

**REQUESTS FOR PROPOSALS
DESIGN/BUILD SERVICES-BOARDWALK, BRIDGE AND FISHING PIERS
LAKE CITY PARK PROJECT
RFP# 03-16/17**

SUBMISSION DEADLINE IS 11:00 AM EST Tuesday, September 20, 2016

DESIGN/BUILD SERVICES-BOARDWALK, BRIDGE AND FISHING PIERS
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REQUESTS FOR PROPOSALS NO. 03-16/17

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Florence County is seeking a licensed marine contractor to provide design/build services for the construction of a boardwalk, bridge and fishing piers within the inside perimeter of an existing lake located at 273 N. Church Street as part of the Lake City Park Project. The project is funded in part by a South Carolina Parks, Recreation, and Tourism Grant and the Drs. Bruce and Lee Foundation.

PROPOSAL SUBMITTALS must be received no later than 11:00 a.m. EST on Tuesday, September 20, 2016 at the address below in a sealed envelope. A proposal response listing of all respondents will be sent to each offeror. All submittals shall contain five (5) copies of the information requested. Submittals received after the deadline will not be opened. Facsimile or e-mail submittals will not be accepted. All submittals should be sent to:

MAILED TO:

Florence County Procurement
Attn: Patrick D. Fletcher
180 N. Irby Street, MSC-R
Florence, South Carolina 29501

HAND-CARRIED TO:

Florence County Procurement
Attn: Patrick D. Fletcher
180 N. Irby Street, Room B-5
Florence, South Carolina 29501

All questions should be addressed to Patrick Fletcher, Procurement Director by email at pfletcher@florenceco.org by close of business Thursday, September 8, 2016. Offerors mailing proposals should allow sufficient mailing time to ensure timely receipt. The County is not responsible for proposals delayed by mail and/or delivery services of any nature. Proposals received after the set time for closing will be returned unopened.

Proposals must be made in the official name of the firm or the individual under which business is conducted (showing the official business address). Proposals must be signed in ink by a person duly authorized to legally bind the person, partnership, company or corporation submitting the proposals. Proposals must be valid for a minimum of one hundred twenty (120) days.

Upon receipt by the County, the proposal shall become the property of the County, without compensation to the offeror, for disposition or usage by the County at its discretion. The County shall have the sole discretion in evaluating both the proposals and the qualifications of the offerors. The County reserves the right to reject any and all proposals and is not bound to accept any proposals if the proposals acceptance is contrary to the best interest of the County. The particulars of any proposals will remain confidential until a contract is signed with the successful offeror(s).

Florence County reserves the right to engage in discussions with any or all responsible responders who submit proposals for the purpose of clarification to assure full understanding of and responsiveness to this request.

Minority Business Owners (minority or woman owned businesses) will be afforded full opportunity to submit proposals in response to this invitation and will not be discriminated against on the grounds of race, color, creed, sex or national origin in consideration for an award. It is the policy of the County that minority business and women owned business enterprises (MBE/WBE) have an opportunity to participate at all levels of contracting in the performance of County contracts to the extent practical and consistent with the efficient performance of the contract.

The successful firm must ensure that all subcontractors, agents, personnel assigned by or employees of prime firm and subcontractors are not discriminated against because of their race, color, religion, sex or national origin. Offerors must make positive efforts to provide equal employment opportunity for minority and women owned businesses.

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General Information and Scope of Work

Florence County is developing a recreational park located at 273 N. Church Street, Lake City, South Carolina, TMP# 80015-02-015 and 80015-02-010. The 43 acre site was historically utilized as a landfill, city public works site and a county manned convenience center. In cooperation with South Carolina DHEC Brownfields Program and assisted by the Catawba Regional Council of Governments, the brownfields site has been remediated and being developed into the recreational park for the citizens to enjoy.

The park features a 6 +/- acre lake which was constructed in 2015. The County is now soliciting bids for the construction of approximately 2,600+/- linear feet of no less than 8' wide boardwalk constructed of treated lumber to provide a pedestrian walkway around the lake. The boardwalk will be constructed around the inside perimeter of the lake. The boardwalk will provide citizen access to Lions Park from the Church Street side of the park. Additionally, a minimum of two (2) fishing piers approximately 10' x 30' should be included in the design. A bridge over to an interior island in the lake should also be included with a fishing pier.

A geotechnical report of the site is included in this solicitation conducted by Terracon Consultants, Inc. dated July 18, 2016.

An as-built topographic survey of the property can be provided upon request by contacting the Procurement Department at 843-665-3018.

The wetland delineation was conducted by The Brigman Company and is included in this solicitation, as well as the approved methodology for construction by the Army Corps of Engineers.

Scope of Services

- ❖ Services include all aspects related to designing, permitting and constructing the boardwalk, bridge and fishing piers.
- ❖ The successful firm shall perform or provide any and all professional related services including architectural; interior design; planning; structural; mechanical; civil; electrical services; and any consultations, presentations or related services incidental thereto necessary to obtain all construction related permits. Respondent represents that all tasks will be performed in accordance with generally acceptable professional standards and further represents that the advice and consultation provided shall be within its authority and capacity as a professional. Respondent will comply with the regulations, laws, ordinances and requirements of all governmental impact applicable to assigned project.
- ❖ The successful firm will provide a rendering of the proposed boardwalk, bridge and fishing piers to the County for approval.
- ❖ The successful firm will prepare a design/build schedule to meet the needs and expectations of the County.
- ❖ Provide complete plans and specifications to meet the County's permit requirements sealed by registered architect or engineer, as required.

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Proposal Submission Requirements

- ❖ A cover letter.
- ❖ The firm's qualifications and experience with this type of work.
- ❖ A comprehensive description of the team's approach to the design/build project including transition from design to construction.
- ❖ Detailed information regarding the team's experience with at least five (5) boardwalk and fishing pier projects, including project descriptions and photographs.
- ❖ References for work of a similar scope, including at least five (5) owner references.
- ❖ An estimate of the time required to complete the scope of services described above.
- ❖ A method to demonstrate the firm's ability to work within the County's proposed project budget.
- ❖ Cost proposal which includes detailed fees for all design services and a detailed price for the construction portion which breaks down cost for fishing piers, boardwalk and bridge separately.
- ❖ A conceptual drawing of the boardwalk design proposed.

Firms are requested to submit five (5) copies of the proposal. **Due to time limitations of the Selection Committee Members, proposals should be limited to twenty (20) single-sided pages using 12-pitch font.** Include tab dividers for access to each of the proposal requirements for easy identification of the proposal (cover sheet and tab dividers do not count toward the 20-page limit).

All materials submitted shall become property of the County.

All questions pertaining to this RFP must be submitted in writing by e-mailing pfletcher@florenceco.org no later than 5:00 p.m. (EST) on Thursday, September 8, 2016. Only written questions will be considered formal.

Evaluation Criteria and Selection Procedure:

The County has formed a selection committee to review the proposals, conduct interviews with the highest ranking firm(s) and to recommend a selection.

1. Phase 1 – Written Proposal Evaluation

Each submittal proposal will be evaluated and ranked based on the following criteria:

EVALUATION CRITERIA:

- A. **Previous experience with similar design/build projects** – Demonstration of expertise, specialized experience or technical expertise of the firm with these type of services to be provided and complexity of the project; familiarity of and number of such projects and references from each. Must include at least five (5) similar projects with references. (30 points).
- B. **Proposed approach to project**-Firm's objectivity and creativity in design; familiarity of the firm with the type of

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problems applicable to the project and degree of understanding of objectives and problems; conformance to RFP terms and conditions; completeness and clarity of proposal. (10 points).

- C. **Proposed schedule/time of completion**-Ability of firm to initiate the project within a short time frame of the County's award of the contract and to complete the project within six months of contract award; capacity of firm to perform the work within time limitations taking into consideration the current and planned workload of the firm; firm's plan of how to deal with unforeseen problems or delays; and firm's financial capability to carry out this project. (10 points).
- D. **Project Manager and Team Experience with Similar Work**- Demonstration of expertise, specialized experience or technical expertise of the personnel who will be providing the services on this project in at least three (3) similar projects. (30 points).
- E. **Proposed Cost of the project.** (20 points). Cost proposal must detail proposed fees for engineering, permitting, and construction. Please provide a cost for each fishing pier and bridge.

Criteria	Percentage
A. Previous Experience with similar design/build projects	30 points
B. Proposed Approach to Project	10 points
C. Proposed Schedule/Time of Completion	10 points
D. Project Manager and Team Experience with Similar Work	30 points
E. Proposed Cost of the Project	20 points

Based upon the evaluation results, the selection committee MAY request oral/visual interviews with the three (3) highest ranking firms. If the selection committee does not request oral/visual interviews, the final selection will be based on the grading of the written proposals. The Phase II interview evaluation is a completely optional tool in the selection process.

2. Phase 2 – Interview Evaluation (if necessary)

Each interview will be evaluated based on the following criteria:

Criteria	Percentage
A. Quality of Interview	100 points

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If the Phase II interview evaluation process is requested by the selection committee, the selection of the successful proposer and the recommendation to Council will be based on the quality of the interview.

The County shall have sole discretion in evaluating proposals. The County reserves the right to select the company that it determines to be in the best interest of the County. The County also reserves the right to reject any and all proposals, including that of the selected firm if satisfactory contract negotiations cannot be concluded.

Taxes

Florence County pays SC Sales Taxes in the amount of 8%. However, the County is exempt from Federal Excise Taxes and will issue exemption certificates, if requested. **INCLUDE ALL APPLICABLE TAXES IN YOUR LUMP-SUM PROPOSAL COSTS.**

Iran Divestment Act- Certification (Jan 2015):

The Iran Divestment Act List is a list published by the Board pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. Currently, the list is available at the following URL: http://procurement.sc.gov/PS/20150105_SC_IDA_List-Final.pdf Section 11-57-310 requires the government to provide a person ninety days written notice before he is included on the list. The following representation, which is required by Section 11-57-330(A), is a material inducement for the State to award a contract to you. (b) By signing your Offer, you certify that, as of the date you sign, you are not on the then-current version of the Iran Divestment Act List. (c) You must notify the Procurement Officer immediately if, at any time before posting of a final statement of award, you are added to the Iran Divestment Act List. [02-2A077-1]

Employee Verification Per The South Carolina Illegal Immigration Reform Act

By entering into this Agreement, the Design Team hereby certifies to the County that it will verify the employment status of any new employees, and require any consultants or sub-consultants performing services hereunder to verify any new employees status, per the terms of the South Carolina Illegal Immigration Reform Act, and as set out in Title 41, Chapter 8 of the Code of Laws of South Carolina, 1976.

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General Terms and Conditions

1) RECEIPT AND OPENING OF SEALED PROPOSALS:

- a) Sealed proposals will be received and opened as specified in this RFP document.
- b) The County will consider as non-responsive any proposal not prepared and submitted in accordance with the provisions hereof and may waive any informality or reject any and all proposals. Any proposal may be withdrawn prior to the above scheduled time for the opening of proposals or authorized postponement thereof. Any proposal received after the time and date specified shall not be considered. No responder may withdraw a proposal within 120 days after the actual date of the opening thereof or as provided for in the RFP documents whichever is later.

2) PREPARATION OF PROPOSAL:

- a) All proposals will be evaluated in accordance with procedures and specifications contained herein and Florence County Code. The responsiveness to same determined in accordance to the instructions and criteria in this document. Any proposal not providing sufficient information and documentation to comply with the RFP Evaluation requirements will be considered non-responsive and removed from further consideration.
- b) A proposal shall be made in the official name of the firm or individual under which business is conducted (showing the official business address) and must be signed in ink by a person duly authorized to legally bind the person, partnership, company, or corporation submitting the proposal.
- c) All information shall be in ink or typewritten.
- d) Five (5) copies of each proposal must be submitted in a sealed envelope with the RFP # for which the response is submitted. The submitted responder is required to have printed on the envelope or wrapping containing his proposal: responder business name and address, the proposal title, proposal number. If forwarded by mail, the sealed envelope containing the proposal must be enclosed in another envelope. Florence County shall not be responsible for unidentified proposals.
- e) Responders mailing their proposal must allow a sufficient mail delivery period to insure timely receipt of their proposal. Florence County is not responsible for proposals delayed by mail and/or delivery services of any nature. It is the responder's sole responsibility to insure that all documents are received by person (or office) at the time indicated in the proposal document. No facsimile or email submissions will be accepted.
- f) Responders must clearly mark as "Confidential" each part of their offer which they consider proprietary information that could be exempt from disclosure under Section 30-4-40, Code of Laws of South Carolina, 1976 as amended (Freedom of Information Act). If any part is designated as "confidential", there must be attached to that part an explanation of how this information fits within one or more categories listed in Section 30-4-40. Florence County reserves the right to determine whether this information should be exempt from disclosure and no legal action may be brought against Florence County or his agents for its determination in this regard.
- g) Each responder shall acknowledge receipt of all addenda by its submission of a proposal. It shall be each responder's responsibility to assure that all addenda have been received. No claim for failure to receive addenda will be considered.

3) RESPONDER QUALIFICATIONS:

To be acceptable to the County, responders must be skilled and/or licensed, if applicable, in the class of work on which they respond, and no proposal will be considered from any responder who is unable to show that he has actually performed considerable work of similar character to that on which he is responding.

4) EXECUTION OF CONTRACT:

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The responder to whom an award is made shall deliver to the County a Certificate of Insurance and the performance/payment bonds prior to execution of the contract. Once the contract is executed, the County shall issue a "Notice to Proceed" indicating the start date of the project. Responders failing to enter the proposed contract and/or provide the required Certificate of Insurance and the performance/payment bonds may be subject to Debarment and Suspension as prescribed in the Florence County Code from future consideration for award of contracts.

- 5) **PAYMENT AND PERFORMANCE BONDS:** The contractor will be required to provide a payment and performance bond in the amount of 100% of the total contract amount. The bonds shall be provided upon verbal of award and prior to execution of the final contract.

6) **TERM OF CONTRACT AND CONTRACT DOCUMENTS:**

- a) The contract documents that will form the contract shall include:

The Complete Request for Proposals

All Addenda

The Successful Responder's Submitted Proposal Document

Notice of Award (Verbal or Written)

Executed Contract

Purchase Order

Insurance Certification

- b) Proposals submitted must be in a form suitable for incorporation, verbatim, into the contract.

- c) No written contract may be assigned, sublet, or transferred without the written consent of the County Administrator.

7) **ORDER OF PRECEDENCE**

In the event of inconsistent or conflicting provision of this request for proposals and referenced documents, the following descending order of precedence shall prevail: (1) Florence County Procurement Ordinance, as amended (2) General Terms and Conditions, (3) the Specifications, (4) Instructions to Responders and Vendor Agreements (5) Other provisions of the contract whether incorporated by reference or otherwise, and (6) Proposal Announcement/Advertisement.

8) **INSURANCE AND BONDS:**

The successful responder shall procure, maintain, and provide proof of, insurance coverage for injuries to persons and/or property damage as may arise from or in conjunction with, the work performed on behalf of the County by the responder, his agents, representatives, employees or subcontractors. Proof of coverage as contained herein shall be submitted within ten (10) days after the County has provided a verbal notice of award and such coverage shall be maintained by the Responder for the duration of the contract period.

a. General Liability

Coverage shall be broad as: Comprehensive General Liability endorsed to include Broad Form, Commercial General Liability form including Products/Completed Operations.

1. Minimum Limits

General Liability:

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\$1,000,000 General Aggregate Limit

\$1,000,000 Products and Completed Operations

\$1,000,000 Personal and Advertising Injury

\$1,000,000 Each Occurrence Limit

\$50,000 Fire Damage Limit

\$5,000 Medical Expense Limit

b. Automobile Liability

Coverage sufficient to cover all vehicles owned, used, or hired by the Responder, his agents, representatives, employees or subcontractors.

1. Minimum Limits

Automobile Liability:

\$1,000,000 Combined Single Limit

\$1,000,000 Each Occurrence Limit

\$5,000 Medical Expense Limit

c. Workers' Compensation

Limits as required by the Workers' Compensation Act of SC, Employers Liability, \$1,000,000.

d. Owners' and Contractors' Protective Liability (if applicable)

Policy will be in name of County. Minimum limits required are \$1,000,000.

e. Professional Liability (if applicable)

Minimum limits are \$1,000,000 per occurrence.

f. Coverage Provisions

1. All deductibles or self-insured retention shall appear on the certificate.
2. Florence County shall be added as additional insured. This provision does not apply to Professional Liability or Workers' Compensation/Employers' Liability.
3. The responder's insurance shall be primary over any applicable insurance or self-insurance maintained by the County.
4. Shall provide 30 days written notice to the County before any cancellation, suspension, or void of coverage in whole or part, where such provision is reasonable.
5. All coverage for subcontractors of the responder shall be subject to all of the requirements stated herein.
6. All deductibles or self-insured retention shall appear on the certificate and shall be subject to approval by the County. At the option of the County, either the insurer shall reduce or eliminate the deductible

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or self-insured retention; or the responder shall be required to procure a bond guaranteeing payment of losses and related claims expense.

7. Failure to comply with any reporting provisions of the policy shall not affect coverage provided the County, its officers/officials, agents, employees and volunteers.
8. The insurer shall agree to waive all rights of subrogation against the County, its' officers/officials, agents, employees or volunteers for any act, omission, or condition of premises which the parties may be held liable by reason of negligence.
9. The responder shall furnish the County certificates of insurance including endorsements affecting coverage. The certificates are to be signed by a person authorized by the insurance company to bind coverage on its' behalf, if executed by a broker, notarized copy of authorization to bind, or certified coverage must be attached.

9) RIGHT TO INCREASE OR DECREASE THE AMOUNT OF WORK:

The County reserves the right to increase or decrease the amount of work under the Contract at the unit prices quoted in the proposal received from the successful responder (if applicable).

10) LAW AND REGULATIONS:

- a) The responder's attention is directed to the fact that all applicable Federal, State and Local laws, statutes, ordinances, and the rules and regulations of all authorities having jurisdiction over the project shall apply to the contract and the project throughout, and they will be deemed to be included in the contract the same as though herein written out in full.
- b) The responder's attention is directed to the fact that all proposals will comply as prescribed under the most current Florence County Code.

11) METHOD OF AWARD:

- a) Contracts will be awarded to the responder whose proposal appears to serve the best interest of the County. The successful responder will be determined as prescribed herein this document.
- b) Florence County reserves the right to accept or reject, in whole, in part, together or separately, any and all responses as appears in its judgment to be in the best interests of the County, or to waive any and all technicalities and informalities in determining the action of each proposal.

12) OBLIGATION OF RESPONDER:

- a) At the time of the opening of proposals, each responder will be presumed to have inspected the site, if applicable, and to have read and to be thoroughly familiar with the Documents (including all addenda). The failure or omission of any responder to examine any form, instruction or document shall in no way relieve any responder from any obligation in respect to this RFP.

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Vendor Agreements

1. STATEMENT OF RIGHTS

Florence County reserves the right to obtain clarification or additional information necessary to properly evaluate a proposal. Vendors may be asked to give a verbal presentation of their proposal after submission. Failure of vendor to respond to a request for additional information or clarification could result in rejection of that vendor's proposal. Florence County reserves the right to accept or reject any and all proposals, in whole or in part, separately or together, with or without cause; to waive technicalities in submissions, to secure a project that is deemed to be in the best interest of the County. Florence County also reserves the right to make purchases outside of the awarded contracts where it is deemed in the best interest of the County.

2. GENERAL TERMS

Each responder by submitting a response to Florence County as a result of this RFP, agrees to and acknowledges its acceptance of and agreement with the procedures outlined below and the terms, conditions and requirements of the applicable Florence County RFP document. Agreement is evident by the submission of a response to Florence County. If a vendor cannot agree to these terms, or violates these procedures, the response will be judged non-responsive and not considered. If the procedures are violated during the evaluation process or prior to the issuance of a contract by Florence County, the offer of the firm in question will be void and Florence County will procure the goods/services in question from other eligible vendors.

3. SPECIFIC TERMS:

- a) Any deviation from specifications in the proposal solicitation must be clearly pointed out; otherwise, it will be considered that the items offered are in strict compliance with these specifications, and the successful responder will be held responsible therefore. Unless otherwise stated, it is understood and agreed that any item offered or shipped on this proposal shall be new and suitable for storage or shipment, and that prices include standard commercial packaging and handling.
- b) Any attempt by a vendor to influence the opinion of the county staff, or County Council, by discussion, promotion, advertising or any procedure to promote their offer, will constitute grounds to judge such an offer non-responsive. All offers presented to Florence County will be evaluated based on the current County Code and the offer as presented to the county on the date/time specified in the given solicitation.
- c) Florence County reserves the right to make periodic inspections of the manner and means the service is performed or the goods are supplied.
- d) All vendors are informed that the Procurement Officer may exercise the County's option to extend the contract and/or purchase order under the provisions of County Code should such extension be mutually agreeable between the County and the selected vendor.
- e) The Responder agrees to secure at Responder's own expense all personnel necessary to carry out Responder's obligations under this Proposal. Such personnel shall not be deemed to be employees of the County nor shall they or any of them have or is deemed to have any direct contractual relationship with the County. The County shall not be responsible for withholding taxes with respect to the Responder's compensation hereunder. Responder shall not hold himself out as an employee of the County, and shall have no power or authority to bind or obligate the County in any manner, except County shall make payment to Responder for services as herein provided. Responder shall obtain and maintain all licenses and permits required by law for performance of this contract by him. The Responder shall have no claim against the County hereunder or otherwise for vacation pay, sick leave, retirement benefits, social security, worker's compensation, health or disability benefits, unemployment insurance benefits, or employee benefits of any kind. State or Federal governments,

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including but not limited to Social Security, workmen's compensation, Employment Security, sales or use tax and any other taxes and licenses or insurance premiums required by law. The County shall pay no employee benefits or insurance premiums of any kind to or for the benefit of Responder or his employees, agents, and servants by reason of this contract.

- f) The responder will act in an independent capacity and not as officers or employees of the County. The vendor shall indemnify, defend and hold harmless Florence County, its officers, agents and employees from liability and any claims, suits, judgments, and damages of any nature brought because of, arising out of, or due to breach of the agreement by Vendor, its subcontractors, suppliers, agents, or employees or due to any negligent act or occurrence or any omission or commission of Vendor, its subcontractors, suppliers, agents, or employees.
- g) The successful vendor shall indemnify and hold harmless Florence County, its officers, agents and employees from all suits or claims of any character resulting from patent, trademark or copyright infringement or accidents/injury at any point in the delivery of goods/services.
- h) It is the responsibility of the prospective responder to review the entire request for proposals packet and to notify the Procurement Department if the specifications are formulated in a manner that would unnecessarily restrict competition. Any such protest or question regarding the specifications or responding procedures must be received by the Procurement Department not less than five (5) days prior to the time set for proposal opening. These requirements also apply to specifications or instructions that are ambiguous.
- i) Should any vendor fail to perform or comply with any provision or terms and conditions of any documents referenced and made part hereof, Florence County may terminate this contract, in whole or in part, and may consider such failure or non-compliance a breach/default of contract. The County reserves the right to purchase any/all items or service in default on the open market. By submittal of a response, all vendors agree to this provision. No additional responses will be considered from a firm in default until the default expenses are paid. No principals of a defaulting firm may submit a response under another organization or individual name until their previous default is settled.
- j) Florence County may terminate this agreement with or without cause at any time. In the event of termination by either party, uncontested fees due for services satisfactorily performed or goods accepted prior to the termination shall be paid.
- k) Unless specifically requested, submit five (5) copies of your response.
- l) All submittals become the property of Florence County.
- m) All proposals (and supporting documents) will be retained by Florence County for a period of one hundred twenty (120) days from the date the proposals are opened, and no proposal shall be received nor shall any responder be allowed to withdraw a proposal after the opening hour commences.
- n) S.C. LAW CLAUSE: Upon award of a contract or Purchase Order under this proposal, the person, partnership, association, or corporation to whom the award is made must comply with the laws of South Carolina, which require such person or entity to be authorized and/or licensed to do business in this state. Notwithstanding the fact that applicable statutes may exempt or exclude the successful responder from requirements that it be authorized and/or licensed to do business in this state, by submission of this signed proposal, the responder agrees to subject itself to the jurisdiction and process of the courts of the State of South Carolina, to all matters and disputes arising or to arise under the contract and performance thereof, including any questions as to the liability for taxes, licenses, or fees levied by the State.

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PAYMENT BOND REQUIREMENT

A Payment Bond must be submitted to the County by the successful responder ("Contractor") once it has been awarded the contract. Payment Bonds encompass the prime Contractor's obligation to pay subcontractor and others for material and labor used in the project. A Payment Bond guarantees that the Contractor will pay certain bills for labor and materials (including those from subcontractors and suppliers), which are associated with the subject contract. The Payment Bond requirement helps assure that the Contractor provides suitable evidence of its financial condition and ability to complete the project without financial difficulty.

For all contracts submitted with costs exceeding thirty thousand dollars (\$30,000.00), a Payment Bond in the amount of one hundred percent (100%) of the contract price must be submitted by the Contractor with the proposed contract to the County. Failure to satisfy this Payment Bond requirement will result in the Contractor being considered non-responsive and possibly removed from consideration for award of future County contracts. Payment Bond guaranty options are discussed below.

PAYMENT BOND GUARANTY OPTIONS:

For all contracts submitted with costs exceeding thirty thousand dollars (\$30,000.00), a Payment Bond guaranty in the amount of one hundred percent (100%) of the contract price must be submitted by the Contractor with the proposed contract to the County. This Payment Bond requirement can be satisfied utilizing one of the two options below:

(1) Option A:

The Contractor with the executed contract must submit a Payment Bond in the required amount discussed above and executed by a corporate surety licensed under the laws of this state. Contractors not meeting this requirement must furnish an alternative Payment Bond Guaranty as discussed in Option B below.

(2) Option B:

For all Contractors not meeting the criteria of "Option A" above, a deposit in the amount of one hundred percent (100%) of the contract price must be submitted by the Contractor with the proposed contract to the County. This deposit shall take the form of a certified check or a cashier's check deposited with the County. An irrevocable standby letter of credit issued by the bank is an acceptable alternate. **PERSONAL OR COMPANY CHECKS DO NOT MEET THIS REQUIREMENT.** Failure of the Contractor to satisfactorily fulfill its obligations under the subject contract shall result in the forfeiture of this deposit.

One of the above requirements must be met and submitted by the successful Contractor with its proposed contract to the County. Failure to satisfactorily fulfill its obligations under the subject contract shall result in the forfeiture of the Payment Bond guaranty.

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PERFORMANCE BOND REQUIREMENT

A Performance Bond must be submitted to the County by the successful responder ("Contractor") once it has been awarded the contract. The Performance Bond insures that the project will be completed even if the prime Contractor defaults or abandons the project. A Performance Bond guarantees contract performance by the Contractor, according to the contract specifications, terms and conditions. The Performance Bond requirement helps assure that the Contractor provides suitable evidence of its financial condition and ability to complete the project without financial difficulty.

For all contracts submitted with costs exceeding thirty thousand dollars (\$30,000.00), a Performance Bond in the amount of one hundred percent (100%) of the contract price must be submitted by the Contractor with the proposed contract to the County. Failure to satisfy this Performance Bond requirement will result in the Contractor being considered non-responsive and possibly removed from consideration for award of future County contracts. Performance Bond guaranty options are discussed below.

PERFORMANCE BOND GUARANTY OPTIONS:

For all contracts submitted with costs exceeding thirty thousand dollars (\$30,000.00), a Performance Bond Guaranty in the amount of one hundred percent (100%) of the contract price must be submitted by the Contractor with the proposed contract to the County. This Performance Bond guaranty requirement can be satisfied utilizing one of the two options below:

(3) Option A:

The Contractor with the executed contract must submit a Performance Bond in the required amount discussed above and executed by a corporate surety licensed under the laws of this state. Contractors not meeting this requirement must furnish an alternative Performance Bond Guaranty as discussed in Option B below.

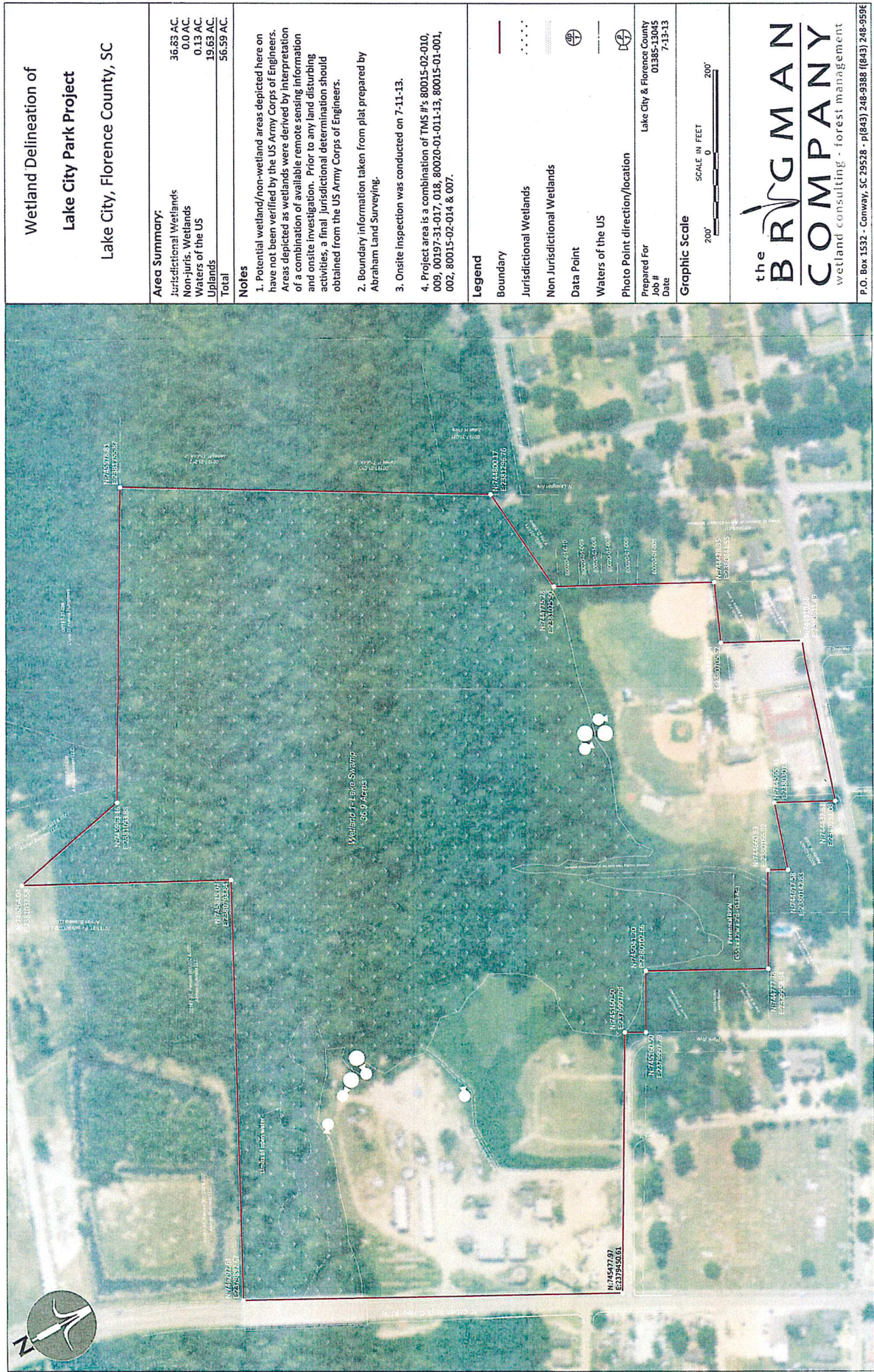
(4) Option B:

For all Contractors not meeting the criteria of "Option A" above, a deposit in the amount of one hundred percent (100%) of the contract price must be submitted by the Contractor with the proposed contract to the County. This deposit shall take the form of a certified check or a cashier's check deposited with the County. An irrevocable standby letter of credit issued by the bank is an acceptable alternate. **PERSONAL OR COMPANY CHECKS DO NOT MEET THIS REQUIREMENT.** Failure of the Contractor to satisfactorily fulfill its obligations under the subject contract shall result in the forfeiture of this deposit.

One of the above requirements must be met and submitted by the successful Contractor with its proposed contract to the County. Failure to satisfactorily fulfill its obligations under the subject contract shall result in the forfeiture of the Performance Bond Guaranty.

DESIGN/BUILD SERVICES-BOARDWALK, BRIDGE AND FISHING PIERS
LAKE CITY PARK PROJECT
REQUESTS FOR PROPOSALS NO. 03-16/17

APPENDIXES



Wetland Delineation of

Lake City Park Project

Lake City, Florence County, SC

Area Summary:

Jurisdictional Wetlands	36.83 AC.
Non-juris. Wetlands	0.0 AC.
Waters of the US	0.13 AC.
Uplands	19.63 AC.
Total	56.59 AC.

Notes

1. Potential wetland/non-wetland areas depicted here on have not been verified by the US Army Corps of Engineers. Areas depicted as wetlands were derived by interpretation of a combination of available remote sensing information and onsite investigation. Prior to any land disturbing activities, a final jurisdictional determination should be obtained from the US Army Corps of Engineers.
2. Boundary information taken from plat prepared by Abraham Land Surveying.
3. Onsite inspection was conducted on 7-11-13.
4. Project area is a combination of TMS #'s 80015-02-010, 009, 00197-31-017, 018, 80020-01-011-13, 80015-01-001, 002, 80015-02-014 & 007.

Legend

- Boundary
- Jurisdictional Wetlands
- Non Jurisdictional Wetlands
- Data Point
- Waters of the US
- Photo Point direction/location

Prepared For
Lake City & Florence County
Job #
01385-13045
Date
7-13-13

Graphic Scale



the **BRIGMAN**
COMPANY
wetland consulting - forest management

P.O. Box 1532 - Conway, SC 29528 • p(843) 248-9388 f(843) 248-9596

the
BRIGMAN COMPANY
wetland consulting forest management

July 24, 2013

Mr. Josh Mitchell
Regulatory Project Manager
U.S. Army Corps of Engineers
1949 Industrial Park Road, Room 140
Conway, SC 29526



RE: Lake City Park (Proposed)
Florence County, South Carolina

Dear Mr. Mitchell:

On behalf of Florence County Administrators Office, we are pleased to submit this request for verification for the wetland determination/delineation conducted by our office on the above referenced project and secure a "No Permit Required" acknowledgement for the construction activities proposed within the wetlands. This letter summarizes our findings and approach.

Background:

Florence County Administrator's Office is planning to construct passive park within the city limits of Lake City, South Carolina. The project area contains [56.59 acres] and is situated east of and adjacent to the intersection of North Church Street (S.C. Highway 378) and Park Avenue in Lake City, South Carolina. (See Vicinity Map). Historically, portions of the site have been utilized as a municipal landfill, waste water treatment facility, public works facility and recreation. The proposed improvements within the non-wetland areas include play areas, picnic areas and an education garden with attendant features such as parking, walking paths, shelters and playground equipment. Proposed improvements within the wetland area include the excavation of a lake to a depth of 6'-8' within the margin of the wetland occurring onsite. Additionally, they are planning to construct of a raised boardwalk through the wetland that will connect to walking paths throughout the upland portions of the park. All of the proposed improvements are reflected on the attached Lake City Park Conceptual Plan.

We were contracted to identify and delineate waters of the United States, including wetlands, occurring within the limits of the subject property. The purpose for the delineation was to insure that the proposed improvements would not result in the deposition of dredge or fill material in wetlands. For the proposed activities occurring within the limits of wetlands, we have developed a construction methodology to insure the soil disturbance is limited to "incidental fallback" as defined in the "Tullock II" case.

Page 2
Mr. Mitchell

Construction Methodology:

Proposed Lake

- Step 1: Erect heavy duty silt fence around perimeter of Proposed Lake to minimize migration of sediments outside to construction area
- Step 2: Install double turbidity barrier at confluence of open water portion of Lake Swamp and Proposed Lake to minimize degradation of water quality.
- Step 3: Identify all specimen trees (24" diameter at breast height and greater) occurring within the limits of proposed lake and erect heavy duty silt fence at drip line to protect/favor during construction.
- Step 4: Remove vegetation from the ground line utilizing low ground pressure feller-buncher to minimize soil disturbance.
- Step 5: Place double mats for initial reach and install sump per the attached detail to commence the dewatering process. (Excavated material shall be de-water to insure that only small volumes of material are re-deposited during the excavation process.)
- Step 6: Commence excavation process utilizing excavator with a 2-3 yard bucket to remove remaining biomass and earthen material and deposit in a solid box hauling unit. Excavated material shall be transported and deposited into an upland disposal area onsite. Suitable material shall be utilized onsite to facilitate construction of proposed upland improvements. (Step 5 and 6 shall be repeated until construction of proposed lake is complete.)
- Step 7: The final step shall be the completion of the reach separating the existing open water portion of Lake Swamp with the proposed lake.

Proposed Raised Boardwalk:

- Step 1: Alignment of raised boardwalk through wetlands shall meander around trees to the greatest degree possible to minimize disturbance.
- Step 2: Any vegetation removed to facilitate construction of boardwalk shall be performed by hand and be limited to above the ground line.
- Step 3. Raised boardwalk shall be constructed on posts/pilings to insure compliance with Regulatory Guidance Letter 90-08 (See attached)

Page 3
Mr. Mitchell

Wetland Delineation Verification and No Permit Required (NPR) Acknowledgement Request:

TBC, acting as agents for Florence County Administrator's officer, hereby requests that the wetland determination/delineation conducted by our office be audited and a letter of verification is issued, providing that it meets with your approval. Along with a Request for Verification Form, we are providing the following information:

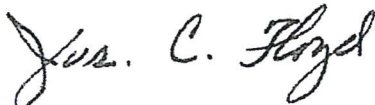
- Vicinity Map
- Soil Survey
- USGS Topographic Map
- National Wetland Inventory
- Preliminary Wetland Delineation Map
- Determination Data Forms
- Representative Photographs of Existing Conditions

Additionally, we are seeking a NPR acknowledgement of the proposed construction methodology for the lake and raised boardwalk. To facilitate your review and approval of this request we have attached the following supplementary information:

- Overall Plan View (figure 1)
- Plan View (figure 2)
- Work Plan (figure 3)
- Section View (figure 4)
- RGL 90-8

Please notify me at your earliest convenience in order to schedule an audit of the established wetland boundary. Should you have any questions or require additional information, please advise.

Sincerely,



Joseph C. Floyd
Project Manager

Enclosures

cc: Suzanne King- Florence County Assistant Administrator

M:\Forms\CORPCOVLETR\01385-13045c



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
1949 Industrial Park Road, Room 104
Conway, South Carolina 29526

NOV 15 2013

Regulatory Division

Mr. K.G. Smith, Jr.
Florence County Administrator
c/o The Brigman Company
P.O. Box 1532
Conway, South Carolina 29528



Dear Mr. Smith:

This is in response to your recent letter wherein you inquired as to the necessity of obtaining a Department of the Army permit to excavate a recreational lake and construct a boardwalk at a location situated east of and adjacent to the junction of North Church Street (S.C. Highway 378) and Sylvan Street in the City of Lake City, Florence County, South Carolina. The project is depicted on sheets 1 through 4 of 4 of the plans submitted by the Brigman Company, dated July 30, 2013, and titled, "Lake City Park Project".

A review of the information provided indicates that the work will not involve work in a Navigable Water of the United States, nor will it entail the placement of fill material in wetlands/waters of the United States. Therefore, a Department of the Army permit is not required, and you may proceed with the project. However, you are cautioned that if the activities result in the movement of substantial amounts of material from one location to another in wetlands or other waters of the United States, then the activities may require a Department of the Army permit. For example, activities where the excavated material is sidcast into wetlands or other waters of the United States, activities that result in either the temporary or permanent stockpiling in wetlands or other waters of the United States, and mechanized landclearing activities in wetlands or other waters of the United States are regulated activities.

In future correspondence concerning this matter, please refer to SAC# 2003-26495-4I. You may need state or local assent. Prior to performing any work, you should contact the South Carolina Department of Health and Environmental Control, Bureau of Water. A copy of this letter is being forwarded to that agency for their information. The address for this agency is provided on the enclosed list for your convenience.

If you have any questions concerning this matter, please contact me at 843-365-4239.

Sincerely,

Tommy E. Fennel
Chief, Northeast Branch

Enclosures:
Project Plans

Copy Furnished:
South Carolina Department of
Health and Environmental Control
Bureau of Water
2600 Bull Street
Columbia, SC 29201

The site plan illustrates the proposed development of the former Naval Air Station. Key features include:

- Proposed Development Zones:**
 - Class Section A:** Located in the upper left, featuring a large open area with a stippled pattern.
 - Class Section B:** Located in the upper right, featuring a large open area with a stippled pattern.
 - Class Section C:** Located in the lower right, featuring a large open area with a stippled pattern.
 - Class Section D:** Located in the lower left, featuring a large open area with a stippled pattern.
- Proposed Infrastructure:**
 - Proposed Roadway:** A winding road running through the center of the site.
 - Proposed Runway:** A long, straight road running horizontally across the middle of the site.
 - Proposed Taxiway:** A short, straight road running vertically on the right side of the site.
 - Proposed Parking:** Several parking areas are indicated, including a large one in the lower left and smaller ones along the proposed roadway.
 - Proposed Building:** A large, rectangular building is shown in the lower right, adjacent to the proposed runway.
- Other Features:**
 - Proposed Landscaping:** Indicated by hatched areas along the proposed roadway and around the proposed building.
 - Proposed Utilities:** Various utility lines (water, sewer, gas, etc.) are shown running across the site.
 - Proposed Fencing:** A line of fencing is shown running along the perimeter of the site.

Application No.

Sheet 1 of 4

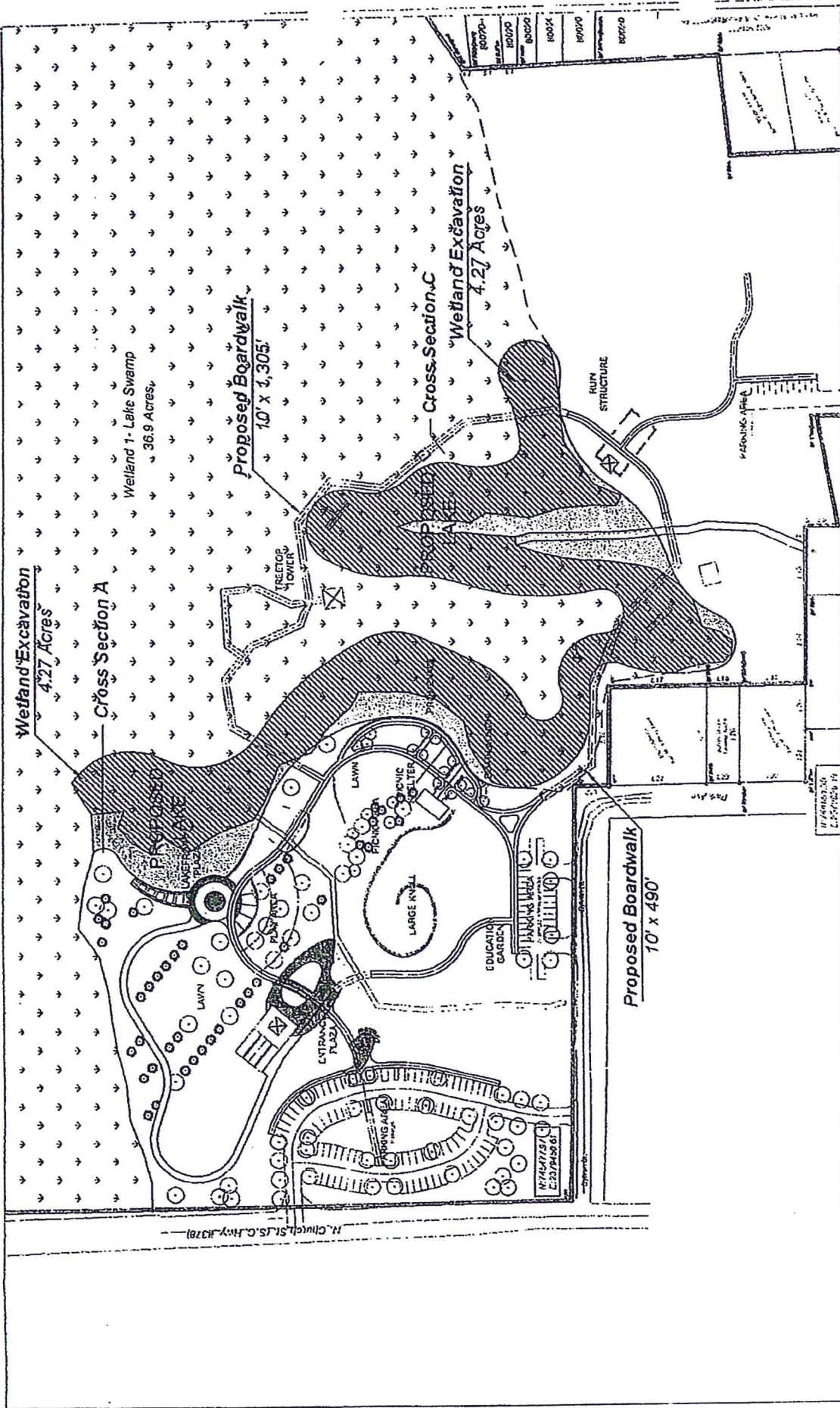
AFFLICANT: Florence Courty

FIGURE

FIGURE 7

SCALE IN FEET

Plan View



Lake City Park Project

Florence County

Date: 7-30-13

Date Revised:

Application No.

SAC # 2003-26495

Sheet 2 of 4

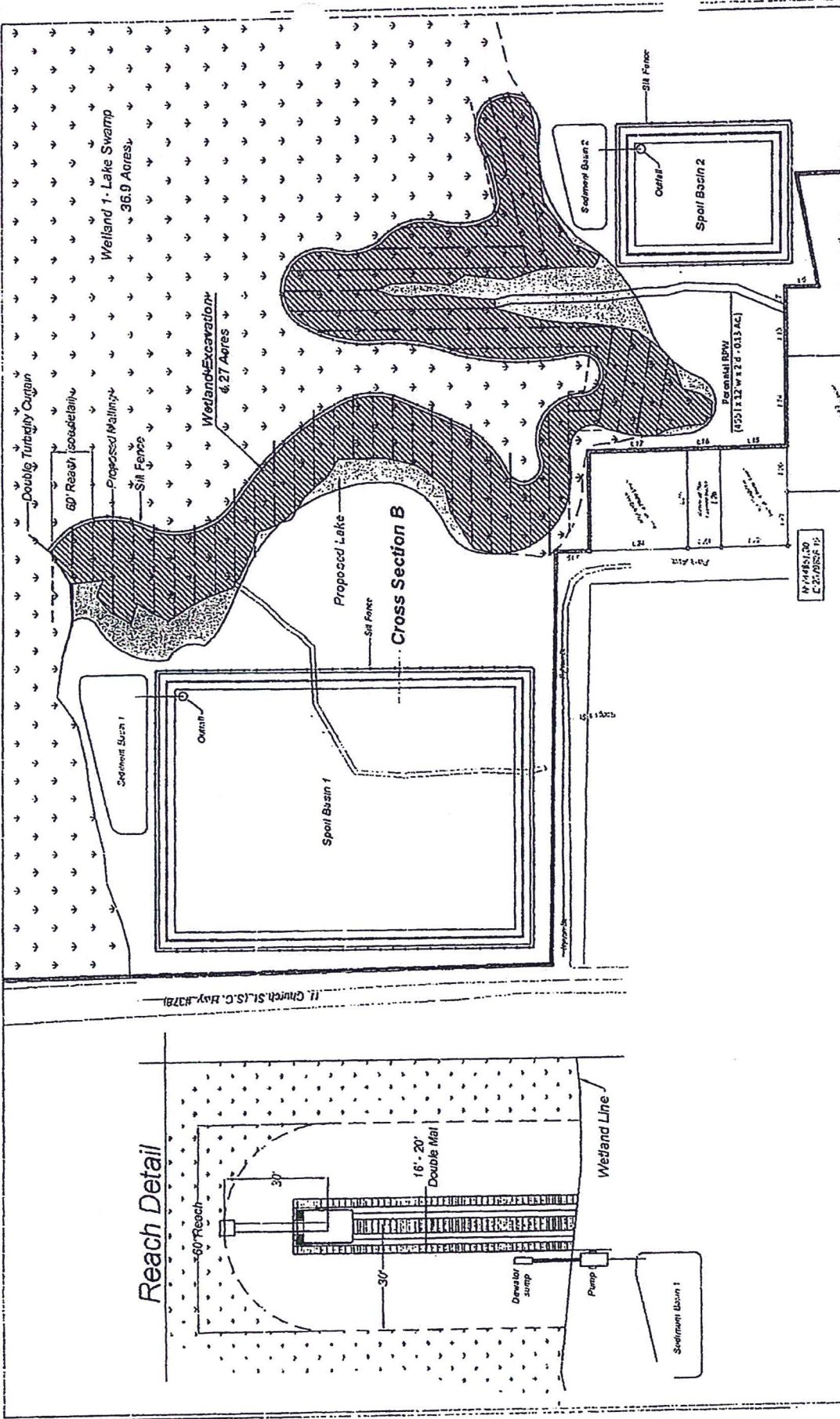
FIGURE 2

PROPOSED ACTIVITY: Excavation

APPLICANT: Florence County

SCALE IN FEET
200' 400'

Work Plan



Lake City Park Project

Florence County

Date: 7-30-13

Date Revised:

Application No.

PROPOSED ACTIVITY: Excavation

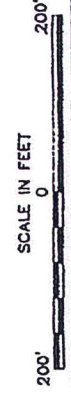
APPLICANT: Florence County



FIGURE

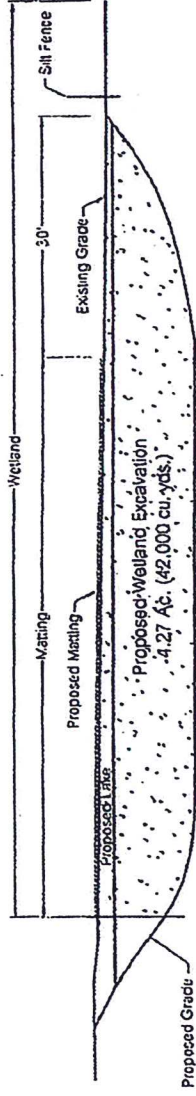
Sheet 3 of 4

SAC # 2003-26495

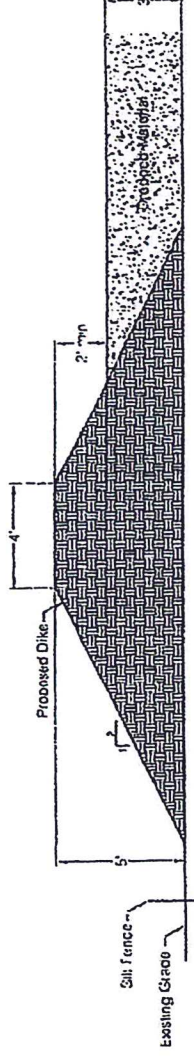


Section View

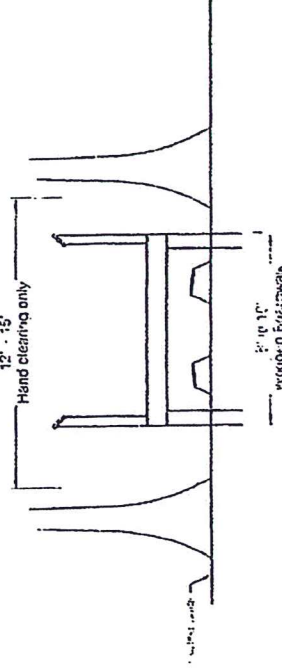
Cross Section A - Proposed Lake



Cross Section B - Spoil Basin Dike



Cross Section C - Boardwalk



PROPOSED ACTIVITY: Excavation
 APPLICANT: Florence County

Lake City Park Project

Florence County

Date: 7-30-13

Date Revised:

Application No.

SAC # 2003-26495

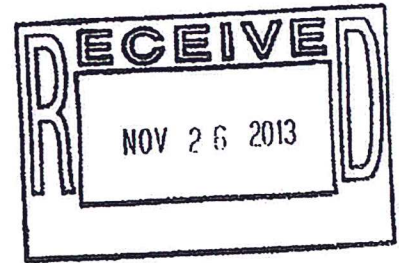
FIGURE

sheet 4 of 4

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION



A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): November 13, 2013

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:
KG Smith, Jr., Florence County Administrator, 180 North Irby Street, MSC-G,
Florence, South Carolina 29501

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Charleston District,
Lake City Park Project, SAC# 2003-26495-4I

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: The site is located east and adjacent to the junction of North Church Street (US Highway 378) and Sylvan Street in Lake City. The delineation is to determine the extent of jurisdictional, freshwater wetlands on the tract. The project involves excavating a small, recreational lake (4.27 acres) and the construction of raised, wooden boardwalks as amenities to a public park in Lake City. Total area of the tract reviewed is approximately 56.59 acres.

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: South Carolina County/parish/borough: Florence County

City: Lake City

Center coordinates of site (lat/long in degree decimal format): Lat. 33.875618° Long. -79.745552°.

Name of nearest waterbody: Lynches River

Identify (estimate) amount of waters in the review area:

Non-wetland waters: 0.13 acres.

Cowardin Class: PF01C

Wetlands: 36.83 acres.

Cowardin Class: PF01C

Name of any water bodies on the site that have been identified as Section 10 waters: N/A

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:

☒ Field Determination. Date(s): August 29, 2013

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply

- checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:

☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

☒ Office concurs with data sheets/delineation report.

☐ Office does not concur with data sheets/delineation report.

☐ Data sheets prepared by the Corps:

☐ Corps navigable waters' study:

☐ U.S. Geological Survey Hydrologic Atlas:

☐ USGS NHD data.

☒ USGS 8 and 12 digit HUC maps. HUC 03040202-06

☒ U.S. Geological Survey map(s). Cite scale & quad name: Scranton Quad.

☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Florence County Soil Survey, Page 90, .

☒ National wetlands inventory map(s). Cite name: PF01C.

☐ State/Local wetland inventory map(s):

☐ FEMA/FIRM maps:

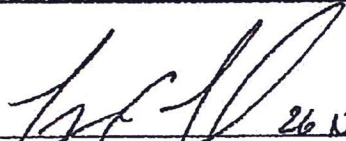
☐ 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)

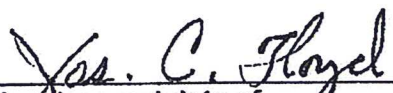
☐ Photographs: ☒ Aerial (Name & Date): SCDNR 2006 (99:11229:105)
or ☐ Other (Name & Date):

☐ Previous determination(s). File no. and date of response letter:

☐ Other information (please specify):

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.


26 Nov 2017
Signature and date of
Regulatory Project Manager


Signature and date of
person requesting preliminary JD

Site number	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
Open Water	33.877261	-79.747573	PF01C	0.13 acres	Section 404
Wetland	33.876866	-79.745539	PF01C	36.83 acres	Section 404

Report to be completed

Geotechnical Engineering Report

Lake City Elevated Walkway
Florence County, South Carolina

July 18, 2016

Terracon Project No. ER165013

Prepared for:

Florence County
Florence, South Carolina

Prepared by:

Terracon Consultants, Inc.
North Charleston, South Carolina

Offices Nationwide
Employee-Owned

Established in 1965
terracon.com

Terracon

Geotechnical ■ Environmental ■ Construction Materials ■ Facilities

July 18, 2016

Florence County
180 Nirby Street
Florence, SC 29501



Attn: Ms. Suzanne King
E: sking@florenceco.org

Re: Geotechnical Engineering Report
Lake City Elevated Walkway
Florence County, South Carolina
Terracon Project No. ER165013

Dear Ms. King:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. These services were performed in general accordance with our proposal number PER161075 dated June 3, 2016. This report provides our geotechnical findings and presents recommendations for foundation options for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please feel free to contact us at your convenience.

Sincerely,
Terracon Consultants, Inc.

A handwritten signature in black ink, appearing to read "W. J. Botts".

Will J. Botts, E.I.T.
Project Manager

A handwritten signature in black ink, appearing to read "Bryan T. Shiver".

Bryan T. Shiver, P.E.
Geotechnical Department Manager
SC Registration No. 27816



Reviewed by Bill Wright, P.E., Senior Consultant



Enclosures
cc: 1 – Client (PDF)
1 – File

Terracon Consultants, Inc. 1450 Fifth Street West North Charleston, South Carolina 29405
P [843] 884 1234 F [843] 884 9234 terracon.com

Geotechnical

Environmental

Construction Materials

Facilities

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APPENDIX A – FIELD EXPLORATION

- Exhibit A-1 — Site Vicinity Map
- Exhibit A-2 — Exploration Location Diagram
- Exhibit A-3 — Field Exploration Description
- Exhibit A-4 — Cone Penetration Test (CPT)
- Exhibit A-5 — Kessler Dynamic Cone Penetrometer (DCP) & Hand Auger Boring (HAB) Logs

APPENDIX B – SUPPORTING DOCUMENTS

- Exhibit B-1 — General Notes
- Exhibit B-2 — USCS

Geotechnical Engineering Report

Lake City Elevated Walkway ■ Florence County, South Carolina
July 18, 2016 ■ Terracon Project No: ER165013



EXECUTIVE SUMMARY

This report presents the results of our geotechnical evaluation performed for proposed Lake City Elevated Walkway to be constructed in Florence, SC. Our geotechnical scope of work for this project consisted of 4 Cone Penetration Tests (CPTs), 1 Seismic Cone Penetration Test (SCPT) and 4 Kessler Dynamic Cone Penetrometer Tests (DCPs) at select locations within the study area, associated engineering analysis, and the generation of this report.

This report provides geotechnical recommendations for foundation options, seismic considerations, and the other geotechnical related conditions that might affect the proposed construction. The following geotechnical considerations were identified during our investigation:

- Based upon our analysis and our experience with similar projects, the proposed boardwalk can be supported on 8 inch tip diameter timber piles.
- Since structural loads are not yet known, allowable capacities for 8 inch timber piles have been evaluated at different embedment depths below the existing ground surface.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT LAKE CITY ELEVATED WALKWAY FLORENCE COUNTY, SOUTH CAROLINA

Project No. ER165013

July 18, 2016

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the proposed Lake City Elevated Walkway in Florence County, South Carolina.

The project site was explored with 4 Cone Penetration Tests (CPTs), 1 Seismic Cone Penetration Test (SCPT) and 4 Kessler Dynamic Cone Penetrometer Tests (DCPs) to depths of approximately 5 to 36 feet below the existing ground surface. The testing logs, field exploration description, and the exploration location diagram are included in Appendix A of this report. The purpose of the study is to provide subsurface information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions
- foundation options
- other geotechnical design parameters

2.0 PROJECT INFORMATION

2.1 Project Description

ITEM	DESCRIPTION
Proposed Improvements	Based on the site plan provided by Florence County, we understand an elevated boardwalk will be built approximately 3,000 feet in length over the newly constructed pond.
Structural Loads	Structural loads are not yet known, as such, allowable capacities for 8 inch timber piles have been evaluated at different embedment depths below the existing ground surface. Capacity reductions due to liquefaction have not been considered in the pile design.
Grading	We are assuming the site will not receive any additional fill material to get the site on the designed grade.

2.2 Site Location and Description

ITEM	DESCRIPTION
Site Location	The project site is located in off of Highway 378 near its intersection with Charles Street in Lake City, Florence County, South Carolina.
Existing improvements	The site is currently cleared and a large pond was recently excavated onsite.
Current ground cover	Grass and marsh.
Existing topography	The site is relatively flat, however, the north area of the property is low lying and contains marsh and ponding water.

3.0 SUBSURFACE CONDITIONS

3.1 Typical Soil Profile

Based on the results of the field exploration, subsurface conditions on the project site can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum	Material Encountered ¹
Stratum 1	5 feet	Loose to Medium Dense Sand to Silty Sand
Stratum 2	10 feet	Medium Dense to Very Dense Sand
Stratum 3	11 feet	Medium Stiff to Stiff Clay & Silt Mixtures
Stratum 4	20 feet	Medium Dense to Dense Silty Sand to Sand
Stratum 5	36 feet (to termination depth of deepest CPT)	Medium Dense to Dense Silty Sand to Sandy Silt

1. Material descriptions are based on correlations with CPT data

Conditions encountered at each of the test locations are indicated on the individual logs. Details for each of the tests can be found on the records located in Exhibit A-4 in Appendix A of this report.

3.2 Groundwater

At the time of our exploration, the water table was estimated at a depth of 1 to 3 feet below the existing ground surface. The groundwater depths are estimated from CPT pore water pressure and measurements taken in the voids left from testing.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, tidal cycles, and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. The groundwater surface should be checked prior to construction to assess its effect on site work and other construction activities.

4.0 GEOTECHNICAL SEISMIC CONSIDERATIONS

4.1 Seismic Evaluation

According to the International Building Code 2012 edition (IBC 2012), structures are required to avoid collapse during a design earthquake event. The design earthquake has a 50 year exposure period with a 2% probability of exceedance (i.e. a 2500 year design earthquake). The 2500 year design earthquake has a Moment Magnitude (M_w) of 7.3 and a design Peak Ground Acceleration (PGA) of **0.62g**, as determined by data provided in the IBC 2012 Code. The seismic evaluation of the site identified potentially liquefiable soils. According to the IBC (2012) and ASCE 7-10, this potential for liquefaction classifies the site as Site Class F.

ASCE 7-10 (Section 20.3.1) provides an exception to the Site Class recommendation for structure(s) with a fundamental period equal to or less than 0.5 seconds. This exception states that a site can be classified without considering liquefaction to determine spectral accelerations for structural design. If the proposed structures meet the requirements of the exception Seismic Site Class D would be applicable and the following seismic design parameters can be used for the site:

Code Used	Site Classification
2012 International Building Code (IBC) ¹	D ²
Seismic Design Parameter	Value
F_a	1.10
F_v	1.72
F_{PGA}	1.00
S_{DS}	0.74 g
S_{D1}	0.39 g
PGA_M	0.62 g

1. In general accordance with the 2012 *International Building Code*, Table 1613.5.2.

2. Based upon the fundamental period exception outlined in ASCE 7-10 Section 20.3.1 and average weighted shear wave velocity of 999 ft/s collected at SCPT2. The structural engineer should verify that this assumption is valid for the planned structure.

4.2 Liquefaction Potential

Due to the high seismicity of the South Carolina coast, we performed a liquefaction potential analysis for the site to evaluate the stability of the subgrade soils. Ground shaking at the foundation of structures and liquefaction of the soil under the foundation are the principle seismic hazards to be considered in design of earthquake-resistant structures. Liquefaction occurs when a rapid buildup in water pressure, caused by the ground motion, pushes sand particles apart, resulting in a loss of strength and later densification as the water pressure dissipates. This loss of strength can cause bearing capacity failure while the densification can cause excessive settlement.

While the amount of settlement is dependent on the magnitude and distance from a seismic event, and geologic age of the soil deposit, we estimate that settlements from the design earthquake may range from **1 to 2 inches**. Differential settlement may range up to 50% to 100% of the total settlement depending on depth and amount of liquefaction, and location relative to a seismic event epicenter. However, we understand that the bridge will not be designed to withstand seismic forces. Therefore, downdrag loads due to liquefaction have not been considered in our design.

5.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

5.1 Timber Pile Foundation Recommendations

The proposed structure can be supported by 8 inch tip diameter timber piles meeting the requirements of ASTM D-25¹. Since structural loads are not yet known, allowable capacities for 8 inch timber piles have been evaluated at different depths as shown in the following table. Attempts to drive the pile past refusal condition may cause significant damage to the pile. Refusal can be considered at 30 blows per foot (4 blows per inch). A Factor of Safety (FOS) of 3 was used in our calculations which assume that no load tests will be performed on the piles. However, a drivability analysis should be performed to determine blow count criteria at termination depth.

¹ *Standard Specification for Round Timber Piles*

Geotechnical Engineering Report

Lake City Elevated Walkway ■ Florence County, South Carolina

July 18, 2016 ■ Terracon Project No: ER165013



Allowable Pile Capacities		
Pile Type	Pile Depth (ft)	Factored Capacity (kips)
8 inch tip Timber Pile	10	10.7
	14	12.2
	18	15.8
<ol style="list-style-type: none">1. Pile Factor Safety of 3 used in analysis.2. Structural pile capacities should be verified by the structural engineer.		

Lateral and uplift loads have not been evaluated for this report. Additionally, the walkway is not being design for seismic loadings. Therefore, down drag loads on the piles due to liquefaction have not been considered.

5.1.1 Driven Pile Installation

Based on our experience with similar projects, air or diesel hammers with a minimum rated energy of 15 to 20 kip-ft should be suitable for pile installation. Pre-augering will not be necessary. We recommend a minimum center to center pile spacing of 6 diameters to avoid group effects. Jetting of the piles should not be performed.

5.1.2 Driven Pile Foundation Quality Control

We recommend that at a minimum of four test piles be monitored during installation to evaluate hammer performance and blow counts. A hammer restrike should be performed on the test piles a minimum of a few hours after installation to determine final capacity and satisfactory number of blow counts. This wait period will account for the time dependent pile capacity gain (i.e. pile "setup" or "freeze"). If non-uniform subsurface conditions are discovered, and the blow count criteria is not meet at the termination depth, a PDA load test should be performed to verify capacity in accordance with ASTM D4945 Standard Test Method for High-Strain Dynamic Testing of Piles.

An engineering technician, supervised by a registered professional engineer, should monitor and document the installation of production piles. A pile driving record should be kept for each individual production pile. The individual pile driving records should have the following minimum information:

- Pile size and type
- Final pile embedment depth
- Pile tip and head elevation
- Pile installation date and time
- Pile blow counts per one (1) foot interval
- Relevant Hammer and Cushion Information

- Hammer Stroke
- Installation notes (as required)

5.1.3 Vibration Monitoring

Ground vibrations may be a concern to the existing adjacent structure(s). If they become a concern, vibrations should be monitored during pile driving operations. An engineering technician, supervised by a registered professional engineer, should conduct vibration monitoring in conjunction with pile installation monitoring. We recommend the criteria developed by U.S. Bureau of Mines, Research Investigation 8507 (USBM RI 8507) be used for this project. If pile driving vibrations exceed these criteria during installation, pile driving methods should be modified. Modifications can include stroke reduction or use of a hammer with a smaller rated energy.

If vibrations are monitored at the site, a pre-condition and post-condition survey should be performed on the buildings on-site and adjacent properties to document existing cracks and other significant defects on adjacent structures both before and after pile installation. The survey would involve photographic records and measurements of existing cracks as well as installation of crack monitoring devices. The surveys should extend a minimum of two to three pile lengths from the proposed pile driving.

6.0 GENERAL COMMENTS

The recommendations presented herein have been developed on the basis of the subsurface conditions encountered during the field investigation and our understanding of the proposed construction. Should changes in the project criteria occur or additional loading information becomes available, a review must be made by Terracon to determine if modifications to our recommendations will be required.

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during site preparations and grading, and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings/soundings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction.

If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

Geotechnical Engineering Report

Lake City Elevated Walkway ■ Florence County, South Carolina

July 18, 2016 ■ Terracon Project No: ER165013

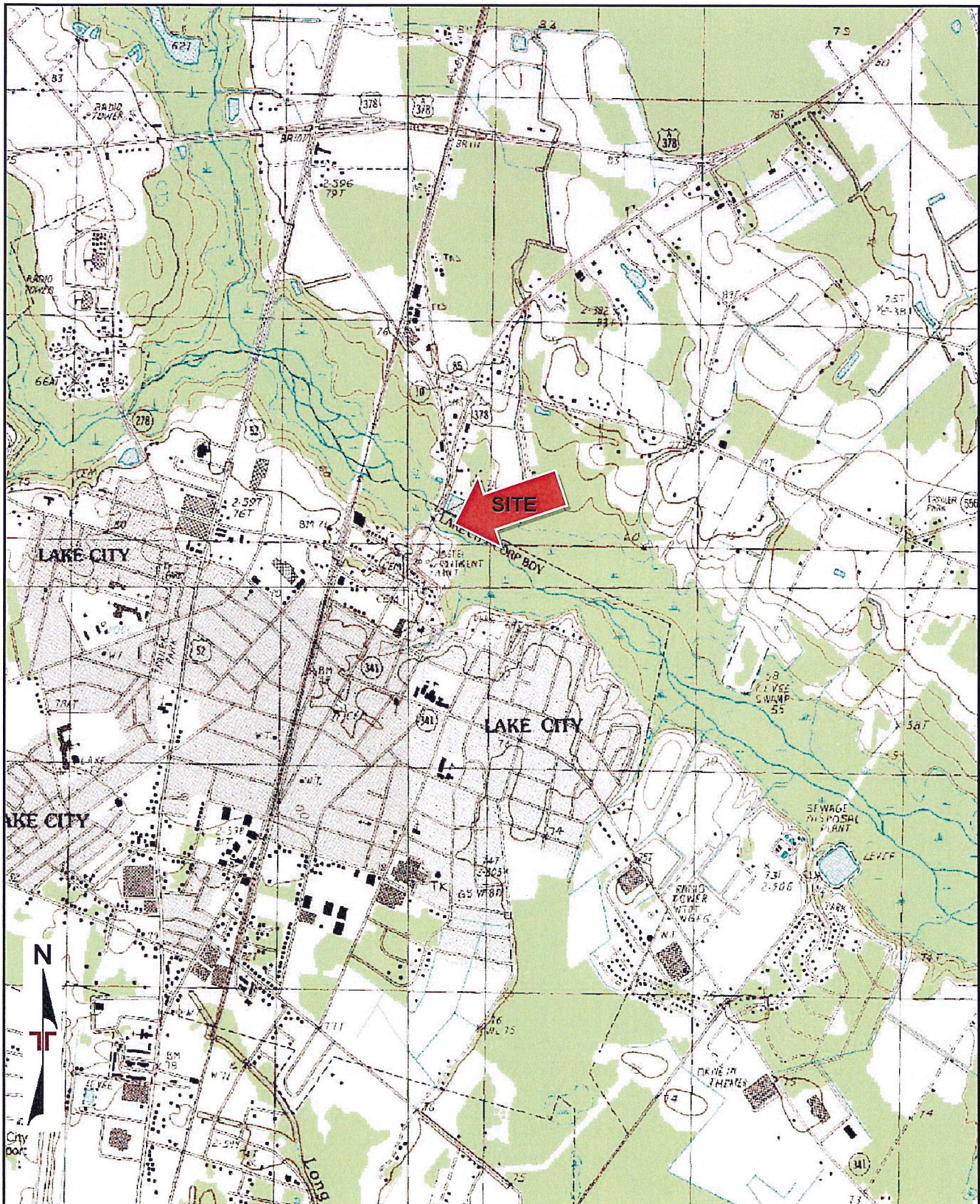


The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken. Terracon can perform these services on request.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either expressed or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

Exhibit A-1	Site Location
Exhibit A-2	Exploration Plan
Exhibit A-3	Field Exploration Description
Exhibit A-4	CPT Logs
Exhibit A-5	DCP & HAB Logs



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
 QUADRANGLES INCLUDE: MILL BAY, SC (1/1/1990), SCRANTON, SC (1/1/1990), LAKE CITY WEST, SC (1/1/1990) and LAKE CITY EAST, SC (1/1/1990).

Project Manager:	WJB
Drawn by:	WJB
Checked by:	BTS
Approved by:	BTS
Project No.:	ER165013
Scale:	1"=2,000'
File Name:	ER165013
Date:	7/18/2016

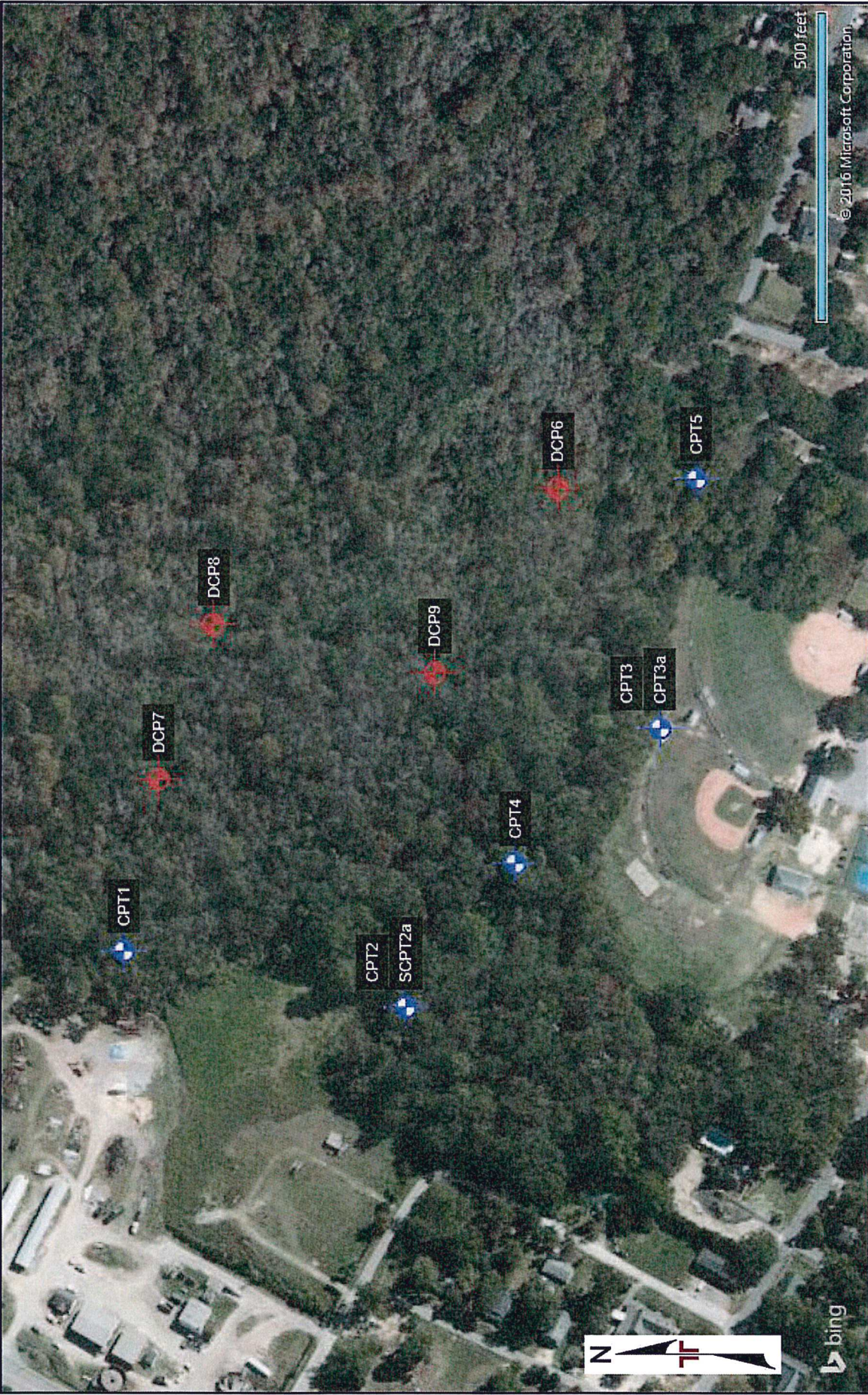
Terracon
 1246 Howard Ave
 Myrtle Beach, SC 29577-1658

SITE LOCATION

Lake City Elevated Walkway
 Hwy 378 and Charles St
 Lake City, SC

Exhibit

A-1



AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS		EXPLORATION PLAN		Exhibit
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES		Lake City Elevated Walkway Hwy 378 and Charles St Lake City, SC		A-2
Project Manager: WJB		<div>Terracon</div>		
Drawn by: WJB		1246 Howard Ave		
Checked by: BTS		Myrtle Beach, SC 29577-1658		
Approved by: BTS		Project No. ER165013		
		Scale: AS SHOWN		
		File Name: ER165013		
		Date: 7/18/2016		

Geotechnical Engineering Report

Lake City Elevated Walkway ■ Florence, SC

July 18, 2016 ■ Terracon Project No: ER165013

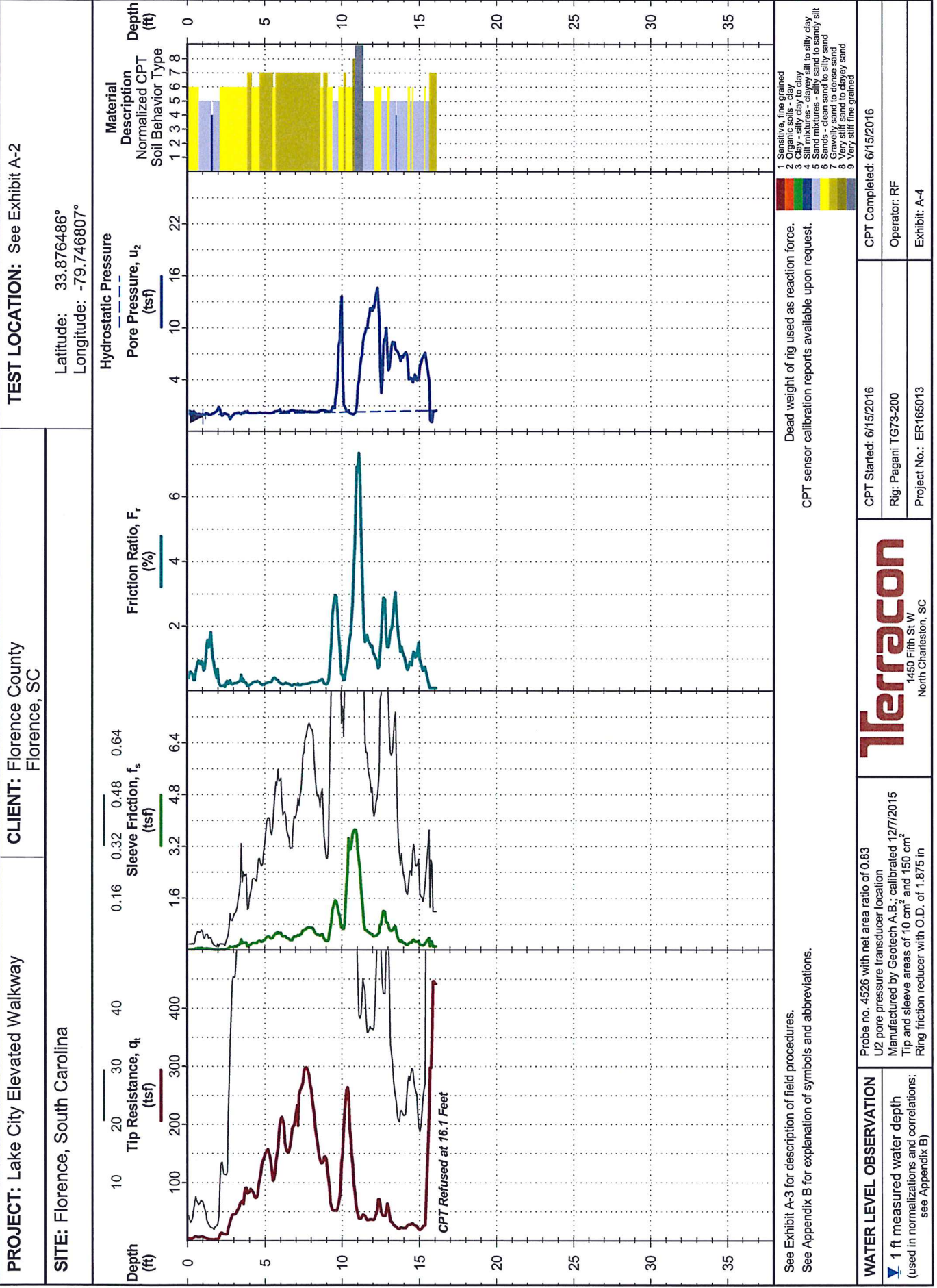


Field Exploration Description

Subsurface conditions were explored by advancing 4 Cone Penetration Tests (CPTs), 1 Seismic Cone Penetrometer Test (SCPT) and 4 Kessler Dynamic Cone Penetrometer Tests (DCPs) to depths of approximately 5 to 36 feet below the existing ground surface. The approximate locations of the tests are indicated on the Exploration Location Diagram on Exhibit A-2 in Appendix A. The field exploration was performed on June 15, 2016. The test locations were selected by Terracon personnel using landmarks, hand held GPS, and aerial drawings. The boring locations should be considered accurate only to the degree implied by the methods employed to determine them.

The CPTs were advanced with a track mounted Pagani 220-73 rig. The field logs and recovered samples were compiled and reviewed by the geotechnical engineer in order to produce the logs. The testing logs are presented on Exhibit A-4 in Appendix A. General notes and soil classification procedures for the soundings are presented in Appendix B.

CPT LOG NO. CPT1



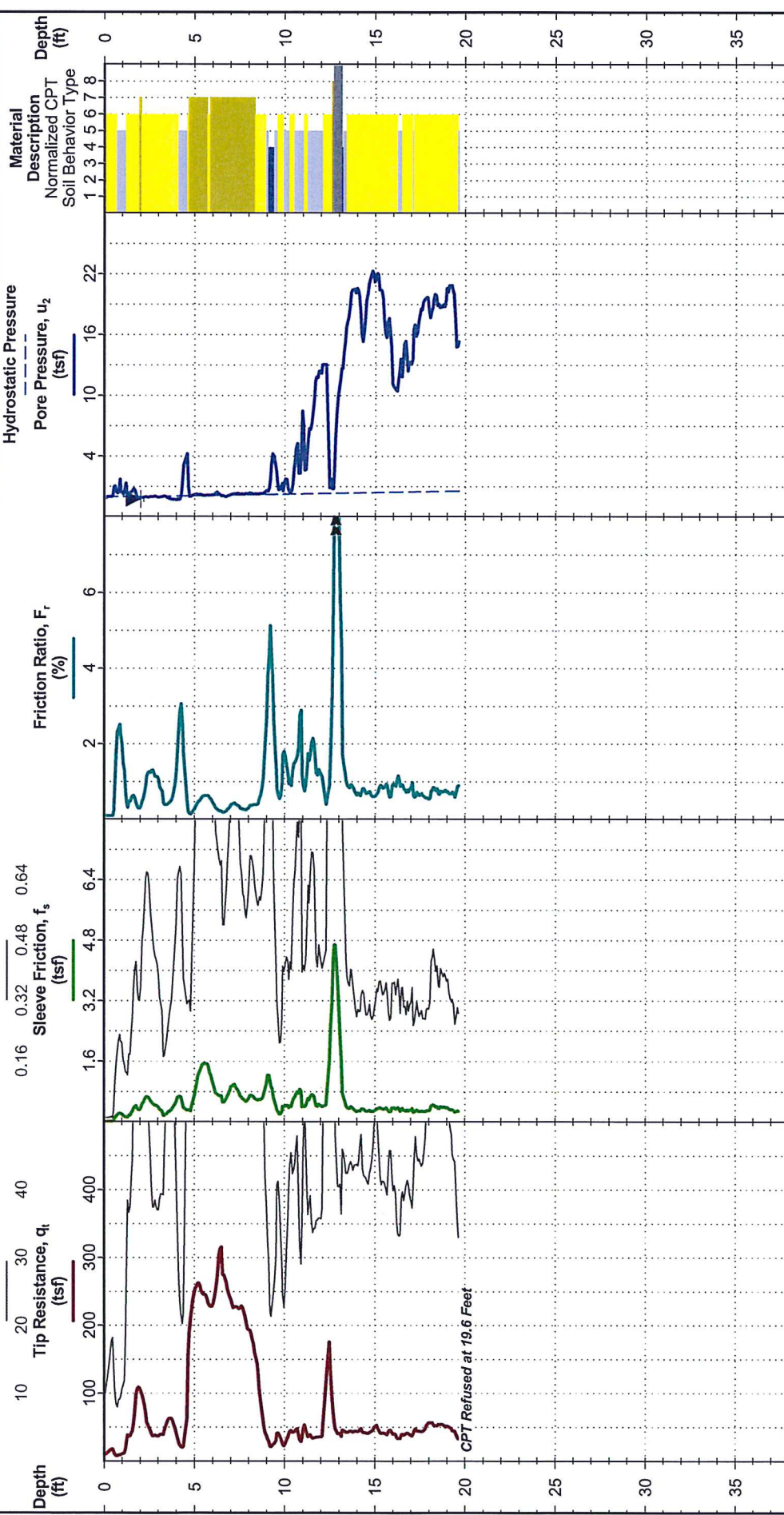
CPT LOG NO. CPT2

PROJECT: Lake City Elevated Walkway
CLIENT: Florence County
Florence, SC

TEST LOCATION: See Exhibit A-2

SITE: Florence, South Carolina

Latitude: 33.875235°
Longitude: -79.747105°



See Exhibit A-3 for description of field procedures.
See Appendix B for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.
CPT sensor calibration reports available upon request.

WATER LEVEL OBSERVATION
2 ft estimated water depth
(used in normalizations and correlations;
see Appendix B)

Terracon
1450 Fifth St W
North Charleston, SC

CPT Started: 6/15/2016
Rig: Pagani TG73-200
Project No.: ER165013

CPT Completed: 6/15/2016
Operator: RF
Exhibit: A-4

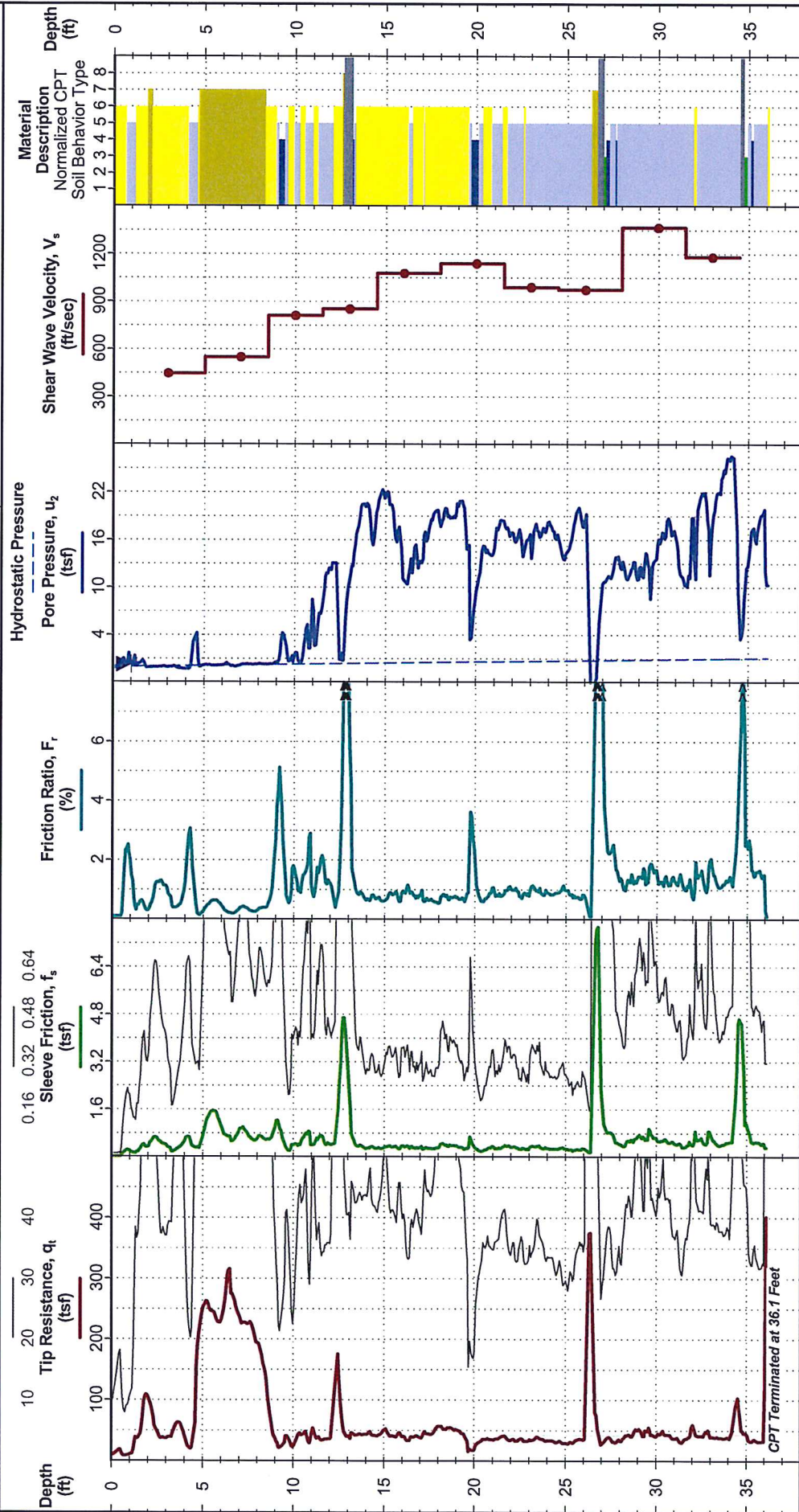
PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

TEST LOCATION: See Exhibit A-2

SITE: Florence, South Carolina

Latitude: 33.875234°
Longitude: -79.747107°




See Exhibit A-3 for description of field procedures.
See Appendix B for explanation of symbols and abbreviations.

Dead weight of rig used as reaction force.

1	Sensitive, fine grained
2	Organic soils - clay
3	Clay - silty clay to clay
4	Silt mixtures - clayey silt
5	Sand mixtures - silty sand
6	Sands - clean sand to silt
7	Gravelly sand to densest
8	Very stiff sand to clayey
9	Very stiff fine grained

WATER LEVEL OBSERVATION

 1 ft measured water depth
(used in normalizations and correlations;
see Appendix B)

Probe no. 4526 with net area ratio of 0.83
U2 pore pressure transducer location
Manufactured by Geotech A.B.; calibrated 12/7/2015
Tip and sleeve areas of 10 cm² and 150 cm²
Ring friction reducer with O.D. of 1.875 in

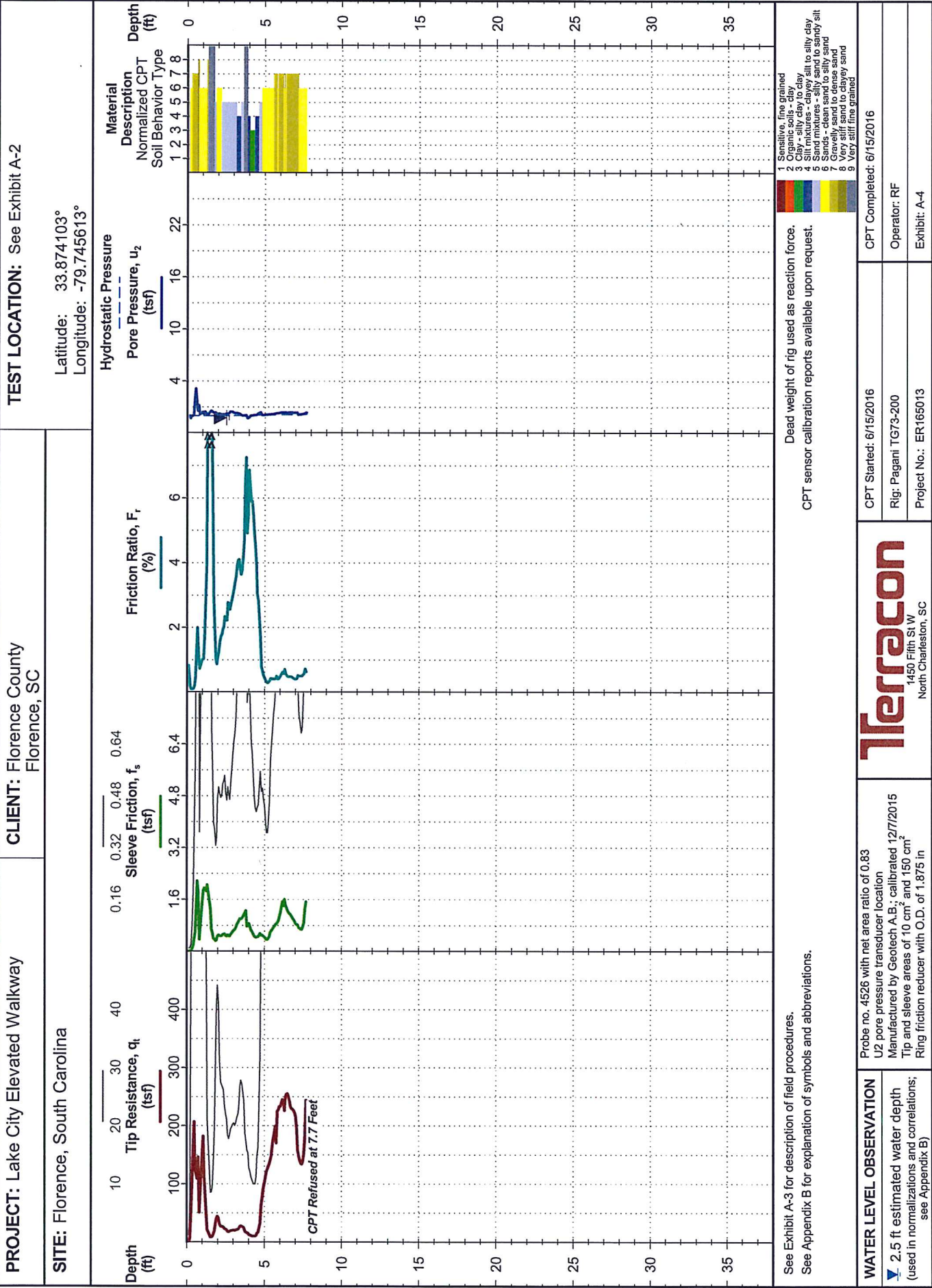
Terracon
1450 Fifth St W
North Charleston, SC

CPT Started: 6/15/2016
Rig: Pagani TG73-200
Project No.: ER165013

CPT Completed: 6/15/2016
Operator: RF
Exhibit: A-4

CPT LOG NO. CPT3

Page 1 of 1

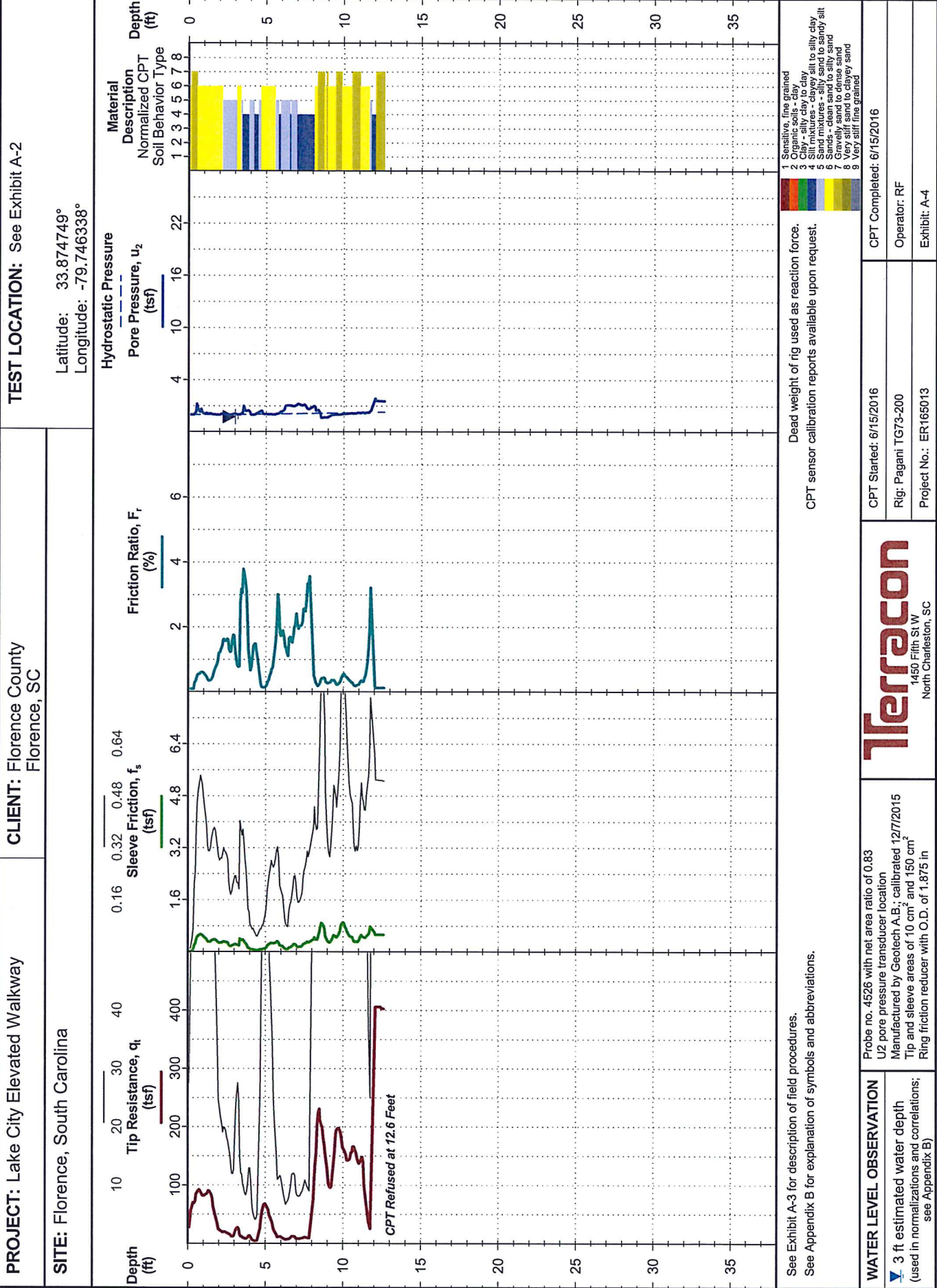


CPT LOG NO. CPT3a

Page 1 of 1

PROJECT: Lake City Elevated Walkway			CLIENT: Florence County Florence, SC			TEST LOCATION: See Exhibit A-2		
SITE: Florence, South Carolina			Latitude: 33.874105° Longitude: -79.745615°					
Depth (ft)	Tip Resistance, q_t (tsf)	Sleeve Friction, f_s (tsf)	Friction Ratio, F_r (%)	Pore Pressure, u_2 (tsf)	Hydrostatic Pressure	Material Description Normalized CPT Soil Behavior Type	Depth (ft)	
0	100	0.16	0.16	0.16	0.16	1	0	
5	200	0.32	0.32	0.32	0.32	2	5	
10	300	0.48	0.48	0.48	0.48	3	10	
15	400	0.64	0.64	0.64	0.64	4	15	
20	500	0.80	0.80	0.80	0.80	5	20	
25	600	0.96	0.96	0.96	0.96	6	25	
30	700	1.12	1.12	1.12	1.12	7	30	
35	800	1.28	1.28	1.28	1.28	8	35	
See Exhibit A-3 for description of field procedures. See Appendix B for explanation of symbols and abbreviations.								
WATER LEVEL OBSERVATION			Probe no. 4526 with net area ratio of 0.83 U2 pore pressure transducer location Manufactured by Geotech A.B.; calibrated 12/7/2015 Tip and sleeve areas of 10 cm ² and 150 cm ² Ring friction reducer with O.D. of 1.875 in			CPT Started: 6/15/2016		
2.5 ft estimated water depth (used in normalizations and correlations; see Appendix B)			1450 Fifth St W North Charleston, SC			Operator: RF		
			Terracon			Project No.: ER165013		
						CPT Completed: 6/15/2016		
						Exhibit: A-4		

CPT LOG NO. CPT4



BORING LOG NO. HAB1

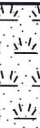




Page 1 of 1

PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

SITE:

Florence, South Carolina

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 33.876486° Longitude: -79.746807°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	Dynamic Cone Penetrometer Blow Count (blows/2 inches)
	DEPTH				
	<u>TOPSOIL</u> , dark brown to brown				
	0.7 <u>SILTY SAND (SM)</u> , fine to medium grained, brown to light brown				
					
	4.0 Boring Terminated at 4 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Manual Hand Auger


See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

 1 ft at time of exploration

Terracon
1450 Fifth St W
North Charleston, SC

Boring Started: 6/15/2016

Boring Completed: 6/15/2016

Drill Rig: NA

Driller: RF

Project No.: ER165013

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL ER155013 LAKE CITY ELEVATED WALKWAY.GPJ TERRACON2015.GDT 7/18/16

BORING LOG NO. HAB2

Page 1 of 1

PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

SITE:

Florence, South Carolina

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 33.875235° Longitude: -79.747105°	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	Dynamic Cone Penetrometer Blow Count (blows/2 inches)
	DEPTH				
	TOPSOIL , dark brown to brown				
	0.8 SILTY SAND (SM) , fine to medium grained, brown to light brown				
	4.0 Boring Terminated at 4 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Manual Hand Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

1 ft at time of exploration

Terracon

1450 Fifth St W
North Charleston, SC

Boring Started: 6/15/2016

Boring Completed: 6/15/2016

Drill Rig: NA

Driller: RF

Project No.: ER165013

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL ER155013 LAKE CITY ELEVATED WALKWAY.GPJ TERRACON2015.GDT 7/18/16

BORING LOG NO. HAB4

Page 1 of 1

PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

SITE:

Florence, South Carolina

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 33.874749° Longitude: -79.746338°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	Dynamic Cone Penetrometer Blow Count (blows/2 inches)
	DEPTH				
	TOPSOIL , dark brown to brown				
	SILTY SAND (SM) , fine to medium grained, light brown to tan				
	Boring Terminated at 4 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Manual Hand Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
1450 Fifth St W
North Charleston, SC

Boring Started: 6/15/2016

Boring Completed: 6/15/2016

Drill Rig: NA

Driller: RF

Project No.: ER165013

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL ER155013 LAKE CITY ELEVATED WALKWAY.GPJ TERRACON2015.GDT 7/18/16

BORING LOG NO. HAB3

Page 1 of 1

PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

SITE:

Florence, South Carolina

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 33.874103° Longitude: -79.745613°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	Dynamic Cone Penetrometer Blow Count (blows/2 inches)
	DEPTH				
	SILTY SAND (SM) , fine to medium grained, brown to light brown				
	0.5				
	Auger Refusal at 0.5 Foot				

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Manual Hand Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
1450 Fifth St W
North Charleston, SC

Boring Started: 6/15/2016

Boring Completed: 6/15/2016

Drill Rig: NA

Driller: RF

Project No.: ER165013

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL ER155013 LAKE CITY ELEVATED WALKWAY.GPJ TERRACON2015.GDT 7/18/16

BORING LOG NO. HAB5

Page 1 of 1

PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

SITE:

Florence, South Carolina

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 33.873943° Longitude: -79.744282°	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	Dynamic Cone Penetrometer Blow Count (blows/2 inches)
	DEPTH				
	<u>TOPSOIL</u> , dark brown to brown				
	2.0 <u>SILTY SAND (SM)</u> , fine to medium grained, brown to light brown				
	4.0 Boring Terminated at 4 Feet				

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Manual Hand Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

1 ft at time of exploration

Terracon

1450 Fifth St W
North Charleston, SC

Boring Started: 6/15/2016

Boring Completed: 6/15/2016

Drill Rig: NA

Driller: RF

Project No.: ER165013

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL ER155013 LAKE CITY ELEVATED WALKWAY.GPJ TERRACON2015.GDT 7/18/16

BORING LOG NO. DCP6

Page 1 of 1

PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

SITE:

Florence, South Carolina

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 33.874558° Longitude: -79.744324°	DEPTH (FT.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	Dynamic Cone Penetrometer Blow Count (blows/2 inches)
	DEPTH				
	SILTY CLAY (CL-ML) , dark brown to brown, very soft to soft				WOH
					WOH
					WOH
					WOH
					WOH
					WOH
					WOH
					WOH
					WOH
					WOH
					WOH
					WOH
					1
					1
					1
					1
					2
					2
					2
					2
					3
					3
					3
					4
					4
					5
					6
					6
	Boring Terminated at 5 Feet	5			

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dynamic Cone Penetrometer

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
DCPs backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

At completion of drilling

Terracon
1450 Fifth St W
North Charleston, SC

Boring Started: 6/15/2016

Boring Completed: 6/15/2016

Drill Rig: NA

Driller: RF

Project No.: ER165013

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL ER155013 LAKE CITY ELEVATED WALKWAY.GPJ TERRACON2015.GDT 7/18/16

BORING LOG NO. DCP8

Page 1 of 1

PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

SITE:

Florence, South Carolina

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 33.876088° Longitude: -79.745051°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	Dynamic Cone Penetrometer Blow Count (blows/2 inches)
	SILTY CLAY (CL-ML) , dark brown to brown, very soft to soft				WOH
					WOH
					WOH
					WOH
					WOH
1.0	SILTY SAND (SM) , fine to medium grained, brown to light brown				1
					2
					2
					2
					2
					2
					3
					3
					3
					4
					5
					5
					5
					7
					7
					7
					7
					8
					10
					10
					12
					12
					14
5.0	Boring Terminated at 5 Feet	5			14

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dynamic Cone Penetrometer

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
DCPs backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

At completion of drilling

Terracon
1450 Fifth St W
North Charleston, SC

Boring Started: 6/15/2016

Boring Completed: 6/15/2016

Drill Rig: NA

Driller: RF

Project No.: ER165013

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL ER155013 LAKE CITY ELEVATED WALKWAY.GPJ TERRACON2015.GDT 7/18/16

BORING LOG NO. DCP9

Page 1 of 1

PROJECT: Lake City Elevated Walkway

CLIENT: Florence County
Florence, SC

SITE:

Florence, South Carolina

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 33.875106° Longitude: -79.74531°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	Dynamic Cone Penetrometer Blow Count (blows/2 inches)
	DEPTH				
	<u>SILTY CLAY (CL-ML)</u> , dark brown to brown, very soft to soft				WOH
					WOH
					WOH
					1
					1
					1
					1
					1
					1
					1
					1
					1
					2
					1
					2
					2
					2
					3
					3
					3
					3
					4
					5
					5
					6
					6
					7
					8
					10
					10
	Boring Terminated at 5 Feet	5			

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Dynamic Cone Penetrometer

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
DCPs backfilled with soil cuttings upon completion.

See Appendix B for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

At completion of drilling

Terracon

1450 Fifth St W
North Charleston, SC

Boring Started: 6/15/2016

Boring Completed: 6/15/2016

Drill Rig: NA

Driller: RF

Project No.: ER165013

Exhibit: A-5

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APPENDIX B

Exhibit B-1 CPT General Notes
Exhibit B-2 USCS

CPT GENERAL NOTES

DESCRIPTION OF MEASUREMENTS AND CALIBRATIONS

To be reported per ASTM D5778:

Uncorrected Tip Resistance, q_c
Measured force acting on the cone divided by the cone's projected area

Corrected Tip Resistance, q_t
Cone resistance corrected for porewater and net area ratio effects
 $q_t = q_c + U2(1 - a)$

Where a is the net area ratio, a lab calibration of the cone typically between 0.70 and 0.85

Pore Pressure, U1/U2

Pore pressure generated during penetration
U1 - sensor on the face of the cone
U2 - sensor on the shoulder (more common)

Sleeve Friction, f_s
Frictional force acting on the sleeve divided by its surface area

Normalized Friction Ratio, FR

The ratio as a percentage of f_s to q_t , accounting for overburden pressure

To be reported per ASTM D7400, if collected:

Shear Wave Velocity, V_s
Measured in a Seismic CPT and provides direct measure of soil stiffness

DESCRIPTION OF GEOTECHNICAL CORRELATIONS

Normalized Tip Resistance, Q_t

$$Q_t = (q_t - \sigma_{v0}) / \sigma'_{v0}$$

Over Consolidation Ratio, OCR

$$OCR(1) = 0.25(Q_t)^{1.25}$$

$$OCR(2) = 0.33(Q_t)$$

Undrained Shear Strength, S_u

$$S_u = Q_t \times \sigma'_{v0} / N_k$$

N_k is a geographical factor (shown on S_u plot)

Sensitivity, St

$$St = (q_t - \sigma_{v0} / N_k) \times (1 / fs)$$

Effective Friction Angle, ϕ'

$$\phi'(1) = \tan^{-1}(0.373[\log(q_t / \sigma'_{v0}) + 0.29])$$

$$\phi'(2) = 17.6 + 11[\log(Q_t)]$$

Unit Weight

$$UW = (0.27[\log(FR)] + 0.36[\log(q_t / atm)] + 1.236) \times UW_{water}$$

σ_{v0} is taken as the incremental sum of the unit weights

Small Strain Shear Modulus, G_0

$$G_0(1) = \rho V_s^2$$

$$G_0(2) = 0.015 \times 10^{(0.55k + 1.68)} (q_t - \sigma_{v0})$$

Soil Behavior Type Index, I_c

$$I_c = [(3.47 - \log(Q_t))^2 + (\log(FR) + 1.22)^2]^{0.5}$$

SPT N_{60}

$$N_{60} = (q_t / atm) / 10^{(1.1268 - 0.2817k)}$$

Elastic Modulus, E_s (assumes $q_t / q_{t, \text{claymax}} \sim 0.3$, i.e. $FS = 3$)

$$E_s(1) = 2.6 \Psi G_0 \text{ where } \Psi = 0.56 - 0.33 \log Q_{t, \text{clean sand}}$$

$$E_s(2) = G_0$$

$$E_s(3) = 0.015 \times 10^{(0.55k + 1.68)} (q_t - \sigma_{v0})$$

$$E_s(4) = 2.5 q_t$$

Constrained Modulus, M

$$M = \alpha_M (q_t - \sigma_{v0})$$

For $I_c > 2.2$ (fine-grained soils)

$$\alpha_M = Q_t \text{ with maximum of } 14$$

For $I_c < 2.2$ (coarse-grained soils)

$$\alpha_M = 0.0188 \times 10^{(0.55k + 1.68)}$$

Hydraulic Conductivity, k

$$\text{For } 1.0 < I_c < 3.27 \quad k = 10^{(0.952 - 3.04 I_c)}$$

$$\text{For } 3.27 < I_c < 4.0 \quad k = 10^{(-4.52 - 1.37 I_c)}$$

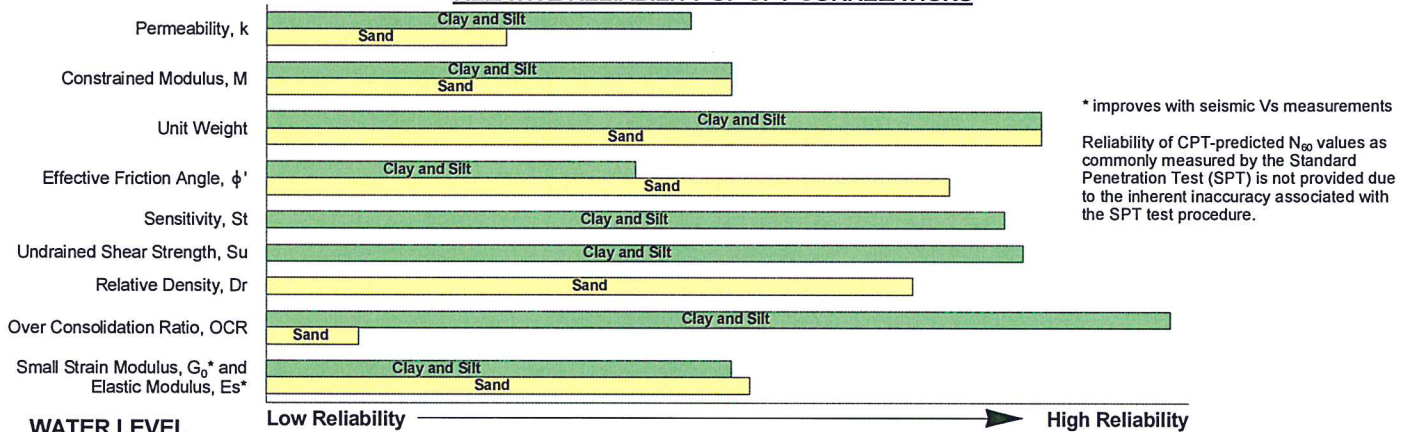
Relative Density, Dr

$$Dr = (Q_t / 350)^{0.5} \times 100$$

REPORTED PARAMETERS

CPT logs as provided, at a minimum, report the data as required by ASTM D5778 and ASTM D7400 (if applicable). This minimum data include tip resistance, sleeve resistance, and porewater pressure. Other correlated parameters may also be provided. These other correlated parameters are interpretations of the measured data based upon published and reliable references, but they do not necessarily represent the actual values that would be derived from direct testing to determine the various parameters. The following chart illustrates estimates of reliability associated with correlated parameters based upon the literature referenced below.

RELATIVE RELIABILITY OF CPT CORRELATIONS



WATER LEVEL

The groundwater level at the CPT location is used to normalize the measurements for vertical overburden pressures and as a result influences the normalized soil behavior type classification and correlated soil parameters. The water level may either be "measured" or "estimated:"

Measured - Depth to water directly measured in the field

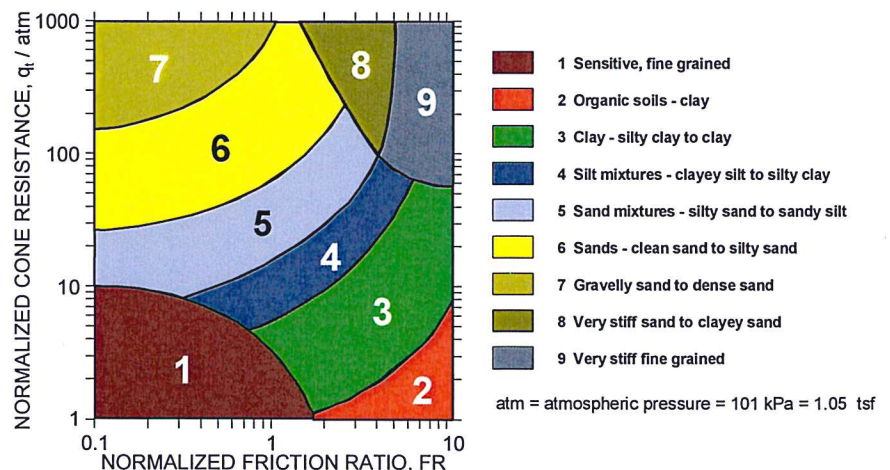
Estimated - Depth to water interpolated by the practitioner using pore pressure measurements in coarse grained soils and known site conditions

While groundwater levels displayed as "measured" more accurately represent site conditions at the time of testing than those "estimated," in either case the groundwater should be further defined prior to construction as groundwater level variations will occur over time.

CONE PENETRATION SOIL BEHAVIOR TYPE

The estimated stratigraphic profiles included in the CPT logs are based on relationships between corrected tip resistance (q_t), friction resistance (f_s), and porewater pressure (U2). The normalized friction ratio (FR) is used to classify the soil behavior type.

Typically, silts and clays have high FR values and generate large excess penetration porewater pressures; sands have lower FRs and do not generate excess penetration porewater pressures. Negative pore pressure measurements are indicative of fissured fine-grained material. The adjacent graph (Robertson et al.) presents the soil behavior type correlation used for the logs. This normalized SBT chart, generally considered the most reliable, does not use pore pressure to determine SBT due to its lack of repeatability in onshore CPTs.



REFERENCES

- Kulhawy, F.H., Mayne, P.W., (1997). "Manual on Estimating Soil Properties for Foundation Design," Electric Power Research Institute, Palo Alto, CA.
- Mayne, P.W., (2013). "Geotechnical Site Exploration in the Year 2013," Georgia Institute of Technology, Atlanta, GA.
- Robertson, P.K., Cabal, K.L. (2012). "Guide to Cone Penetration Testing for Geotechnical Engineering," Signal Hill, CA.
- Schmertmann, J.H., (1970). "Static Cone to Compute Static Settlement over Sand," *Journal of the Soil Mechanics and Foundations Division*, 96(SM3), 1011-1043.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification		
				Group Symbol	Group Name ^B	
Coarse Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E	GW	Well-graded gravel ^F	
			$Cu < 4$ and/or $1 > Cc > 3$ ^E	GP	Poorly graded gravel ^F	
		Gravels with Fines: More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F,G,H}	
			Fines classify as CL or CH	GC	Clayey gravel ^{F,G,H}	
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E	SW	Well-graded sand ^I	
			$Cu < 6$ and/or $1 > Cc > 3$ ^E	SP	Poorly graded sand ^I	
		Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G,H,I}	
			Fines classify as CL or CH	SC	Clayey sand ^{G,H,I}	
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots on or above "A" line ^J	CL	Lean clay ^{K,L,M}	
			$PI < 4$ or plots below "A" line ^J	ML	Silt ^{K,L,M}	
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay ^{K,L,M,N}
			Liquid limit - not dried			Organic silt ^{K,L,M,O}
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above "A" line	CH	Fat clay ^{K,L,M}	
			PI plots below "A" line	MH	Elastic Silt ^{K,L,M}	
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay ^{K,L,M,P}
			Liquid limit - not dried			Organic silt ^{K,L,M,Q}
Highly organic soils:		Primarily organic matter, dark in color, and organic odor		PT	Peat	

^A Based on the material passing the 3-in. (75-mm) sieve

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

$$^E Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

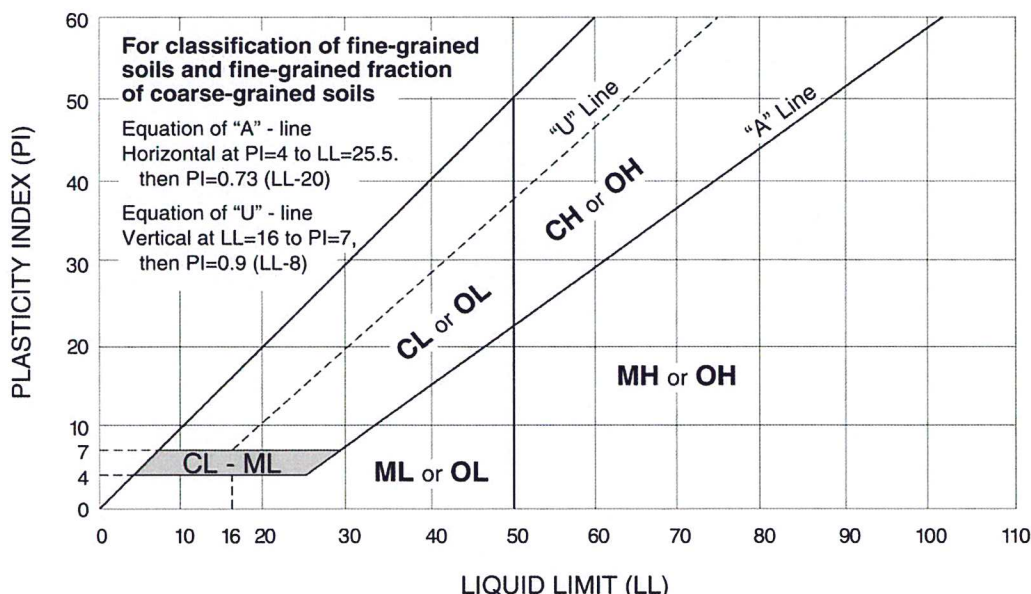
^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.





BRIGMAN ENGINEERING
LAKE CITY LAKE PROJECT
7 OCT. 2015