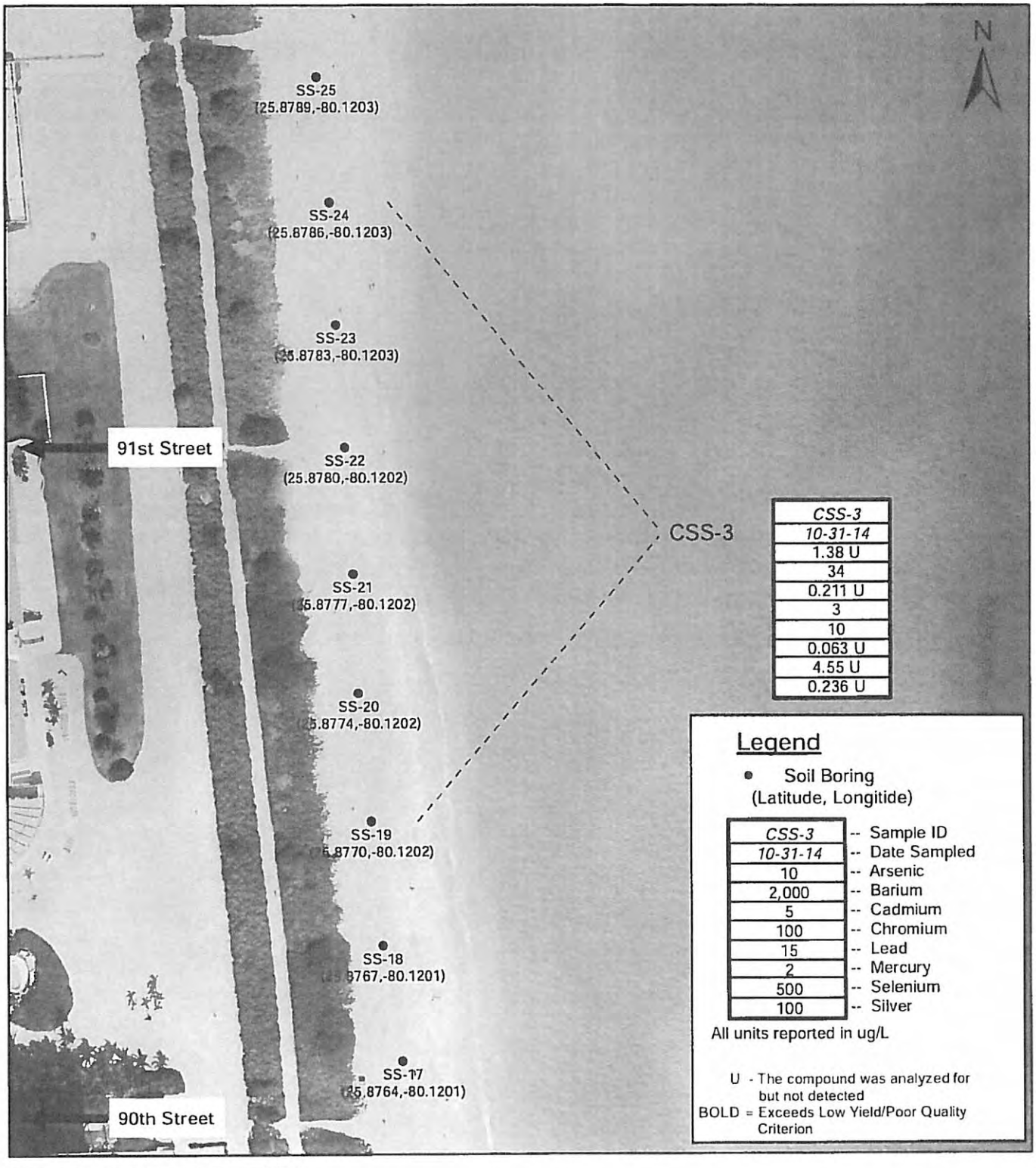
Miami, Florida

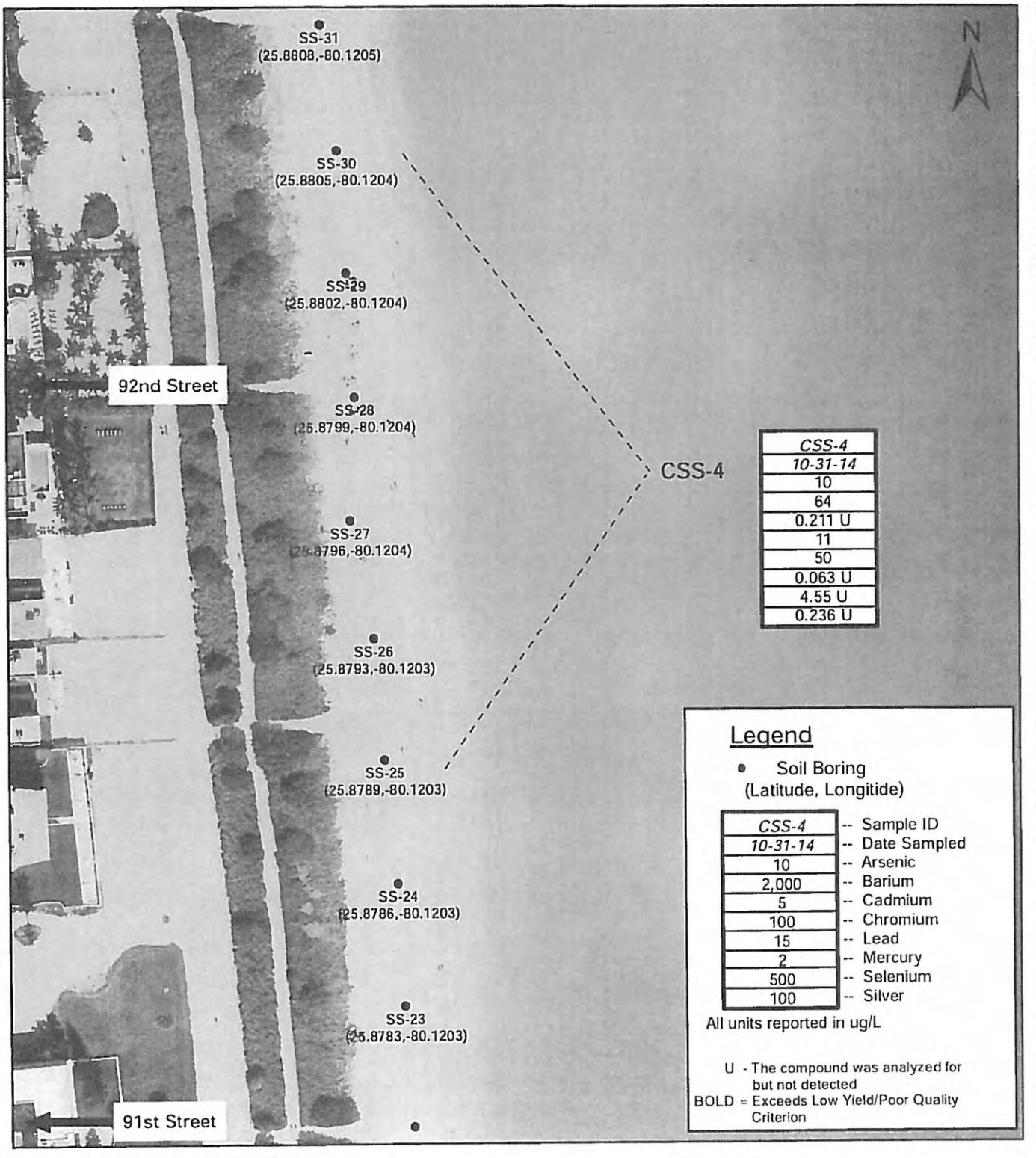
Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 6c
SPLP HEAVY METAL CONCENTRATIONS IN SOIL
October 31, 2014
(From 89th Street to 90th Street)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 6d SPLP HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 90th Street to 91st Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida



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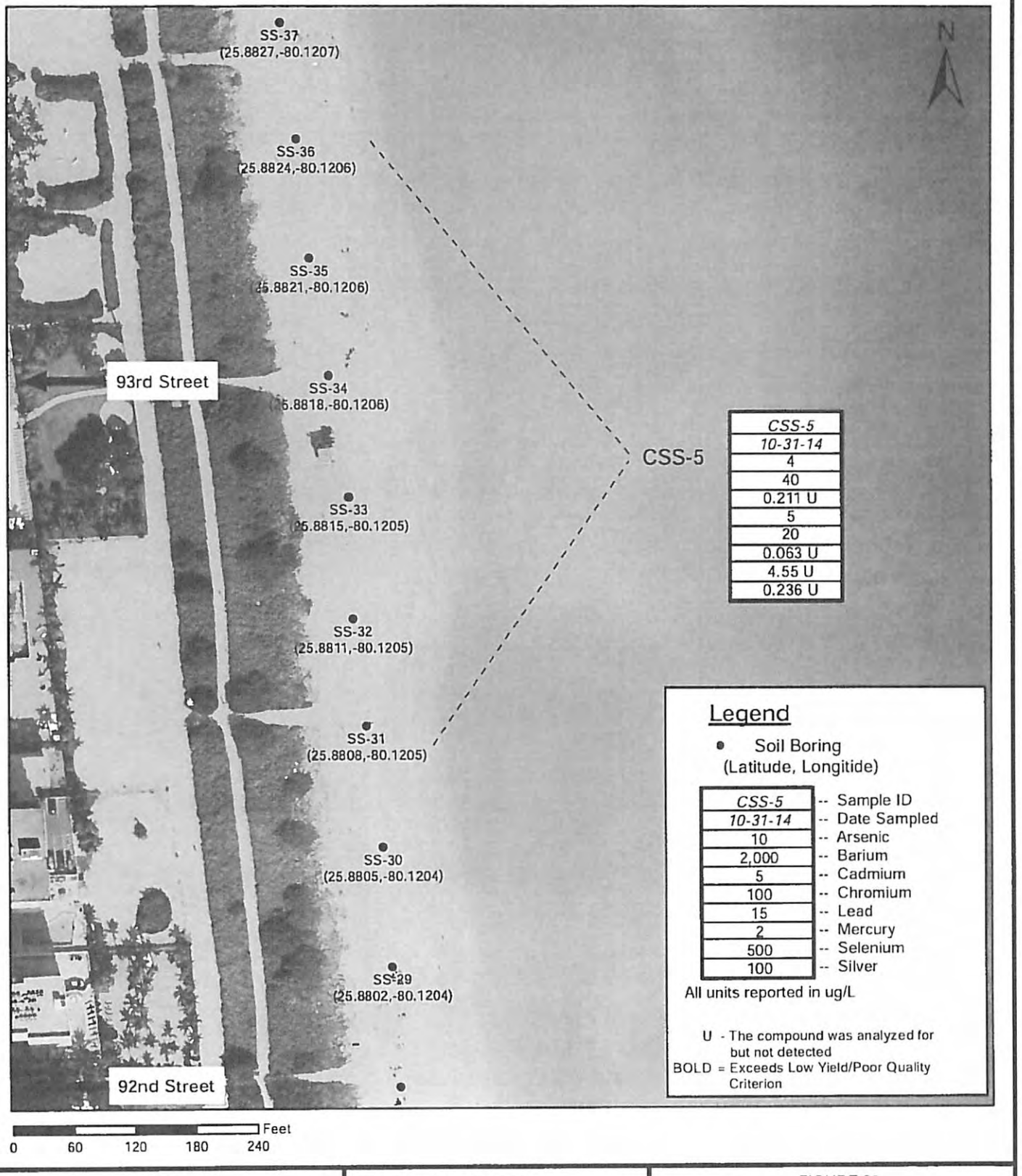
Miami, Florida

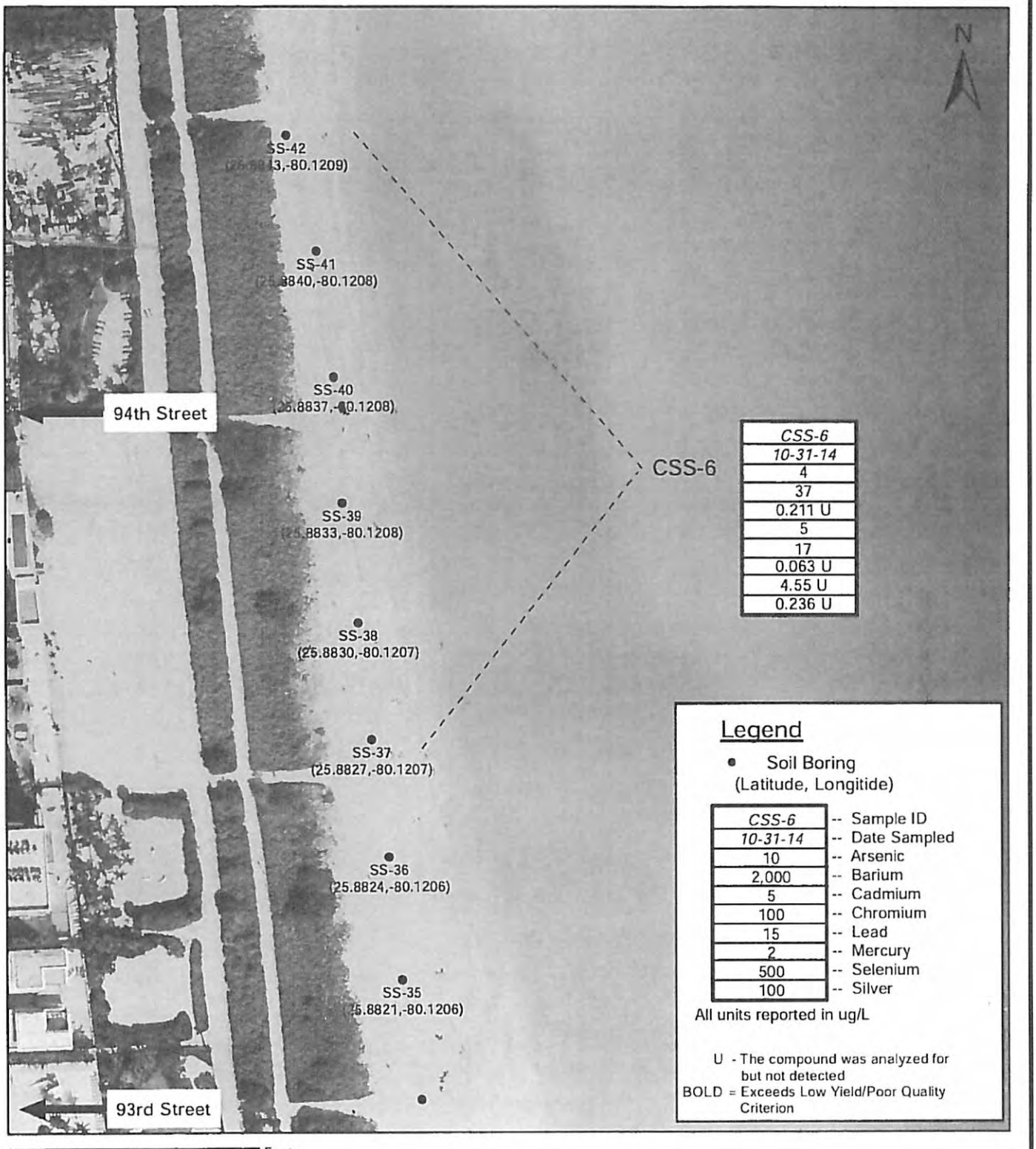
Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 6e
SPLP HEAVY METAL CONCENTRATIONS IN SOIL
October 31, 2014
(From 91st Street to 92nd Street)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



LANDSCIENCE Miami, Florida	Project No: 2146811 Drawn By: VM Date: 11/24/14 Client(s): Town of Surfside	FIGURE 6f SPLP HEAVY METAL CONCENTRATIONS IN SOIL October 31, 2014 (From 92nd Street to 93rd Street) City of Surfside Coastal Area Soil Evaluation Surfside, Miami-Dade County, Florida

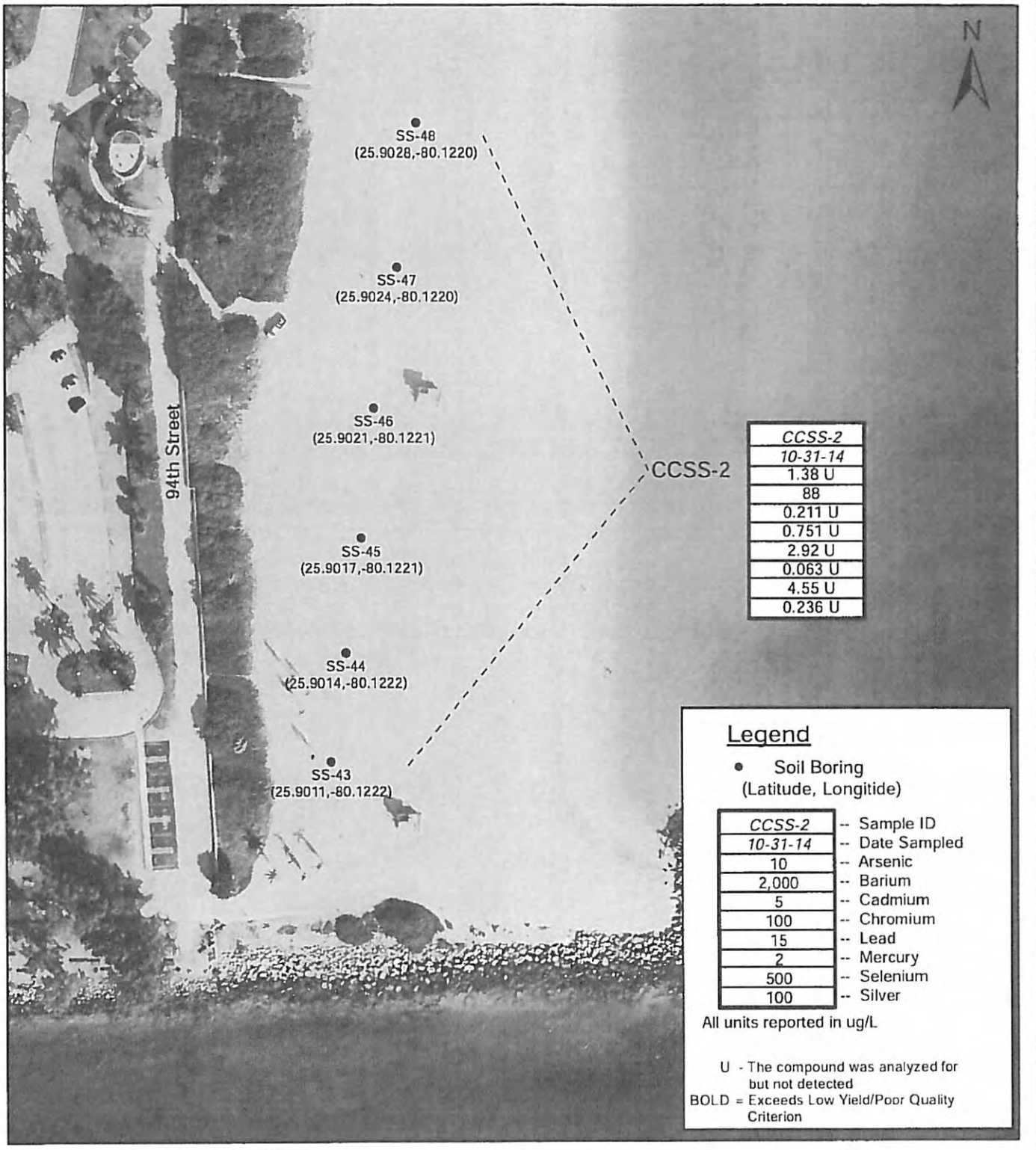


LANDSCIENCE
Miami, Florida

Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 6g
SPLP HEAVY METAL CONCENTRATIONS IN SOIL
October 31, 2014
(From 93rd Street to 94th Street)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida



LANDSCIENCE
Miami, Florida

Project No: 2146811
Drawn By: VM
Date: 11/24/14
Client(s): Town of Surfside

FIGURE 6h
SPLP HEAVY METAL CONCENTRATIONS IN SOIL
October 31, 2014
(Fisher Pier)

City of Surfside Coastal Area Soil Evaluation
Surfside, Miami-Dade County, Florida

APPENDICES

APPENDIX A

Laboratory Analytical Reports and Chain of Custody Records for Soil Samples Collected on October 31, 2014

Florida Spectrum
Environmental Services, Inc.

NELAP ACCREDITED TNI LABORATORY

Report To:
Mauricio Pages
Land Science Inc.
12570 NE 7th Avenue
North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St.,
Surfside

Lab ID: 14J0891-01
Client Sample ID: CCSS-1
Matrix: Solid

Collection Date: 10/31/14 09:27
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Florida Petroleum Residual Organics										
Total FL-PRO (C8-C40)	ND	U	mg/kg dry	1	0.190	0.570	FL-PRO	11/04 09:03	11/04 15:20	JR
Wet Chemistry										
% Solids	96.6		% by Weight	1	0.100	0.300	SM2540G	11/03 13:39	11/03 14:42	AR
Metals by EPA 6000/7000 Series Methods										
Arsenic	2.39		mg/kg dry	1	0.0649	0.195	EPA 6010	11/03 09:00	11/03 19:08	IN
Barium	5.44		mg/kg dry	1	0.00173	0.00518	EPA 6010	11/03 09:00	11/03 19:08	IN
Cadmium	ND	U	mg/kg dry	1	0.00380	0.0114	EPA 6010	11/03 09:00	11/03 19:08	IN
Chromium	4.42		mg/kg dry	1	0.0380	0.114	EPA 6010	11/03 09:00	11/03 19:08	IN
Lead	0.559		mg/kg dry	1	0.0528	0.158	EPA 6010	11/03 09:00	11/03 19:08	IN
Mercury	ND	U	mg/kg dry	1	0.0270	0.0810	7471	11/03 09:00	11/03 13:12	EN
Selenium	0.661		mg/kg dry	1	0.104	0.311	EPA 6010	11/03 09:00	11/03 19:08	IN
Silver	ND	U	mg/kg dry	1	0.00550	0.0165	EPA 6010	11/03 09:00	11/03 19:08	IN
Organochlorine Pesticides by EPA Method 8081A										
4,4´-DDE	ND	U	mg/kg dry	1	0.000144	0.000433	EPA 8081	11/04 12:15	11/05 01:30	JR
4,4´-DDT	ND	U	mg/kg dry	1	0.000239	0.000717	EPA 8081	11/04 12:15	11/05 01:30	JR
4,4'-DDD	ND	U	mg/kg dry	1	0.000126	0.000378	EPA 8081	11/04 12:15	11/05 01:30	JR
Aldrin	ND	U	mg/kg dry	1	0.000153	0.000460	EPA 8081	11/04 12:15	11/05 01:30	JR
alpha-BHC	ND	U	mg/kg dry	1	0.0000659	0.000198	EPA 8081	11/04 12:15	11/05 01:30	JR
beta-BHC	ND	U	mg/kg dry	1	0.000154	0.000464	EPA 8081	11/04 12:15	11/05 01:30	JR

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Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-01
Client Sample ID: CCSS-1
Matrix: Solid

Collection Date: 10/31/14 09:27
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Organochlorine Pesticides by EPA Method 8081A										
Chlordane	ND	U	mg/kg dry	1	0.000269	0.000807	EPA 8081	11/04 12:15	11/05 01:30	JR
delta-BHC	ND	U	mg/kg dry	1	0.000177	0.000532	EPA 8081	11/04 12:15	11/05 01:30	JR
Dieldrin	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 01:30	JR
Endosulfan I	ND	U	mg/kg dry	1	0.000196	0.000589	EPA 8081	11/04 12:15	11/05 01:30	JR
Endosulfan II	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 01:30	JR
Endosulfan sulfate	ND	U	mg/kg dry	1	0.000206	0.000619	EPA 8081	11/04 12:15	11/05 01:30	JR
Endrin	ND	U	mg/kg dry	1	0.000156	0.000468	EPA 8081	11/04 12:15	11/05 01:30	JR
Endrin aldehyde	ND	U	mg/kg dry	1	0.000260	0.000779	EPA 8081	11/04 12:15	11/05 01:30	JR
Endrin ketone	ND	U	mg/kg dry	1	0.000324	0.000963	EPA 8081	11/04 12:15	11/05 01:30	JR
gamma-BHC (Lindane)	ND	U	mg/kg dry	1	0.000148	0.000445	EPA 8081	11/04 12:15	11/05 01:30	JR
Heptachlor	ND	U	mg/kg dry	1	0.000183	0.000548	EPA 8081	11/04 12:15	11/05 01:30	JR
Heptachlor epoxide	ND	U	mg/kg dry	1	0.000174	0.000521	EPA 8081	11/04 12:15	11/05 01:30	JR
Methoxychlor	ND	U	mg/kg dry	1	0.000149	0.000448	EPA 8081	11/04 12:15	11/05 01:30	JR
Toxaphene	ND	U	mg/kg dry	1	0.00893	0.0268	EPA 8081	11/04 12:15	11/05 01:30	JR
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1016	ND	U	mg/kg dry	1	0.00129	0.00386	EPA 8082	11/04 12:20	11/05 01:30	JR
PCB-1221	ND	U	mg/kg dry	1	0.000739	0.00222	EPA 8082	11/04 12:20	11/05 01:30	JR
PCB-1232	ND	U	mg/kg dry	1	0.00195	0.00584	EPA 8082	11/04 12:20	11/05 01:30	JR
PCB-1242	ND	U	mg/kg dry	1	0.000775	0.00232	EPA 8082	11/04 12:20	11/05 01:30	JR
PCB-1248	ND	U	mg/kg dry	1	0.000480	0.00144	EPA 8082	11/04 12:20	11/05 01:30	JR
PCB-1254	ND	U	mg/kg dry	1	0.000786	0.00236	EPA 8082	11/04 12:20	11/05 01:30	JR

Florida Spectrum Environmental Services, Inc.

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North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-01
Client Sample ID: CCSS-1
Matrix: Solid

Collection Date: 10/31/14 09:27
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1260	ND	U	mg/kg dry	1	0.00144	0.00430	EPA 8082	11/04 12:20	11/05 01:30	JR
SPLP Extraction by EPA 1312										
Fluid Type (1,2,or 3)	1.00		-	1			EPA 1312	11/03 15:00	11/04 09:30	MAZ
SPLP Metals by 6000/7000 Series Methods										
Arsenic	ND	U	mg/L	1	0.00138	0.00410	EPA 6010	11/04 10:00	11/04 14:28	IN
Barium	0.0490		mg/L	1	0.000236	0.000700	EPA 6010	11/04 10:00	11/04 14:28	IN
Cadmium	ND	U	mg/L	1	0.000211	0.000600	EPA 6010	11/04 10:00	11/04 14:28	IN
Chromium	ND	U	mg/L	1	0.000751	0.00230	EPA 6010	11/04 10:00	11/04 14:28	IN
Lead	ND	U	mg/L	1	0.00292	0.00880	EPA 6010	11/04 10:00	11/04 14:28	IN
Mercury	ND	U	mg/L	1	0.0000630	0.000190	7471	11/06 09:30	11/06 11:57	EN
Selenium	ND	U	mg/L	1	0.00455	0.0137	EPA 6010	11/04 10:00	11/04 14:28	IN
Silver	ND	U	mg/L	1	0.000260	0.000800	EPA 6010	11/04 10:00	11/04 14:28	IN

Report To:
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Land Science Inc.
12570 NE 7th Avenue
North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-02
Client Sample ID: CSS-1
Matrix: Solid

Collection Date: 10/31/14 09:51
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Florida Petroleum Residual Organics										
Total FL-PRO (C8-C40)	ND	U	mg/kg dry	1	0.190	0.570	FL-PRO	11/04 09:03	11/04 15:51	JR
Wet Chemistry										
% Solids	96.9		% by Weight	1	0.100	0.300	SM2540G	11/03 13:39	11/03 14:42	AR
Metals by EPA 6000/7000 Series Methods										
Arsenic	6.46		mg/kg dry	1	0.0649	0.195	EPA 6010	11/03 09:00	11/03 19:13	IN
Barium	8.41		mg/kg dry	1	0.00162	0.00485	EPA 6010	11/03 09:00	11/03 19:13	IN
Cadmium	ND	U	mg/kg dry	1	0.00380	0.0114	EPA 6010	11/03 09:00	11/03 19:13	IN
Chromium	4.99		mg/kg dry	1	0.0380	0.114	EPA 6010	11/03 09:00	11/03 19:13	IN
Lead	4.85		mg/kg dry	1	0.0528	0.158	EPA 6010	11/03 09:00	11/03 19:13	IN
Mercury	ND	U	mg/kg dry	1	0.0270	0.0810	7471	11/03 09:00	11/03 13:14	EN
Selenium	0.618		mg/kg dry	1	0.104	0.311	EPA 6010	11/03 09:00	11/03 19:13	IN
Silver	ND	U	mg/kg dry	1	0.00550	0.0165	EPA 6010	11/03 09:00	11/03 19:13	IN
Organochlorine Pesticides by EPA Method 8081A										
4,4'-DDE	ND	U	mg/kg dry	1	0.000144	0.000433	EPA 8081	11/04 12:15	11/05 02:00	JR
4,4'-DDT	ND	U	mg/kg dry	1	0.000239	0.000717	EPA 8081	11/04 12:15	11/05 02:00	JR
4,4'-DDD	ND	U	mg/kg dry	1	0.000126	0.000378	EPA 8081	11/04 12:15	11/05 02:00	JR
Aldrin	ND	U	mg/kg dry	1	0.000153	0.000460	EPA 8081	11/04 12:15	11/05 02:00	JR
alpha-BHC	ND	U	mg/kg dry	1	0.0000659	0.000198	EPA 8081	11/04 12:15	11/05 02:00	JR
beta-BHC	ND	U	mg/kg dry	1	0.000154	0.000464	EPA 8081	11/04 12:15	11/05 02:00	JR
Chlordane	ND	U	mg/kg dry	1	0.000269	0.000807	EPA 8081	11/04 12:15	11/05 02:00	JR

Report To:
Mauricio Pages
Land Science Inc.
12570 NE 7th Avenue
North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-02
Client Sample ID: CSS-1
Matrix: Solid

Collection Date: 10/31/14 09:51
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Organochlorine Pesticides by EPA Method 8081A										
delta-BHC	ND	U	mg/kg dry	1	0.000177	0.000532	EPA 8081	11/04 12:15	11/05 02:00	JR
Dieldrin	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 02:00	JR
Endosulfan I	ND	U	mg/kg dry	1	0.000196	0.000589	EPA 8081	11/04 12:15	11/05 02:00	JR
Endosulfan II	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 02:00	JR
Endosulfan sulfate	ND	U	mg/kg dry	1	0.000206	0.000619	EPA 8081	11/04 12:15	11/05 02:00	JR
Endrin	ND	U	mg/kg dry	1	0.000156	0.000468	EPA 8081	11/04 12:15	11/05 02:00	JR
Endrin aldehyde	ND	U	mg/kg dry	1	0.000260	0.000779	EPA 8081	11/04 12:15	11/05 02:00	JR
Endrin ketone	ND	U	mg/kg dry	1	0.000324	0.000963	EPA 8081	11/04 12:15	11/05 02:00	JR
gamma-BHC (Lindane)	ND	U	mg/kg dry	1	0.000148	0.000445	EPA 8081	11/04 12:15	11/05 02:00	JR
Heptachlor	ND	U	mg/kg dry	1	0.000183	0.000548	EPA 8081	11/04 12:15	11/05 02:00	JR
Heptachlor epoxide	ND	U	mg/kg dry	1	0.000174	0.000521	EPA 8081	11/04 12:15	11/05 02:00	JR
Methoxychlor	ND	U	mg/kg dry	1	0.000149	0.000448	EPA 8081	11/04 12:15	11/05 02:00	JR
Toxaphene	ND	U	mg/kg dry	1	0.00893	0.0268	EPA 8081	11/04 12:15	11/05 02:00	JR
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1016	ND	U	mg/kg dry	1	0.00129	0.00386	EPA 8082	11/04 12:20	11/05 02:00	JR
PCB-1221	ND	U	mg/kg dry	1	0.000739	0.00222	EPA 8082	11/04 12:20	11/05 02:00	JR
PCB-1232	ND	U	mg/kg dry	1	0.00195	0.00584	EPA 8082	11/04 12:20	11/05 02:00	JR
PCB-1242	ND	U	mg/kg dry	1	0.000775	0.00232	EPA 8082	11/04 12:20	11/05 02:00	JR
PCB-1248	ND	U	mg/kg dry	1	0.000480	0.00144	EPA 8082	11/04 12:20	11/05 02:00	JR
PCB-1254	ND	U	mg/kg dry	1	0.000786	0.00236	EPA 8082	11/04 12:20	11/05 02:00	JR
PCB-1260	ND	U	mg/kg dry	1	0.00144	0.00430	EPA 8082	11/04 12:20	11/05 02:00	JR

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-02
Client Sample ID: CSS-1
Matrix: Solid

Collection Date: 10/31/14 09:51
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
SPLP Extraction by EPA 1312										
Fluid Type (1,2,or 3)	1.00		.	1			EPA 1312	11/03 15:00	11/04 09:30	MAZ
SPLP Metals by 6000/7000 Series Methods										
Arsenic	0.00900		mg/L	1	0.00138	0.00410	EPA 6010	11/04 10:00	11/04 14:32	IN
Barium	0.0610		mg/L	1	0.000236	0.000700	EPA 6010	11/04 10:00	11/04 14:32	IN
Cadmium	ND	U	mg/L	1	0.000211	0.000600	EPA 6010	11/04 10:00	11/04 14:32	IN
Chromium	0.00800		mg/L	1	0.000751	0.00230	EPA 6010	11/04 10:00	11/04 14:32	IN
Lead	0.0380		mg/L	1	0.00292	0.00880	EPA 6010	11/04 10:00	11/04 14:32	IN
Mercury	ND	U	mg/L	1	0.0000630	0.000190	7471	11/06 09:30	11/06 11:59	EN
Selenium	ND	U	mg/L	1	0.00455	0.0137	EPA 6010	11/04 10:00	11/04 14:32	IN
Silver	ND	U	mg/L	1	0.000260	0.000800	EPA 6010	11/04 10:00	11/04 14:32	IN

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North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-03
Client Sample ID: CSS-2
Matrix: Solid

Collection Date: 10/31/14 10:18
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Florida Petroleum Residual Organics										
Total FL-PRO (C8-C40)	ND	U	mg/kg dry	1	0.190	0.570	FL-PRO	11/04 09:03	11/04 16:22	JR
Wet Chemistry										
% Solids	96.8		% by Weight	1	0.100	0.300	SM2540G	11/03 13:39	11/03 14:42	AR
Metals by EPA 6000/7000 Series Methods										
Arsenic	4.57		mg/kg dry	1	0.0649	0.195	EPA 6010	11/03 09:00	11/03 19:51	IN
Barium	5.38		mg/kg dry	1	0.00171	0.00512	EPA 6010	11/03 09:00	11/03 19:51	IN
Cadmium	ND	U	mg/kg dry	1	0.00380	0.0114	EPA 6010	11/03 09:00	11/03 19:51	IN
Chromium	4.07		mg/kg dry	1	0.0380	0.114	EPA 6010	11/03 09:00	11/03 19:51	IN
Lead	2.01		mg/kg dry	1	0.0528	0.158	EPA 6010	11/03 09:00	11/03 19:51	IN
Mercury	ND	U	mg/kg dry	1	0.0270	0.0810	7471	11/03 09:00	11/03 13:16	EN
Selenium	0.553		mg/kg dry	1	0.104	0.311	EPA 6010	11/03 09:00	11/03 19:51	IN
Silver	ND	U	mg/kg dry	1	0.00550	0.0165	EPA 6010	11/03 09:00	11/03 19:51	IN
Organochlorine Pesticides by EPA Method 8081A										
4,4'-DDE	ND	U	mg/kg dry	1	0.000144	0.000433	EPA 8081	11/04 12:15	11/05 02:30	JR
4,4'-DDT	ND	U	mg/kg dry	1	0.000239	0.000717	EPA 8081	11/04 12:15	11/05 02:30	JR
4,4'-DDD	ND	U	mg/kg dry	1	0.000126	0.000378	EPA 8081	11/04 12:15	11/05 02:30	JR
Aldrin	ND	U	mg/kg dry	1	0.000153	0.000460	EPA 8081	11/04 12:15	11/05 02:30	JR
alpha-BHC	ND	U	mg/kg dry	1	0.0000659	0.000198	EPA 8081	11/04 12:15	11/05 02:30	JR
beta-BHC	ND	U	mg/kg dry	1	0.000154	0.000464	EPA 8081	11/04 12:15	11/05 02:30	JR
Chlordane	ND	U	mg/kg dry	1	0.000269	0.000807	EPA 8081	11/04 12:15	11/05 02:30	JR

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-03
Client Sample ID: CSS-2
Matrix: Solid

Collection Date: 10/31/14 10:18
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Organochlorine Pesticides by EPA Method 8081A										
delta-BHC	ND	U	mg/kg dry	1	0.000177	0.000532	EPA 8081	11/04 12:15	11/05 02:30	JR
Dieldrin	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 02:30	JR
Endosulfan I	ND	U	mg/kg dry	1	0.000196	0.000589	EPA 8081	11/04 12:15	11/05 02:30	JR
Endosulfan II	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 02:30	JR
Endosulfan sulfate	ND	U	mg/kg dry	1	0.000206	0.000619	EPA 8081	11/04 12:15	11/05 02:30	JR
Endrin	ND	U	mg/kg dry	1	0.000156	0.000468	EPA 8081	11/04 12:15	11/05 02:30	JR
Endrin aldehyde	ND	U	mg/kg dry	1	0.000260	0.000779	EPA 8081	11/04 12:15	11/05 02:30	JR
Endrin ketone	ND	U	mg/kg dry	1	0.000324	0.000963	EPA 8081	11/04 12:15	11/05 02:30	JR
gamma-BHC (Lindane)	ND	U	mg/kg dry	1	0.000148	0.000445	EPA 8081	11/04 12:15	11/05 02:30	JR
Heptachlor	ND	U	mg/kg dry	1	0.000183	0.000548	EPA 8081	11/04 12:15	11/05 02:30	JR
Heptachlor epoxide	ND	U	mg/kg dry	1	0.000174	0.000521	EPA 8081	11/04 12:15	11/05 02:30	JR
Methoxychlor	ND	U	mg/kg dry	1	0.000149	0.000448	EPA 8081	11/04 12:15	11/05 02:30	JR
Toxaphene	ND	U	mg/kg dry	1	0.00893	0.0268	EPA 8081	11/04 12:15	11/05 02:30	JR
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1016	ND	U	mg/kg dry	1	0.00129	0.00386	EPA 8082	11/04 12:20	11/05 02:30	JR
PCB-1221	ND	U	mg/kg dry	1	0.000739	0.00222	EPA 8082	11/04 12:20	11/05 02:30	JR
PCB-1232	ND	U	mg/kg dry	1	0.00195	0.00584	EPA 8082	11/04 12:20	11/05 02:30	JR
PCB-1242	ND	U	mg/kg dry	1	0.000775	0.00232	EPA 8082	11/04 12:20	11/05 02:30	JR
PCB-1248	ND	U	mg/kg dry	1	0.000480	0.00144	EPA 8082	11/04 12:20	11/05 02:30	JR
PCB-1254	0.0863		mg/kg dry	1	0.000786	0.00236	EPA 8082	11/04 12:20	11/05 02:30	JR
PCB-1260	ND	U	mg/kg dry	1	0.00144	0.00430	EPA 8082	11/04 12:20	11/05 02:30	JR

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-03
Client Sample ID: CSS-2
Matrix: Solid

Collection Date: 10/31/14 10:18
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
SPLP Extraction by EPA 1312										
Fluid Type (1,2,or 3)	1.00		.	1			EPA 1312	11/03 15:00	11/04 09:30	MAZ
SPLP Metals by 6000/7000 Series Methods										
Arsenic	0.00300	I	mg/L	1	0.00138	0.00410	EPA 6010	11/04 10:00	11/04 14:36	IN
Barium	0.0610		mg/L	1	0.000236	0.000700	EPA 6010	11/04 10:00	11/04 14:36	IN
Cadmium	ND	U	mg/L	1	0.000211	0.000600	EPA 6010	11/04 10:00	11/04 14:36	IN
Chromium	0.00300		mg/L	1	0.000751	0.00230	EPA 6010	11/04 10:00	11/04 14:36	IN
Lead	0.0120		mg/L	1	0.00292	0.00880	EPA 6010	11/04 10:00	11/04 14:36	IN
Mercury	ND	U	mg/L	1	0.0000630	0.000190	7471	11/06 09:30	11/06 12:01	EN
Selenium	ND	U	mg/L	1	0.00455	0.0137	EPA 6010	11/04 10:00	11/04 14:36	IN
Silver	ND	U	mg/L	1	0.000260	0.000800	EPA 6010	11/04 10:00	11/04 14:36	IN

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-04
Client Sample ID: CSS-3
Matrix: Solid

Collection Date: 10/31/14 10:42
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Florida Petroleum Residual Organics										
Total FL-PRO (C8-C40)	ND	U	mg/kg dry	1	0.190	0.570	FL-PRO	11/04 09:03	11/04 16:54	JR
Wet Chemistry										
% Solids	97.1		% by Weight	1	0.100	0.300	SM2540G	11/03 13:39	11/03 14:42	AR
Metals by EPA 6000/7000 Series Methods										
Arsenic	3.80		mg/kg dry	1	0.0649	0.195	EPA 6010	11/03 09:00	11/03 19:56	IN
Barium	5.80		mg/kg dry	1	0.00170	0.00510	EPA 6010	11/03 09:00	11/03 19:56	IN
Cadmium	ND	U	mg/kg dry	1	0.00380	0.0114	EPA 6010	11/03 09:00	11/03 19:56	IN
Chromium	3.80		mg/kg dry	1	0.0380	0.114	EPA 6010	11/03 09:00	11/03 19:56	IN
Lead	1.75		mg/kg dry	1	0.0528	0.158	EPA 6010	11/03 09:00	11/03 19:56	IN
Mercury	ND	U	mg/kg dry	1	0.0270	0.0810	7471	11/03 09:00	11/03 13:19	EN
Selenium	0.600		mg/kg dry	1	0.104	0.311	EPA 6010	11/03 09:00	11/03 19:56	IN
Silver	ND	U	mg/kg dry	1	0.00550	0.0165	EPA 6010	11/03 09:00	11/03 19:56	IN
Organochlorine Pesticides by EPA Method 8081A										
4,4'-DDE	ND	U	mg/kg dry	1	0.000144	0.000433	EPA 8081	11/04 12:15	11/05 03:00	JR
4,4'-DDT	ND	U	mg/kg dry	1	0.000239	0.000717	EPA 8081	11/04 12:15	11/05 03:00	JR
4,4'-DDD	ND	U	mg/kg dry	1	0.000126	0.000378	EPA 8081	11/04 12:15	11/05 03:00	JR
Aldrin	ND	U	mg/kg dry	1	0.000153	0.000460	EPA 8081	11/04 12:15	11/05 03:00	JR
alpha-BHC	ND	U	mg/kg dry	1	0.0000659	0.000198	EPA 8081	11/04 12:15	11/05 03:00	JR
beta-BHC	ND	U	mg/kg dry	1	0.000154	0.000464	EPA 8081	11/04 12:15	11/05 03:00	JR
Chlordane	ND	U	mg/kg dry	1	0.000269	0.000807	EPA 8081	11/04 12:15	11/05 03:00	JR

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-04
Client Sample ID: CSS-3
Matrix: Solid

Collection Date: 10/31/14 10:42
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Organochlorine Pesticides by EPA Method 8081A										
delta-BHC	ND	U	mg/kg dry	1	0.000177	0.000532	EPA 8081	11/04 12:15	11/05 03:00	JR
Dieldrin	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 03:00	JR
Endosulfan I	ND	U	mg/kg dry	1	0.000196	0.000589	EPA 8081	11/04 12:15	11/05 03:00	JR
Endosulfan II	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 03:00	JR
Endosulfan sulfate	ND	U	mg/kg dry	1	0.000206	0.000619	EPA 8081	11/04 12:15	11/05 03:00	JR
Endrin	ND	U	mg/kg dry	1	0.000156	0.000468	EPA 8081	11/04 12:15	11/05 03:00	JR
Endrin aldehyde	ND	U	mg/kg dry	1	0.000260	0.000779	EPA 8081	11/04 12:15	11/05 03:00	JR
Endrin ketone	ND	U	mg/kg dry	1	0.000324	0.000963	EPA 8081	11/04 12:15	11/05 03:00	JR
gamma-BHC (Lindane)	ND	U	mg/kg dry	1	0.000148	0.000445	EPA 8081	11/04 12:15	11/05 03:00	JR
Heptachlor	ND	U	mg/kg dry	1	0.000183	0.000548	EPA 8081	11/04 12:15	11/05 03:00	JR
Heptachlor epoxide	ND	U	mg/kg dry	1	0.000174	0.000521	EPA 8081	11/04 12:15	11/05 03:00	JR
Methoxychlor	ND	U	mg/kg dry	1	0.000149	0.000448	EPA 8081	11/04 12:15	11/05 03:00	JR
Toxaphene	ND	U	mg/kg dry	1	0.00893	0.0268	EPA 8081	11/04 12:15	11/05 03:00	JR
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1016	ND	U	mg/kg dry	1	0.00129	0.00386	EPA 8082	11/04 12:20	11/05 03:00	JR
PCB-1221	ND	U	mg/kg dry	1	0.000739	0.00222	EPA 8082	11/04 12:20	11/05 03:00	JR
PCB-1232	ND	U	mg/kg dry	1	0.00195	0.00584	EPA 8082	11/04 12:20	11/05 03:00	JR
PCB-1242	ND	U	mg/kg dry	1	0.000775	0.00232	EPA 8082	11/04 12:20	11/05 03:00	JR
PCB-1248	ND	U	mg/kg dry	1	0.000480	0.00144	EPA 8082	11/04 12:20	11/05 03:00	JR
PCB-1254	ND	U	mg/kg dry	1	0.000786	0.00236	EPA 8082	11/04 12:20	11/05 03:00	JR
PCB-1260	ND	U	mg/kg dry	1	0.00144	0.00430	EPA 8082	11/04 12:20	11/05 03:00	JR

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-04
Client Sample ID: CSS-3
Matrix: Solid

Collection Date: 10/31/14 10:42
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
SPLP Extraction by EPA 1312										
Fluid Type (1,2,or 3)	1.00		-	1			EPA 1312	11/03 15:00	11/04 09:30	MAZ
SPLP Metals by 6000/7000 Series Methods										
Arsenic	ND	U	mg/L	1	0.00138	0.00410	EPA 6010	11/04 10:00	11/04 14:40	IN
Barium	0.0340		mg/L	1	0.000236	0.000700	EPA 6010	11/04 10:00	11/04 14:40	IN
Cadmium	ND	U	mg/L	1	0.000211	0.000600	EPA 6010	11/04 10:00	11/04 14:40	IN
Chromium	0.00300		mg/L	1	0.000751	0.00230	EPA 6010	11/04 10:00	11/04 14:40	IN
Lead	0.0100		mg/L	1	0.00292	0.00880	EPA 6010	11/04 10:00	11/04 14:40	IN
Mercury	ND	U	mg/L	1	0.0000630	0.000190	7471	11/06 09:30	11/06 12:04	EN
Selenium	ND	U	mg/L	1	0.00455	0.0137	EPA 6010	11/04 10:00	11/04 14:40	IN
Silver	ND	U	mg/L	1	0.000260	0.000800	EPA 6010	11/04 10:00	11/04 14:40	IN

Report To:
Mauricio Pages
Land Science Inc.
12570 NE 7th Avenue
North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-05
Client Sample ID: CSS-4
Matrix: Solid

Collection Date: 10/31/14 11:15
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Florida Petroleum Residual Organics										
Total FL-PRO (C8-C40)	5.68		mg/kg dry	1	0.190	0.570	FL-PRO	11/04 09:03	11/04 15:20	JR
Wet Chemistry										
% Solids	96.9		% by Weight	1	0.100	0.300	SM2540G	11/03 13:39	11/03 14:42	AR
Metals by EPA 6000/7000 Series Methods										
Arsenic	5.84		mg/kg dry	1	0.0649	0.195	EPA 6010	11/03 09:00	11/03 20:01	IN
Barium	8.95		mg/kg dry	1	0.00158	0.00473	EPA 6010	11/03 09:00	11/03 20:01	IN
Cadmium	ND	U	mg/kg dry	1	0.00380	0.0114	EPA 6010	11/03 09:00	11/03 20:01	IN
Chromium	4.08		mg/kg dry	1	0.0380	0.114	EPA 6010	11/03 09:00	11/03 20:01	IN
Lead	5.24		mg/kg dry	1	0.0528	0.158	EPA 6010	11/03 09:00	11/03 20:01	IN
Mercury	ND	U	mg/kg dry	1	0.0270	0.0810	7471	11/03 09:00	11/03 13:21	EN
Selenium	0.556		mg/kg dry	1	0.104	0.311	EPA 6010	11/03 09:00	11/03 20:01	IN
Silver	ND	U	mg/kg dry	1	0.00550	0.0165	EPA 6010	11/03 09:00	11/03 20:01	IN
Organochlorine Pesticides by EPA Method 8081A										
4,4'-DDE	ND	U	mg/kg dry	1	0.000144	0.000433	EPA 8081	11/04 12:15	11/05 03:30	JR
4,4'-DDT	0.0138		mg/kg dry	1	0.000239	0.000717	EPA 8081	11/04 12:15	11/05 03:30	JR
4,4'-DDD	ND	U	mg/kg dry	1	0.000126	0.000378	EPA 8081	11/04 12:15	11/05 03:30	JR
Aldrin	ND	U	mg/kg dry	1	0.000153	0.000460	EPA 8081	11/04 12:15	11/05 03:30	JR
alpha-BHC	ND	U	mg/kg dry	1	0.0000659	0.000198	EPA 8081	11/04 12:15	11/05 03:30	JR
beta-BHC	ND	U	mg/kg dry	1	0.000154	0.000464	EPA 8081	11/04 12:15	11/05 03:30	JR
Chlordane	ND	U	mg/kg dry	1	0.000269	0.000807	EPA 8081	11/04 12:15	11/05 03:30	JR

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-05
Client Sample ID: CSS-4
Matrix: Solid

Collection Date: 10/31/14 11:15
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Organochlorine Pesticides by EPA Method 8081A										
delta-BHC	ND	U	mg/kg dry	1	0.000177	0.000532	EPA 8081	11/04 12:15	11/05 03:30	JR
Dieldrin	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 03:30	JR
Endosulfan I	ND	U	mg/kg dry	1	0.000196	0.000589	EPA 8081	11/04 12:15	11/05 03:30	JR
Endosulfan II	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 03:30	JR
Endosulfan sulfate	ND	U	mg/kg dry	1	0.000206	0.000619	EPA 8081	11/04 12:15	11/05 03:30	JR
Endrin	ND	U	mg/kg dry	1	0.000156	0.000468	EPA 8081	11/04 12:15	11/05 03:30	JR
Endrin aldehyde	ND	U	mg/kg dry	1	0.000260	0.000779	EPA 8081	11/04 12:15	11/05 03:30	JR
Endrin ketone	ND	U	mg/kg dry	1	0.000324	0.000963	EPA 8081	11/04 12:15	11/05 03:30	JR
gamma-BHC (Lindane)	ND	U	mg/kg dry	1	0.000148	0.000445	EPA 8081	11/04 12:15	11/05 03:30	JR
Heptachlor	ND	U	mg/kg dry	1	0.000183	0.000548	EPA 8081	11/04 12:15	11/05 03:30	JR
Heptachlor epoxide	ND	U	mg/kg dry	1	0.000174	0.000521	EPA 8081	11/04 12:15	11/05 03:30	JR
Methoxychlor	ND	U	mg/kg dry	1	0.000149	0.000448	EPA 8081	11/04 12:15	11/05 03:30	JR
Toxaphene	ND	U	mg/kg dry	1	0.00893	0.0268	EPA 8081	11/04 12:15	11/05 03:30	JR
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1016	ND	U	mg/kg dry	1	0.00129	0.00386	EPA 8082	11/04 12:20	11/05 03:30	JR
PCB-1221	ND	U	mg/kg dry	1	0.000739	0.00222	EPA 8082	11/04 12:20	11/05 03:30	JR
PCB-1232	ND	U	mg/kg dry	1	0.00195	0.00584	EPA 8082	11/04 12:20	11/05 03:30	JR
PCB-1242	ND	U	mg/kg dry	1	0.000775	0.00232	EPA 8082	11/04 12:20	11/05 03:30	JR
PCB-1248	ND	U	mg/kg dry	1	0.000480	0.00144	EPA 8082	11/04 12:20	11/05 03:30	JR
PCB-1254	ND	U	mg/kg dry	1	0.000786	0.00236	EPA 8082	11/04 12:20	11/05 03:30	JR
PCB-1260	ND	U	mg/kg dry	1	0.00144	0.00430	EPA 8082	11/04 12:20	11/05 03:30	JR

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Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-05
Client Sample ID: CSS-4
Matrix: Solid

Collection Date: 10/31/14 11:15
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
SPLP Extraction by EPA 1312										
Fluid Type (1,2,or 3)	1.00		.	1			EPA 1312	11/03 15:00	11/04 09:30	MAZ
SPLP Metals by 6000/7000 Series Methods										
Arsenic	0.0100		mg/L	1	0.00138	0.00410	EPA 6010	11/04 10:00	11/04 14:44	IN
Barium	0.0640		mg/L	1	0.000236	0.000700	EPA 6010	11/04 10:00	11/04 14:44	IN
Cadmium	ND	U	mg/L	1	0.000211	0.000600	EPA 6010	11/04 10:00	11/04 14:44	IN
Chromium	0.0110		mg/L	1	0.000751	0.00230	EPA 6010	11/04 10:00	11/04 14:44	IN
Lead	0.0500		mg/L	1	0.00292	0.00880	EPA 6010	11/04 10:00	11/04 14:44	IN
Mercury	ND	U	mg/L	1	0.0000630	0.000190	7471	11/06 09:30	11/06 12:06	EN
Selenium	ND	U	mg/L	1	0.00455	0.0137	EPA 6010	11/04 10:00	11/04 14:44	IN
Silver	ND	U	mg/L	1	0.000260	0.000800	EPA 6010	11/04 10:00	11/04 14:44	IN

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-06
Client Sample ID: CSS-5
Matrix: Solid

Collection Date: 10/31/14 11:37
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Florida Petroleum Residual Organics										
Total FL-PRO (C8-C40)	12.9		mg/kg dry	1	0.190	0.570	FL-PRO	11/04 09:03	11/04 15:51	JR
Wet Chemistry										
% Solids	97.1		% by Weight	1	0.100	0.300	SM2540G	11/03 13:39	11/03 14:42	AR
Metals by EPA 6000/7000 Series Methods										
Arsenic	5.39		mg/kg dry	1	0.0649	0.195	EPA 6010	11/03 09:00	11/03 20:06	IN
Barium	7.29		mg/kg dry	1	0.00170	0.00509	EPA 6010	11/03 09:00	11/03 20:06	IN
Cadmium	ND	U	mg/kg dry	1	0.00380	0.0114	EPA 6010	11/03 09:00	11/03 20:06	IN
Chromium	4.04		mg/kg dry	1	0.0380	0.114	EPA 6010	11/03 09:00	11/03 20:06	IN
Lead	3.54		mg/kg dry	1	0.0528	0.158	EPA 6010	11/03 09:00	11/03 20:06	IN
Mercury	ND	U	mg/kg dry	1	0.0270	0.0810	7471	11/03 09:00	11/03 13:28	EN
Selenium	0.699		mg/kg dry	1	0.104	0.311	EPA 6010	11/03 09:00	11/03 20:06	IN
Silver	ND	U	mg/kg dry	1	0.00550	0.0165	EPA 6010	11/03 09:00	11/03 20:06	IN
Organochlorine Pesticides by EPA Method 8081A										
4,4'-DDE	ND	U	mg/kg dry	1	0.000144	0.000433	EPA 8081	11/04 12:15	11/05 04:00	JR
4,4'-DDT	ND	U	mg/kg dry	1	0.000239	0.000717	EPA 8081	11/04 12:15	11/05 04:00	JR
4,4'-DDD	ND	U	mg/kg dry	1	0.000126	0.000378	EPA 8081	11/04 12:15	11/05 04:00	JR
Aldrin	ND	U	mg/kg dry	1	0.000153	0.000460	EPA 8081	11/04 12:15	11/05 04:00	JR
alpha-BHC	ND	U	mg/kg dry	1	0.0000659	0.000198	EPA 8081	11/04 12:15	11/05 04:00	JR
beta-BHC	ND	U	mg/kg dry	1	0.000154	0.000464	EPA 8081	11/04 12:15	11/05 04:00	JR
Chlordane	ND	U	mg/kg dry	1	0.000269	0.000807	EPA 8081	11/04 12:15	11/05 04:00	JR

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-06
Client Sample ID: CSS-5
Matrix: Solid

Collection Date: 10/31/14 11:37
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Organochlorine Pesticides by EPA Method 8081A										
delta-BHC	ND	U	mg/kg dry	1	0.000177	0.000532	EPA 8081	11/04 12:15	11/05 04:00	JR
Dieldrin	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 04:00	JR
Endosulfan I	ND	U	mg/kg dry	1	0.000196	0.000589	EPA 8081	11/04 12:15	11/05 04:00	JR
Endosulfan II	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 04:00	JR
Endosulfan sulfate	ND	U	mg/kg dry	1	0.000206	0.000619	EPA 8081	11/04 12:15	11/05 04:00	JR
Endrin	ND	U	mg/kg dry	1	0.000156	0.000468	EPA 8081	11/04 12:15	11/05 04:00	JR
Endrin aldehyde	ND	U	mg/kg dry	1	0.000260	0.000779	EPA 8081	11/04 12:15	11/05 04:00	JR
Endrin ketone	ND	U	mg/kg dry	1	0.000324	0.000963	EPA 8081	11/04 12:15	11/05 04:00	JR
gamma-BHC (Lindane)	ND	U	mg/kg dry	1	0.000148	0.000445	EPA 8081	11/04 12:15	11/05 04:00	JR
Heptachlor	ND	U	mg/kg dry	1	0.000183	0.000548	EPA 8081	11/04 12:15	11/05 04:00	JR
Heptachlor epoxide	ND	U	mg/kg dry	1	0.000174	0.000521	EPA 8081	11/04 12:15	11/05 04:00	JR
Methoxychlor	ND	U	mg/kg dry	1	0.000149	0.000448	EPA 8081	11/04 12:15	11/05 04:00	JR
Toxaphene	ND	U	mg/kg dry	1	0.00893	0.0268	EPA 8081	11/04 12:15	11/05 04:00	JR
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1016	ND	U	mg/kg dry	1	0.00129	0.00386	EPA 8082	11/04 12:20	11/05 04:00	JR
PCB-1221	ND	U	mg/kg dry	1	0.000739	0.00222	EPA 8082	11/04 12:20	11/05 04:00	JR
PCB-1232	ND	U	mg/kg dry	1	0.00195	0.00584	EPA 8082	11/04 12:20	11/05 04:00	JR
PCB-1242	ND	U	mg/kg dry	1	0.000775	0.00232	EPA 8082	11/04 12:20	11/05 04:00	JR
PCB-1248	ND	U	mg/kg dry	1	0.000480	0.00144	EPA 8082	11/04 12:20	11/05 04:00	JR
PCB-1254	ND	U	mg/kg dry	1	0.000786	0.00236	EPA 8082	11/04 12:20	11/05 04:00	JR
PCB-1260	ND	U	mg/kg dry	1	0.00144	0.00430	EPA 8082	11/04 12:20	11/05 04:00	JR

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Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-06
Client Sample ID: CSS-5
Matrix: Solid

Collection Date: 10/31/14 11:37
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
SPLP Extraction by EPA 1312										
Fluid Type (1,2,or 3)	1.00		.	1			EPA 1312	11/03 15:00	11/04 09:30	MAZ
SPLP Metals by 6000/7000 Series Methods										
Arsenic	0.00400	I	mg/L	1	0.00138	0.00410	EPA 6010	11/04 10:00	11/04 14:48	IN
Barium	0.0400		mg/L	1	0.000236	0.000700	EPA 6010	11/04 10:00	11/04 14:48	IN
Cadmium	ND	U	mg/L	1	0.000211	0.000600	EPA 6010	11/04 10:00	11/04 14:48	IN
Chromium	0.00500		mg/L	1	0.000751	0.00230	EPA 6010	11/04 10:00	11/04 14:48	IN
Lead	0.0200		mg/L	1	0.00292	0.00880	EPA 6010	11/04 10:00	11/04 14:48	IN
Mercury	ND	U	mg/L	1	0.0000630	0.000190	7471	11/06 09:30	11/06 12:09	EN
Selenium	ND	U	mg/L	1	0.00455	0.0137	EPA 6010	11/04 10:00	11/04 14:48	IN
Silver	ND	U	mg/L	1	0.000260	0.000800	EPA 6010	11/04 10:00	11/04 14:48	IN

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-07
Client Sample ID: CSS-6
Matrix: Solid

Collection Date: 10/31/14 12:03
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Florida Petroleum Residual Organics										
Total FL-PRO (C8-C40)	2.00		mg/kg dry	1	0.190	0.570	FL-PRO	11/04 09:03	11/04 16:22	JR
Wet Chemistry										
% Solids	97.4		% by Weight	1	0.100	0.300	SM2540G	11/03 13:39	11/03 14:42	AR
Metals by EPA 6000/7000 Series Methods										
Arsenic	6.44		mg/kg dry	1	0.0649	0.195	EPA 6010	11/03 09:00	11/03 20:10	IN
Barium	8.72		mg/kg dry	1	0.00165	0.00494	EPA 6010	11/03 09:00	11/03 20:10	IN
Cadmium	ND	U	mg/kg dry	1	0.00380	0.0114	EPA 6010	11/03 09:00	11/03 20:10	IN
Chromium	4.07		mg/kg dry	1	0.0380	0.114	EPA 6010	11/03 09:00	11/03 20:10	IN
Lead	2.62		mg/kg dry	1	0.0528	0.158	EPA 6010	11/03 09:00	11/03 20:10	IN
Mercury	ND	U	mg/kg dry	1	0.0270	0.0810	7471	11/03 09:00	11/03 13:31	EN
Selenium	0.581		mg/kg dry	1	0.104	0.311	EPA 6010	11/03 09:00	11/03 20:10	IN
Silver	ND	U	mg/kg dry	1	0.00550	0.0165	EPA 6010	11/03 09:00	11/03 20:10	IN
Organochlorine Pesticides by EPA Method 8081A										
4,4'-DDE	ND	U	mg/kg dry	1	0.000144	0.000433	EPA 8081	11/04 12:15	11/05 04:30	JR
4,4'-DDT	ND	U	mg/kg dry	1	0.000239	0.000717	EPA 8081	11/04 12:15	11/05 04:30	JR
4,4'-DDD	ND	U	mg/kg dry	1	0.000126	0.000378	EPA 8081	11/04 12:15	11/05 04:30	JR
Aldrin	ND	U	mg/kg dry	1	0.000153	0.000460	EPA 8081	11/04 12:15	11/05 04:30	JR
alpha-BHC	ND	U	mg/kg dry	1	0.0000659	0.000198	EPA 8081	11/04 12:15	11/05 04:30	JR
beta-BHC	ND	U	mg/kg dry	1	0.000154	0.000464	EPA 8081	11/04 12:15	11/05 04:30	JR
Chlordane	ND	U	mg/kg dry	1	0.000269	0.000807	EPA 8081	11/04 12:15	11/05 04:30	JR

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Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-07
Client Sample ID: CSS-6
Matrix: Solid

Collection Date: 10/31/14 12:03
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Organochlorine Pesticides by EPA Method 8081A										
delta-BHC	ND	U	mg/kg dry	1	0.000177	0.000532	EPA 8081	11/04 12:15	11/05 04:30	JR
Dieldrin	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 04:30	JR
Endosulfan I	ND	U	mg/kg dry	1	0.000196	0.000589	EPA 8081	11/04 12:15	11/05 04:30	JR
Endosulfan II	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 04:30	JR
Endosulfan sulfate	ND	U	mg/kg dry	1	0.000206	0.000619	EPA 8081	11/04 12:15	11/05 04:30	JR
Endrin	ND	U	mg/kg dry	1	0.000156	0.000468	EPA 8081	11/04 12:15	11/05 04:30	JR
Endrin aldehyde	ND	U	mg/kg dry	1	0.000260	0.000779	EPA 8081	11/04 12:15	11/05 04:30	JR
Endrin ketone	ND	U	mg/kg dry	1	0.000324	0.000963	EPA 8081	11/04 12:15	11/05 04:30	JR
gamma-BHC (Lindane)	ND	U	mg/kg dry	1	0.000148	0.000445	EPA 8081	11/04 12:15	11/05 04:30	JR
Heptachlor	ND	U	mg/kg dry	1	0.000183	0.000548	EPA 8081	11/04 12:15	11/05 04:30	JR
Heptachlor epoxide	ND	U	mg/kg dry	1	0.000174	0.000521	EPA 8081	11/04 12:15	11/05 04:30	JR
Methoxychlor	ND	U	mg/kg dry	1	0.000149	0.000448	EPA 8081	11/04 12:15	11/05 04:30	JR
Toxaphene	ND	U	mg/kg dry	1	0.00893	0.0268	EPA 8081	11/04 12:15	11/05 04:30	JR
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1016	ND	U	mg/kg dry	1	0.00129	0.00386	EPA 8082	11/04 12:20	11/05 04:30	JR
PCB-1221	ND	U	mg/kg dry	1	0.000739	0.00222	EPA 8082	11/04 12:20	11/05 04:30	JR
PCB-1232	ND	U	mg/kg dry	1	0.00195	0.00584	EPA 8082	11/04 12:20	11/05 04:30	JR
PCB-1242	ND	U	mg/kg dry	1	0.000775	0.00232	EPA 8082	11/04 12:20	11/05 04:30	JR
PCB-1248	ND	U	mg/kg dry	1	0.000480	0.00144	EPA 8082	11/04 12:20	11/05 04:30	JR
PCB-1254	ND	U	mg/kg dry	1	0.000786	0.00236	EPA 8082	11/04 12:20	11/05 04:30	JR
PCB-1260	ND	U	mg/kg dry	1	0.00144	0.00430	EPA 8082	11/04 12:20	11/05 04:30	JR

Report To:
Mauricio Pages
Land Science Inc.
12570 NE 7th Avenue
North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-07
Client Sample ID: CSS-6
Matrix: Solid

Collection Date: 10/31/14 12:03
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
SPLP Extraction by EPA 1312										
Fluid Type (1,2,or 3)	1.00			1			EPA 1312	11/03 15:00	11/04 09:30	MAZ
SPLP Metals by 6000/7000 Series Methods										
Arsenic	0.00400	I	mg/L	1	0.00138	0.00410	EPA 6010	11/04 10:00	11/04 14:53	IN
Barium	0.0370		mg/L	1	0.000236	0.000700	EPA 6010	11/04 10:00	11/04 14:53	IN
Cadmium	ND	U	mg/L	1	0.000211	0.000600	EPA 6010	11/04 10:00	11/04 14:53	IN
Chromium	0.00500		mg/L	1	0.000751	0.00230	EPA 6010	11/04 10:00	11/04 14:53	IN
Lead	0.0170		mg/L	1	0.00292	0.00880	EPA 6010	11/04 10:00	11/04 14:53	IN
Mercury	ND	U	mg/L	1	0.0000630	0.000190	7471	11/06 09:30	11/06 12:11	EN
Selenium	ND	U	mg/L	1	0.00455	0.0137	EPA 6010	11/04 10:00	11/04 14:53	IN
Silver	ND	U	mg/L	1	0.000260	0.000800	EPA 6010	11/04 10:00	11/04 14:53	IN

Report To:
Mauricio Pages
Land Science Inc.
12570 NE 7th Avenue
North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-08
Client Sample ID: CCSS-2
Matrix: Solid

Collection Date: 10/31/14 12:35
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Florida Petroleum Residual Organics										
Total FL-PRO (C8-C40)	6.70		mg/kg dry	1	0.190	0.570	FL-PRO	11/04 09:03	11/04 16:54	JR
Wet Chemistry										
% Solids	89.5		% by Weight	1	0.100	0.300	SM2540G	11/03 13:39	11/03 14:42	AR
Metals by EPA 6000/7000 Series Methods										
Arsenic	1.80		mg/kg dry	1	0.0649	0.195	EPA 6010	11/03 09:00	11/03 20:15	IN
Barium	5.93		mg/kg dry	1	0.00180	0.00540	EPA 6010	11/03 09:00	11/03 20:15	IN
Cadmium	ND	U	mg/kg dry	1	0.00380	0.0114	EPA 6010	11/03 09:00	11/03 20:15	IN
Chromium	3.07		mg/kg dry	1	0.0380	0.114	EPA 6010	11/03 09:00	11/03 20:15	IN
Lead	0.317		mg/kg dry	1	0.0528	0.158	EPA 6010	11/03 09:00	11/03 20:15	IN
Mercury	ND	U	mg/kg dry	1	0.0270	0.0810	7471	11/03 09:00	11/03 13:33	EN
Selenium	0.794		mg/kg dry	1	0.104	0.311	EPA 6010	11/03 09:00	11/03 20:15	IN
Silver	ND	U	mg/kg dry	1	0.00550	0.0165	EPA 6010	11/03 09:00	11/03 20:15	IN
Organochlorine Pesticides by EPA Method 8081A										
4,4'-DDE	ND	U	mg/kg dry	1	0.000144	0.000433	EPA 8081	11/04 12:15	11/05 05:00	JR
4,4'-DDT	ND	U	mg/kg dry	1	0.000239	0.000717	EPA 8081	11/04 12:15	11/05 05:00	JR
4,4'-DDD	ND	U	mg/kg dry	1	0.000126	0.000378	EPA 8081	11/04 12:15	11/05 05:00	JR
Aldrin	ND	U	mg/kg dry	1	0.000153	0.000460	EPA 8081	11/04 12:15	11/05 05:00	JR
alpha-BHC	ND	U	mg/kg dry	1	0.0000659	0.000198	EPA 8081	11/04 12:15	11/05 05:00	JR
beta-BHC	ND	U	mg/kg dry	1	0.000154	0.000464	EPA 8081	11/04 12:15	11/05 05:00	JR
Chlordane	ND	U	mg/kg dry	1	0.000269	0.000807	EPA 8081	11/04 12:15	11/05 05:00	JR

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North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-08
Client Sample ID: CCSS-2
Matrix: Solid

Collection Date: 10/31/14 12:35
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
Organochlorine Pesticides by EPA Method 8081A										
delta-BHC	ND	U	mg/kg dry	1	0.000177	0.000532	EPA 8081	11/04 12:15	11/05 05:00	JR
Dieldrin	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 05:00	JR
Endosulfan I	ND	U	mg/kg dry	1	0.000196	0.000589	EPA 8081	11/04 12:15	11/05 05:00	JR
Endosulfan II	ND	U	mg/kg dry	1	0.000196	0.000588	EPA 8081	11/04 12:15	11/05 05:00	JR
Endosulfan sulfate	ND	U	mg/kg dry	1	0.000206	0.000619	EPA 8081	11/04 12:15	11/05 05:00	JR
Endrin	ND	U	mg/kg dry	1	0.000156	0.000468	EPA 8081	11/04 12:15	11/05 05:00	JR
Endrin aldehyde	ND	U	mg/kg dry	1	0.000260	0.000779	EPA 8081	11/04 12:15	11/05 05:00	JR
Endrin ketone	ND	U	mg/kg dry	1	0.000324	0.000963	EPA 8081	11/04 12:15	11/05 05:00	JR
gamma-BHC (Lindane)	ND	U	mg/kg dry	1	0.000148	0.000445	EPA 8081	11/04 12:15	11/05 05:00	JR
Heptachlor	ND	U	mg/kg dry	1	0.000183	0.000548	EPA 8081	11/04 12:15	11/05 05:00	JR
Heptachlor epoxide	ND	U	mg/kg dry	1	0.000174	0.000521	EPA 8081	11/04 12:15	11/05 05:00	JR
Methoxychlor	ND	U	mg/kg dry	1	0.000149	0.000448	EPA 8081	11/04 12:15	11/05 05:00	JR
Toxaphene	ND	U	mg/kg dry	1	0.00893	0.0268	EPA 8081	11/04 12:15	11/05 05:00	JR
Polychlorinated Biphenyls (as Congeners) by EPA Method 8082										
PCB-1016	ND	U	mg/kg dry	1	0.00129	0.00386	EPA 8082	11/04 12:20	11/05 05:00	JR
PCB-1221	ND	U	mg/kg dry	1	0.000739	0.00222	EPA 8082	11/04 12:20	11/05 05:00	JR
PCB-1232	ND	U	mg/kg dry	1	0.00195	0.00584	EPA 8082	11/04 12:20	11/05 05:00	JR
PCB-1242	ND	U	mg/kg dry	1	0.000775	0.00232	EPA 8082	11/04 12:20	11/05 05:00	JR
PCB-1248	ND	U	mg/kg dry	1	0.000480	0.00144	EPA 8082	11/04 12:20	11/05 05:00	JR
PCB-1254	ND	U	mg/kg dry	1	0.000786	0.00236	EPA 8082	11/04 12:20	11/05 05:00	JR
PCB-1260	ND	U	mg/kg dry	1	0.00144	0.00430	EPA 8082	11/04 12:20	11/05 05:00	JR

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Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Lab ID: 14J0891-08
Client Sample ID: CCSS-2
Matrix: Solid

Collection Date: 10/31/14 12:35
Received Date: 10/31/14 14:09
Collected By: Mauricio Pages

Laboratory Analysis Report

Parameter	Result	QC	Units	Dil	MDL	PQL	Method	Date Ext.	Date Analy.	Analyst
SPLP Extraction by EPA 1312										
Fluid Type (1,2,or 3)	1.00		.	1			EPA 1312	11/03 15:00	11/04 09:30	MAZ
SPLP Metals by 6000/7000 Series Methods										
Arsenic	ND	U	mg/L	1	0.00138	0.00410	EPA 6010	11/04 10:00	11/04 14:56	IN
Barium	0.0880		mg/L	1	0.000236	0.000700	EPA 6010	11/04 10:00	11/04 14:56	IN
Cadmium	ND	U	mg/L	1	0.000211	0.000600	EPA 6010	11/04 10:00	11/04 14:56	IN
Chromium	ND	U	mg/L	1	0.000751	0.00230	EPA 6010	11/04 10:00	11/04 14:56	IN
Lead	ND	U	mg/L	1	0.00292	0.00880	EPA 6010	11/04 10:00	11/04 14:56	IN
Mercury	ND	U	mg/L	1	0.0000630	0.000190	7471	11/06 09:30	11/06 12:13	EN
Selenium	ND	U	mg/L	1	0.00455	0.0137	EPA 6010	11/04 10:00	11/04 14:56	IN
Silver	ND	U	mg/L	1	0.000260	0.000800	EPA 6010	11/04 10:00	11/04 14:56	IN

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12570 NE 7th Avenue
North Miami FL, 33161

Report Printed: 11/10/2014
Work Order # 14J0891
Project:
Town of Surfside - Coastal Area

Coastal Area Between 88th & 95th St., Surfside

Notes and Definitions

U	Indicated that the compound was analyzed for but not detected. This shall be used to indicate that the specific component was not detected. The value associated with the qualifier shall be the laboratory method detection limit.
J-3	The matrix spike recovery exceeded method acceptance limits indicating matrix interference.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the detection limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
V	Indicated that the analyte was detected in both the sample and the associated method blank.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
Z	Too many colonies were present for accurate counting.

QC=Qualifier Codes as defined by DEP 62-160
Unless indicated, soil results are reported on actual (wet) weight basis.
Work performed by outside (subcontracted) labs denoted by SUB in Analyst Field.

Results relate only to this sample.

Maria Castellanos - Lab Manager

Authorized CSM Signature (954) 978-6400
Florida-Spectrum Environmental Services,Inc.
Certification# E86006

All NELAP certified analysis are performed in accordance with Chapter 64E-1 Florida Administrative code, which has been determined to be equivalent to NELAC standards. Analysis certified by programs other than NELAP are designated with a "~".

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CHAIN OF CUSTODY RECORD

WORK ORDER # 1430891

Logged in LIMS by: NA
Meets Acceptance Criteria: (Y) N

Florida Spectrum Environmental Services, Inc.

☐ 1460 W. McNab Road Ft Laud. FL 33309 Tel: (954) 978-6400 Fax: (954) 978-2233
☐ 630 Indian Street Savannah, GA 31401 Tel: (912) 238-5050 Fax: (912) 234-4815
☐ 528 Gooch Road Fort Meade, FL 33841 Tel: (863) 285-8145 Fax: (863) 285-7030
☐ 610 Parrot Ave. N, Okeechobee, FL 34972 Tel: (863) 763-3336 Fax: (863) 763-1544

Original-Return w/report Yellow-Lab File Copy Pink - Sampler Copy

DUE DATE Requested

RUSH RESERVATION #

Rush Surcharges apply

Report to: (company name) LANDSCIENCE
Report to Address:

Invoice to: (company name)
Purchase Order #
Invoice to Address:

Project Name and/or Number: TOWN OF SURFSIDE - COASTAL AREA
Site Location: COASTAL AREA BETWEEN 88TH ST & 95TH ST., SURFSIDE

Project Contact:
Phone:
Fax:
Email:

Sampler Name: (printed) MAURICIO PAGÉS
Affiliation:
Sampler Signature: [signature]

	ORDER # Lab Control Number / Shaded Areas For Laboratory Use Only	Sample ID	Date Sampled	Time Sampled	Matrix (DW SW GW WW S SED HW BIO SEA OIL X AIR)	Bottle & Pres. Combo Codes	Number of Containers Received & NELAC Letter Suffixes # A-?	Analysis Required: 6010 BRCRA METALS	TPH FL-PRO	8081 CHLOR PEST.	8082 PCBS	SPLP BRCRA METALS			Field Tests: TEMP °C	PH	COND	CHLOR
1	01	CSS-1	10/31/14	9:27	S	58	1	✓	✓	✓	✓	✓						
2	02	CSS-1		9:51	S			✓	✓	✓	✓	✓						
3	03	CSS-2		10:18	S			✓	✓	✓	✓	✓						
4	04	CSS-3		10:42	S			✓	✓	✓	✓	✓						
5	05	CSS-4		11:15	S			✓	✓	✓	✓	✓						
6	06	CSS-5		11:37	S			✓	✓	✓	✓	✓						
7	07	CSS-6		12:03	S			✓	✓	✓	✓	✓						
8	08	CCSS-2		12:35	S			✓	✓	✓	✓	✓						
9																		
10																		

Special Comments:
"I waive TNI protocol" (emergency) (sign here) >

Total: 8

Deliverables: QA/QC Report Needed? Yes No (additional charge)

	Signature	Affiliation	Date/Time
1	Relinquished by: [signature]		10/31/14 14:09
1	Received by: [signature] FSS		10/31/14 1409
2	Relinquished by:		
2	Received by:		
3	Relinquished by:		
3	Received by:		

www.flenviro.com COC Page 1 of 1

Sample Custody & Field Comments
Received on Ice: Y (N)
Temp as received 25 °C
Custody seals? (Y) N
FIELD TIME:
Sampling _____ hrs
Pick-Up _____ hrs
Misc. charges _____

Bottle Type
A-liter amber
B-Bacteria bag/bottle
F-500 ml O-125 ml
H-Plastic Amber Liter
L-liter bottle
S2-2 oz soil jar
S4-4 oz soil jar / S8-8 oz soil jar
T-250 ml
V-40 ml vial
W-wide mouth
X-other TED-Tedlar Air Bag
Additional Bottle Types
B-brown liter plastic

Preservatives
A-ascorbic acid P-H3PO4
C-HCL S-H2SO4
Cu-CuSO4 T-Na2S2O3
DI-DI water U-Unpreserved
H-HNO3 N-NaOH
M-MCAB NH4-NH4CL
MeOH-Methanol
Z-zinc acetate
Additional Preservatives
Hex-Hex Cr Buffer
EDA-Ethylene Diamine

Page 26 of 26

APPENDIX B

Qualifications of Consultant

RESUMES

ROB LUDICKE, PRESIDENT

Mr. Ludicke is a Registered Environmental Professional # 5985 and Registered Environmental Manager #12093, who has over 23 years of environmental consulting and engineering experience. He has a thorough knowledge of environmental rules and regulations, policies, and procedures. He has an extensive network of dedicated technical experts. He has conducted numerous Phase I/Phase II environmental site assessments.

In addition, Mr. Ludicke has conducted over 250 Property Condition Assessments of office buildings, shopping centers, warehouse buildings, maritime facilities, apartment buildings, etc.

PROFESSIONAL EXPERIENCE

April 1998-Present **PRESIDENT**
LandScience, Inc., North Miami, FL

1992-March 1998 **SENIOR ENVIRONMENTAL SCIENTIST/BRANCH MANAGER**
Ambient Technologies, Inc., Pompano Beach, FL

- Conducted Phase I/Phase II environmental site assessment projects.
- Hired, scheduled, and supervised subcontractors.
- Developed and implemented Hazard Analysis and Critical Control Point (HACCP) plans and Sanitation Standard Operating Procedures (SSOP) for food processing facilities.
- Researched and presented seminars on food safety issues.
- Successfully managed and operated branch office of environmental engineering/consulting firm.

1989-92 **ENVIRONMENTAL SCIENTIST/PROJECT MANAGER**
Law Engineering Companies Group, Inc., Ft. Lauderdale, FL

- Conducted wetlands, endangered species, and Phase I and II environmental site assessments.
- Retained, scheduled, and supervised subcontractors.

1987-89 **DIRECTOR OF TECHNICAL MARKETING AND SERVICES**
Spectralytix, Inc., Gaithersburg, MD

- Formulated technical solutions for specific environmental concerns.
- Initiated and Implemented a Marketing Plan to promote analytical laboratory services.
- Established a large personal client database through thorough product knowledge, excellent sales ability, and superior client service.
- Demonstrated quick, accurate, and decisive results of customer

problems/complaints.

- Increased profits 300 percent in less than one year; increased monthly sales by $150,000.

1983-87 **RESEARCH SCIENTIST**
For the Following Governmental Agencies:

- Food and Drug Administration, Washington, D.C.
- Naval Medical Research Unit III, Cairo, Egypt
- Walter Reed Army Institute of Research, Washington, D.C.

EDUCATION

MS Degree, Microbiology, 1987
Catholic University of America, Washington, D.C.

BS Degree, Biology, 1983
Mount Saint Mary's College, Emmitsburg, MD

REGISTRATIONS, ACCREDITATIONS, AND CERTIFICATIONS

- Registered Environmental Professional # 5985.
- Registered Environmental Manager # 12093.
- Property Condition Assessment Course as administered by ASTM, 2007
- Project Management Course, Atlanta, GA, 1990.
- Phase I Environmental Site Assessment Course, Atlanta, GA, 1991.
- National Association of Environmental Professionals.
- South Florida Association of Environmental Professionals.
- Teaching Assistantship, Catholic University of America, 1983.
- Certified OSHA Hazardous Waste, Health, and Safety Training.

CURTIS L. DOKKEN, PE, BC, PC

ENVIRONMENTAL ENGINEERING SUMMARY

Mr. Dokken has engineering and project management experience for a wide range of environmental construction projects including design/build projects. Experience in investigation/feasilibity studies; preparation of detailed construction designs and specifications for remedial action programs involving petroleum, hazardous waste, transformers and pipeline facilities; industrial waste, and underground storage tanks management.

Revelant experience includes:

- Lead Engineer or Supporting Engineer for four of the largest groundwater and soil remediation systems in the Southeast at MIA Northwest Cargo Area, Concourse C, Concourse E, and Concourse F. *Project value $12,000,000.*
- Engineering support for contamination assessments, remedial investigations/feasibility studies and remedial design/remedial action programs for sites containing hazardous waste, and pipeline facilities contaminated with polychlorinated biphenyls (PCB) and mercury.
- Removal and Installation of Underground Storage Tanks and Fuel Systems.
- QA/QC Engineer for the completion of the groundwater VOC an iron removal system at Site 82 of Camp Lejune, North Carolina. Performed troubleshooting and modification of the VOC and iron removal system. Provided sub-contractor oversight and completion punchlist preparation. Also, assisted in the preparation and operation of the multi-well pump test.
- Project Manager of the Flamingo Water Improvements Project. Project consists of installation of a nanofiltration system, reservoir tank, water meters, radio telemetry system, and completion of the main treatment building and water main. *Project value $2,500,000.*
- Lead Engineer/Project Manager for the design/build/operate of the South Dade Landfill Leachate Treatment System. *Project value $3,500,000.*
- Preparation of engineering plans and specifications for spill prevention control and countermeasures (SPCC) engineering controls.
- Engineer of Record (EOR) fo the installation and operation of six bio-venting systems at the Homestead Air force Base, Site 15B. The six bio-venting systems include approximately 4 miles of underground piping, treating and approximate area of 300,000 square feet along the active runway.

- Restoration Supervisor, responsible for the interior and exterior restoration of 100 residences and businesses over 15 month period in Jackson County, Mississippi for the United States Environmental Protection Agency (USEPA) and United States Army Corp of Engineers (USACE). Responsible for the restoration work plans, contracting and supervision of multiple contractors. Liaison between site owners, federal and local officials, and contractors.

- Project Engineer and client liaison for FDOT utility removal and installation. Developed work plan and oversight of implementation.

- Modification of an existing hydrocarbon contaminated groundwater remediation system to also treat cyanide.

- Engineering and contractor support for the remediation of arsenic impacted soils and waters at several private properties.

- Environmental Consulting/Assessment/Remedial Design/Construction Pla/Specifications/Construction Oversight in support of OHM's Miami International Airport (MIA) Contract.

- Project Manager, Lead Engineer, or Supporting Engineer for large-scale groundwater and soil remediation pilot studies at MIA Hanger 22, Concourse C and Concourse F.

- Provided Engineering and QA/QC support for removal of PCB impacted soils at FPL substations.

- Field team leader for characterization of the open burn/open detonation (OB/OD) area at the bombing range at Camp Shelby, Mississippi. Project included preservation of endangered species Project engineer for the RCRA closure plan.

AREAS OF EXPERTISE

Engineering & Project Management
Environmental Construction
Investigation / Feasibility Studies

EDUCATION / PROFESSIONAL AFFILIATIONS

B.S., Civil Engineering, University of Florida, 1990
State of Florida Professional Engineer, P.E.- 0051350
State of Florida Building Contractor License, CB - 059199
State of Florida Pollutant Storage Systems Contractor, PCC-1256787

TRAINING

OSHA 40-hour Health and Safety Training
OSHA 8 hour Hazardous Waster Supervisor Training
OSHA 8-hour Annual Refresher Training
FDOT Traffic Safety in the Work Area Course

MAURICIO PAGES, SENIOR GEOLOGIST

Mr. Pagés is a Senior Geologist, who has over 12 years of environmental consulting experience. He is very familiar with Florida Department of Transportation (FDOT) protocol, policies and regulations. He has conducted over 1,000 Phase I Environmental Site Assessments, numerous Phase II Environmental Site Assessments, Source Removals, Tank Closure Assessments, Contamination Assessments for petroleum products and other hazardous chemicals, and conducted Emergency Response activities for the FDOT District IV and Turnpike Enterprise.

PROFESSIONAL EXPERIENCE

2011-Present **DIRECTOR OF OPERATIONS/SENIOR GEOLOGIST**
LandScience, Inc., North Miami, FL

2005-Present **SENIOR GEOLOGIST**
LandScience, Inc., North Miami, FL

2000-2005 **SENIOR HYDROGEOLOGIST/PROJECT MANAGER**
Handex of Florida, Inc., Delray Beach, FL

- Conducted Phase I and Phase II Environmental Site Assessments.
- Underground Storage Tank (UST) Removal and preparation of Tank Closure Assessment Reports.
- Conducted source removal activities and prepared Source Removal Reports.
- Health and Safety Officer.
- Operation and Maintenance of Groundwater Remediation Systems.
- Coordinated and Participated in Emergency Response Activities for the FDOT District IV, and Turnpike Enterprise.

2000 **PROJECT GEOLOGIST**
Tetra Tech, Inc., San Juan, Puerto Rico

- Phase I and Phase II Environmental Site Assessments.
- Operations and Maintenance of Pump and Treat Remediation System.
- Soil and Groundwater Sampling.

2000 **FIELD GEOLOGIST**
EA Engineering, Inc., Miami, Florida

- Phase I and Phase II Environmental Site Assessments.
- Soil and Groundwater Monitoring during construction activities at Miami International Airport.

EDUCATION

BS Degree, Geology with Emphasis on Hydrogeology, 1999
Florida Atlantic University, Boca Raton, Florida

REGISTRATIONS, ACCREDITATIONS, AND CERTIFICATIONS

- Advanced Maintenance of Traffic Supervisor
- PADI Scuba Diving Instructor
- OSHA 40- Hour Health and Safety for Hazardous Waste Operations Training

WAYNE G. MUNCHOW, ENVIRONMENTAL SCIENTIST

Mr. Munchow is an environmental scientist familiar with federal, state, and local environmental rules and regulations, policies, and procedures. He has conducted Phase I Environmental Site Assessments and Limited Phase II Environmental Site Assessments on commercial, industrial, and agricultural properties.

PROFESSIONAL EXPERIENCE

1999-Present **ENVIRONMENTAL SCIENTIST**
LandScience Inc., North Miami, Florida

- Prepared Phase I Environmental Site Assessment Reports and Limited Phase II Environmental Site Assessment Reports.
- Supervised soil penetration tests and monitoring well installations.
- Performed field screening of potentially contaminated soil samples.
- Collected soil and groundwater samples for chemical analysis.

1997-1999 **STUDENT ASSISTANT TO PROFESSOR**
Florida Atlantic University, Davie, Florida

- Prepared and accurately processed academic data into graphs and charts.
- Organized and exhibited publicly viewed presentations regarding soil microbiology, the everglades, and food borne pathogens.
- Assisted in a variety of routine clerical and laboratory tasks.

EDUCATION

BS Degree, Microbiology, 1999
Florida Atlantic University, Boca Raton, Florida

REGISTRATIONS, ACCREDITATIONS, AND CERTIFICATIONS

- OSHA 40- Hour Health and Safety for Hazardous Waste Operations Training
- AHERA Building Inspectors Certificate

ANDREW WHITAKER, PROJECT MANAGER

Mr. Whitaker is an environmental scientist who has experience in environmental consulting. He is familiar with federal, state, and local environmental rules and regulations, policies, and procedures. He has conducted Phase I/Limited Phase I Environmental Assessments on commercial, industrial, and agricultural properties.

PROFESSIONAL EXPERIENCE

Present **PROJECT MANAGER**
LandScience, Inc., North Miami, FL

- Researched and completed Phase I/Limited Phase I Environmental Site Assessment (ESA) reports in accordance with 1527-13 ASTM standards.
- Conducted Field Inspections on Various Commercial, Industrial and Agricultural Properties.
- Managed and Organized Projects.
- Assisted with Limited Phase II Environmental Site Assessments

EDUCATION

Nova Southeastern University — Fort Lauderdale, FL
Bachelor of Science Degree in Environmental Science — Sept 2007-May 2010
Undergraduate Research: *Intraguild predation of non-native Everglades cichlids*

North Shore Community College — Danvers, MA
Associate of Arts Degree in Liberal Arts — Sept 2000-May 2004

THUYSI HO, ENVIRONMENTAL SCIENTIST

Mr. Thuysi Ho is an Environmental Scientist whom conducted several Phase I Environmental Site Assessments and is familiar with local, state, and federal environmental regulation.

PROFESSIONAL EXPERIENCE

10/2011-Present Environmental Scientist
LandScience, Inc, North Miami, FL

- Prepare and compose Phase I Environmental Site Assessment Reports, Limited Phase I Environmental Site Assessment Reports, and Transaction Site Process Report.

12/2008-10/2011 Environmental Technician
Nationwide Laboratory Service

- Use Centrifuge, Manual Pipettes, and Automated Pipettes to prepare blood serum for testing of trace metals.
- Use ICP-MS to analyze blood serum for Aluminum and Zinc.
- Analyzed Data Printouts from ICP-MS and Conduct Repeat Analysis if necessary (i.e. when values are out of range/out of linearity).
- Prepare Media Necessary for Colony Count Analysis.
- Use Incubator to Incubate Tryptic Soy Agar Plates for Colony Count Analysis.
- Use pH meter to test pH of Dialysate Water.
- Assist in preparatory phase of Endotoxin Analysis, and streak Petri-plates for Colony Count Analysis.

EDUCATION

Florida International University
Bachelor of Science in Biological Sciences Miami, FL
08/2008
Minor in Criminal Justice

SKILLS

Laboratory

- Aseptic Technique, Microscopy (Oil Immersion), Centrifugation, Automated Pipetting, Growing Live Culture on Petri Dishes.
- Quadrant Sampling Techniques, Lines Transect Sampling Techniques for Biological Organisms.

Computers

- Expert Computer User, Created Charts and Graphs using Statistical Analysis via Microsoft Excel, Produced 15 page essays via Microsoft Word and Presented a Talk About Avian Flu via PowerPoint.
- Type 40 words per minute.

Language

- Fluent Spanish (Reading, Writing, and Speaking).
- Fluent English (Reading, Writing, and Speaking).
- Conversational Vietnamese (Limited Speaking).

COREY KNUCKLES, ENVIRONMENTAL SCIENTIST

Mr. Corey Knuckles is an Environmental Scientist whom conducted several Phase I Environmental Site Assessments and is familiar with local, state, and federal environmental regulation.

PROFESSIONAL EXPERIENCE

LandScience, Inc, North Miami, FL
Environmental Scientist: March 2013-Present
Responsibilities: Prepare and compose Phase I Environmental Site Assessment Reports, Limited Phase I Environmental Site Assessment Reports, and Transaction Site Process Reports.

Refresh Construction and Design, Charlotte, NC
Painter and Sales Representative: Summer 2012
Responsibilities: Interacting with clients, painting client property, and assisting in additional sales.

Camp Care 5K Run/Walk, Charlotte, NC
Volunteer: September 2011
Responsibilities: Directing Participants to time chip stations, handing out time chips to runners before the run/walk and retrieving time chips from runners after the run/walk.

Hands on Charlotte Speed Street Green Team, Charlotte, NC
Volunteer: May 2011
Responsibilities: Working with other hands on Charlotte volunteers to assist the city in the recycling efforts for the annual speed street event held in uptown Charlotte. As a team volunteers would walk the event area to confirm that all recycling bins were being used only for recyclables. Volunteers also raised awareness by wearing green shirts that have a common recycling logo on the front and gave assistance to event participants of recyclable materials.

Staples, Pinecrest, FL
Stock/Sales Clerk: Seasonal 2010
Responsibilities: Inventory check, customer assistance, re-stocking shelves, night-time inventory, cashier, greeted customers, go-backs, unpacking of delivery truck and heavy lifting.

Alligator Pools, Miami, FL
Mason Worker: May 2004- Dec 2009
Responsibilities: Masonry, heavy lifting, moving materials, mixing of diamond-brite or bond kote, application of mosaic tile, cleaning tools or supplies, preparing pools for diamond brite application, acid washing pools, final preparations prior to filling pools, grout work, cleaning of coping, driving to job site, and replenishment of inventory.

EDUCATION

Queens University of Charlotte
Bachelors in Environmental Studies: 2013 Graduate
Relevant coursework in Environmental Science, GIS, Biology, Environmental Impact Assessment, Data Analysis, Tropical Island Systems, Research Methods, Biology, Conservation Biology, Environmental Philosophy, and Environmental Politics. Completed an independent research project which I proposed, conducted and presented a literature review on heavy metal content in urban soils and their possible effects within the city of Charlotte North Carolina.

Miami-Dade College
Associates in Science: 2010 Graduate
Relevant coursework in Biology, Zoology, and Native Plants of South Florida.

Miami Palmetto Senior High
2005 Graduate

SKILLS

- Complete knowledge in Microsoft Word, Power Point, Excel, and Access.
- Course taken and experience using Geographic Information Systems (GIS).
- Experience creating a phase one environmental impact assessment or EIA.

VALERIE MEBANE, ENVIRONMENTAL SCIENTIST

Ms. Valerie Mebane is an Environmental Scientist whom conducted several Phase I Environmental Site Assessments and is familiar with local, state, and federal environmental regulation.

PROFESSIONAL EXPERIENCE

May 2013-Present — Environmental Scientist / Project Manager
LandScience, Inc, North Miami, FL

- Conducts Phase I Environmental Site Assessments
- Performs field inspections, researches property history, and analyzes regulatory documents to assess the potential environmental impacts on a variety of properties
- Prepares technical reports to present findings to clients

August 2008–May 2013 — Research Assistant
Pennsylvania State University,

- Developed a methodology to model and map a soil's drought vulnerability
- Compiled, organized, and analyzed large and complex data sets
- Gained experience in environmental, crop, and climate simulation modeling
- Assisted with coursework development and teaching of ArcGIS workshops
- Provided education and support to staff and students in the use of GPS and GIS technologies
- Conducted independent research leading to publication
- Prepared proposals, reports, and presentations related to research

Pennsylvania State University,
August 2008 – December 2012
Teaching Assistant

- Assisted professor with lectures and lab sessions preparing students in uses of geographic information systems and digital environmental spatial databases
- Graded student assignments
- Answered questions in office hours and served as mentor to undergraduate and graduate students

Pennsylvania State University,
May 2007 – August 2007
Research Assistant

- Designed and maintained small grains crop variety trials
- Evaluated the effects of chemical treatments on crop yields
- Analyzed the ability of small grains to promote the development of ethanol and bio-diesel production

EDUCATION:

Master of Science in Soil Science, August 2011
The Pennsylvania State University, University Park, PA

Bachelor of Science in Environmental Resource Management, May 2008
The Pennsylvania State University, University Park, PA
Environmental Soil Science Minor and Watershed & Water Resources Minor

PUBLICATIONS:

Mebane, V.J., R.L. Day, J.M. Hamlett, J.E. Watson, and G.W. Roth. 2013. Validating the FAO AquaCrop Model for Rainfed Maize in Pennsylvania. Agron. J. 105: 419-427. doi:10.2134/agronj2012.0337.

COMPUTER SKILLS: Microsoft Office (Word, Excel, Access, PowerPoint), ArcGIS (9.2, 9.3, 10.0, 10.1), ArcObjects, VBA, SQL Server, Matlab, Minitab, SAS, R, Hydrus

LICENSES

State of Florida
Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee, FL 32303-5268

Land Science, Inc.
12570 NE 7TH AVENUE
NORTH MIAMI, FL 33161

Each licensee is solely responsible for notifying the Florida Board of Professional Engineers in writing the licensee's current address.

Name changes require legal documentation showing name change. An original, a certified copy, or a duplicate of an original or certified copy of a document which shows the legal name change will be accepted unless there is a question about the authenticity of the document raised on its face, or because the genuineness of the document is uncertain, or because of another matter related to the application.

At least 90 days prior to the expiration date shown on this license, a notice of renewal will be sent to your last known address. If you have not yet received your notice 60 days prior to the expiration date, please call (850) 521-0500, or write, Florida Board of Professional Engineers, 2639 North Monroe Street, Suite B-112,Tallahassee, FL 32303-5268 or e-mail: board@fbpe.org. Our website address is http://www.fbpe.org.

State of Florida

Board of Professional Engineers

Attests that

Land Science, Inc.

is authorized under the provisions of Section 471.023, Florida Statutes, to offer engineering services to the public through a Professional Engineer, duly licensed under Chapter 471, Florida Statutes.

Expiration: 2/28/2015
Audit No: 228201502783

Certificate of Authorization

CA Lic. No:
8312

STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

BOARD OF PROFESSIONAL GEOLOGISTS
1940 NORTH MONROE STREET
TALLAHASSEE FL 32399-0783

(850) 487-1395

LAND SCIENCE, INC.
12570 NE 7TH AVE
LANDSCIENCE INC
NORTH MIAMI FL 33161

Congratulations! With this license you become one of the nearly one million Floridians licensed by the Department of Business and Professional Regulation. Our professionals and businesses range from architects to yacht brokers, from boxers to barbeque restaurants, and they keep Florida's economy strong.

Every day we work to improve the way we do business in order to serve you better. For information about our services, please log onto **www.myfloridalicense.com**. There you can find more information about our divisions and the regulations that impact you, subscribe to department newsletters and learn more about the Department's initiatives.

Our mission at the Department is: License Efficiently, Regulate Fairly. We constantly strive to serve you better so that you can serve your customers. Thank you for doing business in Florida, and congratulations on your new license!

STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

GB389 ISSUED: 04/28/2014

GEOLOGY BUSINESS
LAND SCIENCE, INC.

IS CERTIFIED under the provisions of Ch.492 FS.
Expiration date JUL 31, 2016 L1404280000891

DETACH HERE

RICK SCOTT, GOVERNOR KEN LAWSON, SECRETARY

STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION
BOARD OF PROFESSIONAL GEOLOGISTS

LICENSE NUMBER	
GB389	

The GEOLOGY BUSINESS
Named below IS CERTIFIED
Under the provisions of Chapter 492 FS.
Expiration date: JUL 31, 2016

LAND SCIENCE, INC.
12570 NE 7TH AVE
MIAMI FL 33161

ISSUED: 04/28/2014 DISPLAY AS REQUIRED BY LAW SEQ # L1404280000891

CERTIFICATE OF INSURANCE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 06/16/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: MANNY MICELI
INSURANCE RISK ADVISORS, INC. 1560 SAWGRASS CORPORATE PARKWAY 4TH FL. SUNRISE, FL. 33323	PHONE (A/C, No, Ext): 954-331-8165 FAX (A/C, No): 954-331-4687 E-MAIL ADDRESS: IRASERVICES@YAHOO.COM
INSURED LANDSCIENCE, INC. 12570 NE 7TH AVENUE NORTH MIAMI, FL. 33161	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : UNDERWRITERS AT LLOYD'S LONDON INSURER B : INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY X CLAIMS-MADE ☐ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☐ PRO-JECT ☐ LOC			PGIARK02967-01	06/15/2014	06/15/2015	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG Pollution Liability	$ 2,000,000 $ 100,000 $ 10,000 $ 2,000,000 $ 2,000,000 $ 2,000,000 $ 2,000,000
A	AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS X HIRED AUTOS ☐ NON-OWNED AUTOS			PGIARK02967-01	06/15/2014	06/15/2015	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 2,000,000 $ $ $
	☐ UMBRELLA LIAB ☐ OCCUR ☐ EXCESS LIAB ☐ CLAIMS-MADE ☐ DED ☐ RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? Y/N ☐ N/A (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below						WC STATU-TORY LIMITS ☐ OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $
A	PROFESSIONAL LIABILITY			PGIARK02967-01	06/15/2014	06/15/2015		$ 2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

CERTIFICATE OF LIABILITY INSURANCE

Date: 3/27/2014

Producer: Lion Insurance Company
2739 U.S. Highway 19 N.
Holiday, FL 34691
(727) 938-5562

Insured: South East Personnel Leasing, Inc. & Subsidiaries
2739 U.S. Highway 19 N.
Holiday, FL 34691

This Certificate is issued as a matter of information only and confers no rights upon the Certificate Holder. This Certificate does not amend, extend or alter the coverage afforded by the policies below.

Insurers Affording Coverage	NAIC #
Insurer A: Lion Insurance Company	11075
Insurer B:	
Insurer C:	
Insurer D:	
Insurer E:	

Coverages

The policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions, and conditions of such policies. Aggregate limits shown may have been reduced by paid claims.

INSR LTR	ADDL INSRD	Type of Insurance	Policy Number	Policy Effective Date (MM/DD/YY)	Policy Expiration Date (MM/DD/YY)	Limits	
		GENERAL LIABILITY ☐ Commercial General Liability ☐ ☐ Claims Made ☐ Occur General aggregate limit applies per: ☐ Policy ☐ Project ☐ LOC				Each Occurrence	$
						Damage to rented premises (EA occurrence)	$
						Med Exp	$
						Personal Adv Injury	$
						General Aggregate	$
						Products - Comp/Op Agg	$
		AUTOMOBILE LIABILITY ☐ Any Auto ☐ All Owned Autos ☐ Scheduled Autos ☐ Hired Autos ☐ Non-Owned Autos				Combined Single Limit (EA Accident)	$
						Bodily Injury (Per Person)	$
						Bodily Injury (Per Accident)	$
						Property Damage (Per Accident)	$
		EXCESS/UMBRELLA LIABILITY ☐ Occur ☐ Claims Made ☐ Deductible				Each Occurrence	
						Aggregate	
A		**Workers Compensation and Employers' Liability** Any proprietor/partner/executive officer/member excluded? **NO** If Yes, describe under special provisions below.	WC 71949	01/01/2014	01/01/2015	X WC Statutory Limits ☐ OTHER	
						E.L. Each Accident	$1,000,000
						E.L. Disease - Ea Employee	$1,000,000
						E.L. Disease - Policy Limits	$1,000,000
Other			**Lion Insurance Company is A.M. Best Company rated A- (Excellent). AMB # 12616**				

Descriptions of Operations/Locations/Vehicles/Exclusions added by Endorsement/Special Provisions: Client ID: 91-67-743

Coverage only applies to active employee(s) of South East Personnel Leasing, Inc. & Subsidiaries that are leased to the following "Client Company":

Land Science, Inc

Coverage only applies to injuries incurred by South East Personnel Leasing, Inc. & Subsidiaries active employee(s).

Coverage does not apply to statutory employee(s) or independent contractor(s) of the Client Company or any other entity.

A list of the active employee(s) leased to the Client Company can be obtained by faxing a request to (727) 937-2138 or by calling (727) 938-5562.

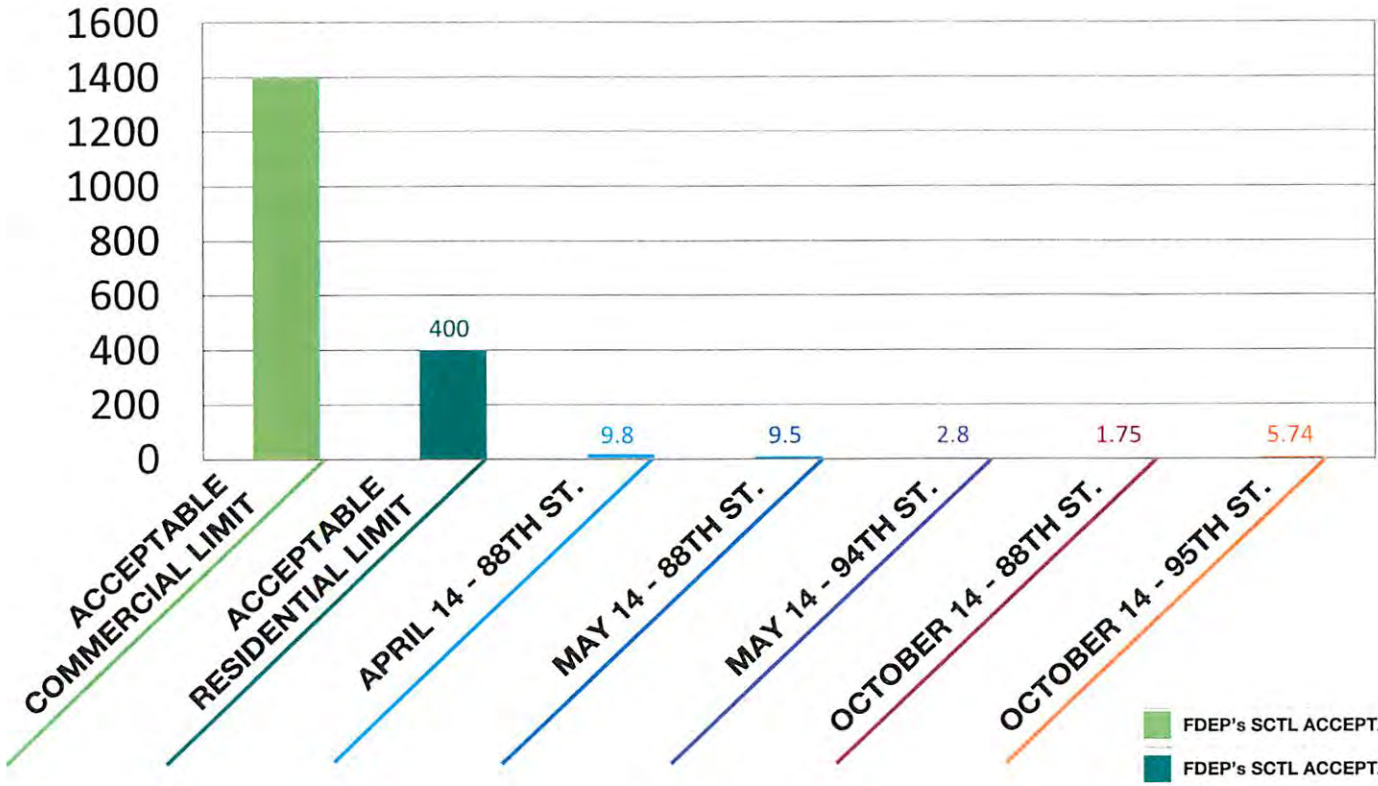
Project Name:

FAX: 305-893-9364 & 954-331-4687 / ISSUE 03-27-14 (CF)

Begin Date 3/16/2014

CERTIFICATE HOLDER	CANCELLATION
INSURANCE RISK ANDVISOR, INC 1560 SAWGRASS CORPORATE PKWY, 4TH FLOOR SUNRISE, FL 33323	Should any of the above described policies be cancelled before the expiration date thereof, the issuing insurer will endeavor to mail 30 days written notice to the certificate holder named to the left, but failure to do so shall impose no obligation or liability of any kind upon the insurer, its agents or representatives. Jodi A Bowers

TOWN OF SURFSIDE BEACH SAND TESTING RESULTS



FDEP's SCTL ACCEPTABLE COMMERCIAL LIMIT FOR LEAD	1400 MG/KG
FDEP's SCTL ACCEPTABLE RESIDENTIAL LIMIT FOR LEAD	1400 MG/KG
APRIL 14 - TERRACON TESTING RESULTS - 88TH STREET	9.8 MG/KG
MAY 14 - TERRACON TESTING RESULTS - 88TH STREET	9.5 MG/KG
MAY 14 - TERRACON TESTING RESULTS - 94TH STREET	2.8 MG/KG
OCTOBER 14 - LANDSCIENCE TESTING RESULTS - 88TH STREET	3.8 MG/KG
OCTOBER 14 - LANDSCIENCE TESTING RESULTS - 95TH STREET	5.74 MG/KG