

Cut along the outer border and affix this label to your sealed proposal envelope to identify it as a "Sealed Proposal". Be sure to include the name of the company submitting the bid where requested.

**SEALED PROPOSAL • DO NOT OPEN**

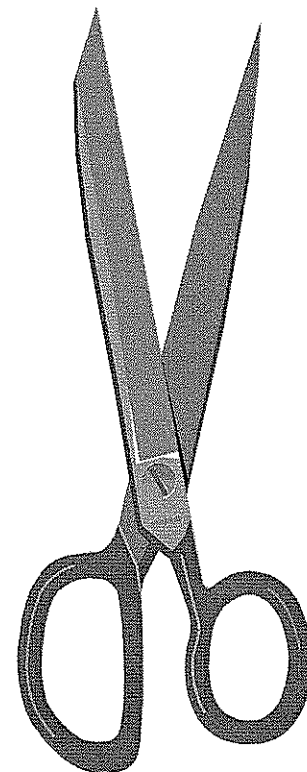
SEALED PROPOSAL NO.: 090-0271-NC (AM)

PROPOSAL TITLE : Lake Seminole Sediment  
Removal

DUE DATE/TIME: May 13, 2010 @ 3:00 p.m.

SUBMITTED BY: \_\_\_\_\_  
(Name of Company)

DELIVER TO: PURCHASING DEPARTMENT  
Board of County Commissioners  
Annex Building –6<sup>th</sup> Floor  
400 South Fort Harrison Avenue  
Clearwater, FL 33756



***Please Note:***

From time to time, addenda may be issued to this proposal. Any such addenda will be posted on the same Web site, [www.pinellascounty.org/purchase/Current\\_Bids1.htm](http://www.pinellascounty.org/purchase/Current_Bids1.htm), from which you obtained this proposal. Before submitting your proposal you should check our Web site to download any addenda that may have been issued. Please remember to sign and return Addenda Acknowledgement Form with completed proposal package if applicable.

**SUBMIT TO:**

PINELLAS COUNTY BOARD OF  
COUNTY COMMISSIONERS  
400 S. FT. HARRISON AVENUE  
ANNEX BUILDING – 6<sup>TH</sup> FLOOR  
CLEARWATER, FL 33756



# REQUEST FOR PROFESSIONAL SERVICES- NON-CONTINUING

AS GOVERNED BY FLORIDA STATUTE 287.055 (See Attachment #1)

**ISSUE DATE:**

April 23, 2010

PROPOSAL SUBMITTALS RECEIVED AFTER SUBMITTAL DATE & TIME WILL NOT BE  
CONSIDERED

**TITLE: LAKE SEMINOLE SEDIMENT REMOVAL**

**RFP NUMBER:**

090-0271-NC (AM)

**SUBMITTAL DUE: MAY 13, 2010 @ 3:00 P.M.**

AND MAY NOT BE WITHDRAWN FOR 120 DAYS FROM DATE LISTED ABOVE.

**PRE-PROPOSAL DATE & LOCATION:**  
NOT APPLICABLE

**DEADLINE FOR WRITTEN QUESTIONS: MAY 6, 2010 BY 3:00 P.M.**

**SUBMIT QUESTIONS TO: AMELIA McFARLANE, CPPB AT amcfarla@pinellascounty.org**  
Phone: (727) 464-3149 Fax: (727) 464-3925

**PLEASE TAKE SPECIAL NOTE OF  
THE LOBBYING CLAUSE ON PAGE  
4, PARAGRAPH 15. BY SIGNING  
THIS PAGE, YOUR FIRM AGREES  
TO ADHERE TO PINELLAS  
COUNTY'S RULES IN REGARDS TO  
LOBBYING.**

**THE MISSION OF PINELLAS COUNTY**  
Pinellas County Government is committed to progressive  
public policy, superior public service, courteous public  
contact, judicious exercise of authority and sound  
management of public resources to meet the needs and  
concerns of our citizens today and tomorrow.

  
**JOSEPH LAURO,**  
CPPO/CPPB  
Director of Purchasing

**PROPOSER MUST COMPLETE THE FOLLOWING**

BY SIGNING THIS PROPOSAL FORM YOU ARE AGREEING TO ALL PROPOSAL TERMS AND CONDITIONS.

**BIDDER (COMPANY NAME):**

D/B/A

**Mailing Address**

**City, State Zip**

**Company Email Address**

**Phone**

**Fax**

**Remit To Name (as Shown on Company Invoice)**

**Printed Contact Representative/Title/Email**

Proper Corporate Identity is needed when you submit your bid, especially how your firm is registered with the Florida Division of Corporations. Please visit [www.sunbiz.org](http://www.sunbiz.org) for this information. It is essential to return a copy of your W-9 with your bid. Thank you.

**I HEREBY AGREE TO ABIDE BY ALL CONDITIONS OF THIS BID & CERTIFY I AM AUTHORIZED TO SIGN THIS BID FOR THE BIDDER.**

**AUTHORIZED SIGNATURE**

**PRINT NAME & TITLE**

*We, the above signed, hereby declare that no person or persons, firm or corporation, other than the above signed, are interested in this proposal, as principals, and this Proposal is made without collusion with any person, firm or corporation, and we have carefully to our full satisfaction examined the Special Provisions and form of Agreement and Bond, together with approved Plans and Specifications for the above described Project, and we have made a full examination of the location of the proposed Work and source of supply of materials, and we hereby agree to furnish all necessary labor, equipment, and materials, fully understanding that quantities shown herewith are approximate only, and we will fully complete all necessary Work in accordance with Plans and Specifications and requirements under the terms of the County, within the Agreement Amount and Agreement Period specified in this Proposal.*

**SEE PAGE 13 SECTION E SCOPE OF WORK**

**RETURN THIS PAGE WITH YOUR PROPOSAL**

**SECTION A - GENERAL CONDITIONS****1. SUBMISSION OF PROPOSAL:**

- a) Proposals will be opened immediately after the proposal submittal date and time (3:00 PM) by the Pinellas County Purchasing Department, 400 South Fort Harrison Avenue, Annex Building, 6th Floor, Clearwater, FL 33756. The public may attend the proposal opening, but may not immediately review any proposals submitted. The names of respondents only will be read aloud at the time of opening. Pursuant to Section 119.07(3)(m), all proposals submitted shall be subject to review as public records 10 days from opening, or earlier if an intended decision is reached before the 10-day period expires. Late proposals will not be accepted for any reason.
- b) Proposals and changes thereto shall be enclosed in sealed envelopes or packages, addressed to the Purchasing Department, Pinellas County. The name and address of the firms, the date and hour of the proposal submittal, and the title shall be placed on the outside of the envelope.
- c) Proposals must follow the format of the RFP and structure their responses to follow the sequence of the RFP when submitting a proposal. County staff will evaluate the proposals received, based on responsiveness to the evaluation criteria and based on the information being provided in the required sequence.
- d) Proposers must have experience in work of the same or similar nature, and must provide references that will satisfy the County. Proposer must furnish a reference list of at least four (4) customers for whom they have performed similar services and must provide information as specified in Section D. **Pinellas County references will not be accepted.**
- e) Proposer is advised that exceptions to any of the terms contained in this RFP or the attached service agreement must be identified in its response to the RFP. Failure to do so may lead County to declare any such term non-negotiable. Proposer's desire to take exception to a non-negotiable term will not disqualify it from consideration for award.

**2. WRITTEN REQUESTS FOR INTERPRETATIONS/CLARIFICATIONS:**

No oral interpretations will be made to any firms as to the meaning of specifications or any other contract documents. All questions pertaining to the terms and conditions or scope of work of this proposal must be sent in writing (mail or fax) to the Purchasing Department and received no later than the deadline specified in RFP. Responses to questions may be handled as an addendum if the response would provide clarification to requirements of the proposal. All such addenda shall become part of the contract documents. The County will not be responsible for any other explanation or interpretation of the proposed RFP made or given prior to the award of the contract. The Purchasing Department will be unable to respond to questions received after the specified deadline.

**3. RIGHTS OF PINELLAS COUNTY IN REQUEST FOR PROPOSAL PROCESS:**

In addition to all other rights of the County under Florida law, the County specifically reserves the following:

- a) Pinellas County reserves the right to rank firms and negotiate with the highest-ranking firm. Negotiation with an individual proposer does not require negotiation with others.
- b) Pinellas County reserves the right to select the proposal that it believes will serve the best interest of Pinellas County.
- c) Pinellas County reserves the right to reject any or all Requests for Proposals.
- d) Pinellas County reserves the right to cancel the entire Request for Proposal.
- e) Pinellas County reserves the right to remedy or waive technical or immaterial errors in the Request for Proposal or in proposals submitted.
- f) Pinellas County reserves the right to request any necessary clarifications or proposal data without changing the terms of the proposal.

**4. COSTS INCURRED BY PROPOSERS:**

All expenses involved with the preparation and submission of proposals to the County, or any work performed in connection therewith, shall be borne solely by the Proposer(s). No payment will be made for any responses received, or for any other effort required of, or made by, the Proposer(s) prior to contract commencement.

**SECTION A - GENERAL CONDITIONS****5. ORAL PRESENTATION:**

An oral presentation of proposal may be requested of any firm, at the Evaluation Committee's discretion.

**6. CONFLICT OF INTEREST:**

- a) The Proposer represents that it presently has no interest and shall acquire no interest, either direct or indirect, which would conflict in any manner with the performance or services required hereunder, as provided for in Fla. Stat., §112.311, et. Seq. The Proposer further represents that no person having any interest shall be employed for said performance.
- b) The Proposer shall promptly notify the County's representative, in writing, by certified mail, of all potential conflicts of interest for any prospective business association, interest, or other circumstance, which may influence or appear to influence the Contractor's judgment or quality of services being provided hereunder. Such written notification shall identify the prospective business association, interest or circumstance, the nature of work that the Proposer may undertake and request an opinion of the County as to whether the association, interest or circumstance would, in the opinion of the County, constitute a conflict of interest if entered into by the Proposer. The County agrees to notify the Proposer of its opinion by certified mail within thirty days of receipt of notification by the Proposer.

**7. WITHDRAWAL OF PROPOSAL:**

A proposal may be withdrawn prior to the time set for the proposal submittal, based on a written request from an authorized representative of the firm; however, a proposal may not be withdrawn after the time set for the proposal submittal for a period of time as specified.

**8. LATE PROPOSAL OR MODIFICATIONS:**

Proposal and modifications received after the time set for the proposal submittal will not be considered; however, modifications in writing received prior to the time set for the proposal submittal will be accepted. **In addition, late proposals will not be accepted, will be rejected and will be returned for any reason. The time clock stamp located in Pinellas County Purchasing Department shall be the official time stamp.** This upholds the integrity of the proposal process.

**9. LOCAL, STATE, AND FEDERAL COMPLIANCE REQUIREMENTS:**

The laws of the State of Florida apply to any purchase made under this Request for Proposal. Proposers shall comply with all local, state, and federal directives, orders and laws as applicable to this proposal and subsequent contract(s) including but not limited to Equal Employment Opportunity (EEO), Minority Business Enterprise (MBE), and OSHA as applicable to this contract.

**10. RIGHT TO AUDIT:**

Pinellas County reserves the privilege of auditing a vendor's records as such records relate to purchases between Pinellas County and said vendor. Such audit privilege is provided for within the text of the Pinellas County Code §2-156 through §2-176(j). Records should be maintained for three years from the date of final payment.

**11. STATEMENT RELATIVE TO "PUBLIC ENTITY CRIMES":**

The proposer is directed to the Florida Public Entity Crime Act, §287.133, Florida Statutes, and the County's requirement that the successful proposer comply with it in all respects prior to and during the term of this contract.

**12. COUNTY INDEMNIFICATION:**

- A. The first ten dollars (\$10) of compensation received by the contractor pursuant to this contract represents specific consideration for the following indemnification: contractor shall indemnify, pay the cost of defense, including attorneys' fees, and hold harmless the County from all suits, actions or claims of any character brought on account of any injuries or damages received or sustained by any person, persons or property by or from the said contractor; or by, or in consequence of any neglect in safeguarding the work; or through the use of unacceptable materials in the construction of improvements; or by, or on account of any act or omission, neglect or misconduct of the said contractor; or by, or on account of, any claim or amounts recovered under the "Workers' Compensation Law" or of any other laws, by-laws, ordinance, order or decree, except only such injury or damage as shall have been occasioned by the sole negligence of the County.
- B. The successful proposer(s) agrees to indemnify the County and hold it harmless from and against all claims, liability, loss, damage or expense, including counsel fees, arising from or by reason of any actual or claimed trademark, patent or copyright infringement or litigation based thereon, with respect to the goods or any part thereof covered by this order, and such obligation shall survive acceptance of the goods and payment thereof by the County.



**SECTION A - GENERAL CONDITIONS****13. TERMINATION:**

- a) Pinellas County reserves the right to terminate this contract without cause by giving thirty (30) days prior notice to the contractor in writing of the intention to terminate or with cause if at any time the contractor fails to fulfill or abide by any of the terms or conditions specified.
- b) Failure of the contractor to comply with any of the provisions of this Agreement shall be considered a material breach of Agreement and shall be cause for immediate termination of the Agreement at the discretion of Pinellas County.
- c) In the event sufficient budgeted funds are not available for a new fiscal period, the County shall notify the Bidder of such occurrence and Agreement shall terminate on the last day of current fiscal period without penalty or expense to the County.
- d) In addition to all other legal remedies available to Pinellas County, Pinellas County reserves the right to terminate and obtain from another source, any items which have not been delivered within the period of time stated in the proposal, or if no such time is stated, within a reasonable period of time from the date of order as determined by Pinellas County.

**14. ASSIGNMENT/SUBCONTRACTING/CORPORATE ACQUISITIONS AND/OR MERGERS:**

The Contractor shall perform this contract. No assignment or subcontracting shall be allowed without prior written consent of the County. If a proposer intends to subcontract a portion of this work, the proposer must disclose that intent in the proposal. In the event of a corporate acquisition and/or merger, the Contractor shall provide written notice to the County within thirty (30) business days of Contractor's notice of such action or upon the occurrence of said action, whichever occurs first. The right to terminate this contract, which shall not be unreasonably exercised by the County, shall include, but not be limited to, instances in which a corporate acquisition and/or merger represent a conflict of interest or are contrary to any local, state, or federal laws. Action by the County awarding a proposal to a firm that has disclosed its intent to assign or subcontract in its response to the RFP, without exception shall constitute approval for purpose of this Agreement.

**15. LOBBYING:**

Lobbying shall be prohibited on all county competitive selection processes, and contract awards pursuant to this division, including but not limited to requests for proposals, requests for quotations, requests for qualifications, bids or the award of purchasing contracts of any type. The purpose of this prohibition is to protect the integrity of the procurement process by shielding it from undue influences prior to the contract award, a protest is resolved, or the competitive selection process is otherwise concluded. However, nothing herein shall prohibit a prospective bidder/proposer/protestor from contacting the purchasing department or the county attorney's office to address situations such as clarification and/or questions related to the procurement process or protest..

Lobbying of evaluation committee members, county government employees, or elected officials regarding request for proposals, request for qualifications, bids, purchasing contracts, or bid protests, by the bidder/proposer/protestor any member of the bidder's/proposer's/protestor's staff, any agent or representative of the bidder/proposer/protestor, or any person employed by any legal entity affiliated with or representing a bidder/proposer/protestor, is strictly prohibited from the date of the advertisement, or on a date otherwise established by the board of county commissioners, until either an award is final, any protest is finally resolved, or the competitive selection process is otherwise concluded. Any lobbying activities in violation of this section or on behalf of a bidder/proposer/protestor shall result in the disqualification or rejection of the proposal, quotation, statement of qualification, bid or contract, and may lead to debarment of the bidder or proposer/protestor as provided in Pinellas County Code, Section 2-161(8)b.

For purposes of this provision, lobbying shall mean influencing or attempting to influence action or non-action, and/or attempting to obtain the goodwill of persons specified herein relating to the selection, ranking, or contract award in connection with any request for proposal, request for quotation, requests for qualification, bid or purchasing contract through direct or indirect oral or written communication. The final award of a purchasing contract shall be the effective date of the purchasing contract.

Any evaluation committee member, county government employee or elected official who has been lobbied shall immediately report the lobbying activity to the director of purchasing.

## SECTION A - GENERAL CONDITIONS

### 16. PROTEST PROCEDURE:

As per Section 2-162 of County Code

1.

(a) *Bid/Proposal protests.* Any actual or prospective bidder, proposer, who is allegedly aggrieved in connection with the issuance of a bid/proposal package or pending award of a contract may protest to the director of purchasing.

(b) *Posting.* The Purchasing Department shall post the formal award on the departmental website. The formal award shall be publicly posted on the Purchasing Department's website no less than three full business days after the decision to recommend the award to the bidder/proposer is made.

(c) *Requirements to Protest.*

(1) If the protest relates to the content of the bid/proposal package, a formal written protest must be filed no later than 5:00 p.m. on the fifth full business day after issuance of the bid/proposal package.

(2) If the protest relates to the award of a contract, a formal written protest must be filed no later than 5:00 p.m., on the fifth business day after posting of either the contract award recommendation or the contract award itself. The formal written protest shall identify the protesting party and the solicitation involved; include a clear statement of the grounds on which the protest is based; refer to the statutes, laws, ordinances or other legal authorities which the protesting party deems applicable to such grounds; and specifically request the relief to which the protesting party deems itself entitled by application of such authorities to such grounds.

(3) A formal written protest is considered filed with the county when the Purchasing Department, County Administrator, or County Commission receives it. Accordingly, a protest is not timely filed unless it is received within the time specified above. Failure to file a formal written protest within the time period specified shall constitute a waiver of the right to protest and result in relinquishment of all rights to protest by the bidder/proposer.

(d) *Sole remedy.* These procedures shall be the sole remedy for challenging an award of bid. Bidder/proposers are prohibited from attempts to influence, persuade, or promote a bid protest through any other channels or means. Such attempts shall be cause for suspension in accordance with 2-161(b) of this article.

(e) *Time Limits.* The time limits in which protests must be filed as specified herein may be altered by specific provisions in the Bid/Request for Proposal.

(f) *Authority to resolve.* The Director of Purchasing shall resolve the protest in a fair and equitable manner and shall render a written decision to the protestant no later than 5:00 p.m. on the fifth business day after the filing thereof.

(g) *Review of Purchasing Director's decision.*

(1) The protesting party may request a review of the Purchasing Director's decision to the County Administrator by delivering written request for review of the decision to the Director of Purchasing by 5:00 p.m. on the fifth business day after the date of the written decision. The written notice shall include any written or physical materials, objects, statements, and arguments, which the bidder/proposer deems relevant to the issues raised in the request for review.

(2) If it is determined that the solicitation or award is in violation of law or the regulations and internal procedures of the Purchasing Department, the County Administrator shall immediately cancel or revise the solicitation or award as deemed appropriate.

(3) If it is determined that the solicitation or award should be upheld, the County Administrator shall issue a decision in writing stating the reason for the action with a copy furnished to the protesting party and all substantially affected persons or businesses no later than 5:00 p.m., on the fifth full business day. The decision shall be final and conclusive as to the county unless any further action is taken or a party commences action in court.

(h) *Stay of Procurement During Protests.* There shall be no stay of procurement during protests.

### 17. INTEGRITY OF REQUEST FOR PROPOSAL (RFP) DOCUMENTS:

Proposers shall use the original RFP Form(s) provided by the Purchasing Department and enter information only in the spaces where a response is requested. Proposers may use an attachment as an *addendum* to the RFP Form(s) if sufficient space is not available on the original form for the proposer to enter a complete response. **Any modifications or alterations to the original RFP documents by the proposer, whether intentional or otherwise, will constitute grounds for rejection of a RFP.** Any such modifications or alterations a proposer wishes to propose must be clearly stated in the proposer's RFP response and presented in the form of an addendum to the original RFP documents.

**SECTION A - GENERAL CONDITIONS****18. SERVICES AGREEMENT:**

A written agreement, in substantially the form attached, incorporating the Request for Proposal and the successful proposal will be prepared by the County, signed by the successful proposer and presented to the Board of County Commissioners, County Administrator or Director of Purchasing for approval and signature.

**19. OWNERSHIP OF DOCUMENTS:**

A. Drawings, specifications, designs, models, photographs, reports, surveys, calculations, and other data provided in connection with this RFP are and shall remain the property of the County whether the project for which they are made is executed or not. Such finished or unfinished documents, data, calculations, studies, surveys, specifications, drawings, maps, models, photographs and reports prepared by the Consultant shall be delivered by the Consultant to the County at the conclusion of the project or the termination of the Consultant's services.

B. When such documents are provided to other parties, the Consultant shall ensure return of the County's property.

**20. INDEPENDENT CONTRACTOR STATUS AND COMPLIANCE WITH THE IMMIGRATION REFORM AND CONTROL ACT OF 1986:**

Consultant acknowledges that it is functioning as an independent contractor in performing under the terms of this contract, and it is not acting as an employee of Pinellas County. The consultant acknowledges that it is responsible for complying with the provisions of the Immigration Reform and Control Act of 1986, located at 8 U.S.C. Section 1324, et seq., and regulations relating thereto. Failure to comply with the above provisions of the contract shall be considered a material breach and shall be ground for immediate termination of the contract.

**21. PROHIBITION AGAINST CONTINGENT FEE:**

The consultant warrants that he has not employed or retained any company or person, other than a bona fide employee working solely for the consultant to solicit or secure this contract and that he has not paid or agreed to pay any person, company, corporation, individual, or firm other than a bona fide employee working solely for the consultant, any fee, commission, percentage, gift or any other consideration, contingent upon or resulting from the award or making of this contract.

**22. TRUTH IN NEGOTIATIONS:**

The Consultant certifies to truth-in-negotiation and that wage rates and other factual unit costs supporting the compensation are accurate, complete and current at the time of contracting. Further, the original contract amount and any additions thereto shall be adjusted to exclude any significant sums where the County determines the contract price was increased due to inaccurate, incomplete or non-current wage rates and other factual unit costs. Such adjustments must be made within one (1) year following the end of the contract.

**23. JOINT VENTURES:**

All Bidders intending to submit a proposal as a Joint Venture are required to have filed proper documents with the Florida Department of State, the Division of Professions, Construction Industry Licensing Board and any other state or local licensing Agency prior to submitting the proposal (see Section 489.119 Florida statutes).

Joint Venture Firms must provide an affidavit attesting to the formulation of a joint venture and provide either proof of incorporation as a joint venture or a copy of the formal joint venture Agreement between all joint venture parties, indicating their respective roles, responsibilities and levels of participation for the project.

## SECTION B - SPECIAL CONDITIONS

### Proposal Title: LAKE SEMINOLE SEDIMENT REMOVAL Proposal Number: 090-0271-NC (AM)

#### 1. PURPOSE:

The purpose of this competitive process is to ensure Pinellas County compliance with Section 287.055 Florida Statutes known as the "Consultants' Competitive Negotiation Act" (CCNA). The CCNA establishes contracting procedures by which counties must select architects, professional engineers, landscape architects, and surveyors and mappers ("Professional Firms") for architectural, engineering, landscaping and mapping services ("Professional Services"). The CCNA process allows for professional firms to be chosen on quality of personnel, minority business enterprise consideration, past performance, willingness to meet time and budget requirements, location, workload, and volume of work previously awarded to each Professional Firm by the County.

#### 2. PERIOD OF CONTRACT:

Services performed pursuant to this contract shall commence upon execution of the agreement and continue as necessary to perform and complete all the work required.

#### 3. EVALUATION CRITERIA:

Following is the criteria that will be used by the County to evaluate and score responsive and qualified proposals. Proposers shall include sufficient information to allow the County to thoroughly evaluate and score their proposals. Each proposal submitted shall be evaluated and ranked by an evaluation committee. The contract will be awarded to the most qualified proposer, per the evaluation criteria listed.

##### a) **Capabilities** **150 Points**

Reviews the level of qualifications and experience of the firm and project team and appropriateness of the organization of the project team. Reviews the professional resources available to properly provide services as requested in the RFP document.

##### b) **Adequacy of Personnel** **200 Points**

Reviews the project team to insure the team proposed contains all of the critical disciplines required. Prime team proposed should have exceptional professional resources to properly provide services. The project manager and proposed team should be uniquely qualified to provide the desired services.

##### c) **Experience of Firm** **150 Points**

Reviews the firms experience with projects of similar size, type and scope and the performance on those specific projects. The prime firm must have adequate, recent (within the past five years) experience with projects of similar type as defined in the RFP document. Experience pertaining to specific Pinellas County projects may also be considered. Pinellas County staff shall not however furnish references for such projects.

##### d) **Abilities of Professional Personnel** **125 Points**

Reviews the project team to insure the team proposed contains all of the critical disciplines required. Prime team proposed should have exceptional professional resources to properly provide services. The project manager and proposed team should be uniquely qualified to provide the desired services.

##### e) **Past Performance** **125 Points**

The scope of services provided should represent projects that are similar to those defined in the RFP document. The overall performance of the firm relative to projects of similar size and scope should be evaluated.

##### f) **Willingness to meet time & budget requirements** **100 Points**

Reviews the submittal from the firm and its understanding of the schedule and budgetary requirements. The submittal should show a good understanding and approach to meet schedule and budget.

##### g) **Minority Business Status** **50 Points**

Provides points for minority business status as designated by the State of Florida. If the firm is designated as a minority business by the State of Florida, five percent (5%) of the total evaluation points are awarded. If the firm does not have minority business status as per the State of Florida, zero percent (0%) of the points available are awarded.

**SECTION B - SPECIAL CONDITIONS****h) Volume of work previously awarded by the County****50 Points**

The purpose of this criterion is to effect an equitable distribution of contracts. This criterion is evaluated based on contract value awarded to a firm during the two (2) previous completed fiscal years. The points are worth 5 percent of the overall points available and are distributed as follows:

\$0 - \$200,000 – five (5%) percent of total points available

\$200,001 - \$400,000 – four (4%) percent of total points available

\$400,001 – 600,000 – three (3%) percent of total points available

\$600,001- \$800,000 – two (2%) percent of total points available

\$800,001 - \$1,000,000 – one (1%) percent of total points available

Over \$1,000,000 – zero (0%) percent of total points available

Based on a typical 1000 point evaluation scoring process, a firm deemed to be in the \$0-\$200,000 category threshold would be allotted 50 points etc.

**i) Location****50 Points**

Evaluates the location of the project team relative to Pinellas County including the prime firm and project manager. If firm has an established office located in Pinellas, Manatee, Hillsborough or Pasco counties, 50 points are awarded, If not, no points will be awarded.

**Total 1000 Points****4. TIME LINE:**

Following is a listing of actions and anticipated dates; the County reserves the right to change the dates, if necessary.

Date	
<b>APRIL 23, 2010</b>	Advertising & Publishing RFP
<b>MAY 6, 2010</b>	Deadline for Questions/Clarifications
<b>MAY 13, 2010</b>	Proposals due in Purchasing by 3:00 p.m. Public bid opening to follow immediately.
TBD	Evaluation of the RFP
TBD	Recommendation due to Purchasing from Environmental Management
TBD	Submit recommendation to Board for Award of Contract

## SECTION B - SPECIAL CONDITIONS

### 5. ITEMS TO BE RETURNED WITH PROPOSAL:

Please Review this document carefully. Offers that are accepted by the county are binding contracts. All documents and submittals shall be received by the office of purchasing on or before date and hour specified for receipt (see page #1). Late proposals will be returned unopened.

The Following Documents Shall Be Returned With Proposal:

- a) Standard Forms 330
- b) Certificate Of Florida Small and Minority Business issued by the Florida State Office of Diversity, Department of Management Services (if applicable)

### 6. INFORMATION PACKAGE:

#### A. Request for Letters of Interest for Professional Services As Governed by Florida Statute 287.055

- 1) "Professional services" is defined as those services within the scope of the practice of architecture, professional engineering, landscape architecture, or registered surveying and mapping, as defined by the laws of the state, or those performed by any architect, professional engineer, landscape architect, or registered surveyor and mapper in connection with his or her professional employment or practice.

### SUBMITTAL REQUIREMENTS:

Submittal of current SF-330 (federal Standard Form), Part I and II, with all sections completed. SF-330 can be obtained from U. S. General Services Administration (GSA) website - <http://gsa.gov/forms> , then select Standard Form on the menu and go to the 330.

**Note:** Standard Form (SF) 330 - Part II should be submitted for each firm AND for each subcontractor. Part II **does not count** against the total number of pages for this submittal.

Submittal requirements must be indexed and listed in the order described below:

#### A. Introduction Tab

- 1) Letter of Interest by corporate office or principal of the firm.
- 2) Specific Professional services to be offered (please delineate each service your firm offers).
- 3) Table of Contents.

#### B. Tab 1 - Standard Form (SF) 330 – Part I & II

Should be a Maximum of 50 pages and fully completed as required by the law governing Standard Form (SF) 330.

#### C. Tab 2 - Statements and Documentation

- 1) Proof of licenses/certifications
- 2) Provide proof of proper State of Florida business licensure and professional certifications/registration(s) in the State of Florida.
- 3) Provide proof of corporate registration to operate in the State of Florida by the Department of State, Division of Corporations. Information concerning certification with the Secretary of State can be obtained at: <http://ccfcorp.dos.state.fl.us/index.html>. Must be active status.
- 4) Provide Certificate of Florida Small and Minority Business issued by the Florida State Office of Diversity, Department of Management Services (if applicable)
- 5) State if firm has an established office located in Pinellas, Manatee, Hillsborough or Pasco counties.

#### D. Tab 3 - Certificate(s) of Insurance.

Section C reflects the insurance requirements deemed necessary for this project by County Risk Management. It is not necessary to have this level of insurance in effect at the time of submission, but certificates indicating that the insurance is currently carried, or acknowledgment from the carrier indicating upgrade availability will speed the review process.

**SECTION B - SPECIAL CONDITIONS****E. Tab 4 - Key Personnel Statement**

Submit a statement that personnel listed in the submittal will be available for and shall be assigned to this project. Failure to produce the proposed key personnel may be grounds for dismissal.

**F. Tab 5- Acknowledgment of Addenda (if applicable).****G. Tab 6 - Include any additional information to represent your firm for consideration.**

Original letters shall be signed by an authorized representative of the firm. All information requested must be submitted. Failure to submit all information may delay evaluation of the proposal. Letters, which are substantially incomplete or lack key information, may be rejected by the County at its discretion.

The submittals shall be in the format of Standard Forms (SF) 330. The submittal shall be limited to one hundred (100) pages, **must be in format of a loose leaf binder**. The selection of the firms will be based on the information provided on the forms and in the additional sections.

Information submitted with your letter of interest should include documentation to demonstrate your firm's qualifications and abilities to perform as noted in the scope of services and also include information to allow for a clear understanding of past projects, especially in Florida, staff experience and abilities, and any additional information to present your firm for consideration.

An evaluation committee will review the information submitted. Once review is complete and the firm confirms the maximum ceiling for establishing a fee schedule, a recommendation to the Board of County Commissioners will be prepared. Hours per project and direct expenses will be negotiated. Award(s) resulting from this solicitation shall be subject to the provisions of Section 2-178, contracting for Designated Professional Services of the Ordinances of Pinellas County and Section 10 of the Purchasing Policies and Procedures of Pinellas County.

For questions and additional information, contact person indicated on page 1.

Letters of Interest will be evaluated using the criteria **listed in Item 3, page 7, of this Section**. Firms will be notified in writing if they have been selected in a reasonable time after submittal date.

**Proposals shall be submitted in one (1) original and SEVEN copies.**

## SECTION C - INSURANCE AND INDEMNIFICATION REQUIREMENTS

### I. INSURANCE REQUIREMENTS

- A. The Consultant shall procure, pay for and maintain at least the following insurance coverage and limits. Said insurance shall be evidenced by delivery to the County of one (1) certificate of insurance executed by the insurers listing coverage and limits, expiration dates and terms of policies and all endorsements whether or not required by the Count, and listening all carriers issuing and policies; and (2) upon request, a certified copy of each policy including all endorsements. The insurance requirements shall remain in effect throughout the term of the contract.
- (1) Worker's Compensation in at least the limits as required by law; Employers' Liability Insurance of not less than \$100,000 for each accident.
  - (2) Comprehensive General Liability Insurance including, but not limited to, Independent Contractor, Contractual, Premises/Operations, Products/Completed Operation and Personal Injury covering the liability assumed under indemnification provisions of this Contract, with limits of liability for personal injury and/or bodily injury, including death, of not less than \$500,000, each occurrence; and property damage of not less than \$100,000, each occurrence. (Combined Single Limits of not less than \$500,000, each occurrence, will be acceptable unless otherwise stated). Coverage shall be on an "occurrence" basis, and the policy shall include Broad Form Property Damage coverage, and Fire Legal Liability of not less than \$50,000 per occurrence, unless otherwise stated by exception herein.
  - (3) Comprehensive Automobile and Truck liability covering owned, hired and non-owned vehicles with minimum limits of \$500,000 each occurrence, for bodily injury including death, and property damage of not less than \$100,000, each occurrence. (Combined Single Limits of not less than \$500,000, each occurrence, will be acceptable unless otherwise stated). Coverage shall be on an "occurrence" basis, such insurance to include coverage for loading and unloading hazards.
  - (4) Professional Liability Insurance (including Errors and Omissions) with minimum limits of \$1,000,000 per occurrence, if occurrence form is available; or claims made form with "tail coverage" extending three (3) years beyond completion and acceptance of the PROJECT with proof of "tail coverage" to be submitted with the invoice for final payment. In lieu of "tail coverage", CONSULTANT may submit annually to the COUNTY a current Certificate of Insurance proving claims made insurance remains in force throughout the same three (3) year period.
- B. Each insurance policy shall include the following conditions by endorsement to the policy:
- (1) Each policy shall require that thirty (30) days prior to expiration, cancellation, non-renewal or any material change in coverage's or limits, a notice thereof shall be given to County by certified mail to: Pinellas County Purchasing Department, 400 S. Ft. Harrison Avenue, 6th Floor, Clearwater, Florida 33756. Consultant shall also notify County, in a like manner, within twenty-four (24) hours after receipt, of any notices of expiration, cancellation, non-renewal or material change in coverage received by said Contractor from its insurer; and nothing contained herein shall absolve Consultant of this requirement to provide notice.
  - (2) Companies issuing the insurance policy, or policies, shall have no recourse against County for payment of premiums or assessments for any deductibles which all are at the sole responsibility and risk of Consultant.
  - (3) The term "County" or "Pinellas County" shall include all Authorities, Boards, Bureaus, Commissions, Divisions, Departments and offices of County and individual members, employees thereof in their official capacities, and/or while acting on behalf of Pinellas County.
  - (4) **Pinellas County Board of County Commissioners shall be endorsed** to the required policy or policies as an additional insured, exclusive of Professional Liability Insurance and Worker's Compensation Insurance.
- C. Consultant hereby waives subrogation rights for loss or damage against the County.
- D. The policy clause "Other Insurance" shall not apply to any insurance coverage currently held by County to any such future coverage, or to County's Self-insured Retentions of whatever nature.



## SECTION D - VENDOR REFERENCES

**Proposal Title: LAKE SEMINOLE SEDIMENT REMOVAL**  
**Proposal Number: 090-0271-NC (AM)**

THE FOLLOWING INFORMATION IS REQUIRED IN ORDER THAT YOUR PROPOSAL MAY BE REVIEWED AND PROPERLY EVALUATED.

COMPANY NAME: \_\_\_\_\_

LENGTH OF TIME COMPANY HAS BEEN IN BUSINESS: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

HOW LONG IN PRESENT LOCATION: \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_ FAX NUMBER: \_\_\_\_\_

TOTAL NUMBER OF CURRENT EMPLOYEES: \_\_\_\_\_ FULL TIME \_\_\_\_\_ PART TIME

NUMBER OF EMPLOYEES YOU PLAN TO USE TO SERVICE THIS CONTRACT: \_\_\_\_\_

All references will be contacted by a County Designee via email, fax, mail or phone call to obtain answers to questions, as applicable before an evaluation decision is made.

EITHER LOCAL COMMERCIAL OR GOVERNMENTAL REFERENCE(S) (PINELLAS COUNTY GOVERNMENT REFERENCES WILL NOT BE ACCEPTED) THAT YOU HAVE PREVIOUSLY PERFORMED SIMILAR CONTRACT SERVICES FOR:

All fields below must be completed

**1** \_\_\_\_\_  
 COMPANY NAME  
 \_\_\_\_\_  
 CITY, STATE  
 \_\_\_\_\_  
 CONTACT PERSON  
 \_\_\_\_\_  
 TELEPHONE  
 \_\_\_\_\_  
 FAX  
 \_\_\_\_\_  
 EMAIL ADDRESS  
 \_\_\_\_\_

**2** \_\_\_\_\_  
 COMPANY NAME  
 \_\_\_\_\_  
 CITY, STATE  
 \_\_\_\_\_  
 CONTACT PERSON  
 \_\_\_\_\_  
 TELEPHONE  
 \_\_\_\_\_  
 FAX  
 \_\_\_\_\_  
 EMAIL ADDRESS  
 \_\_\_\_\_

**3** \_\_\_\_\_  
 COMPANY NAME  
 \_\_\_\_\_  
 CITY, STATE  
 \_\_\_\_\_  
 CONTACT PERSON  
 \_\_\_\_\_  
 TELEPHONE  
 \_\_\_\_\_  
 FAX  
 \_\_\_\_\_  
 EMAIL ADDRESS  
 \_\_\_\_\_

**4** \_\_\_\_\_  
 COMPANY NAME  
 \_\_\_\_\_  
 CITY, STATE  
 \_\_\_\_\_  
 CONTACT PERSON  
 \_\_\_\_\_  
 TELEPHONE  
 \_\_\_\_\_  
 FAX  
 \_\_\_\_\_  
 EMAIL ADDRESS  
 \_\_\_\_\_

**SECTION E – SCOPE OF WORK****Proposal Title: LAKE SEMINOLE SEDIMENT REMOVAL  
Proposal Number: 090-0271-NC (AM)****A. OBJECTIVE:**

The Board of County Commissioners (BCC) of Pinellas County is seeking a qualified consultant to assist with the necessary services required for Phase I of the whole Lake Seminole sediment removal project. Phase I will comprise design and permitting consistent with the goals and objectives of the *Lake Seminole Watershed Management Plan (WMP) (2001)*, the state and federally approved *Reasonable Assurance Plan (RAP) (2007)*, and the *Lake Seminole Sediment Removal Feasibility Study (2006)* for the removal of nuisance, nutrient rich sediments that have degraded water quality and lake habitats. These documents estimate that there are approximately 1 million cubic yards of organic sediments in the Lake. This sediment removal PROJECT is the number one ranked alternative in the WMP for improving water quality and habitat and to meet the RAP goals.

**B. BACKGROUND:**

The WMP, the RAP and the Feasibility study of 2006, provide an overview of the history of the lake including the water quality problems that have persisted and worsened due to stormwater pollution and internal sediment nutrient recycling. Furthermore, these documents outline the management actions necessary to restore the lake's natural habitats and water quality. The management actions include but are not limited to regional stormwater improvements which are in progress and the sediment removal project which is the number one ranked project for restoring water quality in the lake.

**C. SCOPE OF WORK:**

The PROJECT has two phases. Phase 1 includes design and permitting of sediment removal within Lake Seminole and Phase 2 is construction and operations to remove organic sediments. During Phase 1 the COUNTY will contract with a CONSULTANT to perform engineering, survey, environmental, biological, GIS, public interaction, and technical support tasks for the development of a comprehensive whole-lake sediment removal design to protect, enhance, and restore water quality and natural systems. The CONSULTANT will prepare permit applications and assist in acquiring permits. In Phase 2 the COUNTY will hire a CONTRACTOR to perform sediment removal consistent with design plans, specifications and permits.

**1. PROJECT TASKS****PHASE 1:****Task I – Preliminary Design**

Under COUNTY direction, the CONSULTANT will review existing PROJECT data, perform field reconnaissance of the lake and adjacent areas to confirm existing site conditions and assess potential sites for upland spoil containment and project staging. The CONSULTANT will determine the need for additional sediment sampling and survey, sediment volume analysis, and other required data collection to provide a preliminary design report. The CONSULTANT will perform the needed sampling and survey. This preliminary design will also include the necessary data review and field reconnaissance to evaluate the Largo Landfill for project staging and as the final disposal site for the dewatered sediments. The CONSULTANT will develop a feasibility report that includes alternatives analysis, cost estimates, and recommendations for PROJECT design.

**Task 2 – PROJECT Design and Permitting**

The CONSULTANT will proceed to PROJECT design based upon COUNTY Task I review comments and direction. Design will include engineering, survey, environmental, biological, GIS, public interaction, and technical support tasks necessary to acquire permits and to develop plans and technical specifications for the PROJECT. The design includes providing a prioritized list of sediment laden areas based on areal estimates of sediment coverage and volumes and a schedule for their removal. Design reports will be provided to the COUNTY and at the 30%, 60%, and 90% milestones.

**Task 3 – Final Design**

Once all necessary permits have been received by the COUNTY, the CONSULTANT will provide final plans and technical specifications for the PROJECT and an estimate of probable costs for the PROJECT.

## SECTION E – SCOPE OF WORK

### PHASE 2 – Implementation of Sediment Removal PROJECT

#### Task 1- PROJECT Bid

The COUNTY will be responsible for preparing bid documents with the aid of the CONSULTANT. The COUNTY will advertise for bids and hold a pre-bid meeting. The COUNTY, with their CONSULTANT, will be responsible for providing responses to questions regarding PROJECT design and specifications.

#### Task 2 – Bid Award

The COUNTY and their CONSULTANT will evaluate bids and prepare a bid tabulation and recommendation for award of the PROJECT.

#### Task 3 (OPTIONAL) – Construction Management and Inspection (CEI)

The COUNTY may retain the services of the CONSULTANT to provide construction management and inspection services during the construction/installation phase of the sediment removal design.

#### Task 4 – Construction Phase and Operational Oversight and Technical Guidance

The CONSULTANT will provide operational oversight and technical guidance during the operational phase of the sediment removal process including responsibilities such as:

- Documentation of critical points requiring CONSULTANT observation during construction and will provide
- Consultation regarding any and all parts of the PROJECT plans and specifications.
- Reviewing all shop drawings, change orders, and requests for information during the course of the PROJECT.
- Weekly construction meetings and site visits including the final walk through and pre and post construction conferences.

#### References:

PBS&J (2001), *Lake Seminole Watershed Management Plan*  
Available at [www.pinellascounty.org/LakeSeminole](http://www.pinellascounty.org/LakeSeminole)

PBS&J (2006), *Lake Seminole Sediment Removal Feasibility Study*  
Available at [www.pinellascounty.org/LakeSeminole](http://www.pinellascounty.org/LakeSeminole)

PBS&J (2007), *Lake Seminole Reasonable Assurance Plan*  
*See Attachments*

Various Largo landfill reports

The project schedule is listed below. The design company will be needed throughout the entirety of the project.

#### PROJECT SCHEDULE

Phase	Activity	Complete
1	Consultant Notice to Proceed	June 30, 2010
1	Preliminary Design Report	June 30, 2011
1	Final Design and Permits	December 31, 2012
2	Bid and Contractor Selection	August 31, 2013
2	Commence Dredging Implementation	December 31, 2013
2	Complete Dredging Implementation	December 31, 2015
2	Project Completion	September 30, 2016

**SECTION F – INSTRUCTIONS FOR SUBMITTING PROPOSAL**

**Proposal Title: LAKE SEMINOLE SEDIMENT REMOVAL**  
**Proposal Number: 090-0271-NC (AM)**

All proposals shall be signed in ink by authorized principals of the firm.

Proposals are to be submitted in a sealed envelope. The face of the envelope shall indicate the RFP number, name, and address of the firm, and title of the proposal.

Proposals are to be submitted to Pinellas County Purchasing Department, 400 S. Ft. Harrison Avenue, 6th Floor, Clearwater, FL 33756 by the date and time indicated on the cover sheet.

**Proposals shall be submitted in one (1) original and SEVEN copies.**

**W-9 REQUEST FOR TAXPAYER ID NUMBER AND CERTIFICATION**Substitute  
Form**W-9****Request for Taxpayer  
Identification Number and Certification**Give form to the  
requester. Do not  
send to the IRS.Print or type  
See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: ☐ Individual/Sole proprietor ☐ Corporation ☐ Partnership  
☐ Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶ .....  
☐ Other (see instructions) ▶

☐ Exempt  
payee

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

**Part I Taxpayer Identification Number (TIN)**

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Social security number

or

Employer identification number

**Note.** If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

**Part II Certification**

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined in the instructions).

**Certification instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

**Sign  
Here**Signature of  
U.S. person ▶

Date ▶

**\*Instructions to Form W-9 available upon request.**

Detach on the perforation

**Section 119.071(5), Florida Statutes Notice:**

Your Tax Identification Number (which for individuals is your social security number) is collected on Form W9 for use in filing information returns with the IRS as described more fully below. Collection of the tax identification number (or social security number as applicable) is mandatory pursuant to Section 6109 of the Internal Revenue Code (26 U.S.C § 6109).

**Privacy Act Notice:**

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons who must file information returns with the IRS to report interest, dividends, and certain other income paid to you, mortgage interest you paid, the acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA, or Archer MSA or HSA. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return. The IRS may also provide this information to the Department of Justice for civil and criminal litigation, and to cities, states, the District of Columbia, and U.S. possessions to carry out their tax laws. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You must provide your TIN whether or not you are required to file a tax return. Payers must generally withhold 28% of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to a payer. Certain penalties may also apply.

## SECTION G ADDENDA ACKNOWLEDGEMENT FORM

Proposal Title: LAKE SEMINOLE SEDIMENT REMOVAL

Proposal Number: 090-0271-NC (AM)

PLEASE ACKNOWLEDGE RECEIPT OF ADDENDA FOR THIS ITB/RFP BY SIGNING AND DATING BELOW:

ADDENDA NO.

SIGNATURE/PRINTED NAME

DATE RECEIVED


**Note:** Prior to submitting the response to this solicitation, it is the responsibility of the firm submitting a response to confirm if any addenda have been issued. If such document(s) has been issued, acknowledge receipt by signature and date in section above and return Addenda Acknowledgement Form with RFP. Failure to do so may result in being considered non-responsive or result in lowering the rating of a firm's proposal.

Information regarding Addenda issued is available on the Purchasing Department section of the County's website at, [www.pinellascounty.org/purchase/Current\\_Bids1.htm](http://www.pinellascounty.org/purchase/Current_Bids1.htm) , listed under category 'Current Bids'. You will be directed to DemandStar.com

SECTION H – STATEMENT OF NO PROPOSAL
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**NOTE:** If you do not intend to submit a proposal on this requirement, please return this form immediately. *Thank you.*

[Pinellas County Purchasing Department  
400 South Fort Harrison Avenue, 6th Floor  
Clearwater, Florida 33756]

We, the undersigned have declined to submit a proposal for RFP No. **090-0271-NC (AM) for LAKE SEMINOLE  
SEDIMENT REMOVAL**

- \_\_\_\_\_ Specifications too "tight", i.e., geared toward one brand or manufacturer only  
(explain below).  
\_\_\_\_\_ Insufficient time to respond to the Request for Proposal.  
\_\_\_\_\_ We do not offer this product or service.  
\_\_\_\_\_ Our schedule would not permit us to perform.  
\_\_\_\_\_ Unable to meet specifications.  
\_\_\_\_\_ Unable to meet Bond requirement.  
\_\_\_\_\_ Specifications unclear (explain below).  
\_\_\_\_\_ Unable to Meet Insurance Requirements.  
\_\_\_\_\_ Remove Us from Your "Notification List" Altogether  
\_\_\_\_\_ Other (specify below).

REMARKS:

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We understand that if the "No Proposal" letter is not executed and returned our name may be deleted from the Bidders List of Pinellas County.

COMPANY NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

TYPED NAME OF ABOVE: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

FAX: \_\_\_\_\_

EMAIL: \_\_\_\_\_

**FLORIDA STATUTES****287.055 Acquisition of professional architectural, engineering, landscape architectural, or surveying and mapping services; definitions; procedures; contingent fees prohibited; penalties.--**

(1) SHORT TITLE.--This section shall be known as the "Consultants' Competitive Negotiation Act."

(2) DEFINITIONS.--For purposes of this section:

(a) "Professional services" means those services within the scope of the practice of architecture, professional engineering, landscape architecture, or registered surveying and mapping, as defined by the laws of the state, or those performed by any architect, professional engineer, landscape architect, or registered surveyor and mapper in connection with his or her professional employment or practice.

(b) "Agency" means the state, a state agency, a municipality, a political subdivision, a school district, or a school board. The term "agency" does not extend to a nongovernmental developer that contributes public facilities to a political subdivision under s. 380.06 or ss. 163.3220-163.3243.

(c) "Firm" means any individual, firm, partnership, corporation, association, or other legal entity permitted by law to practice architecture, engineering, or surveying and mapping in the state.

(d) "Compensation" means the total amount paid by the agency for professional services.

(e) "Agency official" means any elected or appointed officeholder, employee, consultant, person in the category of other personal service or any other person receiving compensation from the state, a state agency, municipality, or political subdivision, a school district or a school board.

(f) "Project" means that fixed capital outlay study or planning activity described in the public notice of the state or a state agency under paragraph (3)(a). A project may include:

1. A grouping of minor construction, rehabilitation, or renovation activities.
2. A grouping of substantially similar construction, rehabilitation, or renovation activities.

(g) A "continuing contract" is a contract for professional services entered into in accordance with all the procedures of this act between an agency and a firm whereby the firm provides professional services to the agency for projects in which estimated construction costs of each individual project under the contract does not exceed \$2 million, for study activity if the fee for professional service for each individual study under the contract does not exceed \$200,000, or for work of a specified nature as outlined in the contract required by the agency, with the contract being for a fixed term or with not time limitation except that the contract must provide a termination clause. Firms providing professional services under continuing contracts shall not be required to bid against one another.

(h) A "design-build firm" means a partnership, corporation, or other legal entity that:

1. Is certified under s. 489.119 to engage in contracting through a certified or registered general contractor or a certified or registered building contractor as the qualifying agent; or
2. Is certified under s. 471.023 to practice or to offer to practice engineering; certified under s. 481.219 to practice or to offer to practice architecture; or certified under s. 481.319 to practice or to offer to practice landscape architecture.

(i) A "design-build contract" means a single contract with a design-build firm for the design and construction of a public construction project.

(j) A "design criteria package" means concise, performance-oriented drawings or specifications of the public construction project. The purpose of the design criteria package is to furnish sufficient information to permit design-build firms to prepare a bid or a response to an agency's request for proposal, or to permit an agency to enter into a negotiated design-build contract. The design criteria package must specify performance-based criteria for the public construction project, including the legal description of the site, survey information concerning the site, interior space requirements, material quality standards, schematic layouts and conceptual design criteria of the project, cost or budget estimates, design and construction schedules, site development requirements, provisions for utilities, stormwater retention and disposal, and parking requirements applicable to the project.



(k) A "design criteria professional" means a firm who holds a current certificate of registration under chapter 481 to practice architecture or landscape architecture or a firm who holds a current certificate as a registered engineer under chapter 471 to practice engineering and who is employed by or under contract to the agency for the providing of professional architect services, landscape architect services, or engineering services in connection with the preparation of the design criteria package.

(3) PUBLIC ANNOUNCEMENT AND QUALIFICATION PROCEDURES.--

(a) Each agency shall publicly announce, in a uniform and consistent manner, each occasion when professional services must be purchased for a project the basic construction cost of which is estimated by the agency to exceed the threshold amount provided in s. 287.017 for CATEGORY FIVE (\$250,000) or for a planning or study activity when the fee for professional services exceeds the threshold amount provided in s. 287.017 for CATEGORY TWO (\$25,000), except in cases of valid public emergencies certified by the agency head. The public notice must include a general description of the project and must indicate how interested consultants may apply for consideration.

(b) Each agency shall encourage firms engaged in the lawful practice of their professions that desire to provide professional services to the agency to submit annually statements of qualifications and performance data.

(c) Any firm or individual desiring to provide professional services to the agency must first be certified by the agency as qualified pursuant to law and the regulations of the agency. The agency must find that the firm or individual to be employed is fully qualified to render the required service. Among the factors to be considered in making this finding are the capabilities, adequacy of personnel, past record, and experience of the firm or individual.

(d) Each agency shall evaluate professional services, including capabilities, adequacy of personnel, past record, experience, whether the firm is a certified minority business enterprise as defined by the Florida Small and Minority Business Assistance Act of 1985, and other factors determined by the agency to be applicable to its particular requirements. When securing professional services, an agency must endeavor to meet the minority business enterprise procurement goals under s. 287.09451.

(e) The public must not be excluded from the proceedings under this section.

(4) COMPETITIVE SELECTION.--

(a) For each proposed project, the agency shall evaluate current statements of qualifications and performance data on file with the agency, together with those that may be submitted by other firms regarding the proposed project, and shall conduct discussions with, and may require public presentations by, no fewer than three firms regarding their qualifications, approach to the project, and ability to furnish the required services.

(b) The agency shall select in order of preference no fewer than three firms deemed to be the most highly qualified to perform the required services. In determining whether a firm is qualified, the agency shall consider such factors as the ability of professional personnel; whether a firm is a certified minority business enterprise; past performance; willingness to meet time and budget requirements; location; recent, current, and projected workloads of the firms; and the volume of work previously awarded to each firm by the agency, with the object of effecting an equitable distribution of contracts among qualified firms, provided such distribution does not violate the principle of selection of the most highly qualified firms. The agency may request, accept, and consider proposals for the compensation to be paid under the contract only during competitive negotiations under subsection (5).

(c) This subsection does not apply to a professional service contract for a project the basic construction cost of which is estimated by the agency to be not in excess of the threshold amount provided in s. 287.017 for CATEGORY FIVE (\$250,000) or for a planning or study activity when the fee for professional services is not in excess of the threshold amount provided in s. 287.017 for CATEGORY TWO (\$25,000).

(d) Nothing in this act shall be construed to prohibit a continuing contract between a firm and an agency.

## (5) COMPETITIVE NEGOTIATION.--

(a) The agency shall negotiate a contract with the most qualified firm for professional services at compensation which the agency determines is fair, competitive, and reasonable. In making such determination, the agency shall conduct a detailed analysis of the cost of the professional services required in addition to considering their scope and complexity. For any lump-sum or cost-plus-a-fixed-fee professional service contract over the threshold amount provided in s. 287.017 for CATEGORY FOUR (\$150,000), the agency shall require the firm receiving the award to execute a truth-in-negotiation certificate stating that wage rates and other factual unit costs supporting the compensation are accurate, complete, and current at the time of contracting. Any professional service contract under which such a certificate is required must contain a provision that the original contract price and any additions thereto will be adjusted to exclude any significant sums by which the agency determines the contract price was increased due to inaccurate, incomplete, or noncurrent wage rates and other factual unit costs. All such contract adjustments must be made within 1 year following the end of the contract.

b) Should the agency be unable to negotiate a satisfactory contract with the firm considered to be the most qualified at a price the agency determines to be fair, competitive, and reasonable, negotiations with that firm must be formally terminated. The agency shall then undertake negotiations with the second most qualified firm. Failing accord with the second most qualified firm, the agency must terminate negotiations. The agency shall then undertake negotiations with the third most qualified firm.

(c) Should the agency be unable to negotiate a satisfactory contract with any of the selected firms, the agency shall select additional firms in the order of their competence and qualification and continue negotiations in accordance with this subsection until an agreement is reached.

## (6) PROHIBITION AGAINST CONTINGENT FEES.--

(a) Each contract entered into by the agency for professional services must contain a prohibition against contingent fees as follows: "The architect (or registered surveyor and mapper or professional engineer, as applicable) warrants that he or she has not employed or retained any company or person, other than a bona fide employee working solely for the architect (or registered surveyor and mapper, or professional engineer, as applicable) to solicit or secure this agreement and that he or she has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for the architect (or registered surveyor and mapper or professional engineer, as applicable) any fee, commission, percentage, gift, or other consideration contingent upon or resulting from the award or making of this agreement." For the breach or violation of this provision, the agency shall have the right to terminate the agreement without liability and, at its discretion, to deduct from the contract price, or otherwise recover, the full amount of such fee, commission, percentage, gift, or consideration.

(b) Any individual, corporation, partnership, firm, or company, other than a bona fide employee working solely for an architect, professional engineer, or registered land surveyor and mapper, who offers, agrees, or contracts to solicit or secure agency contracts for professional services for any other individual, company, corporation, partnership, or firm and to be paid, or is paid, any fee, commission, percentage, gift, or other consideration contingent upon, or resulting from, the award or the making of a contract for professional services shall, upon conviction in a competent court of this state, be found guilty of a first degree misdemeanor, punishable as provided in s. 775.082 or s. 775.083.

(c) Any architect, professional engineer, or registered surveyor and mapper, or any group, association, company, corporation, firm, or partnership thereof, who offers to pay, or pays, any fee, commission, percentage, gift, or other consideration contingent upon, or resulting from, the award or making of any agency contract for professional services shall, upon conviction in a state court of competent authority, be found guilty of a first degree misdemeanor, punishable as provided in s. 775.082 or s. 775.083.

(d) Any agency official who offers to solicit or secure, or solicits or secures, a contract for professional services and to be paid, or is paid, any fee, commission, percentage, gift, or other consideration contingent upon the award or making of such a contract for professional services between the agency and any individual person, company, firm, partnership, or corporation shall, upon conviction by a court of competent authority, be found guilty of a first degree misdemeanor, punishable as provided in s. 775.082 or s. 775.083.

(7) **AUTHORITY OF DEPARTMENT OF MANAGEMENT SERVICES.**--Notwithstanding any other provision of this section, the Department of Management Services shall be the agency of state government which is solely and exclusively authorized and empowered to administer and perform the functions described in subsections (3), (4), and (5) respecting all projects for which the funds necessary to complete same are appropriated to the Department of Management Services, irrespective of whether such projects are intended for the use and benefit of the Department of Management Services or any other agency of government. However, nothing herein shall be construed to be in derogation of any authority conferred on the Department of Management Services by other express provisions of law. Additionally, any agency of government may, with the approval of the Department of Management Services, delegate to the Department of Management Services authority to administer and perform the functions described in subsections (3), (4), and (5). Under the terms of the delegation, the agency may reserve its right to accept or reject a proposed contract.

(8) **STATE ASSISTANCE TO LOCAL AGENCIES.**--On any professional service contract for which the fee is over \$25,000, the Department of Transportation or the Department of Management Services shall provide, upon request by a municipality, political subdivision, school board, or school district, and upon reimbursement of the costs involved, assistance in selecting consultants and in negotiating consultant contracts.

(9) **APPLICABILITY TO DESIGN-BUILD CONTRACTS.**--

(a) Except as provided in this subsection, this section is not applicable to the procurement of design-build contracts by any agency, and the agency must award design-build contracts in accordance with the procurement laws, rules, and ordinances applicable to the agency.

(b) The design criteria package must be prepared and sealed by a design criteria professional employed by or retained by the agency. If the agency elects to enter into a professional services contract for the preparation of the design criteria package, then the design criteria professional must be selected and contracted with under the requirements of subsections (4) and (5). A design criteria professional who has been selected to prepare the design criteria package is not eligible to render services under a design-build contract executed pursuant to the design criteria package.

(c) Except as otherwise provided in s. 337.11(7), the Department of Management Services shall adopt rules for the award of design-build contracts to be followed by state agencies. Each other agency must adopt rules or ordinances for the award of design-build contracts. Municipalities, political subdivisions, school districts, and school boards shall award design-build contracts by the use of a competitive proposal selection process as described in this subsection, or by the use of a qualifications-based selection process pursuant to subsections (3), (4), and (5) for entering into a contract whereby the selected firm will subsequently establish a guaranteed maximum price and guaranteed completion date. If the procuring agency elects the option of qualifications-based selection, during the selection of the design-build firm the procuring agency shall employ or retain a licensed design professional appropriate to the project to serve as the agency's representative. Procedures for the use of a competitive proposal selection process must include as a minimum the following:

1. The preparation of a design criteria package for the design and construction of the public construction project.
2. The qualification and selection of no fewer than three design-build firms as the most qualified, based on the qualifications, availability, and past work of the firms, including the partners or members thereof.
3. The criteria, procedures, and standards for the evaluation of design-build contract proposals or bids, based on price, technical, and design aspects of the public construction project, weighted for the project.
4. The solicitation of competitive proposals, pursuant to a design criteria package, from those qualified design-build firms and the evaluation of the responses or bids submitted by those firms based on the evaluation criteria and procedures established prior to the solicitation of competitive proposals.
5. For consultation with the employed or retained design criteria professional concerning the evaluation of the responses or bids submitted by the design-build firms, the supervision or approval by the agency of the detailed working drawings of the project; and for evaluation of the compliance of the project construction with the design criteria package by the design criteria professional.
6. In the case of public emergencies, for the agency head to declare an emergency and authorize negotiations with the best qualified design-build firm available at that time.

(10) REUSE OF EXISTING PLANS.--Notwithstanding any other provision of this section, there shall be no public notice requirement or utilization of the selection process as provided in this section for projects in which the agency is able to reuse existing plans from a prior project of the agency, or, in the case of a board as defined in s. 1013.01, a prior project of that or any other board. Except for plans of a board as defined in s. 1013.01, public notice for any plans that are intended to be reused at some future time must contain a statement that provides that the plans are subject to reuse in accordance with the provisions of this subsection.

(11) CONSTRUCTION OF LAW.--Nothing in the amendment of this section by chapter 75-281, Laws of Florida, is intended to supersede the provisions of ss. 1013.45 and 1013.46.

**History.**--ss. 1, 2, 3, 4, 5, 6, 7, 8, ch. 73-19; ss. 1, 2, 3, ch. 75-281; s. 1, ch. 77-174; s. 1, ch. 77-199; s. 10, ch. 84-321; ss. 23, 32, ch. 85-104; s. 57, ch. 85-349; s. 6, ch. 86-204; s. 1, ch. 88-108; s. 1, ch. 89-158; s. 16, ch. 90-268; s. 15, ch. 91-137; s. 7, ch. 91-162; s. 250, ch. 92-279; s. 55, ch. 92-326; s. 1, ch. 93-95; s. 114, ch. 94-119; s. 10, ch. 94-322; s. 868, ch. 95-148; s. 2, ch. 95-410; s. 45, ch. 96-399; s. 38, ch. 97-100; s. 1, ch. 97-296; s. 80, ch. 98-279; s. 55, ch. 2001-61; s. 63, ch. 2002-20; s. 944, ch. 2002-387.

**287.017 Purchasing categories, threshold amounts; procedures for automatic adjustment by department.--**

(1) The following purchasing categories are hereby created:

- (a) CATEGORY ONE: \$15,000.
- (b) CATEGORY TWO: \$25,000.
- (c) CATEGORY THREE: \$50,000.
- (d) CATEGORY FOUR: \$150,000.
- (e) CATEGORY FIVE: \$250,000.

(2) The department shall adopt rules to adjust the amounts provided in subsection (1) based upon the rate of change of a nationally recognized price index. Such rules shall include, but not be limited to, the following:

- (a) Designation of the nationally recognized price index or component thereof used to calculate the proper adjustment authorized in this section.
- (b) The procedure for rounding results.
- (c) The effective date of each adjustment based upon the previous calendar year data.

**History.**--ss. 5, 13, ch. 86-204; ss. 12, 34, ch. 90-268; s. 3, ch. 96-236; s. 17, ch. 98-65; s. 75, ch. 98-279; s. 43, ch. 99-399; s. 9, ch. 2002-207.

# PROFESSIONAL SERVICES NON-CONTINUING SERVICES SAMPLE AGREEMENT

## TABLE OF CONTENTS

SECTION 1 INTENT OF AGREEMENT .....	2
SECTION 2 SCOPE OF PROJECT .....	3
2.1 PROJECT DESCRIPTION AND PROFESSIONAL REQUIREMENTS .....	3
2.2 PROJECT PHASES .....	3
2.3 CONSULTING RESPONSIBILITIES .....	3
2.4 GENERAL DESIGN CONDITIONS .....	4
2.5 GOVERNING SPECIFICATIONS REGULATIONS AND PERTINENT DOCUMENTS .....	4
SECTION 3 SERVICES TO BE FURNISHED BY THE CONSULTANT .....	4
3.1 ARCHITECTURAL PROGRAMMING PHASE .....	4
3.2 SCHEMATIC DESIGN PHASE .....	4
3.3 DESIGN DEVELOPMENT PHASE .....	5
3.4 CONSTRUCTION DOCUMENTS PHASE .....	6
3.5 BIDDING PHASE .....	7
3.6 CONSTRUCTION PHASE .....	8
3.7 PROVISIONS RELATED TO ALL PHASES .....	11
3.8 PERMIT APPLICATIONS AND APPROVALS .....	12
3.9 COORDINATION WITH UTILITY SERVICES AND AFFECTED PUBLIC AGENCIES .....	13
SECTION 4 SERVICES TO BE FURNISHED BY THE COUNTY .....	13
SECTION 5 PRESENTATIONS, PUBLIC MEETINGS AND TECHNICAL LIAISON .....	13
SECTION 6 PAYMENT GUIDELINES AND CATEGORY OF SERVICES .....	14
6.1 BASIC SERVICES .....	14
6.2 CONTINGENCY SERVICES .....	14
6.3 ADDITIONAL SERVICES .....	14
6.4 INVOICING .....	14
SECTION 7 COMPENSATION TO THE CONSULTANT .....	15
SECTION 8 PERFORMANCE SCHEDULE .....	16
SECTION 9 AUTHORIZATION FOR CONTINGENT OR ADDITIONAL SERVICES .....	17
SECTION 10 FIRMS AND INDIVIDUALS PROVIDING SUBCONSULTING SERVICES .....	17
SECTION 11 SATISFACTORY PERFORMANCE .....	17
SECTION 12 RESOLUTION OF DISAGREEMENTS .....	17
SECTION 13 CONSULTANT'S ACCOUNTING RECORDS .....	17
SECTION 14 OWNERSHIP OF PROJECT DOCUMENTS .....	18
SECTION 15 INSURANCE COVERAGE AND INDEMNIFICATION .....	18
SECTION 16 EQUAL EMPLOYMENT OPPORTUNITY CLAUSE FOR CONTRACTS NOT SUBJECT TO EXECUTIVE ORDER 11246 .....	19
SECTION 17 INDEPENDENT CONTRACTOR STATUS AND COMPLIANCE WITH THE IMMIGRATION REFORM AND CONTROL ACT OF 1986 .....	19
SECTION 18 PROHIBITION AGAINST CONTINGENT FEE .....	20
SECTION 19 TRUTH IN NEGOTIATIONS .....	20
SECTION 20 SUCCESSORS AND ASSIGNS .....	20
SECTION 21 INTEREST ON JUDGMENTS .....	20
SECTION 22 TERMINATION OF AGREEMENT .....	20
SECTION 23 AGREEMENT TERM .....	21
SECTION 24 CONFLICT OF INTEREST .....	21
SECTION 25 EXTENT OF AGREEMENT .....	21
SECTION 26 PUBLIC ENTITY CRIMES .....	21
SECTION 27 GOVERNING LAW AND AGREEMENT EXECUTION .....	22

**SECTION 1  
INTENT OF AGREEMENT**

**AGREEMENT FOR PROFESSIONAL ARCHITECTURAL/ENGINEERING SERVICES FOR  
(PROJECT TITLE)**

THIS AGREEMENT, entered into on the \_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_, between PINELLAS COUNTY, a political subdivision of the State of Florida, hereinafter referred to as the COUNTY, represented by its Board of County Commissioners, and \_\_\_\_\_, with offices in \_\_\_\_\_, hereinafter referred to as the CONSULTANT.

WITNESSETH, That:

WHEREAS, the COUNTY intends to \_\_\_\_\_ the  
aforementioned improvements being hereinafter referred to as the PROJECT; and

WHEREAS, the COUNTY desires the CONSULTANT provide PROFESSIONAL  
ARCHITECTURAL/ENGINEERING SERVICES requisite to the development of the PROJECT; and

WHEREAS, the CONSULTANT has expressed the willingness and ability to provide the  
aforementioned Services; and

NOW THEREFORE, the COUNTY and the CONSULTANT, in consideration of the mutual  
covenants hereinafter set forth, agree as follows:

## **SECTION 2 SCOPE OF PROJECT**

### **2.1 PROJECT DESCRIPTION AND PROFESSIONAL REQUIREMENTS**

For the purposes of this Agreement the term PROJECT shall include all areas of proposed improvements, all areas that may reasonably be judged to have an impact on the PROJECT, and all PROJECT development phases and the services and activities attendant thereto. It is not the intent of this Agreement to identify the exact limits or details involved in providing satisfactorily completed PROJECT construction documents. The CONSULTANT shall provide the following professional services to prepare construction plans, specifications, and complete applications for and receive all federal, state, and local permits required for construction of the PROJECT. The PROJECT design shall be based on the following data:

**(Insert complete description of PROJECT and all disciplines required.)**

### **2.2 PROJECT PHASES**

(Note: Phases may be deleted depending upon complexity of PROJECT.)

The CONSULTANT will complete the PROJECT in six (6) phases as described below. Specific services to be provided are described in Section 3.

Phase 1 – Architectural Programming Phase  
Phase 2 – Schematic Design Phase  
Phase 3 – Design Development Phase  
Phase 4 – Construction Documents Phase  
Phase 5 – Bidding Phase  
Phase 6 – Construction Phase

### **2.3 CONSULTING RESPONSIBILITIES**

- A. It is the intention of the COUNTY that the CONSULTANT is held accountable for its work, including checking and review of plans, and that submittals are complete.
- B. The CONSULTANT shall be responsible for the accuracy of the work and shall promptly correct its errors and omissions without additional compensation. Acceptance of the work by the COUNTY will not relieve the CONSULTANT of the responsibility for subsequent correction of any errors and the clarification of any ambiguities.
- C. The CONSULTANT represents that it has secured or will secure, at its own expense, all personnel necessary to complete this Agreement; none of whom shall be employees of or have any contractual relationship with the COUNTY. Primary liaison with the COUNTY will be through the CONSULTANT'S Project Manager. All of the services required hereunder will be performed by the CONSULTANT or under the CONSULTANT'S supervision, and all personnel engaged in the work shall be fully qualified and shall be authorized or permitted under law to perform such services.
- D. The CONSULTANT shall endorse all reports, calculations, contract plans, and survey data. Services shall be prepared under the direction of an engineer registered in the State of Florida and qualified in the required discipline. Products or services performed or checked shall be signed and sealed by the CONSULTANT'S Florida registered engineer.
- E. The CONSULTANT shall be responsible for the preparation of a PROJECT design schedule, which shows a breakdown of all tasks to be performed, and their relationship in achieving the completion of each phase of work. A bar chart schedule showing overall PROJECT time

frames should also be prepared. These schedules must be submitted for COUNTY approval within ten (10) days of the initial PROJECT Notice to Proceed. These schedules will be used to verify CONSULTANT performance in relationship to Fees claimed and to allow the COUNTY'S Project Manager to monitor the CONSULTANT'S efforts. The CONSULTANT shall be responsible for any updates to these schedules and for documenting in writing to the COUNTY any major deviations in the actual versus estimated PROJECT time frames.

- F. The CONSULTANT shall respond, in writing, to all review comments made by the COUNTY, and shall incorporate appropriate design adjustments into the PROJECT, in a timely manner, resulting from the review exchange.

## **2.4 GENERAL DESIGN CONDITIONS**

2.4.1 The CONSULTANT shall coordinate and solicit appropriate input, with the knowledge of the COUNTY.

2.4.2 All design data, plans, and drawings shall be delivered on 3.5" diskette or CD ROM formatted to .DXF or .DWG utilizing AutoCAD Release 14.0 or later; as well as providing reproducible hard copies of plans and drawings. Final plans shall be prepared in ink on double mat mylar sheets of 4 mil thickness. All specifications and other documents shall be delivered on 3.5" high-density floppy diskettes or a CD ROM, Windows 95 format, as well as the reproducible hard copies.

2.4.3 One (1) original and nine (9) copies of all deliverables are required unless specific submittal requirements are specified elsewhere in this Agreement.

2.4.4 The CONSULTANT shall develop acceptable alternates to any and all design recommendations that may be declared unacceptable.

## **2.5 GOVERNING SPECIFICATIONS REGULATIONS AND PERTINENT DOCUMENTS**

The PROJECT shall be designed by the CONSULTANT in accordance with applicable industry standards. The CONSULTANT shall be responsible for utilizing and maintaining current knowledge of any laws, ordinances, codes, rules, regulations, standards, guidelines, special conditions, specifications, or other mandates relevant to the PROJECT or the services to be performed.

# **SECTION 3 SERVICES TO BE FURNISHED BY THE CONSULTANT**

## **3.1 ARCHITECTURAL PROGRAMMING PHASE** (Insert appropriate tasks)

## **3.2 SCHEMATIC DESIGN PHASE**

3.2.1 The CONSULTANT shall obtain and review all user information to ascertain the requirements of the PROJECT, and shall arrive at a mutual understanding of such requirements with the COUNTY.

3.2.2 The CONSULTANT shall prepare and submit a preliminary concept report of the PROJECT, detailed schedule, and general estimate of construction budget requirements for the COUNTY'S review.

3.2.3 Based upon a mutually agreed upon program, schedule, and construction budget requirements, the CONSULTANT shall prepare for acceptance by the COUNTY, schematic design documents illustrating the scale and relationship of the PROJECT components. A minimum of three (3) concepts must be presented.



3.2.4 The CONSULTANT shall prepare and present to the COUNTY a minimum of three (3) alternative master site plan concepts with a recommended alternate.

3.2.5 The CONSULTANT'S final submittal and presentation shall include, but not be limited to, the following:

- a. Total site assessment, drainage and utility study with new building, including access roads and parking areas.
- b. Site plan indicating finish floor elevation(s).
- c. Floor plan(s).
- d. Elevations.
- e. Building sections.
- f. Typical wall sections.
- g. Gross space tabulations.
- h. General discussion, recommendations, and schematic plans for all major systems including structural, mechanical, plumbing, and electrical with consideration of alternate systems.
- i. Preliminary construction cost estimates.
- j. Preliminary vertical circulation plans, if required.

3.2.6 The CONSULTANT'S shall make separate formal presentations during this Phase to the Director of \_\_\_\_\_ or designee, and the Board of County Commissioners, if required.

### 3.3 DESIGN DEVELOPMENT PHASE

Upon review of the Schematic Design Phase submittal and issuance by the COUNTY of a written "Notice to Proceed," the CONSULTANT shall perform the following:

3.3.1 The development by all disciplines of the concept/schematic design chosen by the COUNTY to a level which will determine that the facility can be satisfactorily constructed in all task areas.

3.3.2 The documentation by structural, mechanical, electrical, and other disciplines of the continued development of that discipline's responsibilities to establish the final scope and details for that discipline's work.

3.3.3 Prepare drawings and outline specifications to fix and describe the size and character of the entire PROJECT.

3.3.4 Prepare a statement of probable construction cost.

3.3.5 The CONSULTANT'S presentation shall include, but not be limited to, the following:

- a. Site plan indicating the following:
  1. Finish floor elevations;
  2. Existing elevations with benchmark and survey data;

3. New topographic elevations to include contour interval lines;
  4. Existing and new utilities;
  5. New Structures;
  6. Existing and new roads and accesses;
  7. Parking areas with spaces;
  8. Grading and drainage features.
- b. Building plans
  - c. Building elevations
  - d. Appropriate sections.
  - e. Space tabulations, including a space-by-space comparison of the project program.
  - f. Preliminary structural design.
  - g. Preliminary plans, plumbing fixture schedule, etc., for the mechanical systems and equipment schedule.
  - h. Preliminary plans of the electrical systems.
  - i. Energy analysis report for the mechanical phase.
  - j. Interior Design Services:
    1. Design and present, to the COUNTY, at least two (2) color scheme boards including interior colored elevations;
    2. Select, for approval by the COUNTY, floor finishes, wall finishes, and ceiling treatment;
    3. From the selected finishes noted above, produce and provide on the Contract Documents the required information for incorporation of these items into the basic Contractor's Contract.
  - k. Vertical circulation plans.
  - l. Graphic design/signage plans.

3.3.6 The CONSULTANT shall make formal presentations during this phase to the Director of \_\_\_\_\_ or designee, and the Board of County Commissioners, if required.

### 3.4 CONSTRUCTION DOCUMENTS PHASE

Upon review of the Design Development Phase submittal, and issuance by the COUNTY of a written "Notice to Proceed," the CONSULTANT shall perform the following:  
The CONSULTANT shall prepare final design documents as follows:

3.4.1 Prepare final calculations, construction documents and specifications setting forth in detail each discipline's requirements into a cohesive whole from the COUNTY'S accepted schematic/design development documents.

3.4.2 Compile the PROJECT manual including conditions of the contract, bidding documents and specifications.

3.4.3 Prepare a statement of probable construction cost.

3.4.4 A fixed limit of construction cost shall be established as the approved Statement of Probable Construction Cost following the Construction Documents Phase.

3.4.5 Should construction bids exceed the Statement of Probable Construction Cost, the CONSULTANT, at his own expense, shall make all changes and/or corrections to the design, if necessary, to bring the PROJECT into the approved budget amount discussed above.

The CONSULTANT shall advise the COUNTY of any adjustments to previous preliminary estimates of construction cost indicated by changes in requirements or general market conditions.

The CONSULTANT, in representing the COUNTY assumes the responsibility for filing documents required for the approval of governmental authorities having jurisdiction over the PROJECT. This should be done no later than the ninety percent (90%) completion point of this phase. Plans and technical specifications should be complete and ready for bidding.

### 3.5 BIDDING PHASE

The CONSULTANT shall prepare with the COUNTY'S assistance the necessary bidding information, bidding forms, the conditions of the contract, and the form of agreement between the COUNTY and the Contractor. The CONSULTANT also, shall bear the cost of \_\_\_\_\_ (\_\_\_\_\_) complete sets of documents (plans and specifications), two (2) of which shall be signed and sealed by the CONSULTANT as original record sets for the PROJECT. Each sheet in the two (2) construction plans print sets shall be signed, sealed and dated. The title sheet only of the two (2) specifications sets shall be signed, sealed, and dated. Additionally, any required addenda shall be signed, sealed, and dated.

3.5.1 The CONSULTANT, following the COUNTY'S review of the Construction Documents and of the latest Statement of Probable Construction Cost, shall be available to assist the COUNTY in obtaining bids, and in preparing and awarding construction contracts for each bid package. The CONSULTANT shall assist conducting pre-bid conferences, and shall prepare a Bid Tabulation spreadsheet following receipt of bids.

3.5.2 If the Advertisement for bids has not commenced within sixty (60) days after the CONSULTANT submits the approved Construction Documents to the COUNTY, any fixed limit of Construction Cost established as a condition of this Agreement shall be adjusted to reflect any change in the general level of prices which may have occurred during that period of time in construction industry. The adjustment shall reflect changes between the date of submission of the Construction Documents to the COUNTY and the date on which the Advertisement for Bids occurred.

3.5.3 The CONSULTANT shall prepare any required addenda to construction plans and specifications on the PROJECT during the bidding phase affecting the CONSULTANT'S plans and specifications. The CONSULTANT shall also provide any addenda during the Construction Phase in sufficient quantity to distribute to all necessary parties as determined by the COUNTY. Addenda material shall be placed in envelopes by the CONSULTANT for mailing by the COUNTY. The CONSULTANT shall also furnish certified mail receipt material and prepare mailing labels. The COUNTY shall mail all addenda.

### 3.6 CONSTRUCTION PHASE

All contact and/or communication from the CONSULTANT to the Contractor shall be coordinated with the knowledge of the COUNTY.

#### A. Construction Consultation Services

1. Processing, review, approval and distribution of shop drawings, product data, samples and other submittals required by the Contract Documents.
2. Maintenance of master file of submittals with duplicate for COUNTY.
3. Construction Field Observation Services consisting of visits to the site as frequent as necessary, but not less than once every week, to become generally familiar with the progress and quality of the work and to determine in general if the work is proceeding in accordance with the Contract Documents and prepare related reports and communications. Provide written report of each visit. This field observation requirement shall include any subconsultants at appropriate construction points.
4. Review for comment or approval any and all proposal requests, supplemental drawings and information and change orders.
5. Review for correctness Contractors pay requests for the COUNTY.
6. Prepare, reproduce and distribute supplemental drawings, specifications and interpretations in response to requests for clarification by the Contractor or the COUNTY as required by construction exigencies. Response to any request must be received by the COUNTY within twenty-four (24) hours of request, or the next available working day when the request is prior to a weekend or holiday.
7. Review, upon notice by the Contractor that work is ready for final inspection and acceptance.
8. Notify the COUNTY of any deficiencies found in follow-up reviews.
9. Evaluate all testing results and make recommendations to the COUNTY.
10. Assist in the establishment by the COUNTY of programs of operation and maintenance of the physical plant and equipment.
11. Arrange for and coordinate instructions on operations and maintenance of equipment in conjunction with manufacturer's representatives.
12. Prepare an operation and maintenance manual for the COUNTY'S use.
13. The CONSULTANT shall visit the facility at initial occupancy and at three (3) month, six (6) month and one (1) year after issuance of the Certificate of Substantial Completion. On the facility visit the CONSULTANT shall observe, troubleshoot and assist in the operation of building systems. This shall not relieve the CONSULTANT of other needed visits to the facility should specific issues arise.
14. Assistance in the training of the facility operation and maintenance personnel in proper operations, schedules, procedures and maintenance inventory.
15. Prepare as-built record drawings, based on information furnished by the Contractors including significant changes in the work made during construction. The

CONSULTANT will provide one (1) set of signed and sealed prints and one (1) CADD disk of the as-built record construction documents.

16. Transmit certified as-built record drawings and general data, appropriately identified, to the COUNTY within thirty (30) days following completion of construction.
17. Consult with, and recommend solutions to, the COUNTY during the duration of warranties in connection with inadequate performance of materials, systems, and equipment under warranty.
18. Review facilities or equipment prior to expiration of warranty period(s) to ascertain adequacy of performance, materials, systems and equipment.
19. Document noted defects or deficiencies and assist the COUNTY in preparing instructions to the Contractor for correction of noted defects.
20. The Contractor shall provide the CONSULTANT with all the required project close out material for CONSULTANT'S use in the warranty period services.
21. The Contractor shall have prime responsibility in the warranty period for all services herein. The CONSULTANT shall assist, consult, observe review and document as noted.

**(The section below is optional and should be included if full-time inspection services are desired.)**

**B. Full-Time Construction Contracts Administration Services**

1. The CONSULTANT shall provide full construction contract administration services with the following staff positions on site:

**(Need for the following positions should be negotiated with the CONSULTANT based on the size of the PROJECT.)**

- a. Senior Architect/Construction Administrator;
  - b. One (1) Architectural Inspector;
  - c. One (1) MEP Coordinator and Inspector;
  - d. Field Secretary and Clerk.
2. The CONSULTANT, as representative of the COUNTY during construction, shall advise and consult with the COUNTY and all of the COUNTY'S instructions to the Contractor shall be issued through the CONSULTANT. Through continuous on-site observations of the work in progress and field checks of materials and equipment the CONSULTANT shall endeavor to provide protection for the COUNTY against defects and deficiencies in the work of the Contractor.
  3. Based on such observations at the site and on the Contractor's Application For Payment, the CONSULTANT shall determine the amount owing to the Contractor and shall prepare Pay Requests for such amounts. The issuance of Pay Requests shall constitute a representation by the CONSULTANT to the COUNTY that the Work has progressed to the point indicated; that to the best of the CONSULTANT'S knowledge, information and belief, the quality of the Work is in accordance with the Construction Contract Documents subject to minor deviations from the Construction Contract Documents correctable prior to completion, and to any specific qualifications stated in the Pay Request, and that the

Contractor is entitled to payment in the amount certified. The CONSULTANT shall review claims for extra compensation, or extensions of time from the Contractor, make recommendations to the COUNTY concerning validity, and prepare responses for the COUNTY.

4. The CONSULTANT shall be, in the first instance, the interpreter of the requirements of the Construction Contract Documents. The CONSULTANT shall render opinions on all claims of the COUNTY or Contractor relating to the execution and progress of the Work and on all other matters or questions related thereto. The CONSULTANT'S decisions in matters relating to artistic effect shall be final if consistent with the intent of the Construction Contract Documents.
5. The CONSULTANT shall have authority to reject Work, which does not conform to the Construction Contract Documents. Whenever, in his reasonable opinion, he considers it necessary or advisable to insure the proper implementation of the intent of the Construction Contract Documents, he will have authority to require special inspection or testing of any Work in accordance with the provisions of the Construction Contract Documents whether or not such Work be then fabricated, installed or completed.
6. The CONSULTANT shall review and approve shop drawing, samples, and other submissions of the Contractor for conformance with the design concept of the Project and for compliance with the information given in the Construction Contract Documents.
7. The CONSULTANT shall prepare Change Orders. All Change Orders must be submitted to the COUNTY for review and approval by the Board of County Commissioners before any work covered by such Change Orders can begin.
8. The CONSULTANT shall:
  - a. Review the progress schedule, schedule of Shop Drawing submittals and schedule of values prepared by the Contractor and consult with the COUNTY concerning acceptability; and
  - b. Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
9. The CONSULTANT shall:
  - a. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples, reproductions of original Contract Documents including all Work Directive Changes, Addenda, Change Orders, and Field Orders, additional Drawings issued subsequent to the execution of the Contract. Clarifications and interpretations of the Contract Documents, progress reports, and other PROJECT related documents;
  - b. Keep a diary or log book, recording Contractor hours on the job site, weather conditions, data relative to questions of Work Directive Changes, Change Orders or changed conditions, list of job site visitors, list of job site equipment, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures, and send copies to the COUNTY;
  - c. Record names, addresses and telephone numbers of all Contractors, subcontractors and major suppliers of materials and equipment;

- d. Furnish the COUNTY no less than monthly reports of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and sample submittals;
  - e. Report immediately to the COUNTY upon occurrence of any accident;
  - f. Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel, and that Contractor maintains adequate records thereof, and observe, record and report to the COUNTY appropriate details relative to the test procedures and startups;
  - g. Accompany visiting inspectors representing public or other agencies having jurisdiction over the PROJECT, and record the results of these inspections; and
  - h. During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by the Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to the COUNTY prior to final payment for the Work.
10. The CONSULTANT shall before the issuance of a Certificate of Substantial Completion:
- a. Submit to the Contractor a list of observed items requiring completion or correction;
  - b. Conduct final inspection in the company of the COUNTY, and Contractor and prepare a final list of items to be completed or corrected, and
  - c. Observe that all items on the final list have been completed or corrected and make recommendations to the COUNTY concerning acceptance.
- C. The CONSULTANT shall not: (Applies in all cases/NOTE: Always include)
- 1. Authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by the COUNTY;
  - 2. Undertake any of the responsibilities of the Contractor, subcontractor or Contractor's superintendent;
  - 3. Advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents;
  - 4. Advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work; and
  - 5. Accept Shop Drawing or sample submittals from anyone other than the Contractor.

### 3.7 PROVISIONS RELATED TO ALL PHASES

3.7.1 The CONSULTANT will investigate and confirm in writing to the COUNTY, to the best of the CONSULTANT'S knowledge, conformance with all applicable local public and utility regulations.

3.7.2 The CONSULTANT will coordinate work designed by various disciplines.

3.7.3 The CONSULTANT will furnish check prints for every project phase including five (5) sets at the 50% point of each phase and at every PROJECT phase completion. One (1) set of paper sepias shall be provided to the COUNTY for Owner-provided printing and distribution.

3.7.4 The CONSULTANT shall submit to the COUNTY design notes and computations to document the design conclusions reached during the development of the construction plans.

a. Five (5) copies of the design notes and computations shall be submitted to the COUNTY with the design development review plans. When the plans are submitted for final review, the design notes and computations corrected for any COUNTY comments shall be resubmitted. At the PROJECT completion, a final set of the design notes and computations, properly endorsed by the CONSULTANT, shall be submitted with the record set of plans and tracings.

b. The design notes and calculations shall include, but not be limited to, the following data:

- 1) Design criteria used for the PROJECT.
- 2) Lighting calculations.
- 3) Structural calculations.
- 4) Drainage calculations.
- 5) Acoustical calculations.
- 6) HVAC calculations.
- 7) Calculations as required by provisions of the Florida Energy Conservation Manual (Department of General Services), latest revision.
- 8) Calculations showing probable cost comparisons of various alternatives considered.
- 9) Documentation of decisions reached resulting from meetings, telephone conversations or site visits.
- 10) Other PROJECT-related correspondences as appropriate.

3.7.5 Each set of plans for the PROJECT shall be accurate, legible, complete in design, suitable for bidding purposes and drawn to scales acceptable to the COUNTY. The completed plans shall be furnished on reproducible material and in a format, which is acceptable to the COUNTY.

3.7.6 The CONSULTANT shall make such reviews, visits, attend such meetings and conferences and make such contacts as are necessary for the proper preparation of plans and specifications for the PROJECT.

3.7.7 The COUNTY in no way obligates itself to check the CONSULTANT'S work and further is not responsible for maintaining project schedules.

3.7.8 Other CONSULTANT responsibilities shall be as listed below:

- a. Provide necessary sealed drawings to obtain building permits or any utility permit.
- b. Assist the COUNTY in Contractor claims and/or litigation.
- c. Review the Adequacy and completeness of documents submitted by the Contractor to protect the COUNTY against claims by suppliers or third parties.

3.7.9 The CONSULTANT must be familiar with the intent, thoroughness, safety factors and design assumptions of all structural calculations.

3.7.10 All work prepared and/or submitted shall be reviewed and checked by a CONSULTANT (Architect/Engineer) registered in Florida. All plans shall be signed and sealed by the Professional CONSULTANT in responsible charge.

### 3.8 PERMIT APPLICATIONS AND APPROVALS

3.8.1 The CONSULTANT shall prepare all permit applications, data and drawings required for submittal BY THE COUNTY for approval of local, state and federal agencies.



3.8.2 The CONSULTANT shall, at no additional cost to the COUNTY, make all reasonable and necessary construction plans revisions required to obtain the necessary permit approvals for construction of the PROJECT.

3.8.3 For the purpose of ensuring the timely approval of all permits necessary for the construction of the PROJECT, the CONSULTANT shall schedule the necessary contacts and liaison with all agencies having permit jurisdiction over the PROJECT, and shall furnish, on a timely basis, such plans, data and information as may be necessary to secure approval of the required permits.

### 3.9 COORDINATION WITH UTILITY SERVICES AND AFFECTED PUBLIC AGENCIES

3.9.1 The requirements of the various utility services shall be recognized and properly coordinated with the PROJECT design.

3.9.2 Drainage investigations and drainage design shall be coordinated with any city or drainage district that may be affected by or have an effect on the PROJECT.

## **SECTION 4 SERVICES TO BE FURNISHED BY THE COUNTY**

4.1 The COUNTY shall provide the following for the CONSULTANT'S use and guidance:

- A. Copies of existing maps, existing aerial photographs, as-built construction plans and data pertinent to the PROJECT design, which the COUNTY may have in its possession.
- B. Reproduces of the COUNTY Engineering Department Standard Drawings applicable to the PROJECT.
- C. Sample copies of the COUNTY standard contract documents and specifications.
- D. Preparation of legal (front-end) section of the specifications.

## **SECTION 5 PRESENTATIONS, PUBLIC MEETINGS AND TECHNICAL LIAISON**

The following services shall be provided at no additional cost to the COUNTY:

5.1 Prior to the commencement of design activities, the COUNTY will conduct with the CONSULTANT a pre-design conference for the purpose of discussing issues relative to the PROJECT, plans preparation and submittal procedures and to convey to the CONSULTANT such items provided for under Section 4 as may be required and available at that time.

5.2 The CONSULTANT shall make presentations to the COUNTY'S Director of \_\_\_\_\_ or designee as often as reasonably requested and at any point in the PROJECT development should issues arise which make additional presentations other than those listed elsewhere in this Agreement, in the COUNTY'S best interest.

5.3 The CONSULTANT shall participate in Monthly PROJECT Conferences with COUNTY staff personnel. The meetings will be scheduled by the COUNTY at a location provided by the COUNTY.

5.4 The CONSULTANT shall attend, as technical advisor to the COUNTY all meetings or hearings conducted by permitting agencies or public bodies in connection with any permit required for the

construction of the PROJECT, and shall prepare all presentation aids, documents and data required in connection with such meetings or hearings, and at the discretion of the COUNTY, shall either plead the COUNTY'S case or provide engineering and technical assistance to the COUNTY in its pleading of the case.

5.5 The CONSULTANT shall keep accurate minutes of all meetings and distribute copies to all attending. These meetings shall be set up through the COUNTY and appropriate COUNTY staff shall attend.

## **SECTION 6 PAYMENT GUIDELINES AND CATEGORY OF SERVICES**

### **6.1 BASIC SERVICES**

The services described and provided for under Sections 2, 3 and 4 shall constitute the Basic Services to be performed by the CONSULTANT under this Agreement.

### **6.2 CONTINGENCY SERVICES**

When authorized in writing by the COUNTY'S Director of \_\_\_\_\_ or designee, the CONSULTANT shall furnish services resulting from unforeseen circumstances not anticipated under Basic Services due to minor changes in the PROJECT scope.

Compensation for any Contingency Services assignments shall be negotiated between the COUNTY and the CONSULTANT at the time the need for services becomes known.

### **6.3 ADDITIONAL SERVICES**

When executed by the Board of County Commissioners as an amendment to this Agreement, the CONSULTANT shall provide such additional services as may become necessary because of changes in the Scope of PROJECT. Additional Services shall be classified as any change beyond the Contingency Services upset limit for compensation.

### **6.4 INVOICING**

The CONSULTANT may submit invoices for fees earned on a monthly basis. Such invoicing shall be supported by a Progress Report showing the actual tasks performed and their relationship to the percentage of fee claimed for each phase. Billings within each phase of work shall be for the percentage of work effort completed to date for that phase. The COUNTY shall make payments to the CONSULTANT for work performed in accordance with the Local Government Prompt Payment Act, Section 218.70 et. seq., F.S.

The following services shall be considered reimbursable services and may be filled in full upon their completion and acceptance. The CONSULTANT shall provide copies of supporting receipts/invoices/billing documentation. Self-performed reimbursable work shall be reimbursed at the firm's standard hourly rates for all related services. A breakdown of man hours and billing rates shall be provided with each invoice. An hourly rate sheet is attached (Exhibit A).

- A. Soil Analysis/Geotechnical Investigations.
- B. Contamination Assessments/Hazardous Material Analysis (if required).
- C. Aerial Photography (if required).
- D. Payment of Permit Fees (if required).

- E. Payment of the Public Information Meeting Advertisements, if required.
- F. Payment of the Court Reporter for public meetings, if required.
- G. Printing and Binding Services.

Should an invoiced amount for fees earned appear to exceed the work effort believed to be completed, the COUNTY may, prior to processing of the invoice for payment, require the CONSULTANT to submit satisfactory evidence to support the invoice.

All progress reports and invoices shall be mailed to the attention of \_\_\_\_\_, Director of \_\_\_\_\_.

Invoices not properly prepared (mathematical errors, billing not reflecting actual work done, any signature, etc.) shall be returned to the CONSULTANT for correction.

Fees for contingent or additional services authorized shall be invoiced separately, and shall be due and payable in full upon the presentation of satisfactory evidence that the corresponding services have been performed.

## SECTION 7 COMPENSATION TO THE CONSULTANT

7.1 For the BASIC SERVICES provided for in this Agreement, as defined in Section 3.10, the COUNTY agrees to pay the CONSULTANT as follows:

A Lump Sum Fee of: \_\_\_\_\_ (TYPE AMOUNT UPPER/LOWER NOT  
UNDERScoreD) (INSERT DOLLAR AMOUNT IN PARENTHESIS) for the  
Architectural Programming Phase of the PROJECT.

A Lump Sum Fee of: \_\_\_\_\_ (TYPE AMOUNT UPPER/LOWER NOT  
UNDERScoreD) (INSERT DOLLAR AMOUNT IN PARENTHESIS) for the  
Schematic Design Phase of the PROJECT.

A Lump Sum Fee of: \_\_\_\_\_ (TYPE AMOUNT UPPER/LOWER NOT  
UNDERScoreD) (INSERT DOLLAR AMOUNT IN PARENTHESIS) for the  
Design Development Phase of the PROJECT.

A Lump Sum Fee of: \_\_\_\_\_ (TYPE AMOUNT UPPER/LOWER NOT  
UNDERScoreD) (INSERT DOLLAR AMOUNT IN PARENTHESIS) for the  
Construction Documents Phase and Bidding Phase of the PROJECT.

A Lump Sum Fee of: \_\_\_\_\_ (TYPE AMOUNT UPPER/LOWER NOT  
UNDERScoreD) (INSERT DOLLAR AMOUNT IN PARENTHESIS) for the  
Construction Consultant Services as described in Section 3.6A.

(\*INCLUDE IF NECESSARY)

\*For the services provided for under Section 3.6B, Full-Time Construction Contracts Administration, the COUNTY agrees to pay the CONSULTANT an amount equal to the CONSULTANT'S direct labor costs times a factor of \_\_\_\_\_ for all services rendered by the CONSULTANT'S staff assigned to the job site, up to an amount not to exceed \_\_\_\_\_ (TYPE AMOUNT UPPER/LOWER NOT UNDERScoreD) (INSERT DOLLAR AMOUNT IN PARENTHESIS)

\*Direct labor costs shall mean salaries and wages paid directly to the CONSULTANT'S personnel and does not include indirect payroll related costs or fringe benefits.

The above fees shall constitute the total not to exceed amount of \_\_\_\_\_. (TYPE AMOUNT UPPER/LOWER NO UNDERSCORED) (INSERT DOLLAR AMOUNT IN PARENTHESIS) to the CONSULTANT for the performance of the Basic Services.

7.2 For Basic reimbursable services as listed in Section 6, the COUNTY agrees to reimburse the CONSULTANT for actual costs up to an amount not to exceed \_\_\_\_\_ dollars (\$\_\_\_\_\_).

7.3 For any CONTINGENCY SERVICES performed, the COUNTY agrees to pay the CONSULTANT, a negotiated fee based on the assignment, up to a maximum amount not to exceed \_\_\_\_\_ dollars (\$\_\_\_\_\_ ) for all assignments performed.

7.4 Total agreement amount \_\_\_\_\_ dollars (\$\_\_\_\_\_).

7.5 The compensation rate in Exhibit B shall be adjusted annually on the anniversary date of the AGREEMENT each year, by the percentage increase in the Consumer Price Index (CPI), All Urban Consumers, Not Seasonally Adjusted, from the previous year, over the life of this AGREEMENT. The first CPI escalation increase shall take effect on the first anniversary date of AGREEMENT.

7.6 For any ADDITIONAL SERVICES, the COUNTY agrees to pay the CONSULTANT a negotiated total fee based on the work to be performed as detailed by a written amendment to this Agreement.

7.7 In the event that this Agreement is terminated under the provisions of this contract the total and complete compensation due the CONSULTANT shall be as established by the COUNTY based on the COUNTY'S determination of the percentage of work effort completed to date of termination.

## **SECTION 8 PERFORMANCE SCHEDULE**

Time is of the essence in this Agreement. The CONSULTANT shall plan and execute the performance of all services provided for in this Agreement in such manner as to ensure their proper and timely completion in accordance with the following schedule:

8.1 The services to be rendered by the CONSULTANT shall be commenced upon receipt from the COUNTY of written "NOTICE TO PROCEED."

8.2 The Schematic Design Phase submittal shall be submitted to the COUNTY within \_\_\_\_\_ (TYPE NUMBER UPPER/LOWER NO UNDERSCORE) (INSERT NUMBER IN PARENTHESIS) calendar days of the "NOTICE TO PROCEED."

8.3 The Design Development Phase submittal shall be submitted to the COUNTY within \_\_\_\_\_ (TYPE NUMBER UPPER/LOWER NO UNDERSCORE) (INSERT NUMBER IN PARENTHESIS) from the date of the Design Development Phase "NOTICE TO PROCEED."

8.4 The Construction Documents submittal shall be submitted to the COUNTY within \_\_\_\_\_ (TYPE NUMBER UPPER/LOWER NO UNDERSCORE) (INSERT NUMBER IN PARENTHESIS) the time from the date of Construction Documents "NOTICE TO PROCEED."

8.5 The CONSULTANT shall not be held responsible for delays in the completion of the PROJECT design when the COUNTY causes such delays. The COUNTY reviews related to the above submittals shall not exceed twenty-one (21) days.

**SECTION 9  
AUTHORIZATION FOR CONTINGENT OR ADDITIONAL SERVICES**

9.1 The CONTINGENCY services provided for under this Agreement shall be performed only upon prior written authorization from the Director of \_\_\_\_\_ or designee.

9.2 The ADDITIONAL services provided for under this Agreement shall be performed only upon approval of the Board of County Commissioners.

9.3 The CONSULTANT shall perform no services contemplated to merit compensation beyond that provided for in this Agreement unless such services, and compensation therefore, shall be provided for by appropriate written authorization or amendment(s) to this Agreement.

**SECTION 10  
FIRMS AND INDIVIDUALS PROVIDING SUBCONSULTING SERVICES**

The COUNTY reserves the right to review the qualifications of any and all subconsultants, and to reject any subconsultant in a proper and timely manner, deemed not qualified to perform the services for which it shall have been engaged.

**SECTION 11  
SATISFACTORY PERFORMANCE**

All services to be provided by the CONSULTANT under the provisions of this Agreement, including services to be provided by subcontractors, shall be performed to the reasonable satisfaction of the COUNTY'S Director of \_\_\_\_\_ or designee.

**SECTION 12  
RESOLUTION OF DISAGREEMENTS**

12.1 The COUNTY shall reasonably decide all questions and disputes, of any nature whatsoever, that may arise in the execution and fulfillment of the services provided for under this Agreement.

12.2 The decision of the COUNTY upon all claims, questions, disputes and conflicts shall be final and conclusive, and shall be binding upon all parties to this Agreement, subject to judicial review.

**SECTION 13  
CONSULTANT'S ACCOUNTING RECORDS**

13.1 Records of expenses pertaining to all services performed shall be kept in accordance with generally accepted accounting principles and procedures.

13.2 The CONSULTANT'S records shall be open to inspection and subject to examination, audit, and/or reproduction during normal working hours by the COUNTY'S agent or authorized representative to the extent necessary to adequately permit evaluation and verification of any invoices, payments or claims submitted by the CONSULTANT or any of his payees pursuant to the execution of the Agreement. These records shall include, but not be limited to, accounting records, written policies and procedures, subcontractor files (including proposals of successful and unsuccessful bidders), original estimates, estimating worksheets, correspondence, change order files (including documentation covering negotiated settlements), and any other supporting evidence necessary to substantiate charges related to this Agreement. They shall also include, but not be limited to, those records necessary to evaluate and verify direct and indirect costs (including overhead allocations) as they may apply to costs associated with this Agreement. The COUNTY shall not audit payroll and expense records on task assignments paid by lump sum fee.

13.3 For the purpose of such audits, inspections, examinations and evaluations, the COUNTY'S agent or authorized representative shall have access to said records from the effective date of the Agreement, for the duration of work, and until three (3) years after the date of final payment by the COUNTY to the CONSULTANT pursuant to this Agreement.

13.4 The COUNTY'S agent or authorized representative shall have access to the CONSULTANT'S facilities and all necessary records in order to conduct audits in compliance with this Section. The COUNTY'S agent or authorized representative shall give the CONSULTANT reasonable advance notice of intended inspections, examinations, and/or audits.

#### **SECTION 14 OWNERSHIP OF PROJECT DOCUMENTS**

Upon completion or termination of this Agreement, all records, documents, tracings, plans, specifications, maps, evaluations, reports and other technical data, other than working papers, prepared or developed by the CONSULTANT under this Agreement shall be delivered to and become the property of the COUNTY. The CONSULTANT, at its own expense, may retain copies for its files and internal use. The COUNTY shall not reuse any design plans or specifications to construct another project at the same or a different location without the CONSULTANT'S specific written verification, adaptation or approval.

#### **SECTION 15 INSURANCE COVERAGE AND INDEMNIFICATION**

15.1 The CONSULTANT shall procure, pay for and maintain at least the following insurance coverages and limits. Said insurance shall be evidenced by delivery to the COUNTY of one (1) certificate of insurance executed by the insurers listing coverages and limits, expiration dates and terms of policies and all endorsements whether or not required by the COUNTY, and listing all carriers issuing said policies; and (2) upon request, a certified copy of each policy including all endorsements. The insurance requirements shall remain in effect throughout the term of the Agreement.

15.1.1 Workers' compensation in at least the Limits as required by law; Employers' Liability Insurance of not less than \$100,000 for each accident.

15.1.2 Comprehensive General Liability Insurance including, but not limited to, Independent Contractor, Contractual, Premises-Operations, and Personal Injury covering the liability assumed under indemnification provisions of this Agreement, with limits of liability for personal injury and/or bodily injury, including death of not less than \$1,000,000, each occurrence; and property damage of not less than \$100,000, each occurrence. (Combined Single Limits of not less than \$500,000, each occurrence, will be acceptable unless otherwise stated). Coverage shall be on an "occurrence" basis, and the policy shall include Broad Form Property Damage coverage of not less than \$50,000 per occurrence, unless otherwise stated by exception herein.

15.1.3 Professional Liability Insurance (including Errors and Omissions) with minimum limits of \$1,000,000 per occurrence, if occurrence form is available; or claims made form with "tail coverage" extending three (3) years beyond completion and acceptance of the PROJECT with proof of "tail coverage" to be submitted with the invoice for final payment. In lieu of "tail coverage," CONSULTANT may submit annually to the COUNTY a current Certificate of Insurance proving claims made insurance remains in force throughout the same three (3) year period.

15.1.4 Comprehensive Automobile and Truck liability covering owned, hired and non-owned vehicles with minimum limits of \$500,000 each occurrence for bodily injury including death, and property damage of not less than \$100,000, each occurrence. (Combined Single Limits of not less than \$500,000 each occurrence, will be acceptable unless otherwise stated). Coverage shall be on an "occurrence" basis, such insurance to include coverage for loading and unloading hazards.

15.2 Each insurance policy shall include the following conditions by endorsement to the policy:

15.2.1 Each policy shall require that thirty (30) days prior to expiration, cancellation, non-renewal or any material change in coverages or limits, a notice thereof shall be given to COUNTY by certified mail to: Director of \_\_\_\_\_, and the Director of Risk Management at 400 South Ft. Harrison Avenue, Clearwater, FL, 33756. CONSULTANT shall also notify COUNTY, in a like manner, within twenty-four (24) hours after receipt, of any notices of expiration, cancellation, non-renewal or material change in coverage received by said CONSULTANT from its insurer; and nothing contained herein shall absolve CONSULTANT of this requirement to provide notice.

15.2.2 Companies issuing the insurance policy, or policies, shall have no recourse against COUNTY for payment of premiums or assessments for any deductibles which all are at the sole responsibility and risk of CONSULTANT.

15.2.3 The term COUNTY in this Section 15 shall include the Board of County Commissioners, all its members, its officers, and employees while acting on behalf of Pinellas County.

15.2.4 Pinellas County shall be endorsed to the required policy or policies as an additional insured, exclusive of Professional Liability Insurance and Workers' Compensation Insurance.

15.2.5 The policy clause "Other Insurance" shall not apply to any insurance coverage currently held by COUNTY to any such future coverage, or to COUNTY'S Self-Insured Retentions of whatever nature.

The CONSULTANT hereby waives subrogation rights for loss or damage against the COUNTY.

15.3 To the maximum extent permitted by Florida law, the CONSULTANT shall defend, indemnify and hold harmless the COUNTY, its officers and employees from any and all liabilities, claims, damages, penalties, demands, judgments, actions, proceedings, losses or costs, including, but not limited to, reasonable attorneys' fees and paralegals' fees, or by, or on account of, any claim or amounts recovered under the "Workers' Compensation Law" or of any other laws, by-laws, ordinance, order or decree, except only such injury or damage as shall have been occasioned by the sole negligence of the COUNTY, whether resulting from any claimed breach of this Agreement by the CONSULTANT or from personal injury, property damage, direct or consequential damages, or economic loss, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the CONSULTANT or anyone employed or utilized by the CONSULTANT in the performance of this Agreement.

The duty to defend under this Article is independent and separate from the duty to indemnify, and the duty to defend exists regardless of any ultimate liability of the CONSULTANT, the COUNTY and any indemnified party. The duty to defend arises immediately upon presentation of a claim by any party and written notice of such claim being provided to the CONSULTANT. The CONSULTANT'S obligation to indemnify and defend under this Article will survive the expiration or earlier termination of this Agreement until it is determined by final judgment that an action against the COUNTY or an indemnified party for the matter indemnified hereunder is fully and finally barred by the applicable statute of limitations.

#### **SECTION 16 EQUAL EMPLOYMENT OPPORTUNITY CLAUSE FOR CONTRACTS NOT SUBJECT TO EXECUTIVE ORDER 11246**

In carrying out the contract, the CONSULTANT shall not discriminate against employee or applicant for employment because of race, color, religion, sex or national origin.

#### **SECTION 17 INDEPENDENT CONTRACTOR STATUS AND COMPLIANCE WITH THE IMMIGRATION REFORM AND CONTROL ACT OF 1986**

CONSULTANT acknowledges that it is functioning as an independent contractor in performing under the terms of this Agreement, and it is not acting as an employee of COUNTY. CONSULTANT acknowledges that it is responsible for complying with the provisions of the Immigration Reform and Control Act of 1986, located at 8 U.S.C. Section 1324, et seq., and regulations relating thereto. Failure to comply with the above provisions of this contract shall be considered a material breach and shall be grounds for immediate termination of the contract.

#### **SECTION 18 PROHIBITION AGAINST CONTINGENT FEE**

The CONSULTANT warrants that he has not employed or retained any company or person, other than a bona fide employee working solely for the CONSULTANT to solicit or secure this Agreement, and that he has not paid or agreed to pay any person, company, corporation, individual, or firm other than a bona fide employee working solely for the CONSULTANT, any fee, commission, percentage, gift or any other consideration, contingent upon or resulting from the award or making of this Agreement.

#### **SECTION 19 TRUTH IN NEGOTIATIONS**

By execution of this Agreement, the CONSULTANT certifies to truth-in-negotiations and that wage rates and other factual unit costs supporting the compensation are accurate, complete and current at the time of contracting. Further, the original contract amount and any additions thereto shall be adjusted to exclude any significant sums where the COUNTY determines the contract price was increased due to inaccurate, incomplete or non-current wage rates and other factual unit costs. Such adjustments must be made within one (1) year following the end of the contract.

#### **SECTION 20 SUCCESSORS AND ASSIGNS**

The CONSULTANT shall not assign, sublet, or transfer his interest in this Agreement without the written consent of the COUNTY.

#### **SECTION 21 INTEREST ON JUDGMENTS**

In the event of any disputes between the parties to this Agreement, including without limitation thereto, their assignees and/or assigns, arising out of or relating in any way to this Agreement, which results in litigation and a subsequent judgment, award or decree against either party, it is agreed that any entitlement to post judgment interest, to either party and/or their attorneys, shall be fixed by the proper court at the rate of five percent (5%), per annum, simple interest. Under no circumstances shall either party be entitled to pre-judgment interest. The parties expressly acknowledge and, to the extent allowed by law, hereby opt out of any provision of federal or state statute not in agreement with this paragraph.

#### **SECTION 22 TERMINATION OF AGREEMENT**

22.1 The COUNTY reserves the right to cancel this Agreement, without cause, by giving thirty (30) days prior written notice to the CONSULTANT of the intention to cancel. Failure of the CONSULTANT to fulfill or abide by any of the terms or conditions specified shall be considered a material breach of contract and shall be cause for immediate termination of the contract at the discretion of COUNTY. Alternatively, at the COUNTY'S discretion, the COUNTY may provide to CONSULTANT thirty (30) days to cure the breach. Where notice of breach and opportunity to cure is given, and CONSULTANT fails to cure the breach within the time provided for cure, COUNTY reserves the right to treat the notice of breach as notice of intent to cancel the Agreement for convenience.



22.2 If COUNTY terminates the Agreement for convenience, other than where the CONSULTANT breaches the Agreement, the CONSULTANT'S recovery against the COUNTY shall be limited to that portion of the CONSULTANT'S compensation earned through date of termination, together with any costs reasonably incurred by the CONSULTANT that are directly attributable to the termination. The CONSULTANT shall not be entitled to any further recovery against the COUNTY, including but not limited to anticipated fees or profit on work not required to be performed.

22.3 Upon termination, the CONSULTANT shall deliver to the COUNTY all original papers, records, documents, drawings, models, and other material set forth and described in this Agreement.

22.4 In the event that conditions arise, such as lack of available funds, which in the COUNTY'S opinion make it advisable and in the public interest to terminate this Agreement, it may do so upon written notice.

### **SECTION 23 AGREEMENT TERM**

This Agreement will become effective on the date of execution first written above and shall remain in effect for \_\_\_\_\_ years, unless terminated at an earlier date under other provisions of this Agreement, or unless extended for a longer term by amendment.

### **SECTION 24 CONFLICT OF INTEREST**

24.1 By accepting award of this Contract, the CONSULTANT, which shall include its directors, officers and employees, represents that it presently has no interest in and shall acquire no interest in any business or activity which would conflict in any manner with the performance of services required hereunder, including as described in the CONSULTANT'S own professional ethical requirements. An interest in a business or activity which shall be deemed a conflict includes but is not limited to direct financial interest in any of the material and equipment manufacturers suppliers, distributors, or contractors who will be eligible to supply material and equipment for the PROJECT for which the CONSULTANT is furnishing its services required hereunder.

24.2 If, in the sole discretion of the County Administrator or designee, a conflict of interest is deemed to exist or arise during the term of the contract, the County Administrator or designee may cancel this contract, effective upon the date so stated in the Written Notice of Cancellation, without penalty to the COUNTY.

### **SECTION 25 EXTENT OF AGREEMENT**

This Agreement represents, together with all Exhibits, the entire written Agreement between the COUNTY and the CONSULTANT and may be amended only by written instrument signed by both the COUNTY and the CONSULTANT.

### **SECTION 26 PUBLIC ENTITY CRIMES**

The CONSULTANT is directed to the Florida Public Entity Crimes Act, Section 287.133, Florida Statutes, specifically section 2(a), and the COUNTY'S requirement that the CONSULTANT comply with it in all respects prior to and during the term of the Contract.

**SECTION 27**  
**GOVERNING LAW AND AGREEMENT EXECUTION**

This Agreement shall be governed by the laws of the State of Florida.

IN WITNESS WHEREOF, the parties herein have executed this Agreement as of the day and year first written above.

Firm Name

PINELLAS COUNTY, by and through its Board of  
County Commissioners

By: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_ Date: \_\_\_\_\_

By: \_\_\_\_\_  
Chairman Date: \_\_\_\_\_

ATTEST:

ATTEST:  
Ken Burke, Clerk of the Circuit Court

By: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_ Date: \_\_\_\_\_

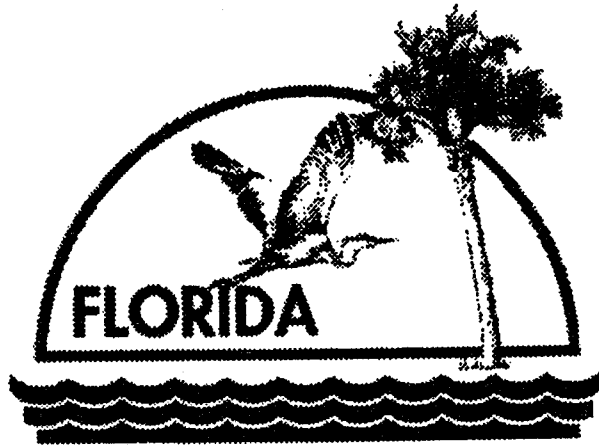
By: \_\_\_\_\_  
Deputy Clerk Date: \_\_\_\_\_

(CORPORATE SEAL)

APPROVAL AS TO FORM:

By: \_\_\_\_\_  
Office of the County Attorney

**PRELIMINARY ASSESSMENT  
REPORT  
CITY OF LARGO LANDFILL  
PINELLAS COUNTY, FLORIDA  
FL0002451383**



**Florida Department of Environmental Protection**

**Division of Waste Management  
Bureau of Waste Clean-up  
Site Screening Superfund Subsection**

**A. James McCarthy Jr.  
Professional Geologist I  
September 30, 1998**

**Date:** 9/30/98

**Prepared by:**

A. James McCarthy Jr., P.G.  
FDEP

**Site:**

City of Largo Landfill  
South of intersection of East Bay Drive (SR686) and Highland Avenue  
Largo, Pinellas County, Florida  
EPA ID No: FL0002451383

## **1.0 Introduction**

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Re-authorization Act of 1986 (SARA), the Florida Department of Environmental Protection, Division of Waste Management, Site Screening Superfund Subsection conducted a Preliminary Assessment (PA) for the City of Largo Landfill site in Largo, Pinellas County, Florida. The purpose of this investigation was to assess the threat posed to human health and the environment, and to determine the need for additional investigation under CERCLA/SARA or other action. The scope of the investigation included a review of available file information and a comprehensive target survey.

## **2.0 Site Background**

### **2.1 Location**

The abandoned City of Largo Landfill is located south of the intersection of East Bay Drive (aka: SR686) and Highland Avenue, Largo, Pinellas County, Florida. The coordinates for the site are Latitude 27° 54' 47" North and Longitude 82° 46' 37" West in the SW 1/4 of Section 35, Township 29 South, Range 15 East [1,31,32,34,38] (Figures 1,2,3). From downtown Largo (intersection of E. Bay Drive & Missouri Ave.) head east 0.8 mile on East Bay Drive to the intersection of Highland Ave. The former landfill is located south of the Highland Ave. and E. Bay Drive intersection. [1,31,32,34,38] (Figures 1,2,3,4).

### **2.2 Site Description**

The former City of Largo Landfill occupies approximately 60 acres. Based on the available information, landfill activities commenced in the northern third of the site. The majority of the site is undeveloped. The site is reportedly overgrown with trees and weeds. Elevations in the filled portions of the landfill range from 4 to 10 feet above mean sea level (msl). The Long Bayou drainage canal bisects the landfill. This canal continues south and discharges

into Lake Seminole, located 1.8 miles south of the site. A Florida Power Corporation (FPC) substation and a vacant bank building (formerly National Bank) exists along the eastern and northeastern edge of the site, respectively. The bank was constructed in 1983-84. The Missing Links Driving Range is located between the FPC substation and the site. Portions of the Driving Range may actually be located on a previously landfilled area of the site. The site area is a mix of residential, industrial and commercial properties. Commercial properties are present north of East Bay Drive. The Lincolnshire Mobile Home Park exits south of the site. A small lake borders the southwestern edge of the site. Additional residential areas exist just beyond the lake [1,31,32,34,36,38,39,40,43] (Figures 1,2,3,4 ).

### 2.3. Local Climate

Pinellas County has a humid, subtropical climate. The mean annual temperature in the County is approximately 72° F. The mean annual rainfall in the St. Petersburg area averages about 55 inches. More than 50% of the annual rainfall occurs during the area's rainy season (June to September). The summer wet season precipitation is primarily a result of convective thunderstorms, tropical depressions and/or hurricanes. The Net Precipitation and 2-year, 24 hour rainfall values for the North Port area are approximately 3 and 5 inches, respectively. The majority of the site is located within a 100-year floodplain. However, two areas located in the northeast and southwest portions of the site are located in an area of minimal flooding [5,6,7,8,19,30].

## 3.0 Site History

### 3.1 Site Ownership

The landfill was operated by the City of Largo. The City of Largo still owns portions of the site. These include areas in the northwest, southwest and eastern portions of the site. Winn Dixie, Inc. owns a nine acre parcel in the northeast corner of the site. This is the planned location for the Winn Dixie Marketplace. In 1977, the Southwest Florida Water Management District (SWFWMD) purchased 70 acres from John S. Taylor for a flood control project. This area includes the Long Bayou Drainage ditch corridor and central portions of the site [31,43].

### 3.2. Operational History and Waste Characteristics

Based on the available file information, this site was used for agricultural practices from the mid-1950's to early 1960's. The landfill reportedly accepted residential, commercial and industrial waste from the early 1960's to the late 1970's. The City reportedly closed the landfill in January 1981. Approximately 60 acres were utilized for landfilling at the site. It has been reported that landfill waste was disposed of into a pond and wetland area of the site. Both the trench and high rise method of waste disposal were reportedly utilized at the site. The landfill cells, which were unlined, were reported to be 10 feet in depth. However, former City employees report that waste was disposed to depths of 40 feet.

Based on the available information, landfill activities commenced in the northern third of the site. The Winn Dixie Stores, Inc. currently has plans to construct a Winn Dixie Market Store on the northeastern portion of the site [31,34,36,38,39,43] (Figures 1,3,4).

### 3.3 Regulatory/Permitting History

It should be noted that landfilling activities at this site predated any permit activities [31,34,41]. On December 19, 1974, the Florida Department of Pollution Control issued a permit (SO52-0053) to the City of Largo to operate Solid Waste Resource Recovery and Management Facility at this site. This permit was renewed by the Florida Department of Environmental Regulation (FDER) in August 1977 (SO52-0053A) and October 1979 (SO52-22437). The last permit renewal expired in 1984 [28,31,34,38,39].

In early 1987, the FDER Southwest District discovered that the landfill was being used for the disposal of high water content, dredge spoil. The District was concerned about any potential breaches in the fill cover. Based on these concerns, dredge spoil was subsequently disposed of at another site for soil spreading. In May 28, 1987, the District requested assistance from the FDER Groundwater Section Operation Response Team (ORT) to conduct a site assessment at the former Largo Landfill. This request was based on concerns for the integrity of the fill cover and the elevated levels of metals found during past groundwater and surface water sampling activities [32,33].

FDER ORT approved the District request on June 11, 1987. However, Pinellas County subsequently took over responsibility for the Landfill and the ORT was asked to cease any future assessment activities at the site [32,33].

Between 1993 and 1997, a number of subsurface investigations and Phase II environmental assessments were conducted at the site. The majority of these investigations focused on the northeast portion of the site. This area includes the proposed location for the Winn Dixie Market, the abandoned bank building and an area near the Driving Range. A number of monitoring wells were installed as a result of these investigations [38]. Please refer to Section 3.3 for more information pertaining to these investigations.

In May 1996, a Phase 1 Environmental Site Assessment was conducted by WRAGG Environmental Inc. of the northeastern portion of the site. Landfilling of solid waste in this area was confirmed. In addition, asbestos containing materials were identified within the abandoned bank building. Since the building was slated for demolition, an Asbestos Demolition Survey was subsequently recommended. A dry cleaner (Highlands Cleaners and Laundry Facility) located north of the site, was identified as possibly impacting the investigated area [38,39] (Figure 4).

On November 6, 1997, a set of Final Construction Plans for the Winn-Dixie Marketplace was submitted to the Florida Department of Environmental Protection (FDEP; formerly FDER). These plans were subsequently revised on February 17, 1998. The plans included: engineering drawings of the site layout, landscaping, irrigation, parking, drainage, water

and sewer lines, detention pond and lift station. A number of deficiencies were noted in the plan. These deficiencies included: insufficient information regarding the removal and destination of excavated solid waste, additional groundwater monitoring requirements and additional details regarding the proposed stormwater pond. On June 26, 1998, FDEP informed Winn Dixie's consultant (Lloveras, Baur and Stevens) of the Construction Plan's deficiencies [41].

On June 22, 1998, an attorney representing a nearby property owner sent a letter to the FDEP Site Screening Superfund subsection regarding the City of Largo Landfill. The letter expressed concerns regarding groundwater contamination and for leachate discharging into nearby surface waters. These concerns were supported by file materials including assessment reports and photographs [41]. On July 17, 1998, FDEP completed a Checklist for CERCLA Site Discovery for the City of Largo Landfill. Based on the available information and the proximity of drinking water wells and surface water bodies, a CERCLA Preliminary Assessment (PA) was recommended for this site [42].

### 3.4 Previous Site Investigations, Sampling and Analysis

In February 1978, groundwater samples collected from the three existing landfill monitor wells were found to contain elevated levels of chromium and lead. Surface water samples, presumably collected from Long Bayou canal, also contained elevated levels of lead [32].

Following closure of the landfill, the three existing monitor wells were sampled for nitrate, chemical oxygen demand (COD) and conductivity. These sampling activities continued until April 1982. The COD and conductivity values in the two downgradient monitor wells were significantly higher than those of the background monitor well sample [32]. The analytical results from the early sampling episodes are not present in the site file.

Phase II Environmental Assessments were conducted on the bank portion of the site between 1993 and 1995. These results were briefly summarized in a later Environmental Assessment report [38]. Elevated levels of acetone, benzene, lead and mercury were detected in groundwater samples above State of Florida Maximum Contaminant Levels (MCLs). Low levels of acetone, methylene chloride and xylenes (total) were detected in the soil samples. In addition, the possible presence of methane gas was noted in several of the soil borings [38]. A Phase II Environmental Assessment was conducted over the northeastern portion of the site in 1994. The investigation determined that solid waste had been landfilled in this portion of the site.

Elevated levels of methane gas and/or other volatile gases were detected across the area. Chlorobenzene, 1,4-dichlorobenzene, naphthalene, isopropyl benzene, dichlorodifluoromethane and several metals were detected at low concentrations in area groundwater. The presence of metals were attributed to the high turbidity of the water samples. The report concluded that groundwater was not significantly impacted by landfilling activities [38].

Between July 29 and August 14, 1996, WRAGG Environmental conducted a Phase II Environmental Assessment of the area of the proposed Winn Dixie Marketplace (northeastern portion of site). This work included: soil borings with volatile and methane gas screening, installation of three monitor wells and sampling and analysis of the existing (two wells) and new monitor wells. A brief summary of these results follows. The complete results of this investigation are presented in the WRAGG Phase II Environmental Assessment Report (EAR) [39] (Figure 5).

Soil borings were conducted from a grid pattern in order to determine the extent of landfilling activities. Soil samples were generally collected at three depth intervals within a grid pattern. Soil samples were collected from 29 locations at depth intervals of 0 - 2 feet, 2 - 4 feet and 4 - 5.5 feet. The samples were subsequently screened for volatile and methane gases using an organic vapor analyzer (OVA) with a flame ionization detector (FID). A charcoal filter was used to determine the possible presence of methane. The results indicated that solid waste existed above the water table along the central and southwestern portion of the study area. This waste ranged from 1.5 to 7 feet in depth. Only small amounts of solid waste were found above the water table in the eastern section of the study area. However, elevated levels of methane were detected over the east-central, southern and northwest portions of the study area [39] (Figure 5).

Based on the results of the soil boring study, three new monitor wells (MW-5, MW-6 & MW-7) were installed within the study area. The wells were constructed of two inch PVC and were 12 feet in depth (2 feet casing/10 foot screen). Groundwater samples collected from the existing (MW-SW and MW-4) and new monitor wells were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, BOD, COD, turbidity, phenols, total recoverable petroleum hydrocarbons (TRPHs) and the eight RCRA metals (dissolved). Elevated levels of organic and metal contaminants were detected in the well samples. The contaminants included (highest levels/monitor well #): chlorobenzene (14 micrograms per liter [ug/l]/MW-6), 1,4-dichlorobenzene (5.8 ug/l/MW-6), naphthalene (1.4 ug/l/MW-5), ammonia (15 milligrams per liter [mg/l]/MW-6), chromium (250 ug/l/MW-SW) and lead (250 ug/l/MW-SW). The levels of lead and chromium exceeded both the federal and state maximum contaminant levels (MCLs) for those contaminants [25,26,39] (Figure 5).

The Phase II EAR recommended additional monitoring of volatile gases (including methane). In addition, the report recommended resampling monitor well MW-SW for metals utilizing quiescent sampling techniques. This well had indicated elevated levels of lead and chromium. The EAR concluded that, with modifications in design, construction activities would not be severely impacted by past landfilling activities.

On December 27, 1996, a Nettles & Associates representative relayed to FDEP the results of their assessment of the nearby Golf Driving range. The owners of the Driving Range wanted to purchase some additional land adjacent to the landfill. Strong pesticide odors (i.e. Malathion) were noted during installation and sampling of a monitor well located on that adjacent land. In addition, some solid waste (putrid rag) was brought up on one of the



auger flights. On May 7, 1997, Nettles and Associates relayed the groundwater sample results. The sample was found to contain: butyl benzene (2.9 ug/l), chlorobenzene (9.6 ug/l) 1,2 dichlorobenzene (0.52 ug/l), 1,4-dichlorobenzene (trace), bis (2-ethyl hexyl) phthalate (18 ug/l) and naphthalene (6 ug/l). Based on the results of the investigation, Nettles & Associates advised the Driving Range not to purchase the property [35,37].

In April 1997, Geoscience & Materials Engineers, Inc. conducted a soils exploration study of the proposed Winn Dixie Marketplace (northeastern portion of site). This study was to assist in foundation recommendations for the proposed Winn Dixie store. A brief summary of these results follows. The complete results of this investigation are presented in the Geoscience & Materials Engineers, Inc. Report of Subsurface Soils Exploration and Foundation Recommendations [36]. Twenty-four soil borings were conducted in the study area. Borings B-1 to B-6 were conducted in the approximate location of the proposed Winn Dixie building. The remaining borings (A-1 to A-18) were in the areas proposed for the parking lot and retention pond (Figure 6). Boring depths varied from 2 feet (Boring A-15) to 36.5 feet (Boring B-1). The borings were conducted using either a drill rig equipped with a spilt spoon sampler (Borings B-1 to B-6) or a hand auger (Boring A-1 to A-18). Landfilling debris (i.e. glass fragments, plastic, metal filings and newspaper) were encountered in many of the borings. However, the report recommended that with proper compaction (proof rolling process) and fill, the Winn Dixie store could be constructed [36] (Figure 6)

Between May 22 to 27, 1997, EE & G conducted a limited Phase II Subsurface Investigation at the area of the proposed Winn Dixie Marketplace (northeastern portion of site). This investigation also included an Asbestos Demolition Survey of the abandoned bank building. The subsurface investigation included a quantitative soil gas survey and sampling (and subsequent analysis) of four existing on-site monitor wells. A brief summary of these results follows. The complete results of this investigation are presented in the EE & G Limited Phase II Subsurface Investigation and Asbestos Demolition Survey report [38] (Figure 6).

The quantitative soil gas survey was broken into a VOC/SVOC survey and methane survey. The VOC/SVOC survey involved the deployment of six soil gas cartridges. The cartridges were placed in the soil in the areas of historically high methane readings. The cartridges were retrieved after 72 hours and sent to a laboratory for analysis. The cartridges were subsequently analyzed for VOCs and SVOCs. Six methane probes were also installed. Methane readings were conducted every 3 hours over a 12 hour period [38] (Figure 6, Table 2). The VOC/SVOC contaminants included (highest levels/Sample #): acetone (3.8 nanograms per square meter per minute [ $\text{ng}/\text{m}^2/\text{min}$ ]/Sample#5), benzene (1.1  $\text{ng}/\text{m}^2/\text{min}$ ./Sample #5), benzoic acid (0.8  $\text{ng}/\text{m}^2/\text{min}$ /Sample#5), 4-chloroaniline (1.5  $\text{ng}/\text{m}^2/\text{min}$ ./Sample# 3), 4-methyl-2-pentanone (1.1  $\text{ng}/\text{m}^2/\text{min}$ ./Sample# 3), toluene (2.7  $\text{ng}/\text{m}^2/\text{min}$ ./Sample# 3) and vinyl acetate (1.2  $\text{ng}/\text{m}^2/\text{min}$ ./Sample # 2A). It should be noted that the acetone readings may be invalid due to its presence in a method blank. No significant methane levels were detected during the methane survey [38] (Figure 6).

Groundwater samples were collected from existing monitor wells MW-2, MW-4, MW-6 & MW-7. The samples were subsequently analyzed for Environmental Protection Agency (EPA) Priority Pollutant organics (EPA Methods 8240/8270), pesticides/PCBs (EPA Method 8080), and Priority Pollutant metals. Elevated levels of metals were detected in the samples. The metals detected included (highest levels/monitor well #): cadmium (7 ug/l/MW-7), lead (7.6 ug/l/MW-7), selenium (960 ug/l/MW-6) and zinc (50 ug/l/MW-6). The cadmium and selenium concentrations exceeded both the federal and state MCLs for those contaminants. No VOC, SVOC, pesticide or PCB compounds were detected. The elevated metal concentrations were attributed to sample turbidity (suspended solids) and/or isolated small pockets of contamination. Based on the investigation results, EE & G recommended no further assessment activities at the site [25,26,38] (Figure 6, Table 2).

In October 1997, Environmental Research & Design, Inc. (ERD) completed the Largo Regional Stormwater Treatment Facility Evaluation report. The report was prepared for the Southwest Florida Water Management District (SWFWMD) under the Surface Water Improvement (SWIM) program. The report assessed the alternatives for a regional stormwater treatment facility in the general area of the old City of Largo Landfill. A brief summary of these results follows. The complete results of this investigation are presented in the ERD report [43]. Between April and June 1997, stormwater and baseflow samples were collected at three locations near the landfill. In addition, groundwater samples were collected from test pits excavated within the old landfill (Figure 8). These samples were collected to determine whether the landfill was impacting nearby surface waters. A subsurface soil exploration program was also conducted at the project site [43].

Two of the surface water sample locations (Sites 1 & 2) were situated in the Long Bayou drainage canal which bisects the old landfill. The other location, Site 3, was located in the Country Club Outfall Canal which is situated east of the landfill. The surface water samples were analyzed for general inorganics, metals, VOCs and SVOCs. No organic compounds were detected in any of the baseflow or stormwater runoff surface water samples. The heavy metal concentrations detected in the samples were generally at similar low levels. Elevated levels of ammonia, dissolved organic nitrogen and particulate nitrogen were detected in the Site 2 baseflow water samples. Site 2 was located in the Long Bayou drainage canal (Main Channel) at the southeastern corner of the landfill. The Site 2 nitrogen species levels were significantly higher than those in the Site 1 water sample. The Site 1 samples were collected upstream of the Site 2 samples immediately south of East Bay Drive. In addition, the alkalinity and specific conductivity values for the stormwater Site 2 samples were substantially higher than the stormwater samples from Site 1. The elevated levels detected in the Site 2 baseflow and stormwater samples may be attributable to landfill leachate [43,44].

As part of the ERD study, the City of Largo excavated approximately 10 test pits in and around the former landfill area. These pits were excavated on May 4, 1997 and showed evidence of sanitary landfill materials to the full depths of the pits (15 feet). ERD subsequently collected groundwater samples from the test pits for analysis. Elevated conductivity (1,763  $\mu$ mho/cm), ammonia (108,909 ug/l), alkalinity 1,273 mg/l and total

nitrogen (118,634 ug/l) values were detected in the pit samples. In addition, a number of organic compounds were detected. The organic contaminants included: acetone (36.5 ug/l), methyl ethyl ketone (8.8 ug/l), chlorobenzene (8.1 ug/l), 1,4-dichlorobenzene (2.9 ug/l) and dichlorodifluoromethane (2.2 ug/l).

In conjunction with the sampling activities, Ardaman & Associates, Inc. conducted a preliminary subsurface soil exploration program at the project site. The purpose of the subsurface investigation was for soil classification determination and to assist in the selection of the proper design alternative for the stormwater treatment facility. Soil borings were conducted in the landfill areas (six mechanical auger borings), upland areas (three mechanical auger borings) and wetlands (two hand auger borings). Landfill material was detected in three (AB-2, AB-3 & AB-4) of the landfill borings [43].

#### **4.0 Ground-Water Pathway**

##### **4.1 Hydrogeologic Setting**

This site is located on the Level Lowlands of the Gulf Coastal Lowlands Physiographic Province. This area also consists of various karst terrain features including: sinkholes (predominantly cover-collapse) and sinkhole lakes. Three hydrostratigraphic units, the surficial aquifer system, intermediate aquifer system/confining unit and the Floridan aquifer system, exist in the site area [7,8,9,10,11,12].

The surficial aquifer system generally consists of fine to medium grained quartz sand and shelly sand. These deposits grade downward to sandy clay, marl and some interbedded clay. These sediments are Pleistocene to possibly Pliocene age. Organic material and silt commonly form a hardpan layer 5 to 10 feet below land surface (bls). This hardpan acts as a semi-confining bed that restricts the vertical movement of water. A gray to white, tan, phosphatic limestone forms the base of the aquifer in some portions of Pinellas County. In the Clearwater-Dunedin area, an organic rich, dark-brown to black, very fine grained sand occurs near the base of the aquifer system. The surficial aquifer exists under unconfined conditions and the water-table is found generally less than 5 feet bls in the County. However, the water table may be more than 10 feet bls in topographically high, well drained areas. The saturated thickness of the surficial aquifer in the County averages about 30 feet throughout most of the County. The aquifer ranges in thickness from approximately 40 feet along the Pinellas Ridge to more than 80 feet in the western part of St. Petersburg. Recharge to the surficial aquifer is primarily from local rainfall. The surficial aquifer is used primarily for lawn irrigation use and is of limited use for domestic purposes. Small diameter wells open to the aquifer yield between 5 to 30 gallons per minute. The water from this aquifer generally contains high levels of iron which results in staining of fixtures and utensils [7,8,9,12,13].

Underlying the surficial aquifer system are the Middle and Upper Miocene Deposits, the lower Miocene age Arcadia Formation (Fm) and the Tampa Member of the Arcadia Fm. The Arcadia Fm and the Tampa Member comprise the Hawthorn Group in Pinellas

County. These Miocene age deposits jointly form the intermediate aquifer system/confining unit in Pinellas County. Low permeability portions of the upper Tampa Member of the Arcadia Fm. form the base of the intermediate aquifer system/confining unit [7,8,9,12,13].

The Middle and Upper Miocene Deposits, also referred to as the Alachua Formation (Fm), consist predominantly of blue to gray clay, fine-grained sandstone and weathered lumps of limestone. These deposits are generally less than 50 feet thick. This unit is limited in lateral extent being present only between Clearwater and Palm Harbor. These deposits do not yield significant quantities of water due to their large clay content. The Arcadia Fm is composed predominantly of limestone and dolostone with various amounts of sand, clay and phosphate grains. Thin beds of quartz sand and clay are dispersed throughout the Arcadia Fm. The Arcadia Fm is generally present in the southern part of the county and thins to the north. The Arcadia Fm pinches out north of Coachman and is absent in northern Pinellas County. The top of the Arcadia Fm is found at sea level in the north-central part of the County to 50 feet below sea level in the St. Petersburg area. Thin beds of sand within the Hawthorn Group may yield water to domestic wells. However, these sands have low permeability and are discontinuous making them a poor water producer. The intermediate aquifer system thins to the north and is absent in central and northern Pinellas County. Low permeability beds within the Middle and Upper Miocene Deposits and/or Hawthorn Group restricts the vertical movement of water to and from the surficial and Floridan aquifer systems [7,8,9,12,13].

The Floridan aquifer system is the major source of potable groundwater in the area and consists of a series of limestones of Eocene to early Miocene age. These carbonate units effectively function as a single hydrologic unit. The aquifer ranges in thickness from 1,000 feet (north Pinellas County) to 1,200 feet (southern Pinellas County) throughout the County. The Floridan aquifer system includes, in ascending order, the Ocala Limestone, Suwannee Limestone and permeable limestone beds (Tampa Limestone) of the Tampa Member of the Arcadia Fm. The Ocala Limestone is not an important component of the Floridan aquifer system in Pinellas County due to its depth and the productiveness of the Suwannee and Tampa Limestones. The Tampa Limestone, an early Miocene age deposit, forms the upper layer of the Floridan aquifer and is first encountered at between sea level in the Tarpon Springs area to 120 feet below sea level in the St. Petersburg area. Locally, the depths to the Tampa Limestone may vary over a wide range. This variability of depth reflects the irregular surface of the Tampa Member caused by numerous pinnacles and sinkholes. The Tampa Limestone contains numerous solution channels. The Tampa Limestone consists of white to light tan, sandy, fossiliferous limestone with chert fragments. The Suwannee Limestone underlies the Tampa Member and is composed of predominantly white to cream-colored, hard, fossiliferous limestone. Water in the Floridan aquifer system exists under water-table conditions north of Palm Harbor and west of Lake Tarpon. An 8-inch diameter well open the Upper Floridan aquifer system can yield several hundred gallons per minute (gpm) of water. Water from the Floridan aquifer is generally hard, particularly water from the Suwannee Limestone. In addition, saltwater intrusion generally precludes the aquifer for potable use along the portions of coastal Pinellas

County. Regional groundwater flow in the Upper Floridan aquifer in the County is generally ill defined. However, near coastal areas flow is either towards Old Tampa Bay (east coast) or the Gulf of Mexico (west coast). Recharge to the Floridan aquifer system varies from none to very low in southern Pinellas County to low to moderate in north Pinellas County [7,8,12,13,14,15].

#### 4.2 Site Hydrogeology

As a result of past environmental assessments, a number of borings have been conducted. However, it must be noted that most of the borings were performed in the northeast portion of the site in the general vicinity of the proposed Winn Dixie Marketplace. The borings ranged in depth from land surface to 36.5 feet bls. Interbedded layers of fine sand, clayey sand and silty sand are the predominant lithologies underlying that area. A mottled, light olive brown and dark brown gray silty clay was detected approximately 27 feet below land surface (bls) in one of the borings. The water table in this area was detected between 2.75 to 5.5 feet bls [36,38,39]. Lithologic well logs from the Largo area indicate that the top of the Floridan aquifer system (Tampa Member of the Arcadia Fm.) is encountered between 80 to 180 feet bls [13].

#### 4.3. Ground-Water Targets

The Pinellas County Water System (PCWS) provides water to Largo, Seminole Park, Oldsman, Safety Harbor and unincorporated areas of Pinellas County. Water for this system is provided by the Eldridge-Wilde, Cosme Odessa and East Lake Road wellfields. These wellfields tap the Floridan aquifer system and are located more than 15 miles northeast of the City of Largo. The City of Clearwater has its own water system which currently serves 109,350 people in the Clearwater area. This system consists of eighteen Floridan aquifer wells. The nearest of these wells are located approximately 4.2 miles north-northeast of the site. However, the majority of the water for the Clearwater system, approximately 80%, is purchased from the PCWS [1,16,17,18].

The Town Of Belleair water system serves 4,878 people. This system does not normally purchase water from the PCWS. However, in an emergency water, from PCWS can be piped into the Belleair Water System. The Belleair water system consists of five municipal wells that are open to the Floridan aquifer system. These wells are located between 1.7 (Well# 9) to 1.95 miles (Well# 5) miles northwest of the site. Eight community/non-community well systems have been identified within 4 miles of the site. These wells collectively serve 634 people and are open to upper portions of the Floridan aquifer system. The nearest systems, the Wyatt Springs system, serves a total of 12 people and is located approximately 0.9 mile northwest of the site [1,16,17,18].

The average persons per household in Pinellas County (1990 U.S. Census) is 2.18 [16,23]. A breakdown of the municipal community and non-community well systems, by distance, is presented in Table 1.

**Table 1**  
**Estimated Number of Potable Wells and Population Served**  
**City of Largo Landfill**  
**Largo, Pinellas County, Florida**  
**Floridan aquifer system (AOC)**

Well Type	0-1/4 mile	1/4-1/2 mile	1/2-1 mile	1-2 miles	2-3 miles	3-4 miles
Municipal <sup>1</sup>	0/0	0/0	0/0	5/4,878	0/0	0/0
Community/ Noncomm <sup>2</sup>	0/0	0/0	1/12	0/0	2/30	6/592
Private	NE	NE	NE	NE	NE	NE
Totals	0/0	0/0	1/12	5/4,878	2/30	6/592

Key:

NE=Not Evaluated

AOC=Aquifer of Concern

Footnotes:

<sup>1</sup> City of Belleair: The Town Of Belleair water system serves 4,878 people. This system does not normally purchase water from the Pinellas County Water System (PCWS). However, in an emergency water, from PCWS can be piped into the Belleair Water System. The Belleair water system consists of five municipal wells that are open to the Floridan aquifer system. These wells are located between 1.7 (Well# 9) to 1.95 miles (Well# 5) miles northwest of the site [1,16,17,18].

<sup>2</sup> The community & noncommunity well systems are open to the upper portion of the Floridan aquifer system. The community and noncommunity well data was provided by FDEP's PWS Potable well search database [16]. These locations were subsequently plotted on the 4-Mile USGS topographic map collage of the site [1]. The average persons per household in Pinellas County (1990 U.S. Census) are 2.18 [16,23].

#### 4.4 Ground-Water Conclusions

The groundwater migration pathway may be a concern at this site. This is based on the available groundwater contamination evidence, the size of the landfill and the proximity of the site to drinking water wells. Elevated levels of organic compounds and heavy metals (chromium, cadmium and lead) have been detected in groundwater samples collected at the Landfill. Several of the heavy metal concentrations exceeded both State and federal MCLs. Most of the groundwater assessment work has been focused on the northeast portion of the site, near the location of the proposed Winn Dixie Marketplace. Further assessment work, including the installation of additional monitor wells, needs to be conducted across the remainder of the Landfill.

#### 5.0 Surface Water Pathway

##### 5.1 Hydrology

The majority of the site is situated within a 100 year floodplain. However, the southwestern portion of the site (most recent fill area) is situated in an area of minimal flooding [19]. Elevations in the filled portions of the landfill range from 4 to 10 feet above mean sea level (msl). The Long Bayou drainage canal (aka: Main Channel) bisects the

landfill. This canal runs diagonally through the landfill. The Long Bayou drainage canal ultimately discharges into Lake Seminole, which is located 1.8 miles south of the site. Lake Seminole is connected to Long Bayou which discharges into Boca Ciega Bay. Johns Pass provides an outlet from the Bay into the Gulf of Mexico. This outlet is located approximately 9.5 miles downstream from the site. It is estimated that tidal influence ranges up to at least the southern end of Lake Seminole. [1,29,43] (Figures 1,3,4).

## **5.2 Surface Water Targets**

No drinking water intakes are located along the surface water migration pathway [17,18]. Recreational boating and fishing take place in Lake Seminole, Long Bayou and Boca Ciega Bay. It is reported that tarpon and bass fishing tournaments take place in Lake Seminole. However, information is currently unavailable regarding recreational or commercial production from these water bodies [1,45].

A small isolated wetland area is located near the southeastern corner of the site [1,43] (Figure 1). The Long Bayou Drainage canal runs through the southwestern portion of the wetland. A number of federally and/or State endangered/threatened species exist in Pinellas County [24]. The 1997 SWFWMD study has identified six species in the immediate site area. These species include: White ibis, Limpkin, Little blue heron, Snowy egret, Woodstork and the American alligator [43]. Bald eagle habitats are documented to be present along the shores of Lake Seminole. The Boca Ciega Bay Aquatic Preserve is a habitat to a number of federal and State designated endangered and threatened species. These species include: the West Indian manatee, Loggerhead turtle, Green sea turtle, Hawksbill turtle and Kemp's Ridley turtle [1,20,21,22].

## **5.3 Surface Water Pathway Conclusions**

A number of fisheries and sensitive environments exist downstream of the landfill. Elevated levels of organic compounds and heavy metals have been detected in on-site groundwater. In addition, leachate has been observed in the canal that bisects the landfill. Based on these facts, the surface water migration pathway is a concern at this site.

## **6.0 Soil Exposure and Air Migration Pathways**

### **6.1 Physical Conditions**

The landfill consists of approximately 60 acres. The Long Bayou drainage canal bisects the landfill. The majority of the site is undeveloped and is overgrown by trees, bushes and weeds. The northeast portion of the site is the proposed location for a Winn Dixie Marketplace. Portions of this area have been cleared of vegetation. A Florida Power Corporation (FPC) substation and a vacant bank building (formerly National Bank) exist along the eastern and northeastern edge of the site, respectively. The southwestern portion of the site (newer fill area) is less overgrown with a number of dirt roads traversing the former fill area [1,31,32,34,36,38,39,40,43] (Figures 1,2,3,4).

## 6.2. Soil Exposure and Air Migration Targets

No residents, schools or day care centers currently exist on-site. However, the Lincolnshire Mobile Home Park borders the site to the south. A small lake borders the southwestern edge of the site. Additional residential areas exist just beyond the lake. As detailed earlier, the 1997 SWFWMD study identified a number of federal and State endangered and threatened species in the immediate site area. These species include: White ibis, Limpkin, Little blue heron, Snowy egret, Woodstork and the American alligator. Based on 1990 Census data, the Largo area has a population of 64,455 and a population density of 6,095 people per square mile [23]. A number of sensitive environments, detailed above in the surface water target section, exist within 4-miles of the site.

## 6.3. Soil Exposure and Air Migration Conclusions.

This landfill encompasses a large area. Residential areas are present along the southern and southwestern borders of the site. In addition, a number of sensitive environments exist on-site and in close proximity to the site. Based on these facts, the soil exposure and air migration pathways may be a concern at this site.

## 7.0 Summary and Conclusions

The abandoned City of Largo Landfill is located south of the intersection of East Bay Drive (aka: SR686) and Highland Avenue, Largo, Pinellas County, Florida. The Long Bayou drainage canal bisects the landfill. Based on the available file information, this site was used for agricultural practices from the mid-1950's to early 1960's. The landfill reportedly accepted residential, commercial and industrial waste from the early 1960's to the late 1970's. The City reportedly closed the landfill in January 1981. Approximately 60 acres were utilized for landfilling at the site. It has been reported that landfill waste was disposed of into a pond and wetland area of the site. Based on past aerial photographs of the site, landfilling initially took place in the northern third of the site. Both the trench and high rise method of waste disposal were reportedly utilized at the site. The landfill cells, which were unlined, were reported to be 10 feet in depth. However, former City employees report that waste was disposed to depths of 40 feet. The Winn Dixie Stores, Inc. currently has plans to construct a Winn Dixie Market Store on the northeastern portion of the site.

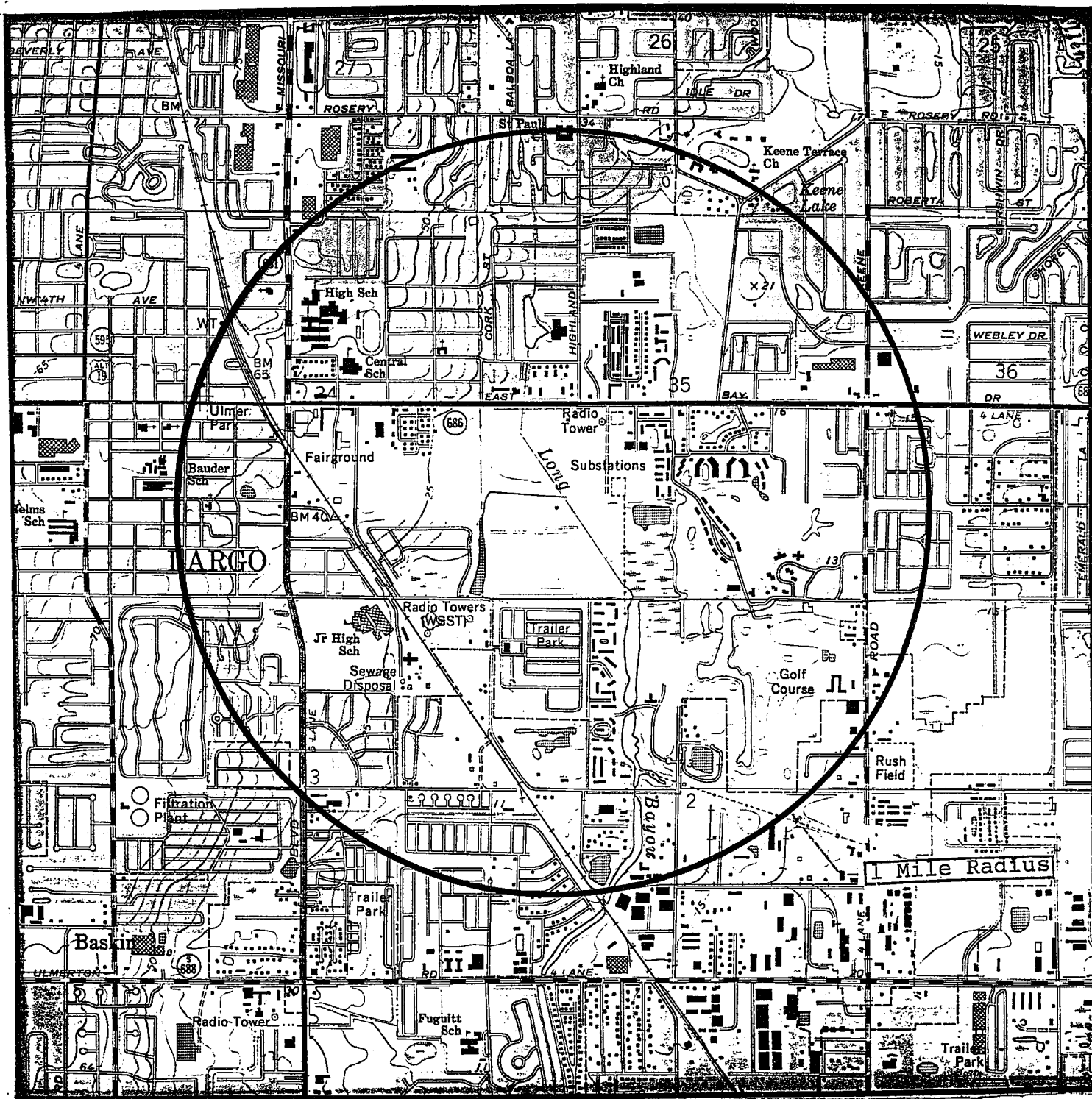
The groundwater migration pathway may be a concern at this site. Low levels of organic compounds and elevated levels of heavy metals have been detected in on-site groundwater. A number of drinking water wells are in close proximity to the site.

A number of fisheries and sensitive environments exist downstream of the landfill. In addition, landfill leachate has been reported in the canal that transects the landfill. Based on the above findings, the surface water migration pathway may be a concern at this site.



This landfill encompasses a large area. Residential areas are present along the southern and southwestern borders of the site. In addition, a number of sensitive environments exist on-site and in close proximity to the site. Based on these facts, the soil exposure and air migration pathways may be a concern at this site.

Based on the findings presented in this PA and the results of a draft Hazard Ranking System (HRS) evaluation (SI Worksheets) of the site, further CERCLA action is warranted at this site. Therefore, a Site Inspection (SI) is recommended for this site.



1:24000

0 1/2 1 MILE

N

SITE LOCATION MAP

City of Largo Landfill

Largo, Florida

Clearwater, Florida

1974 (PR 1987)

USGS QUAD

Figure 1

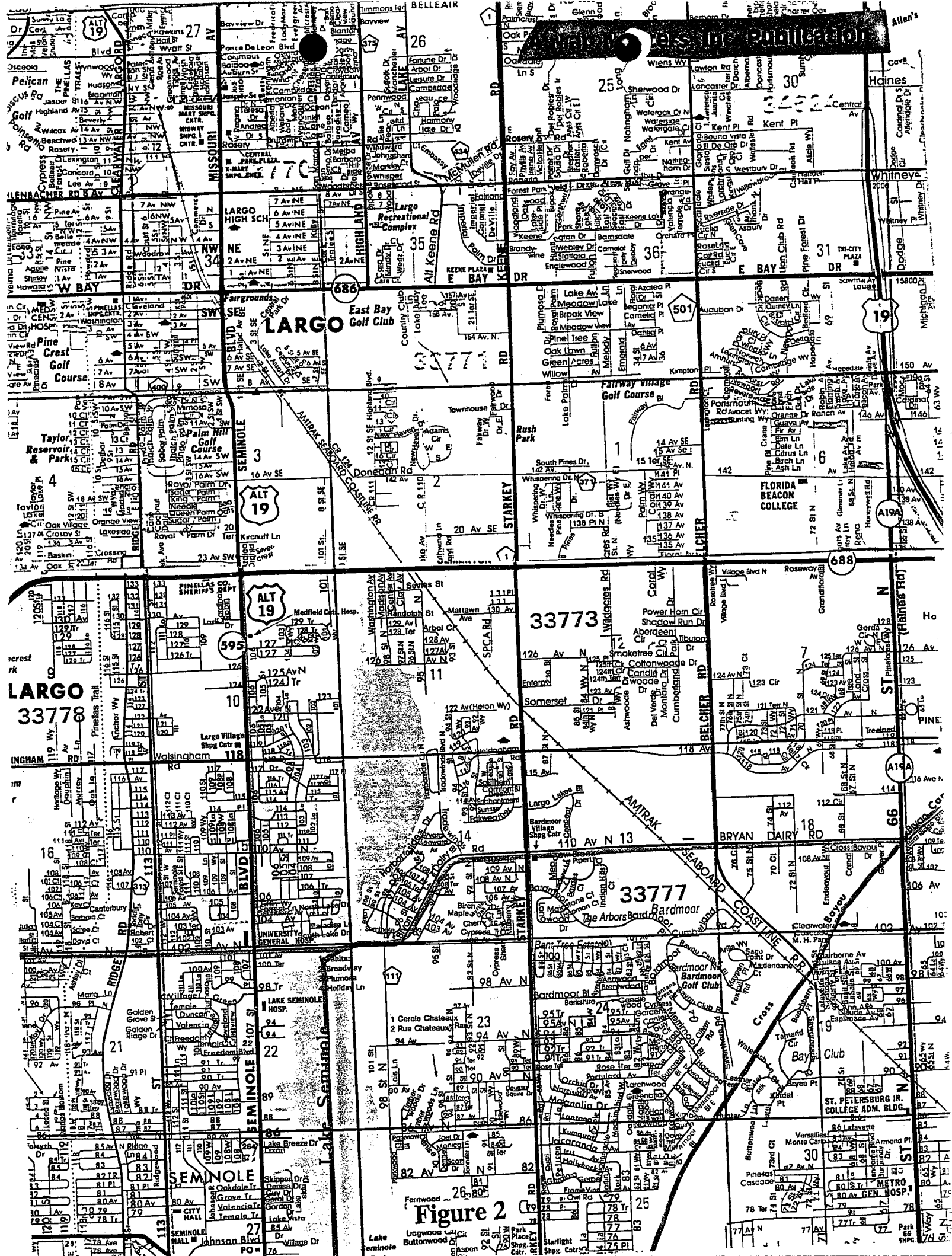


Figure 2

# LAND USE & EXISTING CONDITIONS

SCALE: 1" = 400'



E. S.R. 686

(COUNTY)

(COMMERCIAL)

PREVIOUSLY FILLED AREA

densely wooded

sparsely wooded

LECUM 69 KV LINE (FPC)

FUTURE FILL AREA

(P)

ZONED P-(PUBLIC)

grassy

densely wooded

DRAINAGE CANAL

FPC SUBSTATION (LARGO)

DLW LINE (FPC)

(COUNTY)

EXISTING FILL AREA

sparsely wooded

8TH AVE SW.

(INDUSTRIAL)

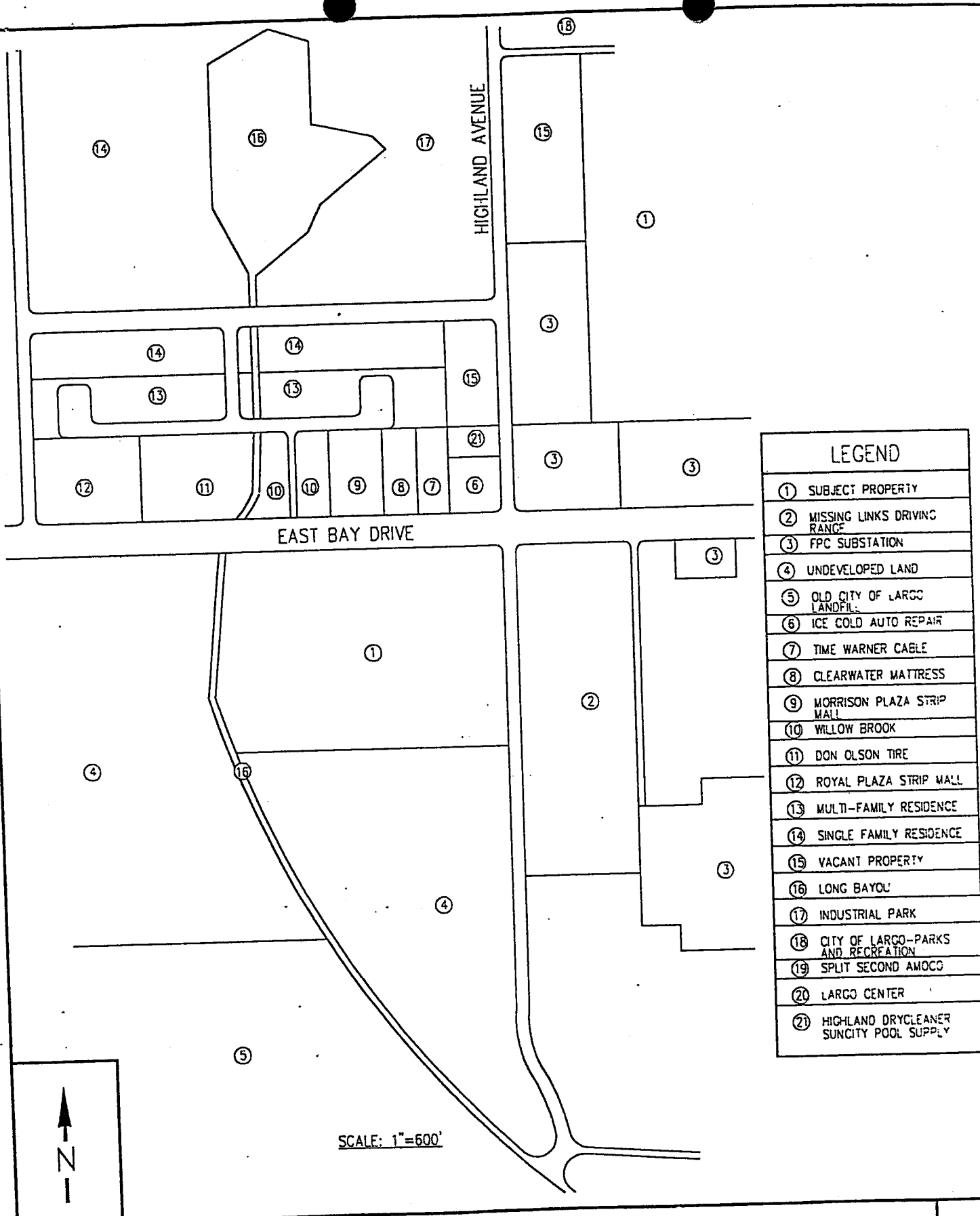
(RMH) LINCOLNSHIRE MHP

WATERWAY

DRAWING 2-B

Figure 3

1974

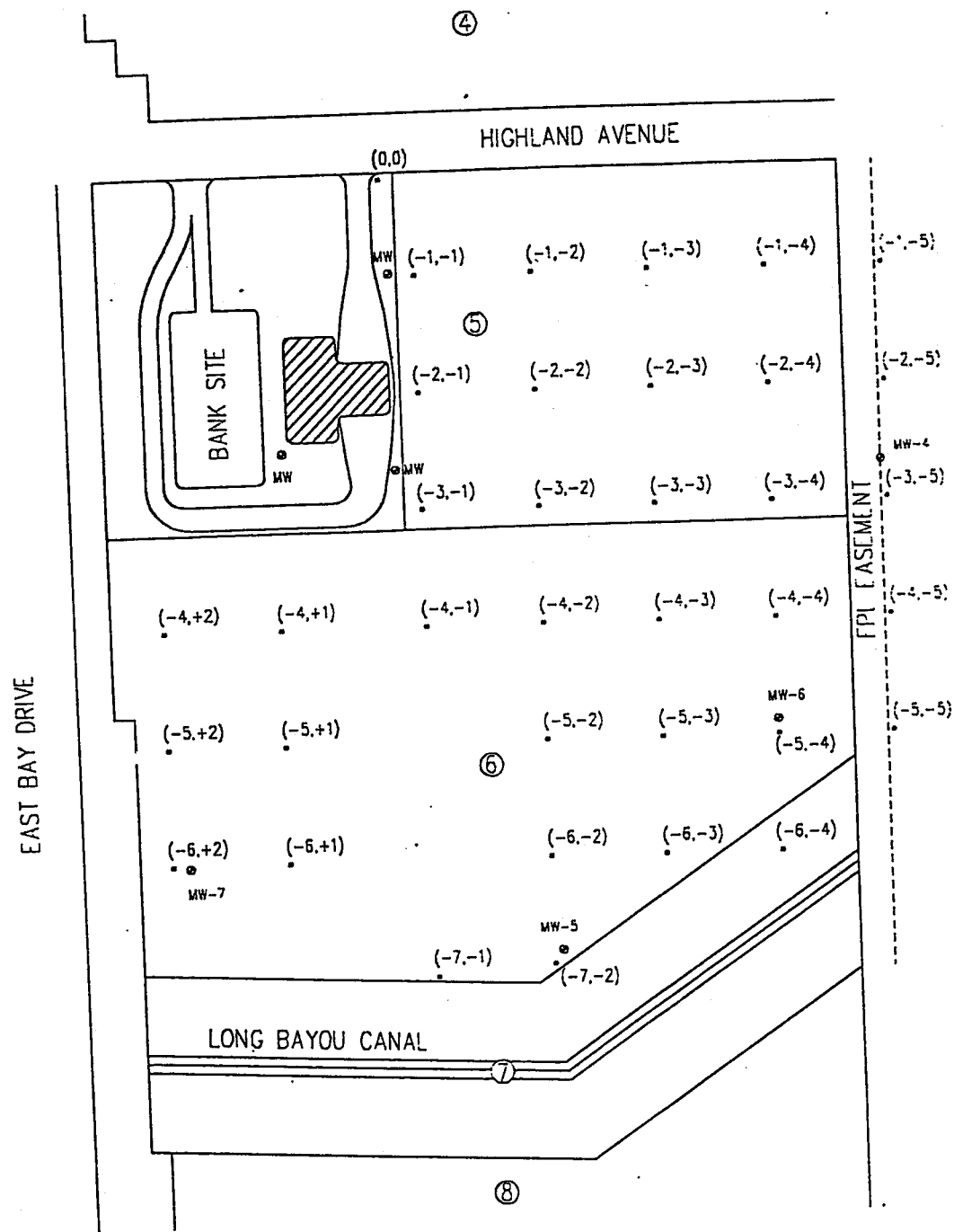


**Wragg Environmental, Inc.**  
Environmental Consulting and Engineering

MARKETPLACE AT LARGO  
EAST BAY DRIVE / HIGHLAND AVENUE  
LARGO, FLORIDA  
**SITE VICINITY MAP**

PROJECT #: 1013-001-02 FILENAME: W-0021 DATE: 09/23/95

**Figure 4**



# LEGEND:

- SHALLOW MONITORING WELL
- BORING & COORDINATE
- ▨ BANK BUILDING

SCALE: 1"=150'

← Z →

**Wragg Environmental, Inc.**  
Environmental Consulting and Engineering

MARKETPLACE AT LARGO  
EAST BAY DRIVE / HIGHLAND AVENUE  
LARGO, FLORIDA

## SITE PLAN

PROJECT #: 1013-001-02 FILENAME: W-0022 DATE: 09/23/96

Figure 5

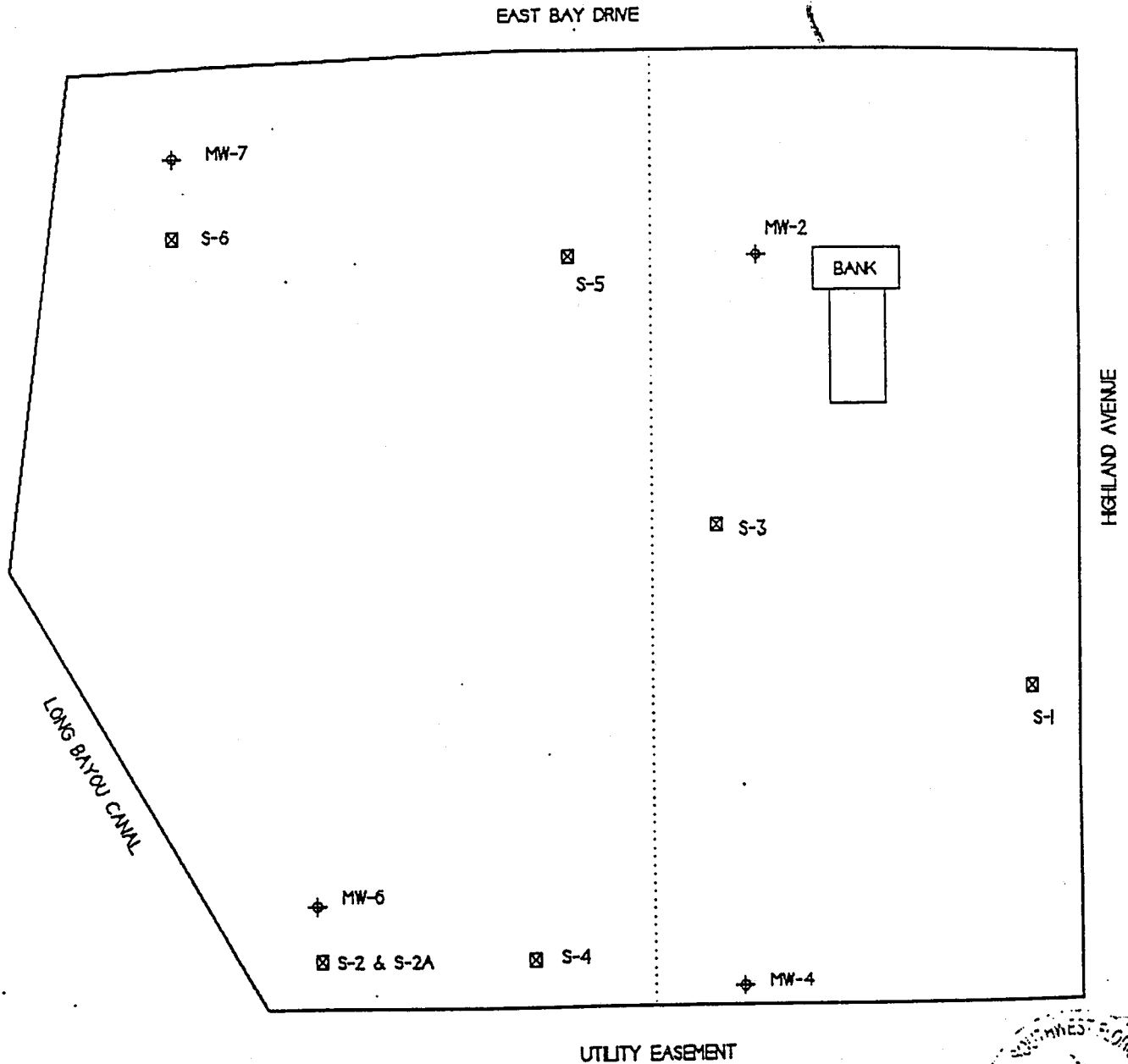
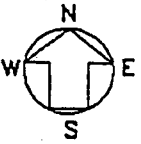


FIGURE #1: SITE DIAGRAM  
SAMPLING LOCATIONS (S-X) AND  
MONITORING WELL LOCATIONS (MW-X)

FUTURE MARKETPLACE AT LARGO  
HIGHLAND AVENUE AND EAST BAY DRIVE  
LARGO, FLORIDA

NOT TO SCALE

EE&G PROJECT #9810028

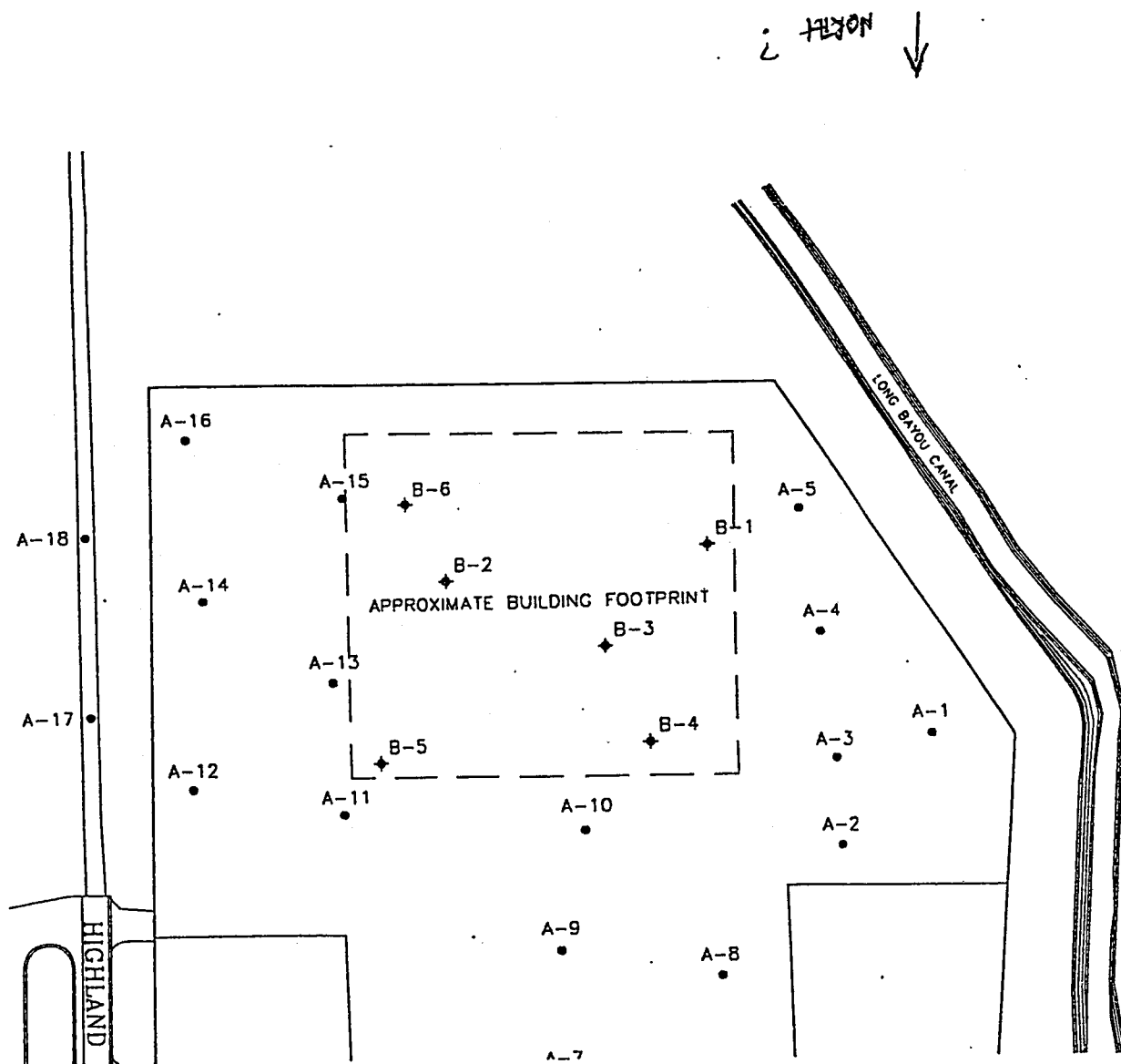
Date  
06/19/97

By  
MGM

**EE&G**

8509-D Benjamin Road  
Tampa, Florida 33634  
(813) 243-8877

Figure 6



**GEOSCIENCE & MATERIALS ENGINEERS, INC.**

**Figure 7**



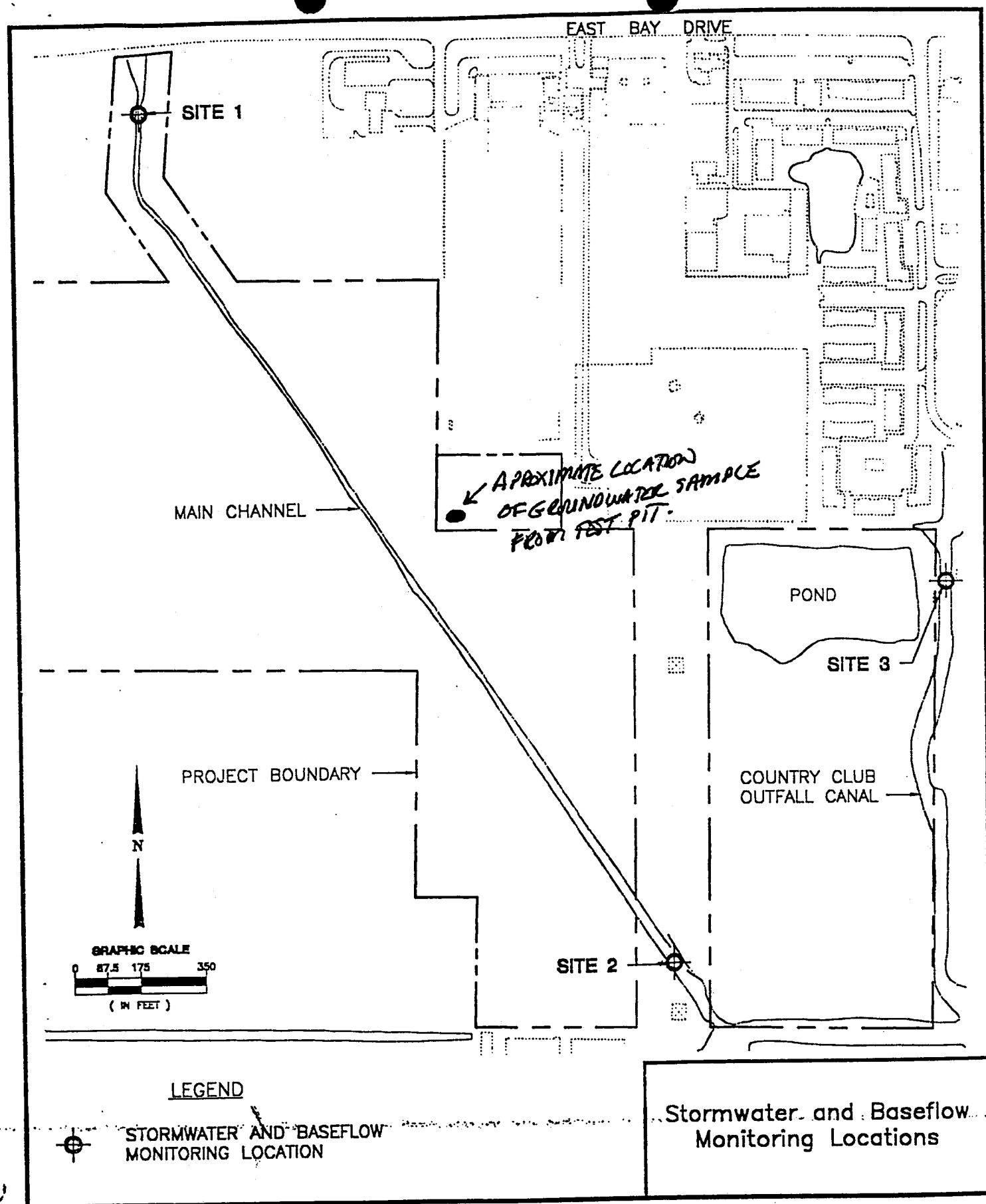


Figure 4-1. Stormwater and Baseflow Monitoring Locations.

Table 2

**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS**  
**Future Marketplace at Largo, Largo, Florida**

Analyte	MW-2	MW-4	MW-6	MW-7	MCLs
EPA Method 8240: All compounds	ND	ND	ND	ND	—
EPA Method 8270: All compounds	ND	ND	ND	ND	—
EPA Method 8080: All Compounds	ND	ND	ND	ND	—
Metals:					
Antimony	<0.005	<0.005	<0.005	<0.005	0.006
Arsenic	<0.010	<0.010	<0.010	<0.010	0.050
Beryllium	<0.004	<0.004	<0.004	<0.004	0.004
Cadmium	<0.005	<0.005	<0.005	0.0070	0.005
Chromium	<0.010	<0.010	<0.010	<0.010	0.100
Copper	<0.025	<0.025	<0.025	<0.025	—
Lead	0.0052	<0.015	0.0065	0.0076	0.015
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	0.002
Nickel	<0.040	<0.040	<0.040	<0.040	0.100
Selenium	<0.010	<0.010	0.960	<0.010	0.050
Silver	<0.010	<0.010	<0.010	<0.010	0.100
Thallium	<0.010	<0.010	<0.010	<0.010	0.002
Zinc	<0.020	<0.020	0.050	<0.020	5.0
<p align="center">All readings in milligrams per liter (mg/L)  Samples collected and analyzed 05/22/97  Savannah Laboratories Report B7-41334  MCLs taken from Chapter 62-550, FAC, Drinking Water Standard</p>					

**VOC/SVOC EMISSION FLUX RATES (ng/m<sup>2</sup>/min)**  
**Future Marketplace at Largo Site, Largo, Florida**

Sample Location: Analyte:	Quantitation Level	Sample #1	Sample #2A	Sample #3	Sample #4	Sample #5	Sample #6
Acetone	1.1	ND	2.5 B	ND	ND	3.8 B	ND
Benzene	0.9	ND	ND	ND	0.9	1.1	ND
Benzoic Acid	0.6	ND	ND	ND	ND	0.8	ND
Carbon Disulfide	0.6	ND	ND	ND	ND	0.6	ND
4-Chloroaniline	0.8	ND	ND	1.5	ND	ND	ND
4-Methyl-2-Pentanone	0.8	ND	ND	1.1	ND	ND	ND
Toluene	0.7	0.8	2.2	2.7	ND	1.9	ND
Vinyl Acetate	0.9	ND	1.2	ND	ND	ND	ND
<p align="center">ND - not detected  B - compound detected in method blank</p>							

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STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

## DISTRICT ROUTING SLIP

To: BOB BUTERA

DATE: 9/25/98

CC To:

	<b>PENSACOLA</b>	<b>NORTHWEST DISTRICT</b>	
	Panama City	Northwest District Branch Office	
	Tallahassee	Northwest District Branch Office	
	Sopchoppy	Northwest District Satellite Office	
X	<b>TAMPA</b>	<b>SOUTHWEST DISTRICT</b>	
	Punta Gorda	Southwest District Branch Office	
	Bartow	Southwest District Satellite Office	
	<b>ORLANDO</b>	<b>CENTRAL DISTRICT</b>	
	Melbourne	Central District Satellite Office	
	<b>JACKSONVILLE</b>	<b>NORTHEAST DISTRICT</b>	
	Gainesville	Northeast District Branch Office	
	<b>FORT MYERS</b>	<b>SOUTH DISTRICT</b>	
	Marathon	South District Branch Office	
	<b>WEST PALM BEACH</b>	<b>SOUTHEAST DISTRICT</b>	
	Port St. Lucie	Southeast District Branch Office	

☐ Reply Optional  
Date Due \_\_\_\_\_

☐ Reply Required  
Date Due: \_\_\_\_\_

☐ Info Only

Comments:

**RECEIVED**  
SEP 29 1998  
Department of Environmental Protection  
BY SOUTHWEST DISTRICT  
Tel: \_\_\_\_\_

From:

JACQUE BRICKER

SC218-3935

## Memorandum

# Florida Department of Environmental Protection

**TO:** Bill Kutash, Waste Program Administrator  
FDEP Southwest District

**THROUGH:** Joseph McGarrity, Environmental Specialist III *JM*  
Bureau of Waste Cleanup

**FROM:** Jeanine Bricker, Environmental Specialist I *JB*  
Bureau of Waste Cleanup

**DATE:** September 24, 1998

**SUBJECT:** Preliminary Assessment Reports for:

1. Tender Touch Cleaners site in Winter Haven, Polk County
2. City of Largo Landfill site in Largo, Pinellas County

Please find enclosed the Preliminary Assessment reports and CERCLA Site Assessment Report Summaries for the above-referenced sites. This information is for your files. If you have any questions regarding the reports please contact Joe McGarrity or me at Suncom 278-3935.

enclosures

cc: Eric Nuzie, DEP  
Bob Butera, DEP-SW District  
John Morris, DEP-SW District  
reading file





Date: 5/13/97 4:23:37 PM  
From: Allison Amram TPA  
Subject: Largo Landfill  
To: Joseph McGarrity TAL  
CC: Steve Morgan TPA

Joe-

Did your section ever do an investigation of the Largo landfill in Pinellas County? I heard that it may have been referred to your group in the late 1980s. If you all have a report, please send us a copy.  
Thanks.

Allison



# Department of Environmental Protection

Lawton Chiles  
Governor

Southwest District  
3804 Coconut Palm Drive  
Tampa, Florida 33619

Virginia B. Wetherell  
Secretary

TO: Bob Butera  
THROUGH: Bill Kutash *WZ 5/12/97*  
THROUGH: Mary Yeargan *my 5/12/97*  
FROM: Sandra Tippin *SBT*  
DATE: May 12, 1997  
SUBJECT: Largo Landfill  
Pinellas County

The referenced landfill apparently operated from about 1971 until about 1981 under the conditions of a solid waste operating permit. No recent activity by the Waste Cleanup Section is reflected in the files. Therefore, the Waste Cleanup Section is referring this site to the Solid Waste Section for appropriate action based upon the previous solid waste permits issued to this landfill.

Attachment: Copy of District files

st

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
SOUTHWEST DISTRICT

CONVERSATION RECORD

Date 5/7/97

Subject Large landfill

Time 12:40 1:20

Permit No. \_\_\_\_\_

County \_\_\_\_\_

M Sandy Nettles

Telephone No. 733-6682

Representing Nettles & Assoc. 813/376-7409

[ ] Phoned Me [x] Was Called [ ] Scheduled Meeting [ ] Unscheduled Meeting

Other Individuals Involved in Conversation/Meeting \_\_\_\_\_

Summary of Conversation/Meeting \_\_\_\_\_

12:40 Wrong #  
1:20 Left a voice mail message

5/8 9:40 Sandy called me - they have done some work @ site for a drilling range - range wanted to buy more land installed a well, sampled & advised range not to buy the land. He will provide me his info if I request

3 - He didn't see any wells on this section of ~~landfill~~ landfill  
talked w/ Sandy  
18 bis-2 ethylhexyl phthalate  
2.9 butyl benzene 6 naphthalenes  
9.6 chlorobenzene Got strong odor, like Malathion  
-52 1,2-dichlorobenzene below water table.  
1,4-dcb present

(continue on another  
sheet, if necessary)

Signature Allison Annam

Title PGI

PA-01  
1/96  
pap  
may have retested Winn-Dixie & found some contaminants.  
City still owns the landfill property, some work Phase 2 going on.

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
SOUTHWEST DISTRICT

CONVERSATION RECORD

Date 12/27/96

Subject Old Largo Landfill

Time \_\_\_\_\_

Permit No. \_\_\_\_\_

County \_\_\_\_\_

M Sandy Nettles

Telephone No. \_\_\_\_\_

Representing \_\_\_\_\_

☐ Phoned Me ☐ Was Called ☐ Scheduled Meeting ☐ Unscheduled Meeting

Other Individuals Involved in Conversation/Meeting \_\_\_\_\_

Summary of Conversation/Meeting \_\_\_\_\_

Sandy did some assessment of Old Largo LF off East Bay + Highlands adjacent to Driving Range. (The Golf Course is looking to expand.

~~But~~ Odors like pesticide were noted during sampling however no pesticides were detected in analyticals putrid bag came up on auger & fumes 20' from well would knock you over.

Analyticals showed things like low level Chlorobenzene

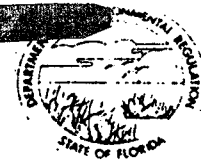
The back half of old landfill is road building stuff (C&D?) Winn Dixie is built on part of old landfill-- they say it tested clean.

Sent Sandy booklet on guidance concentrations & he will call Sandra after Jan 2.

(continue on another  
sheet, if necessary)

Signature M. Yeager

Title PGH



# Interoffice Memorandum

TO: Geoffrey Watts

THROUGH: Rodney S. DeHan *RG*  
Richard Garrity *RG*  
William Kutash *WK*

FROM: Kirk R. Johnson *KRJ*

DATE: May 28, 1987

SUBJECT: Abandoned City of Largo Landfill, west 1/2 of Southeast  
1/4 of Section 35, Township 29 South, Range 15 East,  
Pinellas County

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: _____	Locn: _____
To: _____	Locn: _____
To: _____	Locn: _____
From: _____	Date: _____

The subject site was operated as a sanitary landfill between 1971 and January, 1981 by the City of Largo. The landfill site is approximately 60 acres, and reportedly accepted residential and industrial waste. Groundwater and surface water samples collected in February, 1978 revealed elevated chromium and lead levels in groundwater and elevated levels of lead in surface water at the site.

Following closure, groundwater was sampled from three monitor wells for analysis of nitrate, chemical oxygen demand and conductivity until April 22, 1982. Chemical oxygen demand and conductivity in the two downgradient monitor wells was consistently higher than in the background monitor well.

This landfill was recently brought to the District's attention when dredge spoil with a high water content was being dumped on the landfill cover, and possibly into excavations of the landfill cover. This practice was discontinued at the District's direction, and another site was chosen for the dredge spoil spreading.

The District was able to retrieve the archived solid waste permitting file but it is not clear that the file is complete. The landfill is apparently transected by a canal which drains to Lake Seminole, and there are indications that landfill materials had been placed below the water table.

A residential neighborhood is located proximal to the south boundary of the landfill site and residents have recently expressed concerns of the quality of the surface water in the canal.

The District is requesting that the Groundwater Section Operation Response Team conduct a site assessment of the abandoned City of Largo Landfill in order to determine if groundwater has been degraded or if residents are at risk of exposure to contaminated surface water as a result of leachate generation from landfill materials.

KRJ/ab  
Attachments

FINAL SITE INSPECTION REPORT  
LARGO LANDFILL  
LARGO, PINELLAS COUNTY, FLORIDA

U.S. EPA ID NO. FL0002451383

Revision 1


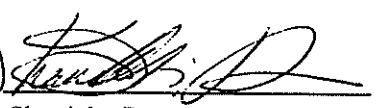

Prepared for  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
Region 4  
Atlanta, Georgia 30303

Contract No.	:	68-W-00-123
TDD No.	:	4W-01-11-A-006
Work Order No.	:	12587-001-001-0029
Document Control No.	:	RFW-LLS-0021
Date Prepared	:	September 27, 2001
EPA Work Assignment Manager	:	Joe Alfano
Telephone No.	:	404-562-8933
Prepared by	:	Roy F. Weston, Inc.- START-2
Telephone No.	:	770-263-7014

Prepared by

Reviewed by

Approved by

		
Melaney Fieldhouse START-2 Project Manager	Shanieka Pennamon START-2 Technical Reviewer	William R. Doyle START-2 Program Manager

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Approved Report  
9/27/2001  
Joe Alfano  
Further Action Required  
Low Priority

## CONTENTS

<u>Section</u>	<u>Page</u>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 SITE BACKGROUND .....</b>	<b>2</b>
2.1 SITE DESCRIPTION AND ENVIRONMENTAL SETTING .....	2
2.2 SITE OPERATIONS AND REGULATORY HISTORY .....	2
2.3 PREVIOUS RELEASES AND INVESTIGATIONS .....	3
<b>3.0 SI ACTIVITIES .....</b>	<b>6</b>
3.1 SAMPLE COLLECTION METHODOLOGY AND PROCEDURES .....	6
3.2 ANALYTICAL SUPPORT AND METHODOLOGY .....	6
3.3 ANALYTICAL DATA QUALITY AND DATA QUALIFIERS .....	7
<b>4.0 SOURCE SAMPLING .....</b>	<b>13</b>
4.1 SOURCE SAMPLE LOCATIONS AND ANALYTICAL RESULTS .....	13
4.1.1 LANDFILL .....	14
4.2 SOURCE CONCLUSIONS .....	15
<b>5.0 PATHWAYS .....</b>	<b>16</b>
5.1 GROUNDWATER MIGRATION PATHWAY .....	16
5.1.1 Geologic and Hydrogeologic Setting .....	16
5.1.2 Groundwater Sampling Locations and Analytical Results .....	19
5.1.3 Groundwater Targets .....	20
5.1.4 Groundwater Conclusions .....	21
5.2 SURFACE WATER MIGRATION PATHWAY .....	21
5.2.1 Hydrologic Setting .....	22
5.2.2 Surface Water and Sediment Sampling Locations and Analytical Results .....	22
5.2.3 Surface Water Targets .....	23
5.2.4 Surface Water Conclusions .....	24

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## CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
5.3 SOIL EXPOSURE PATHWAY AND AIR MIGRATION PATHWAY .....	24
5.3.1 Physical Conditions .....	24
5.3.2 Sampling Locations and Analytical Results .....	24
5.3.3 Soil and Air Targets .....	25
5.3.4 Soil and Air Conclusions .....	25
6.0 SUMMARY AND CONCLUSIONS .....	25
REFERENCES .....	28

## TABLES

<u>Table</u>	<u>Page</u>
1 SURFACE SOIL SAMPLING LOCATIONS AND RATIONALE .....	8
2 SUBSURFACE SOIL SAMPLING LOCATIONS AND RATIONALE .....	9
3 GROUNDWATER SAMPLING LOCATIONS AND RATIONALE .....	10
4 SURFACE WATER SAMPLING LOCATIONS AND RATIONALE .....	11
5 SEDIMENT SAMPLING LOCATIONS AND RATIONALE .....	12



## CONTENTS (Continued)

### APPENDICES

#### A Figures

<u>Figure</u>	<u>Title</u>
1	General Site Location Map
2	Site Layout Map
3	Sample Location Map

#### B Analytical Data Tables

<u>Table</u>	<u>Title</u>
6	Summary of Inorganic Analytical Results - Surface Soil Samples
7	Summary of Organic Analytical Results - Surface Soil Samples
8	Summary of Inorganic Analytical Results - Subsurface Soil Samples
9	Summary of Organic Analytical Results - Subsurface Soil Samples
10	Summary of Field Parameters - Groundwater Samples
11	Summary of Inorganic Analytical Results - Groundwater Samples
12	Summary of Organic Analytical Results - Groundwater Samples
13	Summary of Inorganic Analytical Results - Surface Water Samples
14	Summary of Organic Analytical Results - Surface Water Samples
15	Summary of Inorganic Analytical Results - Sediment Samples
16	Summary of Organic Analytical Results - Sediment Samples

#### C Analytical Data Set

#### D Photographic Log

## 1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) tasked the Roy F. Weston, Inc. Superfund Technical Assessment and Response Team - 2 (START-2) to conduct a site inspection (SI) for Largo Landfill in Largo, Pinellas County, Florida, EPA ID No. FL0002451383. The SI is prepared under Contract No. 68-W-00-123, Technical Direction Document (TDD) No. 4W-01-11-A-006.

The primary objective of an SI is to determine whether a site has the potential to be placed on the National Priorities List (NPL). The NPL identifies sites at which a release, or threatened release, of hazardous substances poses a serious enough risk to public health or the environment to warrant further investigation and possible remediation under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986.

Information gathered during the SI is used to generate a preliminary Hazard Ranking System (HRS) score. The HRS is the primary criterion EPA uses to determine whether a site should be placed on the NPL. SIs are generally conducted at sites where additional environmental sampling or monitoring well installation is necessary to fulfill HRS documentation requirements. SIs are also conducted to address site issues not adequately resolved in previous investigations.

Specifically, the objectives of the SI are as follows:

- Obtain and review relevant file material
- Collect samples to attribute hazardous substances to site operations
- Collect samples to establish representative background levels
- Evaluate target populations for the groundwater migration, surface water migration, soil exposure, and air migration pathways
- Collect any other missing HRS data
- Document current site conditions
- Develop a site layout map

This report documents the results of the SI conducted at Largo Landfill during the week of April 18, 2001, under the START-2 contract managed by Roy F. Weston. Information reviewed for the SI was gathered from the Florida Department of Environmental Protection (FDEP) and from the EPA Region 4 CERCLA files.

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## **2.0 SITE BACKGROUND**

This section describes the facility, its present and past operations (including waste disposal practices and regulatory history), previous investigations, and potential source areas located at the facility.

### **2.1 SITE DESCRIPTION AND ENVIRONMENTAL SETTING**

Largo Landfill comprises approximately 60-acres and is located in an area consisting of residential, industrial, and commercial properties (Ref. 1, p.1). Its geographical coordinates are 27° 54' 47" north latitude, and 82° 46' 37" west longitude (Ref. 2). The majority of the property is undeveloped and consists of overgrown trees and weeds (Ref. 1, p.1). The Long Bayou drainage canal bisects the landfill and a small lake borders the southwestern edge of the property (Ref. 2). Winn Dixie Marketplace is now situated on the northern portion of the property (Ref. 3).

Pinellas County has long humid summers and mild winters, with temperatures moderated by the waters of the Gulf of Mexico and Tampa Bay. Total annual rainfall is approximately 55 inches and is uniform throughout the county (Ref. 4). The mean annual lake evaporation for the area is 53 inches, for a net annual rainfall of 2 inches (Ref. 4). Approximately sixty percent of the total rainfall falls from June through September (Ref. 5, p. 61). The 2-year, 24-hour rainfall event for the area is approximately 4.5 inches (Ref. 6). Prevailing winds are from the south in March and from the north and east the rest of the year. Wildlife is no longer a major resource in Pinellas County, as urbanization has eliminated habitat suitable for many game and non-game species, and only in the northern part of the county is wildlife still abundant (Ref. 5, pp. 57-61).

### **2.2 SITE OPERATIONS AND REGULATORY HISTORY**

Largo Landfill was operated by the City of Largo. The city still owns portions of the property which include the northwest, southwest and eastern portions. Based on available file information, the landfill was used for agricultural practices from the mid-1950s to the early 1960s. The landfill reportedly accepted residential, commercial and industrial wastes from the early 1960s to the 1970s. In January 1981, the landfill was supposedly closed by the city. Although waste disposal practices included both the trench and high rise

methods, reportedly, landfill waste was also disposed of into a pond and wetland area on the property. Unlined landfill cells were reported to be 10 feet deep. However, city employees alledge that waste was disposed of in trenches to depths of 40 feet. According to the file information, landfill activities took place in the northern portion of the property (Ref. 7, p. 2-3).

Activities at Largo Landfill predated any permitted municipal landfill activities. The Florida Department of Pollution Control issued a permit to the City of Largo on December 19, 1974, which allowed for the operation of a Solid Waste Resource Recovery and Management Facility. In August 1977 and October 1979, the Florida Department of Environmental Regulation (FDER) renewed the city's permit. The city's last permit expired in 1984 (Ref. 1, p. 3)

In 1987, FDER discovered that the landfill was being used for the disposal dredge spoil, which contained a high water content. On May 28, 1987, FDER requested assistance from its Groundwater Section Operation Response Team (ORT) to conduct a site assessment at the former Largo Landfill. The request was based on concerns for the integrity of the fill cover and elevated levels of metals found during past groundwater sampling activities (Ref. 8). FDER ORT approved the request, however, Pinellas County took over responsibility for the landfill (Ref. 1, p.3).

### **2.3 PREVIOUS RELEASES AND INVESTIGATIONS**

In February 1978, groundwater samples collected from the landfill were found to contain elevated levels of chromium and lead. Surface water samples collected along the Long Bayou Canal during the same investigation were found to contain elevated levels of lead (Ref. 8).

Following the closure of the landfill in 1981, existing downgradient monitoring wells were continually sampled through April 1982. The sampling results showed the chemical oxygen demand and conductivity values of the down gradient wells to be significantly higher than those of the background monitoring well sample (Ref. 8).

Between 1993 and 1995, Phase II ESAs were conducted on the northeastern portion of the property. Elevated levels of acetone, benzene, lead, and mercury were detected in the groundwater samples exceeding the State Maximum Contaminant Levels (MCLs). Low levels of acetone, methylene chloride and total

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xylenes were detected in the soil samples. The possible presence of methane gas was also noted in several of the soil borings. The 1994, Phase II ESA determined that solid waste had been landfilled in the northeastern portion of the property (Ref. 1, p. 4).

Between 1993 and 1997, a number of subsurface investigations took place on the property. The majority of the investigations focused on the northeastern portion of the property. Several monitoring wells were installed during the investigations (Ref. 9, p. 2).

In May 1996, a Phase I Environmental Site Assessment (ESA) of the northeastern portion of the facility was conducted by WRAGG Environmental Inc. During the investigation, landfilling of solid waste in that area was confirmed. In the same area of the property, asbestos containing material was found within the abandoned bank building (Ref. 9, p. 2).

Between July 29, 1996 and August 14, 1996, WRAGG Environmental conducted a Phase II Environmental Assessment of the area of the proposed Winn Dixie Marketplace (northeastern portion). The work included soil borings with volatile organic compounds and methane gas screening, installation of three monitoring wells, and sampling and analysis of two existing wells and a the new monitoring well. The results of the soil borings indicated that solid waste existed above the water table along the central and southwestern portion of the study area. Elevated levels of organic and metal contaminants were detected in the well samples. Sampling of one of the monitoring wells indicated elevated levels of lead and chromium (Ref. 8).

In 1997, a nearby driving range was interested in purchasing part of the landfill property. Based on the interest of the driving range owners, Nettles and Associates relayed information of groundwater sample results to FDEP on May 7, 1997. The samples were found to contain butyl benzene, chlorobenzene, 1, 2-dichlorobenzene, 1, 4- dichlorobenzene, bis(2-ethylhexyl)phthalate, and naphthalene. Based on the results, the driving range was advised not to purchase the property (Ref. 11).

In April 1997, Geoscience and Materials Engineers, Inc. conducted a soils exploration study of the proposed Winn Dixie Marketplace (northeastern portion of property) to assist in foundation recommendations. Landfill debris, such as glass, newspaper, plastic and metal filings were encountered in many of the borings. Twenty-four soil borings were collected and it was concluded that with proper compaction and fill, the Winn Dixie store could be constructed (Ref. 12).

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Between May 22, 1997 and May 27, 1997, EE & G conducted a limited Phase II Subsurface Investigation of the proposed Winn Dixie Marketplace portion of the property. The investigation included an Asbestos Demolition Survey of the abandoned bank building and a subsurface investigation which included a quantitative soil gas survey and sampling of four existing on-site monitoring wells. The quantitative soil gas survey showed elevated levels of acetone, benzene, benzoic acid, 4-chloroaniline, 4-methyl-2-pentanone, toluene, and vinyl acetate. The groundwater samples collected from the monitoring wells contained lead, selenium, zinc, and cadmium. Cadmium and selenium concentrations exceeded both federal and state MCLs (Ref. 1, pp. 1, 3, 6).

Between April and June 1997, Environmental Research and Design (ERD) collected stormwater runoff and baseflow samples collected at three locations near the landfill. Groundwater samples were also collected from test pits excavated within the old landfill. These samples were collected to determine the impact of the landfill on surrounding surface waters. A subsurface soil exploration was also conducted at the landfill (Ref. 7). As part of the ERD study, the City of Largo excavated approximately ten test pits in and around the former landfill area. Groundwater samples collected from the test pits, showed elevated conductivity, ammonia, alkalinity, total nitrogen, and a number of organic compounds (Ref. 1, p. 7).

In conjunction with the investigation by ERD, Ardman and Associates, Inc. conducted a preliminary subsurface soil exploration study on the property. Soil borings were placed in the landfill areas, up land areas, and wetlands. Landfill material was detected in three of the landfill borings (Ref. 7).

On June 22, 1998, an attorney representing a nearby property owner sent a letter to FDEP regarding the landfill. The letter expressed concerns regarding groundwater contamination and leachate discharging into nearby surface waters (Ref. 1, p. 4). These concerns were supported by assessment reports and photographs. On July 17, 1998, FDEP completed a checklist for CERCLA Site Discovery for the landfill. A CERCLA Preliminary Assessment (PA) was recommended for the facility (Ref. 10).

### 3.0 SI ACTIVITIES

This section outlines field observations and sampling procedures at the sampling locations. Individual subsections address the sampling investigation and rationale for specific SI activities. The SI was conducted in accordance with the EPA-approved site-specific sampling plan (SSSP), Revision 0 dated April 10, 2001. The SSSP was prepared by Roy F. Weston, Inc. under the START-2 contract. Deviations from the sampling plan involved adding a groundwater sample (LL-06-GW) and removing surface soil sample LL-07-SS and subsurface soil sample LL-07-SB. These samples were removed per of lack of access.

#### 3.1 SAMPLE COLLECTION METHODOLOGY AND PROCEDURES

Roy F. Weston, Inc., START-2 personnel collected nine surface soil samples (including one duplicate sample), nine subsurface soil samples (including one duplicate), six groundwater samples, seven surface water samples (including one duplicate), and six sediment samples at the Largo Landfill during the week of April 18, 2001. Sampling locations are depicted on Figure 3 and summarized in Tables 1 through 5.

START-2 personnel collected the surface soil samples from 0 to 6 inches below ground surface (bgs). Subsurface soil samples were collected from 2 to 4 feet bgs utilizing direct-push sampling methods. A truck-mounted hydraulically operated Geoprobe was used to push small-diameter soil core samplers and a retractable wellpoint. Subsurface samples were collected with 2-foot long cores obtained at the desired interval of 2 to 4 feet bgs. Groundwater samples were collected through a retractable stainless steel screen installed at the depth of groundwater. START-2 personnel followed sample collection procedures outlined in the SSSP, which were developed in accordance with the EPA Region 4 Science and Ecosystem Support Division (SESD), *Environmental Investigation Standard Operating Procedures and Quality Assurance Manual*.

#### 3.2 ANALYTICAL SUPPORT AND METHODOLOGY

All samples collected during the SI were analyzed through the EPA Contract Laboratory Program (CLP). The laboratories analyzed for EPA Target Compound List (TCL) volatile organic compounds (VOC), extractable semivolatile organic compounds (SVOC), pesticides, and PCBs. The samples were also analyzed for Target Analyte List (TAL) inorganic substances (metals and cyanide). All samples were analyzed for

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the full TAL scan. EPA Region 4 SESD reviewed all data for compliance with the terms of the CLP.

### 3.3 ANALYTICAL DATA QUALITY AND DATA QUALIFIERS

All analytical data were subject to a quality assurance review as described in the EPA SESD laboratory data evaluation guidelines. The text and analytical data tables presented in this report show some concentrations of organic and inorganic parameters as qualified with a "J," indicating that the qualitative analysis was acceptable; however, the quantitative value has been estimated. Other compounds may have been qualified with an "N," indicating that they were detected based on the presumptive evidence of their presence. This means that the compound was only tentatively identified, and its detection cannot be considered a positive indication of its presence. Some sample results are reported with a "U" qualifier, meaning that the material was analyzed for but not detected. The reported number is the laboratory-derived sample quantization limit (SQL) for the constituent in that sample. At times, miscellaneous organic compounds that do not appear on the TCL are reported with the data set. These constituents are qualified as "JN," indicating that they are tentatively identified at estimated quantities. Because these constituents are not routinely analyzed for or reported, background levels of SQLs are not generally available for comparison. Some compounds are qualified with an "R" which indicates the QC evaluation has determined the concentration of the compound is unusable. Compounds qualified with a "C" have been confirmed by gas chromatograph or mass spectrometry. The complete analytical data sheets are presented in Appendix C.



**TABLE 1**  
**SURFACE SOIL SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

Sample Number	Location	Rationale
LL-01-SS	Background; off site, northeast and upgradient	Background soil sample for comparison to on-site sample results
LL-02-SS	Approximately 30 yards west of the northern entrance gate to the property	Determine presence or absence of hazardous substances
LL-03-SS	East central border of the property in clearing for power lines	Determine presence or absence of hazardous substances
LL-03D-SS	Central eastern border of property in clearing for power lines	Determine presence or absence of hazardous substances
LL-04-SS	Approximately 75 yards west of northern entrance gate to the property	Determine presence or absence of hazardous substances
LL-05-SS	Southeast corner of the property, west of the drainage canal	Determine presence or absence of hazardous substances
LL-06-SS*	Approximately 200 yards southeast of the northern entrance gate to the property	Determine presence or absence of hazardous substances
LL-08-SS	Northwest border of the property with in Florida Power Company's easement	Determine the presence or absence of hazardous substances
LL-09-SS	Center of southern boundary to property	Determine the presence or absence of hazardous substances

Notes: LL - Largo Landfill  
SS - Surface soil sample  
D - Duplicate sample  
\* - Surface soil sample LL-07-SS was not collected

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**TABLE 2**  
**SUBSURFACE SOIL SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

Sample Number	Location	Rationale
LL-01-SB	Background; off site, northeast and upgradient	Background subsurface soil sample for comparison to on-site sample results
LL-02-SB	Approximately 30 yards west of the northern entrance gate to the property	Determine the presence or absence of hazardous substances
LL-03-SB	East central border of the property in clearing for power lines	Determine the presence or absence of hazardous substances
LL-04-SB	Approximately 75 yards west of the northern entrance gate to the property	Determine the presence or absence of hazardous substances
LL-05-SB	Southeast corner of the property west of the drainage canal	Determine the presence or absence of hazardous substances
LL-06-SB*	Approximately 200 yards southeast of the northern entrance gate to the property	Determine the presence or absence of hazardous substances
LL-08-SB	Northwest border of property within Florida Power Company's easement	Determine the presence or absence of hazardous substances
LL-09-SB	Center of southern boundary to the property	Determine the presence or absence of hazardous substances

Notes: LL - Largo Landfill  
SB - Subsurface soil sample  
\* - Subsurface soil sample LL-07-SB was not collected

**TABLE 3**  
**GROUNDWATER SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

Sample Number	Location	Rationale
LL-01-GW	Background; off site and northeast upgradient	Background groundwater sample for comparison to downgradient sample results
LL-02-GW	Approximately 30 yards west of the northern entrance gate to the property	Determine the presence or absence of hazardous substances
LL-03-GW	Central eastern border of the property in clearing for power lines	Determine the presence or absence of hazardous substances
LL-04-GW	Approximately 75 yards west of the northern entrance gate to the property	Determine the presence or absence of hazardous substances
LL-05-GW	Southeast corner of the property, west of the drainage canal	Determine the presence or absence of hazardous substances
LL-06-GW	Center of southern boundary to the property	Determine the presence or absence of hazardous substances

Notes: LL - Largo Landfill  
GW - Temporary monitoring well sample

**TABLE 4**  
**SURFACE WATER SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

<b>SAMPLE NUMBER</b>	<b>LOCATION</b>	<b>RATIONALE</b>
LL-01-SW	Background; off site, north and upgradient	Background surface water sample for comparison to downstream samples
LL-02-SW	Along north end of drainage canal, west of Winn Dixie	Determine the presence or absence of hazardous substances
LL-03-SW	Along center of drainage canal	Determine the presence or absence of hazardous substances
LL-04-SW	Along south end of drainage canal	Determine the presence or absence of hazardous substances
LL-05-SW	Opposite of drainage canal, along the southern edge of the waterway	Determine the presence or absence of hazardous substances
LL-05D-SW	Opposite of drainage canal, along the southern edge of the waterway	Determine the presence or absence of hazardous substances
LL-06-SW	Opposite of drainage canal, along the southern edge of the waterway	Determine the presence or absence of hazardous substances

Notes: LL - Largo Landfill  
 SW - Surface water sample  
 D - Duplicate sample

**TABLE 5**  
**SEDIMENT SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

Sample Number	Location	Rationale
LL-01-SD	Background; off site and northeast and upgradient	Background sediment sample for comparison to downstream samples
LL-02-SD	Along north end of drainage canal, west of Winn Dixie	Determine the presence or absence of hazardous substances
LL-03-SD	Along center of drainage canal	Determine the presence or absence of hazardous substances
LL-04-SD	Along south end of drainage canal	Determine the presence or absence of hazardous substances
LL-05-SD	Opposite of drainage canal, along the southern edge of the waterway	Determine the presence or absence of hazardous substances
LL-06-SD	Opposite of drainage canal, along the eastern edge of the waterway	Determine the presence or absence of hazardous substances

Notes: LL - Largo Landfill  
SD - Sediment sample

## 4.0 SOURCE SAMPLING

This section discusses the source area evaluated at the facility and the sampling locations and analytical results of samples collected from the landfill. The source areas at Largo Landfill evaluated in this SI are the landfill itself. Surface soil and subsurface soil sampling locations are depicted on Figure 3 and described in Tables 1 and 2. Surface soil inorganic and organic analytical results are summarized in Tables 6 and 7, respectively, and subsurface soil inorganic and organic analytical sampling results are summarized in Tables 8 and 9, respectively. Tables 6 through 9 are presented in Appendix B following Section 6.0. Elevated concentrations of constituents are shaded in the tables. The concentration of a constituent is considered to be elevated if the concentration is greater than or equal to three times the concentration detected in the background or control sample. In the case where a constituent is undetected in the background or control sample, any concentration equal to or greater than the SQL is considered to be elevated. The complete set of analytical data sheets is presented as Appendix C.

The following discussion of hazardous constituents detected at elevated levels in soil samples collected at the landfill includes only those hazardous constituents that are associated with site operations and those hazardous constituents that may pose a threat to human health or the environment.

### 4.1 SOURCE SAMPLING LOCATIONS AND ANALYTICAL RESULTS

Roy F. Weston, Inc., START-2 personnel, collected surface soil samples and eight subsurface soil samples from various locations throughout Largo Landfill. One background surface soil sample (LL-01-SS) and one background subsurface soil sample (LL-01-SB) were collected from an undisturbed area located northeast of the site at a city park. Surface soil sample LL-02-SS and subsurface soil sample LL-02-SB were collected from an area approximately 30 yards west of the northern entrance gate. Surface soil samples LL-03-SS and LL-03D-SS and subsurface soil sample LL-03-SB was collected from the central eastern border of the property in a clearing for power lines. Surface soil sample LL-04-SS and subsurface soil sample LL-04-SB were collected approximately 75 yards west of the northern entrance gate to the property. Surface soil sample LL-05-SS and subsurface soil sample LL-05-SB were collected from the

southeastern corner of the property, west of the drainage canal. Surface soil sample LL-06-SS and

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subsurface sample LL-06-SB were collected approximately 200 yards southeast of the northern entrance gate to the property. Surface soil sample LL-08-SS and subsurface soil sample LL-08-SB were collected from the northwestern border of the property within Florida Power Company's easement. Surface soil sample LL-09-SS and subsurface soil sample LL-09-SB were collected from the center of the southern boundary to the property.

#### **4.1.1 Landfill**

##### **Surface Soil**

- Metal constituents detected at elevated concentrations in on-site surface soil samples include barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, vanadium, and zinc. Metal concentrations range from 0.18 milligrams per Kilogram (mg/kg) to 440 mg/kg.
- Methyl acetate (13 micrograms per Kilogram) was the only VOC detected at an elevated level. It was detected in surface soil sample LL-09-SS.
- Several SVOCs were detected at elevated concentrations in sample LL-06-SS. Constituents detected include benzo(b)fluoranthene, benzo(k)fluoranthene, and pyrene. Benzaldehyde was detected at elevated levels in samples LL-03-SS and LL-03D-SS. Benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene were detected at elevated levels in sample LL-08-SS. SVOC concentrations ranged from 180 J mg/kg to 3,400 mg/kg.
- Gamma-chlordane was the only pesticide detected at an elevated concentration of 2.9 mg/kg.

##### **Subsurface Soil**

- Metal constituents detected at elevated levels in subsurface soil samples include barium, cadmium, copper, lead, manganese, mercury, nickel, vanadium, and zinc. Metal concentrations ranged from 0.15 mg/kg to 140 mg/kg.
- 1,4-dichlorobenzene, acetone, and chlorobenzene were the VOCs detected at elevated

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concentrations in subsurface soil samples LL-02-SB and LL-08-SB. VOC concentrations ranged from 15 mg/kg to 140 mg/kg.

- Bis(2-ethylhexyl)phthalate was detected at elevated concentrations in samples LL-07-SB (3,000mg/kg and LL-09-SB 1,700 mg/kg). Subsurface soil sample LL-04-SB contained several SVOCs ranging in concentration from 440J mg/kg to 1,100J mg/kg. The constituents detected in sample LL-04-SB include (3 and/or 4)-Methylphenol, 2-methylnaphthalene, acenaphthene and naphthalene.
- The pesticide 4,4'-DDE, alpha-chlordane, and gamma-chlordane were detected in samples LL-07-SB and LL-09-SB at concentrations ranging from 4.6 mg/kg to 57 mg/kg.
- PCB-1260 was detected at elevated levels in sample LL-02-SB (41J mg/kg and LL-07-SB (46 mg/kg).

Unknown and several miscellaneous compounds were detected in the surface and subsurface soil samples as detailed in Appendix C.

#### 4.2 SOURCE CONCLUSIONS

Based on the analytical results for surface and subsurface soil samples, surficial contamination exists within the Largo Landfill. Inorganic constituents detected at elevated levels in surface and subsurface soil samples when compared to background surface and subsurface samples include barium, cadmium, chromium, copper, lead, manganese, nickel, silver, total mercury, vanadium, and zinc. The organic constituents detected at elevated levels in the surface and subsurface soil samples include chrysene, methyl acetate, 1,4-dichlorobenzene, chlorobenzene, 2-methylnaphthalene, acenaphthene, (3-and/or 4)-methylphenol, pyrene, DDE, naphthalene, benzaldehyde, benzo(b)fluoranthene, and benzo(k)fluoranthene.



## **5.0 PATHWAYS**

This section discusses the groundwater migration, surface water migration, soil exposure, and air migration pathways. Additionally, this section discusses the targets associated with each pathway and draws pathway-specific conclusions. Sampling locations and analytical results for samples collected from the specific pathways are also discussed.

### **5.1 GROUNDWATER MIGRATION PATHWAY**

Six groundwater samples were collected during the SI. Groundwater sampling locations are depicted on Figure 3 and described in Table 3. Field parameters, inorganic and organic analytical results for groundwater samples are summarized in Tables 10, 11 and 12, respectively, in Appendix B following Section 6.0.

#### **5.1.1 Geologic and Hydrogeologic Setting**

The city of Largo, Pinellas County, Florida, lies within the hilly uplands of the Gulf Coastal Lowlands which are dominated by the Pinellas Ridge. The Ridge extends from Seminole northward to Palm Harbor. It consists of gently rolling hills formed by the erosion of small streams, and of sinkholes formed by the collapse of surface formations into limestone caverns. Altitudes range from about 25 feet to 97 feet above mean sea level (Ref. 13). The Largo Landfill property is underlain in descending stratigraphic order by: undifferentiated deposits, the Hawthorne Group, the Suwannee Limestone, and the Ocala Limestone (Refs. 13; 14; 15).

Undifferentiated deposits lie directly under the Largo Landfill. The deposits consist of sands and shelly sands, gray to white, tan, phosphatic, and some limestone. The deposits range in thickness from a few feet to more than 50 feet (Ref. 16).

The Hawthorne Group directly underlies the undifferentiated deposits. In Pinellas County the Hawthorne Group consists of the Arcadia Formation, which includes the upper portion of the Tampa Member (formerly known as the Tampa Limestone). The Arcadia Formation consists predominantly of limestone and dolomite containing varying amounts of quartz sand, clay and phosphate grains. Dolomite is

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generally the most abundant carbonate component of the Arcadia Formation except in the upper portion of the Tampa Member. The dolostones are quartz sand, phosphatic, often slightly clayey to clayey, soft to hard, moderately to highly altered, slightly porous to very porous and micro- to fine crystalline. The dolostones range in color from yellowish-gray to light olive gray. The limestones are typically a wackestone to mudstone with few beds of packstone. They range in color from white to yellowish gray (Ref. 15). The Arcadia Formation, excluding the basal Tampa Member, is approximately 100 feet in the vicinity of the property (Ref. 14). The upper portion of the Tampa Member of the Arcadia Formation represents a lithostratigraphic change in status from formation to member. The change from formation to member is necessary due to the limited areal extent of the upper portion of the Tampa Member and its lithologic similarities and relationships with the remainder of the Arcadia Formation of the Hawthorne Group (Ref. 15). The upper Tampa Member consists predominantly of limestone with subordinate dolostone, sands, and clays. Lithologically, the limestones are variably quartz sandy and clayey with minor to no phosphate. Fossil molds are often present and include mollusks, foraminifera and algae. Colors range from white to yellowish-gray. The limestones range from mudstones to packstones but are most often wackestones (Ref. 15). The upper Tampa Member is approximately 150 feet thick in the vicinity of the property (Ref. 14).

The Suwannee Limestone directly underlies the Hawthorne Group. The Suwannee Limestone is biogenic, predominantly foraminiferal test packstone to grainstone. Interbeds may contain quartz sand, and dolomite, which is common toward the unit's base from the Tampa Bay area southward. The upper part may contain thin chert lenses and be highly macrofossiliferous. The limestone ranges in color from white to cream (Ref. 14). The Suwannee Limestone is approximately 300 feet thick in the vicinity of the property (Ref. 14).

The Ocala Limestone directly underlies the Hawthorne Group. The Ocala Limestone is a shallow water marine limestone composed of foraminiferal tests, large foraminifera, mollusks, and large echinoids. Lithologically, it is a soft-to-hard, highly fossiliferous limestone that contains minor amounts of dolomite (Ref. 14). The Ocala is approximately 350 feet thick in the vicinity of the property (Ref. 14).

In Pinellas County, two aquifers have been identified - the surficial aquifer and the Floridan Aquifer. The surficial aquifer consists of the unconsolidated sand and shelly sand (Ref. 16). These deposits vary in composition both laterally and vertically. In most areas, the sand and shelly sand of the surficial aquifer grade downward to a sandy clay or marl with some interbedding of clay. Near the surface, the sand commonly contains a mixture of organic material and silt that form a hardpan (Ref. 16). This hardpan occurs at depths of about 5 to 10 feet and acts as a semi-confining bed that restricts the vertical movement of water. In some areas, a gray to white, sandy, phosphatic limestone forms the base of the surficial aquifer (Ref. 16). The surficial aquifer is approximately 30 to 50 feet thick in the vicinity of the Landfill (Ref. 16, Figure 3). The surficial aquifer is unconfined and recharge is primarily from local rainfall. Groundwater flow within the surficial aquifer follows local topography (Ref. 16). The surficial aquifer in Pinellas County has only limited use as a supplemental or alternative source of water for public, industrial or agricultural supply. The aquifer is thin and heterogenous, has low values of transmissivity, and low yields to pumping wells (Ref. 13). The Arcadia Formation (upper portion of the Tampa Member) is the lower confining unit for the surficial aquifer separating it from the Floridan Aquifer.

The Floridan Aquifer system includes in descending order; the basal Tampa Member of the Arcadia Formation, the Suwanee Limestone and the Ocala Limestone. The Ocala Limestone is not an important component of the Floridan Aquifer system in Pinellas County due to its depth and the productiveness of the Suwannee and Tampa Limestones (Ref. 17, pp.17-20). The basal portion of the Tampa and the Suwannee Limestone effectively function as a single hydrological unit (Ref. 18, p. 12). The basal Tampa Member forms the upper layer of the Floridan Aquifer and is first encountered at between sea level in the Tarpon Springs area to 120 feet below sea level in the St. Petersburg area. Locally, the depths to the basal Tampa Member may vary over a wide range. This variability of depth reflects the irregular surface of the basal Tampa Member caused by numerous pinnacles and sinkholes. The basal Tampa Limestone contains numerous solution channels (Ref. 17, p. 14). The aquifer ranges in thickness from 1,000 feet to 1,200 feet throughout the county (Ref. 13, p. 123). Groundwater use from the Floridan Aquifer is restricted, in Pinellas County. This is due to the aquifer's sensitivity to saltwater encroachment and subsequent water quality. However, the Floridan Aquifer is used for municipal supply. Agricultural and

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industrial uses are minor. Of the total water used for public supply, only about ten percent is withdrawn from Pinellas County. The remainder is imported from adjacent counties. Wellfields which draw from the Floridan Aquifer in Pinellas County include Eldridge-Wilde, East Lake Road, Dunedin, Clearwater, and Bellair (Ref. 13, p. 129). Regional groundwater flow in the county is usually ill defined, however, the general groundwater trend is to flow towards the southwest (Ref. 14, p. 28). Recharge to the Floridan Aquifer system varies from none to very low in southern Pinellas County to low to moderate in northern Pinellas County (Ref. 13, p. 130).

#### **5.1.2 Groundwater Sampling Locations and Analytical Results**

Roy F. Weston, Inc., START-2 personnel, collected six groundwater samples on Largo Landfill. The sample collected for comparison to on-site samples was LL-01-GW. It was collected from an undisturbed area northeast of the landfill in a city park. The five remaining samples were collected downgradient of the background sample. Groundwater sample LL-02-GW was collected from an area approximately 30 yards west of the northern entrance gate. Groundwater sample HS-03-GW was collected from the central eastern border of the property in a clearing for power lines. Groundwater sample LL-04-GW was collected from approximately 75 yards west of the northern entrance gate to the property. Groundwater sample LL-05-GW was collected from the southeastern corner of the property, west of the drainage canal. Groundwater sample LL-06-GW was collected from the center of the southern boundary to the property. Table 10 lists the field parameters for the groundwater samples.

### Temporary Monitoring Wells

- All groundwater samples collected from temporary monitoring wells were screened in the shallow aquifer. Temporary monitoring wells were installed by START-2 personnel using a Geoprobe, stainless steel casings, and stainless steel screens.
- Metal compounds detected at elevated concentrations in the groundwater samples LL-02-GW, LL-03-GW, LL-04-GW, LL-05-GW, and LL-06-GW include arsenic, barium, chromium, lead, manganese, mercury, vanadium, and zinc. Concentrations of the aforementioned constituents range from 0.73 micrograms per Liter (mg/L) to 640J mg/L.
- The only organic compound detected at an elevated concentration in the groundwater and also detected at elevated concentrations in source samples is chlorobenzene. Chlorobenzene concentrations in the groundwater ranged from 16 mg/kg in sample LL-06-GW to 56 mg/L in sample LL-04-GW.
- No other organic compounds were detected at elevated levels in groundwater samples.

All well depths were screened from approximately 8 to 9 feet bgs (Ref. 19, pp. 4, 5).

#### **5.1.3 Groundwater Targets**

According to a CENTRACTS report based on 1990 U.S. Bureau of Census data, an estimated 1,039 persons obtain potable water from private wells located within 4 miles of the facility and are distributed as follows: 0 to 0.25, 1 person; 0.25 to 0.50, 7 persons; 0.50 to 1 mile, 40 persons; 1 to 2 miles, 212 persons; 2 to 3 miles, 386 persons; and 3 to 4 miles, 393 persons. The nearest private well is located between 0 to 0.25 mile from the facility (Ref. 20).

Municipal water is obtained through the Pinellas County Water System (PCWS), Town of Bellair Water System (TBWS), and the Wyatt Springs Water System (WSWS) (Ref. 1, p. 10). All wells in the aforementioned water systems are screened in the Floridan Aquifer. PCWS does not have any wells located within a 4-mile radius of the landfill. The TBWS serves 4,878 people by means of six interconnected wells. The average number of persons per well is 813 ( $4,878 \text{ people} \div 6 \text{ wells} = 813$ ).

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people per well). Of the six TBWS wells, four are within a 1 to 2-mile radius of the landfill; the other two wells are outside of a 4-mile radius of the landfill. Therefore, there are 3,252 persons served by TBWS wells within a 4-mile radius of the landfill (Ref. 21).

The WSWS is a community well system which serves a total of four connections. According to 2000 U.S. Census Bureau figures, there are 2.17 persons per household in Pinellas County (Ref. 22). Therefore, approximately 9 persons are served by the WSWS (2.17 people per household x 4 connections) (Ref. 23).

#### **5.1.4 Groundwater Conclusions**

Inorganic constituents detected at elevated concentrations in groundwater samples include: arsenic, barium, chromium, lead, magnesium, manganese, potassium, total mercury, vanadium, and zinc. Chlorobenzene was the only organic constituent detected at an elevated level in groundwater samples LL-04-GW and LL-06-GW. Chlorobenzene was also detected in a source subsurface soil sample.

The groundwater migration pathway is a likely migration pathway for on-site contaminants due to the nature of the soils in the vicinity of the property. On-site groundwater samples (collected from the surficial aquifer) indicate the presence of elevated concentrations of metals including barium, chromium, lead, manganese, mercury, vanadium, and zinc. An elevated concentration of chlorobenzene was also detected in a groundwater sample. The only constituent detected above National Drinking Water Regulations is lead. Lead was detected at concentrations ranging from 5.4 micrograms per liter ( $\mu\text{g/L}$ ) to 72  $\mu\text{g/L}$ . The maximum contaminant level for lead is 15  $\mu\text{g/L}$ . The majority of residents in the vicinity of the landfill are served by municipal water supplies. A total of 3,270 persons are served by five wells located within 4 miles of the property. The nearest well is located approximately 1.5 miles from the landfill; all wells are completed in the Floridan Aquifer.

## **5.2 SURFACE WATER MIGRATION PATHWAY**

Seven surface water and sediment samples were collected during the SI from the Long Bayou Drainage Canal which bisects the landfill and an unnamed tributary to Lake Seminole.

### **5.2.1 Hydrologic Setting**

Surface water runoff from Largo Landfill generally flows south with the slope of the land to the Long Bayou Drainage Canal, down the unnamed tributary into Lake Seminole and Lake Seminole flows south into Long Bayou where there is an outlet to both the Gulf of Mexico and Boca Ciega Bay. The 15-mile surface water pathway is completed in the Gulf of Mexico. Both the Gulf of Mexico and Boca Ciega Bay are tidally influenced and flow rates are not available. The flow rate of the unnamed tributary to Long Bayou Drainage Canal is approximately 400 cubic feet per second (Ref. 24). The designated wetland area on the property contains stagnant water (Ref. 25). Portions of the landfill are within the 100-year flood plain, the remaining portions are within areas of minimal flooding (Ref. 26). There are no known surface water intakes are located along the downstream 15-mile surface water target distance limit (Ref. 27).

### **5.2.2 Surface Water and Sediment Sampling Locations and Analytical Results**

Several sediment and surface water samples were collected from the Long Bayou Drainage Canal that bisects Largo Landfill and also the waterway at the southern end of the canal. Sediment sample LL-01-SD and surface water sample LL-01-SW are the background samples for the Long Bayou Drainage Canal. Sediment samples LL-02-SD, LL-03-SD, LL-04-SD and surface water samples LL-02-SW, LL-03-SW, LL-04-SW were collected from the drainage canal. Sediment samples LL-05-SD, LL-06-SD and surface water samples LL-05-SW, LL-06-SW were collected from the water way south of the drainage canal. Sediment sample LL-02-SD and surface water sample LL-02-SW were collected along the northern end of the drainage canal, west of the Winn Dixie. Sediment sample LL-03-SD and surface water sample LL-03-SW were collected along the center of the drainage canal. Sediment sample LL-04-SD and surface water sample LL-04-SW were collected along the south end of the drainage canal.

#### **Surface Water**

- No metal constituents were detected at elevated concentrations in surface water samples collected from the drainage canal or the adjacent water way.
- The only elevated organic constituent detected in surface water samples is bis(2-

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ethylhexyl)phthalate. This compound is not considered to be site related.

### **Sediment**

- Several inorganic constituents were detected at elevated levels in the sediment samples. Such constituents include barium, copper, manganese, and zinc. These constituents range in concentration from 5.1 mg/kg to 66 mg/kg. The above mentioned constituents were detected in source samples also.
- Fluoranthene was the only SVOC detected at elevated levels in samples LL-02-SD and LL-03-SD from the canal and from sample LL-06-SD which was collected from the waterway. Fluoranthene concentrations range from 250J mg/kg to 460J mg/kg.
- The pesticides alph-chlordane, dieldrin, and gamma-chlordane were detected at elevated levels in sample LL-04-SD collected from the canal. Pesticide concentrations range from 4.2 mg/kg to 7.7 mg/kg.

### **5.2.3 Surface Water Targets**

There are no known surface water intakes within the 15-mile downstream surface water pathway of Largo Landfill (Ref. 27).

The unnamed waterway south of Long Bayou Drainage Canal is used for recreational fishing (Ref. 28, p. 2). There are approximately 15-miles of wetland frontage along the downstream surface water pathway (Ref. 29). Several federal threatened and endangered species are located within the 15-mile downstream surface water pathway of the landfill. Such species include the West Indian Manatee (*Trichechus manatus latirostris*), Kemps Ridley Sea Turtle (*Lepidochelys kempi*), and Loggerhead Sea Turtle (*Caretta caretta caretta*) (Ref. 30). All of the waters of Pinellas County are also considered aquatic preserves. These waters include: Lake Seminole, Boca Ciega Bay, Terra Ceia Bay and Cockroach Bay (Ref. 30).



#### **5.2.4 Surface Water Conclusions**

The surface water migration pathway includes Long Bayou Drainage Canal, Lake Seminole, Boca Ciega Bay, and the Gulf of Mexico. Surface water samples collected in Long Bayou Drainage Canal contained elevated levels of bis(2-ethylhexyl) phthalate. Past investigations revealed levels of lead in the drainage canal. During the SI, the inorganic constituents that were detected in the sediment samples include barium, copper, manganese, and zinc. The aforementioned constituents were detected in source samples, however, they are naturally occurring.

The surface water pathway is a viable migration route. The on-site canal collects surface water run-off which is then directed to a waterway leading to Lake Seminole, Boca Ciega Bay, and terminating in the Gulf of Mexico. Constituents detected in samples collected from the surface water pathway include barium, copper, manganese, and zinc. Constituents detected in samples collected from the on-site wetland areas included manganese, zinc, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene. No organic compounds were detected in samples collected from off-site surface water bodies.

### **5.3 SOIL EXPOSURE PATHWAY AND AIR MIGRATION PATHWAY**

Ten surface soil (including one duplicate surface soil sample) and eight subsurface soil samples were collected during the SI. Surface and subsurface soil sample results were discussed in Section 4.0.

#### **5.3.1 Physical Conditions**

Largo Landfill is no longer in operation and the area immediately surrounding the facility is industrial and rural residential (Refs. 1; 2). The southwestern portion of the property is accessible to the public (Ref. 19, p. 13). Three schools are located within a 0.5 mile radius of the landfill (Ref. 2). Future plans for Largo Landfill involves conversion into a city park and stormwater treatment facility (Ref. 31).

#### **5.3.2 Sampling Locations and Analytical Results**

Surface and subsurface soil sampling locations and analytical results are discussed under Source Sampling in Section 4.1. No air samples were collected during the SI.

### 5.3.3 Soil and Air Targets

According to a CENTRACTS report based on 1990 U.S. Bureau of Census data, approximately 170,558 people live within 4 radial miles of Largo Landfill. The population distribution is as follows: 0 to 0.25 mile, 486 persons; 0.25 to 0.50 mile, 1,792 persons; 0.50 to 1 mile, 10,144 persons; 1 to 2 miles, 40,544 persons; 2 to 3 miles, 58,708 persons; 3 to 4 miles, 58,884 persons (Ref. 20). The nearest residences are northwest of the landfill. Several federal threatened and endangered species are suspected to be within the vicinity of Largo Landfill although their exact location has not been identified. Approximately 169-acres of wetlands are located within a 4-mile radius of the Largo Landfill (Ref. 29). All Pinellas County waters, including Long Bayou Drainage Canal, Lake Seminole, Boca Ciega Bay, and Terra Ceia Bay, are aquatic preserves (Ref. 30).

### 5.3.4 Soil and Air Conclusions

There is extensive soil contamination at the Largo Landfill. Surface and Subsurface soil samples detected inorganic constituents such as barium, cadmium, copper, lead, manganese, nickel, silver, total mercury, vanadium, and zinc. Organic constituents detected in surface and subsurface soil samples include benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, pyrene, DDE, methyl acetate, 1,4-dichlorobenzene, chlorobenzene, 2-methylnaphthalene, acenaphthene, (3-and/or 4)-methylphenol, and naphthalene.

## 6.0 SUMMARY AND CONCLUSIONS

Largo Landfill was operated by the City of Largo. The city still owns portions of the property which include the northwest, southwest and eastern portions. Based on available file information, the landfill was used for agricultural practices from the mid-1950s to the early 1960s. The landfill reportedly accepted residential, commercial and industrial wastes from the early 1960s to the 1970s. In January 1981, the landfill was supposedly closed by the city. Although waste disposal practices included both the trench and high rise methods, reportedly, landfill waste was also disposed of into a pond and wetland area on the property. Unlined landfill cells were reported to be 10 feet deep. However, city employees alleged that waste was disposed of in trenches to depths of 40 feet. According to the file information, landfill activities took place in the northern portion of the property.

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Based on the analytical results for surface and subsurface soil samples, surficial contamination exists within the Largo Landfill. Inorganic constituents detected at elevated levels in surface and subsurface soil samples when compared to background surface and subsurface samples include barium, cadmium, chromium, copper, lead, manganese, nickel, silver, total mercury, vanadium, and zinc. The organic constituents detected at elevated levels in the surface and subsurface soil samples include chrysene, methyl acetate, 1,4-dichlorobenzene, chlorobenzene, 2-methylnaphthalene, acenaphthene, (3-and/or 4)-methylphenol, pyrene, DDE, naphthalene, benzaldehyde, benzo(b)fluoranthene, and benzo(k)fluoranthene. Groundwater sampling around the landfill had consistently shown contamination. Inorganic constituents detected at elevated concentrations in groundwater samples include: arsenic, barium, chromium, lead, magnesium, manganese, potassium, total mercury, vanadium, and zinc. Chlorobenzene was the only organic constituent detected at an elevated level in groundwater samples LL-04-GW and LL-06-GW. Chlorobenzene was also detected in a subsurface soil sample collected from the source area.

The groundwater migration pathway is a likely migration pathway for on-site contaminants due to the nature of the soils in the vicinity of the property. On-site groundwater samples (collected from the surficial aquifer) indicate the presence of elevated concentrations of metals including barium, chromium, lead, manganese, mercury, vanadium, and zinc. An elevated concentration of chlorobenzene was also detected in a groundwater sample. The only constituent detected above National Drinking Water Regulations is lead. Lead was detected at concentrations ranging from 5.4 micrograms per liter ( $\mu\text{g/L}$ ) to 72  $\mu\text{g/L}$ . The maximum contaminant level for lead is 15  $\mu\text{g/L}$ . The majority of residents in the vicinity of the landfill are served by municipal water supplies. A total of 3,270 persons are served by five wells located within 4 miles of the property. The nearest well is located approximately 1.5 miles from the landfill; all wells are completed in the Floridan Aquifer.

The surface water migration pathway includes Long Bayou Drainage Canal, Lake Seminole, Boca Ciega Bay, and the Gulf of Mexico. Surface water samples collected in Long Bayou Drainage Canal contained elevated levels of bis(2-ethylhexyl) phthalate. Past investigations revealed levels of lead in the drainage canal. During the SI, the inorganic constituents that were detected in the sediment samples include barium, copper, manganese, and zinc. The aforementioned constituents were detected in source samples.

The surface water pathway is a viable migration route. The on-site canal collects surface water run-off which is then directed to a waterway leading to Lake Seminole, Boca Ciega Bay, and terminating in the Gulf of Mexico. Constituents detected in samples collected from the surface water pathway include barium, copper, manganese, and zinc, with concentrations ranging from 5.1 mg/kg to 66 mg/kg. Constituents detected in samples collected from the on-site wetland areas included manganese, zinc, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene. No organic compounds were detected in samples collected from off-site surface water bodies. The soil exposure pathway is a viable pathway. Numerous inorganic and organic constituents were detected at elevated concentrations in on-site soils. Portions of the landfill are to be converted into a city park and a stormwater treatment facility. The air migration pathway is not a viable pathway.

Based on the analytical results of samples collected and observations made during the SI, further CERCLA evaluation is recommended for Largo Landfill.

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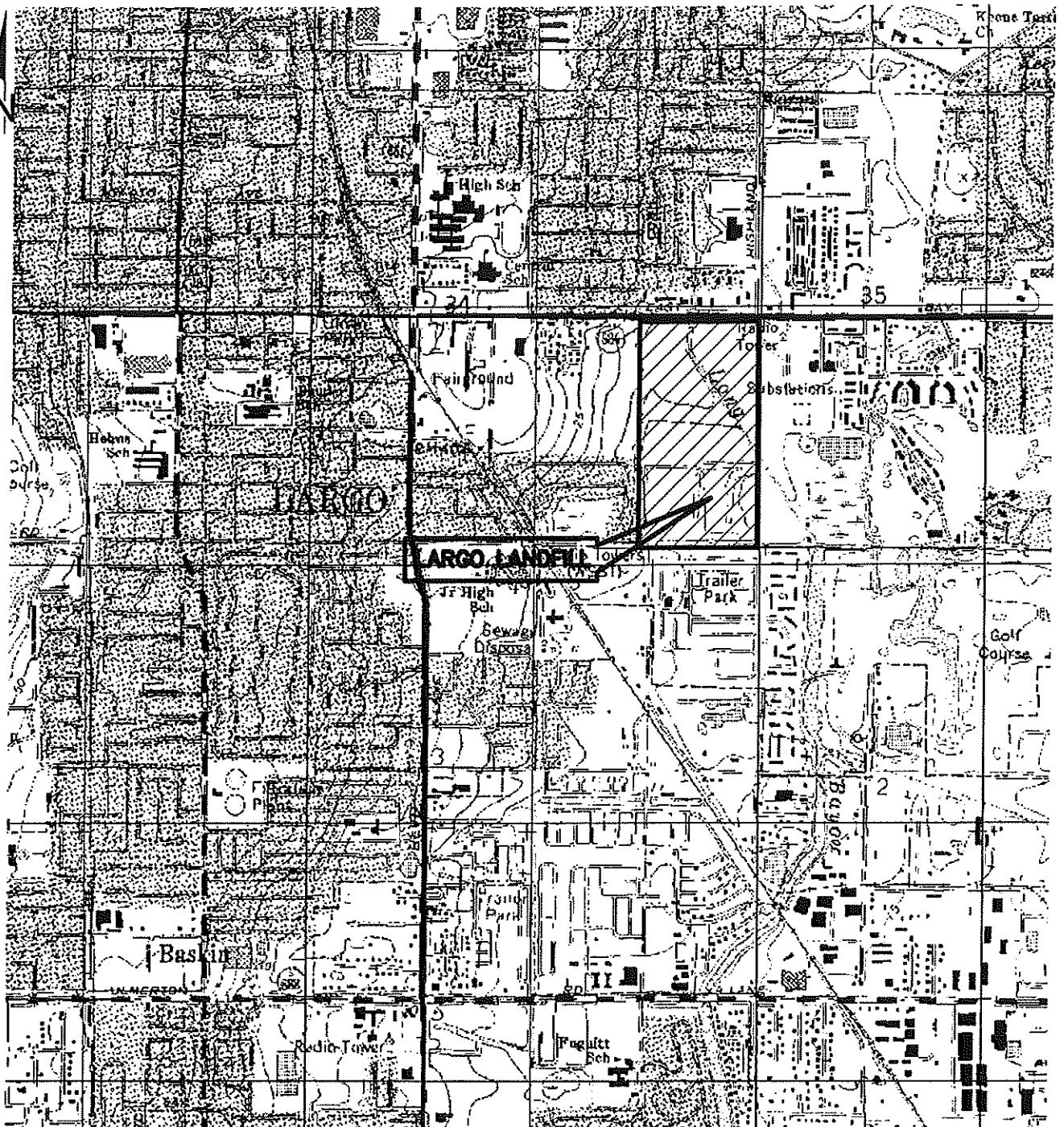
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Final Site Inspection Report  
Largo Landfill  
Revision: 1  
Date: September 2001  
DCN: RFW-LLS-0021

## **APPENDIX A**

### **FIGURES**





MODIFIED U.S.G.S. QUAD CLEARWATER MAP (7.5 SERIES), DATED 1999, SCALE: 1:2000

# LARGO LANDFILL PINELLAS COUNTY, FLORIDA

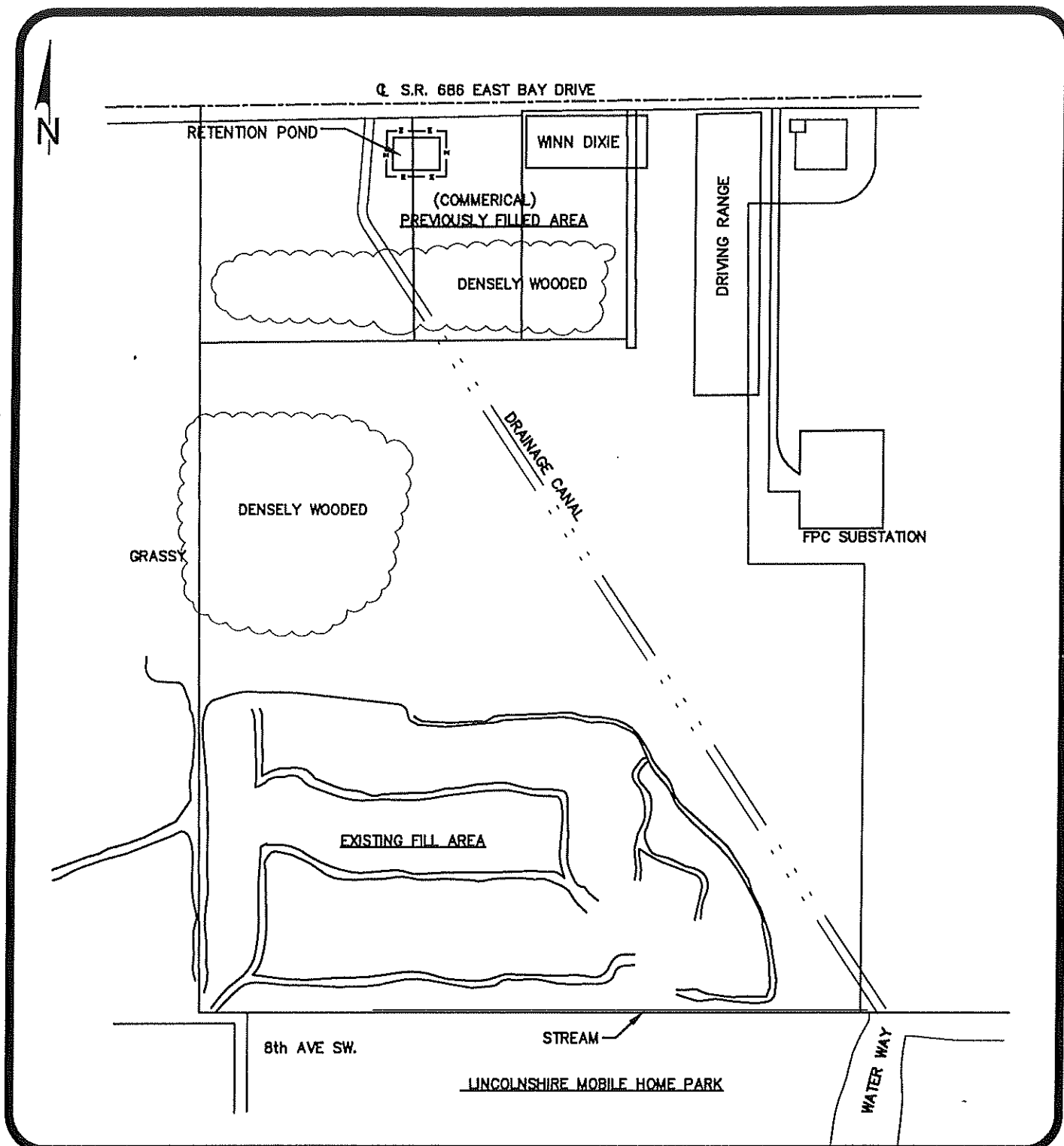
# GENERAL SITE LOCATION MAP

FIGURE 1



DRAWN: J. MILLER	DATE: 08/02/01	W.O. NO.: largo.dwg 12587-001-001-0029
SCALE: AS SHOWN	EPA ID NO: FLD002451383	TOD NO: 4W-01-11-A-006





LARGO LANDFILL  
PINELLAS COUNTY, FLORIDA

SITE LAYOUT MAP

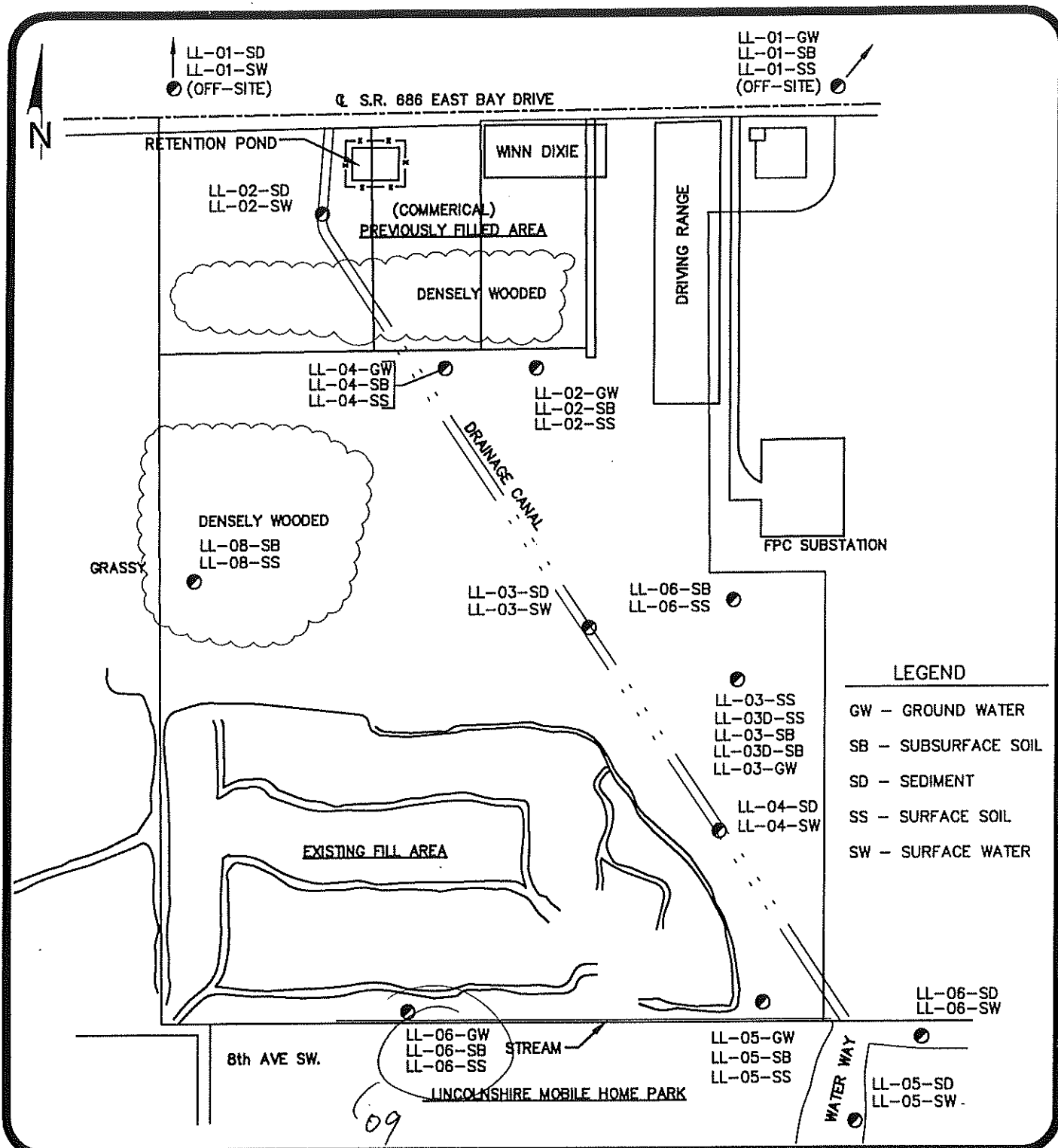
FIGURE 2



ROY F. WESTON, INC.  
**WESTON**  
MANAGERS DESIGNERS/CONSULTANTS

DRAWN: J. MILLER	DATE: 08/02/01	W.O. NO.: largo.dwg 12587-001-001-0029
SCALE: N.T.S.	EPA ID NO: FLD002451383	TOD NO: 4W-01-11-A-006





LARGO LANDFILL  
PINELLAS COUNTY, FLORIDA

SAMPLE  
LOCATION MAP  
FIGURE 3



ROY F. WESTON, INC.  
**WESTON**  
MANAGERS DESIGNERS/CONSULTANTS

DRAWN: J. MILLER	DATE: 08/02/01	W.O. NO.: largo.dwg 12587-001-001-0029
SCALE: N.T.S.	EPA ID NO: FLD0002L51383	TDD NO: 4W-01-11-A-006



## ANALYTICAL DATA TABLES

### APPENDIX B

TABLE 6  
SUMMARY OF INORGANIC ANALYTICAL RESULTS  
SURFACE SOIL SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-SS	LL-02-SS	LL-03-SS	LL-03D-SS	LL-04-SS	LL-05-SS	LL-06-SS	LL-07-SS	LL-08-SS	LL-09-SS
<b>Inorganics - Total (mg/kg)</b>										
Aluminum	610	2100	5000	4600	1900	6600	2200	4200	1900	770
Barium	6.0	8.8	37	35	8.3	50	13	140	6.5	4.7
Cadmium	0.07 U	0.08 U	0.15 U	0.18 U	0.07 U	0.32 U	0.17 U	1.9	0.08 U	0.06 U
Calcium	1700	1700	11000	12000	1500	26000	28000	10000	1800	63000
Chromium	3.0	4.0	11	10 J	3.9	11	5.6	20	3.1	1.6 U
Copper	2.8	7.3	13	13	6.7	16	7.6	140	4.2	1.8
Iron	550	1500	4300	3700	1200	4400	1300	14000	780	440
Lead	15	12	26	29 J	11	25	16	140	8.6	16
Magnesium	130	180	1000	1100	140	1800	420	560	100	460
Manganese	2.4	18	32	36	15	91	22	150	7.9	12
Nickel	1.2	1.2	6.4	5.3 U	0.99	5.5	1.9	14	1.1	0.57
Potassium	60	120	160	190	110	670	160	630	32 U	52
Silver	0.16 U	0.16 U	0.25 U	0.26 U	0.16 U	0.16 U	0.18	3.8	0.19 U	0.14 U
Total Mercury	0.08 U	0.05 U	0.17 U	0.18 U	0.05 U	0.11 U	0.08 U	0.27	0.07 U	0.05 U
Vanadium	3.1	2.9	11	10 U	2.3	11	4.8	5.9	3.5	1.4
Zinc	6.7	31	21	32	29	190	34	440	24	17

Notes:

- LL - Largo Landfill
- SS - surface soil sample
- D - duplicate sample
- mg/kg - milligrams per kilogram
- U - value is below the reporting limit
- J - estimated value
- Shading - constituent is elevated above background

TABLE 7  
SUMMARY OF ORGANIC ANALYTICAL RESULTS  
SURFACE SOIL SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-SS	LL-02-SS	LL-03-SS	LL-03D-SS	LL-04-SS	LL-05-SS	LL-06-SS	LL-07-SS	LL-08-SS	LL-09-SS
<b>VOCs (ug/kg)</b>										
Methyl Acetate	12 U	12 U	21 U	21 U	12 U	12 U	11 U	12 U	13 U	13
Toluene	12 U	12 U	21 U	21 U	12 U	12 U	4 J	12 U	13 U	2 J
<b>Semivolatiles (ug/kg)</b>										
Benzaldehyde	390 UJ	55 J	850 J	430 J	39 J	160 J	680 UJ	390 UJ	96 J	670 UJ
Benzo(a)anthracene	390 U	400 U	630 U	620 U	380 U	410 U	160 J	390 U	87 J	670 U
Benzo(b)fluoranthene	51 J	400 U	79 J	73 J	380 U	110 J	250 J	390 U	200 J	670 U
Benzo(ghi)perylene	390 U	400 U	630 U	620 U	380 U	410 U	130 J	390 U	66 J	670 U
Benzo(k)fluoranthene	50 J	400 U	630 U	65 J	380 U	61 J	250 J	390 U	180 J	670 U
Benzo-a-pyrene	390 U	400 U	630 U	620 U	380 U	70 J	230 J	390 U	150 J	670 U
Bis(2-ethylhexyl) Phthalate	390 U	400 U	630 U	620 U	380 U	410 U	3400	390 U	470 U	670 U
Chrysene	63 J	46 J	71 J	74 J	40 J	81 J	290 J	390 U	190 J	670 U
Fluoranthene	78 J	60 J	82 J	82 J	46 J	110 J	340 J	390 U	220 J	95 J
Indeno (1,2,3-cd) Pyrene	390 U	400 U	630 U	620 U	380 U	410 U	130 J	390 U	96 J	670 U
Phenanthrene	390 U	400 U	630 U	620 U	380 U	410 U	120 J	390 U	63 J	670 U
Pyrene	68 J	51 J	70 J	68 J	40 J	87 J	310 J	390 U	200 J	78 J
<b>Pesticides &amp; PCBs (ug/kg)</b>										
4,4'-DDD (p,p'-DDD)	4.4 N	4.0 U	6.3 U	6.0 U	3.7 U	4.2 U	3.4 U	3.9 U	4.7 U	3.4 U
4,4'-DDT (p,p'-DDT)	4.0 U	4.0 U	6.3 U	6.0 U	3.7 U	4.2 U	4.9 N	3.9 U	4.7 U	3.4 U
Alpha-chlordane	2.0 U	2.1 U	3.2 U	3.1 U	1.9 U	2.2 U	3.1 N	2.0 U	2.4 U	1.8 U
Gamma-chlordane	2.0 U	2.1 U	3.2 U	3.1 U	1.9 U	2.2 U	2.9	2.0 U	2.4 U	1.8 U
PCB-1260 (Aroclor 1260)	39 U	40 U	63 U	60 U	28 J	42 U	34 U	39 U	47 U	34 U

Notes:

- LL - Largo Landfill
- SS - surface soil sample
- D - duplicate sample
- VOCs - volatile organic compounds
- ug/kg - micrograms per kilogram
- U - value is below the reporting limit
- J - estimated value
- PCBs - polychlorinated biphenyls
- N - presumptive evidence of presence of material
- Shading - constituent is elevated above background

TABLE 8  
SUMMARY OF INORGANIC ANALYTICAL RESULTS  
SUBSURFACE SOIL SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-SB	LL-02-SB	LL-03-SB	LL-04-SB	LL-05-SB	LL-06-SB	LL-07-SB	LL-08-SB	LL-09-SB
<b>Inorganics - Total (mg/kg)</b>									
Aluminum	3000	2000	1000	8800	10000	960	3000	2400	1600
Barium	3.6	7.4	15	8.3	98	7.9	9.1	4.7	50
Cadmium	0.07 U	0.07 U	0.07 U	0.07 U	0.19 U	0.07 U	0.07 U	0.07 U	1.6
Calcium	280	2000	2100	360	52000	1100	850	680	72000
Chromium	6.4	6.2	2.6	11 J	18	2.1 U	3.9	3.5	6.1
Copper	0.58	3.0	1.4	0.45 U	25	11	1.9	0.44	15
Iron	300	1400	310	860	4600	650	960	240	3000
Lead	4.6	9.8	1.2 J	3.5 J	9.9	8.3	2.1	1.4	64
Magnesium	42 U	190	130	88 U	2600	79	230	55 U	530
Manganese	1.3	6.7	3.7	3.5 U	140	6.5	2.6	1.2	37
Nickel	0.36	0.89	0.87	1.4 U	9.2	0.80	1.4	0.42	2.3
Potassium	10 U	31 U	26 U	64	1100	54	160	25 U	100
Total Mercury	0.07 U	0.15	0.05 U	0.06 U	0.07 U	0.05 U	0.06 U	0.06 U	0.21
Vanadium	1.5	2.1	1.8	5.4 U	14	2.5	3.4	2.8	3.1
Zinc	0.24 U	12	0.24 U	0.24 U	10	19	0.68	0.25 U	120

Notes:

LL - Largo Landfill  
SB - subsurface soil sample  
mg/kg - milligrams per kilogram  
U - value is below the reporting limit  
J - estimated value

Shading - constituent is elevated above background

TABLE 9  
SUMMARY OF ORGANIC ANALYTICAL RESULTS  
SUBSURFACE SOIL SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-SB	LL-02-SB	LL-03-SB	LL-04-SB	LL-05-SB	LL-06-SB	LL-07-SB	LL-08-SB	LL-09-SB
<b>VOCs (ug/kg)</b>									
1,4-Dichlorobenzene	11 U	16	13 U	11 U	14 U	11 U	14 U	14 UJ	3 J
Acetone	18 U	140 J	62 U	39 U	98 U	44 U	14 U	110	26 U
Carbon Disulfide	11 U	3 J	13 U	11 U	14 U	11 U	14 U	14 U	13 U
Chlorobenzene	11 U	15	13 U	11 U	3 J	11 U	14 U	14 UJ	13 UJ
Isopropylbenzene	11 U	5 J	13 U	11 U	14 U	11 U	14 U	14 UJ	13 UJ
Toluene	11 U	2 J	13 U	11 U	14 U	11 U	14 U	14 UJ	13 UJ
Trichlorofluoromethane	11 UJ	13 U	13 U	11 U	14 U	11 U	14 UJ	14 U	2 J
<b>Semivolatiles (ug/kg)</b>									
(3-and/or4)-Methylphenol	350 U	900 U	400 U	440 J	470 U	370 U	430 U	400 U	800 U
1,1-Biphenyl	350 U	900 U	400 U	200 J	470 U	370 U	430 U	400 U	800 U
2-methylnaphthalene	350 U	900 U	400 U	1000 J	470 U	370 U	430 U	400 U	800 U
Acenaphthene	350 U	900 U	400 U	810 J	470 U	370 U	430 U	400 U	800 U
Benzaldehyde	350 UJ	900 UJ	400 UJ	2000 UJ	470 UJ	370 UJ	88 J	400 UJ	800 UJ
Benzo(a)anthracene	350 U	900 U	400 U	2000 U	470 U	370 U	120 J	400 U	800 U
Benzo(b)fluoranthene	350 U	900 U	400 U	2000 U	470 U	370 U	110 J	400 U	800 U
Benzo(k)fluoranthene	350 U	900 U	400 U	2000 U	470 U	370 U	120 J	400 U	800 U
Benzo-a-pyrene	350 U	900 U	400 U	2000 U	470 U	370 U	110 J	78 J	800 U
Bis(2-ethylhexyl) Phthalate	350 U	900 U	400 U	2000 U	470 U	370 U	3000	400 U	1700
Chrysene	350 U	900 U	400 U	2000 U	470 U	370 U	140 J	400 U	800 U
Dibenzofuran	350 U	900 U	400 U	310 J	470 U	370 U	430 U	400 U	800 U
Fluoranthene	350 U	900 U	400 U	2000 U	470 U	370 U	180 J	400 U	800 U
Indeno (1,2,3-cd) Pyrene	350 U	900 U	400 U	2000 U	470 U	370 U	48 J	400 U	800 U
Naphthalene	350 U	900 U	400 U	1100 J	470 U	370 U	430 U	400 U	800 U
Phenanthrene	350 U	900 U	400 U	2000 U	470 U	370 U	48 J	400 U	800 U
Pyrene	350 U	900 U	400 U	2000 U	470 U	370 U	150 J	400 U	800 U
<b>Pesticides &amp; PCBs (ug/kg)</b>									
4,4'-DDE (p,p'-DDE)	3.5 U	4.5 U	4.1 U	3.9 U	4.6 U	3.7 U	9.8	4.0 U	57
Alpha-chlordane	1.8 U	2.3 U	2.1 U	2.0 U	2.4 U	1.9 U	3.1 U	2.0 U	17
Gamma-chlordane	1.8 U	2.3 U	2.1 U	2.0 U	2.4 U	1.9 U	4.6	2.0 U	24
PCB-1260 (Aroclor 1260)	35 U	41 J	41 U	39 U	46 U	37 U	46	40 U	40 U

Notes:

- LL - Largo Landfill
- SB - subsurface soil sample
- VOCs - volatile organic compounds
- ug/kg - micrograms per kilogram
- U - value is below the reporting limit
- J - estimated value
- PCBs - polychlorinated biphenyls
- Shading - constituent is elevated above background



**TABLE 10**  
**SUMMARY OF FIELD PARAMETERS**  
**GROUNDWATER SAMPLES**  
**LARGO LANDFILL**  
**LARGO, FLORIDA**

Sample Number	pH	Conductivity (μS/cm)	Turbidity (NTU)	Temperature °C	Comments
LL-01-GW	7.22	0.592	3	20.3	Sample was collected when water parameters stabilized
LL-02-GW	6.84	0.294	NR	20.6	No final turbidity reading was reported
LL-03-GW	7.1	0.477	3	18.2	Sample was collected when water parameters stabilized
LL-04-GW	7.38	0.459	1	18.9	Sample was collected when water parameters stabilized
LL-05-GW	7.2	0.225	1	20.3	Sample was collected when water parameters stabilized
LL-06-GW	7.23	0.394	2	17.5	Sample was collected when water parameters stabilized

Notes:

LL - Largo Landfill  
 GW - Temporary monitoring well sample  
 μS/cm - microsiemens per centimeter  
 NTU - Nephelometric turbidity units  
 °C - degrees Celsius  
 NR - No reading

TABLE 11  
SUMMARY OF INORGANIC ANALYTICAL RESULTS  
GROUNDWATER SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-GW	LL-02-GW	LL-03-GW	LL-04-GW	LL-05-GW	LL-06-GW
<b>Inorganics - Total (ug/l)</b>						
Aluminum	2000	170000	6900	92000	2600	250 U
Arsenic	2.1 U	24	10 U	7.9 U	42 U	2.3 U
Barium	12 J	300 J	220 J	270 J	640 J	240 J
Calcium	20000	140000	130000	85000	180000	210000
Chromium	7.7 U	200	31	130	7.9 U	5.9 U
Iron	2600	23000	3800	4600	3900	34000
Lead	1.5 U	47 J	5.4	72	1.1 U	1.2
Magnesium	11000	74000	24000	35000	32000	32000
Manganese	16 J	140 J	140 J	160 J	96 J	580 J
Potassium	320 J	17000 J	15000 J	35000 J	92000 J	72000 J
Sodium	14000	66000	69000	50000	120000	76000
Total Mercury	0.10 U	0.73	0.10 U	1.5	0.10 U	0.10 U
Vanadium	6.6 U	130	13 U	81	39 U	0.71 U
Zinc	4.1 U	33	17 U	55 U	180	65

Notes:

- LL - Largo Landfill
- GW - temporary monitoring well sample
- ug/L - micrograms per liter
- U - value is below the reporting limit
- J - estimated value
- Shading - constituent is elevated above background

TABLE 12  
SUMMARY OF ORGANIC ANALYTICAL RESULTS  
GROUNDWATER SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-GW	LL-02-GW	LL-03-GW	LL-04-GW	LL-05-GW	LL-06-GW
<b>VOCs (ug/l)</b>						
1,4-Dichlorobenzene	10 U	2 J	10 U	2 J	1 J	5 J
Acetone	14 U	10 U	10 U	10 U	13 J	10 U
Benzene	10 U	10 U	10 U	4 J	1 J	10 U
Chlorobenzene	10 U	9 J	3 J	56	8 J	16
<b>Semivolatiles (ug/l)</b>						
None						
<b>Pesticides &amp; PCBs (ug/l)</b>						
None						

Notes:

- LL - Largo Landfill
- GW - temporary monitoring well sample
- VOCs - volatile organic compounds
- ug/L - micrograms per liter
- U - value is below the reporting limit
- J - estimated value
- PCBs - polychlorinated biphenyls
- Shading - constituent is elevated above background

TABLE 13  
SUMMARY OF INORGANIC ANALYTICAL RESULTS  
SURFACE WATER SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-SW	LL-02-SW	LL-03-SW	LL-04-SW	LL-05-SW	LL-05D-SW	LL-06-SW
<b>Inorganics - Total (ug/l)</b>							
Barium	25 J	19 J	24 J	26 J	29 J	31 J	31 J
Calcium	58000	59000	56000	60000	65000	68000	69000
Iron	910	210	330	260	150	290	230
Magnesium	7000	6200	6400	7100	6700	6900	6300
Manganese	150 J	18 J	14 UJ	8.1 UJ	31 J	52 J	15 J
Potassium	6200 J	3300 J	14000 J	5200 J	6100 J	6300 J	5200 J
Sodium	29000	26000	4200000	28000	36000	36000	36000

Notes:

LL - Largo Landfill

SW - surface water sample

D - duplicate sample

ug/L - micrograms per liter

U - value is below the reporting limit

J - estimated value

Shading - constituent is elevated above background

TABLE 14  
SUMMARY OF ORGANIC ANALYTICAL RESULTS  
SURFACE WATER SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-SW	LL-02-SW	LL-03-SW	LL-04-SW	LL-05-SW	LL-05D-SW	LL-06-SW
VOCs (ug/l)							
None							
Semivolatiles (ug/l)							
Bis(2-ethylhexyl) Phthalate	10 U	10 U	72	10 U	75	16 U	10 U
Pesticides & PCBs (ug/l)							
None							

Notes:

- LL - Largo Landfill
- SW - surface water sample
- D - duplicate sample
- VOCs - volatile organic compounds
- ug/L - micrograms per liter
- U - value is below the reporting limit
- PCBs - polychlorinated biphenyls
- Shading - constituent is elevated above background

TABLE 15  
SUMMARY OF INORGANIC ANALYTICAL RESULTS  
SEDIMENT SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-SD	LL-02-SD	LL-03-SD	LL-04-SD	LL-05-SD	LL-06-SD
<b>Inorganics - Total (mg/kg)</b>						
Aluminum	6100	2700	1700	2900	2300	2600
Barium	6.8	11	10	32	20	27
Calcium	770	1800	2300	52000	9400	28000
Chromium	7.6	4.7	2.7 J	7.7 J	4.2 J	6.4 J
Copper	2.7	2.2	1.4 U	5.0	5.3 U	18
Iron	940	1100	940	2800	1300	3000
Lead	3.5	5.5	3.4 J	5.5 J	4.1 J	8.2 J
Magnesium	76	180	130	1000	360	640
Manganese	3.3	10	5.8	52	26	66
Nickel	2.2	1.3	0.86 U	3.0 U	2.4 U	2.8 U
Potassium	37 U	74	45 U	260	120	250
Vanadium	10	3.2	2.9 U	7.6 U	3.9 U	6.8 U
Zinc	1.1	5.2	8.4	20	5.1	20

Notes:

LL - Largo Landfill

SD - sediment sample

mg/kg - milligrams per kilogram

U - value is below the reporting limit

J - estimated value

Shading - constituent is elevated above background

TABLE 16  
SUMMARY OF ORGANIC ANALYTICAL RESULTS  
SEDIMENT SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

Compound	Background Sample LL-01-SD	LL-02-SD	LL-03-SD	LL-04-SD	LL-05-SD	LL-06-SD
<b>VOCs (ug/kg)</b>						
1,3-Dichlorobenzene	12 U	2 J	14 U	15 U	15 U	15 U
Chlorobenzene	12 U	4 J	14 U	15 U	15 U	15 U
<b>Semivolatiles (ug/kg)</b>						
Benzo(a)anthracene	420 U	91 J	160 J	5000 U	500 U	1100 U
Benzo(b)fluoranthene	420 U	180 J	350 J	5000 U	70 J	270 J
Benzo(k)fluoranthene	420 U	130 J	240 J	5000 U	63 J	220 J
Benzo-a-pyrene	420 U	120 J	220 J	5000 U	500 U	170 J
Chrysene	420 U	180 J	330 J	5000 U	72 J	260 J
Fluoranthene	54 J	250 J	460 J	5000 U	87 J	280 J
Indeno (1,2,3-cd) Pyrene	420 U	70 J	140 J	5000 U	500 U	1100 U
Phenanthrene	420 U	69 J	120 J	5000 U	500 U	1100 U
Pyrene	420 U	220 J	360 J	5000 U	77 J	250 J
<b>Pesticides &amp; PCBs (ug/kg)</b>						
Alpha-chlordane	2.2 U	2.5 U	2.3 U	4.2	2.6 U	2.8 U
Dieldrin	4.2 U	4.9 U	4.4 U	5.7	5.1 U	5.4 U
Gamma-chlordane	2.2 U	2.5 U	2.3 U	7.7	2.6 U	2.8 U

Notes:

- LL - Largo Landfill
- SD - sediment sample
- VOCs - volatile organic compounds
- ug/kg - micrograms per kilogram
- U - value is below the reporting limit
- J - estimated value
- PCBs - polychlorinated biphenyls
- Shading - constituent is elevated above background



## Explanation of Major Steps of the CERCLA Process

**Preliminary Assessment--**As a screening process, the EPA will perform a preliminary assessment (PA) of a site (often a review of data without an actual site visit) to determine if further study is necessary.

**Site Inspection--**A site inspection (SI) is an on-site investigation to find out whether there is a release or potential release and to determine the nature of the associated threats. The purpose is to augment the data collected in the PA and to generate, if necessary, sampling and other field data to determine if further action or investigation is necessary. If deemed necessary, the site is scored using the Hazard Ranking System. Any site which receives a score of 28.50 or above on the HRS will be included on the National Priorities List (NPL).

**Remedial Investigation--**A remedial investigation (RI) is a process undertaken by the lead agency to determine the nature and extent of the problem presented by the release. The RI emphasizes data collection and site characterization and is generally performed concurrently and in an interactive fashion with the feasibility study. The RI includes sampling and monitoring, as necessary, and the gathering of sufficient information to determine the necessity for remedial action and to support the evaluation of remedial alternatives.

**Feasibility Study--**A feasibility study (FS) is undertaken by the lead agency to develop and evaluate options for remedial action. The FS emphasizes data analysis, using data gathered during the RI. The RI data is used to define the objectives of the response action, to develop remedial alternatives, and to undertake an initial screening and detailed analysis of the alternatives. The remedial investigation and feasibility study are collectively referred to as the RI/FS.

**Proposed Plan--**The Proposed Plan outlines the nature and extent of contamination at the site, the alternatives evaluated and the preferred approach to remediation. This activity is a key point in the CERCLA process for formal input from the general public.

**Record of Decision--**Once the RI/FS is completed, the EPA selects the appropriate cleanup option, following principles set forth in the CERCLA Cleanup Standards and the revised NCP. This selection is described in a public document called a Record of Decision (ROD).

**Remedial Design--**The remedial design is the technical analysis and procedures that follow the selection of a remedy for a site and results in a detailed set of plans and specifications for implementation of the remedial action.

**Remedial Action--**The remedial action follows the remedial design and involves the actual construction or implementation of a cleanup.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

August 21, 2003

4WD-SSMB

Teresa Kinner-Booeshaghi  
Site Screening Superfund Subsection  
Bureau of waste Cleanup  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

SUBJ: NFRAP  
Largo Landfill, EPA ID No. FL0002451383

Dear Ms. Kinner:

The Environmental Protection Agency (EPA) has reviewed the Expanded Site Inspection Report dated July 18, 2003. EPA has designated the site as "No Further Remedial Action Planned" under CERCLA.

Enclosed are the site decision forms for the site. If you have any questions, contact me at (404) 562-8933 or e-mail at [alfano.joe@epa.gov](mailto:alfano.joe@epa.gov).

Sincerely,

Joseph Alfano  
South Site Management Branch

Enclosure

cc: Steven B. Stanton, Largo City Manager (with enclosure)

COPY

Dept. of Environmental  
Protection  
FEB 14 2008

Southwest District

EPA ID: FL0002451383 Site Name: LARGO LANDFILL

State ID:

Alias Site Names:

City: LARGO

County or Parish: PINELLAS

State: FL

Refer to Report Dated: 07/18/2003

Report Type: EXPANDED SITE INSPECTION 001

Report Developed by: START

**DECISION:**

☒ 1. Further Remedial Site Assessment under CERCLA (Superfund) is not required because:

☒ 1a. Site does not qualify for further remedial site assessment under CERCLA (No Further Remedial Action Planned - NFRAP)

☐ 1b. Site may qualify for action, but is deferred to:

☐ 2. Further Assessment Needed Under CERCLA:

2a. Priority: ☐ Higher ☐ Lower

2b. Other: (recommended action) NFRAP (No Further Remedial Action Planned)

**DISCUSSION/RATIONALE:**

Slightly elevated levels of inorganics in the landfill soils, generally below Preliminary Remedial Goals (PRGs). No on site residents, although some recreational use of property such as flying model airplanes.

Groundwater sample results indicate no constituents above MCLs.

Slightly elevated inorganics in the on site portion of Longs Bayou, which is posted as catch and release. No off-site surface water contamination.

The U.S. Environmental Protection Agency (EPA) has determined that no further remedial action by the Federal Superfund program is warranted at the referenced site, at this time. The basis for the no further remedial action planned (NFRAP) determination is provided in the attached document. A NFRAP designation means that no additional remedial steps under the Federal Superfund program will be taken at the site unless new information warranting further Superfund consideration or conditions not previously known to EPA regarding the site are disclosed. In accordance with EPA's decision regarding the tracking of NFRAP sites, the referenced site may be removed from the CERCLIS database and placed in a separate archival database as a historical record if no further Superfund interest is warranted. Archived sites may be returned to the CERCLIS site inventory if new information necessitating further Superfund consideration is discovered.

Dept. of Environmental  
Protection  
FEB 14 2008  
Southwest District

Site Decision Made by: JOSEPH ALFANO

Signature: \_\_\_\_\_

*Joseph Alfano*

Date: 08/21/2003

**EXPANDED SITE INSPECTION REPORT**

**LARGO LANDFILL  
LARGO, PINELLAS COUNTY, FLORIDA**

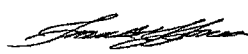

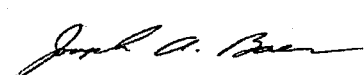
**U.S. EPA ID NO. FL0002451383**

**Revision 0**

**Prepared for**

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
Region 4  
Atlanta, Georgia 30303**

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# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Region 4

Science and Ecosystem Support Division  
980 College Station Road  
Athens, Georgia 30605-2720

### MEMORANDUM

Date: 01/14/2003

Subject: Results of METALS Sample Analysis  
03-0143 Largo Landfill  
Largo, FL

From: Goddard, Denise

To: Sloan, Fred

CC: SESD/EIB/SAS

Thru: QA Office

Attached are the results of analysis of samples collected as part of the subject project. If you have any questions, please contact me.

ATTACHMENT

January 6, 2003

## INORGANIC DATA QUALIFIERS REPORT

Case Number: 31215

Project Number: 03-0143

Site: Largo Landfill, Largo, FL

Sample No.	Element	Flag	Reason
1743	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1744	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1745	Cu	J	PE sample recovery < warning limit
	Pb	J	% RSD > 20% for ICP multiple exposures
	Se	J	Matrix spike recovery = 71.4%
1746	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1747	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1748	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1749	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1750	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1751	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1752	Cu	J	PE sample recovery < warning limit
	Se	J	Matrix spike recovery = 71.4%
1753	Al	J	Serial dilution percent difference = 11.2%
	As	U	Baseline instability in prep blank
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1754	Al	J	Serial dilution percent difference = 11.2%
	As	U	Baseline instability in prep blank
	Cr	U	Baseline instability in cal blanks
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1755	Al	J	Serial dilution percent difference = 11.2%
	As	U	Baseline instability in prep blank
	Cr	U	Baseline instability in cal blanks
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%

January 6, 2003

## INORGANIC DATA QUALIFIERS REPORT (continued)

Case Number: 31215

Project Number: 03-0143

Site: Largo Landfill, Largo, FL

Sample No.	Element	Flag	Reason
1756	Al	J	Serial dilution percent difference = 11.2%
	As	U	Baseline instability in prep blank
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1757	Al	J	Serial dilution percent difference = 11.2%
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1758	Al	J	Serial dilution percent difference = 11.2%
	As	U	Baseline instability in prep blank
	Cd	R	Analyte reported as potential false positive
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
	Hg	U	Positive reported < lowest std on cal curve
1759	Al	J	Serial dilution percent difference = 11.2%
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1760	Al	J	Serial dilution percent difference = 11.2%
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1761	Al	J	Serial dilution percent difference = 11.2%
	As	J	% RSD > 20% for ICP multiple exposures
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1762	Al	J	Serial dilution percent difference = 11.2%
	As	U	Baseline instability in prep blank
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1763	Al	J	Serial dilution percent difference = 11.2%
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1764	Al	J	Serial dilution percent difference = 11.2%
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%
1765	Al	J	Serial dilution percent difference = 11.2%
	As	U	Baseline instability in prep blank
	Cr	U	Baseline instability in cal blanks
	Cu	J	PE sample recovery < warning limit
	Pb	J	Matrix spike recovery = 129.1%

January 6, 2003

## INORGANIC DATA QUALIFIERS REPORT (continued)

Case Number: 31215Project Number: 03-0143Site: Largo Landfill, Largo, FL

Sample No.	Element	Flag	Reason
1767	Al	UJ	PE sample recovery > action limit Positives in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit
1768	Al	UJ	PE sample recovery > action limit Positives in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	Ni	R	Analyte reported as potential false positive
	K	J	PE sample recovery > warning limit
1769	Al	UJ	PE sample recovery > action limit Positives in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cd	UJ	PE sample recovery > warning limit Baseline instability in cal blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	Ni	R	Analyte reported as potential false positive
	K	J	PE sample recovery > warning limit
1770	Al	UJ	PE sample recovery > action limit Positives in blind blank
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit
1771	Al	UJ	PE sample recovery > action limit Positives in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit
	Tl	R	Analyte reported as potential false positive
1772	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit
1773	Al	UJ	PE sample recovery > action limit Positives in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit

January 6, 2003

## INORGANIC DATA QUALIFIERS REPORT (continued)

Case Number: 31215

Project Number: 03-0143

Site: Largo Landfill, Largo, FL

Sample No.	Element	Flag	Reason
1774	Al	UJ	PE sample recovery > action limit
			Positives in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit
	V	R	Analyte reported as potential false positive
1775	Al	UJ	PE sample recovery > action limit
			Positives in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit
1776	Al	UJ	PE sample recovery > action limit
			Positives in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit
1777	Al	UJ	PE sample recovery > action limit
			Positive in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	UJ	PE sample recovery > warning limit
			Positive in blind blank
1778	Al	J	PE sample recovery > action limit
	As	U	Baseline instability in cal and blind blanks
	Cd	UJ	PE sample recovery > warning limit
			Baseline instability in cal blanks
	Co	R	Analyte reported as potential false positive
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Mn	J	PE sample recovery > warning limit
	K	J	PE sample recovery > warning limit
1779	Al	J	PE sample recovery > action limit
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	Pb	J	% RSD > 20% for ICP multiple exposures
	Mn	J	PE sample recovery > warning limit
	Ni	R	Analyte reported as potential false positive
	K	J	PE sample recovery > warning limit



January 6, 2003

## INORGANIC DATA QUALIFIERS REPORT (continued)

Case Number: 31215Project Number: 03-0143Site: Largo Landfill, Largo, FL

Sample No.	Element	Flag	Reason
1780	Al	UJ	PE sample recovery > action limit Positive in blind blank
	As	U	Baseline instability in cal and blind blanks
	Cu	U	Baseline instability in cal, prep, and blind blanks
	K	UJ	PE sample recovery > warning limit Positive in blind blank
	Na	U	Positive in blind blank

## CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION .....	1
2.0 SITE BACKGROUND .....	2
2.1 SITE DESCRIPTION AND ENVIRONMENTAL SETTING .....	2
2.2 SITE OPERATIONS AND REGULATORY HISTORY .....	3
2.3 PREVIOUS RELEASES AND INVESTIGATIONS .....	4
3.0 ESI ACTIVITIES .....	7
3.1 SAMPLE COLLECTION METHODOLOGY AND PROCEDURES .....	8
3.2 ANALYTICAL SUPPORT AND METHODOLOGY .....	8
3.3 ANALYTICAL DATA QUALITY AND DATA QUALIFIERS .....	14
4.0 SOURCE SAMPLING .....	15
4.1 SOURCE SAMPLE LOCATIONS AND ANALYTICAL RESULTS .....	15
4.2 SOURCE CONCLUSIONS .....	16
5.0 PATHWAYS .....	17
5.1 GROUNDWATER MIGRATION PATHWAY .....	17
5.1.1 Geologic and Hydrogeologic Setting .....	17
5.1.2 Groundwater Sampling Locations and Analytical Results .....	20
5.1.3 Groundwater Targets .....	21
5.1.4 Groundwater Conclusions .....	21
5.2 SURFACE WATER MIGRATION PATHWAY .....	22
5.2.1 Hydrologic Setting .....	22
5.2.2 Surface Water and Sediment Sampling Locations and Analytical Results .....	23
5.2.3 Surface Water Targets .....	24
5.2.4 Surface Water Conclusions .....	24

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## CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
5.3 SOIL EXPOSURE PATHWAY AND AIR MIGRATION PATHWAY .....	25
5.3.1 Physical Conditions .....	25
5.3.2 Sampling Locations and Analytical Results .....	25
5.3.3 Soil and Air Targets .....	25
5.3.4 Soil and Air Conclusions .....	26
6.0 SUMMARY AND CONCLUSIONS .....	26
REFERENCES .....	28

## TABLES

<u>Table</u>	<u>Page</u>
1 SURFACE SOIL SAMPLING LOCATIONS AND RATIONALE .....	9
2 SUBSURFACE SOIL SAMPLING LOCATIONS AND RATIONALE .....	10
3 GROUNDWATER SAMPLING LOCATIONS AND RATIONALE .....	11
4 SURFACE WATER SAMPLING LOCATIONS AND RATIONALE .....	12
5 SEDIMENT SAMPLING LOCATIONS AND RATIONALE .....	13

## CONTENTS (Continued)

### APPENDICES

#### A Figures

<u>Figure</u>	<u>Title</u>
1	General Site Location Map
2	Site Layout Map
3	Sample Location Map

#### B Analytical Data Tables

<u>Table</u>	<u>Title</u>
6	Summary of Inorganic Analytical Results - Surface Soil Samples
7	Summary of Organic Analytical Results - Surface Soil Samples
8	Summary of Inorganic Analytical Results - Subsurface Soil Samples
9	Summary of Organic Analytical Results - Subsurface Soil Samples
10	Summary of Field Parameters - Groundwater Samples
11	Summary of Inorganic Analytical Results - Groundwater Samples
12	Summary of Organic Analytical Results - Groundwater Samples
13	Summary of Inorganic Analytical Results - Surface Water Samples
14	Summary of Organic Analytical Results - Surface Water Samples
15	Summary of Inorganic Analytical Results - Sediment Samples
16	Summary of Organic Analytical Results - Sediment Samples

#### C Analytical Data Set

## 1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) tasked the Weston Solutions, Inc. (formerly Roy F. Weston, Inc.) (Weston) Superfund Technical Assessment and Response Team - 2 (START-2) to conduct a expanded site inspection (ESI) for Largo Landfill in Largo, Pinellas County, Florida, EPA ID No. FL0002451383. The ESI is prepared under Contract No. 68-W-00-123, Technical Direction Document (TDD) No. 4W-02-02-A-003

The primary objective of an ESI is to determine whether a site has the potential to be placed on the National Priorities List (NPL). The NPL identifies sites at which a release, or threatened release, of hazardous substances poses a serious enough risk to public health or the environment to warrant further investigation and possible remediation under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986.

Information gathered during the ESI is used to generate a preliminary Hazard Ranking System (HRS) score. The HRS is the primary criterion EPA uses to determine whether a site should be placed on the NPL. ESIs are generally conducted at sites where additional environmental sampling or monitoring well installation is necessary to fulfill HRS documentation requirements. ESIs are also conducted to address site issues not adequately resolved in previous investigations.

Specifically, the objectives of the ESI are as follows:

- Obtain and review relevant file material
- Collect samples to attribute hazardous substances to site operations
- Collect samples to establish representative background levels
- Evaluate target populations for the groundwater migration, surface water migration, soil exposure, and air migration pathways
- Collect any other missing HRS data
- Document current site conditions
- Develop a site layout map

This report documents the results of the ESI investigation conducted at Largo Landfill during the week of November 19 and 20, 2002,, under the START-2 contract managed by Weston. Information reviewed for the ESI was gathered from the Florida Department of Environmental Protection (FDEP) and from the EPA Region 4 CERCLA files.

## **2.0 SITE BACKGROUND**

This section describes the facility, its present and past operations (including waste disposal practices and regulatory history), previous investigations, and potential source areas located at the facility.

### **2.1 SITE DESCRIPTION AND ENVIRONMENTAL SETTING**

The former Largo Landfill (the landfill) comprises approximately 60-acres and is located in an area consisting of residential, industrial, and commercial properties (Ref. 1, pp. 1, 2). Its geographical coordinates are 27°54'47" north latitude, and 82°46'37" west longitude (Ref. 2). The majority of the property is undeveloped and consists of overgrown trees and weeds (Ref. 1, p. 1). The Long Bayou drainage canal bisects the landfill and a small lake borders the southwestern edge of the property (Ref. 2) (See Appendix A, Figure 1). Winn Dixie Marketplace is now situated on the northern portion of the property (Ref. 3). The southwestern portion of the property is accessible to the public and is sometimes used recreationally (Ref. 4; 5, p. 13). A storm water treatment facility operates on the property, east of Long Bayou Canal and a nature preserve with a boardwalk and walking trails are also located on the property, east of Long Bayou Canal (Ref. 4; 6). East Bay Drive borders the landfill to the north. Property used for the Largo Renaissance Festival and residential areas border the landfill to the west. A Florida Power substation and wetlands border the landfill to the east, while a trailer park borders the landfill to the south (Refs. 2; 7, pp. 5, 12).

Pinellas County has long humid summers and mild winters, with temperatures moderated by the waters of the Gulf of Mexico and Tampa Bay. Total annual rainfall is approximately 55 inches and is uniform throughout the county (Ref. 8, p. 43). The mean annual lake evaporation for the area is 53 inches, for a net annual rainfall of 2 inches (Ref. 8, p. 63). Approximately sixty percent of the total rainfall falls from June through September (Ref. 9, p. 61). The 2-year, 24-hour rainfall event for the area is approximately 4.5 inches (Ref. 10). Prevailing winds are from the south in March and from the north and east the rest of the year. Wildlife is no longer a major resource in Pinellas County, as urbanization has eliminated habitat suitable for many game and non-game species, and only in the northern part of the county is wildlife still abundant (Ref. 9, pp. 57 - 61).

## 2.2 SITE OPERATIONS AND REGULATORY HISTORY

The former Largo Landfill was operated by the City of Largo (City). The City still owns portions of the property which include the northwest, southwest and eastern portions. Based on available file information, the landfill was used for agricultural practices from the mid-1950s to the early 1960s. The landfill reportedly accepted residential, commercial and industrial wastes from the early 1960s to the 1970s. In 1979, a borrow pit was constructed in the northeast corner of the property from material used as cover for the landfilling activities. Available information does not indicate for what purpose the borrow pit was used. In January 1981, the landfill was closed by the city. Although waste disposal practices included both the trench and high rise methods, landfill waste was also reportedly disposed into a pond and wetland area on the property. Available file material is inconsistent regarding the depth of the unlined landfill cells, with depths of 10 feet officially, but depth of 40 feet reported by City employees. According to the file information, landfill activities took place in the northern and west-central portions of the property (Ref. 11, pp. 2-2, 2-3, 2-4).

Activities at Largo Landfill predated any permitted municipal landfill activities. The Florida Department of Pollution Control issued a permit to the City of Largo on December 19, 1974, which allowed for the operation of a Solid Waste Resource Recovery and Management Facility. In August 1977 and October 1979, the Florida Department of Environmental Regulation (FDER) renewed the City's permit. The City's last permit expired in 1984 (Ref. 1, p. 3).

In 1987, FDER discovered that the landfill was being used for the disposal dredge spoil, which contained a high water content. On May 28, 1987, FDER requested assistance from its Groundwater Section Operation Response Team (ORT) to conduct a site assessment at the former Largo Landfill. The request was based on concerns for the integrity of the fill cover and elevated levels of metals found during past groundwater sampling activities (Ref. 12). FDER ORT approved the request, however, Pinellas County took over responsibility for the landfill and the ORT was asked to cease any future assessment activities at the landfill (Ref. 1, p. 3).

## 2.3 PREVIOUS RELEASES AND INVESTIGATIONS

In February 1978, groundwater samples collected from the landfill were found to contain elevated levels of chromium and lead. Surface water samples collected along the Long Bayou Canal during the same investigation were found to contain elevated levels of lead (Ref. 12).

Following the closure of the landfill in 1981, existing downgradient monitoring wells were continually sampled through April 1982. The sampling results showed the chemical oxygen demand and conductivity values of the down gradient wells to be significantly higher than those of the background monitoring well sample (Ref. 12).

Between 1993 and 1995, Phase II ESAs were conducted on the northeastern portion of the property. Elevated levels of acetone, benzene, lead, and mercury were detected in the groundwater samples exceeding the State Maximum Contaminant Levels (MCLs). Low levels of acetone, methylene chloride and total xylenes were detected in the soil samples. The possible presence of methane gas was also noted in several of the soil borings. The 1994, Phase II ESA determined that solid waste had been landfilled in the northeastern portion of the property (Ref. 1, p. 4).

Between 1993 and 1997, a number of subsurface investigations took place on the property. The majority of the investigations focused on the northeastern portion of the property. Four monitoring wells were installed and sampled during the investigations (Ref. 13, pp. 2, 3).

In May 1996, a Phase I Environmental Site Assessment (ESA) of the northeastern portion of the facility was conducted by WRAGG Environmental Inc. During the investigation, landfilling of solid waste in that area was confirmed. In the same area of the property, asbestos containing material was found within the

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abandoned bank building (Ref. 13, pp. 2, 4).

Between July 29, 1996 and August 14, 1996, WRAGG Environmental conducted a Phase II Environmental Assessment of the area of the proposed Winn Dixie Marketplace (northeastern portion). The work included soil borings with volatile organic compounds and methane gas screening, installation of three monitoring wells, and sampling and analysis of two existing wells and of the new monitoring wells. The results of the soil borings indicated that solid waste existed above the water table along the central and southwestern portion of the study area. Elevated levels of organic and metal contaminants were detected in the well samples. Sampling of one of the monitoring wells indicated elevated levels of lead and chromium (Ref. 12).

In 1997, a nearby driving range was interested in purchasing part of the landfill property. Based on the interest of the driving range owners, Nettles and Associates relayed information of groundwater sample results to FDEP on May 7, 1997. The samples were found to contain butyl benzene, chlorobenzene, 1, 2-dichlorobenzene, 1, 4-dichlorobenzene, bis(2-ethylhexyl)phthalate, and naphthalene. Based on the results, the driving range was advised not to purchase the property (Ref. 14).

In April 1997, Geoscience and Materials Engineers, Inc. conducted a soils exploration study of the proposed Winn Dixie Marketplace (northeastern portion of property) to assist in foundation recommendations. Landfill debris, such as glass, newspaper, plastic and metal filings were encountered in many of the borings. Twenty-four soil borings were collected and it was concluded that with proper compaction and fill, the Winn Dixie store could be constructed (Ref. 15).

Between May 22, 1997 and May 27, 1997, EE & G conducted a limited Phase II Subsurface Investigation of the proposed Winn Dixie Marketplace portion of the property. The investigation included an Asbestos Demolition Survey of the abandoned bank building and a subsurface investigation which included a quantitative soil gas survey and sampling of four existing on-site monitoring wells. The quantitative soil gas survey showed elevated levels of acetone, benzene, benzoic acid, 4-chloroaniline, 4-methyl-2-pentanone, toluene, and vinyl acetate. The groundwater samples collected from the monitoring wells contained lead, selenium, zinc, and cadmium. Cadmium and selenium concentrations exceeded both federal and state MCLs (Ref. 1, pp. 1, 6, 7).

Between April and June 1997, Environmental Research and Design (ERD) collected storm water runoff and baseflow samples collected at three locations near the landfill. Groundwater samples were also collected from test pits excavated within the old landfill. These samples were collected to determine the impact of the landfill on surrounding surface waters. A subsurface soil exploration was also conducted at the landfill (Ref. 11). As part of the ERD study, the City of Largo excavated approximately ten test pits in and around the former landfill area. Groundwater samples collected from the test pits exhibited high concentrations of conductivity, ammonia, alkalinity, total nitrogen, and a number of organic compounds (Ref. 1, pp. 7, 8).

In conjunction with the investigation by ERD, Ardman and Associates, Inc. conducted a preliminary subsurface soil exploration study on the property. Soil borings were placed in the landfill areas, up land areas, and wetlands. Landfill material was detected in three of the landfill borings (Ref. 11, p. 8).

On June 22, 1998, an attorney representing a nearby property owner sent a letter to FDEP regarding the landfill. The letter expressed concerns regarding groundwater contamination and leachate discharging into nearby surface waters (Ref. 1, p. 4). These concerns were supported by assessment reports and photographs. On July 17, 1998, FDEP completed a checklist for CERCLA Site Discovery for the landfill. A CERCLA Preliminary Assessment (PA) was recommended for the facility (Ref. 16).

During the week of April 18, 2001, Weston START-2 personnel collected surface soil, subsurface soil, groundwater samples, surface water, and sediment samples during a Site Inspection (SI) at the Largo Landfill. Background samples were collected off-site from a city park located northeast of the site for comparison to on-site samples (Ref. 17, pp. 1, 6, 13). Inorganic constituents detected at elevated levels in surface and subsurface soil samples when compared to background surface and subsurface samples included barium, cadmium, chromium, copper, lead, manganese, nickel, silver, total mercury, vanadium, and zinc. The organic constituents detected at elevated levels in the surface and subsurface soil samples included chrysene; methyl acetate; 1,4-dichlorobenzene; chlorobenzene; 2-methylnaphthalene; acenaphthene; (3-and/or 4)-methylphenol; pyrene; DDE; naphthalene; benzaldehyde; benzo(b)fluoranthene; and benzo(k)fluoranthene (Ref. 17, pp. 14, 15).

Site-attributable inorganic constituents detected at elevated concentrations in groundwater samples included: barium, chromium, lead, manganese, total mercury, vanadium, and zinc. Chlorobenzene was the only site-attributable organic constituent detected at an elevated level in groundwater samples (Ref. 17, pp. 20, 21). Lead was the only constituent detected above National Drinking Water Regulations. Lead was detected at concentrations ranging from 5.4 micrograms per liter ( $\mu\text{g/L}$ ) to 72  $\mu\text{g/L}$  (Ref. 17, p. 21). The maximum contaminant level for lead is 15  $\mu\text{g/L}$  (Ref. 18).

Surface water samples collected in Long Bayou Drainage Canal contained elevated levels of bis(2-ethylhexyl) phthalate. Inorganic constituents detected at elevated levels in sediment samples included barium, copper, manganese, and zinc. Although these constituents are site-attributable, they are also naturally occurring. Constituents detected in samples collected from the on-site wetland areas included manganese, zinc, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene (Ref. 17, pp. 22 - 24). Based on the analytical results of samples collected during the 2001 SI, Weston recommended further CERCLA evaluation for Largo Landfill (Ref. 17, p. 27).

### 3.0 ESI ACTIVITIES

This section outlines field observations and sampling procedures at the sampling locations. Individual subsections address the sampling investigation and rationale for specific ESI activities. U.S. EPA, Region 4, Science and Ecosystem Support Division (SESD), conducted the ESI sampling conducted November 19 and 20, 2002, using the EPA-approved Weston sampling recommendations, submitted as Appendix A of the June 28, 2002 ESI Work Plan (Ref. 19). Weston prepared the Work Plan and sampling recommendations under the START-2 contract. Although site logbooks and figures from the sampling event were provided by SESD, photographs of the site and ESI sampling activities were not collected during the ESI. The deviation from the sampling recommendations provided by Weston included moving the proposed off-site background surface soil (LLE-01-SS), subsurface soil (LLE-01-SB), and groundwater (LLE-01-GW) samples to an on-site location, in the north edge of the site. SESD indicated that this location was hydraulically upgradient of other on-site samples (Ref. 20).

### 3.1 SAMPLE COLLECTION METHODOLOGY AND PROCEDURES

SESD personnel collected nine surface soil samples (including one duplicate sample), six subsurface soil samples (including one duplicate), four groundwater samples (including one duplicate), eight surface water samples (including one duplicate), and eight sediment samples (including one duplicate), during the Largo Landfill ESI conducted November 19 and 20, 2002 (Ref. 20). Sampling locations are depicted in Appendix A, Figure 3 and summarized in Tables 1 through 5.

SESD personnel collected the surface soil samples from 0 to 6 inches below land surface (bls). Subsurface soil samples were collected from 2 feet bls or greater. SESD personnel installed four temporary monitoring wells using a Geoprobe® coring device. Temporary monitoring wells were installed between 28 and 32 feet bls. Groundwater samples were collected from each of the temporary monitoring wells. SESD personnel followed sample collection procedures outlined in the sampling recommendations included in Appendix A of the ESI Work Plan and which were developed in accordance with the EPA Region 4 Science and Ecosystem Support Division (SESD), *Environmental Investigation Standard Operating Procedures and Quality Assurance Manual* (Refs. 17; 20).

### 3.2 ANALYTICAL SUPPORT AND METHODOLOGY

All samples collected during the ESI were analyzed through the EPA Contract Laboratory Program (CLP). The laboratories analyzed for EPA Target Compound List (TCL) volatile organic compounds (VOC), extractable semivolatile organic compounds (SVOC), pesticides, and PCBs. The samples were also analyzed for Target Analyte List (TAL) inorganic substances (metals and cyanide). All samples were analyzed for the full TAL scan. EPA Region 4 SESD reviewed all data for compliance with the terms of the CLP (Ref. 20).

**TABLE 1**  
**SURFACE SOIL SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

Sample Number	Location	Rationale
LLE-01-SS	Background/control; North-central portion of the site in an upgradient location, south of East Bay Drive and west of Long Bayou Canal	Background/control soil sample for comparison to on-site sample results
LLE-02-SS	South of driving range	Determine presence or absence of hazardous substances
LLE-03-SS	Southeast corner of property, west of Long Bayou	Determine presence or absence of hazardous substances
LLE-04-SS	East, southeast portion of property, east of Long Bayou	Determine presence or absence of hazardous substances
LLE-05-SS	Western boundary of the property, within the power line easement that runs through the center of the property	Determine presence or absence of hazardous substances
LLE-06-SS	Western portion of southern fill area	Determine presence or absence of hazardous substances
LLE-07-SS	Eastern portion of southern fill area	Determine the presence or absence of hazardous substances
LLE-08-SS	Northeast portion of property, east of entrance gate and south of the Winn Dixie property	Determine the presence or absence of hazardous substances

Notes: LLE - Largo Landfill ESI  
 SS - Surface soil sample

**TABLE 2**  
**SUBSURFACE SOIL SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

Sample Number	Location	Rationale
LLE-01-SB	Background/control; North-central portion of the site in an upgradient location, south of East Bay Drive and west of Long Bayou Canal	Background/Control subsurface soil sample for comparison to on-site sample results
LLE-02-SB	South of driving range	Determine the presence or absence of hazardous substances
LLE-03-SB	Southeast corner of property, west of Long Bayou	Determine the presence or absence of hazardous substances
LLE-04-SB	East, southeast portion of the property, east of Long Bayou	Determine the presence or absence of hazardous substances
LLE-05-SB	Western boundary of the property, within the power line easement that runs through the center of the property	Determine the presence or absence of hazardous substances

Notes: LLE - Largo Landfill ESI  
 SB - Subsurface soil sample

**TABLE 3**  
**GROUNDWATER SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

Sample Number	Location	Rationale
LLE-01-GW	Background/control; North-central portion of the site in an upgradient location, south of East Bay Drive and west of Long Bayou Canal	Background/Control groundwater sample for comparison to downgradient sample results
LLE-02-GW	South of the driving range	Determine the presence or absence of hazardous substances
LLE-03-GW	Southern portion of property, west of Long Bayou	Determine the presence or absence of hazardous substances
LLE-04-GW	East, southeast portion of property, east of Long Bayou	Determine the presence or absence of hazardous substances

Notes: LLE - Largo Landfill ESI  
 GW - Temporary monitoring well sample

**TABLE 4**  
**SURFACE WATER SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

SAMPLE NUMBER	LOCATION	RATIONALE
LLE-01-SW	Background; from Long Bayou approximately 1 block north of East Bay Drive	Background surface water sample for comparison to downstream samples
LLE-02-SW	Control sample; Long Bayou, just south of East Bay Drive	Control wetland sample for comparison to downgradient sample results
LLE-03-SW	Long Bayou, north central portion of property, just south of the northern power easement	Determine the presence or absence of hazardous substances
LLE-04-SW	Long Bayou, southeast portion of property	Determine the presence or absence of hazardous substances
LLE-05-SW	Long Bayou, southeast corner of property, before it converges with unnamed stream to east	Determine the presence or absence of hazardous substances
LLE-06-SW	Background/control; upstream of convergence of Long Bayou with unnamed stream	Background/control surface water sample for comparison to downstream sample results
LLE-07-SW	Long Bayou, off site and south of its convergence with the unnamed stream	Determine the presence or absence of hazardous substances

Notes: LLE - Largo Landfill ESI  
SW - Surface water sample



**TABLE 5**  
**SEDIMENT SAMPLING LOCATIONS AND RATIONALE**  
**LARGO LANDFILL**

Sample Number	Location	Rationale
LLE-01-SD	Background; from Long Bayou approximately 1 block north of East Bay Drive	Background sediment sample for comparison to downstream samples
LLE-02-SD	Control sample; Long Bayou, just south of East Bay Drive,	Control wetland sample for comparison to downgradient sample results
LLE-03-SD	Long Bayou, north central portion of property, just south of the northern power easement	Determine the presence or absence of hazardous substances
LLE-04-SD	Long Bayou, southeast portion of property	Determine the presence or absence of hazardous substances
LLE-05-SD	Long Bayou, southeast corner of property, before it converges with unnamed stream to east	Determine the presence or absence of hazardous substances
LLE-06-SD	Background/Control; upstream of convergence of Long Bayou with unnamed stream	Background/control sediment sample for comparison to downstream samples
LLE-07-SD	Long Bayou, off site and south of its convergence with the unnamed stream	Determine the presence or absence of hazardous substances

Notes: LLE - Largo Landfill ESI  
 SD - Sediment sample

### 3.3 ANALYTICAL DATA QUALITY AND DATA QUALIFIERS

All analytical data were subject to a quality assurance review as described in the EPA SESD laboratory data evaluation guidelines. Analytical data indicate that some concentrations of organic and inorganic parameters have been qualified with a "J," indicating that the qualitative analysis was acceptable, although the quantitative value has been estimated. However, for the purposes of this ESI, J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" to see reference review to input info here (Ref. 21). Therefore, the analytical data tables presented in this report depict both adjusted data, which has been italicized, and the original data. Other compounds may have been qualified with an "N," indicating that they were detected based on the presumptive evidence of their presence. This means that the compound was only tentatively identified, and its detection cannot be considered a positive indication of its presence. Some sample results are reported with a "U" qualifier, meaning that the material was analyzed for but not detected. The reported number is the laboratory-derived sample quantization limit (SQL) for the constituent in that sample. At times, miscellaneous organic compounds that do not appear on the TCL are reported with the data set. These constituents are qualified as "JN," indicating that they are tentatively identified at estimated quantities. Because these constituents are not routinely analyzed for or reported, background levels of SQLs are not generally available for comparison. Some compounds are qualified with an "R" which indicates the QC evaluation has determined the concentration of the compound is unusable. The complete analytical data sheets are presented in Appendix C.

## 4.0 SOURCE SAMPLING

This section discusses the source area evaluated at the facility, the sampling locations, and analytical results of samples collected from the landfill. The former Largo Landfill is the source area evaluated in this ESI. Surface soil and subsurface soil sampling locations are depicted on Figure 3 in Appendix A and described in Tables 1 and 2. Surface soil inorganic and organic analytical results are summarized in Tables 6 and 7, respectively, and subsurface soil inorganic and organic analytical sampling results are summarized in Tables 8 and 9, respectively. Tables 6 through 9 are presented in Appendix B following Section 6.0. Elevated concentrations of constituents are shaded in the tables. The concentration of a constituent is considered to be elevated if the concentration is greater than or equal to three times the concentration detected in the background or control sample. In the case where a constituent is undetected in the background or control sample, any concentration equal to or greater than the SQL is considered to be elevated. The complete set of analytical data sheets is presented as Appendix C.

The following discussion of hazardous constituents detected at elevated levels in soil samples collected at the landfill includes only those hazardous constituents that are associated with site operations and those hazardous constituents that may pose a threat to human health or the environment.

### 4.1 SOURCE SAMPLING LOCATIONS AND ANALYTICAL RESULTS

SESD personnel collected seven surface and five subsurface source samples from various locations around the landfill. Surface and subsurface soil samples LLE-02-SS and LLE-02-SB were collected south of the driving range on the eastern side of the landfill and samples LLE-03-SS and LLE-03-SB were collected from the southeast corner of the landfill, west of Long Bayou. Samples LLE-04-SS and LLE-04-SB were collected from the southeastern portion of the landfill, east of Long Bayou. Samples LLE-05-SS and LLE-05-SB were collected from the west-central boundary of the landfill within the power line easement that runs through the center of the property. Three additional surface soil samples, LLE-06-SS, LLE-07-SS, and LLE-08-SS were collected from the western, eastern, and northern portions of the landfill property, respectively (Ref. 20).

Arsenic, cadmium, chromium, cobalt, copper, manganese, nickel, silver, total mercury, and zinc were detected at elevated levels in on-site surface soil samples. Most inorganic constituents detected at elevated levels in surface soil samples were detected in sample LLE-08-SS, collected from the northeast portion of the landfill.

Benzyl butyl phthalate, and several pesticides and PCBs also were detected at elevated levels in on-site surface soil samples. Benzyl butyl phthalate was detected at 25,000 micrograms per kilogram ( $\mu\text{g/kg}$ ) in sample LLE-03-SS, collected from the southeast corner of the property. Alpha-chlordane/2; gamma-chlordane/2; heptachlor; 4,4'-DDE; and 4,4'-DDT were detected at elevated levels in surface soil samples LLE-03-SS and LLE-06-SS. PCB-1248 was detected at  $170\mu\text{g/kg}$ , and PCB-1254 was detected at  $95\mu\text{g/kg}$  in surface soil sample LLE-08-SS. Some polynuclear aromatic hydrocarbons (PAHs) were detected above U.S. EPA, Region 9 Preliminary Remediation Goals (PRGs) in onsite surface soil samples; however, the same PAHs were detected above PRGs in the background sample and were not detected at elevated levels in on-site surface soil samples because concentrations were not detected above sample quantitation limits. Dieldrin was also detected above the PRG in one surface soil sample; however the concentration of dieldrin was qualified with an "N," indicating that it was detected based on the presumptive evidence of its presence.

Arsenic, barium, beryllium, chromium, copper, lead, manganese, nickel, and zinc were the only inorganic constituents detected at elevated levels in on-site subsurface soil samples. Gamma-chlordane/2, detected at  $5.7\mu\text{g/kg}$  and  $2.6\mu\text{g/kg}$  in samples LLE-02-SB and LLE-03-SB, respectively, was the only organic constituent detected at an elevated level in on-site subsurface soil samples.

## 4.2 SOURCE CONCLUSIONS

Inorganic constituents detected at elevated levels in soil samples collected throughout the landfill property include arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, total mercury, and zinc. Inorganic constituents occur naturally in the environment. Benzyl butyl phthalate, pesticides, and PCBs were the only organic constituents detected at elevated levels in on-site soil samples.

## 5.0 PATHWAYS

This section discusses the groundwater migration, surface water migration, soil exposure, and air migration pathways. Additionally, this section discusses the targets associated with each pathway and draws pathway-specific conclusions. Sampling locations and analytical results for samples collected from the specific pathways are also discussed.

### 5.1 GROUNDWATER MIGRATION PATHWAY

Four groundwater samples were collected by SESD during the ESI. Groundwater sampling locations are depicted on Figure 3, located in Appendix A, and described in Table 3. Field parameters, inorganic and organic analytical results for groundwater samples are summarized in Tables 10, 11 and 12, respectively, in Appendix B following Section 6.0. Analytical data are presented in Appendix C.

#### 5.1.1 Geologic and Hydrogeologic Setting

The City of Largo, Pinellas County, Florida, lies within the hilly uplands of the Gulf Coastal Lowlands which are dominated by the Pinellas Ridge. The Ridge extends from Seminole northward to Palm Harbor. It consists of gently rolling hills formed by the erosion of small streams, and of sinkholes formed by the collapse of surface formations into limestone caverns. Altitudes range from about 25 feet to 97 feet above mean sea level (Ref. 17). The Largo Landfill property is underlain in descending stratigraphic order by: undifferentiated deposits, the Hawthorne Group, the Suwannee Limestone, and the Ocala Limestone (Refs. 22; 23; 24).

Undifferentiated deposits lie directly under the Largo Landfill. The deposits consist of sands and shelly sands, gray to white, tan, phosphatic, and some limestone. The deposits range in thickness from a few feet to more than 50 feet (Ref. 25, p. 9).

The Hawthorne Group directly underlies the undifferentiated deposits. In Pinellas County the Hawthorne Group consists of the Arcadia Formation, which includes the upper portion of the Tampa Member (formerly known as the Tampa Limestone). The Arcadia Formation consists predominantly of limestone and dolostone containing varying amounts of quartz sand, clay and phosphate grains. Dolomite is generally the most abundant carbonate component of the Arcadia Formation except in the upper portion of the Tampa Member. The dolostones are quartz sand, phosphatic, often slightly clayey to clayey, soft to hard, moderately to highly altered, slightly porous to very porous and micro- to fine crystalline. The dolostones range in color from yellowish-gray to light olive gray. The limestones are typically a wackestone to mudstone with few beds of packstone. They range in color from white to yellowish gray (Ref. 24, p. 58). The Arcadia Formation, excluding the basal Tampa Member, is approximately 100 feet in the vicinity of the property (Ref. 23, p. 13). The upper portion of the Tampa Member of the Arcadia Formation represents a lithostratigraphic change in status from formation to member. The change from formation to member is necessary due to the limited areal extent of the upper portion of the Tampa Member and its lithologic similarities and relationships with the remainder of the Arcadia Formation of the Hawthorne Group. The upper Tampa Member consists predominantly of limestone with subordinate dolostone, sands, and clays. Lithologically, the limestones are variably quartz sandy and clayey with minor to no phosphate. Fossil molds are often present and include mollusks, foraminifera and algae. Colors range from white to yellowish-gray. The limestones range from mudstones to packstones but are most often wackestones (Ref. 24, p. 70). The upper Tampa Member is approximately 150 feet thick in the vicinity of the property (Ref. 23, p. 13).

The Suwannee Limestone directly underlies the Hawthorne Group. The Suwannee Limestone is biogenic, predominantly foraminiferal test packstone to grainstone. Interbeds may contain quartz sand, and dolomite, which is common toward the unit's base from the Tampa Bay area southward. The upper part may contain thin chert lenses and be highly macrofossiliferous. The limestone ranges in color from white to cream. The Suwannee Limestone is approximately 300 feet thick in the vicinity of the property (Ref. 23, p. 13).

The Ocala Limestone directly underlies the Hawthorne Group. The Ocala Limestone is a shallow water marine limestone composed of foraminiferal tests, large foraminifera, mollusks, and large echinoids. Lithologically, it is a soft-to-hard, highly fossiliferous limestone that contains minor amounts of dolomite. The Ocala is approximately 350 feet thick in the vicinity of the property (Ref. 23, p. 13).

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In Pinellas County, two aquifers have been identified - the surficial aquifer and the Floridan aquifer. The surficial aquifer consists of the unconsolidated sand and shelly sand. These deposits vary in composition both laterally and vertically. In most areas, the sand and shelly sand of the surficial aquifer grade downward to a sandy clay or marl with some interbedding of clay. Near the surface, the sand commonly contains a mixture of organic material and silt that form a hardpan. This hardpan occurs at depths of about 5 to 10 feet and acts as a semi-confining bed that restricts the vertical movement of water. In some areas, a gray to white, sandy, phosphatic limestone forms the base of the surficial aquifer (Ref. 25, p. 8). The surficial aquifer is approximately 30 to 50 feet thick in the vicinity of the Landfill (Ref. 21, Figure 3). The surficial aquifer is unconfined and recharge is primarily from local rainfall. Groundwater flow within the surficial aquifer follows local topography (Ref. 25). The surficial aquifer in Pinellas County has only limited use as a supplemental or alternative source of water for public, industrial or agricultural supply. The aquifer is thin and heterogenous, has low values of transmissivity, and low yields to pumping wells (Ref. 22, p. 123). The Arcadia Formation (upper portion of the Tampa Member) is the lower confining unit for the surficial aquifer separating it from the Floridan aquifer.

The Floridan aquifer system includes in descending order; the basal Tampa Member of the Arcadia Formation, the Suwannee Limestone and the Ocala Limestone. The Ocala Limestone is not an important component of the Floridan aquifer system in Pinellas County due to its depth and the productiveness of the Suwannee and Tampa Limestones (Ref. 26, pp.17 - 20). The basal portion of the Tampa and the Suwannee Limestone effectively function as a single hydrological unit (Ref. 27, p. 12). The basal Tampa Member forms the upper layer of the Floridan aquifer and is first encountered at between sea level in the Tarpon Springs area to 120 feet below sea level in the St. Petersburg area. Locally, the depths to the basal Tampa Member may vary over a wide range. This variability of depth reflects the irregular surface of the basal Tampa Member caused by numerous pinnacles and sinkholes. The basal Tampa Limestone contains numerous solution channels (Ref. 26, p. 14). The aquifer ranges in thickness from 1,000 feet to 1,200 feet throughout the county (Ref. 22, p. 123). Groundwater use from the Floridan aquifer is restricted, in Pinellas County. This is due to the aquifer's sensitivity to saltwater encroachment and subsequent water quality. However, the Floridan aquifer is used for municipal supply. Agricultural and industrial uses are minor. Of the total water used for public supply, only about ten percent is withdrawn from Pinellas County. The remainder is imported from adjacent counties. Wellfields which draw from the Floridan aquifer in Pinellas County include Eldridge-Wilde, East Lake Road, Dunedin, Clearwater, and Belleair (Ref. 22, p. 129).

Regional groundwater flow in the county is usually ill defined, however, the general groundwater trend is to flow towards the southwest (Ref. 23, p. 28). Recharge to the Floridan aquifer system varies from none to very low in southern Pinellas County to low to moderate in northern Pinellas County (Ref. 22, p. 130).

### **5.1.2 Groundwater Sampling Locations and Analytical Results**

SESD personnel collected four groundwater samples from temporary monitoring wells installed on-site in the surficial aquifer. Groundwater sample LLE-02-GW was collected from the east central portion of the property, south of an off-site driving range. Groundwater sample LLE-03-GW was collected from the southern portion of the property west of Long Bayou and sample LLE-04-GW was collected from the southeast portion of the property, east of Long Bayou (Ref. 20).

Chromium, cobalt, lead, nickel, selenium, vanadium, and zinc were the only site-attributable inorganic constituents of concern detected at elevated levels in groundwater samples collected from on-site temporary monitoring wells. Most of the inorganic constituents detected at elevated levels in on-site groundwater samples were detected in samples LLE-02-GW and LLE-03-GW. No organic constituents were detected at elevated levels in on-site groundwater samples. Thallium was the only constituent detected above U.S. EPA Maximum contaminant levels (MCLs) (Refs. 18; 28, p. 29). However, thallium was not detected at elevated levels in on-site soil samples, and therefore, may not be site-attributable.



### 5.1.3 Groundwater Targets

According to a CENTRACTS report based on 1990 U.S. Bureau of Census data, an estimated 1,039 persons obtain potable water from private wells located within 4 miles of the facility and are distributed as follows: 0 to 0.25, 1 person; 0.25 to 0.50, 7 persons; 0.50 to 1 mile, 40 persons; 1 to 2 miles, 212 persons; 2 to 3 miles, 386 persons; and 3 to 4 miles, 393 persons. The nearest private well is located between 0 to 0.25 mile from the facility (Ref. 29).

Belleair Water System (BWS), is the only municipal water company in Pinellas County with groundwater wells located within 4 miles of the landfill (Refs. 30; 31; 32). BWS provides potable water to 3,364 people with water obtained from six interconnected wells ( $1,550 \text{ connections} \times 2.17 \text{ persons per household} = 3,364 \text{ persons}$ ). The average number of persons per well is 813 ( $3,364 \text{ people} \div 6 \text{ wells} = 561 \text{ persons per well}$ ). Of the six BWS wells, four are located between 1 and 2 miles from the landfill. Therefore, there are 2,244 persons served by BWS wells within a 4-mile radius of the landfill (Refs. 30; 33; 34).

### 5.1.4 Groundwater Conclusions

Chromium, cobalt, lead, nickel, selenium, vanadium, and zinc were the only site-attributable inorganic constituents of concern detected at elevated levels in groundwater samples collected from on-site temporary monitoring wells. No organic constituents were detected at elevated levels in on-site groundwater samples. Inorganic constituents occur naturally in the environment. Furthermore, no site-attributable constituents were detected above maximum contaminant levels (MCLs) reported in U.S. EPA National Primary Drinking Water Regulations or State of Florida selected MCLs (Refs. 18; 28, p. 29).

Most residents in the vicinity of the landfill obtain potable water from groundwater sources within the Floridan aquifer. An estimated 1,039 persons obtain potable water from private wells installed in the surficial aquifer and an estimated 2,244 persons obtain potable water from municipal wells installed within the Floridan aquifer. The nearest municipal well is located approximately 1.5 miles from the landfill.

## 5.2 SURFACE WATER MIGRATION PATHWAY

Seven surface water and sediment samples were collected during the ESI from the Long Bayou Drainage Canal and an unnamed tributary that converges with Long Bayou after the canal exits the landfill property. Surface water and sediment sampling locations are depicted on Figure 3 and described in Tables 4 and 5, respectively. Inorganic and organic analytical results for surface water samples are summarized in Tables 13 and 14, respectively. Inorganic and organic analytical results for sediment samples are summarized in Tables 15 and 15, respectively. Analytical data tables are presented in Appendix B following Section 6.0. Analytical data are presented in Appendix C.

### 5.2.1 Hydrologic Setting

Surface water runoff from Largo Landfill enters Long Bayou Drainage Canal which flows south, southeast across the landfill property. Long Bayou Drainage Canal exits the property, converges with an unnamed canal, widens, and flows south for approximately 1.5 miles prior to entering the Lake Seminole Bypass Canal. The Lake Seminole Bypass Canal flows approximately 3.5 miles south, around Lake Seminole and converges with Long Bayou. Long Bayou continues to flow south for about 2 miles and enters Boca Ciega Bay. The 15-mile surface water pathway is completed in the Gulf of Mexico (Refs. 1, pp. 1, 2; 2; 4; 7, pp. 5, 9, 10).

Both the Gulf of Mexico and Boca Ciega Bay are tidally influenced and flow rates are not available. Portions of the landfill are within the 100-year flood plain, the remaining portions are within areas of minimal flooding (Ref. 35). There are no known surface water intakes are located along the downstream 15-mile surface water target distance limit (Ref. 36).

### 5.2.2 Surface Water and Sediment Sampling Locations and Analytical Results

SESD Personnel collected surface water and sediment samples from four on-site locations along Long Bayou (LLE-02-SW and LLE-02-SD through LLE-05-SW and LLE-05-SD). Two off-site surface water and two off-site sediment samples were collected for comparison purposes to downstream samples. Background samples LLE-01-SW and LLE-01-SD were collected from Long Bayou approximately 500 feet upstream from the northern site boundary (Refs. 2; 20). Control samples LLE-06-SW and LLE-06-SD were collected from an unnamed tributary that flows south around an adjacent wetland area and then flows west toward the site and converges with Long Bayou after it exits the site property (Ref. 2; 7, pp. 5, 9, 10). Samples LLE-06-SW and LLE-06-SD were collected upstream of the unnamed tributary's confluence with Long Bayou (Refs. 2; 20). Samples LLE-07-SW and LLE-07-SD were collected from Long Bayou downstream of its confluence with the unnamed tributary (Ref. 20).

Barium was the only inorganic constituent of concern detected at an elevated level in surface water samples collected from Long Bayou. Barium was detected at 100 µg/L in surface water sample LLE-04-SW. Manganese was the only inorganic constituent detected above U.S. EPA MCLs in on-site surface water samples. However, the Long Bayou drainage canal is not used for drinking water purposes. No organic constituents were detected at elevated levels in surface water samples collected from Long Bayou. No organic constituents were detected above U.S. EPA MCLs in on-site surface water samples.

Barium and several other inorganic constituents of concern were detected at elevated levels in sediment samples collected from Long Bayou, including chromium, copper, manganese, nickel, and vanadium. However, none of the inorganic constituents of concern detected in surface water and sediment samples were detected in the samples collected from Long Bayou off site. No organic constituents were detected at elevated levels in sediment samples collected from Long Bayou. Some polynuclear aromatic hydrocarbons (PAHs) were detected above PRGs in on-site sediment samples; however, the same PAHs were detected above PRGs in the background sample and were not detected at elevated levels in on-site sediment samples because concentrations were not detected above sample quantitation limits.

### 5.2.3 Surface Water Targets

There are no known surface water intakes within the 15-mile downstream surface water pathway of Largo Landfill (Ref. 36). The 1.5 mile, off-site portion of Long Bayou is fished; however, the on-site canal is posted as a catch and release. Therefore, the fish caught from the on-site canal are not consumed (Ref. 34). The subsequent portion of Long Bayou, and Boca Ciega Bay are used for recreational fishing and boating (Refs. 1, p. 12; 4; 37).

There are approximately 15-miles of wetland frontage along the downstream surface water pathway (Ref. 38). Several federal threatened and endangered species are located within the 15-mile downstream surface water pathway of the landfill. Such species include the West Indian Manatee (*Trichechus manatus latirostris*), Kemp's Ridley Sea Turtle (*Lepidochelys kempi*), and Loggerhead Sea Turtle (*Caretta caretta*). All of the waters of Pinellas County are also considered aquatic preserves. These waters include: Lake Seminole, Boca Ciega Bay, Terra Ceia Bay and Cockroach Bay (Ref. 39).

### 5.2.4 Surface Water Conclusions

Barium and several other inorganic constituents of concern were detected at elevated levels in sediment samples collected from Long Bayou, including chromium, copper, manganese, nickel, and vanadium. However, none of the inorganic constituents of concern detected in surface water and sediment samples were detected in the samples collected from Long Bayou off site from the portion of the canal that is known to be fished. Furthermore, inorganic constituents occur naturally in the environment. No organic constituents were detected at elevated levels in surface water or sediment samples collected from Long Bayou.

There are no known surface water intakes within the 15-mile downstream surface water pathway of Largo Landfill. The 1.5 mile off-site portion of Long Bayou is fished; however, the on-site canal is posted as a catch and release. Therefore, the fish caught from the on-site canal are not consumed. The subsequent portion of Long Bayou, and Boca Ciega Bay are used for recreational fishing and boating.

### **5.3 SOIL EXPOSURE PATHWAY AND AIR MIGRATION PATHWAY**

Ten surface soil (including one duplicate surface soil sample) and eight subsurface soil samples were collected during the ESI. Surface and subsurface soil sample results were discussed in Section 4.0.

#### **5.3.1 Physical Conditions**

Largo Landfill is no longer operational. The area immediately surrounding the facility is industrial and rural residential (Refs. 1, p. 2; 2). The southwestern portion of the property is accessible to the public and is sometimes used recreationally (Ref. 4; 5, p. 13). A storm water treatment facility operates on the property, east of Long Bayou Canal and a nature preserve with a boardwalk and walking trails are also located on the property, east of Long Bayou Canal (Ref. 4; 6). Three schools are located within a 0.5 mile radius of the landfill (Ref. 2).

#### **5.3.2 Sampling Locations and Analytical Results**

Surface and subsurface soil sampling locations and analytical results are discussed under Source Sampling in Section 4.1. No air samples were collected during the ESI.

#### **5.3.3 Soil and Air Targets**

According to a LandView report based on 2000 U.S. Bureau of Census data, approximately 175,815 people live within 4 radial miles of Largo Landfill. The population distribution is as follows: 0 to 0.25 mile, 356 persons; 0.25 to 0.50 mile, 2,022 persons; 0.50 to 1 mile, 11,120 persons; 1 to 2 miles, 38,419 persons; 2 to 3 miles, 59,665 persons; 3 to 4 miles, 64,233 persons (Ref. 40). The nearest residences are northwest of the landfill (Ref. 2). Several federal threatened and endangered species are suspected to be within the vicinity of Largo Landfill although their exact location has not been identified. Approximately 169-acres of wetlands are located within a 4-mile radius of the Largo Landfill (Ref. 38). All Pinellas County waters, including Long Bayou Drainage Canal, Lake Seminole, Boca Ciega Bay, and Terra Ceia Bay, are aquatic preserves (Ref. 39).

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#### 5.3.4 Soil and Air Conclusions

There are no on-site residents; however, a storm water treatment facility operates on the eastern portion of the landfill and the landfill property is used recreationally. The nearest residences are within 0.25 mile of the landfill. Minimal soil exposure and air migration targets are located within four miles of the landfill. Several inorganic constituents, including arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, total mercury, and zinc, were detected at elevated levels in soil samples collected throughout the landfill property. Inorganic constituents occur naturally in the environment. Benzyl butyl phthalate, pesticides, and PCBs were the only organic constituents detected at elevated levels in on-site soil samples.

### 6.0 SUMMARY AND CONCLUSIONS

Largo Landfill was operated by the City of Largo. The city still owns portions of the property which include the northwest, southwest and eastern portions. Based on available file information, the landfill was used for agricultural practices from the mid-1950s to the early 1960s. The landfill reportedly accepted residential, commercial and industrial wastes from the early 1960s to the 1970s. In January 1981, the landfill was reported to have been closed by the city. Although waste disposal practices included both the trench and high rise methods, allegedly, landfill waste was also disposed of into a pond and wetland area on the property. Unlined landfill cells were reported to be 10 feet deep. However, City employees allege that waste was disposed of in trenches to depths of 40 feet. According to the file information, landfill activities took place in the northern portion of the property.

Several inorganic constituents, including arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, total mercury, and zinc, were detected at elevated levels in soil samples collected throughout the landfill property. However, these inorganic constituents occur naturally in the environment. Benzyl butyl phthalate, pesticides, and PCBs were the only organic constituents detected at elevated levels in on-site soil samples. Furthermore, none of these organic constituents were detected in off-site groundwater, surface water, or sediment samples, indicating that man-made site-attributable constituents have not migrated from the site.

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Chromium, cobalt, lead, nickel, selenium, vanadium, and zinc were the only site-attributable inorganic constituents of concern detected at elevated levels in groundwater samples collected from on-site temporary monitoring wells. No organic constituents were detected at elevated levels in on-site groundwater samples, and inorganic constituents occur naturally in the environment. Furthermore, no constituents were detected above MCLs reported in U.S. EPA National Primary Drinking Water Regulations or State of Florida selected MCLs. Minimal targets exist for the groundwater migration pathway. An estimated 2,244 persons obtain potable water from groundwater sources located within four miles of the landfill in the Floridan aquifer. An estimated 1,039 persons obtain potable water from private wells installed in the surficial aquifer. The nearest well is a municipal well located approximately 1.5 miles from the landfill.

Barium and several other inorganic constituents of concern were detected at elevated levels in sediment samples collected from Long Bayou, including chromium, copper, manganese, nickel, and vanadium. However, none of the inorganic constituents of concern detected in surface water and sediment samples were detected in the samples collected from Long Bayou off site from the portion of the canal that is known to be fished. Furthermore, inorganic constituents occur naturally in the environment. No organic constituents were detected at elevated levels in surface water or sediment samples collected from Long Bayou.

There are no known surface water intakes within the 15-mile downstream surface water pathway of Largo Landfill. The 1.5 mile off-site portion of Long Bayou is fished; however any fish that are caught from the on-site portion of the canal must be released back into the canal, and therefore, are not caught for consumption. The subsequent portion of Long Bayou, and Boca Ciega Bay are used for recreational fishing and boating.

There are no on-site residents; however, a storm water treatment facility operates on the east portion of the landfill property and areas of the property are used recreationally. The nearest residences are within 0.25 mile of the landfill. Minimal soil exposure and air migration targets are located within four miles of the landfill.

Based on the analytical results of samples collected and observations made during the ESI, no further CERCLA evaluation is recommended for Largo Landfill.

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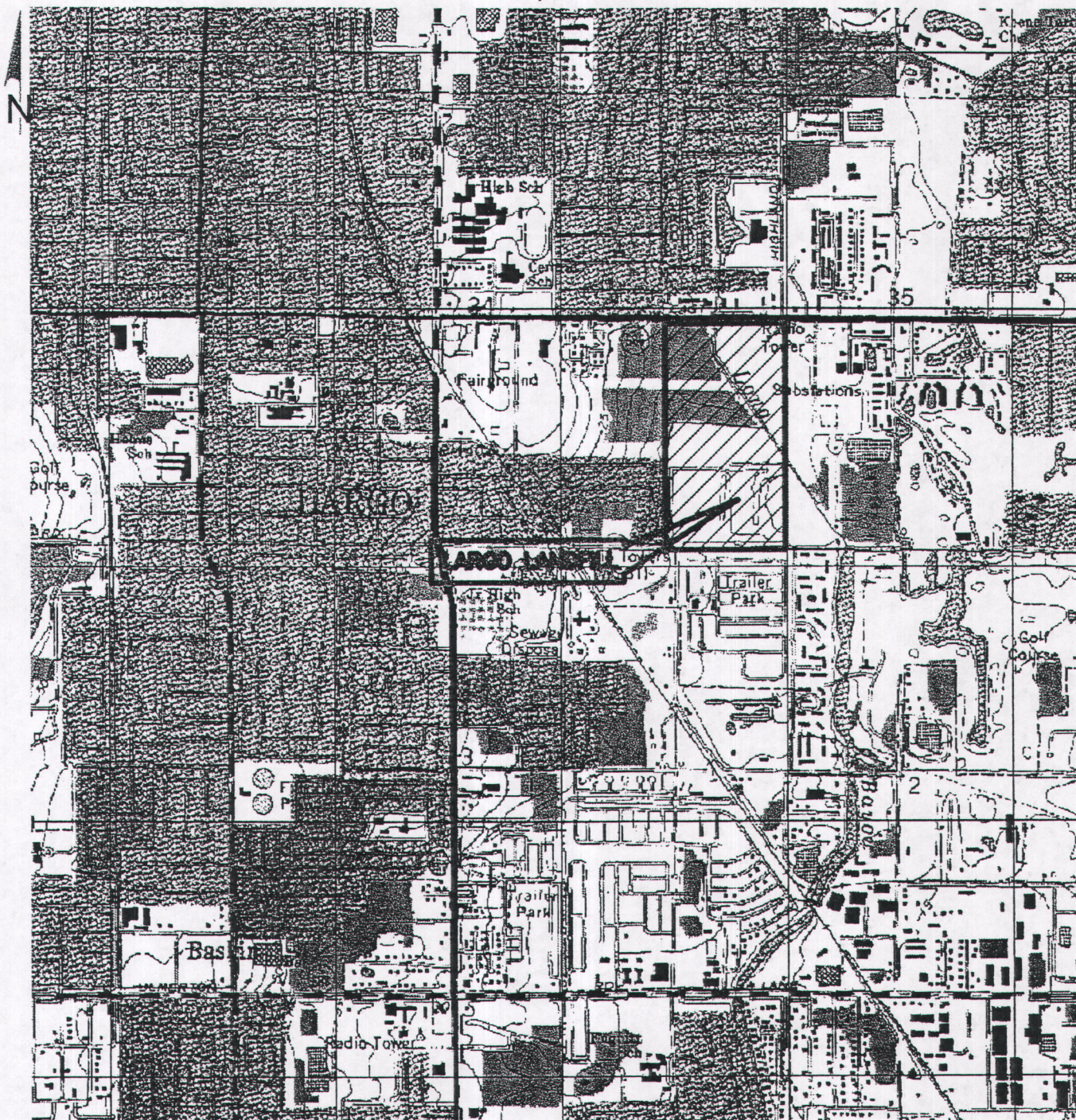
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## **Appendix A**

### **Figures**





MODIFIED U.S.G.S. QUAD CLEARWATER MAP (7.5 SERIES), DATED 1999, SCALE: 1:2000

LARGO LANDFILL  
FUEL/VE CONT

## GENERAL SITE LOCATION MAP

FIGURE 1



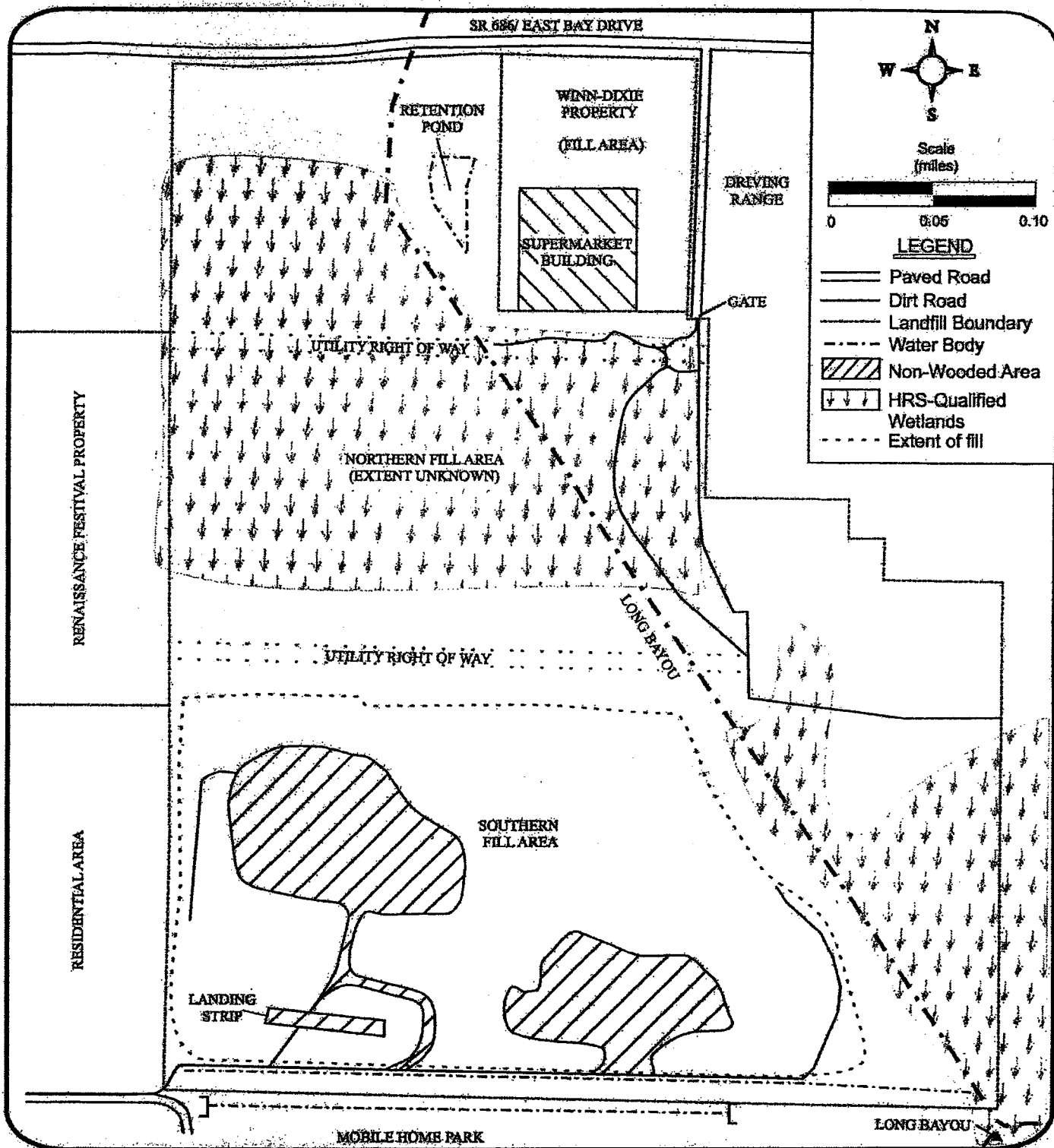
DRAWN:  
J. MILLER  
SCALE:  
AS SHOWN

DATE:  
07/01/03  
EPA ID NO:  
FL002451383

W.O. NO.: largo.dwg  
12587-001-001-0027  
TDD NO:  
4W-02-02-A-003







LARGO LANDFILL  
LARGO, PINELLAS COUNTY, FLORIDA

SITE LAYOUT MAP  
FIGURE 2



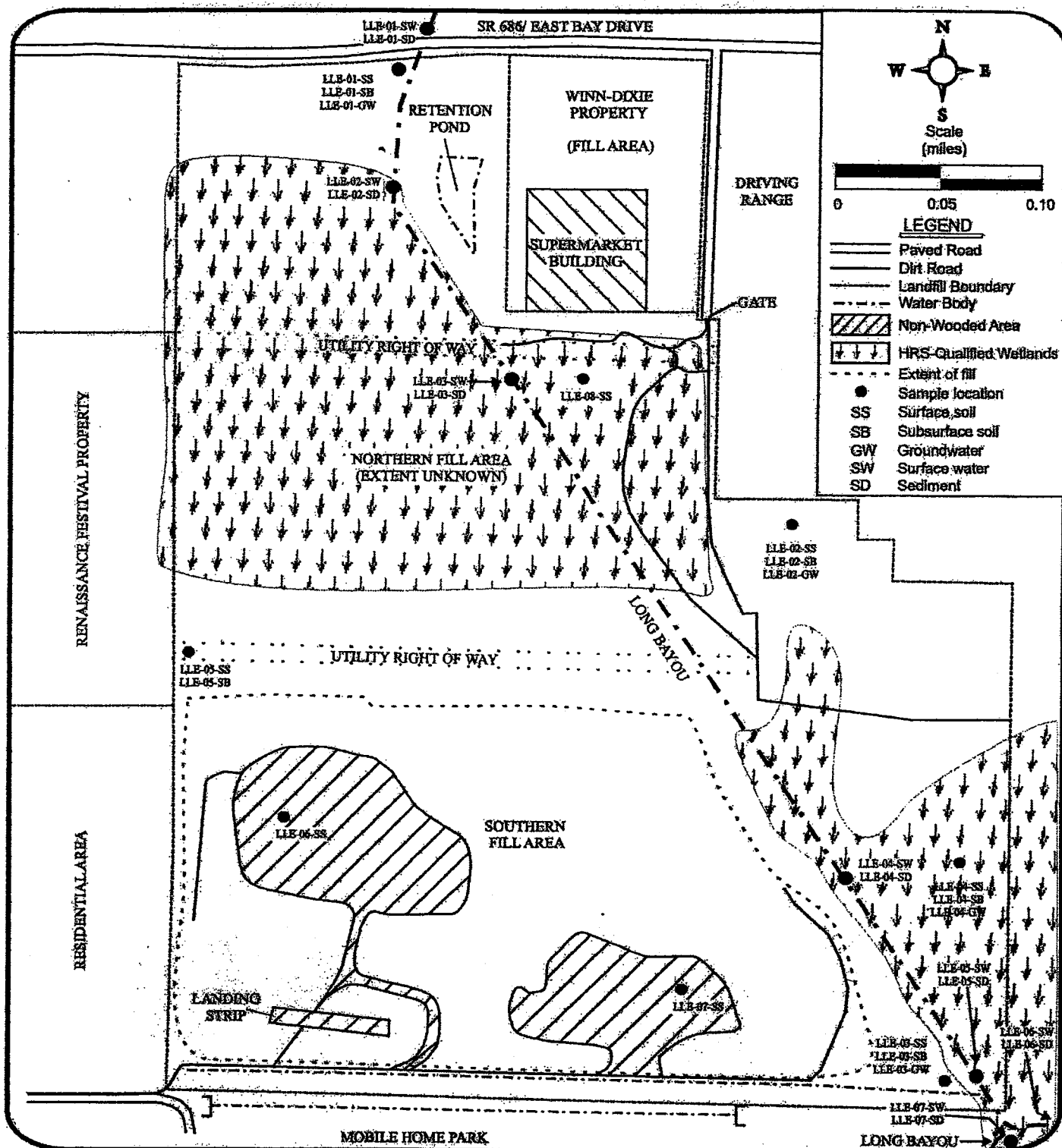
**WESTON**  
SOLUTIONS



DRAWN  
D. SHEPHERD  
SCALE

DATE  
07/01/03  
EPA ID NO.:  
FL0002451383

W.O. NO.  
12587-001-001-0127-00  
IDD NO.:  
4W-02-02-A-003



LARGO LANDFILL  
LARGO, PINELLAS COUNTY, FLORIDA

SAMPLE LOCATION MAP  
FIGURE 3



**WESTON**  
SOLUTIONS



DRAWN  
D. SHEHZEEN  
SCALE

DATE  
07/01/03  
EPA ID NO.:  
FL0002451383

W. O. NO.  
12587-001-081-0127-00  
TDD NO.:  
4W-02-02-A-003

Sample 1761 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE08SS /

MD No: 1P90

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P90

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:00

Ending:

RESULTS	UNITS	ANALYTE
40 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1761 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE08SS /

MD No: 1P90

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P90

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:00

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
13 U	UG/KG	Dichlorodifluoromethane
13 U	UG/KG	Chloromethane
13 U	UG/KG	Vinyl Chloride
13 U	UG/KG	Bromomethane
13 U	UG/KG	Chloroethane
13 U	UG/KG	Trichlorofluoromethane (Freon 11)
13 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
13 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
13 UJ	UG/KG	Acetone
13 U	UG/KG	Carbon Disulfide
13 UJ	UG/KG	Methyl Acetate
13 UJ	UG/KG	Methylene Chloride
13 U	UG/KG	trans-1,2-Dichloroethene
13 U	UG/KG	Methyl T-Butyl Ether (MTBE)
13 U	UG/KG	1,1-Dichloroethane
13 U	UG/KG	cis-1,2-Dichloroethene
13 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
13 U	UG/KG	Chloroform
13 U	UG/KG	1,1,1-Trichloroethane
13 U	UG/KG	Cyclohexane
13 U	UG/KG	Carbon Tetrachloride
13 U	UG/KG	Benzene
13 U	UG/KG	1,2-Dichloroethane
13 U	UG/KG	Trichloroethene (Trichloroethylene)
13 U	UG/KG	Methylcyclohexane
13 U	UG/KG	1,2-Dichloropropane
13 U	UG/KG	Bromodichloromethane
13 U	UG/KG	cis-1,3-Dichloropropene
13 UJ	UG/KG	Methyl Isobutyl Ketone
13 U	UG/KG	Toluene
13 U	UG/KG	trans-1,3-Dichloropropene
13 U	UG/KG	1,1,2-Trichloroethane
2 J	UG/KG	Tetrachloroethene (Tetrachloroethylene)
13 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
13 U	UG/KG	Dibromochloromethane
13 U	UG/KG	1,2-Dibromoethane (EDB)
13 U	UG/KG	Chlorobenzene
13 U	UG/KG	Ethyl Benzene
13 U	UG/KG	Total Xylenes
13 U	UG/KG	Styrene
13 U	UG/KG	Bromoform
13 U	UG/KG	Isopropylbenzene
13 U	UG/KG	1,1,2,2-Tetrachloroethane
13 U	UG/KG	1,3-Dichlorobenzene
13 U	UG/KG	1,4-Dichlorobenzene
13 U	UG/KG	1,2-Dichlorobenzene
13 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
13 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
16	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1753 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE07SS /

MD No: 1P82

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P82

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:45

Ending:

RESULTS	UNITS	ANALYTE
30 NJ	UG/KG	CYCLOTETRASILOXANE, OCTAMETHYL-

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1753 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P82

D No: 1P82

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
10 U	UG/KG	Dichlorodifluoromethane
10 U	UG/KG	Chloromethane
10 U	UG/KG	Vinyl Chloride
10 U	UG/KG	Bromomethane
10 U	UG/KG	Chloroethane
10 U	UG/KG	Trichlorofluoromethane (Freon 11)
10 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 U	UG/KG	Acetone
10 U	UG/KG	Carbon Disulfide
10 U	UG/KG	Methyl Acetate
10 U	UG/KG	Methylene Chloride
10 U	UG/KG	trans-1,2-Dichloroethene
10 U	UG/KG	Methyl T-Butyl Ether (MTBE)
10 U	UG/KG	1,1-Dichloroethane
10 U	UG/KG	cis-1,2-Dichloroethene
10 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
10 U	UG/KG	Chloroform
10 U	UG/KG	1,1,1-Trichloroethane
10 U	UG/KG	Cyclohexane
10 U	UG/KG	Carbon Tetrachloride
10 U	UG/KG	Benzene
10 U	UG/KG	1,2-Dichloroethane
10 U	UG/KG	Trichloroethene (Trichloroethylene)
10 U	UG/KG	Methylcyclohexane
10 U	UG/KG	1,2-Dichloropropane
10 U	UG/KG	Bromodichloromethane
10 U	UG/KG	cis-1,3-Dichloropropene
10 U	UG/KG	Methyl Isobutyl Ketone
10 U	UG/KG	Toluene
10 U	UG/KG	trans-1,3-Dichloropropene
10 U	UG/KG	1,1,2-Trichloroethane
10 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/KG	Dibromochloromethane
10 U	UG/KG	1,2-Dibromoethane (EDB)
10 U	UG/KG	Chlorobenzene
10 U	UG/KG	Ethyl Benzene
10 U	UG/KG	Total Xylenes
10 U	UG/KG	Styrene
10 U	UG/KG	Bromoform
10 U	UG/KG	Isopropylbenzene
10 U	UG/KG	1,1,2,2-Tetrachloroethane
10 U	UG/KG	1,3-Dichlorobenzene
10 U	UG/KG	1,4-Dichlorobenzene
10 U	UG/KG	1,2-Dichlorobenzene
10 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
9	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1758 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE06SS /

MD No: 1P87

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P87

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:20

Ending:

RESULTS	UNITS	ANALYTE
24 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1758 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE06SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P87

D No: 1P87

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dichlorodifluoromethane
11 U	UG/KG	Chloromethane
11 U	UG/KG	Vinyl Chloride
11 U	UG/KG	Bromomethane
11 U	UG/KG	Chloroethane
11 U	UG/KG	Trichlorofluoromethane (Freon 11)
11 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
11 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
11 UJ	UG/KG	Acetone
11 U	UG/KG	Carbon Disulfide
11 UJ	UG/KG	Methyl Acetate
11 UJ	UG/KG	Methylene Chloride
11 U	UG/KG	trans-1,2-Dichloroethene
11 U	UG/KG	Methyl T-Butyl Ether (MTBE)
11 U	UG/KG	1,1-Dichloroethane
11 U	UG/KG	cis-1,2-Dichloroethene
11 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
11 U	UG/KG	Chloroform
11 U	UG/KG	1,1,1-Trichloroethane
11 U	UG/KG	Cyclohexane
11 U	UG/KG	Carbon Tetrachloride
11 U	UG/KG	Benzene
11 U	UG/KG	1,2-Dichloroethane
11 U	UG/KG	Trichloroethene (Trichloroethylene)
11 U	UG/KG	Methylcyclohexane
11 U	UG/KG	1,2-Dichloropropane
11 U	UG/KG	Bromodichloromethane
11 U	UG/KG	cis-1,3-Dichloropropene
11 UJ	UG/KG	Methyl Isobutyl Ketone
11 U	UG/KG	Toluene
11 U	UG/KG	trans-1,3-Dichloropropene
11 U	UG/KG	1,1,2-Trichloroethane
11 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
11 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dibromochloromethane
11 U	UG/KG	1,2-Dibromoethane (EDB)
11 U	UG/KG	Chlorobenzene
11 U	UG/KG	Ethyl Benzene
11 U	UG/KG	Total Xylenes
11 U	UG/KG	Styrene
11 U	UG/KG	Bromoform
11 U	UG/KG	Isopropylbenzene
11 U	UG/KG	1,1,2,2-Tetrachloroethane
11 U	UG/KG	1,3-Dichlorobenzene
11 U	UG/KG	1,4-Dichlorobenzene
11 U	UG/KG	1,2-Dichlorobenzene
11 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
11 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
9	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1765 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SS /

MD No: 1P94

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P94

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:10

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
11 UJ	UG/KG	Dichlorodifluoromethane
11 UJ	UG/KG	Chloromethane
11 UJ	UG/KG	Vinyl Chloride
11 UJ	UG/KG	Bromomethane
11 UJ	UG/KG	Chloroethane
2 J	UG/KG	Trichlorofluoromethane (Freon 11)
11 UJ	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
11 UJ	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
11 UJ	UG/KG	Acetone
11 UJ	UG/KG	Carbon Disulfide
11 UJ	UG/KG	Methyl Acetate
13 UJ	UG/KG	Methylene Chloride
11 UJ	UG/KG	trans-1,2-Dichloroethene
11 UJ	UG/KG	Methyl T-Butyl Ether (MTBE)
11 UJ	UG/KG	1,1-Dichloroethane
11 UJ	UG/KG	cis-1,2-Dichloroethene
11 UJ	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
11 UJ	UG/KG	Chloroform
11 UR	UG/KG	1,1,1-Trichloroethane
11 UR	UG/KG	Cyclohexane
11 UR	UG/KG	Carbon Tetrachloride
11 UR	UG/KG	Benzene
11 UJ	UG/KG	1,2-Dichloroethane
11 UR	UG/KG	Trichloroethene (Trichloroethylene)
11 UR	UG/KG	Methylcyclohexane
11 UR	UG/KG	1,2-Dichloropropane
11 UR	UG/KG	Bromodichloromethane
11 UR	UG/KG	cis-1,3-Dichloropropene
11 UR	UG/KG	Methyl Isobutyl Ketone
11 UR	UG/KG	Toluene
11 UR	UG/KG	trans-1,3-Dichloropropene
11 UR	UG/KG	1,1,2-Trichloroethane
11 UR	UG/KG	Tetrachloroethene (Tetrachloroethylene)
11 UR	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
11 UR	UG/KG	Dibromochloromethane
11 UR	UG/KG	1,2-Dibromoethane (EDB)
11 UR	UG/KG	Chlorobenzene
11 UR	UG/KG	Ethyl Benzene
11 UR	UG/KG	Total Xylenes
11 UR	UG/KG	Styrene
11 UR	UG/KG	Bromoform
11 UR	UG/KG	Isopropylbenzene
11 UR	UG/KG	1,1,2,2-Tetrachloroethane
11 UR	UG/KG	1,3-Dichlorobenzene
11 UR	UG/KG	1,4-Dichlorobenzene
11 UR	UG/KG	1,2-Dichlorobenzene
11 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
11 UR	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
18	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1762 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## MISCELLANEOUS COMPOUNDS

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 15:20

Id/Station: LLE04SS /

MD No: 1P91

Inorg Contractor: SENTIN

Ending:

Media: SURFACE SOIL (0" - 12")

D No: 1P91

Org Contractor: CEIMIC

## RESULTS UNITS

## ANALYTE

12 NJ UG/KG

CYCLOTETRAILOXANE, OCTAMETHYL-

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1762 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SS /

MD No: 1P91

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P91

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
12 U	UG/KG	Dichlorodifluoromethane
12 U	UG/KG	Chloromethane
12 U	UG/KG	Vinyl Chloride
12 U	UG/KG	Bromomethane
12 U	UG/KG	Chloroethane
3 J	UG/KG	Trichlorofluoromethane (Freon 11)
12 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
12 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
12 UJ	UG/KG	Acetone
12 U	UG/KG	Carbon Disulfide
12 UJ	UG/KG	Methyl Acetate
12 UJ	UG/KG	Methylene Chloride
12 U	UG/KG	trans-1,2-Dichloroethene
12 U	UG/KG	Methyl T-Butyl Ether (MTBE)
12 U	UG/KG	1,1-Dichloroethane
12 U	UG/KG	cis-1,2-Dichloroethene
12 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
12 U	UG/KG	Chloroform
12 U	UG/KG	1,1,1-Trichloroethane
12 U	UG/KG	Cyclohexane
12 U	UG/KG	Carbon Tetrachloride
12 U	UG/KG	Benzene
12 U	UG/KG	1,2-Dichloroethane
12 U	UG/KG	Trichloroethene (Trichloroethylene)
12 U	UG/KG	Methylcyclohexane
12 U	UG/KG	1,2-Dichloropropane
12 U	UG/KG	Bromodichloromethane
12 U	UG/KG	cis-1,3-Dichloropropene
12 UJ	UG/KG	Methyl Isobutyl Ketone
12 U	UG/KG	Toluene
12 U	UG/KG	trans-1,3-Dichloropropene
12 U	UG/KG	1,1,2-Trichloroethane
12 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
12 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
12 U	UG/KG	Dibromochloromethane
12 U	UG/KG	1,2-Dibromoethane (EDB)
12 U	UG/KG	Chlorobenzene
12 U	UG/KG	Ethyl Benzene
12 U	UG/KG	Total Xylenes
12 U	UG/KG	Styrene
12 U	UG/KG	Bromoform
12 U	UG/KG	Isopropylbenzene
12 U	UG/KG	1,1,2,2-Tetrachloroethane
12 U	UG/KG	1,3-Dichlorobenzene
12 U	UG/KG	1,4-Dichlorobenzene
12 U	UG/KG	1,2-Dichlorobenzene
12 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
12 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
16	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1760 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE03SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P89

D No: 1P89

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:38

Ending:

RESULTS	UNITS	ANALYTE
7 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1760 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## Volatiles Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 13:38

Id/Station: LLE03SS /

MD No: 1P89

Inorg Contractor: SENTIN

Ending:

Media: SURFACE SOIL (0" - 12")

D No: 1P89

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
10 UJ	UG/KG	Dichlorodifluoromethane
10 UJ	UG/KG	Chloromethane
10 UJ	UG/KG	Vinyl Chloride
10 UJ	UG/KG	Bromomethane
10 UJ	UG/KG	Chloroethane
4 J	UG/KG	Trichlorofluoromethane (Freon 11)
10 UJ	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
10 UJ	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 UJ	UG/KG	Acetone
10 UJ	UG/KG	Carbon Disulfide
10 UJ	UG/KG	Methyl Acetate
10 UJ	UG/KG	Methylene Chloride
10 UJ	UG/KG	trans-1,2-Dichloroethene
10 UJ	UG/KG	Methyl T-Butyl Ether (MTBE)
10 UJ	UG/KG	1,1-Dichloroethane
10 UJ	UG/KG	cis-1,2-Dichloroethene
10 UJ	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
10 UJ	UG/KG	Chloroform
10 UJ	UG/KG	1,1,1-Trichloroethane
10 UJ	UG/KG	Cyclohexane
10 UJ	UG/KG	Carbon Tetrachloride
10 UJ	UG/KG	Benzene
10 UJ	UG/KG	1,2-Dichloroethane
10 UJ	UG/KG	Trichloroethene (Trichloroethylene)
10 UJ	UG/KG	Methylcyclohexane
10 UJ	UG/KG	1,2-Dichloropropane
10 UJ	UG/KG	Bromodichloromethane
10 UJ	UG/KG	cis-1,3-Dichloropropene
10 UJ	UG/KG	Methyl Isobutyl Ketone
10 UJ	UG/KG	Toluene
10 UJ	UG/KG	trans-1,3-Dichloropropene
10 UJ	UG/KG	1,1,2-Trichloroethane
10 UJ	UG/KG	Tetrachloroethene (Tetrachloroethylene)
10 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 UJ	UG/KG	Dibromochloromethane
10 UJ	UG/KG	1,2-Dibromoethane (EDB)
10 UJ	UG/KG	Chlorobenzene
10 UJ	UG/KG	Ethyl Benzene
10 UJ	UG/KG	Total Xylenes
10 UJ	UG/KG	Styrene
10 UJ	UG/KG	Bromoform
10 UJ	UG/KG	Isopropylbenzene
10 UJ	UG/KG	1,1,2,2-Tetrachloroethane
10 UJ	UG/KG	1,3-Dichlorobenzene
10 UJ	UG/KG	1,4-Dichlorobenzene
10 UJ	UG/KG	1,2-Dichlorobenzene
10 UJ	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
10 UJ	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
8	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1752 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE02SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P80

D No: 1P80

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:00

Ending:

RESULTS	UNITS	ANALYTE
14 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1752 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE02SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P80

D No: 1P80

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:00

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
12 U	UG/KG	Dichlorodifluoromethane
12 U	UG/KG	Chloromethane
12 U	UG/KG	Vinyl Chloride
12 U	UG/KG	Bromomethane
12 U	UG/KG	Chloroethane
2 J	UG/KG	Trichlorofluoromethane (Freon 11)
12 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
12 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
12 U	UG/KG	Acetone
12 U	UG/KG	Carbon Disulfide
12 U	UG/KG	Methyl Acetate
12 U	UG/KG	Methylene Chloride
12 U	UG/KG	trans-1,2-Dichloroethene
12 U	UG/KG	Methyl T-Butyl Ether (MTBE)
12 U	UG/KG	1,1-Dichloroethane
12 U	UG/KG	cis-1,2-Dichloroethene
12 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
12 U	UG/KG	Chloroform
12 U	UG/KG	1,1,1-Trichloroethane
12 U	UG/KG	Cyclohexane
12 U	UG/KG	Carbon Tetrachloride
12 U	UG/KG	Benzene
12 U	UG/KG	1,2-Dichloroethane
12 U	UG/KG	Trichloroethene (Trichloroethylene)
12 U	UG/KG	Methylcyclohexane
12 U	UG/KG	1,2-Dichloropropane
12 U	UG/KG	Bromodichloromethane
12 U	UG/KG	cis-1,3-Dichloropropene
12 U	UG/KG	Methyl Isobutyl Ketone
12 U	UG/KG	Toluene
12 U	UG/KG	trans-1,3-Dichloropropene
12 U	UG/KG	1,1,2-Trichloroethane
12 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
12 U	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
12 U	UG/KG	Dibromochloromethane
12 U	UG/KG	1,2-Dibromoethane (EDB)
12 U	UG/KG	Chlorobenzene
12 U	UG/KG	Ethyl Benzene
12 U	UG/KG	Total Xylenes
12 U	UG/KG	Styrene
12 U	UG/KG	Bromoform
12 U	UG/KG	Isopropylbenzene
12 U	UG/KG	1,1,2,2-Tetrachloroethane
12 U	UG/KG	1,3-Dichlorobenzene
12 U	UG/KG	1,4-Dichlorobenzene
12 U	UG/KG	1,2-Dichlorobenzene
12 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
12 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
8	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1747 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SSD /

MD No: 1P75

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P75

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:30

Ending:

RESULTS	UNITS	ANALYTE
18 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1747 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE01SSD /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P75

D No: 1P75

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dichlorodifluoromethane
11 U	UG/KG	Chloromethane
11 U	UG/KG	Vinyl Chloride
11 U	UG/KG	Bromomethane
11 U	UG/KG	Chloroethane
3 J	UG/KG	Trichlorofluoromethane (Freon 11)
11 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
11 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
11 U	UG/KG	Acetone
11 U	UG/KG	Carbon Disulfide
11 U	UG/KG	Methyl Acetate
11 U	UG/KG	Methylene Chloride
11 U	UG/KG	trans-1,2-Dichloroethene
11 U	UG/KG	Methyl T-Butyl Ether (MTBE)
11 U	UG/KG	1,1-Dichloroethane
11 U	UG/KG	cis-1,2-Dichloroethene
11 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
11 U	UG/KG	Chloroform
11 U	UG/KG	1,1,1-Trichloroethane
11 U	UG/KG	Cyclohexane
11 U	UG/KG	Carbon Tetrachloride
11 U	UG/KG	Benzene
11 U	UG/KG	1,2-Dichloroethane
11 U	UG/KG	Trichloroethene (Trichloroethylene)
11 U	UG/KG	Methylcyclohexane
11 U	UG/KG	1,2-Dichloropropane
11 U	UG/KG	Bromodichloromethane
11 U	UG/KG	cis-1,3-Dichloropropene
11 U	UG/KG	Methyl Isobutyl Ketone
11 U	UG/KG	Toluene
11 U	UG/KG	trans-1,3-Dichloropropene
11 U	UG/KG	1,1,2-Trichloroethane
11 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
11 U	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dibromochloromethane
11 U	UG/KG	1,2-Dibromoethane (EDB)
11 U	UG/KG	Chlorobenzene
11 U	UG/KG	Ethyl Benzene
11 U	UG/KG	Total Xylenes
11 U	UG/KG	Styrene
11 U	UG/KG	Bromoform
11 U	UG/KG	Isopropylbenzene
11 U	UG/KG	1,1,2,2-Tetrachloroethane
11 U	UG/KG	1,3-Dichlorobenzene
11 U	UG/KG	1,4-Dichlorobenzene
11 U	UG/KG	1,2-Dichlorobenzene
11 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
11 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
4	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1746 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## MISCELLANEOUS COMPOUNDS

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Beginning: 11/19/2002 09:30

Id/Station: LLE01SS /

Case No: 31215

Ending:

Media: SURFACE SOIL (0" - 12")

MD No: 1P74

Inorg Contractor: SENTIN

D No: 1P74

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
15 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1746 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SS /

MD No: 1P74

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P74

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dichlorodifluoromethane	11 U	UG/KG	Dibromochloromethane
11 U	UG/KG	Chloromethane	11 U	UG/KG	1,2-Dibromoethane (EDB)
11 U	UG/KG	Vinyl Chloride	11 U	UG/KG	Chlorobenzene
11 U	UG/KG	Bromomethane	11 U	UG/KG	Ethyl Benzene
11 U	UG/KG	Chloroethane	11 U	UG/KG	Total Xylenes
11 U	UG/KG	Trichlorofluoromethane (Freon 11)	11 U	UG/KG	Styrene
11 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)	11 U	UG/KG	Bromoform
11 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	11 U	UG/KG	Isopropylbenzene
11 U	UG/KG	Acetone	11 U	UG/KG	1,1,2,2-Tetrachloroethane
11 U	UG/KG	Carbon Disulfide	11 U	UG/KG	1,3-Dichlorobenzene
11 U	UG/KG	Methyl Acetate	11 U	UG/KG	1,4-Dichlorobenzene
11 U	UG/KG	Methylene Chloride	11 U	UG/KG	1,2-Dichlorobenzene
11 U	UG/KG	trans-1,2-Dichloroethene	11 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
11 U	UG/KG	Methyl T-Butyl Ether (MTBE)	11 U	UG/KG	1,2,4-Trichlorobenzene
11 U	UG/KG	1,1-Dichloroethane	NA	UG/KG	1,2,3-Trichlorobenzene
11 U	UG/KG	cis-1,2-Dichloroethene	4	%	% Moisture
11 U	UG/KG	Methyl Ethyl Ketone			
NA	UG/KG	Bromochloromethane			
11 U	UG/KG	Chloroform			
11 U	UG/KG	1,1,1-Trichloroethane			
11 U	UG/KG	Cyclohexane			
11 U	UG/KG	Carbon Tetrachloride			
11 U	UG/KG	Benzene			
11 U	UG/KG	1,2-Dichloroethane			
11 U	UG/KG	Trichloroethene (Trichloroethylene)			
11 U	UG/KG	Methylcyclohexane			
11 U	UG/KG	1,2-Dichloropropane			
11 U	UG/KG	Bromodichloromethane			
11 U	UG/KG	cis-1,3-Dichloropropene			
11 U	UG/KG	Methyl Isobutyl Ketone			
11 U	UG/KG	Toluene			
11 U	UG/KG	trans-1,3-Dichloropropene			
11 U	UG/KG	1,1,2-Trichloroethane			
11 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)			
11 U	UG/KG	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



# ORGANIC DATA QUALIFIER REPORT

Case Number:	31215	Project Number	03-0143	SOW Number	OLM04.2
Site ID.	Largo Landfill Site, Largo, FL			Date:	1/15/03
<u>Affected Samples</u>	<u>Compound or Fraction</u>	<u>Flag Used</u>	<u>Reason</u>		
1758, 1759, 1760	2,4-dinitrophenol	J	erratic calibration response		
1760	benzaldehyde, acetophenone	J	< quantitation limit		
1761-65	caprolactam	UJ	erratic calibration response		
1761	benzaldehyde, benzo(b)fluoranthene	J	< quantitation limit		
1765	benzaldehyde	J	< quantitation limit		
1767-70	hexachlorobutadiene, hexachlorocyclopentadiene, 4-nitrophenol, hexachlorobenzene	J	erratic calibration response		
1771-79	2,4-dinitrophenol	J	erratic calibration response		
1777	naphthalene	J	< quantitation limit		
<u>Pesticides</u>					
1749, 1750, 1751	alpha-chlordane	N	difference between columns		
1752	gamma-chlordane	N	difference between columns		
1758	4,4'-DDD	J	< quantitation limit		
1759	alpha-chlordane	J	< quantitation limit		
1760	dieldrin	N	difference between columns		
1761	aldrin	N	difference between columns		
1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779	alpha-BHC	J	erratic initial calibration response		

# ORGANIC DATA QUALIFIER REPORT

Case Number: 31215 Project Number 03-0143 SOW Number OLM04.2

Site ID. Largo Landfill Site, Largo, FL Date: 1/15/03

<u>Affected Samples</u>	<u>Compound or Fraction</u>	<u>Flag Used</u>	<u>Reason</u>
<b><u>Extractables</u></b>			
1743	phenanthrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene	J	< quantitation limit
1744	fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, benzo(g,h,i)perylene	J	< quantitation limit
1745	benzo(b)fluoranthene	J	< quantitation limit
1746, 1747	phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, benzo(g,h,i)perylene	J	< quantitation limit
1749-50	acenaphthene, dibenzofuran, fluorene, anthracene, carbazole, indeno(1,2,3-cd) pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene	J	< quantitation limit
1751, 1752, 1753	fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k) fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, benzo(g,h,i)perylene	J	< quantitation limit
1754	fluoranthene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene	J	< quantitation limit
1755	fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k) fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, benzo(g,h,i)perylene	J	< quantitation limit
1757	fluoranthene, benzo(k)fluoranthene	J	< quantitation limit

# ORGANIC DATA QUALIFIER REPORT

Case Number: 31215 Project Number 03-0143 SOW Number OLM04.2  
 Site ID. Largo Landfill Site, Largo, FL Date 1/15/03

<u>Affected Samples</u>	<u>Compound or Fraction</u>	<u>Flag Used</u>	<u>Reason</u>
1765	dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane, trichlorofluoromethane, 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoro-ethane, acetone, carbon disulfide, methyl acetate, methylene chloride, trans-1,2-dichloroethene, methyl t-butyl ether, 1,1-dichloroethane, cis-1,2-dichloroethene, 2-butanone, chloroform, 1,2-dichloroethane	J	low internal standard recovery
	1,1,1-trichloroethane, cyclohexane, carbon tetrachloride, benzene, trichloroethene, methylcyclohexane, 1,2-dichloropropane, bromodichloromethane, cis-1,3-dichloropropene, 4-methyl-2-pentanone, toluene, trans-1,3-dichloropropene, 1,1,2-trichloroethane, tetrachloroethene, 2-hexanone, dibromochloro- methane, 1,2-dibromoethane, chlorobenzene, ethylbenzene, xylenes (total), styrene, bromoform, isopropylbenzene	R	extremely low internal standard recovery
1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779, 1781, 1782, 1783	1,2-dibromo-3-chloropropane	R	poor instrument response during calibration
1767	tetrachloroethene	J	< quantitation limit
1767, 1768	dichlorodifluoromethane, acetone, methylene chloride	J	erratic continuing calibration response
1769, 1770, 1771, 1772, 1781, 1782	acetone, dichlorodifluoromethane, methylene chloride	J	erratic continuing calibration response
1770, 1771, 1776	tetrachloroethene	J	< quantitation limit
1773, 1776	trichloroethene	J	< quantitation limit

# ORGANIC DATA QUALIFIER REPORT

Case Number: 31215 Project Number 03-0143 SOW Number OLM04.2  
 Site ID. Largo Landfill Site, Largo, FL Date 1/15/03

<u>Affected Samples</u>	<u>Compound or Fraction</u>	<u>Flag Used</u>	<u>Reason</u>
<b><u>Volatiles</u></b>			
1743, 1744, 1745, 1746, 1747, 1748, 1749, 1752, 1753	1,2-dibromo-3-chloropropane	R	poor instrument response during calibration
1747, 1749, 1750, 1751, 1752, 1754, 1760, 1762, 1765	trichlorofluoromethane	J	< quantitation limit
1750, 1751, 1754, 1755, 1756, 1757, 1758, 1759, 1761, 1762, 1763, 1764, 1765	acetone, methyl acetate, methylene chloride, 4-methyl-2-pentanone, 2-hexanone	J	erratic continuing calibration response
1760	all	J	low internal standard recovery
	dichlorodifluoromethane, acetone, trans-1,2-dichloroethene	J	erratic continuing calibration response
1761	tetrachloroethene	J	< quantitation limit



# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4

Science and Ecosystem Support Division  
980 College Station Road  
Athens, Georgia 30605-2720

## MEMORANDUM

Date: 01/29/2003

Subject: Results of VOLATILES Sample Analysis

03-Q143    Largo Landfill  
Largo, FL

From: Messer, Edward

A handwritten signature in black ink, appearing to read "Edward E. Messer", is written over the printed name.

To: Sloan, Fred

CC: SESD/EIB/SAS

Thru: QA Office

Attached are the results of analysis of samples collected as part of the subject project. If you have any questions, please contact me.

ATTACHMENT

12



**Appendix C**  
**Analytical Data Set**





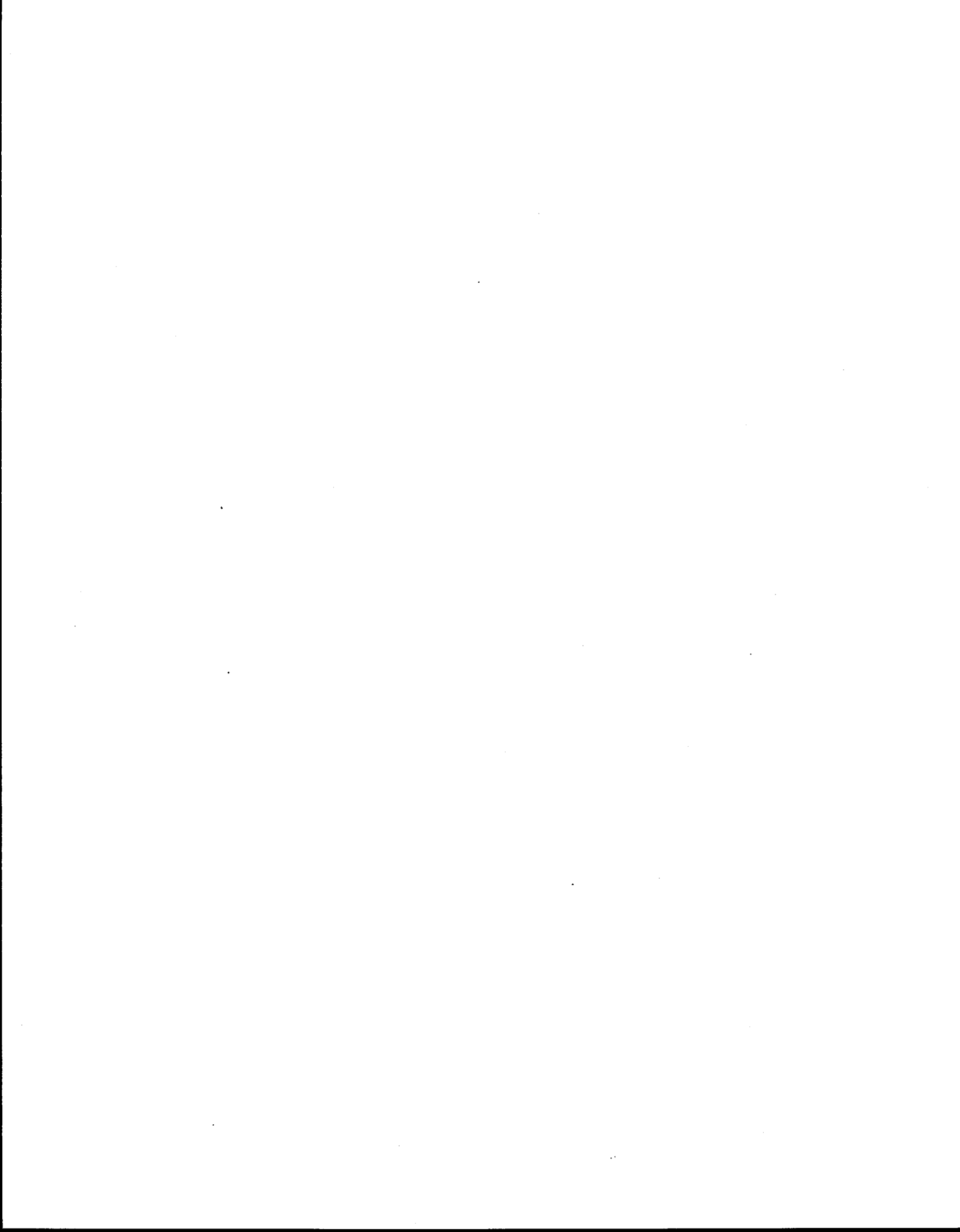
**TABLE 16**  
**SUMMARY OF ORGANIC ANALYTICAL RESULTS**  
**SEDIMENT SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

			Background		Downgradient Samples				Control	Downstream
Compound	Unit	PRG	LLE01SD	LLE01SDD	LLE02SD	LLE03SD	LLE04SD	LLE05SD	LLE06SD	LLE07SD
Extractables										
ACENAPHTHENE	UG/KG	3,700,000	3,000 J	970 J	-	-	-	-	3,000 U	-
DIBENZOFURAN	UG/KG	290,000	1,600 J	670 J	-	-	-	-	3,000 U	-
FLUORENE	UG/KG	NA	2,800	960 J	-	-	-	-	3,000 U	-
BENZO(A)ANTHRACENE	UG/KG	620	15,000	6,000	1,900 J	310 J	560 J	-	3,000 U	-
BENZO(A)PYRENE	UG/KG	62	13,000	5,600	2,100 J	410 J	760 J	-	3,000 U	-
BENZO(B)FLUORANTHENE	UG/KG	620	14,000	5,400	2,800 J	590 J	1,100 J	-	3,000 U	240 J
BENZO(GHI)PERYLENE	UG/KG	NA	9,600 J	4,100 J	1,800 J	400 J	690 J	-	3,000 U	-
BENZO(K)FLUORANTHENE	UG/KG	6,200	14,000	7,300	2,500 J	540 J	780 J	-	860 J	-
Miscellaneous Volatiles										
HEXADECANOIC ACID	UG/KG	NA	-	-	-	-	-	-	1,300 NJ	-
CHOLESTEROL	UG/KG	NA	-	-	-	-	-	-	2,100 NJ	-
GAMMA-SITOSTEROL	UG/KG	NA	-	-	-	-	-	-	-	770NJ
UNKNOWN COMPOUNDS/NO.	UG/KG	NA	-	1,000 J/I	-	500 J/I	4,500 J/3	17,000 J/7	4,500 J/4	3,900 J/4
Pesticides/Polychlorinated Biphenyls										
4,4'-DDE (P,P'-DDE)	UG/KG	1,700	4.3	4.5 U	-	-	-	-	6.0 U	-
ALPHA-CHLORDANE/2	UG/KG	NA	4.8 N	9.6 N	5.9	-	4.7	-	3.1 U	-
GAMMA-CHLORDANE/2	UG/KG	NA	2.9 U	3.7 U	-	-	-	-	3.1 U	-
Miscellaneous Volatiles										
UNKNOWN SILOXANE	UG/KG	NA	-	24 J	27 J	34 J	43 J	37 J	75 J	30 J
BENZENE, 1-METHYL-2-(1-METHYLETHYL)-	UG/KG	NA	-	-	-	-	48 NJ	-	-	-
CYCLOTETRASILOXANE,OCTAMETHYL-	UG/KG	NA	16 NJ	-	-	-	-	-	-	-
Volatiles										
TRICHLOROFLUOROMETHANE (FREON 11)	UG/KG	390,000	2 J	3 J	-	-	-	-	-	2 J

**Notes:**

- PRG - Preliminary Remediation Goals (Region 9 - residential soils)
- LLE - Largo Landfill ESI
- SD - Sediment sample
- UG/KG - Micrograms per kilogram
- - Below detection limit or not detected in sample
- J - Estimated value
- U - Value is below the reporting limit
- N - Presumptive presence of evidence
- /# - Number of unknown compounds
- NA - Not available
- Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration. If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.
- Outline - Constituents elevated above PRGs

\* For the purposes of this ESI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).



**TABLE 15**  
**SUMMARY OF INORGANIC ANALYTICAL RESULTS**  
**SEDIMENT SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

			Background		Downstream Samples				Control	Downstream
Compound	Unit	PRG	LLE01SD	LLE01SDD	LLE02SD	LLE03SD	LLE04SD	LLE05SD	LLE06SD	LLE07SD
Metals										
ALUMINUM	MG/KG	76,000	670	620	500	1,200	1,500 J	2,800 J	3,900 J	1,200 J
ARSENIC	MG/KG	22	1.6 U	1.5 U	-	-	-	-	5.3	-
BARIUM	MG/KG	5,400	3.3	3.7	2.2	11	19	14	42	8.4
BERYLLIUM	MG/KG	150	0.30 U	0.27 U	-	-	-	-	0.5	-
CALCIUM	MG/KG	NA	14,000	32,000	8,900	6,000	14,000	56,000	13,000	8,800
CHROMIUM	MG/KG	210	2.3	1.6	1.2	3.5	-	7.1	12	-
COPPER	MG/KG	3,100	2.7 J/3.29*	2.7 J/3.29*	206 J/168.85*	2.7 J	3.8 J	7.8 J	20 J/16.39*	10 J/8.20*
IRON	MG/KG	23,000	700	550	430	1,600	1,000	2,500	3,900	1,100
LEAD	MG/KG	400	3.9	3.7	3.9	3.3	6.5 J	6.0 J	4.6 J/23.61	6.2 J/4.31*
MAGNESIUM	MG/KG	NA	79	230	74	360	430	2,000	700	160
MANGANESE	MG/KG	1,800	16	16	3.9	21	27	65	49	10
NICKEL	MG/KG	1,600	1.7 U	1.6 U	-	-	-	2.8	6.2	-
POTASSIUM	MG/KG	NA	100	78	64	240	190	370	390	140
SODIUM	MG/KG	NA	480	490	340	370	530	520	510	420
VANADIUM	MG/KG	550	1.9 U	1.7 U	-	2.3	3	6.2	7.8	2.8
ZINC	MG/KG	23,000	15	15	18	11	24	20	20	23

**Notes:**

PRG - Preliminary Remediation Goals (Region 9 - residential soils)

LLE - Largo Landfill ESI

SD - Sediment sample

MG/KG - Milligrams per kilogram

J - Estimated value

U - Value is below the reporting limit

NA - Not available

Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration.  
If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.

Outline - Constituents elevated above PRGs

\* For the purposes of this ESI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).



**TABLE 14**  
**SUMMARY OF ORGANIC ANALYTICAL RESULTS**  
**SURFACE WATER SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

			Background		Downstream Samples				Control	Downstream
Compound	Unit	MCL	LLE01SW	LLE01SWD	LLE02SW	LLE03SW	LLE04SW	LLE05SW	LLE06SW	LLE07SW
Extractables										
None detected										
Miscellaneous Extractables										
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH)	UG/L	NA	-	-	-	-	-	-	-	5 NJ
UNKNOWN COMPOUNDS/NO.	UG/L	NA	-	-	-	-	2 J/I	-	-	-
Pesticides/Polychlorinated Biphenyls										
None detected										
Volatiles										
TRICHLOROETHENE (TRICHLOROETHYLENE)	UG/L	5	12	10 U	3 J	-	-	2 J	10 U	-
TETRACHLOROETHENE (TETRACHLOROETHYLENE)	UG/L	5	23	10 U	-	-	-	3 J	10 U	2 J
Miscellaneous Volatiles										
STRAIGHT- CHAIN ALKANE	UG/L	NA	-	9 J	-	-	-	-	-	-
D-LIMONENE	UG/L	NA	-	-	7 NJ	11 NJ	9 NJ	5 NJ	7 NJ	-

**Notes:**

MCL. - Maximum Contamination Limit (U.S. EPA National Primary Drinking water Regulations)

L.L.F. - Largo Landfill ISI

SW - Surface water sample

UG/L. - Micrograms per liter

- - Below detection limit or not detected in sample

J - Estimated value

U - Value is below the reporting limit

N - Presumptive presence of evidence

/# - Number of unknown compounds

NA - Not available

Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration. If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.

Outline - Constituents elevated above PRGs

\* For the purposes of this ISI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).



**TABLE 13**  
**SUMMARY OF INORGANIC ANALYTICAL RESULTS**  
**SURFACE WATER SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

			Background		Downstream Samples				Control	Domestic
Compound	Unit	MCL	LLE01SW	LLE01SWD	LLE02SW	LLE03SW	LLE04SW	LLE05SW	LLE06SW	LLE07SW
Metals										
BARIUM	UG/L	2,000	17	29	18	19	100	35	27	17
CALCIUM	UG/L	NA	51,000	65,000	53,000	55,000	92,000	67,000	61,000	50,000
IRON	UG/L	300	150	180	180	250	290	230	140	140
MAGNESIUM	UG/L	NA	5,000	5,800	4,900	5,300	16,000	7,300	5,300	5,000
MANGANESE	UG/L	50	20 J/25.6*	28 J/35.84*	16 J	20 J	76 J	37 J	23 J	20 J
NICKEL	UG/L	100	1.9 R	2.2 R	-	-	3.7	-	1.9 U	-
POTASSIUM	UG/L	NA	4,000 J	6,300 J	3,800 J	4,400 J	32,000 J	9,700 J	5,900 J	4,100 J
SODIUM	UG/L	160,000	25,000	29,000	22,000	24,000	58,000	31,000	29,000	25,000
VANADIUM	UG/L	49	3.6	3.1	3.1	3.4	1.9 R	2.9	3.3	3.8
ZINC	UG/L	5,000	3.7	5.3	15	9.9	3.1	7.9	10	4.2

**Notes:**

- MCL - Maximum Contamination Limit (U.S. EPA National Primary Drinking water Regulations)
  - LLE - Largo Landfill ESI
  - SW - Surface water sample
  - UG/L - Micrograms per liter
  - D - Duplicate sample
  - - Below detection limit or not detected in sample
  - J - Estimated value
  - U - Value is below the reporting limit
  - R - Data are unusable
  - NA - Not available
  - Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration. If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.
  - Outline - Constituents elevated above PRGs
- \* For the purposes of this ESI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).





**TABLE 12**  
**SUMMARY OF ORGANIC ANALYTICAL RESULTS**  
**GROUNDWATER SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

			Background	Downgradient Samples				
Compound	Unit	MCLs	LLE01GW	LLE02GW	LLE03GW	LLE04GW	LLE04GWD	LLE05GW
Extractables								
NAPHTHALENE	UG/L	NA	6 J	-	-	-	-	-
Miscellaneous Extractables								
UNKNOWN COMPOUNDS/NO.	UG/L	NA	-	-	4 J/I	-	-	-
Pesticides/Polychlorinated Biphenyls								
None								
Volatiles								
TETRACHLOROETHENE (TETRACHLOROETHYLENE)	UG/L	5	10 U	-	-	1 J	2 J	-
Miscellaneous Volatiles								
MICYCLO[2.2.1]HEPT-2-ENE,1,7,7-TRIMETHYL	UG/L	NA	16 NJ	-	-	-	-	-
D-LIMONENE	UG/L	NA	-	-	-	10 NJ	9 NJ	-

**Notes:**

- MCL - Maximum Contamination Limit (U.S. EPA National Primary Drinking water Regulations)
- LLE - Largo Landfill ESI
- GW - Groundwater sample
- UG/L - Micrograms per liter
- - Below detection limit or not detected in sample
- J - Estimated value
- U - Value is below the reporting limit
- N - Presumptive presence of evidence
- /# - Number of unknown compounds
- NA - Not available
- Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration. If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.
- Outline - Constituents elevated above PRGs

\* For the purposes of this ESI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).

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**TABLE 11**  
**SUMMARY OF INORGANIC ANALYTICAL RESULTS**  
**GROUNDWATER SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

			Background	Downgradient Samples				
Compound	Unit	MCLs	LLE01GW	LLE02GW	LLE03GW	LLE04GW	LLE04GWD	LLE05GW
Metals								
ALUMINUM	UG/L	200	760 UJ	1,800 J	3,200 J	-	-	250
ARSENIC	UG/L	50	5.1 U	-	-	-	-	4.5
BARIUM	UG/L	2,000	14	34	27	19	20	-
CALCIUM	UG/L	NA	37,000	41,000	16,000	33,000	33,000	-
CHROMIUM	UG/L	100	4.1	9.1	37	2.6	2.3	-
COBALT	UG/L	420	1.2 U	1.9	1.5 R	-	-	-
COPPER	UG/L	1,000	3.3 U	-	-	-	-	1.1
IRON	UG/L	300	1,400	4,200	3,600	760	750	-
LEAD	UG/L	15	3.0 U	3.47	-	-	-	-
MAGNESIUM	UG/L	NA	20,000	10,000	6,100	14,000	14,000	-
MANGANESE	UG/L	50	31 J	43 J	39 J	17 J	17 J	-
NICKEL	UG/L	100	1.9 U	6.1 R	6.6	-	-	-
POTASSIUM	UG/L	NA	1,000 UJ	2,600 J	3,900 J	2,700 J	2,700 J	240
SELENIUM	UG/L	50	3.4 U	-	3.5	-	-	-
SODIUM	UG/L	180,000	20,000	15,000	200,000	36,000	36,000	740
THALLIUM	UG/L	2	6.1 U	-	-	8.1 R	-	-
VANADIUM	UG/L	49	2.6	11	56	4.8	4.4	-
ZINC	UG/L	5,000	9	33	13	9.1	9	-

**Notes:**

- MCL - Maximum Contamination Limit (U.S. EPA National Primary Drinking water Regulations)
  - LLE - Largo Landfill ESI
  - GW - Groundwater sample
  - UG/L - Micrograms per liter
  - - Below detection limit or not detected in sample
  - J - Estimated value
  - U - Value is below the reporting limit
  - R - Data are unusable
  - NA - Not available
  - Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration. If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.
  - Outline - Constituents elevated above PRGs
- \* For the purposes of this ESI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).



**TABLE 10**  
**SUMMARY OF FIELD PARAMETERS FOR**  
**GROUNDWATER SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

Sample Number	pH	Conductivity (µS/cm)	Turbidity (NTU)	Temperature °C
LLE01GW	4.92	0.18	18.1	26.5
LLE02GW	6.03	0.256	125	26.8
LLE03GW	4.92	0.398	373	26.7
LLE04GW	5.57	0.204	114	28.7
LLE04GWD	5.77	0.148	2.6	27.8
LLE05GW	5.77	0.148	2.6	27.8

Notes:

- LLE - Largo Landfill ESI
- GW - Groundwater Sample
- D - Duplicate sample
- µS/cm - Microsiemens per centimeter
- NTU - Nephelometric turbidity units
- °C - Degrees Celsius



TABLE 9  
SUMMARY OF ORGANIC ANALYTICAL RESULTS  
SUBSURFACE SOIL SAMPLES  
LARGO LANDFILL  
LARGO, PINELLAS COUNTY, FLORIDA

			Background		On-site Samples			
Compound	Unit	PRG	LLE01SB	LLE01SBD	LLE02SB	LLE03SB	LLE04SB	LLE05SB
Extractables								
PHENANTHRENE	UG/KG	NA	360 U	360 U	300 1/30*	-	-	-
FLUORANTHENE	UG/KG	2,300,000	360 U	360 U	890 1/89*	-	-	-
PYRENE	UG/KG	2,300,000	360 U	360 U	740 1/74*	-	-	-
BENZO(A)ANTHRACENE	UG/KG	620	360 U	360 U	370 1/37*	-	-	-
CHRYSENE	UG/KG	62,000	360 U	360 U	520 1/52*	-	-	-
BENZO(B)FLUORANTHENE	UG/KG	620	1,000*	360 U	510 1/51*	-	-	-
BENZO(K)FLUORANTHENE	UG/KG	6,200	360 U	360 U	440 1/44*	-	-	-
BENZO-A-PYRENE	UG/KG	62	360 U	360 U	429 1/42.9*	-	-	-
INDENO(1,2,3-CD)PYRENE	UG/KG	620	360 U	360 U	349 1/34.9*	-	-	-
BENZO(G,H,I)PERYLENE	UG/KG	NA	360 U	360 U	370 1/37*	-	-	-
Miscellaneous Extractables								
1-DODECENE	UG/KG	NA	140 NJ	-	-	-	-	-
1-PENTADECENE	UG/KG	NA	180 NJ	-	-	-	-	-
1-DOCOSENE	UG/KG	NA	220 NJ	-	-	-	-	-
2-HEPTACOSANONE	UG/KG	NA	150 NJ	120 J	-	-	-	220 NJ
2-PENTACOSANONE	UG/KG	NA	-	76 J	-	-	-	-
BENZO[E]PYRENE	UG/KG	NA	-	-	460 NJ	-	-	-
GAMMA-SITOSTEROL	UG/KG	NA	-	-	-	600 J	-	-
OLEAN-12-ENE	UG/KG	NA	-	-	-	1,400 NJ	-	-
URS-12-EN-24-OIC ACID,3-OXO-,METHYL ESTER	UG/KG	NA	-	-	-	4,400 NJ	-	-
TRIDECANOL, 2-ETHYL-2-METHYL	UG/KG	NA	-	-	-	-	-	110 NJ
UNKNOWN COMPOUNDS/ NO.	UG/KG	NA	1,900 1/11	730 1/7	1,500 1/3	600 1/1	1,300 1/6	1,700 1/9
Pesticides/Polychlorinated Biphenyls								
ALPHA-CHLORDANE/2	UG/KG	NA	1.8 U	1.9 U	5.0 N	1.6 J	-	-
GAMMA-CHLORDANE/2	UG/KG	NA	1.8 U	1.9 U	15.7	2.6	-	-
Miscellaneous Volatiles								
UNKNOWN SILOXANE	UG/KG	NA	31 J	29 J	12 J	-	9 J	-
CYCLOTETRASILOXANE,OCTAMETHYL-	UG/KG	NA	-	-	-	35 NJ	-	10 NJ
Volatiles								
TRICHLOROFLUOROMETHANE (FREON 11)	UG/KG	1,500	12 U	11 U	1 J	-	-	-

**Notes:**

- PRG - Preliminary Remediation Goals (Region 9 - residential soils)
- LLE - Largo Landfill ISI
- SB - Subsurface soil sample
- UG/KG - Micrograms per kilogram
- - Below detection limit or not detected in sample
- J - Estimated value
- U - Value is below the reporting limit
- N - Presumptive presence of evidence
- /# - Number of unknown compounds
- R - Data are unusable
- NA - Not applicable
- Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration. If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.
- Outline/Bold - Constituents elevated above PRGs
- \* For the purposes of this ISI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).





**TABLE 8**  
**SUMMARY OF INORGANIC ANALYTICAL RESULTS**  
**SUBSURFACE SOIL SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

Compound	Unit	PRG	Background		On-site Samples			
			LLE01SB	LLE01SBD	LLE02SB	LLE03SB	LLE04SB	LLE05SB
ALUMINUM	MG/KG	76,000	690	640	1,400	2,900 J	2,200 J	1,800 J
ARSENIC	MG/KG	22	1.1 U	1.4 U	-	-	3	2
BARIUM	MG/KG	5,400	2	1.9	4.8	7	37	87
BERYLLIUM	MG/KG	150	0.2 U	0.2 U	-	-	0.33	-
CADMIUM	MG/KG	37	0.16 U	0.16 U	0.16	-	-	-
CALCIUM	MG/KG	NA	1,800	2,200	21,000	12,000	5,400	14,000
CHROMIUM	MG/KG	210	1.7	1.5	3.5	5.7	4.7	3
COPPER	MG/KG	3,100	1.3 UJ	1.3 UJ	-	-	4.7 J/3.83*	-
IRON	MG/KG	23,000	310	320	1,100	520	2,300	1,300
LEAD	MG/KG	400	1.2 J/1.73*	1.3	17	3.1 J	3.9 J/2.7*	8.4 J/5.83*
MAGNESIUM	MG/KG	NA	36	34	200	210	900	350
MANGANESE	MG/KG	1,800	0.88	1.4	8.6	7.4	30	14
NICKEL	MG/KG	1,600	1.2 U	1.2 U	-	12	2.5	13
POTASSIUM	MG/KG	NA	47	52	73	120	220	320
SODIUM	MG/KG	NA	240	260	320	300	440	350
VANADIUM	MG/KG	550	1.6	1.3 U	2.8	2.7	3.4	2.7
ZINC	MG/KG	23,000	1.6	1.5	40	6.8	2.4	3.2

**Notes:**

- PRG - Preliminary Remediation Goals (Region 9 - residential soils)
  - LLE - Largo Landfill ESI
  - SB - Subsurface soil sample
  - MG/KG - Milligrams per kilogram
  - J - Estimated value
  - U - Value is below the reporting limit
  - NA - Not available
  - Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration. If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.
  - Outline - Constituents elevated above PRGs
- \* For the purposes of this ESI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).



TABLE 7 (Continued)  
SUMMARY OF ORGANIC ANALYTICAL RESULTS  
SURFACE SOIL SAMPLES  
LARGO LANDFILL  
LARGO, FLORIDA

			Background		On-site Samples						
Compound	Unit	PRG	LLE01SS	LLE01SSD	LLE02SS	LLE03SS	LLE04SS	LLE05SS	LLE06SS	LLE07SS	LLE08SS
Pesticides/Polychlorinated Biphenyls											
DIELDRIN	UG/KG	30	3.5 U	3.8 U	-	46 N	-	-	-	-	-
4,4'-DDD (P,P'-DDD)	UG/KG	2,400	3.5 U	3.8 U	-	-	-	-	3.6 1/0.36*	-	-
4,4'-DDE (P,P'-DDE)	UG/KG	1,700	3.5 U	3.8 U	-	-	-	-	20	-	16
4,4'-DDT (P,P'-DDT)	UG/KG	1,700	3.5 U	3.8 U	-	-	-	-	10	-	-
PCB-1248	UG/KG	220	35 U	38 U	-	-	-	-	-	-	170
PCB-1254	UG/KG	220	35 U	38 U	-	-	-	-	-	-	95
Miscellaneous Volatiles											
UNKNOWN SILOXANE	UG/KG	NA	15 J	18 J	14 J	7 J	-	-	24 J	-	40 J
CYCLOTETRASILOXANE,OCTAMETHYL-	UG/KG	NA	-	-	-	-	12 NJ	-	-	30 NJ	-
Volatiles											
TRICHLOROFLUOROMETHANE (FREON 11)	UG/KG	390,000	11 U	3 J	2 J	4 J	3 J	2 J	-	-	-
TETRACHLOROETHENE (TETRACHLOROETHYLENE)	UG/KG	1,500	11 U	11 U	-	-	-	-	-	-	2 J

**Notes:**

- PRG - Preliminary Remediation Goals (Region 9 - residential soils)
- LLE - Largo Landfill ESI
- SS - Surface soil sample
- D - Duplicate sample
- UG/KG - Micrograms per kilogram
- - Below detection limit or not detected in sample
- J - Estimated value
- U - Value is below the reporting limit
- N - Presumptive presence of evidence
- NA - Not available
- Shading - Elevated concentrations of constituents. A constituent is considered to be elevated if it is three times the designated background concentration. If the constituent is undetected in the background sample, any concentration equal to or greater than the SQL is considered to be elevated.
- Outline - Constituents elevated above PRGs

\* For the purposes of this ESI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).



TABLE 7  
SUMMARY OF ORGANIC ANALYTICAL RESULTS  
SURFACE SOIL SAMPLES  
LARGO LANDFILL  
LARGO, PINELLAS COUNTY, FLORIDA

			Background		On-site Samples						
Compound	Unit	PRG	LLE01SS	LLE01SSD	LLE02SS	LLE03SS	LLE04SS	LLE05SS	LLE06SS	LLE07SS	LLE08SS
Extractables											
BENZALDEHYDE	UG/KG	6,100,000	3,500 U	3,800 U	-	430 J	-	47 J	-	-	48 J
ACETOPHENONE	UG/KG	NA	3,500 U	3,800 U	-	1,400 J	-	-	-	-	-
FLUORANTHENE	UG/KG	2,300,000	2,400 J	2,300 J	1,800 J	-	-	-	-	680 J	-
BENZO(A)ANTHRACENE	UG/KG	620	990 J	980 J	640 J	-	-	-	-	270 J	-
CHRYSENE	UG/KG	62,000	1,400 J	1,300 J	830 J	-	-	-	-	480 J	-
BENZO(B)FLUORANTHENE	UG/KG	620	1,000 J	1,100 J	640 J	-	-	-	-	510 J	49 J
BENZO(K)FLUORANTHENE	UG/KG	6,200	1,300 J	1,000 J	720 J	-	-	-	-	460 J	-
BENZO-A-PYRENE	UG/KG	62	1,000 J	1,000 J	680 J	-	-	-	-	390 J	-
INDENO(1,2,3-CD)PYRENE	UG/KG	620	810 J	800 J	500 J	-	-	-	-	370 J	-
BENZO(G,H,I)PERYLENE	UG/KG	NA	870 J	860 J	530 J	-	-	-	-	400 J	-
PHENANTHRENE	UG/KG	NA	1000 J	930 J	1,400 J	-	-	-	-	190 J	-
NAPHTHALENE	UG/KG	56,000	3,500 U	3,800 U	190 J	-	-	-	-	-	-
PYRENE	UG/KG	2,300,000	2,000 J	1,900 J	1,500 J	-	-	-	-	590 J	-
BENZYL BUTYL PHTHALATE	UG/KG	NA	3,500 U	3,800 U	-	25,000	-	-	-	-	-
Miscellaneous Extractables											
BENZO(J)FLUORANTHENE	UG/KG	NA	1,100 NJ	-	-	-	-	-	-	-	-
UNKNOWN COMPOUNDS/NO.	UG/KG	NA	-	-	1,200 J/I	49,000 J/6	4,700 J/22	3,700 J/21	-	370 J/I	3,500 J/17
.ALPHA.-METHYLSTYRENE	UG/KG	NA	-	-	-	950 NJ	-	-	-	-	-
PHENOL,2,2-BIS(1,1-DIMETHYLETHYL)-	UG/KG	NA	-	-	-	3,100 NJ	-	-	-	-	-
HEXADECANOIC ACID	UG/KG	NA	-	-	-	2,100 NJ	140 NJ	420 NJ	-	-	680 NJ
HEXADECANOIC ACID, METHYL ESTER	UG/KG	NA	-	-	-	-	-	-	-	-	190 NJ
PHENOL,4,4'-(1-METHYLETHYLIDENE)BIS-	UG/KG	NA	-	-	-	1,000 NJ	-	-	-	-	-
UNKNOWN PHTHALATES/NO.	UG/KG	NA	-	-	-	6,500 J/4	-	-	-	-	-
2-PENTACOSANONE	UG/KG	NA	-	-	-	-	470 NJ	-	-	-	720 NJ
2-HEPTACOSANONE	UG/KG	NA	-	-	-	-	380 NJ	-	-	-	-
2-NONACOSANONE	UG/KG	NA	-	-	-	-	230 NJ	-	-	-	-
PENTADECANOIC ACID, 14-METHYL-,METHYL E	UG/KG	NA	-	-	-	-	-	140 NJ	-	-	-
11-OCTADECENOIC ACID, METHYL ESTER	UG/KG	NA	-	-	-	-	-	190 NJ	-	-	-
9, 12-OCTADECADIENOIC ACID (Z,Z)-	UG/KG	NA	-	-	-	-	-	470 NJ	-	-	-
PERYLENE	UG/KG	NA	-	-	-	-	-	-	-	460 NJ	-
1-DECENE	UG/KG	NA	-	-	-	-	-	-	-	-	420 NJ
OXACYCLOHEXADECAN-2-ONE	UG/KG	NA	-	-	-	-	-	-	-	-	360 NJ
OCTADECANOIC ACID	UG/KG	NA	-	-	-	-	-	-	-	-	90 NJ
UNKNOWN STEROID	UG/KG	NA	-	-	650 J	-	-	-	-	-	-
Pesticides/Polychlorinated Biphenyls											
ALDRIN	UG/KG	2.9	1.8 U	2.0 U	-	-	-	-	-	-	9.6 N
ALPHA-CHLORDANE/2	UG/KG	NA	2.1	2.0 U	5	30	-	-	9.3	3.1	-
GAMMA-CHLORDANE/2	UG/KG	NA	1.8 U	2.0 U	3.9 N	61	-	-	11	-	-
HEPTACHLOR	UG/KG	110	1.8 U	2.0 U	-	23	-	-	-	-	-



**TABLE 6**  
**SUMMARY OF INORGANIC ANALYTICAL RESULTS**  
**SURFACE SOIL SAMPLES**  
**LARGO LANDFILL**  
**LARGO, PINELLAS COUNTY, FLORIDA**

Compound	Unit	PRG	Background		On-site Samples						
			LLE01SS	LLE01SSD	LLE02SS	LLE03SS	LLE04SS	LLE05SS	LLE06SS	LLE07SS	LLE08SS
Metals											
ALUMINUM	MG/KG	76,000	1,500	1,800	1,500	2,600 J	1,400 J	1200 J	2,200 J	1,400 J	2,600 J
ARSENIC	MG/KG	22	1.1 U	1.1 U	1.4	2.8	-	-	-	-	3.3 J/189 *
BARIUM	MG/KG	5,400	9.4	6.3	9.1	22	17	6.9	7.5	6.6	68
CADMIUM	MG/KG	37	0.24	0.2	0.19	-	-	-	0.16 R	-	0.75
CALCIUM	MG/KG	NA	30,000	38,000	58,000	100,000	5,700	17,000	14,000	12,000	6,200
CHROMIUM	MG/KG	210	3.4	4.8	5	7.7	3.8	-	15	4.4	9.5
COBALT	MG/KG	900	1.5 U	1.5 U	-	-	-	-	-	-	2
COPPER	MG/KG	3,100	4.9 J/5.9 *	3.6 J/4.39 *	3.7 J	5.9 J	3.1 J	-	3.8 J	7.2 J	87.3/71.3/1.5
IRON	MG/KG	23,000	770	1,000	900	2,000	1,300	550	1,200	850	4,800
LEAD	MG/KG	400	19	21	9.4	13 J	4.5 J	11 J	14 J	12 J	70 J/48.61 *
MAGNESIUM	MG/KG	NA	300	320	380	1,000	600	200	340	160	440
MANGANESE	MG/KG	1,800	8.6	10	14	30	14	9.2	9.9	6.1	52
NICKEL	MG/KG	1,600	1.1 U	1.1 U	1.4	2.8	1.9	-	1.7	1.3	10
POTASSIUM	MG/KG	NA	61	68	160	280	170	170	110	80	260
SILVER	MG/KG	390	0.28 U	0.28 U	-	-	-	-	-	-	11
SODIUM	MG/KG	NA	340	380	230	550	520	320	320	240	300
TOTAL MERCURY	MG/KG	23	0.05 U	0.05 U	-	-	-	-	-	-	0.18
VANADIUM	MG/KG	550	2.1	3.4	4.4	8	3.2	2	3.3	3.4	4
ZINC	MG/KG	23,000	26	28	17	33	6.1	8.5	44	30	550

**Notes:**

PRG - Preliminary Remediation Goals (Region 9 - residential soil)

LLE - Largo Landfill ESI

SS - Surface soil sample

D - Duplicate sample

MG/KG - Milligrams per kilogram

NA - Not available

J - Estimated value

U - Value is below the reporting limit

R - Data are unusable

Shading - Elevated concentrations of constituents. A constituent is considered to be Elevated if it is three times the designated Background concentration.

If the constituent is undetected in the background sample, any concentration equal to or greater than the SQI is considered to be elevated.

Outline - Constituents elevated above PRGs

\* For the purposes of this ESI, observed release J-qualified data have been adjusted in accordance with the U.S. EPA fact sheet, "Using Qualified Data to Document an Observed Release and Observed Contamination" (Ref. 17).





**Appendix B**  
**Analytical Data Tables**

Sample 1745 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SB /

MD No: 1P73

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P73

Inorg Contractor: SENTIN

Org Contractor: CEIMC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:41

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
12 U	UG/KG	Dichlorodifluoromethane
12 U	UG/KG	Chloromethane
12 U	UG/KG	Vinyl Chloride
12 U	UG/KG	Bromomethane
12 U	UG/KG	Chloroethane
12 U	UG/KG	Trichlorofluoromethane (Freon 11)
12 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
12 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
12 U	UG/KG	Acetone
12 U	UG/KG	Carbon Disulfide
12 U	UG/KG	Methyl Acetate
12 U	UG/KG	Methylene Chloride
12 U	UG/KG	trans-1,2-Dichloroethene
12 U	UG/KG	Methyl T-Butyl Ether (MTBE)
12 U	UG/KG	1,1-Dichloroethane
12 U	UG/KG	cis-1,2-Dichloroethene
12 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
12 U	UG/KG	Chloroform
12 U	UG/KG	1,1,1-Trichloroethane
12 U	UG/KG	Cyclohexane
12 U	UG/KG	Carbon Tetrachloride
12 U	UG/KG	Benzene
12 U	UG/KG	1,2-Dichloroethane
12 U	UG/KG	Trichloroethene (Trichloroethylene)
12 U	UG/KG	Methylcyclohexane
12 U	UG/KG	1,2-Dichloropropane
12 U	UG/KG	Bromodichloromethane
12 U	UG/KG	cis-1,3-Dichloropropene
12 U	UG/KG	Methyl Isobutyl Ketone
12 U	UG/KG	Toluene
12 U	UG/KG	trans-1,3-Dichloropropene
12 U	UG/KG	1,1,2-Trichloroethane
12 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
12 U	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
12 U	UG/KG	Dibromochloromethane
12 U	UG/KG	1,2-Dibromoethane (EDB)
12 U	UG/KG	Chlorobenzene
12 U	UG/KG	Ethyl Benzene
12 U	UG/KG	Total Xylenes
12 U	UG/KG	Styrene
12 U	UG/KG	Bromoform
12 U	UG/KG	Isopropylbenzene
12 U	UG/KG	1,1,2,2-Tetrachloroethane
12 U	UG/KG	1,3-Dichlorobenzene
12 U	UG/KG	1,4-Dichlorobenzene
12 U	UG/KG	1,2-Dichlorobenzene
12 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
12 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
9	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1745 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P73

D No: 1P73

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:41

Ending:

RESULTS	UNITS	ANALYTE
31 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1748 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SBD /

MD No: 1P76

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P76

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:40

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dichlorodifluoromethane	11 U	UG/KG	Dibromochloromethane
11 U	UG/KG	Chloromethane	11 U	UG/KG	1,2-Dibromoethane (EDB)
11 U	UG/KG	Vinyl Chloride	11 U	UG/KG	Chlorobenzene
11 U	UG/KG	Bromomethane	11 U	UG/KG	Ethyl Benzene
11 U	UG/KG	Chloroethane	11 U	UG/KG	Total Xylenes
11 U	UG/KG	Trichlorofluoromethane (Freon 11)	11 U	UG/KG	Styrene
11 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)	11 U	UG/KG	Bromoform
11 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	11 U	UG/KG	Isopropylbenzene
11 U	UG/KG	Acetone	11 U	UG/KG	1,1,2,2-Tetrachloroethane
11 U	UG/KG	Carbon Disulfide	11 U	UG/KG	1,3-Dichlorobenzene
11 U	UG/KG	Methyl Acetate	11 U	UG/KG	1,4-Dichlorobenzene
11 U	UG/KG	Methylene Chloride	11 U	UG/KG	1,2-Dichlorobenzene
11 U	UG/KG	trans-1,2-Dichloroethene	11 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
11 U	UG/KG	Methyl T-Butyl Ether (MTBE)	11 U	UG/KG	1,2,4-Trichlorobenzene
11 U	UG/KG	1,1-Dichloroethane	NA	UG/KG	1,2,3-Trichlorobenzene
11 U	UG/KG	cis-1,2-Dichloroethene	6	%	% Moisture
11 U	UG/KG	Methyl Ethyl Ketone			
NA	UG/KG	Bromochloromethane			
11 U	UG/KG	Chloroform			
11 U	UG/KG	1,1,1-Trichloroethane			
11 U	UG/KG	Cyclohexane			
11 U	UG/KG	Carbon Tetrachloride			
11 U	UG/KG	Benzene			
11 U	UG/KG	1,2-Dichloroethane			
11 U	UG/KG	Trichloroethene (Trichloroethylene)			
11 U	UG/KG	Methylcyclohexane			
11 U	UG/KG	1,2-Dichloropropane			
11 U	UG/KG	Bromodichloromethane			
11 U	UG/KG	cis-1,3-Dichloropropene			
11 U	UG/KG	Methyl Isobutyl Ketone			
11 U	UG/KG	Toluene			
11 U	UG/KG	trans-1,3-Dichloropropene			
11 U	UG/KG	1,1,2-Trichloroethane			
11 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)			
11 U	UG/KG	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1748 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SBD /

MD No: 1P76

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P76

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:40

Ending:

RESULTS	UNITS	ANALYTE
29 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1751 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02SB /

MD No: 1P79

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P79

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dichlorodifluoromethane
11 U	UG/KG	Chloromethane
11 U	UG/KG	Vinyl Chloride
11 U	UG/KG	Bromomethane
11 U	UG/KG	Chloroethane
1 J	UG/KG	Trichlorofluoromethane (Freon 11)
11 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
11 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
11 UJ	UG/KG	Acetone
11 U	UG/KG	Carbon Disulfide
11 UJ	UG/KG	Methyl Acetate
11 UJ	UG/KG	Methylene Chloride
11 U	UG/KG	trans-1,2-Dichloroethene
11 U	UG/KG	Methyl T-Butyl Ether (MTBE)
11 U	UG/KG	1,1-Dichloroethane
11 U	UG/KG	cis-1,2-Dichloroethene
11 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
11 U	UG/KG	Chloroform
11 U	UG/KG	1,1,1-Trichloroethane
11 U	UG/KG	Cyclohexane
11 U	UG/KG	Carbon Tetrachloride
11 U	UG/KG	Benzene
11 U	UG/KG	1,2-Dichloroethane
11 U	UG/KG	Trichloroethene (Trichloroethylene)
11 U	UG/KG	Methylcyclohexane
11 U	UG/KG	1,2-Dichloropropane
11 U	UG/KG	Bromodichloromethane
11 U	UG/KG	cis-1,3-Dichloropropene
11 UJ	UG/KG	Methyl Isobutyl Ketone
11 U	UG/KG	Toluene
11 U	UG/KG	trans-1,3-Dichloropropene
11 U	UG/KG	1,1,2-Trichloroethane
11 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
11 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dibromochloromethane
11 U	UG/KG	1,2-Dibromoethane (EDB)
11 U	UG/KG	Chlorobenzene
11 U	UG/KG	Ethyl Benzene
11 U	UG/KG	Total Xylenes
11 U	UG/KG	Styrene
11 U	UG/KG	Bromoform
11 U	UG/KG	Isopropylbenzene
11 U	UG/KG	1,1,2,2-Tetrachloroethane
11 U	UG/KG	1,3-Dichlorobenzene
11 U	UG/KG	1,4-Dichlorobenzene
11 U	UG/KG	1,2-Dichlorobenzene
11 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
11 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
7	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1751 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE02SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P79

D No: 1P79

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:15

Ending:

RESULTS	UNITS	ANALYTE
12 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1759 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SB /

MD No: 1P88

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P88

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:52

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
12 U	UG/KG	Dichlorodifluoromethane	12 U	UG/KG	Dibromochloromethane
12 U	UG/KG	Chloromethane	12 U	UG/KG	1,2-Dibromoethane (EDB)
12 U	UG/KG	Vinyl Chloride	12 U	UG/KG	Chlorobenzene
12 U	UG/KG	Bromomethane	12 U	UG/KG	Ethyl Benzene
12 U	UG/KG	Chloroethane	12 U	UG/KG	Total Xylenes
12 U	UG/KG	Trichlorofluoromethane (Freon 11)	12 U	UG/KG	Styrene
12 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)	12 U	UG/KG	Bromoform
12 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	12 U	UG/KG	Isopropylbenzene
21 UJ	UG/KG	Acetone	12 U	UG/KG	1,1,2,2-Tetrachloroethane
12 U	UG/KG	Carbon Disulfide	12 U	UG/KG	1,3-Dichlorobenzene
12 UJ	UG/KG	Methyl Acetate	12 U	UG/KG	1,4-Dichlorobenzene
12 UJ	UG/KG	Methylene Chloride	12 U	UG/KG	1,2-Dichlorobenzene
12 U	UG/KG	trans-1,2-Dichloroethene	12 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
12 U	UG/KG	Methyl T-Butyl Ether (MTBE)	12 U	UG/KG	1,2,4-Trichlorobenzene
12 U	UG/KG	1,1-Dichloroethane	12 U	UG/KG	1,2,3-Trichlorobenzene
12 U	UG/KG	cis-1,2-Dichloroethene	NA	UG/KG	% Moisture
12 U	UG/KG	Methyl Ethyl Ketone	11	%	
NA	UG/KG	Bromochloromethane			
12 U	UG/KG	Chloroform			
12 U	UG/KG	1,1,1-Trichloroethane			
12 U	UG/KG	Cyclohexane			
12 U	UG/KG	Carbon Tetrachloride			
12 U	UG/KG	Benzene			
12 U	UG/KG	1,2-Dichloroethane			
12 U	UG/KG	Trichloroethene (Trichloroethylene)			
12 U	UG/KG	Methylcyclohexane			
12 U	UG/KG	1,2-Dichloropropane			
12 U	UG/KG	Bromodichloromethane			
12 U	UG/KG	cis-1,3-Dichloropropene			
12 UJ	UG/KG	Methyl Isobutyl Ketone			
12 U	UG/KG	Toluene			
12 U	UG/KG	trans-1,3-Dichloropropene			
12 U	UG/KG	1,1,2-Trichloroethane			
12 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)			
12 UJ	UG/KG	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1759 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SB /

MD No: 1P88

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P88

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:52

Ending:

RESULTS	UNITS	ANALYTE
35 NJ	UG/KG	CYCLOTETRASILOXANE, OCTAMETHYL-

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1763 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE04SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P92

D No: 1P92

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
11 U	UG/KG	Dichlorodifluoromethane	11 U	UG/KG	Dibromochloromethane
11 U	UG/KG	Chloromethane	11 U	UG/KG	1,2-Dibromoethane (EDB)
11 U	UG/KG	Vinyl Chloride	11 U	UG/KG	Chlorobenzene
11 U	UG/KG	Bromomethane	11 U	UG/KG	Ethyl Benzene
11 U	UG/KG	Chloroethane	11 U	UG/KG	Total Xylenes
11 U	UG/KG	Trichlorofluoromethane (Freon 11)	11 U	UG/KG	Styrene
11 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)	11 U	UG/KG	Bromoform
11 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	11 U	UG/KG	Isopropylbenzene
11 UJ	UG/KG	Acetone	11 U	UG/KG	1,1,2,2-Tetrachloroethane
11 U	UG/KG	Carbon Disulfide	11 U	UG/KG	1,3-Dichlorobenzene
11 UJ	UG/KG	Methyl Acetate	11 U	UG/KG	1,4-Dichlorobenzene
11 UJ	UG/KG	Methylene Chloride	11 U	UG/KG	1,2-Dichlorobenzene
11 U	UG/KG	trans-1,2-Dichloroethene	11 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
11 U	UG/KG	Methyl T-Butyl Ether (MTBE)	11 U	UG/KG	1,2,4-Trichlorobenzene
11 U	UG/KG	1,1-Dichloroethane	NA	UG/KG	1,2,3-Trichlorobenzene
11 U	UG/KG	cis-1,2-Dichloroethene	17	%	% Moisture
11 U	UG/KG	Methyl Ethyl Ketone			
NA	UG/KG	Bromochloromethane			
11 U	UG/KG	Chloroform			
11 U	UG/KG	1,1,1-Trichloroethane			
11 U	UG/KG	Cyclohexane			
11 U	UG/KG	Carbon Tetrachloride			
11 U	UG/KG	Benzene			
11 U	UG/KG	1,2-Dichloroethane			
11 U	UG/KG	Trichloroethene (Trichloroethylene)			
11 U	UG/KG	Methylcyclohexane			
11 U	UG/KG	1,2-Dichloropropane			
11 U	UG/KG	Bromodichloromethane			
11 U	UG/KG	cis-1,3-Dichloropropene			
11 UJ	UG/KG	Methyl Isobutyl Ketone			
11 U	UG/KG	Toluene			
11 U	UG/KG	trans-1,3-Dichloropropene			
11 U	UG/KG	1,1,2-Trichloroethane			
11 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)			
11 UJ	UG/KG	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1763 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SB /

MD No: 1P92

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P92

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:30

Ending:

RESULTS	UNITS	ANALYTE
9 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1764 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SB /

MD No: 1P93

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P93

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
10 U	UG/KG	Dichlorodifluoromethane
10 U	UG/KG	Chloromethane
10 U	UG/KG	Vinyl Chloride
10 U	UG/KG	Bromomethane
10 U	UG/KG	Chloroethane
10 U	UG/KG	Trichlorofluoromethane (Freon 11)
10 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
13 UJ	UG/KG	Acetone
10 U	UG/KG	Carbon Disulfide
10 UJ	UG/KG	Methyl Acetate
10 UJ	UG/KG	Methylene Chloride
10 U	UG/KG	trans-1,2-Dichloroethene
10 U	UG/KG	Methyl T-Butyl Ether (MTBE)
10 U	UG/KG	1,1-Dichloroethane
10 U	UG/KG	cis-1,2-Dichloroethene
10 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
10 U	UG/KG	Chloroform
10 U	UG/KG	1,1,1-Trichloroethane
10 U	UG/KG	Cyclohexane
10 U	UG/KG	Carbon Tetrachloride
10 U	UG/KG	Benzene
10 U	UG/KG	1,2-Dichloroethane
10 U	UG/KG	Trichloroethene (Trichloroethylene)
10 U	UG/KG	Methylcyclohexane
10 U	UG/KG	1,2-Dichloropropane
10 U	UG/KG	Bromodichloromethane
10 U	UG/KG	cis-1,3-Dichloropropene
10 UJ	UG/KG	Methyl Isobutyl Ketone
10 U	UG/KG	Toluene
10 U	UG/KG	trans-1,3-Dichloropropene
10 U	UG/KG	1,1,2-Trichloroethane
10 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
10 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/KG	Dibromochloromethane
10 U	UG/KG	1,2-Dibromoethane (EDB)
10 U	UG/KG	Chlorobenzene
10 U	UG/KG	Ethyl Benzene
10 U	UG/KG	Total Xylenes
10 U	UG/KG	Styrene
10 U	UG/KG	Bromoform
10 U	UG/KG	Isopropylbenzene
10 U	UG/KG	1,1,2,2-Tetrachloroethane
10 U	UG/KG	1,3-Dichlorobenzene
10 U	UG/KG	1,4-Dichlorobenzene
10 U	UG/KG	1,2-Dichlorobenzene
10 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
13	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1764 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SB /

MD No: 1P93

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P93

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:20

Ending:

RESULTS	UNITS	ANALYTE
10 NJ	UG/KG	CYCLOTETRAILOXANE, OCTAMETHYL-

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1777 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA7

D No: 1PA7

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 15:28

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Dichlorodifluoromethane	10 U	UG/L	Dibromochloromethane
10 U	UG/L	Chloromethane	10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Vinyl Chloride	10 U	UG/L	Chlorobenzene
10 U	UG/L	Bromomethane	10 U	UG/L	Ethyl Benzene
10 U	UG/L	Chloroethane	10 U	UG/L	Total Xylenes
10 U	UG/L	Trichlorofluoromethane (Freon 11)	10 U	UG/L	Styrene
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)	10 U	UG/L	Bromoform
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	10 U	UG/L	Isopropylbenzene
10 U	UG/L	Acetone	10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	Carbon Disulfide	10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	Methyl Acetate	10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	Methylene Chloride	10 U	UG/L	1,2-Dichlorobenzene
10 U	UG/L	trans-1,2-Dichloroethene	10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	Methyl T-Butyl Ether (MTBE)	10 U	UG/L	1,2,4-Trichlorobenzene
10 U	UG/L	1,1-Dichloroethane	NA	UG/L	1,2,3-Trichlorobenzene
10 U	UG/L	cis-1,2-Dichloroethene			
10 U	UG/L	Methyl Ethyl Ketone			
NA	UG/L	Bromochloromethane			
10 U	UG/L	Chloroform			
10 U	UG/L	1,1,1-Trichloroethane			
10 U	UG/L	Cyclohexane			
10 U	UG/L	Carbon Tetrachloride			
10 U	UG/L	Benzene			
10 U	UG/L	1,2-Dichloroethane			
10 U	UG/L	Trichloroethene (Trichloroethylene)			
10 U	UG/L	Methylcyclohexane			
10 U	UG/L	1,2-Dichloropropane			
10 U	UG/L	Bromodichloromethane			
10 U	UG/L	cis-1,3-Dichloropropene			
10 U	UG/L	Methyl Isobutyl Ketone			
10 U	UG/L	Toluene			
10 U	UG/L	trans-1,3-Dichloropropene			
10 U	UG/L	1,1,2-Trichloroethane			
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)			
10 U	UG/L	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1777 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01GW /

MD No: 1PA7

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA7

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 15:28

Ending:

RESULTS	UNITS	ANALYTE
16 NJ	UG/L	BICYCLO[2.2.1]HEPT-2-ENE,1,7,7-TRIMETHYL

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1779 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02GW /

MD No: 1PA9

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA9

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 16:25

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Dichlorodifluoromethane	10 U	UG/L	Dibromochloromethane
10 U	UG/L	Chloromethane	10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Vinyl Chloride	10 U	UG/L	Chlorobenzene
10 U	UG/L	Bromomethane	10 U	UG/L	Ethyl Benzene
10 U	UG/L	Chloroethane	10 U	UG/L	Total Xylenes
10 U	UG/L	Trichlorofluoromethane (Freon 11)	10 U	UG/L	Styrene
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)	10 U	UG/L	Bromoform
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	10 U	UG/L	Isopropylbenzene
10 U	UG/L	Acetone	10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	Carbon Disulfide	10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	Methyl Acetate	10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	Methylene Chloride	10 U	UG/L	1,2-Dichlorobenzene
10 U	UG/L	trans-1,2-Dichloroethene	10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	Methyl T-Butyl Ether (MTBE)	10 U	UG/L	1,2,4-Trichlorobenzene
10 U	UG/L	1,1-Dichloroethane	NA	UG/L	1,2,3-Trichlorobenzene
10 U	UG/L	cis-1,2-Dichloroethene			
10 U	UG/L	Methyl Ethyl Ketone			
NA	UG/L	Bromochloromethane			
10 U	UG/L	Chloroform			
10 U	UG/L	1,1,1-Trichloroethane			
10 U	UG/L	Cyclohexane			
10 U	UG/L	Carbon Tetrachloride			
10 U	UG/L	Benzene			
10 U	UG/L	1,2-Dichloroethane			
10 U	UG/L	Trichloroethene (Trichloroethylene)			
10 U	UG/L	Methylcyclohexane			
10 U	UG/L	1,2-Dichloropropane			
10 U	UG/L	Bromodichloromethane			
10 U	UG/L	cis-1,3-Dichloropropene			
10 U	UG/L	Methyl Isobutyl Ketone			
10 U	UG/L	Toluene			
10 U	UG/L	trans-1,3-Dichloropropene			
10 U	UG/L	1,1,2-Trichloroethane			
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)			
10 U	UG/L	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1778 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03GW /

MD No: 1PA8

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA8

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 16:00

Ending:

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromomethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 U	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 U	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
10 U	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1771 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE04GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA1

D No: 1PA1

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:20

Ending:

RESULTS	UNITS	ANALYTE
10 UJ	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromomethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 UJ	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 UJ	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
10 U	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
1 J	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1771 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## MISCELLANEOUS COMPOUNDS

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/20/2002 11:20

Id/Station: LLE04GW /

MD No: 1PA1

Inorg Contractor: SENTIN

Ending:

Media: GROUNDWATER

D No: 1PA1

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
10 NJ	UG/L	D-LIMONENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1770 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04GWD /

MD No: 1PA0

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA0

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:20

Ending:

RESULTS	UNITS	ANALYTE
10 UJ	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromomethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 UJ	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 UJ	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
10 U	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
2 J	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1770 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04GWD /

MD No: 1PA0

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA0

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:20

Ending:

RESULTS	UNITS	ANALYTE
9 NJ	UG/L	D-LIMONENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1768 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1P98

D No: 1P98

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 UJ	UG/L	Dichlorodifluoromethane	10 U	UG/L	Dibromochloromethane
10 U	UG/L	Chloromethane	10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Vinyl Chloride	10 U	UG/L	Chlorobenzene
10 U	UG/L	Bromomethane	10 U	UG/L	Ethyl Benzene
10 U	UG/L	Chloroethane	10 U	UG/L	Total Xylenes
10 U	UG/L	Trichlorofluoromethane (Freon 11)	10 U	UG/L	Styrene
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)	10 U	UG/L	Bromoform
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	10 U	UG/L	Isopropylbenzene
10 UJ	UG/L	Acetone	10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	Carbon Disulfide	10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	Methyl Acetate	10 U	UG/L	1,4-Dichlorobenzene
10 UJ	UG/L	Methylene Chloride	10 U	UG/L	1,2-Dichlorobenzene
10 U	UG/L	trans-1,2-Dichloroethene	10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	Methyl T-Butyl Ether (MTBE)	10 U	UG/L	1,2,4-Trichlorobenzene
10 U	UG/L	1,1-Dichloroethane	NA	UG/L	1,2,3-Trichlorobenzene
10 U	UG/L	cis-1,2-Dichloroethene			
10 U	UG/L	Methyl Ethyl Ketone			
NA	UG/L	Bromochloromethane			
10 U	UG/L	Chloroform			
10 U	UG/L	1,1,1-Trichloroethane			
10 U	UG/L	Cyclohexane			
10 U	UG/L	Carbon Tetrachloride			
10 U	UG/L	Benzene			
10 U	UG/L	1,2-Dichloroethane			
12	UG/L	Trichloroethene (Trichloroethylene)			
10 U	UG/L	Methylcyclohexane			
10 U	UG/L	1,2-Dichloropropane			
10 U	UG/L	Bromodichloromethane			
10 U	UG/L	cis-1,3-Dichloropropene			
10 U	UG/L	Methyl Isobutyl Ketone			
10 U	UG/L	Toluene			
10 U	UG/L	trans-1,3-Dichloropropene			
10 U	UG/L	1,1,2-Trichloroethane			
23	UG/L	Tetrachloroethene (Tetrachloroethylene)			
10 U	UG/L	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1769 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SWD /

MD No: 1P99

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1P99

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
10 UJ	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromomethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 UJ	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 UJ	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
10 U	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
9 J	UG/L	STRAIGHT-CHAIN ALKANE

Page 1 of 1



Sample 1772 FY 2003 Project: 03-0143

Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE02SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA2

D No: 1PA2

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:05

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 UJ	UG/L	Dichlorodifluoromethane	10 U	UG/L	Dibromochloromethane
10 U	UG/L	Chloromethane	10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Vinyl Chloride	10 U	UG/L	Chlorobenzene
10 U	UG/L	Bromomethane	10 U	UG/L	Ethyl Benzene
10 U	UG/L	Chloroethane	10 U	UG/L	Total Xylenes
10 U	UG/L	Trichlorofluoromethane (Freon 11)	10 U	UG/L	Styrene
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)	10 U	UG/L	Bromoform
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	10 U	UG/L	Isopropylbenzene
10 UJ	UG/L	Acetone	10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	Carbon Disulfide	10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	Methyl Acetate	10 U	UG/L	1,4-Dichlorobenzene
10 UJ	UG/L	Methylene Chloride	10 U	UG/L	1,2-Dichlorobenzene
10 U	UG/L	trans-1,2-Dichloroethene	10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	Methyl T-Butyl Ether (MTBE)	10 U	UG/L	1,2,4-Trichlorobenzene
10 U	UG/L	1,1-Dichloroethane	NA	UG/L	1,2,3-Trichlorobenzene
10 U	UG/L	cis-1,2-Dichloroethene			
10 U	UG/L	Methyl Ethyl Ketone			
NA	UG/L	Bromochloromethane			
10 U	UG/L	Chloroform			
10 U	UG/L	1,1,1-Trichloroethane			
10 U	UG/L	Cyclohexane			
10 U	UG/L	Carbon Tetrachloride			
10 U	UG/L	Benzene			
10 U	UG/L	1,2-Dichloroethane			
10 U	UG/L	Trichloroethene (Trichloroethylene)			
10 U	UG/L	Methylcyclohexane			
10 U	UG/L	1,2-Dichloropropane			
10 U	UG/L	Bromodichloromethane			
10 U	UG/L	cis-1,3-Dichloropropene			
10 U	UG/L	Methyl Isobutyl Ketone			
10 U	UG/L	Toluene			
10 U	UG/L	trans-1,3-Dichloropropene			
10 U	UG/L	1,1,2-Trichloroethane			
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)			
10 U	UG/L	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1772 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE02SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA2

D No: 1PA2

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:05

Ending:

RESULTS	UNITS	ANALYTE
7 NJ	UG/L	D-LIMONENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1773 FY 2003 Project: 03-0143

Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE03SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA3

D No: 1PA3

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:30

Ending:

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromoimethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 U	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 U	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
3 J	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1746 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Beginning: 11/19/2002 09:30

Id/Station: LLE01SS /

Case No: 31215

Ending:

Media: SURFACE SOIL (0" - 12")

MD No: 1P74

Inorg Contractor: SENTIN

D No: 1P74

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1500	MG/KG	Aluminum
2.1 U	MG/KG	Antimony
1.1 U	MG/KG	Arsenic
9.4	MG/KG	Barium
0.19 U	MG/KG	Beryllium
0.24	MG/KG	Cadmium
30000	MG/KG	Calcium
3.4	MG/KG	Chromium
1.5 U	MG/KG	Cobalt
4.9 J	MG/KG	Copper
770	MG/KG	Iron
19	MG/KG	Lead
300	MG/KG	Magnesium
8.6	MG/KG	Manganese
0.05 U	MG/KG	Total Mercury
1.1 U	MG/KG	Nickel
61	MG/KG	Potassium
0.92 UJ	MG/KG	Selenium
0.28 U	MG/KG	Silver
340	MG/KG	Sodium
0.90 U	MG/KG	Thallium
2.1	MG/KG	Vanadium
26	MG/KG	Zinc
NA	MG/KG	Cyanide
6	%	% Moisture

U-Analyte: Not detected or above reporting limit

NA: Not Analyzed. U: Not Analyzed due to interference. J: Analyte analyzed in replicates. Reported value is "average" of replicates.

R: Presence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1747 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Beginning: 11/19/2002 09:30

Id/Station: LLE01SSD /

Case No: 31215

Ending:

Media: SURFACE SOIL (0" - 12")

MD No: 1P75

Inorg Contractor: SENTIN

D No: 1P75

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1800	MG/KG	Aluminum
2.1 U	MG/KG	Antimony
1.1 U	MG/KG	Arsenic
6.3	MG/KG	Barium
0.19 U	MG/KG	Beryllium
0.20	MG/KG	Cadmium
38000	MG/KG	Calcium
4.8	MG/KG	Chromium
1.5 U	MG/KG	Cobalt
3.6 J	MG/KG	Copper
1000	MG/KG	Iron
21	MG/KG	Lead
320	MG/KG	Magnesium
10	MG/KG	Manganese
0.05 U	MG/KG	Total Mercury
1.1 U	MG/KG	Nickel
68	MG/KG	Potassium
0.92 UJ	MG/KG	Selenium
0.28 U	MG/KG	Silver
370	MG/KG	Sodium
0.90 U	MG/KG	Thallium
3.4	MG/KG	Vanadium
28	MG/KG	Zinc
NA	MG/KG	Cyanide
6	%	% Moisture

UJ-Analyte is not detected or above reporting limit. Reporting limit is an estimate.

NA - Not Analyzed. UJ - Analyte is not detected or above reporting limit. Reporting limit is an estimate.

## EXTRACTABLES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1754 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P83

D No: 1P83

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:55

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
2300 U	UG/KG	Benzaldehyde	2300 U	UG/KG	Dibenzofuran
2300 U	UG/KG	Phenol	2300 U	UG/KG	2,4-Dinitrotoluene
2300 U	UG/KG	bis(2-Chloroethyl) Ether	2300 U	UG/KG	Diethyl Phthalate
2300 U	UG/KG	2-Chlorophenol	2300 U	UG/KG	Fluorene
2300 U	UG/KG	2-Methylphenol	2300 U	UG/KG	4-Chlorophenyl Phenyl Ether
2300 U	UG/KG	bis(2-Chloroisopropyl) Ether	5700 U	UG/KG	4-Nitroaniline
2300 U	UG/KG	Acetophenone	5700 U	UG/KG	2-Methyl-4,6-Dinitrophenol
2300 U	UG/KG	(3-and/or 4-)Methylphenol	2300 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
2300 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
2300 U	UG/KG	Hexachloroethane	2300 U	UG/KG	4-Bromophenyl Phenyl Ether
2300 U	UG/KG	Nitrobenzene	2300 U	UG/KG	Hexachlorobenzene (HCB)
2300 U	UG/KG	Isophorone	2300 U	UG/KG	Atrazine
2300 U	UG/KG	2-Nitrophenol	5700 U	UG/KG	Pentachlorophenol
2300 U	UG/KG	2,4-Dimethylphenol	2300 U	UG/KG	Phenanthrene
2300 U	UG/KG	bis(2-Chloroethoxy)Methane	2300 U	UG/KG	Anthracene
2300 U	UG/KG	2,4-Dichlorophenol	2300 U	UG/KG	Carbazole
2300 U	UG/KG	Naphthalene	2300 U	UG/KG	Di-n-Butylphthalate
2300 U	UG/KG	4-Chloroaniline	250 J	UG/KG	Fluoranthene
2300 U	UG/KG	Hexachlorobutadiene	2300 U	UG/KG	Pyrene
2300 U	UG/KG	Caprolactam	2300 U	UG/KG	Benzyl Butyl Phthalate
2300 U	UG/KG	4-Chloro-3-Methylphenol	2300 U	UG/KG	3,3'-Dichlorobenzidine
2300 U	UG/KG	2-Methylnaphthalene	2300 U	UG/KG	Benzo(a)Anthracene
2300 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	2300 U	UG/KG	Chrysene
2300 U	UG/KG	2,4,6-Trichlorophenol	2300 U	UG/KG	bis(2-Ethylhexyl) Phthalate
5700 U	UG/KG	2,4,5-Trichlorophenol	2300 U	UG/KG	Di-n-Octylphthalate
2300 U	UG/KG	1,1-Biphenyl	240 J	UG/KG	Benzo(b)Fluoranthene
2300 U	UG/KG	2-Chloronaphthalene	2300 U	UG/KG	Benzo(k)Fluoranthene
5700 U	UG/KG	2-Nitroaniline	2300 U	UG/KG	Benzo-a-Pyrene
2300 U	UG/KG	Dimethyl Phthalate	630 J	UG/KG	Indeno (1,2,3-cd) Pyrene
2300 U	UG/KG	2,6-Dinitrotoluene	2300 U	UG/KG	Dibenzo(a,h)Anthracene
2300 U	UG/KG	Acenaphthylene	2300 U	UG/KG	Benzo(ghi)Perylene
5700 U	UG/KG	3-Nitroaniline	27	%	% Moisture
2300 U	UG/KG	Acenaphthene			
5700 U	UG/KG	2,4-Dinitrophenol			
5700 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1754 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE07SD /

MD No: 1P83

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P83

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:55

Ending:

RESULTS	UNITS	ANALYTE
770 NJ	UG/KG	GAMMA-SITOSTEROL
3900 J	UG/KG	4 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1756 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P85

D No: 1P85

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
4900 U	UG/KG	Benzaldehyde	4900 U	UG/KG	Dibenzofuran
4900 U	UG/KG	Phenol	4900 U	UG/KG	2,4-Dinitrotoluene
4900 U	UG/KG	bis(2-Chloroethyl) Ether	4900 U	UG/KG	Diethyl Phthalate
4900 U	UG/KG	2-Chlorophenol	4900 U	UG/KG	Fluorene
4900 U	UG/KG	2-Methylphenol	4900 U	UG/KG	4-Chlorophenyl Phenyl Ether
4900 U	UG/KG	bis(2-Chloroisopropyl) Ether	12000 U	UG/KG	4-Nitroaniline
4900 U	UG/KG	Acetophenone	12000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
4900 U	UG/KG	(3-and/or 4-)Methylphenol	4900 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
4900 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
4900 U	UG/KG	Hexachloroethane	4900 U	UG/KG	4-Bromophenyl Phenyl Ether
4900 U	UG/KG	Nitrobenzene	4900 U	UG/KG	Hexachlorobenzene (HCB)
4900 U	UG/KG	Isophorone	4900 U	UG/KG	Atrazine
4900 U	UG/KG	2-Nitrophenol	12000 U	UG/KG	Pentachlorophenol
4900 U	UG/KG	2,4-Dimethylphenol	4900 U	UG/KG	Phenanthrene
4900 U	UG/KG	bis(2-Chloroethoxy)Methane	4900 U	UG/KG	Anthracene
4900 U	UG/KG	2,4-Dichlorophenol	4900 U	UG/KG	Carbazole
4900 U	UG/KG	Naphthalene	4900 U	UG/KG	Di-n-Butylphthalate
4900 U	UG/KG	4-Chloroaniline	4900 U	UG/KG	Fluoranthene
4900 U	UG/KG	Hexachlorobutadiene	4900 U	UG/KG	Pyrene
4900 U	UG/KG	Caprolactam	4900 U	UG/KG	Benzyl Butyl Phthalate
4900 U	UG/KG	4-Chloro-3-Methylphenol	4900 U	UG/KG	3,3'-Dichlorobenzidine
4900 U	UG/KG	2-Methylnaphthalene	4900 U	UG/KG	Benzo(a)Anthracene
4900 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	4900 U	UG/KG	Chrysene
4900 U	UG/KG	2,4,6-Trichlorophenol	4900 U	UG/KG	bis(2-Ethylhexyl) Phthalate
12000 U	UG/KG	2,4,5-Trichlorophenol	4900 U	UG/KG	Di-n-Octylphthalate
4900 U	UG/KG	1,1-Biphenyl	4900 U	UG/KG	Benzo(b)Fluoranthene
4900 U	UG/KG	2-Chloronaphthalene	4900 U	UG/KG	Benzo(k)Fluoranthene
12000 U	UG/KG	2-Nitroaniline	4900 U	UG/KG	Benzo-a-Pyrene
4900 U	UG/KG	Dimethyl Phthalate	4900 U	UG/KG	Indeno (1,2,3-cd) Pyrene
4900 U	UG/KG	2,6-Dinitrotoluene	4900 U	UG/KG	Dibenzo(a,h)Anthracene
4900 U	UG/KG	Acenaphthylene	4900 U	UG/KG	Benzo(ghi)Perylene
12000 U	UG/KG	3-Nitroaniline	33	%	% Moisture
4900 U	UG/KG	Acenaphthene			
12000 U	UG/KG	2,4-Dinitrophenol			
12000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1756 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P85

D No: 1P85

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:15

Ending:

RESULTS	UNITS	ANALYTE
17000 J	UG/KG	7 UNKNOWN COMPOUNDS
3000 NJ	UG/KG	NAPHTHALENE, 1,2,3,4-TETRAHYDRO-1,6-DIME
1900 NJ	UG/KG	OLEAN-12-ENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1744 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## Volatiles Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 09:50

Id/Station: LLE03SD /

MD No: 1P72

Inorg Contractor: SENTIN

Ending:

Media: SEDIMENT

D No: 1P72

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
21 U	UG/KG	Dichlorodifluoromethane
21 U	UG/KG	Chloromethane
21 U	UG/KG	Vinyl Chloride
21 U	UG/KG	Bromomethane
21 U	UG/KG	Chloroethane
21 U	UG/KG	Trichlorofluoromethane (Freon 11)
21 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
21 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
21 U	UG/KG	Acetone
21 U	UG/KG	Carbon Disulfide
21 U	UG/KG	Methyl Acetate
21 U	UG/KG	Methylene Chloride
21 U	UG/KG	trans-1,2-Dichloroethene
21 U	UG/KG	Methyl T-Butyl Ether (MTBE)
21 U	UG/KG	1,1-Dichloroethane
21 U	UG/KG	cis-1,2-Dichloroethene
21 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
21 U	UG/KG	Chloroform
21 U	UG/KG	1,1,1-Trichloroethane
21 U	UG/KG	Cyclohexane
21 U	UG/KG	Carbon Tetrachloride
21 U	UG/KG	Benzene
21 U	UG/KG	1,2-Dichloroethane
21 U	UG/KG	Trichloroethene (Trichloroethylene)
21 U	UG/KG	Methylcyclohexane
21 U	UG/KG	1,2-Dichloropropane
21 U	UG/KG	Bromodichloromethane
21 U	UG/KG	cis-1,3-Dichloropropene
21 U	UG/KG	Methyl Isobutyl Ketone
21 U	UG/KG	Toluene
21 U	UG/KG	trans-1,3-Dichloropropene
21 U	UG/KG	1,1,2-Trichloroethane
21 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
21 U	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
21 U	UG/KG	Dibromochloromethane
21 U	UG/KG	1,2-Dibromoethane (EDB)
21 U	UG/KG	Chlorobenzene
21 U	UG/KG	Ethyl Benzene
21 U	UG/KG	Total Xylenes
21 U	UG/KG	Styrene
21 U	UG/KG	Bromoform
21 U	UG/KG	Isopropylbenzene
21 U	UG/KG	1,1,2,2-Tetrachloroethane
21 U	UG/KG	1,3-Dichlorobenzene
21 U	UG/KG	1,4-Dichlorobenzene
21 U	UG/KG	1,2-Dichlorobenzene
21 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
21 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
40	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1744 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## MISCELLANEOUS COMPOUNDS

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Beginning: 11/19/2002 09:50

Id/Station: LLE03SD /

Case No: 31215

Ending:

Media: SEDIMENT

MD No: 1P72

Inorg Contractor: SENTIN

D No: 1P72

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
34 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1755 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE04SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P84

D No: 1P84

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 12:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
21 U	UG/KG	Dichlorodifluoromethane
21 U	UG/KG	Chloromethane
21 U	UG/KG	Vinyl Chloride
21 U	UG/KG	Bromomethane
21 U	UG/KG	Chloroethane
21 U	UG/KG	Trichlorofluoromethane (Freon 11)
21 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
21 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
21 UJ	UG/KG	Acetone
21 U	UG/KG	Carbon Disulfide
21 UJ	UG/KG	Methyl Acetate
21 UJ	UG/KG	Methylene Chloride
21 U	UG/KG	trans-1,2-Dichloroethene
21 U	UG/KG	Methyl T-Butyl Ether (MTBE)
21 U	UG/KG	1,1-Dichloroethane
21 U	UG/KG	cis-1,2-Dichloroethene
21 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
21 U	UG/KG	Chloroform
21 U	UG/KG	1,1,1-Trichloroethane
21 U	UG/KG	Cyclohexane
21 U	UG/KG	Carbon Tetrachloride
21 U	UG/KG	Benzene
21 U	UG/KG	1,2-Dichloroethane
21 U	UG/KG	Trichloroethene (Trichloroethylene)
21 U	UG/KG	Methylcyclohexane
21 U	UG/KG	1,2-Dichloropropane
21 U	UG/KG	Bromodichloromethane
21 U	UG/KG	cis-1,3-Dichloropropene
21 UJ	UG/KG	Methyl Isobutyl Ketone
21 U	UG/KG	Toluene
21 U	UG/KG	trans-1,3-Dichloropropene
21 U	UG/KG	1,1,2-Trichloroethane
21 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
21 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
21 U	UG/KG	Dibromochloromethane
21 U	UG/KG	1,2-Dibromoethane (EDB)
21 U	UG/KG	Chlorobenzene
21 U	UG/KG	Ethyl Benzene
21 U	UG/KG	Total Xylenes
21 U	UG/KG	Styrene
21 U	UG/KG	Bromoform
21 U	UG/KG	Isopropylbenzene
21 U	UG/KG	1,1,2,2-Tetrachloroethane
21 U	UG/KG	1,3-Dichlorobenzene
21 U	UG/KG	1,4-Dichlorobenzene
21 U	UG/KG	1,2-Dichlorobenzene
21 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
21 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
48	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1755 FY 2003 Project: 03-0143

MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE04SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P84

D No: 1P84

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 12:45

Ending:

RESULTS	UNITS	ANALYTE
48 NJ	UG/KG	BENZENE, 1-METHYL-2-(1-METHYLETHYL)-
43 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1756 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SD /

MD No: 1P85

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P85

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
17 U	UG/KG	Dichlorodifluoromethane
17 U	UG/KG	Chloromethane
17 U	UG/KG	Vinyl Chloride
17 U	UG/KG	Bromomethane
17 U	UG/KG	Chloroethane
17 U	UG/KG	Trichlorofluoromethane (Freon 11)
17 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
17 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
17 UJ	UG/KG	Acetone
17 U	UG/KG	Carbon Disulfide
17 UJ	UG/KG	Methyl Acetate
17 UJ	UG/KG	Methylene Chloride
17 U	UG/KG	trans-1,2-Dichloroethene
17 U	UG/KG	Methyl T-Butyl Ether (MTBE)
17 U	UG/KG	1,1-Dichloroethane
17 U	UG/KG	cis-1,2-Dichloroethene
17 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
17 U	UG/KG	Chloroform
17 U	UG/KG	1,1,1-Trichloroethane
17 U	UG/KG	Cyclohexane
17 U	UG/KG	Carbon Tetrachloride
17 U	UG/KG	Benzene
17 U	UG/KG	1,2-Dichloroethane
17 U	UG/KG	Trichloroethene (Trichloroethylene)
17 U	UG/KG	Methylcyclohexane
17 U	UG/KG	1,2-Dichloropropane
17 U	UG/KG	Bromodichloromethane
17 U	UG/KG	cis-1,3-Dichloropropene
17 UJ	UG/KG	Methyl Isobutyl Ketone
17 U	UG/KG	Toluene
17 U	UG/KG	trans-1,3-Dichloropropene
17 U	UG/KG	1,1,2-Trichloroethane
17 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
17 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
17 U	UG/KG	Dibromochloromethane
17 U	UG/KG	1,2-Dibromoethane (EDB)
17 U	UG/KG	Chlorobenzene
17 U	UG/KG	Ethyl Benzene
17 U	UG/KG	Total Xylenes
17 U	UG/KG	Styrene
17 U	UG/KG	Bromoform
17 U	UG/KG	Isopropylbenzene
17 U	UG/KG	1,1,2,2-Tetrachloroethane
17 U	UG/KG	1,3-Dichlorobenzene
17 U	UG/KG	1,4-Dichlorobenzene
17 U	UG/KG	1,2-Dichlorobenzene
17 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
17 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
31	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1756 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P85

D No: 1P85

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:15

Ending:

RESULTS	UNITS	ANALYTE
37 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1757 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE06SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P86

D No: 1P86

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:35

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
26 U	UG/KG	Dichlorodifluoromethane
26 U	UG/KG	Chloromethane
26 U	UG/KG	Vinyl Chloride
26 U	UG/KG	Bromomethane
26 U	UG/KG	Chloroethane
26 U	UG/KG	Trichlorofluoromethane (Freon 11)
26 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
26 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
26 UJ	UG/KG	Acetone
26 U	UG/KG	Carbon Disulfide
26 UJ	UG/KG	Methyl Acetate
26 UJ	UG/KG	Methylene Chloride
26 U	UG/KG	trans-1,2-Dichloroethene
26 U	UG/KG	Methyl T-Butyl Ether (MTBE)
26 U	UG/KG	1,1-Dichloroethane
26 U	UG/KG	cis-1,2-Dichloroethene
26 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
26 U	UG/KG	Chloroform
26 U	UG/KG	1,1,1-Trichloroethane
26 U	UG/KG	Cyclohexane
26 U	UG/KG	Carbon Tetrachloride
26 U	UG/KG	Benzene
26 U	UG/KG	1,2-Dichloroethane
26 U	UG/KG	Trichloroethene (Trichloroethylene)
26 U	UG/KG	Methylcyclohexane
26 U	UG/KG	1,2-Dichloropropane
26 U	UG/KG	Bromodichloromethane
26 U	UG/KG	cis-1,3-Dichloropropene
26 UJ	UG/KG	Methyl Isobutyl Ketone
26 U	UG/KG	Toluene
26 U	UG/KG	trans-1,3-Dichloropropene
26 U	UG/KG	1,1,2-Trichloroethane
26 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
26 UJ	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
26 U	UG/KG	Dibromochloromethane
26 U	UG/KG	1,2-Dibromoethane (EDB)
26 U	UG/KG	Chlorobenzene
26 U	UG/KG	Ethyl Benzene
26 U	UG/KG	Total Xylenes
26 U	UG/KG	Styrene
26 U	UG/KG	Bromoform
26 U	UG/KG	Isopropylbenzene
26 U	UG/KG	1,1,2,2-Tetrachloroethane
26 U	UG/KG	1,3-Dichlorobenzene
26 U	UG/KG	1,4-Dichlorobenzene
26 U	UG/KG	1,2-Dichlorobenzene
26 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
26 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
51	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1757 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE06SD /

MD No: 1P86

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P86

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:35

Ending:

RESULTS	UNITS	ANALYTE
75 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1754 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE07SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P83

D No: 1P83

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:55

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
17 U	UG/KG	Dichlorodifluoromethane	17 U	UG/KG	Dibromochloromethane
17 U	UG/KG	Chloromethane	17 U	UG/KG	1,2-Dibromoethane (EDB)
17 U	UG/KG	Vinyl Chloride	17 U	UG/KG	Chlorobenzene
17 U	UG/KG	Bromomethane	17 U	UG/KG	Ethyl Benzene
17 U	UG/KG	Chloroethane	17 U	UG/KG	Total Xylenes
2 J	UG/KG	Trichlorofluoromethane (Freon 11)	17 U	UG/KG	Styrene
17 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)	17 U	UG/KG	Bromoform
17 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	17 U	UG/KG	Isopropylbenzene
17 UJ	UG/KG	Acetone	17 U	UG/KG	1,1,2,2-Tetrachloroethane
17 U	UG/KG	Carbon Disulfide	17 U	UG/KG	1,3-Dichlorobenzene
17 UJ	UG/KG	Methyl Acetate	17 U	UG/KG	1,4-Dichlorobenzene
17 UJ	UG/KG	Methylene Chloride	17 U	UG/KG	1,2-Dichlorobenzene
17 U	UG/KG	trans-1,2-Dichloroethene	17 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
17 U	UG/KG	Methyl T-Butyl Ether (MTBE)	17 U	UG/KG	1,2,4-Trichlorobenzene
17 U	UG/KG	1,1-Dichloroethane	NA	UG/KG	1,2,3-Trichlorobenzene
17 U	UG/KG	cis-1,2-Dichloroethene	35	%	% Moisture
17 U	UG/KG	Methyl Ethyl Ketone			
NA	UG/KG	Bromochloromethane			
17 U	UG/KG	Chloroform			
17 U	UG/KG	1,1,1-Trichloroethane			
17 U	UG/KG	Cyclohexane			
17 U	UG/KG	Carbon Tetrachloride			
17 U	UG/KG	Benzene			
17 U	UG/KG	1,2-Dichloroethane			
17 U	UG/KG	Trichloroethene (Trichloroethylene)			
17 U	UG/KG	Methylcyclohexane			
17 U	UG/KG	1,2-Dichloropropane			
17 U	UG/KG	Bromodichloromethane			
17 U	UG/KG	cis-1,3-Dichloropropene			
17 UJ	UG/KG	Methyl Isobutyl Ketone			
17 U	UG/KG	Toluene			
17 U	UG/KG	trans-1,3-Dichloropropene			
17 U	UG/KG	1,1,2-Trichloroethane			
17 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)			
17 UJ	UG/KG	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
30 J	UG/KG	UNKNOWN SILOXANE

Page 1 of 1

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1781 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: QA002TW /

Media: TRIP BLANK - WATER

D No: 1P95

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:46

Ending:

RESULTS	UNITS	ANALYTE
10 UJ	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromomethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 UJ	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 UJ	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
10 U	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1781 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: QA002TW /

Media: TRIP BLANK - WATER

D No: 1P95

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:46

Ending:

RESULTS	UNITS	ANALYTE
7 J	UG/L	STRAIGHT-CHAIN ALKANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1782 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Case No: 31215

Id/Station: QA003TW /

Media: TRIP BLANK - WATER

D No: 1P96

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:46

Ending:

RESULTS	UNITS	ANALYTE
10 UJ	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromomethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 UJ	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 UJ	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
10 U	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAJ-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1783 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: QA001TS /

Media: TRIP BLANK - SOIL

Case No: 31215

D No: 1P81

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:35

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
14 U	UG/KG	Dichlorodifluoromethane	14 U	UG/KG	Dibromochloromethane
14 U	UG/KG	Chloromethane	14 U	UG/KG	1,2-Dibromoethane (EDB)
14 U	UG/KG	Vinyl Chloride	14 U	UG/KG	Chlorobenzene
14 U	UG/KG	Bromomethane	14 U	UG/KG	Ethyl Benzene
14 U	UG/KG	Chloroethane	14 U	UG/KG	Total Xylenes
14 U	UG/KG	Trichlorofluoromethane (Freon 11)	14 U	UG/KG	Styrene
14 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)	14 U	UG/KG	Bromoform
14 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	14 U	UG/KG	Isopropylbenzene
14 U	UG/KG	Acetone	14 U	UG/KG	1,1,2,2-Tetrachloroethane
14 U	UG/KG	Carbon Disulfide	14 U	UG/KG	1,3-Dichlorobenzene
14 U	UG/KG	Methyl Acetate	14 U	UG/KG	1,4-Dichlorobenzene
14 U	UG/KG	Methylene Chloride	14 U	UG/KG	1,2-Dichlorobenzene
14 U	UG/KG	trans-1,2-Dichloroethene	14 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
14 U	UG/KG	Methyl T-Butyl Ether (MTBE)	14 U	UG/KG	1,2,4-Trichlorobenzene
14 U	UG/KG	1,1-Dichloroethane	NA	UG/KG	1,2,3-Trichlorobenzene
14 U	UG/KG	cis-1,2-Dichloroethene	0	%	% Moisture
14 U	UG/KG	Methyl Ethyl Ketone			
NA	UG/KG	Bromochloromethane			
14 U	UG/KG	Chloroform			
14 U	UG/KG	1,1,1-Trichloroethane			
14 U	UG/KG	Cyclohexane			
14 U	UG/KG	Carbon Tetrachloride			
14 U	UG/KG	Benzene			
14 U	UG/KG	1,2-Dichloroethane			
14 U	UG/KG	Trichloroethene (Trichloroethylene)			
14 U	UG/KG	Methylcyclohexane			
14 U	UG/KG	1,2-Dichloropropane			
14 U	UG/KG	Bromodichloromethane			
14 U	UG/KG	cis-1,3-Dichloropropene			
14 U	UG/KG	Methyl Isobutyl Ketone			
14 U	UG/KG	Toluene			
14 U	UG/KG	trans-1,3-Dichloropropene			
14 U	UG/KG	1,1,2-Trichloroethane			
14 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)			
14 U	UG/KG	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1783 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: QA001TS /

Media: TRIP BLANK - SOIL

D No: 1P81

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:35

Ending:

RESULTS	UNITS	ANALYTE
32 NJ	UG/KG	CYCLOTETRASIOXANE, OCTAMETHYL-

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4

Science and Ecosystem Support Division  
980 College Station Road  
Athens, Georgia 30605-2720

MEMORANDUM

Date: 01/29/2003

Subject: Results of EXTRACTABLES Sample Analysis  
03-0143 Largo Landfill  
Largo, FL

From: Messer, Edward

A handwritten signature in black ink, appearing to read "Edward Messer", is written over the "From" line.

To: Sloan, Fred

CC: SESD/EIB/SAS

Thru: QA Office

Attached are the results of analysis of samples collected as part of the subject project. If you have any questions, please contact me.

ATTACHMENT

## EXTRACTABLES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1746 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P74

D No: 1P74

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
3500 U	UG/KG	Benzaldehyde	3500 U	UG/KG	Dibenzofuran
3500 U	UG/KG	Phenol	3500 U	UG/KG	2,4-Dinitrotoluene
3500 U	UG/KG	bis(2-Chloroethyl) Ether	3500 U	UG/KG	Diethyl Phthalate
3500 U	UG/KG	2-Chlorophenol	3500 U	UG/KG	Fluorene
3500 U	UG/KG	2-Methylphenol	3500 U	UG/KG	4-Chlorophenyl Phenyl Ether
3500 U	UG/KG	bis(2-Chloroisopropyl) Ether	8800 U	UG/KG	4-Nitroaniline
3500 U	UG/KG	Acetophenone	8800 U	UG/KG	2-Methyl-4,6-Dinitrophenol
3500 U	UG/KG	(3-and/or 4-)Methylphenol	3500 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
3500 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
3500 U	UG/KG	Hexachloroethane	3500 U	UG/KG	4-Bromophenyl Phenyl Ether
3500 U	UG/KG	Nitrobenzene	3500 U	UG/KG	Hexachlorobenzene (HCB)
3500 U	UG/KG	Isophorone	3500 U	UG/KG	Atrazine
3500 U	UG/KG	2-Nitrophenol	8800 U	UG/KG	Pentachlorophenol
3500 U	UG/KG	2,4-Dimethylphenol	1000 J	UG/KG	Phenanthrene
3500 U	UG/KG	bis(2-Chloroethoxy)Methane	3500 U	UG/KG	Anthracene
3500 U	UG/KG	2,4-Dichlorophenol	3500 U	UG/KG	Carbazole
3500 U	UG/KG	Naphthalene	3500 U	UG/KG	Di-n-Butylphthalate
3500 U	UG/KG	4-Chloroaniline	2400 J	UG/KG	Fluoranthene
3500 U	UG/KG	Hexachlorobutadiene	2000 J	UG/KG	Pyrene
3500 U	UG/KG	Caprolactam	3500 U	UG/KG	Benzyl Butyl Phthalate
3500 U	UG/KG	4-Chloro-3-Methylphenol	3500 U	UG/KG	3,3'-Dichlorobenzidine
3500 U	UG/KG	2-Methylnaphthalene	990 J	UG/KG	Benzo(a)Anthracene
3500 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	1400 J	UG/KG	Chrysene
3500 U	UG/KG	2,4,6-Trichlorophenol	3500 U	UG/KG	bis(2-Ethylhexyl) Phthalate
8800 U	UG/KG	2,4,5-Trichlorophenol	3500 U	UG/KG	Di-n-Octylphthalate
3500 U	UG/KG	1,1-Biphenyl	1000 J	UG/KG	Benzo(b)Fluoranthene
3500 U	UG/KG	2-Chloronaphthalene	1300 J	UG/KG	Benzo(k)Fluoranthene
8800 U	UG/KG	2-Nitroaniline	1000 J	UG/KG	Benzo-a-Pyrene
3500 U	UG/KG	Dimethyl Phthalate	810 J	UG/KG	Indeno (1,2,3-cd) Pyrene
3500 U	UG/KG	2,6-Dinitrotoluene	3500 U	UG/KG	Dibenzo(a,h)Anthracene
3500 U	UG/KG	Acenaphthylene	870 J	UG/KG	Benzo(ghi)Perylene
8800 U	UG/KG	3-Nitroaniline	7	%	% Moisture
3500 U	UG/KG	Acenaphthene			
8800 U	UG/KG	2,4-Dinitrophenol			
8800 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1746 FY 2003 Project: 03-0143

MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE01SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P74

D No: 1P74

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:30

Ending:

RESULTS	UNITS	ANALYTE
1100 NJ	UG/KG	BENZO[J]FLUORANTHENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
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L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## EXTRACTABLES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1747 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SSD /

MD No: 1P75

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P75

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
3800 U	UG/KG	Benzaldehyde	3800 U	UG/KG	Dibenzofuran
3800 U	UG/KG	Phenol	3800 U	UG/KG	2,4-Dinitrotoluene
3800 U	UG/KG	bis(2-Chloroethyl) Ether	3800 U	UG/KG	Diethyl Phthalate
3800 U	UG/KG	2-Chlorophenol	3800 U	UG/KG	Fluorene
3800 U	UG/KG	2-Methylphenol	3800 U	UG/KG	4-Chlorophenyl Phenyl Ether
3800 U	UG/KG	bis(2-Chloroisopropyl) Ether	9500 U	UG/KG	4-Nitroaniline
3800 U	UG/KG	Acetophenone	9500 U	UG/KG	2-Methyl-4,6-Dinitrophenol
3800 U	UG/KG	(3-and/or 4-)Methylphenol	3800 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
3800 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
3800 U	UG/KG	Hexachloroethane	3800 U	UG/KG	4-Bromophenyl Phenyl Ether
3800 U	UG/KG	Nitrobenzene	3800 U	UG/KG	Hexachlorobenzene (HCB)
3800 U	UG/KG	Isophorone	3800 U	UG/KG	Atrazine
3800 U	UG/KG	2-Nitrophenol	9500 U	UG/KG	Pentachlorophenol
3800 U	UG/KG	2,4-Dimethylphenol	930 J	UG/KG	Phenanthrene
3800 U	UG/KG	bis(2-Chloroethoxy)Methane	3800 U	UG/KG	Anthracene
3800 U	UG/KG	2,4-Dichlorophenol	3800 U	UG/KG	Carbazole
3800 U	UG/KG	Naphthalene	3800 U	UG/KG	Di-n-Butylphthalate
3800 U	UG/KG	4-Chloroaniline	2300 J	UG/KG	Fluoranthene
3800 U	UG/KG	Hexachlorobutadiene	1900 J	UG/KG	Pyrene
3800 U	UG/KG	Caprolactam	3800 U	UG/KG	Benzyl Butyl Phthalate
3800 U	UG/KG	4-Chloro-3-Methylphenol	3800 U	UG/KG	3,3'-Dichlorobenzidine
3800 U	UG/KG	2-Methylnaphthalene	980 J	UG/KG	Benzo(a)Anthracene
3800 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	1300 J	UG/KG	Chrysene
3800 U	UG/KG	2,4,6-Trichlorophenol	3800 U	UG/KG	bis(2-Ethylhexyl) Phthalate
9500 U	UG/KG	2,4,5-Trichlorophenol	3800 U	UG/KG	Di-n-Octylphthalate
3800 U	UG/KG	1,1-Biphenyl	1100 J	UG/KG	Benzo(b)Fluoranthene
3800 U	UG/KG	2-Chloronaphthalene	1000 J	UG/KG	Benzo(k)Fluoranthene
9500 U	UG/KG	2-Nitroaniline	1000 J	UG/KG	Benzo-a-Pyrene
3800 U	UG/KG	Dimethyl Phthalate	800 J	UG/KG	Indeno (1,2,3-cd) Pyrene
3800 U	UG/KG	2,6-Dinitrotoluene	3800 U	UG/KG	Dibenzo(a,h)Anthracene
3800 U	UG/KG	Acenaphthylene	860 J	UG/KG	Benzo(ghi)Perylene
9500 U	UG/KG	3-Nitroaniline	14	%	% Moisture
3800 U	UG/KG	Acenaphthene			
9500 U	UG/KG	2,4-Dinitrophenol			
9500 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to Interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1752 FY 2003 Project: 03-0143	Produced by: Messer, Edward
Extractables Scan	Requestor:
Facility: Largo Landfill Largo, FL	Project Leader: FSLOAN
Program: SF Case No: 31215	Beginning: 11/19/2002 11:00
Id/Station: LLE02SS / MD No: 1P80	Ending:
Media: SURFACE SOIL (0" - 12") D No: 1P80	
Inorg Contractor: SENTIN	
Org Contractor: CEIMIC	
DATA REPORTED ON DRY WEIGHT BASIS	

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
1900 U	UG/KG	Benzaldehyde	1900 U	UG/KG	Dibenzofuran
1900 U	UG/KG	Phenol	1900 U	UG/KG	2,4-Dinitrotoluene
1900 U	UG/KG	bis(2-Chloroethyl) Ether	1900 U	UG/KG	Diethyl Phthalate
1900 U	UG/KG	2-Chlorophenol	1900 U	UG/KG	Fluorene
1900 U	UG/KG	2-Methylphenol	1900 U	UG/KG	4-Chlorophenyl Phenyl Ether
1900 U	UG/KG	bis(2-Chloroisopropyl) Ether	4700 U	UG/KG	4-Nitroaniline
1900 U	UG/KG	Acetophenone	4700 U	UG/KG	2-Methyl-4,6-Dinitrophenol
1900 U	UG/KG	(3-and/or 4-)Methylphenol	1900 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine.
1900 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
1900 U	UG/KG	Hexachloroethane	1900 U	UG/KG	4-Bromophenyl Phenyl Ether
1900 U	UG/KG	Nitrobenzene	1900 U	UG/KG	Hexachlorobenzene (HCB)
1900 U	UG/KG	Isophorone	1900 U	UG/KG	Atrazine
1900 U	UG/KG	2-Nitrophenol	4700 U	UG/KG	Pentachlorophenol
1900 U	UG/KG	2,4-Dimethylphenol	1400 J	UG/KG	Phenanthrene
1900 U	UG/KG	bis(2-Chloroethoxy)Methane	1900 U	UG/KG	Anthracene
1900 U	UG/KG	2,4-Dichlorophenol	1900 U	UG/KG	Carbazole
190 J	UG/KG	Naphthalene	1900 U	UG/KG	Di-n-Butylphthalate
1900 U	UG/KG	4-Chloroaniline	1800 J	UG/KG	Fluoranthene
1900 U	UG/KG	Hexachlorobutadiene	1500 J	UG/KG	Pyrene
1900 U	UG/KG	Caprolactam	1900 U	UG/KG	Benzyl Butyl Phthalate
1900 U	UG/KG	4-Chloro-3-Methylphenol	1900 U	UG/KG	3,3'-Dichlorobenzidine
1900 U	UG/KG	2-Methylnaphthalene	640 J	UG/KG	Benzo(a)Anthracene
1900 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	830 J	UG/KG	Chrysene
1900 U	UG/KG	2,4,6-Trichlorophenol	1900 U	UG/KG	bis(2-Ethylhexyl) Phthalate
4700 U	UG/KG	2,4,5-Trichlorophenol	1900 U	UG/KG	Di-n-Octylphthalate
1900 U	UG/KG	1,1-Biphenyl	640 J	UG/KG	Benzo(b)Fluoranthene
1900 U	UG/KG	2-Chloronaphthalene	720 J	UG/KG	Benzo(k)Fluoranthene
4700 U	UG/KG	2-Nitroaniline	680 J	UG/KG	Benzo-a-Pyrene
1900 U	UG/KG	Dimethyl Phthalate	500 J	UG/KG	Indeno (1,2,3-cd) Pyrene
1900 U	UG/KG	2,6-Dinitrotoluene	1900 U	UG/KG	Dibenzo(a,h)Anthracene
1900 U	UG/KG	Acenaphthylene	530 J	UG/KG	Benzo(ghi)Perylene
4700 U	UG/KG	3-Nitroaniline	12	%	% Moisture
1900 U	UG/KG	Acenaphthene			
4700 U	UG/KG	2,4-Dinitrophenol			
4700 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
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L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## EXTRACTABLES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1752 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02SS /

MD No: 1P80

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P80

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:00

Ending:

RESULTS	UNITS	ANALYTE
1200 J	UG/KG	UNKNOWN COMPOUND
650 J	UG/KG	UNKNOWN STEROID

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1760 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SS /

MD No: 1P89

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P89

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:38

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
430 J	UG/KG	Benzaldehyde	3800 U	UG/KG	Dibenzofuran
3800 U	UG/KG	Phenol	3800 U	UG/KG	2,4-Dinitrotoluene
3800 U	UG/KG	bis(2-Chloroethyl) Ether	3800 U	UG/KG	Diethyl Phthalate
3800 U	UG/KG	2-Chlorophenol	3800 U	UG/KG	Fluorene
3800 U	UG/KG	2-Methylphenol	3800 U	UG/KG	4-Chlorophenyl Phenyl Ether
3800 U	UG/KG	bis(2-Chloroisopropyl) Ether	9500 U	UG/KG	4-Nitroaniline
1400 J	UG/KG	Acetophenone	9500 U	UG/KG	2-Methyl-4,6-Dinitrophenol
3800 U	UG/KG	(3-and/or 4-)Methylphenol	3800 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
3800 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
3800 U	UG/KG	Hexachloroethane	3800 U	UG/KG	4-Bromophenyl Phenyl Ether
3800 U	UG/KG	Nitrobenzene	3800 U	UG/KG	Hexachlorobenzene (HCB)
3800 U	UG/KG	Isophorone	3800 U	UG/KG	Atrazine
3800 U	UG/KG	2-Nitrophenol	9500 U	UG/KG	Pentachlorophenol
3800 U	UG/KG	2,4-Dimethylphenol	3800 U	UG/KG	Phenanthrene
3800 U	UG/KG	bis(2-Chloroethoxy)Methane	3800 U	UG/KG	Anthracene
3800 U	UG/KG	2,4-Dichlorophenol	3800 U	UG/KG	Carbazole
3800 U	UG/KG	Naphthalene	3800 U	UG/KG	Di-n-Butylphthalate
3800 U	UG/KG	4-Chloroaniline	3800 U	UG/KG	Fluoranthene
3800 U	UG/KG	Hexachlorobutadiene	3800 U	UG/KG	Pyrene
3800 U	UG/KG	Caprolactam	25000	UG/KG	Benzyl Butyl Phthalate
3800 U	UG/KG	4-Chloro-3-Methylphenol	3800 U	UG/KG	3,3'-Dichlorobenzidine
3800 U	UG/KG	2-Methylnaphthalene	3800 U	UG/KG	Benzo(a)Anthracene
3800 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	3800 U	UG/KG	Chrysene
3800 U	UG/KG	2,4,6-Trichlorophenol	3800 U	UG/KG	bis(2-Ethylhexyl) Phthalate
9500 U	UG/KG	2,4,5-Trichlorophenol	3800 U	UG/KG	Di-n-Octylphthalate
3800 U	UG/KG	1,1-Biphenyl	3800 U	UG/KG	Benzo(b)Fluoranthene
3800 U	UG/KG	2-Chloronaphthalene	3800 U	UG/KG	Benzo(k)Fluoranthene
9500 U	UG/KG	2-Nitroaniline	3800 U	UG/KG	Benzo-a-Pyrene
3800 U	UG/KG	Dimethyl Phthalate	3800 U	UG/KG	Indeno (1,2,3-cd) Pyrene
3800 U	UG/KG	2,6-Dinitrotoluene	3800 U	UG/KG	Dibenzo(a,h)Anthracene
3800 U	UG/KG	Acenaphthylene	3800 U	UG/KG	Benzo(ghi)Perylene
9500 U	UG/KG	3-Nitroaniline	14	%	% Moisture
3800 U	UG/KG	Acenaphthene			
9500 UJ	UG/KG	2,4-Dinitrophenol			
9500 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1760 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SS /

MD No: 1P89

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P89

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:38

Ending:

RESULTS	UNITS	ANALYTE
950 NJ	UG/KG	.ALPHA.-METHYLSTYRENE
3100 NJ	UG/KG	PHENOL,2,4-BIS(1,1-DIMETHYLETHYL)-
2100 NJ	UG/KG	HEXADECANOIC ACID
1000 NJ	UG/KG	PHENOL, 4,4'-(1-METHYLETHYLIDENE)BIS-
49000 J	UG/KG	6 UNKNOWN COMPOUNDS
6500 J	UG/KG	4 UNKNOWN PHTHALATES

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1762 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE04SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P91

D No: 1P91

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
400 U	UG/KG	Benzaldehyde	400 U	UG/KG	Dibenzofuran
400 U	UG/KG	Phenol	400 U	UG/KG	2,4-Dinitrotoluene
400 U	UG/KG	bis(2-Chloroethyl) Ether	400 U	UG/KG	Diethyl Phthalate
400 U	UG/KG	2-Chlorophenol	400 U	UG/KG	Fluorene
400 U	UG/KG	2-Methylphenol	400 U	UG/KG	4-Chlorophenyl Phenyl Ether
400 U	UG/KG	bis(2-Chloroisopropyl) Ether	1000 U	UG/KG	4-Nitroaniline
400 U	UG/KG	Acetophenone	1000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
400 U	UG/KG	(3-and/or 4-)Methylphenol	400 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
400 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
400 U	UG/KG	Hexachloroethane	400 U	UG/KG	4-Bromophenyl Phenyl Ether
400 U	UG/KG	Nitrobenzene	400 U	UG/KG	Hexachlorobenzene (HCB)
400 U	UG/KG	Isophorone	400 U	UG/KG	Atrazine
400 U	UG/KG	2-Nitrophenol	1000 U	UG/KG	Pentachlorophenol
400 U	UG/KG	2,4-Dimethylphenol	400 U	UG/KG	Phenanthrene
400 U	UG/KG	bis(2-Chloroethoxy)Methane	400 U	UG/KG	Anthracene
400 U	UG/KG	2,4-Dichlorophenol	400 U	UG/KG	Carbazole
400 U	UG/KG	Naphthalene	400 U	UG/KG	Di-n-Butylphthalate
400 U	UG/KG	4-Chloroaniline	400 U	UG/KG	Fluoranthene
400 U	UG/KG	Hexachlorobutadiene	400 U	UG/KG	Pyrene
400 UJ	UG/KG	Caprolactam	400 U	UG/KG	Benzyl Butyl Phthalate
400 U	UG/KG	4-Chloro-3-Methylphenol	400 U	UG/KG	3,3'-Dichlorobenzidine
400 U	UG/KG	2-Methylnaphthalene	400 U	UG/KG	Benzo(a)Anthracene
400 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	400 U	UG/KG	Chrysene
400 U	UG/KG	2,4,6-Trichlorophenol	400 U	UG/KG	bis(2-Ethylhexyl) Phthalate
1000 U	UG/KG	2,4,5-Trichlorophenol	400 U	UG/KG	Di-n-Octylphthalate
400 U	UG/KG	1,1-Biphenyl	400 U	UG/KG	Benzo(b)Fluoranthene
400 U	UG/KG	2-Chloronaphthalene	400 U	UG/KG	Benzo(k)Fluoranthene
1000 U	UG/KG	2-Nitroaniline	400 U	UG/KG	Benzo-a-Pyrene
400 U	UG/KG	Dimethyl Phthalate	400 U	UG/KG	Indeno (1,2,3-cd) Pyrene
400 U	UG/KG	2,6-Dinitrotoluene	400 U	UG/KG	Dibenzo(a,h)Anthracene
400 U	UG/KG	Acenaphthylene	400 U	UG/KG	Benzo(ghi)Perylene
1000 U	UG/KG	3-Nitroaniline	19	%	% Moisture
400 U	UG/KG	Acenaphthene			
1000 U	UG/KG	2,4-Dinitrophenol			
1000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1762 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SS /

MD No: 1P91

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P91

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:20

Ending:

RESULTS	UNITS	ANALYTE
140 NJ	UG/KG	HEXADECANOIC ACID
470 NJ	UG/KG	2-PENTACOSANONE
380 NJ	UG/KG	2-HEPTACOSANONE
230 NJ	UG/KG	2-NONACOSANONE
4700 J	UG/KG	22 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1765 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P94

D No: 1P94

Inorg Contractor: SENTIN

Org Contractor: CEIMC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:10

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
47 J	UG/KG	Benzaldehyde	400 U	UG/KG	Dibenzofuran
400 U	UG/KG	Phenol	400 U	UG/KG	2,4-Dinitrotoluene
400 U	UG/KG	bis(2-Chloroethyl) Ether	400 U	UG/KG	Diethyl Phthalate
400 U	UG/KG	2-Chlorophenol	400 U	UG/KG	Fluorene
400 U	UG/KG	2-Methylphenol	400 U	UG/KG	4-Chlorophenyl Phenyl Ether
400 U	UG/KG	bis(2-Chloroisopropyl) Ether	1000 U	UG/KG	4-Nitroaniline
400 U	UG/KG	Acetophenone	1000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
400 U	UG/KG	(3-and/or 4-)Methylphenol	400 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
400 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
400 U	UG/KG	Hexachloroethane	400 U	UG/KG	4-Bromophenyl Phenyl Ether
400 U	UG/KG	Nitrobenzene	400 U	UG/KG	Hexachlorobenzene (HCB)
400 U	UG/KG	Isophorone	400 U	UG/KG	Atrazine
400 U	UG/KG	2-Nitrophenol	1000 U	UG/KG	Pentachlorophenol
400 U	UG/KG	2,4-Dimethylphenol	400 U	UG/KG	Phenanthrene
400 U	UG/KG	bis(2-Chloroethoxy)Methane	400 U	UG/KG	Anthracene
400 U	UG/KG	2,4-Dichlorophenol	400 U	UG/KG	Carbazole
400 U	UG/KG	Naphthalene	400 U	UG/KG	Di-n-Butylphthalate
400 U	UG/KG	4-Chloroaniline	400 U	UG/KG	Fluoranthene
400 U	UG/KG	Hexachlorobutadiene	400 U	UG/KG	Pyrene
400 UJ	UG/KG	Caprolactam	400 U	UG/KG	Benzyl Butyl Phthalate
400 U	UG/KG	4-Chloro-3-Methylphenol	400 U	UG/KG	3,3'-Dichlorobenzidine
400 U	UG/KG	2-Methylnaphthalene	400 U	UG/KG	Benzo(a)Anthracene
400 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	400 U	UG/KG	Chrysene
400 U	UG/KG	2,4,6-Trichlorophenol	400 U	UG/KG	bis(2-Ethylhexyl) Phthalate
1000 U	UG/KG	2,4,5-Trichlorophenol	400 U	UG/KG	Di-n-Octylphthalate
400 U	UG/KG	1,1-Biphenyl	400 U	UG/KG	Benzo(b)Fluoranthene
400 U	UG/KG	2-Chloronaphthalene	400 U	UG/KG	Benzo(k)Fluoranthene
1000 U	UG/KG	2-Nitroaniline	400 U	UG/KG	Benzo-a-Pyrene
400 U	UG/KG	Dimethyl Phthalate	400 U	UG/KG	Indeno (1,2,3-cd) Pyrene
400 U	UG/KG	2,6-Dinitrotoluene	400 U	UG/KG	Dibenzo(a,h)Anthracene
400 U	UG/KG	Acenaphthylene	400 U	UG/KG	Benzo(ghi)Perylene
1000 U	UG/KG	3-Nitroaniline	18	%	% Moisture
400 U	UG/KG	Acenaphthene			
1000 U	UG/KG	2,4-Dinitrophenol			
1000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1765 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## MISCELLANEOUS COMPOUNDS

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 16:10

Id/Station: LLE05SS /

MD No: 1P94

Inorg Contractor: SENTIN

Ending:

Media: SURFACE SOIL (0" - 12")

D No: 1P94

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
140 NJ	UG/KG	PENTADECANOIC ACID, 14-METHYL-, METHYL E
420 NJ	UG/KG	HEXADECANOIC ACID
190 NJ	UG/KG	11-OCTADECENOIC ACID, METHYL ESTER
470 NJ	UG/KG	9,12-OCTADECADIENOIC ACID (Z,Z)-
3700 J	UG/KG	21 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1758 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE06SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P87

D No: 1P87

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
1800 U	UG/KG	Benzaldehyde	1800 U	UG/KG	Dibenzofuran
1800 U	UG/KG	Phenol	1800 U	UG/KG	2,4-Dinitrotoluene
1800 U	UG/KG	bis(2-Chloroethyl) Ether	1800 U	UG/KG	Diethyl Phthalate
1800 U	UG/KG	2-Chlorophenol	1800 U	UG/KG	Fluorene
1800 U	UG/KG	2-Methylphenol	1800 U	UG/KG	4-Chlorophenyl Phenyl Ether
1800 U	UG/KG	bis(2-Chloroisopropyl) Ether	4600 U	UG/KG	4-Nitroaniline
1800 U	UG/KG	Acetophenone	4600 U	UG/KG	2-Methyl-4,6-Dinitrophenol
1800 U	UG/KG	(3-and/or 4-)Methylphenol	1800 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
1800 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
1800 U	UG/KG	Hexachloroethane	1800 U	UG/KG	4-Bromophenyl Phenyl Ether
1800 U	UG/KG	Nitrobenzene	1800 U	UG/KG	Hexachlorobenzene (HCB)
1800 U	UG/KG	Isophorone	1800 U	UG/KG	Atrazine
1800 U	UG/KG	2-Nitrophenol	4600 U	UG/KG	Pentachlorophenol
1800 U	UG/KG	2,4-Dimethylphenol	1800 U	UG/KG	Phenanthrene
1800 U	UG/KG	bis(2-Chloroethoxy)Methane	1800 U	UG/KG	Anthracene
1800 U	UG/KG	2,4-Dichlorophenol	1800 U	UG/KG	Carbazole
1800 U	UG/KG	Naphthalene	1800 U	UG/KG	Di-n-Butylphthalate
1800 U	UG/KG	4-Chloroaniline	1800 U	UG/KG	Fluoranthene
1800 U	UG/KG	Hexachlorobutadiene	1800 U	UG/KG	Pyrene
1800 U	UG/KG	Caprolactam	1800 U	UG/KG	Benzyl Butyl Phthalate
1800 U	UG/KG	4-Chloro-3-Methylphenol	1800 U	UG/KG	3,3'-Dichlorobenzidine
1800 U	UG/KG	2-Methylnaphthalene	1800 U	UG/KG	Benzo(a)Anthracene
1800 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	1800 U	UG/KG	Chrysene
1800 U	UG/KG	2,4,6-Trichlorophenol	1800 U	UG/KG	bis(2-Ethylhexyl) Phthalate
4600 U	UG/KG	2,4,5-Trichlorophenol	1800 U	UG/KG	Di-n-Octylphthalate
1800 U	UG/KG	1,1-Biphenyl	1800 U	UG/KG	Benzo(b)Fluoranthene
1800 U	UG/KG	2-Chloronaphthalene	1800 U	UG/KG	Benzo(k)Fluoranthene
4600 U	UG/KG	2-Nitroaniline	1800 U	UG/KG	Benzo-a-Pyrene
1800 U	UG/KG	Dimethyl Phthalate	1800 U	UG/KG	Indeno (1,2,3-cd) Pyrene
1800 U	UG/KG	2,6-Dinitrotoluene	1800 U	UG/KG	Dibenzo(a,h)Anthracene
1800 U	UG/KG	Acenaphthylene	1800 U	UG/KG	Benzo(ghi)Perylene
4600 U	UG/KG	3-Nitroaniline	11	%	% Moisture
1800 U	UG/KG	Acenaphthene			
4600 UJ	UG/KG	2,4-Dinitrophenol			
4600 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1753 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P82

D No: 1P82

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
1800 U	UG/KG	Benzaldehyde	1800 U	UG/KG	Dibenzofuran
1800 U	UG/KG	Phenol	1800 U	UG/KG	2,4-Dinitrotoluene
1800 U	UG/KG	bis(2-Chloroethyl) Ether	1800 U	UG/KG	Diethyl Phthalate
1800 U	UG/KG	2-Chlorophenol	1800 U	UG/KG	Fluorene
1800 U	UG/KG	2-Methylphenol	1800 U	UG/KG	4-Chlorophenyl Phenyl Ether
1800 U	UG/KG	bis(2-Chloroisopropyl) Ether	4600 U	UG/KG	4-Nitroaniline
1800 U	UG/KG	Acetophenone	4600 U	UG/KG	2-Methyl-4,6-Dinitrophenol
1800 U	UG/KG	(3-and/or 4-)Methylphenol	1800 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
1800 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
1800 U	UG/KG	Hexachloroethane	1800 U	UG/KG	4-Bromophenyl Phenyl Ether
1800 U	UG/KG	Nitrobenzene	1800 U	UG/KG	Hexachlorobenzene (HCB)
1800 U	UG/KG	Isophorone	1800 U	UG/KG	Atrazine
1800 U	UG/KG	2-Nitrophenol	4600 U	UG/KG	Pentachlorophenol
1800 U	UG/KG	2,4-Dimethylphenol	190 J	UG/KG	Phenanthrene
1800 U	UG/KG	bis(2-Chloroethoxy)Methane	1800 U	UG/KG	Anthracene
1800 U	UG/KG	2,4-Dichlorophenol	1800 U	UG/KG	Carbazole
1800 U	UG/KG	Naphthalene	1800 U	UG/KG	Di-n-Butylphthalate
1800 U	UG/KG	4-Chloroaniline	680 J	UG/KG	Fluoranthene
1800 U	UG/KG	Hexachlorobutadiene	590 J	UG/KG	Pyrene
1800 U	UG/KG	Caprolactam	1800 U	UG/KG	Benzyl Butyl Phthalate
1800 U	UG/KG	4-Chloro-3-Methylphenol	1800 U	UG/KG	3,3'-Dichlorobenzidine
1800 U	UG/KG	2-Methylnaphthalene	270 J	UG/KG	Benzo(a)Anthracene
1800 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	480 J	UG/KG	Chrysene
1800 U	UG/KG	2,4,6-Trichlorophenol	1800 U	UG/KG	bis(2-Ethylhexyl) Phthalate
4600 U	UG/KG	2,4,5-Trichlorophenol	1800 U	UG/KG	Di-n-Octylphthalate
1800 U	UG/KG	1,1-Biphenyl	510 J	UG/KG	Benzo(b)Fluoranthene
1800 U	UG/KG	2-Chloronaphthalene	460 J	UG/KG	Benzo(k)Fluoranthene
4600 U	UG/KG	2-Nitroaniline	390 J	UG/KG	Benzo-a-Pyrene
1800 U	UG/KG	Dimethyl Phthalate	370 J	UG/KG	Indeno (1,2,3-cd) Pyrene
1800 U	UG/KG	2,6-Dinitrotoluene	1800 U	UG/KG	Dibenzo(a,h)Anthracene
1800 U	UG/KG	Acenaphthylene	400 J	UG/KG	Benzo(ghi)Perylene
4600 U	UG/KG	3-Nitroaniline	11	%	% Moisture
1800 U	UG/KG	Acenaphthene			
4600 U	UG/KG	2,4-Dinitrophenol			
4600 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1753 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE07SS /

MD No: 1P82

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P82

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:45

Ending:

RESULTS	UNITS	ANALYTE
460 NJ	UG/KG	PERYLENE
370 J	UG/KG	UNKNOWN COMPOUND

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1761 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE08SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P90

D No: 1P90

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:00

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
48 J	UG/KG	Benzaldehyde	400 U	UG/KG	Dibenzofuran
400 U	UG/KG	Phenol	400 U	UG/KG	2,4-Dinitrotoluene
400 U	UG/KG	bis(2-Chloroethyl) Ether	400 U	UG/KG	Diethyl Phthalate
400 U	UG/KG	2-Chlorophenol	400 U	UG/KG	Fluorene
400 U	UG/KG	2-Methylphenol	400 U	UG/KG	4-Chlorophenyl Phenyl Ether
400 U	UG/KG	bis(2-Chloroisopropyl) Ether	1000 U	UG/KG	4-Nitroaniline
400 U	UG/KG	Acetophenone	1000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
400 U	UG/KG	(3-and/or 4-)Methylphenol	400 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
400 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
400 U	UG/KG	Hexachloroethane	400 U	UG/KG	4-Bromophenyl Phenyl Ether
400 U	UG/KG	Nitrobenzene	400 U	UG/KG	Hexachlorobenzene (HCB)
400 U	UG/KG	Isophorone	400 U	UG/KG	Atrazine
400 U	UG/KG	2-Nitrophenol	1000 U	UG/KG	Pentachlorophenol
400 U	UG/KG	2,4-Dimethylphenol	400 U	UG/KG	Phenanthrene
400 U	UG/KG	bis(2-Chloroethoxy)Methane	400 U	UG/KG	Anthracene
400 U	UG/KG	2,4-Dichlorophenol	400 U	UG/KG	Carbazole
400 U	UG/KG	Naphthalene	400 U	UG/KG	Di-n-Butylphthalate
400 U	UG/KG	4-Chloroaniline	400 U	UG/KG	Fluoranthene
400 U	UG/KG	Hexachlorobutadiene	400 U	UG/KG	Pyrene
400 UJ	UG/KG	Caprolactam	400 U	UG/KG	Benzyl Butyl Phthalate
400 U	UG/KG	4-Chloro-3-Methylphenol	400 U	UG/KG	3,3'-Dichlorobenzidine
400 U	UG/KG	2-Methylnaphthalene	400 U	UG/KG	Benzo(a)Anthracene
400 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	400 U	UG/KG	Chrysene
400 U	UG/KG	2,4,6-Trichlorophenol	400 U	UG/KG	bis(2-Ethylhexyl) Phthalate
1000 U	UG/KG	2,4,5-Trichlorophenol	400 U	UG/KG	Di-n-Octylphthalate
400 U	UG/KG	1,1-Biphenyl	49 J	UG/KG	Benzo(b)Fluoranthene
400 U	UG/KG	2-Chloronaphthalene	400 U	UG/KG	Benzo(k)Fluoranthene
1000 U	UG/KG	2-Nitroaniline	400 U	UG/KG	Benzo-a-Pyrene
400 U	UG/KG	Dimethyl Phthalate	400 U	UG/KG	Indeno (1,2,3-cd) Pyrene
400 U	UG/KG	2,6-Dinitrotoluene	400 U	UG/KG	Dibenzo(a,h)Anthracene
400 U	UG/KG	Acenaphthylene	400 U	UG/KG	Benzo(ghi)Perylene
1000 U	UG/KG	3-Nitroaniline	18	%	% Moisture
400 U	UG/KG	Acenaphthene			
1000 U	UG/KG	2,4-Dinitrophenol			
1000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1761 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE08SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P90

D No: 1P90

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:00

Ending:

RESULTS	UNITS	ANALYTE
420 NJ	UG/KG	1-DECENE
190 NJ	UG/KG	HEXADECANOIC ACID, METHYL ESTER
680 NJ	UG/KG	HEXADECANOIC ACID
360 NJ	UG/KG	OXACYCLOHEXADECAN-2-ONE
90 NJ	UG/KG	OCTADECANOIC ACID
320 NJ	UG/KG	2-PENTACOSANONE
400 NJ	UG/KG	2-PENTACOSANONE
3500 J	UG/KG	17 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1745 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SB /

MD No: 1P73

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P73

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:41

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
360 U	UG/KG	Benzaldehyde	360 U	UG/KG	Dibenzofuran
360 U	UG/KG	Phenol	360 U	UG/KG	2,4-Dinitrotoluene
360 U	UG/KG	bis(2-Chloroethyl) Ether	360 U	UG/KG	Diethyl Phthalate
360 U	UG/KG	2-Chlorophenol	360 U	UG/KG	Fluorene
360 U	UG/KG	2-Methylphenol	360 U	UG/KG	4-Chlorophenyl Phenyl Ether
360 U	UG/KG	bis(2-Chloroisopropyl) Ether	900 U	UG/KG	4-Nitroaniline
360 U	UG/KG	Acetophenone	900 U	UG/KG	2-Methyl-4,6-Dinitrophenol
360 U	UG/KG	(3-and/or 4-)Methylphenol	360 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
360 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
360 U	UG/KG	Hexachloroethane	360 U	UG/KG	4-Bromophenyl Phenyl Ether
360 U	UG/KG	Nitrobenzene	360 U	UG/KG	Hexachlorobenzene (HCB)
360 U	UG/KG	Isophorone	360 U	UG/KG	Atrazine
360 U	UG/KG	2-Nitrophenol	900 U	UG/KG	Pentachlorophenol
360 U	UG/KG	2,4-Dimethylphenol	360 U	UG/KG	Phenanthrene
360 U	UG/KG	bis(2-Chloroethoxy)Methane	360 U	UG/KG	Anthracene
360 U	UG/KG	2,4-Dichlorophenol	360 U	UG/KG	Carbazole
360 U	UG/KG	Naphthalene	360 U	UG/KG	Di-n-Butylphthalate
360 U	UG/KG	4-Chloroaniline	360 U	UG/KG	Fluoranthene
360 U	UG/KG	Hexachlorobutadiene	360 U	UG/KG	Pyrene
360 U	UG/KG	Caprolactam	360 U	UG/KG	Benzyl Butyl Phthalate
360 U	UG/KG	4-Chloro-3-Methylphenol	360 U	UG/KG	3,3'-Dichlorobenzidine
360 U	UG/KG	2-Methylnaphthalene	360 U	UG/KG	Benzo(a)Anthracene
360 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	360 U	UG/KG	Chrysene
360 U	UG/KG	2,4,6-Trichlorophenol	360 U	UG/KG	bis(2-Ethylhexyl) Phthalate
900 U	UG/KG	2,4,5-Trichlorophenol	360 U	UG/KG	Di-n-Octylphthalate
360 U	UG/KG	1,1-Biphenyl	100 J	UG/KG	Benzo(b)Fluoranthene
360 U	UG/KG	2-Chloronaphthalene	360 U	UG/KG	Benzo(k)Fluoranthene
900 U	UG/KG	2-Nitroaniline	360 U	UG/KG	Benzo-a-Pyrene
360 U	UG/KG	Dimethyl Phthalate	360 U	UG/KG	Indeno (1,2,3-cd) Pyrene
360 U	UG/KG	2,6-Dinitrotoluene	360 U	UG/KG	Dibenzo(a,h)Anthracene
360 U	UG/KG	Acenaphthylene	360 U	UG/KG	Benzo(ghi)Perylene
900 U	UG/KG	3-Nitroaniline	9	%	% Moisture
360 U	UG/KG	Acenaphthene			
900 U	UG/KG	2,4-Dinitrophenol			
900 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1745 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SB /

MD No: 1P73

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P73

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:41

Ending:

RESULTS	UNITS	ANALYTE
140 NJ	UG/KG	1-DODECENE
180 NJ	UG/KG	1-PENTADECENE
220 NJ	UG/KG	1-DOCOSENE
150 NJ	UG/KG	2-HEPTACOSANONE
1900 J	UG/KG	11 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1748 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SBD /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P76

D No: 1P76

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:40

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
360 U	UG/KG	Benzaldehyde	360 U	UG/KG	Dibenzofuran
360 U	UG/KG	Phenol	360 U	UG/KG	2,4-Dinitrotoluene
360 U	UG/KG	bis(2-Chloroethyl) Ether	360 U	UG/KG	Diethyl Phthalate
360 U	UG/KG	2-Chlorophenol	360 U	UG/KG	Fluorene
360 U	UG/KG	2-Methylphenol	360 U	UG/KG	4-Chlorophenyl Phenyl Ether
360 U	UG/KG	bis(2-Chloroisopropyl) Ether	910 U	UG/KG	4-Nitroaniline
360 U	UG/KG	Acetophenone	910 U	UG/KG	2-Methyl-4,6-Dinitrophenol
360 U	UG/KG	(3-and/or 4-)Methylphenol	360 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
360 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
360 U	UG/KG	Hexachloroethane	360 U	UG/KG	4-Bromophenyl Phenyl Ether
360 U	UG/KG	Nitrobenzene	360 U	UG/KG	Hexachlorobenzene (HCB)
360 U	UG/KG	Isophorone	360 U	UG/KG	Atrazine
360 U	UG/KG	2-Nitrophenol	910 U	UG/KG	Pentachlorophenol
360 U	UG/KG	2,4-Dimethylphenol	360 U	UG/KG	Phenanthrene
360 U	UG/KG	bis(2-Chloroethoxy)Methane	360 U	UG/KG	Anthracene
360 U	UG/KG	2,4-Dichlorophenol	360 U	UG/KG	Carbazole
360 U	UG/KG	Naphthalene	360 U	UG/KG	Di-n-Butylphthalate
360 U	UG/KG	4-Chloroaniline	360 U	UG/KG	Fluoranthene
360 U	UG/KG	Hexachlorobutadiene	360 U	UG/KG	Pyrene
360 U	UG/KG	Caprolactam	360 U	UG/KG	Benzyl Butyl Phthalate
360 U	UG/KG	4-Chloro-3-Methylphenol	360 U	UG/KG	3,3'-Dichlorobenzidine
360 U	UG/KG	2-Methylnaphthalene	360 U	UG/KG	Benzo(a)Anthracene
360 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	360 U	UG/KG	Chrysene
360 U	UG/KG	2,4,6-Trichlorophenol	360 U	UG/KG	bis(2-Ethylhexyl) Phthalate
910 U	UG/KG	2,4,5-Trichlorophenol	360 U	UG/KG	Di-n-Octylphthalate
360 U	UG/KG	1,1-Biphenyl	360 U	UG/KG	Benzo(b)Fluoranthene
360 U	UG/KG	2-Chloronaphthalene	360 U	UG/KG	Benzo(k)Fluoranthene
910 U	UG/KG	2-Nitroaniline	360 U	UG/KG	Benzo-a-Pyrene
360 U	UG/KG	Dimethyl Phthalate	360 U	UG/KG	Indeno (1,2,3-cd) Pyrene
360 U	UG/KG	2,6-Dinitrotoluene	360 U	UG/KG	Dibenzo(a,h)Anthracene
360 U	UG/KG	Acenaphthylene	360 U	UG/KG	Benzo(ghi)Perylene
910 U	UG/KG	3-Nitroaniline	9	%	% Moisture
360 U	UG/KG	Acenaphthene			
910 U	UG/KG	2,4-Dinitrophenol			
910 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1748 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SBD /

MD No: 1P76

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P76

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:40

Ending:

RESULTS	UNITS	ANALYTE
120 J	UG/KG	2-HEPTACOSANONE
76 J	UG/KG	2-PENTACOSANONE
730 J	UG/KG	7 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1751 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE02SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P79

D No: 1P79

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
1800 U	UG/KG	Benzaldehyde	1800 U	UG/KG	Dibenzofuran
1800 U	UG/KG	Phenol	1800 U	UG/KG	2,4-Dinitrotoluene
1800 U	UG/KG	bis(2-Chloroethyl) Ether	1800 U	UG/KG	Diethyl Phthalate
1800 U	UG/KG	2-Chlorophenol	1800 U	UG/KG	Fluorene
1800 U	UG/KG	2-Methylphenol	1800 U	UG/KG	4-Chlorophenyl Phenyl Ether
1800 U	UG/KG	bis(2-Chloroisopropyl) Ether	4600 U	UG/KG	4-Nitroaniline
1800 U	UG/KG	Acetophenone	4600 U	UG/KG	2-Methyl-4,6-Dinitrophenol
1800 U	UG/KG	(3-and/or 4-)Methylphenol	1800 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
1800 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
1800 U	UG/KG	Hexachloroethane	1800 U	UG/KG	4-Bromophenyl Phenyl Ether
1800 U	UG/KG	Nitrobenzene	1800 U	UG/KG	Hexachlorobenzene (HCB)
1800 U	UG/KG	Isophorone	1800 U	UG/KG	Atrazine
1800 U	UG/KG	2-Nitrophenol	4600 U	UG/KG	Pentachlorophenol
1800 U	UG/KG	2,4-Dimethylphenol	300 J	UG/KG	Phenanthrene
1800 U	UG/KG	bis(2-Chloroethoxy)Methane	1800 U	UG/KG	Anthracene
1800 U	UG/KG	2,4-Dichlorophenol	1800 U	UG/KG	Carbazole
1800 U	UG/KG	Naphthalene	1800 U	UG/KG	Di-n-Butylphthalate
1800 U	UG/KG	4-Chloroaniline	890 J	UG/KG	Fluoranthene
1800 U	UG/KG	Hexachlorobutadiene	740 J	UG/KG	Pyrene
1800 U	UG/KG	Caprolactam	1800 U	UG/KG	Benzyl Butyl Phthalate
1800 U	UG/KG	4-Chloro-3-Methylphenol	1800 U	UG/KG	3,3'-Dichlorobenzidine
1800 U	UG/KG	2-Methylnaphthalene	370 J	UG/KG	Benzo(a)Anthracene
1800 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	520 J	UG/KG	Chrysene
1800 U	UG/KG	2,4,6-Trichlorophenol	1800 U	UG/KG	bis(2-Ethylhexyl) Phthalate
4600 U	UG/KG	2,4,5-Trichlorophenol	1800 U	UG/KG	Di-n-Octylphthalate
1800 U	UG/KG	1,1-Biphenyl	510 J	UG/KG	Benzo(b)Fluoranthene
1800 U	UG/KG	2-Chloronaphthalene	440 J	UG/KG	Benzo(k)Fluoranthene
4600 U	UG/KG	2-Nitroaniline	430 J	UG/KG	Benzo-a-Pyrene
1800 U	UG/KG	Dimethyl Phthalate	350 J	UG/KG	Indeno (1,2,3-cd) Pyrene
1800 U	UG/KG	2,6-Dinitrotoluene	1800 U	UG/KG	Dibenzo(a,h)Anthracene
1800 U	UG/KG	Acenaphthylene	370 J	UG/KG	Benzo(ghi)Perylene
4600 U	UG/KG	3-Nitroaniline	11	%	% Moisture
1800 U	UG/KG	Acenaphthene			
4600 U	UG/KG	2,4-Dinitrophenol			
4600 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1751 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02SB /

MD No: 1P79

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P79

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:15

Ending:

RESULTS	UNITS	ANALYTE
460 NJ	UG/KG	BENZO[E]PYRENE
1500 J	UG/KG	3 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1759 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SB /

MD No: 1P88

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P88

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:52

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
2000 U	UG/KG	Benzaldehyde	2000 U	UG/KG	Dibenzofuran
2000 U	UG/KG	Phenol	2000 U	UG/KG	2,4-Dinitrotoluene
2000 U	UG/KG	bis(2-Chloroethyl) Ether	2000 U	UG/KG	Diethyl Phthalate
2000 U	UG/KG	2-Chlorophenol	2000 U	UG/KG	Fluorene
2000 U	UG/KG	2-Methylphenol	2000 U	UG/KG	4-Chlorophenyl Phenyl Ether
2000 U	UG/KG	bis(2-Chloroisopropyl) Ether	5000 U	UG/KG	4-Nitroaniline
2000 U	UG/KG	Acetophenone	5000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
2000 U	UG/KG	(3-and/or 4-)Methylphenol	2000 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
2000 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
2000 U	UG/KG	Hexachloroethane	2000 U	UG/KG	4-Bromophenyl Phenyl Ether
2000 U	UG/KG	Nitrobenzene	2000 U	UG/KG	Hexachlorobenzene (HCB)
2000 U	UG/KG	Isophorone	2000 U	UG/KG	Atrazine
2000 U	UG/KG	2-Nitrophenol	5000 U	UG/KG	Pentachlorophenol
2000 U	UG/KG	2,4-Dimethylphenol	2000 U	UG/KG	Phenanthrene
2000 U	UG/KG	bis(2-Chloroethoxy)Methane	2000 U	UG/KG	Anthracene
2000 U	UG/KG	2,4-Dichlorophenol	2000 U	UG/KG	Carbazole
2000 U	UG/KG	Naphthalene	2000 U	UG/KG	Di-n-Butylphthalate
2000 U	UG/KG	4-Chloroaniline	2000 U	UG/KG	Fluoranthene
2000 U	UG/KG	Hexachlorobutadiene	2000 U	UG/KG	Pyrene
2000 U	UG/KG	Caprolactam	2000 U	UG/KG	Benzyl Butyl Phthalate
2000 U	UG/KG	4-Chloro-3-Methylphenol	2000 U	UG/KG	3,3'-Dichlorobenzidine
2000 U	UG/KG	2-Methylnaphthalene	2000 U	UG/KG	Benzo(a)Anthracene
2000 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	2000 U	UG/KG	Chrysene
2000 U	UG/KG	2,4,6-Trichlorophenol	2000 U	UG/KG	bis(2-Ethylhexyl) Phthalate
5000 U	UG/KG	2,4,5-Trichlorophenol	2000 U	UG/KG	Di-n-Octylphthalate
2000 U	UG/KG	1,1-Biphenyl	2000 U	UG/KG	Benzo(b)Fluoranthene
2000 U	UG/KG	2-Chloronaphthalene	2000 U	UG/KG	Benzo(k)Fluoranthene
5000 U	UG/KG	2-Nitroaniline	2000 U	UG/KG	Benzo-a-Pyrene
2000 U	UG/KG	Dimethyl Phthalate	2000 U	UG/KG	Indeno (1,2,3-cd) Pyrene
2000 U	UG/KG	2,6-Dinitrotoluene	2000 U	UG/KG	Dibenzo(a,h)Anthracene
2000 U	UG/KG	Acenaphthylene	2000 U	UG/KG	Benzo(ghi)Perylene
5000 U	UG/KG	3-Nitroaniline	18	%	% Moisture
2000 U	UG/KG	Acenaphthene			
5000 UJ	UG/KG	2,4-Dinitrophenol			
5000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1759 FY 2003 Project: 03-0143

MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE03SB /

Media: SUBSURFACE SOIL (> 12")

Case No: 31215

MD No: 1P88

D No: 1P88

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:52

Ending:

RESULTS	UNITS	ANALYTE
600 J	UG/KG	UNKNOWN COMPOUND
1300 NJ	UG/KG	.GAMMA.-SITOSTEROL
1400 NJ	UG/KG	OLEAN-12-ENE
4400 NJ	UG/KG	URS-12-EN-24-OIC ACID,3-OXO-, METHYL ESTER

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1763 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE04SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P92

D No: 1P92

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
390 U	UG/KG	Benzaldehyde	390 U	UG/KG	Dibenzofuran
390 U	UG/KG	Phenol	390 U	UG/KG	2,4-Dinitrotoluene
390 U	UG/KG	bis(2-Chloroethyl) Ether	390 U	UG/KG	Diethyl Phthalate
390 U	UG/KG	2-Chlorophenol	390 U	UG/KG	Fluorene
390 U	UG/KG	2-Methylphenol	390 U	UG/KG	4-Chlorophenyl Phenyl Ether
390 U	UG/KG	bis(2-Chloroisopropyl) Ether	970 U	UG/KG	4-Nitroaniline
390 U	UG/KG	Acetophenone	970 U	UG/KG	2-Methyl-4,6-Dinitrophenol
390 U	UG/KG	(3-and/or 4-)Methylphenol	390 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
390 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
390 U	UG/KG	Hexachloroethane	390 U	UG/KG	4-Bromophenyl Phenyl Ether
390 U	UG/KG	Nitrobenzene	390 U	UG/KG	Hexachlorobenzene (HCB)
390 U	UG/KG	Isophorone	390 U	UG/KG	Atrazine
390 U	UG/KG	2-Nitrophenol	970 U	UG/KG	Pentachlorophenol
390 U	UG/KG	2,4-Dimethylphenol	390 U	UG/KG	Phenanthrene
390 U	UG/KG	bis(2-Chloroethoxy)Methane	390 U	UG/KG	Anthracene
390 U	UG/KG	2,4-Dichlorophenol	390 U	UG/KG	Carbazole
390 U	UG/KG	Naphthalene	390 U	UG/KG	Di-n-Butylphthalate
390 U	UG/KG	4-Chloroaniline	390 U	UG/KG	Fluoranthene
390 U	UG/KG	Hexachlorobutadiene	390 U	UG/KG	Pyrene
390 UJ	UG/KG	Caprolactam	390 U	UG/KG	Benzyl Butyl Phthalate
390 U	UG/KG	4-Chloro-3-Methylphenol	390 U	UG/KG	3,3'-Dichlorobenzidine
390 U	UG/KG	2-Methylnaphthalene	390 U	UG/KG	Benzo(a)Anthracene
390 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	390 U	UG/KG	Chrysene
390 U	UG/KG	2,4,6-Trichlorophenol	390 U	UG/KG	bis(2-Ethylhexyl) Phthalate
970 U	UG/KG	2,4,5-Trichlorophenol	390 U	UG/KG	Di-n-Octylphthalate
390 U	UG/KG	1,1-Biphenyl	390 U	UG/KG	Benzo(b)Fluoranthene
390 U	UG/KG	2-Chloronaphthalene	390 U	UG/KG	Benzo(k)Fluoranthene
970 U	UG/KG	2-Nitroaniline	390 U	UG/KG	Benzo-a-Pyrene
390 U	UG/KG	Dimethyl Phthalate	390 U	UG/KG	Indeno (1,2,3-cd) Pyrene
390 U	UG/KG	2,6-Dinitrotoluene	390 U	UG/KG	Dibenzo(a,h)Anthracene
390 U	UG/KG	Acenaphthylene	390 U	UG/KG	Benzo(ghi)Perylene
970 U	UG/KG	3-Nitroaniline	15	%	% Moisture
390 U	UG/KG	Acenaphthene			
970 U	UG/KG	2,4-Dinitrophenol			
970 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1763 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE04SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P92

D No: 1P92

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:30

Ending:

RESULTS	UNITS	ANALYTE
1300 J	UG/KG	6 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1764 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SB /

MD No: 1P93

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P93

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
370 U	UG/KG	Benzaldehyde	370 U	UG/KG	Dibenzofuran
370 U	UG/KG	Phenol	370 U	UG/KG	2,4-Dinitrotoluene
370 U	UG/KG	bis(2-Chloroethyl) Ether	370 U	UG/KG	Diethyl Phthalate
370 U	UG/KG	2-Chlorophenol	370 U	UG/KG	Fluorene
370 U	UG/KG	2-Methylphenol	370 U	UG/KG	4-Chlorophenyl Phenyl Ether
370 U	UG/KG	bis(2-Chloroisopropyl) Ether	940 U	UG/KG	4-Nitroaniline
370 U	UG/KG	Acetophenone	940 U	UG/KG	2-Methyl-4,6-Dinitrophenol
370 U	UG/KG	(3-and/or 4-)Methylphenol	370 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
370 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
370 U	UG/KG	Hexachloroethane	370 U	UG/KG	4-Bromophenyl Phenyl Ether
370 U	UG/KG	Nitrobenzene	370 U	UG/KG	Hexachlorobenzene (HCB)
370 U	UG/KG	Isophorone	370 U	UG/KG	Atrazine
370 U	UG/KG	2-Nitrophenol	940 U	UG/KG	Pentachlorophenol
370 U	UG/KG	2,4-Dimethylphenol	370 U	UG/KG	Phenanthrene
370 U	UG/KG	bis(2-Chloroethoxy)Methane	370 U	UG/KG	Anthracene
370 U	UG/KG	2,4-Dichlorophenol	370 U	UG/KG	Carbazole
370 U	UG/KG	Naphthalene	370 U	UG/KG	Di-n-Butylphthalate
370 U	UG/KG	4-Chloroaniline	370 U	UG/KG	Fluoranthene
370 U	UG/KG	Hexachlorobutadiene	370 U	UG/KG	Pyrene
370 UJ	UG/KG	Caprolactam	370 U	UG/KG	Benzyl Butyl Phthalate
370 U	UG/KG	4-Chloro-3-Methylphenol	370 U	UG/KG	3,3'-Dichlorobenzidine
370 U	UG/KG	2-Methylnaphthalene	370 U	UG/KG	Benzo(a)Anthracene
370 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	370 U	UG/KG	Chrysene
370 U	UG/KG	2,4,6-Trichlorophenol	370 U	UG/KG	bis(2-Ethylhexyl) Phthalate
940 U	UG/KG	2,4,5-Trichlorophenol	370 U	UG/KG	Di-n-Octylphthalate
370 U	UG/KG	1,1-Biphenyl	370 U	UG/KG	Benzo(b)Fluoranthene
370 U	UG/KG	2-Chloronaphthalene	370 U	UG/KG	Benzo(k)Fluoranthene
940 U	UG/KG	2-Nitroaniline	370 U	UG/KG	Benzo-a-Pyrene
370 U	UG/KG	Dimethyl Phthalate	370 U	UG/KG	Indeno (1,2,3-cd) Pyrene
370 U	UG/KG	2,6-Dinitrotoluene	370 U	UG/KG	Dibenzo(a,h)Anthracene
370 U	UG/KG	Acenaphthylene	370 U	UG/KG	Benzo(ghi)Perylene
940 U	UG/KG	3-Nitroaniline	13	%	% Moisture
370 U	UG/KG	Acenaphthene			
940 U	UG/KG	2,4-Dinitrophenol			
940 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1764 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## MISCELLANEOUS COMPOUNDS

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 16:20

Id/Station: LLE05SB /

MD No: 1P93

Inorg Contractor: SENTIN

Ending:

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P93

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
110 NJ	UG/KG	TRIDECANOL, 2-ETHYL-2-METHYL-
220 NJ	UG/KG	2-HEPTACOSANONE
1700 J	UG/KG	9 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1777 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA7

D No: 1PA7

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 15:28

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
6 J	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 U	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 UJ	UG/L	2,4-Dinitrophenol			
25 U	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1779 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02GW /

MD No: 1PA9

Media: GROUNDWATER

D No: 1PA9

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 16:25

Ending:

RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde
10 U	UG/L	Phenol
10 U	UG/L	bis(2-Chloroethyl) Ether
10 U	UG/L	2-Chlorophenol
10 U	UG/L	2-Methylphenol
10 U	UG/L	bis(2-Chloroisopropyl) Ether
10 U	UG/L	Acetophenone
10 U	UG/L	(3-and/or 4-)Methylphenol
10 U	UG/L	n-Nitrosodi-n-Propylamine
10 U	UG/L	Hexachloroethane
10 U	UG/L	Nitrobenzene
10 U	UG/L	Isophorone
10 U	UG/L	2-Nitrophenol
10 U	UG/L	2,4-Dimethylphenol
10 U	UG/L	bis(2-Chloroethoxy)Methane
10 U	UG/L	2,4-Dichlorophenol
10 U	UG/L	Naphthalene
10 U	UG/L	4-Chloroaniline
10 U	UG/L	Hexachlorobutadiene
10 U	UG/L	Caprolactam
10 U	UG/L	4-Chloro-3-Methylphenol
10 U	UG/L	2-Methylnaphthalene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)
10 U	UG/L	2,4,6-Trichlorophenol
25 U	UG/L	2,4,5-Trichlorophenol
10 U	UG/L	1,1-Biphenyl
10 U	UG/L	2-Chloronaphthalene
25 U	UG/L	2-Nitroaniline
10 U	UG/L	Dimethyl Phthalate
10 U	UG/L	2,6-Dinitrotoluene
10 U	UG/L	Acenaphthylene
25 U	UG/L	3-Nitroaniline
10 U	UG/L	Acenaphthene
25 UJ	UG/L	2,4-Dinitrophenol
25 U	UG/L	4-Nitrophenol

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibenzofuran
10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	Diethyl Phthalate
10 U	UG/L	Fluorene
10 U	UG/L	4-Chlorophenyl Phenyl Ether
25 U	UG/L	4-Nitroaniline
25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Atrazine
25 U	UG/L	Pentachlorophenol
10 U	UG/L	Phenanthrene
10 U	UG/L	Anthracene
10 U	UG/L	Carbazole
10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	Fluoranthene
10 U	UG/L	Pyrene
10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Chrysene
10 U	UG/L	bis(2-Ethylhexyl) Phthalate
10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	Benzo(k)Fluoranthene
10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Benzo(ghi)Perylene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1778 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE03GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA8

D No: 1PA8

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 16:00

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
10 U	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 U	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 UJ	UG/L	2,4-Dinitrophenol			
25 U	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1778 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE03GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA8

D No: 1PA8

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 16:00

Ending:

RESULTS	UNITS	ANALYTE
4 J	UG/L	UNKNOWN COMPOUND

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1771 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE04GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA1

D No: 1PA1

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:20

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
10 U	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 U	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 UJ	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 UJ	UG/L	2,4-Dinitrophenol			
25 U	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1770 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04GWD /

MD No: 1PA0

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA0

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:20

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 UJ	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
10 U	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 UJ	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 UJ	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 U	UG/L	2,4-Dinitrophenol			
25 UJ	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1768 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SW /

MD No: 1P98

Media: SURFACE WATER

D No: 1P98

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde
10 U	UG/L	Phenol
10 U	UG/L	bis(2-Chloroethyl) Ether
10 U	UG/L	2-Chlorophenol
10 U	UG/L	2-Methylphenol
10 U	UG/L	bis(2-Chloroisopropyl) Ether
10 U	UG/L	Acetophenone
10 U	UG/L	(3-and/or 4-)Methylphenol
10 U	UG/L	n-Nitrosodi-n-Propylamine
10 U	UG/L	Hexachloroethane
10 U	UG/L	Nitrobenzene
10 U	UG/L	Isophorone
10 U	UG/L	2-Nitrophenol
10 U	UG/L	2,4-Dimethylphenol
10 U	UG/L	bis(2-Chloroethoxy)Methane
10 U	UG/L	2,4-Dichlorophenol
10 U	UG/L	Naphthalene
10 U	UG/L	4-Chloroaniline
10 UJ	UG/L	Hexachlorobutadiene
10 U	UG/L	Caprolactam
10 U	UG/L	4-Chloro-3-Methylphenol
10 U	UG/L	2-Methylnaphthalene
10 UJ	UG/L	Hexachlorocyclopentadiene (HCCP)
10 U	UG/L	2,4,6-Trichlorophenol
25 U	UG/L	2,4,5-Trichlorophenol
10 U	UG/L	1,1-Biphenyl
10 U	UG/L	2-Chloronaphthalene
25 U	UG/L	2-Nitroaniline
10 U	UG/L	Dimethyl Phthalate
10 U	UG/L	2,6-Dinitrotoluene
10 U	UG/L	Acenaphthylene
25 U	UG/L	3-Nitroaniline
10 U	UG/L	Acenaphthene
25 U	UG/L	2,4-Dinitrophenol
25 UJ	UG/L	4-Nitrophenol

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibenzofuran
10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	Diethyl Phthalate
10 U	UG/L	Fluorene
10 U	UG/L	4-Chlorophenyl Phenyl Ether
25 U	UG/L	4-Nitroaniline
25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	4-Bromophenyl Phenyl Ether
10 UJ	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Atrazine
25 U	UG/L	Pentachlorophenol
10 U	UG/L	Phenanthrene
10 U	UG/L	Anthracene
10 U	UG/L	Carbazole
10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	Fluoranthene
10 U	UG/L	Pyrene
10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Chrysene
10 U	UG/L	bis(2-Ethylhexyl) Phthalate
10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	Benzo(k)Fluoranthene
10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Benzo(ghi)Perylene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1769 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SWD /

MD No: 1P99

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1P99

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 UJ	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
10 U	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 UJ	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 UJ	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 U	UG/L	2,4-Dinitrophenol			
25 UJ	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1772 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE02SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA2

D No: 1PA2

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:05

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
10 U	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 U	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 UJ	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 UJ	UG/L	2,4-Dinitrophenol			
25 U	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to Interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1773 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SW /

MD No: 1PA3

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1PA3

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:30

Ending:

RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde
10 U	UG/L	Phenol
10 U	UG/L	bis(2-Chloroethyl) Ether
10 U	UG/L	2-Chlorophenol
10 U	UG/L	2-Methylphenol
10 U	UG/L	bis(2-Chloroisopropyl) Ether
10 U	UG/L	Acetophenone
10 U	UG/L	(3-and/or 4-)Methylphenol
10 U	UG/L	n-Nitrosodi-n-Propylamine
10 U	UG/L	Hexachloroethane
10 U	UG/L	Nitrobenzene
10 U	UG/L	Isophorone
10 U	UG/L	2-Nitrophenol
10 U	UG/L	2,4-Dimethylphenol
10 U	UG/L	bis(2-Chloroethoxy)Methane
10 U	UG/L	2,4-Dichlorophenol
10 U	UG/L	Naphthalene
10 U	UG/L	4-Chloroaniline
10 U	UG/L	Hexachlorobutadiene
10 U	UG/L	Caprolactam
10 U	UG/L	4-Chloro-3-Methylphenol
10 U	UG/L	2-Methylnaphthalene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)
10 U	UG/L	2,4,6-Trichlorophenol
25 U	UG/L	2,4,5-Trichlorophenol
10 U	UG/L	1,1-Biphenyl
10 U	UG/L	2-Chloronaphthalene
25 U	UG/L	2-Nitroaniline
10 U	UG/L	Dimethyl Phthalate
10 U	UG/L	2,6-Dinitrotoluene
10 U	UG/L	Acenaphthylene
25 U	UG/L	3-Nitroaniline
10 U	UG/L	Acenaphthene
25 UJ	UG/L	2,4-Dinitrophenol
25 U	UG/L	4-Nitrophenol

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibenzofuran
10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	Diethyl Phthalate
10 U	UG/L	Fluorene
10 U	UG/L	4-Chlorophenyl Phenyl Ether
25 U	UG/L	4-Nitroaniline
25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Atrazine
25 U	UG/L	Pentachlorophenol
10 U	UG/L	Phenanthrene
10 U	UG/L	Anthracene
10 U	UG/L	Carbazole
10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	Fluoranthene
10 U	UG/L	Pyrene
10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Chrysene
10 UJ	UG/L	bis(2-Ethylhexyl) Phthalate
10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	Benzo(k)Fluoranthene
10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Benzo(ghi)Perylene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1774 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SW /

MD No: 1PA4

Media: SURFACE WATER

D No: 1PA4

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:10

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
10 U	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 U	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 UJ	UG/L	2,4-Dinitrophenol			
25 U	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1774 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SW /

MD No: 1PA4

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1PA4

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:10

Ending:

RESULTS	UNITS	ANALYTE
2 J	UG/L	UNKNOWN COMPOUND

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1776 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SW /

MD No: 1PA6

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1PA6

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 14:00

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
10 U	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 U	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 UJ	UG/L	2,4-Dinitrophenol			
25 U	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1775 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largó, FL

Program: SF

Id/Station: LLE06SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA5

D No: 1PA5

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:45

Ending:

RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde
10 U	UG/L	Phenol
10 U	UG/L	bis(2-Chloroethyl) Ether
10 U	UG/L	2-Chlorophenol
10 U	UG/L	2-Methylphenol
10 U	UG/L	bis(2-Chloroisopropyl) Ether
10 U	UG/L	Acetophenone
10 U	UG/L	(3-and/or 4-)Methylphenol
10 U	UG/L	n-Nitrosodi-n-Propylamine
10 U	UG/L	Hexachloroethane
10 U	UG/L	Nitrobenzene
10 U	UG/L	Isophorone
10 U	UG/L	2-Nitrophenol
10 U	UG/L	2,4-Dimethylphenol
10 U	UG/L	bis(2-Chloroethoxy)Methane
10 U	UG/L	2,4-Dichlorophenol
10 U	UG/L	Naphthalene
10 U	UG/L	4-Chloroaniline
10 U	UG/L	Hexachlorobutadiene
10 U	UG/L	Caprolactam
10 U	UG/L	4-Chloro-3-Methylphenol
10 U	UG/L	2-Methylnaphthalene
10 U	UG/L	Hexachlorocyclopentadiene (HCCP)
10 U	UG/L	2,4,6-Trichlorophenol
25 U	UG/L	2,4,5-Trichlorophenol
10 U	UG/L	1,1-Biphenyl
10 U	UG/L	2-Chloronaphthalene
25 U	UG/L	2-Nitroaniline
10 U	UG/L	Dimethyl Phthalate
10 U	UG/L	2,6-Dinitrotoluene
10 U	UG/L	Acenaphthylene
25 U	UG/L	3-Nitroaniline
10 U	UG/L	Acenaphthene
25 UJ	UG/L	2,4-Dinitrophenol
25 U	UG/L	4-Nitrophenol

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibenzofuran
10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	Diethyl Phthalate
10 U	UG/L	Fluorene
10 U	UG/L	4-Chlorophenyl Phenyl Ether
25 U	UG/L	4-Nitroaniline
25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Atrazine
25 U	UG/L	Pentachlorophenol
10 U	UG/L	Phenanthrene
10 U	UG/L	Anthracene
10 U	UG/L	Carbazole
10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	Fluoranthene
10 U	UG/L	Pyrene
10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	Benzo(a)Anthracene
10 U	UG/L	Chrysene
10 U	UG/L	bis(2-Ethylhexyl) Phthalate
10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	Benzo(k)Fluoranthene
10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Benzo(ghi)Perylene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1767 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE07SW /

MD No: 1P97

Media: SURFACE WATER

D No: 1P97

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:05

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Benzaldehyde	10 U	UG/L	Dibenzofuran
10 U	UG/L	Phenol	10 U	UG/L	2,4-Dinitrotoluene
10 U	UG/L	bis(2-Chloroethyl) Ether	10 U	UG/L	Diethyl Phthalate
10 U	UG/L	2-Chlorophenol	10 U	UG/L	Fluorene
10 U	UG/L	2-Methylphenol	10 U	UG/L	4-Chlorophenyl Phenyl Ether
10 U	UG/L	bis(2-Chloroisopropyl) Ether	25 U	UG/L	4-Nitroaniline
10 U	UG/L	Acetophenone	25 U	UG/L	2-Methyl-4,6-Dinitrophenol
10 U	UG/L	(3-and/or 4-)Methylphenol	10 U	UG/L	n-Nitrosodiphenylamine/Diphenylamine
10 U	UG/L	n-Nitrosodi-n-Propylamine	NA	UG/L	1,2,4,5-Tetrachlorobenzene
10 U	UG/L	Hexachloroethane	10 U	UG/L	4-Bromophenyl Phenyl Ether
10 U	UG/L	Nitrobenzene	10 UJ	UG/L	Hexachlorobenzene (HCB)
10 U	UG/L	Isophorone	10 U	UG/L	Atrazine
10 U	UG/L	2-Nitrophenol	25 U	UG/L	Pentachlorophenol
10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	Phenanthrene
10 U	UG/L	bis(2-Chloroethoxy)Methane	10 U	UG/L	Anthracene
10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	Carbazole
10 U	UG/L	Naphthalene	10 U	UG/L	Di-n-Butylphthalate
10 U	UG/L	4-Chloroaniline	10 U	UG/L	Fluoranthene
10 UJ	UG/L	Hexachlorobutadiene	10 U	UG/L	Pyrene
10 U	UG/L	Caprolactam	10 U	UG/L	Benzyl Butyl Phthalate
10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	3,3'-Dichlorobenzidine
10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	Benzo(a)Anthracene
10 UJ	UG/L	Hexachlorocyclopentadiene (HCCP)	10 U	UG/L	Chrysene
10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	bis(2-Ethylhexyl) Phthalate
25 U	UG/L	2,4,5-Trichlorophenol	10 U	UG/L	Di-n-Octylphthalate
10 U	UG/L	1,1-Biphenyl	10 U	UG/L	Benzo(b)Fluoranthene
10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	Benzo(k)Fluoranthene
25 U	UG/L	2-Nitroaniline	10 U	UG/L	Benzo-a-Pyrene
10 U	UG/L	Dimethyl Phthalate	10 U	UG/L	Indeno (1,2,3-cd) Pyrene
10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	Dibenzo(a,h)Anthracene
10 U	UG/L	Acenaphthylene	10 U	UG/L	Benzo(ghi)Perylene
25 U	UG/L	3-Nitroaniline			
10 U	UG/L	Acenaphthene			
25 U	UG/L	2,4-Dinitrophenol			
25 UJ	UG/L	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1767 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1P97

D No: 1P97

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:05

Ending:

RESULTS	UNITS	ANALYTE
5 NJ	UG/L	1,2-BENZENEDICARBOXYLIC ACID, BIS(2-METH

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1750 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P78

D No: 1P78

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
13000 U	UG/KG	Benzaldehyde	1600 J	UG/KG	Dibenzofuran
13000 U	UG/KG	Phenol	13000 U	UG/KG	2,4-Dinitrotoluene
13000 U	UG/KG	bis(2-Chloroethyl) Ether	13000 U	UG/KG	Diethyl Phthalate
13000 U	UG/KG	2-Chlorophenol	2800 J	UG/KG	Fluorene
13000 U	UG/KG	2-Methylphenol	13000 U	UG/KG	4-Chlorophenyl Phenyl Ether
13000 U	UG/KG	bis(2-Chloroisopropyl) Ether	32000 U	UG/KG	4-Nitroaniline
13000 U	UG/KG	Acetophenone	32000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
13000 U	UG/KG	(3-and/or 4-)Methylphenol	13000 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
13000 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
13000 U	UG/KG	Hexachloroethane	13000 U	UG/KG	4-Bromophenyl Phenyl Ether
13000 U	UG/KG	Nitrobenzene	13000 U	UG/KG	Hexachlorobenzene (HCB)
13000 U	UG/KG	Isophorone	13000 U	UG/KG	Atrazine
13000 U	UG/KG	2-Nitrophenol	32000 U	UG/KG	Pentachlorophenol
13000 U	UG/KG	2,4-Dimethylphenol	37000	UG/KG	Phenanthrene
13000 U	UG/KG	bis(2-Chloroethoxy)Methane	3000 J	UG/KG	Anthracene
13000 U	UG/KG	2,4-Dichlorophenol	5600 J	UG/KG	Carbazole
13000 U	UG/KG	Naphthalene	13000 U	UG/KG	Di-n-Butylphthalate
13000 U	UG/KG	4-Chloroaniline	45000	UG/KG	Fluoranthene
13000 U	UG/KG	Hexachlorobutadiene	36000	UG/KG	Pyrene
13000 U	UG/KG	Caprolactam	13000 U	UG/KG	Benzyl Butyl Phthalate
13000 U	UG/KG	4-Chloro-3-Methylphenol	13000 U	UG/KG	3,3'-Dichlorobenzidine
13000 U	UG/KG	2-Methylnaphthalene	15000	UG/KG	Benzo(a)Anthracene
13000 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	19000	UG/KG	Chrysene
13000 U	UG/KG	2,4,6-Trichlorophenol	13000 U	UG/KG	bis(2-Ethylhexyl) Phthalate
32000 U	UG/KG	2,4,5-Trichlorophenol	13000 U	UG/KG	Di-n-Octylphthalate
13000 U	UG/KG	1,1-Biphenyl	14000	UG/KG	Benzo(b)Fluoranthene
13000 U	UG/KG	2-Chloronaphthalene	14000	UG/KG	Benzo(k)Fluoranthene
32000 U	UG/KG	2-Nitroaniline	13000	UG/KG	Benzo-a-Pyrene
13000 U	UG/KG	Dimethyl Phthalate	9300 J	UG/KG	Indeno (1,2,3-cd) Pyrene
13000 U	UG/KG	2,6-Dinitrotoluene	3400 J	UG/KG	Dibenzo(a,h)Anthracene
13000 U	UG/KG	Acenaphthylene	9600 J	UG/KG	Benzo(ghi)Perylene
32000 U	UG/KG	3-Nitroaniline	23	%	% Moisture
3000 J	UG/KG	Acenaphthene			
32000 U	UG/KG	2,4-Dinitrophenol			
32000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1750 FY 2003 Project: 03-0143

MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Program: SF

Id/Station: LLE01SD /

Media: SEDIMENT

Largo, FL

Case No: 31215

MD No: 1P78

D No: 1P78

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
2700 NJ	UG/KG	9,10-ANTHRACENEDIONE
3000 NJ	UG/KG	7H-BENZ[DE]ANTHRACEN-7-ONE
11000 NJ	UG/KG	PERYLENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1749 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SDD /

Media: SEDIMENT

Case No: 31215

MD No: 1P77

D No: 1P77

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
4500 U	UG/KG	Benzaldehyde	670 J	UG/KG	Dibenzofuran
4500 U	UG/KG	Phenol	4500 U	UG/KG	2,4-Dinitrotoluene
4500 U	UG/KG	bis(2-Chloroethyl) Ether	4500 U	UG/KG	Diethyl Phthalate
4500 U	UG/KG	2-Chlorophenol	960 J	UG/KG	Fluorene
4500 U	UG/KG	2-Methylphenol	4500 U	UG/KG	4-Chlorophenyl Phenyl Ether
4500 U	UG/KG	bis(2-Chloroisopropyl) Ether	11000 U	UG/KG	4-Nitroaniline
4500 U	UG/KG	Acetophenone	11000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
4500 U	UG/KG	(3-and/or 4-)Methylphenol	4500 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
4500 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
4500 U	UG/KG	Hexachloroethane	4500 U	UG/KG	4-Bromophenyl Phenyl Ether
4500 U	UG/KG	Nitrobenzene	4500 U	UG/KG	Hexachlorobenzene (HCB)
4500 U	UG/KG	Isophorone	4500 U	UG/KG	Atrazine
4500 U	UG/KG	2-Nitrophenol	11000 U	UG/KG	Pentachlorophenol
4500 U	UG/KG	2,4-Dimethylphenol	15000	UG/KG	Phenanthrene
4500 U	UG/KG	bis(2-Chloroethoxy)Methane	1000 J	UG/KG	Anthracene
4500 U	UG/KG	2,4-Dichlorophenol	2000 J	UG/KG	Carbazole
4500 U	UG/KG	Naphthalene	4500 U	UG/KG	Di-n-Butylphthalate
4500 U	UG/KG	4-Chloroaniline	18000	UG/KG	Fluoranthene
4500 U	UG/KG	Hexachlorobutadiene	15000	UG/KG	Pyrene
4500 U	UG/KG	Caprolactam	4500 U	UG/KG	Benzyl Butyl Phthalate
4500 U	UG/KG	4-Chloro-3-Methylphenol	4500 U	UG/KG	3,3'-Dichlorobenzidine
4500 U	UG/KG	2-Methylnaphthalene	6000	UG/KG	Benzo(a)Anthracene
4500 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	8700	UG/KG	Chrysene
4500 U	UG/KG	2,4,6-Trichlorophenol	4500 U	UG/KG	bis(2-Ethylhexyl) Phthalate
11000 U	UG/KG	2,4,5-Trichlorophenol	4500 U	UG/KG	Di-n-Octylphthalate
4500 U	UG/KG	1,1-Biphenyl	5400	UG/KG	Benzo(b)Fluoranthene
4500 U	UG/KG	2-Chloronaphthalene	7300	UG/KG	Benzo(k)Fluoranthene
11000 U	UG/KG	2-Nitroaniline	5600	UG/KG	Benzo-a-Pyrene
4500 U	UG/KG	Dimethyl Phthalate	4000 J	UG/KG	Indeno (1,2,3-cd) Pyrene
4500 U	UG/KG	2,6-Dinitrotoluene	1400 J	UG/KG	Dibenzo(a,h)Anthracene
4500 U	UG/KG	Acenaphthylene	4100 J	UG/KG	Benzo(ghi)Perylene
11000 U	UG/KG	3-Nitroaniline	27	%	% Moisture
970 J	UG/KG	Acenaphthene			
11000 U	UG/KG	2,4-Dinitrophenol			
11000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1749 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SDD /

MD No: 1P77

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P77

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
1000 J	UG/KG	UNKNOWN PAH
960 NJ	UG/KG	9,10-ANTHRACENEDIONE
1200 NJ	UG/KG	7H-BENZ[DE]ANTHRACEN-7-ONE
4700 NJ	UG/KG	BENZO[J]FLUORANTHENE
1400 NJ	UG/KG	BENZO[B]TRIPHENYLENE
920 NJ	UG/KG	DIBENZO[DEF,MNO]CHRYSENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1743 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE02SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P71

D No: 1P71

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
4100 U	UG/KG	Benzaldehyde	4100 U	UG/KG	Dibenzofuran
4100 U	UG/KG	Phenol	4100 U	UG/KG	2,4-Dinitrotoluene
4100 U	UG/KG	bis(2-Chloroethyl) Ether	4100 U	UG/KG	Diethyl Phthalate
4100 U	UG/KG	2-Chlorophenol	4100 U	UG/KG	Fluorene
4100 U	UG/KG	2-Methylphenol	4100 U	UG/KG	4-Chlorophenyl Phenyl Ether
4100 U	UG/KG	bis(2-Chloroisopropyl) Ether	10000 U	UG/KG	4-Nitroaniline
4100 U	UG/KG	Acetophenone	10000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
4100 U	UG/KG	(3-and/or 4-)Methylphenol	4100 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
4100 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
4100 U	UG/KG	Hexachloroethane	4100 U	UG/KG	4-Bromophenyl Phenyl Ether
4100 U	UG/KG	Nitrobenzene	4100 U	UG/KG	Hexachlorobenzene (HCB)
4100 U	UG/KG	Isophorone	4100 U	UG/KG	Atrazine
4100 U	UG/KG	2-Nitrophenol	10000 U	UG/KG	Pentachlorophenol
4100 U	UG/KG	2,4-Dimethylphenol	1700 J	UG/KG	Phenanthrene
4100 U	UG/KG	bis(2-Chloroethoxy)Methane	4100 U	UG/KG	Anthracene
4100 U	UG/KG	2,4-Dichlorophenol	4100 U	UG/KG	Carbazole
4100 U	UG/KG	Naphthalene	4100 U	UG/KG	Di-n-Butylphthalate
4100 U	UG/KG	4-Chloroaniline	4900	UG/KG	Fluoranthene
4100 U	UG/KG	Hexachlorobutadiene	4200	UG/KG	Pyrene
4100 U	UG/KG	Caprolactam	4100 U	UG/KG	Benzyl Butyl Phthalate
4100 U	UG/KG	4-Chloro-3-Methylphenol	4100 U	UG/KG	3,3'-Dichlorobenzidine
4100 U	UG/KG	2-Methylnaphthalene	1900 J	UG/KG	Benzo(a)Anthracene
4100 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	3100 J	UG/KG	Chrysene
4100 U	UG/KG	2,4,6-Trichlorophenol	4100 U	UG/KG	bis(2-Ethylhexyl) Phthalate
10000 U	UG/KG	2,4,5-Trichlorophenol	4100 U	UG/KG	Di-n-Octylphthalate
4100 U	UG/KG	1,1-Biphenyl	2800 J	UG/KG	Benzo(b)Fluoranthene
4100 U	UG/KG	2-Chloronaphthalene	2500 J	UG/KG	Benzo(k)Fluoranthene
10000 U	UG/KG	2-Nitroaniline	2100 J	UG/KG	Benzo-a-Pyrene
4100 U	UG/KG	Dimethyl Phthalate	1700 J	UG/KG	Indeno (1,2,3-cd) Pyrene
4100 U	UG/KG	2,6-Dinitrotoluene	930 J	UG/KG	Dibenzo(a,h)Anthracene
4100 U	UG/KG	Acenaphthylene	1800 J	UG/KG	Benzo(ghi)Perylene
10000 U	UG/KG	3-Nitroaniline	20	%	% Moisture
4100 U	UG/KG	Acenaphthene			
10000 U	UG/KG	2,4-Dinitrophenol			
10000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1743 FY 2003 Project: 03-0143

MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Program: SF

Id/Station: LLE02SD /

Media: SEDIMENT

Largo, FL

Case No: 31215

MD No: 1P71

D No: 1P71

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:15

Ending:

RESULTS	UNITS	ANALYTE
1300 NJ	UG/KG	BICYCLO [2.2.1] HEPTAN-2-ONE, 1,7,7-TRIMET
2700 NJ	UG/KG	9,10-ANTHRACENEDIONE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1744 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SD /

MD No: 1P72

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P72

Org Contractor: CEIMC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:50

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2600 U	UG/KG	Benzaldehyde
2600 U	UG/KG	Phenol
2600 U	UG/KG	bis(2-Chloroethyl) Ether
2600 U	UG/KG	2-Chlorophenol
2600 U	UG/KG	2-Methylphenol
2600 U	UG/KG	bis(2-Chloroisopropyl) Ether
2600 U	UG/KG	Acetophenone
2600 U	UG/KG	(3-and/or 4-)Methylphenol
2600 U	UG/KG	n-Nitrosodi-n-Propylamine
2600 U	UG/KG	Hexachloroethane
2600 U	UG/KG	Nitrobenzene
2600 U	UG/KG	Isophorone
2600 U	UG/KG	2-Nitrophenol
2600 U	UG/KG	2,4-Dimethylphenol
2600 U	UG/KG	bis(2-Chloroethoxy)Methane
2600 U	UG/KG	2,4-Dichlorophenol
2600 U	UG/KG	Naphthalene
2600 U	UG/KG	4-Chloroaniline
2600 U	UG/KG	Hexachlorobutadiene
2600 U	UG/KG	Caprolactam
2600 U	UG/KG	4-Chloro-3-Methylphenol
2600 U	UG/KG	2-Methylnaphthalene
2600 U	UG/KG	Hexachlorocyclopentadiene (HCCP)
2600 U	UG/KG	2,4,6-Trichlorophenol
6600 U	UG/KG	2,4,5-Trichlorophenol
2600 U	UG/KG	1,1-Biphenyl
2600 U	UG/KG	2-Chloronaphthalene
6600 U	UG/KG	2-Nitroaniline
2600 U	UG/KG	Dimethyl Phthalate
2600 U	UG/KG	2,6-Dinitrotoluene
2600 U	UG/KG	Acenaphthylene
6600 U	UG/KG	3-Nitroaniline
2600 U	UG/KG	Acenaphthene
6600 U	UG/KG	2,4-Dinitrophenol
6600 U	UG/KG	4-Nitrophenol

RESULTS	UNITS	ANALYTE
2600 U	UG/KG	Dibenzofuran
2600 U	UG/KG	2,4-Dinitrotoluene
2600 U	UG/KG	Diethyl Phthalate
2600 U	UG/KG	Fluorene
2600 U	UG/KG	4-Chlorophenyl Phenyl Ether
6600 U	UG/KG	4-Nitroaniline
6600 U	UG/KG	2-Methyl-4,6-Dinitrophenol
2600 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
NA	UG/KG	1,2,4,5-Tetrachlorobenzene
2600 U	UG/KG	4-Bromophenyl Phenyl Ether
2600 U	UG/KG	Hexachlorobenzene (HCB)
2600 U	UG/KG	Atrazine
6600 U	UG/KG	Pentachlorophenol
2600 U	UG/KG	Phenanthrene
2600 U	UG/KG	Anthracene
2600 U	UG/KG	Carbazole
2600 U	UG/KG	Di-n-Butylphthalate
840 J	UG/KG	Fluoranthene
730 J	UG/KG	Pyrene
2600 U	UG/KG	Benzyl Butyl Phthalate
2600 U	UG/KG	3,3'-Dichlorobenzidine
310 J	UG/KG	Benzo(a)Anthracene
550 J	UG/KG	Chrysene
2600 U	UG/KG	bis(2-Ethylhexyl) Phthalate
2600 U	UG/KG	Di-n-Octylphthalate
590 J	UG/KG	Benzo(b)Fluoranthene
540 J	UG/KG	Benzo(k)Fluoranthene
410 J	UG/KG	Benzo-a-Pyrene
360 J	UG/KG	Indeno (1,2,3-cd) Pyrene
2600 U	UG/KG	Dibenzo(a,h)Anthracene
400 J	UG/KG	Benzo(ghi)Perylene
37	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1744 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE03SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P72

D No: 1P72

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:50

Ending:

RESULTS	UNITS	ANALYTE
550 J	UG/KG	UNKNOWN COMPOUND
1500 NJ	UG/KG	[3,4:9,10] DIBENZPYRENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1755 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SD /

MD No: 1P84

Media: SEDIMENT

D No: 1P84

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 12:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
5300 U	UG/KG	Benzaldehyde	5300 U	UG/KG	Dibenzofuran
5300 U	UG/KG	Phenol	5300 U	UG/KG	2,4-Dinitrotoluene
5300 U	UG/KG	bis(2-Chloroethyl) Ether	5300 U	UG/KG	Diethyl Phthalate
5300 U	UG/KG	2-Chlorophenol	5300 U	UG/KG	Fluorene
5300 U	UG/KG	2-Methylphenol	5300 U	UG/KG	4-Chlorophenyl Phenyl Ether
5300 U	UG/KG	bis(2-Chloroisopropyl) Ether	13000 U	UG/KG	4-Nitroaniline
5300 U	UG/KG	Acetophenone	13000 U	UG/KG	2-Methyl-4,6-Dinitrophenol
5300 U	UG/KG	(3-and/or 4-)Methylphenol	5300 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
5300 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
5300 U	UG/KG	Hexachloroethane	5300 U	UG/KG	4-Bromophenyl Phenyl Ether
5300 U	UG/KG	Nitrobenzene	5300 U	UG/KG	Hexachlorobenzene (HCB)
5300 U	UG/KG	Isophorone	5300 U	UG/KG	Atrazine
5300 U	UG/KG	2-Nitrophenol	13000 U	UG/KG	Pentachlorophenol
5300 U	UG/KG	2,4-Dimethylphenol	5300 U	UG/KG	Phenanthrene
5300 U	UG/KG	bis(2-Chloroethoxy)Methane	5300 U	UG/KG	Anthracene
5300 U	UG/KG	2,4-Dichlorophenol	5300 U	UG/KG	Carbazole
5300 U	UG/KG	Naphthalene	5300 U	UG/KG	Di-n-Butylphthalate
5300 U	UG/KG	4-Chloroaniline	1500 J	UG/KG	Fluoranthene
5300 U	UG/KG	Hexachlorobutadiene	1300 J	UG/KG	Pyrene
5300 U	UG/KG	Caprolactam	5300 U	UG/KG	Benzyl Butyl Phthalate
5300 U	UG/KG	4-Chloro-3-Methylphenol	5300 U	UG/KG	3,3'-Dichlorobenzidine
5300 U	UG/KG	2-Methylnaphthalene	560 J	UG/KG	Benzo(a)Anthracene
5300 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	1100 J	UG/KG	Chrysene
5300 U	UG/KG	2,4,6-Trichlorophenol	5300 U	UG/KG	bis(2-Ethylhexyl) Phthalate
13000 U	UG/KG	2,4,5-Trichlorophenol	5300 U	UG/KG	Di-n-Octylphthalate
5300 U	UG/KG	1,1-Biphenyl	1100 J	UG/KG	Benzo(b)Fluoranthene
5300 U	UG/KG	2-Chloronaphthalene	780 J	UG/KG	Benzo(k)Fluoranthene
13000 U	UG/KG	2-Nitroaniline	760 J	UG/KG	Benzo-a-Pyrene
5300 U	UG/KG	Dimethyl Phthalate	640 J	UG/KG	Indeno (1,2,3-cd) Pyrene
5300 U	UG/KG	2,6-Dinitrotoluene	5300 U	UG/KG	Dibenzo(a,h)Anthracene
5300 U	UG/KG	Acenaphthylene	690 J	UG/KG	Benzo(ghi)Perylene
13000 U	UG/KG	3-Nitroaniline	38	%	% Moisture
5300 U	UG/KG	Acenaphthene			
13000 U	UG/KG	2,4-Dinitrophenol			
13000 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1755 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE04SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P84

D No: 1P84

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 12:45

Ending:

RESULTS	UNITS	ANALYTE
4500 J	UG/KG	3 UNKNOWN COMPOUNDS
2700 J	UG/KG	UNKNOWN STEROID

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to Interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1768 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SW /

MD No: 1P98

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1P98

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
330 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
4.9 U	UG/L	Arsenic
17	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
51000	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
5.0 U	UG/L	Copper
150	UG/L	Iron
3.0 U	UG/L	Lead
5000	UG/L	Magnesium
20 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 R	UG/L	Nickel
4000 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
25000	UG/L	Sodium
6.1 U	UG/L	Thallium
3.6	UG/L	Vanadium
3.7	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED



## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1766 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/20/2002 10:45

Id/Station: LLE50GW /

MD No: 1P70

Inorg Contractor: SENTIN

Ending:

Media: GROUNDWATER

RESULTS	UNITS	ANALYTE
250	UG/L	Aluminum
4.0 U	UG/L	Antimony
4.5	UG/L	Arsenic
1.0 U	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
100 U	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
1.1	UG/L	Copper
35 U	UG/L	Iron
3.0 U	UG/L	Lead
74 U	UG/L	Magnesium
0.40 U	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
240	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
740	UG/L	Sodium
6.1 U	UG/L	Thallium
1.1 U	UG/L	Vanadium
1.6 U	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1770 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE04GWD /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA0

D No: 1PA0

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:20

Ending:

RESULTS	UNITS	ANALYTE
480 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
3.7 U	UG/L	Arsenic
20	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
33000	UG/L	Calcium
2.3	UG/L	Chromium
1.2 U	UG/L	Cobalt
2.6 U	UG/L	Copper
750	UG/L	Iron
3.0 U	UG/L	Lead
14000	UG/L	Magnesium
17 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
2700 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
36000	UG/L	Sodium
6.1 U	UG/L	Thallium
4.4	UG/L	Vanadium
9.0	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

Obtained from:

Quality control procedure:

Sampled and analyzed:

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1771 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/20/2002 11:20

Id/Station: LLE04GW /

MD No: 1PA1

Inorg Contractor: SENTIN

Ending:

Media: GROUNDWATER

D No: 1PA1

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
550 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
4.0 U	UG/L	Arsenic
19	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
33000	UG/L	Calcium
2.6	UG/L	Chromium
1.2 U	UG/L	Cobalt
3.3 U	UG/L	Copper
760	UG/L	Iron
3.0 U	UG/L	Lead
14000	UG/L	Magnesium
17 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
2700 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
36000	UG/L	Sodium
8.1 R	UG/L	Thallium
4.8	UG/L	Vanadium
9.1	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1778 FY 2003 Project: 03-0143

Metals Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE03GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA8

D No: 1PA8

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 16:00

Ending:

RESULTS	UNITS	ANALYTE
3200 J	UG/L	Aluminum
4.0 U	UG/L	Antimony
7.7 U	UG/L	Arsenic
27	UG/L	Barium
0.20 U	UG/L	Beryllium
0.99 UJ	UG/L	Cadmium
16000	UG/L	Calcium
37	UG/L	Chromium
1.5 R	UG/L	Cobalt
5.8 U	UG/L	Copper
3600	UG/L	Iron
3.0 U	UG/L	Lead
6100	UG/L	Magnesium
39 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
6.6	UG/L	Nickel
3900 J	UG/L	Potassium
3.5	UG/L	Selenium
0.90 U	UG/L	Silver
200000	UG/L	Sodium
6.1 U	UG/L	Thallium
56	UG/L	Vanadium
13	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1779 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/20/2002 16:25

Id/Station: LLE02GW /

MD No: 1PA9

Inorg Contractor: SENTIN

Ending:

Media: GROUNDWATER

D No: 1PA9

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
1800 J	UG/L	Aluminum
4.0 U	UG/L	Antimony
9.8 U	UG/L	Arsenic
34	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
41000	UG/L	Calcium
9.1	UG/L	Chromium
1.9	UG/L	Cobalt
4.6 U	UG/L	Copper
4200	UG/L	Iron
5.0 J	UG/L	Lead
10000	UG/L	Magnesium
43 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
6.1 R	UG/L	Nickel
2600 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
15000	UG/L	Sodium
6.1 U	UG/L	Thallium
11	UG/L	Vanadium
33	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

When an analyte is detected, the reported value is an estimate. If an analyte is not detected at or above reporting limit, Reporting limit is an estimate.  
When an analyte is detected, the reported value is an estimate. If an analyte is not detected at or above reporting limit, Reporting limit is an estimate.  
When an analyte is detected, the reported value is an estimate. If an analyte is not detected at or above reporting limit, Reporting limit is an estimate.  
When an analyte is detected, the reported value is an estimate. If an analyte is not detected at or above reporting limit, Reporting limit is an estimate.

Quality control problem

Detected and considered

Sample 1777 FY 2003 Project: 03-0143

**Metals Scan**

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA7

D No: 1PA7

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 15:28

Ending:

RESULTS	UNITS	ANALYTE
760 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
5.1 U	UG/L	Arsenic
14	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
37000	UG/L	Calcium
4.1	UG/L	Chromium
1.2 U	UG/L	Cobalt
3.3 U	UG/L	Copper
1400	UG/L	Iron
3.0 U	UG/L	Lead
20000	UG/L	Magnesium
31 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
1000 UJ	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
20000	UG/L	Sodium
6.1 U	UG/L	Thallium
2.6	UG/L	Vanadium
9.0	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1764 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 16:20

Id/Station: LLE05SB /

MD No: 1P93

Inorg Contractor: SENTIN

Ending:

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P93

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1800 J	MG/KG	Aluminum
2.3 U	MG/KG	Antimony
2.4	MG/KG	Arsenic
8.7	MG/KG	Barium
0.21 U	MG/KG	Beryllium
0.16 U	MG/KG	Cadmium
14000	MG/KG	Calcium
3.0	MG/KG	Chromium
1.6 U	MG/KG	Cobalt
1.3 UJ	MG/KG	Copper
1300	MG/KG	Iron
8.4 J	MG/KG	Lead
350	MG/KG	Magnesium
14	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.3	MG/KG	Nickel
320	MG/KG	Potassium
0.99 U	MG/KG	Selenium
0.30 U	MG/KG	Silver
350	MG/KG	Sodium
0.96 U	MG/KG	Thallium
2.7	MG/KG	Vanadium
3.2	MG/KG	Zinc
NA	MG/KG	Cyanide
13	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

NA-Not Analyzed. J-First Analyte analyzed due to detection limits. UJ-Analyte analyzed in duplicate. Reported value is "average" of replicates.

R-Presence or absence of analyte determined from data due to severe quality control problems. Data are rejected and considered unusable.

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1763 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SB /

MD No: 1P92

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P92

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2200 J	MG/KG	Aluminum
2.4 U	MG/KG	Antimony
2.8	MG/KG	Arsenic
37	MG/KG	Barium
0.33	MG/KG	Beryllium
0.17 U	MG/KG	Cadmium
5400	MG/KG	Calcium
4.7	MG/KG	Chromium
1.7 U	MG/KG	Cobalt
4.7 J	MG/KG	Copper
2300	MG/KG	Iron
3.9 J	MG/KG	Lead
900	MG/KG	Magnesium
30	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
2.5	MG/KG	Nickel
220	MG/KG	Potassium
1.0 U	MG/KG	Selenium
0.32 U	MG/KG	Silver
440	MG/KG	Sodium
1.0 U	MG/KG	Thallium
3.4	MG/KG	Vanadium
2.4	MG/KG	Zinc
NA	MG/KG	Cyanide
18	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

NA-Not Analyzed; N/A-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from this data due to quality control problems. Data is rejected and considered unreliable.



## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1759 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 13:52

Id/Station: LLE03SB /

MD No: 1P88

Inorg Contractor: SENTIN

Ending:

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P88

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2900 J	MG/KG	Aluminum
2.3 U	MG/KG	Antimony
1.1 U	MG/KG	Arsenic
7.0	MG/KG	Barium
0.21 U	MG/KG	Beryllium
0.16 U	MG/KG	Cadmium
12000	MG/KG	Calcium
5.7	MG/KG	Chromium
1.6 U	MG/KG	Cobalt
1.3 UJ	MG/KG	Copper
520	MG/KG	Iron
3.1 J	MG/KG	Lead
210	MG/KG	Magnesium
7.4	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.2	MG/KG	Nickel
120	MG/KG	Potassium
0.98 U	MG/KG	Selenium
0.30 U	MG/KG	Silver
300	MG/KG	Sodium
0.96 U	MG/KG	Thallium
2.7	MG/KG	Vanadium
6.8	MG/KG	Zinc
NA	MG/KG	Cyanide
12	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

1. Analyte analyzed in triplicate. Reported value is "average" of replicates.  
2. Analyte analyzed in triplicate. Reported value is "average" of replicates.  
3. Analyte analyzed in triplicate. Reported value is "average" of replicates.

1. Analyte analyzed in triplicate. Reported value is "average" of replicates.

2. Analyte analyzed in triplicate. Reported value is "average" of replicates.

3. Analyte analyzed in triplicate. Reported value is "average" of replicates.

Sample 1751 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02SB /

MD No: 1P79

Inorg Contractor: SENTIN

Media: SUBSURFACE SOIL (&gt; 12")

D No: 1P79

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1400	MG/KG	Aluminum
2.2 U	MG/KG	Antimony
1.1 U	MG/KG	Arsenic
4.8	MG/KG	Barium
0.20 U	MG/KG	Beryllium
0.16	MG/KG	Cadmium
21000	MG/KG	Calcium
3.5	MG/KG	Chromium
1.5 U	MG/KG	Cobalt
3.4 J	MG/KG	Copper
1100	MG/KG	Iron
17	MG/KG	Lead
200	MG/KG	Magnesium
8.6	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.2 U	MG/KG	Nickel
73	MG/KG	Potassium
0.96 UJ	MG/KG	Selenium
0.29 U	MG/KG	Silver
320	MG/KG	Sodium
0.94 U	MG/KG	Thallium
2.8	MG/KG	Vanadium
40	MG/KG	Zinc
NA	MG/KG	Cyanide
10	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

Sample analyzed at or above  
reference analyteSample identification  
has reported as testSample analyzed, reported as  
NJ-PresumptiveSample analyzed, reported as  
NJ-PresumptiveSample analyzed, reported as  
NJ-PresumptiveSample analyzed, reported as  
NJ-Presumptive

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1748 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Beginning: 11/19/2002 09:40

Id/Station: LLE01SBD /

Case No: 31215

Ending:

Media: SUBSURFACE SOIL (&gt; 12")

MD No: 1P76

Inorg Contractor: SENTIN

D No: 1P76

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
640	MG/KG	Aluminum
2.2 U	MG/KG	Antimony
1.1 U	MG/KG	Arsenic
1.9	MG/KG	Barium
0.20 U	MG/KG	Beryllium
0.16 U	MG/KG	Cadmium
2200	MG/KG	Calcium
1.5	MG/KG	Chromium
1.5 U	MG/KG	Cobalt
1.3 UJ	MG/KG	Copper
320	MG/KG	Iron
1.3	MG/KG	Lead
34	MG/KG	Magnesium
1.4	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.2 U	MG/KG	Nickel
52	MG/KG	Potassium
0.96 UJ	MG/KG	Selenium
0.29 U	MG/KG	Silver
260	MG/KG	Sodium
0.94 U	MG/KG	Thallium
1.3 U	MG/KG	Vanadium
1.5	MG/KG	Zinc
NA	MG/KG	Cyanide
10	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

Method: EPA 8210 or show procedure for detection of analyte is as follows: recorded value is an estimate. If Analyte not detected, show "ND".

Lab: [Redacted] Report: [Redacted]

Sample 1745 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

Metals Scan

Requestor:

Facility: Largo Landfill

Project Leader: FSLOAN

Program: SF

Beginning: 11/19/2002 10:41

Id/Station: LLE01SB /

Ending:

Media: SUBSURFACE SOIL (> 12")

Case No: 31215

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
690	MG/KG	Aluminum
2.2 U	MG/KG	Antimony
1.1 U	MG/KG	Arsenic
2.0	MG/KG	Barium
0.20 U	MG/KG	Beryllium
0.16 U	MG/KG	Cadmium
1800	MG/KG	Calcium
1.7	MG/KG	Chromium
1.5 U	MG/KG	Cobalt
1.3 UJ	MG/KG	Copper
310	MG/KG	Iron
1.2 J	MG/KG	Lead
36	MG/KG	Magnesium
0.88	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.2 U	MG/KG	Nickel
47	MG/KG	Potassium
0.95 UJ	MG/KG	Selenium
0.29 U	MG/KG	Silver
240	MG/KG	Sodium
0.93 U	MG/KG	Thallium
1.6	MG/KG	Vanadium
1.6	MG/KG	Zinc
NA	MG/KG	Cyanide
10	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1761 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 16:00

Id/Station: LLE08SS /

MD No: 1P90

Inorg Contractor: SENTIN

Ending:

Media: SURFACE SOIL (0" - 12")

D No: 1P90

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2600 J	MG/KG	Aluminum
2.3 U	MG/KG	Antimony
3.3 J	MG/KG	Arsenic
68	MG/KG	Barium
0.21 U	MG/KG	Beryllium
0.75	MG/KG	Cadmium
6200	MG/KG	Calcium
9.5	MG/KG	Chromium
2.0	MG/KG	Cobalt
87 J	MG/KG	Copper
4800	MG/KG	Iron
70 J	MG/KG	Lead
440	MG/KG	Magnesium
52	MG/KG	Manganese
0.18	MG/KG	Total Mercury
10	MG/KG	Nickel
260	MG/KG	Potassium
1.0 U	MG/KG	Selenium
11	MG/KG	Silver
300	MG/KG	Sodium
0.99 U	MG/KG	Thallium
4.0	MG/KG	Vanadium
550	MG/KG	Zinc
NA	MG/KG	Cyanide
15	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

0-11111

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1753 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P82

D No: 1P82

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1400 J	MG/KG	Aluminum
2.2 U	MG/KG	Antimony
1.5 U	MG/KG	Arsenic
6.6	MG/KG	Barium
0.20 U	MG/KG	Beryllium
0.16 U	MG/KG	Cadmium
12000	MG/KG	Calcium
4.4	MG/KG	Chromium
1.5 U	MG/KG	Cobalt
7.2 J	MG/KG	Copper
850	MG/KG	Iron
12 J	MG/KG	Lead
160	MG/KG	Magnesium
6.1	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.3	MG/KG	Nickel
80	MG/KG	Potassium
0.96 U	MG/KG	Selenium
0.29 U	MG/KG	Silver
240	MG/KG	Sodium
0.94 U	MG/KG	Thallium
3.4	MG/KG	Vanadium
30	MG/KG	Zinc
NA	MG/KG	Cyanide
10	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

CYANIDE ANALYSIS NOT REQUESTED. If cyanide was detected, it would be reported as mg/kg. If not detected, it would be reported as not detected. Reporting limit: 0.1 mg/kg. Reporting method: estimate.

CYANIDE ANALYSIS NOT REQUESTED. If cyanide was detected, it would be reported as mg/kg. If not detected, it would be reported as not detected. Reporting limit: 0.1 mg/kg. Reporting method: estimate.

once or add

be determin

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1758 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Beginning: 11/19/2002 14:20

Id/Station: LLE06SS /

Case No: 31215

Ending:

Media: SURFACE SOIL (0" - 12")

MD No: 1P87

Inorg Contractor: SENTIN

D No: 1P87

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2200 J	MG/KG	Aluminum
2.2 U	MG/KG	Antimony
2.1 U	MG/KG	Arsenic
7.5	MG/KG	Barium
0.20 U	MG/KG	Beryllium
0.16 R	MG/KG	Cadmium
14000	MG/KG	Calcium
15	MG/KG	Chromium
1.6 U	MG/KG	Cobalt
3.8 J	MG/KG	Copper
1200	MG/KG	Iron
14 J	MG/KG	Lead
340	MG/KG	Magnesium
9.9	MG/KG	Manganese
0.09 U	MG/KG	Total Mercury
1.7	MG/KG	Nickel
110	MG/KG	Potassium
0.97 U	MG/KG	Selenium
0.29 U	MG/KG	Silver
320	MG/KG	Sodium
0.95 U	MG/KG	Thallium
3.3	MG/KG	Vanadium
44	MG/KG	Zinc
NA	MG/KG	Cyanide
11	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

NA-Not Analyzed.

| NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.

R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1765 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SS /

MD No: 1P94

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P94

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:10

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1200 J	MG/KG	Aluminum
2.4 U	MG/KG	Antimony
1.7 U	MG/KG	Arsenic
6.9	MG/KG	Barium
0.22 U	MG/KG	Beryllium
0.17 U	MG/KG	Cadmium
17000	MG/KG	Calcium
2.4 U	MG/KG	Chromium
1.7 U	MG/KG	Cobalt
1.4 UJ	MG/KG	Copper
550	MG/KG	Iron
11 J	MG/KG	Lead
200	MG/KG	Magnesium
9.2	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.3 U	MG/KG	Nickel
170	MG/KG	Potassium
1.0 U	MG/KG	Selenium
0.32 U	MG/KG	Silver
320	MG/KG	Sodium
1.0 U	MG/KG	Thallium
2.0	MG/KG	Vanadium
8.5	MG/KG	Zinc
NA	MG/KG	Cyanide
18	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

...not analyzed. | ...due to Interferences. | ...analyte analyzed in replicate. Reported value is "average" of replicates.  
...not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



## METALS SAMPLE ANALYSIS

EPA - REGION IV SED, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1762 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 15:20

Id/Station: LLE04SS /

MD No: 1P91

Inorg Contractor: SENTIN

Ending:

Media: SURFACE SOIL (0" - 12")

D No: 1P91

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1400 J	MG/KG	Aluminum
2.3 U	MG/KG	Antimony
1.6 U	MG/KG	Arsenic
17	MG/KG	Barium
0.21 U	MG/KG	Beryllium
0.16 U	MG/KG	Cadmium
5700	MG/KG	Calcium
3.8	MG/KG	Chromium
1.6 U	MG/KG	Cobalt
3.1 J	MG/KG	Copper
1300	MG/KG	Iron
4.5 J	MG/KG	Lead
600	MG/KG	Magnesium
14	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.9	MG/KG	Nickel
170	MG/KG	Potassium
1.0 U	MG/KG	Selenium
0.31 U	MG/KG	Silver
520	MG/KG	Sodium
0.99 U	MG/KG	Thallium
3.2	MG/KG	Vanadium
6.1	MG/KG	Zinc
NA	MG/KG	Cyanide
15	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1760 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE03SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P89

D No: 1P89

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:38

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2600 J	MG/KG	Aluminum
2.3 U	MG/KG	Antimony
2.8	MG/KG	Arsenic
22	MG/KG	Barium
0.21 U	MG/KG	Beryllium
0.16 U	MG/KG	Cadmium
100000	MG/KG	Calcium
7.7	MG/KG	Chromium
1.6 U	MG/KG	Cobalt
5.9 J	MG/KG	Copper
2000	MG/KG	Iron
13 J	MG/KG	Lead
1000	MG/KG	Magnesium
30	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
2.8	MG/KG	Nickel
280	MG/KG	Potassium
0.98 U	MG/KG	Selenium
0.30 U	MG/KG	Silver
550	MG/KG	Sodium
0.96 U	MG/KG	Thallium
8.0	MG/KG	Vanadium
33	MG/KG	Zinc
NA	MG/KG	Cyanide
12	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

**EPA - REGION IV SEDS, ATHENS, GA**

**Production Date: 01/14/2003 10:15**

Sample 1752 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02SS /

MD No: 1P80

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P80

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:00

Ending: .

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1500	MG/KG	Aluminum
2.2 U	MG/KG	Antimony
1.4	MG/KG	Arsenic
9.1	MG/KG	Barium
0.20 U	MG/KG	Beryllium
0.19	MG/KG	Cadmium
58000	MG/KG	Calcium
5.0	MG/KG	Chromium
1.5 U	MG/KG	Cobalt
3.7 J	MG/KG	Copper
900	MG/KG	Iron
9.4	MG/KG	Lead
380	MG/KG	Magnesium
14	MG/KG	Manganese
0.06 U	MG/KG	Total Mercury
1.4	MG/KG	Nickel
160	MG/KG	Potassium
0.95 UJ	MG/KG	Selenium
0.29 U	MG/KG	Silver
230	MG/KG	Sodium
0.93 U	MG/KG	Thallium
4.4	MG/KG	Vanadium
17	MG/KG	Zinc
NA	MG/KG	Cyanide
10	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

Analyte not detected at or above reporting limit.	Reporting limit.	If J value is less than 0.95, analyte is acceptable; if J value is an estimate.	Analyte not detected at or above reporting limit. Reporting limit is an estimate.
Analyte concentration below reporting limit.	Reporting limit.	Analyte concentration below reporting limit.	Analyte concentration below reporting limit.
Analyte concentration above reporting limit.	Reporting limit.	Analyte concentration above reporting limit.	Analyte concentration above reporting limit.

Sample 1757 FY 2003 Project: 03-0143

MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE06SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P86

D No: 1P86

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:35

Ending:

RESULTS	UNITS	ANALYTE
740 NJ	UG/KG	OXACYCLOHEXADECAN-2-ONE, 16-METHYL-
1300 NJ	UG/KG	HEXADECANOIC ACID
2100 NJ	UG/KG	CHOLESTEROL
4500 J	UG/KG	4 UNKNOWN COMPOUNDS

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1757 FY 2003 Project: 03-0143

## Extractables Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE06SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P86

D No: 1P86

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:35

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
3000 U	UG/KG	Benzaldehyde	3000 U	UG/KG	Dibenzofuran
3000 U	UG/KG	Phenol	3000 U	UG/KG	2,4-Dinitrotoluene
3000 U	UG/KG	bis(2-Chloroethyl) Ether	3000 U	UG/KG	Diethyl Phthalate
3000 U	UG/KG	2-Chlorophenol	3000 U	UG/KG	Fluorene
3000 U	UG/KG	2-Methylphenol	3000 U	UG/KG	4-Chlorophenyl Phenyl Ether
3000 U	UG/KG	bis(2-Chloroisopropyl) Ether	7500 U	UG/KG	4-Nitroaniline
3000 U	UG/KG	Acetophenone	7500 U	UG/KG	2-Methyl-4,6-Dinitrophenol
3000 U	UG/KG	(3-and/or 4-)Methylphenol	3000 U	UG/KG	n-Nitrosodiphenylamine/Diphenylamine
3000 U	UG/KG	n-Nitrosodi-n-Propylamine	NA	UG/KG	1,2,4,5-Tetrachlorobenzene
3000 U	UG/KG	Hexachloroethane	3000 U	UG/KG	4-Bromophenyl Phenyl Ether
3000 U	UG/KG	Nitrobenzene	3000 U	UG/KG	Hexachlorobenzene (HCB)
3000 U	UG/KG	Isophorone	3000 U	UG/KG	Atrazine
3000 U	UG/KG	2-Nitrophenol	7500 U	UG/KG	Pentachlorophenol
3000 U	UG/KG	2,4-Dimethylphenol	3000 U	UG/KG	Phenanthrene
3000 U	UG/KG	bis(2-Chloroethoxy)Methane	3000 U	UG/KG	Anthracene
3000 U	UG/KG	2,4-Dichlorophenol	3000 U	UG/KG	Carbazole
3000 U	UG/KG	Naphthalene	3000 U	UG/KG	Di-n-Butylphthalate
3000 U	UG/KG	4-Chloroaniline	340 J	UG/KG	Fluoranthene
3000 U	UG/KG	Hexachlorobutadiene	3000 U	UG/KG	Pyrene
3000 U	UG/KG	Caprolactam	3000 U	UG/KG	Benzyl Butyl Phthalate
3000 U	UG/KG	4-Chloro-3-Methylphenol	3000 U	UG/KG	3,3'-Dichlorobenzidine
3000 U	UG/KG	2-Methylnaphthalene	3000 U	UG/KG	Benzo(a)Anthracene
3000 U	UG/KG	Hexachlorocyclopentadiene (HCCP)	3000 U	UG/KG	Chrysene
3000 U	UG/KG	2,4,6-Trichlorophenol	3000 U	UG/KG	bis(2-Ethylhexyl) Phthalate
7500 U	UG/KG	2,4,5-Trichlorophenol	3000 U	UG/KG	Di-n-Octylphthalate
3000 U	UG/KG	1,1-Biphenyl	3000 U	UG/KG	Benzo(b)Fluoranthene
3000 U	UG/KG	2-Chloronaphthalene	860 J	UG/KG	Benzo(k)Fluoranthene
7500 U	UG/KG	2-Nitroaniline	3000 U	UG/KG	Benzo-a-Pyrene
3000 U	UG/KG	Dimethyl Phthalate	3000 U	UG/KG	Indeno (1,2,3-cd) Pyrene
3000 U	UG/KG	2,6-Dinitrotoluene	3000 U	UG/KG	Dibenzo(a,h)Anthracene
3000 U	UG/KG	Acenaphthylene	3000 U	UG/KG	Benzo(ghi)Perylene
7500 U	UG/KG	3-Nitroaniline	45	%	% Moisture
3000 U	UG/KG	Acenaphthene			
7500 U	UG/KG	2,4-Dinitrophenol			
7500 U	UG/KG	4-Nitrophenol			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1769 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SWD /

MD No: 1P99

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1P99

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
450 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
6.9 U	UG/L	Arsenic
29	UG/L	Barium
0.20 U	UG/L	Beryllium
0.62 UJ	UG/L	Cadmium
65000	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
6.0 U	UG/L	Copper
180	UG/L	Iron
3.0 U	UG/L	Lead
5800	UG/L	Magnesium
28 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
2.2 R	UG/L	Nickel
6300 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
29000	UG/L	Sodium
6.1 U	UG/L	Thallium
3.1	UG/L	Vanadium
5.3	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

**Production Date: 01/14/2003 10:15**

Produced by: Goddard, Denise

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

**Case No: 31215**

Id/Station: LLE02SW /

MD No: 1PA2

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1PA2

Org Contractor: CEIMIC

**Requestor:**

**Project Leader: FSLOAN**

Beginning: 11/20/2002 12:05

**Ending:**

RESULTS	UNITS	ANALYTE
110 U	UG/L	Aluminum
4.0 U	UG/L	Antimony
3.7 U	UG/L	Arsenic
18	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
53000	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
4.4 U	UG/L	Copper
180	UG/L	Iron
3.0 U	UG/L	Lead
4900	UG/L	Magnesium
16 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
3800 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
22000	UG/L	Sodium
6.1 U	UG/L	Thallium
3.1	UG/L	Vanadium
15	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

**Normalized**: The value is "average" of replicates.  
**Not normalized**: The value is "average" of replicates.  
**Severe quality control**: Replicates are rejected and controlled.

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1773 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SW /

MD No: 1PA3

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1PA3

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:30

Ending:

RESULTS	UNITS	ANALYTE
290 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
6.3 U	UG/L	Arsenic
19	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
55000	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
3.1 U	UG/L	Copper
250	UG/L	Iron
3.0 U	UG/L	Lead
5300	UG/L	Magnesium
20 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
4400 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
24000	UG/L	Sodium
6.1 U	UG/L	Thallium
3.4	UG/L	Vanadium
9.9	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED



## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1774 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/20/2002 13:10

Id/Station: LLE04SW /

MD No: 1PA4

Inorg Contractor: SENTIN

Ending:

Media: SURFACE WATER

D No: 1PA4

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
310 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
9.5 U	UG/L	Arsenic
100	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
92000	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
4.2 U	UG/L	Copper
290	UG/L	Iron
3.0 U	UG/L	Lead
16000	UG/L	Magnesium
76 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
3.7	UG/L	Nickel
32000 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
58000	UG/L	Sodium
6.1 U	UG/L	Thallium
1.9 R	UG/L	Vanadium
3.1	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1776 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SW /

MD No: 1PA6

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1PA6

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 14:00

Ending:

RESULTS	UNITS	ANALYTE
420 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
5.6 U	UG/L	Arsenic
35	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
67000	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
4.7 U	UG/L	Copper
230	UG/L	Iron
3.0 U	UG/L	Lead
7300	UG/L	Magnesium
37 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
9700 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
31000	UG/L	Sodium
6.1 U	UG/L	Thallium
2.9	UG/L	Vanadium
7.9	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

Analyte is in  
units ofvalue may be  
reported asvalue expected  
reportedreported value.  
reported

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1775 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/20/2002 13:45

Id/Station: LLE06SW /

MD No: 1PA5

Inorg Contractor: SENTIN

Ending:

Media: SURFACE WATER

D No: 1PA5

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
520 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
6.9 U	UG/L	Arsenic
27	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
61000	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
5.8 U	UG/L	Copper
140	UG/L	Iron
3.0 U	UG/L	Lead
5300	UG/L	Magnesium
23 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
5900 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
29000	UG/L	Sodium
6.1 U	UG/L	Thallium
3.3	UG/L	Vanadium
10	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1767 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1P97

D No: 1P97

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:05

Ending:

RESULTS	UNITS	ANALYTE
330 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
6.2 U	UG/L	Arsenic
17	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
50000	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
3.0 U	UG/L	Copper
140	UG/L	Iron
3.0 U	UG/L	Lead
5000	UG/L	Magnesium
20 J	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
4100 J	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
25000	UG/L	Sodium
6.1 U	UG/L	Thallium
3.8	UG/L	Vanadium
4.2	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1750 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P78

D No: 1P78

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
670	MG/KG	Aluminum
3.3 U	MG/KG	Antimony
1.6 U	MG/KG	Arsenic
3.3	MG/KG	Barium
0.30 U	MG/KG	Beryllium
0.23 U	MG/KG	Cadmium
14000	MG/KG	Calcium
2.3	MG/KG	Chromium
2.3 U	MG/KG	Cobalt
2.7 J	MG/KG	Copper
700	MG/KG	Iron
3.9	MG/KG	Lead
79	MG/KG	Magnesium
16	MG/KG	Manganese
0.08 U	MG/KG	Total Mercury
1.7 U	MG/KG	Nickel
100	MG/KG	Potassium
1.4 UJ	MG/KG	Selenium
0.43 U	MG/KG	Silver
480	MG/KG	Sodium
1.4 U	MG/KG	Thallium
1.9 U	MG/KG	Vanadium
15	MG/KG	Zinc
NA	MG/KG	Cyanide
39	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

to be less than the reported value.

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1749 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SDD /

Media: SEDIMENT

Case No: 31215

MD No: 1P77

D No: 1P77

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
620	MG/KG	Aluminum
2.9 U	MG/KG	Antimony
1.5 U	MG/KG	Arsenic
3.7	MG/KG	Barium
0.27 U	MG/KG	Beryllium
0.21 U	MG/KG	Cadmium
32000	MG/KG	Calcium
1.6	MG/KG	Chromium
2.0 U	MG/KG	Cobalt
2.7 J	MG/KG	Copper
550	MG/KG	Iron
3.7	MG/KG	Lead
230	MG/KG	Magnesium
16	MG/KG	Manganese
0.07 U	MG/KG	Total Mercury
1.6 U	MG/KG	Nickel
78	MG/KG	Potassium
1.3 UJ	MG/KG	Selenium
0.38 U	MG/KG	Silver
490	MG/KG	Sodium
1.2 U	MG/KG	Thallium
1.7 U	MG/KG	Vanadium
15	MG/KG	Zinc
NA	MG/KG	Cyanide
32	%	% Moisture

## CYANIDE ANALYSIS NOT REQUESTED

U - Analyte not detected at or above reporting limit. | J - Identification of analyte is acceptable; reported value is an estimate. | UJ - Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
K - Analyte not detected at or above reporting limit. Analyte reported as tentative identification. | NJ - Presumptive guidance analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
KJ - Analyte not detected at or above reporting limit. Analyte may be biased; reported value is expected to be less than reported value.

NA - Analyte or element cannot be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1743 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 09:15

Id/Station: LLE02SD /

MD No: 1P71

Inorg Contractor: SENTIN

Ending:

Media: SEDIMENT

D No: 1P71

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
500	MG/KG	Aluminum
2.7 U	MG/KG	Antimony
1.3 U	MG/KG	Arsenic
2.2	MG/KG	Barium
0.24 U	MG/KG	Beryllium
0.19 U	MG/KG	Cadmium
8900	MG/KG	Calcium
1.2	MG/KG	Chromium
1.8 U	MG/KG	Cobalt
2.6 J	MG/KG	Copper
430	MG/KG	Iron
3.9	MG/KG	Lead
74	MG/KG	Magnesium
3.9	MG/KG	Manganese
0.07 U	MG/KG	Total Mercury
1.4 U	MG/KG	Nickel
64	MG/KG	Potassium
1.2 UJ	MG/KG	Selenium
0.35 U	MG/KG	Silver
340	MG/KG	Sodium
1.1 U	MG/KG	Thallium
1.6 U	MG/KG	Vanadium
18	MG/KG	Zinc
NA	MG/KG	Cyanide
25	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

J-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
I- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to Interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1744 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE03SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P72

D No: 1P72

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:50

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1200	MG/KG	Aluminum
3.5 U	MG/KG	Antimony
1.8 U	MG/KG	Arsenic
11	MG/KG	Barium
0.32 U	MG/KG	Beryllium
0.25 U	MG/KG	Cadmium
6000	MG/KG	Calcium
3.5	MG/KG	Chromium
2.4 U	MG/KG	Cobalt
2.7 J	MG/KG	Copper
1600	MG/KG	Iron
3.3	MG/KG	Lead
360	MG/KG	Magnesium
21	MG/KG	Manganese
0.09 U	MG/KG	Total Mercury
1.9 U	MG/KG	Nickel
240	MG/KG	Potassium
1.5 UJ	MG/KG	Selenium
0.46 U	MG/KG	Silver
370	MG/KG	Sodium
1.5 U	MG/KG	Thallium
2.3	MG/KG	Vanadium
11	MG/KG	Zinc
NA	MG/KG	Cyanide
44	%	% Moisture

U-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
M-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1755 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

## Metals Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 12:45

Id/Station: LLE04SD /

MD No: 1P84

Inorg Contractor: SENTIN

Ending:

Media: SEDIMENT

D No: 1P84

Org Contractor: CEIMIC

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1500 J	MG/KG	Aluminum
3.7 U	MG/KG	Antimony
2.4 U	MG/KG	Arsenic
19	MG/KG	Barium
0.33 U	MG/KG	Beryllium
0.26 U	MG/KG	Cadmium
14000	MG/KG	Calcium
3.1 U	MG/KG	Chromium
2.6 U	MG/KG	Cobalt
3.8 J	MG/KG	Copper
1000	MG/KG	Iron
6.5 J	MG/KG	Lead
430	MG/KG	Magnesium
27	MG/KG	Manganese
0.09 U	MG/KG	Total Mercury
2.0 U	MG/KG	Nickel
190	MG/KG	Potassium
1.6 U	MG/KG	Selenium
0.48 U	MG/KG	Silver
530	MG/KG	Sodium
1.6 U	MG/KG	Thallium
3.0	MG/KG	Vanadium
24	MG/KG	Zinc
NA	MG/KG	Cyanide
46	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

## METALS SAMPLE ANALYSIS

EPA - REGION IV SED, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1756 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P85

D No: 1P85

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2800 J	MG/KG	Aluminum
3.3 U	MG/KG	Antimony
2.2 U	MG/KG	Arsenic
34	MG/KG	Barium
0.30 U	MG/KG	Beryllium
0.23 U	MG/KG	Cadmium
56000	MG/KG	Calcium
7.1	MG/KG	Chromium
2.3 U	MG/KG	Cobalt
7.8 J	MG/KG	Copper
2500	MG/KG	Iron
6.0 J	MG/KG	Lead
2000	MG/KG	Magnesium
65	MG/KG	Manganese
0.08 U	MG/KG	Total Mercury
2.8	MG/KG	Nickel
370	MG/KG	Potassium
1.4 U	MG/KG	Selenium
0.44 U	MG/KG	Silver
520	MG/KG	Sodium
1.4 U	MG/KG	Thallium
6.2	MG/KG	Vanadium
20	MG/KG	Zinc
NA	MG/KG	Cyanide
40	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

**Production Date: 01/14/2003 10:15**

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
3900 J	MG/KG	Aluminum
4.0 U	MG/KG	Antimony
5.3	MG/KG	Arsenic
42	MG/KG	Barium
0.50	MG/KG	Beryllium
0.28 U	MG/KG	Cadmium
13000	MG/KG	Calcium
12	MG/KG	Chromium
2.8 U	MG/KG	Cobalt
20 J	MG/KG	Copper
3900	MG/KG	Iron
34 J	MG/KG	Lead
700	MG/KG	Magnesium
49	MG/KG	Manganese
0.10 U	MG/KG	Total Mercury
6.2	MG/KG	Nickel
390	MG/KG	Potassium
1.7 U	MG/KG	Selenium
0.52 U	MG/KG	Silver
510	MG/KG	Sodium
1.7 U	MG/KG	Thallium
7.8	MG/KG	Vanadium
20	MG/KG	Zinc
NA	MG/KG	Cyanide
50	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

<p>Reported value is less than reporting limit. Reporting limit is 1.00 mg/L. Analyte is not reported.</p>	<p>Reported value is at or above reporting limit. Analyte is reported as <b>detected</b>. Reported value is 1.00 mg/L.</p>	<p>Reported value is an estimate. Analyte is reported as <b>estimated</b>. Reported value is 1.00 mg/L.</p>	<p>Reported value is not detected at or above reporting limit. Reporting limit is 1.00 mg/L. Analyte is reported as <b>not detected</b>. Reported value is 0.00 mg/L.</p>	<p>Reported value is at or above reporting limit. Analyte is reported as <b>detected</b>. Reported value is 1.00 mg/L.</p>
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R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## METALS SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1754 FY 2003 Project: 03-0143

## Metals Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P83

D No: 1P83

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Goddard, Denise

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:55

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1200 J	MG/KG	Aluminum
3.5 U	MG/KG	Antimony
2.5 U	MG/KG	Arsenic
8.4	MG/KG	Barium
0.32 U	MG/KG	Beryllium
0.25 U	MG/KG	Cadmium
8800	MG/KG	Calcium
3.0 U	MG/KG	Chromium
2.4 U	MG/KG	Cobalt
10 J	MG/KG	Copper
1100	MG/KG	Iron
6.2 J	MG/KG	Lead
160	MG/KG	Magnesium
10	MG/KG	Manganese
0.09 U	MG/KG	Total Mercury
1.9 U	MG/KG	Nickel
140	MG/KG	Potassium
1.5 U	MG/KG	Selenium
0.46 U	MG/KG	Silver
420	MG/KG	Sodium
1.5 U	MG/KG	Thallium
2.8	MG/KG	Vanadium
23	MG/KG	Zinc
NA	MG/KG	Cyanide
43	%	% Moisture

CYANIDE ANALYSIS NOT REQUESTED

**METALS SAMPLE ANALYSIS**

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/14/2003 10:15

Sample 1780 FY 2003 Project: 03-0143

Produced by: Goddard, Denise

**Metals Scan**

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/20/2002 17:00

Id/Station: QA004PB /

MD No: 1PB0

Inorg Contractor: SENTIN

Ending:

Media: PRESERVATIVE BLANK

RESULTS	UNITS	ANALYTE
240 UJ	UG/L	Aluminum
4.0 U	UG/L	Antimony
4.8 U	UG/L	Arsenic
1.0 U	UG/L	Barium
0.20 U	UG/L	Beryllium
0.60 U	UG/L	Cadmium
100 U	UG/L	Calcium
0.80 U	UG/L	Chromium
1.2 U	UG/L	Cobalt
1.9 U	UG/L	Copper
35 U	UG/L	Iron
3.0 U	UG/L	Lead
74 U	UG/L	Magnesium
0.40 U	UG/L	Manganese
0.10 U	UG/L	Total Mercury
1.9 U	UG/L	Nickel
240 UJ	UG/L	Potassium
3.4 U	UG/L	Selenium
0.90 U	UG/L	Silver
920 U	UG/L	Sodium
6.1 U	UG/L	Thallium
1.1 U	UG/L	Vanadium
1.6 U	UG/L	Zinc
NA	UG/L	Cyanide

CYANIDE ANALYSIS NOT REQUESTED



# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4

Science and Ecosystem Support Division  
980 College Station Road  
Athens, Georgia 30605-2720

## MEMORANDUM

Date: 01/29/2003

Subject: Results of PESTICIDES/PCB Sample Analysis

03-0143      Largo Landfill

Largo, FL

From: Messer, Edward

A handwritten signature in black ink, appearing to read "Edward Messer", is written over the printed name.

To: Sloan, Fred

CC: SESD/EIB/SAS

Thru: QA Office

Attached are the results of analysis of samples collected as part of the subject project. If you have any questions, please contact me.

ATTACHMENT

Sample 1746 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE01SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P74

D No: 1P74

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1.8 U	UG/KG	alpha-BHC
1.8 U	UG/KG	beta-BHC
1.8 U	UG/KG	delta-BHC
1.8 U	UG/KG	gamma-BHC (Lindane)
1.8 U	UG/KG	Heptachlor
1.8 U	UG/KG	Aldrin
1.8 U	UG/KG	Heptachlor Epoxide
1.8 U	UG/KG	Endosulfan I (alpha)
3.5 U	UG/KG	Dieldrin
3.5 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.5 U	UG/KG	Endrin
3.5 U	UG/KG	Endosulfan II (beta)
3.5 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.5 U	UG/KG	Endosulfan Sulfate
3.5 U	UG/KG	4,4'-DDT (p,p'-DDT)
18 U	UG/KG	Methoxychlor
3.5 U	UG/KG	Endrin Ketone
3.5 U	UG/KG	Endrin Aldehyde
2.1	UG/KG	alpha-Chlordane /2
1.8 U	UG/KG	gamma-Chlordane /2
180 U	UG/KG	Toxaphene
35 U	UG/KG	PCB-1016 (Aroclor 1016)
71 U	UG/KG	PCB-1221 (Aroclor 1221)
35 U	UG/KG	PCB-1232 (Aroclor 1232)
35 U	UG/KG	PCB-1242 (Aroclor 1242)
35 U	UG/KG	PCB-1248 (Aroclor 1248)
35 U	UG/KG	PCB-1254 (Aroclor 1254)
35 U	UG/KG	PCB-1260 (Aroclor 1260)
7	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1747 FY 2003 Project: 03-0143

Pesticides Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE01SSD /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P75

D No: 1P75

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.0 U	UG/KG	alpha-BHC
2.0 U	UG/KG	beta-BHC
2.0 U	UG/KG	delta-BHC
2.0 U	UG/KG	gamma-BHC (Lindane)
2.0 U	UG/KG	Heptachlor
2.0 U	UG/KG	Aldrin
2.0 U	UG/KG	Heptachlor Epoxide
2.0 U	UG/KG	Endosulfan I (alpha)
3.8 U	UG/KG	Dieldrin
3.8 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.8 U	UG/KG	Endrin
3.8 U	UG/KG	Endosulfan II (beta)
3.8 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.8 U	UG/KG	Endosulfan Sulfate
3.8 U	UG/KG	4,4'-DDT (p,p'-DDT)
20 U	UG/KG	Methoxychlor
3.8 U	UG/KG	Endrin Ketone
3.8 U	UG/KG	Endrin Aldehyde
2.0 U	UG/KG	alpha-Chlordane /2
2.0 U	UG/KG	gamma-Chlordane /2
200 U	UG/KG	Toxaphene
38 U	UG/KG	PCB-1016 (Aroclor 1016)
77 U	UG/KG	PCB-1221 (Aroclor 1221)
38 U	UG/KG	PCB-1232 (Aroclor 1232)
38 U	UG/KG	PCB-1242 (Aroclor 1242)
38 U	UG/KG	PCB-1248 (Aroclor 1248)
38 U	UG/KG	PCB-1254 (Aroclor 1254)
38 U	UG/KG	PCB-1260 (Aroclor 1260)
14	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems, Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane



Sample 1752 FY 2003 Project: 03-0143

Pesticides Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE02SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P80

D No: 1P80

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:00

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1.9 U	UG/KG	alpha-BHC
1.9 U	UG/KG	beta-BHC
1.9 U	UG/KG	delta-BHC
1.9 U	UG/KG	gamma-BHC (Lindane)
1.9 U	UG/KG	Heptachlor
1.9 U	UG/KG	Aldrin
1.9 U	UG/KG	Heptachlor Epoxide
1.9 U	UG/KG	Endosulfan I (alpha)
3.7 U	UG/KG	Dieldrin
3.7 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.7 U	UG/KG	Endrin
3.7 U	UG/KG	Endosulfan II (beta)
3.7 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.7 U	UG/KG	Endosulfan Sulfate
3.7 U	UG/KG	4,4'-DDT (p,p'-DDT)
19 U	UG/KG	Methoxychlor
3.7 U	UG/KG	Endrin Ketone
3.7 U	UG/KG	Endrin Aldehyde
5.0	UG/KG	alpha-Chlordane /2
3.9 N	UG/KG	gamma-Chlordane /2
190 U	UG/KG	Toxaphene
37 U	UG/KG	PCB-1016 (Aroclor 1016)
76 U	UG/KG	PCB-1221 (Aroclor 1221)
37 U	UG/KG	PCB-1232 (Aroclor 1232)
37 U	UG/KG	PCB-1242 (Aroclor 1242)
37 U	UG/KG	PCB-1248 (Aroclor 1248)
37 U	UG/KG	PCB-1254 (Aroclor 1254)
37 U	UG/KG	PCB-1260 (Aroclor 1260)
12	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1760 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE03SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P89

D No: 1P89

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:38

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.0 U	UG/KG	alpha-BHC
2.0 U	UG/KG	beta-BHC
2.0 U	UG/KG	delta-BHC
2.0 U	UG/KG	gamma-BHC (Lindane)
23	UG/KG	Heptachlor
2.0 U	UG/KG	Aldrin
6.5 U	UG/KG	Heptachlor Epoxide
2.0 U	UG/KG	Endosulfan I (alpha)
46 N	UG/KG	Dieldrin
3.8 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.8 U	UG/KG	Endrin
3.8 U	UG/KG	Endosulfan II (beta)
3.8 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.8 U	UG/KG	Endosulfan Sulfate
3.8 U	UG/KG	4,4'-DDT (p,p'-DDT)
20 U	UG/KG	Methoxychlor
3.8 U	UG/KG	Endrin Ketone
3.8 U	UG/KG	Endrin Aldehyde
30	UG/KG	alpha-Chlordane /2
61	UG/KG	gamma-Chlordane /2
200 U	UG/KG	Toxaphene
38 U	UG/KG	PCB-1016 (Aroclor 1016)
77 U	UG/KG	PCB-1221 (Aroclor 1221)
38 U	UG/KG	PCB-1232 (Aroclor 1232)
38 U	UG/KG	PCB-1242 (Aroclor 1242)
38 U	UG/KG	PCB-1248 (Aroclor 1248)
38 U	UG/KG	PCB-1254 (Aroclor 1254)
38 U	UG/KG	PCB-1260 (Aroclor 1260)
14	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1762 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SS /

MD No: 1P91

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P91

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.1 U	UG/KG	alpha-BHC
2.1 U	UG/KG	beta-BHC
2.1 U	UG/KG	delta-BHC
2.1 U	UG/KG	gamma-BHC (Lindane)
2.1 U	UG/KG	Heptachlor
2.1 U	UG/KG	Aldrin
2.1 U	UG/KG	Heptachlor Epoxide
2.1 U	UG/KG	Endosulfan I (alpha)
4.0 U	UG/KG	Dieldrin
4.0 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.0 U	UG/KG	Endrin
4.0 U	UG/KG	Endosulfan II (beta)
4.0 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.0 U	UG/KG	Endosulfan Sulfate
4.0 U	UG/KG	4,4'-DDT (p,p'-DDT)
21 U	UG/KG	Methoxychlor
4.0 U	UG/KG	Endrin Ketone
4.0 U	UG/KG	Endrin Aldehyde
2.1 U	UG/KG	alpha-Chlordane /2
2.1 U	UG/KG	gamma-Chlordane /2
210 U	UG/KG	Toxaphene
40 U	UG/KG	PCB-1016 (Aroclor 1016)
82 U	UG/KG	PCB-1221 (Aroclor 1221)
40 U	UG/KG	PCB-1232 (Aroclor 1232)
40 U	UG/KG	PCB-1242 (Aroclor 1242)
40 U	UG/KG	PCB-1248 (Aroclor 1248)
40 U	UG/KG	PCB-1254 (Aroclor 1254)
40 U	UG/KG	PCB-1260 (Aroclor 1260)
19	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1765 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE05SS /

Media: SURFACE SOIL (0" - 12")

Case No: 31215

MD No: 1P94

D No: 1P94

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:10

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.1 U	UG/KG	alpha-BHC
2.1 U	UG/KG	beta-BHC
2.1 U	UG/KG	delta-BHC
2.1 U	UG/KG	gamma-BHC (Lindane)
2.1 U	UG/KG	Heptachlor
2.1 U	UG/KG	Aldrin
2.1 U	UG/KG	Heptachlor Epoxide
2.1 U	UG/KG	Endosulfan I (alpha)
4.0 U	UG/KG	Dieldrin
4.0 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.0 U	UG/KG	Endrin
4.0 U	UG/KG	Endosulfan II (beta)
4.0 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.0 U	UG/KG	Endosulfan Sulfate
4.0 U	UG/KG	4,4'-DDT (p,p'-DDT)
21 U	UG/KG	Methoxychlor
4.0 U	UG/KG	Endrin Ketone
4.0 U	UG/KG	Endrin Aldehyde
2.1 U	UG/KG	alpha-Chlordane /2
2.1 U	UG/KG	gamma-Chlordane /2
210 U	UG/KG	Toxaphene
40 U	UG/KG	PCB-1016 (Aroclor 1016)
81 U	UG/KG	PCB-1221 (Aroclor 1221)
40 U	UG/KG	PCB-1232 (Aroclor 1232)
40 U	UG/KG	PCB-1242 (Aroclor 1242)
40 U	UG/KG	PCB-1248 (Aroclor 1248)
40 U	UG/KG	PCB-1254 (Aroclor 1254)
40 U	UG/KG	PCB-1260 (Aroclor 1260)
18	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1758 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE06SS /

MD No: 1P87

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P87

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1.9 U	UG/KG	alpha-BHC
1.9 U	UG/KG	beta-BHC
1.9 U	UG/KG	delta-BHC
1.9 U	UG/KG	gamma-BHC (Lindane)
1.9 U	UG/KG	Heptachlor
1.9 U	UG/KG	Aldrin
1.9 U	UG/KG	Heptachlor Epoxide
1.9 U	UG/KG	Endosulfan I (alpha)
3.7 U	UG/KG	Dieldrin
20	UG/KG	4,4'-DDE (p,p'-DDE)
3.7 U	UG/KG	Endrin
3.7 U	UG/KG	Endosulfan II (beta)
3.6 J	UG/KG	4,4'-DDD (p,p'-DDD)
3.7 U	UG/KG	Endosulfan Sulfate
10	UG/KG	4,4'-DDT (p,p'-DDT)
19 U	UG/KG	Methoxychlor
3.7 U	UG/KG	Endrin Ketone
3.7 U	UG/KG	Endrin Aldehyde
9.3	UG/KG	alpha-Chlordane /2
11	UG/KG	gamma-Chlordane /2
190 U	UG/KG	Toxaphene
37 U	UG/KG	PCB-1016 (Aroclor 1016)
74 U	UG/KG	PCB-1221 (Aroclor 1221)
37 U	UG/KG	PCB-1232 (Aroclor 1232)
37 U	UG/KG	PCB-1242 (Aroclor 1242)
37 U	UG/KG	PCB-1248 (Aroclor 1248)
37 U	UG/KG	PCB-1254 (Aroclor 1254)
37 U	UG/KG	PCB-1260 (Aroclor 1260)
11	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1753 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE07SS /

MD No: 1P82

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P82

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1.9 U	UG/KG	alpha-BHC
1.9 U	UG/KG	beta-BHC
1.9 U	UG/KG	delta-BHC
1.9 U	UG/KG	gamma-BHC (Lindane)
1.9 U	UG/KG	Heptachlor
1.9 U	UG/KG	Aldrin
1.9 U	UG/KG	Heptachlor Epoxide
1.9 U	UG/KG	Endosulfan I (alpha)
3.7 U	UG/KG	Dieldrin
3.7 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.7 U	UG/KG	Endrin
3.7 U	UG/KG	Endosulfan II (beta)
3.7 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.7 U	UG/KG	Endosulfan Sulfate
3.7 U	UG/KG	4,4'-DDT (p,p'-DDT)
19 U	UG/KG	Methoxychlor
3.7 U	UG/KG	Endrin Ketone
3.7 U	UG/KG	Endrin Aldehyde
3.1	UG/KG	alpha-Chlordane /2
2.5 U	UG/KG	gamma-Chlordane /2
190 U	UG/KG	Toxaphene
37 U	UG/KG	PCB-1016 (Aroclor 1016)
75 U	UG/KG	PCB-1221 (Aroclor 1221)
37 U	UG/KG	PCB-1232 (Aroclor 1232)
37 U	UG/KG	PCB-1242 (Aroclor 1242)
37 U	UG/KG	PCB-1248 (Aroclor 1248)
37 U	UG/KG	PCB-1254 (Aroclor 1254)
37 U	UG/KG	PCB-1260 (Aroclor 1260)
11	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1761 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE08SS /

MD No: 1P90

Inorg Contractor: SENTIN

Media: SURFACE SOIL (0" - 12")

D No: 1P90

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:00

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.0 U	UG/KG	alpha-BHC
2.0 U	UG/KG	beta-BHC
2.0 U	UG/KG	delta-BHC
2.3 U	UG/KG	gamma-BHC (Lindane)
2.0 U	UG/KG	Heptachlor
9.6 N	UG/KG	Aldrin
2.0 U	UG/KG	Heptachlor Epoxide
2.0 U	UG/KG	Endosulfan I (alpha)
4.0 U	UG/KG	Dieldrin
16	UG/KG	4,4'-DDE (p,p'-DDE)
4.0 U	UG/KG	Endrin
4.0 U	UG/KG	Endosulfan II (beta)
4.0 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.0 U	UG/KG	Endosulfan Sulfate
5.0 U	UG/KG	4,4'-DDT (p,p'-DDT)
20 U	UG/KG	Methoxychlor
4.0 U	UG/KG	Endrin Ketone
4.0 U	UG/KG	Endrin Aldehyde
17 U	UG/KG	alpha-Chlordane /2
18 U	UG/KG	gamma-Chlordane /2
200 U	UG/KG	Toxaphene
40 U	UG/KG	PCB-1016 (Aroclor 1016)
81 U	UG/KG	PCB-1221 (Aroclor 1221)
40 U	UG/KG	PCB-1232 (Aroclor 1232)
40 U	UG/KG	PCB-1242 (Aroclor 1242)
170	UG/KG	PCB-1248 (Aroclor 1248)
95	UG/KG	PCB-1254 (Aroclor 1254)
40 U	UG/KG	PCB-1260 (Aroclor 1260)
18	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1745 FY 2003 Project: 03-0143

Pesticides Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE01SB /

Media: SUBSURFACE SOIL (> 12")

Case No: 31215

MD No: 1P73

D No: 1P73

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:41

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1.8 U	UG/KG	alpha-BHC
1.8 U	UG/KG	beta-BHC
1.8 U	UG/KG	delta-BHC
1.8 U	UG/KG	gamma-BHC (Lindane)
1.8 U	UG/KG	Heptachlor
1.8 U	UG/KG	Aldrin
1.8 U	UG/KG	Heptachlor Epoxide
1.8 U	UG/KG	Endosulfan I (alpha)
3.6 U	UG/KG	Dieldrin
3.6 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.6 U	UG/KG	Endrin
3.6 U	UG/KG	Endosulfan II (beta)
3.6 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.6 U	UG/KG	Endosulfan Sulfate
3.6 U	UG/KG	4,4'-DDT (p,p'-DDT)
18 U	UG/KG	Methoxychlor
3.6 U	UG/KG	Endrin Ketone
3.6 U	UG/KG	Endrin Aldehyde
1.8 U	UG/KG	alpha-Chlordane /2
1.8 U	UG/KG	gamma-Chlordane /2
180 U	UG/KG	Toxaphene
36 U	UG/KG	PCB-1016 (Aroclor 1016)
73 U	UG/KG	PCB-1221 (Aroclor 1221)
36 U	UG/KG	PCB-1232 (Aroclor 1232)
36 U	UG/KG	PCB-1242 (Aroclor 1242)
36 U	UG/KG	PCB-1248 (Aroclor 1248)
36 U	UG/KG	PCB-1254 (Aroclor 1254)
36 U	UG/KG	PCB-1260 (Aroclor 1260)
9	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane



Sample 1748 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SBD /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P76

D No: 1P76

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:40

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1.9 U	UG/KG	alpha-BHC
1.9 U	UG/KG	beta-BHC
1.9 U	UG/KG	delta-BHC
1.9 U	UG/KG	gamma-BHC (Lindane)
1.9 U	UG/KG	Heptachlor
1.9 U	UG/KG	Aldrin
1.9 U	UG/KG	Heptachlor Epoxide
1.9 U	UG/KG	Endosulfan I (alpha)
3.6 U	UG/KG	Dieldrin
3.6 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.6 U	UG/KG	Endrin
3.6 U	UG/KG	Endosulfan II (beta)
3.6 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.6 U	UG/KG	Endosulfan Sulfate
3.6 U	UG/KG	4,4'-DDT (p,p'-DDT)
19 U	UG/KG	Methoxychlor
3.6 U	UG/KG	Endrin Ketone
3.6 U	UG/KG	Endrin Aldehyde
1.9 U	UG/KG	alpha-Chlordane /2
1.9 U	UG/KG	gamma-Chlordane /2
190 U	UG/KG	Toxaphene
36 U	UG/KG	PCB-1016 (Aroclor 1016)
73 U	UG/KG	PCB-1221 (Aroclor 1221)
36 U	UG/KG	PCB-1232 (Aroclor 1232)
36 U	UG/KG	PCB-1242 (Aroclor 1242)
36 U	UG/KG	PCB-1248 (Aroclor 1248)
36 U	UG/KG	PCB-1254 (Aroclor 1254)
36 U	UG/KG	PCB-1260 (Aroclor 1260)
9	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1751 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE02SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P79

D No: 1P79

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 11:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1.9 U	UG/KG	alpha-BHC
1.9 U	UG/KG	beta-BHC
1.9 U	UG/KG	delta-BHC
1.9 U	UG/KG	gamma-BHC (Lindane)
1.9 U	UG/KG	Heptachlor
1.9 U	UG/KG	Aldrin
1.9 U	UG/KG	Heptachlor Epoxide
1.9 U	UG/KG	Endosulfan I (alpha)
3.6 U	UG/KG	Dieldrin
3.6 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.6 U	UG/KG	Endrin
3.6 U	UG/KG	Endosulfan II (beta)
3.6 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.6 U	UG/KG	Endosulfan Sulfate
3.6 U	UG/KG	4,4'-DDT (p,p'-DDT)
19 U	UG/KG	Methoxychlor
3.6 U	UG/KG	Endrin Ketone
3.6 U	UG/KG	Endrin Aldehyde
5.0 N	UG/KG	alpha-Chlordane /2
5.7	UG/KG	gamma-Chlordane /2
190 U	UG/KG	Toxaphene
36 U	UG/KG	PCB-1016 (Aroclor 1016)
74 U	UG/KG	PCB-1221 (Aroclor 1221)
36 U	UG/KG	PCB-1232 (Aroclor 1232)
36 U	UG/KG	PCB-1242 (Aroclor 1242)
36 U	UG/KG	PCB-1248 (Aroclor 1248)
36 U	UG/KG	PCB-1254 (Aroclor 1254)
36 U	UG/KG	PCB-1260 (Aroclor 1260)
11	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1759 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE03SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P88

D No: 1P88

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:52

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.1 U	UG/KG	alpha-BHC
2.1 U	UG/KG	beta-BHC
2.1 U	UG/KG	delta-BHC
2.1 U	UG/KG	gamma-BHC (Lindane)
2.1 U	UG/KG	Heptachlor
2.1 U	UG/KG	Aldrin
2.1 U	UG/KG	Heptachlor Epoxide
2.1 U	UG/KG	Endosulfan I (alpha)
4.0 U	UG/KG	Dieldrin
4.0 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.0 U	UG/KG	Endrin
4.0 U	UG/KG	Endosulfan II (beta)
4.0 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.0 U	UG/KG	Endosulfan Sulfate
4.0 U	UG/KG	4,4'-DDT (p,p'-DDT)
21 U	UG/KG	Methoxychlor
4.0 U	UG/KG	Endrin Ketone
4.0 U	UG/KG	Endrin Aldehyde
1.6 J	UG/KG	alpha-Chlordane /2
2.6	UG/KG	gamma-Chlordane /2
210 U	UG/KG	Toxaphene
40 U	UG/KG	PCB-1016 (Aroclor 1016)
81 U	UG/KG	PCB-1221 (Aroclor 1221)
40 U	UG/KG	PCB-1232 (Aroclor 1232)
40 U	UG/KG	PCB-1242 (Aroclor 1242)
40 U	UG/KG	PCB-1248 (Aroclor 1248)
40 U	UG/KG	PCB-1254 (Aroclor 1254)
40 U	UG/KG	PCB-1260 (Aroclor 1260)
18	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1763 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE04SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P92

D No: 1P92

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 15:30

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.0 U	UG/KG	alpha-BHC
2.0 U	UG/KG	beta-BHC
2.0 U	UG/KG	delta-BHC
2.0 U	UG/KG	gamma-BHC (Lindane)
2.0 U	UG/KG	Heptachlor
2.0 U	UG/KG	Aldrin
2.0 U	UG/KG	Heptachlor Epoxide
2.0 U	UG/KG	Endosulfan I (alpha)
3.9 U	UG/KG	Dieldrin
3.9 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.9 U	UG/KG	Endrin
3.9 U	UG/KG	Endosulfan II (beta)
3.9 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.9 U	UG/KG	Endosulfan Sulfate
3.9 U	UG/KG	4,4'-DDT (p,p'-DDT)
20 U	UG/KG	Methoxychlor
3.9 U	UG/KG	Endrin Ketone
3.9 U	UG/KG	Endrin Aldehyde
2.0 U	UG/KG	alpha-Chlordane /2
2.0 U	UG/KG	gamma-Chlordane /2
200 U	UG/KG	Toxaphene
39 U	UG/KG	PCB-1016 (Aroclor 1016)
79 U	UG/KG	PCB-1221 (Aroclor 1221)
39 U	UG/KG	PCB-1232 (Aroclor 1232)
39 U	UG/KG	PCB-1242 (Aroclor 1242)
39 U	UG/KG	PCB-1248 (Aroclor 1248)
39 U	UG/KG	PCB-1254 (Aroclor 1254)
39 U	UG/KG	PCB-1260 (Aroclor 1260)
15	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS. | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1764 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SB /

Media: SUBSURFACE SOIL (&gt; 12")

Case No: 31215

MD No: 1P93

D No: 1P93

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 16:20

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
1.9 U	UG/KG	alpha-BHC
1.9 U	UG/KG	beta-BHC
1.9 U	UG/KG	delta-BHC
1.9 U	UG/KG	gamma-BHC (Lindane)
1.9 U	UG/KG	Heptachlor
1.9 U	UG/KG	Aldrin
1.9 U	UG/KG	Heptachlor Epoxide
1.9 U	UG/KG	Endosulfan I (alpha)
3.7 U	UG/KG	Dieldrin
3.7 U	UG/KG	4,4'-DDE (p,p'-DDE)
3.7 U	UG/KG	Endrin
3.7 U	UG/KG	Endosulfan II (beta)
3.7 U	UG/KG	4,4'-DDD (p,p'-DDD)
3.7 U	UG/KG	Endosulfan Sulfate
3.7 U	UG/KG	4,4'-DDT (p,p'-DDT)
19 U	UG/KG	Methoxychlor
3.7 U	UG/KG	Endrin Ketone
3.7 U	UG/KG	Endrin Aldehyde
1.9 U	UG/KG	alpha-Chlordane /2
1.9 U	UG/KG	gamma-Chlordane /2
190 U	UG/KG	Toxaphene
37 U	UG/KG	PCB-1016 (Aroclor 1016)
76 U	UG/KG	PCB-1221 (Aroclor 1221)
37 U	UG/KG	PCB-1232 (Aroclor 1232)
37 U	UG/KG	PCB-1242 (Aroclor 1242)
37 U	UG/KG	PCB-1248 (Aroclor 1248)
37 U	UG/KG	PCB-1254 (Aroclor 1254)
37 U	UG/KG	PCB-1260 (Aroclor 1260)
13	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1777 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01GW /

MD No: 1PA7

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA7

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 15:28

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1779 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02GW /

MD No: 1PA9

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA9

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 16:25

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1778 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE03GW /

Media: GROUNDWATER

Case No: 31215

MD No: 1PA8

D No: 1PA8

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 16:00

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane



Sample 1771 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04GW/

MD No: 1PA1

Inorg Contractor: SENTIN

Media: GROUNDWATER

D No: 1PA1

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:20

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1770 FY 2003 Project: 03-0143

Pesticides Scan

Facility: Largo Landfill

Program: SF

Id/Station: LLE04GWD /

Media: GROUNDWATER

Largo, FL

Case No: 31215

MD No: 1PA0

D No: 1PA0

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:20

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1768 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SW /

MD No: 1P98

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1P98

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1769 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## Pesticides Scan

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/20/2002 10:45

Id/Station: LLE01SWD /

MD No: 1P99

Inorg Contractor: SENTIN

Ending:

Media: SURFACE WATER

D No: 1P99

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1772 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02SW /

MD No: 1PA2

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1PA2

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:05

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1773 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE03SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA3

D No: 1PA3

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:30

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample: 1774 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SW /

MD No: 1PA4

Inorg Contractor: SENTIN

Media: SURFACE WATER

D No: 1PA4

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:10

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1776 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA6

D No: 1PA6

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 14:00

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane



Sample 1775 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE06SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA5

D No: 1PA5

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:45

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1767 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1P97

D No: 1P97

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:05

Ending:

RESULTS	UNITS	ANALYTE
0.050 UJ	UG/L	alpha-BHC
0.050 U	UG/L	beta-BHC
0.050 U	UG/L	delta-BHC
0.050 U	UG/L	gamma-BHC (Lindane)
0.050 U	UG/L	Heptachlor
0.050 U	UG/L	Aldrin
0.050 U	UG/L	Heptachlor Epoxide
0.050 U	UG/L	Endosulfan I (alpha)
0.10 U	UG/L	Dieldrin
0.10 U	UG/L	4,4'-DDE (p,p'-DDE)
0.10 U	UG/L	Endrin
0.10 U	UG/L	Endosulfan II (beta)
0.10 U	UG/L	4,4'-DDD (p,p'-DDD)
0.10 U	UG/L	Endosulfan Sulfate
0.10 U	UG/L	4,4'-DDT (p,p'-DDT)
0.50 U	UG/L	Methoxychlor
0.10 U	UG/L	Endrin Ketone
0.10 U	UG/L	Endrin Aldehyde
0.050 U	UG/L	alpha-Chlordane /2
0.050 U	UG/L	gamma-Chlordane /2
5.0 U	UG/L	Toxaphene
1.0 U	UG/L	PCB-1016 (Aroclor 1016)
2.0 U	UG/L	PCB-1221 (Aroclor 1221)
1.0 U	UG/L	PCB-1232 (Aroclor 1232)
1.0 U	UG/L	PCB-1242 (Aroclor 1242)
1.0 U	UG/L	PCB-1248 (Aroclor 1248)
1.0 U	UG/L	PCB-1254 (Aroclor 1254)
1.0 U	UG/L	PCB-1260 (Aroclor 1260)

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1750 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P78

D No: 1P78

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.2 U	UG/KG	alpha-BHC
2.2 U	UG/KG	beta-BHC
2.2 U	UG/KG	delta-BHC
2.2 U	UG/KG	gamma-BHC (Lindane)
2.2 U	UG/KG	Heptachlor
2.2 U	UG/KG	Aldrin
2.2 U	UG/KG	Heptachlor Epoxide
2.2 U	UG/KG	Endosulfan I (alpha)
4.3 U	UG/KG	Dieldrin
4.3 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.3 U	UG/KG	Endrin
4.3 U	UG/KG	Endosulfan II (beta)
4.3 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.3 U	UG/KG	Endosulfan Sulfate
4.3 U	UG/KG	4,4'-DDT (p,p'-DDT)
22 U	UG/KG	Methoxychlor
4.3 U	UG/KG	Endrin Ketone
4.3 U	UG/KG	Endrin Aldehyde
4.8 N	UG/KG	alpha-Chlordane /2
2.9 U	UG/KG	gamma-Chlordane /2
220 U	UG/KG	Toxaphene
43 U	UG/KG	PCB-1016 (Aroclor 1016)
87 U	UG/KG	PCB-1221 (Aroclor 1221)
43 U	UG/KG	PCB-1232 (Aroclor 1232)
43 U	UG/KG	PCB-1242 (Aroclor 1242)
43 U	UG/KG	PCB-1248 (Aroclor 1248)
43 U	UG/KG	PCB-1254 (Aroclor 1254)
43 U	UG/KG	PCB-1260 (Aroclor 1260)
23	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1749 FY 2003 Project: 03-0143

Pesticides Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE01SDD /

Media: SEDIMENT

Case No: 31215

MD No: 1P77

D No: 1P77

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.3 U	UG/KG	alpha-BHC
2.3 U	UG/KG	beta-BHC
2.3 U	UG/KG	delta-BHC
2.3 U	UG/KG	gamma-BHC (Lindane)
2.3 U	UG/KG	Heptachlor
2.3 U	UG/KG	Aldrin
2.3 U	UG/KG	Heptachlor Epoxide
2.3 U	UG/KG	Endosulfan I (alpha)
4.5 U	UG/KG	Dieldrin
4.5 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.5 U	UG/KG	Endrin
4.5 U	UG/KG	Endosulfan II (beta)
4.5 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.5 U	UG/KG	Endosulfan Sulfate
4.5 U	UG/KG	4,4'-DDT (p,p'-DDT)
23 U	UG/KG	Methoxychlor
4.5 U	UG/KG	Endrin Ketone
4.5 U	UG/KG	Endrin Aldehyde
9.6 N	UG/KG	alpha-Chlordane /2
3.7 U	UG/KG	gamma-Chlordane /2
230 U	UG/KG	Toxaphene
45 U	UG/KG	PCB-1016 (Aroclor 1016)
91 U	UG/KG	PCB-1221 (Aroclor 1221)
45 U	UG/KG	PCB-1232 (Aroclor 1232)
45 U	UG/KG	PCB-1242 (Aroclor 1242)
45 U	UG/KG	PCB-1248 (Aroclor 1248)
45 U	UG/KG	PCB-1254 (Aroclor 1254)
45 U	UG/KG	PCB-1260 (Aroclor 1260)
27	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1743 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE02SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P71

D No: 1P71

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.1 U	UG/KG	alpha-BHC
2.1 U	UG/KG	beta-BHC
2.1 U	UG/KG	delta-BHC
2.1 U	UG/KG	gamma-BHC (Lindane)
2.1 U	UG/KG	Heptachlor
2.1 U	UG/KG	Aldrin
2.1 U	UG/KG	Heptachlor Epoxide
2.1 U	UG/KG	Endosulfan I (alpha)
4.1 U	UG/KG	Dieldrin
4.1 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.1 U	UG/KG	Endrin
4.1 U	UG/KG	Endosulfan II (beta)
4.1 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.1 U	UG/KG	Endosulfan Sulfate
4.1 U	UG/KG	4,4'-DDT (p,p'-DDT)
21 U	UG/KG	Methoxychlor
4.1 U	UG/KG	Endrin Ketone
4.1 U	UG/KG	Endrin Aldehyde
5.9	UG/KG	alpha-Chlordane /2
2.1 U	UG/KG	gamma-Chlordane /2
210 U	UG/KG	Toxaphene
41 U	UG/KG	PCB-1016 (Aroclor 1016)
83 U	UG/KG	PCB-1221 (Aroclor 1221)
41 U	UG/KG	PCB-1232 (Aroclor 1232)
41 U	UG/KG	PCB-1242 (Aroclor 1242)
41 U	UG/KG	PCB-1248 (Aroclor 1248)
41 U	UG/KG	PCB-1254 (Aroclor 1254)
41 U	UG/KG	PCB-1260 (Aroclor 1260)
20	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1744 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE03SD /

MD No: 1P72

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P72

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:50

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.3 U	UG/KG	alpha-BHC
2.3 U	UG/KG	beta-BHC
2.3 U	UG/KG	delta-BHC
2.3 U	UG/KG	gamma-BHC (Lindane)
2.3 U	UG/KG	Heptachlor
2.3 U	UG/KG	Aldrin
2.3 U	UG/KG	Heptachlor Epoxide
2.3 U	UG/KG	Endosulfan I (alpha)
4.5 U	UG/KG	Dieldrin
4.5 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.5 U	UG/KG	Endrin
4.5 U	UG/KG	Endosulfan II (beta)
4.5 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.5 U	UG/KG	Endosulfan Sulfate
4.5 U	UG/KG	4,4'-DDT (p,p'-DDT)
23 U	UG/KG	Methoxychlor
4.5 U	UG/KG	Endrin Ketone
4.5 U	UG/KG	Endrin Aldehyde
2.3 U	UG/KG	alpha-Chlordane /2
2.3 U	UG/KG	gamma-Chlordane /2
230 U	UG/KG	Toxaphene
45 U	UG/KG	PCB-1016 (Aroclor 1016)
91 U	UG/KG	PCB-1221 (Aroclor 1221)
45 U	UG/KG	PCB-1232 (Aroclor 1232)
45 U	UG/KG	PCB-1242 (Aroclor 1242)
45 U	UG/KG	PCB-1248 (Aroclor 1248)
45 U	UG/KG	PCB-1254 (Aroclor 1254)
45 U	UG/KG	PCB-1260 (Aroclor 1260)
27	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1755 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE04SD /

MD No: 1P84

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P84

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 12:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
3.4 U	UG/KG	alpha-BHC
2.7 U	UG/KG	beta-BHC
2.7 U	UG/KG	delta-BHC
2.7 U	UG/KG	gamma-BHC (Lindane)
2.7 U	UG/KG	Heptachlor
2.7 U	UG/KG	Aldrin
2.7 U	UG/KG	Heptachlor Epoxide
2.7 U	UG/KG	Endosulfan I (alpha)
5.3 U	UG/KG	Dieldrin
5.3 U	UG/KG	4,4'-DDE (p,p'-DDE)
5.3 U	UG/KG	Endrin
5.3 U	UG/KG	Endosulfan II (beta)
5.3 U	UG/KG	4,4'-DDD (p,p'-DDD)
5.3 U	UG/KG	Endosulfan Sulfate
5.3 U	UG/KG	4,4'-DDT (p,p'-DDT)
27 U	UG/KG	Methoxychlor
5.3 U	UG/KG	Endrin Ketone
5.3 U	UG/KG	Endrin Aldehyde
4.7 U	UG/KG	alpha-Chlordane /2
3.0 U	UG/KG	gamma-Chlordane /2
270 U	UG/KG	Toxaphene
53 U	UG/KG	PCB-1016 (Aroclor 1016)
110 U	UG/KG	PCB-1221 (Aroclor 1221)
53 U	UG/KG	PCB-1232 (Aroclor 1232)
53 U	UG/KG	PCB-1242 (Aroclor 1242)
53 U	UG/KG	PCB-1248 (Aroclor 1248)
53 U	UG/KG	PCB-1254 (Aroclor 1254)
53 U	UG/KG	PCB-1260 (Aroclor 1260)
38	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1756 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P85

D No: 1P85

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.5 U	UG/KG	alpha-BHC
2.5 U	UG/KG	beta-BHC
2.5 U	UG/KG	delta-BHC
2.5 U	UG/KG	gamma-BHC (Lindane)
2.5 U	UG/KG	Heptachlor
2.5 U	UG/KG	Aldrin
2.5 U	UG/KG	Heptachlor Epoxide
2.5 U	UG/KG	Endosulfan I (alpha)
4.9 U	UG/KG	Dieldrin
4.9 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.9 U	UG/KG	Endrin
4.9 U	UG/KG	Endosulfan II (beta)
4.9 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.9 U	UG/KG	Endosulfan Sulfate
4.9 U	UG/KG	4,4'-DDT (p,p'-DDT)
25 U	UG/KG	Methoxychlor
4.9 U	UG/KG	Endrin Ketone
4.9 U	UG/KG	Endrin Aldehyde
2.5 U	UG/KG	alpha-Chlordane /2
2.5 U	UG/KG	gamma-Chlordane /2
250 U	UG/KG	Toxaphene
49 U	UG/KG	PCB-1016 (Aroclor 1016)
99 U	UG/KG	PCB-1221 (Aroclor 1221)
49 U	UG/KG	PCB-1232 (Aroclor 1232)
49 U	UG/KG	PCB-1242 (Aroclor 1242)
49 U	UG/KG	PCB-1248 (Aroclor 1248)
49 U	UG/KG	PCB-1254 (Aroclor 1254)
49 U	UG/KG	PCB-1260 (Aroclor 1260)
33	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane



Sample 1757 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE06SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P86

D No: 1P86

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 14:35

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
3.1 U	UG/KG	alpha-BHC
3.1 U	UG/KG	beta-BHC
3.1 U	UG/KG	delta-BHC
3.1 U	UG/KG	gamma-BHC (Lindane)
3.1 U	UG/KG	Heptachlor
3.1 U	UG/KG	Aldrin
3.1 U	UG/KG	Heptachlor Epoxide
3.1 U	UG/KG	Endosulfan I (alpha)
6.0 U	UG/KG	Dieldrin
6.0 U	UG/KG	4,4'-DDE (p,p'-DDE)
6.0 U	UG/KG	Endrin
6.0 U	UG/KG	Endosulfan II (beta)
6.0 U	UG/KG	4,4'-DDD (p,p'-DDD)
6.0 U	UG/KG	Endosulfan Sulfate
6.0 U	UG/KG	4,4'-DDT (p,p'-DDT)
31 U	UG/KG	Methoxychlor
6.0 U	UG/KG	Endrin Ketone
6.0 U	UG/KG	Endrin Aldehyde
3.1 U	UG/KG	alpha-Chlordane /2
3.1 U	UG/KG	gamma-Chlordane /2
310 U	UG/KG	Toxaphene
60 U	UG/KG	PCB-1016 (Aroclor 1016)
120 U	UG/KG	PCB-1221 (Aroclor 1221)
60 U	UG/KG	PCB-1232 (Aroclor 1232)
60 U	UG/KG	PCB-1242 (Aroclor 1242)
60 U	UG/KG	PCB-1248 (Aroclor 1248)
60 U	UG/KG	PCB-1254 (Aroclor 1254)
60 U	UG/KG	PCB-1260 (Aroclor 1260)
45	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane

Sample 1754 FY 2003 Project: 03-0143

## Pesticides Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE07SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P83

D No: 1P83

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 13:55

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
2.3 U	UG/KG	alpha-BHC
2.3 U	UG/KG	beta-BHC
2.3 U	UG/KG	delta-BHC
2.3 U	UG/KG	gamma-BHC (Lindane)
2.3 U	UG/KG	Heptachlor
2.3 U	UG/KG	Aldrin
2.3 U	UG/KG	Heptachlor Epoxide
2.3 U	UG/KG	Endosulfan I (alpha)
4.5 U	UG/KG	Dieldrin
4.5 U	UG/KG	4,4'-DDE (p,p'-DDE)
4.5 U	UG/KG	Endrin
4.5 U	UG/KG	Endosulfan II (beta)
4.5 U	UG/KG	4,4'-DDD (p,p'-DDD)
4.5 U	UG/KG	Endosulfan Sulfate
4.5 U	UG/KG	4,4'-DDT (p,p'-DDT)
23 U	UG/KG	Methoxychlor
4.5 U	UG/KG	Endrin Ketone
4.5 U	UG/KG	Endrin Aldehyde
2.3 U	UG/KG	alpha-Chlordane /2
2.3 U	UG/KG	gamma-Chlordane /2
230 U	UG/KG	Toxaphene
45 U	UG/KG	PCB-1016 (Aroclor 1016)
91 U	UG/KG	PCB-1221 (Aroclor 1221)
45 U	UG/KG	PCB-1232 (Aroclor 1232)
45 U	UG/KG	PCB-1242 (Aroclor 1242)
45 U	UG/KG	PCB-1248 (Aroclor 1248)
45 U	UG/KG	PCB-1254 (Aroclor 1254)
45 U	UG/KG	PCB-1260 (Aroclor 1260)
27	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.  
 C-confirmed by GCMS | /1-when no value is reported, see chlordane constituents | /2-constituents or metabolites of technical chlordane



Sample 1773 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE03SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA3

D No: 1PA3

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 12:30

Ending:

RESULTS	UNITS	ANALYTE
11 NJ	UG/L	D-LIMONENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1774 FY 2003 Project: 03-0143

Volatiles Scan

Facility: Largo Landfill

Program: SF

Id/Station: LLE04SW /

Media: SURFACE WATER

Largo, FL

Case No: 31215

MD No: 1PA4

D No: 1PA4

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:10

Ending:

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Dichlorodifluoromethane	10 U	UG/L	Dibromochloromethane
10 U	UG/L	Chloromethane	10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Vinyl Chloride	10 U	UG/L	Chlorobenzene
10 U	UG/L	Bromomethane	10 U	UG/L	Ethyl Benzene
10 U	UG/L	Chloroethane	10 U	UG/L	Total Xylenes
10 U	UG/L	Trichlorofluoromethane (Freon 11)	10 U	UG/L	Styrene
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)	10 U	UG/L	Bromoform
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	10 U	UG/L	Isopropylbenzene
10 U	UG/L	Acetone	10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	Carbon Disulfide	10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	Methyl Acetate	10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	Methylene Chloride	10 U	UG/L	1,2-Dichlorobenzene
10 U	UG/L	trans-1,2-Dichloroethene	10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	Methyl T-Butyl Ether (MTBE)	10 U	UG/L	1,2,4-Trichlorobenzene
10 U	UG/L	1,1-Dichloroethane	NA	UG/L	1,2,3-Trichlorobenzene
10 U	UG/L	cis-1,2-Dichloroethene			
10 U	UG/L	Methyl Ethyl Ketone			
NA	UG/L	Bromochloromethane			
10 U	UG/L	Chloroform			
10 U	UG/L	1,1,1-Trichloroethane			
10 U	UG/L	Cyclohexane			
10 U	UG/L	Carbon Tetrachloride			
10 U	UG/L	Benzene			
10 U	UG/L	1,2-Dichloroethane			
10 U	UG/L	Trichloroethene (Trichloroethylene)			
10 U	UG/L	Methylcyclohexane			
10 U	UG/L	1,2-Dichloropropane			
10 U	UG/L	Bromodichloromethane			
10 U	UG/L	cis-1,3-Dichloropropene			
10 U	UG/L	Methyl Isobutyl Ketone			
10 U	UG/L	Toluene			
10 U	UG/L	trans-1,3-Dichloropropene			
10 U	UG/L	1,1,2-Trichloroethane			
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)			
10 U	UG/L	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1774 FY 2003 Project: 03-0143

MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE04SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA4

D No: 1PA4

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:10

Ending:

RESULTS	UNITS	ANALYTE
9 NJ	UG/L	D-LIMONENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1776 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE05SW /

MD No: 1PA6

Media: SURFACE WATER

D No: 1PA6

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 14:00

Ending:

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromomethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 U	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 U	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
2 J	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
3 J	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1776 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE05SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA6

D No: 1PA6

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 14:00

Ending:

RESULTS	UNITS	ANALYTE
5 NJ	UG/L	D-LIMONENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1775 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE06SW /

MD No: 1PA5

Media: SURFACE WATER

D No: 1PA5

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:45

Ending:

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
10 U	UG/L	Dichlorodifluoromethane	10 U	UG/L	Dibromochloromethane
10 U	UG/L	Chloromethane	10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Vinyl Chloride	10 U	UG/L	Chlorobenzene
10 U	UG/L	Bromomethane	10 U	UG/L	Ethyl Benzene
10 U	UG/L	Chloroethane	10 U	UG/L	Total Xylenes
10 U	UG/L	Trichlorofluoromethane (Freon 11)	10 U	UG/L	Styrene
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)	10 U	UG/L	Bromoform
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	10 U	UG/L	Isopropylbenzene
10 U	UG/L	Acetone	10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	Carbon Disulfide	10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	Methyl Acetate	10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	Methylene Chloride	10 U	UG/L	1,2-Dichlorobenzene
10 U	UG/L	trans-1,2-Dichloroethene	10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	Methyl T-Butyl Ether (MTBE)	10 U	UG/L	1,2,4-Trichlorobenzene
10 U	UG/L	1,1-Dichloroethane	NA	UG/L	1,2,3-Trichlorobenzene
10 U	UG/L	cis-1,2-Dichloroethene			
10 U	UG/L	Methyl Ethyl Ketone			
NA	UG/L	Bromochloromethane			
10 U	UG/L	Chloroform			
10 U	UG/L	1,1,1-Trichloroethane			
10 U	UG/L	Cyclohexane			
10 U	UG/L	Carbon Tetrachloride			
10 U	UG/L	Benzene			
10 U	UG/L	1,2-Dichloroethane			
10 U	UG/L	Trichloroethene (Trichloroethylene)			
10 U	UG/L	Methylcyclohexane			
10 U	UG/L	1,2-Dichloropropane			
10 U	UG/L	Bromodichloromethane			
10 U	UG/L	cis-1,3-Dichloropropene			
10 U	UG/L	Methyl Isobutyl Ketone			
10 U	UG/L	Toluene			
10 U	UG/L	trans-1,3-Dichloropropene			
10 U	UG/L	1,1,2-Trichloroethane			
10 U	UG/L	Tetrachloroethene (Tetrachloroethylene)			
10 U	UG/L	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1775 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE06SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1PA5

D No: 1PA5

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 13:45

Ending:

RESULTS	UNITS	ANALYTE
7 NJ	UG/L	D-LIMONENE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1767 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill Largo, FL

Program: SF

Id/Station: LLE07SW /

Media: SURFACE WATER

Case No: 31215

MD No: 1P97

D No: 1P97

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/20/2002 11:05

Ending:

RESULTS	UNITS	ANALYTE
10 UJ	UG/L	Dichlorodifluoromethane
10 U	UG/L	Chloromethane
10 U	UG/L	Vinyl Chloride
10 U	UG/L	Bromomethane
10 U	UG/L	Chloroethane
10 U	UG/L	Trichlorofluoromethane (Freon 11)
10 U	UG/L	1,1-Dichloroethene (1,1-Dichloroethylene)
10 U	UG/L	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
10 UJ	UG/L	Acetone
10 U	UG/L	Carbon Disulfide
10 U	UG/L	Methyl Acetate
10 UJ	UG/L	Methylene Chloride
10 U	UG/L	trans-1,2-Dichloroethene
10 U	UG/L	Methyl T-Butyl Ether (MTBE)
10 U	UG/L	1,1-Dichloroethane
10 U	UG/L	cis-1,2-Dichloroethene
10 U	UG/L	Methyl Ethyl Ketone
NA	UG/L	Bromochloromethane
10 U	UG/L	Chloroform
10 U	UG/L	1,1,1-Trichloroethane
10 U	UG/L	Cyclohexane
10 U	UG/L	Carbon Tetrachloride
10 U	UG/L	Benzene
10 U	UG/L	1,2-Dichloroethane
10 U	UG/L	Trichloroethene (Trichloroethylene)
10 U	UG/L	Methylcyclohexane
10 U	UG/L	1,2-Dichloropropane
10 U	UG/L	Bromodichloromethane
10 U	UG/L	cis-1,3-Dichloropropene
10 U	UG/L	Methyl Isobutyl Ketone
10 U	UG/L	Toluene
10 U	UG/L	trans-1,3-Dichloropropene
10 U	UG/L	1,1,2-Trichloroethane
2 J	UG/L	Tetrachloroethene (Tetrachloroethylene)
10 U	UG/L	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
10 U	UG/L	Dibromochloromethane
10 U	UG/L	1,2-Dibromoethane (EDB)
10 U	UG/L	Chlorobenzene
10 U	UG/L	Ethyl Benzene
10 U	UG/L	Total Xylenes
10 U	UG/L	Styrene
10 U	UG/L	Bromoform
10 U	UG/L	Isopropylbenzene
10 U	UG/L	1,1,2,2-Tetrachloroethane
10 U	UG/L	1,3-Dichlorobenzene
10 U	UG/L	1,4-Dichlorobenzene
10 U	UG/L	1,2-Dichlorobenzene
10 UR	UG/L	1,2-Dibromo-3-Chloropropane (DBCP)
10 U	UG/L	1,2,4-Trichlorobenzene
NA	UG/L	1,2,3-Trichlorobenzene

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
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L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to Interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1750 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P78

D No: 1P78

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE	RESULTS	UNITS	ANALYTE
14 U	UG/KG	Dichlorodifluoromethane	14 U	UG/KG	Dibromochloromethane
14 U	UG/KG	Chloromethane	14 U	UG/KG	1,2-Dibromoethane (EDB)
14 U	UG/KG	Vinyl Chloride	14 U	UG/KG	Chlorobenzene
14 U	UG/KG	Bromomethane	14 U	UG/KG	Ethyl Benzene
14 U	UG/KG	Chloroethane	14 U	UG/KG	Total Xylenes
2 J	UG/KG	Trichlorofluoromethane (Freon 11)	14 U	UG/KG	Styrene
14 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)	14 U	UG/KG	Bromoform
14 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	14 U	UG/KG	Isopropylbenzene
14 UJ	UG/KG	Acetone	14 U	UG/KG	1,1,2,2-Tetrachloroethane
14 U	UG/KG	Carbon Disulfide	14 U	UG/KG	1,3-Dichlorobenzene
14 UJ	UG/KG	Methyl Acetate	14 U	UG/KG	1,4-Dichlorobenzene
14 UJ	UG/KG	Methylene Chloride	14 U	UG/KG	1,2-Dichlorobenzene
14 U	UG/KG	trans-1,2-Dichloroethene	14 U	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
14 U	UG/KG	Methyl T-Butyl Ether (MTBE)	14 U	UG/KG	1,2,4-Trichlorobenzene
14 U	UG/KG	1,1-Dichloroethane	NA	UG/KG	1,2,3-Trichlorobenzene
14 U	UG/KG	cis-1,2-Dichloroethene	32	%	% Moisture
14 U	UG/KG	Methyl Ethyl Ketone			
NA	UG/KG	Bromochloromethane			
14 U	UG/KG	Chloroform			
14 U	UG/KG	1,1,1-Trichloroethane			
14 U	UG/KG	Cyclohexane			
14 U	UG/KG	Carbon Tetrachloride			
14 U	UG/KG	Benzene			
14 U	UG/KG	1,2-Dichloroethane			
14 U	UG/KG	Trichloroethene (Trichloroethylene)			
14 U	UG/KG	Methylcyclohexane			
14 U	UG/KG	1,2-Dichloropropane			
14 U	UG/KG	Bromodichloromethane			
14 U	UG/KG	cis-1,3-Dichloropropene			
14 UJ	UG/KG	Methyl Isobutyl Ketone			
14 U	UG/KG	Toluene			
14 U	UG/KG	trans-1,3-Dichloropropene			
14 U	UG/KG	1,1,2-Trichloroethane			
14 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)			
14 UJ	UG/KG	Methyl Butyl Ketone			

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K- Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L- Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA- Not Analyzed. | NAI- Not Analyzed due to Interferences. | A- Analyte analyzed in replicate. Reported value is "average" of replicates.  
R- Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1750 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SD /

Media: SEDIMENT

Case No: 31215

MD No: 1P78

D No: 1P78

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
16 NJ	UG/KG	CYCLOTETRAILOXANE, OCTAMETHYL-

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1749 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Id/Station: LLE01SDD /

Media: SEDIMENT

Case No: 31215

MD No: 1P77

D No: 1P77

Inorg Contractor: SENTIN

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
14 U	UG/KG	Dichlorodifluoromethane
14 U	UG/KG	Chloromethane
14 U	UG/KG	Vinyl Chloride
14 U	UG/KG	Bromomethane
14 U	UG/KG	Chloroethane
3 J	UG/KG	Trichlorofluoromethane (Freon 11)
14 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
14 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
14 U	UG/KG	Acetone
14 U	UG/KG	Carbon Disulfide
14 U	UG/KG	Methyl Acetate
14 U	UG/KG	Methylene Chloride
14 U	UG/KG	trans-1,2-Dichloroethene
14 U	UG/KG	Methyl T-Butyl Ether (MTBE)
14 U	UG/KG	1,1-Dichloroethane
14 U	UG/KG	cis-1,2-Dichloroethene
14 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
14 U	UG/KG	Chloroform
14 U	UG/KG	1,1,1-Trichloroethane
14 U	UG/KG	Cyclohexane
14 U	UG/KG	Carbon Tetrachloride
14 U	UG/KG	Benzene
14 U	UG/KG	1,2-Dichloroethane
14 U	UG/KG	Trichloroethene (Trichloroethylene)
14 U	UG/KG	Methylcyclohexane
14 U	UG/KG	1,2-Dichloropropane
14 U	UG/KG	Bromodichloromethane
14 U	UG/KG	cis-1,3-Dichloropropene
14 U	UG/KG	Methyl Isobutyl Ketone
14 U	UG/KG	Toluene
14 U	UG/KG	trans-1,3-Dichloropropene
14 U	UG/KG	1,1,2-Trichloroethane
14 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
14 U	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
14 U	UG/KG	Dibromochloromethane
14 U	UG/KG	1,2-Dibromoethane (EDB)
14 U	UG/KG	Chlorobenzene
14 U	UG/KG	Ethyl Benzene
14 U	UG/KG	Total Xylenes
14 U	UG/KG	Styrene
14 U	UG/KG	Bromoform
14 U	UG/KG	Isopropylbenzene
14 U	UG/KG	1,1,2,2-Tetrachloroethane
14 U	UG/KG	1,3-Dichlorobenzene
14 U	UG/KG	1,4-Dichlorobenzene
14 U	UG/KG	1,2-Dichlorobenzene
14 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
14 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
31	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

Sample 1749 FY 2003 Project: 03-0143

## MISCELLANEOUS COMPOUNDS

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE01SDD /

MD No: 1P77

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P77

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 10:45

Ending:

RESULTS	UNITS	ANALYTE
24 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
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L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

## VOLATILES SAMPLE ANALYSIS

EPA - REGION IV SEDS, ATHENS, GA

Production Date: 01/29/2003 15:54

Sample 1743 FY 2003 Project: 03-0143

## Volatiles Scan

Facility: Largo Landfill

Largo, FL

Program: SF

Case No: 31215

Id/Station: LLE02SD /

MD No: 1P71

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P71

Org Contractor: CEIMIC

Produced by: Messer, Edward

Requestor:

Project Leader: FSLOAN

Beginning: 11/19/2002 09:15

Ending:

DATA REPORTED ON DRY WEIGHT BASIS

RESULTS	UNITS	ANALYTE
13 U	UG/KG	Dichlorodifluoromethane
13 U	UG/KG	Chloromethane
13 U	UG/KG	Vinyl Chloride
13 U	UG/KG	Bromomethane
13 U	UG/KG	Chloroethane
13 U	UG/KG	Trichlorofluoromethane (Freon 11)
13 U	UG/KG	1,1-Dichloroethene (1,1-Dichloroethylene)
13 U	UG/KG	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)
13 U	UG/KG	Acetone
13 U	UG/KG	Carbon Disulfide
13 U	UG/KG	Methyl Acetate
13 U	UG/KG	Methylene Chloride
13 U	UG/KG	trans-1,2-Dichloroethene
13 U	UG/KG	Methyl T-Butyl Ether (MTBE)
13 U	UG/KG	1,1-Dichloroethane
13 U	UG/KG	cis-1,2-Dichloroethene
13 U	UG/KG	Methyl Ethyl Ketone
NA	UG/KG	Bromochloromethane
13 U	UG/KG	Chloroform
13 U	UG/KG	1,1,1-Trichloroethane
13 U	UG/KG	Cyclohexane
13 U	UG/KG	Carbon Tetrachloride
13 U	UG/KG	Benzene
13 U	UG/KG	1,2-Dichloroethane
13 U	UG/KG	Trichloroethene (Trichloroethylene)
13 U	UG/KG	Methylcyclohexane
13 U	UG/KG	1,2-Dichloropropane
13 U	UG/KG	Bromodichloromethane
13 U	UG/KG	cis-1,3-Dichloropropene
13 U	UG/KG	Methyl Isobutyl Ketone
13 U	UG/KG	Toluene
13 U	UG/KG	trans-1,3-Dichloropropene
13 U	UG/KG	1,1,2-Trichloroethane
13 U	UG/KG	Tetrachloroethene (Tetrachloroethylene)
13 U	UG/KG	Methyl Butyl Ketone

RESULTS	UNITS	ANALYTE
13 U	UG/KG	Dibromochloromethane
13 U	UG/KG	1,2-Dibromoethane (EDB)
13 U	UG/KG	Chlorobenzene
13 U	UG/KG	Ethyl Benzene
13 U	UG/KG	Total Xylenes
13 U	UG/KG	Styrene
13 U	UG/KG	Bromoform
13 U	UG/KG	Isopropylbenzene
13 U	UG/KG	1,1,2,2-Tetrachloroethane
13 U	UG/KG	1,3-Dichlorobenzene
13 U	UG/KG	1,4-Dichlorobenzene
13 U	UG/KG	1,2-Dichlorobenzene
13 UR	UG/KG	1,2-Dibromo-3-Chloropropane (DBCP)
13 U	UG/KG	1,2,4-Trichlorobenzene
NA	UG/KG	1,2,3-Trichlorobenzene
22	%	% Moisture

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
 N-Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ-Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
 K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
 L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
 NA-Not Analyzed. | NAI-Not Analyzed due to interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
 R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.



Sample 1743 FY 2003 Project: 03-0143

Produced by: Messer, Edward

## MISCELLANEOUS COMPOUNDS

Requestor:

Facility: Largo Landfill

Largo, FL

Project Leader: FSLOAN

Program: SF

Case No: 31215

Beginning: 11/19/2002 09:15

Id/Station: LLE02SD /

MD No: 1P71

Inorg Contractor: SENTIN

Media: SEDIMENT

D No: 1P71

Org Contractor: CEIMIC

RESULTS	UNITS	ANALYTE
27 J	UG/KG	UNKNOWN SILOXANE

Data Reported as Identified by CLP Lab - IDs Not Verified

U-Analyte not detected at or above reporting limit. | J-Identification of analyte is acceptable; reported value is an estimate. | UJ-Analyte not detected at or above reporting limit. Reporting limit is an estimate.  
N- Presumptive evidence analyte is present; analyte reported as tentative identification. | NJ- Presumptive evidence analyte is present; analyte reported as tentative identification. Reported value is an estimate.  
K-Identification of analyte is acceptable; reported value may be biased high. Actual value expected to be less than the reported value.  
L-Identification of analyte is acceptable; reported value may be biased low. Actual value expected to be greater than reported value.  
NA-Not Analyzed. | NAI-Not Analyzed due to Interferences. | A-Analyte analyzed in replicate. Reported value is "average" of replicates.  
R-Presence or absence of analyte can not be determined from data due to severe quality control problems. Data are rejected and considered unusable.

# Lake Seminole Watershed

## Reasonable Assurance Plan

Prepared for:



September  
2007

Prepared by:



Segment 2

Segment 1

Site E

Segment 1



# TABLE OF CONTENTS

Purpose of Document.....	1
History of Lake Seminole.....	3
Physical Modifications .....	3
Land Use .....	6
Causes of Current Problems .....	7
 1. Description of the Impaired Water Body.....	8
1.a Name of the Water Listed on the Verified List.....	8
1.b Location of the Water Body and Watershed.....	8
1.c Watershed/8-digit Cataloging Unit Code (HUC).....	8
1.d NHD Identifier .....	9
1.e Water Body Type .....	9
1.f Water Use Classification .....	9
1.g Designated Use Not Being Attained .....	9
1.h Length of Impaired Area .....	9
1.i Pollutants of Concern .....	9
1.j Suspected or Documented Sources of the Pollutants of Concern .....	10
Trophic State .....	10
Water and Nutrient Budgets .....	16
Pollutant Loads.....	18
 2. Description of Water-Quality Goals .....	22
2.a Description of the Water Quality-Based Targets (both Interim and Final) Established for the Pollutant(s) of Concern .....	22
2.b Averaging Period for Numeric Water Quality Goals .....	26
2.c Discussion of How These Goals Will Result in the Restoration of the Water Body's Impaired Designated Uses .....	26
2.d Schedule Indicating When Interim And Final Targets Are Expected To Be Met.....	27
2.e Description Of Procedures To Determine Whether Additional Corrective Actions Are Needed.....	28
 3. Description of the Proposed Management to be Undertaken .....	29
3.a Names of the Responsible Participating Entities.....	29
3.b Summary and List of Existing and Proposed Management Activities Designed to Restore Water Quality .....	29
Structural Components.....	31
Management Components .....	40
Legal Components .....	48
Policy Component .....	50
Compliance and Enforcement Component .....	51
Public Education Components .....	52
3.c Geographic Scope of any Proposed Management Activity .....	55
3.d Documentation of the Estimated Pollutant Load Reduction and Other Benefits Anticipated from Implementation of Individual Management Actions.....	55
Structural Components.....	55
Management Components .....	58
Legal Components .....	62
Policy Component .....	62
Compliance and Enforcement Component .....	62
Public Education Components .....	62

Modeling Results .....	63
3.e Copies of Written Agreements Committing Participants to the Management Actions .	68
3.f Discussion On How Future Growth And New Sources Will Be Addressed.....	69
3.g Confirmed Sources of Funding.....	70
3.h Implementation Schedule (Including interim milestones, and the date by which designated uses will be restored) .....	70
Phasing of Plan Components .....	70
3.i Enforcement Programs or Local Ordinances (If management strategy is not voluntary) .....	71
4. Procedures for Monitoring and Reporting Results .....	72
4.a Description of Procedures for Monitoring and Reporting .....	72
4.b Quality Assurance/Quality Control Elements that Demonstrate the Monitoring will Comply with Chapter 62-160, F.A.C.....	73
4.c Procedures for Entering all appropriate Data into STORET.....	73
4.d Responsible Monitoring and Reporting Entity .....	73
4.e Frequency and Format for Reporting Results .....	73
4.f Frequency and Format for Reporting on the Implementation of all Proposed Management Activities .....	75
4.g Methods for Evaluating Progress Towards Goals .....	75
5. A Description of Proposed Corrective Actions .....	75
5.a Description of Proposed Corrective Actions that will be undertaken if water quality does not improve after implementation of the management actions or if management actions are not completed on schedule.....	75
5.b Process for Notifying the Department that these corrective actions are being implement .....	75
Case Study #1 - Sediment Removal .....	74



## **LIST OF APPENDICES**

Appendix A	Permits
Appendix B	Sub Basin One Effectiveness Evaluation
Appendix C	WASP Model
Appendix D	External WASP Review
Appendix E	Interlocal Agreement
Appendix F	Pinellas County Monitoring Plan
Appendix G	Ambient Monitoring Report 2003-2005
Appendix H	Standard Field Protocol and Checklist

## LIST OF TABLES

Table 1-1	Timeline of Events within Lake Seminole
Table 1-2	Trophic State Index (TSI for Lakes and Estuaries (from FDEP 1996)
Table 1-3	Water Budget for Lake Seminole Calculated Using 1997 Data
Table 1-4	Total Nitrogen (TN) Budget for Lake Seminole Calculated using 1997 Data
Table 1-5	Total Phosphorus (TP) Budget for lake Seminole Calculated using 1997 Data
Table 1-6	Major Sub-basins with the Highest Integrated Nonpoint Source Pollutant Loads Listed in Order of Decreasing Priority
Table 2-1	Goals, Targets and Monitoring Objectives for the Water Quality Issue
Table 3-1	Summary of Recommended Habitat Restorations Sites and Projects in Lake Seminole and its Watershed
Table 3-2	Potential Stormwater BMP Locations in the Priority Sub-basins
Table 3-3	Summary Comparison of Project Alternatives
Table 3-4	Tabular Summary of Target Monthly Lake Levels under the Recommended Enhanced Lake Level Fluctuation Schedule
Table 3-5	Mean Pollutant Efficiencies Achieved during Laboratory Jar Tests Conducted on Stormwater Samples Collected in Lake Seminole Watershed during November 2003-March 2004 (ERD 2005)
Table 3-6	Pollutant Removal Efficiencies for Alum Treatment Systems (from Harper and Livingston, 1999)
Table 3-7	LWWM Simulation Results for Management Action #1 - Regional Stormwater Treatment Facilities (BMPs)
Table 3-8	LWWM Simulation Components and Results for Management Action #3 - Canal Diversion
Table 3-9	LWWM Simulation Components and Results for Management Action #4 - Sediment Removal
Table 3-10	LWWM Simulation Components and Results for Management Action Combinations
Table 3-11	Confirmed Sources of Funding for Lake Seminole Restoration Projects
Table 3-12	Implementation Schedule
Table 4-1	Pinellas County Water Quality Monitoring Schedule 2007
Table 4-2	Lake Seminole Sampling Stations
Table 4-3	Indicators Collected at each Sampling Site (From Monitoring Plan 2003)

## LIST OF FIGURES

Figure 1-1	Location of Lake Seminole Watershed
Figure 1-2	Timeline of Major Events in Lake Seminole and annual chlorophyll-a values
Figure 1-3	Current (2004) land use in the Lake Seminole Watershed
Figure 1-4	Lake Seminole Water Level from January 1995 to May 2007 and monthly Precipitation (SWFWMD)
Figure 1-5	Trend in Lake Seminole annual average Secchi disk depths (*missing data for some seasons)
Figure 1-6	Natural vs cultural (human-induced) eutrophication
Figure 1-7	Trend in Lake Seminole annual average chlorophyll-a concentrations
Figure 1-8	Annual Average Total Nitrogen in Lake Seminole and flow-weighted direct runoff calculated in 2001
Figure 1-9	Annual Average Total Phosphorus in Lake Seminole and the flow-weighted direct runoff calculated in 2001
Figure 1-10	Trend in annual rainfall totals in the Lake Seminole watershed (SWFWMD)
Figure 1-11	Comparison of TSI calculation methods for Lake Seminole
Figure 1-12	Graphical depiction of the lake water budget
Figure 1-13	Graphical depiction of the lake phosphorus budget
Figure 1-14	Major sub-basins delineation in the Lake Seminole watershed
Figure 1-15	Pollutant load rankings of the major sub-basins
Figure 3-1	Potential Publicly Owned Staging and Sediment Treatment Sites in the Lake Seminole Vicinity
Figure 3-2	Location of Recommended Habitat Restoration Sites in lake Seminole and its Watershed
Figure 3-3	Location of Recommended Enhanced Regional Stormwater Treatment Facilities
Figure 3-4	Conceptual Diagram of the Preferred Alternative 6A
Figure 3-5	Recommended Enhanced Lake Level Fluctuation Schedule
Figure 3-6	Storm Drain labels within the Lake Seminole Watershed
Figure 3-7	BMP Alternative #1237 Simulation Results vs 1998 Future Land Use Baseline Conditions (Model Plot)
Figure 3-8	Weir Alternative Simulation Results vs 1998 Future Land Use Baseline Conditions (Model Plot)
Figure 3-9	Canal Diversion Alternative #3A1 Simulation Results vs 1998 Future Land Use Baseline Conditions (Model Plot)
Figure 3-10	Dredging Alternative #4C Simulation Results vs 1998 Future Land Use Baseline Conditions (Model Plot)
Figure 3-11	Combination of all Management Actions Simulation Results vs 1998 Future Land Use Baseline Conditions (Model Plot)
Figure 3-12	Allocated Funding for Pinellas County Capital Improvement Projects

# **Lake Seminole Reasonable Assurance Plan**

## **Purpose of Document**

Lake Seminole is currently listed by the Florida Department of Environmental Protection (DEP) as an impaired waterbody pursuant to Section 303(d) of the federal Clean Water Act. The primary pollutants associated with this impairment are nutrients, which have resulted in hyper-eutrophic conditions and associated water quality violations (e.g., dissolved oxygen) in the lake.

In 2004, the Pinellas County Board of County Commissioners adopted the Lake Seminole Watershed Management Plan (Plan). The Plan assimilated substantial diagnostic and feasibility analyses, and specifies four major projects aimed at reducing nutrient concentrations in the lake and improving water quality conditions. These projects include: 1) retrofitting stormwater outflows from the five highest nutrient loading sub basins with alum treatment systems; 2) alum treatment and redirection of a portion of flows in the Lake Seminole Bypass Canal into Lake Seminole; 3) removal of organic muck sediments and 4) lake level fluctuation. Using a WASP model developed specifically for Lake Seminole, it was predicted that the trophic state index (TSI) of the lake using the method derived by Huber et al. (1982) could feasibly be reduced from greater than 80 currently to approximately 65 through the implementation of the four major water quality improvement projects.

Since 1994 more than \$32 million has been spent and/or allocated for Lake Seminole diagnostic feasibility studies, watershed management planning, engineering design, and construction of habitat restoration projects. Pinellas County has been responsible for over \$10 million of these expenditures, while additional cost sharing has been provided by the Southwest Florida Water Management District (SWFWMD), the Florida Fish and Wildlife Conservation Commission (FWCC), the Florida Department of Environmental Protection (FDEP), and the Cities of Largo and Seminole. Moving forward, Pinellas County has dedicated substantial funds in their 2007-2012 Capital Improvement Plan, and has secured funding agreements with other agencies, as necessary to ensure the full implementation of the four major water quality improvement projects, as well as other associated infrastructure improvements. Specifically, \$4.9 million has been allocated for the design and construction of the alum stormwater and bypass canal diversion treatment facilities designed to reduce external nutrient loads to Lake Seminole, and \$8 million has been allocated to remove organic sediments from the lake to reduce external nutrient recycling. The County is moving forward with construction on these projects with the alum and bypass canal construction beginning in 2007, and as of April 2007 a contractor has been selected for the sediment removal project, anticipated to begin construction in 2008.

Furthermore, it should be noted that the commitments made by Pinellas County with regard to the implementation of the aforementioned water quality improvement projects are fully enforceable through their existing State of Florida Municipal Separate Storm Sewer System (MS4) Permit, issued under the National Pollutant Discharge Elimination System (NPDES) program. In addition, continued operation and maintenance of the alum stormwater and bypass canal diversion treatment facilities is guaranteed under a cooperative funding agreement between Pinellas County and SWFWMD. **Appendix A**



contains copies of the Pinellas County MS4 permit and the cooperative funding agreement between the County and SWFWMD. Also, Pinellas County has received the appropriate approved Environmental Resource Permit (ERP) and Army Corps Of Engineers (ACOE) permits for the alum projects. Finally, a federal dredge and fill (CWA Section 404/10) permit from the U.S. Army Corps of Engineers, and a State of Florida Environmental Resource Permit (for delegated Water Quality Certification), will be required for the sediment removal project. This permit will likely specify monitoring and reporting requirements for the project, thus establishing additional federal and state enforcement provisions.

This document provides “reasonable assurance” that implementation of the Plan will be sufficient to attain compliance with water quality standards and eliminate the necessity of a TMDL. A comprehensive discussion of all restoration plans implemented or proposed for Lake Seminole are detailed in the reasonable assurance document. Several of the large scale restoration plans were proposed by the Plan, therefore, a majority of the content contained within this document was taken from the Plan.

The Clean Water Act regulations recognize that alternative pollution control requirements may obviate the need for a TMDL. Specifically, waterbody segments that would otherwise be listed as “impaired” are not required to be included on the Section 303(d) list if other pollution control measures required by local, State or Federal authorities are demonstrated to be stringent enough to result in compliance with water quality standards within a reasonable period of time (see 40 CFR 130.7(b)(1)). These alternatives to TMDLs are referred to as Category 4b waters. This reasonable assurance documentation is prepared for formal Category 4b Demonstration for Lake Seminole, to be coordinated with the U.S. Environmental Protection Agency (EPA). The EPA guidance on Category 4b demonstrations requires that the following elements be addressed:

1. Identification of segment and statement of problems causing the impairment.
2. Description of pollution controls and how they will achieve water quality standards.
3. An estimate or projection of the time when water quality standards will be met.
4. Schedule for implementing pollution controls.
5. Monitoring plan to track effectiveness of pollution controls.
6. Commitment to revise pollution controls as necessary.

In addition to addressing the elements listed above, adequate reasonable assurance documentation will establish that: 1) implementation of the major water quality projects set forth in the Plan are sufficient to meet the established TSI goal of 60; and 2) that the TSI goal of 60 is appropriate for Lake Seminole in light of unnatural origins of the lake, as well as the significant hydrologic and biological alterations that have taken place since the lake was first impounded.

The recommended structure for category 4B demonstrations was followed for the construction of the Reasonable Assurance Plan for Lake Seminole in Florida.

# History of Lake Seminole

## Physical Modifications

Lake Seminole, located in west central Pinellas County, Florida, was created in the mid-1940s by the impoundment of an arm of Long Bayou, a brackish water segment of Boca Ciega Bay (**Figure 1-1; Figure 1-2**). On July 3, 1945, the Pinellas County Board of County Commissioners passed a resolution to create a freshwater lake in conjunction with the planned construction of Park Boulevard and a causeway across Long Bayou by the State Public Roads Administration (**Table 1-1**). A secondary purpose for the creation of a freshwater lake was to provide a source of irrigation water for nearby citrus groves as well as to augment potable water supplies provided by the Pinellas County Water System (SWFWMD, 1992). Fresh water was contained in the lake through the construction of a fixed crest weir with an elevation of 6-feet NGVD at the south end of the lake. The constructed lake was created through flooding both mangrove and salt marsh systems. Prior to inundation, the existing peat and sediment was not removed.

Since the single fixed crest weir located at the south end of the lake had the potential to cause significant tailwater flooding upstream of the lake, a second weir was constructed at the north end of the lake in the late 1940s (SWFWMD, 1992). Water was then pumped from a dredged basin at the southern end of Long Creek (the original tributary which flowed to Long Bayou) over the north weir and into the lake via three lift pumps. This modification allowed the water level in Lake Seminole to be permanently maintained at elevation 6-feet NGVD. Between 1957 and 1965, Long Creek was channelized upstream of Lake Seminole to improve drainage conveyance in a rapidly urbanizing portion of Pinellas County.

In 1963, Lake Seminole was designated a State Fish Management Area for the cooperative management of freshwater fishes with the local community. Subsequently, the Lake Seminole Park was constructed in 1967. Additionally, a small 18-inch diameter outfall pipe with an invert elevation of 3.5-feet NGVD was constructed from the lake through a series of three interconnected ponds in the park. Water flows from the lake through this series of interconnected ponds and eventually discharges into the Seminole Bypass Canal over a weir slightly below elevation 5-feet NGVD. The purpose of this outfall was to provide relatively constant flow through the ponds to prevent stagnation and water quality problems. In the late 1960s, the northern weir was replaced with a fixed curvilinear weir that exists today. The fixed elevation of the existing weir is 5-feet NGVD.

In the late 1960's, the Florida Fish and Wildlife Conservation Commission (FWCC) recommended preventative measures to reduce the decline in water quality in Lake Seminole. The water quality and fishery were declining and the abundance of nuisance vegetation was increasing. Point sources for nutrient pollution were targeted for evaluation and termination. In 1971, the City of Largo closed a secondary, high rate, filtration plant. The plant had been discharging into a drainage ditch which flowed into the north end of the lake. Not long after the termination of the wastewater treatment plant, Lake Seminole was classified as eutrophic by the USEPA based on samples collected and analyzed during a "National Eutrophication Survey" (Camp, Dresser, and McKee, 1990).

In 1976, the Seminole Bypass Canal was constructed in response to flooding in the upper Long Creek basin, as well as a perceived decrease in lake water quality thought to be caused by the pumping of Long Creek flows into the lake (SWFWMD, 1992). The construction of the Seminole Bypass Canal diverted runoff from approximately eleven square miles of the historic Long Creek basin, around Lake Seminole to the east and directly into Long Bayou. Subsequently, a fixed crest weir with an elevation of 3-feet NGVD was constructed at the southern terminus of the Seminole Bypass Canal. Although this modification successfully reduced flooding potential in the upper Long Creek watershed, it essentially resulted in the hydrologic isolation of Lake Seminole, and substantially increased the residence time of the lake. Prior to this modification, the lake was discharging at or slightly above the 5-foot NGVD weir crest elevation a majority of the time. However, after the construction of the Seminole Bypass Canal and the dismantling of the pumps, discharge over the weir has been infrequent and of short duration (SWFWMD, 1992).

The ecological conditions worsened in the 1980's due to the isolation of Lake Seminole which resulted in an increase in residence time, accumulation of organic sediments, a decline in water quality (algal blooms) and fisheries and an increase in nuisance aquatic vegetation (hydrilla). The FWCC stocked the lake with triploid grass carp in 1987 as an attempt to control the hydrilla infestation. Additionally grass carp were stocked in 1988, 1989, and 1991. The grass carp successfully eliminated the majority of nuisance SAV from the lake and even today a few grass carp are present in the lake. In turn, the Pinellas County Board of County Commissioners passed a resolution in January 1989 (Resolution 89-13) urging the joint development of an effective long term lake management program through the cooperative efforts of the public, lake users, and state and local agencies with responsibilities on the lake. These agencies included Pinellas County, the Southwest Florida Water Management District (SWFWMD), the Florida Department of Natural Resources (FDNR), the Florida Department of Environmental Regulation (FDER), the Florida Fish and Wildlife Conservation Commission (FWCC), and the Cities of Largo and Seminole. Representatives from these agencies as well as affected homeowner and business interests, were subsequently assembled as the Lake Seminole Advisory Committee (LSAC).

In 1992, the Pinellas-Anclote Basin Board authorized a \$10 million cooperative funding agreement with Pinellas County to restore the water quality in Lake Seminole. As a result of this agreement, SWFWMD funded a diagnostic feasibility study of Lake Seminole in 1992. The Lake Seminole Diagnostic Feasibility Study (SWFWMD, 1992) estimated potential pollutant loadings from the watershed, as well as the lake's ability to assimilate these pollutant loads. In support of this work a preliminary lake/watershed model was developed (Dames and Moore, 1992). This model was termed the Lake Seminole Management Model (LSMM). Other components of the diagnostic feasibility study included an assessment of plant and animal communities in the lake and watershed, as well as a characterization of lake water quality and sediments. This work was used as the basis for various lake and watershed management actions initiated by the County and other resource management agencies; however, a comprehensive lake and watershed management plan was never developed.

Since the completion of the diagnostic feasibility study, Pinellas County, with financial support from SWFWMD through the cooperative agreement, initiated several projects aimed at reducing external nutrient loads to Lake Seminole, and improving in-lake habitats. These included the Dog Leg Pond and the Pond-6 Stormwater Rehabilitation

Projects, and the construction of an improved outfall control structure to allow for greater lake level fluctuation. In addition, the County continued to sponsor periodic meetings of the LSAC to obtain input from represented local governments, regulatory and resource management agencies, and affected citizens and businesses regarding better management of the lake. The primary functions of the LSAC included: the identification of priority lake management issues and problems; the development of management goals and strategies; and, the provision of a general forum for the sharing of information and the discussion of ongoing and emerging lake management issues.

As part of the County's on-going work to develop comprehensive watershed management plans for all significant basins within their jurisdiction, and to provide a focus for the activities of the LSAC, the County selected PBS&J in 1997 to assist in the preparation of the Lake Seminole Watershed Management Plan (Plan). The Plan represents the culmination of a decade of diagnostic feasibility and resource planning activities undertaken by numerous governmental agencies and consulting scientists and engineers (PBS&J, 2001). In support of the Plan development, PBS&J completed a task deliverable document entitled *Lake Seminole Sediment Removal Feasibility Study* in 1999 (PBS&J, 1999). This task report addressed the feasibility of removing accumulated sediments from Lake Seminole with these objectives in mind. However, since the completion of that document, and the adoption of the Plan by the Pinellas County Board of County Commissioners in 2004, some of the assumptions and conditions leading to the recommendations contained in Plan have changed (e.g., availability of publicly owned parcels for spoil dewatering). Additionally, in 2004 the City of St. Petersburg initiated a sediment removal project as part of the overall restoration plan for Lake Maggiore, and much relevant information is now available from that project. In 2006, an updated and revised deliverable document, *Lake Seminole Sediment Removal Feasibility Study*, was submitted to Pinellas County by PBS&J (PBS&J, 2006).

In addition to Pinellas County's effort to rehabilitate Lake Seminole, the FWCC released juvenile largemouth bass to the lake on two occasions (mid-1990's and November 2006) to supplement the fishery population and restore the fishery. The initial stocking was unsuccessful but 3 months after the 2006 stocking event a healthy largemouth bass population was reported in the lake. In an attempt to improve the fisheries habitat and water quality in the lake, the FWCC initiated the first phase of a habitat enhancement project in 2002 which involved sediment removal and vegetation planting. Sections of the lake were isolated using bladder dams, dewatered, and scraped down using traditional mechanical equipment. This resulted in the removal of over 31,000 cubic yards of organic material from critical sport fish spawning areas and resulted in the establishment of native submerged and emergent vegetation. In 2006, phase II of the habitat restoration project began in collaboration with the Pinellas County Department of Environmental Management (PCDEM). However, the water level of the entire lake was drawn down. An extensive lake clean-up was completed involving nuisance vegetation removal, replanting, and drainage improvements. Over 460 volunteers throughout the community participated in three lake clean up events resulting in the removal of over 27 tons of trash and debris (**Photo 1-1**). Approximately 100,000 cubic yards of organic material were removed from the lake. While the water levels were low, a USGS water level and discharge recorder was installed at the southern weir of the lake.





**Photo 1-1. Local Volunteer Lake Clean-Up in 2006 during lake level draw down.**

Since the adoption of the Plan, Pinellas County has implemented several other restoration components in order to address water quality concerns and improve the ecological health of the lake. The alum treatment system and pump required to divert water from the Seminole Bypass Canal to the lake and three of five lake alum treatment facilities are at 100% design and will begin construction in 2007. In early 2007, Pinellas County selected Hayes-Bosworth, Inc in coordination with PBS&J, to dredge Lake Seminole. Finally, the lake level modification structure has been completed and was used to draw down the lake water level for the habitat enhancement projects. Pinellas County anticipates the completion of all proposed projects by 2012. To date Pinellas County has spent over \$10 million on restoration projects in Lake Seminole. The Cities of Largo and Seminole have contributed over \$156,107 toward the restoration of the Lake. Additionally, the FWCC, SWFWMD and SWIM have spent \$336,623, \$6,371,284 and \$231,871, respectively. A total of over \$19.2 million local and state funding has been allocated and/or spent toward the improvement of water quality in Lake Seminole since 1994.

## **Land Use**

Since the construction of the Park Boulevard causeway and the impoundment of Long Bayou, land uses in the Lake Seminole watershed have changed from predominantly low density rural residential and agriculture (e.g., improved pasture and citrus) to high density urban residential and commercial. A review of historic aerial photography

indicates that urbanization in the basin began in the 1950s, and was first evident along the western side of the lake where numerous waterfront residential developments were initiated. Many of these developments involved major dredge and fill activities to create canals and bulkheads.

From the early 1950s through the mid-1960s, urbanization continued to occur predominantly in the western portion of the watershed, along the Seminole Boulevard corridor. In the mid-1960s, land use changes in the eastern portion of the watershed began to occur. In 1967, Lake Seminole Park was constructed, and the park was subsequently expanded in 1976. Rapid infilling of urban land uses occurred throughout the watershed during the 1970s and 1980s; however, no new major dredge and fill activities in the lake were permitted during this time period. In the mid-1990s the 102nd Avenue Bridge was constructed over the central 'narrows' portion of Lake Seminole. **Figure 1-3** shows the boundaries of the Lake Seminole watershed and existing (2004) land use in the basin.

### **Causes of Current Problems**

It should be emphasized that many of the problems facing Lake Seminole today were essentially predetermined by the physical origins of the lake, as well as the subsequent hydrologic modifications and land use changes that later occurred in the watershed. Long Bayou was historically a shallow tidal embayment which likely had been accumulating fine organic muck sediments in the poorly flushed backwaters for several centuries. When the lake was created by impounding Long Bayou, these sediments along with the riparian mangrove swamps were flooded by detained freshwater discharges from Long Creek. Today, these deposits of organic sediments constitute a lake management problem that now, more than ever, needs to be addressed. Increased nutrient input to Lake Seminole contributed to the decline in water quality. Additionally, wastewater from a treatment facility in Largo was discharging nutrient laden water into Lake Seminole until direct discharges ended in 1971. Subsequently, Long Creek flows were isolated from the lake via the construction of the Lake Seminole Bypass Canal substantially reduced lake circulation and flushing and increased the residence time of nutrients entering the lake. Combined with rapid urbanization with little or no stormwater treatment in the surrounding watershed, this hydrologic modification has likely significantly contributed to the persistent algae blooms and cultural eutrophication observed in Lake Seminole.

A stair-step decline in water quality was observed in 1999 and continued through 2005 which can not be attributed to changes in anthropogenic sources (**Figure 1-2**). In 1999, drought conditions contributed to the lowering of the lake level which further increased the residence time (**Figure 1-4**). During this period a persistent decrease in secchi depth was recorded which could have been due to the resuspension of sediment during and after the lake level was drawn down (**Figure 1-5**). The conditions were further exacerbated in 2006 by a scheduled lake level drawdown for a habitat enhancement sediment removal project. The lake level remained low for an extended period of time due to minimal precipitation and rapid evaporation. Lake water quality has not recovered back to pre-1999 conditions and it is hypothesized that the observed step-change has been maintained by increased residence time and internal nutrient recycling as well as an increasing dominance of nitrogen-fixing blue-green algae.

When the original decision was made by the Pinellas County Board of County Commissioners to create Lake Seminole, these problems could scarcely have been anticipated. However, with the commitment to create the lake comes the obligation to manage the lake and its watershed in a manner consistent with the goals, objectives, and policies of the Pinellas County Comprehensive Plan. The Lake Seminole Watershed Management Plan provides the framework for remediating the historic problems described above, as well as for creating a new future for Lake Seminole.

## **1. Description of the Impaired Water Body**

Lake Seminole is a 684-acre freshwater lake located in west central Pinellas County, Florida (**Figure 1-1**). It was created by the impoundment of an arm of Long Bayou, an estuarine waterbody, in the 1940s. The Lake Seminole watershed encompasses approximately 3,500 acres, of which almost 90 percent is developed as urban land uses. Drainage from much of the historical watershed of the lake has been diverted to the Seminole Bypass Canal, which intercepts surface runoff and conveys it east of the lake to Long Bayou. The lake currently supports intense recreational use including boating, skiing, and fishing. In recent years; however, the sport fishery (primarily largemouth bass and bluegill) and water quality have declined. Prior to creation, Lake Seminole was comprised of a low energy mangrove and salt marsh system. Due to the estuarine marsh environment, a substantial amount of organic silt sediments were present during the impoundment of Long Bayou to create Lake Seminole. These sediments were not removed and have continued to accumulate since the 1940's. The accumulation of organic silts in lakes is often associated with declining water quality and undesirable changes in aquatic invertebrate and fish communities. The available data indicate a trend of increasing eutrophication and harmful algal blooms in Lake Seminole. The primary concern with regard to water quality in Lake Seminole is excessive cultural (human-induced) eutrophication. Other types of water quality problems can occur in lakes, such as high concentrations of toxics (e.g., heavy metals, pesticides, etc.) and pathogens (e.g., coliform bacteria), but these types of public health problems have not been observed in Lake Seminole to any significant degree. Rather, the major water quality concerns are: 1) the control of excessive nutrients entering the lake; and 2) the fate of the nutrients that do reach the lake (e.g., internal nutrient recycling).

### **1.a Name of the Water Listed on the Verified List**

This document addresses Lake Seminole WBID 1618 located in Pinellas County, Florida.

### **1.b Location of the Water Body and Watershed**

Lake Seminole is located in west central Pinellas County (**Figure 1-1**). The lake is located in the Long Bayou Watershed.

### **1.c Watershed/8-digit Cataloging Unit Code (HUC)**

The USGS Watershed/ 8-digit Cataloging Unit Code for Lake Seminole is 03100207. Lake Seminole is located within the Crystal River to St. Petersburg Watershed.

#### **1.d NHD Identifier**

Both Medium and High resolution data are available from the National Hydrography Dataset (NHD) for Lake Seminole. The Com\_ID for the High resolution data is 120024097 and Medium Resolution is 16933868 (<http://nhd.usgs.gov/>). The Reach Number for the High and Medium Resolution polygon is 031002070160475 and 03100207003126, respectively.

#### **1.e Water Body Type**

Lake.

#### **1.f Water Use Classification**

The impaired waterbody, Lake Seminole, is classified as Class III-Freshwater. This classification designates Lake Seminole for recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife (FDEP, 1996).

#### **1.g Designated Use Not Being Attained**

Class III-Freshwater- recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife.

As of July 27, 2006, Lake Seminole was listed on the Group 5 Draft Verified List of Impaired Waters due to high nutrient concentrations (or TSI). Between 1999 and 2004, the annual average TSI value for Lake Seminole was greater than 60 all six years. The median Total Nitrogen value for 445 samples was 3.28 mg/l. The median Total Phosphorus value for 448 samples was 0.12 mg/l. The median Biological Oxygen Demand for 342 samples was 7.0 mg/l. ([http://www.dep.state.fl.us/water/tmdl/verified\\_gp5.htm](http://www.dep.state.fl.us/water/tmdl/verified_gp5.htm)). This document addresses the eutrophication of Lake Seminole and the management strategies that can be implemented to address impairments listed for the lake from the 303(d) Impaired Waters List.

Due to the decline in water quality, use of the lake by residents, fisherman and tourists has diminished. The increase in nutrients and sediments has decreased the quality of the fishery habitat resulting in a reduction in quantity and quality of target fishes (i.e. largemouth bass, crappie, etc.).

#### **1.h Length of Impaired Area**

Lake Seminole is approximately 684 acres in size, and it is the second largest lake in Pinellas County. The lake is approximately 3.3 miles long by 0.43 miles wide.

#### **1.i Pollutants of Concern**

An elevated Trophic State Index (TSI) value has been identified as the water quality parameter of concern for Lake Seminole. Specifically, TSI values exceeded the IWR threshold of 60 in the years 1999 to 2004, which is the threshold value for lakes with levels of color in excess of 40 platinum-cobalt units (IWR 2004). Between 1991 and 1998, Lake Seminole's annual average chlorophyll-a values exceeded 24 µg / liter, which is the median value for mesotrophic lakes in Florida (FDEP 1996). However, it



was not until 1999 that levels of chlorophyll-a exceeded 78 µg / liter, which is the median value for eutrophic lakes in Florida (FDEP 1996). Between 1991 and 2006, levels of TP in Lake Seminole have been higher than the median value (0.07 mg / liter) for mesotrophic lakes, but mostly lower than the median value (0.13 mg / liter) for eutrophic lakes in Florida (FDEP 1996). Since at least 1993, levels of TN in Lake Seminole have exceeded the median value (1.36 mg / liter) for mesotrophic lakes in Florida (FDEP 1996), while TN values have exceeded the median value for eutrophic lakes (2.4 mg / liter) since 1999.

## **1.j Suspected or Documented Sources of the Pollutants of Concern**

The documented sources of excessive nutrients in Lake Seminole is based on data collected by the extensive water quality monitoring plan implemented by PCDEM. The suspected or documented sources of nutrient enrichment in Lake Seminole water quality are discussed in terms of: 1) trophic state; 2) water and nutrient budgets; and 3) pollutant loads. The data analysis includes all data collected by PCDEM between collected between 1991-2006.

### **Trophic State**

The term *trophic state* can be loosely defined as the nutritional status of a lake (Huber et al, 1982). Like other plants, microscopic, single-celled algae (also referred to as phytoplankton) require nitrogen and phosphorus and other primary nutrients to grow and reproduce. However, if nutrients are available in the water column of lakes in concentrations that are too high, nuisance algae blooms can occur. If these conditions persist for a prolonged period of time, many ecological changes begin to take place in the lake. First, the excessive algae concentrations increase turbidity in the water column and shade out the light that supports rooted plants, eventually resulting in the die-off of submerged aquatic vegetation. Second, the bacterial breakdown of the excessive amount of dead algal cells raining down on the lake bottom results in a depletion of oxygen in the water column which can result in fish kills. Third, when algae becomes the dominant source of primary production (photosynthesis) in the lake, this can result in a shift in the fish population structure from a predominance of carnivorous sport fish (e.g., largemouth bass) to a predominance of herbivorous rough fish (e.g., gizzard shad). This process is called *eutrophication*.

Lake eutrophication is a natural process resulting from the gradual accumulation of nutrients, increased productivity, and a slow filling in of the basin with accumulated sediments, silt and organic matter from the watershed. The classical lake succession sequence is usually depicted as a unidirectional progression through the following series of phases or trophic states including:

*Oligotrophy* - nutrient-poor, biologically unproductive, low turbidity;

*Mesotrophy* - intermediate nutrients and biological productivity, moderate turbidity;

*Eutrophy* - nutrient-rich, high biological productivity, high turbidity;

*Hypereutrophy* - pea soup conditions, the extreme end of the trophic continuum.

Although natural eutrophication could take tens of thousands of years to occur, a lake's lifespan can be drastically shortened by human-induced cultural eutrophication. Activities in the watershed such as forest clearing, road building, agricultural cultivation, residential and commercial development, stormwater runoff and wastewater discharges can all result in substantial increases in the discharge of nutrients, organic matter and sediments to the lake. **Figure 1-6** illustrates the differences between natural and cultural, or human-induced, eutrophication.

The primary measure of the degree of eutrophication in a lake is the concentration of chlorophyll-a in the water column. Chlorophyll-a is an estimate of algal cell biomass, and may be directly related to the trophic state of the lake. In addition, the primary nutrients of concern with respect to controlling eutrophication are total nitrogen (TN) and total phosphorus (TP). Finally, the most commonly used measure of water transparency is the Secchi disk depth, or the maximum depth at which a disk suspended on a weighted line can be visually detected below the water surface.

The following summaries of the status and trends in water quality and pollutant loading sources focus on the parameters related to the trophic state of the lake, including chlorophyll-a, TN, TP, and Secchi disk depth. With respect to indicators of eutrophication, water quality in Lake Seminole has generally declined over the past decade. Below are plots of annual averages of seasonal water quality data collected in Lake Seminole from the period of record, 1991 through 2006 (**Figures 1-4, 1-5 and 1-7 through 1-10**). Due to limitations in detection limits and other analytical problems, all data prior to 1995 should be investigated with caution.

Chlorophyll-a is the most commonly used measure of lake trophic state. **Figure 1-2** provides a timeline of major events in relation to Lake Seminole and chlorophyll a. A water sample was collected in Lake Seminole by the FWCC for each year from 1969-1972. The chlorophyll-a values ranged from 21.4-69.5 µg/l. In 1973, six water quality samples were collected by the EPA. This data provides a historical "snap-shot" of the water quality in Lake Seminole based on the quantity of samples, the average chlorophyll a was 102 µg/l. **Figure 1-7** shows trends in annual average chlorophyll-a concentrations from 1991-2006. Chlorophyll-a concentrations in Lake Seminole were the lowest on record and generally stable from 1991 through 1998, but increased substantially in 1999. The mean annual chlorophyll-a concentration from 1991 through 1998 was 65 µg/l. However, in 1999 the mean monthly chlorophyll-a concentration increased to 120 µg/l, almost double the mean annual concentration over the previous eight years. Based on annual rainfall to Tampa Bay, 1999 was the beginning of a multi-year drought that extended till 2001 (Morrison et al., 2006). Additionally, 1997-1998 were "El Nino" years with the associated above average rainfall. The increased rainfall in 1998 would have increased stormwater runoff and nutrient input into Lake Seminole. The following drought would have resulted in minimal freshwater input to the Lake. The water level in Lake Seminole dropped below 4.0 feet (NGVD) in 2000 (**Figure 1-4**). Since 1999, chlorophyll a values have fluctuated around 120 µg/l. However, in 2006, values increased to 161 µg/l. In 2006, chlorophyll a values were perhaps high due to lowering the lake from 5.0 ft NGVD to 2.5 ft NGVD for a habitat restoration project. The lake level decreased further to below 2.0 ft NGVD due to an extended drought throughout the summer of 2006. The chlorophyll a values during this period are not indicative of the lake's normal condition. Further, no substantial changes in the lake or watershed that could significantly affect external pollutant loads or internal nutrient recycling are known to have occurred.

**Figure 1-8** shows trends in annual average total nitrogen concentrations. Like chlorophyll-a, total nitrogen concentrations in Lake Seminole were relatively stable from 1992 through 1998, but increased substantially in 1999. The 1999 increase is potentially due to increased nutrient input in 1998 followed by decreased precipitation and increased evaporation in Lake Seminole. Similar to chlorophyll a, TN values increased in 2006, averaging 3.8 mg/l. In comparison, the average TN concentration in 1973 was 2.4 mg/l.

TP concentrations have decreased considerably from 1973 to 1992. The annual TP concentration in 1973 was 0.2 mg/l compared to 0.11 mg/l in 1992. As shown in **Figure 1-9**, total phosphorus concentrations decreased somewhat between 1993 and 1996. From 1997 to 2002, TP values increased from 0.11 mg/l to 0.14 mg/. In 2003, TP concentrations decreased substantially to 0.11 mg/l. Currently, concentrations have increased slightly but remain lower than 2002 values. The decrease in TP could be attributed to the organic sediment removal in Lake Seminole during 2002.

**Figure 1-5** shows trends in the annual average Secchi depth. Secchi depth in Lake Seminole has generally decreased since 1991. In 2000, the mean monthly Secchi depth was 0.28 meters, the lowest during the previous six year reporting period. Secchi values remained low until 2002. An increase in secchi depth occurred from 2002 to 2004. In 2005, Secchi depth decreased substantially from 0.33m to 0.25m. The decrease in secchi depth could be due to the resuspension of sediment during and after the lake level was drawn down. As an indicator of water transparency, Secchi depth values are generally inversely related to chlorophyll-a concentrations. Secchi depth values less than about 0.5 meters generally represent conditions that are severely light limiting for aquatic macrophytes. Based on data collected by the EPA, the average secchi depth in 1973 was 0.7 m.

**Figure 1-10** shows trends in annual rainfall totals in the Lake Seminole area (SWFWMD) for the period 1992-2005. As shown, 1995 and 1997 were wet years, with 1997 and 1998 being documented 'El-Nino' years during which most of the rainfall occurred during the winter months between 1997 and 1998. 2004 was also a wet year due to increased tropical storm and hurricane activity. Conversely, 1990 and 1999 were the driest years during this period. Additionally, water levels in Lake Seminole greatly declined in 1999 and 2000 presumably due to the lack of rainfall and increased evaporation. Given the lesser 1999 rainfall total, the observed increase in chlorophyll-a concentrations in 1999 cannot be readily explained in terms of increased external nutrient loads from stormwater runoff for that year. However, the increased nutrient load from 1998 could have contributed to a substantial storage of nutrients in the sediments and water column for 1999.

Although trophic state concepts have been in existence for some time, debate has existed over the terminology, the precise definition of various trophic state classes, and the development of an ecologically meaningful and widely accepted quantitative procedure for determining trophic state. There are several common indicators that are included in calculation of a lake's trophic state, chlorophyll a, total nitrogen and total phosphorus. Secchi depth was previously included in the calculation derived by Huber et al., (1982). The Florida lakes index is calculated differently for nitrogen limited, phosphorus limited, and nutrient balanced lakes, and involves the calculation of separate sub-indices for total nitrogen, total phosphorus, chlorophyll-a, and Secchi depth.

As discussed by Huber et al. (1982), three classes of lakes can be described pursuant to the total nitrogen to total phosphorus ratio. They are as follows:

Nitrogen-limited lakes	= $TN/TP < 10$
Nutrient-balanced lakes	= $10 \leq TN/TP \leq 30$
Phosphorus-limited lakes	= $TN/TP > 30$

The sub-indices for the Huber et al., (1982) and FDEP approved TSI calculation:

$$\begin{aligned} CHLA_{TSI} &= 16.8 + [14.4 * LN(CHLA)] \\ TN_{TSI} &= 56 + [19.8 * LN(TN)] \\ TN2_{TSI} &= 10 * [5.96 + 2.15 * LN(TN + .0001)] \\ TP_{TSI} &= [18.6 * LN(TP * 1000)] - 18.4 \\ TP2_{TSI} &= 10 * [2.36 * LN(TP * 1000) - 2.38] \\ ^1SD_{TSI} &= 10 [6.0 - (3.0 \ln SD)] \end{aligned}$$

<sup>1</sup>Huber et al. method only

$CHLA_{TSI}$ ,  $TN_{TSI}$ ,  $TN2_{TSI}$ ,  $TP_{TSI}$ ,  $TP2_{TSI}$ , and  $SD_{TSI}$ , are sub-indices for chlorophyll-a, Total Nitrogen (nutrient-balanced lake), Total Nitrogen (nitrogen-limited lake), Total Phosphorus (nutrient-balanced lake), Total Phosphorus (phosphorus-limited lake) and Secchi depth, respectively.

The overall trophic state index (TSI) for a lake is determined by combining the appropriate sub-indices to obtain an average for the physical, chemical, and biological features of the trophic state. All TSI values included within the Lake Seminole Watershed Management Plan (Plan) were calculated using the Huber et al. (1982) formulas. It is important to note that the Huber et al. formula includes Secchi depth.

#### Limiting nutrient considerations for calculating $TSI_{AVE}$ :

$$\begin{aligned} \text{If } TN/TP > 30 \text{ then } TSI_{AVE} &= 1/3 [CHLA_{TSI} + SD_{TSI} + TP_{TSI}] \\ \text{If } TN/TP < 10 \text{ then } TSI_{AVE} &= 1/3 [CHLA_{TSI} + SD_{TSI} + TN_{TSI}] \\ \text{If } 10 < TN/TP < 30 \text{ then } TSI_{AVE} &= 1/3 [CHLA_{TSI} + SD_{TSI} + 0.5(TP_{TSI} + TN_{TSI})] \end{aligned}$$

The inclusion of secchi depth as an indicator for water quality in Florida lakes is controversial due to problems during the calculation of the TSI in dark-water lakes. Secchi depth readings can give an inaccurate representation of algal reduced light transparency due to the tannin-rich water. This complication is not a concern in Lake Seminole given the low levels of tannin colored waters in the lake. However, FDEP removed the secchi depth indicator from all calculations of TSI for Florida lakes. Currently, the Impaired Water Rule cites the “1996 Water-Quality Assessment for the State of Florida. Section 305(b) Main Report” as the accepted methodology for calculating the TSI (FDEP, 1996). Previously, in the Plan, it was recommended that the TSI calculation as derived by Huber et al. (1982), be used for all comparative TSI calculations for Lake Seminole. However, the use of modified versions of the above described trophic state index, or other indices altogether, will yield different calculated TSI values which may lead to confusion with regard to the establishment of defensible resource management and pollutant load reduction goals. Therefore, we amend our previous recommendation and suggest that the FDEP accepted TSI calculation be used

for all future calculations of TSI in order to facilitate lake comparisons. The FDEP accepted TSI calculation for a nutrient balanced lake is:

**Limiting nutrient considerations for calculating  $NUTR_{TSI}$ :**

If  $TN/TP > 30$  then  $NUTR_{TSI} = TP_{TSI}^2$   
 If  $TN/TP < 10$  then  $NUTR_{TSI} = TN_{TSI}^2$   
 If  $10 < TN/TP < 30$  then  $NUTR_{TSI} = (TP_{TSI} + TN_{TSI})/2$

$$TSI = (CHLA_{TSI} + NUTR_{TSI})/2$$

For comparison, the TSI values for Lake Seminole were calculated using both formulas to demonstrate the complications that would arise without a standard formula. To determine the current trophic state of Lake Seminole, the most recent monitoring data available from Pinellas County, covering the period January through December 2005, were used. The mean seasonal concentrations of chlorophyll-a, TN, TP, and the mean seasonal Secchi depth, for this time period are as follows:

Chlorophyll-a (Chl-a)	= 129 µg/l
Total Nitrogen (TN)	= 3.42 mg/l
Total Phosphorus (TP)	= 0.111 mg/l
Secchi Depth (SD)	= 0.25 m

***The Plan Calculation***

Using the mean values shown above, the TN:TP ratio in Lake Seminole is **30.77**, making it a phosphorus limited lake, at least under current conditions.

$$TSI_{AVE} = 1/3 [CHLA_{TSI} + SD_{TSI} + TP_{TSI}]$$

These sub-indices are given and solved as follows:

$CHLA_{TSI} = 16.8 + [14.4 * \ln(CHLA)]$	=	<b>86.8</b>
$TP_{TSI} = 10 * [2.36 * \ln(TP * 1000) - 2.38]$	=	<b>87.4</b>
$SD_{TSI} = 10 [6.0 - (3.0 \ln SD)]$	=	<b>101.6</b>

With the values of all sub-indices known,  $TSI_{AVE}$  for Lake Seminole can be solved as follows:

$$TSI_{AVE} = 1/3 [86.8 + 101.6 + 87.4] = \mathbf{92}$$

Therefore, the calculated current trophic state index using the Huber et al. (1982) formula, which includes secchi depth, for Lake Seminole for the period January through December 2005 is **92**.

***FDEP Calculation***

Using the IWR methodology, quarterly mean Chl-a, TN, and TP values are calculated to determine quarterly TSI values, and then the four quarterly TSI values are averaged to produce an annual TSI. The formulas below were used to calculate the TSI for a phosphorus limited lake.

$$\begin{aligned} \text{NUTR}_{\text{TSI}} &= \text{TP2}_{\text{TSI}} \\ \text{TSI} &= (\text{CHLA}_{\text{TSI}} + \text{NUTR}_{\text{TSI}})/2 \end{aligned}$$

These sub-indices are given and solved as follows:

$$\begin{aligned} \text{CHLA}_{\text{TSI}} &= 16.8 + [14.4 * \text{LN}(\text{CHLA})] &= & \mathbf{86.8} \\ \text{TP2}_{\text{TSI}} &= 10 * [2.36 * \text{LN}(\text{TP} * 1000) - 2.38] &= & \mathbf{87.4} \\ \text{NUTR}_{\text{TSI}} &= \text{TP2}_{\text{TSI}} &= & \mathbf{87.4} \end{aligned}$$

With the values of all sub-indices known, TSI for Lake Seminole can be solved as follows:

$$\text{TSI} = (86.8 + 87.4)/2 = \mathbf{87}$$

Therefore, the calculated current trophic state index using the FDEP accepted TSI calculation for Lake Seminole for the period January through December 2005 is **87**.

### ***TSI Comparison***

The Plan TSI calculation computed a TSI of **92** compared to the FDEP formula which calculated **87** for the TSI of Lake Seminole for an approximately 5 point difference between the two formulas. The TSI calculations for both formulas from 1992 to 2006 are presented in **Figure 1-11**. From 1992-2004, the TSI calculation for a nutrient-balanced lake was used based on the TN:TP value. The Plan calculation is consistently 5-7 points greater than the FDEP method. A 5 point difference in TSI is equivalent to a 20 µg/l change in Chlorophyll a, a 0.04 mg/l change in TP and a 0.7 mg/l change in TN. The implications on water quality status and potential management decisions based on TSI values are substantial. One standard method for TSI calculation is necessary to successfully document and implement restoration plans to improve water quality in Lake Seminole.

### ***Management Endpoint***

A primary issue regarding the application of the TSI to the classification of Florida lakes for management purposes is the selection of a critical TSI value, or a value above which the lake is considered to have trophic related problems. Based upon a review of data from 573 Florida lakes, and the subsequent classification of each, Huber et al. (1982) determined the TSI value of 60 to be a generally applicable critical value defining eutrophic conditions. In response to the results reported by Huber et al. (1982), the FDEP established a classification criteria for lakes, estuaries and streams in Florida (**Table 1-2**). A lake is classified as “good” with a TSI value < 59, “fair” with a TSI of 60-69, and “poor” with a TSI value >69 (FDEP, 1996). The Plan presented a TSI goal of 65 (using secchi depth) based on the predicted modeled results and realistic understanding of the lake’s urban setting. The aforementioned TSI comparison clearly shows that the Plans recommended target TSI of 65 is equivalent to the FDEP’s criteria of a TSI of 60. Therefore, both the FDEP and the Plan agree upon a target management endpoint of a TSI value of 60 (based on FDEP’s methodology). We present this TSI target based on the continued eutrophication of the lake and the unique formation and history of Lake Seminole, as described below.

Lake Seminole, was created in the 1940s by the construction of a causeway along Park Boulevard, thus isolating the upper reaches of Long Bayou from its historical tidal



influences. Therefore, Lake Seminole can more properly be described as an artificial reservoir, than a true, natural lake. In addition to its artificial nature, the now freshwater Lake Seminole was initially created out of a brackish to estuarine portion of a tributary to Tampa Bay's Boca Ciega Bay. Previous monitoring data from Lake Seminole indicated that the lake has been consistently eutrophic, and has exhibited numerous trophic related problems. In 1973, the annual TSI value calculated using the above described criteria was 81. In comparison, the current TSI is 87. Lake Seminole is now classified as severely hypereutrophic. In the absence of pre-1970 water quality data, lakes such as Lake Seminole are often assessed for indications of their historic water quality conditions through the use of paleolimnological indicators. Using this technique, the past water quality conditions are ascertained via the detection of changes in the diatom and/or dinoflagellate species composition of the lake in past years, as illuminated via examining different depths of sediments, and tying these depths back to specific dates via various sediment aging techniques (i.e., lead-210 decay). In 1990, the University of Florida in coordination with SWFWMD collected core samples from three locations in Lake Seminole for paleolimnological analysis (SWFWMD, 1992). Due to high concentrations of  $^{210}\text{Pb}$  throughout the core, they were unable to successfully date the sections. Therefore, the results of the diatom analysis were unable to be correlated with the sediment age. Due to the well-mixed sediments and since Lake Seminole was not previously a freshwater lake, this technique is not likely to be useful. Instead, this Reasonable Assurance Plan outlines a complex and holistic lake restoration strategy, with which successful implementation might be expected to produce a greatly enhanced water quality with a target TSI value of 60. This target would not only be an improvement over current conditions, but apparently an improvement over conditions that existed in the early 1970's.

### **Water and Nutrient Budgets**

The first step in determining the pollutant loads to any lake is the establishment of a water budget. Flows carry pollutants into and out of lakes, and a meaningful analysis of lake eutrophication and most other water quality problems cannot be conducted without a quantitative understanding of lake hydrology. The basic water balance equation considers the following terms, typically expressed in units of acre-feet per year:

$$\text{INFLOW} + \text{PRECIPITATION} = \text{OUTFLOW} + \text{EVAPORATION} + \Delta \text{STORAGE}$$

For Lake Seminole, a storage volume of 3,420 acre-feet was calculated using an average depth of 5.0 feet and a surface area of 684 acres. Because the lake water level is currently managed within a relatively narrow range, this volume was assumed to be static for the purposes of this water budget analysis. Because the annual change in storage volume is considered to be zero, the water budget equation must be solved as follows:

$$\text{INFLOWS} + \text{PRECIPITATION} = \text{OUTFLOWS} + \text{EVAPORATION}$$

**Figure 1-12** graphically illustrates the water budget concept. The water budget calculated for Lake Seminole using 1997 data is summarized in **Table 1-3**.

Using the information developed in the water budget, lake nutrient budgets provide the cornerstone for evaluating lake eutrophication problems. The following terms are evaluated and are typically expressed in terms of tons or kilograms per year:

$$\text{INFLOW LOADINGS} = \text{OUTFLOW LOADING} + \text{NET SEDIMENTATION} + \Delta\text{STORAGE}$$

Nutrient budgets can be prepared for both nitrogen and phosphorus, although there are differences in some of the minor terms of the equation. The major components of inflow and outflow nutrient loads are essentially determined by multiplying appropriate nutrient concentration data with the respective inflow and outflow water volumes determined in the lake water budget.

The **net sedimentation** term defines the amount of nitrogen and phosphorus accumulated or retained in lake bottom sediments and/or the macrophyte standing crop. It reflects the net result of all physical, chemical, and biological processes causing vertical transfer of nutrients between the water column and the lake bottom.

For a given loading, lake water quality will generally improve as the magnitude of sedimentation increases because higher sedimentation leaves less available nutrients behind in the water column to stimulate algal growth. Because several complex processes are involved that vary spatially and seasonally within a given lake, it is generally infeasible to measure net sedimentation directly. Accordingly, this term is usually calculated by obtaining the difference from the other terms, or estimated using empirical models; however, site specific data have been collected in Lake Seminole to enable a more direct estimate of net sedimentation of TN and TP (SWFWMD, 1992; PBS&J, 1999).

The **change in storage** term accounts for changes in the total mass of nitrogen and phosphorus stored in the lake water column between the beginning and end of the study period. Such changes would reflect changes in lake volume, average nutrient concentrations, or both.

As discussed above, there is no significant change in the volume of Lake Seminole on an annual average basis, and water quality monitoring has indicated relatively stable nutrient concentrations prior to 1999. Therefore, for the purposes of this analysis, the change in nutrient storage is considered to be close to zero allowing that the equation be solved as follows:

$$\text{INFLOW LOADINGS} = \text{OUTFLOW LOADINGS} + \text{NET SEDIMENTATION}$$

**Figure 1-13** graphically illustrates the nutrient budget concept with respect to phosphorus. The nutrient budgets calculated for Lake Seminole using 1997 data are summarized in **Tables 1-4 and 1-5** for total nitrogen and total phosphorus, respectively.



Based on the water and nutrient budgets summarized in **Tables 1-3 through 1-5**, the following conclusions can be made regarding the inflow and outflow of both water and the nutrients TN and TP in Lake Seminole.

- Direct runoff from the watershed land surface accounts for about 65.4% of the total annual hydrologic inflows. Direct precipitation on the lake water surface accounts for about 33.9% of the total annual hydrologic inflows. Groundwater seepage from the surficial aquifer accounts for the remaining 0.7%.
- Hydrologic discharges from the Lake Seminole weir structure and diversion pipe in the south lobe of the lake account for about 81.4% of the total annual hydrologic outflows. Evapotranspiration accounts for about 17.8% of the total annual hydrologic outflows. Storage loss due to sedimentation accounts for the remaining 0.8%.
- Direct runoff from the watershed land surface and direct precipitation on the lake water surface account for about 36.8% and 5.3% of the total annual TN inputs, respectively. Groundwater seepage from the surficial aquifer only accounts for about 0.2% of the total annual TN inputs.
- Approximately 57.7% of the total annual TN inputs are derived from undetermined sources. Internal nutrient recycling processes (e.g., sediment fluxes) could account for a substantial fraction of this TN mass. In addition, analyses of Lake Seminole phytoplankton populations conducted during the summer and fall of 2000 have revealed high concentrations of the nitrogen fixing blue-green alga *Cylindrospermopsis cuspis* (PCDEM, 2000). The observed dominance of nitrogen-fixing cyanobacteria indicates that the biological fixation of atmospheric nitrogen may be a major source of TN inputs to Lake Seminole.
- Other potential undetermined sources of nitrogen inflows could include illicit discharges to lake surface waters, the municipal stormwater system and sanitary sewer overflows or leaks. However, to date, no direct evidence of such nitrogen sources has been discovered in Lake Seminole.
- Hydrologic discharges from the Lake Seminole weir structure and diversion pipe in the south lobe of the lake account for about 66.0% of the total annual TN losses. Sedimentation accounts for the remaining 34.0% of the total annual TN loss.
- Direct runoff from the watershed land surface accounts for about 96.2% of the total annual TP input. Direct precipitation on the lake water surface accounts for about 3.7% of the total annual TP input. Groundwater seepage from the surficial aquifer accounts for the remaining 0.1%.
- Hydrologic discharges from the Lake Seminole weir structure and diversion pipe in the south lobe of the lake account for about 39.6% of the total annual TP outflows. Sedimentation accounts for the remaining 60.4% of the total annual TP outflows.

### **Pollutant Loads**

It should be noted that there are no permitted point source discharges in the basin, and the entire Lake Seminole watershed is served by central sanitary sewer facilities.

Therefore, the water and nutrient budgets presented above underscore two very important points with respect to potential pollutant load reduction strategies for Lake Seminole:

- **stormwater runoff** represents the single most important source of external phosphorus loads to Lake Seminole; and
- **internal nutrient recycling** - including nitrogen fixation by blue-green algae and sediment fluxes - constitutes a substantial cumulative nitrogen and phosphorus source to Lake Seminole surface waters.

## Stormwater Runoff

As part of the planning process, modeling of stormwater runoff using EPA's Surface Water Management Model (SWMM) was conducted to determine those major sub-basins contributing the highest nonpoint source pollutant loads. The location of the major sub-basins in the Lake Seminole watershed are shown in **Figure 1-14**, whereas the modeled annual nonpoint source loads of TN, TP and total suspended solids (TSS) for each of the major sub-basins are summarized in **Figure 1-15**.

Using a ranking procedure which integrates modeled TN, TP, and TSS loads, the five priority major sub-basins, or those with the highest integrated nonpoint source pollutant loads, are listed in **Table 1-6** in order of decreasing priority.

Because high density urban land uses in the Lake Seminole basin are relatively ubiquitous, there are not significant differences in the unit area loads generated from each of the major sub-basins. Although there are minor differences in the age of the urban land uses in the various sub-basins, and whether or not on-site stormwater treatment is provided, these differences are generally not significant. Consequently, the major sub-basins with greatest contributing drainage area were generally the ones that ranked highest in terms of nonpoint source pollutant loads, as they deliver the greatest hydrologic and pollutant loads per unit rainfall.

## Internal Nutrient Recycling

As shown in **Table 1-4**, it is estimated that undetermined sources accounted for approximately 24.40 tons, or about 57.7%, of the annual TN inputs to Lake Seminole in 1997. However, it should be noted that the *undetermined sources* term was not measured but rather derived as the balancing term after accounting for modeled and measured inflows and outflows, and after accounting for an estimated sedimentation rate based on a measured sediment N:P ratio of 7.09. The estimated 24.40 tons of nitrogen from undetermined sources in Lake Seminole during 1997 equates to a rate of approximately 7.9 g N/m<sup>2</sup>/yr. Under nitrogen limiting conditions, certain blue-green algae species (cyanobacteria) are capable of fixing atmospheric nitrogen to support their growth and reproduction. Measured nitrogen fixation rates in other hypereutrophic Florida lakes have ranged as high as 5.7 g N/m<sup>2</sup>/yr, accounting for about 44% of the annual TN inputs, in Lake Tohopekaliga (Dierberg and Scheinkman, 1987). Therefore, based on the fact cyanobacteria with the potential ability to fix atmospheric nitrogen are the dominant alga in Lake Seminole (SWFWMD, 1992; PCDEM, 2000), it is reasonable to assume that nitrogen fixation accounts for the majority of the undetermined sources of nitrogen inflows to Lake Seminole.

It is possible that some portion of the internally derived mass of nitrogen revealed in the lake nitrogen budget may actually represent an undocumented point source discharge to Lake Seminole. Such a discharge could include sanitary sewer leaks or overflows, or an illicit discharge(s) to lake surface waters or municipal storm sewer systems. However, it should be noted that no direct evidence of an undocumented or illicit point source discharge has been discovered to date, and the presence of such an external pollutant source is not needed to explain the observed conditions and nutrient budgets. Nonetheless, Pinellas County will continue to investigate the possible existence of an undocumented point source discharge to Lake Seminole.

Upon a closer inspection of **Tables 1-4 and 1-5** it can be seen that the TN:TP ratio of the measured and modeled inflows to Lake Seminole (excluding the calculated *undetermined sources* term in the nitrogen budget) is 5.32, whereas the TN:TP ratio for the measured outflows is 20.98. These findings indicate that the nutrient inflows should establish nitrogen limiting conditions; however, the outflows reflect nutrient balanced conditions. Since very little dissolved inorganic nitrogen (ammonia and nitrate/nitrite) or phosphorus (orthophosphate) is present in Lake Seminole surface waters, the measured TN:TP ratio in lake outflows represents that which has been assimilated in phytoplankton biomass. Therefore, the additional nitrogen assimilated by lake phytoplankton must be derived from internal sources which likely include both nitrogen fixation and sediment nitrogen fluxes.

A stable isotope analysis ( $\delta^{15}\text{N}$  and  $\delta^{13}\text{C}$ ) was completed by PCDEM in 2000 to identify the various sources of nutrients within sediment, water or algal samples (Levy, 2000). The PCDEM collected Lake Seminole sediment, algae and wastewater from a nearby pump station. The results of this analysis supported the production of nitrogen within Lake Seminole due to cyanobacteria. The  $\delta^{15}\text{N}$  signature of the algal samples was most comparable with cyanobacteria ( $\text{N}_2$ -fixers), the dominant algal species in the lake is *Cylindrospermopsis sp.* which is capable of nitrogen fixation. The  $\delta^{15}\text{N}$  of the sediment samples was heavier and indicated that the nitrogen source in the sediment was comprised of a variety of types of organic matter (aquatic vegetation, phytoplankton, zooplankton, invertebrates and detritus). The analysis of the wastewater revealed that it could be a contributing factor to the nitrogen and carbon found in the sediments. The nitrogen budget in combination with the stable isotope analysis suggests that a majority of the biologically available nitrogen in Lake Seminole is produced by nitrogen fixing cyanobacteria.

As previously discussed, a significant increase in TN was observed in 1999 following the severe “El Nino” event of 1997 to 1998. We believe that 1999 signifies the “downturn” in water quality at Lake Seminole. The average annual nutrient concentration was compared to the flow-weighted average of nutrients input by direct runoff. The TN and TP load from direct runoff calculated in 2001 were divided by the hydrologic load to the lake, also due to direct runoff, to derive a flow-weighted average for both TN and TP. Over the entire period of record, TP concentrations are consistently lower than the flow-weighted average (**Figure 1-9**). This signifies that TP is being stored in the lake sediments. This conclusion is supported by the TP budget calculated in 1997 which determined that 60% of the phosphorus ‘outflows’ from the lake were due to sedimentation (Table 1-5; PBSJ, 2001). In contrast, TN concentrations consistently exceed the flow-weighted average input by direct runoff (**Figure 1-8**). This suggests the production of additional nitrogen due to internal processes. There is substantial documentation of cyanobacteria in the lake which are capable of converting atmospheric nitrogen to biologically available forms. The TN budget calculated in 1997 supports the conclusion of a substantial input of internally produced nitrogen citing “undetermined sources” producing 58% of the TN input to the lake (Table 1-4; PBSJ, 2001). Preliminary results from a mesocosm experiment in Lake Hancock, in Polk County, indicate a potential phenomenon that could also be occurring in Lake Seminole. Lake Hancock is a highly eutrophic lake with a dominant cyanobacteria algal population. The phosphorus laden sediments in combination with an “unlimited” nitrogen supply due to the nitrogen-fixers provide an environment for the overproduction of phytoplankton. The most effective approach to improving water quality and reducing the dominance of cyanobacteria involves management actions that drive the lake towards phosphorus

limitation and away from nitrogen limitation. Examples of such management actions include reduction of external phosphorus loads (e.g., enhanced stormwater treatment), and the removal or inactivation of sediment phosphorus stores (e.g., lake dredging and whole lake alum treatment). Other effective means of reducing the dominance of cyanobacteria include improving circulation and reducing the residence time of lake surface waters.

## **2. Description of Water-Quality Goals**

### **2.a Description of the Water Quality-Based Targets (both Interim and Final) Established for the Pollutant(s) of Concern**

The keystone of any planning process is the establishment of goals. For each established goal, there must also be defined target criteria by which degree of attainment of that goal can be measured. Targets are therefore defined as specific units of measure that define progress towards a particular management goal. Below describes a summary of the final lake and watershed management goal adopted by the Lake Seminole Advisory Committee for water quality.

The lake and its watershed shall be managed such that good water quality, according to Class-III State standards, is achieved and maintained in the lake.

The following six water-quality based targets have been developed in order achieve the adopted Water Quality management goal. The rationale for each proposed monitoring objective is discussed below.

**Target 1: Attain a mean annual chlorophyll-a concentration of 30 µg/l or less.**

Objective 1: Continue to measure in-lake chlorophyll-a concentrations.

Rationale: The amount of phytoplankton biomass, measured as chlorophyll-a, serves as an integrator and indicator of lake trophic conditions. High mean annual chlorophyll-a concentrations usually indicate excessive algal growth. With regard to available and comparable water quality data, the best continuous record exists for the parameter of chlorophyll-a. Furthermore, the collection and measurement of chlorophyll-a samples are already programmed into the existing PCDEM monitoring program.

**Target 2: Attain a mean annual multi-parametric TSI value of 60 or less.**

Objective 2A: Continue to measure in-lake TN and TP concentrations.

Rationale: Nitrogen (N) and phosphorus (P) are the primary nutrients required by plants for growth and reproduction. In excessive concentrations, N and P can cause nuisance algae blooms. The measure of all chemical forms of these nutrients (total N and P, or TN and TP) in the water column is a measure of the algal growth potential, and thus is an important indicator of trophic state. TN and TP concentrations are two of three parameters used to calculate a multi-parametric TSI value, with chlorophyll-a being the other. The collection and measurement of TN and TP samples are programmed into the existing monitoring program.

Objective 2B: Continue to measure in-lake Secchi disk depths.

Rationale: Secchi disk depth serves as a simple measure of lake water clarity. The degree of water transparency is one of the most important attributes of water. Water transparency allows the penetration of light, which supports life through the photosynthetic process. The degree of water transparency has a direct impact on the growth and distribution of submerged aquatic vegetation. Water transparency also allows organisms with visual organs to see in order to search for food and shelter. Water transparency can be affected by suspended organic (e.g., algae) and inorganic (e.g., silt) matter in the water column, as well as tannins and dissolved substances. The measurement of secchi depth is incorporated into the existing monitoring program.

**Target 3: Reduce current annual TP loads from external sources by 50%.**

Objective 3A: Estimate mean annual nonpoint source TP loads to Lake Seminole from priority sub-basins.

Rationale: It is possible to estimate external TP loads from nonpoint source runoff through direct measurement at points of discharge to the lake. Since nonpoint source runoff represents approximately 96% of the total annual external TP load, and since this load is both measurable and manageable to a large extent, long term trends in these loading sources have been monitored to evaluate the effectiveness of load reduction strategies. TN loads were estimated to allow for the development of annual nutrient budgets. As part of the Alum system design for Lake Seminole, PCDEM completed this objective.

Objective 3B: Estimate mean annual loads of TP to Lake Seminole from groundwater seepage.

Rationale: Few site-specific data exist regarding the magnitude and timing of groundwater inputs to Lake Seminole. Using limited groundwater quality data collected by SWFWMD along the western perimeter of the lake, modeling techniques were applied to estimate groundwater loadings to the lake during wet and dry seasons. The results indicate that groundwater seepage contributes less than 1% of the total annual TP load to the lake. This estimate will be confirmed by direct field measurements using seepage meters or similar methods. TN loads will also be estimated to allow for the development of annual nutrient budgets. The SWFWMD wells will also be monitored every two years, and similar modeling techniques will be applied using these data, to determine potential long-term trends in this loading source. Monitoring of groundwater seepage is warranted due to the fact that the recommended enhanced lake level fluctuation schedule has the potential to alter seepage rates by increasing the head difference between the lake level and the water table.

Objective 3C: Estimate mean monthly loads of TP to Lake Seminole from atmospheric deposition.

Rationale: It is possible to estimate external TP loads from atmospheric deposition through direct measurement. Based on measurements taken from sites in the Tampa Bay region, it is estimated that atmospheric deposition accounts for only about 3.7% of the total annual external TP loads to the lake. Wet and dryfall measurements from samples collected in the Lake Seminole basin are needed to better estimate local conditions and loading rates. TN loads will also be estimated to allow for the development of annual nutrient budgets. Although this loading source is not considered to be significant or directly manageable at this time, long term trends will be monitored to determine the relative importance of this source, as well as the effectiveness of regional air quality programs.

**Target 4: Annually calculate current water and nutrient budgets for Lake Seminole.**

Objective 4: Estimate the mean mass of TN, TP and water volume discharged from Lake Seminole.

Rationale: The estimation of mean annual TN, TP, and hydrologic loads discharged from the lake combined with estimates of mean annual loads entering the lake are needed to calculate lake water and nutrient budgets. Estimates of external loadings from nonpoint sources, atmospheric deposition and groundwater are measurable and are addressed in separate monitoring objectives above. To balance a water/nutrient budget, direct measurements of outflows from the lake are needed. Annual estimates of loads leaving the lake will enable the calculation of net loadings into the lake, loads which should be related to mean annual in-lake chlorophyll-a concentrations and TSI values. The Lake Seminole outfall structure provides a convenient location for measuring flow and collecting water samples. Instrumentation for accurately measuring stage and flow volumes has been installed to meet this monitoring objective.

**Target 5: Maintain Class-III water quality standards for dissolved oxygen, pH, specific conductance and chlorides.**

Objective 5A: Estimate the monthly frequency, duration, and magnitude of bottom dissolved oxygen concentrations in Lake Seminole that fall below regulatory minima of 5.0 mg/l.

Rationale: In addition to phytoplankton biomass, the concentration of dissolved oxygen in the deepest portions of the lake is often a good indicator of overall lake water quality. Any dissolved oxygen concentrations below 5 mg/l are in exceedance of Class-III State water quality standards, and may result in fish kills and other adverse impacts on biota. The measurement and monitoring of dissolved oxygen concentrations are programmed into the existing monitoring program.



Objective 5B: Estimate for Lake Seminole: 1) the monthly trend in pH; and 2) the frequency, duration, and magnitude that monthly pH varies by more than one unit above or below natural background levels.

Rationale: A rapid or large change in lake pH may have severe adverse effects on lake biota. Although Lake Seminole monitoring data indicate that the lake is fairly stable with respect to pH, it will be critical to maintain normal pH ranges in the lake to ensure the success of the proposed alum injection and whole lake alum applications. The measurement and monitoring of pH is programmed into the existing monitoring program.

Objective 5C: Estimate for Lake Seminole: 1) the monthly trend in chloride concentration; and 2) the frequency, duration, and magnitude that monthly chloride concentrations exceed background levels by 10% or more.

Rationale: A rise in mean chloride concentrations above existing and historical levels (between about 200-250 mg/l) may have adverse effects on lake biota. Although mean annual lake chloride levels have remained fairly constant, future increases of in-lake chloride concentrations are possible due to the proximity of the lake to saltwater and the proposed enhanced lake level fluctuation schedule. Increasing chlorides could potentially lead to substantial degradation of existing lake flora and fauna. The measurement and monitoring of chloride is programmed into the existing monitoring program.

Objective 5D: Estimate for Lake Seminole: 1) the monthly trend in specific conductance; and 2) the frequency, duration, and magnitude that monthly specific conductance exceeds 1,275  $\mu$ mhos/cm.

Rationale: Increases in specific conductance, like chlorides and pH, may adversely affect in-lake biota. Measurements of specific conductance may be used as a correlate to chloride measurements, and may be potentially used to explain trends in both chlorides and pH. The measurement and monitoring of specific conductance is programmed into the existing monitoring program.

**Target 6: Attain an 80% TSS load reduction for all permitted MSSW facilities within the Lake Seminole watershed.**

Objective 6: Determine the number of permitted Management and Storage of Surface Water (MSSW) facilities in the Lake Seminole watershed attaining an 80% TSS load reduction.

Rationale: Site plans and design specifications should exist for all permitted MSSW facilities in the Lake Seminole watershed. Therefore, a detailed inventory of these facilities and an assessment of their compliance with the required performance standards could feasibly be completed over a period of time. Retroactive enforcement will be based on this information.



The goals, targets and monitoring objectives related to the Water Quality management issue are summarized in **Table 2-1**.

## **2.b Averaging Period for Numeric Water Quality Goals**

The averaging period for numeric water quality goals are calculated based on the methodology implemented within the Florida Impaired Waters Rule (62-303.350). Based on this rule, "Trophic state indices (TSIs) and annual mean chlorophyll a values shall be the primary means for assessing whether water should be assessed for further nutrient impairment." Pinellas County uses a stratified random sampling design which includes nine sampling periods per calendar year. Four samples are collected during each of the nine time periods. Therefore, thirty-six water quality samples are currently collected annually throughout Lake Seminole. This sampling frequency will continue and the seasonal annual average TN, TP, chlorophyll a and TSI values will be analyzed to determine if the implemented water quality goals are being met. Annually, TP loading rates will be calculated in order to determine if the 50% reduction goal is being met. Annual water and nutrient budgets will be quantified based upon water quality samples collected throughout the year. Dissolved oxygen, pH, specific conductivity, and chlorides will continue to be monitored. Concentrations of each parameter will be collected during each sampling trip and evaluated. The PCDEM will continue to investigate the TSS load reduction efficiency of all permitted MSSW facilities within the Lake Seminole watershed. Samples for the analysis of the phytoplankton community will be collected. Additionally, extensive monitoring will be completed in concert with the operation of the alum stormwater treatment facility in sub basin one (**Appendix B**). Water, benthic and sediment quality will be monitored in order to evaluate the success of the treatment facility and the effectiveness of the settling area. The goal of this monitoring effort is to measure the efficiency of the facility based on its Event Mean Concentration (EMC) efficiency and Load Efficiency prior to the construction of the remaining alum stormwater treatment facilities.

## **2.c Discussion of How These Goals Will Result in the Restoration of the Water Body's Impaired Designated Uses**

Six target goals were presented to provide reasonable assurance that water quality will improve in Lake Seminole dependent upon the implementation of the four restoration management plans. The underlying goal of the restoration projects is the reduction/removal of nutrients in Lake Seminole. The rationale for each goal is detailed below:

1. The annual chlorophyll-a goal of 30µg/l is based on the desired beneficial uses of the lake with respect to aquatic vegetation and fisheries, and is consistent with the attainment of multi-parametric TSI target of 60, provided that the TN target of 0.9 mg/L and the TP target of 0.055 mg/L are achieved. In addition, waterbody modeling conducted as part of the planning process predicts that this target is attainable if all major restoration projects are implemented.
2. The target mean annual multi-parametric TSI value of 60 (using FDEP methodology) is based on the desired beneficial uses of the lake with respect to aquatic vegetation and fisheries, and is consistent with the attainment of a mean annual chlorophyll-a target of 30µg/l and the nutrient targets of 0.9 mg/L for TN and 0.055 mg/L for TP. The modeled results of all management actions showed a

potential TP concentration of 0.055 mg/l and TN concentration of 0.9 mg/l, as discussed in Section 3.d.

3. An analysis of pollutant loading sources to the lake has indicated that it is feasible to reduce current annual TP loads from stormwater runoff by 55.7% through the construction of enhanced regional stormwater treatment facilities in the basin. This load reduction equates to about 53.7% of the current annual TP load from all external sources (the remaining external source being direct atmospheric deposition).
4. One of the lake manager's most important tools is an accurate water/nutrient budget. This inflow/outflow analysis of both the sources and sinks of water and nutrients provides information critical to making management decisions. And since a lake's hydrologic and chemical character can change over time in response to changes in the watershed, water and nutrient budgets will be updated annually so that management strategies can be properly adjusted, and management actions re-prioritized.
5. Maintenance of Class-III State water quality standards, as defined in 62-302 of the Florida Administrative Code, is technically required by law. Although toxics such as metals and organic compounds are not considered to be problems in Lake Seminole, compliance monitoring with respect to dissolved oxygen (DO), pH, specific conductance and chlorides is relevant due to various management concerns. Both DO and pH are closely related to the management of living resources, whereas specific conductance and chloride concentrations may be used as indicators of saltwater intrusion.
6. There is a rebuttable presumption that State design criteria for MSSW facilities achieve an 80% pollutant load reduction. Furthermore, because Lake Seminole is an Outstanding Florida Water, a 95% pollutant load reduction is technically required for those MSSW facilities discharging directly into the lake. Although the statutes do not specify which pollutants are targeted by the State design criteria, they are generally interpreted to address total suspended solids (TSS) and biological oxygen demand. Attainment of these performance standards is rarely verified or enforced due to the complexities in monitoring individual MSSW facilities; however, available data indicate that most MSSW facilities are substantially deficient if not properly maintained. State law allows for stringent enforcement of these performance standards where it can be demonstrated that State water quality standards are being violated. It can be reasonably argued that nonpoint source pollutant loads to Lake Seminole are violating the State water quality standard for nutrients (e.g., must not cause an ecological imbalance). Assuming that MSSW facilities meeting the 80% TSS load reduction standard also provide adequate nutrient removal, strict enforcement of this minimal performance standard throughout the watershed is justified.

## **2.d Schedule Indicating When Interim And Final Targets Are Expected To Be Met**

All watershed basins within the state of Florida have been assigned to one of five "Basin Groups" established by the Watershed Management Basin Rotation Project. The FDEP evaluates each basin group byway of a rotating schedule. Therefore, each group is evaluated every five years.

The evaluation process identifies each waterbody to be placed on the 303(d) Impaired Water Body List for submission to the USEPA. Lake Seminole is located in Basin Group 5 which is currently under evaluation (2007). All proposed restoration projects at Lake Seminole are scheduled to be completed by 2012. This self-imposed deadline signifies the next scheduled impaired waters evaluation for Group 5 basins. An improvement of water quality is expected in approximately 5 years. However, a significant improvement of water quality is expected after the sediment removal is completed.

## **2.e Description Of Procedures To Determine Whether Additional Corrective Actions Are Needed**

The three Phase implementation of all proposed restoration projects provides a unique opportunity to monitor the transition of Lake Seminole. PCDEM, City of Seminole, City of Largo, the District, the FWCC, FDEP and local stakeholders have established a comprehensive sampling regime to monitor the benthic and water quality of Lake Seminole. PCDEM is responsible for coordination and implementation of data collection. The water quality data is analyzed annually to determine if any significant improvements or declinations of water quality are observed in the lake. PCDEM will submit an annual report to the FDEP detailing the current water quality and status of Lake Seminole.

### **Adaptive Management**

As is true with all watersheds, the Lake Seminole watershed and water quality is not static. Currently, all scheduled restoration projects are projected to be completed by 2012. The dredging of Lake Seminole is one of final restoration projects to be implemented prior to 2012. Sediment removal could potentially have a significant impact (positive or negative) on the water quality for approximately five years. Therefore, the basis for improvement of water quality in the lake due to the implemented restoration projects would not begin till 2017. At that time, an adaptive management approach similar to the method used by the Tampa Bay Estuary Program (TBEP) to track chlorophyll-a and light attenuation in Tampa Bay (Janicki Environmental, 2006) will be implemented. The current TSI classification for Florida lakes is 0-59 is good, 60-69 is fair, 70-100 is poor (**Table 1-2**; FDEP, 1996). Each year, the annual TSI of Lake Seminole will be compared to the targeted management endpoint of 60. If the TSI value is  $\leq 60$ , the year will be qualified as “green” signifying that the lake has met the target outcome. However, if the annual TSI exceeds 60 the magnitude of the exceedance will be determined. A TSI value of 61-69, will be classified as “yellow”, signifying an improvement in water quality but the lake has not met the target. An annual TSI of 70-100 will be classified as “red”, signifying poor water quality. PCDEM will monitor the green, yellow and red classification for Lake Seminole. A reassessment of the restoration techniques implemented will be performed if the lake is classified “red” consecutively for three of five years. Additionally, if after ten years, PCDEM does not see a progression from red to green classification for the lake, a more detailed assessment of the water quality and potential modifications to the restoration plan will be completed. PCDEM has proposed a whole lake alum treatment if water quality continues to decline after successful completion of projects focused on sediment removal, enhanced stormwater treatment, input of water from the Seminole Bypass Canal and lake level modification.

### **3. Description of the Proposed Management to be Undertaken**

#### **3.a Names of the Responsible Participating Entities**

Pinellas County  
City of Seminole  
City of Largo  
Southwest Florida Water Management District  
Surface Water Improvement and Management (SWIM)  
Florida Department of Environmental Protection  
Florida Fish and Wildlife Conservation Commission

#### **3.b Summary and List of Existing and Proposed Management Activities Designed to Restore Water Quality**

The Lake Seminole Watershed Management Plan outlined three proposed management activities to restore water quality in Lake Seminole:

- reduce external phosphorus loadings;
- reduce internal nutrient recycling; and
- reduce lake hydrologic residence time.

The Plan specifies four major projects aimed at reducing nutrient concentrations in the lake, decreasing residence time, and improving water quality conditions. These projects include: 1) retrofitting stormwater outflows from the five highest nutrient loading sub-basins with alum treatment systems; 2) alum treatment and diversion of a portion of flows in the Lake Seminole Bypass Canal into Lake Seminole; 3) removal of organic muck sediments; and 4) lake level fluctuation. Pinellas County has dedicated substantial funds in their 2007-2012 Capital Improvement Plan, and has secured funding agreements with other agencies, as necessary to ensure the full implementation of the four major water quality improvement projects, as well as other associated infrastructure improvements. Specifically, \$4.9 million has been allocated for the design and construction of the alum stormwater and bypass canal diversion treatment facilities designed to reduce external nutrient loads to Lake Seminole, and \$8 million has been allocated to remove organic sediments from the lake to reduce external nutrient recycling. The County is moving forward with construction on these projects, and as of April 2007 a contractor has been selected for sediment removal project, anticipated to begin construction in 2008.

Several of the below restoration techniques have been completed on Lakes throughout Florida to improve water quality. However, Lake Seminole is the only lake to combine and implement the magnitude and quantity of restoration projects listed below. The structural, management, legal, policy, enforcement and public education components identified exhaust all reasonable restoration actions to restore water quality:

Six structural:

1. Excavate organic peat sediments from shoreline areas
2. Restore priority wetland and upland habitats

3. Install stage and flow measurement instrumentation on the Lake Seminole Outfall Control Structure
4. Construct enhanced regional stormwater treatment facilities in priority sub-basins
5. Divert Seminole Bypass Canal flows to improve lake flushing and dilution
6. Dredge organic silt sediments from submerged areas

Five Management:

1. Mechanically harvest nuisance aquatic vegetations
2. Improve treatment efficiency of existing stormwater facilities
3. Biomanipulate sport fish populations
4. Implement an enhanced lake level fluctuation schedule
5. Inactivate phosphorus through whole lake alum applications ( if warranted by monitoring results)

Two Legal:

1. Adopt a resolution designating the Lake Seminole Watershed as a "Nutrient Sensitive Watershed"
2. Strengthen and standardize local ordinances for regulating stormwater treatment for redevelopment in the Lake Seminole Watershed

One Policy:

1. Establish a Lake Seminole Watershed Management Area (WMA) through amendments to the Pinellas County, and cities of Largo and Seminole Comprehensive Plans

One Compliance and Enforcement:

1. Expand and enforce restricted speed zones on Lake Seminole

Two Public Education:

1. Develop and implement a comprehensive public involvement program for the Lake Seminole Watershed
2. Develop and implement a local citizens Lakewatch program for Lake Seminole

A detailed description of each component and status is discussed below.

## **Structural Components**

### **1. Excavate Organic Peat Sediments From Shoreline Areas**

In May 2002, the FWCC completed a habitat enhancement project removing 31,000 cubic yards of tussock and organic sediments from the lake bottom. In addition, the area was re-vegetated with native species to improve the fishery habitat. A continuation of this project, which was designed to excavate organic peat sediments from shoreline areas, was completed in 2006. Together, the Florida Fish and Wildlife Conservation Commission, SWFWMD, Pinellas County, and local volunteers, coordinated to remove approximately 100,000 cubic yards of organic peat sediments located along the periphery of the lake, removed 26 tons of garbage and debris, replanted native vegetation and improved drainage around the lake.

There are four major shoreline segments in Lake Seminole where large accumulations of organic peat sediments had become a problem, and the majority of the 130,000 cubic yards of fibrous decayed plant matter identified as problem sediments were contained in these four segments. The four major shoreline segments with problem sediments are shown on **Figure 3-1**, and described below.

**Segment 1** - a 44-acre area along the east shoreline of the lake, from the Lake Seminole County Park boat ramp northward to the 102nd Avenue bridge;

**Segment 2** - a 13-acre area along the west shoreline of the lake, from 94th Place northward to the 102nd Avenue bridge;

**Segment 3** - a 12-acre area east shoreline of the lake, from the 102nd Avenue bridge northward along Lake Seminole Drive; and

**Segment 4** - a 16-acre area along the northeast shoreline of the lake, from Harborside Circle northward to the north end of the lake.

The organic shoreline sediments were excavated down to the underlying sand base to create open littoral areas more conducive to sport fish spawning activities. Some of the restored shoreline areas were allowed to recruit naturally with littoral vegetation. Additionally, pilot planting projects were implemented to establish a seed source for desirable aquatic vegetation. Desirable species composition and appropriate plant densities in the restored littoral vegetation communities are maintained with followup chemical treatments and mechanical harvesting.

The objective of this management action is the improvement of water quality, aquatic vegetation communities and fishery habitat, and improved shoreline recreational and aesthetic attributes. According to fishery biologists from the Florida Fish and Wildlife Conservation Commission, sport fish spawning habitat is limited in Lake Seminole. This management action would directly increase the shallow littoral bottom area available to sport fish for spawning.

Implementation Status (May 2007)

The removal of organic sediment in segment 1 and 4 were completed in 2006 (**Photo 3-1**). The remaining segments are scheduled to be completed in the future.





**Photo 3-1. Organic sediment removal for shoreline restoration in Lake Seminole.**

## **2. Restore Priority Wetland and Upland Habitats**

This management action involves the restoration and/or creation of diverse, native aquatic vegetation communities in, and around the perimeter of, Lake Seminole. In addition, this action includes the restoration of priority remnant upland vegetative communities in the watershed. As part of the watershed planning process, habitat distribution and disturbance patterns were evaluated to determine the potential for special habitat management sites or habitats suitable for enhancement or restoration. The general findings from this evaluation were that the urbanized nature of the watershed does not provide justifiable opportunities for the creation or re-establishment of wildlife corridors or dispersal areas. The remnant habitats in the lake and watershed are small and fragmented to the point where an opportunity for a unifying ecological corridor is no longer viable. However, opportunities do exist for recreational corridor connections between Lake Seminole County Park and the Pinellas Trail that extends north-south along the western watershed boundary.

Of the approximately 120 habitat units evaluated within the lake and watershed, a high percentage exhibit nuisance and/or exotic species invasion in varying degrees. Therefore, nuisance species removal coupled with the enhancement and restoration of diverse, native vegetation communities and habitats in both the lake and the watershed is a critical component. It should be noted that the habitat coverage by the exotic upland

species Brazilian pepper (*Schinus terebinthifolius*) and air potato (*Dioscorea bulbifera*) is very high throughout the watershed. Because these species displace both native upland and wetland species, they will be controlled or removed so that habitats can ultimately be restored to their natural condition. In addition, the native aquatics cattails (*Typha* spp.) and carolina willow (*Salix caroliniana*) have become nuisance species in Lake Seminole largely because of the static water levels that have been maintained for decades. Like Brazilian pepper, these species tend to grow as thick monocultures that exclude the establishment of other native species that may provide better fish and wildlife habitat. Cattails, in particular, occur so densely in Lake Seminole that the excessive growth and decomposition has resulted in the buildup of a layer of highly organic fibrous sediments around the perimeter littoral zone of the lake. These fibrous organic shoreline sediments further preclude spawning by desirable sport fish species.

Seven specific restoration sites were selected in conjunction with Pinellas County staff based on the restoration needs stated above as well as the size, ownership and proximity of the sites to one another and to Lake Seminole. In addition, watershed-wide and lake-wide habitat restoration and nuisance species controls are specified. **Table 3-1** lists the sites and their respective existing habitat and restoration/enhancement projects, while **Figure 3-2** identifies the location of each site.

The specific restoration sites that border Lake Seminole have incorporated a littoral shelf planting program that is designed to provide improved diversity, cover and forage for fish and wildlife. In their Annual Performance Report for Lake Seminole, 1990-91, the FWCC referenced the significant loss of littoral and submerged fish habitat due to the density of cattails along the eastern side of the lake and a reduction in the acreage of *hydrilla*. This loss in aquatic habitat has contributed significantly to the decline of the sport fisheries in Lake Seminole.

#### Implementation Status (May 2007)

Habitat restoration was completed at the Park Blvd site in 2006. The management of Brazilian Pepper has been ongoing for the past 4 years in the Lake Seminole Park property (**Photo 3-2**). The removal of nuisance species and habitat restoration in the Northeast parcel will be completed in 2008.





**Photo 3-2. Removal of Brazilian Pepper along the boundary of Lake Seminole.**

### **3. Install stage and flow measurement instrumentation on the Lake Seminole Outfall Control Structure**

This management action involved the installation of instrumentation for accurately measuring lake stage and flow volumes at the Lake Seminole outfall control structure. In addition, this action involved the proper acquisition, storage, reduction and reporting of lake stage and flow volume data using accepted data management protocols.

The Lake Seminole outfall control structure provides a convenient location for measuring flow and collecting water samples; however, instrumentation for accurately measuring and recording stage and flow volumes was not in place. Installation of state-of-the-art instrumentation was needed to address the defined monitoring objective of calculating annual water and nutrient budgets for Lake Seminole. Estimates of external loadings from nonpoint sources, atmospheric deposition and groundwater can be measured or modeled, and are addressed in separate monitoring objectives. To balance a water/nutrient budget, the direct measurements of outflows from the lake are needed and can be related to mean annual chlorophyll-a concentrations and TSI values. Annual estimates of loads leaving the lake will enable the calculation of loadings to Long Bayou, and allow for a demonstration of downstream load reduction following full implementation of the Plan.

## Implementation Status (May 2007)

The stage and flow measurement instrumentation was installed in 2006. All data is available from the USGS website ([www.usgs.gov](http://www.usgs.gov)). The station ID is USGS 02308889.

### **4. Construct enhanced regional stormwater treatment facilities in priority sub-basins**

The SWMM model pollutant loading estimates identified five priority sub-basins that would benefit from enhanced stormwater treatment facilities. The subbasins, listed in order of decreasing pollutant load are: 3, 1, 7, 6, and 2. The location of the sub-basins in the Lake Seminole watershed is shown in **Figure 3-3**.

Given the virtual lack of available vacant lands for wet detention pond construction and/or expansion, and the potentially very high cost of purchasing and converting existing land uses for this purpose, the use of enhanced treatment systems such as alum injection represents a far more cost-effective approach per unit land area. Alum treatment systems are capable of achieving substantially greater treatment efficiencies than wet detention ponds, on the order of 40% removal for TN and 90% removal for TP and TSS (ERD, 1994). Alum injection with off-line floc settling basins is the approach most commonly applied. This approach is typically preferred by regulatory agencies in that the floc buildup is confined to isolated ponds or basins which can be periodically maintenance dredged to restore the settling volume capacity. In addition, the potentially toxic effects of alum floc buildup can be isolated to these smaller man-made ponds. Although the alum injection infrastructure requires very little land area (e.g., typically less than 0.25 acres), additional land area on the order of a few acres is typically required for floc settling ponds.

A less land-intensive, and thus more cost effective, alternative to this approach is alum injection with in-lake floc settling. While this alternative eliminates the need for additional land area for floc settling ponds, floc buildup in the lake and subsequent resuspension may constitute future water quality problems. In addition, the potential toxicity of alum floc to benthic invertebrates has also been raised as a concern (WAR, 1999). However, these problems could at least be partially mitigated by the dredging of deeper floc settling basins in the lake bottom at the outfall point for each alum injection facility. The creation of in-lake settling basins would at least partially isolate the floc buildup into a smaller bottom area, and would allow removal of floc material via periodic maintenance dredging.

BMP locations within each of the priority sub-basins were evaluated with respect to location in the basin (e.g., upstream or downstream), proximity to vacant lands and existing hydrologic features (e.g., existing ponds, canals and wetlands), and engineering design issues (e.g., re-routing of the drainage network, utility impacts, etc.). The projects are described for each of the five priority sub-basins below.

#### **Sub-Basin 3**

- Alternative 3A - Alum injection with floc settling in an existing wet detention pond and/or an existing ditch/canal. This BMP alternative will involve the construction of an alum injection facility between 102nd Avenue N. and 104th Avenue N. immediately east of Seminole Boulevard. Alum will be injected into flows at this

point, and the floc will settle in two existing wet detention ponds that will be modified for this purpose. Alternatively, the alum floc could be allowed to settle in an existing drainage ditch/canal that outfalls to Lake Seminole. This ditch/canal will likely need to be deepened to provide the necessary floc settling storage capacity.

### **Sub-Basin 1**

- Alternative 1A - Alum injection with floc settling in an existing ditch/canal. This BMP alternative will involve the construction of an alum injection facility at 101st Street N., along the existing ditch/canal that outfalls to the north end of Lake Seminole. Alum will be injected into the flows at this point, and the floc will settle in the existing drainage ditch/canal. This ditch/canal will likely need to be deepened to provide the necessary floc settling storage capacity. This alternative would treat runoff from 376 acres, or about 80% of the sub-basin land area.

### **Sub-Basin 7**

- Alternative 7A - Alum injection with floc settling in an existing ditch/canal. This BMP alternative will involve the construction of an alum injection facility east of Seminole Boulevard and north of Skipper Drive, at the outfall of the box culvert draining Sub-Basin 7. Alum will be injected into the flows at this point, and the floc will settle in an existing drainage ditch/canal that outfalls to Lake Seminole. This ditch/canal will likely need to be deepened to provide the necessary floc settling storage capacity. This alternative would treat runoff from 495 acres, or about 90% of the sub-basin land area.

### **Sub-Basin 6**

It should be noted that three stormwater rehabilitation projects have been completed in Sub-Basin 6. These include:

- St. Petersburg Junior College MSSW facility. This facility treats runoff from both the St. Petersburg Junior College Campus site as well as offsite runoff from some upstream areas. This facility meets SWFWMD design standards for wet detention, and treats runoff from approximately 85 acres, or about 22% of the sub-basin land area
- Pinellas County Dog Leg Pond project. This project is primarily a habitat restoration project for an existing regional treatment pond; however, the treatment capacity of the pond has been enhanced by the modifications. The Dog Leg Pond facility treats runoff from approximately 33 acres, or about 8% of the sub-basin land area.
- Pinellas County Pond 6 project. This project was designed to provide both stormwater treatment and habitat restoration benefits. This facility exceeds SWFWMD design standards for wet detention, and provides 14-day residence time treatment for drainage inflows. In addition, environmental education facilities are planned for this location. The Pond 6 facility treats approximately 67 acres, or about 17% of the sub-basin land area.

Both the St. Petersburg Junior College MSSW facility and the Pinellas County Dog Leg Pond project are BMPs that are located fairly high in the basin.

Therefore, the percentage of the annual flows from Sub-Basin 6 treated by these projects is relatively small. In addition, although the Pond 6 project is located low in the basin, it will treat runoff from only about 17% of the sub-basin land area due to the segregated routing of the drainage network in this basin. In addition to these three existing projects, another BMP alternative is schedule for construction as discussed below.

- Alternative 6B - Re-routing of drainage to Pond 6 site with combined alum and wetland treatment. This BMP alternative will involve re-routing the drainage network such that all flows discharging from Sub-Basin 6 will be treated on the Pond 6 site. This will require the re-construction of the drainage network along Seminole Boulevard whereby the flows discharging from the north box culvert discussed above will be re-routed to the south. This has required permitting coordination with FDOT. On the Pond 6 site, the combined basin flows will be treated either with the planned wet detention approach, or with some combination of alum injection and wetland treatment. Given the land area available on the Pond 6 site, it may be feasible to accommodate an alum injection facility with a small floc settling pond that would discharge treated stormwater into a wetland habitat restoration area for water quality polishing prior to discharge to Lake Seminole. This alternative will treat runoff from approximately 365 acres, or about 93% of the sub-basin land area.

## **Sub-Basin 2**

- Alternative 2A - Alum injection with floc settling in an existing ditch/canal. This BMP alternative will involve the construction of an alum injection facility on the Orange Lake Civic Center property, located at the eastern terminus of 118th Avenue N. The facility will be located near the headwall of a box culvert that discharges flows from Sub-Basin 2 into an existing ditch/canal that outfalls to Lake Seminole. Alum will be injected into the flows at this point, and the floc will settle in the existing drainage ditch/canal. This ditch/canal will likely need to be deepened to provide the necessary floc settling storage capacity. This alternative would treat runoff 420 acres, or about 88% of the basin land area.

The above described potential and planned BMP projects are summarized in **Table 3-2**.

## **Implementation Status (May 2007)**

Currently, three of the five stormwater projects are at 100% design and will begin construction in 2007. The enhanced stormwater treatment facilities will be implemented in two Phases. In Phase I, the stormwater treatment projects in Sub-basins 1, 3, 6 will be addressed. Extensive benthic and water quality monitoring will be performed to evaluate the treatment facility at sub-basin 1 prior to the initiation of Phase 2. Pinellas County has received the appropriate permits required to initiate and complete Phase I. In Phase 2, sub-basin 2 and 7 will be implemented. The projected completion date for Phase 1 is 2009 and Phase 2 is 2012.

## **5. Divert and Treat Seminole Bypass Canal flows to improve lake flushing and dilution**

This management action will involve the diversion of some portion of the baseflows and/or high flows from the Seminole Bypass Canal into the northern end of Lake



Seminole. Because there is a 2-foot elevational difference between Lake Seminole (e.g., weir elevation of 5.0 feet NGVD) and the Seminole Bypass Canal (e.g., weir elevation of 3.0 feet NGVD) the transfer of water from the canal to the lake would need to be facilitated using pumps. The effect of this diversion will be to reduce lake residence time, improve flushing and circulation, and potentially provide for some dilution of the nutrient mass in the lake water column. Water quality monitoring conducted by Pinellas County in the Seminole Bypass Canal indicates that canal water quality typically has much lower levels of TN, but higher levels of TP than that of Lake Seminole, especially during high flow periods. The effectiveness of this management action will be substantially enhanced by treating the diverted flows prior to discharge into the lake. The diversion of flows from the Seminole Bypass Canal includes the construction of an alum injection facility in association with the pump station such that diverted water will be treated prior to being discharged into Lake Seminole. Due to the alum injection, an in-lake settling basin will be dredged at the point of discharge to contain the accumulated alum floc. Depending on the diverted volumes, this enhancement should provide for significant dilution of in-lake nutrient concentrations.

#### Implementation Status (May 2007)

Pinellas County has completed the design and received the appropriate permitting required to begin construction of the Bypass Canal diversion structure with an enhanced treatment plant. Construction will begin in 2007.

### **6. Dredge organic silt sediments from submerged areas**

In 2006, The Lake Seminole Sediment Removal Feasibility Plan was completed and provides a comprehensive updated investigation on sediment removal in Lake Seminole (PBSJ, 2006). The new report addresses two objectives: 1) update the 1999 sediment removal feasibility study based on current conditions and new information; and 2) conduct additional technical analyses and due diligence. The findings of that report identify the most cost-effective, permittable, and publicly acceptable approach to completing the sediment removal project. The information from the 2006 study on sediment removal from Lake Seminole is included in the reasonable assurance plan.

In conducting this evaluation of alternatives the following critical project planning design criteria for the Lake Seminole sediment removal project were identified:

- Project duration of two years or less;
- Selective removal of organics;
- Lake water availability for hydraulic dredging;
- Clean water return back to the lake;
- Dewatering process relatively unaffected by climatic variability;
- Minimal on-shore land area requirements for dewatering;
- Minimal volume of dewatered solids for disposal;
- Minimal truck traffic for solids disposal
- Minimal disturbance to water quality, wetlands, and listed species;
- Minimal disturbance to recreation and aesthetics; and
- Proven, cost-effective technology.

For sediment removal projects such as the Lake Seminole project, where on-shore processing space is severely limited, and for which sediment disposal trucking must be minimized, the only logical and reasonable alternatives involve an on-shore dewatering system that can produce the minimum feasible dewatered sediment volumes on the smallest space possible, and return clean water back to lake Seminole at a rate equal to the dredge flow rate. Nine sediment removal alternatives were evaluated and compared based on the following criteria:

- Project duration;
- Permittability;
- Public acceptance;
- Biddability and constructability; and
- Estimated project costs.

**Table 3-3** gives a side by side comparison of all nine project alternatives.

Based on an objective and balanced consideration of the above factors, Alternative 6A, high gravity centrifuge dewatering with a dredge pumping rate of 800 gpm, is the only alternative investigated that satisfies all of the identified project criteria and standards completely. Therefore, Pinellas County concluded that Alternative 6A would be the recommended alternative for Lake Seminole sediment removal project.

**Figure 3-4** shows a conceptual diagram of the process dewatering facility addressed in the preferred alternative. The actual on-shore dewatering process equipment area - excluding boundary set-backs from adjacent properties, piping to and from the lake, roads, administration support buildings and the like – would be 140' by 100'. Compared to all of the other alternatives investigated, this alternative best satisfies the extremely limited space-available criterion while meeting the other criteria.

All of the process operating equipment elements and the process configuration itself are well-known and have been proven nationally and internationally. Furthermore, the principal dewatering equipment elements would be “closed” and would not be susceptible to the sort of inclement weather conditions that might shut down “open” dewatering equipment elements such as lagoons.

The preferred alternative would return 93 percent of the water pumped out of the lake back to the lake. Therefore, there would be no undesirable lake drawdown effects. The water returned to the lake would contain about 0.36% solids. These solids would be the organic/inorganic residual remaining from the on-shore dewatering process, which does not pass through any other material (i.e. polymer) used in the process.

Finally, the preferred alternative would result in minimal impacts to wetlands and listed species, lake recreation and aesthetics, and neighborhood integrity. For these reasons, as well as the overall lake restoration objective of the project, it is anticipated that the preferred alternative would garner strong public acceptance and support.

Implementation Status (May 2007)

Hayes-Bosworth, Inc was selected as the highest ranked firm for the whole lake dredging project in February 2007. Hayes-Bosworth, Inc will proceed with design and

construction plans to begin lake dredging (**Photo 3-3**). The projected completion date is December 2011.



**Photo 3-3. Sediment resuspension in Lake Seminole.**

### **Management Components**

#### **1. Mechanically Harvest Nuisance Aquatic Vegetations**

This management action involves the permanent dedication of one mechanical harvester and transport barge, and a full-time operating crew, to Lake Seminole for the harvesting of cattails on a continual basis. When *Hydrilla* again becomes a component of the Lake Seminole flora, as it will when grass carp are removed and water transparency is improved, the program will be refocused to control this species as a means of controlling both the proliferation of this aggressive exotic as well as nutrient enrichment. The Pinellas County Highway Department (PCHD - Mosquito Control) will be responsible for the operation and maintenance of the harvester units. Drying and processing of the harvested plant matter would take place on publicly-owned property such as the Lake Seminole County Park. Elements of this management action include the following:

- Pinellas County will develop and implement a Lake Seminole Aquatic Weed Management Plan every two years. The plan will be cooperatively developed by the LSAC and technical representatives from Pinellas County Department of Public Works (PCDPW), PCDEM, SWFWMD, FDEP, FWCC, and PCHD. The purpose of

this plan will be to clearly articulate the two year aquatic weed management goals and priority areas, each agency's responsibilities in meeting the goals, and a two year schedule for aquatic plant management activities on the lake. This plan will be based on the technical information generated from biannual submergent and emergent vegetative surveys.

- A target annual harvest goal for cattails of 10 acres/year was adopted. Cattails will be harvested from priority areas identified in the biannual Lake Seminole Aquatic Weed Management Plan.
- A target annual harvest goal for *Hydrilla* of 35 acres/year (inclusive of chemically treated senescent tissue) will be adopted. *Hydrilla* will be harvested opportunistically from areas of heavy concentration on a continual basis. The highest priority use of the harvester will be to remove senescent and decomposing *Hydrilla* mats following effective chemical treatment of infested areas. In this manner, mechanical harvesting of an annual biomass target would complement existing chemical treatment programs in controlling the coverage of nuisance aquatics while also resulting in the removal of a mass of stored nutrients thus reducing the potential for nutrient recycling.
- FDEP and SWFWMD have the primary responsibility for the management of submergent and floating nuisance aquatics in Lake Seminole under the existing Cooperative Aquatic Plant Control Program. A stable and adequate long-term funding source will be pursued so that interruption in maintenance activities is avoided in the future. Consideration will be given to the use of Pinellas-Anclote Basin Board funds for this purpose. Pinellas County will assume primary control of emergent nuisance aquatics.
- A maximum chemical treatment area limitation of 100 acres per year will be established for *Hydrilla* control. Chemical treatment of *Hydrilla* will be performed on a more frequent and regular basis to maintain the coverage within the proposed target range and to avoid the need for major treatment events on large coverage areas.
- Assisted revegetation of the cattail harvest areas with desirable endemic species will be performed at a target rate of approximately 5 acres/year. It is anticipated that the proposed increased range in the lake level fluctuation schedule will stimulate the natural recruitment and proliferation of a more diverse assemblage of desirable emergent species. Assisted revegetation, either implemented through publicly funded habitat restoration projects or required as conditions of permits, will be limited to commonly available, desirable endemic species.

This management action should not be considered contradictory with existing FDEP and SWFWMD policy which essentially states that *Hydrilla* and other exotic nuisance aquatic plants should be managed at their lowest feasible levels. Rather, mechanical harvesting of an annual biomass target would complement existing chemical treatment programs in controlling the coverage of nuisance aquatics while also resulting in the removal of a mass of stored nutrients thus reducing the potential for nutrient recycling. This is especially true with regard to the harvesting of senescing plant tissue following chemical treatment, which will be the primary objective of the harvesting program.



#### Implementation Status (May 2007)

Pinellas County contracted an aquatic weed-harvester to remove nuisance aquatic vegetation (primrose willow and cattails) from 45 acres of the lake during the water level draw down in 2006 (**Photo 3-4**). The County will continue nuisance vegetation maintenance.



**Photo 3-4. Nuisance vegetation along the shoreline of Lake Seminole.**

## **2. Improve treatment efficiency of existing stormwater facilities**

This management action involves the development and implementation of a comprehensive local program to improve compliance monitoring and enforcement of permitted surface water management (MSSW) facilities in the basin. This program will essentially be an enhanced version of the Adopt-a-Pond program implemented in several local governments in Florida, including Hillsborough County. This action would involve the following steps:

- Perform an inventory of all existing permitted MSSW facilities in the basin, as permitted by SWFWMD since 1985. Identify target MSSW facilities for inspection and potential monitoring. Monitoring candidates will be targeted based on the size of the service area and whether significant changes in contributing land uses have occurred since the facility was permitted. Develop a priority list of MSSW facilities to be inspected.

- Inspect and monitor the priority MSSW facilities identified in Step 1 above. The facility will be inspected for compliance with the permitted design. In addition, stormwater entering and discharging from the facility following a storm event will be sampled for TSS, TN and TP.
- If the facility is determined to be out of compliance with permitted design or water quality standards, the owner will be informed of the problems and the need to correct them. Florida Statutes require an 80% pollutant (TSS) removal efficiency and the attainment of Class-III water quality standards at the end of the discharge pipe.
- Working cooperatively with the owners, develop a site-specific improvement plan for each target MSSW facility. The improvement plans could include such modifications as changing the water level control elevations or planting a littoral shelf. In addition, facility improvement plans will incorporate habitat improvement elements wherever feasible.
- Provide financial assistance and technical guidance to owners, as appropriate, to implement the facility improvement plans.

Although facilities constructed prior to 1985 are legally vested from meeting water quality standards, the second level of priority under this program would be these older stormwater ponds. An attempt will be made to get owners of pre-1985 facilities to voluntarily participate in the program through financial incentives and/or assistance.

There is a rebuttable presumption that State design criteria for Management and Storage of Surface Water (MSSW) facilities achieve an 80% pollutant load reduction. Furthermore, because Lake Seminole is an Outstanding Florida Water, a 95% pollutant load reduction is technically required for those MSSW facilities discharging directly into the lake. Although the statutes do not specify which pollutants are targeted by the State design criteria, they are generally interpreted to address total suspended solids (TSS) and biological oxygen demand (BOD). Attainment of these performance standards is rarely verified or enforced due to the complexities in monitoring individual MSSW facilities; however, available data indicate that most MSSW facilities are substantially deficient if not properly maintained.

State law allows for stringent enforcement of these performance standards where it can be demonstrated that State water quality standards are being violated. It can be reasonably argued that nonpoint source pollutant loads to Lake Seminole are violating the State water quality standard for nutrients (e.g., must not cause an ecological imbalance). Assuming that MSSW facilities meeting the 80% TSS load reduction standard also provide adequate nutrient removal, strict enforcement of this minimal performance standard throughout the watershed is justified.

The intense level of existing urban development in the Lake Seminole basin limits the potential effectiveness of implementing more stringent regulations for new development. Many stormwater facilities exist within the watershed but may not be functioning at their intended level-of-service. Therefore, measures to bring these facilities into compliance with current or basin-specific performance standards are likely to be cost-effective management actions, especially in those major basins where regional treatment facilities are not being proposed.

There is currently a rebuttable presumption in the law that existing surface water management facilities that meet State design criteria also comply with State water quality standards. This rebuttable presumption can be, and has been, legally challenged where the need for strict compliance can be clearly demonstrated. Since Lake Seminole is an Outstanding Florida Water (OFW) the applicable water quality standard for nutrients is concentrations which cause degradation of water quality downstream of the discharge. Therefore, under existing regulations, it is possible to develop and enforce a higher basin-specific performance standard for existing stormwater management systems.

#### Implementation Status (May 2007)

Several systems within the priority sub basins were evaluated during the alum system design. PCDEM completed a system evaluation of the sub basin 6 creation in 2005.

### **3. Biomanipulate Sport Fish Populations**

While there are a wide variety of ecological control mechanisms that generally fall under the category of 'biomanipulation', this management action will primarily involve manipulation of the lake fisheries to improve water quality conditions and modify the fish population structure such that sport fish species become dominant. This primarily involves the selected harvesting of herbivorous rough fish from Lake Seminole, including grass carp and gizzard shad. In addition, this action would include stocking of sport fish species, and the adoption and aggressive enforcement of a catch and release rule for select sport fish species in Lake Seminole.

It is anticipated that these activities will be phased to coincide with habitat and water quality improvements associated with other components of the Plan. Initial activities will involve removal of the grass carp via electrofishing and haul seines. The removal of grass carp is considered critical to habitat restoration efforts aimed at increasing the coverage of submerged aquatic vegetation in the lake. Phase I activities would also include haul seine removal of gizzard and threadfin shad as a means of removing phosphorus from the lake and reducing zooplankton predation, which in turn is expected to reduce chlorophyll-a concentrations.

Other activities will involve continued shad harvesting as well as stocking the lake with young carnivorous sport fish, including largemouth bass and bluegill. Phase III activities will involve continued stocking of sport fish as deemed necessary, as well as the adoption and strict enforcement of a 100% catch and release rule for largemouth bass. The catch and release rule could be relaxed after several years if monitoring data indicate the establishment of a healthy sustained sport fish population.

#### Implementation Status (May 2007)

The remaining grass carp in the lake should have no impact on the current vegetation in the lake due to their age and low density (personal communication, Tom Champeau). An unsuccessful attempt to stock the lake with largemouth bass was completed in the mid-1990's. In November 2006, over 12,000 largemouth bass were released into the lake and ongoing monitoring indicates that the stocking was a success. The FWCC will continue to monitor the largemouth bass population every 6 months to document fish population.

#### 4. Implement an Enhanced Lake Level Fluctuation Schedule

This management action involves establishing an operational schedule for the proposed new Lake Seminole outfall control structure so as to provide for greater intra-annual lake level fluctuation and inter-annual variability. Since Long Bayou was severed to create Lake Seminole, static lake levels have been maintained at the approximate elevation of 5.0 feet NGVD. A lake level fluctuation schedule has never been formally adopted or implemented on Lake Seminole, and the maintenance of static levels has adversely affected both the aquatic vegetation communities and water quality by reducing plant diversity and increasing lake residence time.

The recommended enhanced lake level fluctuation schedule is shown in **Figure 3-5**. The enhanced schedule reestablishes a more natural pattern of seasonal and inter-annual variation in lake levels which are to be repeated every four years. The recommended four-year cycle is composed of three different annual lake level fluctuation schedules - A, B, and C. All three schedules have a high elevation of 5.0 feet NGVD. Schedule A has the greatest range with a low of 3.2 feet NGVD. Schedule B has a more moderate range with a low of 3.4 feet NGVD. Schedule C is the most conservative with a low of 3.8 feet NGVD. The four-year cycle involves a repeating pattern of the three schedules as follows: A, C, B, C, A, C . . . etc. **Table 3-4** provides a tabular summary of the target monthly lake level elevations for proposed Schedules A, B and C.

Schedules A, B, and C all call for both spring and fall low lake levels. The spring low lake level under Schedule A is more exaggerated than that for Schedule B, whereas the fall low lake level in Schedule B is more pronounced than that for schedule A. Schedules A and B are repeated every four years, whereas Schedule C is repeated every two years. Theoretically, the spring discharge should result in the flushing and dilution of accumulated in-lake nutrient concentrations prior to the summer growing season, whereas the fall discharge is intended to flush nutrient-rich runoff accumulated from the summer rainy season. All three schedules call for high lake levels of 5.0 feet NGVD during both the winter and summer months. These lake level highs are intended to flood littoral vegetation and control the expansion and proliferation of nuisance species, predominantly cattails and willows.

The recommended four-year enhanced lake level fluctuation schedule is intended to better simulate the natural hydrologic regime while still maintaining consistency with the operational range established by Pinellas County for flood control. However, it should be noted that the recommended four-year enhanced lake level fluctuation schedule is not meant to be implemented rigidly, but rather it is to serve as a guideline for improved lake management. For example, the recommended low water elevation of 3.2 feet NGVD called for in Schedule A should clearly not be attained if extended drought and exceptionally low water table conditions exist.

Water level manipulation is one of the most common lake management techniques, used not only for the control of nuisance aquatic vegetation but also for water quality management via flushing and dilution (EPA, 1990). The design and capabilities of the proposed new Lake Seminole outfall control structure will allow for maximum flexibility in the management of lake levels. Unfortunately, the existing outfall structure was conservatively constructed solely for the purpose of flood control, and did not allow for any controlled water level fluctuation. The built-in flexibility of the proposed new



structure will be properly utilized and applied in the achievement of other lake management goals including aquatic plant management and water quality improvement.

A cursory inventory of nearshore areas and residential canals performed as part of the planning effort indicated that, with the exception of the “narrows” between the north and south lobes of the lake, no significant adverse impacts on recreational navigation or riparian access would be caused by the recommended low lake levels of 3.2, 3.4 and 3.8 feet NGVD that periodically occur naturally during drought conditions. Water depths in the “narrows” segment are limited by the accumulation of organic silt sediments, and navigable access between the north and south lobes of the lake are constrained during low lake levels. For this reason, implementation of the recommended enhanced lake level fluctuation schedule will not be initiated until the organic silt sediments are removed from the “narrows” segment, as discussed above.

#### Implementation Status (May 2007)

The lake level fluctuation schedule will be implemented after sediment removal (**Photo 3-5**).



**Photo 3-5. Photograph of outfall structure under construction.**

## **5. Inactivate phosphorus through whole lake alum applications ( if warranted by monitoring results)**

This management action involves whole lake applications of aluminum sulfate (alum) to the surface waters of Lake Seminole. Good candidate lakes for this procedure are typically those that have had nutrient diversion and have been shown through diagnostic-feasibility studies to have a high internal phosphorus release. The release of phosphorus stored in lake sediments can be so extensive in some lakes and reservoirs that algal blooms persist even after incoming phosphorus has been significantly lowered (EPA, 1990). Treatments of lakes with low doses of alum may effectively remove phosphorus (called phosphorus precipitation) but may be inadequate to provide long-term control of phosphorus release from lake sediments (phosphorus inactivation). Phosphorus precipitation removes phosphorus from the water column. Phosphorus inactivation, on the other hand, is a technique to achieve long-term control of phosphorus release from lake sediments by adding as much aluminum sulfate to the lake as possible within the limits dictated by environmental safety.

Iron, calcium, and aluminum have salts that can combine with (or sorb) inorganic phosphorus or remove phosphorus-containing particulate matter from the water column as part of a floc. Of these elements, aluminum is most often chosen because phosphorus binds tightly to its salts over a wide range of ecological conditions, including low or zero dissolved oxygen. In practice, aluminum sulfate (alum) or sodium aluminate is added to the water, and pin-point, colloidal aggregates of aluminum hydroxide are formed. These aggregates rapidly grow into a visible, brownish floc, a precipitate that settles to the sediments in a few hours or days, carrying phosphorus sorbed to its surface and bits of organic and inorganic particulate matter in the floc (EPA, 1990).

After the floc settles to the sediment surface, the water will be very clear. If enough alum is added, a layer of 1 to 2 inches of aluminum hydroxide will cover the sediments and significantly retard the release of phosphorus into the water column as an internal load. In many lakes, assuming sufficient diversion of external nutrient loading, this will mean that algal cells will become starved for this essential nutrient. In contrast, some untreated lakes, even with adequate diversion of nutrients, will continue to have algal blooms that are sustained by sediment nutrient release (EPA, 1990).

Due to the shallowness of Lake Seminole, and the presence of flocculent sediments that are subject to frequent resuspension, phosphorus inactivation via whole lake alum applications is not recommended until a significant portion of the flocculent sediments have been removed from the lake. The long-term effectiveness of whole lake alum applications for phosphorus inactivation is significantly reduced in lakes where the reactive sediment surface is frequently reworked by turbulent resuspension or other forces (EPA, 1990). Therefore, it is recommended that this management action only be pursued as warranted following the removal of the flocculent deep sediments.

Both empirically derived nutrient budgets and waterbody modeling using WASP5 indicate that internal nutrient recycling in Lake Seminole may be a very significant source of water column phosphorus. In addition, Lake Seminole is dominated by blue-green algal species which have the capability of fixing nitrogen in nitrogen limiting conditions. This management action would strongly drive the lake towards phosphorus limitation, thus reducing the dominance and impact of the persistent blue-green algae blooms that periodically plague Lake Seminole.

## Implementation Status (May 2007)

The whole lake alum application will only be utilized if significant water quality improvements are not measured in result of the combination of all other restoration projects.

### **Legal Components**

#### **1. Adopt a Resolution designating the Lake Seminole Watershed as a “Nutrient Sensitive Watershed”**

This management action will involve the adoption of a resolution by the Pinellas County Board of County Commissioners and the Cities of Largo and Seminole designating the Lake Seminole basin as a ‘Nutrient Sensitive Watershed’. The resolution would reference the Lake Seminole Watershed Management Plan as the controlling planning document, and would identify the need for, and public commitment to, developing specific voluntary guidelines for the following:

- regular street sweeping within the basin;
- proper disposal of lawn cuttings and brush clippings to prevent the dumping of organic debris into the lake;
- proper removal of pet droppings along public and private shoreline areas of the lake to prevent pet waste runoff into the lake;
- fertilizer application rates for both residential and commercial land uses (e.g., number of pounds per acre per month) to prevent over application and excessive runoff and seepage to the lake;
- reclaimed wastewater effluent application rates for both residential and commercial land uses (e.g., limited number of inches per acre per day) to prevent over application and excessive runoff and seepage to the lake; and
- optional control measures for reclaimed wastewater effluent application within the basin (e.g., automatic rain shut-off valves) to prevent runoff during storm events.

Long-term monitoring data indicate that Lake Seminole has been eutrophic virtually since its creation in the mid-1940s. More recent data from the 1990s indicate that the rate of eutrophication is increasing rapidly. Since there are no point source discharges to the lake, and external sources of nutrients to the lake are generally diffuse in nature (e.g., stormwater runoff), the problem of reducing external nutrient loads to the lake must be attacked on many fronts. The predominantly residential and commercial land uses within the basin probably contribute a cumulatively substantial portion of the total nutrient load to the lake through sheetflow runoff, the dumping of lawn cuttings into the lake, pet waste runoff, and seepage of excessive applications of lawn fertilizers and reclaimed irrigation water. This may be especially true for golf courses and heavily landscaped residential areas within the basin. Formal legal recognition of the nutrient sensitivity of the Lake Seminole watershed, as well as measures to reduce these diffuse loads, are needed as part of the overall management strategy.

## Implementation Status (May 2007)

Lake Seminole has been identified as a “Nutrient Sensitive” Waterbody. Pinellas County has installed signs throughout the watershed informing the public of the water quality concerns. The County has organized several meetings and presentations designed to inform the local stakeholders of approved methods to improve water quality.

A proposed rule introduced by the Florida Division of Agricultural Environmental Science to reduce phosphorus additions through fertilizer additions on urban lawns or turf (5E-1.003) is scheduled to be discussed March 29, 2007. The proposed rule states “Fertilizers labels as starter fertilizers shall have directions for use for a maximum application rate no greater than 1.0 lb of P<sub>2</sub>O<sub>5</sub>/1000 ft<sup>2</sup> and that subsequent applications shall be either Low or No Phosphate fertilizer”. This rule would reduce the amount of phosphorus allowed for starter lawns and eliminate phosphorus application for established lawns.

## **2. Strengthen and Standardize Local Ordinances For Regulating Stormwater Treatment for redevelopment in the Lake Seminole Watershed**

This management action involves the cooperative development and adoption of a consistent ordinance, between Pinellas County and the Cities of Largo and Seminole, defining special thresholds, rules, and conditions for stormwater rehabilitation through redevelopment within the Lake Seminole watershed. The ordinance will address the retrofitting of pre-1985 stormwater treatment and/or flood attenuation systems with systems that meet current standards for Outstanding Florida Waters. It is recommended that the ordinance establish the following criteria for redevelopment activities specifically within the Lake Seminole watershed.

- All residential, commercial, and industrial parcels undergoing redevelopment shall meet current State stormwater treatment standards for Outstanding Florida Waters (e.g., treat the first 1.5 inches of runoff) for the entire parcel area.
- Redevelopment shall be defined as any demolition and reconstruction or repaving activity that affects 1,500 square feet or more of area, or 10% or more of the total parcel area, whichever is less. Single family residential lots shall be exempted from this provision.
- Payment in lieu of constructing stormwater treatment facilities shall be an allowable relief mechanism for all parcels falling under the above provisions. The fee shall be based on the estimated costs associated with the construction of said stormwater treatment facilities.
- Fees collected from payments made in lieu of constructing stormwater treatment facilities shall be placed in the Lake Seminole Watershed Management Trust Fund, and shall be used exclusively for the construction, operation and maintenance of regional stormwater treatment facilities constructed pursuant to the Lake Seminole Watershed Management Plan. All fees collected under this ordinance shall be expended within the governmental jurisdiction from which they were collected.

As described above, the recommended ordinance will establish a Lake Seminole Watershed Management Trust Fund for fees collected from payments made in lieu of



constructing stormwater treatment facilities on constrained parcels. The trust fund would be managed by Pinellas County, and would be used exclusively to finance ongoing operation and maintenance of the regional enhanced stormwater treatment facilities.

The recommended ordinance will clearly acknowledge the fact that no net gain in water quality within the watershed can be achieved if redevelopment projects do not make some provisions for improved stormwater management and treatment. This is especially true in the Lake Seminole watershed where the majority of the basin was developed with numerous high density residential and commercial projects prior to the State's adoption of Chapter 17-25 F.A.C. These older developments typically have no stormwater treatment systems incorporated into the original design. Because of the age of the developments in the Lake Seminole watershed, redevelopment is expected to occur at an increasing pace over the next decade. It is imperative for the restoration of the lake that some gains are made with respect to improving the level of stormwater treatment on older developed parcels in the watershed, especially those located directly on the lake.

#### Implementation Status (May 2007)

The Pinellas County Comprehensive Plan is being amended with more stringent environmental requirements.

#### **Policy Component**

##### **1. Establish a Lake Seminole Watershed Management Area (WMA) Through Amendments to the Pinellas County, and Cities of Largo and Seminole Comprehensive Plans**

This management action involves the establishment of a Lake Seminole Watershed Management Area (WMA), via amendments to the Pinellas County, and Cities of Largo and Seminole Comprehensive Plans. The WMA will formally establish a special planning and management district for the Lake Seminole watershed within the growth management framework.

The purpose of the WMA designation will be to focus the adopted goals of the Lake Seminole Advisory Committee within a defined tri-jurisdictional geographic area, and to better coordinate and consolidate the decision making processes for regulatory and management activities conducted by Pinellas County and the Cities of Largo and Seminole within the Lake Seminole watershed. The WMA in concept would be a 'planning' district, rather than a taxing district, that would cover the entire Lake Seminole watershed and place specific policy provisions in place for certain activities and land uses in both the unincorporated and incorporated areas of the basin.

As part of this action, Pinellas County and the Cities of Largo and Seminole would also adopt specific goals, objectives and policies for the Lake Seminole Watershed Management Area. At a minimum, the goals adopted by the Lake Seminole Advisory Committee will be embodied in the Comprehensive Plans of the County and the Cities. In addition, existing goals, objectives and policies as well as basin-specific level-of-service targets (e.g., stormwater treatment and O&M commitments) found elsewhere in the Pinellas County and City Comprehensive Plans will be consolidated under the Lake Seminole Watershed Management Area sections. Examples of such policies include:

- The requirement of OFW-level of stormwater treatment for all new development in the Lake Seminole WMA.
- The consistent application of local stormwater treatment requirements for redevelopment within the Lake Seminole WMA that exceeds the requirements of SWFWMD.
- Payment in lieu of stormwater treatment for exempted parcels.
- The consistent application of land development codes and regulations, as well as voluntary guidelines for management activities such as fertilizer and wastewater reuse application rates, within Lake Seminole WMA.

Numerous policy inconsistencies exist between the Pinellas County and Cities of Largo and Seminole Comprehensive Plans regarding issues that affect the Lake Seminole Watershed Management Plan. The designation of the Lake Seminole Watershed Management Area, and the adoption of a consistent set of policy guidelines and level-of-service targets between both local government Comprehensive Plans will facilitate a common approach to resource management of the Lake Seminole watershed.

Implementation Status (May 2007)

The Pinellas County Comprehensive Plan is being amended with more stringent environmental requirements.

### **Compliance and Enforcement Component**

#### **1. Expand and Enforce Restricted Speed Zones on Lake Seminole**

This management action involved the adoption of an ordinance formally establishing new restricted speed zones in Lake Seminole, as well as the installation and maintenance of buoy markers that clearly define the established “no wake” areas. Recently, the perimeter restricted speed zone was extended out to 200 feet from the shoreline around the entire perimeter of the lake, and restricted speed zones were established for ‘Enhanced Fishing Zones’.

This action also improved the means of communicating to the public the limits, purpose, and intended benefits (e.g., erosion control, noise abatement, segregation of incompatible recreational uses) of the restricted speed zones, as well as allowable activities and speeds within these zones. Improved signage and instructional information is located at all public boat ramp kiosks clarifying the appropriate speeds allowed within restricted speed zone (e.g., clear definitions of no wake, idle speed, slow speed, etc.). Excessive watercraft speed and turbulence in the shallow ‘narrows’ and perimeter portions of the lake contributes to sediment resuspension and associated turbidity and water quality problems.

Implementation Status (May 2007)

Pinellas County has completed the expansion of the restricted speed zones and is drafting a speed zone ordinance.

## **Public Education Components**

### **1. Develop and Implement a Comprehensive Public Involvement Program for the Lake Seminole Watershed**

This management action involves the development and implementation of a comprehensive public involvement program for the Lake Seminole watershed. The program includes a number of elements including the following:

- Preparation of a semi-annual newsletter (e.g., twice per year) to be mailed to residents and businesses in the basin informing the public of the various components of the Plan as well as findings, trends, and upcoming activities.
- Production and airing of a government access television presentation on Lake Seminole, with updates to the program to be made on an annual basis. A video tape of this presentation will be made available to citizens upon request.
- Update and improve the 'Help Save Lake Seminole' brochure. The improved brochure will be distributed to all residents and businesses in the watershed.
- Establish a speakers bureau for homeowners association meetings and other public functions. Members of the Lake Seminole Management Committee will be recruited for this purpose.
- Establish an information clearinghouse for technical reports, monitoring data, and other information related to Lake Seminole.
- Implement Lake Seminole Day as an annual function. Sponsorship for this event will be actively solicited from local businesses.
- Installation of "Dump No Waste - Drains to Lake" plaques on storm drains throughout the watershed.
- Installation of additional roadway signs indicating the boundaries of the Lake Seminole Watershed Management Area.

Public apathy regarding lake and watershed management is a common pattern until obvious problems such as nuisance algae blooms and aquatic weed infestations become apparent. The public response to such problems is typically quite negative and unproductive. Improved public understanding of the causes of lake management problems, and the role that individuals can play in managing and improving the quality of the lake and watershed will contribute significantly to furthering the goals of the Plan. In addition, increased public involvement as stakeholders in the ownership and implementation of the Plan should reduce unproductive and excessive public criticism of the responsible governmental agencies, and improve the overall lake and watershed management effort.

## Implementation Status (May 2007)

Pinellas County has established an extensive network for public outreach to all stakeholders of Lake Seminole. The County holds regular public meetings to discuss the status of the Lake, update past projects and inform of future projects. A website has been established discussing the history, management plan and ongoing projects (<http://www.pinellascounty.org/Environment/pagesHTML/waterResources/wr3200.html>).

A User group of individuals surrounding the lake are updated by email providing relevant information on the Lake status. Additionally, bilingual signs have been installed on 197 storm drains throughout the watershed stating “Dump No Waste-Drains to Lake” (**Figure 3-6**). A fine of \$10,000 can be implemented if violated.

Listed below are the public events held since 2005 to inform local stakeholders in the Lake Seminole watershed:

- Community Meetings
- Four Seasons Mobile Home Park
- Point West Mobile Home Park
- Willow Point Condominiums Homeowners Association
- Town Homes of Lake Seminole Homeowners Association
- Lake Shore Homeowners Association
- Lake Park Homeowners Association
- Lake Seminole Square
- Orange Lake Village Homeowners Association
- Public Meeting May 25, 2005 over 400 in attendance
- Lake Clean up Event February 2006 over 460 volunteers (**Photo 3-6**)
- Park Blvd replanting: February 2007 Eagle Scout project: install 30 live oaks along the southern shoreline (**Photo 3-7**)
- April 2007 Eagle Scout project. Volunteers installed aquatic plants over 2500 linear feet of shoreline
- October 2007 Three aquatic and shoreline planting events (scheduled)





**Photo 3-6. Volunteer participation in “Lake Clean-Up” Event in 2006.**



**Photo 3-7. Installation of 30 live oaks along Park Blvd by Eagle Scouts.**

## **2. Develop and Implement a Local Citizens Lakewatch Program for Lake Seminole**

This management action involves the recruitment of interested local citizens to participate in the collection of supplemental monitoring data from Lake Seminole and its watershed. Local citizen involvement in monitoring activities is implemented through a coordinated network of lakefront homeowners and other interested citizens. The recruitment and training of interested citizens follows the protocols established by the Florida LakeWatch program, which has implemented similar programs on numerous central Florida lakes.

The implementation of a citizen based sampling program allows for the collection of data needs that have been identified and which are currently not being address by Pinellas County or other agencies. Interested citizens will be recruited to assist in the collection of such data wherever feasible. Local citizen LakeWatch programs have been very successful in central Florida, where numerous lake associations are actively involved in monitoring and data collection on their lakes. This type of public 'ownership' in the resource could greatly improve public interest and involvement in the restoration and management of Lake Seminole.

Implementation Status (May 2007)

The citizen based Florida LakeWatch program currently collects samples from Lake Seminole. As of 2003, a total of 12 samples have been collected to measure water quality.

### **3.c Geographic Scope of any Proposed Management Activity**

The geographic scope of the Lake Seminole Management Plan extends throughout the watershed. The management of the lake depends on both external (point source, runoff, etc.) and internal (sediment removal, lake level fluctuation, etc) modifications.

### **3.d Documentation of the Estimated Pollutant Load Reduction and Other Benefits Anticipated from Implementation of Individual Management Actions**

The anticipated benefit of each component of the proposed restoration management plan for Lake Seminole is discussed below. Additionally, the estimated pollutant load reduction is discussed based on a comprehensive modeling effort which includes the four major restoration projects.

#### **Structural Components**

Excavate Organic Peat Sediments From Shoreline Areas. The expected benefits of this management action are improved sport fish reproductive success, increased biodiversity in the littoral plant communities and improvement in water quality of Lake Seminole. Combined with the proposed enhanced lake level fluctuation schedule, this action is expected to result in substantially improved shoreline habitat quality. The enhancement of the vegetative community along the littoral zone should increase nutrient uptake thereby reducing the nutrient concentrations. Additionally, the removal of organic materials will directly remove a source of decaying material which ultimately will release nutrients to the lake.

## **Restore Priority Wetland and Upland Habitats**

A healthy and diverse community of native aquatic vegetation is an important component of all lake ecosystems. Emergent and submerged aquatic vegetation provides numerous ecological functions in lake systems including:

- food and shelter for fish and wildlife;
- stabilization of unconsolidated sediments; and
- nutrient uptake and stabilization of water quality.

It has been noted in Florida lakes that an inverse relationship generally exists between aquatic macrophyte coverage and algal biomass, as measured by chlorophyll-a concentrations (Huber et al., 1982). That is, lakes tend to either be macrophyte or algal dominated with respect to primary productivity. One of the net benefits derived from the above listed functions is improved water clarity. The improved water clarity and enhanced habitat complexity provided by aquatic macrophytes generally lead to improved sport fisheries and more satisfying recreational experiences and aesthetics.

## **Install Stage And Flow Measurement Instrumentation On The Lake Seminole Outfall Control Structure**

The expected benefits of this management action include the acquisition of previously unavailable data essential to the support of various recommended management actions and monitoring programs. This data will be vital for the accurate calculation of the annual water and nutrient budgets.

## **Construct Enhanced Regional Stormwater Treatment Facilities In Priority Sub-Basins**

The five priority sub-basins cumulatively generate approximately 72.30% of the total annual TN, 72.68% of the total annual TP, and 76.03% of the total annual TSS loads to the lake from stormwater runoff. Furthermore, stormwater runoff accounts for about 96.2% of the total external phosphorus inflows to the lake. Assuming a maximum effectiveness of 40% TN removal and 90% TP and TSS removal for enhanced stormwater treatment technology such as alum injection with flocc settling basins, the construction of alum injection facilities at the outfall point of the five priority sub-basins could potentially result in the removal of approximately 1.82 tons of phosphorus annually, or about 55.66% of the total annual phosphorus inflows from stormwater runoff. This accounts for about 53.69% of the total external phosphorus load. Although this estimate likely represents a maximum effectiveness, enhanced stormwater treatment facilities strategically implemented in a small watershed like that of Lake Seminole could be very effective at reducing external pollutant loads, particularly for TP and TSS. The calculated mean pollutant removal efficiencies determined during laboratory testing based on a 10mg Al/liter application to raw stormwater can be found in **Table 3.5** (ERD, 2005). Based on this data, an expected 32% removal of TN, 82% removal of TP and 79% removal of TSS can be expected on average from the stormwater treatment facilities. In a lake that is at least periodically nitrogen limited with respect to inorganic N and P, this management action could be very effective at driving Lake Seminole more towards the desired state of phosphorus limitation.



## **Divert Seminole Bypass Canal Flows To Improve Lake Flushing And Dilution**

Flushing and dilution is a well-documented lake management technique that involves increasing the rate at which the nutrient mass is flushed from the lake combined with the use of higher quality dilution water to reduce in-lake concentrations of nutrients and algae (NYSDEC, 1990). Flushing and dilution serve to reduce the concentration of nutrients, and the period of time that aquatic vegetation is exposed to these nutrients. The reduced nutrient concentrations and residence time should lead to reduced algal biomass and increased water column transparency due to lower algal cell concentrations and, to a lesser extent, the addition of more transparent water to the lake volume. Increased transparency, in turn, should lead to the proliferation of desirable rooted aquatic plants.

Algal cell concentrations may be reduced by flushing alone (e.g., the discharge of lake water). Increasing the water inflow will decrease the retention time and increase the flushing rate. If the flushing rate is greater than the algae growth rate, algal cells may be washed out of the lake system. Effective control of algae blooms can be achieved by a flushing rate of approximately 10-15% of the lake volume per day (NYSDEC, 1990). If flushing alone can be used to decrease algae concentration through washout, then lower quality water can be used, provided that the increases in the algal growth rate resulting from the higher nutrient concentrations are not sufficient to exceed the increased flushing rate. However, dilution water with nutrient concentrations significantly higher than those in the lake may exacerbate existing water quality problems.

If higher inflow nutrient concentrations result in algal growth rates that exceed the increased flushing rate, then algal concentrations in the lake could actually increase. For these reasons, it is imperative that a comparable or better quality source of dilution water be used in Lake Seminole. Fortunately, given the available external supply of dilution water provided by the Seminole Bypass Canal, flushing rates approaching 10-15% (342 to 513 acre feet) per day may be achievable during the wet season. In addition, water quality improvements expected to result from the regional stormwater treatment facility should ensure that suitable conditions exist to make this action viable. Based on removal efficiencies calculated on collected stormwater samples, it is estimated that alum treatment (10 mg Al/liter) will result in 19% removal of TN, 88% removal of TP and 65% removal of TSS (**Table 3.5**; ERD, 2005).

Theoretically, the combined effects of dilution of water column nutrient concentrations, and reduced lake residence times, should produce substantial improvements in lake water quality on a seasonal and annual average basis. Simulations of this management action conducted using the WASP5 model indicate that it could reduce in-lake chlorophyll-a concentration by as much as 14%. Water quality improvements will, in turn, lead to improved conditions for aquatic vegetation and fisheries.

In addition to the water quality benefits, the availability of a dependable source of replacement water for lake water discharged during the implementation of an enhanced lake level fluctuation schedule provides a mechanism for restoring and maintaining target lake levels in the case of drought. Without a dependable source of replacement water, there is some risk that drought following a lake level drawdown will result in an extended period of low lake levels which may adversely impact recreational uses of the lake. This management action provides some insurance against that risk and allows for greater control over lake levels during drought conditions.



## **Dredge Organic Silt Sediments From Submerged Areas**

The removal of up to 1 million cubic yards of unconsolidated flocculent sediments from Lake Seminole would result in direct improvements to waterborne recreation, submerged aquatic vegetation, sport fisheries, and water quality through the physical deepening of the lake. Waterbody modeling using WASP5 has indicated that the removal of the deep organic flocculent sediments could result in significant water quality improvements, with a predicted chlorophyll-a reduction of as much as 24.4%. This is the single most effective management action considered in the waterbody modeling work. The modes of water quality improvement would include: 1) increased lake depth to reduce sediment resuspension; 2) increased lake volume to dilute nutrient concentrations and limit algae growth; and 3) decreased sediment nutrient fluxes to the overlying water column.

In addition, similar sediment removal projects have been completed throughout the State of Florida. At Banana Lake, located in Polk County, FL, it was estimated that approximately 90% of the nutrient loads to Banana Lake were eliminated by the diversion of the wastewater treatment plant discharge and the dredging of organic lake sediments. An in-lake sediment removal mesocosm experiment in Lake Hancock measured nutrient reductions rates between 20-30% due to sediment removal. These results are based on one season of sampling during the winter. Removal rates during the summer will be measured in May 2007. A comprehensive discussion of each completed and in-progress sediment removal projects is available as Case Study #1.

## **Management Components**

### **Mechanically Harvest Nuisance Aquatic Vegetations**

This management action not only addresses the control of nuisance aquatic vegetation, but it also addresses water quality problems related to eutrophication as well. Macrophytes are widely employed for nutrient removal in wastewater treatment facilities. Reddy and DeBusk (1987) present a summary of the application of aquatic plants to the treatment of wastewater. The assimilation of nutrients into macrophyte biomass is used to fix water column nutrients and provide a means for their eventual removal from the aquatic system. Physical removal (i.e., harvesting) of the plant biomass is required to prevent the return of the assimilated nutrients to the water column or sediments as the plants senesce and decompose. However, until relatively recently, experience with the use of macrophytes to remove nutrients from eutrophic surface waters has been limited in both the extent and scope. The principles of nutrient assimilation are the same in treating natural surface waters as in treating wastewater streams, but the relative concentrations of nutrients in the water column are much lower. The same species that have been employed in wastewater treatment, especially water hyacinth (*Eichhornia crassipes*), have been used in removing nutrients from surface waters (Reddy and DeBusk, 1987). There have been several reports published on the successful application of mechanical harvesting of rooted aquatic plants to the mitigation of eutrophication (Souza, et. al., 1988).

Using cattail tissue analysis data from Lake Tarpon (Dames & Moore, 1992), the harvesting of 10 acres per year of cattails would result in the removal of approximately 170 tons of dry weight organic matter, and 0.3 tons of TP, from the system. Based on available harvesting data from Lake Okeechobee (Gremillion et al., 1988), it is estimated that the controlled harvest of approximately 35 acres of *Hydrilla* in Lake Seminole could

result in the annual removal of approximately 4.0 tons of TN and 0.5 tons of TP per year. If this mass of plant tissue were to senesce and decompose simultaneously, as would be the case after a large scale chemical treatment, the harvesting of this material would result in a very substantial internal load reduction.

### **Improve Treatment Efficiency of Existing Stormwater Facilities**

The pollutant load reduction associated with improving the performance of existing stormwater treatment systems is potentially significant given the level of development in the study area, especially in the western portions of the watershed. It is not possible to accurately quantify this potential load reduction; however, until an inventory of existing facilities is completed.

### **Biomanipulate Sport Fish Populations**

The expected benefits of this management action would be a shift in the fish population structure and an improved sport fishery. In addition, the removal of rough fish would also result in an ancillary improvement in water quality conditions.

### **Implement an Enhanced Lake Level Fluctuation Schedule**

The greater range of water level fluctuation will effectively create a more conducive environment for the expansion of a variety of desirable native emergent and submergent species such as bulrush and Eel grass, and will reduce the competitive advantage of cattails. The lowering of lake levels for short periods of time (e.g., weeks to months) almost always elicits a positive vegetation response whereby desirable submerged species such as Eel grass extend their coverage into deeper areas that are more exposed to light. This has the beneficial effect of oxidizing sediment organic matter and binding lake sediments. In addition, raising the water level elevation to, or slightly above, 5.0 NGVD for short periods of time will reduce the competitive advantage of nuisance littoral species such as cattails. Combined with site-specific revegetation projects, the primary benefit of this management action will be substantial improvements in the diversity of the littoral plant community in Lake Seminole, and an overall increase in macrophyte biomass.

A more varied water level fluctuation schedule will also improve sport fishing through the provision of better spawning habitat. Given the low cost of implementation, this component will likely be very cost-effective when compared to large scale habitat restoration projects. Finally, this component will create the opportunity for shoreline residents to remove exposed trash, debris and undesirable vegetation during low lake level periods. Combined with public education, this component should contribute to improved visual aesthetics along the lake shoreline.

It is difficult to quantify the water quality benefits of periodic lake flushing because of the complex biological, hydrogeological and chemical interactions. Using mean annual TN and TP concentrations from 1999 in-lake water quality data, it is estimated that the discharge of 1.0 foot of water from Lake Seminole (e.g., from elevation 5.0 to 4.0 NGVD) would result in a nutrient mass discharge of 5,598 lbs. of TN and 233 lbs. of TP. Although most of this nutrient mass will be replaced by inflowing precipitation, runoff and groundwater, effective dilution would occur if the cumulative nutrient concentrations in the inflow waters were even slightly lower than in-lake concentrations. Following the

implementation of the proposed watershed management actions to reduce external nutrient loads to the lake, greater nutrient dilution can be expected. In addition, the diversion of water from the Seminole Bypass Canal through Lake Seminole, will provide for both increased flushing and dilution and reduced residence time, and will potentially constitute a reserve source of water to maintain target lake levels during periods of drought.

Waterbody modeling using the WASP5 model has indicated that the implementation of the recommended enhanced lake level fluctuation schedule alone will result in a slight increase in mean annual chlorophyll-a concentration of 1.9  $\mu\text{g/l}$  or 3%. The interpretation of these model predictions is that the lesser lake volume during the early summer creates conditions more favorable for algal growth. When combined with other management actions (e.g., diversion of Seminole Bypass Canal flows), this effect is essentially negated. Despite the predicted slight degradation in water quality, this management action is strongly recommended for the other benefits to living resource that it will produce.

### **Inactivate Phosphorus Through Whole Lake Alum Applications (If Warranted By Monitoring Results)**

Phosphorus inactivation has been highly effective and long-lasting in deeper, thermally stratified lakes, especially where an adequate dose has been given to the sediments and where sufficient attenuation of external nutrient loads has occurred. The effectiveness of this phosphorus inactivation has been less impressive in shallow lakes where sediment resuspension is a problem, or where high flows may wash the floc out or quickly cover it with another layer of nutrient-rich silt. Treatment longevity has extended beyond 10 years in some cases and to 5 years in many (EPA, 1990). Shallow, non-stratified lakes appear to have shorter periods of treatment effectiveness than stratified lakes. In those cases where the treatment effectiveness has been short-lived, the phosphorus-sorbing floc layer has usually become covered with new, phosphorus-rich sediments (EPA, 1990). Typical lake responses to alum treatment include:

- sharply lowered phosphorus concentrations;
- greatly increased transparency resulting in improved conditions for desirable aquatic vegetation; and
- algal blooms of much reduced intensity and duration.

It should also be noted that the addition of aluminum salts to lakes has the potential for serious negative impacts, and care must therefore be exercised with regard to dosage. The potential for toxicity problems is directly related to the alkalinity and pH of the lake water. The seasonal ranges of pH and alkalinity must be determined by monitoring before conducting alum treatments. When alum is added, aluminum hydroxide is readily formed in water at pH 6 to 8. This compound is the visible precipitate or floc described earlier. However, pH and alkalinity of the water will fall during alum addition at a rate dictated by the initial alkalinity or buffering capacity of the water. In soft water, only very small doses of alum can be added before alkalinity is exhausted and the pH level falls below 6. At pH 6 and below,  $\text{Al}(\text{OH})_3$  and dissolved elemental aluminum ( $\text{Al}^{+3}$ ) become the dominant forms. Both can be toxic to aquatic animal species. Well-buffered, hard water lakes are therefore good candidates for this type of lake treatment

because a large dose can be given to the lake without fear of creating toxic forms of aluminum. Soft water lakes must be buffered, either with sodium aluminate or carbonate-type salts, to prevent the undesirable pH shift and to generate enough  $\text{Al}(\text{OH})_3$  to control phosphorus release. Therefore, dosage is very lake-specific (EPA, 1990). Lake Seminole is classified as a “hard” water lake, based on an average Hardness value of 155mg/l in 2002.

## **Legal Components**

### **Adopt a Resolution designating the Lake Seminole Watershed as a Nutrient Sensitive Watershed**

The expected benefits from this management action include the reduction of diffuse nutrient loads from residential and commercial land uses within the basin. This management action, combined with improved public education, is aimed at addressing the more diffuse yet cumulatively substantial nutrient loads associated with typical urban landscape management practices.

### **Strengthen and Standardize Local Ordinances For Regulating Stormwater Treatment for redevelopment in the Lake Seminole Watershed**

The expected benefits from this management action would include reduced nonpoint source pollutant loadings to Lake Seminole as the watershed undergoes redevelopment. The percent load reduction cannot be quantitatively predicted, as it will be totally dependent on the level of redevelopment that ultimately occurs.

## **Policy Component**

### **Establish a Lake Seminole Watershed Management Area (WMA) Through Amendments to the Pinellas County, and Cities of Largo and Seminole Comprehensive Plans**

The primary expected benefit of this management action is improved intergovernmental coordination between Pinellas County and Cities of Largo and Seminole with regard to watershed management issues in the basin.

## **Compliance and Enforcement Component**

### **Expand and Enforce Restricted Speed Zones on Lake Seminole**

The primary benefits of this action would be improved public safety and enjoyment of the lake, as well as reduced user conflicts. In addition, water quality may be improved through reduced wake and wave turbulence in shallow portions of the lake susceptible to sediment resuspension.

## **Public Education Components**

### **Develop and Implement a Comprehensive Public Involvement Program for the Lake Seminole Watershed**

The expected benefits of the management action include improved public understanding of lake management problems and solutions, and increased public involvement and participation in the Plan implementation process.

## **Develop and Implement a Local Citizens Lakewatch Program for Lake Seminole**

The expected benefits include improved public interest and involvement in the lake and watershed management process, and assistance in the collection of supplemental monitoring data.

### **Modeling Results**

#### **WASP5 Model Results**

The Plan included a comprehensive section that provides a summary of predictive watershed and waterbody modeling conducted to evaluate the efficacy of key potential management actions proposed to address priority management issues for Lake Seminole and its watershed. Priority lake and watershed management issues include:

- water quality degradation and eutrophication (Issue 1 - Water Quality);
- loss of desirable aquatic vegetation (Issue 2 - Aquatic Vegetation); and
- sport fishery decline (Issue 3 - Fisheries).

Because these three lake management issues are very much interrelated, the proposed management actions addressed herein were developed and evaluated in a holistic manner which considers their individual and cumulative impact on the trophic state of the lake. While other identified lake management issues (e.g., watershed habitat restoration, recreational user conflicts, etc.) are addressed in the Plan, predictive modeling was only conducted on those management actions aimed at addressing the priority issues listed above. A detailed description of the model components and calibration simulation is available in **Appendix C**.

### **Management Action Simulations**

#### ***Management Action #1 - Regional Stormwater Treatment Facilities (BMPs)***

Basins within the Lake Seminole watershed were ranked according to SWMM pollutant loading estimates. These rankings were used to develop locations for potential stormwater treatment facilities within sub-basins 1, 2, 3 and 7. Because several stormwater rehabilitation projects are currently under design or construction in sub-basin 6, and these projects were included in the future land use baseline simulation, no additional facilities were modeled for this sub-basin. The proposed management actions and alternatives for Lake Seminole were evaluated using the Linked Watershed-Waterbody Model (LWWM) developed for the Southwest Florida Water Management District by Ascl, Inc. This water quality model provides a post-processing linkage between the watershed model SWMM, a public domain software program also developed by EPA, and the waterbody model WASP5. An external hydrodynamic file was also required for LWWM simulations which contained model segment flows, and was developed using an Excel spreadsheet and a Fortran routine.

Limited potential exists within the Lake Seminole watershed for stormwater retrofit using conventional wet detention treatment systems due to the lack of vacant land. All regional stormwater treatment facilities modeled for Management Action #1 were therefore assumed to be alum injection systems, with the corresponding alum treatment efficiencies shown in **Table 3-6** applied to pollutant loads passing through the facilities.

It should also be noted that due to the high pollutant removal efficiency and minimal land area requirements, the cost per pound of nutrients removed is substantially lower than a wet detention system. Based on current information provided by SWFWMD (Mike Holtkamp-SWFWMD, personal communication), typical costs per pound of TN removed by wet detention systems ranges between \$3,846 and \$1,108; whereas typical costs per pound of TN removed by alum treatment systems ranges between \$338 and \$120. Because they provide pollutant removal efficiencies per dollar that are an order of magnitude better than wet detention systems and due to limited land availability were selected as the design alternative of choice for Lake Seminole.

Separate non-point source input files were prepared for all possible combinations of potential alum injection treatment facilities within the watershed. Fifteen (15) separate simulations were performed using the various non-point source input files to evaluate the effect of reduced non-point source loads on average annual chlorophyll-a levels. All stormwater best management practice (BMP) management simulations used the same WASP input file (BMP.inp) and hydrodynamic file (98F.hyd). Only the non-point source file was changed for different combinations of potential watershed BMPs.

A summary of these results for all possible stormwater treatment project combinations is provided in **Table 3-7** along with the effective reduction in total non-point source load. The numeric designations for BMP combinations in **Table 3-7** refer to the sub-basins in which enhanced regional stormwater treatment facilities were simulated in the model runs. LWWM predictions for nutrient and chlorophyll-a concentrations within Lake Seminole resulting from implementation of all proposed watershed BMP facilities are provided in **Figure 3-7**.

These results indicate that the most effective alternative of regional stormwater treatment facilities is the combination of facilities located in sub-basins 1, 2, 3, and 7. The implementation of four regional alum treatment facilities at the outfall of these sub-basins is predicted to reduced in-lake chlorophyll-a concentrations by 4.4  $\mu\text{g/l}$ , or about a 7% from baseline future land use conditions using 1998 rainfall. These results are not expected since external pollutant load reduction from regional stormwater treatment facilities should yield cumulative benefits determined by the percentage of the inflows being treated.

### ***Management Action #2 - Lake Level Fluctuation***

A variable lake level fluctuation schedule was proposed primarily for littoral habitat improvement within Lake Seminole. Both inter-annual and intra-annual variations are achieved with the proposed monthly lake level fluctuation schedule. In order to assess the potential impact of this management action on in-lake nutrient and chlorophyll-a levels, the hydrodynamic file for 1998 rainfall and future land use conditions was modified to account for monthly variable weir crest elevations. Schedule A was used for management simulations, which provides the greatest range of fluctuation in the 4-year repeating schedule. Only the hydrodynamic file reference in the WASP input file was changed from the 1998 future land use conditions simulation, and the same baseline non-point source file (98F.nps) was used for the weir management action simulation.

LWWM predictions for nutrient and chlorophyll-a concentrations within Lake Seminole resulting from implementation of the weir fluctuation schedule is provided in Figure 3-8. The simulation results for this management action actually show a slight increase in



chlorophyll-a concentrations of 1.9 mg/m<sup>3</sup> (3.03% increase over baseline conditions). This predicted increase is most likely due to a decreased in-lake volume during the early and mid-summer, the period when algal productivity is greatest. It is interesting to note that Greening and Doyon (1990) cite several case histories where lake drawdowns have led to a slight temporary degradation of water quality, which they attribute to a phosphorus release from decaying macrophytes exposed to oxidation. Although this management action apparently has the potential to cause a slight degradation in water quality, the beneficial effects of enhanced lake level fluctuation on aquatic vegetation and fisheries habitat probably justify its implementation.

### ***Management Action #3 - Canal Diversion***

An important factor affecting receiving water quality is the amount of time it takes to completely exchange in-lake volume, often referred to as residence time. Potential Management Action #3 is designed to reduce residence time within Lake Seminole by pumping water from the adjacent Seminole Bypass Canal into the northern lobe of the lake. Four separate simulations were performed to evaluate the lake response to various pumping rates and treatment alternatives for canal diversion water. Canal baseflow and stormwater volume and nutrient concentration estimates were based on hydrological evaluations of the Starkey Basin performed by ERD, and summarized in a December 15, 1998 SWFWMD letter to PBS&J.

Alternative 3A was simulated by creating a hydrodynamic file containing a constant pumping rate of 10.42 cfs from the bypass canal into the northern lobe of Lake Seminole (3A.hyd). This flow represents a diversion of 80% of the annual baseflow within the canal. Nutrient loads were adjusted in the WASP5 input data file to account for TN, TP and BOD loads contained within the diverted canal water.

Alternative 3A1 used the same hydrodynamic file as above which accounted for an 80% diversion of canal baseflow into the northern lobe of Lake Seminole (3A.hyd). Alum treatment of this constant 10.42 cfs canal diversion flow was simulated prior to discharge into Lake Seminole for this alternative. Nutrient loads calculated in Alternative 3A were reduced by the alum treatment efficiencies contained in **Table 3-6** prior to entry into the WASP5 input data file.

Alternative 3B was simulated by creating a hydrodynamic file (3B.hyd) containing higher pumping rates for canal diversion flow during July (11.40 cfs), August (11.60 cfs) and September (11.39 cfs). These increased pumping rates represent an 80% diversion of stormwater runoff flows expected during these months, in addition to the constant 10.42 cfs baseflow pumping rate. Stormwater flows routed during July, August and September would contain greater nutrient concentrations than a baseflow diversion only. Nutrient loads were therefore adjusted in the WASP5 input data file to account for these increased pollutant loads contained within the diverted stormwater flow in addition to baseflow.

Alternative 3B1 used the same hydrodynamic file as above (3B.hyd), but considered alum treatment of diverted canal baseflow and stormwater flow. Nutrient loads calculated in Alternative 3B were reduced by the alum treatment efficiencies contained in **Table 3-6** prior to entry into the WASP5 input data file for this alternative. The same baseline non-point source file (98F.nps) was used for all canal diversion management action simulations described above.



LWWM predictions for nutrient and chlorophyll-a concentrations within Lake Seminole resulting from implementation of canal diversion Alternative 3A1 are provided in **Figure 3-9**. **Table 3-8** contains a summary of input files used for the evaluation of Management Action #3 and resulting predicted chlorophyll-a concentration reductions.

The results of these LWWM simulations indicate that the greatest reduction in chlorophyll-a concentrations in Lake Seminole can be expected from a constant diversion of treated canal baseflow only (Alternative 3A1). This alternative yields a substantial predicted decrease in chlorophyll-a concentrations of 9.6  $\mu\text{g/l}$  or about a 15% reduction over baseline conditions. Diversion of treated stormwater flows (Alternative 3B1) does not appear to be as effective, as the increased pollutant loads contained in this runoff effectively negate any reductions in chlorophyll-a concentrations achieved through a decrease in residence time.

#### ***Management Action #4 - Sediment Removal***

Sediment removal as a lake management action is expected to result in improved water quality through two primary modes of action: 1) increased lake water volume; and 2) reduced sediment nutrient flux rates. The increase in lake water volume resulting from sediment removal can easily be quantified, being approximately equal to the wet volume of sediments removed. However, reductions in sediment nutrient fluxes resulting from sediment removal cannot be accurately quantified with the existing information from Lake Seminole. Many variables affect sediment nutrient exchange rates, and empirical data from Lake Seminole are currently not available.

During the calibration simulations, sediment nutrient fluxes were included in the variables which were manipulated to obtain the best fit of predicted parameter concentrations to recorded values. Initial sediment fluxes for N and P were set at rates with the same order of magnitude as those determined empirically for Lake Seminole sediments by Schelske et al. (1991; in SWFWMD, 1992). These calibrated flux rates were reduced incrementally in the dredging simulations described below to gain an understanding of the sensitivity of LWWM simulations to manipulation of this parameter.

Initial lake water volumes contained in the WASP5 input data file were increased to reflect the removal of 1 million cubic yards of sediment from the lake bottom, or about 100% of the estimated volume of unconsolidated organic sediments in the lake. In the simulations 36% of the increased lake water volume was applied to the northern lobe, while the remaining 64% was applied to the southern lobe. An updated hydrodynamic file was also created to reflect these increased volumes.

**Table 3-9** contains a summary of input files used for the evaluation of Management Action #4, and the resulting predicted reductions in chlorophyll-a concentrations associated with a 20% (Alternative 4A), 35% (Alternative 4B), and 50% (Alternative 4C) reduction in sediment nutrient fluxes. It should be noted that all three simulations included 100% removal of the unconsolidated organic sediment mass, but applied different sediment nutrient flux rates resulting from the sediment mass removal. LWWM predictions for nutrient and chlorophyll-a concentrations in Lake Seminole resulting from implementation of dredging Alternative 4C are provided in **Figure 3-10**.

The simulation results for the sediment removal alternatives indicate that the model is extremely sensitive to the reduction of sediment nutrient fluxes. With a 50% reduction in sediment nutrient flux rates (Alternative 4C), the model predicts a very substantial reduction in chlorophyll-a concentrations of 15.3  $\mu\text{g/l}$ , or about 24% below baseline conditions.

The proposed removal of approximately 1 million cubic yards of unconsolidated organic sediments from Lake Seminole, including both the fibrous shoreline sediments and the flocculent deep sediments, is expected to reduce sediment nutrient flux rates significantly based on the sediment characterization study. Unfortunately, an accurate estimate of the percent reduction in nutrient flux rates resulting from sediment removal cannot be made with the information currently available. However, it seems reasonable to assume that complete removal of the unconsolidated organic sediments in Lake Seminole could lead to a 50% reduction in sediment nutrient flux rates. With this conservative 50% reduction, significant water quality improvements in Lake Seminole are predicted.

### ***Management Action Combinations***

Model simulations were performed for all possible combinations of each of the four selected management action alternatives described above. In many cases, new WASP5 input data files were developed in order to combine all modifications made in the individual management scenario alternatives described above. In addition, updated hydrodynamic files were created for these simulations where required.

The WASP model used to predict future water quality conditions was run for an essentially built-out watershed, using 1998 rainfall patterns. The model was calibrated using rainfall and water quality data from 1996, 1997, and 1998, but comparisons with the full implementation of lake restoration scenarios were run using 1998 rainfall patterns only. For 1998, the WASP-predicted baseline condition chlorophyll-a value for Lake Seminole was 62.9  $\mu\text{g/L}$ .

**Figure 3-11** shows in-lake chlorophyll-a, DO, BOD, and nutrient concentrations resulting from a combination of all modeled management scenarios combined. **Table 3-10** contains a summary of input files used for the 15 LWWM simulations required for this optimization analysis, and predicted reductions in chlorophyll-a concentrations.

Simulation results for the various combinations of management action alternatives presented in **Table 3-10** above indicate that the most effective combination of alternatives includes the following:

- regional stormwater treatment facilities located in priority sub-basins 1, 2, 3, and 7;
- diversion of treated baseflows from the Seminole Bypass Canal into the lake; and
- removal of 1 million cubic yards of unconsolidated organic sediments.

The predicted reduction in chlorophyll-a concentration resulting from the implementation of this suite of management alternatives is 28.5  $\mu\text{g/l}$ , or about a 45% reduction from baseline conditions. The second most effective combination of alternatives includes the three listed above plus the implementation of an enhanced lake level fluctuation schedule (Management Action #2). The proposed enhanced lake level fluctuation schedule is predicted to result in a slight increase in chlorophyll-a concentrations.

However, the habitat benefits to be derived from this management action probably justify its inclusion in the recommended Plan.

Based on the above described model predictions, implementation of the most comprehensive suite of management action alternatives (Management Action Combination 1+2+3+4 from **Table 3-10** above) will yield the greatest overall improvement in both water quality and habitat conditions. Using the predicted reductions in chlorophyll-a associated with this suite of management action alternatives, it appears feasible to make very substantial improvements in the water quality and trophic state of Lake Seminole. The predicted reduction in chlorophyll-a concentrations associated with this suite of management action alternatives indicates that a mean annual chlorophyll-a concentration of 35.5 µg/l can be achieved. Additionally, the model predicts that a mean annual TN concentration of 0.9 mg/L and a TP concentration of 0.055 mg/L are achievable. These reductions in the lake's chlorophyll-a and nutrient concentrations results in a multi-parametric TSI value of 61.6 (calculated using the FDEP methodology), indicating that considerable gains are made towards meeting the TSI goal of 60.

The model predictions summarized in **Table 3-10** also indicate that simultaneous implementation of the selected management action alternatives in many cases results in synergistic improvements in water quality and trophic state. An independent review of the LWWM model construct and calibration simulations was conducted by Dr. James Martin, one of the original authors of the WASP5 model code. This review is provided in **Appendix D** of this document.

In addition, there are other activities and benefits which are not accounted for in the surface water quality modeling originally performed that will result in water quality improvements in Lake Seminole. These activities and benefits include, 1) additional alum treatment in Sub-basin 6; 2) synergistic water quality improvements resulting from SAV restoration, the adopted lake level fluctuation schedule, and fisheries biomanipulation; and 3) the implementation of whole-lake alum treatment as a backup. Although the improvements to water quality expected from these measures are not quantified, it is expected that these activities and benefits would result in attaining the water quality targets identified in this plan. Pinellas County is committed to implementing these activities in order to meet the TSI target of 60. Whole-lake alum treatment would only be used for Lake Seminole in the event that the combination of other activities does not provide the water quality improvements the County anticipates.

### **3.e Copies of Written Agreements Committing Participants to the Management Actions**

Pinellas County has received commitments from the City of Largo, City of Seminole, and the Florida Department of Transportation by way of a legal document entitled "INTERLOCAL AGREEMENT PROVIDING JOINT CONTROL OF POLLUTANTS WITHIN PINELLAS COUNTY" (**Appendix E**). The interlocal agreement defines the responsibilities and authority for each entity in order to regulate the National Pollutant Discharge Elimination System developed by the USEPA.

### **3.f Discussion On How Future Growth And New Sources Will Be Addressed**

Future land use conditions were modeled to predict non-point source pollutant loads (\*.nps) in the Lake Seminole watershed under a projected ultimate build-out land use scenario. Although some differences in land use are anticipated under future land use conditions, the watershed is currently nearly 100% built out, resulting in little predicted difference in pollutant loads for future land use SWMM simulations. These simulations accounted for three stormwater projects which were recently constructed within the watershed:

- the St. Petersburg Junior College site stormwater master plan;
- the Pinellas County Dog Leg Pond; and
- the Pinellas County Pond 6.

A continuous simulation was performed using 1998 rainfall to create a non-point source input file (98F.nps) which was used for the baseline future land use condition simulations. An external hydrodynamic file for future land use conditions using 1998 rainfall (98F.hyd) was also prepared using these SWMM calculated inflows to Lake Seminole by applying the spreadsheet and Fortran routines described above. A WASP5 simulation for future land use conditions using 1998 rainfall was then performed, which used the hydrodynamic and non-point source input files described above. These simulation results were used as a baseline condition for the evaluation of potential management alternatives. Results were similar to the existing conditions 1998 calibration simulation results, and are provided as a baseline for comparison purposes in **Figures 3-7 through 3-11**.

### **3.g Confirmed Sources of Funding**

Multiple sources of funding are confirmed for the restoration of Lake Seminole (Table 3-11). The SWFWMD, City of Largo, City of Seminole, Pinellas County, FWCC and DEP have allocated over \$32 million toward the improvement of water quality through restoration projects and monitoring in Lake Seminole since 1994. To date Pinellas County has spent over \$10 million on restoration projects in Lake Seminole. The Cities of Largo and Seminole have contributed over \$156,107 toward the restoration of the Lake. The FWCC, and SWFWMD have spent \$336,623 and \$6,603,155, respectively. Pinellas County included the alum injection projects for funding in fiscal years 2007-2012, therefore; approximately \$4.9 million has been designated for the design and construction of the alum stormwater treatment facilities designed to improve water quality in Lake Seminole (**Figure 3-12**). Additionally, a traditional sediment removal project was projected to cost the county over \$20 million. However, Hayes-Bosworth, Inc. presented a proposal which could only cost the county \$1 million. Hayes-Bosworth proposed to turn the sediment removal project into a business venture which would allow the company to absorb the remaining cost of sediment removal. The ingenuity and agreement between the public and private sector has allowed for multi-million dollar cost savings for the county.

### **3.h Implementation Schedule (Including interim milestones, and the date by which designated uses will be restored)**

The following schedule outlines the timeline for implementation of the restoration projects proposed for Lake Seminole.

#### **Phasing of Plan Components**

It should be emphasized that the various components of the restoration projects are not all independent management actions that can be implemented without regard for the others. The implementation of other management actions are based on the measured effectiveness of preceding management actions. For example, it is recommended that the removal of the flocculent deep sediments in the lake not be initiated until the effectiveness of external phosphorus removal has been evaluated through water quality monitoring. If monitoring indicates that expected progress towards meeting the defined water quality targets is not being met through the reduction of external phosphorus loads, then the implementation of the full dredging project would be justified. Similarly, sediment phosphorus inactivation through whole lake alum applications should not be initiated until the flocculent sediments have been removed and monitoring results still indicate insufficient progress towards meeting water quality targets. In recognition of these dependencies, as well as potential financial constraints, it is recommended that the Plan be implemented in three phases, as described below.

- **Phase I** - The first phase would focus initially on the design and permitting of the major structural components for which land acquisition, engineering design and regulatory permit approvals will be required. These activities in support of the major structural components of the Plan may require up to two years to complete and therefore will be initiated immediately. The establishment of several legal and policy related components will also be implemented. Phase I activities are projected to require a minimum of two years to complete, including construction.

- **Phase II** - The primary focus of Phase I will be on watershed management activities that result in the reduction of external phosphorus loads to the lake (e.g., construction of enhanced regional stormwater treatment facilities) and in-lake restoration activities that build upon the watershed management projects completed under Phase I. These would include implementation of in-lake habitat restoration projects, as well as the removal of the flocculent deep sediments. Implementation of the enhanced lake level fluctuation schedule would occur during Phase II following the removal of accumulated sediments in the narrows to ensure navigability throughout the lake. Assuming that all land acquisition, design and permitting activities have been completed for the major structural components in Phase I, it is anticipated that the Phase II construction projects, and other non-structural components of the Plan, could be completed in two years.
- **Phase III** - The third phase of the Plan would focus primarily on following-up on in-lake restoration activities that build upon, or are dependent upon, the implementation of Phase I and Phase II projects. For example, assuming that adequate water quality improvement to support the proliferation of aquatic macrophytes in the lake has resulted from the implementation of the Phase I and II components, the aquatic weed harvesting program would be initiated during Phase III. Conversely, if the defined water quality targets have not been attained following implementation of the Phase I and II components, then sediment phosphorus inactivation would be implemented in Phase III. It should be noted that the majority of the Phase III projects are management or maintenance activities that will likely be conducted indefinitely on an ongoing basis.

**Table 3-12** summarizes implementation schedule for the restoration of Lake Seminole. This table embodies the logical sequencing and dependencies of the various components discussed above. In addition to these components, the recommended monitoring and success evaluation program already presented was implemented in Phase I to document existing baseline conditions, and to track progress throughout project implementation.

### **3.i Enforcement Programs or Local Ordinances (If management strategy is not voluntary)**

The Pinellas County Board of County Commissions adopted the Lake Seminole Watershed Management Plan by resolution in 2001. This resolution articulates a commitment on the part of the County to directly fund, and secure additional grants and cooperative funding agreements, as needed to fully implement the Plan. While the watershed planning and lake restoration efforts undertaken by Pinellas County have been voluntary to date – that is, not required as part of a regulatory process – many of the commitments made with regard to specific projects are in fact enforceable through project-specific permit approvals and inter-local agreements. For example, the construction and monitoring of the alum stormwater and bypass canal diversion treatment facilities are embodied in the State of Florida Municipal Separate Storm Sewer System (MS4) Permit, issued to Pinellas County under the National Pollutant Discharge Elimination System (NPDES) program. In addition, continued operation and maintenance of these facilities is guaranteed under a cooperative funding agreement between Pinellas County and SWFWMD. **Appendix A** contains copies of the Pinellas County MS4 permit and the cooperative funding agreement between the County and SWFWMD. Finally, a federal dredge and fill (CWA Section 404/10) permit from the U.S.



Army Corps of Engineers, and a State of Florida Environmental Resource Permit (for delegated Water Quality Certification), will be required for the sediment removal project. This permit will likely specify monitoring and reporting requirements for the project, thus establishing additional federal and state enforcement provisions.

It should also be noted that Pinellas County has implemented a storm drain education program throughout the Lake Seminole Watershed. Over 2067 stormdrain labels stating, "Dump No Waste-Drains to Lake" have been distributed in an effort to inform the public of the consequences associated with improper disposal of materials down a stormdrain (**Figure 3-6**). 197 of these labels are within the Lake Seminole watershed. The County has the ability to fine anyone identified for improper disposal a maximum fine of \$10,000 (Pinellas County, Florida, Chpt. 58-236-58-246).

## **4. Procedures for Monitoring and Reporting Results**

### **4.a Description of Procedures for Monitoring and Reporting**

The implementation of a water quality monitoring program is important to demonstrate reasonable progress based on the management activities proposed to improve Lake Seminole water quality. Pinellas County contracted Janicki Environmental in 2003 to complete a document which details a comprehensive monitoring plan for Pinellas County. The document is entitled "A design of a surface water quality monitoring program for Pinellas County, FL" and has been included in **Appendix F**. From this point further, this document will be referred to as the "Monitoring Plan".

Pinellas County utilizes stratified randomized design for the selection of all sampling stations, dates and time of day. Nine equal time periods have been determined for the calendar year. Four samples are collected once within each time period established by the county, for a total of 36 samples each calendar year. Each year the statistical program is rerun to determine that years sampling sites, dates and time of day. The sampling dates and times for 2007 are detailed in **Table 4-1**. The 2007 sampling stations are listed in **Table 4-2**. A suite of water quality and explanatory parameters are analyzed for each sampling site (Table 4-3). **Appendix G** includes the "Ambient Monitoring Program Annual Report: 2003-2005" for Pinellas County. This provides more detailed information on the sampling and statistical methodology as well as the format used for reporting. The PCDEM will continue to investigate the TSS load reduction efficiency of all permitted MSSW facilities within the Lake Seminole watershed. Samples for the analysis of the phytoplankton community will be collected. Additionally, extensive monitoring will be completed in concert with the operation of the alum stormwater treatment facility in sub basin one (**Appendix B**). Water, benthic and sediment quality will be monitored in order to evaluate the success of the treatment facility and the effectiveness of the settling area. The goal of this monitoring effort is to measure the efficiency of the facility based on its Event Mean Concentration (EMC) efficiency and Load Efficiency prior to the construction of the remaining alum stormwater treatment facilities. All data are statistically analyzed and reported annually by the PCDEM. These data are used to determine the water quality status of Lake Seminole.

#### **4.b Quality Assurance/Quality Control Elements that Demonstrate the Monitoring will Comply with Chapter 62-160, F.A.C.**

All field data will be collected in accordance of the Chapter 62-160, F.A.C. regulations. All water samples are delivered to the Pinellas County Utilities Department the same day and usually within six hours of sample collection at any given site. The Pinellas County Utilities Department Laboratory, a National Environmental Laboratory Accreditation Conference (NELAC) certified lab, performed most sample analyses. E-lab, a NELAC certified laboratory, also provided analysis services for this program. The Pinellas County Utilities Department laboratory uses Standard Methods and EPA Methods for in order to analyze ambient water samples collected by PCDEM (Table 4-4):

Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983.

Standard Methods for the Examination of Water and Wastewater, 19th Edition. APHA, WEF,AWWA, 1998.

**Appendix G** includes additional information on the sampling protocol used by Pinellas County. **Appendix H** includes the standard checklist required prior to each sampling event and the protocol used for the special samples and additional data collected at Lake Seminole.

#### **4.c Procedures for Entering all appropriate Data into STORET**

The Data Manager, designated by the PCDEM, uploads all water quality data collected for monitoring of Lake Seminole to the Florida STORET database. The Florida STORET database automatically uploads all data to the Federal EPA STORET database. All data uploads will be documented and reported to the FDEP in Tallahassee.

#### **4.d Responsible Monitoring and Reporting Entity**

The PCDEM is the responsible monitoring entity for all waterbodies within Pinellas County. The PCDEM has a designated Data Manager who serves as the point of contact for coordinating the collection, management and reporting of all monitoring data associated with Lake Seminole. Furthermore, PCDEM serves as a depository of all monitoring data associated with the restoration of Lake Seminole.

#### **4.e Frequency and Format for Reporting Results**

Section 6.0, "Data Reporting Methods" of the Monitoring Plan, details the frequency and format for reporting results (**Appendix F**). Currently, PCDEM provides periodic data reporting, annual reporting and an annual review of the monitoring program (**Appendix G**). The tasks required within the periodic data reporting are completed based on quarters of a calendar year. During the first quarter of each calendar year, PCDEM compiles the annual report for the previous sampling period. The report contains all of the water quality status information. After five years of data collection, the annual reports will also include status and trends information. During the second quarter of each calendar year, the annual monitoring program will be reviewed based on the previous years' of monitoring data. The results of the annual review will be published during the



third quarter. Based on the recommendations of the annual review, the random selection of the next year's sampling stations, dates and time of day will be selected.

The annual reporting of water quality results is concentrated on the analysis, presentation and submission of the results collected from the previous sampling year. The below criteria will be included within each annual report (Monitoring Report, Section 6.0):

- A summary section with descriptive answers to the important questions identified for the ambient monitoring program.
- Spatial reporting units consist of the individual geographic populations of interest
- Temporal reporting units consist of each calendar year. Using every two years of sampling results, wet and dry season statistics will be reported.
- The results for all measured parameters will be reported in each annual report.
- The EMAP-based statistical analyses will be conducted to produce frequency distributions of the area of each spatial reporting unit for each water quality parameter. Results will be presented in tabular and graphical format.
- The stratified-random analyses will be conducted to compute the annual mean and standard error for each spatial reporting unit and parameter measured.
- The FDEP Impaired Water Rule criteria will be applied to classify each coastal Water Body (WBID) using data from this monitoring program and any other applicable monitoring activities.
- Potential water quality problem areas will be identified, prioritized and discussed in each annual report.
- The targeted spatial and temporal populations of interest will be compiled through review of the exclusionary criteria applied during the previous year.

In addition the following information will be posted to a project website:

- A summary of the monitoring program, and the important questions it addresses.
- A high level summary of the most recently reported results for the ambient monitoring program.
- Program contact information
- A description of the annual reporting cycle and an updated status of the items in the reporting cycle,
- A library of PDF documents of past annual reports.
- A library of PDF document of past annual monitoring program review reports.

#### **4.f Frequency and Format for Reporting on the Implementation of all Proposed Management Activities**

The PCDEM will publish an annual State-of-the-Lake report which summarizes all of the monitoring data collected during the previous calendar year. In addition to monitoring data summaries, the annual report will include the status for all proposed management activities. Additionally, all stakeholders, which includes the FDEP, will be updated at the stakeholder meetings which are held regularly.

#### **4.g Methods for Evaluating Progress Towards Goals**

The PCDEM will evaluate all data collected and compare them to the goals established in section 2.a. A trend analysis of the annual TSI and mean chlorophyll values will be completed. The collection of 36 samples per year should result in a  $\pm 15\%$  confidence interval (Monitoring Plan, 2003).

### **5. A Description of Proposed Corrective Actions**

#### **5.a Description of Proposed Corrective Actions that will be undertaken if water quality does not improve after implementation of the management actions or if management actions are not completed on schedule**

The comprehensive monitoring program in Lake Seminole under the coordination of the PCDEM is instrumental for quantifying water quality improvements. The current implementation schedule for water quality improvements occur over three phase components. Upon completion of each phase the water quality of the Lake will be investigated to determine if improvements have been accomplished. The third phase component, Inactivate phosphorus through whole lake alum applications, will be implemented only if previous restoration projects were not successful in improving water quality. It is anticipated that the sediment removal will temporarily cause a declination in water quality due to the manipulation and resuspension of sediments. However, it is expected that an improvement in water quality will be recorded within 10 years of sediment removal. After all proposed restoration projects have been exhausted, Lake Seminole will be re-evaluated and new management techniques will be considered to improve water quality conditions if necessary.

#### **5.b Process for Notifying the Department that these corrective actions are being implement**

The PCDEM will complete an annual report (section 4.f) detailing the current water quality and provide an update on all current and future restoration projects on Lake Seminole. All state, federal, local and private agencies involved in the Lake Seminole restoration will be provided a copy of this final report. The FDEP in Tallahassee will be sent an annual report. In addition, The FDEP is a stakeholder within Lake Seminole, therefore, they will be notified of all corrective actions at the stakeholder meetings held regularly.

## **Case Study #1 - Sediment Removal**

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From PBSJ 2006, Lake Seminole Sediment Removal Feasibility Study.

This case study presents a brief summary of four lake sediment removal projects and a mesocosm experiment conducted in the west central Florida area during the past 15 years. The purpose of this summary is to develop an understanding of the real-world problems that have been encountered, and the lessons that have been learned, on projects similar to sediment removal project proposed for Lake Seminole. The projects summarized below include:

- Banana Lake – Polk County
- Lake Hollingsworth – Polk County
- Lake Panasoffkee – Sumter County
- Lake Maggiore – Pinellas County.
- Lake Hancock-Polk County

For each project summary the following subjects are addressed: 1) project history 2) sediment removal methods considered and selected; 3) environmental monitoring data – including sediment quality data, discharge water quality, and pre- and post-dredge water quality data – where available; and 4) problems encountered – including engineering, environmental, and/or construction related issues - and corrective measures implemented. Various sources of information were used in developing these summaries including personal communication with project managers and both published and unpublished data.

### **Banana Lake**

Banana Lake is a 342 acre lake located in Polk County. The lake exhibited very poor water quality for many years as reflected in high chlorophyll-a and low dissolved oxygen values. The hyper-eutrophic conditions were attributed to stormwater runoff from agricultural areas and the direct discharge of wastewater from the City of Lakeland municipal wastewater treatment plant. The wastewater treatment plant stopped discharging in 1986; however, water quality problems persisted. In the mid to late 1980s, Banana Lake was clearly a phytoplankton dominated lake characterized by year-round blooms of green algae and cyanobacteria. As a result, aquatic macrophyte communities were essentially eliminated and the lake sport fishery (e.g., largemouth bass) was replaced by a fish community dominated by planktivorous species (e.g., gizzard shad).

Because lake water quality did not improve significantly following the elimination of the wastewater treatment plant discharge, it was hypothesized by lake managers that the organic sediments that had accumulated on the lake bottom constituted a substantial nutrient reservoir sufficient to maintain high phytoplankton concentrations. Dredging was initiated 1989 and completed in 1990. A hydraulic dredge was used, and dredged spoil material was discharged in upland pits constructed on adjacent agricultural land. The upland drying pits were designed to contain the entire volume of dredged spoil material, and no return water was permitted back to the lake. The total in-lake volume of sediments removed, and the total area of drying pits, was approximately 1 million cubic yards and 400 acres, respectively.

## Case Study #1 - Sediment Removal

It was subsequently estimated that approximately 90% of the nutrient loads to Banana Lake were eliminated by the diversion of the wastewater treatment plant discharge and the dredging of organic lake sediments. Although trophic state and water quality in Banana Lake improved following the dredging project (see **Figures CS1-1 and CS1-2**), the observed improvements have generally been less than anticipated. In addition to water quality improvements, the fish community balance also shifted to a more sport fish (e.g., carnivorous vs. planktivorous) dominated population. Beginning in 1998, Banana Lake began inadvertently receiving a portion of the nutrient laden decant water from the Lake Hollingsworth project, a problem that was later corrected. It is likely that the high ambient phosphorus concentrations in the soils of the Banana Lake watershed are sufficient to maintain high algal productivity.

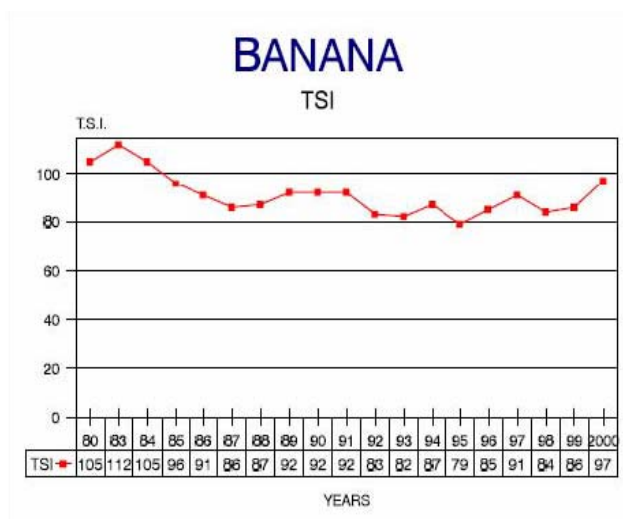


Figure CS1-1. Trophic Stat Index at Banana Lake

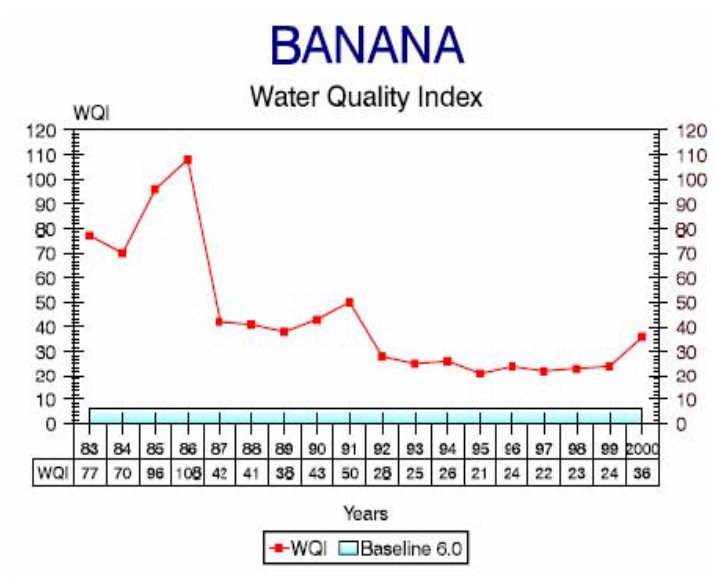


Figure CS1-2. Water Quality Index at Banana Lake

## Case Study #1 - Sediment Removal

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### Lake Hollingsworth

Lake Hollingsworth is a 356 acre lake located within the City of Lakeland, Polk County. Lake water quality had been generally poor for many decades, with persistent algae blooms and low dissolved oxygen levels being the primary concern. Following implementation of several stormwater treatment projects water quality did not improve significantly, so the City of Lakeland contracted with BCI Engineers & Scientists to conduct a sediment removal feasibility study under the assumption that accumulated organic sediments in the lake were serving as a reservoir of nutrients and contributing to water quality problems. The BCI study was completed in 1995 and recommended hydraulic dredging of low density organic sediments combined with process treatment of the dredged slurry to separate the suspended solids. In 1996 project permitting was initiated, and a lake-side pilot test of the process treatment system was conducted.

In February of 1997 dredging was initiated with the dredge spoil being pumped to an adjacent site on which a temporary process treatment plant was constructed. The original design of the process treatment plant was modified several times as it failed to dewater the dredged material to an adequate percent solids to meet contractual requirements for trucking and disposal. Engineering problems with the process treatment plant included inefficient polymer dosing and mixing, and inadequate physical treatment of flocculated organics. In 2000, the plant was retrofitted with an earthen pit to be used as a clarifier for polymer dosing and mixing, combined with a system of evaporation/percolation lagoons comprising approximately 70-acres. This approach also failed primarily because the lagoons flooded prematurely due to inadequate percolation. In 2002, the treatment plant approach was scrapped, and the dredged spoil material was then pumped to the Holloway mine pits located on vacant lands approximately four miles from the plant site.

In March of 2001 the project was terminated due to low water levels in Lake Hollingsworth. Low water levels were attributed to both previous drought conditions and the limited amount of return water diverted back into the lake. The City of Lakeland estimated that at the time of termination the project was approximately 80 percent complete, with 2.96 million cubic yards of muck removed and 842,000 cubic yards remaining, and that a total of \$12 million had been spent. This expenditure equates to a unit cost of \$4.14/c.y. However, it should be noted that the engineering approach to this sediment removal project evolved from a sophisticated mechanical spoil dewatering system to a lagoon disposal alternative. Therefore, it is difficult to evaluate the overall cost-effectiveness of the project.

In 2003 the City of Lakeland conducted a whole lake alum treatment of Lake Hollingsworth with the objective of chemically sequestering remaining phosphorus reserves in lake sediments. In addition, the City implemented several stormwater treatment projects to reduce nutrient inflows. Upon refilling of the lake by average or greater annual rainfall depths, water quality improvements (e.g., Secchi disk depth and chlorophyll-a) have been observed; however, the lake trophic state index remains in the eutrophic to hyper-eutrophic range. Additional data collected by the City indicate that water quality and ecological conditions have improved significantly in response to lake dredging and alum treatment. Summary pre- and post-dredging data collected by the City of Lakeland in Lake Hollingsworth is detailed below. In addition to water quality, the City has reported a 10 percent increase in desirable aquatic vegetation as well as

## Case Study #1 - Sediment Removal

increases in both the abundance and diversity of benthic invertebrates (e.g., Shannon-Weaver Diversity Index increased from 1.04 to 1.60).

In summary, it is difficult to directly quantify the benefits associated with sediment removal in Lake Hollingsworth due to the multiple confounding effects of the dredging, stormwater treatment, and alum application projects, as well as recent climate change (e.g., increasing rainfall). Nonetheless, the net effect of these factors has clearly resulted in improved conditions in Lake Hollingsworth (**Figures CS1-3-14**).

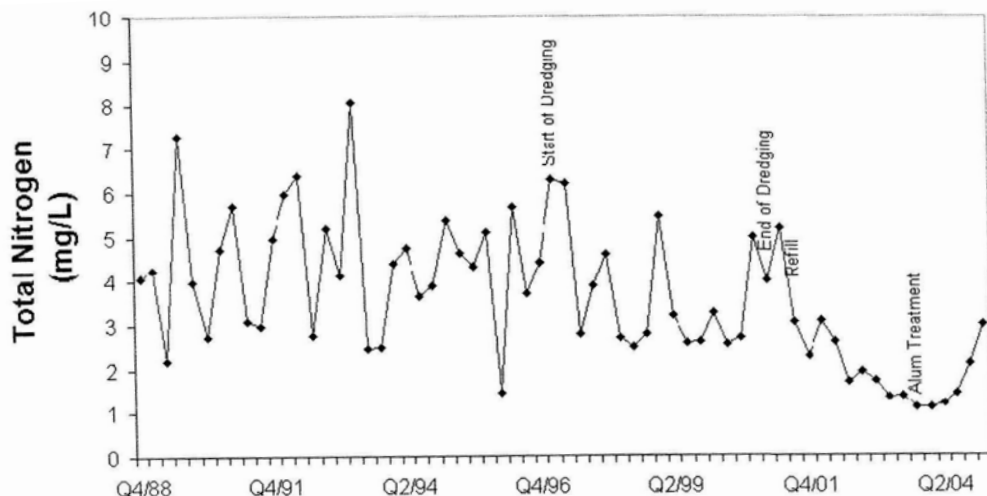


Figure CS1-3. Total Nitrogen at Lake Hollingsworth

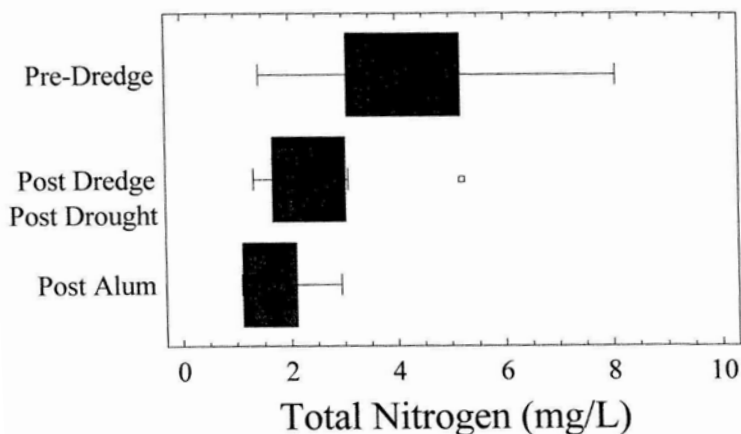


Figure CS1-4. Total Nitrogen concentration compared by restoration project at Lake Hollingsworth

## Case Study #1 - Sediment Removal

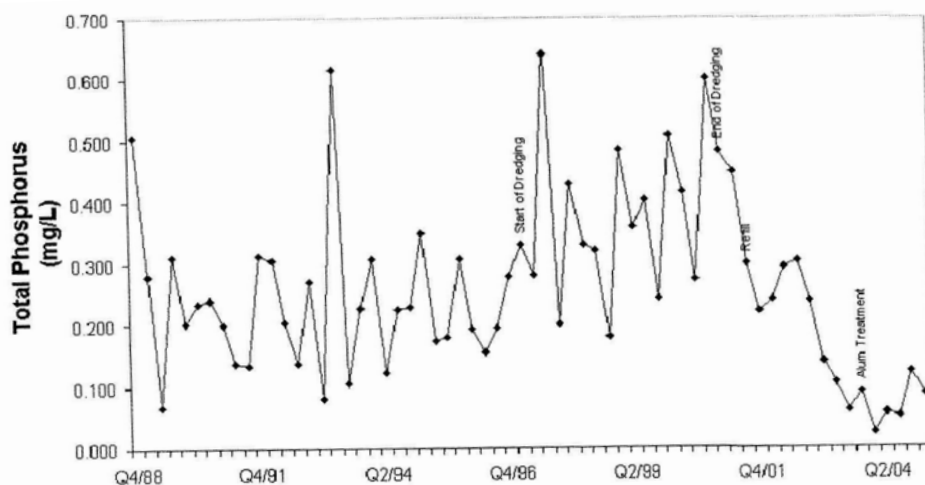


Figure CS1-5. Total Phosphorus at Lake Hollingsworth

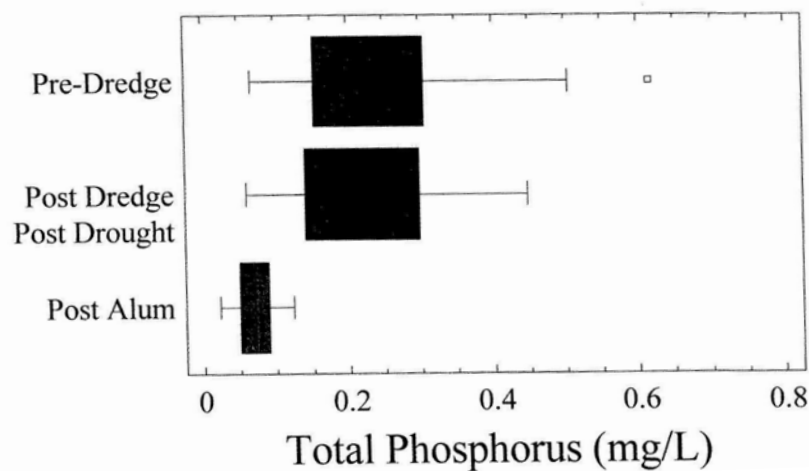


Figure CS1-6. Total Phosphorus Concentration Compared By Restoration Project At Lake Hollingsworth



## Case Study #1 - Sediment Removal

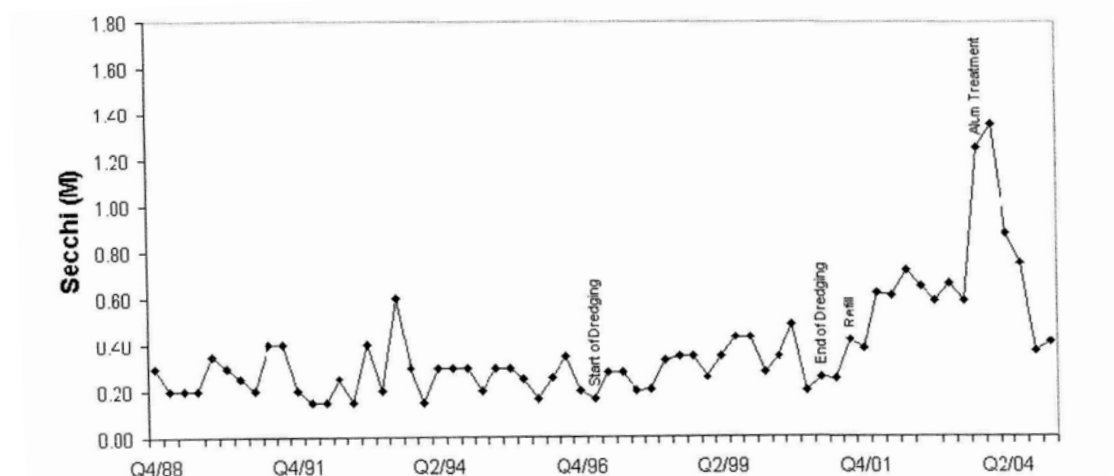


Figure CS1-7. Water Clarity at Lake Hollingsworth

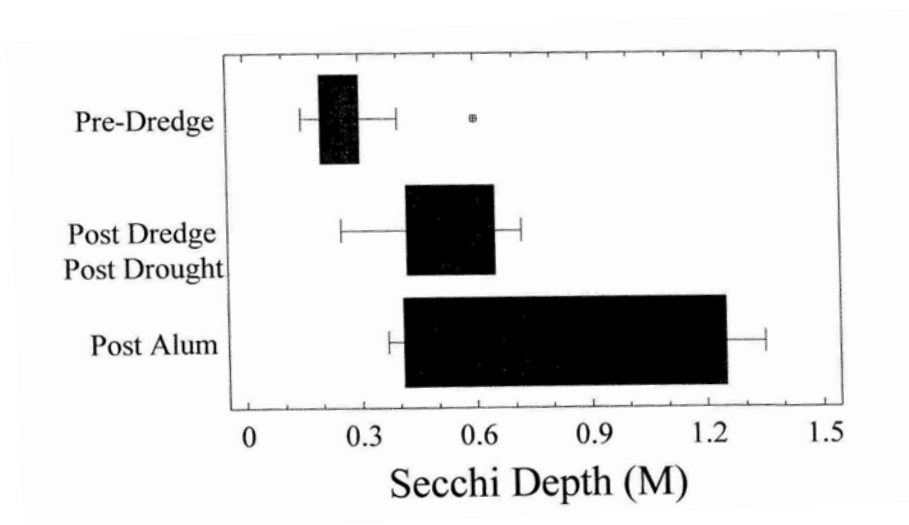


Figure CS1-8. Water Clarity Compared By Restoration Project At Lake Hollingsworth



## Case Study #1 - Sediment Removal

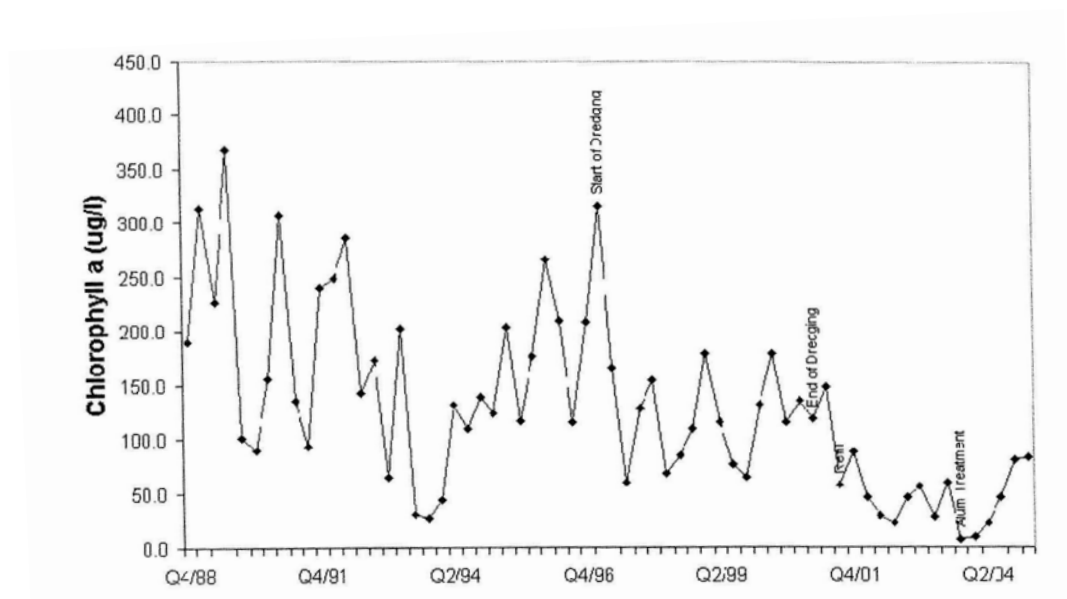


Figure CS1-9. Chlorophyll a at Lake Hollingsworth

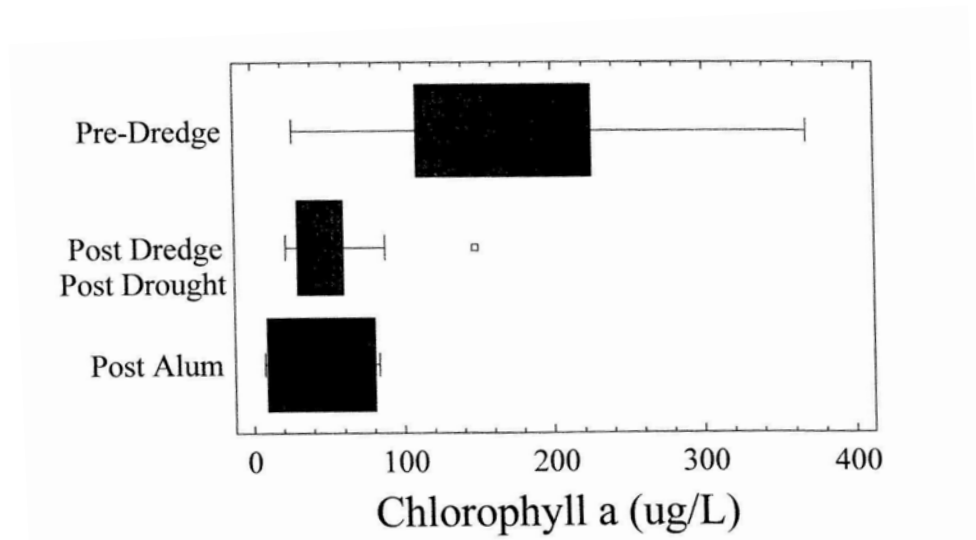


Figure CS1-10. Chlorophyll a concentration compared by restoration project at Lake Hollingsworth

## Case Study #1 - Sediment Removal

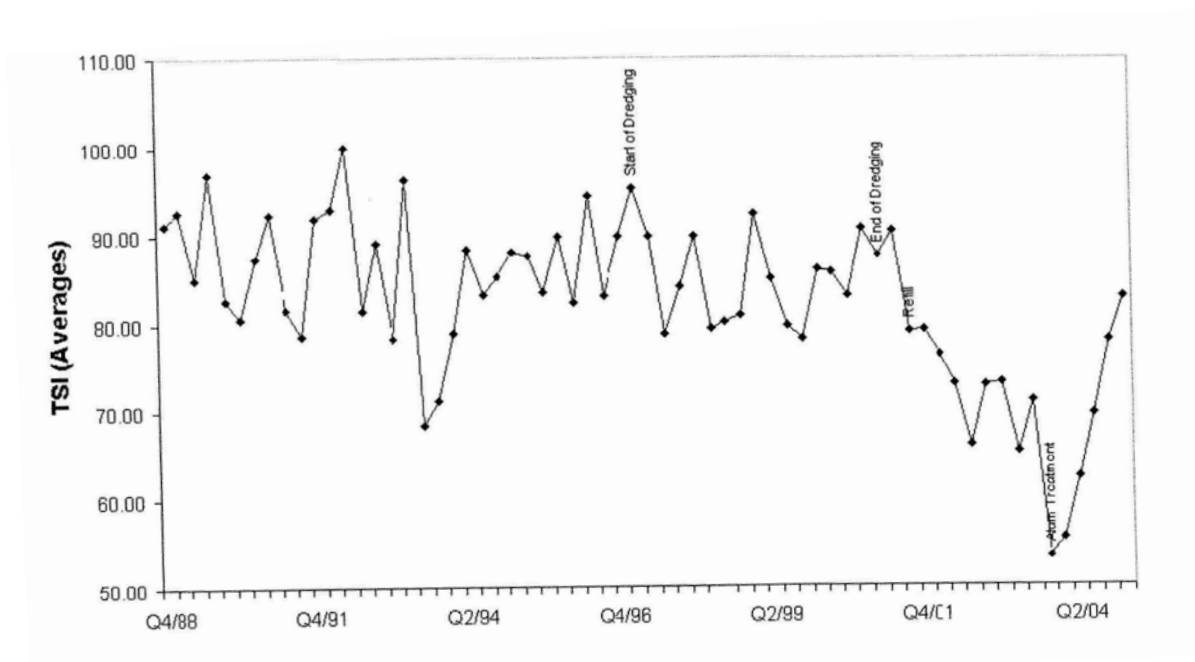


Figure CS1-11. Trophic State Index at Lake Hollingsworth

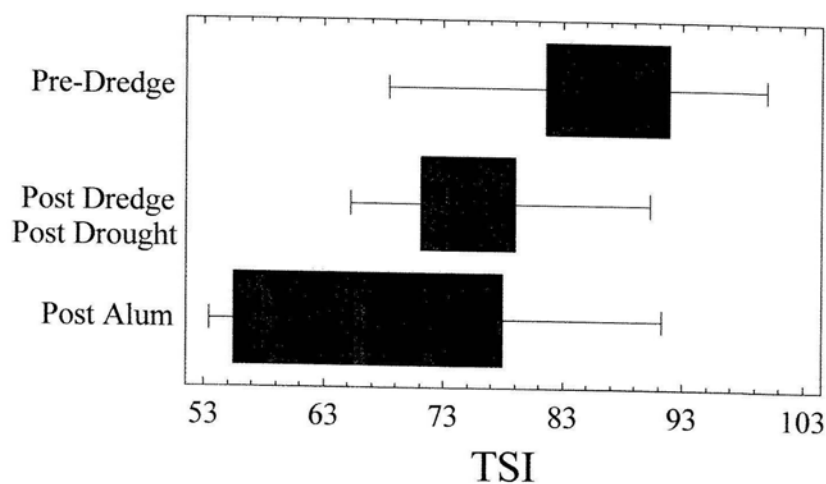


Figure CS1-12. Trophic State Index Compared By Restoration Project At Lake Hollingsworth

## Case Study #1 - Sediment Removal

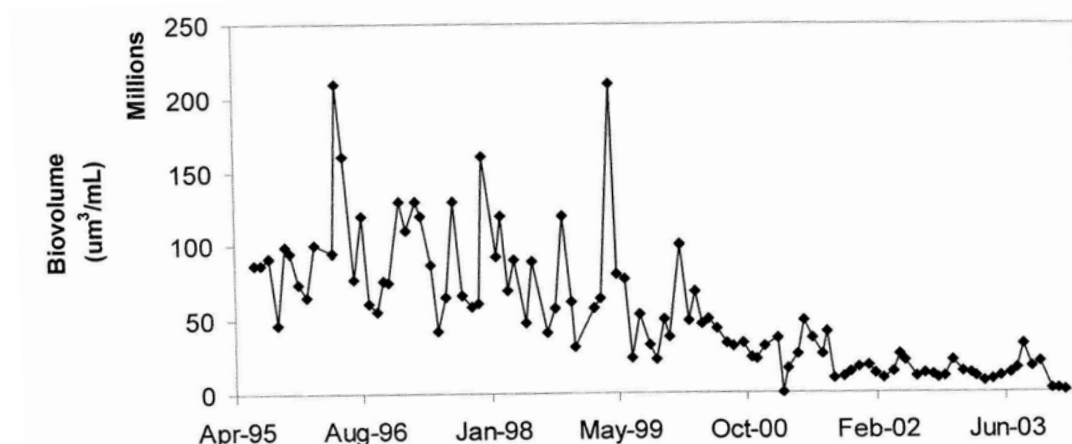


Figure CS1-13. Phytoplankton Biovolume at Lake Hollingsworth

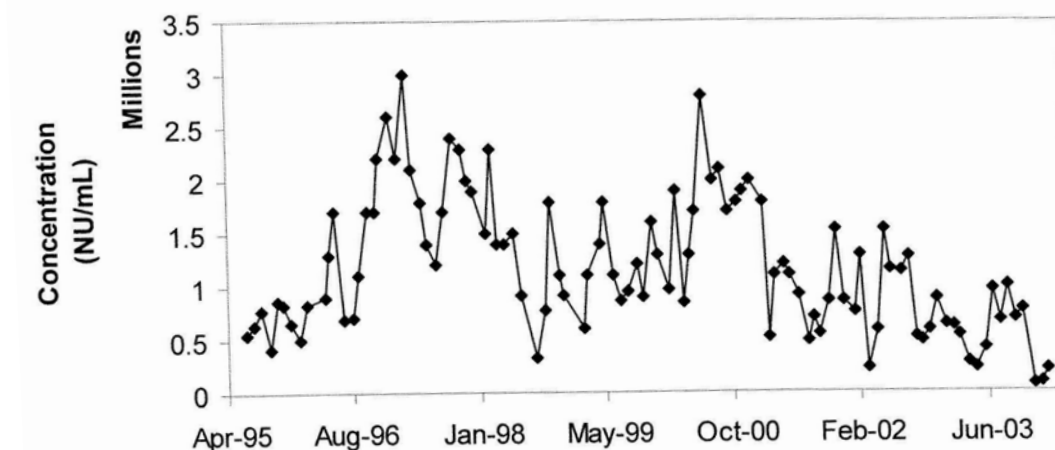


Figure CS1-14. Phytoplankton Concentration Compared By Restoration Project At Lake Hollingsworth

### Lake Panasoffkee

Lake Panasoffkee is a very large (4,820-acres) lake located in rural Sumter County. Unlike many threatened Florida lakes, water quality in Lake Panasoffkee is generally very good, which is attributable to the substantial groundwater inflows into the lake from the Floridan aquifer. The threat to Lake Panasoffkee is the loss of desirable aquatic habitats for lake sport fish species. Since the 1940s, almost 800 acres, or 22 percent of the lake's area, has been lost due to sedimentation. Ironically, the groundwater inflow which keeps the lake's water quality high is also the major contributor to the sediment which is filling the lake. The groundwater carries large amounts of dissolved calcium

## Case Study #1 - Sediment Removal

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carbonate. When the groundwater mixes with the lake water, the calcium carbonate solidifies, producing sediments which settle on the lake bottom covering fish-spawning areas. The apparent rate of sediment accumulation in Lake Panasoffkee has increased during the past two decades, possibly due to the impoundment of the hydrologic connection with the Withlacoochee River. These factors have combined to negatively impact the lake's fishery, promoting expanding shoreline vegetation and tussock formations, which in turn adversely impacts recreation and navigation. Unlike the other lakes discussed in this section, the calcium carbonate sediments in Lake Panasoffkee are very low in organic matter, with about 85 percent of the mass of unconsolidated sediments being inorganic material.

Due to concerns regarding sport fishery habitat loss, and recreational and navigational impacts, the Southwest Florida Water Management District (SWFWMD) initiated the design and permitting of a sediment removal project in 2000. The volume of sediment material to be removed from the lake was substantial (over 8 million cubic yards); however, upland disposal without any chemical treatment was always contemplated given the availability of large areas of vacant land adjacent to the lake and the low percent of organics and clay in the lake sediments. Because SWFWMD was the applicant, the Florida Department of Environmental Protection (FDEP) was responsible for State permitting of the project. In pre-application meetings, SWFWMD argued to the FDEP that the project was a habitat restoration project in the best interest of the public and the environment, and therefore should be permitted as a Notice General Permit (NGP). Even though the project was anticipated to involve the dredging of approximately 27 acres of submerged aquatic vegetation, the FDEP subsequently agreed with this assertion but required the SWFWMD to provide reasonable assurances that the project would not violate water quality standards, as Lake Panasoffkee is an Outstanding Florida Water. Such reasonable assurance would be required under a full Environmental Resource Permit; however, the time to process a NGP was significantly reduced over that likely required for an ERP. Since no flocculating chemicals were needed, return water back to the lake was permitted with a mixing zone. In addition, the U.S. Army Corps of Engineers also agreed with the classification of the project as habitat restoration, and issued their permit approval via a Nationwide 27 Permit. Had a full 404 Permit been required, consultation with other federal agencies and the public notice process would likely have extended the permitting timeframe significantly. All project permits were obtained within approximately one year.

The project design included hydraulic dredging of unconsolidated sediments, with spoil discharge directly to 450 acres of diked upland disposal areas composed of two primary drying cells and several smaller polishing cells. The project permits allow for treated return water back to the lake. The construction contract was awarded at an approximate cost of \$2.76 per cubic yard of *in-situ* sediment removed, including the cost of all upland disposal area creation and maintenance. Approximately 8.2 million cubic yards of sediment are targeted for removal, and the total project budget is approximately \$22.6 million. Construction of the upland disposal sites was initiated in 2002, and dredging was initiated in late 2003.

### Lake Maggiore

Lake Maggiore is a 380 acre lake located in the City of St. Petersburg, Pinellas County. The lake has exhibited poor water quality and hyper-eutrophic conditions for at least the past two decades. Diagnostic feasibility studies conducted in the early 1990s identified

## Case Study #1 - Sediment Removal

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accumulated organic sediments as a significant source of nutrients impacting water quality. In addition, the lake had accumulated so much silt that historic recreational uses had been effectively curtailed due to shallow water depths. As part of a multi-faceted restoration program, the City of St. Petersburg, in cooperation with SWFWMD, initiated the design and permitting of a sediment removal project in 1995. BCI Engineers & Scientists were hired to conduct a sediment removal feasibility study and to develop a conceptual design. BCI determined that approximately 2.3 million cubic yards of low density organic sediments should be removed from the lake.

Many project alternatives were considered; however, the recommended approach involved the filling of 34 acres of lake bottom and riparian wetlands with sand tailings generated from dredging, followed by the construction of upland drying pits on the 34 acres of created uplands. Hydraulic dredge spoil would then be pumped through a cyclone unit to remove sands, mixed with flocculating polymers, and then pumped into the pits where dewatering would occur via settling, evaporation and percolation. Upon settling, decant water would be pumped off and the settled solids would be physically removed from the pits, loaded into trucks and then disposed in the Toytown landfill and on the Sod Farm site. Upon completion of the project, the 34-acre drying pit area would then be restored to create an upland public park and recreational area for the City.

Regulatory permitting of the recommended alternative proved to be a challenge. The primary issue raised by both the U.S. Army Corps of Engineers and the FDEP was the proposed filling of 34 acres of lake bottom, which were determined by FDEP to be sovereign lands, and the eventual conversion of this area to an upland City park. In response to agency review comments the City and their consultants developed several modifications to the project as proposed in the original permit applications. The primary issue of concern was the restoration of the 34 acre drying pit area as functional riparian wetlands rather than an upland City park. In 1999 and 2000, respectively, the federal 404 Permit and the State Environmental Resource Permit were approved, requiring the drying pits to be restored back to wetlands.

The engineer's cost estimate for the project was \$7-\$8 million; however, when the project was let out to bid in 1999, the low bid for both dredging/treatment and disposal was \$12.5 million. The City did not award the bid due to the cost discrepancy, and pursued additional funding from SWFWMD. In addition, based on discussions with bidders it was determined that project costs could be reduced if a process treatment system was incorporated into the bid package, and if disposal was pulled out as a separate bid item. Furthermore, it was recommended that the total volume of sediment to be removed be reduced to lower costs. The project was re-bid in August of 2001 with dredging and disposal as separate bid items. The low bid for dredging and treatment was \$7.7 million, while the low bid for disposal via trucking was \$4.8 million. The City awarded the bid for dredging to the low bidder with the requirement that they be responsible for obtaining any necessary permit modifications. In addition, the City determined that it would be more cost effective if disposal was performed using City trucks and personnel. The contractual requirement for the volume of sediments to be removed was reduced from 2.3 to 1.54 million cubic yards, and the permits were modified by the contractor to address minor wetland impacts and decant water discharges associated with the proposed process treatment plant.

The on-site process treatment plant was completed in June of 2004 and dredging began in September of 2004. The plant is essentially composed of three primary components:

## Case Study #1 - Sediment Removal

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1) a screening and cyclone unit to separate large debris, sand and other high density material; 2) a clarifier unit where polymer is mixed with the dredge spoil to flocculate low density organics; and 3) a series belt filter presses to compress and dewater the flocculated organics. Decant water from the belt filter presses is discharged into a polishing pond, which overflows into an existing 3-acre hardwood swamp along the lake shoreline. To date the plant has been operating fairly successfully at an average rate of about 2,000 cubic yards of dewatered muck per day. The dewatered muck, referred to as sludge or “cake”, has been averaging approximately 25 percent solids. However, current data indicate that the cake contains a much higher fraction of sand than was anticipated, estimated at about 40 percent by weight. As of December 2005 the project was estimated to be approximately 50 percent complete, and the expected completion date was December of 2006. It should be noted that this project is the first lake sediment removal project in West Central Florida to demonstrate that a mechanical dewatering system can be successfully permitted and deployed.

In summary, the project summaries provided above indicate that organic sediment removal as a lake management tool represents many challenges, and project logistics and results are not always predictable. Nonetheless, the removal of nutrient laden organic sediments has been demonstrated to be a potentially powerful strategy in reducing lake eutrophication and related water quality problems, as well as improving lake aesthetics and recreational opportunities.

### Lake Hancock

From PBSJ 2007, Preliminary Results from Sediment Removal Study at Lake Hancock.

Lake Hancock, with a surface area of approximately 4,550 acres, is the third largest lake in Polk County (ERD, 1999). The contributing watershed is approximately 131 square miles in size, for a watershed to open water ratio of 18:1. The major tributaries to Lake Hancock are the Banana Creek sub-basin (13,578 acres), the Lake Lena Run sub-basin (11,754 acres) and the North Saddle Creek sub-basin (49,034 acres). Lake Hancock has been characterized as having “poor” water quality, using the State of Florida’s Trophic State Index (TSI), since at least 1970 (Polk County, 2005), and concerns over poor water quality in the lake have existed as far back as the 1950s (ERD, 1999). More recently, Lake Hancock’s water quality was verified as impaired for nutrients using data collected between January 1997 and June 2004 (EPA, 2005). Levels of total nitrogen, total phosphorus and biological oxygen demand all exceeded the State of Florida’s threshold screening values, all by considerable amounts (EPA, 2005). The poor water quality in Lake Hancock has resulted in a number of reports focusing on strategies to improve its condition.

Polk County and FDEP contracted PBS&J to complete an in-lake mesocosm experiment simulating sediment removal to assess the impact on water quality. An experimental design similar to that which was used to assess the value of sediment removal strategies for Lake Maggiore (in St. Petersburg) was conducted. In this approach, three pairs of 2 meter diameter aluminum rings were driven down through the water column, through the lake’s organic sediments, and into the lake’s underlying sand layer. A frame was extended from the bottom ring to above the lake’s water level, and reinforced plastic was sewn into a hollow cylinder, and attached to the aluminum ring on the lake bottom, and also to a frame at the water surface. Of these pairs, one had its underlying layer of muck removed via a small suction dredge, with the other of the pair left as is. As in Lake

## Case Study #1 - Sediment Removal

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Maggiore, water from outside the tube was allowed to equilibrate with the water column within the tube, after excavation.

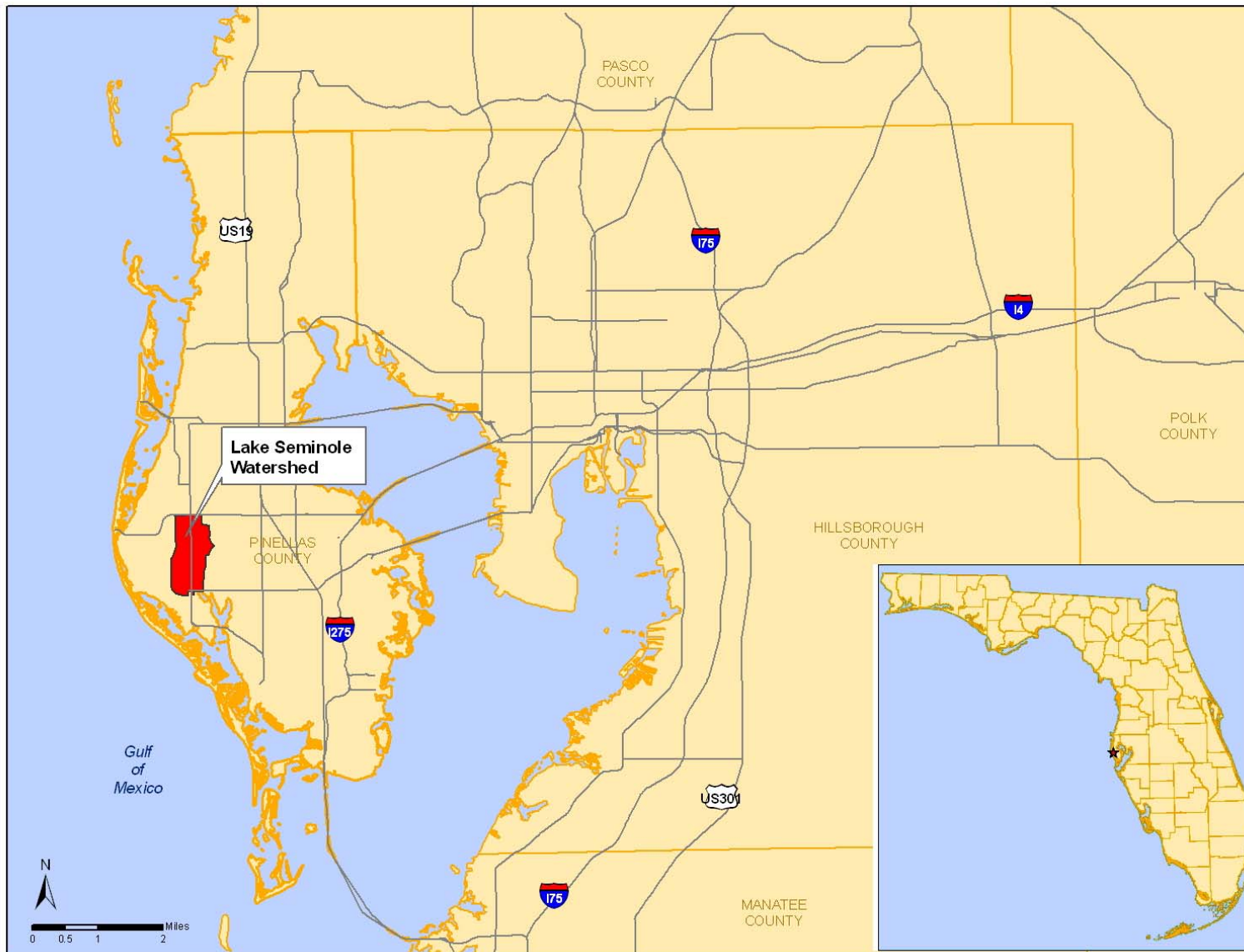
After removal of the muck layer, and equilibration of the overlying water columns, the water within these tubes was compared to each other, and to adjacent water undisturbed by these activities, to determine potential changes in water chemistry due to the lack of an underlying muck layer. To replicate the potential impacts of suspension of bottom sediments by wind action, both tubes were “mixed” with similar mixing actions (using a stirring paddle such as those used previously by the District for mixing water for sample splitting) until the tube with its muck layer still intact shows evidence of substantial resuspension of bottom sediments. Water samples were collected to determine differences in TN, TP, chlorophyll, etc. that were expected to occur for water masses with underlying muck sediments, as opposed to those where such sediments had been removed. This study will be conducted twice (wet season and dry season) at three locations throughout the lake. The dry season experiment was completed in December 2006, the wet season sampling is scheduled for May 2007.

Results from the first sampling period indicate a significant reduction in multiple water quality parameters under both mixed and not-mixed conditions (Table CS1-1). Chlorophyll a, TN, and TP decreased by 20-30% under not-mixed conditions.

**Table CS1-1. Percent Change between Dredged and Undredged cylinders for both not-mixed and mixed conditions.**

	Not-Mixed	Mixed
Chlorophyll a	-21	-31
N:P*	27	102
TKN	-20	-53
TN	-20	-53
SRP	-3	-20
TP	-37	-77
TSS	-34	-72
TSI	-3	-12
Turbidity	-40	-75
BOD	-12	-13

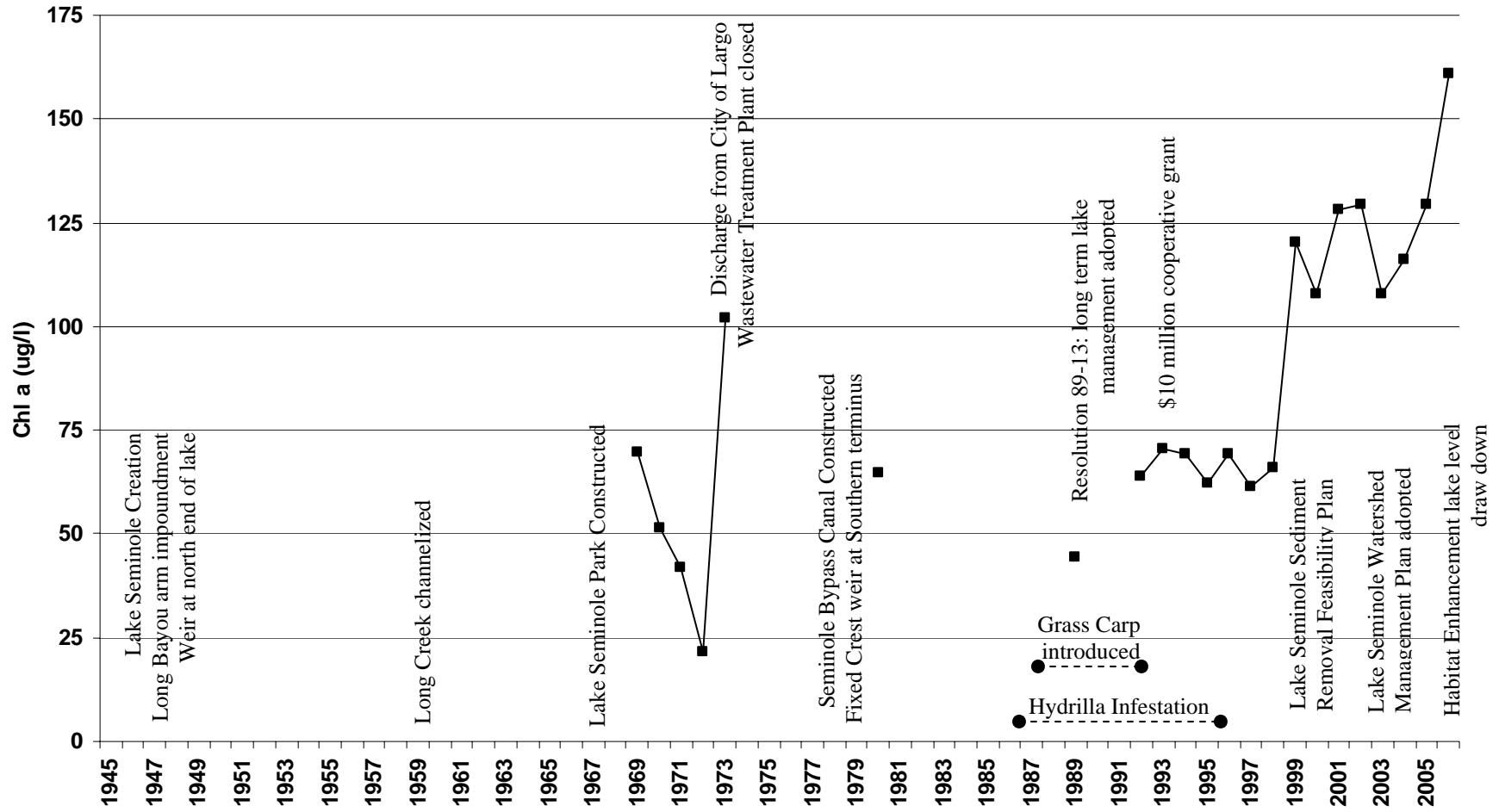


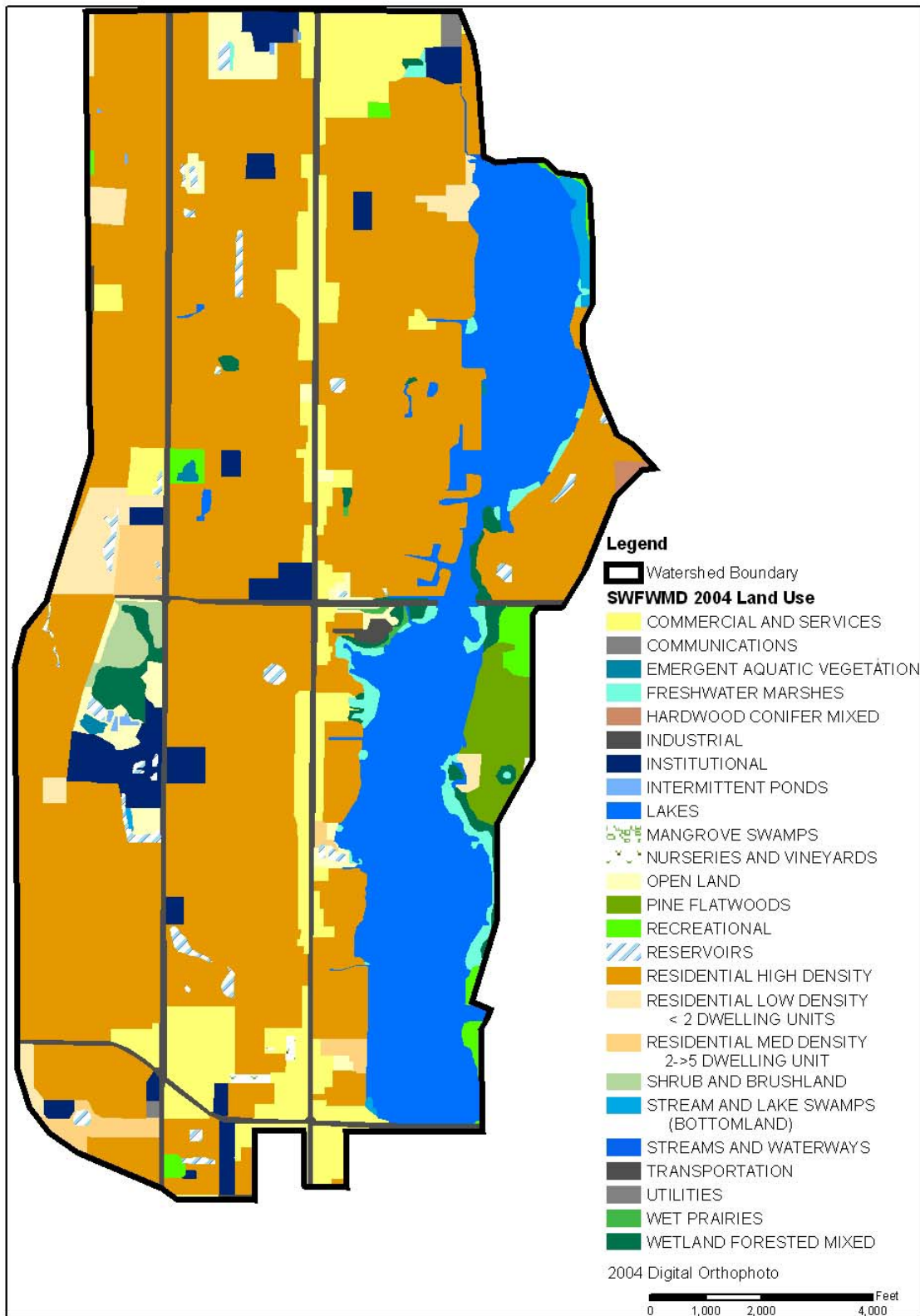


**Figure 1-1. Location of Lake Seminole Watershed.**

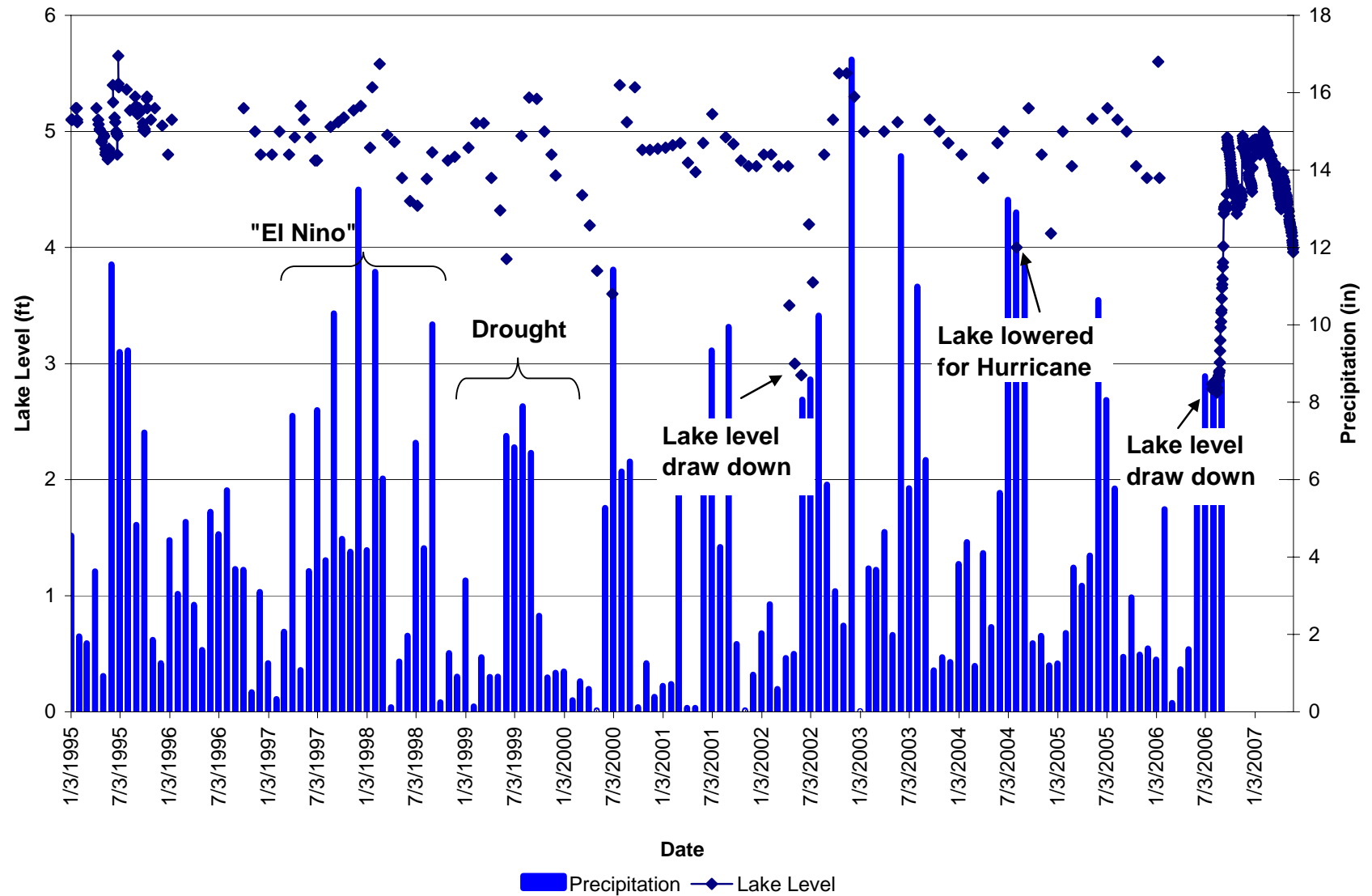


Figure 1-2. Timeline of Major Events in Lake Seminole and annual chlorophyll-a values.





**Figure 1-3. Current (2004) land use in the Lake Seminole Watershed.**



**Figure 1-4. Lake Seminole Water Level from January 1995 to May 2007 and monthly Precipitation (SWFWMD).**

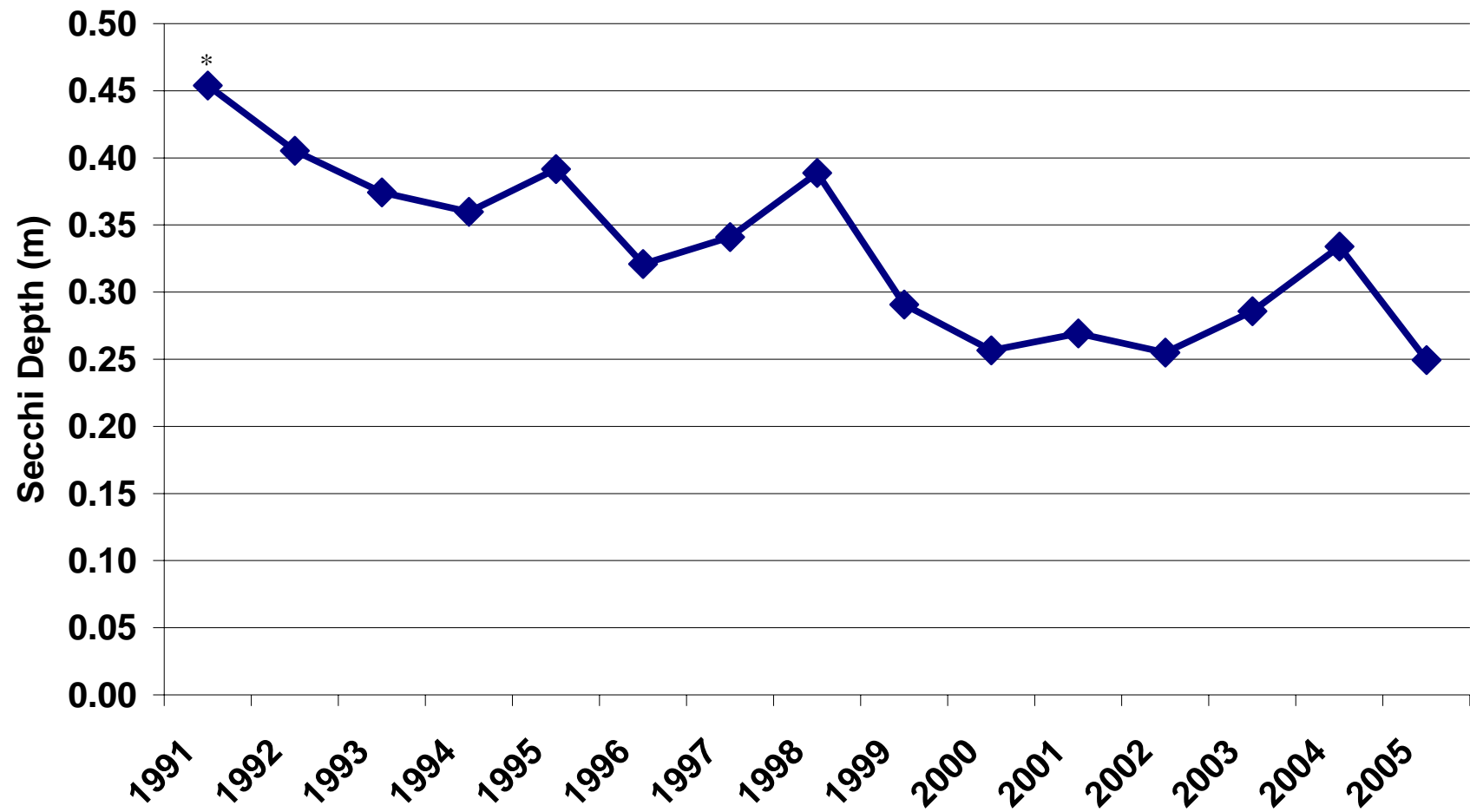


Figure 1-5. Trend in Lake Seminole annual average Secchi disk depths (\*missing data for some seasons).

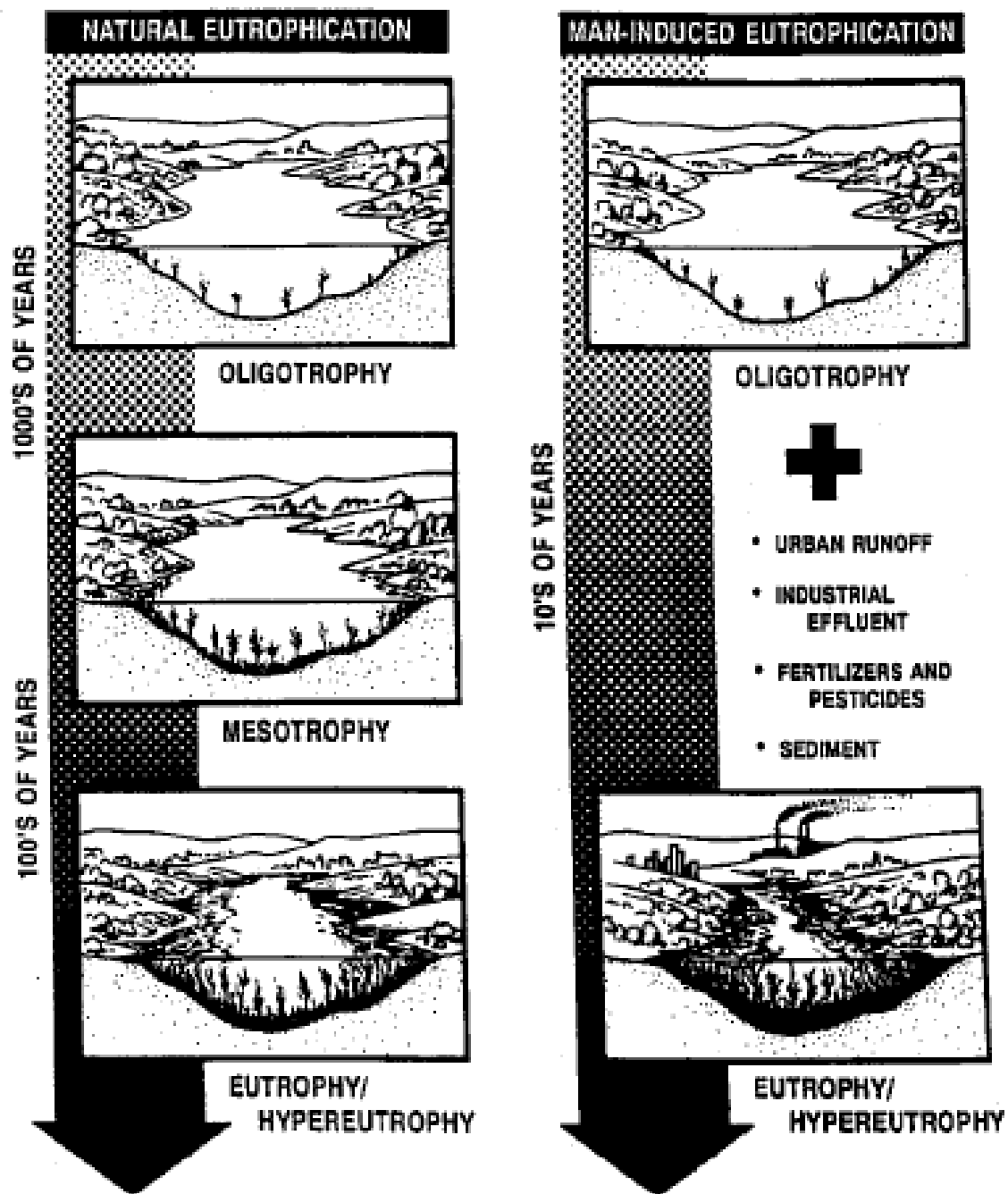


Figure 1-6. Natural vs. cultural (human-induced) eutrophication.

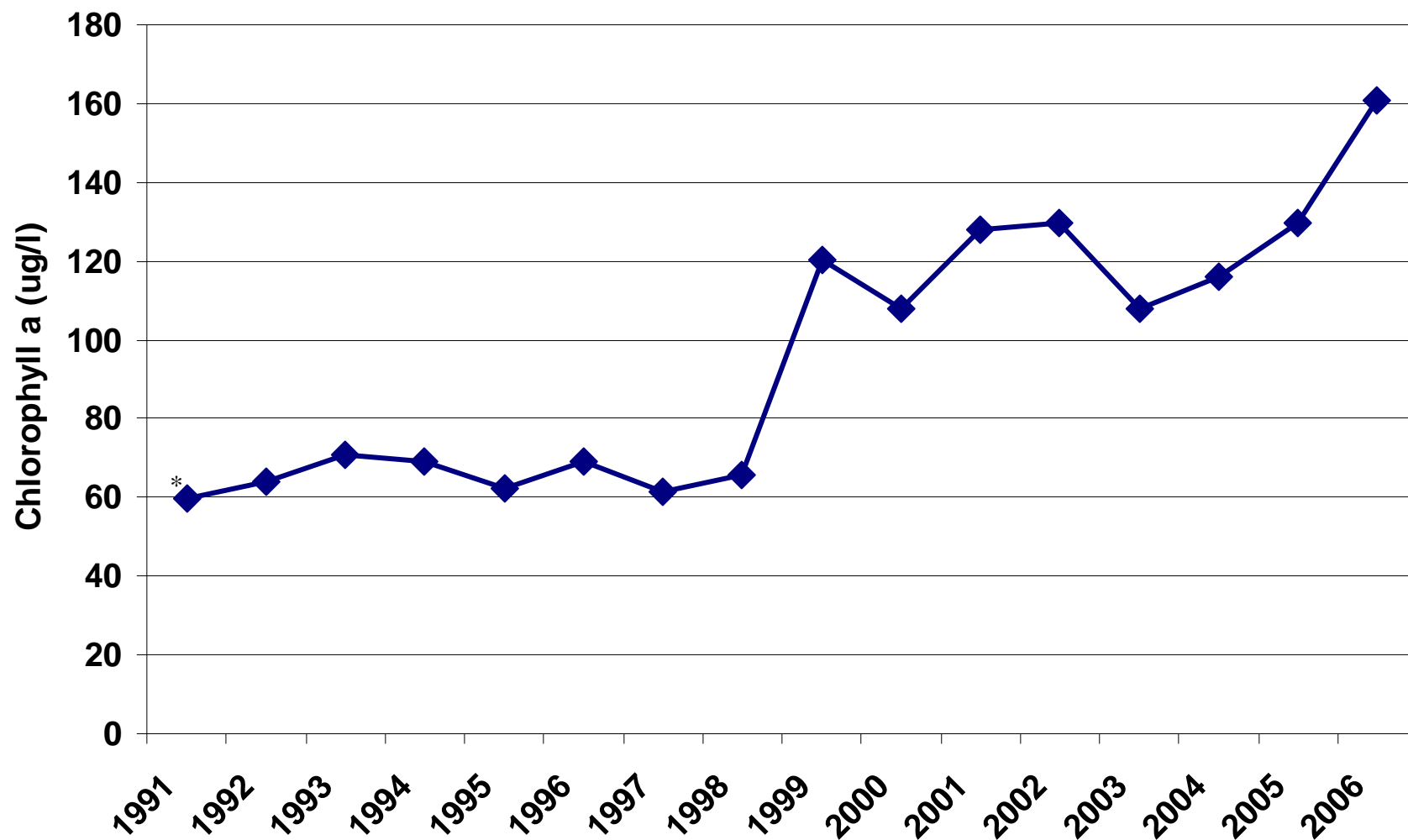


Figure 1-7. Trend in Lake Seminole annual average chlorophyll-a concentrations (\*missing data for some seasons).

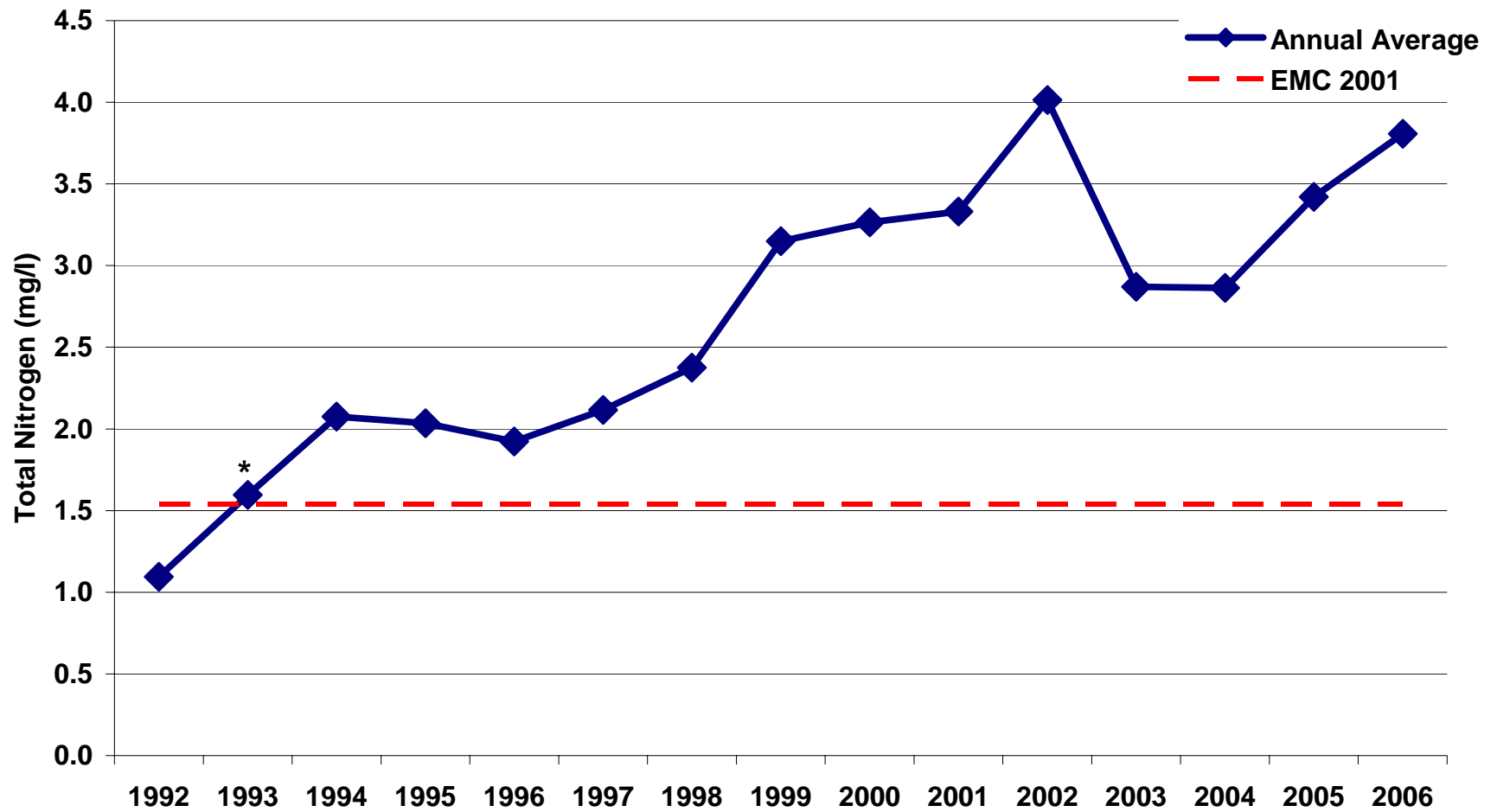


Figure 1-8. Annual Average Total Nitrogen in Lake Seminole and flow-weighted direct runoff calculated in 2001.  
(\*missing data for some seasons).

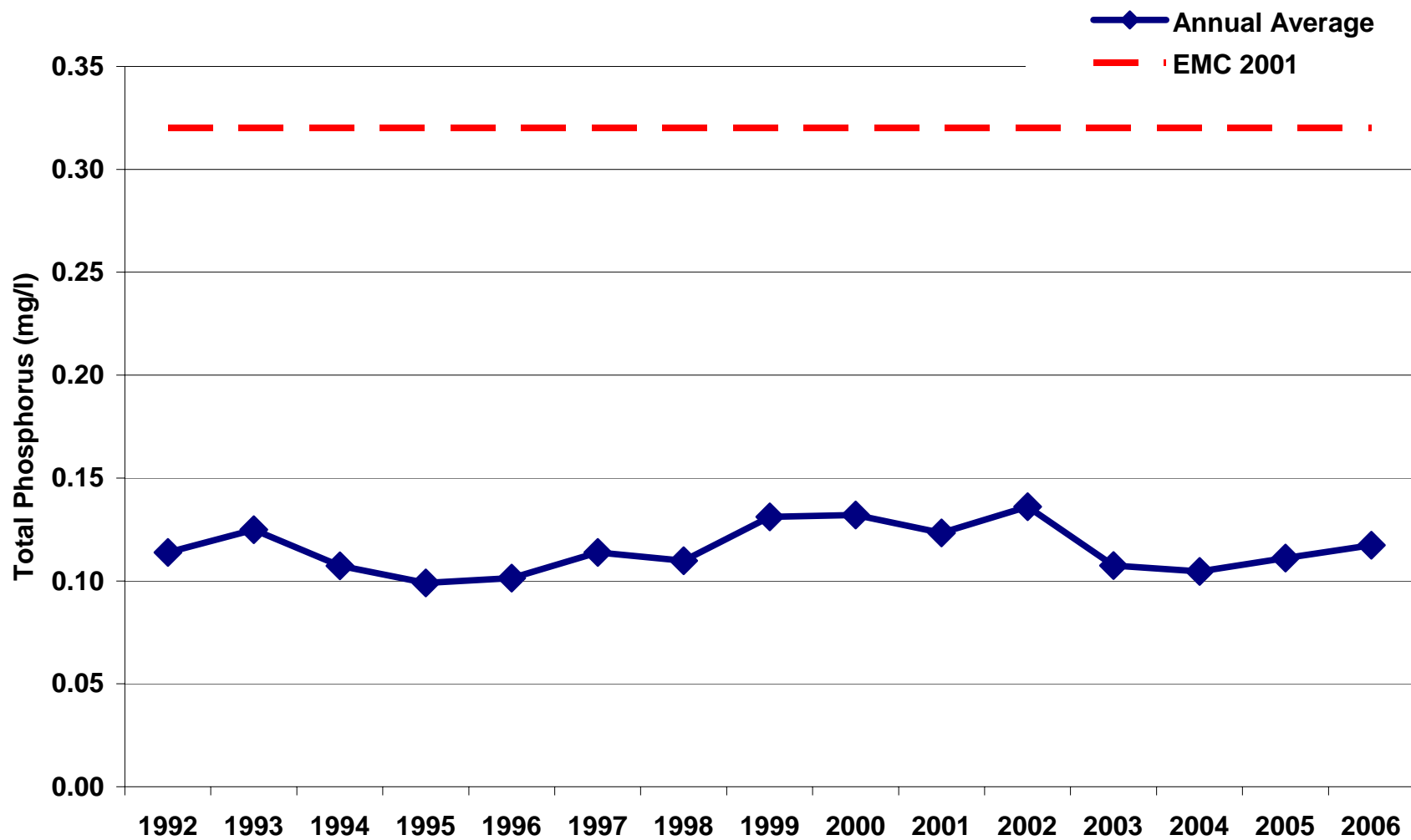
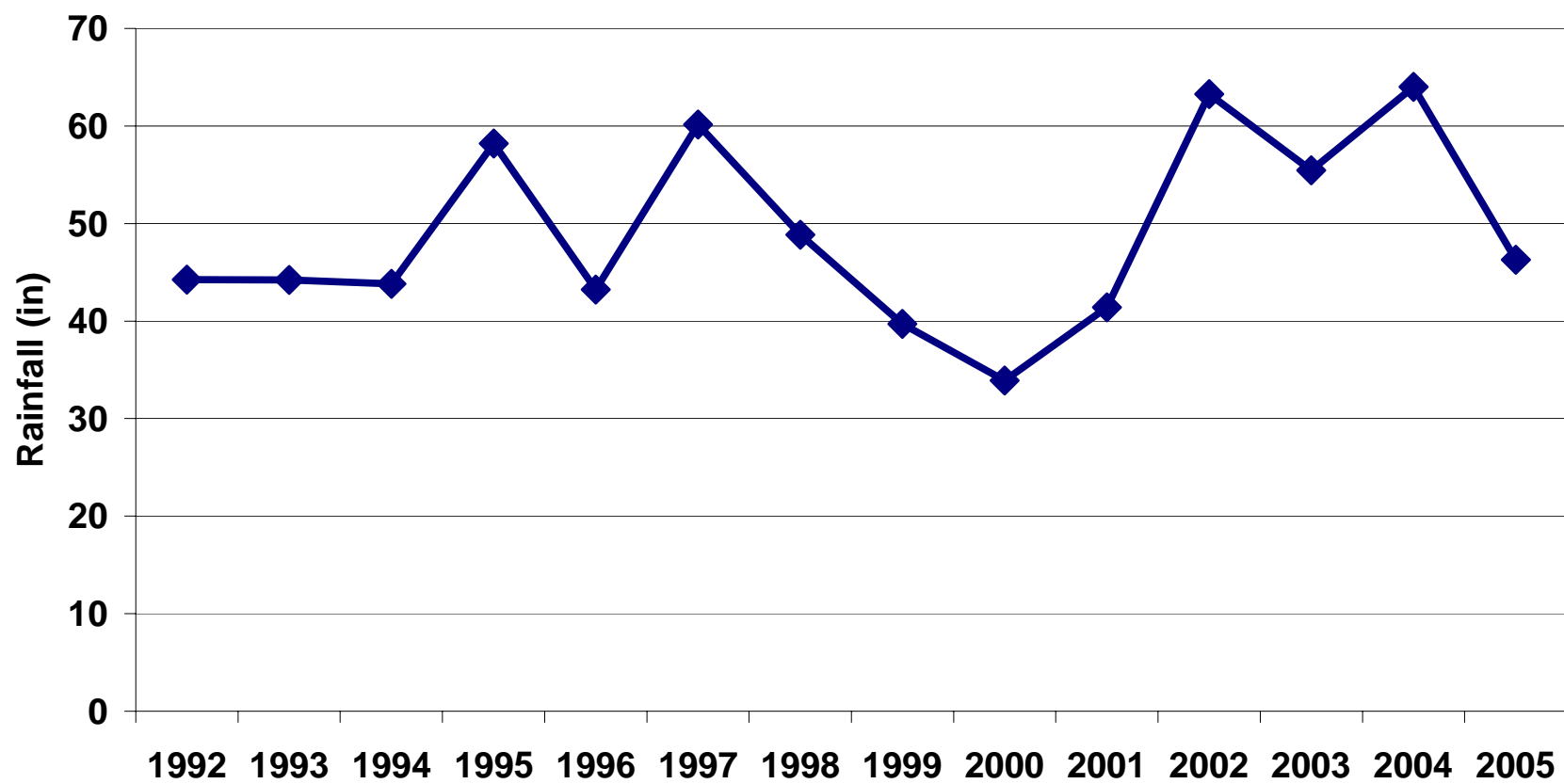


Figure 1-9. Annual Average Total Phosphorus in Lake Seminole and the flow-weighted direct runoff calculated in 2001.





**Figure 1-10. Trend in annual rainfall totals in the Lake Seminole watershed (SWFWMD).**

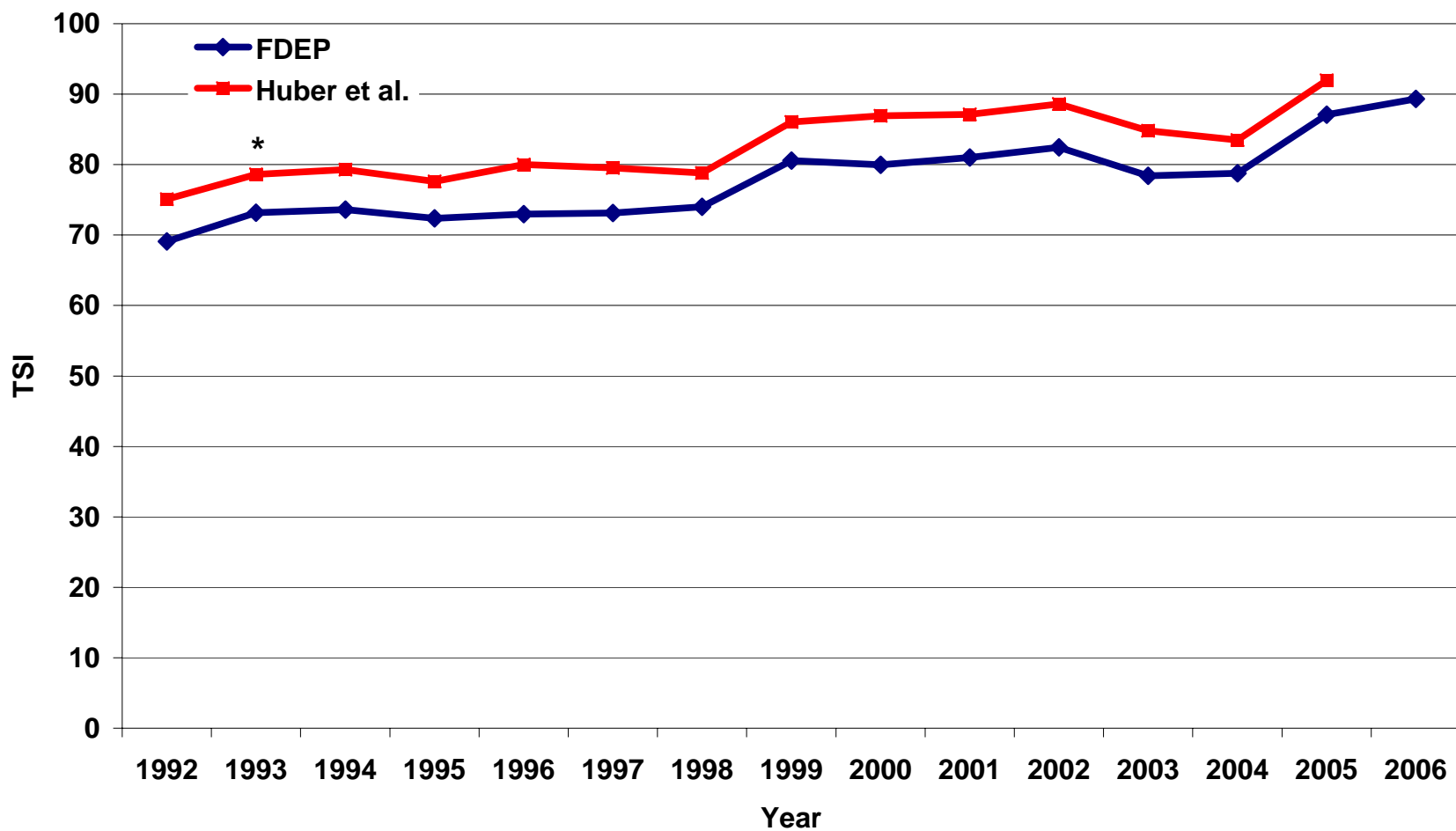


Figure 1-11. Comparison of TSI calculation methods for Lake Seminole  
(\*-missing TN data for some seasons).

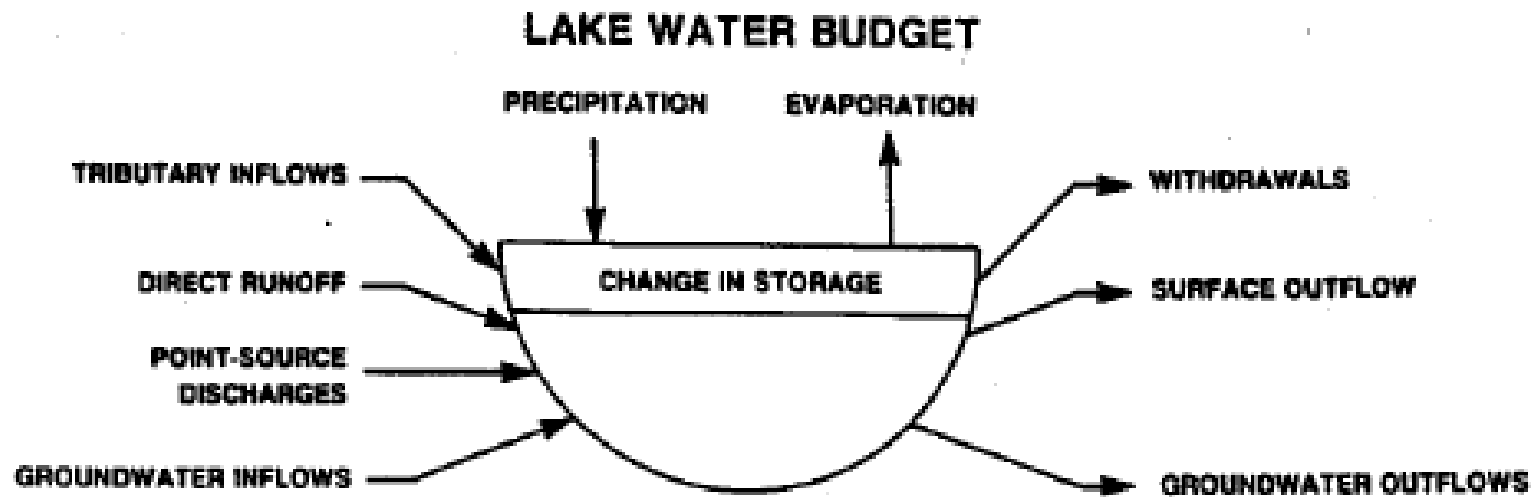


Figure 1-12. Graphical depiction of the lake water budget.

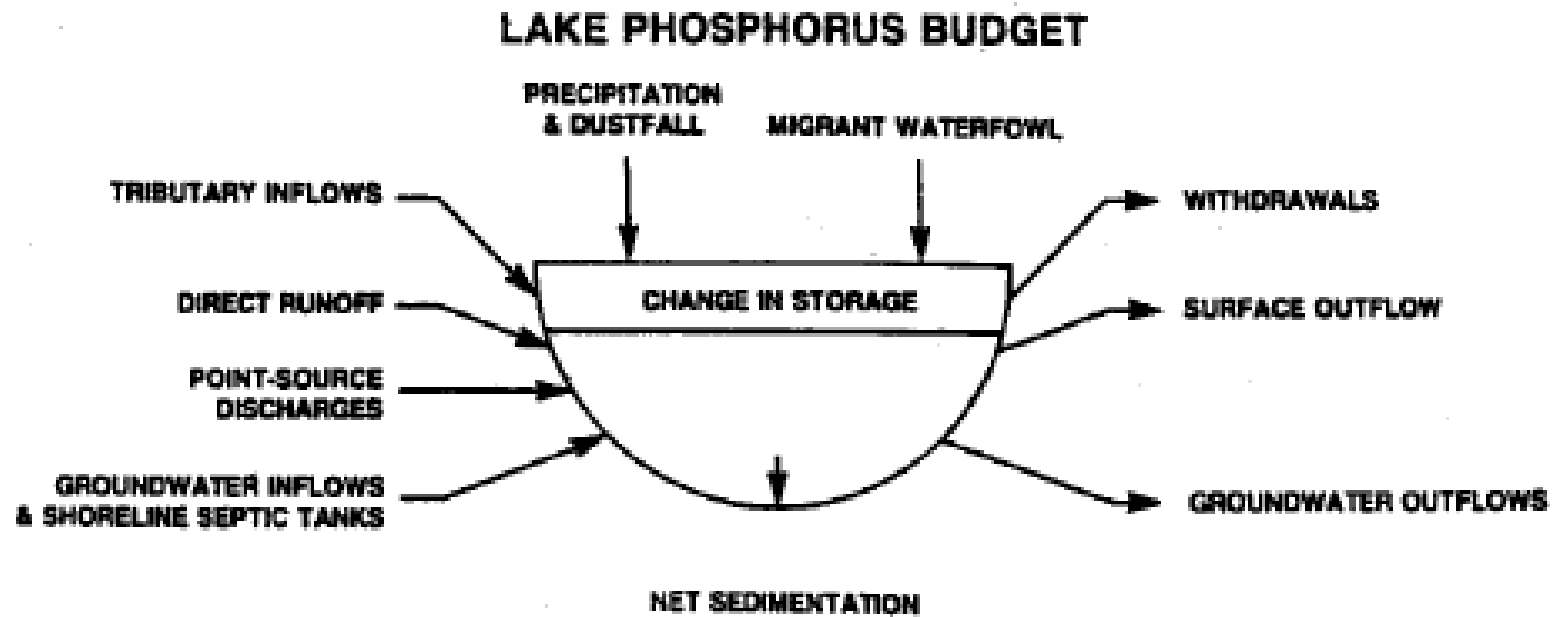


Figure 1-13. Graphical depiction of the lake phosphorus budget.

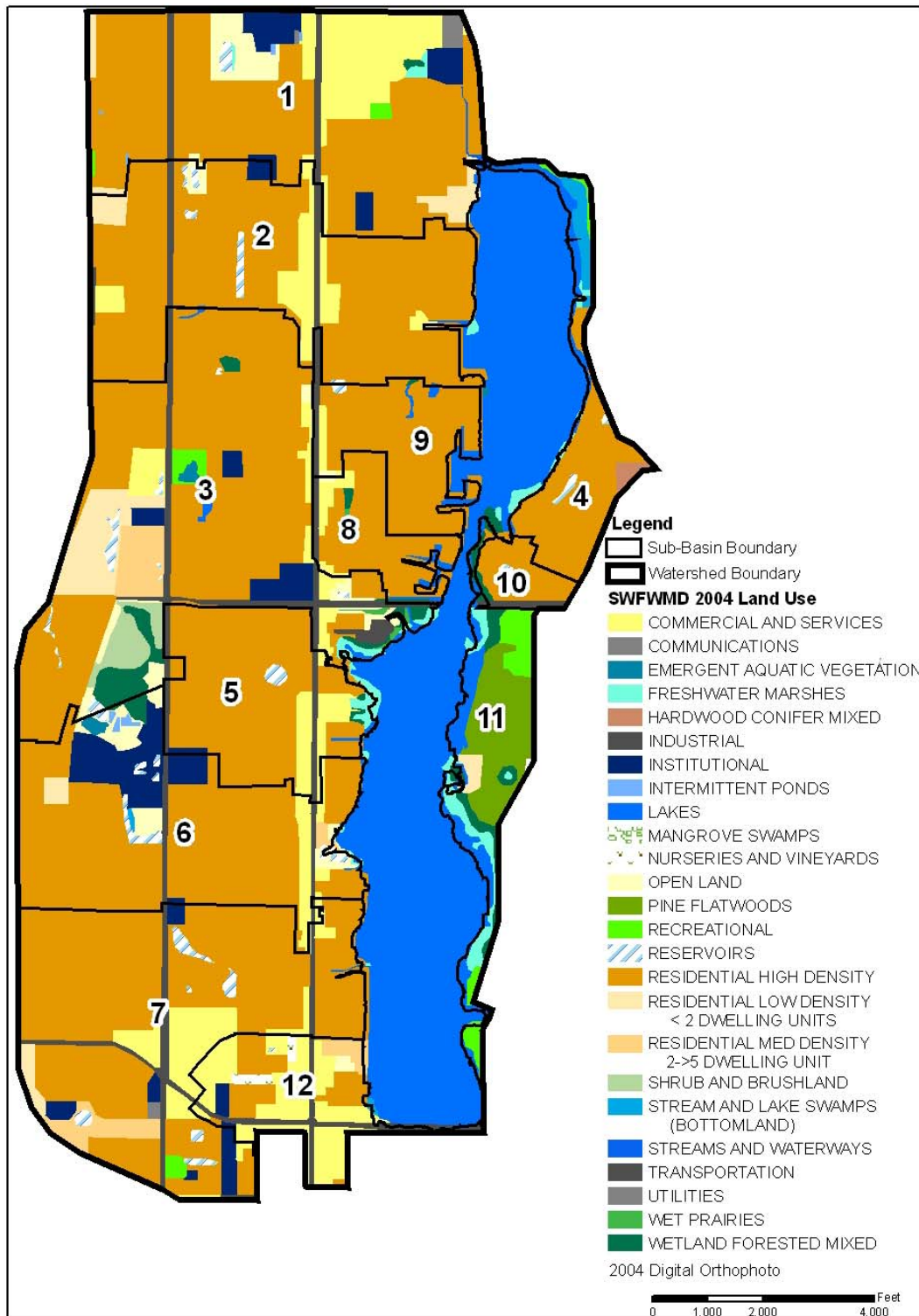
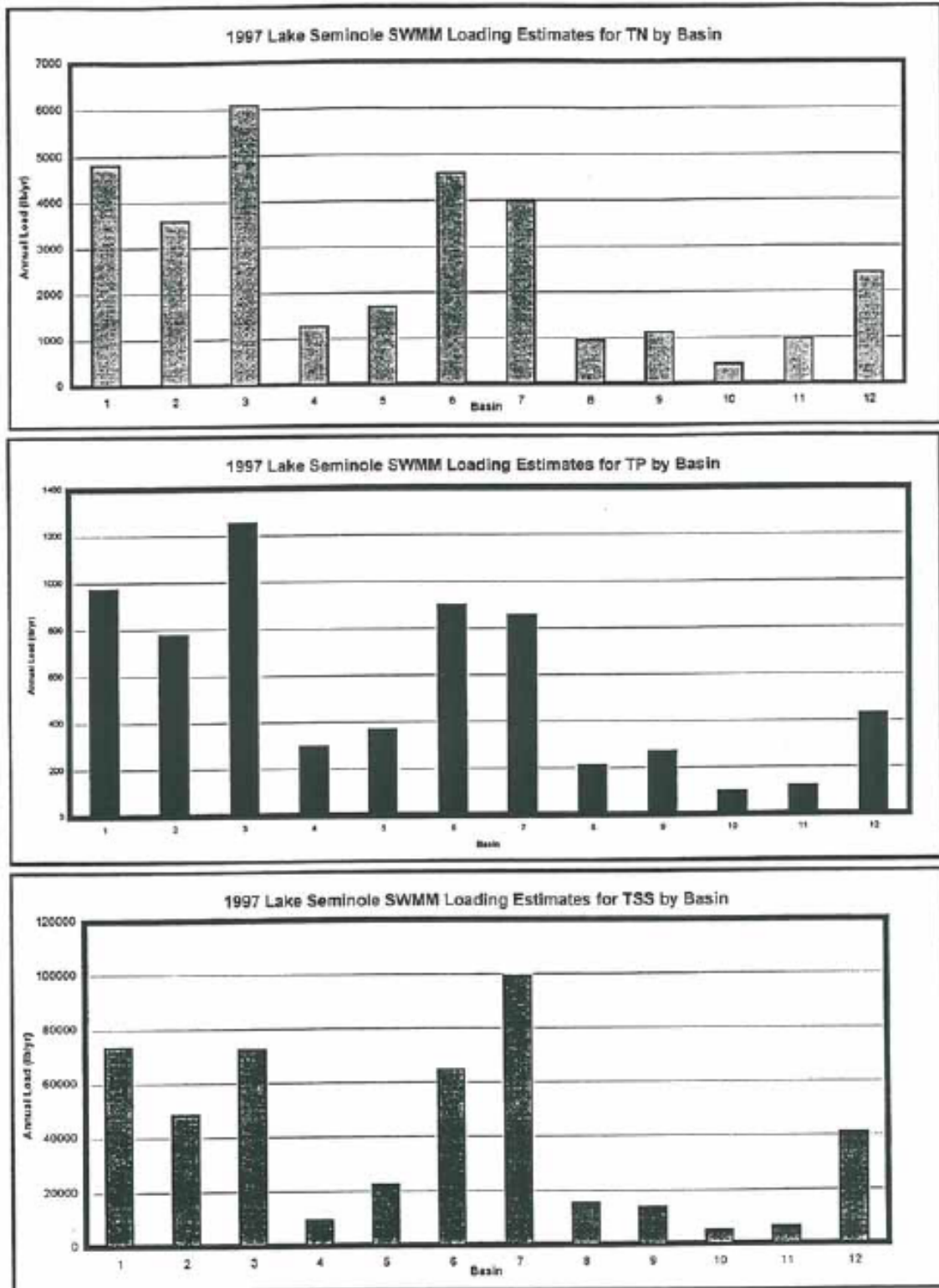
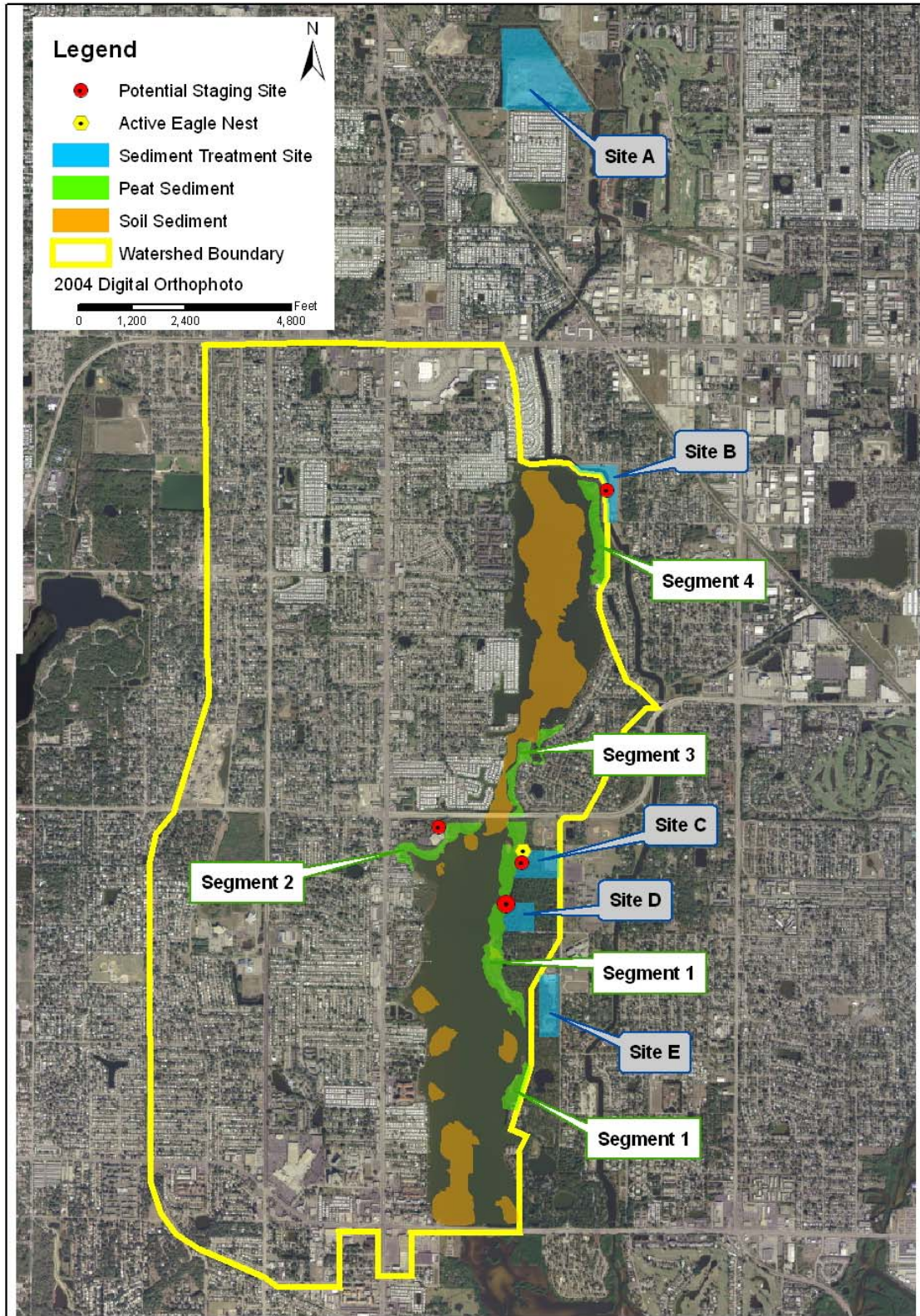


Figure 1-14. Major sub-basins delineation in the Lake Seminole watershed.



**Figure 1-15. Pollutant load rankings of the major sub-basins.**





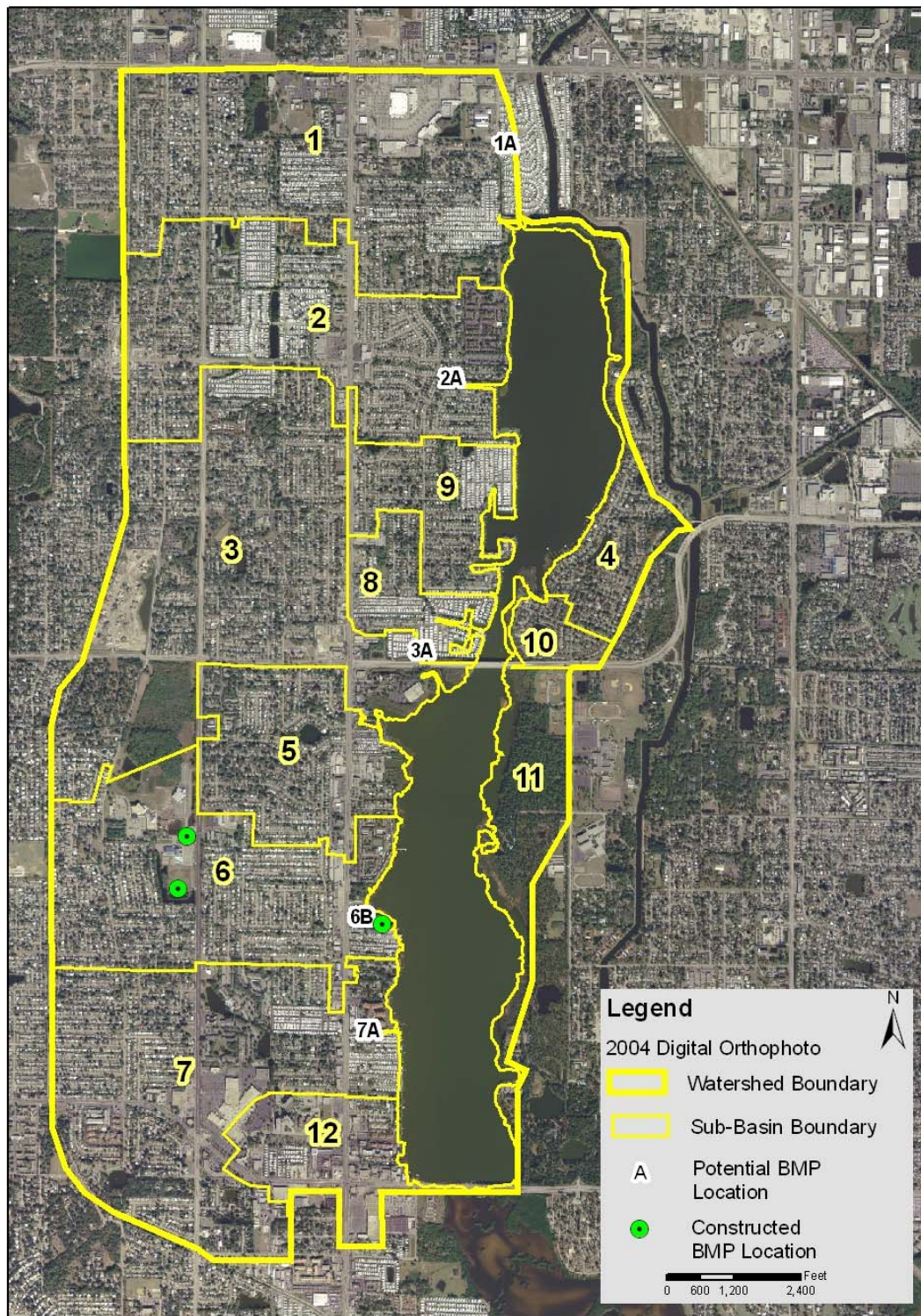
**Figure 3-1. Potential publicly-owned staging and sediment treatment sites in the Lake Seminole vicinity.**



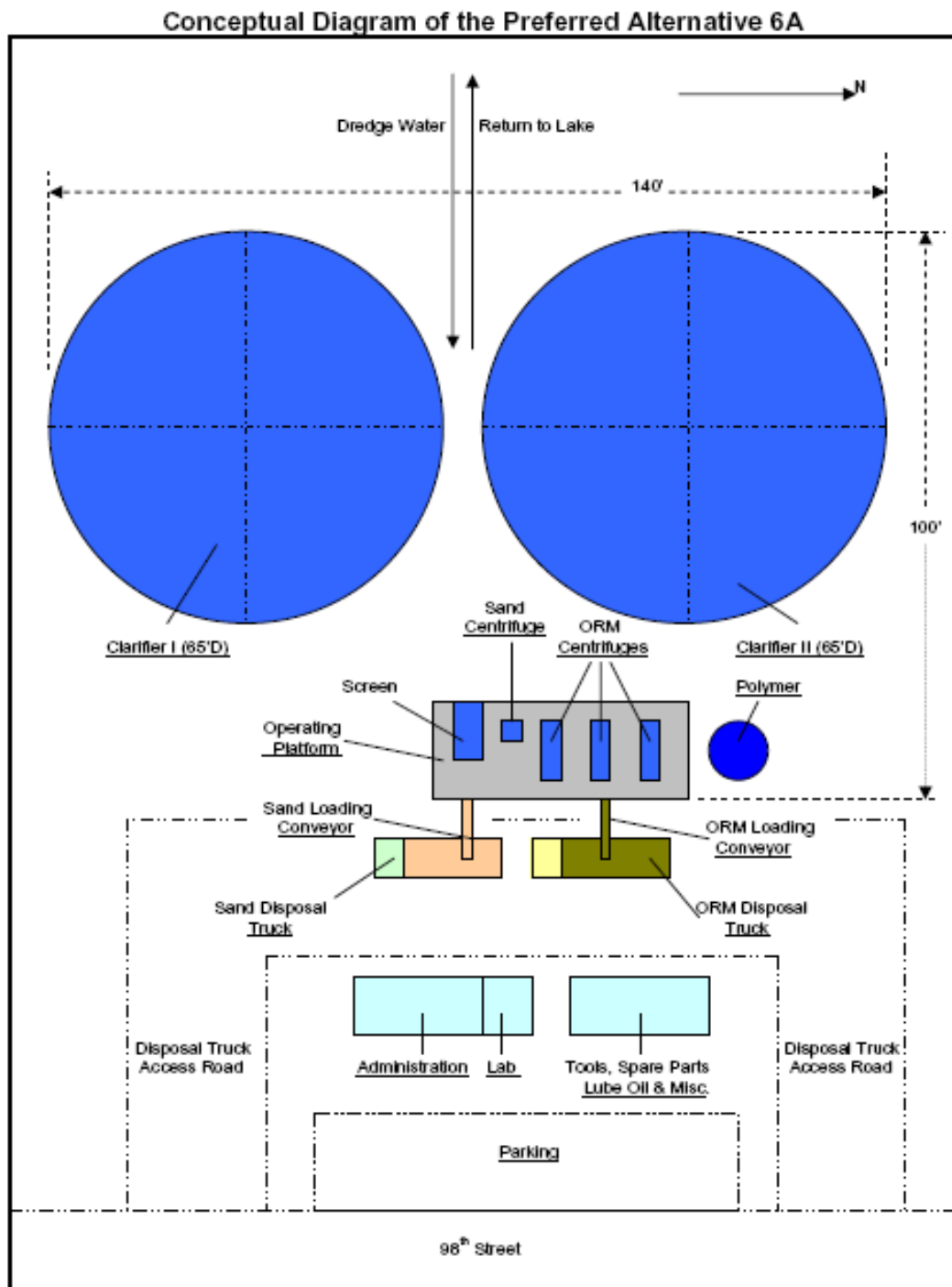


**Figure 3-2. Location of recommended habitat restoration sites in Lake Seminole and its watershed.**





**Figure 3-3. Location of recommended enhanced regional stormwater treatment facilities**



**Figure 3-4. Conceptual Diagram of the Preferred Alternative 6A**

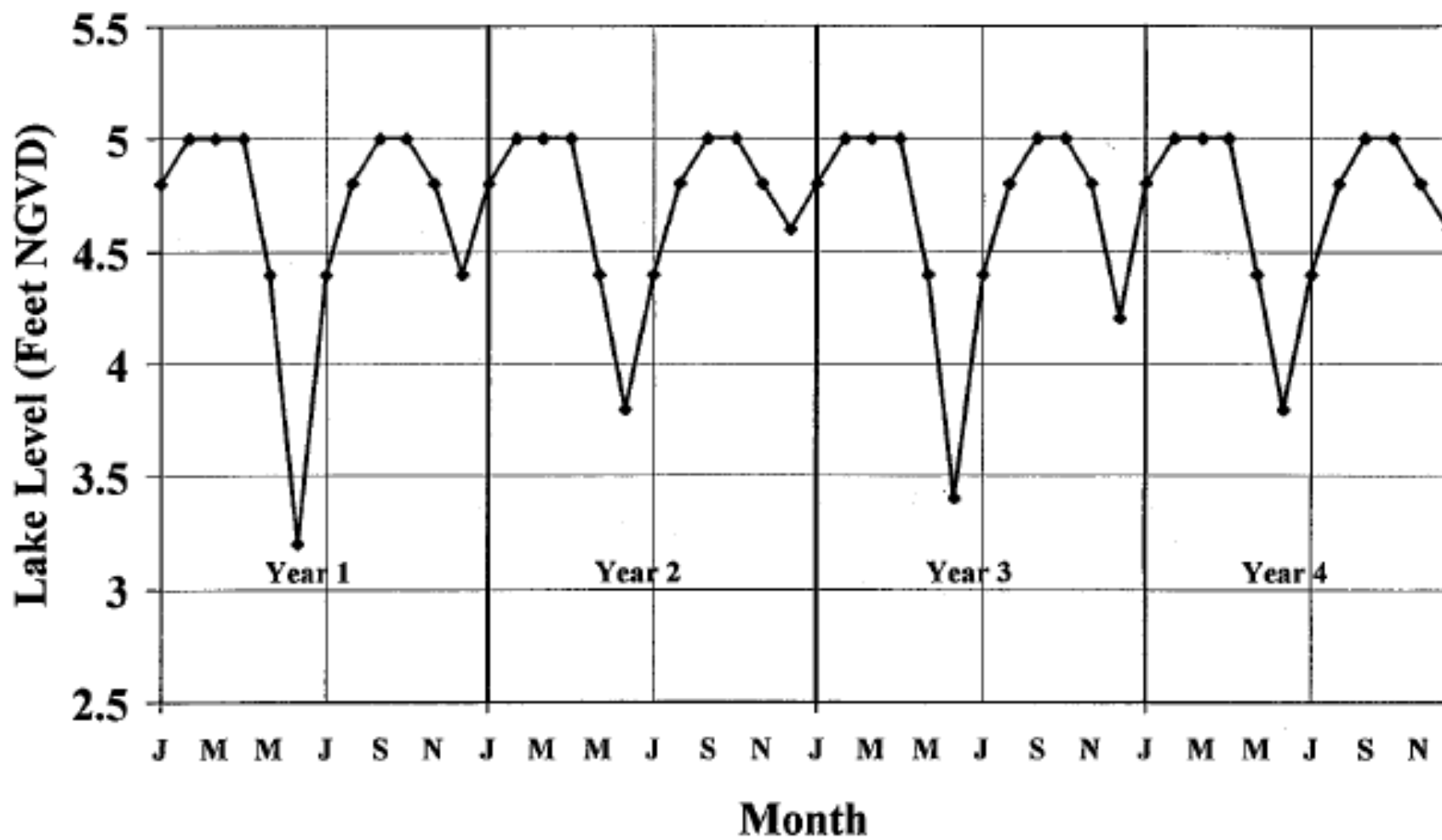
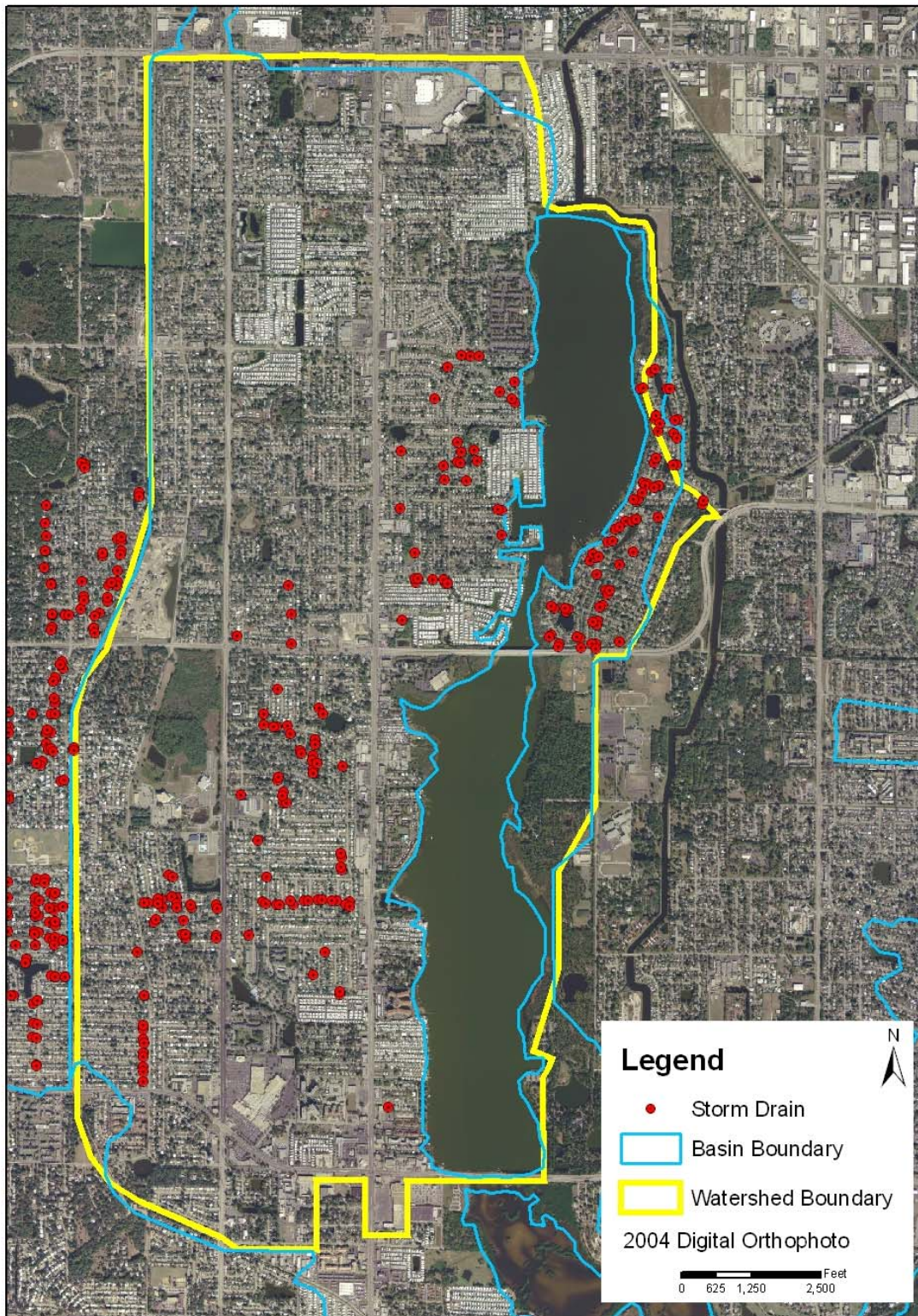


Figure 3-5. Recommended enhanced lake level fluctuation schedule





**Figure 3-6. Storm Drain Labels within the Lake Seminole Watershed.**

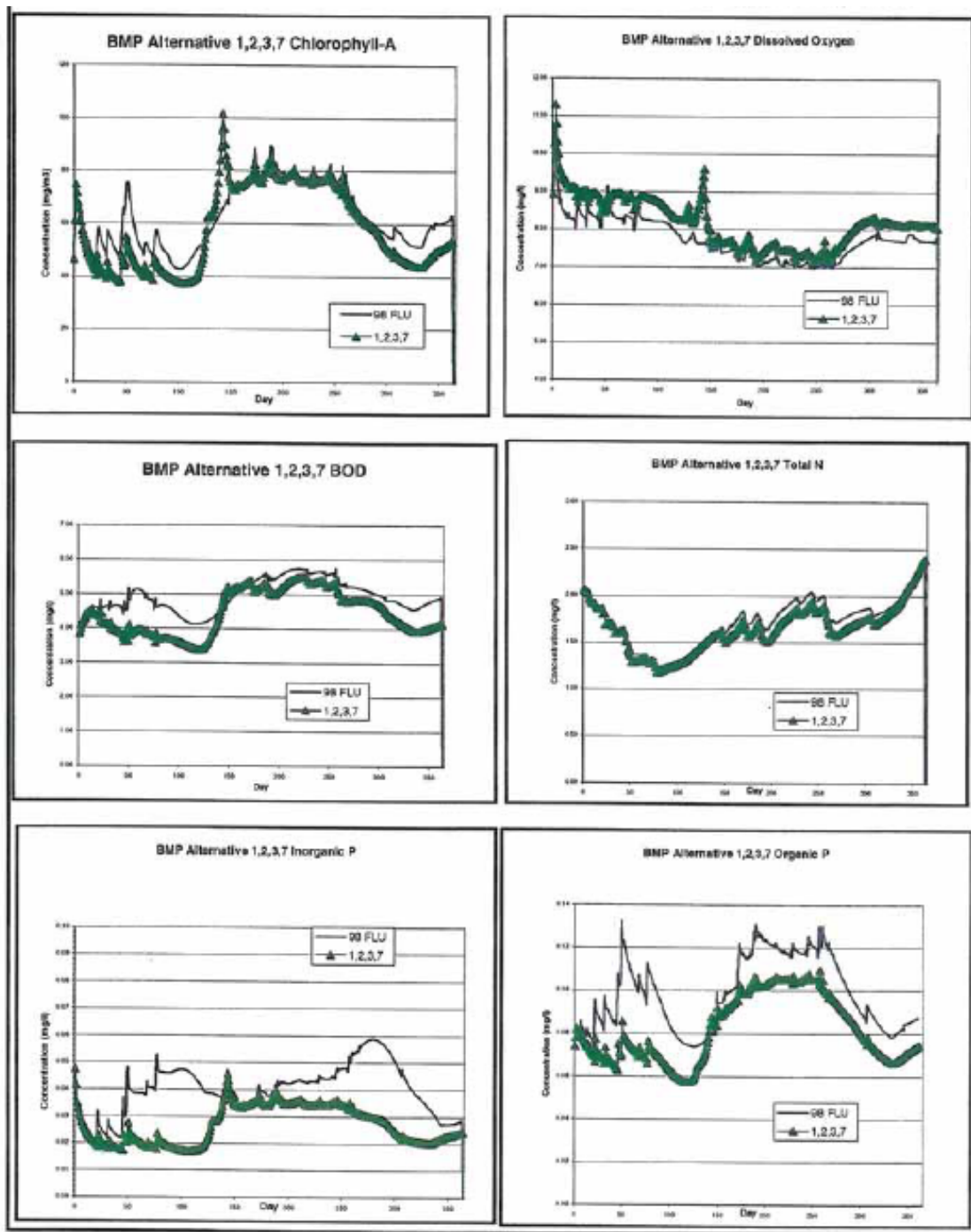


Figure 3-7. BMP Alternative #1237 simulation results vs. 1998 future land use baseline conditions. (Model plot)



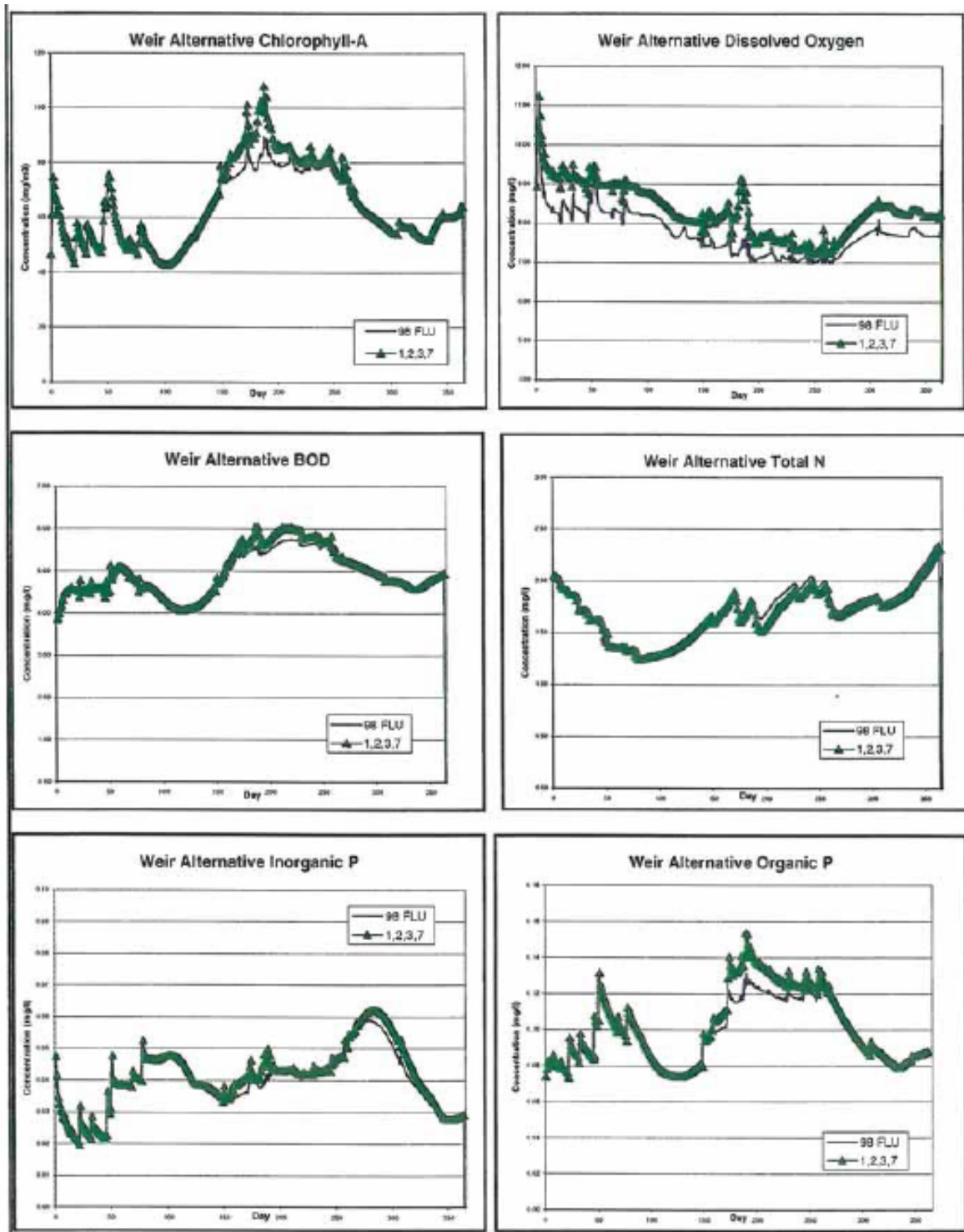
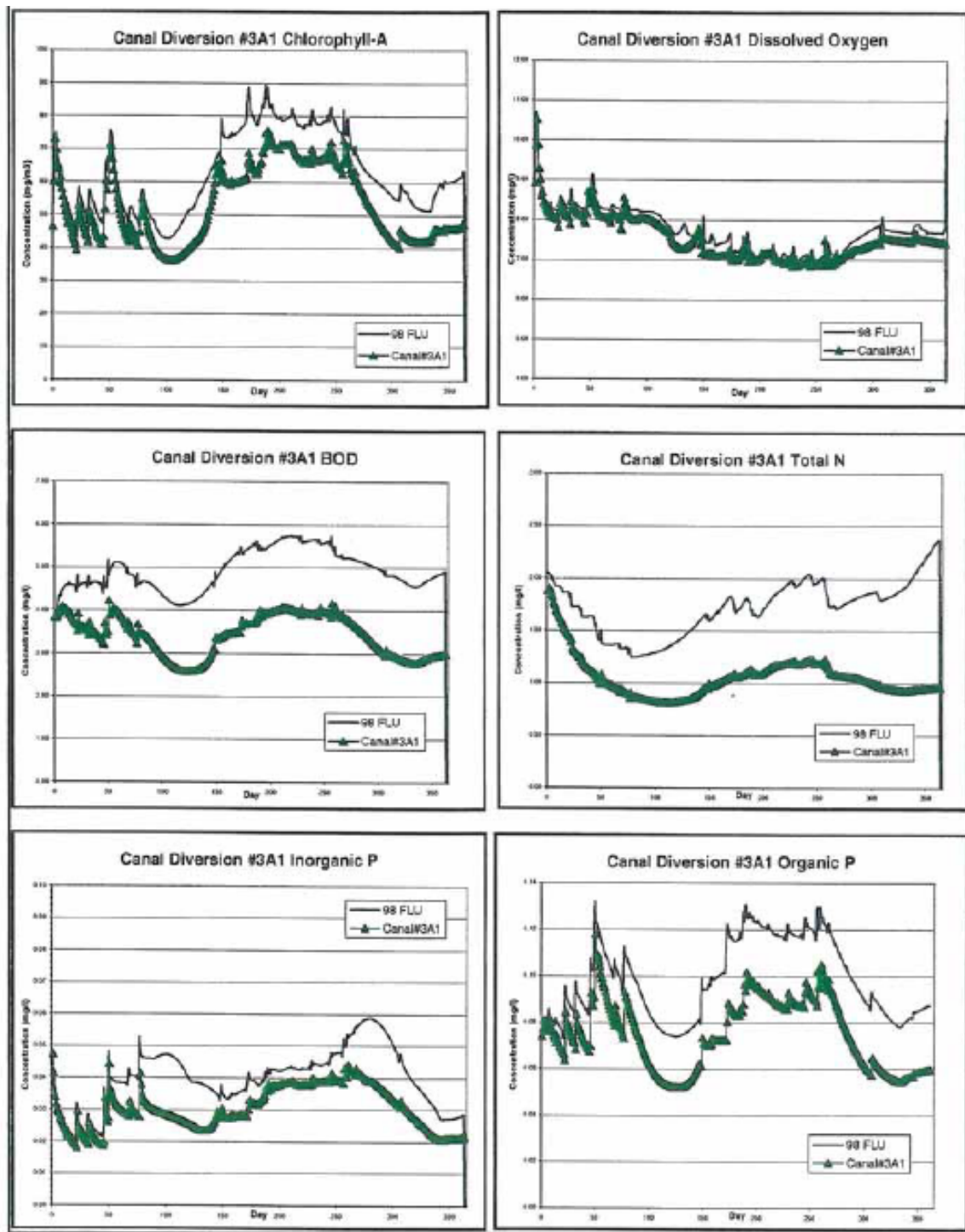


Figure 3-8. Weir Alternative simulation results vs. 1998 future land use baseline conditions. (Model plot)



**Figure 3-9. Canal Diversion Alternative #3A1 simulation results vs. 1998 future land use baseline conditions. (Model plot)**

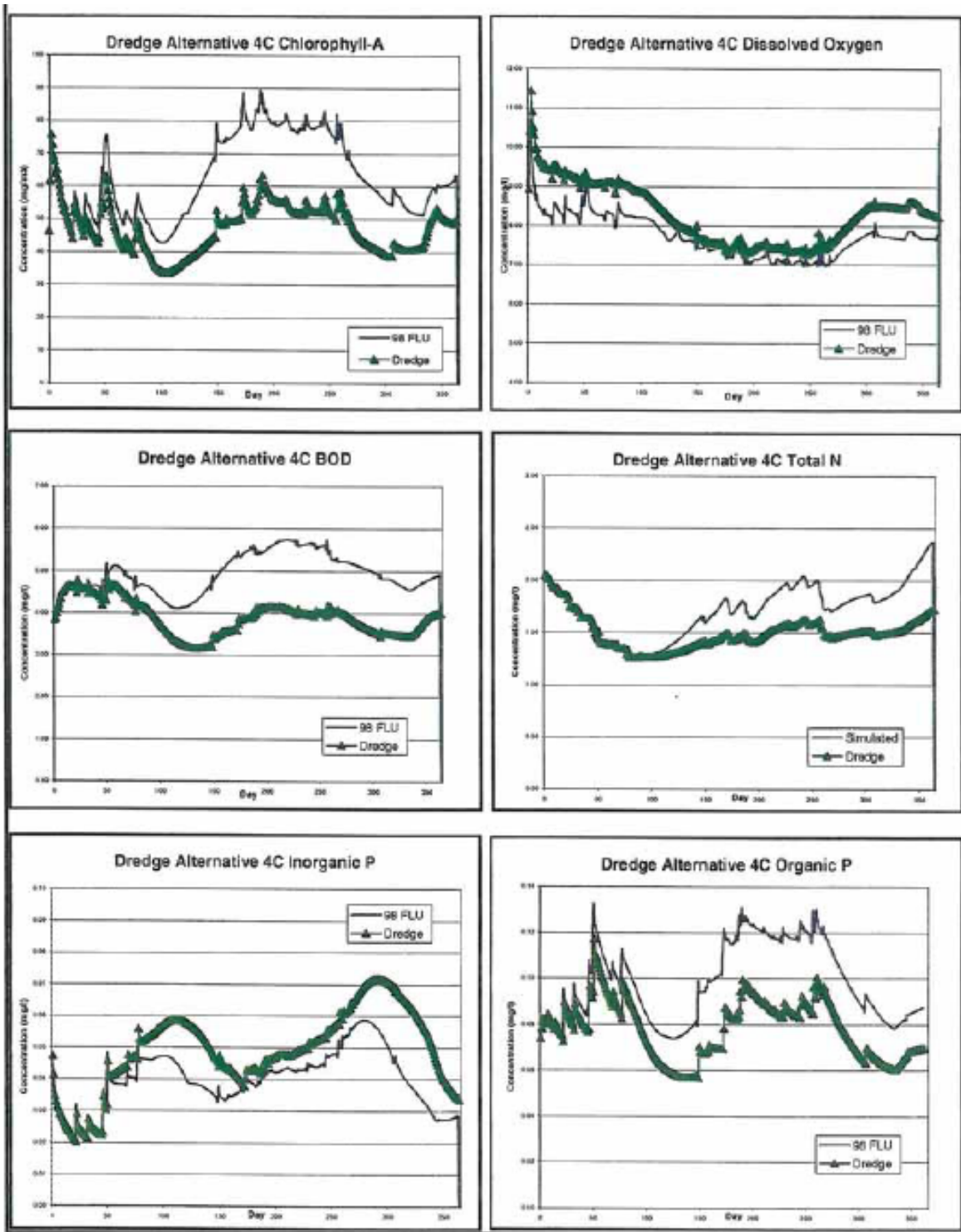


Figure 3-10. Dredging Alternative #4C simulation results vs. 1998 future land use baseline conditions. (Model plot)



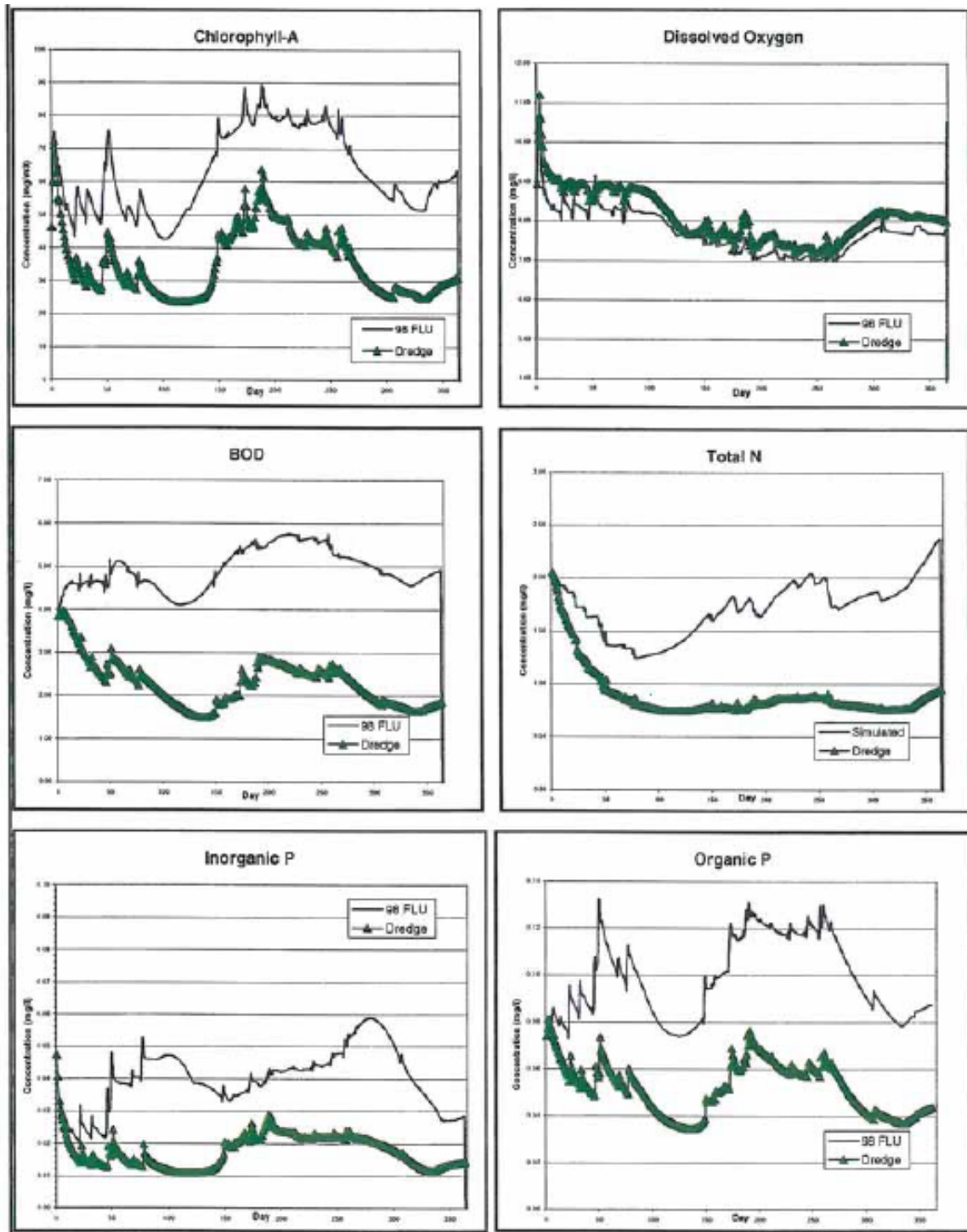


Figure 3-11. Combination of all Management Actions simulation results vs. 1998 future land use baseline conditions. (Model plot)

Category : Surface Water Quality

Project No: 829 Title: Lake Seminole Alum Injection  
 Cost Center: 8382600 Department: Environmental Management Primary Fund: 0401 CIE: Yes  
 Sub-cost Center: 8382611 Organization: CO ADMIN Secondary Fund: CIE Element: Drainage Element

	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	TOTAL
COSTS:							
Professional Svcs	105,000	47,500	47,500	0	0	0	200,000
Construction	2,060,000	1,138,410	1,523,600	0	0	0	4,722,010
Testing	0	30,970	35,900	0	0	0	66,870
TOTAL COSTS:	2,165,000	1,216,880	1,607,000	0	0	0	4,988,880
RESOURCES:							
Penny for Pinellas	1,141,000	23,750	23,750	0	0	0	1,188,500
Grant-Federal	0	287,560	493,040	0	0	0	780,600
Grant-Federal-PCEF	0	200,000	0	0	0	0	200,000
Grant-Local-SWFMD	724,000	508,570	390,000	0	0	0	1,619,570
Grant-State-DEP	300,000	200,000	700,210	0	0	0	1,200,210
TOTAL RESOURCES:	2,165,000	1,216,880	1,607,000	0	0	0	4,988,880

Description: Design and construction of treatment systems with " Alum-Injection equipment" at discharge locations in Lake Seminole for the purpose of improving the lake's water quality.

**Figure 3-12. Allocated Funding for Pinellas County Capital Improvement Projects.**

**Table 1-1. Timeline of Events within Lake Seminole.**

Year	Event
1945	Resolution to create freshwater lake
1956	Impoundment of an arm of Long Bayou
Late 1940's	weir constructed at north end of the lake
1957-1965	Long Creek was channelized
1963	Designated State Fish Management Area
1967	Construction of Lake Seminole Park
	18-inch diameter outfall pipe installed to connect three interconnected ponds.
Late 1960's	Fixed crest weir (6-ft NGVD) replaced with fixed curvilinear weir (5-ft NGVD)
1971	City of Largo Wastewater Treatment Plant closed
Mid-Late 1970's-	Lake Seminole classified as "Eutrophic" by USEPA
	Fixed crest weir construction at southern terminus of the Seminole Bypass Canal (3 ft NGVD)
1976	Lake Seminole Park expanded Construction of Seminole Bypass Canal
1987	Triploid Grass carp introduces
1989	Resolution 89-13: long term lake management program
1990's	Funding for Lake Seminole Diagnostic Feasibility Study
1992	\$10 million cooperative agreement between SWFWMD and PCDEM Pinellas County begins water quality monitoring
Mid 1991-s	102 <sup>nd</sup> Ave Bridge constructed over the central "narrows" portion of the Lake.
Mid-1990's	FFWCC stocks lake with Largemouth Bass-died
1999	Lake Seminole Sediment Removal Feasibility Plan
2001	Lake Seminole Watershed Management Plan completed
2002	Phase I- Habitat enhancement project by FFWCC (Organic sediment removal)
2003	Pinellas County adopts and implements Monitoring Plan by Janicki Environmental
2005	Pinellas County, the Southwest Florida Water Management District, and the Florida Fish and Wildlife Conservation Commission hosted the Lake Seminole Restoration and Recovery Public Meeting
2006	Lake Seminole Sediment Removal Feasibility Plan (updated)
	Lake level drawdown
	Phase II- FFWCC Habitat enhancement project. (organic sediment removed)
	Lake Clean-up (vegetation removal, replanting, drainage improvements, no wake zones implemented within 100ft of shoreline to restore native vegetation)
	FFWCC release 12,000 large mouth bass-successful
	Dog Leg Pond, St. Petersburg Junior College Pond and Pinellas County Pond 6 stormwater treatment facilities constructed and operational
2007-2009	Construction of enhanced stormwater treatment facilities
2009-2011	Sediment Removal

**Table 1-2. Trophic State Index (TSI) for lakes and estuaries (from FDEP, 1996).**

*For lakes: 0-59 is good, 60-69 is fair, 70-100 is poor.  
For estuaries: 0-49 is good, 50-59 is fair, 60-100 is poor.*

<b>Trophic State Index</b>	<b>Chlorophyll CHLA/ micrograms per liter (<math>\mu\text{g}/\text{l}</math>)</b>	<b>Total Phosphorus TP/ milligrams of phosphorus per liter (<math>\text{mgP}/\text{l}</math>)</b>	<b>Total Nitrogen TN/ milligrams of nitrogen per liter (<math>\text{mgN}/\text{l}</math>)</b>
<b>0</b>	0.3	0.003	0.06
<b>10</b>	0.6	0.005	0.10
<b>20</b>	1.3	0.009	0.16
<b>30</b>	2.5	0.01	0.27
<b>40</b>	5.0	0.02	0.45
<b>50</b>	10.0	0.04	0.70
<b>60</b>	20.0	0.07	1.2
<b>70</b>	40	0.12	2.0
<b>80</b>	80	0.20	3.4
<b>90</b>	160	0.34	5.6
<b>100</b>	320	0.58	9.3

**Table 1-3. Water budget for Lake Seminole calculated using 1997 data.**

<b>Inflows</b>	<b>cf</b>	<b>cfs</b>	<b>m<sup>3</sup></b>	<b>%</b>
Direct Runoff (SWMM)	323,610,000	10.26	9,164,635	65.4%
Precipitation	168,013,404	5.33	4,758,140	33.9%
Surficial Aquifer	3,560,758	0.11	100,841	0.7%
<b>TOTALS</b>	<b>495,184,161</b>	<b>15.70</b>	<b>14,023,615</b>	<b>100.0%</b>
<b>Outflows</b>	<b>cf</b>	<b>cfs</b>	<b>m<sup>3</sup></b>	<b>%</b>
Weir & Pipe Outflows	403,315,200	12.79	11,421,886	81.4%
Evapotranspiration	88,106,568	2.79	2,495,178	17.8%
Storage Loss	3,762,393	0.12	106,551	0.8%
<b>TOTALS</b>	<b>495,184,161</b>	<b>15.70</b>	<b>14,023,615</b>	<b>100%</b>
<b>Lake Residence Time = 72 days</b>				

**Table 1-4. Total nitrogen (TN) budget for Lake Seminole calculated using 1997 data.**

<b>Inflows</b>	<b>lbs.</b>	<b>tons</b>	<b>kg</b>	<b>%</b>
Direct Runoff (SWMM)	31,168	15.58	14,135	36.8%
Precipitation	4,487	2.24	2,035	5.3%
Surficial Aquifer	131	0.07	60	0.2%
Undetermined Sources*	48,805	24.40	22,138	57.7%
<b>TOTALS</b>	<b>84,591</b>	<b>42.30</b>	<b>38,366</b>	<b>100.0%</b>
<b>Outflows</b>	<b>lbs.</b>	<b>tons</b>	<b>kg</b>	<b>%</b>
Weir & Pipe Outflows	55,820	27.91	25,315	66.0%
Sedimentation**	28,772	14.39	13,051	34.0%
<b>TOTALS</b>	<b>84,591</b>	<b>42.30</b>	<b>38,366</b>	<b>100.0%</b>

\* Calculated undetermined N sources = (sum of N outflows) - (sum of N inflows from direct runoff, precipitation and surficial aquifer).

\*\* Calculated N sedimentation = [(sum of P inflows) - (sum of P outflows)] x (measured sediment TN:TP ratio of 7.09).

**Table 1-5. Total phosphorus (TP) budget for Lake Seminole calculated using 1997 data.**

<b>Inflows</b>	<b>lbs.</b>	<b>tons</b>	<b>kg</b>	<b>%</b>
Direct Runoff (SWMM)	6,467	3.23	2,933	96.2%
Precipitation	248	0.12	112	3.7%
Surficial Aquifer	9	0.00	4	0.1%
<b>TOTALS</b>	<b>6,724</b>	<b>3.36</b>	<b>3,049</b>	<b>100.0%</b>
<b>Outflows</b>	<b>lbs.</b>	<b>tons</b>	<b>kg</b>	<b>%</b>
Weir & Pipe Outflows	2,666	1.33	1,209	39.6%
Sedimentation*	4,058	2.03	1,840	60.4%
<b>TOTALS</b>	<b>6,724</b>	<b>3.36</b>	<b>3,049</b>	<b>100%</b>

\* Calculated P sedimentation = (sum of the P inflows) - (weir & pipe P outflows).

**Table 1-6. Major sub-basins with the highest integrated nonpoint source pollutant loads listed in order of decreasing priority.**

<b>Major Sub-basin</b>	<b>Drainage Area</b>	<b>%Total NPS Load</b>	<b>Priority Rank</b>
3	654 acres	15%	1st
1	461 acres	14%	2nd
7	548 acres	12%	3rd
6	391 acres	12%	4th
2	478 acres	11%	5th



**Table 2-1. Goals, targets and monitoring objectives for the Water Quality issue.**

Goal(s)	Target(s)	Monitoring Objective(s)
The lake and its watershed shall be managed such that good water quality, according to Class-III State standards, is achieved and maintained in the lake	1. Attain a mean annual chlorophyll-a concentration of 30 ug/l or less.	1. Measure in-lake chlorophyll-a concentrations.
	2. Attain a mean annual multi-parametric TSI value of 65 or less.	2A. Measure in-lake TN and TP concentrations. 2B. Measure in-lake Secchi disk depths.
	3. Reduce current annual TP loads from external sources by 50%.	3A. Estimate mean annual loads of TP to Lake Seminole from priority sub-basins. 3B. Estimate mean annual loads of TP to Lake Seminole from groundwater seepage. 3C. Estimate mean annual loads of TP to Lake Seminole from atmospheric deposition.
	4. Annually calculate current water and nutrient budgets for Lake Seminole.	4. Estimate the mean mass of TN, TP, and water volume discharged from Lake Seminole.
	5. Maintain Class-III water quality standards for dissolved oxygen, pH, specific conductance and chlorides.	5A. Estimate the monthly frequency, duration, and magnitude of bottom dissolved oxygen concentrations in Lake Seminole that fall below the regulatory minima of 5.0 mg/l. 5B. Estimate for Lake Seminole: 1) the monthly trend in pH units; and 2) the frequency, duration, and magnitude that monthly pH varies by more than one unit above or below natural background levels. 5C. Estimate for Lake Seminole: 1) the monthly chloride concentration; and 2) the frequency, duration, and magnitude that monthly chloride concentrations exceed the background level by 10% or more. 5D. Estimate for Lake Seminole: 1) the monthly trends in specific conductance; and 2) the frequency, duration, and magnitude that monthly specific conductance exceeds 1,275 µmhos/cm.
	6. Attain an 80% TSS load reduction for all permitted MSSW facilities within the Lake Seminole watershed.	6. Determine the number of permitted MSSW facilities in the Lake Seminole watershed attaining an 80%TSS load reduction.

**Table 3-1. Summary of recommended habitat restorations sites and projects in Lake Seminole and its watershed.**

Site	Existing Habitat	Restoration/Enhancement Projects
Park Boulevard Site*	Oak and willow fringe with Brazilian pepper between the road and Lake Seminole	Remove Brazilian pepper, improve views to lake, extend existing shoreline and create a 6 to 1 littoral shelf, vegetate shoreline and littoral habitat in the lake.
Cross Bayou Little League Tract	Brazilian pepper fringe	Remove Brazilian pepper fringe, replant with appropriate vegetation.
Northern County-Owned Tract*	Brazilian pepper dominated areas, disturbed areas with castor bean and elderberry dominant cover, willow marsh along old creek	Remove Brazilian pepper and plant appropriate vegetation, clear and plant pines in central area, clear cattails and willows along creek and plant aquatic vegetation in littoral area. Controlled burn of pine flatwoods area.
Pinellas County Sheriff's Complex	Brazilian pepper dominated areas, drainage pond, and mature pine flatwoods	Remove Brazilian pepper and fill material, plant appropriate vegetation, improve pond to provide for treatment of stormwater, controlled burn in pine flatwoods.
102nd Avenue Bridge Area*	Willow dominant wetland area with jacaranda and Brazilian pepper	Remove exotic species and diversify the habitat with mixed hardwood plantings.
Lake Seminole County Park Pine Flatwoods Restoration	Air potato and grape vine within pine flatwoods	Develop and implement emergency control program in response to prolific growth of these two species in recent years.
Eagles' Nest Tract	Pine flatwoods	Recommend a controlled burn to revitalize pine flatwoods ecosystem and removal of Brazilian pepper from south property line.
Watershed-wide	Brazilian pepper	A cooperative program to remove Brazilian pepper from public and private property throughout the watershed.
Lake-wide*	Cattails and carolina willow	An ongoing cooperative program to establish more diverse, native aquatic vegetation communities in the lake littoral zone.

\*In-lake habitat restoration projects.

**Table 3-2. Potential stormwater BMP locations in the priority sub-basins.**

Sub-Basin No.	Sub-Basin Area	Potential BMP Projects	Comments
3	654 acres	Alternative 3A - Alum injection with floc settling in an existing wet detention pond and/or an existing ditch/canal	Would treat 95% of basin land area; off-line or in-lake floc settling basins.
7	548 acres	Alternative 7A - Alum injection with floc settling in an existing ditch/canal.	Would treat 90% of basin land area; in-lake floc settling basin.
1	461 acres	Alternative 1A - Alum injection with floc settling in an existing ditch/canal	Would treat 80% of basin land area; in-lake floc settling basin.
2	478 acres	Alternative 2A - Alum injection with floc settling in an existing ditch/canal	Would treat 88% of basin land area; in-lake floc settling basin.
6	391 acres	<p>St. Petersburg Junior College MSSW facility</p> <p>Pinellas County Dog Leg Pond project</p> <p>Pinellas County Pond 6 project</p> <p>Alternative 6B - Re-routing of drainage to Pond 6 site with combined alum and wetland treatment</p>	<p>Recently completed; treats about 22% of basin land area.</p> <p>Recently completed; primarily a habitat restoration project.</p> <p>Design complete; will treat only 17% of basin land area; includes habitat restoration component.</p> <p>Would treat 93% of basin land area; potentially costly modifications to drainage network; FDOT permit coordination required.</p>

**Table 3-3. Summary Comparison of Project Alternatives.**

<b>Alternative</b>	<b>Project Duration</b>	<b>Permit-ability</b>	<b>Public Acceptance</b>	<b>Construct-ability</b>	<b>Estimated Cost</b>	<b>Conclusions</b>
1	14 years	Very Low	Very Low	Very Low	\$50.7 million	Not feasible due to logistical problems
2A	4 years	Very Low	Very Low	Very Low	\$35.4 million	Not feasible due to permitting constraints
2B	4 years	Very Low	Very Low	Very Low	\$38.7 million	Not feasible due to permitting constraints
3A	4 years	Moderate	Low	Low	\$37.6 million	Not feasible due to lack of available land
3B	4 years	Moderate	Low	Low	\$40.8 million	Not feasible due to lack of available land
4	2 years	High	High	Moderate	\$10.1 million	Not feasible due to infrastructure limitations
5	2 years	Moderate	Moderate	Moderate	\$27.6 million	Feasible but not cost-effective
6A	2 years	High	High	High	\$13.9 million	Feasible – the preferred alternative
6B	2 years	High	High	High	\$19.1 million	Feasible but cost savings not proven

**Table 3-4. Tabular summary of target monthly lake levels under the recommended enhanced lake level fluctuation schedule.**

Month	Target Lake Levels		
	Schedule A	Schedule B	Schedule C
January	4.8	4.8	4.8
February	5.0	5.0	5.0
March	5.0	5.0	5.0
April	5.0	5.0	5.0
May	4.4	4.4	4.4
June	3.2	3.4	3.8
July	4.4	4.4	4.4
August	4.8	4.8	4.8
September	5.0	5.0	5.0
October	5.0	5.0	5.0
November	4.8	4.8	4.8
December	4.4	4.2	4.6

**Notes:**

1. All elevations are given in feet NGVD.
2. Target lake level indicates the recommended water elevation to be attained on the first day of each month.
3. The proposed modified four-year lake level fluctuation schedule involves the sequential implementation of Schedules A,C,B,C... on a repeating four-year cycle.
4. Shaded rows indicate the months during which the three schedules differ.

**Table 3-5. Mean Pollutant Efficiencies Achieved during Laboratory Jar Tests conducted on Stormwater Samples Collected in Lake Seminole watershed during November 2003-March 2004 (ERD 2005).**

Sub-Basin	Parameter	10mg Al/liter
1	Total N	51
	Total P	91
	TSS	94
	BOD	0
2	Total N	33
	Total P	88
	TSS	83
	BOD	44
3	Total N	23
	Total P	67
	TSS	63
	BOD	34
6	Total N	22
	Total P	73
	TSS	73
	BOD	15
7	Total N	32
	Total P	90
	TSS	82
	BOD	64
Bypass Canal	Total N	19
	Total P	88
	TSS	65
	BOD	10

**Table 3-6. Pollutant removal efficiencies for alum treatment systems (from Harper and Livingston, 1999).**

<b>Pollutant</b>	<b>Estimated Removal Efficiency</b>
Total Nitrogen (TN)	50%
Total Phosphorus (TP)	90%
Biological Oxygen Demand (BOD)	75%

**Table 3-7. LWWM simulation results for Management Action #1 - Regional Stormwater Treatment Facilities (BMPs).**

<b>BMP Combination (Sub-Basins)</b>	<b>NPS-TN Load Reduction (%)</b>	<b>NPS-TP Load Reduction (%)</b>	<b>NPS-BOD Load Reduction (%)</b>	<b>LWWM Modeled Chl A Reduction (mg/m<sup>3</sup>)</b>	<b>LWWM Modeled Chl A Reduction (%)</b>
<b>1</b>	5.65	11.97	6.19	0.9	1.43
<b>2</b>	3.93	8.96	4.33	0.6	1.00
<b>3</b>	7.04	17.32	8.54	1.6	2.52
<b>7</b>	2.43	7.19	3.35	0.4	0.58
<b>1+2</b>	9.57	20.93	10.53	2.0	3.17
<b>1+3</b>	12.69	29.29	14.73	2.8	4.44
<b>1+7</b>	8.08	19.17	9.54	1.8	2.81
<b>2+3</b>	10.97	26.27	12.88	2.4	3.87
<b>2+7</b>	6.36	16.15	7.68	1.4	2.28
<b>3+7</b>	9.47	24.51	11.89	2.3	3.58
<b>1+2+3</b>	16.61	38.25	19.07	3.8	6.06
<b>1+2+7</b>	12.01	28.13	13.88	2.7	4.29
<b>1+3+7</b>	15.12	36.48	18.08	3.5	5.58
<b>2+3+7</b>	13.40	33.47	16.23	3.2	5.02
<b>1+2+3+7</b>	19.05	45.44	22.42	4.4	7.04



**Table 3-8. LWWM simulation components and results for Management Action #3 - Canal Diversion.**

<b>Management Action #3 Alternative</b>	<b>WASP Input File</b>	<b>Hydro-dynamic File</b>	<b>Non-point Source File</b>	<b>LWWM Modeled Chl A Reduction (mg/m<sup>3</sup>)</b>	<b>LWWM Modeled Chl A Reduction (%)</b>
3A	CanalA.inp	CanalA.hyd	98F.nps	4.7	7.44
3A1	CanalA1.inp	CanalA.hyd	98F.nps	9.6	15.2
3B	CanalB.inp	CanalB.hyd	98F.nps	0.3	0.46
3B1	CanalB1.inp	CanalB.hyd	98F.nps	8.8	13.98

**Table 3-9. LWWM simulation components and results for Management Action #4 - Sediment Removal.**

<b>Management Action #4 Alternative</b>	<b>WASP Input File</b>	<b>Hydro-dynamic File</b>	<b>Non-point Source File</b>	<b>LWWM Modeled Chl A Reduction (mg/m<sup>3</sup>)</b>	<b>LWWM Modeled Chl A Reduction (%)</b>
4A	DredgeA.inp	Dredge.hyd	98F.nps	1.0	1.57
4B	DredgeB.inp	Dredge.hyd	98F.nps	8.2	13.01
4C	DredgeC.inp	Dredge.hyd	98F.nps	15.3	24.40

**Table 3-10. LWWM simulation components and results for Management Action combinations.**

<b>Management Action Combination</b>	<b>WASP Input File</b>	<b>Hydro-dynamic File</b>	<b>Non-point Source File</b>	<b>LWWM Modeled Chl A Reduction (mg/m<sup>3</sup>)</b>	<b>LWWM Modeled Chl A Reduction (%)</b>
1	BMP1237.inp	98F.hyd	BMP1237.nps	4.4	7.04
2	Weir.inp	Weir.hyd	98F.nps	-1.9	-3.03
3	CanalA1.inp	CanalA.hyd	98F.nps	9.6	15.26
4	DredgeC.inp	Dredge.hyd	98F.nps	15.3	24.40
1+2	Mgt12.inp	Weir.hyd	BMP1237.nps	2.7	4.24
1+3	Mgt13.inp	CanalA.hyd	BMP1237.nps	12.7	20.19
1+4	Mgt14.inp	Dredge.hyd	BMP1237.nps	19.1	30.38
2+3	Mgt23.inp	Mgt23.hyd	98F.nps	7.6	12.08
2+4	Mgt24.inp	Mgt24.hyd	98F.nps	19.4	30.83
3+4	Mgt34.inp	Mgt34.hyd	98F.nps	25.3	40.22
1+2+3	Mgt123.inp	Mgt23.hyd	BMP1237.nps	10.7	17.01
1+2+4	Mgt124.inp	Mgt24.hyd	BMP1237.nps	23.7	37.75
1+3+4	Mgt134.inp	Mgt34.hyd	BMP1237.nps	28.5	45.31
2+3+4	Mgt234.inp	Mgt234.hyd	98F.nps	24.2	38.47
1+2+3+4	Mgt1234.inp	Mgt234.hyd	BMP1237.nps	27.4	43.56

**Table 3-11 Confirmed Sources of Funding for Lake Seminole Restoration Projects**

Contract Information		Funding Allocation by Source							
Contract #	Contract Date	Total Project Cost	District	SWIM	City of Largo	City of Seminole	Pinellas Co	FFWCC	DEP and Others
Weir Project #95CON00007 (P267)	12/20/1994	\$315,312.72	\$300,000.00				\$15,312.72 c		
Creation Pond #95CON00008 (P267)	12/20/1994	\$433,072.63	\$433,072.63				c		
Barnett Property Purchase	1992	\$1,920,000.00					\$1,920,000.00 c		
Creation Pond #95CON00008 – 3 <sup>rd</sup> Amendment (P267)	1/1/2002	\$75,353.00	\$75,353.00				c		
Watershed Management Plan #95CON000040 (P267)	5/20/1996	\$376,583.40	\$301,266.72		\$28,243.76	\$47,072.93	c		
Dog Leg Pond #95CON000046 (P267)	2/7/1995	\$263,950.84	\$211,160.67			\$52,790.17	c		
SPJC Pond #98CON000091 (P267)	2/14/2000	\$711,937.21	\$711,937.21				c		
Aquatic Habitat Restoration Phase II #05CON000033 (P109)	4/25/2005	\$375,269.00	\$137,134.50				\$101,000.00 c	\$137,134.50	
Aquatic Habitat Restoration Phase 2 and Vegetation Harvesting #05CON000033 (P109 phase 2)	2/2007	\$140,000.00	\$60,000.00				\$80,000.00 Est		
Lake Seminole Phase I Subbasin-1,3,6 Watershed Stormwater Pollution Reduction #02CON000072 (P902)	6/30/2002 8/30/2004	\$2,900,000.00	\$2,320,000.00				\$80,000.00 Est		\$500,000 319H
Lake Seminole Phase II Subbasin-2&7 Watershed Stormwater Pollution Reduction #02CON000072 (P902 PhaseII)	Second Amendment in process	\$1,780,000.00	\$890,000.00				\$890,000.00 Est		\$890,000.00 TMDL and EPA Appropriation
Lake Seminole Aquatic Habitat Restoration Excavate Organic Peat Sediment (P903)	9/30/2003	\$398,977.32	\$199,488.66				c	\$199,488.66	
Long Bayou/Lake Seminole Bypass Canal Structural Comp. 2 #06OCS0000040 (W267)	8/10/2005 5/15/2007	\$1,113,742.00	\$231,871.00	\$231,871.00			\$6,729,660.00 <sup>1</sup>		\$650,000.00 319H
Park Blvd. Shoreline Restoration	Completed 2006	\$188,000.00				\$28,000.00	\$160,000.00 c		
Sediment Removal in Canals	Completed 2006	\$68,000.00					\$68,000.00 c		
Lake Seminole Dredging Design and Permitting	Contract in process	\$1,000,000.00	\$500,000.00				\$500,000.00 Est		
Structural Component 6 Install Stage/flow Devices at Outfall Structure	Complete 2006	\$17,000.00					\$17,000.00 c		
Property Purchase for Subbasin 3 Alum Treatment Facility Co. – Two Properties	Co. purchased one parcel Jan 2007 for \$266,750 - 2nd Parcel closing est. Sept. 2007.	\$533,500.00					\$533,500.00 3		
Lake Seminole Dredging (if needed)	FY2011 funding	\$16,000,000	\$8,000,000.00 FY11 request				\$8,000,000.00 Est		
Lake Seminole Phase I and II Stormwater Pollution Reduction Operation and Maintenance	2008-2028	\$3,470,340.00			\$694,650.00 <sup>1</sup>	\$1,014,602.00 <sup>1</sup>	\$1,752,228.20 <sup>1</sup> Est		
Lake Seminole Native Aquatic Plant Restoration	12/2006	\$10,000.00					\$10,000.00 c		Tampa Bay Estuary Program
<b>Project Totals</b>		<b>\$31,990,029.12</b>	<b>\$14,371,284.39</b>	<b>\$231,871.00</b>	<b>\$722,893.76</b>	<b>\$1,142,465.10</b>	<b>\$19,886,700.92 -</b>	<b>\$336,623.16</b>	<b>\$2,040,000</b>

<sup>c</sup> Actual Expenses

<sup>Est</sup> Estimated Expenses

<sup>1</sup> Estimated Operation Maintenance cost over 20 years

<sup>2</sup> Proposed in FY2008 Coop. Fund Initiative

<sup>3</sup> \$266,750 actual purchase for 1st Property-2nd Property estimated cost

**Table 3-12. Implementation schedule.**

<b>Phase I Components Pre-2007</b>	<b>Phase II Components 2007-2009</b>	<b>Phase III Components 2009-</b>
<i>Structural Component</i> - Install Stage and Flow Measurement Instrumentation on the Lake Seminole Outfall Control Structure	<i>Structural Component</i> - Dredge Organic Silt Sediments from Submerged Areas	<i>Structural Component</i> - Excavate Organic Peat Sediments from Shoreline Areas
<i>Legal Component</i> - Adopt a Resolution Designating the Lake Seminole Watershed as a "Nutrient Sensitive Watershed"	<i>Structural Component</i> - Construct Enhanced Regional Stormwater Treatment Facilities in Priority Sub-Basins	<i>Structural Component</i> - Restore Priority Upland and Wetland Habitats (In-Lake Habitat Restoration and Enhancement)
<i>Policy Component</i> - Establish a Lake Seminole Watershed Management Area (WMA) through Amendments to the Pinellas County, and Cities of Largo and Seminole Comprehensive Plans	<i>Structural Component</i> - Divert Seminole Bypass Canal Flows to Improve Lake Flushing and Dilution	<i>Structural Component</i> - Restore Priority Upland and Wetland Habitats (Upland Habitat Restoration and Enhancement)
<i>Public Education Component</i> - Develop and Implement a Local Citizens LakeWatch Program for Lake Seminole	<i>Management Component</i> - Implement an Enhanced Lake Level Fluctuation Schedule	<i>Management Component</i> - Inactivate Phosphorus through Whole Lake Alum Applications (if warranted by monitoring results)
<i>Compliance and Enforcement Component 1</i> - Expand and Enforce Restricted Speed Zones on Lake Seminole	<i>Management Component</i> - Improve Treatment Efficiency of Existing Stormwater Facilities	<i>Management Component</i> - Mechanically Harvest Nuisance Aquatic Vegetation
<i>Structural Component</i> - Install Stage and Flow Measurement Instrumentation on the Lake Seminole Outfall Control Structure	<i>Legal Component</i> - Strengthen and Standardize Local Ordinances for Regulating Stormwater Treatment for Redevelopment in the Lake Seminole Watershed	<i>Management Component</i> <sup>4</sup> - Biomanipulate Sport Fish Populations - Phase III (Enforce Catch & Release)
<i>Public Education Component</i> - Develop and Implement a Comprehensive Public Involvement Program for the Lake Seminole Watershed		
<i>Management Component</i> - Biomanipulate Sport Fish Populations - Phase I (Rough Fish Removal)		
<i>Management Component</i> - Biomanipulate Sport Fish Populations - Phase II (Sport Fish Stocking)		
Dark shaded cells indicate completed projects	Lightly shaded cells indicate current projects	

**Table 4-1. Pinellas County Water Quality Monitoring Schedule 2007  
(prepared Dec 11, 2006)**

<b>Sampling Period</b>	<b>Sampling Date</b>	<b>Western Crew Destination</b>	<b>Western Start Time</b>
<b>1</b>	1/17/2007	SB and SA	Afternoon
<b>2</b>	2/20/2007	SB and SA	Afternoon
<b>3</b>	4/9/2007	SB and SA	Afternoon
<b>4</b>	5/23/2007	SB and SA	Morning
<b>5</b>	6/13/2007	SA and SB	Afternoon
<b>6</b>	8/7/2007	SA and SB	Morning
<b>7</b>	9/12/2007	SA and SB	Morning
<b>8</b>	10/25/2007	SB and SA	Morning
<b>9</b>	12/4/2007	SB and SA	Afternoon

**Table 4-2. 2007 Lake Seminole Sampling Stations.**

STRATA	LATITUDE	LONGITUDE	SITEID	SITENAME	STRATA	LATITUDE	LONGITUDE	SITEID
SA	27.872644	-82.777619	SA -A-7-1	1A	SB	27.864164	-82.779380	SB -A-7-1
SA	27.873566	-82.776812	SA -B-7-1	1B	SB	27.840180	-82.779801	SB -B-7-1
SA	27.877137	-82.776281	SA -A-7-2	2A	SB	27.843598	-82.782720	SB -A-7-2
SA	27.875199	-82.777488	SA -B-7-2	2B	SB	27.852381	-82.779106	SB -B-7-2
SA	27.881385	-82.775812	SA -A-7-3	3A	SB	27.859810	-82.779756	SB -A-7-3
SA	27.886813	-82.776906	SA -B-7-3	3B	SB	27.846320	-82.778845	SB -B-7-3
SA	27.885740	-82.774746	SA -A-7-4	4A	SB	27.844376	-82.779097	SB -A-7-4
SA	27.879567	-82.776148	SA -B-7-4	4B	SB	27.841498	-82.783234	SB -B-7-4
SA	27.881941	-82.775395	SA -A-7-5	5A	SB	27.858452	-82.780739	SB -A-7-5
SA	27.881360	-82.777020	SA -B-7-5	5B	SB	27.851090	-82.779837	SB -B-7-5
SA	27.872552	-82.778451	SA -A-7-6	6A	SB	27.845241	-82.781345	SB -A-7-6
SA	27.877012	-82.772714	SA -B-7-6	6B	SB	27.863634	-82.781331	SB -B-7-6
SA	27.877813	-82.774992	SA -A-7-7	7A	SB	27.852095	-82.778218	SB -A-7-7
SA	27.878686	-82.776581	SA -B-7-7	7B	SB	27.843893	-82.782948	SB -B-7-7
SA	27.878431	-82.773895	SA -A-7-8	8A	SB	27.861073	-82.779766	SB -A-7-8
SA	27.884931	-82.773747	SA -B-7-8	8B	SB	27.854582	-82.779244	SB -B-7-8
SA	27.878862	-82.776888	SA -A-7-9	9A	SB	27.852124	-82.782230	SB -A-7-9
SA	27.882574	-82.775994	SA -B-7-9	9B	SB	27.861147	-82.782387	SB -B-7-9

**Table 4-3. Indicators collected at each sampling site (From Monitoring Plan, 2003 and Updated in 2005).**

Water Quality Indicators	Explanatory Indicators
Water Temperature Conductivity Dissolved Oxygen Concentration Chlorophyll-a, b, c, and phaeophytin Ammonia Nitrate-Nitrite (NOX) Total Kjeldahl Nitrogen Total Phosphorous Orthophosphorous Secchi Disk Depth Turbidity Transmissivity Total Suspended Solids Color pH Dissolved Aluminum Fecal Coliform Enterococci Biological Oxygen Demand	Lake Stage Date and Time of Sample Collection Insolation Cloud Cover Bottom Type Classification Submerged Aquatic Vegetation Wind Direction and Speed Wave Height Instruments Used Recent Rain Events Other Descriptive Information



April 30, 2010

TO: ALL INTERESTED PROPOSERS  
REQUEST FOR PROPOSAL: LAKE SEMINOLE SEDIMENT REMOVAL  
PROPOSAL NUMBER: 090-0271-NC (AM)  
PROPOSAL SUBMITTAL DATE : MAY 13, 2010 @ 3:00 PM

**ADDENDUM NO. 1**

Notice is given that the following is additional information, clarifications, questions and responses relative to referenced Request for Proposal (RFP):

**Question 1:**

- a. Is the project fully funded or is future funding anticipated?
- b. Is there a funding cap for the removal activity?

**Answer 1:**

The project is funded as follow:

FY2010 \$	400,000.00
FY2011 \$	250,000.00
FY2012 \$	8,000,000.00
FY2013 \$	8,000,000.00
FY2014 \$	0.00
FY2015 \$	0.00
TOTAL	\$16,650,000.00

**Question 2:**

**A firm does not have to be pre-qualified with Pinellas County prior to submitting a bid, is this assumption correct?**

**Answer 2:**

That is correct.

**Question 3:**

**Who is the County's Project engineer on previous studies (both the county contact and the consultant)**

**Answer 3:**

For the Lake Seminole Watershed Plan, the Reasonable Assurance Plan, and the Sediment Removal Feasibility Study the project manager was Kelli Levy; the consultant was PBS&J.

**Question 4:**

**Is this project funded by SWFWMD and if so who is their project manager for this project**

**Answer 4:**

Yes and the project manager for SWFWMD is Nancy Norton. Note: Any question referencing the RFP shall be submitted to Pinellas County Purchasing Department.

**Question 5:**

**Are copies of the WMP available, if so, where can they be reviewed**

**Answer 5:**

Refer to:

[www.pinellascounty.org/LakeSeminole](http://www.pinellascounty.org/LakeSeminole)

**Question 6:**

**Do we need to submit any portions of the SF330 for subconsultants that we intend to include on our team?**

**Answer 6:**

See Section B, Special Conditions, page 9 and 10 under "SUBMITTAL REQUIREMENTS", and guidance provided in the SF 330.

**Question 7:**

**If we select a contractor on our team (as a sub consultant) will it present a conflict of interest if that firm wants to pursue on it's own?**

**Answer 7:**

No.

All other specifications, terms and conditions remain the same.

Please remember to acknowledge receipt of this Addendum in Section G, Page 17 under Addendum No. 1 and return with completed bid package.

Sincerely,



Joseph Lauro, CPPO/CPPB  
Director of Purchasing



May 7, 2010

TO: ALL INTERESTED PROPOSERS  
REQUEST FOR PROPOSAL: LAKE SEMINOLE SEDIMENT REMOVAL  
PROPOSAL NUMBER: 090-0271-NC (AM)  
PROPOSAL SUBMITTAL DATE : MAY 13, 2010 @ 3:00 PM

**ADDENDUM NO. 2**

Notice is given that the following is additional information, clarifications, questions and responses relative to referenced Request for Proposal (RFP):

Note: This is the final Addendum for the RFP.

**Question 1:**

**Can you tell me if the County desires that sediment sample speciation analyses be conducted as part of the work to determine cost –benefit.**

**Answer 1:**

Yes. The targeted sediments are those causing poor water quality and other environmental problems so we want to ensure we are focusing on those areas. Additionally, if we have to rank areas for removal due to costs, then we want the best bang for the buck.

**Question 2:**

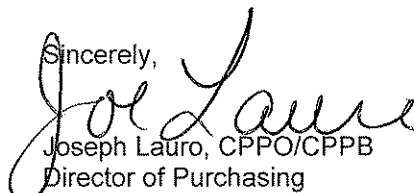
**"If a dredging contractor is included on our team for constructability review and we are awarded his project, does the dredging contractors' involvement with the engineering element of the project prohibit that company from bidding on the actual dredging work?"**

**Answer 2:**

Under the scenario that you describe the dredging contractor **will be prohibited** from bidding on the actual dredging work.

All other specifications, terms and conditions remain the same.

Please remember to acknowledge receipt of this Addendum in Section G, Page 17 under Addendum No. 2 and return with completed bid package.

Sincerely,  
  
Joseph Lauro, CPPO/CPPB  
Director of Purchasing