JEAN LAFITTE NATIONAL HISTORICAL PARK & PRESERVE
JEFFERSON PARISH, LA

TRAIL IMPROVEMENTS AT BARATARIA PRESERVE

PMIS NO.: 318919

PROJECT SPECIFICATIONS

NATIONAL PARK SERVICE (NPS)
DENVER SERVICE CENTER (DSC)

DECEMBER 20, 2024

TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
JELA 318919

PROFESSIONAL SEALS

The documents and supporting material herein have been prepared by or under direct supervision of the named professional engineer listed below.

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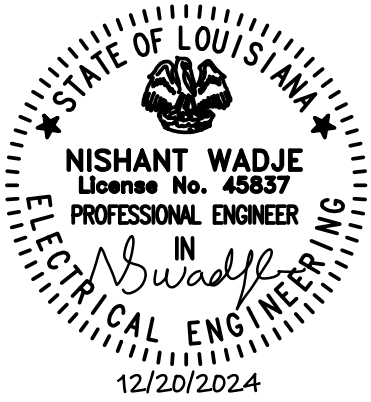
Electrical	Nishant Wadje, PE Louisiana License No. 45837 Stantec Consulting Services, Inc. 1340 Poydras St #1420 New Orleans, LA 70112	

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TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
JELA 318919

TABLE OF CONTENTS

END OF TABLE OF CONTENTS

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 11 00 SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. Section includes the following:

1. Work Covered by Contract Documents
2. Work Phases
3. Construction Contractor Use of Site
4. Public Use of Site
5. Occupancy Requirements for Buildings
6. Conduct of Operations
7. Work Restrictions
8. Special Construction Requirements
9. Soils Investigation Report
10. Additional Reports

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Location: Barataria Preserve of Jean Lafitte National Park and Preserve located at 6588 Barataria Blvd., Marrero, LA 70072. The preserve is located 17 miles south of New Orleans on the west bank of the Mississippi River; Barataria Blvd./Highway 45 runs through the preserve.

B. The Work consists of:

1. Demolition of the existing boardwalks for the Marsh Overlook Trail, Bayou Coquille Trail, Education Center Trail, Visitors Center Trail, and Palmetto Trail.

2. Installation of proposed boardwalks at the Marsh Overlook Trail, Bayou Coquille Trail, and Education Center Trail.

3. Raising of the existing hardened trails at Bayou Coquille Trail.

4. Installation of ancillary components and site furnishings.

C. Project will be constructed under a single prime contract.

1.3 WORK PHASES

A. The Work shall be conducted in 3 phases. Phases may be constructed concurrently, but the priority shall remain as described below. Contractor shall coordinate with the Contracting Officer when developing proposed construction schedule.

1. Phase 1: Demolition and installation of the improvements described above at the Education Center Trail. Work of this phase shall be substantially complete and ready for occupancy within 180 days after the Notice to Proceed.

2. Phase 2: Demolition and installation of the improvements described above at the Marsh Overlook and Bayou Coquille Trails. Work of this phase shall be substantially complete and ready for occupancy within 365 days after the Notice to Proceed.

3. Phase 3: Demolition of the Visitor's Center Trail and the Palmetto Trail. Work of this phase shall be substantially complete within 135 days after the Notice to Proceed.

1.4 CONSTRUCTION CONTRACTOR USE OF SITE

A. General: Construction Contractor shall have full use of each site for the phased construction operations during the construction period. Construction Contractor's use of the site is limited only by the Government's right to perform work or to retain other construction Contractors on portions of Project.

B. Storage of Materials: Confine storage of materials to staging area shown on plans.

C. Parking: Confine parking to the parking lots associated with each phase as shown on drawings G2.1-G2.3

D. Stockpiling: Confine stockpiling to staging areas as shown drawings G2.1-G2.3.

E. Preservation of Natural Features:

1. Prevent damage to natural surroundings. Restore damaged areas, repairing or replacing damaged trees and plants, at no additional expense to the Government.
2. Provide temporary barriers to protect existing trees and plants and root zones.
3. Do not remove, injure, or destroy trees or other plants without prior approval. Consult with Contracting Officer (CO) and remove agreed-on roots and branches that interfere with construction.
4. Do not fasten ropes, cables, or guys to existing trees.
5. Carefully supervise excavating, grading, filling, and other construction operations near trees to prevent damage.

F. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Government employees, and emergency vehicles at all times. Do not use for parking or storage of materials.

1. Schedule deliveries to minimize use of driveways and entrances.
2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

G. Construction Camp: Establishment of a camp within park will not be permitted.

H. Hauling Restrictions: Comply with legal load restrictions in hauling of materials. Load restrictions on park roads are identical to state load restrictions with such additional regulations as may be imposed by the Park Superintendent. Information regarding rules and regulations for vehicular traffic

on park roads may be obtained from the Office of the Park Superintendent. A special permit will not relieve Construction Contractor of liability for damage which may result from moving of equipment.

I. Bridge Restrictions: Identify jurisdictions, load restrictions, permit requirements, time and calendar restrictions as outlined.

1.5 PUBLIC USE OF SITE

A. The park for each phase will be closed to the public during construction.

1.6 CONDUCT OF OPERATIONS

A. Construction Contractor shall conduct his operations in conformance with rules and regulations promulgated by the Secretary of the Interior for the National Park Service, and applicable park rules and regulations prescribed by Park Superintendent.

B. Work on Saturdays, Sundays, Federal holidays or at night may not be performed unless stated in the Work Restrictions below or without prior consent from the Contracting Officer. Submit requests 7 calendar days in advance of the work to the Contracting Officer for approval.

C. No signs or advertisements (except those specified herein) shall be displayed on the construction site or within the park unless approved by the Contracting Officer.

1.7 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 6:00 a.m. to 6:00 p.m., Monday through Friday, except when otherwise indicated or with approval from the CO.

1. Weekend Hours: 6:00 to 6:00 p.m. after receiving approval from the CO.

B. Existing Utilities

1. Existing Utilities: Notify Contracting Officer and utility companies of proposed locations and times for excavation.
2. Construction Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, repair utility at no additional expense to the Government.
3. If damage occurs to an unknown utility, repair utility. An equitable adjustment will be made in accordance with the Changes clause of the contract.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Government or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Contracting Officer not less than two business days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Contracting Officer’s written permission.in the plans on sheets G2.1 - G2.3. Contractor shall provide a disposal receptacle for smoking remnants.

D. Nonsmoking Building/Tobacco Use/Vaping: Tobacco use and vaping is restricted to the parking and staging areas indicated in the plans on sheets G2.1-G2.3. Contractor shall provide a disposal receptacle for smoking remnants.

1.8 SPECIAL CONSTRUCTION REQUIREMENTS

A. Project Management and Communication Software: Software administered by NPS shall be used to manage communication and document sharing during construction.

1. See Section 01 31 00 "Project Management and Coordination" for requirements on using NPS project management and communication software.

1.9 SOILS INVESTIGATION REPORT

A. The report Geotechnical Engineering Report, dated September 22, 2023, prepared by R. Austin Nall, P.E.is available, as an appendix with this package.

B. In case of conflict between report and drawings or specifications, the drawings and specifications govern.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 11 00

SECTION 01 26 01 CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section consists of administrative and procedural requirements for contract modifications.

1.2 DEFINITIONS AND ALLOWANCES

A. Home Office Overhead: Costs incurred in support of all of a contractor's projects and not attributable to a specific job. The cost for home office overhead is only allowed as a percentage of all direct work excluding profit. The following items represent allowable home office overhead costs identified in Part 31 of the Federal Acquisition Regulation (FAR):

1. Rent
2. Utilities
3. Furnishings
4. Office equipment
5. Executive and management staff not exclusively assigned to the project
6. Support, accounting, and administrative staff
7. Preparation of cost proposals, estimating, and schedule analyses connected with Modifications
8. Estimating and preconstruction services
9. Mortgage costs
10. Real estate and corporate taxes
11. Automobile maintenance and travel costs for home office personnel
12. Home office insurances i.e. structure, automotive, umbrella, flood, etc.
13. Depreciation of equipment and other assets
14. Home office supplies (paper, staples, etc.)
15. Legal services
16. Accounting and data processing
17. Professional fees/registration

B. General Conditions (Field Office Overhead): Management and administrative costs incurred on site for the designated project. Costs associated with preparation of modifications will not be allowed. Costs for these items are to be included only in the general conditions of the modification estimate. Only in the case of a contract time extension are additional general conditions included in modifications. The following items, if applicable, are considered allowable costs for calculating General Conditions:

1. Project Manager (PM), Assistant Project Manager
2. Superintendent, Assistant Superintendent
3. Quality Control, Safety Officer, Environmental Manager, etc.
4. Engineers

5. Travel, lodging, and per diem (as established by Federal Travel Regulations)
6. Scheduling
7. Field Office Trailers and associated temporary utilities
8. Field office supplies

    a. Mailing and couriers
    b. Reproduction costs
    c. Storage
    d. Phones
    e. Computers
    f. Copiers

9. Personal vehicles i.e. Superintendent Pickup trucks

C. General Requirements: Costs directly associated with the project and are necessary to perform the actual work of the modification. These costs shall be shown as direct costs in the estimate. The following items, if applicable, are considered allowable costs for calculating General Requirements:

1. Hoisting
2. Material handling
3. Temporary fencing
4. Port-a-lets
5. Trash removal, dumpsters
6. Barricades
7. Small tools
8. Safety supplies
9. Scaffolding
10. Daily cleaning
11. Traffic control
12. Temporary signage
13. Temporary heating and power

D. Personnel Costs: Costs included in the modification must only be for General Conditions staff and workers actually present and working on project site. Modification costs for salaried workers are only allowed within the structure of a 40-hour week and no overtime or holiday pay will be allowed.

1. Worker Hourly Rates are costs directly associated with the individual worker and consist of the following:

    a. Base Rate: The hourly rate paid directly to the worker
    b. Labor Burden: Employer payments of all applicable burdens; includes insurance and taxes the business must pay on behalf of the worker to government entities and educational forums, such as:

        1) Social Security
        2) Medicare
        3) Workers Compensation – Policy and company calculation to be made available.
        4) Federal Unemployment Tax Act (FUTA) - Cap Rate and percentage to be proportionally allocated over one year.

5) State Unemployment Tax Act (SUTA) - Cap Rate and percentage to be proportionally allocated over one year.
6) Union agreement costs - Other costs required under an enforceable collective bargaining agreement.

c. Fringe Benefits: Various non-wage compensations provided to employees such as:

1) Health Care Insurance Premiums
2) Cell Phone
3) Clothing
4) 401K and Pensions
5) Vehicle allowances
6) Gas allowance
7) Life insurance premiums
8) Disability insurance
9) Other Fringe Benefits required under an enforceable collective bargaining agreement

E. Bonuses or Deferred Compensation: No Bonus or Deferred Compensation will be allowed within any components of pricing including Home Office Overhead, General Conditions, General Requirements, Hourly Worker Rates, or the direct costs of work.

F. General Liability Insurance: An insurance policy that protects Contractor from claims resulting from bodily injury or property damage to a third party. Include as a separate line item within all modification proposals and provide a current insurance quote upon request.

G. Performance and Payment Bonds: A performance bond is a surety bond issued by an insurance company or bank to guarantee satisfactory completion of a project. The Payment Bond guarantees the Contractor will pay the labor and material costs incurred. Banks and Insurance companies charge a premium for individual project based on a sliding scale related to the size of the project. Include as a separate line item in modification proposals and provide current company bonding rates upon request.

H. Builder's Risk Insurance: Covers the contractor's loss due to fire, high winds, or other natural forces. Not reimbursed by the National Park Service (NPS) and shall not be included in modification proposals.

1.3 MODIFICATION PROPOSAL PRICING REQUIREMENTS

A. General:

1. Proposal be received in the format and within the time frame specified in the Request for Proposal (RFP) letter. Costs or delays resulting from failure of contractor to submit within the time frame specified will not be compensable.
2. Proposal shall be detailed with itemized lists of equipment, materials, labor, production rates, overhead, profit, and bond markup for each item. Labor costs must be itemized by craft and hourly rate, including Fringe Benefits and Labor Burden. If the costs of Fringe Benefits and Labor Burden are not itemized, it is assumed they are included in the hourly rate shown, or contractor is not requesting reimbursement. Contractor may utilize the

government provided Contractor Estimate Form, or their own form, provided that it contains the same information and level of detail as the Government's form.

3. Requests for extensions of contract time as a result of change must be justified with a Time Impact Analysis (TIA). Refer to Section 01 32 16 "Construction Schedule", for time impact analysis requirements. TIA and associated costs shall be received with the proposal by the date shown within the Request for Proposal letter. Contractor's failure to submit within the specified time frame will be construed as the Contractor waiving right for additional time and no time extension will be allowed.
4. All supporting documentation used to justify the proposed modification will be made available to the Contracting Officer (CO) upon request.
5. Contractor shall review and approve all subcontractor/supplier pricing in detail for proper format, scope, production rates, and pricing prior to submission to NPS. All delay costs associated with not reviewing and approving subcontractor/supplier pricing will be borne by the Contractor.
6. All pricing and production rates within the estimate must be based on fair and reasonable pricing and cannot include built-in contingency.

B. Labor:

1. Contractor shall estimate cost of labor by itemizing each craft involved, indicating worker hourly rate (base rate + labor burden + fringe benefits) for each and itemizing hours required for each craft directly engaged in modification work. Any work proposed requiring overtime work or premium pay shall be itemized separately. Rates shall be in accordance with the Davis-Bacon Act as incorporated herein. Labor Burden may include payroll taxes, Social Security, unemployment insurances, workers compensation insurance, Federal Insurance Contributions Act (FICA), FUTA, and other direct costs resulting from Federal, State or local laws.
2. Itemize labor costs for equipment operators separate from equipment costs.
3. Labor cost for foremen shall only be costs for related work required for the modification.

C. Materials:

1. Estimated cost for materials shall include quotes from multiple sources. Material prices shall include applicable fees and credits, including but not limited to, sales tax, freight and delivery charges, and tax rebates.
2. No markup shall be applied to any material provided by NPS.

D. Equipment:

1. Equipment used for the project must be appropriately sized for work being performed.
2. Do not include costs for "miscellaneous tools and equipment", in your proposal for a replacement value of $500 or less. Costs shown in excess of $500 shall be broken out separately.
3. Regardless of ownership, rates to be used in determining equipment rental costs shall be the lowest cost from one of the following sources:

    a. United States (U.S.) Army Corps of Engineers, Ownership and Operating Expense Schedule (use latest edition and applicable region)
    b. Construction Blue Book
    c. Local equipment rental rates, documented by actual invoice charges, or itemized vendor quotes.

4. Estimated equipment rates shall include operating costs of all fuel, oil, lubrication, supplies, small tools, necessary attachments, ground engaging components, tires and tracks, routine repairs and maintenance (cost of major repair and overhaul is not allowed per Federal Acquisition Regulation (FAR) 31.105(d)(2)), depreciation, storage, insurance, and all incidentals. Mobilization, if applicable, may be included for equipment solely used on the modification work but must be listed separately.
5. Estimate full rate for equipment only for duration that equipment will be utilized to accomplish work of the modification.
6. Standby unit rates used in accordance with paragraph 1.3, D, 2, above. If the U.S. Army Corp of Engineers is utilized then their standby rates prevail. If Bluebook or local equipment pricing is accepted, then 1/2 of equipment costs minus any operating costs, major repair and overhaul will be accepted.
7. If equipment is in standby mode due solely to a documented NPS delay, established standby rate shall apply from the first day of the delay.
8. Equipment not used and on job site for up to five consecutive days may be classified at standby rates, provided the equipment is or has been used solely to perform work on the modification and will be necessary to complete additional modification work. Equipment still on the jobsite but not in use after five consecutive days will not be considered in the modification pricing.
9. Requests for compensation for equipment stand by time must be justified, documented and itemized separately.
10. The estimated timeframe (daily, weekly, monthly) for use of the equipment must reflect the lowest cost to the Government.

E. Establishment and Application of Overhead and Profit Percentages:

1. Home Office Overhead and Profit (OH&P) shall be applied to direct costs only. Profit shall not be applied to overhead amounts; and overhead shall not be applied to profit. Home office overhead shall contain only allowable, allocable, and reasonable costs per the contract documents and FAR Part 31. Profit percentages are based on risk factors found in FAR Part 31which have been applied to the specific type of work included in this project. Negotiated rates shall not exceed the following percentages for OH&P for contractor self-performed work:

   Overhead.....10%
   Profit 9.00%

2. Total aggregate limit of markup (OH&P) for Contractor and Subcontractors on modification work shall not exceed 25%. The NPS will not be responsible for allocation of percentages between contractor and subcontractors at any tier.
3. If Contractors form a partnership, partnership may only receive home office overhead and profit in same amount as an individual Contractor (refer to paragraph 1.3,E,1 above). It is the responsibility of the partners to decide on division of revenue.
4. Combined Increases and Decreases: On proposals involving both increases and decreases in the Contract Price, overhead and profit mark-ups are required on net increases and deducted on net decreases.
5. At no time can profit be calculated on Overhead or itself, it must be calculated on direct costs of work only.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 26 01

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 27 00 DEFINITION OF CONTRACT LINE ITEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section explains in general, what is and is not included in a contract line item, and limits or cut-off points where one item ends, and another begins.

B. If no contract line item exists for a portion of work, include costs in a related item.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 LIST OF CONTRACT LINE ITEMS – BASE BID

A. Contract Line-Item Number 1: Education Center Trail

1. This item consists of work to establish the staging area as shown on the plans, demolition of the existing boardwalk, and installation of the proposed improvements as shown on the plans.
2. Measurement for payment will be determined based on percent of construction complete.
3. Payment will be made at the contract lump sum price.

B. Contract Line-Item Number 2: Bayou Coquille Trail

1. This item consists of work to establish staging areas shown on the plans, demolition of the existing boardwalk, and installation of the proposed improvements as shown on the plans.
2. Measurement for payment will be determined based on percent of construction complete.
3. Payment will be made at the contract lump sum price.

C. Contract Line-Item Number 3: Marsh Overlook Trail

1. This item consists of work to establish staging areas shown on the plans, demolition of the existing boardwalk, and installation of the proposed improvements as shown on the plans.
2. Measurement for payment will be determined based on percent of construction complete.
3. Payment will be made at the contract lump sum price.

3.2 LIST OF CONTRACT LINE ITEMS – OPTIONAL ITEMS

A. Contract Line-Item Number 4: Visitor’s Center Trail Demolition

1. This item consists of work to establish staging areas shown on the plans and demolition of the existing boardwalk.
2. Measurement for payment will be determined based on percent of construction complete
3. Payment will be made at the contract lump sum price.

B. Contract Line-Item Number 5: Palmetto Trail Demolition

1. This item consists of work to establish staging areas shown on the plans and demolition of the existing boardwalk.
2. Measurement for payment will be determined based on percent of construction complete.
3. Payment will be made at the contract lump sum price.

END OF SECTION 01 27 00

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Definitions
2. Construction Coordination
3. Submittals
4. Coordination Drawings
5. Requests for Information (RFIs)
6. NPS Project Management and Communication Software
7. Project Meetings
8. Environmental Coordination
9. Permits

B. Related Requirements:

1. Section 01 32 16 "Construction Schedule" for preparing and submitting Construction Contractor's construction schedule.
2. Section 01 73 40 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

A. Agency with Jurisdiction
B. Construction Permits – Contractor Provided
C. Government Furnished Permits

1.3 CONSTRUCTION COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components with other Construction Contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of components, including mechanical and electrical.
5. Properly plan construction operations to include permit requirements. Allow enough time to execute permit provisions to maintain work schedule, site visits, inspections, and reporting deadlines.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other Construction Contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to:

1. Preparation of Construction Contractor Construction Schedule
2. Preparation of the Schedule of Values
3. Installation and removal of temporary facilities and controls
4. Delivery and processing of submittals
5. Progress meetings
6. Permit requirements
7. Pre-installation conferences
8. Project closeout activities
9. Commissioning activities

1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of Contract Documents or standard printed data. Include following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate dimensions shown on Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Contracting Officer (CO) for resolution of such conflicts.
c. Indicate space requirements for routine maintenance and anticipated replacement of components during the life of the installation.
d. Show location and size of access doors required for access to concealed dampers, valves, and controls.
e. Indicate required installation sequences.

2. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
3. Follow NPS DSC Electronic Drawing Standards. See CAD/BIM (Computer Aided Design/Building Information Modeling) & Drafting Standards page > DSC Requirements section.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Mechanical and Plumbing Work:

   a. Sizes and bottom elevations of conduit runs, including supports systems.

   b. Dimensions of major components, such as valves and hose bibs.

2. Electrical Work:

   a. Runs of vertical and horizontal conduit.
   b. Panel board location.
   c. Location of pull boxes and junction boxes, dimensioned from column center lines.

3. Review: Contracting Officer will review coordination drawings to confirm Work is being coordinated; details of coordination are Construction Contractor's responsibility. If Contracting Officer determines coordination drawings are not prepared in scope or detail; or are otherwise deficient, Contracting Officer will inform Construction Contractor, who shall make changes and resubmit.

4. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 23 "Submittal Procedures."

C. Coordination Digital Data Files: Prepare coordination digital data files according to:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Submittal Format: Submit or post coordination drawing files using Portable Document Format (PDF) file format.
3. Contracting Officer will furnish Construction Contractor one set of digital data files (AutoCad.dwg) of Drawings for use in preparing coordination digital data files.

   a. Contracting Officer makes no representations as to accuracy or completeness of digital data files as they relate to Drawings.
   b. Digital Data Software Program: Drawings are available in AutoCad.dwg.

D. Division 1 documents:

1. Letter designating Project Superintendent
2. Construction Schedule
3. A Comprehensive Schedule of Values
4. Accident Prevention Plan
5. A List of Subcontractors for this project
6. Written statements from Subcontractors certifying compliance with applicable labor standard clauses.
7. Certificates of Insurance and Standard Form SF1413 for Contactor and all Subcontractors
8. Waste Management Plan

9. Quality Control Plan
10. Temporary Storm Water Pollution Prevention Plan (SWPP or UPPP)
11. Construction Contractor Commissioning Plan
12. Historic Preservation Treatment Plan (HPTP)
13. List of Required Construction Permits. Include the following information for each permit:
    a. Name of Permit
    b. Agency(ies) with Jurisdiction issuing the permit
    c. Information required from Government to complete permit application

E. Provide items listed to Contracting Officer at least one week prior to Pre-Construction Conference, or as directed by Contracting Officer.
1. Failure to submit items may result in:
    a. Construction conference may be cancelled, Notice to Proceed may not be issued, and Contracting Officer will consider other contractual remedies.
    b. Work shall not commence until written Notice to Proceed has been issued and Certificates of Insurance and SF1413 documents are received for Construction Contractor and all Subcontractors.

1.5 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of Contract Documents, Construction Contractor shall prepare and submit an RFI utilizing form created on NPS project management and communication software.

1. Contracting Officer will not respond to RFIs submitted by other entities controlled by Construction Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in the work.

B. Content of RFI: Include detailed, legible description of item needing information or interpretation and the following:

1. RFI number, numbered sequentially
2. Date
3. RFI subject
4. Specification Section number and title and related paragraphs, as appropriate.
5. Drawing number and detail references, as appropriate.
6. Field dimensions and conditions, as appropriate.
7. Construction Contractor's suggested resolution: If suggested resolution impacts Contract Time or Contract Sum, Construction Contractor shall state impact in RFI.
8. Construction Contractor's signature
9. Requested date for response
10. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Form: Complete and submit on NPS project management and communication software.

D. Contracting Officer’s Action: Contracting Officer will review each RFI, determine action required, and respond. Contracting Officer will determine critical nature of each RFI and issue response accordingly.

1. The following are not considered to be RFIs and will receive no action:

   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for approval of Construction Contractor's means and methods.
   d. Requests for coordination information already indicated in Contract Documents.
   e. Requests for adjustments in Contract Time or Contract Sum.
   f. Requests for interpretation of Architect's actions on submittals.
   g. Incomplete RFIs or inaccurately prepared RFIs.

2. Contracting Officer's action may include a request for additional information; time for response will date from time of receipt of additional information.
3. Contracting Officer's action on RFIs may result in need for a change to Contract Time or Contract Sum. All contract changes will be processed following terms and conditions of contract.

1.6 PROJECT MANAGEMENT AND COMMUNICATION SOFTWARE

A. Use to manage project communication and document sharing during contract period on:

1. Project directory
2. Project correspondence
3. Meeting agendas and minutes
4. Contract modifications forms and logs
5. RFI form and processing
6. Task and issue management
7. Photo documentation
8. Baseline schedule, schedule updates and calendar management
9. Submittal form and processing
10. Payment coordination documentation
11. Reminder and tracking functions
12. Archiving functions
13. Notification of submittal and RFI statuses and current responsible party
14. Permits and addendums

B. Some documents are not suitable to be shared using NPS project management and communication software. Documents containing Personal Identifying Information (PII) (i.e. certified payrolls) shall not be shared and shall be coordinated with project team as appropriate.

1.7 PROJECT MEETINGS

A. Preconstruction Conference: Before start of construction, Contracting Officer will arrange an on-site meeting with Construction Contractor. Meeting agenda will include the following as a minimum:

1. Roles & Responsibilities / Lines of Authority
2. Park rules and regulations
3. Jobsite Safety
4. Resolution of comments on required Division 1 documents
5. Coordination of Subcontractors
6. Labor law application
7. Modifications
8. Payments to Construction Contractor
9. Payroll reports
10. Contract time
11. Liquidated damages
12. Construction Contractor Performance Evaluation
13. Display of Hotline posters
14. Notice to proceed
15. Correspondence procedures
16. NPS project management and communication software
17. Acceptance/rejection of work
18. Progress meetings
19. Submittal procedures
20. NPS Final Accessibility Inspection
21. Environmental requirements
22. Permit requirements
23. As-constructed drawings/operation and maintenance (O&M) manuals.
24. Saturday, Sunday, holiday and night work.
25. Reference materials
26. Value engineering
27. Schedule of Values

B. Progress Meetings: Contracting Officer will schedule weekly meetings with Construction Contractor.

1. Attendees: In addition to Government Representatives, each Construction Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented. Participants at meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Meeting agenda will include:

    a. Approval of minutes of previous meetings
    b. Submittal status
    c. Review of off-site fabrication and delivery schedules.
    d. Requests for information (RFI) and other issues.
    e. Modifications
    f. Work in progress and projected.
        1) Status of required inspections (Special Inspections, Accessibility, etc.)
    g. Inspections of work in progress and projected (Special inspections, Accessibility, etc.)
    h. Construction Schedule update (provide updated Critical Path Method (CPM)).
    i. Status of Project Record Drawings and O&M manuals.
    j. Other business relating to work.

k. Permit requirements

C. Preinstallation Conferences: Conduct at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend meeting. Advise Contracting Officer of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for particular activity under consideration, including requirements for:

a. Contract Documents
b. Options
c. Related RFIs
d. Related Change Orders
e. Purchases
f. Deliveries
g. Submittals
h. Review of mockups
i. Possible conflicts
j. Compatibility requirements
k. Time schedules
l. Weather limitations
m. Manufacturer's written instructions
n. Warranty requirements
o. Compatibility of materials
p. Acceptability of substrates
q. Temporary facilities and controls
r. Space and access limitations
s. Regulations of agency(ies) with jurisdiction
t. Testing and inspecting requirements
u. Installation procedures
v. Coordination with other work
w. Required performance results
x. Protection of adjacent work
y. Protection of construction and personnel

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene conference at earliest feasible date.

1.8 ENVIRONMENTAL COORDINATION

A. Construction Contractor's Environmental Manager: Designate on-site party responsible for overseeing Construction Contractor's conformance to environmental goals for project and implementing procedures for environmental protection.

1. Qualifications: Minimum 3 years Construction experience on projects of similar size and scope; with environmental procedures similar to this project; familiar with environmental regulations applicable to construction operations.
2. Responsibilities: Responsibilities shall include:

    a. Compliance with applicable Federal, State, and local environmental regulations, including maintaining required documentation.
    b. Implementation of Waste Management Plan (WMP).
    c. Implementation of Indoor Air Quality (IAQ) Management Plan.
    d. Implementation of Storm Water Pollution Prevention Plan (SWPPP).
    e. Present overview of environmental issues and summarize site specific procedures relating to management plans at Preconstruction conference.
    f. Training for Construction Contractor personnel in accordance with position requirements.
    g. Monitoring and documentation of environmental procedures.

B. Perform project quality control in accordance with requirements specified in Related Sections, including:

1. Quality Requirements
2. Regulatory Requirements
3. Indoor Air Quality (IAQ) Management
4. Noise and Acoustics Management
5. Temporary Storm Water Pollution Prevention Environmental Management
6. Construction Waste Management

C. Construction Contractor's Environmental Training Program: Construction Contractor shall provide environmental training for workers performing work on project site. Training shall include:

1. Overview of environmental issues related to building industry.
2. Overview of environmental issues related to Project.
3. Review of site-specific procedures and management plans:

    a. Construction Waste Management
    b. Noise and Acoustics Management
    c. Temporary Storm Water Pollution Prevention
4. Compliance with environmental regulations: As specified in Regulatory Requirements. Submit Construction Contractor 40 CFR (Code of Federal Regulations) employee training records upon request of Contracting Officer.

D. Provide documentation for environmental procedures as specified herein and in accordance with approved Waste Management Plan, IAQ Management Plan, and Storm Water Pollution Prevention Plan.

1.9 PERMITS

A. General:

1. Permits and Responsibilities: Construction Contractor shall, without additional expense to the Government, be responsible for obtaining necessary licenses and permits, and for complying with Federal, State and municipal laws, codes, and regulations applicable to the performance of the work. Construction Contractor shall also be responsible for damages to persons or property that occur as a result of Construction Contractor's fault or negligence; and for materials delivered and work performed until completion and acceptance of the work.
2. For the purpose of this contract, Construction Contractor will not be considered an agent of the Government. Construction Contractor shall comply with appropriate Federal, State and local laws.

B. Government Furnished Permits: During development of the project's design, permits listed below were negotiated and agreed to by the Government. Terms and provisions of these permits shall be adhered to for the duration specified in each permit.

1. A permit was acquired for removing and replacing damaged boardwalks, throughout Barataria Preserve in Jefferson Parish Louisiana with identification number MVN 2024-00241-ENP. The Agency with Jurisdiction for this permit is The United States Army Corps of Engineers, New Orleans District.

C. Potential Permits: Permits listed below were identified during the design process as likely to be required based on typical means and methods of construction. The list is provided to assist Construction Contractor in determining which permits will be required for contract's chosen means and methods. The list shall not be considered complete; it is the Construction Contractors' responsibility to determine means and methods and obtain required permits. Construction Contractor shall obtain all permits required to legally conduct work.
1. Stormwater Pollution Prevention Permit – Louisiana Department of Environmental Quality

D. Coordination with Agency(ies) with Jurisdiction Issuing Permits

1. Coordination: Contact the Agency(ies) with Jurisdiction as needed and sufficiently in advance to avoid delaying work: Coordinate meetings, reporting requirements, inspections, and other requirements.

E. Administrative Procedures:

1. Coordinate scheduling and timing of required administrative provisions of project permits with Agency(ies) with Jurisdiction, Construction Manager, and Park to avoid conflicts.
2. Supply needed information to Agency(ies) with Jurisdiction issuing permits, pay fees required and provide material needed to comply with permit's conditions and provisions.
3. Upload permits to NPS project management and communication software when permits are obtained.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 16 CONSTRUCTION SCHEDULE

PART 1 GENERAL

1.1 SUMMARY

A. Section consists of Construction Schedule requirements including:

1. Schedule of Values
2. Construction Schedule Requirements.
3. Construction Schedule Updates.
4. Time Impact Analysis.

B. Purpose: The Construction Schedule ensures adequate planning, coordination, scheduling, and reporting during execution of the work by the Construction Contractor. It shall assist the Construction Contractor and Contracting Officer (CO) in monitoring the progress of the work, evaluating proposed changes, and processing Construction Contractor's monthly progress payments. It shall include the dates in the contract, phases, milestones, occupancies, holidays, weather consideration, a critical path, and the requirements of this section.

1.2 DEFINITIONS

A. Activity: A discrete part of a project identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: Allocation of the Schedule of Values for completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by the Contracting Officer.

C. Critical Path Method (CPM): Method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: Longest connected chain of interdependent activities through the network schedule that establishes minimum overall Project duration and contains no float.

E. Float: Measure of leeway in starting and completing an activity.

1. Float: Not for the exclusive use or benefit of the Government or Construction Contractor but is jointly owned.
2. Free Float: Amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total Float: Measure of leeway in starting or completing an activity without adversely affecting planned Project completion date.

F. Resource Loading: Allocation of manpower and equipment necessary for completion of an activity as scheduled.

G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

1.3 SUBMITTALS

A. Electronic Copies: Schedules and reports submitted shall be posted on the NPS project management and communication software as PDF (portable document format) files. The intent of the Government is to limit the number of printed reports to those determined by the project team as essential.

B. Schedule of Values: After contract award and before Pre-Construction conference, submit schedule of dollar values based on Contract Price Schedule.

C. Construction Baseline Schedule: After contract award and before Pre-Construction conference, submit two paper copies of baseline schedule, large enough to show entire schedule for entire construction period. Utilize Schedule of Values in preparation of Construction Baseline Schedule.

D. Critical Path Method (CPM) Reports: Concurrent with CPM schedule, submit three paper copies of the following computer-generated reports. For each activity, include activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of predecessor and successor tasks for activities sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.

E. Construction Schedule Updates: On or before 7th day preceding progress payment request date, submit estimates of percent completion of each schedule activity and necessary supporting data. Provide two paper copies.

F. Construction Schedule Revisions and Time Impact Analysis: For each Construction Schedule revision, submit two paper copies of a Time Impact Analysis. Incorporate a Fragmentary Network (Fragnet) into currently accepted Construction Schedule demonstrating proposal to incorporate a modification, change, delay, or Construction Contractor request.

1.4 QUALITY ASSURANCE

A. Construction Contractor shall meet with Contracting Officer on day of the preconstruction conference to go over:

1. Review software limitations, content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, interim milestones, and partial Government occupancy/substantial completions.
4. Review delivery dates for Government-furnished products.
5. Review schedule for work of separate Government contracts.
6. Review time required for review of submittals and re-submittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for completion and startup procedures.
9. Review time required for obtaining and activating permits.
10. Review and finalize list of construction activities to be included in schedule.
11. Review baseline schedule comments, resolve issues and progress on incorporating them
12. Review procedures for updating schedule.
13. Discuss reporting requirements and establish protocol for naming and transmitting electronic schedules.

B. Construction Contractor's Schedule Representative: Before the preconstruction conference, designate an authorized representative to be responsible for preparing and maintaining the Construction Schedule. Submit resume outlining qualifications of Scheduler to Contracting Officer for acceptance. Scheduler shall have prepared and maintained at least 5 previous schedules of similar size and complexity similar to this Contract, demonstrating proficiency of using scheduling software. Authorized representative will be responsible for preparing the Baseline Schedule, required updates, revisions, Time Impact Analyses, and reports.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate Construction Contractors.

B. Coordinate Construction Baseline Schedule with Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. In developing Construction Baseline Schedule, ensure Subcontractor’s work at all tiers, and prime Construction Contractor’s work, is included and coordinated.
2. Secure time commitments for performing critical elements of work from parties involved.
3. Coordinate each construction activity in network with other activities and schedule in proper sequence.

PART 2 PRODUCTS

2.1 SCHEDULE OF VALUES

A. Breakdown each lump-sum item into component work activities used in the schedule for which progress payments may be requested. Work activities broken out within schedule of values shall be integrated into and made a logical part of the construction baseline schedule. Total costs for the component work activities shall equal contract price for that lump-sum item. Contracting Officer may request data to verify accuracy of dollar values. Include mobilization, general condition costs, overhead and profit in the total dollar value of unit price items and in the component work activities for each lump-sum item. Do not include mobilization, general condition costs, overhead or profit as a separate item.

B. Do not break down unit price items. Use only the contract price for unit price items.

C. Total cost of all items shall equal the contract price. The Schedule of Values will form the basis for progress payments and the Construction Schedule.

2.2 CONSTRUCTION SCHEDULE REQUIREMENTS

A. Construction Baseline Schedule: Prepare Construction Baseline Schedule using a computerized, cost and resource-based**,** time-scaled Critical Path Method network analysis diagram for the Work.

1. Develop and finalize Construction Baseline Schedule so it can be accepted for use no later than **30** days after date established for the Notice of Award.

    a. Failure to include any work item required for performance of this Contract shall not excuse Construction Contractor from completing work within applicable completion dates, regardless of Governments acceptance of schedule.

2. Establish procedures for monitoring and updating Construction Baseline Schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

B. Construction Baseline Schedule Preparation: Prepare a list of all activities required to complete the Work. Using preliminary Critical Path Method network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate estimated duration, sequence requirements, and relationship of each activity in relation to other activities.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the Critical Path Method schedule within the limitations of the Contract Time.

4. Show sequence and interdependence of activities required for completion of work. Ensure work sequences are logical and Construction Baseline Schedule shows a coordinated plan of the work.
5. Resource loading of each activity shall include personnel by labor category and equipment type and capacity proposed to complete the activity in duration shown.
6. Consider seasonal weather conditions in planning and scheduling work influenced by high and low ambient temperatures, wind, or precipitation to ensure completion of work within contract time.
7. Time Frame: Proposed duration assigned to each activity shall be Construction Contractor's best estimate of time required to complete activity considering the scope and resources planned for activity.

    a. An early finish date may be shown but the late finish date shall be same date as last day of contract period. An early completion schedule shall contain:

        1) Insert an activity titled "Project Float" as a successor to last activity in early project completion schedule network.
        2) Add a milestone titled "Contract End Date" as a successor to the activity "Project Float".
        3) Add duration to the activity "Project Float" as required so the milestone "Contract End Date" equals the last day of Contract Period.

    b. Contract completion date shall not be changed by submission of a schedule that shows an early completion date.
    c. Construction Contractor shall limit use of lead or lag duration’s between schedule activities.
    d. Project Calendars: Develop and incorporate the following calendars:

        1) Administrative Calendar: Include calendar based on a 7-day week to be used on activities based on calendar days. Apply this calendar to administrative tasks or other tasks not affected by non-working days (Federal Holidays, weather, etc.).
        2) Project Calendar: Include calendar based on planned work week for the project. Include Federal Holidays, weekends, and non-workdays indicated in contract documents. Apply this calendar to activities not anticipated to be affected by weather. Be clear when identifying number of work days in work week.
        3) Weather Calendar: Utilize Project Calendar and show anticipated normal downtime related to weather as non-working time. Weather days shall be based on data for local area from a reliable source like the National Oceanic and Atmospheric Administration (NOAA), National Park Service records, or source acceptable to Contracting Officer. Apply this calendar to activities anticipated to be affected by weather.

    e. Activity Duration: Define so no activity is longer than 14 days, except for non-construction activities including mobilization, shop drawings and submittals, fabrication and delivery of materials and equipment.
    f. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 calendar days, as separate activities in the schedule. Procurement cycle activities can include submittals, approvals, purchasing, fabrication, and delivery.

g. Submittal Review Time: Include review and re-submittal times indicated. Coordinate submittal review times in Construction Baseline Schedule.
h. Substantial Completion: Allow time for Government administrative procedures necessary for certification of Substantial Completion. (For more information, refer to Specification 01 77 00 "Closeout Procedures.")

8. Constraints: Include constraints and work restrictions indicated in Contract Documents and as follows in schedule and show how the sequence of Work is affected.

a. Phasing: Arrange list of activities on schedule by phase.
b. Work under More Than One Contract: Include a separate activity for each contract.
c. Work Restrictions: Show effect of the following on the schedule:

1) Coordination with existing construction
2) Limitations of continued occupancies
3) Uninterruptible services
4) Partial occupancy before Substantial Completion
5) Use of premises restrictions
6) Provisions for future construction
7) Seasonal variations
8) Environmental control
9) Permit provisions

d. Work Stages: Indicate important stages of construction for each major portion of the Work.

1) Subcontract awards
2) Submittals
3) Purchases
4) Mockups
5) Fabrication
6) Sample testing
7) Deliveries
8) Installation
9) Tests and inspections
10) Adjusting
11) Curing
12) Building flush-out.
13) Building commissioning activities.

9. Milestones: Include milestones indicated in Contract Documents in schedule, including, but not limited to, Notice to Proceed, Substantial Completion.

C. Joint Review, Revision, and Acceptance:

1. Within seven calendar days of receiving Construction Contractor's proposed Construction Baseline Schedule, Contracting Officer shall review initial Construction Baseline Schedule.
2. Within seven calendar days after review, Construction Contractor shall revise and resubmit Construction Baseline Schedule in accordance with comments presented from review.
3. In the event the Construction Contractor fails to define any element of work, activity, or logic and the Contracting Officer review does not detect this omission or error, such

omission or error, when discovered by Construction Contractor or Contracting Officer, shall be corrected by Construction Contractor within seven calendar days and shall not affect contract period.

4. Upon acceptance of the Construction Baseline Schedule, Contracting Officer saves schedule as a baseline and updates on a monthly basis. Construction schedule update will be used to evaluate Construction Contractor's monthly applications for payment based upon information developed at monthly Construction Schedule update meeting.

D. Cost Correlation: In the heading of the schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of Work performed as of dates used to prepare payment requests.

1. Construction Contractor shall assign cost to construction activities on Construction Baseline Schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Contracting Officer’s approval, be assigned to fabrication and delivery activities. Costs shall be included for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable).
2. Each activity cost shall reflect an accurate value based on the Contract Price Schedule.
3. Total cost assigned to activities shall equal total Contract Price.

E. Recovery Schedule: When periodic schedule update indicates Work is 14 or more calendar days behind current accepted schedule, a separate recovery schedule indicating means by which Construction Contractor intends to regain compliance with the schedule shall also be submitted. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery shall be accomplished.

F. Computer Software: Prepare schedules using a program developed specifically to manage construction schedules.

1. Use Microsoft Project or Primavera, for (Windows 7 and newer.)

PART 3 EXECUTION

3.1 CONSTRUCTION SCHEDULE UPDATES

A. Progress Meeting Updates: Provide a 2-week look-ahead schedule, derived from the currently accepted schedule, before each weekly progress meeting. Utilize look-ahead schedule to facilitate and take notes on discussions held during progress meeting.

B. Monthly Schedule Updates:

1. General: Update Construction Schedule on monthly basis to reflect construction progress and activities throughout entire contract period and until project substantial completion. The status date of each schedule update shall be the 7th day preceding the progress payment request date.
2. Procedure: Construction Contractor shall meet with Contracting Officer each month at Construction Schedule update meeting to review progress made through the status date of

the Construction Schedule update, including dates activities were started or completed and percentage of work completed on each activity started or completed.

3. Reports: Concurrent schedule revisions, prepare tabulated reports showing:

    a. Identification of activities that have changed
    b. Changes in early and late start dates
    c. Changes in early and late finish dates
    d. Changes in activity durations in workdays
    e. Changes in the critical path
    f. Changes in total float or slack time
    g. Changes in the Contract Time

4. Narrative: Report shall include a brief description of actual progress made during update period; actual and potential delaying activities; impediments to progress; issues related to inclement weather; progress toward established milestones and project float. Report shall include a brief description of work anticipated to be performed in the next month. Minor revisions to the schedule should be identified for evaluation and acceptance or rejection.
5. As Work progresses, indicate Actual Completion percentage for each activity.
6. If schedule update shows a late finish date after contract completion date, include:

    a. Known delays
    b. Actions to get back on schedule
    c. Pending modifications
    d. Impediments or constraints affecting progress

7. Progress Payments: Monthly updating of the currently accepted Construction Schedule shall be an integral part of the process upon which progress payments will be made. If Construction Contractor fails to provide schedule updates or revisions, a portion of the monthly payment may be retained until corrections have been made.

C. Distribution: Distribute copies of accepted schedule to Contracting Officer, Contracting Officers Representative, Construction Management Representative, Subcontractors, testing and inspecting agencies, and other parties identified by Construction Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to same parties and post in same locations. Delete parties from distribution when they have completed their assigned portion of the Work.

D. Construction Schedule Revisions:

1. Required Revisions: If, as a result of the monthly schedule update, it appears the currently accepted Construction Schedule no longer represents actual prosecution and progress of the work, Contracting Officer will request, and Construction Contractor shall submit, a revision to the Construction Schedule. Construction Contractor may also request reasonable revisions to currently accepted Construction Schedule in event the Construction Contractor's planning for the work is revised. If Construction Contractor desires to make changes, Construction Contractor shall notify Contracting Officer in writing, stating reason for proposed revision. Accepted revisions shall be incorporated into currently accepted Construction Schedule for next monthly schedule update.

2. Procedure: If revision to currently accepted Construction Schedule is contemplated, Construction Contractor or Contracting Officer shall advise the other in writing at least seven calendar days prior to next monthly schedule update meeting, describing revision and reasons for the revision. Government-requested revisions will be presented in writing to the Construction Contractor, who shall respond in writing within seven calendar days.
3. Reports: Concurrent with making revisions to schedule, prepare tabulated reports showing:

    a. Identification of activities changed
    b. Changes in early and late start dates
    c. Changes in early and late finish dates
    d. Changes in activity durations in workdays
    e. Changes in critical path
    f. Changes in total float or slack time

3.2 TIME IMPACT ANALYSIS FOR CONTRACT MODIFICATIONS CHANGES DELAYS AND CONSTRUCTION CONTRACTOR REQUESTS:

1. Requirements: When contract modifications or changes are initiated, delays experienced, or Construction Contractor desires to revise currently accepted Construction Schedule, Construction Contractor shall submit to Contracting Officer a written time impact analysis illustrating the influence of modification, change, delay, or Construction Contractor request on contract time.
2. Time Extensions: Activity delays, resulting in a late completion date projection, shall not automatically mean an extension of contract time is warranted or due to Construction Contractor. It is possible a modification, change, or delay will not affect existing critical path activities or cause non-critical activities to become critical. A modification, change, or delay may result in absorbing a part of available total float that may exist within an activity chain of the Schedule, not causing any effect on contract time. Time extensions will be granted in accordance with terms of contract.
3. Extension of contract time will be granted only to the extent the equitable time adjustments to activity or activities affected by modification, change, or delay exceeds total (positive or zero) float available on a particular activity.
4. Procedure: Each time impact analysis shall be submitted within time period stated in a request for proposal, or time period designated under the clauses entitled Changes or Default. In cases where Construction Contractor does not submit a written request for extension of time and a time impact analysis within the designated time, it is mutually agreed that the particular modification, change, delay, or Construction Contractor request does not require an extension of the contract time. Upon acceptance, time impact analysis shall be incorporated into currently accepted Construction Schedule at next monthly schedule update.
5. Contract Modifications: Prepare time-impact analysis using fragnets to demonstrate effect of proposed change on overall Construction Schedule for each proposed contract modification concurrent with submission.

END OF SECTION 01 32 16

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 32 33 PHOTO DOCUMENTATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for:

1. Existing condition images
2. Periodic construction images

B. See Section 01 77 00 "Closeout Procedures" for a complete listing of closeout documents.

1.2 SUBMITTALS

A. Construction Images: Submit images electronically within 7 days of taking the image. Include:

1. Date, time and number (sequentially number all images) in filename.
2. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
3. Submit digital images exactly as originally recorded in digital camera, without alteration, or modifications using image-editing software.

B. Closeout: Submit complete set of digital image electronic files as a Project Record Document**.** Submit on Digital Video Disc (DVD).

1. Provide index as separate file on Disc. List each image as a file name with number, date, and time. Include description and or vantage point image was taken.
2. Submit images that have the same aspect ratio as the sensor, un-cropped.

PART 2 PRODUCTS

2.1 FORMAT REQUIREMENTS

A. Media: DVD-R Archival Gold

B. Media Labels: Archival DVD labeling markers, archival labels, or direct print.

C. Images: Provide sRGB (standard Red Green Blue) color images in JPEG (Joint Photographic Experts Group) format. Minimum sensor size of 8 megapixels, and at image resolution of not less than 3200 by 2400, and 300 dpi (dots per inch).

PART 3 EXECUTION

3.1 CONSTRUCTION IMAGES

A. General: Take digital images using the maximum range of depth of field, in-focus, to clearly show the Work. No blurry or out-of-focus areas accepted.

1. Maintain index with each set of Construction images and identify the number, date, time, and description for each.
2. Maintain one set of images accessible in field office at Project site available for reference.

B. Existing Condition Images: Before starting construction, take color digital images of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Flag construction limits before recording construction images.
2. Take eight separate images to show existing conditions adjacent to property before starting Work.
3. Take eight separate images of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.

C. Periodic Construction Images: Take 12 color, digital images monthly, coinciding with cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last images were taken.

D. Additional Images: Contracting Officer may issue requests for additional images.

1. Three days advance, where feasible.
2. In emergency situations, take additional images within 24 hours of request.
3. Additional images include, but are not limited to:

a. Immediate follow-up when on-site events result in construction damage or losses.
b. Fabrication locations away from Project site.
c. Substantial Completion of a major phase or component of Work.
d. Extra record images at time of final acceptance.

END OF SECTION 01 32 33

SECTION 01 33 23 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 DEFINITIONS

A. Action Submittals: Written, graphic information, and physical samples that require Government's responsive action.

B. Informational Submittals: Written information that does not require Government's responsive action. Submittals may be rejected for not complying with requirements.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 GENERAL SUBMITTAL PROCEDURES

A. General: Prepare and submit submittals required by individual Specification Sections and in some cases as requested in drawings. Types of submittals are indicated in individual specific sections.

1. Contracting Officer (CO) reserves right to require submittals in addition to those called for in individual sections.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Review for legibility, accuracy, completeness, and compliance with Contract Documents.

1. Coordinate submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of Work so processing will not be delayed because of need for concurrent review coordination.

    a. Contracting Officer reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittal List: Submittal list is attached to the appendices of the project specifications. The intent is to provide an overall summary of submittal requirements. The requirements of individual Specification Sections and terms and conditions of the Contract still apply regardless of what is shown on submittal list.

D. Processing Time: Allow enough time for submittal review and re-submittals. Contract time extensions will not be authorized if submittals are not transmitted with enough time to permit processing, including re-submittals.

1. Action Submittals

a. Initial Review: Allow 30 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required.
b. Re-submittal Review: Allow15 days for review of each re-submittal.

2. Informational submittals

a. Review: Allow 10 days for review of each submittal.

E. Approved Equal Submittal Requirements:

1. For each item proposed, submit supporting data, including:

a. Drawings and samples as appropriate.
b. Comparison of the salient characteristics of the proposed item with that specified.
c. Changes required in other elements of the work because of the substitution.
d. Name, address, and telephone number of vendor.
e. Manufacturer's literature regarding installation, operation, and maintenance, including schematics for electrical and hydraulic systems, lubrication requirements, and parts lists. Describe availability of maintenance service, and state source of replacement materials.

2. A request for approval constitutes a representation that Construction Contractor:

a. Has investigated the proposed item and determined that it is equal or superior in all respects to that specified.
b. Will provide the same warranties for the proposed item as for the item specified.
c. Has determined that the proposed item is compatible with interfacing items.
d. Will coordinate installation of an approved item and make changes required in other elements of the work because of the substitution.
e. Waives claims for additional expenses that may be incurred as a result of the substitution.

F. Submittals: Identify and incorporate information in each submittal file as follows:

1. Transmittal Form (CM-16): Utilize NPS Transmittal Form for all submittals. No action will be taken on a submittal item unless accompanied by this Transmittal Form.
2. Physical samples: Complete Transmittal Form and deliver physical sample to the Contracting Officer (or designee) on site for processing. All comments and actions will be documented on the Transmittal Form.

G. Identification: Submittal number or other unique identifier, including revision identifier.

1. Submittal number shall use a sequential number (e.g. .001). Re-submittals shall include alphabetic suffix after another decimal point (e.g. .001.A).

H. Re-submittals: Make re-submittals using same process used with initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in the title block on the Transmittal Form (CM-16) and clearly indicate extent of revision.
3. Re-submit submittals until they are marked "Approved" or "Approved with notations".

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, and others as necessary for performance of construction activities.

J. Use for Construction: Use only final submittals with mark indicating "Approved" or "Approved with notations". Ensure notations have been incorporated and, at a minimum, keep one copy of final approved submittal on site for use during construction.

1.4 CONSTRUCTION CONTRACTOR'S USE OF CAD/BIM FILES

A. General: At Construction Contractor's written request, copies of CAD/BIM (Computer Aided Design/Building Information Modeling) files will be provided to Construction Contractor for use in connection with Project, subject to:

1. Files provided as is; no format or other changes to files or changes to objects in the drawing will be done by the Government

2. CAD/BIM files are not part of the contract documents and shall be used for information purposes only.

PART 2 PRODUCTS

2.1 ACTION SUBMITTALS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each submittal to show which products and options are applicable.
3. As applicable, include:

a. Manufacturer's product specifications.
b. Manufacturer's installation instructions: When Contract Documents require compliance with manufacturer's printed instructions, provide one complete set of instructions to Contracting Officer and keep another complete set of instructions at the project site until substantial completion.

c. Manufacturer's catalog cuts: Submit only pertinent pages; mark each page of standard printed data to identify specific products proposed for use.
d. Wiring diagrams showing factory-installed wiring.
e. Printed performance curves.
f. Operational range diagrams.
g. Compliance with specified referenced standards.
h. Testing by recognized testing agency.

4. Submit product data in PDF (portable document format) file format before or concurrent with samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in Contract Documents. As applicable, include:

a. Dimensions
b. Identification of products
c. Fabrication and installation drawings
d. Roughing-in and setting diagrams
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring
f. Shopwork manufacturing instructions
g. Templates and patterns
h. Schedules
i. Notation of coordination requirements
j. Notation of dimensions established by field measurement
k. Relationship to adjoining construction clearly indicated
l. Seal and signature of professional engineer if specified
m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring

2. Submit shop drawings as PDF electronic file

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Complete and post the Transmittal Form (CM-16) on the NPS project management and communication software website for processing and documentation of action on submitted samples.
3. Identification: Attach label on unexposed side of Samples that includes:

a. Generic description of Sample
b. Product name and name of manufacturer
c. Sample source
d. Submittal Number and title of appropriate Specification Section

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing full range of colors, textures, and patterns available.

    a. Number of Samples: Submit **two** full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Contracting Officer will return with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit four sets of Samples. Contracting Officer will retain three Sample sets; remainder will be returned.

D. Construction Materials: Construction Contractor is encouraged to submit products made from recycled or environmentally responsible material. Every effort will be made by NPS to approve these materials.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by individual Specification Sections.

1. Post informational submittals as PDF electronic files directly to the NPS project management and communication software.
2. Certificates and Certifications: Provide a notarized statement with signature of entity responsible for preparing certification. Certificates and certifications shall be signed by officer or other individual authorized to sign documents on behalf of that entity.
3. Informational submittals that do not comply with requirements specified in Contract Documents will be rejected and one copy will be returned.

B. Coordination Drawings: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."

C. Construction Contractors Construction Schedule: Comply with requirements specified in Section 01 32 16 "Construction Schedule."

D. Accident Prevention Plan: Comply with requirements specified in Section 01 35 23 "Safety Requirements."

E. Schedule of Values: Comply with requirements specified in Section 01 32 16 "Construction Schedule."

F. Waste Recycling Plan: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

G. Quality Control Plan: Comply with requirements specified in Section 01 40 00 "Quality Requirements."

H. Storm Water Pollution Prevention Plan: Comply with requirements specified in Section 01 57 23 "Temporary Storm Water Pollution Prevention" and storm water permit requirements identified in Section 01 31 00 "Project Management and Coordination."

I. Qualification Data: Prepare written information demonstrating capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

J. Welding Certificates: Prepare written certification that welding procedures and personnel comply with Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on American Welding Society (AWS) forms. Include names of firms and personnel certified.

K. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying Installer complies with Contract Documents and, where required, is authorized by manufacturer for this specific Project.

L. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying manufacturer complies with Contract Documents. Include evidence of manufacturing experience where required.

M. Product Certificates: Prepare written statements on manufacturer's letterhead certifying product complies with Contract Documents.

N. Material Certificates: Prepare written statements on manufacturer's letterhead certifying material complies with Contract Documents.

O. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in Contract Documents.

P. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Q. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

R. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in Contract Documents.

S. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

T. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in Contract Documents.

U. Design Data: Prepare written and graphic information, including performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

V. Manufacturer's Instructions: Prepare written or published information documenting manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

W. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. As applicable, include:

1. Statement on condition of substrates and their acceptability for installation of product.
2. Summary of installation procedures being followed, compliance with requirements and, if not, what corrective action was taken.
3. Results of operational and other tests and a statement of whether observed performance complies with the requirements.

X. Permit Compliance Products: Prepare required information for compliance with permit provisions. Products include written notification of project startup, suspension, and completion of work; photo documentation of site conditions; reports; and drawings.

PART 3 EXECUTION

3.1 CONSTRUCTION CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of Contract and for compliance with Contract Documents. Note corrections and field dimensions.

3.2 CONTRACTING OFFICER'S ACTION

A. General: Submittals will be disapproved without technical review if identification information is missing, not filled in, or if placed on back of submittal; an incorrect format of submittals is provided; transmittal form is incorrectly filled out; submittals are not coordinated; or submittals do not show evidence of Construction Contractor's approval.

1. Any work done or orders for materials or services placed before approval shall be at Construction Contractor's own risk.

B. Action Submittals: Contracting Officer will review each submittal, generate comments on corrections or modifications required, and indicate appropriate action on the Transmittal Form (CM-16). Submittal will be marked as defined below:

1. APPROVED: Acceptable with no corrections.
2. APPROVED WITH NOTATIONS: Minor corrections or clarifications required. Comments are clear and no further review is required. Construction Contractor shall address review comments when proceeding with the work.
3. DISAPPROVED - RESUBMIT: Rejected as not in accordance with the contract or as requiring major corrections or clarifications. Contracting Officer will identify reasons for disapproval. Construction Contractor shall revise and resubmit with changes clearly identified.

C. Informational Submittals: Contracting Officer will review each submittal and will either accept or reject it.

D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.

END OF SECTION 01 33 23

APPENDIX TO 01 33 23 - OVERALL SUMMARY OF SUBMITTALS

From Section 01 31 00 – Project Management and Coordination

1. Coordination Drawings
2. Coordination Drawing Organization
3. Coordination Digital Data Files
4. Letter designating Project Superintendent
5. List of Subcontractors
6. Written statements from Subcontractors certifying compliance with applicable labor standard clauses.
7. Certificates of Insurance and Standard Form SF 1413 for Contractor and all Subcontractors
8. Waste Management Plan
9. Constrution Contractor Commissioning Plan

From Section 01 32 16 – Construction Schedule

1. Electronic Schedule
2. Schedule of Values
3. Construction Baseline Schedule
4. Critical Path Method Activity Report
5. Critical Path Method Logic Report
6. Critical Path Method Total Float Report
7. Construction Schedule Updates
8. Constrution Schedule Revisions and Time Impact Analysis

From Section 01 32 33 – Photo Documentation

1. Construction Images

From Section 01 35 13.22 – Archaeological Protection

1. Daily Work Schedule

From Section 01 35 23 – Safety Requirements

1. Accident Prevent Plan

From Section 01 35 91 – Historic Preservation Treatment Procedures

1. Historic Preservation Treatment Plan
2. Alternative Methods and Materials
3. Photographs or Videotape

From Section 01 40 00 – Quality Requirements

1. Quality Control Plan
2. Qualification Data
3. Contractor Quality Control Daily Reports
4. Test Reports
5. Accessibility Inspection Report
6. Off-Site Inspection Reports
7. Permits, Licenses and Certificates

From Section 01 57 23 – Temporary Storm Water Pollution Prevention

1. SWPPP
2. UPP
3. Inspection Schedule of Pollution Prevention Measures

4. Inspection Schedule of Storm Water Pollution Prevention Measures
5. Erosion Control Products

From Section 01 67 00 – Product Requirements

1. Affirmative Procurement Reporting Form
2. Product Environmental Data
3. Material Safety Data Sheets
4. Chain of Custody Documentation for Sustainable Forestry

From Section 01 73 40 – Execution

1. Certificate of Compliance of Location and Elevation of Improvements
2. Landfill Receipts
3. Certified Surveys
4. Quantity Surveys

From Section 01 74 19 – Construction Waste Management

1. Waste Management Plan
2. Progress Documentation
3. Waste Reduction Calculations
4. Landfill and Incinerator Disposal Records
5. Updated Project Waste Management Plan Worksheet
6. Manifests, Weight Tickets, Receipts, and Invoices Identifying Project and Waste Material
7. Summary of Waste Management Plan Worksheet

From Section 01 77 00 – Closeout Procedures

1. Warranties, Guarantees, Bonds, Certifications
2. Project Record Documents
3. Extra Materials
4. Pre-functional checklists, performance testing reports

From Section 01 78 23 – Operations and Maintenance Data

1. Operations and Maintenance Manual

From Section 02 41 16 – Structure Demolition

1. Proposed Protection Measures
2. Demolition Plans
3. Landfill Records

From Section 03 33 00 – Cast-In-Place Concrete

1. Mix Design
2. Delivery Tickets
3. Test Data
4. Mill Tests for Cement
5. Admixture Certification
6. Aggregate Gradation Test Results and Certification
7. Materials and Methods for Curing

From Section 05 50 00 – Metal Fabrications

1. Shop Drawings

From Section 06 05 73 – Treated Wood Preservatives – Pressure Treated Wood

1. Product Data
2. Preservative Treatment Certification

From Section 06 10 00 – Rough Carpentry

1. Shop Drawings
2. Nailers and Nailing Strips Product Data
3. Treated Lumber Product Data
4. Design Data
5. Preservative-treated Lumber and Plywood Test Reports
6. Certificates of Lumber Grade

From Section 06 15 00 – Thermally Modified Top Rail

1. Product Data
2. Samples

From Section 06 61 00 – Pultruded Pedestrian Grating

1. Shop Drawings
2. Manufacturer's Shop Drawings
3. Manufacturer's Published Literature
4. Samples

From Section 12 93 00 – Site Furnishings

1. Product Data
2. Shop Drawings

From Section 22 10 00 – Plumbing Piping

1. Shop Drawings
2.

From Section 26 00 10 – Electrical General Requirements

1. Shop Drawings

From Section 26 05 00 – Common Work Results for Electrical

1. Shop Drawings
2. As-Built Drawings

From Section 31 25 00 – Sediment Control

1. Turbidity Control Plan
2. Product Data
3. Material Certificates

From Section 31 32 19 – Nonwoven Geotextile Stabilization and Separation Fabric

1. Material Certificates
2. Manufacturer Quality Control Test

From Section 31 62 19 – Composite Piles

1. Shop Drawings
2. Product Data
3. Color Samples
4. Certifications

5. Pile Driving Records

From Section 32 15 00 – Aggregate Surfacing

1. Certificate of Compliance
2. Test Reports

END OF APPENDIX TO 01 33 23

SECTION 01 35 13.22 ARCHEOLOGICAL PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section consists of protecting archeological resources contained in soil deposits. See sheet G1.2 of the plans for more details.

1.2 DEFINITIONS

A. Archeological Resources: Archeological resources are physical evidence of past human activity, including evidence of effects of that activity on the environment. Archeological resources represent both prehistoric and historic time periods, found above and below ground and under water.

B. Archeologically Sensitive Areas: Areas having potential to contain significant (National Register eligible) archeological resources. If National Register eligible or listed archeological resources could not be avoided, an appropriate mitigation strategy would be developed in consultation with state historic preservation officer and, if necessary, associated American Indian tribes.

C. Non-sensitive Areas: Areas with little potential of containing significant (National Register eligible) archeological resources.

D. Archeological Monitor: An NPS archeologist or qualified staff member designated to oversee construction activities that could disturb archeological resources.

E. Archeological Resources Protection Act (ARPA) of 1979 (Public Law (P.L.) 96-95; 93 United States Statues at Large (Stat.) 712): defines archeological resources as any material remains of past human life or activities that are of archeological interest and at least 100 years old; Section 4 of the statute describes the requirements that must be met before Federal authorities can issue a permit to excavate or remove any archeological resource on Federal or Indian lands; the curatorial requirements of artifacts, and other materials excavated or removed.

1.3 SUBMITTALS

A. Daily Work Schedule: Detail construction work in archeologically sensitive areas. Submit to Contracting Officer (CO) 30 days before start of ground disturbing site work.

1.4 QUALITY ASSURANCE

A. At least one week before on-site work begins, Contractor shall meet with Contracting Officer and Archeological Monitor to discuss Daily Work Schedule, equipment, and special methods used in

archeologically sensitive areas. Contractor shall ensure approved Daily Work Schedule is followed throughout construction.

PART 2 PRODUCTS

2.1 DAILY WORK SCHEDULE

A. Daily Work Schedule is required for work occurring within archeologically sensitive areas. Include all work that is to occur within the area and key the schedule to the drawings to include:

1. Starting and ending dates of ground-disturbing construction.
2. Locations of temporary facilities, such as barriers, field offices, staging areas, sanitary facilities, borrow pits, and haul and access roads.
3. Types of construction, such as clearing, topsoil stripping, structure or trench excavation, landscaping, and post construction clean-up.
4. Methods and equipment used for each type of construction.
5. Plan for relocating work in the event of temporary work stoppages at each archeologically sensitive area

PART 3 EXECUTION

3.1 BARRICADES

A. Comply with requirements specified in Section 01 50 00 "Temporary Facilities and Controls."

3.2 OBSERVATION

A. Archeological Monitor will observe ground-disturbing site work, including construction of temporary facilities, at archeologically sensitive areas, from a safe location mutually agreed on by Contractor and Monitor. As new ground is broken, Monitor will examine excavated materials, using construction layout centerline and perimeter staking as a reference point to record locations of findings.

3.3 DISCOVERY OF RESOURCES

A. Should construction unearth previously undiscovered cultural resources, work shall be stopped in the area of discovery and park managers shall consult with the State Historic Preservation Officer and the advisory council on historic preservation, as necessary, according to 36 CFR 800.13. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provision outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 and related implementing regulations at 43 CFR shall be followed. Refer to the Environment/ Cultural Resources Notes on the General Notes Plan Sheet.

B. If resources are discovered while Archeological Monitor is absent, stop work immediately and report the discovery to the Contracting Officer.

3.4 INADVERTENT DISCOVERY PROCEDURES

A. Although an attempt has been made to locate and evaluate archaeological sites and/or components prior to construction activities, there is a potential that previously unidentified archeological sites, components, and/or human remains would be identified during construction activities.

B. In the event that construction activities inadvertently discover historic or archaeological artifacts, such as but not limited to, pottery or ceramics, stone tools or metal implements, dugout canoes, human bone or any other physical remains that could indicate a previously unidentified archeological site, component, and/or human remains, all construction work will stop in the immediate area. Work shall not resume in the immediate area until the appropriate authorities and tribes are notified and consulted on the artifacts of interest.

C. The Project Director, Construction Foreman, or their designee would immediately notify the NPS. No construction work would continue in the area until the archeological site, component, and/or human remains were evaluated by the NPS to determine if it meets eligibility criteria of the National Register of Historic Places (NRHP). Consultation with the appropriate State Historic Preservation Office (SHPO), Tribal Historic Preservation Office (THPO)s and other interested Native American groups would be initiated by the NPS and a determination as to the disposition of these remains and/or associated funerary objects would be determined in consultation with the SHPO/THPOs. Any willful destruction of the archeological site, component, and/or human remains could result in the prosecution of individuals under the Archeological Resource Protection Act of 1979 (16 U.S.C. 470), and other statutes that protect the Park's cultural resources.

3.5 WORK STOPPAGE

A. Contractor shall plan, schedule, and execute work to prevent stoppages at one area from stopping all work at construction site.

END OF SECTION 01 35 13.22

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 35 23 SAFETY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes establishing an effective accident prevention program and providing a safe working environment for personnel and visitors.

1.2 CONDITIONS PRESENT FOR PROJECT

A. The project is located in a national preserve with an abundance of wildlife including, but not limited to wintering waterfowl, wading birds, migrating shorebirds, bald eagles, various species of snakes, alligators, wild hogs, deer, tri-colored bats, owls, etc.

B. The park may contain poisonous plants including, but not limited to poison ivy, poison oak, poison sumac, poison hemlock, nightshades, and giant hogweed.

C. Seasonal flooding and tidal influences on the water level may cause problems during construction.

D. Heat and humidity during the summer months with temperatures exceeding 100°F.

1.3 SUBMITTALS

A. Accident Prevention Plan (APP): Submit APP after contract award and before Pre-Construction conference. Contracting Officer (CO) will review proposed APP. If APP requires any revisions or corrections, Contractor shall resubmit Plan within 10 days. No progress payments will be made until the APP is accepted.

1.4 QUALITY ASSURANCE

A. Comply with contract clauses "Accident Prevention" and "Permits and Responsibilities." In case of conflicts between Federal, State, and local safety and health requirements, the most stringent shall apply. Onsite equipment shall meet 29 CFR 1926 (Code of Federal Regulations) (Occupational Safety and Health Administration (OSHA)) requirements. Failure to comply with requirements of this section and related sections may result in suspension of work.

B. Site Safety Supervisor:

1. Designate authorized onsite representative for preparation and maintenance of the APP.
2. Shall be responsible for:

    a. Implementation and enforcement of the APP
    b. Daily safety inspections
    c. Conducting and documenting weekly and monthly safety meetings

d. Review of safety requirements at progress meetings
e. Compilation and maintenance of Safety Data Sheets (SDS) and safety reference materials
f. Tracking and resolution of safety violations
g. Site personnel and visitor compliance with site safety and health requirements and APP
h. Investigation and reporting of accidents and injuries

C. Qualifications of Employees:

1. Physically and able to perform their assigned duties in a safe manner.
2. Do not allow employees whose ability or alertness is impaired because of prescription or illegal drug use, fatigue, illness, intoxication, or other conditions that may expose themselves or others to injury to perform work.
3. Provide operating instructions for equipment. Operators of vehicles, hoisting equipment, and hazardous plant equipment shall be able to understand signs, signals, operating instructions, and be fully capable of operating such equipment. Retain copies of operator licenses and certifications onsite.

1.5 ACCIDENT REPORTING

A. Reportable Accidents: Defined as: death, occupational disease, and/or traumatic injury to employees or the public; fires; and/or property damage by accident in excess of $100.

1. Notify Contracting Officer immediately in the event of a reportable accident.
2. Fill out and forward an Accident/Property Damage Report Form (CM-22) to Contracting Officer within 7 days of a reportable accident. Obtain form from Contracting Officer.

1.6 RESOURCES

A. COVID-19 (Coronavirus Disease 2019) information provided below is not intended to provide a complete analysis of requirements for Contractor and is provided as a courtesy.
1. Coronoavirus.gov
2. Occupational Safety and Health Administration (United States Department of Labor) - COVID-19
3. Center for Disease Control (CDC)
   a. Get the Facts About Coronavirus
   b. What Construction Workers Need to Know about COVID-19
4. Federal Emergency Management Agency (FEMA) - Coronavirus (COVID-19) Response
5. National Park Service (NPS) - NPS Public Health Update

PART 2 PRODUCTS

2.1 ACCIDENT PREVENTION PLAN (APP)

A. APP shall be written to comply with OSHA and project requirements (generic plan is not acceptable) including but not limited to:

1. Name and qualifications of supervisor responsible to carry out program.
2. Weekly and monthly safety meetings shall be documented with topics and attendees.
3. First aid and rescue procedures.
4. Job Hazard Analysis (JHA) for each major phase. List of hazards associated and methods proposed to provide for property protection and safety of the public, National Park Service personnel, and Contractor's employees. Include initial and continuing training.
5. Planning for possible emergency situations, as detailed in Article 1.2. Such planning shall take nature of construction, site conditions, and degree of exposure of persons and property into consideration.
6. Blasting Plan Requirements: See Section 01 35 25 "Explosives."
7. Infectious Disease Preparedness:

    a. Contractors are responsible for their employees' safety and the safety of job site visitors during the performance of this contract. We encourage Contractors to follow guidance from the Department of Labor (DOL), Occupational Safety and Health Administration (OSHA), the Centers for Disease Control and Prevention (CDC), and all other applicable local, city, and state mandates. We encourage Contractors to develop policies for infection prevention and an Infectious Disease Preparedness and Response Plan.
    b. To the extent appropriate, Contractors should include the protective health and safety measures they intend to implement in any accident prevention or safety submittals required under this contract. These plans should contain preventive measures the Contractor intends to follow while performing work on government property as well as responsive and corrective actions to be taken if an employee exhibits symptoms or tests positive for contagion.
    c. Upon contract award, Contractors should communicate with Contracting Officer regarding Contractor decisions and actions to protect the health and safety of workers for the duration of contract performance under which pandemic conditions exist.

2.2 FIRST AID FACILITIES

A. Provide adequate facilities for number of employees and appropriate to construction hazards.

2.3 PERSONNEL PROTECTIVE EQUIPMENT (PPE)

A. Selection shall conform to OSHA Subpart E.

PART 3 EXECUTION

3.1 DAILY SAFETY INSPECTIONS

A. Conduct daily safety inspections and maintain daily safety reports which include:
    1. Area/operation inspected
    2. Date of inspection
    3. Identified hazards
    4. Corrective actions taken

3.2 EMERGENCY INSTRUCTIONS

A. Post telephone numbers and reporting instructions for ambulance, physician, hospital, fire department, and police in conspicuous locations at work site.

3.3 FIRE AND LIFE SAFETY

A. Comply with requirements of 2024 IFC, Chapter 33 Fire Safety During Construction and Demolition.

3.4 HAZARDOUS MATERIALS

A. Hazardous materials: Explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful substances that could cause death or injury.

B. Store hazardous materials in accordance with manufacturer's and OSHA Subpart D requirements. Maintain Safety Data Sheets (SDS) for each chemical readily available on site.

1. Immediately report spills of hazardous materials to the Park.
2. Maintain a spill emergency response kit.
3. Train employees how to respond to a spill and use emergency response kit.

3.5 PROTECTIVE EQUIPMENT

A. Inspect personal protective equipment daily and maintain in a serviceable condition. Clean, sanitize, and repair personal items as appropriate before issuing to another individual.

3.6 SAFETY MEETINGS

A. As a minimum, conduct one weekly 15-minute "toolbox" safety meeting conducted by a foreman or supervisor and attended by construction personnel at worksite. Topics shall coincide with work scheduled for following week. Document and submit meeting minutes to Contracting Officer within one day after meeting.

B. Conduct monthly safety meetings for personnel, contractors, and subcontractors performing work on the site. Notify Contracting Officer of meeting dates and times. Meetings shall be used to: review effectiveness of Contractor's safety effort; resolve current health and safety problems; provide a forum for planning safe construction activities, and for updating Accident Prevention Plan. Contracting Officers Representative will attend meetings and enter results of meetings into the daily log.

3.7 HARD HATS AND PROTECTIVE EQUIPMENT AREAS

A. A hard hat use area shall be designated by Contractor. Hard hat area shall be posted by Contractor in a manner satisfactory to Contracting Officer.

B. It is Contractor's responsibility to require persons working on or visiting site to wear hard hats and PPE in good repair at all times. As a minimum, maintain six hard hats and other APP required equipment.

3.8 TRAINING

A. First Aid: Provide training to personnel to ensure prompt and efficient first aid.

B. Hazardous Material: Train and instruct each employee exposed to hazardous material in safe and approved methods of handling and storage.

END OF SECTION 01 35 23

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 35 91 HISTORIC PRESERVATION TREATMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. NPS does not anticipate uncovering any historical material, but should the contractor uncover a potentially historical artifact, this section includes special procedures for historic treatment on Project including, but not limited to:

1. Definitions
2. Submittals
3. Quality Assurance
4. Storage and protection of existing historic materials
5. Project site conditions
6. Historic Preservation Treatment Plan
7. Protection, General
8. Protection during application of chemicals
9. Protection during use of heat-generating equipment
10. Historic preservation treatment procedures

1.2 DEFINITIONS

A. "Preservation" - To apply measures necessary to sustain existing form, integrity, and materials of historic property. Work may include preliminary measures to protect and stabilize the property.

B. "Rehabilitation" - To make possible a compatible use for property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

C. "Restoration" - To accurately return form, features, and character of a property to its appearance at a particular period of time by means of removal of features from other periods in its history and repair and reconstruction of missing and deteriorated features from the restoration period.

D. "Reconstruction" - To reproduce in exact form and detail, a building, structure, or artifact as it appeared at a specific period in time. Reconstructed elements do not possess historic integrity in their own right since they are-not original fabric.

E. "Stabilize" - To apply measures designed to reestablish a weather-resistant enclosure and structural reinforcement of an item or portion of the building while maintaining essential form as it exists at present. This level of intervention is aimed at retarding or arresting adverse impacts to structures.

F. "Protect and Maintain" - To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least degree of intervention.

G. "Repair" - To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.

H. "Replace" - To duplicate in its entirety, a historic element or feature by matching its historic pattern, detail and appearance. Replacement is justified when original or historic elements are damaged beyond repair or are missing. Replacement conditions and methods include:

1. Replacement with Original or Historic Fabric: Includes fabric salvaged from other locations or projects having identical architectural qualities. Duplication of appearance using identical material possessing historical significance.
2. Replacement with New Materials: Includes replacement with new material of like kind (custom fabricated of manufactured). Duplication of appearance using like material.
3. Replacement with Substitute Materials: Includes replacement with a compatible substitute that is frequently contemporary and unlike the historic fabric. Duplication of appearance using modern (non-traditional) material Use of substitute materials is not approved unless matching materials are not available.

I. "Remove" - To demolish or detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

J. "Remove and Salvage" - To detach items from existing construction and deliver them to Contracting Officer (CO) or designee.

K. "Remove and Reinstall" - To detach items from existing construction, repair and prepare for reuse, and reinstall where indicated.

L. "Existing to Remain" or "Retain" - Existing items of construction not to be removed and not otherwise indicated to be removed and salvaged or removed and reinstalled.

M. "Material in Kind" - Material that closely matches existing materials through comparison of architectural qualities and salient characteristic such as species, cut, color, grain, dimension, profile, thickness, and finish.

1.3 SUBMITTALS

A. Historic Preservation Treatment Plan:

1. After contract award and before Pre-Construction conference, submit for approval a written Historic Preservation Treatment Plan (HPTP).
2. If the plan requires revisions or corrections, Contractor shall resubmit plan within 10 days.
3. No change in approved plan may be made without written concurrence by Contracting Officer.

B. Alternative Methods and Materials: If alternative methods and materials to those indicated are proposed for any phase of work, provide a written description including evidence of successful

use on other, comparable projects, and program of testing to demonstrate effectiveness for use on this Project.

C. Photographs or Videotape: In accordance with Section 01 32 33 "Photographic Documentation," show existing conditions of adjoining construction and site improvements including finish surfaces that might be misconstrued as damage caused by historic treatment operations. Submit before work begins.

1.4 QUALITY ASSURANCE

A. Historic Preservation Treatment Specialist Qualifications: Experienced firm with required certifications and training able to demonstrate through past performance they are qualified to perform this work.

1.5 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Removed and Salvaged Historic Materials:

1. Clean salvaged historic items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in secure area until delivery to Contracting Officer.
4. Transport items to storage area indicated on Drawings.
5. Protect items from damage during transport and storage.
6. Do not dispose of items removed from existing construction without prior written consent of Contracting Officer.

B. Removed and Reinstalled Historic Materials:

1. Clean and repair historic items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use as designed.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling during historic treatment. When permitted by Contracting Officer, items may be removed to suitable, protected storage location during historic treatment and reinstalled in their original locations after historic treatment operations are complete.

D. Storage and Protection: When removed from existing location, store historic materials within weather-tight enclosure protected from wetting by rain, snow, or ground water, and temperature variations. Secure stored materials to protect from theft.

1. Identify removed items with an inconspicuous mark indicating original location.
2. Develop key plan when many similar items are scheduled for removal and reinstallation.

1.6 PROJECT-SITE CONDITIONS

A. Exterior Cleaning and Repairing:

1. Proceed with work only when forecasted weather conditions are favorable.

a. Wet Weather: Do not attempt repairs during rainy or foggy weather. Do not apply primer, paint, putty, or epoxy when relative humidity is above 80 percent. Do not remove exterior elements of structures when rain is forecast or in progress.
b. Do not perform exterior wet work when air temperature is below 40 degrees Fahrenheit (5 degrees Celsius).
c. Do not begin cleaning, patching, or repairing given likelihood of frost or freezing.
d. Do not begin cleaning when either air or surface temperature is below 45 degrees Fahrenheit (7 degrees Celsius) unless approved means are provided for maintaining 45 degrees Fahrenheit (7 degrees Celsius) temperature of air and materials during, and for 48 hours subsequent to, cleaning.

2. Perform cleaning and rinsing of the exterior only during daylight hours.

B. National Park Service will occupy portions of building immediately adjacent to historic treatment area. Conduct historic treatment so National Park Service operations will not be disrupted. Provide **72** hours' notice to Contracting Officer of activities that will affect National Park Service operations.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 HISTORIC PRESERVATION TREATMENT PLAN

A. Prepare written plan for preservation work covering preservation components of project. Plan shall verify construction strategy and intent is compatible with Department of the Interior's (DOI) standards for Treatment of Historic Properties, guidelines for Treatment of Cultural Landscapes, and National Park Service management policies for cultural resources. Plan shall satisfy both project scope and resource protection requirements. Plan shall include:

1. Organized list of preservation components of project, systems, and tasks
2. Staging and sequence of work
3. Disassembly and reassembly techniques and steps
4. Equipment and tools required
5. Supplies and materials with manufacturer or supplier identified including specific clean up/storage procedure including frequency and documentation of such.
6. Skilled trades and crafts required
7. Anticipated testing and analysis of fabric
8. Additional investigations for extents or magnitude of treatments needed
9. Protective measures
10. Seasonal limitations on work
11. Alternative means if primary treatment method is unfeasible

12. Work conducted off-site (Approval from Contracting Officer required prior to taking resources off-site).

3.2 PROTECTION, GENERAL

A. Comply with manufacturer's written instructions for precautions and effects of products and procedures on adjacent building materials, components, and vegetation.

B. Ensure supervisory personnel are present when work begins and during progress.

C. Temporary Protection of Historic Materials during Construction:

1. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.
2. Attachments of temporary protection to existing construction shall be approved by Contracting Officer prior to installation.

D. Protect landscape work adjacent to or within work areas as follows:

1. Provide barriers to protect tree trunks.
2. Bind spreading shrubs.
3. Coverings shall allow plants to breathe. Remove coverings at end of day. Do not cover plant material with waterproof membrane more than 8 hours at a time.
4. Set scaffolding and ladder legs away from plants.

E. Existing Drains: Prior to start of work or cleaning operations, test drains and other water removal systems to ensure drains and systems function properly. Notify Contracting Officer immediately of stopped or blocked drains or systems. Do not begin Work of this Section until drains are in working order.

1. Provide method to prevent solids including stone or mortar residue from entering drains or drain lines. Clean out drains and drain lines blocked or filled because of work performed under this Contract.
2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.

B. Comply with requirements in Section 01 50 00 "Temporary Facilities and Controls."

C. Cover adjacent surfaces with materials proven to resist chemical cleaners selected for Project unless chemicals being used will not damage adjacent surfaces. Use covering materials containing only waterproof, UV (ultraviolet)-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. Promptly remove masking to prevent adhesive staining on completion.

D. Do not clean surfaces during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

E. Neutralize and collect alkaline and acid wastes and dispose of outside park boundaries.

F. Dispose of runoff from chemical operations by legal means and in a manner preventing soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

G. Document daily clean-up, proper storage, and disposition of any flammable/combustible materials with daily reports.

3.4 PROTECTION DURING USE OF HEAT-GENERATING EQUIPMENT

A. Comply with following procedures while performing work with heat-generating equipment, including welding, cutting, soldering, brazing, paint removal with heat, and other operations where open flames or implements utilizing heat are used:

1. Obtain Contracting Officer’s approval for operations involving use of open-flame or welding equipment.

    a. Notification shall be given for each occurrence and location of work with heat-generating equipment.
    b. Obtain appropriate permit from the park as required.

2. As far as practical, use heat-generating equipment in shop areas or outside building.
3. Before work with heat-generating equipment commences, furnish fire watch (or watches) for location(s) where work is to be performed.
4. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use combustible gas indicator test to ensure area is safe.
5. Remove and keep area free of combustibles, including, rubbish, paper, waste, etc., within area of operations.

    a. If combustible material cannot be removed, provide fireproof blankets to cover such materials.

6. Where possible, furnish and use baffles of metal or gypsum board to prevent spraying of sparks or hot slag into surrounding combustible material.
7. Prevent extension of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
8. Inspect each location of day's work not sooner than 30 minutes after completion of operations to detect hidden or smoldering fires; ensure proper housekeeping is maintained.

B. Where sprinkler protection exists and is functional, maintain without interruption while operations are performed. If operations are performed near automatic sprinkler heads, shield individual heads temporarily with guards.

3.5 HISTORIC PRESERVATION TREATMENT PROCEDURES

The principal aim of preservation work is to halt the process of deterioration and stabilize the item's condition to sustain the integrity of the historic element, feature or structure being preserved. Cyclic maintenance is often required as well as repair work. Repair is required where specifically indicated. The following procedures shall be followed:

1. Retain as much existing material as possible; repair and consolidate rather than replace.
2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
3. Use reversible processes wherever possible.
4. Use traditional replacement materials and techniques if possible. New work shall be distinguishable from old work and original materials and techniques.
5. Record repair work during construction with periodic construction photos and daily inspection reporting. Photo documentation is specified in Section 013233 "Photographic Documentation."

B. Prohibit smoking by personnel performing work on or near historic structures.

C. Notify Contracting Officer of visible changes in integrity of material or components due to environmental causes including biological attack, UV degradation, freezing, or thawing, or due to structural defects including cracks, movement, or distortion.

1. Do not proceed with work in question until directed by Contracting Officer.

D. Where Work requires existing features to be removed, cleaned, and reinstalled, perform operations without damage to material itself, to adjacent materials, or to substrate.

E. Identify new or replacement materials and features with inconspicuous, permanent marks to distinguish from original materials. Record legend of identification marks and locations of these marks on Record Drawings.

F. When cleaning, match samples of existing materials that have been cleaned and identified for acceptable cleaning levels. Avoid over-cleaning to prevent damage. Use gentlest methods available. Initiate cleaning using hand cleaning methods before introducing power cleaning methods and equipment.

END OF SECTION 01 35 91

SECTION 01 40 00 QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements. Quality of work shall be responsibility of the Contractor.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with Contract Document requirements.

C. See Divisions 2 through 49 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the work to evaluate actual products incorporated into the work and completed construction comply with requirements.

C. Mockups: Full-size physical assemblies constructed on-site. Mockups are constructed from selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Approved mockups establish the standard by which the Work will be judged, unless otherwise indicated.

1. Laboratory Mockups: Full-size physical assemblies constructed at a testing facility to verify performance characteristics.
2. Integrated Exterior Mockups: Mockups of exterior envelope erected separately from building but on Project site, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for project before products and materials are incorporated into work to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections performed by a Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing, to establish product performance and compliance with industry standards.

F. Source Quality Control Testing: Tests and inspections performed at the source, i.e., plant, mill, factory, or shop.

G. Field Quality Control Testing: Tests and inspections performed on-site for installation of work and for completed work.

H. Testing Agency or Laboratory: Entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not imply certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.

1.3 CONFLICTING REQUIREMENTS

A. Reference Standards: If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quality levels, comply with most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Contracting Officer before proceeding.

B. Minimum Quality Levels: Quality level shown or specified shall be minimum provided or performed. Actual installation may comply exactly with minimum quality specified, or it may exceed minimum within reasonable limits. To comply with requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Contracting Officer before proceeding.

1.4 SUBMITTALS

A. Quality Control Plan:

1. After contract award and before Pre-Construction conference, submit a written Contractor Quality Control (CQC) plan.
2. If plan requires revisions or corrections, Contractor shall resubmit plan within 10 days.
3. Government reserves the right to require changes in plan during contract period as necessary to obtain the quality specified.

4. No change in the approved plan may be made without written concurrence by Contracting Officer.

B. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in form of a recent report on inspection of testing agency by a recognized authority.

C. Contractor Quality Control (CQC) Daily Reports: Submit showing inspections and tests on first workday following date covered by report. Quality Control Supervisor shall utilize DSC Forms.

1. Review Construction Management Representative (CMR) Daily report if applicable and reconcile any differences prior to posting.

D. Test Reports

1. Test reports shall be completed by person performing test.
2. Submit Daily Test Information Sheets with Quality Control Daily Reports.
3. Submit failing test results and proposed remedial actions within four hours of noted deficiency.
4. Submit three copies of complete test results no later than one calendar day after test was performed.

E. Accessibility Inspection Report:

1. Fill out applicable sections of the Accessibility Inspection Report and attach to Contractor Quality Control Daily Report.
2. Utilize attached Accessibility Inspection form to document compliance with Architectural Barriers Act Accessibility Standards (ABAAS).
3. Inspect at various stages of construction as needed to ensure finished product meets standards.
4. Submit report no later than one calendar day after inspection was performed.

F. Off-Site Inspection Reports: Submit prior to shipment.

G. If Contractor Quality Control plan and Quality Control Daily Reports are not submitted as specified, Contracting Officer may retain payments until such time plan(s) is/are accepted and implemented, or may retain payments for work completed on days with no Quality Control Daily Reports.

H. Permits, Licenses, and Certificates: For National Park Service (NPS) records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of work.

1.5 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Contractors Quality Control Staff:

1. Contractor's Quality Control Supervisor may also perform other duties.
2. Contractor's Quality Control Supervisor shall be assigned no other duties.
3. Contractor's designated Quality Control Supervisor shall be on the project site whenever contract work is in progress.
4. Contractor's job supervisory staff may be used to assist Quality Control Supervisor supplemented, as necessary, by additional certified testing technicians.

C. Installer Qualifications: Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent indicated for Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: Firm experienced in manufacturing products or systems similar to those indicated for Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Fabricator Qualifications: Firm experienced in producing products similar to those indicated for Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

F. Professional Engineer Qualifications: Professional engineer legally qualified to practice in jurisdiction where Project is located and is experienced in providing engineering services of kind indicated (including Structural Tests and Special Inspections (STSI)). Engineering services are defined as those performed for installations of system, assembly, or products similar to those indicated for Project in material, design, and extent.

G. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing Work.

H. Testing Agency Qualifications: A Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or an independent agency with experience and capability to conduct testing and inspecting indicated, according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by Contract, is acceptable to Contracting Officer.

1. Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7 (Code of Federal Regulations).
2. National Voluntary Laboratory Accreditation Program (NVLAP): Testing agency accredited according to National Institute of Standards and Technology’s (NIST) National Voluntary Laboratory Accreditation Program.
3. Measuring devices, laboratory equipment, and instruments shall be calibrated at established intervals against certified standards in accordance with NIST requirements. Measuring and testing devices shall be made available for use by Government for verification tests.

I. Factory-Authorized Service Representative Qualifications: Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products similar in material, design, and extent to those indicated for Project.

J. Mockups: Before installing portions of work requiring mockups, build mockups for each form of construction and finish required to comply with following requirements, using materials indicated for completed work:

1. Build mockups in location and of size indicated; if not indicated, as directed by Contracting Officer.
2. Notify Contracting Officer seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate proposed range of aesthetic effects and workmanship.
4. Obtain Contracting Officer's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups in an undisturbed condition as a standard for judging the completed work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 2 through 49.

1.6 QUALITY CONTROL

A. Contractor is responsible for testing and inspections, including Structural Tests and Special Inspections (STSI), as identified in attached STSI. Inspect and test work as needed to ensure quality of materials, workmanship, construction, finish, and functional performance are in compliance with applicable specifications, drawings, and those required by the Building Code.

1. Engage qualified testing agency to perform quality-control services.
2. Submit appropriate report for each quality-control service.
3. Testing and inspecting requested by Contractor and not required by Contract Documents are Contractor's responsibility.
4. Contracting Officer may designate test locations.

B. Manufacturer's Field Services: Where indicated, engage factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

C. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction of replaced work that failed to comply with Contract Documents.

D. Testing Agency Responsibilities: Cooperate with NPS and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Contracting Officer and Contractor promptly of irregularities or deficiencies observed in work during performance of services.
2. Determine location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections, State in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit 3 copies of certified written report of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of Work.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide:

1. Access to Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for material mixes that require control by testing agency.
7. Security and protection for samples and testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services with minimum delay and to avoid removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 PRODUCTS

2.1 QUALITY CONTROL PLAN

A. Quality Control Plan shall include:

1. List of personnel responsible for quality control and assigned duties. Include each person's qualifications. Include alternate(s) and qualifications.
2. Copy of letter of direction to Contractor's Quality Control Supervisor(s) outlining assigned duties and authorities designated by principal or owner.
3. Names, qualifications / accreditations, and descriptions of laboratories to perform sampling and testing, and samples of proposed report forms from laboratories.
4. Methods of performing, documenting, and enforcing quality control of work including Contractor report forms and acknowledgment of NPS forms.
5. Methods of monitoring and controlling environmental pollution and contamination as required by regulations and laws.
6. Specific discussion regarding mockups, off-site visits, receiving inspections, manufacturers representation, startup requirements, and other aspects of performance specific to Project.
7. Provisions for substantial completion(s) and final inspection(s) per Contract.

PART 3 EXECUTION

3.1 OFF-SITE CONTROL

A. Items fabricated or assembled off-site shall be inspected for quality control at place of fabrication.

3.2 ON-SITE CONTROL

A. Notification:

1. Notify Contracting Officer at least 48 hours in advance of preparatory phase meeting.
2. Notify Contracting Officer at least 24 hours in advance of initial and follow-up phases.

B. Preparatory Phase: Perform before beginning each feature of work.

1. Review control submittal requirements with personnel directly responsible for quality assurance and quantity control of the work. As a minimum, Contractor's Quality Control Supervisor and foreman responsible for feature of work shall be in attendance.
2. Review applicable specifications sections and drawings related to feature of work.
3. Ensure copies of referenced standards related to sampling, testing, and execution for feature of work are available on site.
4. Ensure provisions have been made for field control testing.
5. Examine work area to ensure preliminary work has been completed.
6. Verify field dimensions and advise Contracting Officer of discrepancies with contract documents.
7. Ensure necessary equipment and materials are at project site and they comply with approved shop drawings and submittals.
8. Document preparatory phase activities and discussions on Contractor's Quality Control Daily Report.

C. Initial Phase:

1. As soon as work begins, inspect and test representative portion of particular feature of work for quality of workmanship.
2. Review control testing procedures to ensure compliance with contract requirements.
3. Document initial phase activities and discussions on Contractor's Quality Control Daily Report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

D. Follow-Up Phase: Inspect and test as work progresses to ensure compliance with contract requirements until completion of work.

E. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be required on same feature of work for following reasons:

1. Quality of on-going work is unacceptable.
2. Changes in quality control staff, on-site production supervision, or work crew.
3. Work on particular feature of work is resumed after substantial period of inactivity.

3.3 DOCUMENTATION

A. Maintain Quality Control Daily Reports, Daily Test Report Information Sheets, and Accessibility Inspection Reports of quality control activities and tests. (Download from DSC Workflows website > Forms/Templates/Samples/Guidelines page > Construction Forms section.)

B. Quality Control Daily Reports shall not be substituted for other written reports required under clauses of contract, such as Disputes, Differing Site Conditions, or Changes.

C. Quality Control Daily Reports shall accurately portray all work and materials. The materials shall match the materials as approved from the Construction Documents (CD) requirements. Combustible/flammable materials shall be documented as well.

3.4 ENFORCEMENT

A. Contractor shall stop work on any item or feature pending satisfactory correction of deficiency noted by quality control staff or Contracting Officer.

3.5 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams as invisible as possible.
2. Comply with Contract Document requirements for Section 01 73 29 "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

Statement of Structural Tests and Special Inspections

National Park Service (NPS) - Denver Service Center (DSC) | 8-22-24

Park: JELA

Project Management Information System (PMIS) Number: 318919

Project Name: Trail Improvements at Barataria Preserve

Structural Engineering Firm: Stantec

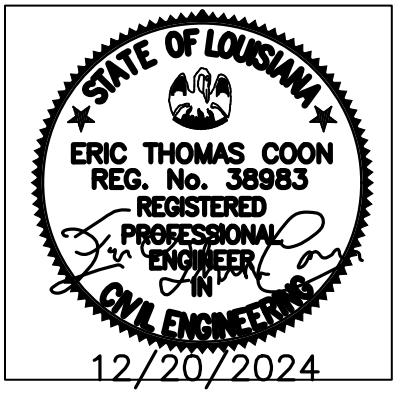
This Statement of Structural Tests and Special Inspections is being submitted as required by Chapter 17 of the **2024 International Building Code** (IBC 2024). It includes the following:

1. Seismic requirements
2. Wind requirements
3. Qualification Requirements for Inspectors and Testing Technicians
4. Listing of Required Structural Tests and Special Inspections

The Construction Contractor's Quality Control Supervisor will provide copies of all special inspection reports and associated documentation to the Contracting Officer (CO). The Construction Contractor will be required to correct all deficiencies discovered in the Special Inspection and Structural Testing program.

Prepared By: Eric Coon, PE
(Type or print name)

Signature: _____ Date: 12/20/2024



Stamped by Professional Engineer (PE) or Structural Engineer (SE)

Seismic and Wind Requirements

Seismic Requirements, IBC 2024 Section 1704.3

Description of seismic-force-resisting system and designated seismic systems subject to special inspections:

N/A

Wind Requirements, IBC 2024 Section 1704.3

Description of wind-force-resisting system and designated wind systems subject to special inspections:

N/A

Instructions:

1. Under Listing of Required Structural Tests and Special Inspections:
    a. **Required?** - Place an **X** for all Special Inspections and Tests required for this project.
    b. **Required Qualifications** - Provide qualifications for the special inspector, using the Qualification Requirements for Inspector and Testing Technicians list below, for all required Structural Tests and Special Inspections.
    c. **Continuous** - If marked with an **X**, continuous special inspection shall be as defined in Chapter 2, IBC 2024.
    d. **Periodic** - If marked with an **X**, provide the minimum number of tests, i.e. 20% of all field welds, or the amount of work to be inspected (e.g. 10% of all wall surfaces).
2. Attach completed Statement of Structural Tests and Special Inspections to the end of NPS DSC Division 1 Specifications **Section 01 40 00 Quality Requirements**.

Qualification Requirements for Inspectors and Testing Technicians

PE/SE	Structural Engineer – licensed PE or SE specializing in the design of buildings and structures
PE/GE	Geotechnical Engineer – licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – graduate engineer who has passed the Fundamentals of engineering examination

American Concrete Institute (ACI) Certification

ACI-CCSI	Concrete Construction Special Inspector
ACI-LTT	Concrete Laboratory Testing Technician Level 1 or 2
ACI-STT	Concrete Strength Testing Technician
ACI-FTT	Concrete Field Testing Technician – Grade I

American Society of Non-Destructive Testing (ASNT) Certification

Non-Destructive Testing Technician – Level II or III

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector

Exterior Design Institute (EDI) Certification

EDI-EIFS	Certified EIFS inspector

International Code Council (ICC) Certification

ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector
ICC-SSI	Soils Special Inspector
ICC-SFSI	Spray-applied Fireproofing Special Inspector
ICC-SMSI	Structural Masonry Special Inspector
ICC-SSBSI	Structural Steel and Bolting Special Inspector
ICC-SWSI	Structural Welding Special Inspector

National Institute for Certification in Engineering Technologies (NICET) Certification

NICET-CT	Concrete Technician – Levels I, II, III and IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III and IV
NICET-ST	Soils Technician - Levels I, II, III and IV

Other

Listing of Required Structural Tests and Special Inspections

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	Structural Steel (IBC 2024 Section 1705.2; American Institute of Steel Construction: AISC 360-22 Chapter N, AISC 341-22 Chapter J)				
	Prior to Welding (AISC 360-22 Table C-N5.4-1)				
	1. Welder qualification records and continuity records.				
	2. Welding procedure specifications (WPS) available.				
	3. Manufacturer certifications for welding consumables available.				
	4. Material identification (type/grade).				
	5. Welder identification system.				
	6. Fit-up of groove welds (including joint geometry).				
	a. Joint preparation.				
	b. Dimensions (alignment, root opening, root face, bevel).				
	c. Cleanliness (condition of steel surfaces).				
	d. Tacking (tack weld quality and location).				
	e. Backing type and fit (if applicable).				
	7. Fit-up of CJP (complete joint penetration) groove welds of HSS (hollow structural sections) T-, Y- and K-joints without backing (including joint geometry).				
	a. Joint preparation.				
	b. Dimensions (alignment, root opening, root face, bevel).				
	c. Cleanliness (condition of steel surfaces).				
	d. Tacking (tack weld quality and location).				

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	8. Configuration and finish of access holes.				
	9. Fit-up of fillet welds.				
	a. Dimensions (alignment, gaps at root).				
	b. Cleanliness (condition of steel surfaces).				
	c. Tacking (tack weld quality and location).				
	10. Check welding equipment.				
	During Welding (AISC 360-22 Table C-N5.4-2)				
	1. Control and handling of welding consumables				
	a. Packaging.				
	b. Exposure control.				
	2. No welding over cracked tack welds.				
	3. Environmental conditions.				
	a. Wind speed within limits.				
	b. Precipitation and temperature.				
	4. WPS followed.				
	a. Settings on welding equipment.				
	b. Travel speed.				
	c. Selected welding materials.				
	d. Shielding gas type/flow rate.				
	e. Preheat applied.				
	f. Interpass temperature maintained (minimum/maximum).				
	g. Proper position (F, V, H, OH).				
Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection

	h. Intermix of filler metals avoided unless approved (AISC 341-22 Section J7).				
	5. Use of qualified welders.				
	6. Welding techniques.				
	a. Interpass and final cleaning.				
	b. Each pass within profile limitations.				
	c. Each pass meets quality requirements.				
	7. Placement and installation of headed stud anchors.				
	After Welding (AISC 360-22 Table C-N5.4-3)				
	1. Welds cleaned.				
	2. Size, length and location of welds.				
	3. Welds meet visual acceptance criteria.				
	a. Crack prohibition.				
	b. Weld/base-metal fusion.				
	c. Crater cross section.				
	d. Weld profiles.				
	e. Weld size.				
	f. Undercut.				
	g. Porosity.				
	4. Arc strikes.				
	5. k-area.				
	6. Weld access holes in rolled heavy shapes and built-up heavy shapes.				
	7. Backing removed and weld tabs removed (if required).				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**

	8. Repair activities.				
	9. Document acceptance or rejection of welded joint or member.				
	10. No prohibited welds have been added without the approval of the EOR (Engineer of Record).				
	11. Placement of reinforcing or contouring fillet welds (if required) (AISC 341-22 Table J7.1).				
	Nondestructive Testing (AISC 360-22 Section N5 and AISC 341-22 Section J7)				
	1. Risk Category II Structures - Perform Ultrasonic Testing on 10% of CJP groove welds in butt, T- and corner joints subject to transversely applied tension loading, in materials 5/16 inch thick or greater.				
	2. Risk Category III or IV Structures - Perform Ultrasonic Testing on all CJP groove welds subject to transversely applied tension loading in butt, T- and corner joints, in materials 5/16 inch thick or greater.				
	3. Access Holes - Perform Magnetic Particle Testing or Liquid Penetrant Testing when the flange thickness exceeds 1.5 inches for rolled shapes, or when the web thickness exceeds 1.5 inches for built-up shapes.				
	4. Welded Joints Subject to Fatigue - Perform testing per AISC 360-22 Section N5c.				
	Nondestructive Testing (AISC 341-22 Section J7)				
	Column Splice and Column to Base Plate PJP Groove Weld (AISC 341-22 Section J7 2b)				
	1. Perform Ultrasonic Testing on 100% of PJP (partial-joint-penetration) groove welds in column splices and column to base plate welds.				
	2. CJP Groove weld.				
	3. Lamellar tearing.				
	4. Beam cope and access hole.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	5. Reduced beam section repair.				

	6. Weld tab removal.				
	Prior to Bolting (AISC 360-22 Table C-N5.6-1)				
	These inspections are not required for snug-tight joints.				
	1. Manufacturer's certifications available for fastener materials.				
	2. Fasteners marked in accordance with ASTM requirements.				
	3. Correct fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane).				
	4. Correct bolting procedure selected for joint detail.				
	5. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements.				
	6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used.				
	7. Protected storage provided for bolts, nuts, washers and other fastener components.				
	During Bolting (AISC 360-22 Table C-N5.6-2)				
	These inspections are not required for snug-tight joints.				
	These inspections are not required for pretensioned joints and slip-critical joints, when the installer is using the turn-of-nut method with matchmarking techniques, the direct-tension-indicator method, or the twist-off-type tension control bolt method.				
	1. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required.				
	2. Joint brought to the snug-tight condition prior to the pretensioning operation.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	3. Fastener component not turned by the wrench prevented from rotating.				

	4. Fasteners are pretensioned in accordance with the RCSC (Resource Council on Structural Connections) Specification, progressing systematically from the most rigid point toward the free edges.				
	After Bolting (AISC 360-22 Table C-N5.6-3)				
	Document acceptance or rejection of bolted connections.				
	Galvanized Structural Steel Main Members (AISC 360-22 Table C-N5.6-3)				
	Inspect per AISC 360-22 Section N5.7.				
	Other Inspection Tasks (AISC 360-22 Section N5.8 and AISC 341-22 Section J9)				
	1. Verify compliance of fabricated steel with the details shown on the approved shop drawings.				
	2. Verify compliance of the erected steel frame with the details shown on the approved erection drawings, including braces, stiffeners, member locations and joint details.				
	3. Anchor rods and other embedments support structural steel.				
	a. Verify the diameter, grade, type and length of the anchor rod or embedded item.				
	b. Verify the extent or depth of embedment into the concrete.				
	4. RBS (reduce beam section) requirements, if applicable. (AISC 341-22)				
	a. Contour and finish.				
	b. Dimensional tolerances.				
	5. Protected zone - no holes or unapproved attachments made by fabricator or erector, as applicable. (AISC 341-22)				
	Inspection of H-Piles (AISC 341-22 Section J11)				

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection

	1. Protected zone - no holes or unapproved attachments made by the responsible contractor, as applicable. (AISC 341-22 Table J11.1)				
	Structural Stainless Steel (IBC 2024 1705.2.2)				
	1. Special inspections and nondestructive testing in accordance with AISC 370-21.				
	Cold-formed Steel Deck (IBC 2024 1705.2.3)				
	2. Special inspections in accordance with QA/QC-2022 Standard for Quality control (QC) and Quality assurance (QA) for Installation of Steel Deck.				
	Open-Web Steel Joists and Joist Girders (IBC 2024 Table 1705.2.4)				
	1. Installation of open-web steel joists and joist girders.				
	a. End connections - welding or bolted.				
	b. Bridging - horizontal or diagonal.				
	1. Standard bridging.				
	2. Bridging that differs from the SJI (Steel Joist Institute) specifications listed in Section 2207.1.				
	Inspection of Composite Structures Prior to Concrete Placement (AISC 341Table J10.1)				
	1. Material identification of reinforcing steel (Type/Grade).				
	2. Determination of carbon equivalent for reinforcing steel other than ASTM A706.				
	3. Proper reinforcing steel size, spacing and orientation.				
	4. Reinforcing steel has not been rebent in the field.				
	5. Reinforcing steel has been tied and supported as required.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**

	6. Required reinforcing steel clearances have been provided.				
	7. Composite member has required size.				
	Inspection of Composite Structures During Concrete Placement (AISC 341-22 Table J10.2)				
	1. Concrete: Material identification (mix design, compressive strength, maximum large aggregate size, maximum slump).				
	2. Limits on water added at the truck or pump.				
	3. Proper placement techniques to limit segregation.				
	Inspection of Composite Structures After Concrete Placement (AISC 341-22 Table J10)				
	1. Achievement of minimum specified concrete compressive.				
	Cold-formed Steel Trusses Spanning 60-feet or Greater (IBC 2024 Section 1705.2.45)				
	1. Verify temporary installation restraint/bracing installed in accordance with the approved shop drawings.				
	2. Verify permanent individual truss member restraint/bracing installed in accordance with the approved shop drawings.				
	Metal Building Systems (IBC 2024 Section 1705.2.6 - Inspect per Structural Steel requirements above as applicable plus requirements in IBC 2024 Table 1705.2.6)				
	1. Installation of rafter/beam flange braces and column flange braces.				
	2. Installation of purlins and girts, including specified lapping.				
	3. Purlin and girt restraint/bridging/bracing.				
	4. Installation of X-bracing, tightened to remove any sag.				
	Concrete Construction (IBC 2024 Section 1705.3)				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**

	1. Inspect reinforcing steel, including prestressing tendons, and verify placement.			X	Once prior to concrete placement
	2. Inspection of reinforcing steel welding				
	a. Verify weldability of reinforcing bars other than ASTM A706.				
	b. Inspect welding of reinforcement for special moment frames, boundary elements of special structural walls and coupling beams.				
	c. Inspect welded reinforcement splices.				
	d. Inspect welding of primary tension reinforcement in corbels.				
	e. Inspect single pass fillet welds, maximum 5/16 inch.				
	f. Inspect all other weds.				
X	3. Inspection of anchors cast in concrete.	PE/SE		X	Once prior to concrete placement
	4. Inspection of anchors post-installed in hardened concrete members.				
X	a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension load.	PE/SE	X		
X	b. Mechanical anchors and adhesive anchors not defined in 4a.	PE/SE		X	50% of anchors installed
X	5. Verify use of approved design mix.	PE/SE		X	Prior to each concrete placement
X	6. Prior to placement fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	PE/SE	X		
X	7. Inspect concrete and shotcrete placement for proper application techniques.	PE/SE	X		
X	8. Inspect for maintenance of specified curing temperature and techniques.			X	
	9. Inspection of prestressed concrete:				
	a. Application of prestressing forces.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**

	b. Grouting of bonded prestressing tendons in the seismic-force-resisting system.				
	10. Erection of precast structural members.				
	11. For precast concrete diaphragm connections or reinforcement at joints classified as moderate or high deformability elements (MDE or HDE) in structures assigned to Seismic Design Category C, D, E, or F, inspect such connections and reinforcement in the field for:				
	a. Installation of the embedded parts.				
	b. Completion of the continuity of reinforcement across joints.				
	c. Completion of connections in the field.				
	12. Inspect installation tolerances of precast concrete diaphragm connections for compliance with ACI 550.5 (American Concrete Institute).				
	13. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.				
	14. Inspection formwork for shape, location and dimensions of the concrete member being formed.				
	Masonry Construction (IBC 2024 Section 1705.4)				
	1. Inspect masonry construction in accordance with IBC 2024 Section 1705.4 and TMS 402-22 and TMS 602-22 (The Masonry Society).				
	Level 1 Quality Assurance				
	Verification Requirements:				
	1. Prior to construction, verification of compliance of submittals.				
	Level 2 Quality Assurance				
	Verification Requirements:				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**

	1. Prior to construction, verification of comliance submittals.				
	2. Prior to construction, verification of f'_m and f'_{AAC} except where specifically exempted by the code.				
	3. During construction, verification of slump flow and Visual Stability Index (VSI) when self-consolidating grout is delivered to the project site in accordance with TMS 602-22 Specification Article 1.5 & 1.6.3.				
	Inspection Tasks:				
	1. As masonry construction begins, verify the following are in compliance:				
	a. Proportions of site-prepared mortar.				
	b. Grade and size of prestressing tendons and anchorages.				
	c. Grade, type and size or reinforcement, connectors, anchor bolts, and prestressing tendons and anchorages.				
	d. Prestressing technique.				
	e. Properties of thin-bed mortar for AAC (autoclaved aerated concrete) masonry.				Continuous inspection is required for the first 5000 square feet of AAC masonry. Periodic inspection is required after the first 5000 square feet of AAC masonry.
	f. Sample panel construction.				
	2. Prior to grouting, verify the following are in compliance:				
	a. Grout space.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	b. Placement of prestressing tendons and anchorages.				

	c. Placement of reinforcement, connectors, and anchor bolts.				
	d. Proportions of site-prepared grout and prestressing grout for bonded tendons.				
	3. Verify the compliance of the following during construction:				
	a. Materials and procedures with the approved submittals.				
	b. Placement of masonry units and mortar joint construction.				
	c. Size and location of structural members.				
	d. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.				
	e. Welding of reinforcement.				
	f. Preparation, construction and protection of masonry during cold weather (temperature below 40 degrees Fahrenheit) or hot weather (temperature above 90 degrees Fahrenheit).				
	g. Application and measurement of prestressing force.				
	h. Placement of grout and prestressing grout for bonded tendons is in compliance.				
	i. Placement of AAC masonry units and construction of thin-bed mortar joints.				Continuous inspection is required for the first 5000 square feet of AAC masonry. Periodic inspection is required after the first 5000 square feet of AAC masonry.
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	4. Observe preparation of grout specimens, mortar specimens and/or prisms.				

	Level 3 Quality Assurance				
	Verification Requirements:				
	1. Prior to construction, verification of compliance of submittals.				
	2. Prior to construction, verification of f'_m and f'_{AAC} except where specifically exempted by the Code.				
	3. During construction, verification of Slump flow and Visual Stability Index (VSI) when self-consolidating grout is delivered to the project site in accordance with TMS 602-22 Specification Article 1.5 & 1.6.3.				
	4. During construction, verification of f'_m and f'_{AAC} for every 5000 square feet.				
	5. During construction, verification of proportions of materials as delivered to the project site for premixed or preblended mortar, prestressing grout, and grout other than self-consolidating grout.				
	Inspection Tasks:				
	1. As masonry construction begins, verify the following are in compliance:				
	a. Proportions of site-prepared mortar.				
	b. Grade and size of reinforcement, connectors, anchor bolts, and prestressing tendons and anchorages.				
	c. Grade, type and size or reinforcement, connectors, anchor bolts, and prestressing tendons and anchorages.				
	d. Prestressing technique.				
	e. Properties of thin-bed mortar for AAC (autoclaved aerated concrete) masonry.				
	f. Sample panel construction.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	2. Prior to grouting, verify the following are in compliance:				

	a. Grout space				
	b. Placement of prestressing tendons and anchorages.				
	c. Placement of reinforcement, connectors, and anchor bolts.				
	d. Proportions of site-prepared grout and prestressing grout for bonded tendons.				
	3. Verify compliance of the following during construction:				
	a. Materials and procedures with the approved submittals.				
	b. Placement of masonry units and mortar joint construction.				
	c. Size and location of structural members.				
	d. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.				
	e. Welding of reinforcement.				
	f. Preparation, construction and protection of masonry during cold weather (temperature below 40 degrees Fahrenheit) or hot weather (temperature above 90 degrees Fahrenheit).				
	g. Application and measurement of prestressing force.				
	h. Placement of grout and prestressing grout for bonded tendons is in compliance.				
	i. Placement of AAC masonry units and construction of thin-bed mortar joints.				
	4. Observe preparation of grout specimens, mortar specimens and/or prisms.				

Wood Construction

(IBC 2024 Section 1705.5)

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	1. Inspect prefabricated wood structural elements in accordance with Section 1704.2.5.				

	2. High load diaphragms:				
	a. Verify sheathing grade and thickness.				
	b. Verify nominal size of framing members at adjoining panel edges.				
	c. Verify nail or staple diameter and length.				
	d. Verify number of fastener lines.				
	e. Verify spacing between fasteners in each line and at panel edges.				
	3. Shearwalls:				
	a. Verify sheathing grade and thickness.				
	b. Verify nominal size of framing members at adjoining panel edges.				
	c. Verify nail or staple diameter and length.				
	d. Verify number of fastener lines.				
	e. Verify spacing between fasteners in each line and at panel edges.				
	f. Location and size of holdowns.				
	4. Verify nailing, bolting, anchoring and fastening of:				
	a. Drag struts and collectors.				
	b. Braces.				
	c. Hold-downs.				
	5. Metal-plate-connected wood trusses spanning 60 feet or greater:				
	a. Verify temporary installation restraint/bracing installed in accordance with the approved shop drawings.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	b. Verify permanent individual truss member restraint/bracing installed in accordance with the approved shop drawings.				

Mass Timber Construction

(IBC 2024 Section 1705.5.3)

Mass timber elements in
Types IV-A, IV-B and IV-C:

	1. Inspection of anchorage and connections of mass timber construction to timber deep foundation systems.				
	2. Inspect erection of mass timber construction.				
	3. Inspection of connections where installation methods are required to meet design loads.				
	4. Threaded fasteners:				
	a. Verify use of proper installation equipment.				
	b. Verify use of pre-drilled holes where required.				
	c. Inspect screws, including diameter, length, head type, spacing, installation angle and depth.				
	5. Adhesive anchors installed in horizontal or upwardly inclined orientation to resist sustained tension loads.				
	6. Adhesive anchors not defined in preceding cell.				
	7. Bolted connections.				
	8. Concealed connections.				

Soils

(IBC 2024 Section 1705.6)

	1. Verify materials below shallow foundations are adequate to achieve the required bearing capacity.				
	2. Verify excavations are extended to proper depth and have reached proper material.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	3. Perform classification and testing of compacted fill materials.				

	4. During fill placement, verify use of proper materials and procedure in accordance with the provisions of the approved geotechnical report. Verify densities and lift thicknesses during placement and compaction of compacted fill.				
	5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.				
	Driven Deep Foundation Elements (IBC 2024 Section 1705.7)				
X	1. Verify element materials, sizes and lengths comply with the requirements.	PE/SE	X		
	2. Determine capacities of test elements and conduct additional load tests when required. Refer to project specifications.				
X	3. Inspect driving operations and maintain complete and accurate records for each element.	PE/SE	X		
X	4. Verify element locations and plumbness.	PE/SE	X		
X	a. Verify type and size of hammer.	PE/SE	X		
X	b. Record number of blows per foot of penetration.	PE/SE	X		
X	c. Determine required penetration to achieve specified capacity.	PE/SE	X		
X	d. Record pile tip and butt elevations.	PE/SE	X		
X	e. Document any damage to any foundation element.	PE/SE	X		
	5. For steel piling, perform additional inspection in accordance with Section 1705.2 and AISC 341-16, Table J10.1.				
	6. For concrete elements and concrete-filled elements, perform additional inspections in accordance with Section 1705.3.				
	7. For specialty elements, perform additional inspections as determined by the registered				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	design professional in responsible charge as required in the project specifications.				

Cast-in-Place Deep Foundation
(IBC 2024 Section 1705.8)

	1. Inspect drilling operations and maintain complete and accurate records for each element.				
	2. Verify element locations and plumbness.				
	a. Verify element diameter.				
	b. Verify bell diameter (if applicable).				
	c. Verify element lengths.				
	d. Verify embedment depth into bedrock (if applicable).				
	e. Verify adequate end-bearing strata capacity.				
	f. Record concrete or grout volumes.				
	3. For concrete elements, perform tests and additional inspections in accordance with Section 1705.3.				

Helical Piles
(IBC 2024 Section 1705.10)

	1. Verify pile locations.				
	a. Verify installation equipment used.				
	b. Verify pile dimensions.				
	c. Verify tip elevations.				
	d. Verify final depth.				
	e. Verify final installation torque.				
	f. Other data as required by the project specifications.				

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection

Fabricated Items
(IBC 2024 Section 1705.11)

	1. Inspect fabricated items in accordance with Section 1704.2.5.				

	Wind Resistance (IBC 2024 Section 1705.12)				
	1. Provide inspections when required by Section 1705.12.				
	Seismic Resistance (IBC 2024 Section 1705.13)				
	1. Provide inspections when required by Section 1705.13.				
	Testing and Qualification for Seismic Resistance (IBC 2024 Section 1705.14)				
	1. Test and qualify seismic resistance in accordance with IBC 2024 Section 1705.14 and the project specifications.				
	Sprayed Fire-Resistive Materials (IBC 2024 Section 1705.15)				
	1. Inspect sprayed fire-resistant materials in accordance with IBC 2024 Section 1705.15 and the project specifications.				
	Intumescent Fire-Resistive Materials (IBC 2024 Section 1705.16)				
	1. Perform inspections in accordance with AWCI 12-B (Association of the Wall and Ceiling Industry) and IBC 2024 Section 1705.16.				
	Exterior Insulation and Finish Systems (EIFS) (IBC 2024 Section 1705.17)				
	1. Perform inspections in accordance with project specifications and IBC 2024 Section 1705.17.				
Required?	**Structural Test or Special Inspection**	**Required Qualifications**	**Continuous**	**Periodic**	**Frequency of Periodic Test or Inspection**
	Fire-Resistant Penetrations and Joints (IBC 2024 Section 1705.18)				
	1. Perform inspections in accordance with project specifications and IBC 2024 Section 1705.18.				

	Smoke Control (IBC 2024 Section 1705.19)				
	1. Perform testing in accordance with project specifications and IBC 2024 Section 1705.19.				
	Sealing of Mass Timber (IBC 2024 Section 1705.20)				
	1. Perform testing in accordance with project specifications and IBC 2024 Section 1705.20.				

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 42 00 REFERENCE STANDARDS

PART 1 GENERAL

1.1 ENVIRONMENTAL DEFINITIONS

A. Definitions pertaining to sustainable development: As defined in ASTM E2114 and as specified herein.

B. Biobased Materials: As defined in the Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, "biobased" means a "commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials." Biobased materials also include fuels, chemicals, building materials, or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

1. Biobased content: Amount of biobased carbon in the material or product as a percentage of weight (mass) of total organic carbon in the material or product.

C. Chain-of-Custody: Process whereby a product or material is maintained under physical possession or control during its entire life cycle.

D. Deconstruction: Disassembly of buildings for purpose of recovering materials.

E. DFE (Design for the Environment): A technique that includes elements of resource conservation and pollution prevention as applied in various product sectors. A technique that incorporates approaches which are part of product (or assembly) concept, need and design. Considerations involve material selection, material and energy efficiency, reuse, maintainability and design for disassembly and recyclability. Refer to International Organization for Standardization (ISO) Guide 64 for additional clarification.

F. Environmentally preferable products: Products and services that have a lesser or reduced effect on the environment in comparison to conventional products and services. Refer to EPA's Final Guidance on Environmentally Preferable Purchasing Program.

G. Non-Renewable Resource: A resource that exists in a fixed amount that cannot be replenished on a human time scale. Non-renewable resources have potential for renewal only by geological, physical, and chemical processes taking place over of millions of years. Examples include iron ore, coal, and oil.

H. Perpetual Resource: A resource that is virtually inexhaustible on a human time scale. Examples include solar energy, tidal energy, and wind energy.

I. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock. Recycled content claim shall be consistent Federal Trade Commission (FTC) Guide for Use of Environmental Marketing Claims.

J. Renewable Resource: A resource that is grown, naturally replenished, or cleansed, at a rate which exceeds depletion of the usable supply of that resource. A renewable resource can be exhausted if improperly managed. However, a renewable resource can last indefinitely with proper stewardship. Examples include trees in forests, grasses in grasslands, and fertile soil.

1.2 QUALITY ASSURANCE

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into Contract Documents to the extent referenced. Such standards are made a part of Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of Contract Documents, unless otherwise indicated.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and standards may establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Contracting Officer (CO) for decision before proceeding.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless Contract Documents include more stringent requirements, applicable construction industry standards have same force and effect as if bound or copied directly into Contract Documents to the extent referenced. Such standards are made a part of Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities found in Section 01 42 00 Sources for Reference Publications, Unified Facilities Guide Specifications (UFGS) (accessible via Masters website > Downloads section > click on UFGS Master (WBDG Website). Name

s, telephone numbers, and websites are subject to change and are believed to be accurate and up-to-date as of date of Contract Documents.

XX	EXAMPLE Association (The) www.EXAMPLE.org	

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in following list. Names, telephone numbers, and websites are subject to change and are believed to be accurate and up-to-date as of date of Contract Documents.

DIN	Deutsches Institut fur Normung e.V. www.din.de	49 30 2601-3003
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. icc-es.org	(800) 423-6587 (562) 699-0543

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in following list. Names, and websites are subject to change and are believed to be accurate and up-to-date as of date of Contract Documents.

ABA & ABAAS United States Access Board	Architectural Barriers Act (ABA) Architectural Barriers Act Accessibility Standards (ABAAS) www.access-board.gov
CoE	Army Corps of Engineers www.usace.army.mil
CPSC	Consumer Product Safety Commission www.cpsc.gov
DOC	Department of Commerce www.commerce.gov
DOD	Department of Defense www.defense.gov
DOJ	Department of Justice www.justice.gov

DOE	Department of Energy www.energy.gov
EPA	Environmental Protection Agency www.epa.gov
FAA	Federal Aviation Administration www.faa.gov
FCC	Federal Communications Commission www.fcc.gov
FDA	Food and Drug Administration www.fda.gov
GSA	General Services Administration www.gsa.gov
HUD	Department of Housing and Urban Development www.hud.gov
LBL	Lawrence Berkeley National Laboratory www.lbl.gov
NCHRP	National Cooperative Highway Research Program (See TRB (Transportation Resource Board))
NIST	National Institute of Standards and Technology www.nist.gov
OSHA	Occupational Safety & Health Administration www.osha.gov
PHS	U.S. Department of Health and Human Services www.hhs.gov
RUS	Rural Utilities Service (See USDA (Department of Agriculture))
SD	State Department www.state.gov
TRB	Transportation Research Board www.nationalacademies.org/trb/transportation-research-board
USDA	Department of Agriculture www.usda.gov
USP	U.S. Pharmacopeia www.usp.org

USPS	Postal Service www.usps.com

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in following list. Names, telephone numbers, and websites are subject to change and are believed to be accurate and up-to-date as of date of Contract Documents.

ABAAS	Architectural Barriers Act Accessibility Standards www.access-board.gov
CFR	Code of Federal Regulations Available from Government Printing Office www.govinfo.gov/app/collection/cfr
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point www.dsp.dla.mil/Specs-Standards/
DSCC	Defense Supply Center Columbus (See FS (Federal Specification))
FED-STD	Federal Standard (See FS (Federal Specification))
FS	Federal Specification Available from Department of Defense Single Stock Point www.dsp.dla.mil/Specs-Standards/ Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.nibs.org
FTMS	Federal Test Method Standard (See FS (Federal Specification))
MIL	(See MILSPEC (Military Specification and Standards))
MIL-STD	(See MILSPEC (Military Specification and Standards))
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point www.dsp.dla.mil/Specs-Standards/
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/ufas *(UFAS is **only** for housing projects per Fair Housing Act. See also the Fair Housing Act Design Manual, www.huduser.gov/portal/publications/destech/fairhousing)*

1.5 ENVIRONMENTAL REFERENCE STANDARDS

A. American Forest and Paper Association:

1. Sustainable Forestry Initiative

B. American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE):
- **ASHRAE 52.2,** *Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size*
- **ASHRAE 55,** *Thermal Environmental Conditions for Human Occupancy*
- **ASHRAE 62.1,** *Ventilation for Acceptable Indoor Air Quality*
- **ASHRAE 62.2,** *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*
- **ASHRAE/IESNA 90.1,** *Energy Standard for Buildings, Except Low-Rise Residential Buildings*
- **ASHRAE 90.2,** *Energy Efficient Design of Low-Rise Residential Buildings*

C. American Association of State Highway and Transportation Officials (AASHTO):
- M288 Geotextile Specification for Highway Applications
- MP009-06 Standard Specification for Compost for Erosion/Sediment Control (Filter Berms and Filter Socks)
- MP010-03 Standard Specification for Compost for Erosion/Sediment Control (Compost Blankets)

D. American Society for Testing and Materials International (ASTM):
- A478 Standard Specification for Chromium-Nickel Stainless Steel Weaving and Knitting Wire
- A580/A580M Standard Specification for Stainless Steel Wire
- A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- B813 Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube
- C1240 Standard Specification for Silica Fume Used in Cementitious Mixtures
- C128 Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
- C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- C1319 Standard Specification for Concrete Grid Paving Units
- C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
- C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- C1371 Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
- C1386 Standard Specification for Precast Autoclaved AERATED Concrete (PAAC) Wall Construction Units
- C1483 Standard Specification for Exterior Solar Radiation Control Coatings on Buildings
- C1549 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer

- C1601 Standard Test Method for Field Determination of Water Penetration of Masonry Wall Surfaces
- C289 Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
- C311 Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete
- C33 Standard Specification for Concrete Aggregates
- C593 Standard Specification for Fly Ash and Other Pozzolans for Use With Lime
- C595 Standard Specification for Blended Hydraulic Cements
- C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
- C67 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile
- C739 Standard Specification for Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation
- C936 Standard Specification for Interlocking Concrete Paver Units
- C989 Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
- D1435 Standard Practice for Outdoor Weathering of Plastics
- D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 foot pound force per cubic foot (ft-lbf/ft3) (2,700 kilonewton meter per cubic meter (kN-m/m3))
- D1972 Standard Practice for Generic Marking of Plastic Products
- D198 Standard Test Methods of Static Tests of Lumber in Structural Sizes
- D2103 Standard Specification for Polyethylene Film and Sheeting
- D217 Standard Test Methods for Cone Penetration of Lubricating Grease
- D2369 Standard Test Method for Volatile Content of Coatings
- D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
- D3792 Standard Test Method for Water Content of Coatings by Direct Injection Into a Gas Chromatograph
- D3864 Standard Guide for Continual On-Line Monitoring Systems for Water Analysis
- D3960 Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
- D4017 Standard Test Method for Water in Paints and Paint Materials by Karl Fischer Method
- D4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
- D4444 Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters
- D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity
- D4552 Standard Practice for Classifying Hot-Mix Recycling Agents
- D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
- D4716 Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
- D4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Product
- D4840 Standard Guide for Sampling Chain-of-Custody Procedures

- D4887 Standard Test Method for Preparation of Viscosity Blends for Hot Recycled Bituminous Materials
- D5106 Standard Specification for Steel Slag Aggregates for Bituminous Paving Mixtures
- D5116 Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products
- D5199 Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
- D5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles
- D5268 Standard Specification for Topsoil Used for Landscaping Purposes
- D5359 Standard Specification for Glass Cullet Recovered from Waste for Use in Manufacture of Glass Fiber
- D5505 Standard Practice for Classifying Emulsified Recycling Agents
- D5509 Standard Practice for Exposing Plastics to a Simulated Compost Environment
- D5512 Standard Practice for Exposing Plastics to a Simulated Compost Environment Using an Externally Heated Reactor
- D5539 Standard Specification for Seed Starter Mix
- D5957 Standard Guide for Flood Testing Horizontal Waterproofing Installations
- D5603 Standard Classification for Rubber Compounding Materials—Recycled Vulcanizate Particulate Rubber
- D5663 Standard Guide for Validating Recycled Content in Packaging Paper and Paperboard
- D5759 Standard Guide for Characterization of Coal Fly Ash and Clean Coal Combustion Fly Ash for Potential Uses
- D5792 Standard Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives
- D5834 Standard Guide for Source Reduction Reuse, Recycling, and Disposal of Solid and Corrugated Fiberboard (Cardboard)
- D5851 Standard Guide for Planning and Implementing a Water Monitoring Program
- D5852 Standard Test Method for Erodibility Determination of Soil in the Field or in the Laboratory by the Jet Index Method
- D6002 Standard Guide for Assessing the Compostability of Environmentally Degradable Plastics
- D6006 Standard Guide for Assessing Biodegradability of Hydraulic Fluid
- D6007 Standard Test Method for Determining Formaldehyde Concentration in Air from Wood Products Using a Small Scale Chamber
- D6046 Standard Classification of Hydraulic Fluids for Environmental Impact
- D6081 Standard Practice for Aquatic Toxicity Testing of Lubricants: Sample Preparation and Results Interpretation
- D6108 Standard Test Method for Compressive Properties of Plastic Lumber and Shapes
- D6109 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber
- D6112 Standard Test Methods for Compressive and Flexural creep and Creep-Rupture of Plastic Lumber and Shapes
- D6117 Standard Test Methods for Mechanical Fasteners In Plastic Lumber and Shapes
- D6155 Standard Specification for Nontraditional Coarse Aggregates for Bituminous Paving Mixtures
- D6245 Standard Guide for Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation
- D6261 Standard Specification for Extruded and Compression Molded Basic Shapes Made from Thermoplastic Polyester (TPES)

- D6262 Standard Specification for Extruded, Compression Molded, and Injection Molded Basic Shapes of Poly(aryl ether ketone) (PAEK)
- D6270 Standard Practice for Use of Scrap Tires in Civil Engineering Applications
- D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers
- D6330 Standard Practice for Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels Using Small Environmental Chambers Under Defined Test Conditions
- D6345 Standard Guide for Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air
- D6400 Standard Specification for Compostable Plastics
- D6435 Standard Test Method for Shear Properties of Plastic Lumber and Plastic Lumber Shapes
- D6629 Standard Guide for Selection of Methods for Estimating Soil Loss by Erosion
- D6662 Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards
- D6712 Standard Specification for Ultra-High-Molecular-Weight Polyethylene (UHMW-PE) Solid Plastic Shapes
- D6886 Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography
- D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures
- D696 Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer
- D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3))
- D7186 Standard Practice for Quality Assurance Observation of Roof Construction and Repair
- E1021 Standard Test Methods for Measuring Spectral Response of Photovoltaic Cells
- E1038 Standard Test Method for Determining Resistance of Photovoltaic Modules to Hail by Impact with Propelled Ice Balls
- E1039 Standard Test Method for Calibration of Silicon Non-Concentrator Photovoltaic Primary Reference Cells Under Global Irradiation
- E1040 Standard Specification for Physical Characteristics of Nonconcentrator Terrestrial Photovoltaic Reference Cells
- E1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
- E1171 Standard Test Method for Photovoltaic Modules in Cyclic Temperature and Humidity Environments
- E1333 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Under Defined Test Conditions Using a Large Chamber
- E1362 Standard Test Method for Calibration of Non-Concentrator Photovoltaic Secondary Reference Cells
- E1433 Standard Guide for Selection of Standards on Environmental Acoustics
- E1462 Standard Test Methods for Insulation Integrity and Ground Path Continuity of Photovoltaic Modules
- E1596 Standard Test Methods for Solar Radiation Weathering of Photovoltaic Modules
- E1597 Standard Test Method for Saltwater Pressure Immersion and Temperature Testing of Photovoltaic Modules for Marine Environments

- E1609 Standard Guide for Development and Implementation of a Pollution Prevention Program
- E1686 Standard Guide for Selection of Environmental Noise Measurements and Criteria
- E1690 Standard Test Method for Determination of Ethanol Extractives in Biomass
- E1721 Standard Test Method for Determination of Acid-Insoluble Residue in Biomass
- E1755 Standard Test Method for Ash in Biomass
- E1758 Standard Test Method for Determination of Carbohydrates in Biomass by High Performance Liquid Chromatography
- E1780 Standard Guide for Measuring Outdoor Sound Received from a Nearby Fixed Source
- E1799 Standard Practice for Visual Inspections of Photovoltaic Modules
- E1802 Standard Test Methods for Wet Insulation Integrity Testing of Photovoltaic Modules
- E1821 Standard Test Method for Determination of Carbohydrates in Biomass by Gas Chromatography
- E1827 Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
- E1830 Standard Test Methods for Determining Mechanical Integrity of Photovoltaic Modules
- E1861 Standard Guide for Use of Coal Combustion By-Products in Structural Fills
- E1918 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
- E1971 Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings
- E1980 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces
- E1991 Standard Guide for Environmental Life Cycle Assessment of Building Materials/Products
- E2047 Standard Test Method for Wet Insulation Integrity Testing of Photovoltaic Arrays
- E2114 Standard Terminology for Sustainability Relative to the Performance of Buildings
- E2128 Standard Guide for Evaluating Water Leakage of Building Walls
- E2129 Standard Practice for Data Collection for Sustainability Assessment of Building Products
- E2397 Standard Practice for Determination of Dead Loads and Live Loads associated with Green Roof Systems
- E2398 Standard Test Method for Water Capture and Media Retention of Geocomposite Drain Layers for Green Roof Systems
- E2399 Standard Test Method for Maximum Media Density for Dead Load Analysis of Green Roof Systems
- E2400 Standard Guide for Selection, Installation, and Maintenance of Plants for Green Roof Systems
- E241 Standard Guide for Limiting Water-Induced Damage to Buildings
- E2432 Standard Guide for General Principles of Sustainability Relative to Buildings
- E408 Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
- E413 Standard Classification for Rating Sound Insulation
- E477 Standard Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers

- E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
- E683 Standard Practice for Installation and Service of Solar Space Heating Systems for One- and Two-Family Dwellings
- E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
- E781 Standard Practice for Evaluating Absorptive Solar Receiver Materials When Exposed to Conditions Simulating Stagnation in Solar Collectors With Cover Plates
- E782 Standard Practice for Exposure of Cover Materials for Solar Collectors to Natural Weathering Under Conditions Simulating Operational Mode
- E823 Standard Practice for Nonoperational Exposure and Inspection of a Solar Collector
- E881 Standard Practice for Exposure of Solar Collector Cover Materials to Natural Weathering Under Conditions Simulating Stagnation Mode
- E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- E903 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
- E948 Standard Test Method for Electrical Performance of Photovoltaic Cells Using Reference Cells Under Simulated Sunlight
- F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- F2034 Standard Specification for Sheet Linoleum Floor Covering
- F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

E. Bat Conservation International:
- Bat Approved Bat Houses

F. Carpet and Rug Institute
- Green Label & Green Label Plus Testing Programs, carpet-rug.org/testing/green-label-plus

G. Center for Resource Solutions
- Green-e program

H. Environmental Protection Agency (EPA):
- Comprehensive Procurement Guidelines
- ENERGY STAR
- Environmentally Preferable Purchasing Program Final Guidance
- GreenScapes program
- Heat Island Initiative
- Indoor Air Quality Building Education and Assessment Model (I-BEAM)
- National Environmental Performance Track
- Pollution Prevention (P2)
- Product Stewardship Program
- Significant New Alternatives Policy (SNAP) Program

I. Federal Trade Commission:
- Guide for the Use of Environmental Marketing Claims

J. Forest Stewardship Council:
- Chain-Of-Custody
- Forest Management

K. Green Building Initiative (GBI):
- Green Globes - US

L. Green Seal:
- GC-03 Anti-Corrosive Paints
- GC-12 Occupancy Sensors
- GC-13 Split-Ductless Air-Source Heat Pumps
- GS-05 Compact Fluorescent Lamps
- GS-11 Paints
- GS-13 Windows
- GS-14 Window Films
- GS-31 Electric Chillers
- GS-32 Photovoltaic Modules
- GS-36 Commercial Adhesives
- GS-37 Industrial & Institutional Cleaners

M. International Iron and Steel Institute:
- CO2 Breakthrough Program

N. International Organization of Standardization:
- Guide 64; Guide for Inclusion of Environmental Aspects in Product Standards
- 9660 Information processing -- Volume and file structure of CD-ROM for information interchange
- 14001 Environmental management systems – Specification with guidance for use
- 14004 Environmental Management Systems – General Guidelines on Principles, Systems and Supporting Techniques
- 14020 Environmental labels and declarations – General principles
- 14024 Environmental labels and declarations – Type I environmental labelling - Principles and procedures
- 14040 Environmental management – Life cycle assessment – Principles and framework

O. National Association of Home Builders:
- Advanced Framing Techniques: Optimum Value Engineering

P. National Institute of Building Sciences:
- MOIST program for transfer of heat and moisture
- Whole Building Design Guide

Q. National Institute of Standards and Technology:
- BEES (Building for Environmental and Economic Sustainability) Lifecycle Decision Support Tool

R. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):
- IAQ Guidelines for Occupied Buildings Under Construction

S. Southcoast Air Quality Management District:

- 1168 Adhesive And Sealant Applications

T. US Composting Council:
- Seal of Testing Assurance Program

U. US Department of Agriculture:
- Biobased Products – Definitions and Descriptions

V. US Green Building Council:
- LEED™ 2009 Green Building Rating System
- LEED™ v4 (version 4) Green Building Rating System

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 01 42 00

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 DEFINITIONS

A. Permanent Enclosure: As determined by Contracting Officer (CO), permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and openings are closed with permanent construction or substantial temporary closures.

1.3 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in Contract Sum as required.

B. Water Service: Portal Water from existing water system is available for use without metering and without payment of use charges at the Education Center and Visitor's Center trails. Contractor shall provide connections and extensions of services are required for construction operations without any additional costs to NPS. Water service is not available at Bayou Coquille and Marsh Overlook trails. Contractor shall make arrangements to provide own potable water for use during these phases.

C. Electric Power Service: Electric power from existing system is available for use with metering and with payment of use charges at the Education Center and Visitor's Center trails. Contractor shall provide connections and extensions of services are required for construction operations without any additional costs to NPS. Electric power service is not available at Bayou Coquille and Marsh Overlook trails. Contractor shall make arrangements to provide own power for use during these phases.

1.4 QUALITY ASSURNCE

A. Electric Service: Comply with National Electrical Contractors Association (NECA), National Electrical Manufacturers Association (NEMA), and Underwriter Laboratories (UL) standards and regulations for temporary electric service. Install service to comply with National Fire Protection Association (NFPA) 70.

B. Environmental Protection: Provide environmental protection as required by agency(ies) with jurisdiction and as indicated in Contract Documents. Coordinate with requirements of the following:

1. Regulatory Requirements
2. Indoor Air Quality (IAQ) Management
3. Noise and Acoustics Management
4. Environmental Management
5. Construction Waste Management

C. Accessible Temporary Egress: Comply with applicable provisions in the United States (U.S.) Architectural & Transportation Barriers Compliance Board's Architectural Barriers Act Accessibility Standard (ABAAS) Accessibility Guidelines.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before NPS acceptance, regardless of previously assigned responsibilities.

PART 2 PRODUCTS

2.1 MATERIALS

A. Temporary materials may be new or used, but must be adequate in capacity for required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

B. Chain-Link Fencing: Minimum 2-inch (50 millimeters), 0.148-inch (3.76 millimeters) thick, galvanized steel, chain-link fabric fencing; minimum 8 feet (1.8 millimeter) high with galvanized steel pipe posts; minimum 2-3/8-inch (60 millimeters) OD (outside diameter) line posts and 2-7/8-inch (73 millimeters) OD corner and pull posts, with 1-5/8 inch (42 millimeters) OD top rails. Chain-link fencing shall not be installed in pavement.

C. Portable Chain-Link Fencing: Minimum 2-inch (50 millimeters), 9-gage, galvanized steel, chain-link fabric fencing; minimum 8 feet (1.8 millimeters) high with galvanized steel pipe posts; minimum 2-3/8-inch (60 millimeters) OD line posts and 2-7/8-inch (73 millimeters) OD corner and pull posts, with 1-5/8-inch (42 millimeters) OD top and bottom rails. Provide galvanized steel bases for supporting posts. Portable chain-link fencing shall be used when installing fencing on pavement.

D. Safety Barrier Fence: Orange plastic fence, minimum height, 4 feet.

E. Barrier Tape shall be 100% virgin pigmented polyolefin film with a printed message on one side, comply with OSHA 29 CFR Part 1910.144, and possess the following salient characteristics:

1. Width: 3"
2. Color: Yellow
3. Imprint: "CAUTION: CONSTRUCTION AREA"
4. Thickness: 4.0 MIL

5. Weight: 19.6 LBS/1000 FT^2

2.2 TEMPORARY FACILITIES

A. Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Temporary weather tight sheds or other covered facilities for storage of materials subject to weather damage. Number and size of structures shall be subject to Contracting Officer's approval.

C. Toilets: Sufficiently lighted and ventilated toilet facilities in weatherproof, sight proof, handicap accessible, sturdy enclosures with privacy locks.

1. Provide separate toilet facilities for men and women.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. Heating, Ventilation, and Air Conditioning (HVAC) Equipment: Unless Contracting Officer authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to agency(ies) with jurisdiction and marked for intended use.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with Minimum Efficiency Reporting Value (MERV) of 8 at each return air grille in system and remove at end of construction.

C. Direct Digital Control (DDC) Internet Connection: Furnish, install and maintain a high-speed connection (Digital Subscriber Line (DSL) or similar) between the project’s DDC system and the internet through a Contractor furnished internet service provider. Contractor is responsible for maintenance of this connection and costs associated with internet service provider through warranty period of this contract. Upon completion of warranty period, service shall be transferable to the Government at which time future costs for connection will no longer be the responsibility of Contractor.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities in the staging areas as shown on sheets G2.1-G2.3.

1. Locate facilities to limit site disturbance and as directed by the Contracting Officer.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, NPS, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Acquire necessary permits.

B. Storm Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by the agency(ies) with jurisdiction.

C. Non-potable water for construction is not available within the park boundaries. Contractor shall furnish non-potable water from a source outside park boundary.

D. Potable water is available on site at Education Center and Visitor's Center. Make connections to existing facilities as needed. Facilities must be cleaned and maintained in a condition acceptable to NPS. At Substantial Completion, restore these facilities to condition existing before initial use.

E. Potable water is not available on site at Bayou Coquille, Marsh Overlook, and Palmetto Trails. Furnish cool, potable water for construction personnel in locations convenient to workstations.

F. Sanitary Facilities: Provide temporary toilets, and wash facilities for use by construction personnel.

1. Place in approved locations secluded from public observation and convenient to workstations. Relocate as work progress requires.
2. Maintain and clean toilet facilities at least weekly.
3. Completely remove sanitary facilities on completion of work.
4. Toilets: Use of existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to NPS. At Substantial Completion, restore facilities to condition existing before initial use.

G. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Use of permanent heating and cooling system will not be allowed without written authorization from Contracting Officer. When the permanent heating and cooling system is approved for use as temporary heating and cooling, pay costs until final acceptance.

Permanent heating and cooling system shall be sufficiently complete, including controls, to permit safe operation.

2. Provide and maintain adequate approved facilities, as required for safety and construction requirements, during the work. Provide ample clearance around stoves, heaters, chimney and vent connections to prevent ignition of combustible material.
3. Install and maintain temporary filters when air handing equipment is used for temporary heating and cooling. Install new filters before final acceptance in addition to any extra sets of filters required. Clean coils as determined by Contracting Officer.
4. Warranties for equipment used for temporary heating *and cooling* shall start on date of Final Acceptance.

H. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

I. Electric Power Service: Use of existing electric power service will be permitted at Education Center and Visitor's Center as long as equipment is maintained in a condition acceptable to NPS.

1. When temporary connections are removed, restore existing utility services to original condition.

J. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations for the Bayou Coquille, Marsh Overlook, and Palmetto Trail phases of the Project.

1. Install electric power service overhead, unless otherwise indicated.

K. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

L. Telephone Service: No telephone service is available on site for Contractor's use. Make arrangements with Telephone Company and pay costs.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 50 feet of building lines. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove structures, equipment, and furnishings, and terminate services after punch list is 100 percent completed or when directed by Contracting Officer. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Contracting Officer.

B. Contracting Officers Field Office:

1. Provide Heat, lights, power, air conditioning, temporary water pressure and sewage holding tanks.
2. Provide office, furnishings, and utility connections no later than 7 days after date of Notice to Proceed. Exact location will be determined by Contracting Officer.
3. Maintain equipment, furnishings, and structures. Provide equipment replacement elements as needed. Provide weekly cleaning services and trash disposal. Maintain and service water and sewer holding tanks as required.

C. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.

D. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."

E. Traffic Controls: Erect and maintain barricades, lights, danger signals, and warning signs in accordance with Manual on Uniform Traffic Control Devices (MUTCD), Part 6, latest edition.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.
3. Illuminate barricades and obstructions at night; keep safety lights burning from sunset to sunrise.
4. Adequately barricade and post open cuts in or adjacent to thoroughfares.
5. Protect pedestrian traffic by guardrails or fences.
6. When pedestrian traffic is detoured onto a roadway, provide temporary walkways with protection as required at ends and overhead. For walkways, use lumber running parallel to direction of traffic movement and provide ramps at changes of elevation.
7. Cover pipes, hoses, and power lines crossing sidewalks and walkways with troughs using beveled edge boards.
8. Install Barrier Tape where directed by Contracting Officer. Keep a minimum of two rolls on site.

F. Parking: Use designated areas of existing shown on drawings parking areas for construction personnel.

G. Dewatering Facilities and Drains: Comply with requirements of the agency(ies) with jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

H. Project Identification and Temporary Signs: Provide Project identification and other signs. Fence, barricade, or otherwise block off the immediate work area to prevent unauthorized entry.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.
3. Erect and maintain sufficient detour signs at road closures and along detour routes.

I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of agency(ies) with jurisdiction.

J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

K. Temporary Elevator Use: Refer to Division 14 Sections for temporary use of new elevators.

L. Existing Elevator Use: Use of existing elevators will be permitted, as long as elevators are cleaned and maintained in a condition acceptable to Contracting Officer. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to shop, make required repairs and refinish entire unit, or provide new units as required.

M. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

N. Existing Stair Usage: Use of existing stairs will be permitted, as long as stairs are cleaned and maintained in a condition acceptable to Contracting Officer. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

O. Temporary Use of Permanent Stairs: Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Cleaning of Equipment: Contractor shall ensure prior to moving on to Project Area, equipment, is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Ensure equipment has been pressure washed and is free of exotic species. Equipment shall be considered free of soil, seeds, and other debris when visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools are not required.

C. Temporary Erosion and Sedimentation Control: Refer to Section 01 57 23 "Temporary Storm Water Pollution Prevention".

D. Tree and Plant Protection: Refer to Section 01 11 00 "Summary of Work".

E. Pest Control: Follow NPS requirements to minimize attraction and harboring of rodents, roaches, and other pests and perform extermination and control procedures at regular intervals so Project will be free of pests and residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

F. Site Enclosure Fence: Before construction operations begin, furnish and install chain link fence gate to prevent people and animals from easily entering site at the proposed Bayou Coquille Trailhead as shown on the plans.
   1. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Contracting Officer with one set of keys.

G. Barricades, Warning Signs, and Lights: Comply with requirements of agency(ies) with jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. erecting structurally adequate barricades, including warning signs and lighting.

I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

   1. Responsible Person: Capable and qualified person shall be placed in charge of fire protection. Responsibilities shall include locating and maintaining fire protective equipment and establishing and maintaining safe torch cutting and welding procedures.
   2. Tobacco Use, Smoking, and Vaping: Smoking within buildings or temporary storage sheds is prohibited.
   3. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of NPS. Check with Park; many require "burn permits" for welding.
   4. Develop and supervise overall fire-prevention and -protection program for personnel at Project Site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

5. Provide temporary standpipes and hoses for fire protection. Hang hoses with warning sign stating hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
6. Hazard Control: Take necessary precautions to prevent fire during construction. Do not store flammable or combustible liquids in existing buildings. Provide adequate ventilation during use of volatile or noxious substances. Ensure cleanup procedures and storage requirements are followed at close of every work session.
7. Spark Arresters: Equip gasoline or diesel-powered equipment used during periods of potential fire hazards or in potential forest and grass fire locations with spark arresters approved by United States Department of Agriculture (USDA) Forest Service.
    a. Written determinations of periods and areas of potential fire hazard will be issued by Contracting Officer.
8. Buildings: Furnish a minimum of one extinguisher for each 1,500 square feet of area or major fraction thereof.
    a. Travel distance from any workstation to nearest extinguisher shall not exceed 75 feet.
9. Vehicles and Equipment: Provide one extinguisher on each vehicle or piece of equipment.
10. Service and Refueling Areas: Locate areas a minimum of 50 feet from buildings. Shut down equipment before refueling.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on 24-hour basis where required to achieve indicated results and avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. NPS reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period.

END OF SECTION 01 50 00

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 57 19.12 NOISE AND ACCOUSTICS MANAGEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Special requirements for noise and acoustics management during **c**onstructio**n** operations.

1.2 DEFINITIONS

A. Ambient noise level: The total noise associated with a given environment, being usually a composite of normal or existing sounds from all sources near and far, excluding the noise source at issue.

B. Daytime: The hours from 6 A.M. to 6 P.M. on weekdays and 6 A.M. 6 P.M. on weekends and holidays.

C. Nighttime: All non-daytime hours.

D. Property line: The real or imaginary line along the ground surface and its vertical extension, which separates real property owned or controlled by one person from contiguous real property owned or controlled by another person or from any public right-of-way or from any public space.

E. Receiving noise area: Any real property where people live or work and where noise is heard, excluding the project or source area.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 NOISE MANGEMENT

A. Noise Control: Perform construction operations to minimize noise. Perform noise-producing work in less sensitive hours of the day or week as directed by the Contracting Officer CO).

B. Repetitive and/or intermittent, high-level noise: Permitted only during Daytime.

1. Do not exceed the following dB(A) limitations at 50 feet:

Sound Level in dB(A)	Time Duration of Impact Noise
70	More than 12 minutes in any hour
80	More than 3 minutes in any hour

2. Maximum permissible construction equipment noise levels at 50 feet:

EARTHMOVING	dB(A)	MATERIALS HANDLING	dB(A)
Front Loaders	75	Concrete Mixers	75

Backhoes	75	Concrete Pumps	75
Dozers	75	Cranes	75
Tractors	75	Derricks Impact	75
Scrapers	80	Pile Drivers	95
Graders	75	Jack Hammers	75
Trucks	75	Rock Drills	80
Pavers, Stationary	80	Pneumatic Tools	80
Pumps	75	Saws	75
Generators	75	Vibrators	75
Compressors	75		

C. Ambient Noise:

1. Maximum noise levels (dB (decibel)) for receiving noise area at property line shall be as follows:

   a. Residential receiving area
      Daytime: 65 dB
      Nighttime: 45 dB

   b. Commercial/Industrial receiving area
      Daytime: 67 dB
      Nighttime: 65 dB

   c. In the event the existing local ambient noise level exceeds the maximum allowable receiving noise level (dB), the receiving noise level maximum for construction operations shall be adjusted as follows:

   d. Residential receiving area: Maximum 3 additional dB above the local ambient as measured at property line.

   e. Commercial/Industrial receiving area: Maximum 5 additional dB above the local ambient as measured at the property line.

3.2 FIELD QUALITY CONTROL

A. Assess potential effects of construction noise on facility occupants in accordance with ASTM E1686 and as follows:

1. Ambient noise measurement: Measure at property line at a height of at least four (4) feet above the immediate surrounding surface. Average the ambient noise level over a period of at least 15 minutes.
2. Ambient noise measurement at urban sites: Conduct during morning peak traffic hour between 6 A.M. and 8 A.M. and afternoon peak traffic hour between 4 P.M. and 6 P.M. In addition, conduct a 24-hour measurement at the proposed project site to document the noise pattern throughout the day. Adjust and weight for seasonal and climatic variations.

B. Monitor noise produced from construction operations in accordance with ASTM E1780.

END OF SECTION 01 57 19.12

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 57 23 TEMPORARY STORM WATER POLLUTION PREVENTION

PART 1 GENERAL

1.1 SUMMARY

A. Federal Regulations for controlling discharges of pollutants (including chemicals, erodible material, and trash) from municipal separate storm sewer systems, construction sites, and industrial activities, were brought under the National Pollution Discharge Elimination System (NPDES) permit process by amendments to the Clean Water Act (CWA), and promulgation of federal stormwater regulations issued by the United States Environmental Protection Agency (USEPA). The USEPA uses amount of ground disturbance as a measure of a project potential to generate pollution from erosion. NPDES Phase I regulates discharges from construction sites that disturb 5 acres or more. NPDES Phase II regulations expand existing General Permit requirements under Phase I to include/regulated discharges from construction sites that disturb land equal to or greater than one (1) acre and less than 5 acres, known as Small Construction Activity. Construction disturbances 1 acre and above typically require a formal NPDES permit, and a formal Stormwater Pollution Prevention Plan (SWPPP) must be submitted to Agency(ies) with Jurisdiction for review and approval.

B. National Park Service (NPS) Standards and Guidelines require water quality be protected to ensure compliance with Organic Act. Contractor shall prepare an Under-An-Acre Pollution Prevention Plan (UPPP) for each project resulting in less than 1 acre of soil disturbance or not otherwise subject to requirements of NPDES program. (UPPP Guideline)

C. The work of this section consists of implementing measures to prevent discharges of pollutants, including temporary storm water pollution during construction activities, either through compliance with NPDES permit program, or in conformance with NPS guidance for UPPPs.

D. Work of this section consists of implementing measures to Temporary Storm Water Pollution during construction activities, either through compliance with NPDES permit program; or in conformance with NPS guidance for UPPPs.

E. See general notes and plans on the drawings for more information.

1.2 DEFINITIONS

A. Definitions pertaining to sustainable development: As defined in ASTM E2114.

B. Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade utility of the environment for aesthetic, cultural, or historical purposes.

C. National Pollution Discharge Elimination System (NPDES) Phase I: Regulates discharges from construction sites that disturb 5 acres or more.

D. NPDES Phase II: Regulations expand existing General Permit requirements under Phase I to include and regulate discharges from construction sites that disturb land equal to or greater than one (1) acre and less than 5 acres, known as Small Construction Activity.

E. Storm Water Pollution Prevention Plan (SWPPP): Developed and implemented stormwater management measures to protect surface water from pollutants during construction activities disturbing an acre or more in compliance with federal, state, and local requirements for permit approval under NPDES program.

F. UPPP: Developed and implemented pollution prevention plan (including stormwater management measures, if needed) to protect environment from pollutants on construction projects with less than one acre of disturbance in conformance with NPS guidelines.

1.3 SUBMITTALS

A. After contract award and before pre-construction conference, prepare and submit:
   1. A SWPPP showing SWPPP satisfies Federal and State NPDES permit requirements.
   2. A UPPP in conformance with NPS guidelines and adherence to applicable construction storm water management practices.

B. Inspection Schedule: Submit schedule for inspection and monitoring of pollution prevention measures.

C. Inspection Schedule: Submit schedule for inspection and monitoring of storm water pollution prevention measures.

D. Erosion Control Products: Submit manufacturer's product information and installation recommendations for silt fence, filter fabric, erosion control blanket, straw bales, and other materials proposed for use on this project.

1.4 QUALITY ASSURANCE

A. Contractor shall prepare and submit a plan to Contracting Officer (CO) for review and concurrence.

B. Orientation Meeting: Contractor shall arrange and conduct an Erosion and Sediment Control meeting/briefing to inform parties, scheduled to be on-site during project, of measures to be implemented for proper erosion and sediment control (may be included as part of Pre-Construction Meeting).

   1. Installation of silt fences, storm drain protection, and other forms of erosion and sediment control shall not begin until after this meeting has occurred.

C. Orientation Meeting: Contractor shall be responsible for arranging and conducting Pollution Prevention meeting/briefing to inform parties scheduled to be on-site during project of measures to be implemented for proper pollution prevention and control (may be included as part of Pre-Construction Meeting).

1. Installation of silt fences, storm drain protection, and other forms of pollution prevention controls shall not begin until after this meeting has occurred.

D. Pollution Prevention Manager: Contractor shall designate Pollution Prevention Manager who will be responsible for implementation, inspection, maintenance, and amendments to approved plan.

1. Pollution Prevention Manager shall be familiar with UPPP procedures and Best Management Practices (BMPs) and shall ensure emergency procedures and plan are updated as needed and available for inspection.

2. When changes in approved plan are required, Pollution Prevention Manager shall prepare and certify an amendment and submit to Contracting Officer for review and concurrence.

E. Pollution Prevention and Erosion Control Manager: Contractor shall designate Pollution Prevention and Erosion Control Manager responsible for implementation, inspection, maintenance, and amendments to approved plan.

1. Pollution Prevention and Erosion Control Manager shall be familiar with temporary storm water pollution prevention procedures and Best Management Practices and ensure emergency procedures and plan are updated as needed and available for inspection.

2. When changes in approved plan are required, Pollution Prevention and Erosion Control Manager shall prepare and certify an amendment and submit to Contracting Officer for review and concurrence.

PART 2 PRODUCTS

2.1 TEMPORARY STORM WATER POLLUTION PREVENTION PLAN

A. Provide SWPPP which satisfies Federal and State NPDES permit requirements and includes:

1. Site description.
2. Identification and contract information for Pollution Prevention and Erosion Control Manager.
3. Expected sequencing of operations and construction schedule.
4. Weather monitoring procedure.
5. Descriptions and details Best Management Practices for of pollution prevention and erosion controls, including dust control.
6. Pollution prevention and erosion control plans.
7. Controls for other potential onsite storm water pollutants.
8. Applicable specifications.
9. Maintenance and inspection procedures and forms.
10. Description of potential non-storm water discharges at site.
11. Notice of Intent (NOI) form.
12. Notice of Termination (NOT) form.
13. Contractor and Sub-contractor Certification forms.
14. Other record keeping forms and procedures.

15. Housekeeping Best Management Practices, including vehicle wash-down areas, protection of equipment storage and maintenance areas, and sweeping of roadways related to hauling activities.

B. Provide UPPP which conforms to NPS requirements (utilize UPPP template) and include:
1. Responsible Parties
2. General Information: Project Scope, Project Details, Site Information, and Spill Prevention
3. Standards and Constraints
4. Project Scheduling
5. Known Data on Soil and Fill
6. Activities with Potential to Generate Sediment
7. Activities and Materials with Potential to Pollute Storm Water
8. Management and Reporting BMPs
9. Waste Management BMPs
10. Non-Storm Water Pollution Control BMPs
11. Soil Stabilization BMPs
12. Sediment Control BMPs
13. Other Pollution Control BMPs
14. References
15. Preparer's Certification
16. Appendices: Contact Information, Pollution Prevention Control Map or Sheet(s), Standard Installation Specifications for each BMP, and Blank forms.

PART 3 EXECUTION

3.1 ENVIRONMENTAL PROTECTION

A. Protection of Natural Resources: Comply with applicable regulations and these specifications. Preserve natural resources within project boundaries and outside limits of work performed under this Contract in their existing condition or restore to an equivalent or improved condition as approved by Contracting Officer.

B. Construction Zone: Arrange construction activities to minimize pollution (i.e., erosion, trash, etc.) to maximum practical extent.

1. Clearing, excavation, and grading shall be limited to those areas of project site necessary for construction. Minimize area exposed and unprotected.
2. Clearly mark and delineate limits of work activities.
3. Equipment shall not be allowed to operate outside limits of work or to disturb existing vegetation.
4. Excavation and grading shall be completed during dry season to maximum extent possible.
5. Material shall be stored away from locations where water is present to greatest extent practicable.

3.2 REGULATORY REQUIREMENTS

A. Permits: Contractor shall obtain required NPDES permits resulting in no impacts to scheduled work. Contractor shall account for possibility of significant lead time in scheduling and executing work.

1. Implement requirements of NPDES permit for erosion control due to storm water runoff during construction.
2. Implement good housekeeping practices, inspections and record keeping.
3. Prior to construction, Contractor and Subcontractors shall sign certifications (included in the plan) that they understand requirements of NPDES permit.
4. Subcontractors shall comply with requirements of NPDES under supervision of Contractor.
5. Accepted plan shall comply with terms and conditions of EPA permit.

B. Notice of Intent (NOI): Contractor shall file a Notice of Intent and formal SWPPP as required to the Agency(ies) with Jurisdiction.

C. Notice of Termination (NOT): After Substantial Completion of Work, file a Notice of Termination (NOT) with the Agency(ies) with Jurisdiction.

D. Contracting Officer Notification: Contractor shall notify Contracting Officer in writing and by telephone of these events:

1. Erosion and sediment control meeting/briefing.
2. Following installation of required sediment control structures.
3. Prior to removal of or modification to sediment control structures.
4. Prior to removal of sediment control structures.

3.3 UNDER-AN_ACRE POLLUTION PREVENTION PLAN

A. Review and Acceptance: Contractor and Contracting Officer will jointly review draft Plan and agree to needed revisions. Contractor shall incorporate revisions, sign, and submit final Plan to Contracting Officer. Final Plan will be the document enforced on the project.

1. Accepted Plan will describe and ensure implementation of practices to be used to reduce pollutants in storm water discharges.
2. Contractor shall maintain current copy of Plan and associated records and forms at jobsite throughout duration of project.
3. Plan shall be available for public inspection and inspection and use of Contracting Officer.
4. Approval of Contractor’s Plan will not relieve Contractor of responsibility for compliance with applicable environmental regulations.

B. Implementation: Implement Plan as required throughout construction period and maintain erosion control elements in proper working order.

1. Do not perform clearing and grubbing or earthwork until Plan has been implemented.

C. SWPPP (including inspection forms) and data used to complete the NOI shall be provided to Contracting Officer after Substantial Completion of project.

3.4 SITE INSPECTIONS AND PLAN REVISIONS

A. Inspections: Contractor and Contracting Officer will perform a weekly inspection onsite.

1. Inspection shall include disturbed areas not completely stabilized, areas used for storage of materials, locations where vehicles enter or exit site, and other erosion and sediment controls included in the Plan.
2. Inspections shall be documented.
3. Inspection forms shall be retained onsite in Plan notebook throughout construction period.

B. Plan Revisions: It may be necessary to revise Plan during construction to make necessary improvements, revisions, or to respond to unforeseen conditions noted during construction or site inspections.

1. Plan shall specify mechanism whereby revisions may be proposed by Contractor or Contracting Officer.
2. Contractor and Contracting Officer will jointly review each revision to Plan before changes incorporated and implemented. Contractor will then provide revised copy of Plan to Contracting Officer.
3. Accepted modifications will be implemented within 7 calendar days following date of inspection when deficiencies or necessary corrections are first noted.

C. Negligence: Provide additional temporary erosion and pollution controls made necessary by Contractor's errors or negligence at no additional cost to Government.

3.5 HOUSEKEEPING AND SITE MANAGEMENT

A. Store materials onsite in conformance to Federal, state, local, and manufacturer's regulations and specifications. Use Best Management Practices to minimize risk of materials coming into contact with environmental conditions (i.e. water and wind) that could disperse them.

B. Manage solid waste in conformance to Federal, state, and local regulations. Best Management Practices should be used to minimize risk of materials coming into contact with environmental conditions (i.e. water and wind) that could disperse them.

C. Include a spill prevention and control plan with provisions placed in SWPPP.

D. Manage hazardous waste (including contaminated soil) in conformance to Federal, state, local and NPS regulations and guidelines.

3.6 EROSION CONTROL MEASURES

A. Erosion control measures shall consist of Best Management Practices for storm water discharges, including wattles and turbidity curtains.

B. Erosion control measures shall be used to contain only direct precipitation in construction zone. Contained water shall be allowed to percolate into ground or drain slowly through wattles. Earthen sediment traps or holding ponds shall not be used unless accepted by Contracting Officer.

C. Earthen sediment traps or holding ponds shall not be used unless accepted by Contracting Officer.

D. Reduce runoff velocity and direct surface runoff around and away from fuel containment, storage, and borrow areas.

E. Divert surface runoff around and away from cut and fill slopes.

F. Excess water used for dust control shall be contained within construction areas by erosion control measures.

G. Contractor shall prevent deposition of materials onto paved areas. Contractor shall inspect paved areas for deposited materials weekly and remove materials immediately.

H. Furnish, install, maintain, and operate necessary control measures and other equipment necessary to prevent erosion as described in approved SWPPP.

I. Furnish, install, maintain, and operate necessary control measures and other equipment necessary to prevent erosion as described in approved UPPP.

J. Before work begins, sufficient equipment shall be available on site to assure operation and adequacy of erosion control system can be maintained.

3.7 MAINTENANCE OF TEMPORARY FACILITIES

A. Ensure erosion and sediment control structures remain effective throughout construction operations. Relocate structures as necessary.

B. Inspect control structures after each significant rainfall. Promptly repair breaches which occur.

C. Contractor shall remove entrapped sediment from behind wattles and turbidity curtains after each storm.

3.8 REPORTING

A. If a discharge occurs or if project receives written notice or order from regulatory agency, Contractor shall immediately notify Contracting Officer and shall file written report to Agency(ies) with Jurisdiction within 7 days of discharge event, notice, or order. Corrective measures shall be implemented immediately following discharge, notice, or order. The report to the Agency(ies) with Jurisdiction shall contain:

1. Date, time, location, nature of operation, and type of discharge, including cause or nature of notice or order.
2. Best Management Practices deployed before discharge event, or prior to receiving notice or order.
3. Date of deployment and type of Best Management Practices deployed after discharge event, or after receiving notice or order, including additional Best Management Practices installed or planned to reduce or prevent re-occurrence.
4. An implementation and maintenance schedule for affected Best Management Practices.

3.9 SEDIMENT DISPOSAL

A. Sediment excavated from temporary sediment control structures shall be disposed on site with general fill, or with topsoil. Sediment shall be allowed to dry out as required before reuse.

B. Contractor shall place sediment removed from traps and other structures where it will not enter a storm drain or watercourse and where it will not immediately reenter the basin.

3.10 REMOVAL OF TEMPORARY STORM WATER POLLUTION CONTROL MEASURES

A. Temporary control measures shall be removed with permission of Contracting Officer within 20 working days after final acceptance of project, and/or once grading is complete and slopes have stabilized.

END OF SECTION 01 57 23

SECTION 01 67 00 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and environmental requirements.

1.2 DEFINITIONS

A. Products: Items purchased for incorporating into Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number and other designation shown or listed in manufacturer's published product literature, current as of date of Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Approved Equals: Product demonstrated and approved through submittal process, or where indicated as a product substitution, to have indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Definitions pertaining to sustainable development: As defined in ASTM E2114.

C. Biobased Materials: As defined in Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, "biobased" means a "commercial or industrial product (other than food or feed) composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials." Biobased materials also include fuels, chemicals, building materials, or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

1. Biobased content: Amount of biobased carbon in material or product as a percentage of weight (mass) of total organic carbon in material or product.

D. Chain-of-Custody: Process whereby a product or material is maintained under physical possession or control during its entire life cycle.

E. Environmentally preferable products: Products and services with lesser or reduced effect on the environment in comparison to conventional products and services. Refer to Environmental

Protection Agency's (EPA) Final Guidance on Environmentally Preferable Purchasing for more information.

F. Stewardship: Responsible use and management of resources in support of sustainability.

G. Sustainability: Maintenance of ecosystem components and functions for future generations.

1. Recycled Content Materials: Products containing pre-consumer or post-consumer materials as all or part of their feedstock. Recycled content claim shall be consistent with International Organization for Standardization (ISO) 140001 Standard for the Use of Environmental Marketing Claims.
2. Rapidly Renewable Material: Material made from plants typically harvested within a ten-year cycle.
3. Regional Materials: Materials manufactured and extracted, harvested, or recovered within a radius of 500 miles from Project location.

1.3 SUBMITTALS

A. Record Submittals as specified in – Sustainable Design Close-Out Documentation, submit:

1. Affirmative Procurement Reporting Form. Submit on form in Appendix A of this Section, or similar form as approved by Contracting Officer (CO).
2. Submit environmental data in accordance with Table 1 of ASTM E2129 for these products:

a. Masonry
b. Finish Carpentry
c. Plastic Fabrications
d. Building Insulation
e. Roofing
f. Joint Sealers
g. Wood & Plastic Doors
h. Windows
i. Skylights
j. Glazed Curtain Wall
k. Gypsum Board
l. Tile
m. Acoustical Ceilings
n. Resilient Flooring
o. Carpet
p. Wall Coverings
q. Paints & Coatings
r. Toilet Compartments
s. Loading Dock Equipment
t. Office Equipment
u. Furnishings & Accessories
v. Renewable Energy Equipment
w. Elevators
x. Plumbing fixtures and equipment.
y. HVAC equipment
z. Lighting equipment

.Material Safety Data Sheets (MSDS): For each product required by OSHA to have a MSDS, submit an MSDS. MSDS shall be prepared no earlier than June 1998. Include information for MSDS Sections 1 to 16 in accordance with ANSI Z400.1 and as follows:

a. Section 1: Chemical Product and Company Identification
b. Section 2: Composition/Information on Ingredients
c. Section 3: Hazards Identification
d. Section 4: First Aid Measures
e. Section 5: Fire Fighting Measures
f. Section 6: Accidental Release Measures
g. Section 7: Handling and Storage
h. Section 8: Exposure Controls/Person Protection
i. Section 9: Physical and Chemical Properties
j. Section 10: Stability and Reactivity Data
k. Section 11: Toxicological Information. Include data used to determine the hazards cited in Section 3. Identify acute data, carcinogenicity, reproductive effects, and target organ effects.
l. Section 12: Ecological Information. Include data regarding environmental impacts during raw materials acquisition, manufacture, and use. Include data regarding environmental impacts in event of accidental release.
m. Section 13: Disposal Considerations. Include data regarding proper disposal of the chemical. Include information regarding recycling and reuse. Indicate whether or not product is considered to be "hazardous waste" according to United States EPA Hazardous Waste Regulations 40 CFR 261 (Code of Federal Regulations).
n. Section 14: Transportation Information. Identify hazard class for shipping.
o. Section 15: Regulatory Information. Identify federal, state, and local regulations applicable to the material.
p. Section 16: Other Information. Include additional information relative to recycled content, biobased content, and other information regarding environmental and health impacts.

4. Chain of Custody: Submit chain-of-custody documentation for sustainable forestry for these products:

a. Rough Carpentry
b. Finish Carpentry
c. Wood Doors
d. Windows
e. Wood Flooring
f. Furnishings & Accessories

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in undamaged condition; in manufacturer's original sealed container or other packaging system; complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with Contract Documents. Ensure products are undamaged and properly protected.
5. Obtain materials in biodegradable or recyclable/reusable packaging which uses minimum amount of packaging possible.

C. Storage:

1. Allow for inspection and measurement of quantity or counting of units.
2. Store materials in manner to not endanger Project structure.
3. Store products subject to damage by the elements, under cover in weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Store loose granular materials in well-drained area on solid surfaces to prevent mixing with foreign matter.

1.6 PACKAGING

A. Where Contractor has option to provide one of listed products or equal, preference shall be given to products with minimal packaging and easily recyclable packaging as defined in ASTM D5834.

B. Maximize use of source reduction and recycling procedures outlined in ASTM D5834.

C. Provide minimum 45 percent post-consumer recycled content and minimum 100 percent recovered fiber content of industrial paperboard in accordance with EPA’s Comprehensive Procurement Guidelines and ASTM D5663.

D. Provide minimum 10 percent post-consumer recycled content and minimum **10** percent recovered fiber content of carrier board in accordance with EPA’s Comprehensive Procurement Guidelines and ASTM D5663.

E. Provide minimum 5 percent post-consumer recycled content and minimum 5 percent recovered fiber content of brown papers (e.g., wrapping papers and bags) in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

1.7 ENVIRONMENTALLY PREFERABLE PRODUCTS

A. Provide environmentally preferable products to greatest extent possible.

1. To greatest extent possible, provide products and materials with a lesser or reduced effect on the environment considering raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and/or disposal of the product.
2. Eliminate use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either Montreal Protocol and Title VI or Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account life cycle impacts.
3. Use products meeting or exceeding EPA's recycled content recommendations for EPA-designated products. Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of total value of the materials in project.

1.8 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for product specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare written document containing appropriate terms and identification, ready for execution. Submit draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with Specifications, prepare written document using appropriate form properly executed.
3. Refer to Divisions 2 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products to comply with Contract Documents, undamaged and, unless otherwise indicated, new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types produced and used successfully in similar situations on other projects.
3. Government reserves right to limit selection to products with warranties not in conflict with requirements of Contract Documents.
4. Where products are accompanied by term "as selected," Contracting Officer will make selection.
5. Where products are accompanied by term "match sample," sample to be matched is Governments.
6. Descriptive, performance, and reference standard requirements in Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:

1. Product: Where Specifications name single product and manufacturer, provide named product that complies with requirements or approved equal.
2. Manufacturer/Source: Where Specifications name single manufacturer or source, provide product by named manufacturer or source that complies with requirements or approved equal.
3. Products: Where Specifications include list of names of both products and manufacturers, provide one of the products listed that complies with requirements or approved equal.
4. Manufacturers: Where Specifications include list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements or approved equal.
5. Available Products: Where Specifications include list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Products" Articles for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Products" Articles for consideration of an unnamed product.
7. Product Options: Where Specifications indicate sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide specified product, system, or approved equal.
8. Visual Matching Specification: Where Specifications require matching an established Sample, select product that complies with requirements and matches Architect's sample. Contracting Officers decision will be final on whether a proposed product matches.

a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

9. Visual Selection Specification: Where Specifications include phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

a. Standard Range: Where Specifications include phrase "standard range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
b. Full Range: Where Specifications include phrase "full range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 APPROVED EQUAL PRODUCTS

A. Conditions: Contracting Officer will consider Contractor's request when the following conditions are satisfied. If following conditions are not satisfied, Contracting Officer will return requests without action, except to record noncompliance with these requirements:

1. Evidence proposed product does not require revisions to Contract Documents, that it is consistent with Contract Documents and will produce indicated results and is compatible with other portions of Work.
2. Detailed comparison of significant qualities of proposed product with those named in Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 EXECUTION

3.1 PROTECTION AFTER INSTALLATION

A. Provide adequate coverings as necessary to protect installed materials from damage resulting from natural elements, traffic, and subsequent construction. Remove when no longer needed.

END OF SECTION 01 67 00

AFFIRMATIVE PROCUREMENT REPORTING FORM
Recycled Content Materials & Biobased Content Materials

Project Name: _____ Project Number: _____

Contractor Name: _____ License Number: _____

Contractor Address: _____

Product	Total $ value provided	Total $ value with recycled content Pre-consumer	Total $ value with recycled content Post-consumer	Total $ value with biobased content	Exempted indicate 1,2,3,4	Comments
Hydraulic Mulch (paper based)						
Hydraulic Mulch (wood based)						
Compost						
Parking Stops (Concrete w/ fly ash, slag cement or low cement content)						
Parking Stops (Plastic/Rubber)						
Patio Blocks/Rubber						
Patio Blocks/Plastic						
Playground Surfaces						
Concrete with fly ash						
Concrete with slag cement						
Concrete with low cement content						
Plastic lumber						
Building Insulation						
Rock Wool						
Fiber glass						
Cellulose						
Perlite Comp Board						
Plastic Rigid Foam						
Glass Fiber Reinforced Foam						
Phenolic Rigid Foam						
Ceramic tile						
Resilient flooring						
Floor Tiles/Rubber						
Floor Tiles/Plastic						
Running Tracks						
Carpet (PET)						
Paint						

Reprocessed Latex Paint White & Light Colors						
Reprocessed Latex Dark Colors						
Consolidated Latex Paint						
Toilet/Shower partitions (plastic or steel)						
Other						

CERTIFICATION

I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials:

1. The product does not meet appropriate performance standards.
2. The product is not available within a reasonable time frame.
3. The product is not available competitively (from two or more sources).
4. The product is only available at an unreasonable price (compared with a comparable non-recycled content product.)

Signature: _____ Date: _____

END OF
AFFIRMATIVE PROCUREMENT REPORTING FORM
Recycled Content Materials & Biobased Content Materials

SECTION 01 73 40 EXECUTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes general procedural requirements governing execution of Work including:

1. Coordination with utility service providers
2. Construction layout
3. Field engineering and surveying
4. General installation of products
5. Progress cleaning
6. Starting and adjusting
7. Protection of installed construction
8. Correction of the Work

1.2 SUBMITTALS

A. Certificates: Submit certificate signed by land surveyor or professional engineer certifying location and elevation of improvements comply with requirements.

B. Landfill Receipts: Submit copy of receipts issued by landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

C. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.

D. Quantity Surveys: Submit **2** copies showing quantities of work performed and actual construction completed in place.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: Professional land surveyor or professional engineer legally qualified to practice in jurisdiction where Project is located and is experienced in providing land-surveying services of kind indicated.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION

A. Existing Conditions: Existence and location of site improvements and other construction indicated as existing are not guaranteed.

1. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

2. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: Existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify existence and location of underground utilities and other construction affecting Work.

1. Before construction, verify location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping, and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit Work properly. Recheck measurements before installing each product. Where portions of Work are indicated fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of need for clarification of the Contract Documents caused by differing field conditions outside control of

Contractor, submit request for information to Contracting Officer in accordance with Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Verify layout information shown on Drawings, in relation to the existing benchmarks before proceeding to lay out Work. Notify Contracting Officer promptly if discrepancies are discovered.

B. General: Engage a land surveyor or professional engineer to lay out Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check location, level and plumb, of every major element as Work progresses.
5. Notify Contracting Officer when deviations from required lines and levels exceed allowable tolerances.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make log available for review by National Park Service (NPS).

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning Work. Preserve and protect permanent benchmarks and control points during construction operations. Controls destroyed by Contractor will be replaced by Contractor at their expense.

1. Existing Monuments: All benchmarks, land corners, and triangulation points, established by other surveys, existing within construction area shall be preserved. If existing monuments interfere with Work, secure written permission before removing them.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with NPS requirements for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

A. General: Locate Work and components of Work accurately in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions for best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Contracting Officer.
2. Allow for building movement, thermal expansion, and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors to be embedded in concrete or masonry. Deliver to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials not considered hazardous.

J. Quantity surveys: Shall be conducted, and data derived from these surveys shall be used in computing quantities of work performed and actual construction completed and in place.

1. Contractor shall conduct original and final surveys and surveys for any periods for which progress payments are requested. These surveys shall be conducted under direction of a representative of the Contracting Officer, unless Contracting Officer waives requirement in a specific instance. Government shall make such computations as are necessary to determine quantities of work performed or finally in place. Contractor shall make computations based on surveys for any periods for which progress payments are requested.
2. Promptly upon completing a survey, Contractor shall furnish originals of field notes and other records relating to survey or layout of Work to Contracting Officer. Contractor shall retain copies of all such material furnished to Contracting Officer.

3.6 PROGRESS CLEANING

A. General: Clean Project site, work areas, and common areas daily. Coordinate progress cleaning for joint-use areas where more than one Installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in National Fire Protection Association (NFPA) 241 for removal of combustible waste materials and debris at the end of every work session.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 degrees Fahrenheit (27 degrees Celsius).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to level of cleanliness necessary for proper execution of Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of Work, broom-clean or vacuum entire work area, as appropriate.
3. Contractor shall provide progress cleaning that minimizes sources of food, water, and harborage available to pests.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials not hazardous to health or property and will not damage exposed surfaces.

1. Utilize non-toxic cleaning materials and methods.

a. Comply with Green Seal Standard (GS) 37 for general purpose cleaning and bathroom cleaning.
b. Use natural cleaning materials where feasible. Natural cleaning materials include:

1) Abrasive cleaners: substitute 1/2 lemon dipped in borax.
2) Ammonia: substitute vinegar, salt and water mixture, or baking soda and water.
3) Disinfectants: substitute 1/2 cup borax in gallon water.

4) Drain cleaners: substitute 1/4 cup baking soda and 1/4 cup vinegar in boiling water.
5) Upholstery cleaners: substitute dry cornstarch.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. Clean and protect construction in progress and adjoining materials already in place during handling and installation. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations so that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or deleterious exposure during construction period.

K. Final Cleaning: At completion of Work, remove remaining waste materials, rubbish, tools, equipment, machinery and surplus materials. Clean exposed surfaces and leave Project clean and ready for occupancy.

1. Provide final cleaning in accordance with ASTM E1971.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 01 73 29 "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to specified condition.

C. Remove and replace damaged surfaces exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 40

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for

1. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Solid Waste: Garbage, debris, sludge, or other discharged material (except hazardous waste) including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations.

D. Debris: Non-hazardous solid waste generated during construction, demolition, or renovation of a structure which exceeds 2.5-inch (60 millimeter) particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders). A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if mixture is comprised primarily of debris by volume, based on visual inspection.

E. Disposal: Removal off-site of demolition and construction waste and subsequent sale, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

F. Environmental Pollution and Damage: Presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade utility of environment for aesthetic, cultural, or historical purposes.

G. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

H. Hazardous Materials: Material regulated as a hazardous material in accordance with 49 CFR 173 (Code of Federal Regulations), requires a Material Safety Data Sheet (MSDS) in accordance with 29 CFR 1910.1200, or which during end use, treatment, handling, storage, transportation or disposal meets or has components which meet or have potential to meet the definition of Hazardous Waste in accordance with 40 CFR 261.

I. Single-use plastic products: Plastic items intended to be disposed of immediately after use, including plastic and polystyrene food and beverage containers, bottles, straws, cups, cutlery, and disposable plastic bags.

1.3 PERFORMANCE REQUIREMENTS

A. General: Project shall minimize creation of construction, deconstruction, and demolition waste to protect and restore natural habitat and resources. Minimize factors contributing to waste such as over packaging, improper storage, ordering error, poor planning, breakage, mishandling, single-use plastic products, and contamination. A Waste Management Plan shall be developed to ensure that existing site and building materials are reused as much as possible to minimize waste disposal in landfills.

B. If waste materials encountered during deconstruction/demolition or construction phase are found to contain lead, asbestos, polychlorinated biphenyls (PCBs), (such as fluorescent lamp ballasts), or other harmful substances, they are to be handled and removed in accordance with local, state, and federal laws and requirements concerning hazardous waste.

C. Existing items and material to be removed during deconstruction/demolition phase shall be reused in construction phase of the Project. Items that cannot be reused shall be disposed. Items considered for reuse must be in refurbishable condition and must meet quality standards set forth in these specifications. Contractor shall ensure quality of the item(s) in question will meet or exceed accepted industry or trade standards for first quality commercial grade application. During construction, deconstruction, or demolition Contracting Officer (CO) may designate other objects or materials for reuse.

1.4 SUBMITTALS

A. Waste Management Plan: After award of contract and prior to scheduled Pre-Construction Conference, Contractor shall submit a draft Waste Management Plan to Contracting Officer for approval. Submit 3 copies of plan. Revise and resubmit Plan as required by Contracting Officer. Approval of Contractor’s Plan will not relieve Contractor of responsibility for compliance with applicable environmental regulations.

B. Progress Documentation: Supplemental to Waste Management Plan, document solid waste disposal, diversion, and cost/revenue analysis and submit completed worksheet on a monthly basis. See Project Waste Management Plan Worksheet Sample, attached to the end of the Division 1 Specifications, and report totals to date for column headings.

C. Waste Reduction Calculations: Before request for Substantial Completion, submit three copies of calculated end-of-Project rates for disposal as a percentage of total waste generated by the Work.

D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

E. Progress payment requirements:

1. With each Application for payment, submit an updated Project Waste Management Plan worksheet for solid waste disposal and diversion.

2. With each Application for Payment, submit manifests, weight tickets, receipts, and invoices specifically identifying the Project and waste material.

F. Closeout Submittals

1. With Closeout Submittals, submit a summary of a Project Waste Management Plan worksheet for solid waste disposal and diversion.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with record of successful waste management coordination of projects with similar requirements, that employs a LEED™-Accredited Professional, certified by USGBC, as waste management coordinator.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Waste Management Meeting: Conduct separate meeting or cover in Pre-Construction Conference and comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including:

1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review procedures for reduction of single-use plastic products on site.
6. Review waste management requirements for each trade.

PART 2 PRODUCTS

2.1 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification and waste reduction work plan. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include:

1. Landfill tip fees per ton.
2. If diverted, tip fee savings from landfill diversion.

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Contracting Officer. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during entire duration of Contract.

B. Waste Management Coordinator: Engage waste management coordinator responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three days of submittal return.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

E. Separation facilities:

1. Contractor shall designate and Contracting Officer shall approve specific area or areas to facilitate separation of materials for potential reuse, and return.
2. Place waste close to point of waste generation but out of traffic pattern.
3. Protect bins during non-working hours from off-site contamination.

F. General: Remove waste materials from Project site and legally dispose in landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials to accumulate on-site.
2. Remove and transport debris in manner preventing spillage on adjacent surfaces and areas.

G. Burning: Do not burn waste materials.

H. Disposal: Transport waste materials off Government property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including:

1. Project Record Drawings
2. Closeout Submittals
3. Substantial Completion and Final Inspection
4. Permit Closure and Transfer
5. Final Acceptance of the Work
6. Warranties

1.2 PROJECT RECORD DRAWINGS

A. Maintain one complete full-size set of contract drawings and one full-size set of vendor-supplied drawings. Clearly mark changes, deletions, and additions using National Park Service (NPS) drafting standards to show actual construction conditions. Show additions in red, deletions in green and special instructions in blue.

B. Keep record drawings current. Make record drawings available to Contracting Officer (CO) for inspection at the time of monthly progress payment requests. If project record drawings are not current, Contracting Officer may retain an appropriate amount of progress payment.

C. Submit complete record drawings on completion of total project. Include shop drawings, sketches, and additional drawings to be included in final set, with clear instructions showing the location of these drawings.

1.3 CLOSEOUT SUBMITTALS

A. A list of closeout requirements has been attached at the end of the Division 1 Specifications for your convenience. The intent is to provide an overall summary of requirements and not a comprehensive list. Terms and conditions of the contract require satisfaction of requirements of individual specification sections regardless of what is shown on the list. Submit the following before requesting final inspection:

1. Specific warranties, guarantees, workmanship bonds, final certifications, and similar documents.
2. NPS required forms for occupancy, Fire Sprinkler/Alarm acceptance, and other similar forms or certificates.
3. Project Record Documents, operation and maintenance manuals, final completion construction digital images recorded on CD-R (compact disc-recordable) or DVD-R

(digital video disc-recordable) with index and descriptions, and similar final record information.

4. Posted Operating Instructions: As specified in individual sections. Furnish operating instructions attached to or posted adjacent to equipment. Include wiring diagrams, control diagrams, control sequence, start-up, adjustment, operation, lubrication, shut-down, safety precautions, procedures in the event of equipment failure, and other items of instruction recommended by manufacturer.
5. Deliver tools, spare parts, extra materials, and similar items to location designated by Contracting Officer. Label with manufacturer's name and model number where applicable.
    a. Special Tools: One set of special tools required to operate, adjust, dismantle, or repair equipment. Special tools are those not normally found in possession of mechanics or maintenance personnel.

6. Keys and Keying Schedule: Submit keys including duplicates. Wire keys for each lock securely together. Tag and plainly mark with lock number, equipment identification, or panel or switch number, and indicate location, building, and room name or number.
7. Make final changeover of permanent locks and deliver keys to Contracting Officer. Advise Park personnel of changeover in security provisions.
8. Approved pre-functional checklists and functional performance testing reports from commissioning documentation.
9. Test and balance report.
10. Terminate and remove temporary facilities, mockups, construction tools, and similar elements from Project site, complete final cleaning requirements, including touchup painting.
11. Touch up and repair and restore marred exposed finishes to eliminate visual defects.
12. Instruct NPS personnel in operation, adjustment, and maintenance of products, equipment, and systems.

1.4 FINAL INSPECTION, SUBSTANTIAL COMPLETION AND ACCEPTANCE PROCEDURES

A. Request final inspection in writing when project or designated portion of project is substantially complete. Contracting Officer will proceed with inspection within 10 days of receipt of written request or will advise Contractor of items that prevent project from being substantially complete.

B. If work is determined substantially complete, following final inspection, Contracting Officer will prepare Punch List and issue a Letter of Substantial Completion.

C. If work is not determined substantially complete following final inspection, Contracting Officer will notify Contractor in writing. Contractor shall request new final inspection after completing work. Re-inspection costs may be charged against Contractor in accordance with Inspection of Construction contract clause.

D. Contractor shall complete Punch List within 30 calendar days, documented weather permitting.

E. If Contractor completes items of work on Punch List and contractually required items, Contracting Officer will issue Letter of final acceptance of work.

F. If Contractor fails to complete work within the time frame, Contracting Officer may correct work with an appropriate reduction in contract price or charge for re-inspection costs in accordance with Inspection of Construction contract clause.

1.5 PERMIT CLOSURE AND TRANSFER

A. When work covered by the permits is complete, create list of tasks required to close or transfer permits to Park. Submit to Contracting Officer for approval.

B. After substantial completion and Punch List completion, permits shall be closed and documented by Agency(ies) with Jurisdiction for the permit.

C. If responsibility for permits is to be transferred to Park, Park shall be informed of permit provisions completed and responsibilities transferring to Park staff.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Contracting Officer for designated portions of Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch (215 by 280 millimeters) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify product or installation. Provide typed description of product or installation, including name of product and name, address, and telephone number of Installer.
3. Identify each binder on front and spine with typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF (portable document format) file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Provide additional copies of each warranty in operation and maintenance manuals.

PART 2 PRODUCTS

2.1 MATERIALS

A. See Division 1 Specification Section "Execution" for information on cleaning agents.

PART 3 EXECUTION

3.1 FINAL CLEANING

A. General: Conduct final cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of stains, films, and foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo, soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and vision-obscuring materials. Replace chipped or broken glass and transparent materials. Polish mirrors and glass.
k. Remove labels that are not permanent.
l. Touch up, repair, and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" (Underwriters Laboratories) and similar labels, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Replace parts subject to unusual operating conditions.
o. Clean plumbing fixtures to sanitary condition, free of stains, including stains resulting from water exposure.
p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out and noticeably dimmed bulbs, and defective or noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
r. Leave Project clean and ready for occupancy.

C. Pest Control: Engage experienced, licensed exterminator to make a final inspection and rid project of rodents, insects, and other pests. Provide Government with report.

D. Waste Disposal: Comply with requirements of Section 01 74 19 "Construction Waste Management and Disposal."

END OF SECTION 01 77 00

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 01 78 23 OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including:

1. Manuals, general
2. Maintenance manuals for care and maintenance of products, materials, and finishes

B. See Divisions 2 through 49 Sections for additional operation and maintenance manual requirements for Work in those Sections.

1.2 SUBMITTALS

A. Manual: Submit two copies of each manual in draft form or one electronic copy at least 15 days before final inspection. Contracting Officer (CO) will return copy or edit version with comments within 15 days of receipt.

B. Format: Submit operations and maintenance manuals in following format:

1. PDF (portable document format) electronic file. Assemble each manual into composite electronically indexed file. Submit on digital media acceptable to Contracting Officer.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

2. Hard copy manual: In accordance with Part 2 of this Section.

3. Correct or modify each manual to comply with Contracting Officers comments. Submit 4 copies of each corrected manual within 15 days of receipt of Contracting Officers comments.

PART 2 PRODUCTS

2.1 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize manual into separate sections for each system and subsystem, and separate sections for each piece of equipment not part of a system. Manual shall contain title page, table of contents, and manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include:

1. Project Title
2. Location
3. Park
4. Contract Number
5. Prime Contractors Name and Address
6. Date of Substantial Completion
7. Binder Volume Number

C. Table of Contents: List each product included in manual, identified by product name, indexed to content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. Assemble instructions for subsystems, equipment, and components of one system into a single binder if needed.

1. Binders: White, commercial quality, hard back, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 by 11-inch (215 by 280 millimeter) paper; with clear plastic window sleeve on front and spine to hold label describing contents and pockets inside covers to hold folded oversize sheets.

    a. Cover Sheet: Identify binders on front and spine, with project title, location, park, contract number, prime contractor's name and address, date of substantial completion, and binder volume number. Insert cover sheet into clear plastic view pocket on front of binder. Insert sheet into clear plastic view pocket on spine with title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Data: Fill binders to no more than 75 percent of capacity. Punch holes shall not obscure any data. When contents of a single tabbed section cover more than one item, provide colored paper sheets to separate the data for each item.

    a. Manufacturers' Data: Provide originals for color or copyrighted data. Black and white data may be originals or clean, good quality reproductions. No copies produced by facsimile transmission and sheets with stamps, such as submittal approval stamps. Include only sheets that apply to items installed; cross out inapplicable data.
    b. Vendor Furnished As-Built Drawings: Maximum 24 inch by 36-inch sheets with minimum character or lettering size of 1/8 inch. Reduced-size reproductions may be provided instead of full-size drawings if reproductions are clear and legible. If reduced-size drawings are used, identify as "REDUCED SIZE" and provide graphic scales, if applicable.
    c. Custom Data: Data supplemented by drawings and schematics necessary to describe systems adequately.
    d. Equipment Data Sheet: Data, using form at end of this section.
    e. Schedules: Schedules reflecting final, as-installed conditions.
    f. Poorly reproduced or illegible data will be rejected.

3. Dividers: Divider sheets with Mylar reinforced edges and pre-printed numbered tabs aligned with numbers and title lines on index sheet. Include typed list of products and major

components of equipment included in section on each divider, cross-referenced to Specification Section number and title of Project Manual.

4. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include:

1. Product name and model number
2. Manufacturer's name
3. Color, pattern, and texture
4. Material and chemical composition
5. Reordering information for specially manufactured products

D. Environmental Requirements

1. Identify environmentally preferable products incorporated into Project. Include: product model; manufacturer’s name, address, phone, and website; and local technical representative.

    a. Verify plastic products to be incorporated into Project are labeled in accordance with ASTM D1972. Where products are not labeled, provide product data indicating polymeric information in Operation and Maintenance Manual.

        1) Type 1: Polyethylene Terephthalate (PET, PETE)
        2) Type 2: High Density Polyethylene (HDPE)
        3) Type 3: Vinyl (Polyvinyl Chloride or PVC)
        4) Type 4: Low Density Polyethylene (LDPE)
        5) Type 5: Polypropylene (PP)
        6) Type 6: Polystyrene (PS)

7) Type 7: Other. Use of this code indicates that package in question is made with a resin other than the six listed above or is made of more than one resin listed above and used in a multi-layer combination.

b. Describe maintenance procedures associated with environmentally preferable materials and systems. Provide cleaning recommendations in accordance with ASTM E1971 and approved Integrated Pest Management (IPM) plan.

1) Include potential environmental impacts of recommended maintenance procedures and materials.
2) Include potential indoor air quality impacts of recommended maintenance procedures and materials.
3) Where proposed maintenance procedures incorporate composting of plastics, assess potential effect of each type of plastic to be included in composting process in accordance with ASTM D5509 or ASTM D6002

c. Material Safety Data Sheets (MSDS): Include MSDSs as specified.

2. Develop environmental management programs for facility as follows:

a. Waste management program: Develop in accordance with ASTM E1609. Maximize use of source reduction and recycling procedures outlined in ASTM D5834.
b. Indoor Air Quality (IAQ) management program: Provide for evaluation of indoor Carbon Dioxide concentrations in accordance with ASTM D6245. Provide for evaluation of VOCs (volatile organic compounds) in indoor air in accordance with ASTM D6345.
c. Water management program: Develop water monitoring program for surface and ground water on project site in accordance with ASTM D5851 and consistent with water management program utilized during construction operations.

E. Maintenance Procedures: Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that affect validity of warranties or bonds.

PART 3 EXECUTION

3.1 GENERAL

A. At start of project, begin accumulating operation and maintenance data and initiate index. Install and index data in binders within 30 days after delivery of items. As custom written data and test results are produced, add to operation and maintenance data file.

B. List of Operation and Maintenance requirements has been attached at end of the Division 1 Specifications for your convenience. Intent is to provide an overall summary of requirements and not a comprehensive list. Terms and conditions of the contract require satisfaction of requirements of individual specification sections regardless of what is shown on the list.

C. Keep operation and maintenance data current. Make operation and maintenance binders available to Contracting Officer for inspection at time of monthly progress payment requests. If operation and maintenance binders are not current, Contracting Officer may retain an appropriate amount of the progress payment.

3.2 MANUAL PREPARATION

A. Manual Types

1. Emergency Manual: Assemble complete set of emergency information indicating procedures for use by emergency personnel and by NPS operating personnel for types of emergencies indicated.
2. Product Maintenance Manual: Assemble complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into Work.
3. Operation and Maintenance Manuals: Assemble complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

B. Manual Contents: Including:

1. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark sheet to identify product or component incorporated into Work. If data include more than one item in a tabular format, identify each item using appropriate references from Contract Documents. Identify data applicable to Work and delete references to information not applicable.
2. Custom Written Data: For data not in manufacturer's standard literature, provide text, drawings, and schematics specifically applicable to installed systems. Include step-by-step descriptions of operating procedures; identification of individual components and their functions; descriptions of how system components relate to one another and operate together to accomplish a common process or function; and sequence of operation for system control circuits. For seasonally operated systems, provide start-up and shutdown instructions.
3. Equipment Data Sheets: For each item of equipment included in operation and maintenance data, provide Equipment Data Sheet using form at the end of this section. For equipment consisting of a driven machine and a driver (for example, a pump and a motor), equipment data shall cover both the driven machine and the driver. For similar type equipment (for example, multiple exhaust fans of the same model and type), provide a single equipment data sheet with an attached schedule listing individual equipment items.
4. Vendor Furnished As-Built Drawings: Provide for each electrical and each mechanical control system.

    a. For each control system, provide control circuit schematic drawings. Identify each wire and terminal block number. Show terminal numbers on control devices. Show control wires and devices remote from control panel.

b. For each control panel, provide general arrangement drawing showing location of each control component and terminal block on the panel front and interior. Include materials list of panel-mounted control components as well as field-installed control components remote from the panel, identifying components, manufacturer, model number, and initial set points or sensing ranges of devices where applicable.
c. For packaged equipment systems, provide general arrangement drawings showing interrelationships of the various items of equipment and components.
d. In addition to control wiring schematic, provide power wiring schematic drawing showing power flow to each motor. Identify each power conductor. Show over-current protection and motor starting devices.

C. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

EQUIPMENT DATA SHEET	
Equipment Item: _____ Designation: _____ Function: _____ Location: _____ Project: _____ Model Number: _____ Serial Number: _____	
Manufacturer Address and Phone:	Supplier Address and Phone:
Preventive Maintenance Tasks:	
Nameplate Data:	
Spare Parts Furnished and Other Information:	

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 02 41 16 STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of boardwalk structure and trails.

1.2 DEFINITIONS

A. Demolish: Completely remove and legally dispose of off-site.

B. Recycle: Materials are not recyclable in the local area.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 SUBMITTALS: To be reviewed by the Contracting Officer

A. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals, wetlands and property, for environmental protection, and for dust control. Indicate proposed locations and construction of barriers.

B. Schedule of Demolition Activities: Indicate the following:

1. Top-down construction requires that demolition activity will occur through project

C. Demolition Plans: Drawings indicating the following:

1. The boardwalk will be demolished in its entirety. Protection measures shall be identified in the environmental protection plan.

D. Landfill Records: Indicate receipt and acceptance of licensed wastes by a landfill facility licensed to accept construction debris.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing USACE regulations during demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Facilities to be demolished will be vacated and their use discontinued before start of the Work.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Contracting Officer. Hazardous materials will be removed under a separate contract.

C. On-site storage or sale of removed items or materials is not permitted.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting demolition operations.

B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Inventory and record of items to be removed and salvaged is not required.

3.2 PREPARATION

A. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of demolition.

3.3 PROTECTION

A. Existing Facilities: Protect adjacent environmentally sensitive areas during demolition operations.

B. Temporary Protection: Erect temporary protection, such as fences, railings, and turbidity curtains where required by authorities having jurisdiction.

C. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.4 DEMOLITION, GENERAL

A. General: Demolish indicated boardwalk structure completely. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Locate boardwalk demolition equipment and remove debris and materials so as not to impose excessive loads on existing facilities.

B. Site Access and Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with park traffic.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from NPS and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Explosives: Use of explosives is not permitted.

3.5 DEMOLITION BY MECHANICAL MEANS

A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete demolition operations above each tier before disturbing supporting members on the next lower level.

B. Below-Grade Construction: Piles will be cut off at mean low tide or flush with existing ground, whichever is higher.

3.6 SITE RESTORATION

A. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.7 REPAIRS

A. Promptly repair damage caused by demolition operations.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site. Refer to approved "Construction Waste Management Plan" for recycling and disposal of demolition waste.

B. Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

C. Do not burn demolished materials.

3.9 CLEANING

A. Clean adjacent improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before demolition operations began.

END OF SECTION 02 41 16

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 03 30 00 CAST IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Provide cast-in-place concrete, as indicated in accordance with the Contract Documents.

B. The following types of concrete are covered in this Section:

1. Structural Concrete

a. Thick Section Mix: This type of concrete may be used for 12-inch and thicker walls, slabs on grade, pavements, and footings at the Contractor's option.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Reference Specifications

01 33 23	Submittal Procedures

B. Reference Standards

American Concrete Institute (ACI)	
ACI 117	Specification for Tolerances for Concrete Construction and Materials
ACI 301	Specifications for Structural Concrete
ACI 306.1	Standard Specification for Cold Weather Concreting
ACI 309R	Guide for Consolidation of Concrete
ACI 318	Building Code Requirements for Structural Concrete
ASTM International (ASTM)	
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C127	Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C128	Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C156	Standard Test Method for Water Loss (from a Mortar Specimen) Through Liquid Membrane-Forming Curing Compounds for Concrete
ASTM C157	Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C192	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1116	Standard Specification for Fiber-Reinforced Concrete
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1240	Standard Specification for Silica Fume Used in Cementitious Mixtures
ASTM D1227	Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
ASTM D2419	Standard Test Methods for Sand Equivalent Value of Soils and Fine Aggregate
ASTM E1643	Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
ASTM E1745	Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
NSF International (NSF)	
NSF/ANSI 61	Drinking Water System Components – Health Effects

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 23 – Submittal Procedures

B. Mix Designs

1. Prior to beginning the Work and within 14 Days of the Notice to Proceed, submit preliminary concrete mix designs which shall show the proportions and gradations of materials proposed for each class and type of concrete.
2. Mix designs shall be checked through trial batch and laboratory testing by an independent testing laboratory acceptable to the Contracting Officer.
3. Costs related to trial batch and related laboratory testing shall be Contractor's responsibility as part of the Work.
4. Since laboratory trial batches require 35 calendar days to complete, the Contractor shall test a minimum of 2 mix designs for each class of concrete.

C. Delivery Tickets

1. Where ready-mix concrete is used, the Contractor shall furnish delivery tickets at the time of delivery of each load of concrete.
2. Each ticket shall show the state-certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, the amount of water in the aggregate added at the batching plant, and the amount allowed to be added at the Site for the specific design mix.
3. In addition, each ticket shall state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to the times when the batch was dispatched, when it left the plant, when it arrived at the Site, when unloading began, and when unloading was finished.

D. Test Data: Test data relating to the cement, aggregate, and admixtures shall be less than 6 months old.

E. Furnish the following submittals in accordance with ACI 301:

1. mill tests for cement
2. admixture certification, including chloride ion content
3. aggregate gradation test results and certification
4. materials and methods for curing

1.4 CONCRETE CONFERENCE

A. The Contracting Officer will chair a meeting to review the detailed requirements of the Contractor's proposed concrete design mixes and to determine the procedures for producing proper concrete construction no later than 14 Days after the Notice to Proceed.

B. Parties involved in the concrete Work shall attend the conference, including the following at a minimum:

1. Contractor's representative
2. testing laboratory representative
3. concrete subcontractor
4. reinforcing steel subcontractor and detailer
5. concrete supplier
6. admixture manufacturer's representative

C. The conference shall be held at a time and place proposed by the Contractor and accepted by the Contracting Officer.

D. The conference shall be held at least 5 Days after acceptance.

1.5 QUALITY ASSURANCE

A. General

1. Tests on component materials and for compressive strength and shrinkage of concrete shall be performed as indicated.
2. Tests for determining slump shall be in accordance with ASTM C143.
3. Testing for aggregate shall include sand equivalence, reactivity, organic impurities, abrasion resistance, and soundness, according to ASTM C33.
4. The cost of trial batch laboratory tests on cement, aggregates, and concrete shall be the Contractor's responsibility.
5. The cost of laboratory tests on field-placed cement, aggregates, and concrete and the cost of Special Inspections required by Code will be the Contractor’s responsibility.
6. The Contractor shall be responsible for the cost of any tests and investigations of Work that is determined to be Defective Work.
7. The testing laboratory shall meet or exceed ASTM C1077.
8. Concrete for testing shall be furnished by the Contractor, and the Contractor shall assist the Contracting Officer in obtaining samples and disposal and cleanup of excess material.

B. Field Compression Tests

1. Compression test specimens shall be taken during construction from the first placement of each type of concrete and at intervals thereafter as selected by the Contracting Officer to ensure continued compliance with the Specifications.
2. Each set of specimens shall be a minimum of 5 cylinders.
3. Compression test specimens for concrete shall be made in accordance with Section 9.2 of ASTM C31.
4. Specimens shall be 6-inches diameter by 12-inches tall cylinders.
5. Compression tests shall be performed in accordance with ASTM C39.

    a. One test cylinder shall be tested at 7 Days, and 2 test cylinders tested at 28 Days.
    b. The remaining cylinders shall be held to verify test results, if needed.

C. Evaluation and Acceptance of Concrete

1. Evaluation and acceptance of the compressive strength of concrete shall be in accordance with ACI 318, ACI 301, and as indicated.
2. A statistical analysis of compression test results shall be performed according to ACI 301.
3. The standard deviation of the test results shall not exceed 640 psi, when ordered at equivalent water content as estimated by slump.
4. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for subsequent batches of the type of concrete affected.
5. When the standard deviation of the test results exceeds 640 psi, the average strength for which the mix is designed shall be increased by an amount necessary to satisfy the

statistical requirement that the probability of any test being more than 500 psi below or the average of any 3 consecutive tests being below the required compressive strength is 1 in 100.

6. The required average strength shall be calculated in accordance with ACI 301.
7. Concrete that fails to meet the ACI requirements and the indicated requirements is subject to removal and replacement.

D. Shrinkage Tests

1. Drying shrinkage tests shall be performed for the trial batches indicated in the Article below entitled "Trial Batch and Laboratory Tests," for the first placement of each class of structural concrete except pea gravel mix, and during placement to determine continued compliance.
2. Neither structural pea gravel nor structural C-R pea gravel mix need to be tested for shrinkage.
3. Drying shrinkage specimens shall be 4-inch by 4-inch by 11-inch prisms with an effective gauge length of 10-inches, and fabricated, cured, dried, and measured in accordance with ASTM C157, modified as follows:

    a. Specimens shall be removed from molds at an age of 23 hours, plus or minus one hour, after trial batching, and shall be placed immediately in water at 73 degrees F, plus or minus 3 degrees F, for at least 30 minutes.
    b. Specimens shall be measured within 30 minutes thereafter to determine original length and then shall be submerged in saturated lime water at 73 degrees F, plus or minus 3 degrees F.
    c. Measurement to determine expansion expressed as a percentage of original length shall be made at age 7 Days.
    d. This length at age 7 Days shall be the base length for drying shrinkage calculations ("0" days drying age).
    e. Specimens then shall be stored immediately in a humidity control room maintained at 73 degrees F, plus or minus 3 degrees F, and 50 percent relative humidity, plus or minus 4 percent, for the remainder of the test.
    f. Measurements to determine shrinkage, expressed as percentage of base length, shall be performed and reported separately for 7, 14, 21, and 28 Days of drying after 7 Days of moist curing.

4. The drying shrinkage deformation of each specimen shall be computed as the difference between the base length (at "0" days drying age) and the length after drying at each test age.
5. The average drying shrinkage deformation of the specimens shall be computed to the nearest 0.0001-inch at each test age.
6. If the drying shrinkage of any specimen departs from the average of that test age by more than 0.0004-inch, the results obtained from that specimen shall be disregarded.
7. Results of the shrinkage test shall be reported to the nearest 0.001 percent of shrinkage.
8. Compression test specimens shall be taken in each case from the same concrete used for preparing drying shrinkage specimens.
9. These tests shall be considered a part of the normal compression tests for the project.
10. Allowable shrinkage limitations are indicated in PART 2 - PRODUCTS, below.

E. Aggregate Testing: Aggregate testing shall be performed for the trial batch in the Article below entitled “Trial Batch and Laboratory Tests” prior to construction and every 12 months during construction to determine continued compliance.

F. Construction Tolerances

1. The Contractor shall set and maintain concrete forms and perform finishing operations to ensure that the completed Work is within tolerances.
2. Surface defects and irregularities are defined as finishes and are different from tolerances.
3. Tolerance is the permissible variation from lines, grades, or dimensions indicated on the Drawings.
4. Where tolerances are not indicated, permissible deviations shall be in accordance with ACI 117.
5. The following non-cumulative construction tolerances apply to finished walls, columns and slabs unless otherwise indicated:

ITEM	**TOLERANCE**
Variation of the constructed linear outline from the established position in plan.	in 10 feet: ¼-inch in 20 feet or more: 1/2-inch
Variation from the level or from the grades indicated.	in 10 feet: 1/4-inch in 20 feet or more: 1/2-inch
Variation from plumb	in 10 feet: 1/4-inch in 20 feet or more: 1/2-inch
Variation in the thickness of slabs and walls.	minus 1/4-inch plus 1/2-inch

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. General

1. Concrete materials in contact with potable water shall be classified as acceptable for potable water use in accordance with NSF/ANSI 61 as required by the authority having jurisdiction. Not all products listed herein are for use in contact with potable water.
2. Cement for concrete that will contact potable water shall not be obtained from kilns that burn metal rich hazardous waste fuel.
3. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage.
4. Cement reclaimed from cleaning bags or leaking containers shall not be used.
5. Cement shall be used in the sequence of receipt of shipments.
6. Materials and storage of materials shall comply with ACI 301, as applicable.

B. Materials for concrete shall conform to the following requirements:

1. Cement
2. Cement shall be standard brand Portland cement conforming to ASTM C150, for Type II or Type V

3. A minimum of 85 percent of cement by weight shall pass a 325 screen.
4. A single brand of cement shall be used throughout the Work, and prior to its use, the brand shall be accepted by the Contracting Officer.
5. The cement shall be suitably protected from exposure to moisture until used.
6. Cement that has become lumpy shall not be used.
7. Sacked cement shall be stored in such a manner so as to permit access for inspection and sampling.
8. Certified mill test reports, including fineness, for each shipment of cement to be used shall be submitted to the Contracting Officer, if requested, regarding compliance with the Specifications.
9. Water

    a. Water for mixing and curing shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts, and other impurities.
    b. The water shall be considered potable, for the purposes of this Section only, if it meets the requirements of the local governmental agencies.
    c. Agricultural water with high total dissolved solids (greater than 1000 mg/L TDS) shall not be used.

10. Aggregates

    a. Aggregates shall be obtained from pits acceptable to the Contracting Officer, shall be non-reactive, and shall conform to ASTM C33.
    b. The maximum size of coarse aggregate shall be as indicated, and the substitution of lightweight sand for fine aggregate will not be permitted.
    c. Coarse Aggregates

        1) Coarse aggregates shall consist of clean, hard, durable gravel, crushed gravel, crushed rock, or a combination thereof.
        2) The coarse aggregates shall be prepared and handled in 2 or more size groups for combined aggregates, with a maximum size greater than ¾-inch.
        3) When the aggregates are proportioned for each batch of concrete, the 2 size groups shall be combined (also refer to the Article below entitled "Trial Batch and Laboratory Tests").

    d. Fine Aggregates

        1) Fine aggregates shall be natural sand or a combination of natural and manufactured sand that is hard and durable.
        2) When tested in accordance with ASTM D2419, the sand equivalency shall not be less than 75 percent for an average of 3 samples, nor less than 70 percent for an individual test.
        3) The gradation of fine aggregate shall conform to ASTM C33 when tested in accordance with ASTM C136 for the fineness modulus of the sand used, including the optional grading in Section 6.2.
        4) The fineness modulus of sand used shall not be greater than 3.1.
        5) When tested in accordance with ASTM C33, the fine aggregate shall produce a color in the supernatant liquid no darker than the reference standard color solution.

    e. Combined Aggregates

1) Combined aggregates shall be well graded from coarse to fine sizes and shall be uniformly graded between screen sizes to produce concrete that has optimum workability and consolidation characteristics.
2) Where a trial batch is required for a mix design, the final combined aggregate gradations will be established during the trial batch process.
3) When tested in accordance with ASTM C33, the coarse aggregate shall show a loss not exceeding 42 percent after 500 revolutions or 10.5 percent after 100 revolutions.

f. When tested in accordance with ASTM C33, the ratio of silica released to reduction in alkalinity shall not exceed 1.0.
g. When tested in accordance with ASTM C33, the loss resulting after 5 cycles of the soundness test shall not exceed 10 percent for fine aggregate and 12 percent for coarse aggregate when using sodium sulfate.

11. Ready-mixed concrete shall conform to the requirements of ASTM C94.
12. Admixtures

a. Admixtures shall be compatible and shall be furnished by a single manufacturer capable of providing qualified field service representation.
b. Admixtures shall be used in accordance with manufacturer's recommendations.
c. If the use of an admixture is producing an inferior end result, the Contractor shall discontinue use of the admixture.
d. Admixtures shall not contain thiocyanates nor more than 0.05 percent chloride ion and shall be non-toxic after 30 days.
e. Air Content

1) An air-entraining agent meeting the requirements of ASTM C260 shall be used.
2) Concrete floors to receive a dry-shake floor hardener shall have an air content not to exceed 3 percent.
3) The Owner reserves the right, at any time, to sample and test the air-entraining agent.
4) The air-entraining agent shall be added to the batch in a portion of the mixing water.
5) The solution shall be batched by means of a mechanical batcher capable of accurate measurement.
6) Air content shall be tested at the point of placement.

f. Set-Controlling and Water-Reducing Admixtures

1) Admixtures may be added at the Contractor's option, subject to the Contracting Officer's approval, to control the set, effect water reduction, and increase workability.
2) The cost of adding an admixture shall be the Contractor's responsibility.
3) Concrete containing an admixture shall be first placed at a location determined by the Contracting Officer.
4) Admixtures shall conform to ASTM C494.
5) The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used.

6) Concrete shall not contain more than one water-reducing admixture, unless it can be demonstrated that the proposed mix will meet the indicated drying shrinkage requirements.
7) The set-controlling admixture may be either with or without water-reducing properties.
8) Where the air temperature at the time of placement is expected to be consistently greater than 80 degrees F, a set-retarding admixture shall be used.
9) Where the air temperature at the time of placement is expected to be consistently less than 40 degrees F, a non-corrosive set accelerating admixture shall be used.
10) Mid-Range Water Reducers

    a) General use water-reducing admixtures shall be mid-range and shall conform to ASTM C494, Type A and F.
    b) The quantity of admixture used and the method of mixing shall be in accordance with the manufacturer's instructions and recommendations.

11) High-Range Water Reducers

    a) High-range water reducers shall conform to ASTM C494, Type F or G.
    b) The high-range water reducer shall be added to the concrete after all other ingredients have been mixed and initial slump has been verified.
    c) No more than 14 ounces of water reducer per sack of cement shall be used.
    d) The water reducer shall be considered as part of the mixing water when calculating the water/cement ratio.
    e) If the high-range water reducer is added to the concrete at the Site, it may be used in conjunction with the same water reducer added at the batch plant.
    f) Concrete shall have a slump of 3-inches, plus or minus ½-inch, prior to adding the high-range water reducing admixture at the Site.
    g) The high-range water reducing admixture shall be accurately measured and pressure injected into the mixer as a single dose by an experienced technician.
    h) A standby system shall be provided and tested prior to each day's operation of the primary system.
    i) Concrete shall be mixed at mixing speed for a minimum of 70 mixer revolutions or 5 minutes after the addition of the high-range water reducer, unless recommended otherwise by the manufacturer.

g. Other Admixtures

1) Flyash

    a) Flyash shall not be used for concrete sections in hydraulic structures.
    b) For other concrete, fly ash may be substituted for not more than 15 percent, by weight, of cement in structural concrete and not more than 30 percent, by weight, for sitework concrete, and not more than 50 percent, by weight, of cement in other concrete.
    c) Fly ash shall conform to ASTM C618 and shall not have loss-on-ignition greater than 3 percent.
    d) The water/cement ratio shall be calculated based on cement plus fly ash.

2) Ground Blast Furnace Slag Cement

a) Slag cement shall not be used for concrete sections in hydraulic structures.
b) Slag cement shall conform to ASTM C989, Grade 100 or 120.
c) Blended cements shall conform to ASTM C595, Type 1S, or ASTM C1157.
d) Slag cement substitution, if used, shall be not less than 25, nor more than 50 percent by weight of cement.
e) Slag cement substitution shall not be used with fly ash substitution.
f) The water/cement ratio shall be calculated based on cement plus slag cement.

3) Fiber reinforcing

a) Fiber-reinforced concrete shall be furnished where indicated.
b) Fiber reinforcement shall be synthetic fiber reinforcement.
c) Fiber reinforcing shall be batched at the plant at a rate of 1.5 pounds per cubic yard of concrete.
d) Material: 100 percent virgin homopolymer polypropylene-fibrillated fibers; containing no reprocessed olefin materials
e) Conformance: ASTM C1116, Type III
f) Fire Classifications: UL Report File No. R8534-11; Southwest Certification Services (SWCS), Omega Point Laboratories No. 8662-1
g) Fiber Length: 1-inch
h) Alkali Resistance: alkali-proof
i) Absorption: nil
j) Specific Gravity: 0.91
k) Melting Point: 324 degrees F

2.2 CURING MATERIALS

A. General: Curing compounds shall be resin-based and shall be compliant with local VOC requirements, unless otherwise indicated herein.

B. Regular Curing Compound

1. Regular curing compound shall be white-pigmented and shall conform to ASTM C309, Type 2, Class B.
2. Sodium silicate compounds will not be accepted.

C. Dissipating Curing Compound

1. When the curing compound must be removed for finishes or grouting, compounds shall be of a dissipating type, conforming to ASTM C309, Type 1-D or 2, Class B.

D. Curing Compound for Applications Requiring NSF/ANSI 61 Compliance

1. When the curing compound is required to conform to NSF/ANSI 61, the curing compound shall be water-based and shall be compliant with all local VOC requirements; shall

conform to ASTM C309; and shall be certified to conform to the requirements of NSF/ANSI 61.

E. Concrete Curing Blanket

1. Polyethylene Sheets

a. Polyethylene sheets for use as concrete curing blanket shall be white and shall have a nominal thickness of 6 mils.
b. The loss of moisture when determined in accordance with ASTM C156 shall not exceed 0.055 grams per square centimeter of surface.

2. Polyethylene-Coated Waterproof Paper

a. Polyethylene-coated waterproof paper sheeting for use as concrete curing blanket shall consist of white polyethylene sheeting free of visible defects, uniform in appearance, shall have a nominal thickness of 2-mils, and shall be permanently bonded to waterproof paper conforming to the requirements of Federal Specification UU-B-790A – Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellant and Fire Resistant).
b. The loss of moisture, when determined in accordance with ASTM C156, shall not exceed 0.055 gram per square centimeter of surface.

3. Polyethylene-Coated Burlap

a. Polyethylene-coated burlap for use as concrete curing blanket shall be 4 mils thick, with white opaque polyethylene film impregnated or extruded into one side of the burlap.
b. The burlap shall weigh not less than 9 ounces per square yard.
c. The loss of moisture, when determined in accordance with ASTM C156, shall not exceed 0.055 grams per square centimeter of surface.

F. Curing Mats

1. Curing mats for use in Curing Method 6, below, shall be heavy shag rugs or carpets or cotton mats quilted at 4-inches on center.
2. Curing mats shall weigh a minimum of 12 ounces per square yard when dry.

G. Evaporation Retardant

1. An evaporation retardant shall be used.

2.3 MISCELLANEOUS MATERIALS

A. Damproofing Agent

1. The damproofing agent shall be an asbestos-free, fibered asphalt emulsion intended for cold application to green concrete, both above- and below-grade.
2. Damproofing shall meet the requirements of ASTM D1227, Type II, Class I.

B. Bonding Agents

1. Bonding agents shall be epoxy adhesives.

C. Vapor Retarder

1. The vapor retarder shall be a plastic sheet meeting the Class A permeance and strength requirements of ASTM E1745. The minimum thickness shall be 10 mils.

D. Colorant for duct bank concrete shall be an integral red oxide coloring pigment used in the proportion of 8 pounds per cubic yard of concrete.

E. Form liners at construction joints (non-architectural)

1. Form liners used at construction joints shall produce a minimum ¼-inch amplitude roughened surface. Surface profiles designated using the International Concrete Repair Institute concrete surface profiles (CSP) shall achieve a CSP 10 roughness.

2.4 CONCRETE DESIGN REQUIREMENTS

A. General

1. Concrete shall be composed of cement, admixtures, aggregates, and water of the qualities indicated.
2. The exact proportions in which these materials are to be used for different parts of the Work shall be determined during the trial batches.
3. In general, the mix shall be designed to produce a concrete capable of being deposited to obtain maximum density and minimum shrinkage, and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface.
4. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items.
5. The proportions shall be changed whenever necessary or desirable to meet the required results, and such changes shall be subject to review by the Contracting Officer.

B. Fine Aggregate Composition

1. In mix designs for structural concrete, except for 1/2-inch and 3/8-inch maximum size aggregate, the percentage of fine aggregate in total aggregate by weight shall be as indicated in the following table:

Fine Aggregate	
Fineness Modulus	**Percent (maximum)**
2.7 or less	41
2.7 to 2.8	42
2.8 to 2.9	43
2.9 to 3.1	44

2. For other concrete, the maximum percentage of fine aggregate of total aggregate by weight shall not exceed 50 percent.

C. Water/Cement Ratio

1. The indicated water/cement ratio is for a saturated-surface dry condition of aggregate.
2. Throughout every Day, the added batch water shall be adjusted for the total free water in the aggregates, which shall be determined as follows:

    a. The total moisture content of all aggregate shall be calculated by ASTM C566.
    b. Subtract the moisture absorbed by the coarse aggregate, calculated by ASTM C127.
    c. Subtract the moisture absorbed by the fine aggregate, calculated by ASTM C128.

D. Concrete Property Tables

1. The maximum cement contents, the maximum W/C Ratios and the maximum Water Contents given in the Concrete Property Tables below are intended to minimize drying shrinkage and heat of hydration of the concrete.
2. It is understood that the indicated maximum cement contents and maximum water contents may require additional water reducing agent for the workability required by the Contractor's methods and may not result in the least costly concrete mix for the required concrete strength.

Type of WORK	**Thick Section Mix (12-inch and thicker walls, slabs on grade, pavements, and footings)**
Min 28 Day Compressive Strength, psi	4000
Max Aggregate Size, in	1-1/2
Cementitious material content per cubic yard, lb, minimum	564
Cementitious material content per cubic yard, lb, maximum	658
Water content per cubic yard, lb, maximum	254

Max W/C Ratio by weight	0.42
Total Air Content, percent	3 to 6
Slump	4-inches +/- 1-in with high-range water reducer: 7-inches +/- 2-in

NOTE: The Contractor is cautioned that the limiting parameters above are not a mix design. Admixtures may be required to achieve workability required by the Contractor's construction methods and aggregates. The Contractor shall be responsible for providing concrete with the required workability and strength.

E. Adjustments to Mix Design

1. The Contractor may elect to decrease the water/cement ratio to achieve the strength and shrinkage requirements and/or add water reducers, as required to achieve workability.
2. The mixes shall be changed whenever such change is necessary or desirable to secure the required strength, density, workability, and surface finish, and the Contractor shall be entitled to no additional compensation because of such changes.
3. Any changes to the accepted concrete mix design shall be submitted to the Contracting Officer for review and shall be tested again in accordance with the indicated requirements.

2.5 CONSISTENCY

A. The quantity of water in a batch of concrete shall be just sufficient, with a normal mixing period, to produce a concrete that can be worked properly into place without segregation, and which can be compacted by vibratory methods to give the desired density, impermeability, and smoothness of surface.

B. The quantity of water shall be changed as necessary, with variations in the nature or moisture content of the aggregates, to maintain uniform production of a desired consistency.

C. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C143.

D. The slumps shall be as indicated with the concrete properties.

2.6 TRIAL BATCH AND LABORATORY TESTS

A. The Contractor shall only use a mix design for construction that has first met the trial batch testing requirements.

B. Before placing any concrete, a testing laboratory selected by the Contracting Officer shall prepare a trial batch of each class of structural concrete, based on the preliminary concrete mixes submitted by the Contractor.

C. Aggregate Proportions

1. During the trial batch the aggregate proportions may be adjusted by the testing laboratory using the two coarse aggregate size ranges to obtain the required properties.
2. If one size range produces an acceptable mix, a second size range need not be used.
3. Such adjustments will be considered refinements to the mix design and will not be the basis for extra compensation to the Contractor.
4. Concrete shall conform to the indicated requirements whether the aggregate proportions are from the Contractor's preliminary mix design or whether the proportions have been adjusted during the trial batch process.
5. The trial batch shall be prepared using the aggregates, cement, and admixture proposed for the project.

D. The trial batch materials shall be of a quantity such that the testing laboratory can obtain 3 drying shrinkage and 6 compression test specimens from each batch.

E. The determination of compressive strength shall be made by testing 6-inch diameter by 12-inch-high cylinders, which have been made, cured, and tested in accordance with ASTM C192 and ASTM C39.

F. The testing schedule shall be 3 compression test cylinders tested at 7 Days and 3 at 28 Days.

G. The average compressive strength for the 3 cylinders tested at 28 Days for any given trial batch shall be not less than the required average compressive strength indicated below:

Specified compressive strength f'c (psi)	**Required average compressive strength f'cr (psi)**
Less than 3000	f'c + 1000
3000 to 5000	f'c + 1200
Over 5000	1.1f'c + 700

H. A sieve analysis of the combined aggregate for each trial batch shall be performed according to the requirements of ASTM C136, and values shall be provided for percent passing each sieve.

2.7 SHRINKAGE LIMITATION

A. General

1. The Contractor shall only use a mix design for construction that has first met the trial batch shrinkage requirements.
2. Shrinkage limitations shall apply only to structural concrete.

B. Maximum Shrinkage

1. The maximum concrete shrinkage for specimens cast in the laboratory from the trial batch, as measured at 21 Day drying age or at 28 Day drying age, shall be 0.036 percent or 0.042 percent, respectively.
2. Standard deviation will not be considered.
3. The maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than 25 percent.

C. If the required shrinkage limitation is not met during construction, the Contractor shall take any or all the following actions to reestablish compliance:

1. changing the source of aggregates, cement and/or admixtures;
2. reducing water/cement ratio;
3. washing of coarse and/or fine aggregate to reduce fines;
4. increasing the number of construction joints;
5. modifying the curing requirements; or
6. other actions to minimize shrinkage or the effects of shrinkage.

2.8 MEASUREMENT OF CEMENT AND AGGREGATE

A. The amount of cement and of each separate size of aggregate entering into each batch of concrete shall be determined by direct weighing equipment furnished by the Contractor and acceptable to the Contracting Officer.

B. Weighing Tolerances

Material	**Percent of Total Weight**
Cement	1
Aggregates	3
Admixtures	3

2.9 MEASUREMENT OF WATER

A. The quantity of water entering the mixer shall be measured by a suitable water meter or other measuring device of a type acceptable to the Contracting Officer and capable of measuring the water in variable amounts within a tolerance of one percent.

B. The water feed control mechanism shall be capable of being locked in position in order to constantly deliver the required amount of water to each batch of concrete.

C. A positive, quick-acting valve shall be used for a cut-off in the water line to the mixer, and the operating mechanism shall prevent leakage when the valve is closed.

2.10 READY-MIXED CONCRETE

A. General

1. At the Contractor's option, ready-mixed concrete may be used if it meets the indicated requirements as to materials, batching, mixing, transporting and placement, and is in accordance with ASTM C94 and the following supplementary requirements.
2. Ready-mixed concrete shall be delivered to the Work, and discharge shall be completed within one hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever occurs first.
3. The use of non-agitating equipment for transporting ready-mixed concrete will not be permitted.
4. Combination truck and trailer equipment for transporting ready-mixed concrete will not be permitted.
5. The quality and quantity of materials used in ready-mixed concrete and in batch aggregates shall be subject to continuous inspection at the batching plant by the Contracting Officer.

B. Counters

1. Truck mixers shall be equipped with electrically-actuated counters by which the number of revolutions of the drum or blades may be readily verified.
2. The counter shall be of the resettable, recording type and shall be mounted in the driver's cab.
3. The counters shall be actuated at the time of starting the mixers at mixing speeds.

C. Mixing

1. Each batch of concrete shall be mixed in a truck mixer for not less than 70 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment.
2. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed.
3. Materials, including the mixing water, shall be in the mixer drum before actuating the revolution counter for determining the number of revolutions of mixing.

D. Uniformity

1. Truck mixers and their operation shall be such that the concrete throughout the mixed batch as discharged is within acceptable limits of uniformity with respect to consistency, mix, and grading.
2. If slump tests taken at approximately the 1/4- and 3/4-point of the load during discharge result in slumps differing by more than 1-inch when the required slump is 3-inches or less, or if they differ by more than 2-inches when the required slump is more than 3-inches, the mixer shall not be used on the Work unless the causative condition is corrected and satisfactory performance is verified by additional slump tests.
3. Mechanical details of the mixer, such as water measuring and discharge apparatus, condition of the blades, speed of rotation, general mechanical condition of the unit, and clearance of the drum, shall be checked before a further attempt to use the unit will be permitted.

E. Each batch of ready-mixed concrete delivered to the Site shall be accompanied by a delivery ticket that is furnished to the Contracting Officer in accordance with the Paragraph in Part 1 of this Section entitled "Delivery Tickets."

PART 3 EXECUTION

3.1 PROPORTIONING AND MIXING

A. Proportioning of the mix shall conform to ACI 301.

B. Mixing shall conform to ACI 301.

C. Slumps shall be as indicated.

D. Re-tempering of concrete or mortar that has partially hardened will not be permitted.

3.2 PREPARATION OF SURFACES FOR CONCRETING

A. General

1. Earth surfaces shall be thoroughly wetted by sprinkling prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon.
2. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. Placement Interruptions

1. When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means that will secure proper union with subsequent Work.
2. Such construction joints shall be made only where acceptable to the Contracting Officer.

C. Embedded Items

1. No concrete shall be placed until the formwork, the installation of parts to be embedded, the reinforcement steel, and the preparation of surfaces involved in the placing have been completed and accepted by the Contracting Officer at least 4 hours before the placement of concrete.
2. Surfaces of forms and embedded items that have become encrusted with dried grout from previous usage shall be cleaned before the surrounding or adjacent concrete is placed.
3. Inserts or other embedded items shall conform to the indicated requirements.
4. Reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms at locations as indicated or shown by Shop Drawings and shall be acceptable to the Contracting Officer before any concrete is placed.
5. Accuracy of placement shall be the responsibility of the Contractor.

D. Water

1. No concrete shall be placed in any structure until water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes or other means, and carried out of the forms, clear of the Work.
2. No concrete shall be deposited underwater, nor shall the Contractor allow still water to rise on any concrete until the concrete has attained its initial set.
3. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete.
4. Pumping or other necessary dewatering operations for removing ground water, if required, shall be subject to review by the Contracting Officer.

E. Anchor bolts shall be accurately set and shall be maintained in position by templates while embedded in the concrete.

F. Cleaning: The surfaces of metalwork to be in contact with the concrete shall be thoroughly cleaned of dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

3.3 HANDLING, TRANSPORTING, AND PLACING

A. General

1. The placement of concrete shall conform to the applicable portions of ACI 301 and the indicated requirements.
2. No aluminum materials shall be used in conveying any concrete.

B. Non-Conforming Work or Materials

1. Concrete which during or before placing is found not to conform to the indicated requirements will be rejected and shall be immediately removed from the Work.
2. Concrete that is not placed in accordance with these requirements or which is of inferior quality shall be removed and replaced.

C. Unauthorized Placement

1. No concrete shall be placed except in the presence of an authorized representative of the Contracting Officer.
2. The Contractor shall notify the Contracting Officer in writing at least 24 hours in advance of the placement of any concrete.

D. Conveyor Belts and Chutes

1. Ends of chutes, hopper gates, and other points of concrete discharge throughout the Contractor's conveying, hoisting, and placement system shall be designed and arranged such that concrete passing from them will not fall separated into whatever receptacle immediately receives it.
2. Conveyor belts, if used, shall be of a type acceptable to the Contracting Officer.
3. Chutes longer than 50 feet will not be permitted.
4. The minimum slopes of chutes shall be such that concrete of the indicated consistency will readily flow in them.

5. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted.
6. Conveyor belts and chutes shall be covered.

E. Placement in Slabs

1. Concrete placement in sloping slabs shall proceed uniformly from the bottom of the slab to the top for the full width of the placement.
2. As the Work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screeded in an up-slope direction.

F. Temperature of Concrete

1. The temperature of concrete when it is being placed shall be not more than 90 degrees F nor less than 50 degrees F.
2. For sections less than 12-inches thick, the temperature of concrete when placed shall be not less than 55 degrees F.

G. Hot or Cold Weather Procedures

1. If required by the Contracting Officer, the Contractor shall submit detailed procedures for the production, transportation, placement, protection, curing, and temperature monitoring of concrete during hot or cold weather.
2. The submittal shall include procedures to be implemented upon abrupt changes in weather conditions or equipment failures.
3. The Contractor shall not be entitled to additional compensation for satisfying the hot weather placement or the cold weather placement requirements below.

H. Hot Weather Placement

1. If the temperature of the concrete is 85 degrees F or greater, the time between introducing the cement into the aggregates and discharge shall not exceed 45 minutes.
2. If the concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees F, the Contractor shall employ effective means such as pre-cooling of aggregates, using ice as mixing water, or placing at night as necessary to maintain the temperature of the concrete below 90 degrees F as it is placed.
3. During the curing period, the maximum temperature decrease measured at the surface of the concrete shall not exceed 50 degrees F in 24 hours nor 5 degrees F in one hour.

I. Cold Weather Placement

1. The placement of concrete shall conform to ACI 306.1 and the following requirements:

    a. Remove snow, ice, and frost from the surfaces, including reinforcement, against which concrete is to be placed.
    b. Before beginning concrete placement, thaw the subgrade to a minimum depth of 6-inches.
    c. Reinforcement and embedded items shall be warmed to above 32 degrees F prior to concrete placement.
    d. Maintain the concrete temperature above 50 degrees F for at least 72 hours after placement.

e. Concrete ingredients shall not be heated more than necessary to prevent the temperature of the mixed concrete, as placed, from falling below the minimum temperature criterion.

3.4 PUMPING OF CONCRETE

A. General: If the pumped concrete does not produce satisfactory end results, the Contractor shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

B. Pumping Equipment

1. The pumping equipment shall have 2 cylinders and shall be designed to operate with one cylinder in case the other one is not functioning.
2. In lieu of this requirement, the Contractor may have a standby pump on the Site during pumping.
3. The minimum diameter of the hose conduits shall be 4-inches, unless approved otherwise by the Contracting Officer.

    a. For thin walls and columns and other elements which do not have sufficient clear space to accommodate a 4 -inch diameter conduit, the Contractor shall submit details for a smaller diameter conduit along with confirmation that the smaller conduit can functionally place the approved concrete mix in accordance with the Concrete Specifications.

4. Pumping equipment and hose conduits that are not functioning properly shall be replaced.
5. Aluminum conduits for conveying the concrete will not be permitted.

C. Field Control: Concrete samples for slump, air content, and test cylinders shall be taken at the placement end of the hose.

3.5 ORDER OF PLACING CONCRETE

A. General

1. The order of placing concrete in the Work shall be acceptable to the Contracting Officer.
2. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints at the indicated locations.

B. The placing of units shall be done by placing alternate units in a manner such that each unit placed shall have cured at least 5 Days for hydraulic structures and 2 Days for all other structures before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the 2 adjacent wall panels have cured at least 10 Days for hydraulic structures and 4 Days for all other structures.

C. Concrete Surfaces

1. The surface of the concrete shall be level whenever a run of concrete is stopped.

2. For a level, straight, intermediate joint on the exposed surface of walls, a wood strip at least 3/4-inch thick shall be tacked to the forms on these surfaces.
3. The concrete shall be carried approximately 1/2-inch above the underside of the strip.
4. The strip shall be removed one hour after the concrete is placed, and any irregularities in the edge formed by the strip shall be leveled with a trowel and laitance shall be removed.

3.6 TAMPING AND VIBRATING

A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted throughout the entire depth of the layer, which is being consolidated, into a dense and homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete.

B. Vibrators

1. Vibrators shall be high speed power vibrators of an immersion type in sufficient number and with at least one standby unit as required.
2. Vibrators shall have the following characteristics and performance attributes:

    a. Diameter of head: 2- to 3-1/2-inches;
    b. Operating frequency in concrete: 8,000 to 12,000 vibrations per minute;
    c. Eccentric moment: 0.20 to 0.70 in-lbs (calculated in accordance with ACI 309R-05 Fig. A.2 – Action of rotary vibrator);
    d. Average amplitude operating in air (half of the peak-to-peak amplitude): 0.025- to 0.05-inches;
    e. Centrifugal force using frequency of vibrator while operating in concrete: 700 to 2000 lbs (calculated in accordance with ACI 309R-05 Fig. A.2– Action of rotary vibrator);
    f. Radius of influence: 7- to 14-inches.

3. Vibrators for plastic concrete in thin walls, columns, beams, thin slabs, along construction joints, and to supplement larger vibrators in confined areas shall have the following characteristics and performance attributes:

    a. Diameter of head: 1-1/4- to 2-1/2-inches;
    b. Operating frequency in concrete: 8,500 to 12,500 vibrations per minute;
    c. Eccentric moment: 0.08 to 0.25 in-lbs (calculated in accordance with ACI 309R-05 Fig. A.2 – Action of rotary vibrator);
    d. Average amplitude operating in air (half of the peak-to-peak amplitude): 0.02 to 0.04-inches;
    e. Centrifugal force using frequency of vibrator while operating in concrete: 300 to 900 lbs (calculated in accordance with ACI 309R-05 Fig. A.2– Action of rotary vibrator);
    f. Radius of influence: 5- to 10-inches.

C. Waterstops

1. Care shall be exercised when placing concrete around waterstops.
2. The concrete shall be carefully worked by rodding and vibrating to make sure that air and rock pockets have been eliminated.

3. Where flat-strip type waterstops have been placed horizontally, the concrete shall be worked under the waterstops by hand, making sure that air and rock pockets have been eliminated.
4. Concrete that is surrounding the waterstops shall be given additional vibration over and above that used for adjacent concrete placement to ensure complete embedment of the waterstops in the concrete.

D. Concrete in Walls

1. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against each surface.
2. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly.
3. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the required results within 15 minutes after concrete of the prescribed consistency has been placed in the forms.
4. The vibrating head shall not contact the surfaces of the forms.
5. Care shall be exercised not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.7 FINISHING CONCRETE SURFACES

A. General

1. Surface defects are defined as fins, bulges, ridges, offsets, honeycombing, roughness of any kind, and surface holes larger than 1/2-inch in diameter or deeper than 1/4-inch.
2. Concrete surfaces shall be free from surface defects and shall present a finished, smooth, continuous hard surface.
3. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions are defined as tolerances and shall be as indicated.
4. These tolerances are to be distinguished from irregularities in finish as indicated.
5. Aluminum finishing tools shall not be used.

B. Formed Surfaces

1. No treatment shall be required after form removal except for curing, repair of defective concrete, and treatment of surface defects.
2. Formed surfaces shall be treated to provide a “Smooth Form Finish”, which consists of finishing the surfaces as necessary to produce smooth, even surfaces of uniform texture and appearance, free of surface defects, depressions and other imperfections.
3. Form tie holes and defective concrete shall be repaired.
4. Where architectural finish is required, treatment(s) shall be as indicated.

C. Unformed Surfaces

1. General

a. After proper and adequate vibration and tamping, unformed top surfaces of slabs, floors, walls, and curbs shall be brought to a uniform surface with suitable tools.

b. Immediately after the concrete has been screeded it shall be treated with a liquid evaporation retardant, and the retardant shall be used again after each operation as necessary to prevent drying shrinkage cracks.

2. The classes of finish for unformed concrete surfaces are defined as follows:

a. Finish U1

1) Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8-inch.
2) No further special finish is required.

b. Finish U2

1) After sufficient stiffening of the screeded concrete, surfaces shall be float finished with wood or metal floats or with a finishing machine using float blades.
2) Excessive floating of surfaces while the concrete is plastic and dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted.
3) Floating shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture.
4) Surface irregularities shall not exceed 1/4-inch.
5) Joints and edges shall be tooled where indicated or as determined by the Contracting Officer.

c. Finish U3

1) After the Finish U2 surface has hardened sufficiently to prevent excess of fine material from being drawn to the surface, steel troweling shall be performed with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense, uniform surface free from blemishes, ripples, and trowel marks.
2) The finish shall be smooth and free of irregularities.

d. Finish U4

1) Trowel the Finish U3 surface to remove local depressions or high points.
2) In addition, the surface shall be given a light broom finish with brooming perpendicular to drainage unless otherwise indicated.
3) The resulting surface shall be sufficiently rough to provide a nonskid finish.

e. Unformed surfaces shall be finished according to the following schedule:

UNFORMED SURFACE FINISH SCHEDULE	
Area	**FINISH**
grade slabs and foundations to be covered with concrete or fill material	U1
floors to be covered with grouted tile or topping grout	U2
water bearing slabs with slopes 10 percent and less	U3

water bearing slabs with slopes greater than 10 percent	U4
slabs not water bearing	U4
slabs to be covered with built-up roofing	U2
interior slabs and floors to receive architectural finish	U3
top surface of walls	U3

3.8 CURING AND DAMPPROOFING

A. General: Concrete shall be cured for not less than 7 Days after placement, in accordance with the methods indicated below for the different parts of the Work.

Surface to be Cured or Dampproofed	**Method**
unstripped forms	1
construction joints between footings and walls, and between floor slab and columns	2
encasement and ductbank concrete and thrust blocks	3
concrete surfaces not specifically indicated in this Paragraph	4
floor slabs on grade in hydraulic structures	5
slabs not on grade	6
wall sections with forms removed	6

B. Method 1

1. Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removal.
2. If steel forms are used the exposed concrete surfaces shall be kept continuously wet until the forms are removed.
3. If forms are removed within 7 Days of placing the concrete, curing shall be continued in accordance with Method 6, below.

C. Method 2

1. The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed.
2. No curing compound shall be applied to surfaces cured under Method 2.

3.9 PROTECTION

A. The Contractor shall protect the concrete against damage until final acceptance.

B. Weather Protection

1. Fresh concrete shall be protected from damage due to rain, hail, sleet or snow.
2. The Contractor shall provide such protection while the concrete is still plastic and whenever precipitation is imminent or occurring.

3.10 CURING DURING COLD WEATHER

A. Water curing of concrete may be reduced to 6 Days during periods when the mean daily temperature in the vicinity of the Site is less than 40 degrees F, provided that during the prescribed period of water curing, when temperatures are such that concrete surfaces may freeze, water curing has been temporarily discontinued.

B. Compound-Cured Concrete

1. Concrete that is to be cured by an application of curing compound shall require no additional protection from freezing if the protection at 50 degrees F for 72 hours is obtained by means of approved insulation in contact with the forms or concrete surfaces.
2. Otherwise, the concrete shall be protected against freezing temperatures for 72 hours immediately following 72 hours protection at 50 degrees F.

C. Concrete cured by water shall be protected against freezing temperatures for 72 hours immediately following the 72 hours of protection at 50 degrees F.

D. Discontinuance of Protection

1. Discontinuance of protection against freezing temperatures shall be such that the drop in temperature of any portion of the concrete will be gradual and will not exceed 40 degrees F in 24 hours.
2. In the spring, when the mean daily temperature rises above 40 degrees F for more than 3 successive Days, the required 72-hour protection at a temperature not lower than 50 degrees F may be discontinued for as long as the mean daily temperature remains above 40 degrees F, provided that the concrete shall be protected against freezing temperatures for not less than 48 hours after placement.

E. Artificial Heat

1. Where artificial heat is employed, special care shall be taken to prevent the concrete from drying.
2. The use of unvented heaters will be permitted only when unformed surfaces of concrete adjacent to the heaters are protected for the first 24 hours from an excessive carbon dioxide atmosphere by application of curing compound, provided that the use of curing compound for such surfaces is otherwise permitted.

3.11 TREATMENT OF SURFACE DEFECTS

A. General

1. Surface defects are defined in Finishing Concrete Surfaces, above.

2. As soon as forms are removed, the exposed concrete surfaces shall be carefully examined, and any irregularities shall be immediately rubbed or ground in order to secure a smooth, uniform, and continuous surface satisfactory to the Contracting Officer.
3. Plastering or coating of surfaces to be smoothed will not be permitted.
4. No repairs shall be made until after inspection by the Contracting Officer.
5. In no case will extensive patching of honeycombed concrete be permitted.
6. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall be repaired as indicated below.
7. Concrete containing extensive voids, holes, honeycombing, or similar depression defects shall be completely removed and replaced.
8. Repairs of surface defects shall be performed promptly.

B. Preparation

1. Defective surfaces to be repaired shall be cut back from trueline a minimum depth of 1/2-inch over the entire area.
2. Feathered edges will not be permitted.
3. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of laitance and soft material, plus not less than 1/32-inch depth of the surface film from hard portions by means of an efficient sandblast.
4. After cutting and sandblasting, the surface shall be wetted sufficiently in advance of shooting with shotcrete or with cement mortar such that while the repair material is being applied the surfaces underneath will remain moist but not so wet as to overcome the suction upon which a good bond depends.

C. Materials

1. The material used for repair shall consist of a mixture of one sack of cement to 3 cubic feet of sand.
2. For exposed walls, the cement shall contain such a proportion of Atlas White Portland cement as is required to make the color of the patch match the color of the surrounding concrete.

D. Holes

1. Holes left by tie-rod cones shall be reamed with suitably toothed reamers in order to leave the surfaces of the holes clean and rough.
2. Holes then shall be repaired in an approved manner with dry-packed cement grout.
3. Holes left by form-tying devices having a rectangular cross section and other imperfections having a depth greater than their least surface dimension shall not be reamed but shall be repaired in an approved manner with dry-packed cement grout.

E. Repairs

1. Repairs shall be built up and shaped in such a manner that the completed Work will conform to the indicated requirements, using approved methods which will not disturb the bond, cause sagging, or cause horizontal fractures.
2. The surfaces of repaired concrete shall receive the same kind and amount of curing treatment as required for the concrete in the repaired section.

3.12 CARE AND REPAIR OF CONCRETE

A. The Contractor shall protect concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until Final Acceptance.

B. Particular care shall be exercised in order to prevent the drying shrinkage damage of concrete and to avoid roughening or otherwise damaging the concrete surface.

C. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed Work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be repaired or removed and replaced with acceptable materials to the satisfaction of the Contracting Officer.

END OF SECTION 03 30 00

SECTION 05 50 00 METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Provide miscellaneous metalwork and appurtenances, complete and in place, as indicated in accordance with the Contract Documents.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Referenced Specifications

01 33 23	Submittal Procedures

B. Reference Codes and Standards

Aluminum Association (AA)	
AA DAF-45	Designation System for Aluminum Finishes
American Association of State Highway and Transportation Officials (AASHTO)	
AASHTO	LRFD Bridge Design Specifications
American Institute of Steel Construction (AISC)	
AISC	Steel Construction Manual
AISC	Detailing for Steel Construction
ASTM International (ASTM)	
ASTM A153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A193	Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A194	Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service
ASTM A307	Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
ASTM A653	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A780	Standard Specification for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A924	Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

ASTM A992	Standard Specification for Structural Steel Shapes
ASTM A1085	Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS)
ASTM C478	Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
ASTM C497	Standard Test Methods for Concrete Pipe, Concrete Box Sections, Manhole Sections, or Tile
ASTM D4101	Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials
ASTM F1554	Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
ASTM F3125	Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength
American Welding Society (AWS)	
AWS B1.5	Standard for the Qualification of Welding Inspectors
AWS D1.1	Structural Welding Code – Steel
AWS D1.3	Structural Welding Code - Sheet Steel
AWS D1.6	Structural Welding Code – Stainless Steel
AWS QC1	Qualification and Certification of Welding Inspectors
Military Specification (MIL)	
MIL-G-18015 A (3)	(Ships) Aluminum Planks. (6063-T6)
MIL-PRF-907F	Antiseize Thread Compound, High Temperature
National Association of Architectural Metal Manufacturers (NAAMM)	
NAAMM MBG531	Metal Bar Grating Manual
NAAMM MBG532	Heavy Duty Metal Bar Grating Manual
United States Department of Labor - Occupational Safety and Health Administration (OSHA)	
OSHA 1910.23(d)	Fixed Ladders
OSHA 1910.29	Fall Protection Systems And Falling Object Protection-Criteria and Practices
Cal/OSHA §3277	Fixed Ladders

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with the requirements of Section 01 33 23 – Submittal Procedures.

B. Shop Drawings

1. Shop Drawings shall conform to AISC Detailing for Steel Construction, and shall show all holes, material grades, and location of parts/pieces in the completed Work.

2. Shop Drawings shall include complete details of members and connections, anchor bolt layouts, schedules for fabrication procedures, and diagrams for the sequence of erection.

1.4 QUALITY ASSURANCE

A. Weld procedures and welder qualifications shall be available in the Contractor's field office for review.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Stainless Steel

1. Unless otherwise indicated, stainless steel metalwork and bolts shall be fabricated from Type 316 stainless steel.

2.2 BOLTS AND ANCHORS

A. Standard Service (Non-Corrosive Application)

1. Bolts, anchor rods, anchor bolts, washers, and nuts shall be fabricated from steel as indicated.

2. Threads on galvanized bolts, rods and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing.

3. Except as otherwise indicated, steel for bolt material, anchor rods, anchor bolts, and cap screws shall be in accordance with the following requirements:

a. Structural Connections: ASTM A307, Grade A or B, hot-dip galvanized.

b. Headed Anchor Rods and Anchor Bolts: ASTM F1554, Grade 36, hot-dip or mechanically galvanized with Grade A matching nuts.

c. High-Strength Bolts, where indicated: ASTM F3125, Grade A325.

d. Pipe and Equipment Flange Bolts: ASTM A193, Grade B7.

B. Corrosive Service

1. Bolts, anchor rods, anchor bolts, nuts, and washers in the locations listed below shall be fabricated from stainless steel as indicated.

a. buried locations

b. submerged locations

c. locations subject to seasonal or occasional flooding

d. inside hydraulic structures below the top of the structure

e. inside buried vaults, manholes, and structures that do not drain through a gravity sewer or to a sump with a pump

f. chemical handling areas

g. inside trenches, containment walls, and curbed areas

h. locations indicated or designated by the Contracting Officer to be provided with stainless steel bolts

C. Unless otherwise indicated, stainless steel bolts, nuts, anchor rods, and washers shall be fabricated from Type 316 stainless steel, Class 2, conforming to ASTM A193 for bolts and to ASTM A194 for nuts.

D. Buried pipe flange bolts and nuts on pipe of Class 275 and greater shall be in accordance with ASTM A193/A194, Grade B7.

E. Coating

1. Threads on stainless steel bolts and rods shall be protected with an antiseize lubricant suitable for submerged stainless steel bolts, meeting government specification MIL-A-907E.

2. Buried bolts in poorly drained soil shall be coated the same as the buried pipe.

3. Antiseize lubricant shall be classified as acceptable for potable water use by the NSF.

F. Bolt Requirements

1. The bolt and nut material shall be free-cutting steel.

2. The nuts shall be capable of developing the full strength of the bolts.

3. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads.

4. Bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.

5. Bolts and nuts shall be installed with washers fabricated from material matching the base material of bolts, except that hardened washers for high-strength bolts shall conform to the requirements of the AISC Specification.

6. Lock washers fabricated from material matching the bolts shall be installed where indicated.

7. The length of each bolt shall be such that the bolt extends at least 1/8 inch beyond the outside face of the nut before tightening, except for anchor bolts which shall be flush with the face of the nut before tightening.

2.3 IMPACT ANCHOR

A. Impact anchors shall be an expansion-type anchor in which a nail-type pin is driven to produce the expansive force.

B. The pin shall be provided with a zinc sleeve with a mushroom-style head and stainless-steel nail pin.

PART 3 EXECUTION

3.1 FABRICATION AND INSTALLATION REQUIREMENTS

A. Fabrication and Erection: Except as otherwise indicated, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction."

B. Aluminum Railings

1. Aluminum railing fabrication and installation shall be performed by craftsmen experienced in the fabrication of architectural metalwork.

2. Exposed surfaces shall be free from defects or other surface blemishes.

3. Dimensions and conditions shall be verified in the field.

4. Joints, junctions, miters, and butting sections shall be precision fitted with no gaps occurring between sections, and with surfaces flush and aligned.

5. Electrolysis protection of materials shall be provided.

3.2 GALVANIZING

A. Structural steel plates shapes, bars, and fabricated assemblies required to be galvanized shall, after the steel has been thoroughly cleaned of rust and scale, be galvanized in accordance with the requirements of ASTM A123.

B. Any galvanized part that becomes warped during the galvanizing operation shall be straightened.

C. Bolts, anchor rods, anchor bolts, nuts, and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A153.

D. Field Repairs

1. Galvanizing shall be repaired in accordance with ASTM A780.
2. Surface preparation shall consist of removing oil, grease, soil, and soluble material by cleaning with water and detergent (SSPC SP1) followed by brush-off blast cleaning (SSPC SP7) over an area extending at least 4 inches into the undamaged area.
3. The coating shall be applied to at least 3 mils dry film thickness.

END OF SECTION 05 50 00

SECTION 06 05 73 TREATED WOOD PRESERVATIVES - PRESSURE TREATED WOOD

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preservative treatment of lumber and plywood.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

1.3 REFERENCES

A. ASTM International (ASTM):

1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

2. ASTM A653 / A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. American Wood-Protection Association (AWPA):

1. AWPA E12 - Standard Method of Determining the Corrosion of Metal in Contact with Wood.

2. AWPA M4 - Standard for the Care of Preservative Treated Wood Products.

3. AWPA P5 - Standard for Waterborne Preservatives.

4. AWPA P26 - Standard for Alkaline Copper Quat Type A (ACQ-A).

5. AWPA P27 - Standard for Alkaline Copper Quat Type B (ACQ-B).

6. AWPA P28 - Standard for Alkaline Copper Quat Type C (ACQ-C).

7. AWPA P29 - Standard for Alkaline Copper Quat Type D (ACQ-D).

8. AWPA P47 - Standard for DCOI/Imidacloprid/Stabilizer, Waterborne (EL2).

9. AWPA P48 - Standard for Copper Azole Type C (CA-C).

10. AWPA T1 - Use Category System: Processing and Treatment Standard.

11. AWPA U1 - Use Category System: User Specification for Treated Wood.

C. Permanent Wood Foundation (PWF) Design Specification, ANSI/AF&PA PWF- 2007.

D. Permanent Wood Foundations, Design and Construction Guide, Southern Pine Council. Publication #400.

1.4 SUBMITTALS: To be reviewed by Design Builder, Engineer of Record and National Park Service.

A. Product Data: Manufacturer's instructions for use, including requirements for storage, cutting, and finishing.

B. Preservative Treatment Certification: Treating plant's certification of compliance with specified standards, process employed, and preservative retention values.

1.5 QUALITY ASSURANCE

A. Wood Treatment Plant Qualifications: Wood treatment plant experienced in performing work of this section.

B. Source Quality: Obtain treated wood products from a single approved source.

C. Preservative Treatment: Mark each piece of plywood and lumber to show compliance with specified standards.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Exposure: Prevent wood products against moisture and dimensional changes, in accordance with instructions from treating plant.

PART 2 PRODUCTS

2.1 MATERIALS

A. Dimension Lumber: As specified in Section 06 10 00 - Rough Carpentry.

B. Structural Plywood: As specified in Section 06 10 00 - Rough Carpentry.

C. Fasteners and Metal Hardware In Preservative Treated Wood: For treated wood and where wood is in ground contact, subject to high relative humidity, or exposed to

weather, provide corrosion resistant steel fasteners with hot-dip zinc coating per ASTM A153/A153M, provide corrosion resistant hardware per ASTM A653 / A653M Class G-185 in compliance with building code requirements.

2.2 PRESERVATIVE PRESSURE TREATMENT OF WOOD

A. Preservative Treatment, Ground and Fresh Water Contact: Above ground framing for piers and docks.

1. Treatment: ACQ in accordance with AWPA U1.

a. Use 0.40 lb/cu ft (6.4 kg/m3) of ACQ in accordance with AWPA U1 (UC4B) as appropriate.

2. Treat wood in the following locations:

a. Framing for boardwalk not in contact with ground or water.

PART 3 EXECUTION

3.1 INSTALLATION

A. Framing and Sheathing: Comply with installation requirements in Section 06 10 00 - Rough Carpentry.

B. Preservative Treated Wood:

1. Surface treatment of field cuts: All field cuts on members that provide structural support to a permanent structure shall be field treated in accordance with AWPA M4 using copper naphthenate or oxine copper.

C. Wood Foundation System: Install in accordance with the following:

1. Permanent Wood Foundation (PWF) Design Specification, ANSI/AF&PA PWF-2007.

2. Permanent Wood Foundations, Design and Construction Guide, Southern Pine Council. Publication #400.

END OF SECTION 06 05 73

SECTION 06 10 00 ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all necessary materials, labor and equipment for the complete installation of rough carpentry as shown on the drawings and specified herein. Provide all necessary supplementary items needed for the complete installation as intended by the documents.

1.2 REFERENCES

A. AMERICAN LUMBER STANDARDS COMMITTEE (ALSC)

1. ALSC PS 20 - (2015) American Softwood Lumber Standard

B. AMERICAN WOOD COUNCIL (AWC)

1. AWC NDS (2015) National Design Specification (NDS) for Wood Construction

2. AWC WFCM (2012) Wood Frame Construction Manual for One- and Two-Family Dwellings

C. AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

1. AWPA BOOK (2015) AWPA Book of Standards

2. AWPA M2 (2019) Standard for the Inspection of Preservative Treated Wood Products for Industrial Use

3. AWPA M6 (2013) Brands Used on Preservative Treated Materials

4. AWPA P18 (2014) Nonpressure Preservatives

5. AWPA P49 (2015; R 2021) Standard for Fire Retardant FR-1

6. AWPA P5 (2015) Standard for Waterborne Preservatives

7. AWPA T1 (2021) Use Category System: Processing and Treatment Standard

8. AWPA U1 (2021) Use Category System: User Specification for Treated Wood

D. APA - THE ENGINEERED WOOD ASSOCIATION (APA)

1. APA E30 (2016) Engineered Wood Construction Guide

2. APA E445 (2002) Performance Standards and Qualification Policy for Structural-Use Panels (APA PRP-108)

3. APA F405 (19) Product Guide: Performance Rated Panels

4. APA L870 (2010) Voluntary Product Standard, PS 1-09, Structural Plywood

5. APA S350 (2014) PS 2-10, Performance Standard for Wood-Based Structural-Use Panels

E. ASME INTERNATIONAL (ASME)

1. ASME B18.2.1 (2012; Errata 2013) Square and Hex Bolts and Screws (Inch Series)

2. ASME B18.2.2 (2015) Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)

3. ASME B18.5.2.1M (2006; R 2011) Metric Round Head Short Square Neck Bolts

4. ASME B18.5.2.2M (1982; R 2010) Metric Round Head Square Neck Bolts

5. ASME B18.6.1 (2016) Wood Screws (Inch Series)

F. ASTM INTERNATIONAL (ASTM)

1. ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

2. ASTM A307 (2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength

3. ASTM A653/A653M (2020) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

4. ASTM D2898 (2010; R 2017) Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing

5. ASTM F1667 (2021) Standard Specification for Driven Fasteners: Nails, Spikes, and Staples

6. ASTM F547 (2017) Standard Terminology of Nails for Use with Wood and Wood-Base Materials

G. CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

1. CDPH SECTION 01350 (2010; Version 1.1) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using

Environmental Chambers

H. REDWOOD INSPECTION SERVICE (RIS) OF THE CALIFORNIA REDWOOD ASSOCIATION (CRA)

1. RIS Grade Use (1998) Redwood Lumber Grades and Uses

I. GREEN SEAL (GS)

1. GS-36 (2013) Adhesives for Commercial Use

J. INTERNATIONAL CODE COUNCIL (ICC)

1. ICC IBC (2021) International Building Code

K. NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA)

1. NELMA Grading Rules (2013) Standard Grading Rules for Northeastern Lumber

L. U.S. DEPARTMENT OF COMMERCE (DOC)

1. DOC/NIST PS56 (1973) Structural Glued Laminated Timber

M. SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION (SCMA)

1. SCMA Spec (1986; Supple. No. 1, Aug 1993) Standard Specifications for Grades of Southern Cypress

N. SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

1. SCAQMD Rule 1168 (2017) Adhesive and Sealant Applications

O. SOUTHERN PINE INSPECTION BUREAU (SPIB)

1. SPIB 1003 (2014) Standard Grading Rules for Southern Pine Lumber

P. U.S. DEPARTMENT OF COMMERCE (DOC)

Q. U.S. GENERAL SERVICES ADMINISTRATION (GSA)

1. CID A-A-1923 (Rev A; Notice 3) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors)

2. CID A-A-1924 (Rev A; Notice 3) Shield, Expansion (Self Drilling Tubular Expansion Shell Bolt Anchors

3. CID A-A-1925 (Rev A; Notice 3) Shield Expansion (Nail Anchors)

R. NATIONAL HARDWOOD LUMBER ASSOCIATION (NHLA)

1. NHLA Rules (2015) Rules for the Measurement & Inspection of Hardwood & Cypress

S. UNDERWRITERS LABORATORIES (UL)

1. UL 2818 (2013) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings

T. WEST COAST LUMBER INSPECTION BUREAU (WCLIB)

1. WCLIB 17 (2015) Standard Grading Rules

U. WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

1. WWPA G-5 (2017) Western Lumber Grading Rules

1.3 SUBMITTALS

A. Shop Drawings

1. All items fabricated for this project showing sizes of items, finishes, methods of construction and mounting details.

B. Nailers and Nailing Strips

1. Drawings of field erection details, including materials and methods of fastening nailers in conformance with the loads specified in the plans.

C. SD-03 Product Data

1. Treated Lumber

D. Design Data

1. Design analysis and calculations showing design criteria used to accomplish the applicable analysis.

E. Test Reports

1. Preservative-treated Lumber and Plywood

F. Certificates

1. Certificates of Grade

1.4 DELIVERY AND STORAGE

A. Deliver materials to the site in an undamaged condition. Store, protect, handle, and install prefabricated structural elements in accordance with manufacturer's instructions

and as specified. Store materials off the ground to provide proper ventilation, with drainage to avoid standing water, and protection against ground moisture and dampness. Store materials with a moisture barrier at both the ground level and as a cover forming a well-ventilated enclosure. Adhere to requirements for stacking, lifting, bracing, cutting, notching, and special fastening requirements. Do not use materials that have visible moisture or biological growth. Remove defective and damaged materials and provide new materials. Store separated reusable wood waste convenient to cutting station and area of work.

1.5 GRADING AND MARKING

A. Lumber

1. Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark of a recognized association or independent inspection agency. Such association or agency must be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. Surfaces that are to be exposed to view must not bear grademarks, stamps, or any type of identifying mark. Hammer marking will be permitted on timbers when all surfaces will be exposed to view.

B. Plywood

1. Mark each sheet with the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The mark must identify the plywood by species group or span rating, exposure durability classification, grade, and compliance with APA L870. Surfaces that are to be exposed to view must not bear grademarks or other types of identifying marks.

C. Preservative-Treated Lumber and Plywood

1. The Contractor is responsible for the quality of treated wood products. Each treated piece must be inspected in accordance with AWPA M2 and permanently marked or branded, by the producer, in accordance with AWPA M6. The Contractor must provide the Contract Monitor or their designated representative with the inspection report of an approved independent inspection agency that offered products comply with applicable AWPA Standards. The appropriate Quality Mark on each piece will be accepted, in lieu of inspection reports, as evidence of compliance with applicable AWPA treatment standards.

D. Fire-Retardant Treated Lumber

1. Mark each piece in accordance with AWPA M6, except pieces that are to be natural or transparent finished. In addition, exterior fire-retardant lumber must be distinguished by a permanent penetrating blue stain. Labels of a nationally recognized independent testing agency will be accepted as evidence of conformance to the fire-retardant requirements of AWPA M6.

1.6 SIZES AND SURFACING

A. ALSC PS 20 for dressed sizes of yard and structural lumber. Lumber must be surfaced four sides. Size references, unless otherwise specified, are nominal sizes, and actual sizes must be within manufacturing tolerances allowed by the standard under which the product is produced. Other measurements are IP or SI standard.

1.7 MOISTURE CONTENT

A. Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products must be as follows at the time of delivery to the job site:

1. Framing lumber and board, 19 percent maximum

2. Timbers 5 inches and thicker, 25 percent maximum

3. Materials other than lumber; moisture content must be in accordance with standard under which the product is produced

1.8 PRESERVATIVE TREATMENT

A. See specification 06 05 73 TREATED WOOD PRESERVATIVES – PRESSURE TREATED WOOD for treatment requirements.

1.9 FIRE-RETARDANT TREATMENT

A. Fire-retardant treated wood must be pressure treated with fire retardants conforming to AWPA P49. Fire retardant treatment of wood products must conform to the requirements of AWPA U1, Commodity Specification H and AWPA T1, Section H. Treatment and performance inspection must be by an independent and qualified testing agency that establishes performance ratings. Each piece or bundle of treated material must bear identification of the testing agency to indicate performance in accordance with such rating. Treated materials to be exposed to rain wetting must be subjected to an accelerated weathering technique in accordance with ASTM D2898 prior to being tested. Such items which will not be inside a building, and such items which will be exposed to heat or high humidity, must receive exterior fire-retardant treatment. Fire-retardant-treated wood products must be free of halogens, sulfates, ammonium phosphate, and formaldehyde. Items to be treated include the following:

1.10 ENVIRONMENTAL REQUIREMENTS

A. During and immediately after installation of treated wood, engineered wood products, and laminated wood products at interior spaces, provide temporary ventilation.

1.11 CERTIFICATIONS

A. Certified Wood Grades

1. Provide certificates of grade from the grading agency on graded but unmarked lumber or plywood attesting that materials meet the grade requirements specified herein.

B. 1.12.2.1 Adhesives and Sealants

1. Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide certification or validation by other third-party programs that products meet the requirements of this Section. Provide current product certification documentation from certification body. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

PART 2 PRODUCTS

2.1 LUMBER

A. Framing Lumber

1. Framing lumber such as studs, plates, caps, collar beams, cant strips, bucks, sleepers, nailing strips, and nailers and board lumber such as subflooring and wall and roof sheathing must be one of the species listed in the table below. Minimum grade of species must be as listed. Finger-jointed lumber may be used in the same applications as solid lumber of an equivalent species and grade, provided the finger-jointed lumber meets all the requirements of the certification and the quality control programs of the rules writing agency having jurisdiction and all applicable requirements of DOC/NIST PS56.

Table of Grades for Framing and Board Lumber			
Grading Rules	Species	Framing	Board Lumber
WWPA G-5 standard grading rules	Aspen, Douglas Fir-Larch, Douglas Fir South, Engelmann Spruce-Lodgepole Pine, Engelmann Spruce, Hem-Fir, Idaho White Pine, Lodgepole Pine, Mountain Hemlock, Mountain Hemlock-Hem-Fir, Ponderosa Pine-Sugar Pine, Ponderosa Pine-Lodgepole Pine, Subalpine Fir, White Woods, Western Woods, Western Cedars, Western Hemlock	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	All Species: No. 3 Common
WCLIB 17 standard grading rules	Douglas Fir-Larch, Hem-Fir, Mountain Hemlock, Sitka Spruce, Western Cedars, Western Hemlock	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	All Species: Standard
SPIB 1003 standard grading rules	Southern Pine	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	No. 2 Boards
SCMA Spec standard specifications	Cypress	No. 2 Common	No. 2 Common

Table of Grades for Framing and Board Lumber			
Grading Rules	Species	Framing	Board Lumber
NELMA Grading Rules standard grading rules	Balsam Fir, Eastern Hemlock-Tamarack, Eastern Spruce, Eastern White Pine, Northern Pine, Northern Pine-Cedar	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	All Species: No. 3 Common except Standard for Eastern White and Northern Pine
RIS Grade Use standard specifications	Redwood	All Species: Standard Light Framing or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10 feet and shorter)	Construction Heart
NHLA Rules - rules for the measurement and inspection of hardwood and cypress lumber	Cypress	No. 2 Dimension	No. 2 Common

2.2 FIRE RETARDANT MISCELLANEOUS ROUGH CARPENTRY

A. Miscellaneous Wood Members

1. Nonstress Graded Members

a Members must include bridging, corner bracing, furring, grounds, and nailing strips. Members must be in accordance with TABLE I for the species used. Sizes must be as follows unless otherwise shown:

Member	Size (inch)
Bridging	1 x 3 or 1 x 4 for use between members 2 x 12 and smaller; 2 x 4 for use between members larger than 2 x 12.
Corner bracing	1 x 4.

Member	Size (inch)
Furring	1 x 2 or 1 x 3
Grounds	Plaster thickness by 38.
Nailing strips	1 x 3 or 1 x 4 when used as shingle base or interior finish, otherwise 2 inch stock.

2. Sill Plates

   a Sill plates must be standard or number 2 grade.

3. Blocking

   a Blocking must be standard or number 2 grade.

4. Rough Bucks and Frames

   a Rough bucks and frames must be straight standard or number 2 grade.

B. Adhesives

1. Comply with applicable regulations regarding toxic and hazardous materials and as specified. Provide non-aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) meeting either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide aerosol adhesives used on the interior of the building meeting either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of GS-36. Provide certification or validation of indoor air quality for non-aerosol adhesives applied on the interior of the building (inside of the weatherproofing system). Provide certification or validation of indoor air quality for aerosol adhesives used on the interior of the building (inside of the weatherproofing system).

2.3 ROUGH HARDWARE

A. Unless otherwise indicated or specified, rough hardware must be of the type and size necessary for the project requirements. Sizes, types, and spacing of fastenings of manufactured building materials must be as recommended by the product manufacturer unless otherwise indicated or specified. Rough hardware exposed to the weather or embedded in or in contact with preservative treated wood, exterior masonry, or concrete walls or slabs must be hot-dip zinc-coated in accordance with ASTM A153/A153M. Nails and fastenings for fire-retardant treated lumber and woodwork exposed to the weather must be copper alloy or hot-dipped galvanized fasteners as recommended by the

treated wood manufacturer.

B. Bolts, Nuts, Studs, and Rivets

1. ASME B18.2.1, ASME B18.5.2.1M, ASME B18.5.2.2M and ASME B18.2.2.

C. Anchor Bolts

1. ASTM A307, size as indicated, complete with nuts and washers.

D. Expansion Shields

1. CID A-A-1923, CID A-A-1924, and CID A-A-1925. Except as shown otherwise, maximum size of devices must be 3/8 inch.

E. Lag Screws and Lag Bolts

1. ASME B18.2.1.

F. Wood Screws

1. ASME B18.6.1.

G. Nails

1. ASTM F547, size and type best suited for purpose. For sheathing length of nails must be sufficient to extend 1 inch into supports. In general, 8-penny or larger nails must be used for nailing through 1 inch thick lumber and for toe nailing 2 inch thick lumber; 16-penny or larger nails must be used for nailing through 2 inch thick lumber. Nails used with treated lumber and sheathing must be hot-dipped galvanized in accordance with ASTM A153/A153M. Nailing must be in accordance with the recommended nailing schedule contained in AWC WFCM. Where detailed nailing requirements are not specified, nail size and spacing must be sufficient to develop an adequate strength for the connection. The connection's strength must be verified against the nail capacity tables in AWC NDS. Reasonable judgment backed by experience must ensure that the designed connection will not cause the wood to split. If a load situation exceeds a reasonable limit for nails, a specialized connector must be used.

H. Wire Nails

1. ASTM F1667.

I. Clip Angles

1. Steel, 3/16 inch thick, size best suited for intended use; or zinc-coated steel or iron commercial clips designed for connecting wood members.

J. Door Buck Anchors

1. Metal anchors, 1/8 by 1-1/4 inch steel, 12 inches long, with ends bent 2 inches. Anchors must be screwed to the backs of bucks and built into masonry or concrete. Locate 8 inches above sills and below heads and not more than 24 inches intermediately between. Anchorage of bucks to steel framing must be as necessary to suit the conditions.

K. Metal Bridging

1. Where not indicated or specified otherwise, No. 16 U.S. Standard gage, cadmium-plated or zinc-coated.

L. Metal Framing Anchors

1. Construct anchors to the configuration shown using hot dip zinc-coated steel conforming to ASTM A653/A653M, G90. Except where otherwise shown, steel must be not lighter than 18 gage. Special nails supplied by the manufacturer must be used for all nailing.

M. Panel Edge Clips

1. Extruded aluminum or galvanized steel, H-shaped clips to prevent differential deflection of roof sheathing.

PART 3 EXECUTION

3.1 INSTALLATION

A. General

1. Do not install construction materials that show visual evidence of biological growth.

2. Conform to AWC WFCM and install in accordance with the National Association of Home Builders (NAHB) Advanced Framing Techniques: Optimum Value Engineering, unless otherwise indicated or specified. Select lumber sizes to minimize waste. Fit framing lumber and other rough carpentry, set accurately to the required lines and levels, and secure in place in a rigid manner. Do not splice framing members between bearing points. Set joists, rafters, and purlins with their crown edge up. Frame members for the passage of pipes, conduits, and ducts. Provide adequate support as appropriate to the application, climate, and modulus of elasticity of the product. Do not cut or bore structural members for the passage of ducts or pipes without approval. Reinforce all members damaged by such cutting or boring by means of specially formed and approved sheet metal or bar steel shapes, or remove and provide new, as approved. Provide as necessary for the proper completion of the work all framing members not indicated or specified. Spiking and nailing not indicated or specified otherwise must be in accordance with the Nailing Schedule contained in ICC IBC; perform bolting in an approved manner. Spikes, nails, and bolts must be drawn up tight.

B. Sills

1. Set sills level and square and wedge with steel or slate shims; point or grout with non-shrinking cement mortar to provide continuous and solid bearing. Anchor sills to the foundations as indicated. Where sizes and spacing of anchor bolts are not indicated, provide not less than 5/8 inch diameter bolts at all corners and splices and space at a maximum of 6 feet o.c. between corner bolts. Provide at least two bolts for each sill member. Lap and splice sills at corners and bolt through the laps or butt the ends and through-bolt not more than 6 inches from the ends. Provide bolts with plate washers and nuts. Bolts in exterior walls must be zinc-coated.

C. Anchors in Concrete

1. Except where indicated otherwise, embed anchor bolts not less than 8 inches in poured concrete walls and provide each with a nut and a 2 inch diameter washer at bottom end. A bent end may be substituted for the nut and washer; bend must be not less than 90 degrees. Powder-actuated fasteners spaced 3 feet o.c. may be provided in lieu of bolts for single thickness plates on concrete.

3.2 MISCELLANEOUS

A. Wood Roof Nailers, Edge Strips, Crickets, Curbs, and Cants

1. Provide sizes and configurations indicated or specified and anchored securely to continuous construction.

B. Crickets, Cants, and Curbs

1. Provide wood saddles or crickets, cant strips, curbs for scuttles and ventilators, and wood nailers bolted to tops of concrete or masonry curbs and at expansion joints, as indicated, specified, or necessary and of lumber inch thick exterior plywood.

C. Rough Wood Bucks

1. Set wood bucks true and plumb. Anchor bucks to concrete or masonry with steel straps extending into the wall 8 inches minimum. Place anchors near the top and bottom of the buck and space uniformly at 2-foot maximum intervals.

D. Wood Blocking

1. Provide proper sizes and shapes at proper locations for the installation and attachment of wood and other finish materials, fixtures, equipment, and items indicated or specified.

E. Wood Furring

1. Provide where shown and as necessary for facing materials specified. Except as shown otherwise, furring strips must be nominal one by 3, continuous, and spaced 16 inches o.c. Erect furring vertically or horizontally as necessary. Nail furring strips to masonry. Do not use wood plugs. Provide furring strips around openings, behind bases, and at angles and corners. Furring must be plumb, rigid, and level and must be shimmed as necessary to provide a true, even plane with surfaces suitable to

receive the finish required. Form furring for offsets and breaks in walls or ceilings on 1 by 4 wood strips spaced 16 inches o.c.

F. Wood Bumpers

1. Dress to the sizes indicated, and bevel edges. Bore, countersink, and bolt bumpers in place.

G. Bridging

1. Wood bridging must have ends accurately bevel-cut to afford firm contact and must be nailed at each end with two nails. Install metal bridging as recommended by the manufacturer. The lower ends of bridging must be driven up tight and secured after subflooring or roof sheathing has been laid and partition framing installed.

H. Corner Bracing

1. Install corner bracing when required by type of sheathing used or when siding, other than panel siding, is applied directly to studs. Corner bracing must be let into the exterior surfaces of the studs at an angle of approximately 45 degrees, must extend completely over wall plates, and must be secured at each bearing with two nails.

I. Sill Plates

1. Sill plates must be set level and square and anchor bolted at not more than 6 feet on centers and not more than 12 inches from end of each piece. A minimum of two anchors must be used for each piece.

END OF SECTION 06 10 00

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 06 15 00 THERMALLY MODIFIED TOP RAIL

PART 1 GENERAL

1.1 SUBMITTALS

A. Action Submittals:
   1. Product Data: Manufacturer's descriptive data and product attributes for wood materials.
   2. Samples: Contractor shall provide 2 samples approximately 6" long to the Contracting Officer for approval of finished color. All applicable data in accordance with Specification 01 67 00 shall be included with the sample.

1.2 QUALITY ASSURANCE

A. Installer Qualifications: Firm specializing in work of this Section, with minimum 2 years' experience.

B. Mockup: Minimum 4 feet. Approved mockup may remain as part of the Work.

C. Slip Resistance: Average dynamic coefficient of friction of 0.44, tested to ANSI A137.1/A326.3 in wet condition.

PART 2 PRODUCTS

2.1 MATERIALS

A. Thermally Modified Wood Guardrail Cap:
   1. Species: White Ash
   2. Nominal size: 2 x 6 inches
   3. Actual size: 1.65 x 5.5 inches
   4. Coverage: 5.5 inches
   5. Profile: Square edges and ends
   6. Color: Brown
   7. Surface texture: Smooth
   8. Finish: Oiled

2.2 ACCESSORIES

A. Fasteners: Type 316 stainless steel screws.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with the plans.

B. Install using face screw method.

END OF SECTION 06 15 00

SECTION 06 61 00 PULTRUDED PEDESTRIAN GRATING

PART 1 GENERAL

1.1 SCOPE OF WORK

A. The CONTRACTOR shall furnish, fabricate (where necessary), and install all fiberglass reinforced plastic (FRP) items, with all appurtenances, accessories and incidentals necessary to produce a complete, operable and serviceable installation as shown on the Contract Drawings and as specified herein, and in accordance with the requirements of the Contract Documents.

1.2 REFERENCES

A. The publications listed below (latest revision applicable) form a part of this specification to the extent referenced herein. The publications are referred to within the text by the designation only.

1. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) Test Methods:

ASTM D 635	Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM D 732	Shear Strength of Plastics by Punch Tool
ASTM E 84	Surface Burning Characteristics of Building Materials

1.3 CONTRACTOR SUBMITTALS

A. The CONTRACTOR shall furnish shop drawings of all fabricated gratings and accessories in accordance with the provisions of this Section.

B. The CONTRACTOR shall furnish manufacturer's shop drawings clearly showing material sizes, types, styles, part or catalog numbers, complete details for the fabrication of and erection of components including, but not limited to, location, lengths, type and sizes of fasteners, clip angles, member sizes, and connection details.

C. The CONTRACTOR shall submit the manufacturer’s published literature including structural design data, structural properties data, grating load/deflection tables, corrosion resistance tables, certificates of compliance, test reports as applicable, concrete anchor systems and their allowable load tables, and design calculations for systems not sized or designed in the contract documents.

D. The CONTRACTOR shall submit sample pieces of each item specified herein for acceptance by the CONTRACTING OFFICER as to quality and color. Sample pieces shall be manufactured by the method to be used in the WORK.

1.4 QUALITY ASSURANCE

A. All items to be provided under this Section shall be furnished only by manufacturers having a minimum of ten (10) years experience in the design and manufacture of similar products and systems. Additionally, if requested, a record of at least five (5) previous, separate, similar successful installations in the last five (5) years shall be provided.

B. Manufacturer shall offer a 3-year limited warranty on all FRP products against defects in materials and workmanship.

C. Manufacturer shall be certified to the ISO 9001-2008 standard.

D. Manufacturer shall provide proof of certification from at least two other quality assurance programs for its facilities or products (DNV, ABS, USCG, AARR).

1.5 PRODUCT DELIVERY AND STORAGE

A. Delivery of Materials: Manufactured materials shall be delivered in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturer. Adhesives, resins and their catalysts and hardeners shall be crated or boxed separately and noted as such to facilitate their movement to a dry indoor storage facility.

B. Storage of Products: All materials shall be carefully handled to prevent them from abrasion, cracking, chipping, twisting, other deformations, and other types of damage. Store items in an enclosed area and free from contact with soil and water. Store adhesives, resins and their catalysts and hardeners in dry indoor storage facilities between 70- and 85-degrees Fahrenheit (21 to 29 degrees Celsius) until they are required.

PART 2 PRODUCTS

2.1 GENERAL

A. All FRP items furnished under this Section shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions as specified in the Contract Documents.

B. Fiberglass reinforcement shall be a combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application and/or physical properties required.

C. Resins shall be ISOPHTHALIC with chemical formulations as necessary to provide the corrosion resistance, strength and other physical properties as required.

D. All finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall

be well covered with resin to protect against their exposure due to wear or weathering.

E. All pultruded structural shapes shall be further protected from ultraviolet (UV) light with 1) integral UV inhibitors in the resin and 2) a synthetic surfacing veil to help produce a resin rich surface.

F. All FRP products shall have a tested flame spread rating of 25 or less per ASTM E-84 Tunnel Test. Gratings shall not burn past the 25 mm reference mark and will be classified HB per ASTM D635.

G. All grating clips shall be manufactured of Type 316SS (stainless steel).

2.2 PULTRUDED GRATING

A. Grating components shall be high strength and high stiffness pultruded elements having a maximum of 70% and a minimum of 60% glass content (by weight) of continuous roving and continuous strand mat fiberglass reinforcements. The finished surface of the product shall be provided with a surfacing veil to provide a resin rich surface which improves corrosion resistance and resistance to ultraviolet degradation. Bearing bars shall be interlocked and epoxied in place with a two piece cross rod system to provide a mechanical and chemical lock. Cross rods should be below the walking surface of the grating. Gratings with cross rods that are flush with the walking surface are excluded.

B. Non-slip surfacing: Grating shall be provided with a barefoot friendly grit bonded and baked to the top surface of the finished grating product.

C. Fire rating: Grating shall be fire retardant with a tested flame spread rating of 25 or less when tested in accordance with ASTM E 84. Manufacturer may be required to provide certification of ASTM E84 test on grating panels from an independent testing laboratory. Test data shall be from full scale testing of actual production grating, of the same type and material supplied on the project. Test data performed only on the base resin shall not be acceptable.

D. Resin system: The resin system used in the manufacture of the grating shall be ISOFR, ISOPHTHALIC. Manufacturer may be required to submit corrosion data from tests performed on actual grating products in standard chemical environments. Corrosion resistance data of the base resin from the manufacturer is not a true indicator of grating corrosion resistance and shall not be accepted.

E. Color: Contractor shall provide color samples to the Contracting Officer before procurement.

F. Depth: 1" deep load bars with a tolerance of plus or minus 1/32".

G. Mesh Configuration: 2" load bar spacing; 6" tie bar spacing on centers.

H. Load/Deflection: Grating shall meet manufacturers published safe recommended loadings with deflection not to exceed the following:

I. Uniform distributed load over a 42" span: 50 pounds per square foot, with a maximum deflection of 0.12".

2.3 GRATING FABRICATION

A. Measurements: Grating supplied shall meet the minimum dimensional requirements as shown or specified. The Contractor shall provide and/or verify measurements in field for work fabricated to fit field conditions as required by grating manufacturer to complete the work. Determine correct size and locations of required holes or cutouts from field dimensions before grating fabrication.

B. Layout: Each grating section shall be readily removable, except where indicated on drawings. Manufacturer to provide openings and holes where located on the contract drawings. Grating supports shall be provided at openings in the grating by contractor where necessary to meet load/deflection requirements specified herein. Grating openings which fit around protrusions (pipes, cables, machinery, etc.) shall be discontinuous at approximately the centerline of opening so each section of grating is readily removable.

C. Sealing: All shop fabricated grating cuts shall be coated with vinyl ester resin to provide maximum corrosion resistance. All field fabricated grating cuts shall be coated similarly by the contractor in accordance with the manufacturer's instructions.

D. Hardware: Type 316 stainless steel hold-down clips shall be provided and spaced at a maximum of four feet apart with a minimum of four per piece of grating, or as recommended by the manufacturer.

PART 3 EXECUTION

3.1 INSPECTION

A. Shop inspection is authorized as required by the Owner and shall be at Owner's expense. The fabricator shall give ample notice to Contractor prior to the beginning of any fabrication work so that inspection may be provided.

B. The grating shall be as free, as commercially possible, from visual defects such as foreign inclusions, delamination, blisters, resin burns, air bubbles and pits.

3.2 INSTALLATION

A. Contractor shall install gratings in accordance with manufacturer’s assembly drawings. Lock grating panels securely in place with hold-down fasteners as specified herein. Field cut and drill fiberglass reinforced plastic products with carbide or diamond tipped bits and blades. Seal cut or drilled surfaces in accordance with manufacturer's instructions. Follow manufacturer's instructions when cutting or drilling fiberglass products or using resin products; provide adequate ventilation.

END OF SECTION 06 61 00

SECTION 12 93 00 SITE FURNISHINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site furnishings of the following types:
   1. Benches
   2. Picnic Tables
   3. Trash/Recycle Receptacle
   4. Exhibits

1.2 SUBMITTALS

A. Submit under provisions of Section 01 33 23 – SUBMITTAL REQUIREMENTS.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Detail drawings.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.

C. Shop Drawings: Indicate materials, dimensions, tolerances, welding, fasteners, hardware, mounting, finish, and accessories. Include manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum five years experience in producing site furnishings and exhibits of the type specified.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handle materials to avoid damage.

1.5 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.6 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty against defects in materials and workmanship.

PART 2 PRODUCTS

2.1 SITE FURNISHINGS

A. Benches:
   a. One piece construction with slats
   b. Center arm rest
   c. Flat bench with raised armrests
   d. All-steel, 6 feet long
   e. UV stabilized, corrosion resistant powder-coating, suitable for outdoor use
   f. Black
   g. Bolted legs

B. Picnic Tables:
   a. ADA/universal access
   b. Top & Seats:
      1) End plates fabricated out of 7-gauge x 3” with a 3” diameter corners. 12-gauge sheet steel precision punched for slat pattern. 7-gauge x 1-1/2” flat bar center supported and mounting bracket understructure. Electrically MIG welded.
   c. Coating:
      1) Oven fused polyethylene copolymer-based thermoplastic. Fluidized bed coating application. Impact resistant and UV-stabilized.
      2) Black
   d. Frame:
      1) 2-3/8” OD x 12-gauge pre-galvanized structural steel tubing. 1” OD x 16-gauge pre-galvanized structural steel tubing cross braces. 1-1/2” x 1-1/2” x 3/16” steel angle mounting brackets. 7-gauge x 1-1/2” die stamped steel flat bar seat and top mounting points.
      2) Oven cured electrostatic powder coated
   e. Hardware:
      1) All stainless-steel hardware fasteners
   f. Dimensions
      1) 8’ portable picnic table walk-through design
      2) Top: 30-3/16” wide x 96’ long and 32-1/8” high.
      3) Seats: 12-3/16” wide x 72” long and 20” high.
      4) Outside to outside dimensions: 69-11/16” x 96”.

C. Trash/Recycle Receptacles:
   a. Animal resistant latches on lids, doors, & handles.
   b. 32-gallon capacity
   c. Rust resistant pre-galvanized steel sheet metal (12-gauge panels, 14-gauge doors)
   d. Stainless steel hinges and handles
   e. Self-closing & weatherproof lids.
   f. Black textured polyester powder-coat finish.
   g. Internal slide-out liner support rack

D. Wayside Exhibits:
   a. Uprights
      1) 36” x 48”
      2) Aluminum frame

3) Double pedestal

b. Low Profile Wayside
   1) 24” x 36”
   2) Aluminum frame
   3) Double pedestal

c. Triangular Kiosk
   1) 36” x 48”
   2) Aluminum frame

d. Bulletin Case
   1) 36”x48”
   2) Aluminum frame
   3) Neoprene rubber backing
   4) 3/16-inch polycarbonate front that is durable, UV resistant, and crystal clear.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

3.2 INSTALLATION

A. Install site furnishings in accordance with manufacturer's installation instructions and in proper relationship with adjacent construction. Adjust until satisfactory results are achieved.

B. Install site furnishings level, plumb, square, accurately aligned, correctly located per drawings, and without warp. Use hardware and fasteners acceptable to manufacturer.

3.3 CLEANING AND PROTECTION

A. Clean in accordance with manufacturer's recommendations.

B. Protect installed products until completion of project.

C. Touch-up, repair or replace damaged products and finishes in accordance with manufacturer's instructions before Substantial Completion.

END OF SECTION 12 93 00

SECTION 22 10 00 PLUMBING PIPING

PART 1 GENERAL

1.1 SUMMARY

A. The Contractor shall provide plumbing piping and specialties, complete and operable, as indicated in accordance with the Contract Documents.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Reference Specifications

01 33 23	Submittal Procedures

B. Reference Standards

American National Standards Institute (ANSI)	
NSF/ANSI 61	Drinking Water System Components – Health Effects
American Society of Sanitary Engineering (ASSE)	
ASSE 1001	Performance Requirements For Atmospheric Type Vacuum Breakers
American Society for Testing and Materials (ASTM)	
ASTM D1785	Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, And 120
ASTM D2665	Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, And Vent Pipe And Fittings
ASTM D1784	Classification System And Basis For Specification For Rigid Poly(Vinyl Chloride) (PVC) Compounds And Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D2672	Joints For IPS PVC Pipe Using Solvent Cement
American Water Works Association (AWWA)	
AWWA C708	Cold-Water Meters – Multijet Type
AWWA C651	Disinfecting Water Mains
AWWA C652	Disinfection of Water Storage Facilities
National Sanitation Foundation (NSF)	
NSF 372	Drinking Water System Components – Lead Content
NSF International STD 61	Drinking Water System Components – Health Effects
NSF International Std 14	Plastics Piping System Components And Related Materials
NSF Std 61	Drinking Water System Components – Health Effects

Safe Drinking Water Act (SDWA)	
United States Environmental Protection Agency (US EPA)	
Public Law (PL)	
PL 93-523	Safe Drinking Water Act
International Organization for Standardization (ISO)	
ISO 9001	Quality management systems

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 23 – Submittal Procedures.

B. Shop Drawings

1. General arrangement drawings of system components

2. Catalog cuts and other manufacturer information for products

1.4 WORKMANSHIP AND MATERIALS

A. Work shall be in strict accordance with the International Plumbing Code and codes of the State of Louisiana, Jefferson Parish, and any other authorities having jurisdiction.

B. The Contractor shall have required certifications and shall be thoroughly familiar with the local codes.

C. The Contractor shall obtain and pay for necessary permits.

D. Protection

1. Care shall be taken at all times to protect floors, stairways, and walls during the make-up and installation of piping and equipment.

2. The Contractor shall remove stains and repair damage before final acceptance of the Work.

E. Identifying Marks

1. If the Contracting Officer finds materials that have identifying marks removed or lack such marks completely, such items will be rejected until the Contractor has furnished proof that said items conform to the Specifications.

2. Adequacy and extent of such proof will be determined by the Contracting Officer.

PART 2 PRODUCTS

2.1 GENERAL

A. Plumbing piping, fixtures, specialties, and equipment shall be as recommended by the manufacturer for the intended usage.

B. Any pipe, plumbing fitting or fixture used in the installation or repair of any public water system or any plumbing in a facility providing water for human consumption, shall be “lead free”

1. Lead free products shall meet or exceed the requirements of the Safe Drinking Water Act (SDWA) - USEPA.

2. Lead free is defined as not more than 0.2 percent lead when used with respect to solder and flux; not more than 0.25 percent in the wetted surface material of pipes, pipe fittings, plumbing fittings and fixtures.

2.2 POTABLE WATER

A. Material or equipment containing a weighted average of greater than 0.25 percent lead shall not be used in any potable water system intended for human consumption, and shall be certified in accordance with NSF/ANSI 61, Annex G or NSF 372.

B. In line devices such as water meters, building valves, check valves, meter stops, valves, fittings and back flow preventers shall comply with PL 93-523 and NSF/ANSI 61, Section 8. End point devices such as drinking water fountains, lavatory faucets, supply stops and end point control valves used to dispense water for drinking must meet the requirements of NSF/ANSI 61, Section 9.

2.3 HANGERS, SUPPORTS, AND MISCELLANEOUS METAL WORK

A. General

1. For utility piping such as cold water, hot water, compressed and vacuum air, and sanitary drain pipes located inside the building, the Contractor shall provide hangers and supports for vertical loads in accordance with the Code, and per the Structural notes indicated on the drawings.

2. No perforated strap hangers nor wire supports will be permitted.

3. The Contractor shall obtain the services of a registered mechanical or structural professional engineer for design of the supports, and the Shop Drawings showing installation shall be stamped by the registered engineer.

B. Rod sizes for pipe hangers shall be as recommended by the hanger manufacturer.

2.4 VALVES

A. Water shutoff valves shall be of the ball valve type, including on fixture supply piping.

B. Hose Valves

1. Interior hose valves shall be provided as directed by NPS.

2. The hose nipple shall be a female brass pipe thread inlet with hose thread outlet.

3. Hose bibbs shall be ¾-in size.

C. Ball Shut-Off Valves

1. Provide ball shut-off valves on cold water piping at entrances to pipe chases and other inaccessible areas and wherever indicated or required to obtain the maximum efficiency for shut-off control on the water system.

2. Ball shut-off valves shall be placed on hot and cold water connections to equipment and fixtures.

3. Show the locations of shut-off valves on the Shop Drawings.

D. Relief Valves

1. Provide pressure relief valves at other locations where indicated.

2. Relief valves shall be equipped with manual test levers.

3. Provide piping to convey the relief valve discharge to the nearest floor drain, the building exterior, or elsewhere if approved by the Contracting Officer.

PART 3 EXECUTION

3.1 PREPARATION

A. The Contractor shall coordinate the roughing-in process with provisions for wall and floor sleeves, pipe inserts, and cutting of roof and floor penetrations, such that drain lines will have the required invert elevations and slopes.

3.2 INSTALLATION AND APPLICATION

A. The Contractor shall provide plumbing specialties in accordance with manufacturer's printed instructions.

B. Pipe shall be arranged in a neat and orderly manner to occupy the minimum amount of space and so that the pipe will not obstruct passageways and movement of building occupants or interfere with normal operation and maintenance of any equipment.

C. Pipe shall be carefully placed and properly sloped and shall be neatly and firmly supported by hangers or supports.

D. Joints

1. Screwed joints shall be made with joint compound and be tight and leak-proof.

2. A sufficient number of brass-to-ferrous metal seat unions shall be placed in lines such that any pipe, valve, or piece of equipment may be easily disconnected.

E. Joints in PE pipe shall be installed such that the longitudinal pull out resistance of each joint is at least equal to the tensile strength of the pipe.

3.3 EQUIPMENT DAMAGE AND REMOVAL

A. The Contractor's operations shall be carried out in such a manner as to guard against damage to those portions of the structure and equipment that are to remain in the finished Work.

B. Any damage caused by the Contractor or Subcontractor through their operations shall be repaired to the satisfaction of the Contracting Officer.

3.4 TESTING

A. The Contractor shall perform such tests as are required by local ordinances and Codes in the presence of a local governing authority inspector to show that piping is tight, leak-free, and otherwise satisfactory, and shall also perform such tests as the Contracting Officer may direct to ensure that fixtures and equipment operate properly.

B. The Contractor shall pay the costs to perform such tests and the costs of making changes or repairs until the Work is acceptable to the governing authorities.

C. Potable Water and Drainage Piping Pressure Testing

1. Demonstrate to an Owner witness that the piping passes the following pressure tests before it is insulated or covered by walls or ceilings. Test piping after all fittings and valves for that portion of the piping have been installed.

2. All pressure testing shall be witnessed and documented with results approved and signed off by an Owner representative.

3. Repair leaks discovered during pressure testing. Retest failed sections of piping to demonstrate satisfactory results.

4. Potable Water Testing: Upon completion of a section or of the entire hot and cold water supply system, it shall be tested and proved tight under a water pressure not less than one and half time of the working pressure under which it is to be used, but not less than 125 psi. The water used for tests shall be obtained from a potable source of sup- ply. The piping shall withstand the test without leaking for a period of not less than 15 minutes.

5. Drainage Water Testing: The drainage, and venting systems shall be tested with water. The water test shall be applied to the drainage and vent systems either in its entirety or in sections. Where the test is applied to the entire system, openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. Where the system is tested in sections, each opening shall be tightly plugged, except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10 ft head of water. In testing successive sections, not less than the upper 10 ft of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 ft of the system) shall have been submitted to a test of less than a 10 ft head of water. The water shall be kept in the system, or in the portion under test, for not less than 15 minutes before inspection starts. The system shall then be tight at all points.

3.5 DISINFECTION

A. The line shall then be filled with water and maintained under not less than 10 psig pressure, for not less than 48 hours, during which period each valve on the line shall be opened and closed several times, after which it shall be flushed clean and then tested by the Owner.

B. After potable water supply lines are successfully pressure tested, they shall be disinfected by introducing an HTH solution, liquid chlorine, or chlorine solution of sufficient strength.

C. Potable water systems shall be purged of deleterious matter and disinfected prior to utilization. The method to be followed shall be that prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in either AWWA C651 or AWWA C652, or as described in this section.

1. The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.

2. The system or part thereof shall be filled with a water/chlorine solution containing not less than 50 parts per million (0.0080 oz./gal 50 mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing not less than 200 parts per million (0.032 oz./gal 200 mg/L) of chlorine and allowed to stand for 3 hours.

3. Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.

4. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.

D. This procedure shall be repeated as often as necessary until the line is pronounced safe for use by the Owner.

E. No cross-connection between the water main and any pipe not yet disinfected will be permitted.

END OF SECTION 22 10 00

SECTION 26 00 10 ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. The work under this Contract consists of a complete and operational electrical system as detailed in the Contract Drawings and as specified herein.

2. The intent of the Contract Documents is to include all labor, products, components and services necessary to complete the work, tested, commissioned, and placed into full operation.

3. The work of this Section is required for installation, testing and operation of electrically driven equipment provided under Specifications in other Divisions.

4. The Contractor shall coordinate the work of Division 26 with the work of other Divisions of these Specifications to provide a coordinated installation.

5. The provisions of this Section shall apply to all Sections in Division 26, except as otherwise indicated.

6. This section of the specification forms part of the contract documents and is to be read, interpreted, and coordinated with all other parts.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Definitions

1. The word “supply” as used in these specifications shall be taken to mean that the so noted equipment is to be purchased, assembled and shipped to the site, including all costs associated with insurance and handling until the Contractor receives written acceptance at the site by the Contracting Officer. The Contractor is responsible to ensure the Supplier of the equipment confirms the functionality of equipment at site prior to the commissioning of the system. Where an item is noted as supplied by the Owner, by others, or by another Division, the electrical work of mounting, connecting and commissioning the item shall be included in the Contract unless specifically noted otherwise.

2. The word “provide” as used in these specifications shall be taken to mean that the so noted equipment is to be supplied, mounted, connected, adjusted, tested and placed into service by this Contract.

3. The word “reviewed” as used in these specifications shall be taken to mean that the so noted equipment is to be reviewed for conformance to the Contract Documents by the Contracting Officer, prior to fabrication.

4. The word “install” means all work and material necessary to place the specified item into full operation, securely fastened and to give a presentable finished appearance. “Install” also includes all necessary connections, wiring, testing and commissioning. Where indicated, this Contract shall require the Contractor to install equipment that is supplied by Others.

5. The word “coordinate” means to make all arrangements directly with the Owner, Contracting Officer, agencies, equipment suppliers, trades, sub-trades and individuals; confirm schedules; be in attendance at the time work is carried out; and take full responsibility for having the work carried out correctly and in a timely manner to meet the construction schedule.

B. Reference Standards

1. The following standards are referenced in this section and throughout Division 26. The edition/revision in effect at the time of bidding shall apply, unless otherwise specified.

   a. InterNational Electrical Testing Association (NETA)

   b. National Electrical Manufacturers Association (NEMA)

   c. Occupational Health and Safety Act (OHSA).

   d. Institute of Electrical and Electronics Engineers (IEEE)

   e. American National Standards Institute (ANSI)

   f. National Fire Protection Association (NFPA)

2. Electrical equipment shall be listed by and shall bear the label of Underwriters' Laboratories, Inc. (UL) or a Nationally Recognized Testing Laboratory (NRTL) acceptable to the local code enforcement agency having jurisdiction.

3. Installation of electrical equipment and materials shall comply with OSHA Safety and Health Standards (29 CFR 1910 and 29 CFR 1926, as applicable), state building standards, and applicable local codes, amendments and regulations.

4. Where the requirements of the specifications conflict with UL/NRTL, NEMA, NFPA, or other applicable codes or standards, the more stringent requirements shall govern.

C. Reference Specifications

01 33 23	Submittal Procedures
01 40 00	Quality Requirements
01 67 00	Product Requirements
01 77 00	Closeout Procedures
Division 26 – All Sections	Electrical (All Sections)

D. Reference Codes

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)	
NFPA 70	National Electrical Code, 2023 Edition

1.3 CODES, PERMITS, AND INSPECTIONS

A. The installation shall comply with the requirements of the edition of the National Electrical Code and the electrical by-laws and amendments as adopted by the local Authority Having Jurisdiction (AHJ). Where a local or regional AHJ has not adopted a specific electrical code, the latest version of the National Electrical Code shall apply.

B. Obtain all permits required and pay inspection fees according to the General Conditions. Take out all permits prior to beginning the work.

C. Coordinate all inspections with the AHJ and correct all identified installation issues to the satisfaction of the AHJ. Re-work associated with corrective actions identified by AHJ inspections, the Owner and Contracting Officer; failure to meet applicable codes; and failure to meet requirements of the contract documents shall be corrected at no additional cost to the Owner.

D. After completion of the work, furnish to the Contracting Officer the certificate(s) of final inspection and approval from the local AHJ.

1.4 SITE CONDITIONS

A. Protection

1. Provide physical protection and energize space heaters (as applicable) for all equipment to protect from damage due to ambient conditions during storage and prior to energization. Protection and storage shall be provided in strict accordance with the manufacturers' and suppliers' requirements.

2. Protect finishes and nameplates on equipment to prevent defacing.

3. Repair, restore or replace damaged, corroded, and rejected items. Where damaged equipment cannot be repaired to a "like new" condition in the opinion of the Owner or Contracting Officer, the equipment shall be replaced at no additional cost to the Owner.

B. Job Conditions

1. Schedule work which will cause interference or interruption in advance with Owner, Contracting Officer, authorities having jurisdiction, and all affected trades. Shutdowns shall be performed in strict accordance with the requirements of the General Conditions and the Division 1 specifications.

2. Examine the Contract Documents to determine how other work will affect the execution of electrical work.

3. Where any material, equipment or system components are installed differently from that shown, show such differences clearly and neatly, using ink or indelible pencil.

4. Prior to substantial completion, submit record documents in accordance with the requirements of the individual Sections of Division 26, Section 01 33 23 – Submittal Procedures and Section 01 77 00 – Closeout Procedures.

C. Area Classifications

1. Electrical equipment shall be approved and listed for use in the area classification in which it is used. Area classifications shall be defined by the NEMA enclosure definitions described in NEMA 250 – Enclosures for Electrical Equipment (1,000 Volts Maximum).

2. Area classifications for electrical work specifically indicated in other Sections shall comply with the requirements of this Section.

3. Area classifications for electrical work shall be as follows, except where specifically indicated otherwise on the drawings:

	NEMA ENCLOSURE CLASSIFICATION					
AREA	**1**	**3R**	**7**	**9**	**12**	**Notes**
Outdoor (Boardwalk)						NEMA 4X

4. Area classifications for electrical work other than specifically indicated above shall default to NEMA 4X.

D. Field Verifications

1. Visit the Site before submitting a Bid to become better acquainted with the work of this Contract.

2. The lack of knowledge will not be accepted as justification for extra compensation to perform the work.

3. The Contractor shall be responsible for identifying available existing circuit breakers in panelboards, motor control centers and switchboards for the intended use as required.

4. The Contractor shall be responsible for field verifying the available space in switchgear and switchboards to integrate new power circuit breakers as indicated.

5. The cost for the above verifications shall be included as part of the work.

1.5 ACTION SUBMITTALS

A. Submit Shop Drawings, Product Data, and samples in accordance with Section 01 33 23 – Submittal Procedures and this Section.

B. Shop Drawings

1. Shop Drawings submitted for review shall be reviewed by Contractor for conformance with design intent, relevant Specifications and coordinated with other divisions' submittals. Shop drawings not signed and reviewed by Contractor will be returned "not reviewed".

2. Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

3. Highlight or otherwise indicate options or specific items to be provided. Cross out items not intended to be provided. Drawings or data indicating “optional” or “as required” will not be accepted.

4. Include wiring, line and schematic diagrams applicable to this project. Generic wiring diagrams that do not apply to the project shall not be included and are not acceptable. Include wiring drawings or diagrams showing interconnection with other equipment and with work of other divisions.

5. Content:

    a. Shop Drawing submittal title sheet.

    b. Data shall be specific and technical.

    c. Identify each piece of equipment with appropriate project-specific equipment tag.

    d. Information shall include all scheduled data.

    e. Advertising and commercial presentation literature will be rejected.

    f. The project and equipment designations shall be identified on each document.

    g. Information shall be provided in Imperial units.

    h. The Shop Drawings / Product Data shall include as a minimum:

        1) Catalog cuts for all equipment and materials identifying the equipment manufacturer(s), catalog and model numbers, options, etc.

        2) Bill of materials.

        3) Dimensioned construction drawings with plans, elevations and sections showing size, arrangement, and necessary clearances, with all equipment weights and mounting point loads, and all approvals, certifications, listing/labelling, and manufacturing standards which apply.

        4) Mounting arrangements showing access clearances and ventilation requirements. Include dimensioned areas for cable/conduit entries and access plates.

        5) Detailed drawings of bases, supports and anchor bolts. Provide seismic installation data and instructions for installation.

        6) Control explanation and complete ladder schematics and interconnection wiring diagrams. Provide details on interconnections, terminal and wire numbering and conductor sizing.

        7) Types of materials and finish

8) Nameplate information including mounting locations, materials, font type/size, background and text colors, and text for each nameplate.

9) Temperature ratings and limitations, as applicable.

10) Electrical ratings including, but not limited to: Operating voltage, current, number of phases, frequency, and short circuit current ratings.

11) Grounding requirements.

12) Factory Test information.

13) Spare parts information.

i. Equipment supports shall be designed and submitted for approval.

6. Submission format:

a. Provide in accordance with Section 01 33 23 – Submittal Procedures, with the following additional requirements:

1) Text size shall be 10 point minimum. Smaller font sizes or unreadable text shall be grounds for rejection.

2) Text shall be in English.

3) Electronic submittals shall be in bookmarked, using pdf (portable document format) file structure. PDFs of drawings and other shop drawing information shall be generated from the original electronic documents. Scanned pdf documents shall be limited to equipment catalog cuts, provided they are clearly legible.

4) Markings and clarifications in the submittals by the Contractor or Supplier shall be in colors other than red, as this is reserved for Contracting Officer/Owner review markings.

7. Coordination:

a. Where electrical equipment requires support or backing or interconnection with other trades (mechanical connections, etc.), the Shop Drawings shall also be circulated for review to the other relevant Subcontractor(s) prior to submission to the Contracting Officer.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data

1. Provide operation and maintenance data for incorporation into operation and maintenance (O&M) manuals. Manuals shall be prepared and submitted in accordance with Section 01 77 00 – Closeout Procedures and Section 01 33 23 – Submittal Procedures. The O&M manuals shall describe the equipment in full and shall include the following major items:

a. Operating instructions and start-up procedures, including receiving and installation requirements. Where installed in seismic areas, include specific requirements for seismic installations.

b. Maintenance instructions listing preventive and corrective maintenance procedures and frequency of maintenance. Corrective maintenance procedures shall identify the most probable failures and the appropriate repairs. Test measurement levels shall be referenced to specific test points on the installed equipment.

c. Details of design elements, construction features, component function and maintenance requirements, to permit effective operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.

d. Spare parts data shall be furnished for each item of material and equipment specified. The data shall include a complete list of parts and supplies with current source of supply. A list and itemized breakdown (with current pricing) of spare parts recommended for stocking shall be furnished. The parts selected shall be those which, in the manufacturer's judgment, will be involved in the majority of maintenance procedures expected.

e. Equipment fabrication drawings, one-line diagrams, schematic diagrams and connection diagrams. Wiring and schematic diagrams must be specific to each individual piece of equipment and be detailed with as-built wire/cable tags and termination information. Generic documentation is not acceptable.

f. Catalog cuts and technical manuals for all components of the system, with specific model numbers clearly identified, and including technical data, product data; supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising and sales literature are not acceptable.

g. Copy of all guarantees and warranties issued for the various items of equipment, showing all dates of expiration.

h. Copies of all testing and commissioning results.

i. Copies of all “as-left” adjustable and programmable settings. In addition, provide electronic files of programmable settings for devices that can be programmed using such settings files.

j. Final copies of all shop drawings, incorporating manufacturing and field “as-built’ changes.

k. Record (as-built) Contract Drawings updated to show revisions to the electrical work when different from the original Contract Drawings. Prepare by obtaining new, clean sets of Contract Drawings from the Owner, and pay all costs for the same.

l. Names and addresses of local suppliers for items included in maintenance manuals.

2. The O&M manuals shall be formatted in accordance with Division 1 requirements. Where specific formatting is not included in Division 1, the O&M manuals shall have tabs for the following major sections:

a. Title page (in plastic cover).

b. Comprehensive description of the operation of the systems, including the function of each item of equipment within the system.

c. Detailed instructions for the normal maintenance of all systems and equipment installed including procedures and frequency of operational checks and service and troubleshooting instructions.

d. Local source of supply for each item of equipment.

e. Wiring and control diagrams.

f. Spare parts list.

g. Copies of guarantees and certificates.

h. Manufacturer's maintenance manuals and final as-built shop drawings.

3. Submit a single draft copy of each O&M Manual to the Contracting Officer for review 30 days prior to start-up of the systems and equipment covered by the manual. Once approved, provide the remaining copies of the manuals to the Owner for distribution.

4. Electronic O&M Manuals shall be in a bookmarked portable document format (PDF). Manuals without bookmarks will be rejected.

B. Record Documentation

1. Provide project as-built documents as specified in Section 01 77 00 – Closeout Procedures and as further called for in this division.

2. During the construction period, keep on site a clean set of contract drawings marked up to reflect the "As-Built" state of all contract drawings, for examination by the Owner and/or Contracting Officer on a regular basis. Include elevations and detailed locations of buried services, conduit and cable tray systems, junction boxes and pull boxes.

3. Upon completion of commissioning of the electrical equipment, the Contractor shall provide the marked-up “as-built” Shop Drawings to the respective Supplier for updating the Shop Drawings for inclusion into the O&M Manuals.

4. Submit the "as-built" CAD files to the Contracting Officer prior to substantial completion of the Contract. Where the Contracting Officer or Owner identifies items where the Contractor “as-built” drawings do not match the installation, the Contractor shall correct and resubmit all such drawings at no additional cost to the Owner prior to project final completion.

1.7 QUALITY ASSURANCE

A. Quality Assurance: Provide all project quality assurance/quality control in accordance with Section 01 40 00 - Quality Requirements.

B. Qualifications: All electrical work shall be carried out and supervised by qualified, licensed electricians and journeypersons holding valid licenses for the type of work performed in the location(s) where the work is performed, in accordance with local requirements.

C. Work shall be performed neatly and professionally in strict accordance with the written requirements of the equipment manufacturers and established trade procedures and practices.

1.8 PROJECT COORDINATION

A. Check Drawings of all trades to verify space and headroom limitations for work to be installed. Coordinate work with all trades and make changes to facilitate a satisfactory installation. Make no deviations to the design intent involving extra cost to the Owner, without the Owner's written acceptance.

B. The Drawings indicate the general location of equipment to be installed and connected. Routing of raceways and cable trays, where indicated, as general in nature. Where details are not shown on the Drawings or only shown diagrammatically, the electrical equipment shall be routed based on field conditions and customary installation practices. Raceways and cable trays shall be installed in such a way as to conserve head room and interfere as little as possible with the free use of space through which they pass. Raceways and cable trays shall be installed parallel and perpendicular to building lines. All raceways and cable trays installed above reflected ceilings shall be kept as tight as possible to beams or other limiting members at high level. All electrical installation shall be coordinated in elevation to ensure that they are concealed in the ceiling or structural space provided unless detailed otherwise on drawings.

C. Work out jointly all interference problems on the site and coordinate all work before fabricating or installing any material or equipment. Where necessary, produce interference / coordination drawings showing exact locations of electrical systems, duct banks, or equipment within service areas, shafts and the restricted spaces. Distribute copies of the final interference / coordination drawings to the Contracting Officer and all affected parties.

D. Ensure that all materials and equipment fit into the allotted spaces and that all equipment can be properly serviced and replaced, if and when required. Advise the Contracting Officer of space problems before installing any material or equipment. Demonstrate to the Owner on completion of the work that all equipment installed can be properly and safely serviced and replaced, if and when required.

E. No extra cost will be considered for any misunderstanding of the scope of work to be performed resulting from failure to coordinate between trades.

1.9 WARRANTY

A. Manufacturer Warranty

1. Refer to the General Conditions and Division 1 for warranty requirements.

2. Provide additional warranty as per individual equipment Specifications.

3. Warranty of any equipment that is energized and used by the Contractor shall not commence until accepted by the Owner for beneficial use.

4. Temporary or trial use, of any electrical devices or equipment, shall not be construed as evidence of acceptance of the same.

PART 2 PRODUCTS

2.1 MATERIALS

A. Use only new materials, apparatus, and equipment, suitable for the location(s) where installed.

B. Provide similar items in the Work as products of the same manufacturer.

C. Provide equipment and materials of industrial grade standard of construction.

D. On devices indicated to display dates, display the year as 4 digits.

E. Temperature Ratings of Equipment Terminations

1. Provide terminations and lugs rated for use with 167 deg F conductors.

2. Wire sizes in the Contract Documents are based on NEC ampacity tables using the 167 deg F ratings.

PART 3 EXECUTION

3.1 GENERAL

A. Field Control of Location and Arrangement

1. The Drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment, and other items.

2. Exact locations shall be determined by the Contractor in the field, based on the physical size and arrangement of equipment, finished elevations, and other obstructions. Follow the locations on the Drawings, however, as closely as possible.

3. Circuits

a. Wherever conduits and wiring for lighting and receptacles are not indicated, it shall be the Contractor’s responsibility to provide lighting and receptacle-related conduits and wiring as required, based on the actual installed fixture layout and the circuit designations as indicated.

b. Provide No. 12 AWG minimum wiring, and 3/4-in minimum conduits (exposed) and 1-in minimum conduits (encased).

c. Where circuits are combined in the same raceway, derate conductor ampacities in accordance with NEC requirements.

4. Workmanship

a. Install materials and equipment in strict accordance with the printed recommendations of the manufacturer and using workers skilled in the Work.

b. Coordinate installation in the field with other trades to avoid interferences.

5. Protection of Equipment and Materials

a. Fully protect materials and equipment against damage from any cause.

b. Cover materials and equipment, both in storage and during construction, in such a manner that no finished surfaces will be damaged, marred, or splattered with water, foam, plaster, or paint.

c. Keep moving parts clean and dry.

d. Replace or refinish damaged materials or equipment, including faceplates of panels and switchboard sections, as part of the work.

3.2 CORE DRILLING

A. Perform core drilling as required for the installation of raceways through concrete walls and floors.

B. Base the locations of floor penetrations, as may be required, on field conditions.

C. Verify exact core drilling locations based on equipment furnished as well as exact field placement.

D. To the extent possible, identify the existence and locations of encased raceways and other piping in existing walls and floors with the Owner prior to any core drilling activities.

E. Repair damage to encased conduits, wiring, and piping as part of the work.

F. Seal the existing plywood floor with expanding foam. Expanding foam shall be polyurethane type and UL listed.

3.3 EQUIPMENT ANCHORING

A. Floor-supported, wall, or ceiling-hung equipment and raceways shall be anchored in place by methods that will meet seismic requirements in the area where the Project is located.

B. Provide wall-mounted panels that weigh more than 500 lbs or that are within 18-in of the floor with fabricated steel support pedestals.

C. If the supported equipment is a panel or cabinet enclosed within removable side plates, match supported equipment in physical appearance and dimensions.

D. Provide transformers hung from stud walls and weighing more than 300 lbs with auxiliary floor supports.

E. Provide leveling channels anchored to the concrete pad for MCC’s, switchgear and other electrical equipment mounted on housekeeping pads.

F. Manufacturer's Recommendations

1. Anchoring methods and leveling criteria in the printed recommendations of the equipment manufacturers are a part of the work of this Contract.

2. Submit such recommendations as Shop Drawings as indicated.

3.4 SETTING OUT OF WORK

A. Where equipment is built-in with work of other trades, supply equipment to be built-in or measurements to allow necessary openings to be made so as not to hold up work.

B. Coordinate between electrical, mechanical, structural, process and architectural drawings when setting out Work. Consult with respective Divisions in setting out locations for conduit runs, luminaires, panel assemblies, etc., so that conflicts are avoided, equipment is operable and serviceable, and symmetrical, even spacing is maintained.

C. Layouts shown for mechanical and electrical rooms are for general layout purposes only. Coordinate exact installation of conduit, cable trays, outlets and equipment with final room equipment layout using equipment manufacturers' as-built dimensioned drawings.

D. Where switches and receptacles, are in the same general location, outlets shall be lined up vertically unless otherwise indicated.

E. Electrical equipment provided as part of prepackaged or prefabricated systems shall be installed in coordination with the vendor requirements and design.

3.5 FINISHES

A. Clean and touch up surfaces of shop painted equipment scratched or marred during shipment or installation, to match original paint. Obtain touch-up coatings from the original equipment manufacturer to ensure a proper match.

3.6 CUTTING AND PATCHING

A. Do not cut or weld to structural members without prior written approval of the Contracting Officer's Representative.

B. Patch all floor, wall or ceilings that are affected by the Work. Patches shall be neatly installed. Existing gypsum board may be protected, retained and used for re-installation as wall patch. .

3.7 CONDUIT AND CABLE INSTALLATION

A. Install embedded conduit and conduit sleeves prior to placement of concrete. Sleeves through concrete: plastic, sized for free passage of conduit, and protruding 2-in, unless noted otherwise.

B. Cables, other than bare copper grounding cable, shall not be directly buried or embedded in concrete.

C. Ensure all penetrations are properly sealed to prevent ingress of moisture. Above-grade conduit entries subject to flooding (up to the 100 year flood elevation) and below grade conduit entries shall utilize link seals. Conduit entries above the 100 year flood elevation shall be sealed using silicone caulk.

D. Raceways, fittings and appurtenances that are encased in concrete or direct buried shall be listed for the application.

3.8 LOCATION OF OUTLETS

A. Locate outlets in accordance with the drawings.

B. Do not install outlets back-to-back in wall; allow minimum 6-in horizontal clearance between boxes.

C. Change location of outlets at no extra cost or credit, providing distance does not exceed 10 ft, and information is given before installation.

3.9 MOUNTING HEIGHTS

A. The Contracting Officer reserves the right to change location of any electrical device to within 10 ft of point indicated on plans without extra charge provided the Contractor is advised as part of or prior to the rough-in inspection.

3.10 CONSTRUCTION SEQUENCING

A. General

1. Continuous operations of existing facilities during construction is critical. The Contractor shall carefully examine the Work to be provided in, on, or adjacent to existing equipment.

2. Schedule the Work, subject to Owner's approval, to minimize any required shutdown time. The Owner reserves the right to limit or deny shutdowns that restrict the facility’s ability to operate within its permit, particularly during unfavorable weather conditions.

3. Submit a written sequencing request, including the sequence and duration of activities to be performed during a partial or complete facility shutdown.

4. Switching, safety tagging, and the like, as required for plant shutdown or to isolate existing equipment, shall be performed by the Contractor.

5. In no case shall the Contractor begin any work in, on, or adjacent to existing equipment without written authorization from the Owner.

B. Modifications

1. Perform modifications or alterations to existing electrical facilities as required to successfully install and integrate the proposed electrical equipment as indicated.

2. Perform modifications to existing equipment, panels, and cabinets in a professional manner. Modifications shall be made in a manner to preserve UL/NRTL listings.

3. Repair coatings to match existing.

4. The costs for modifications to existing electrical facilities that are required for a complete and operating system shall be included as part of the Work.

C. Existing Utilities

1. Exercise extreme caution when digging trenches to not damage existing underground utilities. Perform potholing or other non-destructive method to identify existing utilities prior to performing the required excavations.

2. The cost of repairs of damages caused during construction shall be included as a part of the Work.

3.11 FIELD QUALITY CONTROL

A. The Contractor shall provide equipment testing and quality control.

1. Conduct test in presence of Contracting Officer or Owner and, if required, inspectors of the AHJ.

2. Arrange date(s) of test(s) in advance with Contracting Officer and Owner, testing company and AHJ. Give all inspectors a minimum of 7 days' notice.

3. Contractor shall furnish or arrange for the use of electrical energy or fuel required for all required test(s).

B. Repair or replace equipment and systems found inoperative or defective, and re-test.

1. If test results are not within prescribed limits, document all failed tests and provide recommendations for corrective action to the Owner/Contracting Officer for approval. Provide corrective action and re-test until satisfactory results are obtained.

2. Continue remedial measures and re-tests until satisfactory results are obtained.

3.12 ADJUST AND CLEAN

A. Maintain cleanliness during construction by keeping doors closed or openings covered. Provide periodic cleaning of equipment that becomes dusty or dirty during construction.

B. Before final acceptance, thoroughly clean the electrical work of cement, plaster, splatters, dirt and other materials.

C. Remove temporary tags, markings, stickers, and the like.

D. Apply matching touch-up paint to scratches on panels and cabinets.

E. Place equipment drawings in control panel pockets and secure all panel door fasteners.

F. Vacuum clean electrical cabinets and enclosures. Do not use compressed air to clean cabinets or rooms.

G. Adjust emergency lighting to properly illuminate egress paths. Clean luminaires inside and out. Replace failed lamps or fixtures.

H. Properly dispose of cleaning debris and refuse off-site.

3.13 OTHER DIVISIONS

A. Coordinate the Work with other Divisions. Include labor and materials required to provide a complete, coordinated installation. Typical incidental items shall be provided and include but are not limited to: terminal lugs not furnished with vendor-supplied equipment, compression connectors for cables, splices, junction and terminal boxes, and control wiring required by vendor-supplied equipment to connect with other equipment.

3.14 OTHER CONTRACTORS

A. Coordinate the work with other Contractors on site to provide a complete installation while minimizing interference with, and disruption to, other projects.

END OF SECTION 26 00 10

SECTION 26 05 00 COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. The work under this Contract consists of a complete and operational electrical system as detailed in the Contract Drawings and as specified herein.

2. The intent of the Contract Documents is to include all labor, products, components and services necessary to complete the work, tested, commissioned, and placed into full operation.

3. The work of this Section is required for installation, testing and operation of electrically driven equipment provided under Specifications in other Divisions.

4. The Contractor shall coordinate the work of Division 26 with the work of other Divisions of these Specifications to provide a coordinated installation.

5. The provisions of this Section shall apply to all Sections in Division 26, except as otherwise indicated.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Reference Standards

1. The following standards are referenced in this section and throughout Division 26. The edition/revision in effect at the time of bidding shall apply, unless otherwise specified.

   a. InterNational Electrical Testing Association (NETA)

   b. National Electrical Manufacturers Association (NEMA)

   c. Occupational Health and Safety Act (OHSA).

   d. Institute of Electrical and Electronics Engineers (IEEE)

   e. American National Standards Institute (ANSI)

   f. National Fire Protection Association (NFPA)

2. Electrical equipment shall be listed by and shall bear the label of Underwriter's Laboratories, Inc. (UL) or a Nationally Recognized Testing Laboratory (NRTL) acceptable to the local code enforcement agency having jurisdiction.

3. Installation of electrical equipment and materials shall comply with OSHA Safety and Health Standards (29 CFR 1910 and 29 CFR 1926, as applicable), state building standards, and applicable local codes, amendments and regulations.

4. Where the requirements of the specifications conflict with UL/NRTL, NEMA, NFPA, or other applicable codes or standards, the more stringent requirements shall govern.

B. Reference Specifications

01 33 23	Submittal Procedures
Division 26 – All Sections	Electrical (All Sections)

C. Reference Codes

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)	
NFPA 70	National Electrical Code, 2023

1.3 ACTION SUBMITTALS

A. Submit Shop Drawings, Product Data, and samples in accordance with Section 01 33 23 – Submittal Procedures and this Section.

B. Shop Drawings

1. Submit complete catalog cuts of conductors and cabling, receptacles, circuit breakers, grounding and bonding, raceways, fittings, boxes, supports, and mounting hardware, marked where applicable to show proposed materials and finishes.

2. Submit documentation showing that the proposed materials comply with the requirements of NEC and UL.

C. As-Built Drawings

1. Prepare as-built drawings of encased concealed and exposed raceways, ducts, raceways, junction boxes, pull boxes, and electrical equipment.

2. Furnish the drawings to the CONTRACTING OFFICER in accordance with the requirements of Section 01 33 23 – Submittal Procedures.

1.4 DELIVERY, STORAGE AND HANDLING

A. The CONTRACTOR shall protect all materials from damage at all times.

B. Cable ends shall be protected from water entry in accordance with the manufacturer's recommended procedures. Cable ends shall not be left open in manholes or other locations subject to submergence. If the cable ends become submerged prior to splicing or termination, the cables shall be replaced in their entirety.

C. Cables shall be pulled into raceways in accordance with the manufacturer's requirements. Under no circumstances shall cable pulling tensions exceed the manufacturer's written instructions.

D. Pulling tensions on raceway cables shall be within the limits recommended by the cable manufacturer. Wire pulling lubricant, where needed, shall be UL approved.

PART 2 PRODUCTS

2.1 WIRE AND CABLING

A. Conductors, include grounding conductors, shall be stranded copper. Aluminum conductor and/or solid conductor wire and cable will not be permitted. Insulation shall bear the UL label, the manufacturer's trademark, and identify the type, voltage, and conductor size. Conductors except flexible cords and cables, fixture wires, and conductors that form an integral part of equipment such as motors and controllers shall conform to the requirements of Article 310 of the National Electric Code, latest edition, for current carrying capacity. Flexible cords and cables shall conform to Article 400, and fixture wires shall conform to Article 402. Wiring shall have wire markers at each end.

B. Low Voltage Power and Lighting Wire

1. Wire rated for 600 volts in duct or conduit for power and lighting circuits shall be single conductor, Class B Type XHHW or XHHW-2 cross-linked polyethylene conforming to UL-44 - UL Standard for Thermoset-Insulated Wires and Cables. THHN/THWN wire shall not be permitted to be used for any power or control wiring in this project.

2. Conductors for feeders as defined in Article 100 of the NEC shall be sized to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or combinations of such loads, and where the maximum total voltage drop on both feeders and branch circuits to the farthest connected load does not exceed 5 percent.

C. Cable Splices and Terminations

1. Where cable lugs are required for power cable terminations, utilize compression lugs. Utilize compression tools as recommended by the manufacturer. Pressure type, twist-on connectors (wire nuts) shall only be used in the receptacle enclosures for size #12 AWG conductors.

2. Pre-insulated fork tongue lugs shall be crimp on type and sized for the specified conductor range.

3. General purpose insulating tape shall be 7 mil thick, rated for 600V.

4. Labels for coding 600-volt wiring shall be computer printable or pre-printed, self-laminating, self-sticking.

2.2 ELECTRICAL RACEWAY SYSTEMS

A. General

1. Pull and junction boxes, fittings, and other indicated enclosures that are dedicated to the raceway system shall comply with the requirements of this Section.

B. Rigid PVC-Coated Galvanized Steel (RPGS) Conduit

1. Provide rigid steel conduit manufactured from mild steel, hot-dip galvanized inside and out.

2. Provide rigid steel conduit manufactured in accordance with NEMA C80.1 – Electrical Rigid Steel Conduit, and UL-6 – Electrical Rigid Metal Conduit - Steel.

3. Bond a PVC coating to the outer surface of the galvanized conduit.

4. Ensure that the bond between the coating and the conduit surface is greater than the tensile strength of the coating.

5. Provide the inside surfaces and threads of the conduit with a 2-mil urethane coating.

6. Provide a PVC coating thickness not less than 40 mils.

7. The PVC-coated RGS shall be manufactured in accordance with the following standards:

a. UL-6

b. ANSI C80.1

c. NEMA RN1 - PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit

C. Liquid-Tight Flexible Conduit

1. Provide liquid-tight flexible conduit constructed of a flexible galvanized metal core with a sunlight-resistant thermoplastic outer jacket.

2. Provide liquid-tight flexible conduit manufactured in accordance with the requirements of UL-360 - Steel Conduits, Liquid-Tight Flexible.

D. Fittings and Terminations

1. Provide PVC-coated cast and malleable iron fittings of the threaded type with 5 full threads that are the products of the same manufacturer as the conduit.

2. Provide male and female threads and internal surfaces with a 2-mil urethane coating.

3. Provide fittings and boxes with neoprene gaskets and non-magnetic stainless steel screws.

4. Attach covers by means of holes tapped into the body of the fitting.

5. Covers for fittings attached by means of clips or clamps will not be accepted.

6. In outdoor areas, terminate conduit in rain-tight, grounding type hubs and bushings with lay-in grounding lug.

7. In other than outdoor areas, provide sealed locknuts and bushings.

8. Expansion fittings shall be ferrous metal and have 40 mil PVC exterior coating, 2 mil urethane interior coating, and internal bonding jumper. Expansion fitting shall allow 4" maximum movement for expansion and contraction in expose conduit runs.

9. Where indicated or required boxes are larger than standard cast or malleable types, provide Type 316 stainless steel, NEMA 4X boxes.

E. Stainless Steel Boxes

1. Provide stainless steel boxes where indicated.

2. Provide NEMA 4X stainless steel boxes, sized 8"(H) X 8"(W) X 4(D)", constructed of Type 316 stainless steel.

3. Provide stainless steel of a minimum of 14-gauge thickness, with a brushed finish.

4. Door Hinges

a. Provide doors with full-length stainless steel piano hinges and seamless foam gasket as part of the door assembly.

b. Latches shall be provided to provide a watertight seal.

c. Non-hinged boxes will not be accepted.

F. Conduit Supports

1. All conduit support components in contact with PVC-coated RGS conduit and fittings shall have a 20 mil PVC exterior coating. All other components of the conduit support systems shall be Type 316 Stainless Steel.

2. Conduit supports shall consist of pipe hangers with 3/8"-16 threaded rods and nest-back clamps where indicated in the plans. The supports shall be designed for use with PVC-coated RGS conduit and the designated trade size.

2.3 WIRING DEVICES

A. General

1. Devices shall carry the U.L. label and shall be designed for use with stranded or solid copper conductors.

2. General purpose duplex receptacles shall be white everywhere except unless otherwise indicated.

3. Receptacles shall be of specification grade and shall conform to NEMA WD-1, Federal Specifications W-C-596E and W-S-896E, respectively.

B. General Purpose Receptacles

1. Duplex receptacles shall be of the polarized 3-wire type for use with a 3-wire cord with grounded lead, and one designated stud shall be permanently grounded to the conduit system in accordance with NEC article 406.4.

2. Ground-fault circuit-interrupting receptacles (GFCIs) shall be installed at the indicated locations.

3. GFCIs shall be duplex receptacles, of specification grade, and tripping at 5 mA.

4. GFCI ratings shall be 125V, 15 amperes, NEMA WD-1, Configuration 5-15R, and capable of interrupting 5,000 amperes without damage.

5. GFCIs shall be weather resistant-listed in accordance with NEC Article 406.8.

6. Feed-through-type GFCIs serving standard receptacles will not be permitted.

C. Enclosures and Covers

1. Receptacle enclosure shall be NEMA 4X, sized 8”(H) X 6”(W) X 4(D)”, brushed 316 stainless steel type. Provide stainless steel of a minimum of 14-gauge thickness.

   a. Receptacle enclosure shall have with full-length stainless steel piano hinges, cover clamps, and seamless foam gasket as part of the door assembly.

   b. Latches shall be provided to provide a watertight seal.

   c. Non-hinged boxes will not be accepted.

   d. The enclosure shall have a hinged swing out panel kit. The swing out panel shall be 14 gauge 304 stainless steel type, shop cut with precise openings for receptacle mounting. All edges shall be smooth and installation shall not compromise the NEMA 4X enclosure rating.

2.4 PANELBOARDS

A. Circuit Breakers

1. New circuit breakers shall be compatible with existing GE Catalog Number AQF3301CBX panelboard LPEF2 and shall be series rated for 22,000 Ampere Interrupting Capacity with existing main circuit breaker.

2. Bolt-on type with solderless lug load connections. Plug-in circuit breakers will not be acceptable.

3. Thermal magnetic type with “ON”, “OFF” and “TRIPPED” positions. Common trip for 2 and 3 pole units. Single pole breakers with handle ties are not acceptable.

4. Single, 2- and 3-pole as indicated on schedules.

5. Ampere ratings as indicated on schedules.

PART 3 EXECUTION

3.1 WIRE AND CABLING

A. Installation

1. The CONTRACTOR shall provide, terminate and test all power conductors.

2. The CONTRACTOR shall, as a minimum, provide the number of control wires listed in the conduit schedule or on the Contract Drawings. Excess wires shall be treated as spares for future use.

3. Conductors shall not be pulled into any raceway until raceway has been cleared of moisture and debris.

4. Wire in panels, cabinets, and wireways shall be neatly grouped using nylon tie straps, and shall be neatly fanned out to terminals.

5. Wire taps and splices shall be properly taped and insulated according to their respective classes.

6. In general, there shall be no cable splices in pullboxes. The cables shall be spliced/tapped using submersible cable splices only, suitable for continuous submergence. Other the locations indicated in the drawings, splices in pullboxes may be made only with the approval of the CONTRACTING OFFICER.

7. Stranded conductors shall be terminated directly on equipment box lugs making sure that conductor strands are confined within lug. Use forked-tongue lugs where equipment box lugs have not been provided.

B. Cable Identification

1. General: Wire and cable shall be identified for proper control of power circuits and equipment and to reduce maintenance effort. Identification shall be installed at every termination point.

2. 120/208-volt system feeder cables and branch circuit conductors shall be color coded as follows: Phase A - black, Phase B - red, Phase C - blue, and Neutral - white. The ground shall be green.

C. Field Quality Control

1. Cable Assembly and Testing: Cable assembly and testing shall comply with applicable requirements of ICEA Publication No. S-95-658/NEMA WC70 - Ethylene-Propylene-Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy. Factory test results shall be submitted in accordance with Section 01 33 23 – Submittal Procedures, prior to shipment of cable. The following field tests shall be the minimum requirements:

2. Insulation resistance testing, using a DC megohmeter, shall be performed on cables operating at more than 2,000 volts to ground. Time-resistance readings shall be taken and recorded at intervals of 30 seconds and one minute. Time-resistance voltage levels shall be per the cable manufacturer's recommendations.

3. Power cable rated at 600 volts shall be tested for insulation resistance between phases and from each phase to a ground using a megohmeter.

4. Field testing shall be done after cable is installed in the raceways.

5. Field megger testing may be performed by the CONTRACTOR or a NETA-certified test organization. When tested by the CONTRACTOR, submit test equipment calibration sheets prior to performing any field testing. Test results shall be submitted to the CONTRACTING OFFICER for review and acceptance.

6. Cables failing the tests shall be replaced with a new cable or be repaired. Repair methods shall be as recommended by the cable manufacturer and shall be performed by persons certified by the industry.

7. Continuity Test: Control and instrumentation cable shall be tested for continuity, polarity, undesirable ground, and origination. Such tests shall be performed after installation and prior to placing cable in service.

3.2 ELECTRICAL RACEWAY SYSTEMS

A. General

1. Run raceway parallel or perpendicular to structural framing to the extent possible.

2. Where raceway routings are indicated, follow those routings to the extent possible. Adjust routings in order to avoid obstructions.

3. Coordinate between trades prior to installing the raceways. The lack of such coordination shall not be justification for extra compensation, and any costs for removal and re-installation to resolve conflicts shall be part of the Contract Price.

4. Provide bends and offsets that are smooth and symmetrical, and accomplished with tools designed for use with PVC-coated RGS conduit and fittings. Provide factory elbows wherever possible Provide bends and offsets that are smooth and symmetrical, and accomplished with tools designed for use with PVC-coated RGS conduit and fittings. Provide factory elbows wherever possible.

5. Provide raceway systems that are electrically and mechanically complete before conductors are installed. Run wiring in raceway unless indicated otherwise. Install raceways between equipment as indicated.

6. The CONTRACTOR installing PVC-Coated Conduit and fittings shall be certified by the manufacturer and be able to present a valid, unexpired “Certified Installer” card prior to installation beginning. All clamping, cutting, threading, bending, and assembly instructions listed in the manufacturer’s installation guide should be vigorously followed. Installer certification, before installation, is required.

B. Expansion Fittings

1. Install expansion fittings with internal bonding jumpers wherever exposed raceways cross building/structure expansion joints and for runs over 200ft.

2. Install expansion/deflection fittings where conduit movement is expected in more than one dimension, and where conduits transition out of structures in locations where differential settlement may occur.

3. Install exposed raceways at least 1/2 inch from walls or ceilings except that at locations above finished grade where damp conditions do not prevail, install exposed raceways at least 1/4 inch from the face of walls or ceilings by the use of clamp backs or struts.

C. Conduit

1. Install supports at distances required by the NEC and as indicated in the plans.

2. Penetrations

a. Provide conduit passing through walls or floors with plastic sleeves.

b. Perform core drilling in accordance with the requirements of Section 26 00 10 – Electrical General Requirements.

c. Conduits passing through a slab, wall, or beam shall not significantly impair the strength of the construction.

d. Place the conduit such that cutting, bending, or displacing reinforcement from its proper location will not be required.

e. Coat threads with a conductive lubricant before assembly.

f. Duct sealant shall be foam duct sealant. Provide duct sealant per NEC Article 300.7.

3. Joints

a. Provide joints that are tight, thoroughly grounded, secure, and free of obstructions in the pipe.

b. Adequately ream the conduit in order to prevent damage to the wires and cables inside.

c. Use strap-wrenches and vises to install the conduit, in order to prevent wrench marks on the conduit.

d. Replace conduit with wrench marks.

3.3 WIRING DEVICES

A. General

1. Perform WORK in accordance with the requirements of the NEC.

B. Connection

1. Rigidly attach wiring devices in accordance with the NEC and as indicated, avoiding interference with other equipment.

2. Securely fasten nameplates using screws, bolts, or rivets centered under or on the device, unless otherwise indicated.

3. Nameplates shall meet the requirements of Section 26 00 10 – Electrical General Requirements, and shall consist of a red plate with white letters a minimum of 1/4 inch tall. Nameplates shall identify the panelboard and circuit number at indicated in the plans.

C. Grounding

1. Devices, including receptacles, shall be grounded in accordance with NEC, Article 250.

2. Install bonding connections as required by Code and as indicated on the drawings. Connections shall include but not limited to: metallic water mains and metallic piping systems; non-current carrying metal parts and frames of electrical equipment.

3. Provide bonding conductors of size and quantity in accordance with NEC unless indicated to be larger on the drawings

4. Provide equipment grounding conductors in all raceways (metallic and non-metallic). The raceway shall not be used as the sole means for providing equipment grounding and bonding connections.

5. Where crossing expansion joints, provide raceways with external flexible braided bonding jumpers.

D. Field Testing

1. Provide checkout, field, and functional testing of wiring devices in accordance with Section 26 00 10 – Electrical General Requirements.

2. Perform grounding and bonding continuity tests.

3. Test each receptacle for polarity and ground integrity, using a standard receptacle tester. Self-test and reset function shall be tested for each GFCI receptacle.

3.4 PANELBOARDS

A. Circuit Directory

1. Furnish a new circuit directory including new and existing loads. Directory shall be located on the inside of the front door and shall be laminated. CONTRACTOR shall verify existing spare breakers and naming for loads prior to creating new circuit directory

2. Provide typewritten directory describing the load and its location for each circuit.

B. Load Balancing

1. Prior to installation of new circuits, measure load balance on all panelboards with normal loads (lighting included) operating. Adjust new branch circuit connections as required to obtain best balance of current between phases.

2. If load unbalance exceeds 15 percent, notify the CONTRACTING OFFICER.

3. Submit, at completion of the Work, a report listing phase and neutral currents on panelboards operating under normal loads. State hour and date on which each load was measured and include voltage at time of test.

END OF SECTION 26 05 00

SECTION 31 11 00 CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SCOPE

A. The work covered by this section consists of furnishing all plant, labor, equipment, and materials, and performing all operations necessary for the clearing and grubbing of the access paths for the Education Center Trail as indicated on the drawings, for the removal and disposal of all cleared and grubbed materials, and for the filling of all holes caused by grubbing operations, as specified herein.

1.2 QUALITY CONTROL

A. The Contractor shall establish and maintain quality control for clearing and grubbing operations to assure compliance with contract requirements, and maintain records of his/her quality control for all construction operations including but not limited to the following:
   1. Clearing. Station to station limits transverse clearing limits from applicable baseline; percentages of area complete; type of material.
   2. Grubbing. Station to station limits, transverse grubbing limits from applicable baseline; percentage of area complete; type of material.
   3. Disposition of Cleared and Grubbed Materials. Method and location of disposition; damage to timber or improvements which are not to be cleared.

B. A copy of these records of inspections and tests, as well as the records of corrective action taken, shall be furnished to the Contracting Officer daily. Format of the report shall be as prescribed in Section 01 40 00 QUAILITY REQUIREMENTS.

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 76	Acid Rain Nitrogen Oxides Emission Reduction Program

STATE OF LOUISIANA, AIR CONTROL COMMISSION (LACC)

Act 1964, No. 259	(Title 40, Section 2201) Acid Rain Nitrogen Oxides Emission Reduction Program

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. All clearing and grubbing work shall be completed in advance of placement of geotextile separator fabric, aggregate surfacing, and matting. If regrowth of vegetation or trees occurs after clearing and grubbing and before placement of aggregate surfacing, the Contractor will be required to clear and grub the area again, and no payment will be made for this additional clearing and grubbing.

3.2 CLEARING

A. General
   1. Clearing, unless otherwise specified, shall consist of the complete removal above the ground surface of all trees, stumps, down timber snags, brush, vegetation, old piling, loose stone, abandoned structures, fencing, and similar debris. Growth standing in water in areas that are not drained in accordance with Section 31 20 00 EARTHWORK may be cut off so as not to protrude more than 12 inches above the existing water surfaces.

B. Merchantable Timber
   1. Merchantable timber remaining within the areas to be cleared on or after the date of award of this contract may be disposed of as the Contractor sees fit, if such merchantable timber is either removed from the rights-of-ways indicated on the drawings or is satisfactorily disposed of in accordance with the provisions of paragraph "DISPOSAL OF DEBRIS."

C. Surveys
   1. The Contractor shall clear the baseline traverse, centerline traverse, and ranges at all P.C.'s, P.I.'s, P.T.'s, 100-foot centerline stations and tie-in stations as needed to facilitate surveying.

D. Trees
   1. Trees shall be felled in such a manner as to avoid damage to trees to be left standing, to existing structures and installations and to those under construction, and with due regard for the safety of employees and others.

E. Vegetation
   1. Vegetation to be removed shall consist of crops, grass, bushes, and weeds. Close-growing grass and other vegetation shall be removed from areas to receive embankment or wick drainage blanket or as directed by the Contract Monitor or their designated representative to provide a complete bare earth surface immediately prior to foundation preparation. Acceptance of the vegetation removal operation shall precede the initiation of foundation preparation in the area from which vegetation has been removed. For areas to receive uncompacted fill, close-growing grass and other vegetation shall be mowed not to exceed 2-inches above the ground surface or existing embankment prior to foundation preparation. Removal of marsh grass will not be required.

F. Miscellaneous Structure Foundations and Debris

1. The Contractor shall also remove all abandoned foundations, debris, and other materials which remain after buildings or other structures have been removed.

G. Areas to be Cleared
   1. General
      a. The entire area to be occupied by the embankment and berm together with strips 5-feet wide contiguous thereto, road ramps, above ground structures, riprap, ditches, shall be cleared.
   2. Other Areas
      a. Clearing of the area between the 5-foot strip contiguous to the embankment and berm and adjacent to the borrow area, and traverses left between borrow pits shall be limited to the minimum required for construction operations.

3.3 GRUBBING

A. General
   1. Grubbing shall consist of the removal of all stumps, roots, buried logs, old piling, old paving, old foundations, pipes, drains, and other unsuitable matter.

B. Areas to be Grubbed
   1. Embankments and Structures
      a. Grubbing shall be performed within the limits of any areas where the access roads at Education Center trails are to be constructed. All roots and other projections over 1-1/2-inches in diameter shall be removed. The areas to be grubbed are those specific areas within the limits specified herein above from which trees, stumps, down timber, snags, old piling, abandoned structures, and other projections have been removed.

3.4 DISPOSAL OF DEBRIS

A. General
   1. All debris resulting from clearing and grubbing operations at the construction site shall, at the Contractor's option, be disposed of by removal from the site. Grass material may be used as "Windrow" for erosion control at locations, as shown on the drawings. The Contractor shall make a reasonable effort to channel merchantable material into the commercial market to make beneficial use of materials resulting from clearing and grubbing operations.

B. Burning
   1. No burning is allowed.

C. Chipping
   1. No onsite chipping is allowed.

D. Removal From Site of Work
   1. The Contractor shall remove all of the debris from the site of the work. Such disposal shall comply with all applicable Federal, State, and Local laws. The Contractor shall, at his/her option, either retain for his/her own use or dispose of by sale or otherwise, such materials of value. The NPS is not responsible for the protection and safekeeping of any materials retained by the Contractor. Such materials shall be removed from the site of the work before the date of completion of the work. If debris

from clearing operations is placed on adjacent property, the Contractor shall obtain, without cost to the NPS, additional right-of-way for such purposes. Such material shall be so placed as not to interfere with roads, drainage or other improvements and in such a manner as to eliminate the possibility of its entering into channels, ditches, or streams. The Contractor shall submit written evidence to the Contracting Officer that he/she has obtained from the property owner permission for disposal of material on the owner's property. The written evidence shall consist of an authenticated copy of the conveyance under which the Contractor acquired the property rights and access thereto, prepared and executed in accordance with the laws of the State of Louisiana. If temporary rights are obtained by the Contractor, then the period of time shall coincide with the requirements in the Contract Documents. However, delay resulting from acquisition of additional rights-of-way for alternate disposal areas will not qualify as excusable delays if suitable approved disposal areas are available.

END OF SECTION 31 11 00

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 31 20 00 EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavation, filling, compacting and grading operations as required for below-grade improvements and to achieve grades and elevations indicated.

B. Common fill for hardened trail improvements.

C. Suitable fill from off-site if on-site quantities are insufficient or unacceptable, and legal disposal of excess fill off-site.

1.2 SUBMITTALS

A. Submit under provisions of Section 01 33 23 – Submittal Procedures.

B. Source of fill

C. Certification that fill is free of weeds

D. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

E. Test Reports: Submit for approval test reports, list of materials and gradations proposed for use.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2-year experience installing similar products in similar conditions.

1.4 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.5 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.6 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MATERIALS

A. Earthwork:
   1. Common Fill: Usable soil used to raise the grade beneath the new Hardened Trails. Soil to conform to LSSRB 2016 Section 203. The fill shall be weed free. Contractor will submit the source of the soil and provide testing certificates for approval.

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare surfaces using the methods recommended by contract documents for achieving the best result for the substrate under the project conditions.

B. Usable soil placed for the purpose of raising the Hardened Trail may be placed on top of the existing trail or outside the outer edge of the existing trail. Firm, intact portions of the existing trail are to remain in place. Any soft or loose existing trail material should be removed prior to placing the usable soil on top of the existing trail. For areas outside the limits of the existing trail, all topsoil, soft, loose, or deleterious materials should be removed and replaced with usable soil. Once the native subgrade or existing trail is properly prepared, placement of the usable soil may begin.

3.2 INSTALLATION

A. Excavation is unclassified and includes excavation to subgrade regardless of materials encountered. Repair excavations beyond elevations and dimensions indicated as follows:
   1. At Structure: Concrete or compacted structural fill.
   2. Elsewhere: Backfill and compact as directed.

B. Maintain stability of excavations; coordinate shoring and bracing as required by authorities having jurisdiction. Prevent surface and subsurface water from accumulating in excavations. Stockpile satisfactory materials for reuse, allow for proper drainage and do not stockpile materials within drip line of trees to remain.

C. Compact materials with +/- 3 percent optimum moisture content as determined by ASTM D 1557 to the following percentages of maximum dry density:
   1. Hardened Trails: Subgrade and each fill layer to 95 percent of maximum dry density to suitable depth.

D. Place acceptable materials in layers not more than 8 inches loose depth for materials compacted by heavy equipment and not more than 4 inches loose depth for materials compacted by hand equipment to subgrades indicated as follows:
   1. Common Fill: Use under hardened trail surface

E. Grading Tolerances Outside Building Lines:
   1. Hardened trails: plus or minus 1 inch.

F. Protect newly graded areas from traffic and erosion. Recompact and regrade settled, disturbed and damaged areas as necessary to restore quality, appearance, and condition of work.

G. Control erosion to prevent runoff or damage to sloped or surfaced areas.

H. Control dust to prevent hazards to adjacent properties and vehicles. Immediately repair or remedy damage caused by dust including air filters in equipment and vehicles. Clean soiled

surfaces.

I. Dispose of waste and unsuitable materials off-site in a legal manner.

END OF SECTION 31 20 00

SECTION 31 25 00 SEDIMENT CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. This section includes requirements for sediment control measures, including the installation, maintenance, and removal of turbidity curtains and wattles to prevent siltation and pollution of adjacent water bodies.

B. The work shall conform to all applicable Federal, State, and local regulations, including those set forth by the Louisiana Department of Environmental Quality (LDEQ).

1.2 SUBMITTALS

A. Turbidity Control Plan: The Contractor shall submit a Turbidity Control Plan with the Work Plan, including detailed descriptions and drawings of all turbidity control measures to be used and the locations of all proposed discharge points for approval by the Contracting Officer.

B. Product Data: Submit manufacturer's product data for turbidity curtains and wattle materials, including physical and performance characteristics, installation instructions, and maintenance requirements.

C. Certificates: Provide certification that all materials comply with applicable standards and regulations.

1.3 QUALITY ASSURANCE

A. Turbidity Control Plan: The Contractor shall submit a Turbidity Control Plan with the Work Plan, including detailed descriptions and drawings of all turbidity control measures to be used and the locations of all proposed discharge points for approval by the Contracting Officer.

B. Product Data: Submit manufacturer's product data for turbidity curtains and silt fence materials, including physical and performance characteristics, installation instructions, and maintenance requirements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Turbidity Curtains:
   1. Turbidity curtains shall be fabricated from high-strength, permeable geotextile fabric resistant to UV degradation, rot, and mildew.
   2. Floatation devices shall be capable of maintaining the curtain in an upright position under all conditions.
   3. Anchors shall be sufficient to maintain the position of the curtain and withstand site-specific environmental conditions.

B. Wattles:
   1. Wattles shall be a minimum of 9" in diameter and 100% natural and biodegradable

with adequate permeability to control sediment runoff.

2. Support posts shall be wood or steel, and spacing shall conform to the manufacturer's recommendations and project-specific conditions.

2.2 INSTALLATION

A. Turbidity Curtains:
   1. Install turbidity curtains in accordance with the manufacturer's instructions and as shown on the approved plans.
   2. Curtains shall be positioned to effectively contain suspended sediments within the work area.
   3. Curtains shall extend the full depth of the water body unless otherwise specified. Overlapping sections shall be securely joined to prevent gaps.

B. Wattles:
   1. Install wattles along the contour of the land, with the help of a biodegradable stake.
   2. Wattles shall be anchored with biodegradable or wooden stakes in intervals according to the manufacturer's recommendations and project-specific conditions.

PART 3 EXECUTION

3.1 EROSION CONTROL

A. The Contractor shall perform work in a manner that prevents damaging siltation or pollution of water bodies. All applicable Louisiana standards and statutes relating to pollution prevention shall be strictly followed.

B. The Contractor shall continuously monitor construction activities to minimize impact on water quality, fish, and wildlife. Any exceedance of turbidity levels must be reported to the Contracting Officer immediately, and operations shall be modified or ceased until compliance is restored.

C. All erosion control measures must be maintained throughout the project duration. Turbidity curtains shall be and removed at the Contractor's expense prior to demobilization. Wattles are to remain in place after construction.

3.2 REMOVAL AND DISPOSAL

A. The Contractor is responsible for the removal and proper disposal of all turbidity control measures in accordance with manufacturer's recommendations and any applicable environmental regulations.

END OF SECTION 31 25 00

SECTION 31 32 19 NONWOVEN GEOTEXTILE STABILIZATION AND SEPARATION FABRIC

PART 1 GENERAL

1.1 SUMMARY

A. Separation Geotextile

1. This section is applicable to the use of a geotextile fabric to prevent mixing of soil and an aggregate surfacing material.

1.2 RELATED SECTIONS

A. Section 01 33 23 Submittal Procedures

B. Section 31 11 00 Clearing and Grubbing

C. Section 31 20 00 Earthwork

D. Section 32 15 00 Aggregate Surfacing

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D4632 – Test Method for Grab Breaking Load and Elongation of Geotextiles

2. ASTM D4533 – Test Method for Trapezoid Tearing Strength of Geotextiles

3. ASTM D6241 – Test Method for Measuring Static Puncture Strength of Geotextiles and Geosynthetic-Related Products Using a 50 mm Probe

4. ASTM D4751 – Test Method for Determining Apparent Opening Size of a Geotextile

5. ASTM D4759 – Standard Practice for Determining the Specification Conformance of Geosynthetics

6. ASTM D4491 – Test Method for Water Permeability

7. ASTM D4354 – Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing

8. ASTM D4355 – Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)

9. ASTM D5261 – Test Method for Measuring Mass per Unit Area of Geotextiles

10. ASTM D4873 – Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples

1.4 SUBMITTALS

A. Certification

1. The contractor shall provide NPS a certificate stating the name of the geotextile manufacturer, product name, style, chemical compositions of filaments or yarns and other pertinent information to fully describe the geotextile

2. The manufacturer shall demonstrate transparency of their manufacturing process by showing traceability of the product from the origin of raw material through finished good.

3. The Manufacturer is responsible for establishing and maintaining quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request.

4. The manufacturer's certificate shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the manufacturer's quality control program. The certificate shall be attested to by a person having legal authority to bind the manufacture.

B. Manufacturing Quality Control (MQC) test results shall be provided upon request.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Geotextile labeling, shipment and storage shall follow ASTM D4873

B. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.

C. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.

D. The protective wrapping shall be maintained during periods of shipment and storage. If the wrapping is damaged prior to installation, the outer wrap of geotextile material must be discarded before installation.

E. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, chemicals that are strong acids or strong bases, flames, sparks, temperatures in excess of 160 def F, and any other environmental condition that might damage the geotextile

F. Product Data: Submit manufacturer's product data for turbidity curtains and silt fence materials, including physical and performance characteristics, installation instructions, and maintenance requirements.

1.6 QUALITY ASSURANCE SAMPLING, TESTING, AND ACCEPTANCE

A. Geotextiles shall be subject to sampling and testing to verify conformance with this specification. Sampling for testing shall be in accordance with ASTM D4354.

B. Acceptance shall be in accordance with ASTM D4759 based on testing of either conformance samples obtained during Procedure A of ASTM D4354, or based on manufacturer's certifications and testing of quality control samples obtained using Procedure

B of ASTM D4354

PART 2 PRODUCTS

2.1 MATERIALS

A. Geotextile Separation Fabric

1. The geotextile separation fabric shall be a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position.

2. It shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

3. The geotextile shall meet the following salient characteristics:

MECHANICAL PROPERTIES	**TEST METHOD**	**UNIT**	**MINIMUM AVERAGE ROLL VALUE**
Grab Tensile Strength	ASTM D4632	lbs	120
Grab Tensile Elongation	ASTM D4632	%	50
Trapezoid Tear Strength	ASTM D4533	lbs	50
CBS Puncture Strength	ASTM D6241	lbs	310
			MAXIMUM OPENING SIZE
Apparent Opening Size (AOS)	ASTM D4751	U.S. sieve	70
			MINIMUM ROLL VALUE
Permittivity	ASTM D4491	sec^{-1}	1.7
Flow Rate	ASTM D4491	$gal/min/ft^2$	135
			MINIMUM TEST VALUE
UV Resistance	ASTM D4355	% strength retained	70
PHYSICAL PROPERTIES	**TEST METHOD**	**UNIT**	**MINIMUM AVERAGE ROLL VALUE**
Weight	ASTM D5261	oz/yd^2	4.0

PART 3 EXECUTION

3.1 PREPARATION

A. Contractor shall follow Specifications 31 11 00.00 12 Clearing and Grubbing and 31 20 00 Earthwork for preparation of subgrades and fill materials.

3.2 INSTALLATION

A. The geotextile shall be laid smooth without wrinkles or folds on the prepared subgrade in the direction of construction. Geotextile can be held in place using U-shaped sod staples or by strategically placing shovelfuls of the fill to weigh down the fabric.

B. Adjacent geotextile rolls shall be overlapped a minimum of 18 inches.

C. On curves, the geotextile may be cut and overlapped. Cutting may be done with sharp shears, razor knives, or handheld power saws. Cut the geotextile to conform to immovable protrusions, if necessary.

D. Aggregate fill shall be placed and compacted directly over the geosynthetic in accordance with Specification 32 15 00 Aggregate Surfacing.

END OF SECTION 31 32 19

SECTION 31 62 19 COMPOSITE PILES

PART 1 GENERAL

1.1 DESCRIPTION

A. Furnish and install Polyvinyl Chloride/Fiberglass Composite Marine Piling at the locations indicated on the drawings and specified herein.

1.2 SUBSURFACE DATA

A. Subsurface soil data logs are appended to the special contract requirements.

1.3 SUBMITTALS

A. NPS approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for information only. Submit the following in accordance with section 01 33 23 SUBMITTAL PROCEDURES:

1. Shop Drawings

Installation Drawings; G

2. Product Data

Driving Equipment; G

Helmets and Cushion Blocks; G

Pile Shoes; G

3. Color Samples

Composite Piles; G

4. Certificates

Composite Piles; G

5. Closeout Submittals

Pile Driving Records; G

1.4 DELIVERY, STORAGE, AND HANDLING

A. General

1. Composite piles shall be shipped and stored in such a manner as to minimize scratching and damage. Composite piles can be moved using traditional lifting and handling methods.
2. Stack piles during delivery and storage so that each pile is maintained in a straight

position and is supported every 10 feet or less along its length (ends inclusive). Do not stack piles more than 5 feet high. Use methods for handling and storage of piles such that the piles are not subjected to excessive bending stress.

B. Damaged Piles
1. Inspect each pile for soundness, splits, cracks and holes before transporting them to the project site and immediately prior to placement in the driving leads. Bring any unusual pile conditions to the attention of the contracting officer. Piles which are damaged during delivery, storage, or handling to the extent they are rendered unsuitable for the work, in the opinion of the contracting officer, will be rejected and removed from the project site, or may be repaired, if approved, at no cost to NPS.
2. Any pile damaged by reason of internal defects or by improper driving must be corrected by one of the following methods approved by the Contracting Officer for the pile in question:
   a. The pile is withdrawn, if practicable, and replaced by a new and, if necessary, longer pile.
   b. A pile dynamic analysis and integrity testing must be performed by the contractor's geotechnical consultant to assess the structural integrity of the driven pile(s).
3. A pile driven below the specified butt elevation must be corrected by one of the following methods approved by the Contracting Officer:
   a. The pile is spliced (if approved).
   b. A sufficient portion of the footing is extended down to properly embed the pile.
4. A pile driven out of its proper location or out of plumb as approved by the Contracting Officer, must be corrected by one of the following methods approved by the Contracting Officer:
   a. One or more replacement piles are driven next to the pile in question.
   b. As directed by the Contracting Officer.

C. Pile Sweep
1. Limit sweep to 1/8 inch per 10 feet over the length of the pile. Piles having excessive sweep will be rejected.

PART 2 PRODUCTS

2.1 MATERIALS

A. Piles
1. Polyvinyl chloride (PVC) pipe piles with internal webbing and grooved retention rings.
2. Ridged PVC compounded with stranded/chopped fiberglass
3. UV protected PV capstock
4. Molecular weight (resin): 65 K value
5. Relative viscosity: 2.15 dL/gm
6. Inherent viscosity: 0.91 dL/gm
7. Relative density: 1.47
8. Mechanical properties
   a. Impact strength, notched Izod: 110 j/m 23°C ASTM D265a
   b. Impact strength, unnotched Izod: 270 j/m 23°C ASTM D256
   c. Tear strength: 750-1000 lb ft/in ASTM D624
   d. Hardness 88 shore d durometer
   e. Coefficient of friction: 0.3 μs PVC to PVC
   f. Tensile strength @ break, %: 2% ASTM D638

g. Tensile stress @ yield: 103 MPa ASTM D638
h. Tensile modulus: 9650 MPa ASTM D638
i. Flexural modulus: 9310 MPa ASTM D790

9. Thermal properties
   a. Softening point: 120 C
   b. Max continuous service temp: 65 C
10. Fire performance
   a. Flammability, oxygen index: 0.45 ASTM D2863
   b. Ignitability index: 2 AS 1530
   c. Smoke produced index: 8 AS 1530
   d. Flame spread index: 0
11. Electrical properties
   a. Dielectric strength (breakdown) 14-20 kV/mm
   b. Volume resistivity 1016 Ohm.cm (60% rh)
   c. Surface resistivity: 1013 – 1014 Ohm
   d. Dielectric constant: 3.4-3.6 at 25°C (60 Hz)
   e. Dissipation factor: 0.015-0.020 at 20°C

2.2 PILE DRIVING EQUIPMENT

A. Pile Hammers

1. Provide a hammer capable of developing the indicated ultimate pile capacity at blow count less than 100 per foot considering hammer impact velocity; ram weight; stiffness of hammer and pile cushions; cross section, length, and total weight of pile; and character of subsurface material to be encountered. Use wave equation analysis to verify that the hammer will develop stresses within acceptable limits in the piles. At final driving, operate pile hammer in accordance with manufacturer's recommendation. Provide the plant and equipment for air hammers that have sufficient capacity to maintain, under working conditions, the pressure at the hammer specified by the manufacturer. The hose connecting the compressor with the hammer must be at least the minimum size recommended by the Manufacturer. Evaluate hammer performance at the end of driving by measuring blows per minute and comparing with the manufacturer's recommendations. Always measure impact velocity of open-end (single acting) diesel hammers during pile driving operations with a device for this purpose. If such a device is not available, obtain the stroke by measuring the speed of operation either manually or with a device that makes the measurement automatically. Equip closed-end (double acting) diesel hammers with a bounce chamber pressure gauge in good working order, mounted near ground level so as to be easily read by the Contracting Officer. Provide a correlation chart of bounce chamber pressure and potential energy. Equip hydraulic hammers with a system for measurement of ram energy. The system must be in good working order and the results must be easily and immediately available to the Contracting Officer.

B. Driving Helmets and Cushion Blocks

1. Use a driving helmet and pile cushion combination capable of protecting pile head, minimizing energy absorption and dissipation, and transmitting hammer energy uniformly over top of pile. Provide driving helmet that fits sufficiently loose around top of pile so that pile may be free to rotate without binding within driving helmet. Use pile cushion of a minimum of 2 sheets of 3/4” thick plywood. Replace pile cushion at the start of driving of each pile and when it becomes highly compressed, charred or burned,

or has become spongy or deteriorated in any manner. Submit details of driving helmets, and pile cushions at least 2 weeks prior to pile installation.

2. Hammer Cushion
   a. Use a hammer cushion between driving helmet or cap and hammer ram consisting of a solid hardwood block with grain parallel to the pile axis and enclosed in a close-fitting steel housing. Use steel plates at top and bottom of hammer cushion. Replace hammer cushion when it becomes highly compressed, charred or burned or becomes spongy or deteriorated in any manner. Do not use small wood blocks, wood chips, rope or other materials that permit excessive loss of hammer energy.
   b. If the cushion is other than that specified above, submit to the Contracting Officer at least two weeks prior to the commencement of test pile driving, detailed drawings and records of previous successful use. Generally, follow the pile hammer manufacturer's recommendations with respect to hammer cushions.

PART 3 EXECUTION

3.1 PRELIMINARY WORK

A. Wave Equation Analysis of Pile Drivability
   1. Prior to driving any pile, submit a pile Wave Equation Analysis, performed by Contractor's Geotechnical Consultant, for each size pile and distinct subsurface profile condition. These analyses must consider the proposed hammer assembly, pile capblock and cushion characteristics, the pile properties and estimated lengths and the soil properties anticipated to be encountered throughout the installed pile length based on static capacity analysis with consideration of driving gain/loss factors. Only one specific model of pile hammer may be used for each pile type and capacity.
   2. Demonstrate using the Wave Equation Analysis that the piles will not be damaged during driving, indicate that the driving stresses will be maintained within the limits below and indicate the blow count necessary to achieve the required ultimate static pile capacities.
      a. **Allowable Driving Stresses – 15 ksi**
   3. Perform a refined Wave Equation Analysis upon completion of the dynamic and static testing programs outlined in this specification section, taking into consideration the evaluated capacities, gain/loss factors and recommended production pile lengths. Develop production pile driving criteria based on the results of the refined Wave Equation Evaluations.]
   4. All pile driving equipment provided by the Contractor will be subject to the approval of the Contractor's Geotechnical Consultant. Complete the attached pile and driving equipment data form, including hammer information, in full as part of the submittal of the results of the Wave Equation Analyses.

B. Pile Length Markings
   1. Mark each pile prior to driving with horizontal lines at one-foot intervals. Mark the interval number on pile every 5 feet from pile tip.

3.2 PILE DRIVING

A. Driving Piles
   1. Notify Contracting Officer 10 days prior to driving of piles.
   2. Drive piles to indicated tip elevation in accordance with the drawings and the results of the Wave Equation Analysis. During initial driving and until pile tip has penetrated

beyond layers of very soft soil, use a reduced driving energy of the hammer as required to prevent pile damage. Refusal criteria will be established by the Contracting Officer. If a pile fails to reach calculated and indicated tip elevation, or if a pile reaches tip elevation without reaching required driving resistance, notify Contracting Officer and perform corrective measures as directed. Provide hearing protection when noise levels exceed 140 dB. Do not handle or move piles or pile sections in any manner that would result in cracking or permanent damage to the concrete or to the grout surrounding the prestressing cables. Piles may be driven without pile guides or leads providing a hammer guide frame is used to keep the pile and hammer in alignment.

B. Protection of Piles
   1. Take care to avoid damage to piles during handling, placing pile in leads, and during pile driving operations. Support piles laterally during driving but allow rotation in leads. Maintain axial alignment of pile hammer with that of the pile.

C. Pile Placement and Tolerances in Driving
   1. Drive piles with a variation of not more than 2 percent from vertical for plumb piles. Maintain and check axial alignment of pile and leads at all times. If subsurface conditions cause pile drifting beyond allowable axial alignment tolerance, notify Contracting Officer and perform corrective measures as directed. Place butts within 4 inches of location indicated. Manipulation of piles within specified tolerances will be permitted, to a maximum of 1-1/2 percent of their exposed length above ground surface or mudline. Piles must be monitored for heave immediately after installation and after adjacent piles are installed. If piles heave more than 1/2 inch notify the Contracting Officer. Redrive heaved piles to required point elevation. Piles damaged or driven outside the above tolerances must be replaced, or additional piles driven at locations specified by the Contracting Officer at no expense to NPS.

D. Rejected Piles
   1. Withdraw piles damaged or impaired for use during handling or driving, mislocated, or driven out of alignment beyond the maximum tolerance. Replace with new piles or cut-off and abandon damaged or impaired piles and drive new piles as directed. Remove excess cut-off from piles and unacceptable piles from the work site. Perform all work in connection with withdrawing and removing rejected piles from the site at no additional cost to the Government.

E. Jetting of Piles
   1. Water jets will not be permitted.

F. Predrilling of Piles
   1. Predrilling to remove soil or other material representing the bulk of the volume of the pile to be driven will not be permitted

G. Pile Splices
   1. Splicing of piles is not permitted.

H. Pile Cut-Off
   1. Cut-off piles with a smooth level cut using pneumatic tools, sawing, or other suitable methods approved by Contracting Officer. Use of explosives for cutting is not permitted. Remove cut-off sections of piles from the site and off property upon completion of the work.

I. As-Driven Survey

1. After the driving of each pile group is complete and before boardwalk bents and stringers are placed, provide the Contracting Officer with an as-driven survey showing actual location and top elevation of each pile. Do not proceed with placing members until the Contracting Officer has reviewed the survey and verified the safe load for the pile group driven. Present a survey in such form that it gives deviation from plan location in two perpendicular directions and elevations of each pile to nearest half inch. Survey must be prepared and certified by a licensed land surveyor.

3.3 FIELD QUALITY CONTROL

A. Pile Analyzing

1. 10 working days prior to driving the piles, submit the pile and complete driving equipment data to the Contracting Officer. The Contractor's Geotechnical Consultant must use the submitted information to perform wave equation analyses and must prepare a summary report of the wave equation results. The wave equation analysis using software approved by the Contracting Officer to assess the ability of the proposed driving system to install the pile to the required capacity and desired penetration depth within the allowable driving stresses. Approval of the proposed driving system by the Contracting Officer must be based upon the wave equation analyses indicating that the proposed driving system can develop a pile capacity of 13.8 kips at a driving resistance within allowable driving stress limits. The hammer must also be sized or adjustable such that the penetration per blow at the required ultimate capacity does not exceed 0.5 inches.

B. Pile Driving Records

1. Keep a complete and accurate record of each pile driven. Indicate the pile location, deviations from pile location, cross section shape and dimensions, original length, ground elevation, tip elevation, cut-off elevations, number of blows required for each foot of penetration and number of blows for the last 6 inches penetration or fraction thereof as required for the "calculated" driving resistance. Include in the record the beginning and ending times of each operation during driving of pile, type and size of hammer used, rate of operation, stroke or equivalent stroke for diesel hammer, type of driving helmet, and type and dimension of hammer cushion and pile cushion used. Record retap data and unusual occurrences during pile driving such as redriving, heaving, weaving, splicing, obstructions, and any driving interruptions. A preprinted pile driving log for recording pile driving data, which can be downloaded at: http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables
2. Submit complete and accurate pile driving records of installed piles to Contracting Officer within 15 calendar days after completion of pile driving. Make pile driving records available to the Contracting Officer at the job site, within 24 hours after each day of pile driving. Preparation of the record must be by, or under the direct supervision of a registered professional engineer.

END OF SECTION 31 62 19

Jean Lafitte Barataria Preserve – PMIS 318919

SECTION 32 15 00 AGGREGATE SURFACING

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following: specifications for the application of the finished surface aggregate along the trail alignment.

1.2 RELATED SECTIONS

A. The following is a list of Specifications which may be related to this section.
   1. Section 31 11 00 – Clearing and Grubbing

1.3 REFERENCES

A. The following is a list of Specification which may be related to this section.

1. American Association of Highway Transportation Officials (AASHTO):

   a. AASHTO T-96, Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

2. ASTM International (ASTM):

   a. ASTM C 131, Standard Test Method for Resistance to Degradation of Small-Size Aggregate by Abrasion and Impact in the Los Angeles Machine

   b. ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

3. Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges (LSSRB)

   a. Section 401 Aggregate Surface Course

   b. Section 1003.05 Aggregates for Surface Course

1.4 DELIVERY, STORAGE, AND HANDLING

A. Aggregate: Stockpile, remove, transport, and spread aggregates in a manner that will preserve specified gradation and avoid contamination. Do not intermingle stockpiles of aggregate having different gradations.

1.4 SUBMITTALS

A. Submit test results and a Certificate of Compliance verifying that aggregate gradation meets section 1003.05.1 of LSSRB requirements. Sample the material before incorporation into the work as follows:
   1. For commercially produced aggregates: at the producer's plant or stockpile.

1.5 SCHEDULING

A. Weather Limitations: To be placed at optimum moisture, placement is not recommended if the forecasted weather is too cold or wet to allow the material to meet compaction requirements.

PART 2 - PRODUCTS

2.1 TRAIL SURFACE AGGREGATE (TSA)

A. To be derived from the LSSRB Approved Materials List.

B. Aggregate shall meet the requirements outlined below:

U.S. (Metric Sieve Size)	Percent Passing By Weight (Mass)
1 ½ inches (37.5 mm)	100
¾ inch (19.0 mm)	50 – 100
No. 4 (4.75 mm)	35 – 65
No. 40 (425 µm)	10 – 35
No. 200 (75 µm)	3 – 15

For material passing the No. 40 (425 µm) sieve, comply with the following requirements:

Liquid Limit (Max.) 25

Plasticity Index (Max.) 5

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine trail for drainage concerns. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.2 PREPARATION OF SUBGRADE

A. Place separator geotextile in accordance with the manufacturer's recommendations. Care shall be taken not to damage the geotextile during placement of the aggregate.

3.3 SPREADING AND COMPACTING

A. Aggregate should be placed from the furthest point working back towards the source to avoid running equipment on the final trail for which the trail was not intended. Some construction equipment may impose more loading than the final section was intended for.

B. Use aggregate that is uniformly mixed at optimum moisture content and spread and compact to the final thickness and width. Aggregate should be placed in lifts of 8 inches or less of loose material and then compacted. Obtain compaction by one of the following methods:
    1. Aggregate should be compacted using plate compactor or multiple passes of construction equipment vehicles that can access the trail locations and do not overload the design section.
    2. A minimum of 4 passes shall be made for compaction.

C. After initial compaction, contractor shall wet the surface as directed.

D. Immediately following final spreading, smoothing, and compacting, contractor shall correct any irregularities or depressions that develop by adding or removing material until the surface is smooth, uniform and compacted.

3.4 ACCEPTANCE, TESTING, SAMPLING, TOLERANCES

A. Do not vary the total compacted thickness of the aggregate or place it consistently below or above the specified depth.

B. Do not vary the aggregate width by more than 2 inches from the specified width or place it consistently narrower or wider than the specified width.

END OF SECTION 32 15 00

APPENDICES

Stantec

TRAIL IMPROVEMENTS AT BARATARIA PRESERVE - JELA 318919
Geotechnical Engineering Report

December 20, 2024

Prepared for:
National Park Service

Prepared by:
Stantec Consulting Inc.

Project Number: PMIS 318919

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
0	SD DRAFT	R. Nall	7/7/23	R. Waldron	7/10/23	D. Lindeman	7/13/23
1	SD DRAFT	R. Nall	9/7/23	R. Waldron	9/22/23	D. Lindeman	9/22/23
2	FINAL	R. Nall	12/20/24	E. Matte	12/20/24	D. Lindeman	12/20/24

The conclusions in the Report titled Geotechnical Engineering Report are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Table of Contents

LIST OF FIGURES
No table of figures entries found.

LIST OF APPENDICES

1 Introduction

The “Trail Improvements at Barataria Preserve” project is located at Jean Lafitte National Historical Park and Preserve (JELA) in the Barataria Preserve Unit. The Barataria Preserve is located 17 miles south of New Orleans, on the west bank of the Mississippi River. The Preserve is comprised of 26,000 acres of primary freshwater deltaic coastal wetlands, including wet bottomland hardwood forest, Bald cypress swamp, bayous, and marshes. The Barataria Preserve protects unique and significant examples of the natural and cultural resources found in the Mississippi River Delta Region. A network of boardwalks and hardened trails provide the sole means to access these wild places and view alligators, snakes, native flora and over 200 species of birds. The New Orleans metro area has very few extensive natural areas for nature walks, making the Barataria Trails an important regional resource. Recreational visitation to the Barataria Preserve averages approximately 157,000 people per year, and visitation is expected to increase following improvements to the trails.

The National Park Service proposes to address repairs to the trail network due to hurricane-related damage. The project scope is to provide repairs to four (4) trails, which are comprised of boardwalks and hardened trails. The trails to be improved include the following (current total length is 1.76 miles): Visitor Center (VC) Trail 1707 ft. (0.32 mi), Bayou Coquille (BC) Trail 3333 ft. (0.63 mi), Marsh Overlook (MO) Trail 2615 ft. (0.5 mi), and Education Center (EC) Trail 1642 ft. (0.31 mi).

The geotechnical scope of work for the project included performing a field and laboratory data collection program to gather soil data along the trail alignments and performing geotechnical engineering evaluations to develop recommendations for the proposed trail improvements. This report presents recommendations for deep foundations for support of the elevated boardwalks along with gravel thicknesses for the hardened trails constructed on the existing grade.

1.1 Existing Conditions

The condition of each trail varies from the others, but all trails are generally in disrepair. The Visitor Center and Education Center Trails consist entirely of boardwalks with timber pile foundations. The tops of the existing timber piles were measured to have butt diameters on the order of approximately 7 to 10 inches. While the timber decking of these boardwalks is generally in poor condition, most of the timber piles appeared to be structurally sound and providing adequate foundational support.

Bayou Coquille consists of primarily hardened gravel trails but also includes several intermittent segments of timber pile supported boardwalks. The design and condition of Bayou Coquille Trail’s timber piles appears similar to the Visitor Center and Education Center Trails. The existing hardened gravel trails generally consist of approximately crushed gravel on top of a geotextile separator fabric. It is understood through discussions with the park that the gravel is typically 6 inches thick and performs well, requiring only periodic maintenance.

The Marsh Overlook Trail primarily consists of boardwalk supported by 8-inch wide square timber beams laid perpendicular to the boardwalk and directly on the ground surface. The beams appeared to be spaced on the order of approximately 4 ft. The trail is generally in poor condition with many of the ground surface supported beams failing. The Marsh Overlook Trail also includes a pedestrian bridge over Bayou Coquille, designated Kenta Canal Drawbridge, that utilizes a timber pile foundation and appears to be structurally sound. Due to its overall acceptable condition, it is understood replacing the Kenta Canal Drawbridge is not included in the project unless a wider bridge is required for construction access. The Overlook viewpoint located at the end of the Marsh Overlook Trail includes a pedestrian bridge in acceptable condition, designated Marsh Overlook Trail Pipeline Canal Bridge, and is not included in the project.

1.2 Proposed Improvements

Improvements will include demolition and replacement of the boardwalks within the existing trail prism and horizontal alignment and increasing hardened trail and boardwalk elevations to provide greater resiliency for future hurricane and storm events, sea level rise and land subsidence. Additionally, NPS staff will identify trail sections and “turnouts and overlooks” (areas for seating and/or interpretive opportunities) for demolition. The new combined length of the improved trails, with selected segments demolished and not rebuilt, will be approximately 1.28 miles for Bayou Coquille Trail, Marsh Overlook Trail, and Education Center Trail; the Visitor Center Trail currently has an additional length of 0.3 miles. Demolished trail sections will be allowed to return to a natural state. NPS staff stated that no revegetation operations will be required (no seeding or planting) to let natural plant succession occur in trail demolition and obliteration segments.

Potential materials to rebuild the boardwalk segments were evaluated during Schematic Design (SD). A Value Analysis workshop was held with the park and the results of the workshop were incorporated into design and this report. Potential boardwalk foundation options that were evaluated during the workshop include driven concrete, timber, and composite piles and helical piles. The workshop resulted in a selection of composite piles for the new elevated trails. Reference can be given to the workshop report for additional discussions on the process and results. The new hardened trails will consist of six inches of crushed gravel and geotextile fabric placed on top of the existing trails. Some segments of hardened trail may be raised approximately 1 ft. to the recommended trail elevation using additional gravel.

2 Geotechnical Data Report

Stantec subcontracted the geotechnical field and laboratory data collection portion of the work to Eustis Engineering, LLC of Metairie, Louisiana. The data collection was performed and completed during the 30 Percent Pre-Design phase. For details and discussions on the field exploration program completed for the Trail Improvements, reference can be given to Eustis Engineering, LLC’s draft Report No. 24895, dated March 2, 2023, presented in Appendix A. Contact information for Eustis is located in their report.

The limited access and remote nature of the trails provided challenging conditions for performing the field exploration program. Multiple exploration methods and techniques were utilized to gather the data

necessary to perform geotechnical engineering evaluations for the project. Adjustments to the originally proposed explorations were made after performing site visits and assessing existing conditions. The completed field exploration program consisted of three (3) undisturbed type soil borings to the 60 ft. depth, two (2) Cone Penetration Test (CPT) soundings to the 30 ft. depth, thirteen (13) collocated hand auger borings and Dynamic Cone Penetrometer Tests (DCPT) to depths of 5 to 10 ft., and four (4) direct push soil borings to depths of 12 to 32 ft. Laboratory tests performed on samples collected from the borings generally consisted of natural water content, unit weight, unconfined compression shear, unconsolidated undrained triaxial compression shear, Atterberg limits tests, and percent passing the U.S. Standard No. 200 mesh sieve.

3 Subsurface Conditions

3.1 Geology

Geologically, the project site is defined by soils from three depositional environments of Bayou des Familles, deposited when it was formerly a distributary of the Mississippi River: The higher, more wooded ground near the bayou consists of slightly firmer Natural Levee and Point Bars deposits. Moving away from the bayou the ground becomes lower, less wooded and consists of softer, more compressible Inland Swamp deposits. The east side of the bayou, and in the general area of the Education Center Trail, is characterized by Point Bar deposits which typically consist of relatively more competent soils with more frequent sands and silts. The Visitor Center Trail is in an area characterized by Natural Levee deposits, which are typically consist of firmer, leaner clay soils with increased percentages of silty soils. The Bayou Coquille Trail begins in Natural Levee deposits and transitions to the Inland Swamp deposits as it moves west to the Overlook Trail. These Inland Swamp deposits are typically defined by softer, compressible clays with increased organic content. The strength, compressibility, and variability of these deposits, and the delineation of their limits, will be a key driver in foundation design solutions for the various trails and project features.

3.2 Site-Specific Soil Profile Interpretations

A summary of the interpreted subsurface conditions at each trail based on the field explorations is provided in the follow sections. Additional reference should be given to the full data report and logs for additional information.

3.2.1 VISITOR'S CENTER TRAIL

Referencing soil boring B-2 and hand augers A-3, A-4, and A-12 performed at the Visitor Center Trail, beginning at the ground surface there is very soft to medium stiff gray clay to the full explored depth of 60 ft. The clays are generally a mix of both lean and fat clays with traces of silt, sand, and organic.

3.2.2 EDUCATION CENTER TRAIL

Referencing soil boring B-1 and hand augers A-0, A-1, and A-2 performed at the Education Center Trail, beginning at the ground surface there is soft to medium stiff gray clay to approximately the 37 ft. depth. This is underlain by loose to medium dense sand to at least the 60 ft. depth, where the boring was terminated. An approximately 5 ft. thick silt layer was encountered at the 27 ft. depth in boring B-1.

The upper clays encountered in boring B-1 and hand auger A-1 were primarily lean clays with low plasticity. However, hand augers A-0 and A-2 encountered high plasticity fat clays and organic clays varying levels of roots and decayed wood.

3.2.3 BAYOU COQUILLE TRAIL

Referencing soil boring B-3, hand augers A-5, A-6, A-7, A-8, Cone Penetration Test soundings CPT-7 and CPT-8, and Geoprobe borings G-5, G-6, G-7, G-8 performed at the Bayou Coquille Trail, beginning at the ground surface there is very soft to medium stiff gray, dark gray, and brown fat clay to the full explored depth of 60 ft. The deeper borings and CPT soundings indicate a few relatively thin lean clay and silty sand were encountered. The logs also indicate that various amount of organic matter, roots, and wood were encountered in the borings.

3.2.4 MARSH OVERLOOK TRAIL

Referencing hand augers A-9, A-10, and A-11 performed at the Marsh Overlook Trail, beginning at the ground surface there is gray and dark gray fat clay and organic clay to the 10 ft. depth where the hand augers were terminated. The logs indicate that that varying levels of roots and decayed wood were encountered in the borings.

3.3 Groundwater

The trails are located in a marsh and wetland type environment where areas of standing water are commonly observed. Considering this, it is believed that the groundwater level is located relatively close to the ground surface. At the time of performing soil borings B-1 and B-2, Eustis initially encountered free water at about the 6 ft. depth in the boreholes. After a waiting period of about 15 minutes, the water level rose to a depth of 3 ft. After the 15-minute period, water and drilling fluid was added to the boreholes to continue drilling operations. These field measurements are short term observations and the water level in the borehole may not have fully stabilized. Groundwater levels may vary with time and may be impacted by atmospheric and environmental conditions, changes to site drainage, construction activities, water levels in adjacent bodies of water, etc. If groundwater is expected to impact construction, it should be measured prior to and during construction by the applicable party.

3.4 Seismic Site Class

The site was evaluated to determine the Seismic Site Class based on the International Building Code (2021). Based on the soils encountered in the explorations, the Site Class was determined to be Site Class E.

4 Foundation Analysis

Geotechnical engineering analyses were performed utilizing data collected during the field and laboratory data collection program to evaluate multiple foundation alternatives for the proposed boardwalk improvements. As mentioned in Section 1.2, during schematic design consideration was given to driven concrete, timber, and composite piles as well as helical piles. Preliminary analyses were performed to estimate the axial capacity of each foundation option. These analyses were used to estimate pile lengths and constructability for consideration during the Value Analysis workshop. The workshop resulted in selection of composite piles for final design.

One of the key components driving the pile material selection was constructability. The boardwalks will be constructed using a top-down approach meaning the new boardwalk must support the construction equipment as new segments of boardwalk are constructed. It was determined the construction equipment loads present the controlling load case for the boardwalks. Concrete piles were removed from consideration for final design as it was determined during the workshop that the construction equipment to install the concrete piles resulted in longer and heavier piles, adding cost and complexity to the project. Composite piles were chosen over timber based on their expected life span and timber pile's need for treatment. Helical piles resulted in higher costs when compared to composite piles. Based on the results of the workshop, schematic design progressed with use of composite piles. The results of analyses to estimate the axial capacity of the composite piles are provided in the following sections along estimates of settlement and general construction recommendations. Timber pile capacities are also provided for general reference.

4.1 Axial Capacity

Analyses were performed to estimate the axial compression capacity of several types and lengths of driven composite and timber piles using the FHWA method and the computer program APILE by Ensoft, Inc. Consideration was given to uniform diameter composite piles as well as multiple sizes of Class "B" timber piles in accordance with ASTM D25 Standard Specification for Round Timber Piles. The composite piles considered for the project are EcoPiles by Shoreline Plastics. The piles will primarily develop capacity through "skin friction" along the sides of the piles since no firm bearing strata was encountered within the depth range expected for the boardwalk foundation. Results of the analyses are presented in Table **1** in terms of tip elevation and consider the existing ground elevation at approximately El. 0 to +1 ft. Adjustments must be made to the capacities for lower ground elevations.

Table 1**: Axial Pile Capacity**

Tip Elevation (ft)	Allowable Single Pile Axial Capacity in Compression (kips) Factor of Safety = 3.0					
	Class "B" Timber Piles			Composite Piles		
	8-in. Butt 5-in. Tip	10-in. Butt 6.5-in. Tip	12-in. Butt 8.5-in. Tip	8-in.	10-in.	12-in.
-15	1.7	2.2	3.0	2.4	3.0	3.5
-20	2.6	3.2	4.0	3.5	4.3	5.2
-25	3.5	4.3	5.4	4.6	5.8	6.9
-30	4.2	5.5	6.9	5.9	7.3	8.8

The capacities presented utilize a factor of safety of 3.0 which is recommended for final, long-term conditions. For short-term, construction loading a factor of safety of 2.0 may be used.

4.2 Pile Loading

Design loads of the boardwalk system were furnished by the structural engineers for use in evaluating pile loads. These design loads include the total dead load for the boardwalk structure selected as well as a uniform live load of 90 pounds per square foot. The design live loads for the boardwalks include consideration for the all-terrain type utility vehicles the park currently uses for maintenance which has an estimated weight of approximately 1,500 pounds. For the construction conditions, construction equipment loads were estimated based on the size of equipment that can fit on the boardwalk and expected to be used for installing the piles. The selected pile tip at El. -20 ft. allows for a total construction loading of 4,700 pounds per pile which equates to a total allowable construction loading of 9,400 pounds. The contractor should adhere to this maximum weight limit. A summary of these loads is provided in Table 2.

Table 2: Pile Loading

Load Type	Load Per Pile (lbs.)	
	Long-Term	Construction
Structure	521	521
Design Live Load	1,800	N/A
Construction Equipment and Loads	N/A	4,700
Total Load Per Pile	2,321	5,221
Factor of Safety	3.0	2.0
Required Ultimate Axial Capacity	6,963	10,442

As shown in Table 2, the highest required ultimate axial capacity is presented by the construction cases and controls the pile tip elevation. Based on these loads, an 8-inch diameter composite pile with minimum tip elevation of El. -20 ft. was selected to satisfy the construction load cases with factors of safety of 2.0. A minimum pile tip elevation of only El. -15 ft. is needed to satisfy the long-term conditions with a factor of safety of 3.0. Considering this, if the contractor is able to use lighter equipment, with a total weight of 6,000 lbs. (3,000 lbs. per pile), the pile tip elevation may be raised to El. -15 ft.

4.3 Pile Installation

The boardwalk will utilize top-down construction method including during pile installation. Given this method of construction along with the limited access and remote nature of the trails, it is expected that the contractor will utilize smaller equipment similar to a skid-steer for installing the piles as traditional pile driving rigs mounted to crawler cranes will not be suitable for this construction method. In general, impact driving of the composite and Class “B” piles should be limited to the rate of 25 blows per foot using a hammer with 15,000 ft-lbs of energy. Given the smaller equipment expected to be used for pile installation, it is expected the contractor may use a smaller hammer with a lower energy which may require blow counts higher than 25 blows per foot. A vibratory hammer may be used but must apply the vibrations to the top of the pile only. Based on manufacturer recommendations, side grip mounts for vibratory hammers are not permitted for the composite piles.

In reference to the logs of geotechnical explorations performed at the site and the soil profile interpretations presented in Section 3.2, piles with tip elevations in the upper 20 to 25 ft. depth will be installed in primarily soft to medium stiff clays and should be able to driven with normal driving effort not exceeding the above limitations. The contractor should submit their proposed driving system for review which should include the type of equipment used, hammer type, and method of installation. It is recommended that probe piles be driven at each trail to establish driving characteristics prior to production pile driving. The probe piles should be installed using the same equipment and procedure that will be used to install the production piles.

4.4 Estimated Settlement

Long-term settlement of the pile supported boardwalk using composite or timber piles and the allowable pile capacities presented herein are estimated to be on the order of 0.5 to 1 inch. This estimate is based two piles being installed per boardwalk bent and dead loads shown in Section 4.2. To reduce the potential for differential settlement the piles should be installed at the same approximate tip elevation.

5 Hardened Trails

The following sections present recommendations for the new hardened trails including site preparation, fill requirements, and design section thicknesses. The hardened trails will primarily be subjected to pedestrian traffic but will experience occasionally loading from all-terrain type utility vehicles the park currently uses for maintenance.

The new hardened trails will consist of six inches of crushed gravel and geotextile fabric placed on top of the existing trails. Some segments of hardened trail will be raised approximately 0.5 to 1 ft. to the recommended trail elevation using additional gravel. A cross section drawing of a typical hardened trial section is provided on Drawing C7.2.

5.1 Hardened Trail Improvements

The existing hardened gravel trails generally consist of approximately crushed gravel on top of a geotextile separator fabric. It is understood through discussions with the park that the gravel is typically 6 inches thick and performs well, requiring only periodic maintenance. Based on a review of the current hardened trail design and the park's observed performance of the existing trails, it is recommended that the new trails consist of six inches of crushed gravel placed on top of a geotextile separator fabric. It is understood that that the park will leave the existing trail's gravel in place and the new trail will be placed on top. Considering this, the new hardened trail should be placed directly on top of the existing trail while adhering to the subgrade preparation procedures outline in the following section. It is understood that some segments of the hardened trails will be raised more than 6 inches in order to meet the recommended trail surface elevations. In these areas, additional gravel may be placed to meet the design elevation. A tabulation of the recommended hardened trail section is presented in Table 3.

Table 3: Hardened Trail Section

Layer No.	Material Layering	Thickness
1	Crushed Gravel (LaDOTD Section 1003.05.1)	Minimum 6 inches
2	Geotextile Separator Fabric (Mirafi 140N or equivalent)	One Layer
3	Prepared Foundation (Existing Trail or Subgrade)	N/A

The crushed gravel used for the hardened trails should meet the gradation requirements for aggregate surface courses presented in the 2016 Edition of Louisiana Standard Specifications for Roads in Bridges Section 1003.05.1. The new hardened trails should be placed on top of a foundation prepared in accordance with the following section.

5.2 Foundation Preparation

As mentioned, the new hardened trail will be primarily constructed over the existing gravel trail. However, some areas of the new trails may overlap currently vegetated areas near the edges of the existing trail. Prior to construction, any areas where the new hardened trails are to be constructed should be stripped of any loose or soft soils, vegetation, and any deleterious materials. The existing gravel trail should be left in place as it will provide better support than the softer, native underlying clays. The near surface native subgrade soils at the site are soft and will experience a loss in strength when disturbed or exposed to surface water, making it difficult to move equipment or compact fill. The contractor should maintain positive site drainage before and during construction to move surface water away from the areas of construction. Construction should only commence when the foundation soil is dry, stable, and positive drainage away from the construction area is established. Construction should be designed and progressed in a manner causing minimal disturbance to foundation soils, which may require temporary matting.

After removal of unsuitable material from within the footprint of the new trails, the subgrade should be prepared for placement of the new fill and gravel section. The foundation soils should be inspected to ensure the soil is dry, firm, and stable. It is recommended that any unsuitable soils removed be replaced with additional gravel.

It is understood that rectangular timber curbing may be used to border the new hardened trails. It is recommended that the foundation for the timber curbing adhere to the foregoing preparation recommendations presented .

APPENDICES

Appendix A – Geotechnical Data Report

Stantec

TRAIL IMPROVEMENTS AT BARATARIA PRESERVE - JELA 318919

Geotechnical Engineering Report

September 22, 2023

Prepared for:
National Park Service

Prepared by:
R. Austin Nall, PE

Project Number: PMIS 318919

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
0	SD DRAFT	R. Nall	7/7/23	R. Waldron	7/10/23	D. Lindeman	7/13/23
1	SD DRAFT	R. Nall	9/7/23	R. Waldron	9/22/23	D. Lindeman	9/22/23

The conclusions in the Report titled Geotechnical Engineering Report are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from National Park Service (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

Prepared by: 

Signature

R. Austin Nall, P.E.

Printed Name

Independent Review by: 

Signature

Daryl Lindeman, P.E.

Printed Name

Approved by: 

Signature

Thomas Cancienne, P.E.

Printed Name

Table of Contents

LIST OF FIGURES
No table of figures entries found.

LIST OF APPENDICES

1 Introduction

The “Trail Improvements at Barataria Preserve” project is located at Jean Lafitte National Historical Park and Preserve (JELA) in the Barataria Preserve Unit. The Barataria Preserve is located 17 miles south of New Orleans, on the west bank of the Mississippi River. The Preserve is comprised of 26,000 acres of primary freshwater deltaic coastal wetlands, including wet bottomland hardwood forest, Bald cypress swamp, bayous, and marshes. The Barataria Preserve protects unique and significant examples of the natural and cultural resources found in the Mississippi River Delta Region. A network of boardwalks and hardened trails provide the sole means to access these wild places and view alligators, snakes, native flora and over 200 species of birds. The New Orleans metro area has very few extensive natural areas for nature walks, making the Barataria Trails an important regional resource. Recreational visitation to the Barataria Preserve averages approximately 157,000 people per year, and visitation is expected to increase following improvements to the trails.

The National Park Service proposes to address repairs to the trail network due to hurricane-related damage. The project scope is to provide repairs to four (4) trails, which are comprised of boardwalks and hardened trails. The trails to be improved include the following (current total length is 1.76 miles): Visitor Center (VC) Trail 1707 ft. (0.32 mi), Bayou Coquille (BC) Trail 3333 ft. (0.63 mi), Marsh Overlook (MO) Trail 2615 ft. (0.5 mi), and Education Center (EC) Trail 1642 ft. (0.31 mi).

The geotechnical scope of work for the project included performing a field and laboratory data collection program to gather soil data along the trail alignments and performing geotechnical engineering evaluations to develop recommendations for the proposed trail improvements. This report presents recommendations for deep foundations for support of the elevated boardwalks along with gravel thicknesses for the hardened trails constructed on the existing grade.

1.1 Existing Conditions

The condition of each trail varies from the others, but all trails are generally in disrepair. The Visitor Center and Education Center Trails consist entirely of boardwalks with timber pile foundations. The tops of the existing timber piles were measured to have butt diameters on the order of approximately 7 to 10 inches. While the timber decking of these boardwalks is generally in poor condition, most of the timber piles appeared to be structurally sound and providing adequate foundational support.

Bayou Coquille consists of primarily hardened gravel trails but also includes several intermittent segments of timber pile supported boardwalks. The design and condition of Bayou Coquille Trail’s timber piles appears similar to the Visitor Center and Education Center Trails. The existing hardened gravel trails generally consist of approximately crushed gravel on top of a geotextile separator fabric. It is understood through discussions with the park that the gravel is typically 6 inches thick and performs well, requiring only periodic maintenance.

The Marsh Overlook Trail primarily consists of boardwalk supported by 8-inch wide square timber beams laid perpendicular to the boardwalk and directly on the ground surface. The beams appeared to be spaced on the order of approximately 4 ft. The trail is generally in poor condition with many of the ground surface supported beams failing. The Marsh Overlook Trail also includes a pedestrian bridge over Bayou Coquille, designated Kenta Canal Drawbridge, that utilizes a timber pile foundation and appears to be structurally sound. Due to its overall acceptable condition, it is understood replacing the Kenta Canal Drawbridge is not included in the project unless a wider bridge is required for construction access. The Overlook viewpoint located at the end of the Marsh Overlook Trail includes a pedestrian bridge in acceptable condition, designated Marsh Overlook Trail Pipeline Canal Bridge, and is not included in the project.

1.2 Proposed Improvements

Improvements will include demolition and replacement of the boardwalks within the existing trail prism and horizontal alignment and increasing hardened trail and boardwalk elevations to provide greater resiliency for future hurricane and storm events, sea level rise and land subsidence. Additionally, NPS staff will identify trail sections and “turnouts and overlooks” (areas for seating and/or interpretive opportunities) for demolition. The new combined length of the improved trails, with selected segments demolished and not rebuilt, will be approximately 1.28 miles for Bayou Coquille Trail, Marsh Overlook Trail, and Education Center Trail; the Visitor Center Trail currently has an additional length of 0.3 miles. Demolished trail sections will be allowed to return to a natural state. NPS staff stated that no revegetation operations will be required (no seeding or planting) to let natural plant succession occur in trail demolition and obliteration segments.

Potential materials to rebuild the boardwalk segments were evaluated during Schematic Design (SD). A Value Analysis workshop was held with the park and the results of the workshop were incorporated into design and this report. Potential boardwalk foundation options that were evaluated during the workshop include driven concrete, timber, and composite piles and helical piles. The workshop resulted in a selection of composite piles for the new elevated trails. Reference can be given to the workshop report for additional discussions on the process and results. The new hardened trails will consist of six inches of crushed gravel and geotextile fabric placed on top of the existing trails. Some segments of hardened trail may be raised approximately 1 ft. to the recommended trail elevation using additional gravel.

2 Geotechnical Data Report

Stantec subcontracted the geotechnical field and laboratory data collection portion of the work to Eustis Engineering, LLC of Metairie, Louisiana. The data collection was performed and completed during the 30 Percent Pre-Design phase. For details and discussions on the field exploration program completed for the Trail Improvements, reference can be given to Eustis Engineering, LLC’s draft Report No. 24895, dated March 2, 2023, presented in Appendix A. Contact information for Eustis is located in their report.

The limited access and remote nature of the trails provided challenging conditions for performing the field exploration program. Multiple exploration methods and techniques were utilized to gather the data

necessary to perform geotechnical engineering evaluations for the project. Adjustments to the originally proposed explorations were made after performing site visits and assessing existing conditions. The completed field exploration program consisted of three (3) undisturbed type soil borings to the 60 ft. depth, two (2) Cone Penetration Test (CPT) soundings to the 30 ft. depth, thirteen (13) collocated hand auger borings and Dynamic Cone Penetrometer Tests (DCPT) to depths of 5 to 10 ft., and four (4) direct push soil borings to depths of 12 to 32 ft. Laboratory tests performed on samples collected from the borings generally consisted of natural water content, unit weight, unconfined compression shear, unconsolidated undrained triaxial compression shear, Atterberg limits tests, and percent passing the U.S. Standard No. 200 mesh sieve.

3 Subsurface Conditions

3.1 Geology

Geologically, the project site is defined by soils from three depositional environments of Bayou des Familles, deposited when it was formerly a distributary of the Mississippi River: The higher, more wooded ground near the bayou consists of slightly firmer Natural Levee and Point Bars deposits. Moving away from the bayou the ground becomes lower, less wooded and consists of softer, more compressible Inland Swamp deposits. The east side of the bayou, and in the general area of the Education Center Trail, is characterized by Point Bar deposits which typically consist of relatively more competent soils with more frequent sands and silts. The Visitor Center Trail is in an area characterized by Natural Levee deposits, which are typically consist of firmer, leaner clay soils with increased percentages of silty soils. The Bayou Coquille Trail begins in Natural Levee deposits and transitions to the Inland Swamp deposits as it moves west to the Overlook Trail. These Inland Swamp deposits are typically defined by softer, compressible clays with increased organic content. The strength, compressibility, and variability of these deposits, and the delineation of their limits, will be a key driver in foundation design solutions for the various trails and project features.

3.2 Site-Specific Soil Profile Interpretations

A summary of the interpreted subsurface conditions at each trail based on the field explorations is provided in the follow sections. Additional reference should be given to the full data report and logs for additional information.

3.2.1 VISITOR'S CENTER TRAIL

Referencing soil boring B-2 and hand augers A-3, A-4, and A-12 performed at the Visitor Center Trail, beginning at the ground surface there is very soft to medium stiff gray clay to the full explored depth of 60 ft. The clays are generally a mix of both lean and fat clays with traces of silt, sand, and organic.

3.2.2 EDUCATION CENTER TRAIL

Referencing soil boring B-1 and hand augers A-0, A-1, and A-2 performed at the Education Center Trail, beginning at the ground surface there is soft to medium stiff gray clay to approximately the 37 ft. depth. This is underlain by loose to medium dense sand to at least the 60 ft. depth, where the boring was terminated. An approximately 5 ft. thick silt layer was encountered at the 27 ft. depth in boring B-1.

The upper clays encountered in boring B-1 and hand auger A-1 were primarily lean clays with low plasticity. However, hand augers A-0 and A-2 encountered high plasticity fat clays and organic clays varying levels of roots and decayed wood.

3.2.3 BAYOU COQUILLE TRAIL

Referencing soil boring B-3, hand augers A-5, A-6, A-7, A-8, Cone Penetration Test soundings CPT-7 and CPT-8, and Geoprobe borings G-5, G-6, G-7, G-8 performed at the Bayou Coquille Trail, beginning at the ground surface there is very soft to medium stiff gray, dark gray, and brown fat clay to the full explored depth of 60 ft. The deeper borings and CPT soundings indicate a few relatively thin lean clay and silty sand were encountered. The logs also indicate that various amount of organic matter, roots, and wood were encountered in the borings.

3.2.4 MARSH OVERLOOK TRAIL

Referencing hand augers A-9, A-10, and A-11 performed at the Marsh Overlook Trail, beginning at the ground surface there is gray and dark gray fat clay and organic clay to the 10 ft. depth where the hand augers were terminated. The logs indicate that that varying levels of roots and decayed wood were encountered in the borings.

3.3 Groundwater

The trails are located in a marsh and wetland type environment where areas of standing water are commonly observed. Considering this, it is believed that the groundwater level is located relatively close to the ground surface. At the time of performing soil borings B-1 and B-2, Eustis initially encountered free water at about the 6 ft. depth in the boreholes. After a waiting period of about 15 minutes, the water level rose to a depth of 3 ft. After the 15-minute period, water and drilling fluid was added to the boreholes to continue drilling operations. These field measurements are short term observations and the water level in the borehole may not have fully stabilized. Groundwater levels may vary with time and may be impacted by atmospheric and environmental conditions, changes to site drainage, construction activities, water levels in adjacent bodies of water, etc. If groundwater is expected to impact construction, it should be measured prior to and during construction by the applicable party.

3.4 Seismic Site Class

The site was evaluated to determine the Seismic Site Class based on the International Building Code (2021). Based on the soils encountered in the explorations, the Site Class was determined to be Site Class E.

4 Foundation Analysis

Geotechnical engineering analyses were performed utilizing data collected during the field and laboratory data collection program to evaluate multiple foundation alternatives for the proposed boardwalk improvements. As mentioned in Section 1.2, during schematic design consideration was given to driven concrete, timber, and composite piles as well as helical piles. Preliminary analyses were performed to estimate the axial capacity of each foundation option. These analyses were used to estimate pile lengths and constructability for consideration during the Value Analysis workshop. The workshop resulted in selection of composite piles for final design.

One of the key components driving the pile material selection was constructability. The boardwalks will be constructed using a top-down approach meaning the new boardwalk must support the construction equipment as new segments of boardwalk are constructed. It was determined the construction equipment loads present the controlling load case for the boardwalks. Concrete piles were removed from consideration for final design as it was determined during the workshop that the construction equipment to install the concrete piles resulted in longer and heavier piles, adding cost and complexity to the project. Composite piles were chosen over timber based on their expected life span and timber pile's need for treatment. Helical piles resulted in higher costs when compared to composite piles. Based on the results of the workshop, schematic design progressed with use of composite piles. The results of analyses to estimate the axial capacity of the composite piles are provided in the following sections along estimates of settlement and general construction recommendations. Timber pile capacities are also provided for general reference.

4.1 Axial Capacity

Analyses were performed to estimate the axial compression capacity of several types and lengths of driven composite and timber piles using the FHWA method and the computer program APILE by Ensoft, Inc. Consideration was given to uniform diameter composite piles as well as multiple sizes of Class "B" timber piles in accordance with ASTM D25 Standard Specification for Round Timber Piles. The composite piles considered for the project are EcoPiles by Shoreline Plastics. The piles will primarily develop capacity through "skin friction" along the sides of the piles since no firm bearing strata was encountered within the depth range expected for the boardwalk foundation. Results of the analyses are presented in Table **1** in terms of tip elevation and consider the existing ground elevation at approximately El. 0 to +1 ft. Adjustments must be made to the capacities for lower ground elevations.

Table 1**: Axial Pile Capacity**

Tip Elevation (ft)	Allowable Single Pile Axial Capacity in Compression (kips) Factor of Safety = 3.0					
	Class "B" Timber Piles			Composite Piles		
	8-in. Butt 5-in. Tip	10-in. Butt 6.5-in. Tip	12-in. Butt 8.5-in. Tip	8-in.	10-in.	12-in.
-15	1.7	2.2	3.0	2.4	3.0	3.5
-20	2.6	3.2	4.0	3.5	4.3	5.2
-25	3.5	4.3	5.4	4.6	5.8	6.9
-30	4.2	5.5	6.9	5.9	7.3	8.8

The capacities presented utilize a factor of safety of 3.0 which is recommended for final, long-term conditions. For short-term, construction loading a factor of safety of 2.0 may be used.

4.2 Pile Loading

Design loads of the boardwalk system were furnished by the structural engineers for use in evaluating pile loads. These design loads include the total dead load for the boardwalk structure selected as well as a uniform live load of 90 pounds per square foot. The design live loads for the boardwalks include consideration for the all-terrain type utility vehicles the park currently uses for maintenance which has an estimated weight of approximately 1,500 pounds. For the construction conditions, construction equipment loads were estimated based on the size of equipment that can fit on the boardwalk and expected to be used for installing the piles. The selected pile tip at El. -20 ft. allows for a total construction loading of 4,700 pounds per pile which equates to a total allowable construction loading of 9,400 pounds. The contractor should adhere to this maximum weight limit. A summary of these loads is provided in Table 2.

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Factor of Safety	3.0	2.0
Required Ultimate Axial Capacity	6,963	10,442

As shown in Table 2, the highest required ultimate axial capacity is presented by the construction cases and controls the pile tip elevation. Based on these loads, an 8-inch diameter composite pile with minimum tip elevation of El. -20 ft. was selected to satisfy the construction load cases with factors of safety of 2.0. A minimum pile tip elevation of only El. -15 ft. is needed to satisfy the long-term conditions with a factor of safety of 3.0. Considering this, if the contractor is able to use lighter equipment, with a total weight of 6,000 lbs. (3,000 lbs. per pile), the pile tip elevation may be raised to El. -15 ft.

4.3 Pile Installation

The boardwalk will utilize top-down construction method including during pile installation. Given this method of construction along with the limited access and remote nature of the trails, it is expected that the contractor will utilize smaller equipment similar to a skid-steer for installing the piles as traditional pile driving rigs mounted to crawler cranes will not be suitable for this construction method. In general, impact driving of the composite and Class “B” piles should be limited to the rate of 25 blows per foot using a hammer with 15,000 ft-lbs of energy. Given the smaller equipment expected to be used for pile installation, it is expected the contractor may use a smaller hammer with a lower energy which may require blow counts higher than 25 blows per foot. A vibratory hammer may be used but must apply the vibrations to the top of the pile only. Based on manufacturer recommendations, side grip mounts for vibratory hammers are not permitted for the composite piles.

In reference to the logs of geotechnical explorations performed at the site and the soil profile interpretations presented in Section 3.2, piles with tip elevations in the upper 20 to 25 ft. depth will be installed in primarily soft to medium stiff clays and should be able to driven with normal driving effort not exceeding the above limitations. The contractor should submit their proposed driving system for review which should include the type of equipment used, hammer type, and method of installation. It is recommended that probe piles be driven at each trail to establish driving characteristics prior to production pile driving. The probe piles should be installed using the same equipment and procedure that will be used to install the production piles.

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Long-term settlement of the pile supported boardwalk using composite or timber piles and the allowable pile capacities presented herein are estimated to be on the order of 0.5 to 1 inch. This estimate is based two piles being installed per boardwalk bent and dead loads shown in Section 4.2. To reduce the potential for differential settlement the piles should be installed at the same approximate tip elevation.

5 Hardened Trails

The following sections present recommendations for the new hardened trails including site preparation, fill requirements, and design section thicknesses. The hardened trails will primarily be subjected to pedestrian traffic but will experience occasionally loading from all-terrain type utility vehicles the park currently uses for maintenance.

The new hardened trails will consist of six inches of crushed gravel and geotextile fabric placed on top of the existing trails. Some segments of hardened trail will be raised approximately 0.5 to 1 ft. to the recommended trail elevation using additional gravel. A cross section drawing of a typical hardened trial section is provided on Drawing C7.2.

5.1 Hardened Trail Improvements

The existing hardened gravel trails generally consist of approximately crushed gravel on top of a geotextile separator fabric. It is understood through discussions with the park that the gravel is typically 6 inches thick and performs well, requiring only periodic maintenance. Based on a review of the current hardened trail design and the park's observed performance of the existing trails, it is recommended that the new trails consist of six inches of crushed gravel placed on top of a geotextile separator fabric. It is understood that that the park will leave the existing trail's gravel in place and the new trail will be placed on top. Considering this, the new hardened trail should be placed directly on top of the existing trail while adhering to the subgrade preparation procedures outline in the following section. It is understood that some segments of the hardened trails will be raised more than 6 inches in order to meet the recommended trail surface elevations. In these areas, additional gravel may be placed to meet the design elevation. A tabulation of the recommended hardened trail section is presented in Table 3.

Table 3: Hardened Trail Section

Layer No.	Material Layering	Thickness
1	Crushed Gravel (LaDOTD Section 1003.05.1)	Minimum 6 inches
2	Geotextile Separator Fabric	One Layer
3	Prepared Foundation (Existing Trail or Subgrade)	N/A

The crushed gravel used for the hardened trails should meet the gradation requirements for aggregate surface courses presented in the 2016 Edition of Louisiana Standard Specifications for Roads in Bridges Section 1003.05.1. The new hardened trails should be placed on top of a foundation prepared in accordance with the following section.

5.2 Foundation Preparation

As mentioned, the new hardened trail will be primarily constructed over the existing gravel trail. However, some areas of the new trails may overlap currently vegetated areas near the edges of the existing trail. Prior to construction, any areas where the new hardened trails are to be constructed should be stripped of any loose or soft soils, vegetation, and any deleterious materials. The existing gravel trail should be left in place as it will provide better support than the softer, native underlying clays. The near surface native subgrade soils at the site are soft and will experience a loss in strength when disturbed or exposed to surface water, making it difficult to move equipment or compact fill. The contractor should maintain positive site drainage before and during construction to move surface water away from the areas of construction. Construction should only commence when the foundation soil is dry, stable, and positive drainage away from the construction area is established. Construction should be designed and progressed in a manner causing minimal disturbance to foundation soils, which may require temporary matting.

After removal of unsuitable material from within the footprint of the new trails, the subgrade should be prepared for placement of the new fill and gravel section. The foundation soils should be inspected to ensure the soil is dry, firm, and stable. It is recommended that any unsuitable soils removed be replaced with additional gravel.

It is understood that rectangular timber curbing may be used to border the new hardened trails. It is recommended that the foundation for the timber curbing adhere to the foregoing preparation recommendations presented .

APPENDICES

Appendix A – Geotechnical Data Report

2 March 2023

Stantec Consulting Services Inc.
Suite 1420
1340 Poydras Street
New Orleans, Louisiana 70112-1274

Attention Mr. R. Austin Nall, P.E.
DN 1-504-654-1721
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Email Austin.Nall@stantec.com

Ladies and Gentlemen:

Geotechnical Data Report
National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana
Stantec Subcontract No. 26163-91444
Stantec Project No. 177311762
JELA Project No. 318919
Eustis Engineering Project No. 24895

Transmitted is an electronic copy of our data report covering professional geotechnical services for the subject project. Hard copies are available upon request.

Thank you for asking us to perform these geotechnical services. If you have any questions or require further clarification, please do not hesitate to contact us.

Yours very truly,

EUSTIS ENGINEERING L .L.C.

Patrick Thurmond

PATRICK A. THURMOND, P.E.

STATE OF LOUISIANA
PATRICK A. THURMOND
License No. 44237
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

A. E. Carvajal:asp/bar

GEOTECHNICAL DATA REPORT

NATIONAL PARK SERVICE

JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE

TRAIL IMPROVEMENTS AT BARATARIA PRESERVE

NEW ORLEANS, LOUISIANA

STANTEC SUBCONTRACT NO. 26163-91444

STANTEC PROJECT NO. 177311762

JELA PROJECT NO. 318919

EUSTIS ENGINEERING PROJECT NO. 24895

FOR
STANTEC CONSULTING SERVICES INC.
SALT LAKE CITY, UTAH

BY

EUSTIS
ENGINEERING L.L.C.
SINCE 1946

METAIRIE, LOUISIANA

2 MARCH 2023

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

FIGURES

APPENDICES

GEOTECHNICAL DATA REPORT (GDR)

NATIONAL PARK SERVICE

JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE

TRAIL IMPROVEMENTS AT BARATARIA PRESERVE

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STANTEC SUBCONTRACT NO. 26163-91444

STANTEC PROJECT NO. 177311762

JELA PROJECT NO. 318919

EUSTIS ENGINEERING PROJECT NO. 24895

INTRODUCTION

1. This geotechnical data report contains the results of a geotechnical exploration performed for improvements along the Education, Visitor Center, Bayou Coquille, and Marsh Overlook Trails within the Barataria Preserve located in New Orleans, Louisiana. A site vicinity map is presented in Figure 1. The geotechnical exploration was performed in general accordance with Eustis Engineering L.L.C.'s revised proposal dated 29 September 2022. Stantec Consulting Services Inc. (Stantec) provided authorization to proceed with the scope of work by issuance of Consulting Services Subcontract No. 26163-91444 effective 14 September 2022. The National Park Service (NPS) operates the Barataria Preserve as part of the Jean Lafitte National Historical Park and Preserve.

SCOPE OF SERVICE

2. The exploration as originally proposed included drilling of three undisturbed sample type soil borings, performance of two cone penetration tests (CPTs), and thirteen collocated

Geoprobe® soil test borings and dynamic cone penetration tests (DCPTs) . After site visits on 4 August and 26 October 2022, the exploration plan was revised due to site access issues to include three undisturbed sample type soil borings, two CPTs, four Geoprobe borings, and thirteen collocated hand auger borings and DCPTs. The geotechnical exploration was performed to evaluate subsoil conditions and stratification, and to obtain samples of the various strata encountered. This data report transmits the results of the geotechnical exploration.

FIELD EXPLORATION

3. General. Eustis Engineering submitted a final revised work plan to Stantec and NPS on 27 October 2022. NPS indicated on 15 December 2022, a Coastal Use Permit (CUP) for the work had been received and coordinated with Eustis Engineering and Stantec to begin field activities 3 January 2023. Field activities took place between 3 January and 6 February 2023. Three undisturbed sample type soil borings, designated as B-1 through B-3, were drilled at the site between 3 and 5 January 2023 using a truck-mounted drill rig. Thirteen collocated auger borings and DCPTs, designated as A-0 through A-12 and DCPT-0 through DCPT-12, respectively, were performed using handheld equipment between 17 and 25 January 2023. Two CPTs, designated as CPT-6 and CPT-8, and four direct push borings, designated as G-5 through G-8, were performed using a compact Geoprobe tripod assembly between 31 January and 6 February 2023. A summary of the field exploration including designation, type, depth, and dates performed is provided in Table 1. We provide a site vicinity map and summary of location plans on Figure 1, Sheets 1 and 2, respectively. The approximate locations for the borings, CPTs, and DCPTs for each individual trail are shown on Figure 2, Sheets 1 through 4.

TABLE 1: SUMMARY OF FIELD EXPLORATION ACTIVITES

DESIGNATION	TYPE	APPROXIMATE DEPTH IN FEET	LATITUDE	LONGITUDE	DATE PERFORMED
B-1	Undisturbed Sample Type Boring	60.0	29.78478	-90.11186	1/5/2023
B-2		60.0	29.78359	-90.11470	1/4/2023
B-3		60.0	29.79335	-90.12272	1/3/2023
A-0	Hand Auger	10.0	29.78702	-90.11392	1/20/2023
A-1		10.0	29.78702	-90.11392	1/20/2023
A-2		10.0	29.78343	-90.11466	1/25/2023
A-3		10.0	29.78343	-90.11589	1/20/2023
A-4		10.0	29.78374	-90.11718	1/25/2023
A-5		6.0[(1)]	29.79289	-90.12471	1/18/2023
A-6		8.0[(1)]	29.79226	-90.12643	1/17/2023
A-7		4.0[(1)]	29.79166	-90.12798	1/17/2023
A-8		8.0[(1)]	29.79078	-90.13020	1/17/2023
A-9		8.0[(1)]	29.79111	-90.13084	1/17/2023
A-10		8.0[(1)]	29.79311	-90.13256	1/17/2023
A-11		8.0[(1)]	29.79470	-90.13359	1/18/2023
A-12		10.0	29.78259	-90.11735	1/25/2023
DCPT-0	Dynamic Cone Penetration Test	8.2	29.78702	-90.11392	1/20/2023
DCPT-1		8.2	29.78702	-90.11392	1/20/2023
DCPT-2		8.2	29.78343	-90.11466	1/20/2023
DCPT-3		8.1	29.78343	-90.11589	1/19/2023
DCPT-4		8.4	29.78374	-90.11718	1/18/2023
DCPT-5		8.4	29.79289	-90.12471	1/17/2023
DCPT-6		8.5	29.79226	-90.12643	1/17/2023
DCPT-7		8.2	29.79166	-90.12798	1/17/2023
DCPT-8		8.6	29.79078	-90.13020	1/17/2023
DCPT-9		8.4	29.79111	-90.13084	1/18/2023
DCPT-10		9.6	29.79311	-90.13256	1/18/2023
DCPT-11		8.1	29.79470	-90.13359	1/18/2023
DCPT-12		8.6	29.78259	-90.11735	1/19/2023
G-5	Direct Push Boring	32.0	29.79284	-90.12495	2/6/2023
G-6		32.0	29.79222	-90.12642	2/3/2023
G-7		32.0	29.79173	-90.12770	2/6/2023
G-8		12.0[(2)]	29.79077	-90.13020	1/31/2023
CPT-6	Cone Penetration Test	30.1	29.79223	-90.12642	2/3/2023
CPT-8		31.1	29.79077	-90.13020	1/31/2023

[(1)] Unable to advance auger beyond terminal depth.
[(2)] Drilling interrupted due to site access conflicts.

4. Detailed descriptive logs of the undisturbed sample and direct push borings are presented in both tabular and graphical form in Appendix I. Logs and records of the collocated auger

borings and DCPTs are provided in Appendix II. Records of the CPT soundings are plotted graphically with depth and are provided in Appendix III. Upon completion of each exploration point, the holes were backfilled and/or or sealed in accordance with current regulatory requirements. GPS coordinates were obtained for the locations using a handheld device and should be considered approximate. These coordinates are shown in terms of latitude and longitude in Table 1 above and on the boring logs and CPT records in Appendices I through III.

5. Undisturbed Sample Type Borings. The undisturbed sample type borings were drilled with a truck-mounted rig. Samples of cohesive or semi-cohesive subsoils were obtained in the borings at close intervals or changes in stratum using a 3-in. diameter thin wall Shelby tube sampling barrel. The samples were immediately extruded from the sampling barrel, inspected, and visually classified by Eustis Engineering's soil technician. Pocket penetrometer tests were performed on the soil samples to give a general indication of their shear strength or consistency. The results of these tests are shown on the boring logs in Appendix I under the column heading "PP." Representative portions were then promptly placed in moistureproof containers and sealed for preservation of their natural moisture content.

6. Samples of cohesionless and semi-cohesive subsoils were obtained during the performance of in-situ Standard Penetration Tests. This test consists of driving a 2-in. diameter sampler 1 foot into the soil after first seating it 6 inches. A 140-lb weight dropped 30 inches is used to advance the sampler. The number of blows required to drive the sampler is indicative of the relative density of cohesionless soils and the consistency of cohesive soils. The samples were visually classified by our soil technician and then placed in moistureproof containers for preservation of their natural moisture content.

The results of the Standard Penetration Tests are shown on the boring logs in Appendix I under the column heading "SPT."

7. Auger Borings. Disturbed grab samples were collected from the auger blades in Borings A-0 through A-12 and were visually inspected and classified by Eustis Engineering's soil technician. Representative samples were placed and sealed in moistureproof containers for transportation to our laboratory.

8. Dynamic Cone Penetration Tests. The DCPTs were performed using an 8-kg (17.6-lb) hammer (Type 1) and a 4.6-kg (10.1-lb) hammer (Type 2). The cone used on this dynamic cone penetrometer (DCP) has an apex angle of 60° and a diameter of 0.79 inches and was manufactured by Kessler Soils Engineering Products, Inc., under license of the U.S. Army Corps of Engineers (USACE). Penetration resistances for the DCPTs are recorded in terms of the number of blows from a fixed weight falling a fixed distance advancing the cone a measured distance. With the K-100 DCP device held in a vertical or plumb position, the hammer was repeatedly lifted and released from the standard height of approximately 575 millimeters (22.6 inches) and cumulative penetrations were recorded. The number of blows from the hammer required to advance the tip approximately 50 mm was recorded to the terminal depth of the DCPT. The penetration resistance measured by the K-100 DCP has been correlated by the USACE to the California Bearing Ratio and Modulus of Rigidity (or Soil Resilient Modulus, MR) for primary use as a design tool for pavements. Use of these data for other applications may not be appropriate and should be assessed by the designer of record in conjunction with Eustis Engineering.

9. Direct Push Borings. Soil was continuously sampled in the Geoprobe borings by direct push methods using a Macro-Core® (MC) Geoprobe sampler. The samples were obtained using an MC7 sampler with plastic liners that were sealed immediately after being retrieved to preserve their natural moisture content. The samples were brought to our

laboratory, extruded from the sample liners, inspected, and visually classified by Eustis Engineering's laboratory technician.

10. Cone Penetration Tests. The CPT soundings were performed using a compact Geoprobe tripod assembly and an electronic piezocone penetrometer having a 50-MPa capacity and a net area ratio of 0.841. Testing was performed in general accordance with the methods and procedures outlined in ASTM D5778-20. The CPTs were performed using a 10-cm^2 cross-sectional area cone with a 60° apex angled tip and a 150-cm^2 friction sleeve area. The penetrometer was hydraulically advanced into the ground at a rate of 2 cm/sec. During the sounding, CPT parameters (tip resistance, sleeve friction, and pore pressure) were recorded at 5-cm depth intervals.

11. The plots presented on the CPT records in Appendix III provide measurements of tip resistance (q_t), sleeve friction (f_s), and pore pressure (u_2). Also shown on these plots are interpreted undrained shear strengths (S_u), estimated standard penetration resistances (N_{60}), and interpreted soil behavior type (SBT). These values are interpreted from correlations developed by Lunne, Robertson and Powell (1997 and 1986) and our engineering experience in southeast Louisiana and the Gulf Coast region. The interpreted SBT is determined according to the non-normalized friction-ratio based soil behavior chart established by Robertson and Campanella (1986).

12. Our standard practice, and that of others in the southeastern Louisiana area, has been to use one site-specific correction factor to estimate S_u based on a study performed by the USACE entitled "Cone Penetration Test Correlations in New Orleans Area Practice, Report Submitted to the New Orleans District, U.S. Army Corps of Engineers" by the Department of Civil and Environmental Engineering, Virginia Tech, Blacksburg, Virginia, dated November 2010, and other projects where CPTs and 5-in. diameter undisturbed borings were performed. Two correlation methods for interpreting undrained shear strength are

presented on the CPT logs. These include $S_u(2)$ and $S_u(6)$ based on cone factors of N_{kT} = 15 and N_c = 20, respectively. The plots of interpreted shear strength are included in Appendix III. Please refer to the cone penetration test correlation document in Appendix III following the CPT records for additional details.

LABORATORY TESTS

13. Soil mechanics laboratory tests, consisting of visual classification, natural water content, unit weight, unconfined compression shear (UC), and unconsolidated undrained triaxial compression shear (OB), were performed on selected samples obtained from the soil test borings. These tests are necessary to determine the relative strength and compressibility of the subsoils. In addition, Atterberg liquid limits (LL) and plastic limits (PL) tests and the test establishing the percent passing the U.S. Standard No. 200 mesh sieve (-#200) were performed on selected representative samples to aid in the classification of the subsoils. The results of these laboratory tests are tabulated on the boring logs presented in Appendices I and II.

14. Grain size sieve analyses (SV) were performed on selected representative samples to establish their particle size distribution. These tests were performed to help classify cohesionless soils encountered in the borings. Separate plots of these test results are provided in Appendix I following the boring logs.

DESCRIPTION OF SITE CONDITIONS

Site Description

15. The project site is located within the NPS Jean Lafitte National Historical Park and Preserve. The project will consist of repairs to four trails which compromise boardwalks and hardened trails. The four trails include the Visitor Center, Bayou Coquille, Marsh

Overlook, and Education Trail. In total, the trails make up 1.76 miles of boardwalk and hardened trail.

Stratigraphy

16. Graphical subsurface soil profiles depicting our interpretations of stratigraphy are provided in Figures 3 through 6. Based on our review of the boring logs, the ground surface at Borings B-1 through B-3 was mantled by approximately 3 inches of asphalt underlain by apparent fill materials comprising medium dense gray and tan poorly graded sand that extended to approximately 2 feet below existing grade. Below these materials and from the ground surface at the remaining locations, we encountered primarily soft to medium stiff gray and tan fat clay with some lean clay to the terminal depths of the auger borings approximately 6 to 10 feet below existing grade and approximately 60 feet below grade at the undisturbed sample type borings. Exceptions to this general stratigraphy include isolated strata of organic clay and humus generally encountered between 0 and 8 feet and loose to medium dense gray sand encountered below 37 feet in Boring B-1. The CPT records show general agreement of interpreted soil types in comparison to the soil samples we collected from the borings for this project.

Groundwater

17. Visual observations of groundwater were made in Borings B-2 and B-3 during drilling. The borings were initially drilled without the addition of water to a depth of 6 feet where groundwater was initially encountered. After an observation period of approximately 15 minutes, the depth to groundwater was observed to have risen to a depth of 3 feet below the existing ground surface. Note, the observation period was relatively short due to the limited time required to complete our field exploration, and the water level in the borehole may not have stabilized before our field crew backfilled the hole before

demobilizing from the site. Standing water was observed at Borings A-2, A-3, A-4, and A-12. The depth to groundwater should be expected to vary with climatic conditions, local drainage improvements, onsite construction activities, water levels in the nearby canals, and/or other factors. For this reason, the depth to groundwater should be determined immediately prior to beginning work by those persons responsible for construction.

GEOTECHNICAL SERVICES DURING CONSTRUCTION

18. Eustis Engineering can provide additional geotechnical services which may include consultation during design and construction. Geotechnical engineering services may include completing analyses and recommendations to support design of foundation elements for the new pathways. Other services include compaction and density tests of structural fill, logging the installation of piles (job and test), performance and evaluation of static and dynamic load tests, concrete and steel inspection, and other soils and materials testing services to meet the project needs.

LIMITATIONS

19. This report has been prepared in accordance with generally accepted geotechnical engineering practices for the exclusive use of the NPS and Stantec for specific application to the subject site. In the event of any changes in the nature or location of the proposed trail improvements, the information contained in this report shall not be considered valid unless the changes are reviewed, and this report is modified and verified in writing. Should these data be used by anyone other than the NPS and Stantec, the user should contact Eustis Engineering for interpretation of data and to secure any other information pertinent to this project.

20. Our findings in this report are based on selected points of field exploration, laboratory testing, and our understanding of the proposed project. Further variations in soil or

groundwater conditions could exist between and beyond the exploration points. The nature and extent of these variations may not become evident until construction. Variations in soil or groundwater may require additional studies, consultation, and possible revisions to our recommendations.

21. Eustis Engineering has striven to provide our services in accordance with generally accepted geotechnical engineering practices in this locality at this time. No warranty or guarantee is expressed or implied. The results of the soil borings, CPTs, and laboratory tests contained in the Appendices of this report may be included in the plans and specifications.

22. The scope of our services does not include an environmental assessment or an investigation for the presence or absence of wetlands and hazardous or toxic materials in the soil; surface water; groundwater; or air on, below, or adjacent to the subject property. Furthermore, the scope does not include the investigation or detection of biological pollutants at the site. The term “biological pollutants” includes, but is not limited to, molds, fungi, spores, bacteria, viruses, and the byproducts of any such biological organisms.

SATELLITE IMAGERY DATED: 17 JANUARY 2021

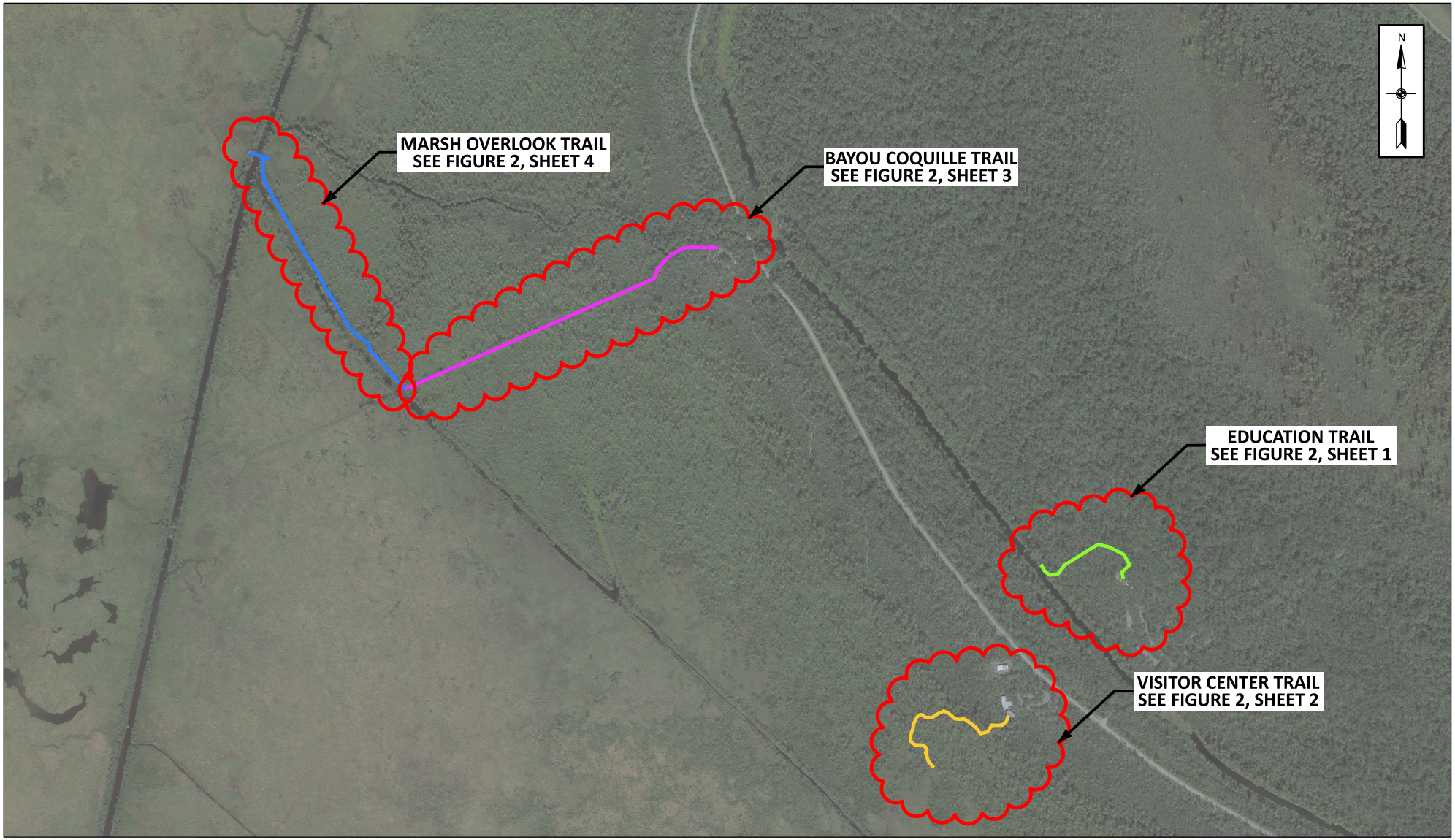
NOT TO SCALE

SITE VICINITY MAP

NATIONAL PARK SERVICE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
NEW ORLEANS, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: A.E.C.	JOB NO.: 24895
CHECKED BY: P.A.T.	DATE: 15 FEB 2023
CADD FILE: PLAN.DGN	FIGURE 1 SHEET 1 OF 2



SATELLITE IMAGERY DATED: 17 JANUARY 2021

NOT TO SCALE

SUMMARY OF LOCATION PLANS

NATIONAL PARK SERVICE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
NEW ORLEANS, LOUISIANA

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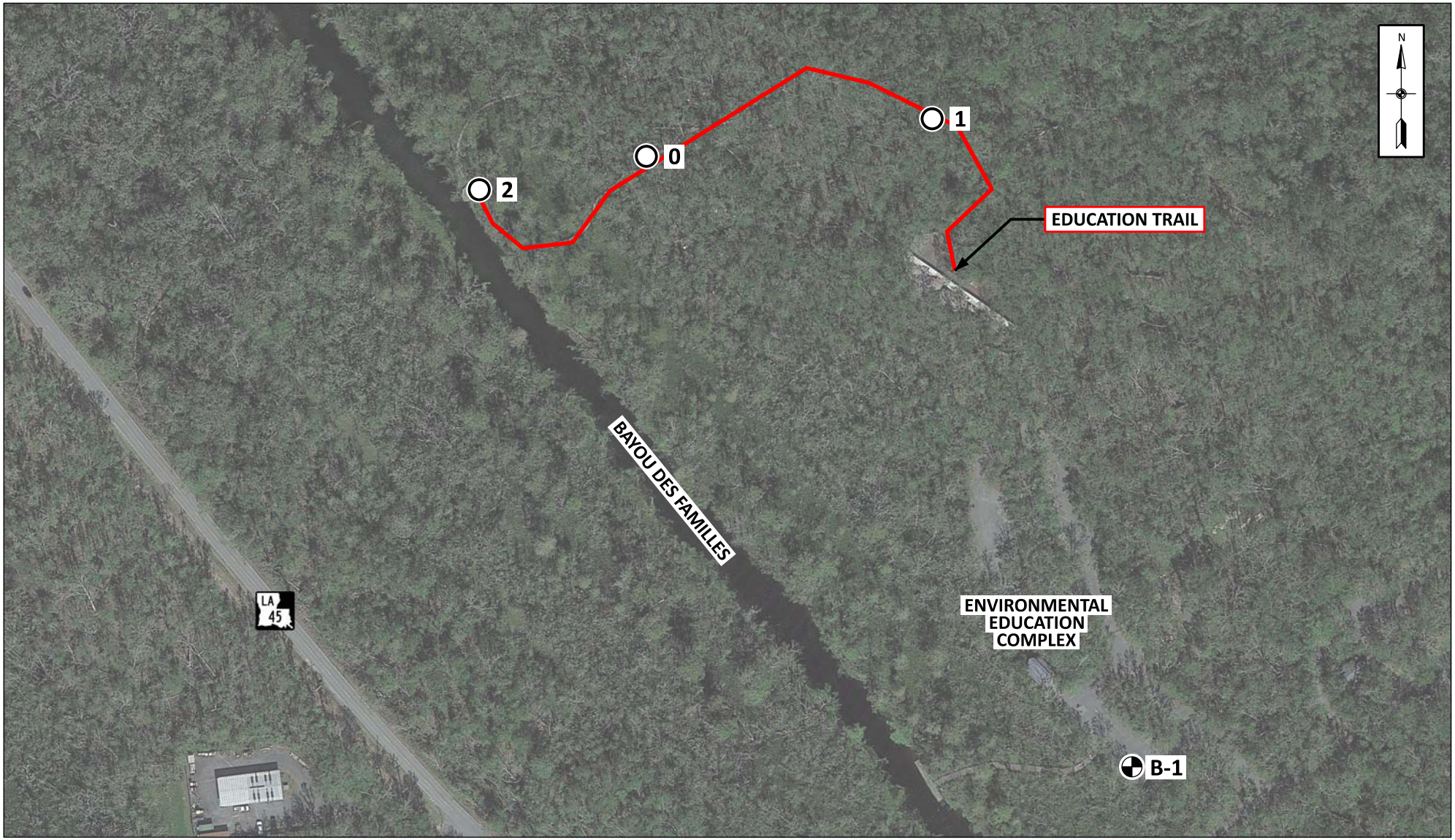
CADD FILE: PLAN.DGN	FIGURE 1 SHEET 2 OF 2



SATELLITE IMAGERY DATED: 17 JANUARY 2021

NOT TO SCALE

○ DENOTES APPROXIMATE LOCATIONS OF COLOCATED DYNAMIC CONE PENETRATION TESTS AND HAND AUGERS PERFORMED BETWEEN 20 AND 25 JANUARY 2023

◒ DENOTES APPROXIMATE LOCATION OF SOIL BORING DRILLED ON 5 JANUARY 2023

LOCATION PLAN
EDUCATION TRAIL

NATIONAL PARK SERVICE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
NEW ORLEANS, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

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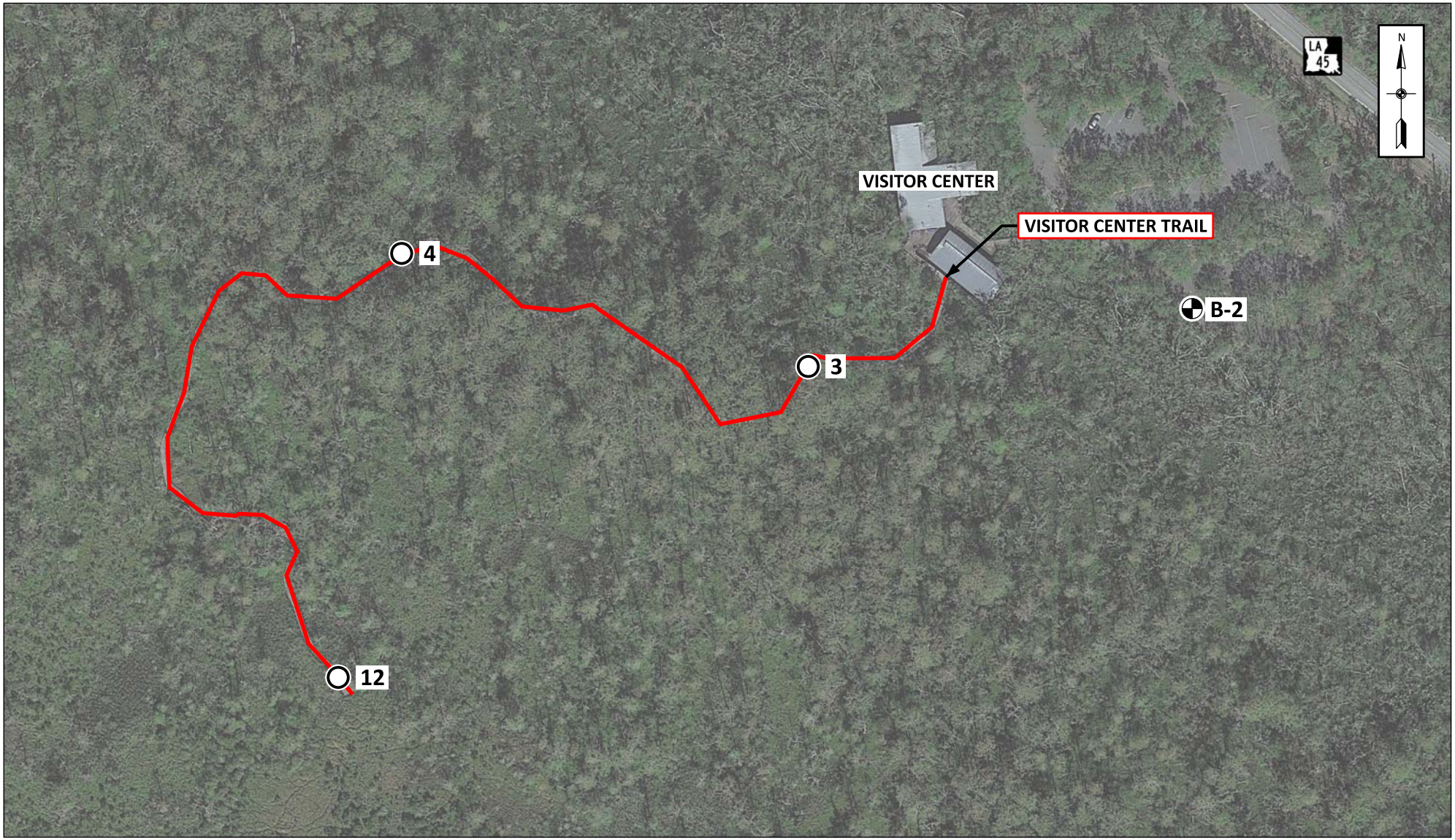
CADD FILE: PLAN.DGN	FIGURE 2 SHEET 1 OF 4



SATELLITE IMAGERY DATED: 17 JANUARY 2021

NOT TO SCALE

○ DENOTES APPROXIMATE LOCATIONS OF COLOCATED DYNAMIC CONE PENETRATION TESTS AND HAND AUGERS PERFORMED BETWEEN 20 AND 25 JANUARY 2023

◐ DENOTES APPROXIMATE LOCATION OF SOIL BORING DRILLED ON 4 JANUARY 2023

LOCATION PLAN
VISITOR CENTER TRAIL

NATIONAL PARK SERVICE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
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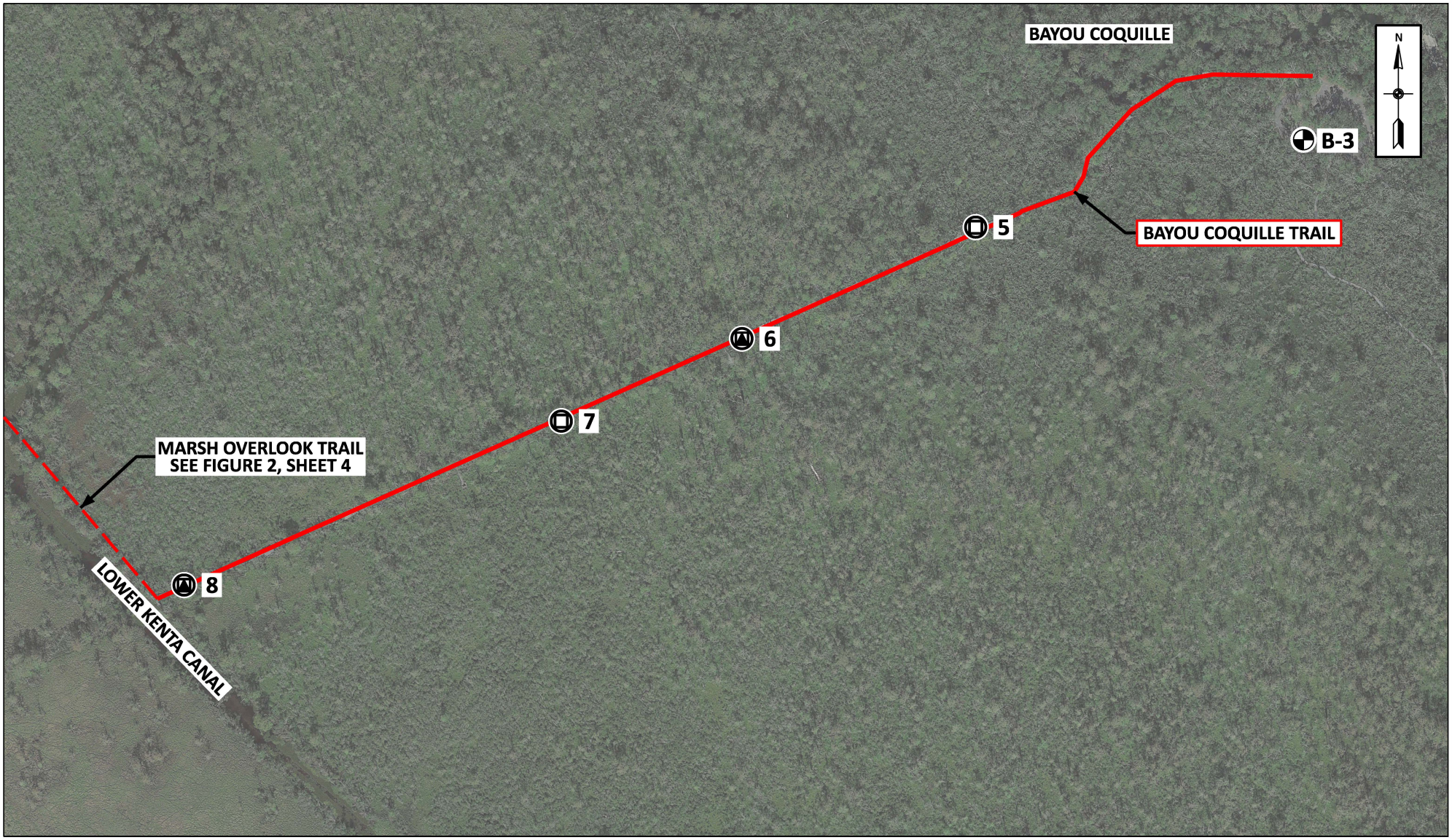
CADD FILE: PLAN.DGN	FIGURE 2 SHEET 2 OF 4



SATELLITE IMAGERY DATED: 17 JANUARY 2021

NOT TO SCALE

- DENOTES APPROXIMATE LOCATIONS OF COLOCATED HAND AUGER, DYNAMIC CONE PENETRATION TEST AND GEOPROBE BORING PERFORMED BETWEEN 17 JANUARY 2023 AND 6 FEBRUARY 2023
- DENOTES APPROXIMATE LOCATIONS OF COLOCATED HAND AUGER, DYNAMIC CONE PENETRATION TEST, GEOPROBE BORING AND CONE PENETRATION TEST PERFORMED BETWEEN 17 JANUARY 2023 AND 3 FEBRUARY 2023
- DENOTES APPROXIMATE LOCATION OF SOIL BORING DRILLED ON 3 JANUARY 2023

LOCATION PLAN
BAYOU COQUILLE TRAIL

NATIONAL PARK SERVICE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
NEW ORLEANS, LOUISIANA

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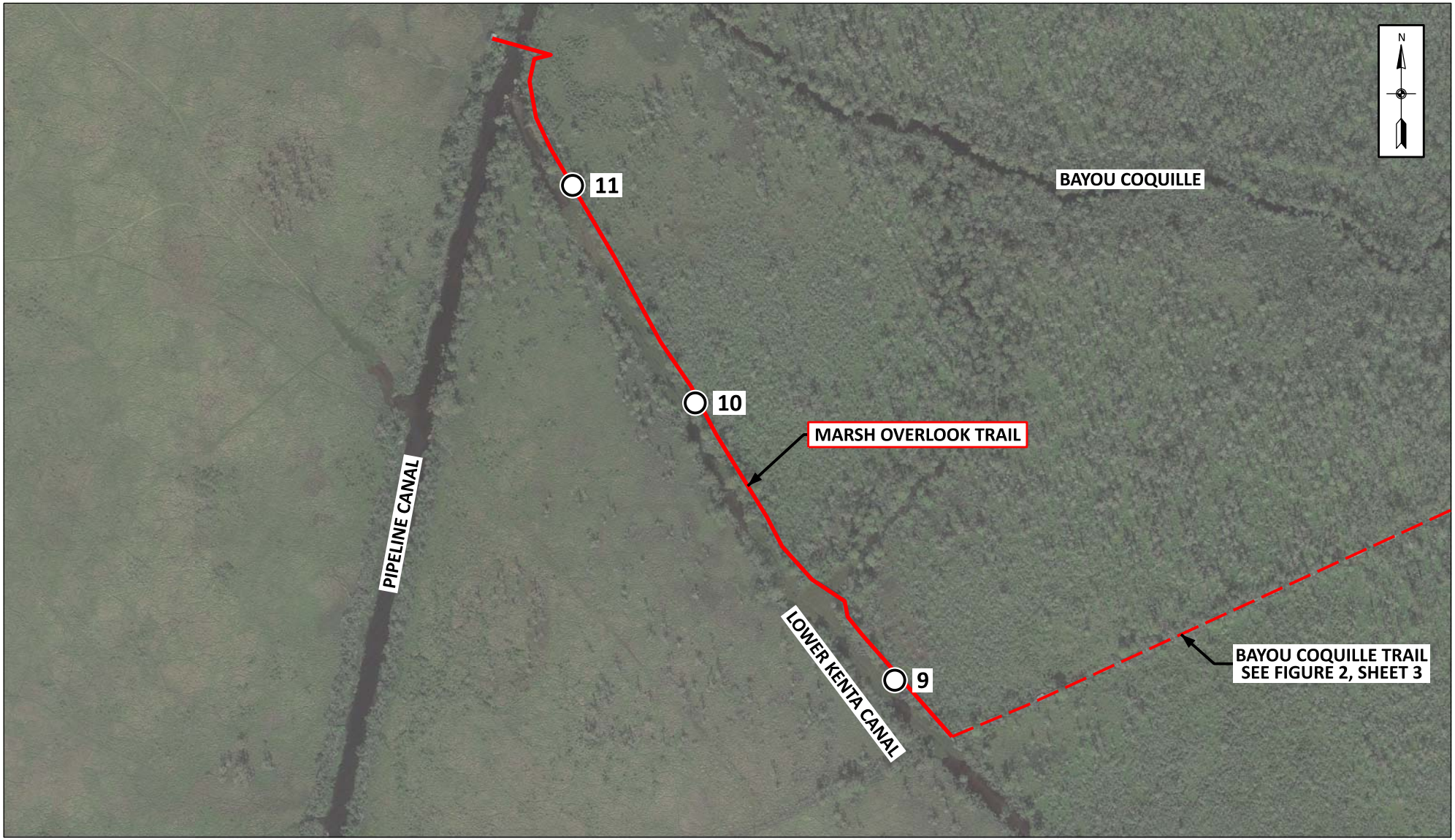
CADD FILE: PLAN.DGN	FIGURE 2 SHEET 3 OF 4



SATELLITE IMAGERY DATED: 17 JANUARY 2021

NOT TO SCALE

○ DENOTES APPROXIMATE LOCATIONS OF COLOCATED DYNAMIC CONE PENETRATION TESTS AND HAND AUGERS PERFORMED ON 17 AND 18 JANUARY 2023

LOCATION PLAN
MARSH OVERLOOK TRAIL

NATIONAL PARK SERVICE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
NEW ORLEANS, LOUISIANA

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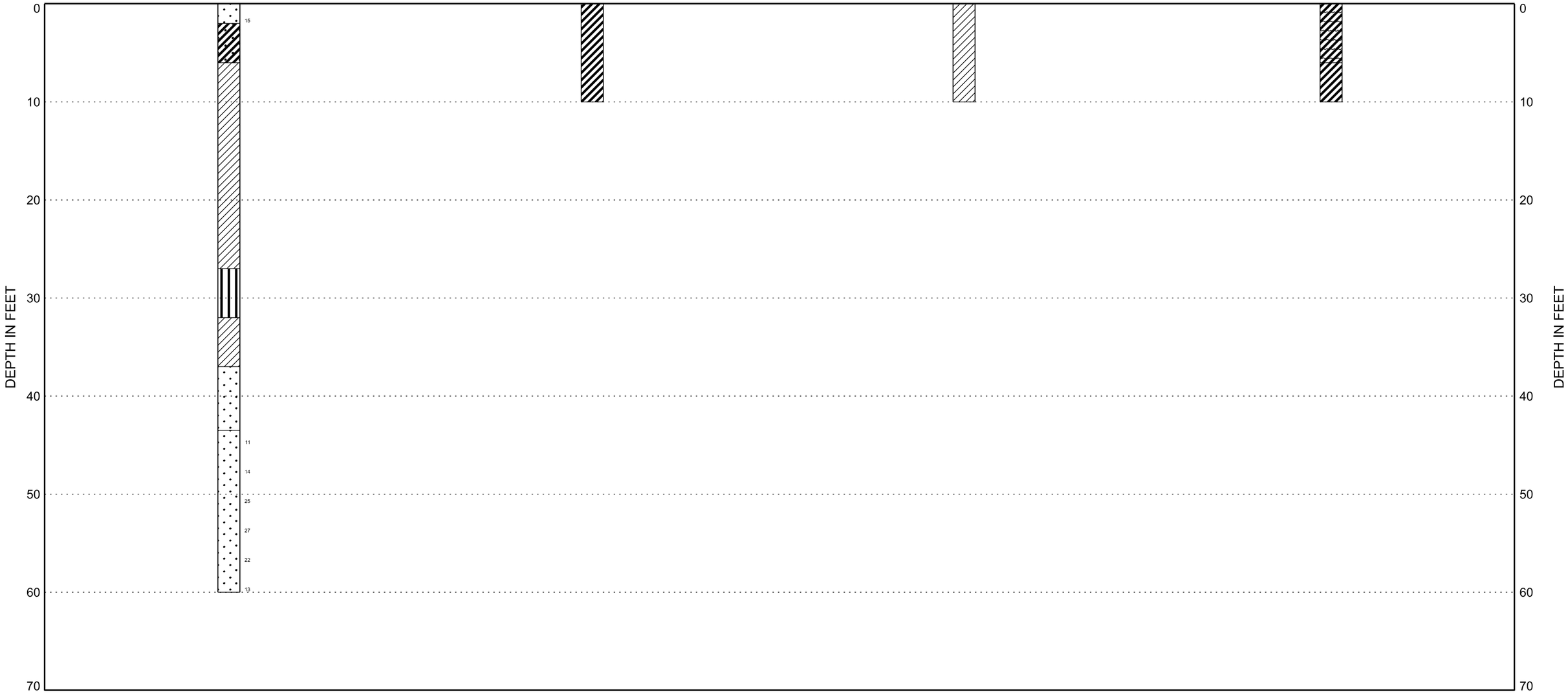
CADD FILE: PLAN.DGN	FIGURE 2 SHEET 4 OF 4

B-1
05 JAN 23
29.784776° -90.111863°

A-0
20 JAN 23
29.787020° -90.113920°

A-1
20 JAN 23
29.787158° -90.112710°

A-2
25 JAN 23
29.786899° -90.114699°



BORING MATERIAL GRAPHICS

- FAT CLAY
- LEAN CLAY
- SANDY LEAN CLAY
- ORGANIC CLAY
- SAND
- SILT

NOTE:

THE NUMBERS TO THE RIGHT OF THE BORING LOGS REPRESENT THE RESULTS OF THE STANDARD PENETRATION TESTS

SUBSURFACE SOIL PROFILE
EDUCATION TRAIL

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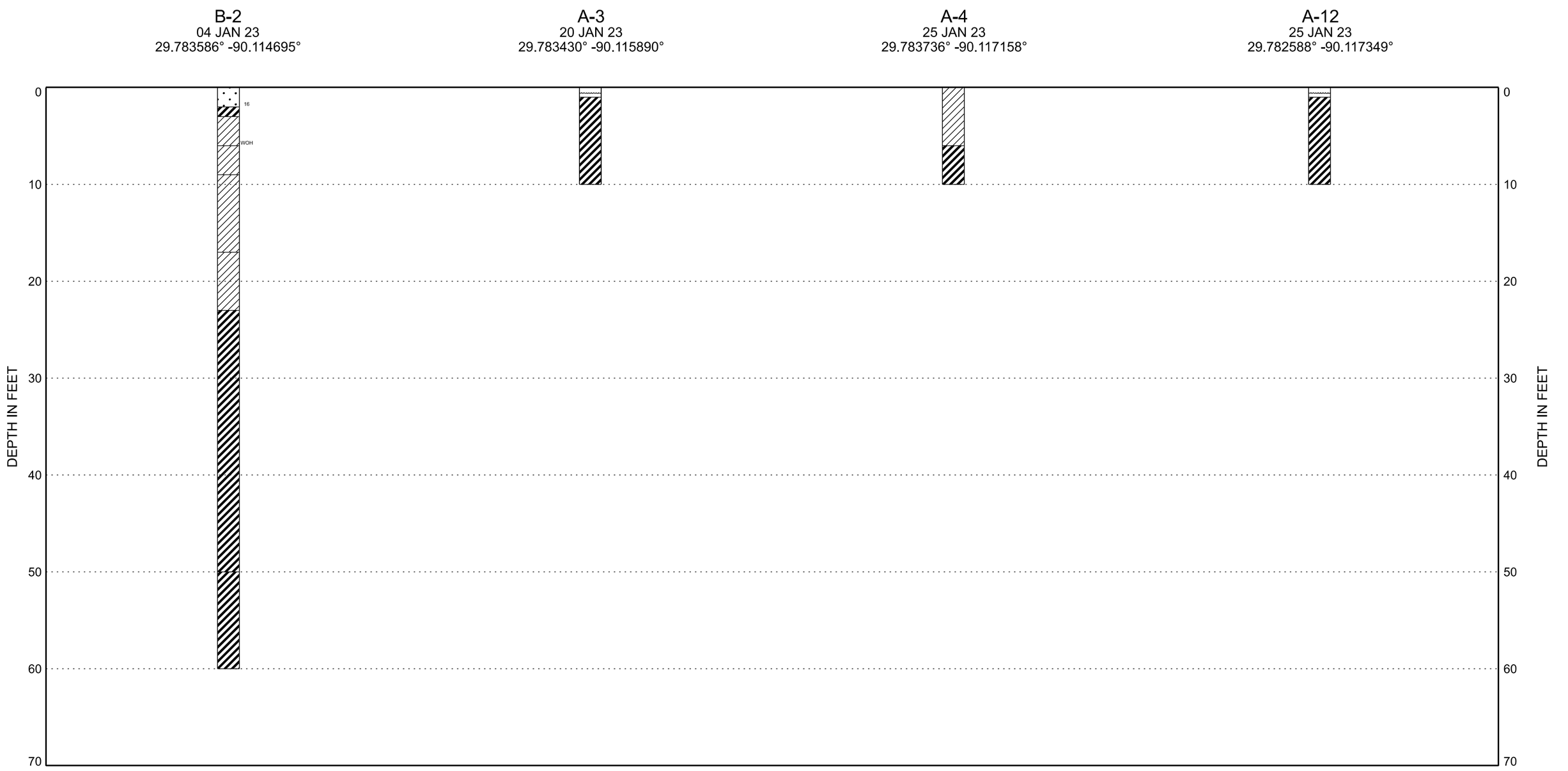
CADD FILE: PROFILES.DGN	FIGURE 3



BORING MATERIAL GRAPHICS

- FAT CLAY
- LEAN CLAY
- SANDY LEAN CLAY
- ORGANIC CLAY
- SAND
- SILT
- HUMUS

NOTE:

THE NUMBERS TO THE RIGHT OF THE BORING LOGS REPRESENT THE RESULTS OF THE STANDARD PENETRATION TESTS

SUBSURFACE SOIL PROFILE
VISITOR CENTER TRAIL

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CADD FILE: PROFILES.DGN	FIGURE 4

B-3
03 JAN 23
29.793350° -90.122718°

A-5
18 JAN 23
29.792856° -90.124887°

G-5
06 FEB 23
29.792837° -90.124945°

A-6
17 JAN 23
29.792197° -90.126480°

CPT-6
03 FEB 23
29.792233° -90.126420°

Sleeve Stress f_s (ksf)
1 0.8 0.6 0.4 0.2

Tip Resistance q_t (tsf)
50 100 150 200 250

0 20 40 60 80
Pore Pressure u_2 (psi)

G-6
03 FEB 23
29.792233° -90.126420°

DEPTH IN FEET
0 10 20 30 40 50 60 70

BORING MATERIAL GRAPHICS

- FAT CLAY
- LEAN CLAY
- SANDY LEAN CLAY
- ORGANIC CLAY
- SAND
- HUMUS
- SILTY SAND

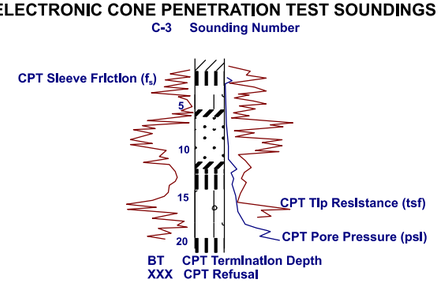
CPT MATERIAL GRAPHICS

- SENSITIVE FINE GRAINED
- ORGANIC SOILS, PEATS
- CLAY
- SILTY CLAY TO CLAY
- CLAYEY SILT TO SILTY CLAY
- SANDY SILT TO CLAYEY SILT
- SILTY SAND TO SANDY SILT
- SAND TO SILTY SAND
- SAND
- GRAVELLY SAND TO SAND
- VERY STIFF FINE GRAINED (*)
- SAND TO CLAYEY SAND (*)

* OVERCONSOLIDATED OR CEMENTED

Robertson et al (1986) q vs Rf

ELECTRONIC CONE PENETRATION TEST SOUNDINGS



NOTE:

THE NUMBERS TO THE RIGHT OF THE BORING LOGS REPRESENT THE RESULTS OF THE STANDARD PENETRATION TESTS

SUBSURFACE SOIL PROFILE
BAYOU COQUILLE TRAIL

NATIONAL PARK SERVICE
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TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
NEW ORLEANS, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: A.E.C.	JOB NO.: 24895
CHECKED BY: P.A.T.	DATE: 9 FEB 2023
CADD FILE: PROFILES.DGN	FIGURE 5 (SHEET 1 OF 2)

A-7
17 JAN 23
29.791705° -90.127682°

G-7
06 FEB 23
29.791730° -90.127700°

A-8
17 JAN 22
29.790762° -90.130232°

CPT-8
31 JAN 23
29.790770° -90.130200°

Sleeve Stress f_s (ksf)
1 0.8 0.6 0.4 0.2

Tip Resistance q_t (tsf)
50 100 150 200 250

0 20 40 60 80
Pore Pressure u_2 (psi)

G-8
31 JAN 23
29.790770° -90.130200°

DEPTH IN FEET
0 10 20 30 40 50 60 70

BORING MATERIAL GRAPHICS

- FAT CLAY
- LEAN CLAY
- SANDY LEAN CLAY
- ORGANIC CLAY
- SAND
- SILT
- HUMUS

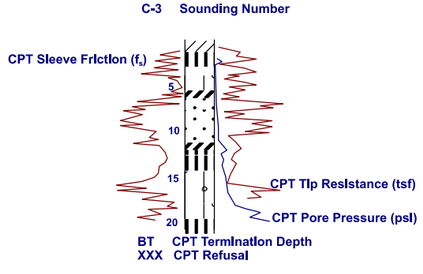
CPT MATERIAL GRAPHICS

- SENSITIVE FINE GRAINED
- ORGANIC SOILS, PEATS
- CLAY
- SILTY CLAY TO CLAY
- CLAYEY SILT TO SILTY CLAY
- SANDY SILT TO CLAYEY SILT
- SILTY SAND TO SANDY SILT
- SAND TO SILTY SAND
- SAND
- GRAVELLY SAND TO SAND
- VERY STIFF FINE GRAINED (*)
- SAND TO CLAYEY SAND (*)

* OVERCONSOLIDATED OR CEMENTED

Robertson et al (1986) q vs Rf

ELECTRONIC CONE PENETRATION TEST SOUNDINGS



NOTE:

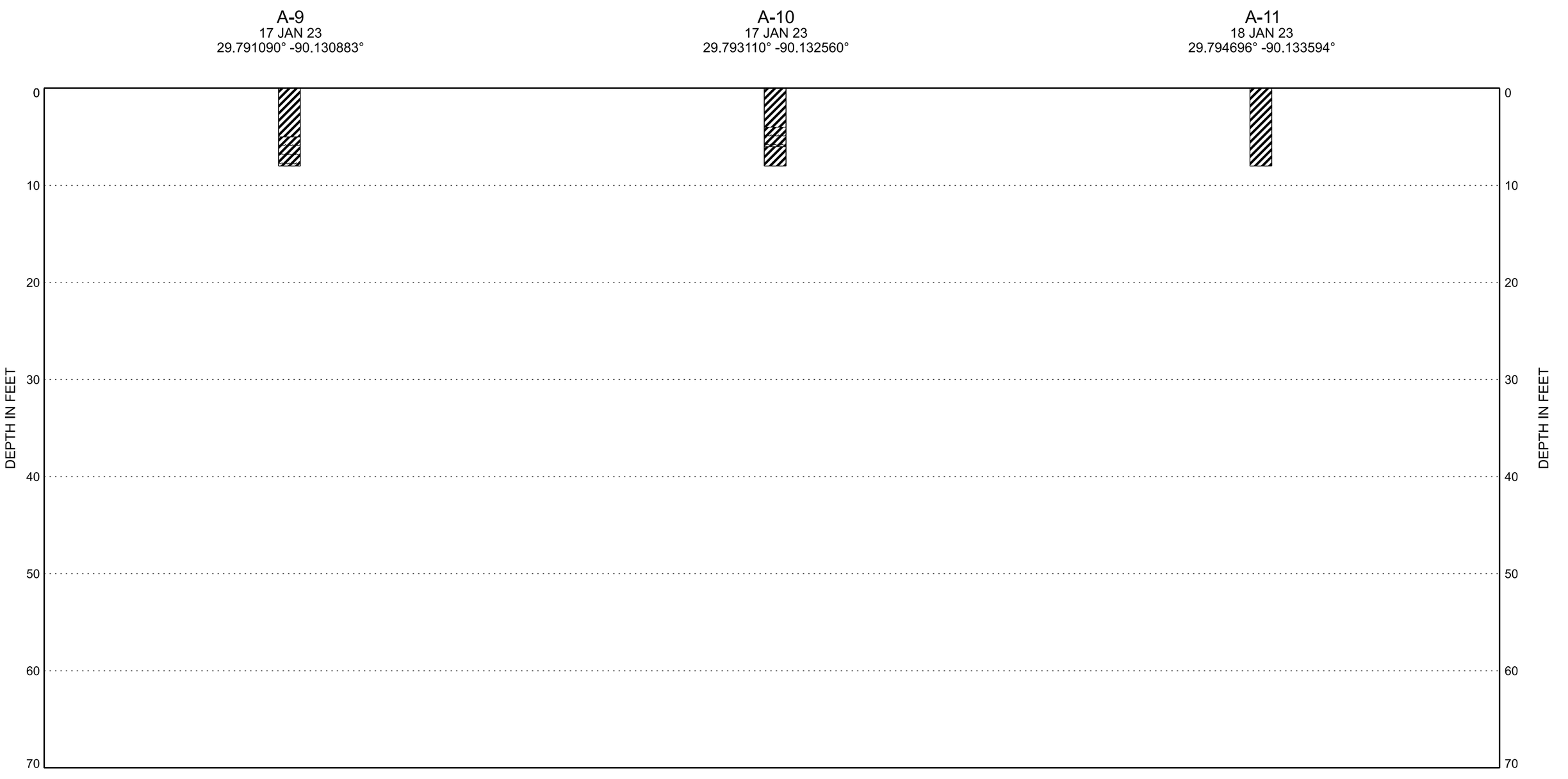
THE NUMBERS TO THE RIGHT OF THE BORING LOGS REPRESENT THE RESULTS OF THE STANDARD PENETRATION TESTS

SUBSURFACE SOIL PROFILE
BAYOU COQUILLE TRAIL

NATIONAL PARK SERVICE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
NEW ORLEANS, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: A.E.C.	JOB NO.: 24895
CHECKED BY: P.A.T.	DATE: 9 FEB 2023
CADD FILE: PROFILES.DGN	FIGURE 5 (SHEET 2 OF 2)



BORING MATERIAL GRAPHICS

FAT CLAY

ORGANIC CLAY

NOTE:

THE NUMBERS TO THE RIGHT OF THE BORING LOGS REPRESENT THE RESULTS OF THE STANDARD PENETRATION TESTS

SUBSURFACE SOIL PROFILE
MARSH OVERLOOK TRAIL

NATIONAL PARK SERVICE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
TRAIL IMPROVEMENTS AT BARATARIA PRESERVE
NEW ORLEANS, LOUISIANA

EUSTIS ENGINEERING L.L.C. SINCE 1946

DRAWN BY: A.E.C.	JOB NO.: 24895
CHECKED BY: P.A.T.	DATE: 9 FEB 2023
CADD FILE: PROFILES.DGN	FIGURE 6

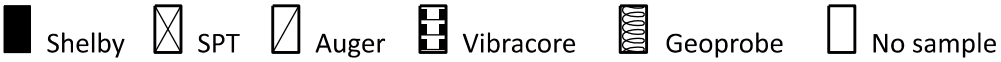
APPENDIX I

EUSTIS ENGINEERING SINCE 1946

LEGEND AND NOTES FOR LOG OF BORING AND TEST RESULTS

PP Pocket penetrometer: Resistance in tons per square foot

SPT Standard Penetration Test: Number of blows of a 140-lb hammer dropped 30 inches required to drive 2-in. O.D., 1.4-in. I.D. sampler a distance of 1 foot into the soil after first seating it 6 inches. Values shown have not been corrected.

SPLR Type of Sampling  Shelby, SPT, Auger, Vibracore, Geoprobe, No sample

SYMBOL Clay, Silt, Sand, Peat/Humus, Shells, Stone/Gravel

Predominant type shown heavy; modifying type shown light

USC Unified Soil Classification

DENSITY Unit weight in pounds per cubic foot

SHEAR TESTS

TYPE

- UC Unconfined compression shear
- OB Unconsolidated undrained triaxial compression shear on one specimen confined at the approximate overburden pressure
- UU Unconsolidated undrained triaxial compression shear
- ϕ Angle of internal friction in degrees
- c Cohesion in pounds per square foot

ATTERBERG LIMITS

- LL Liquid Limit
- PL Plastic Limit
- PI Plasticity Index

OTHER TESTS

- CON Consolidation
- -#200 Percent passing a U.S. No. 200 sieve
- SV Particle size distribution (sieve only)
- PD Particle size distribution (sieve and hydrometer)
- k Coefficient of permeability in centimeters per second
- SP Swelling pressure in pounds per square foot

Other laboratory test results reported on separate figures

GENERAL NOTES

(1) If a ground water depth is shown on the boring log, these observations were made at the time of drilling and were measured below the existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal fluctuations and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.

(2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.

LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: B-1

Project No: 24895
Date: 01/05/2023
Latitude: 29.78478°
Longitude: -90.11186°

Water Depth: See Text
Total Depth: 60.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, medium dense gray & tan fine POORLY GRADED SAND	SP	PB-1	0	25										
		15					PB-2	0.5											
	0.50				Moist, soft gray & tan fine SANDY LEAN CLAY	CL	3	2	35	87	117	UC	--	396					
5	0.50				w/few concretions		4	5	33	89	118	OB	0	345	46	18	28		
	0.25				Moist, soft gray & tan LEAN CLAY	CL	5	8	31						33	23	10		
10	0.50																		
	0.25				Moist, soft gray LEAN CLAY	CL	6	11	34	86	116	UC	--	263					
	0.25				W/SAND		7	14	32	90	118	OB	0	350					
15																			
	0.25				w/few fine sand		8	18	35										-#200 = 93.2%
20																			
	0.25						9	23	34	87	117	UC	--	244					
25																			
	0.25				Moist, loose gray SILT w/few fine sand	ML	10	28	29						NP	NP	NP		
30																			
	0.25				Moist, soft gray LEAN CLAY w/trace of fine sand	CL	11	33	33	84	112	UC	--	281					
35																			
	0.25				Moist, loose gray fine POORLY GRADED SAND w/clay layers	SP	12	38	20										
40																			
							PB-13	43.5	25										-#200 = 9.0% SV
		16			Moist, medium dense gray fine POORLY GRADED SAND W/SILT	SP-SM													
45							PB-14	46.5											
		14																	
50																			

NOTES: Approximately 3 inches of asphalt.

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: B-1

Project No: 24895
Date: 01/05/2023
Latitude: 29.78478°
Longitude: -90.11186°

Water Depth: See Text
Total Depth: 60.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50		25			Moist, medium dense gray fine POORLY GRADED SAND W/SILT	SP-SM	PB-15	49.5	25										
		27					PB-16	52.5	25										
55		22					PB-17	55.5	26										
		13					PB-18	58.5	28										
60																			
65																			
70																			
75																			
80																			
85																			
90																			
95																			
100																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES: Approximately 3 inches of asphalt.

EUSTIS ENGINEERING SINCE 1946

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-2

Project No: 24895
Date: 01/04/2023
Latitude: 29.78359°
Longitude: -90.11470°

Water Depth: See Text
Total Depth: 60.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, medium dense tan fine POORLY GRADED SAND	SP	PB-1	0	18										
		16					PB-2	0.5											
	1.00				Moist, soft gray & dark gray FAT CLAY w/few silt pockets	CH	3	2	35										
5		WOH			Moist, very soft gray LEAN CLAY W/SAND (fine pockets)	CL	PB-4	5	31										-#200 = 78.8%
					Moist, soft to medium stiff gray & tan LEAN CLAY w/few sandy silt pockets	CL													
	0.50						5	8	32	85	113	UC	--	512					
10					w/trace of organic matter	CL													
	0.50						6	11	36						37	20	17		
	0.25						7	14	37	84	116	UC	--	179					
15					w/few fine sand pockets & organic matter	CL													
	0.25						8	18	34						43	18	25		
20																			
	1.00				Moist, soft to medium stiff gray FAT CLAY w/trace of silt pockets & roots	CH	9	23	41	80	113	UC	--	710					
25																			
	0.25				w/trace of silt pockets & concretions		10	28	56	67	105	OB	0	254					
30																			
	0.25				w/trace of silt pockets & organic matter		11	33	64						90	26	64		
35																			
	0.25				w/trace of silt pockets		12	38	54										
40																			
	0.50						13	43	58	67	105	UC	--	502					
45																			
	0.50				w/few fine sand pockets & organic matter		14	48	41						70	27	43		
50																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: B-2

Project No: 24895
Date: 01/04/2023
Latitude: 29.78359°
Longitude: -90.11470°

Water Depth: See Text
Total Depth: 60.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Moist, soft to medium stiff gray & tan FAT CLAY w/few fine sand pockets & organic matter	CH													
	0.25				w/few fine sand pockets & layers		15	53	48	73	108	OB	0	389					
55																			
	0.25				w/trace of silt pockets		16	58	50										
60																			
65																			
70																			
75																			
80																			
85																			
90																			
95																			
100																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

EUSTIS ENGINEERING SINCE 1946

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-3

Project No: 24895
Date: 01/03/2023
Latitude: 29.79335°
Longitude: -90.12272°

Water Depth: See Text
Total Depth: 60.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		16			Moist, medium dense tan fine POORLY GRADED SAND w/trace of silt	SP	PB-1 PB-2	0 0.5	10										-#200 = 2.6% SV
	1.75				Moist, stiff gray & dark gray FAT CLAY w/few silt pockets & organic matter	CH	3	4	29						50	16	34		
5					Moist, soft to medium stiff gray & tan FAT CLAY	CH													
	1.25				Moist, soft gray FAT CLAY w/few silt pockets	CH	4	8	41	79	111	OB	0	424					
10	1.25						5	11	39										
	1.00						6	14	39	80	111	UC	--	445					
15																			
	1.25						7	18	45										
20																			
	1.25				Moist, stiff gray FAT CLAY w/trace of silt pockets, decayed wood, & concretions	CH	8	23	42						70	20	50		
25																			
	1.00				Moist, medium stiff dark gray & brown ORGANIC CLAY	OH	9	28	143	33	80	UC	--	802					
30																			
	0.50				Moist, very soft to soft gray FAT CLAY	CH	10	33	42	79	112	OB	0	139					
35																			
	0.50						11	38	40						70	27	43		
40																			
	0.25						12	43	59	64	102	UC	--	459					
45																			
	0.25						13	48	53										
50																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES: Approximately 4 inches of asphalt.

EUSTIS ENGINEERING SINCE 1946

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

LOG OF BORING AND TEST RESULTS

Boring: B-3

Project No: 24895
Date: 01/03/2023
Latitude: 29.79335°
Longitude: -90.12272°

Water Depth: See Text
Total Depth: 60.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Moist, very soft to soft gray FAT CLAY	CH													
	0.25						14	53	54	65	101	UC	--	474					
55																			
	0.50						15	58	54						75	22	53		
60																			
65																			
70																			
75																			
80																			
85																			
90																			
95																			
100																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES: Approximately 4 inches of asphalt.

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: G-5

Project No: 24895
Date: 02/06/2023
Latitude: 29.79284°
Longitude: -90.12495°

Elevation: 0.0
Datum:
Water Depth: See Text
Total Depth: 32.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, brown & gray LEAN CLAY w/little fine gravel, trace of roots, & organic matter	CL	1A 1B	0 0.5	36 26						47	22	25		
5					Moist, gray fine SANDY LEAN CLAY	CL	2	4	31										
10					Moist, gray FAT CLAY w/trace of roots	CH	3 4	8 12	31 43										
15							5	16	38						51	23	28		
20					Moist, gray LEAN CLAY W/SAND (fine)	CL	6	20	40										
25					Moist, gray fine SILTY SAND	SM	7	24	25										
30					Moist, gray FAT CLAY w/trace of shell fragments	CH	8	28	53										
35																			
40																			
45																			
50																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: G-6

Project No: 24895
Date: 02/03/2023
Latitude: 29.79222°
Longitude: -90.12642°

Elevation: 0.0
Datum:
Water Depth: See Text
Total Depth: 32.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Wet, black HUMUS	PT	1A	0	535										
					Moist, gray FAT CLAY w/few decayed wood	CH	1B	2	43										
5					w/trace of decayed wood		2	4	43										
					w/few organic matter		3	8	45										
10					Moist, gray FAT CLAY		4	12	55										
15							5	16	60										
20					Moist, gray fine SANDY LEAN CLAY	CL	6	20	32										
25					Moist, gray FAT CLAY	CH	7	24	63						76	32	44		
					w/trace of decayed wood		8	28	58										
30																			
35																			
40																			
45																			
50																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: G-7

Project No: 24895
Date: 02/06/2023
Latitude: 29.79173°
Longitude: -90.12770°

Elevation: 0.0
Datum:
Water Depth: See Text
Total Depth: 32.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, gray FAT CLAY	CH	1	0	30						66	28	38		
					w/trace of roots		2	4	43										
5							3	8	35										
10							4	12	47						93	34	59		
15					Moist, gray LEAN CLAY W/SAND (fine)	CL	5	16	41										
20					Moist, gray fine SANDY LEAN CLAY w/silt pockets	CL	6	20	46										
25							7	24	34										
30					Moist, gray FAT CLAY w/silt pockets & trace of shell fragments	CH	8	28	53										
35																			
40																			
45																			
50																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: G-8

Project No: 24895
Date: 01/31/2023
Latitude: 29.79077°
Longitude: -90.13020°

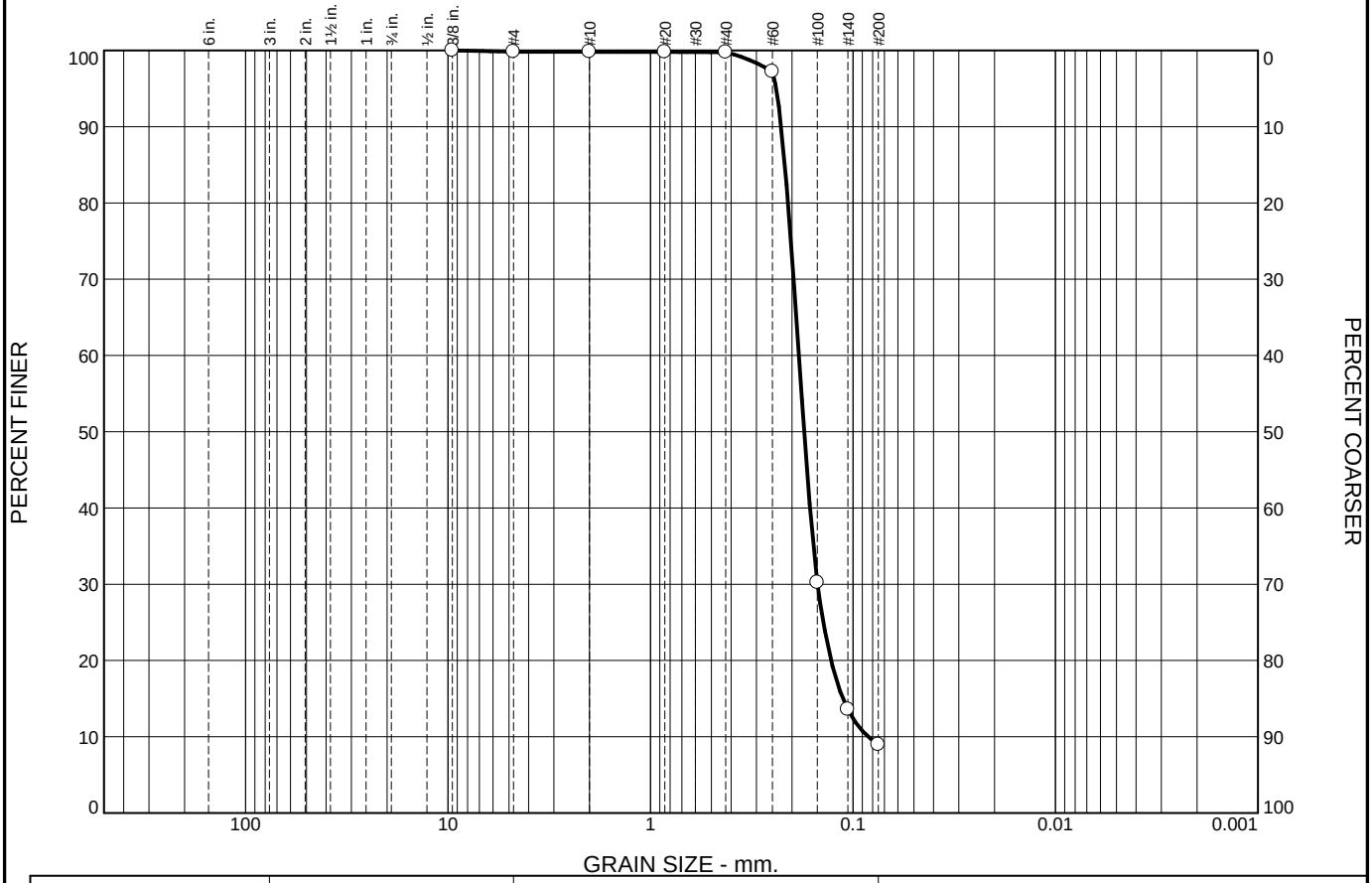
Elevation: 0.0
Datum:
Water Depth: See Text
Total Depth: 12.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, soft black HUMUS	PT	1A	0	148						85	29	56		
					Moist, gray FAT CLAY	CH	1B	0.5	49										
5					w/little decayed wood		2	4	95										
					w/trace of roots		3	8							78	23	55		
10																			
15																			
20																			
25																			
30																			
35																			
40																			
45																			
50																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	0.0	0.0	90.8	9.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.2170	0.1850	0.1742	0.1497	0.1122	0.0839	1.44	2.20

Material Description	USCS	AASHTO
○ Moist, medium dense gray fine POORLY GRADED SAND W/ SILT	SP-SM	

Project No. 24895 **Client:** STANTEC CONSULTING SERVICES INC., SALT LAKE

Project: NATIONAL PARK SERVICE - JEAN LAFITTE NATIONAL HISTORIAL PARK AND PRESERVE, TRAIL IMPROVEMENTS AT BARATARIA PRESERVE, NEW ORLEANS (ORLEANS

○ **Source of Sample:** B-1 **Depth:** 43.5 **Sample Number:** PB-13

Remarks:

EUSTIS ENGINEERING SINCE 1946

Figure

Tested By: JMP **Checked By:** CD & RR

GRAIN SIZE DISTRIBUTION TEST DATA

1/12/2023

Client: STANTEC CONSULTING SERVICES INC., SALT LAKE CITY, UTAH
Project: NATIONAL PARK SERVICE - JEAN LAFITTE NATIONAL HISTORIAL PARK AND PRESERVE, TRAIL IMPROVEMENTS AT BARATARIA PRESERVE, NEW ORLEANS (ORLEANS PARISH), LOUISIANA. STANTEC SUBCONTRACT NO. 26163-91444. STANTEC PROJECT NO. 177311762
Project Number: 24895
Location: B-1
Depth: 43.5 **Sample Number:** PB-13
Material Description: Moist, medium dense gray fine POORLY GRADED SAND W/ SILT
USCS Classification: SP-SM
Tested by: JMP **Checked by:** CD & RR

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 84.56
Tare Wt. = 0.00
Minus #200 from wash = 8.3%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
92.20	0.00	0.00	3/8"	0.00	100.0	0.0
			#4	0.16	99.8	0.2
			#10	0.17	99.8	0.2
			#20	0.18	99.8	0.2
			#40	0.22	99.8	0.2
			#60	2.55	97.2	2.8
			#100	64.35	30.2	69.8
			#140	79.68	13.6	86.4
			#200	83.94	9.0	91.0

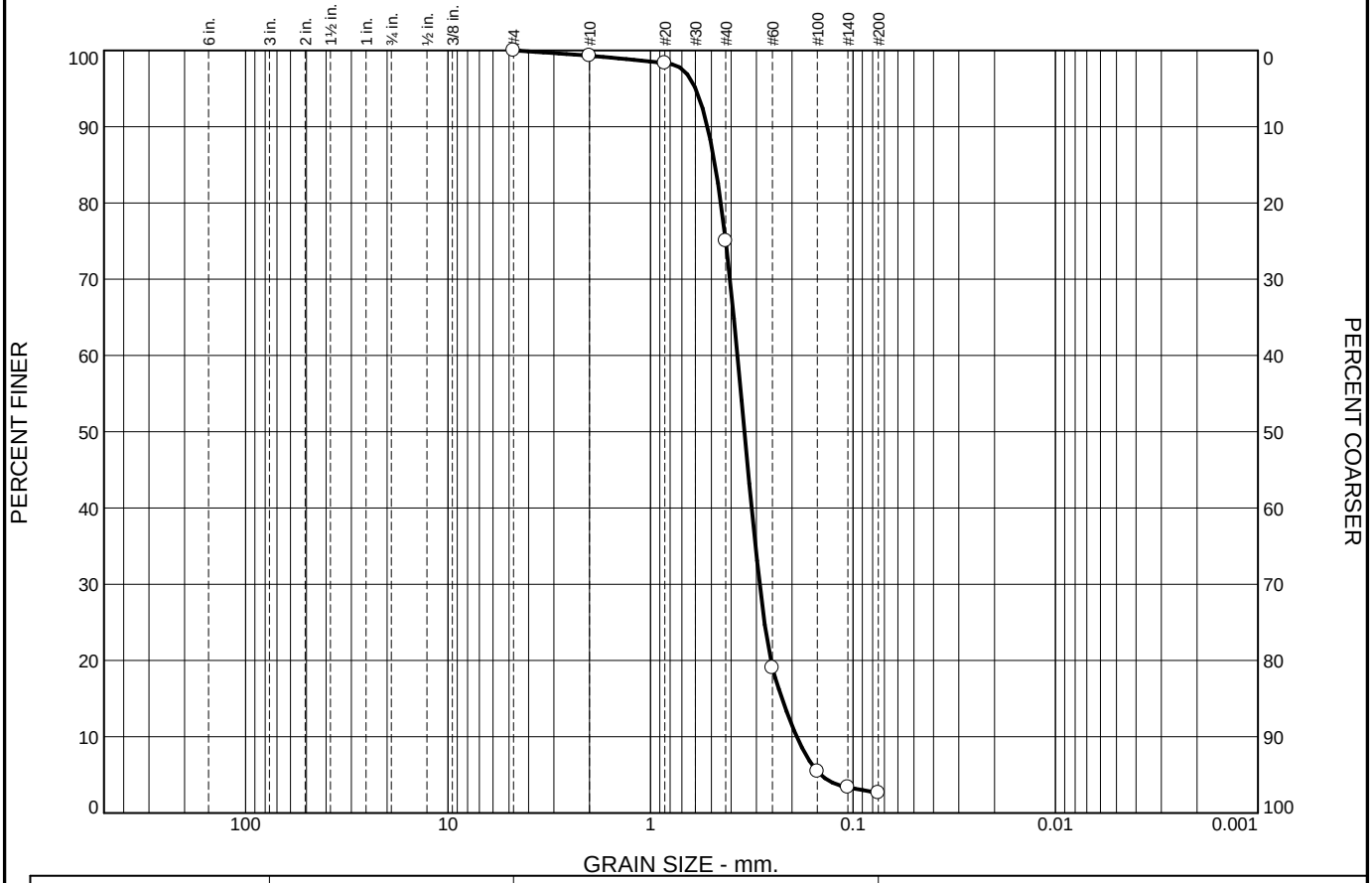
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.0	0.0	90.8	90.8			9.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0839	0.1122	0.1283	0.1497	0.1631	0.1742	0.1850	0.2094	0.2170	0.2263	0.2394

Fineness Modulus	C_u	C_c
0.72	2.20	1.44

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.7	24.3	72.4	2.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4798	0.3720	0.3434	0.2891	0.2242	0.1895	1.19	1.96

Material Description	USCS	AASHTO
○ Moist, medium dense tan fine POORLY GRADED SAND w/ trace silt	SP	

Project No. 24895 **Client:** STANTEC CONSULTING SERVICES INC., SALT LAKE

Project: NATIONAL PARK SERVICE - JEAN LAFITTE NATIONAL HISTORIAL PARK AND PRESERVE, TRAIL IMPROVEMENTS AT BARATARIA PRESERVE, NEW ORLEANS (ORLEANS

○ **Source of Sample:** B-3 **Depth:** 0.5 **Sample Number:** PB-2

Remarks:

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Figure

Tested By: IS **Checked By:** CD & RR

GRAIN SIZE DISTRIBUTION TEST DATA

1/12/2023

Client: STANTEC CONSULTING SERVICES INC., SALT LAKE CITY, UTAH
Project: NATIONAL PARK SERVICE - JEAN LAFITTE NATIONAL HISTORIAL PARK AND PRESERVE, TRAIL IMPROVEMENTS AT BARATARIA PRESERVE, NEW ORLEANS (ORLEANS PARISH), LOUISIANA. STANTEC SUBCONTRACT NO. 26163-91444. STANTEC PROJECT NO. 177311762
Project Number: 24895
Location: B-3
Depth: 0.5 **Sample Number:** PB-2
Material Description: Moist, medium dense tan fine POORLY GRADED SAND w/ trace silt
USCS Classification: SP
Tested by: IS **Checked by:** CD & RR

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 95.21
Tare Wt. = 0.00
Minus #200 from wash = 2.2%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
97.40	0.00	0.00	#4	0.00	100.0	0.0
			#10	0.68	99.3	0.7
			#20	1.62	98.3	1.7
			#40	24.34	75.0	25.0
			#60	78.87	19.0	81.0
			#100	92.08	5.5	94.5
			#140	94.11	3.4	96.6
			#200	94.82	2.6	97.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	24.3	72.4	97.4			2.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1442	0.1895	0.2242	0.2549	0.2891	0.3165	0.3434	0.3720	0.4490	0.4798	0.5232	0.5992

Fineness Modulus	C_u	C_c
1.67	1.96	1.19

APPENDIX II

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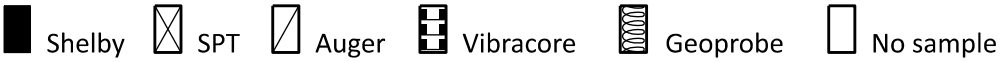
LEGEND AND NOTES FOR LOG OF BORING AND TEST RESULTS

PP Pocket penetrometer: Resistance in tons per square foot

SPT Standard Penetration Test: Number of blows of a 140-lb hammer dropped 30 inches required to drive 2-in. O.D., 1.4-in. I.D. sampler a distance of 1 foot into the soil after first seating it 6 inches. Values shown have not been corrected.

SPLR Type of Sampling  Shelby, SPT, Auger, Vibracore, Geoprobe, No sample

SYMBOL Clay, Silt, Sand, Peat/Humus, Shells, Stone/Gravel

Predominant type shown heavy; modifying type shown light

USC Unified Soil Classification

DENSITY Unit weight in pounds per cubic foot

SHEAR TESTS

TYPE

- UC Unconfined compression shear
- OB Unconsolidated undrained triaxial compression shear on one specimen confined at the approximate overburden pressure
- UU Unconsolidated undrained triaxial compression shear
- ϕ Angle of internal friction in degrees
- c Cohesion in pounds per square foot

ATTERBERG LIMITS

- LL Liquid Limit
- PL Plastic Limit
- PI Plasticity Index

OTHER TESTS

- CON Consolidation
- -#200 Percent passing a U.S. No. 200 sieve
- SV Particle size distribution (sieve only)
- PD Particle size distribution (sieve and hydrometer)
- k Coefficient of permeability in centimeters per second
- SP Swelling pressure in pounds per square foot

Other laboratory test results reported on separate figures

GENERAL NOTES

(1) If a ground water depth is shown on the boring log, these observations were made at the time of drilling and were measured below the existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal fluctuations and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.

(2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.

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LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-0

Project No: 24895
Date: 01/20/2023
Latitude: 29.78702°
Longitude: -90.11392°

Water Depth: See Text
Total Depth: 10.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, gray & tan FAT CLAY w/trace of silt pockets & organic matter	CH	PB-1	0											
							PB-2	1	38										
							PB-3	2	36						57	25	32		
							PB-4	3											
							PB-5	4											
5							PB-6	5											
							PB-7	6	43										
							PB-8	7											
							PB-9	8											
							PB-10	9											
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCP TEST DATA

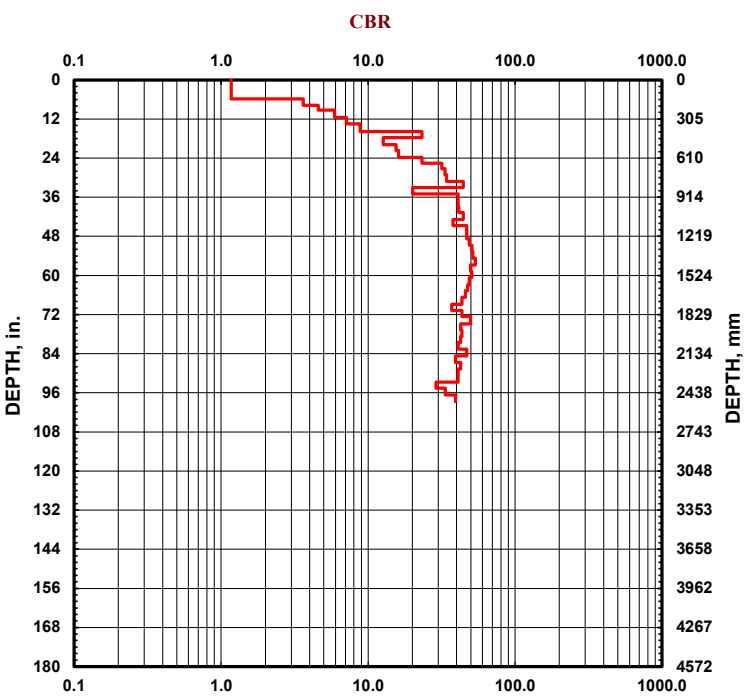
Project No.: 24895 JELA - Boardwalk **Date:** 20-Jan-23

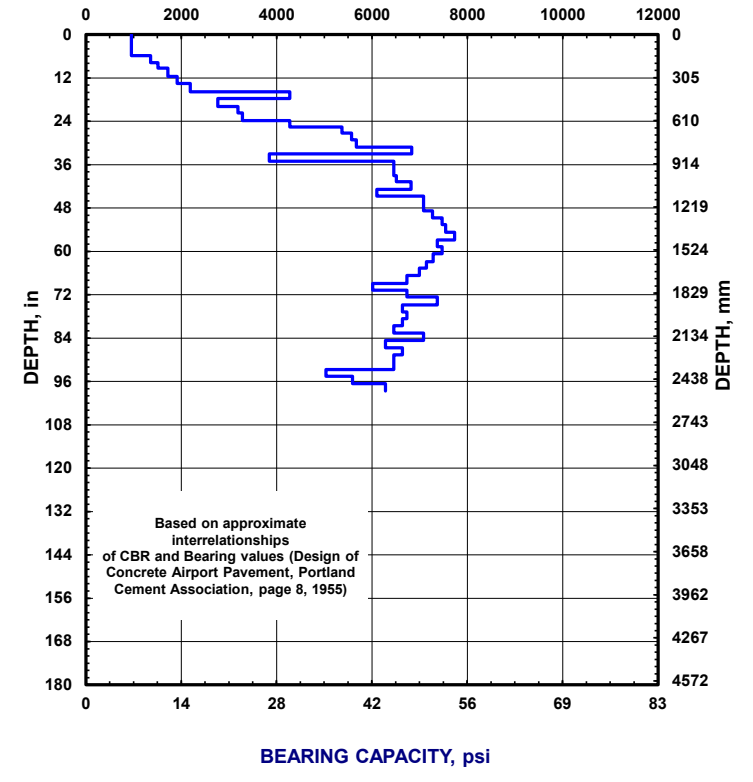
Location: DCPT-0 **Soil Type(s):** Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ◉ CH
- ○ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	149	2
1	197	2
1	235	2
2	294	2
2	343	2
3	402	2
3	450	2
4	505	2
4	550	2
5	604	2
6	649	2
8	693	2
9	740	2
10	791	2
12	838	2
6	890	1
6	941	1
6	992	1
5	1034	1
7	1089	1
5	1135	1
7	1187	1
7	1239	1
7	1289	1
7	1337	1
8	1391	1
8	1443	1
7	1492	1
7	1540	1
8	1597	1
6	1641	1
7	1694	1
7	1750	1
5	1797	1
6	1845	1
8	1901	1
6	1950	1
6	1998	1
6	2047	1
6	2098	1
7	2150	1
6	2203	1
6	2252	1
6	2303	1
6	2354	1
4	2402	1
5	2454	1
6	2507	1





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-1

Project No: 24895
Date: 01/20/2023
Latitude: 29.78718°
Longitude: -90.11272°

Water Depth: See Text
Total Depth: 10.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, gray & tan LEAN CLAY	CL	PB-1	0											
							PB-2	1											
							PB-3	2	28										
							PB-4	3											
							PB-5	4	32						34	22	12		
5							PB-6	5											
							PB-7	6											
							PB-8	7											
					Moist, gray & tan FAT CLAY	CH	PB-9	8	37										
							PB-10	9											
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCPT TEST DATA

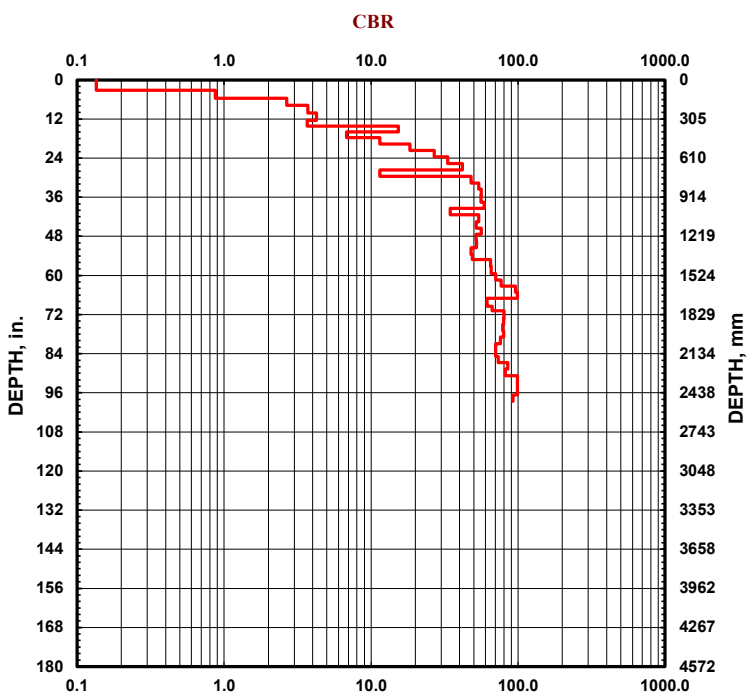
Project No.: 24895 JELA - Boardwalk **Date:** 20-Jan-23

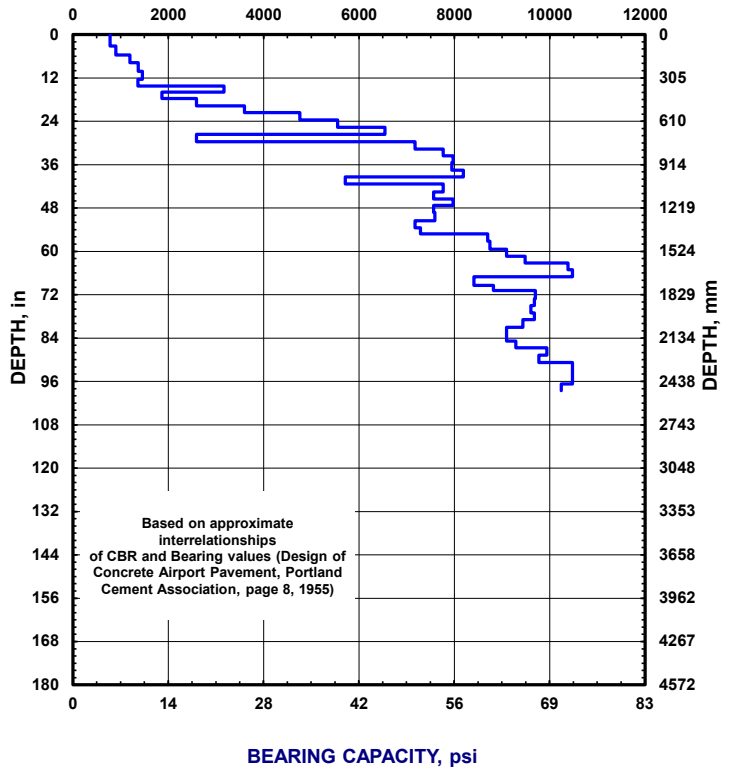
Location: DCPT-1 **Soil Type(s):** Silty Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	80	2
2	143	2
3	197	2
4	258	2
4	315	2
3	361	2
3	404	2
4	449	2
6	501	2
7	549	2
9	600	2
10	651	2
11	701	2
6	753	1
6	804	1
6	852	1
6	899	1
7	954	1
6	1000	1
5	1050	1
7	1106	1
6	1155	1
6	1202	1
6	1251	1
7	1308	1
6	1359	1
5	1401	1
7	1452	1
8	1510	1
7	1559	1
7	1606	1
8	1654	1
9	1703	1
8	1763	1
5	1799	1
9	1858	1
7	1904	1
8	1957	1
7	2003	1
8	2057	1
7	2106	1
7	2155	1
7	2203	1
8	2254	1
8	2306	1
8	2353	1
9	2405	1
9	2456	1
8	2505	1





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LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-2

Project No: 24895
Date: 01/20/2023 - 01/25/2023
Latitude: 29.78343°
Longitude: -90.11466°
Water Depth: See Text
Total Depth: 10.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Wet, brown ORGANIC CLAY w/trace of roots & decayed wood	OH	PB-1	0											
							PB-2	1											
							PB-3	2											
							PB-4	3	284						229	102	127		
							PB-5	4											
5							PB-6	5	163										
					Wet, gray & brown FAT CLAY w/trace of roots & decayed wood	CH	PB-7	6											
							PB-8	7	76										
							PB-9	8											
10							PB-10	9											
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES: Approximately 3 feet of standing water.

DCPT TEST DATA

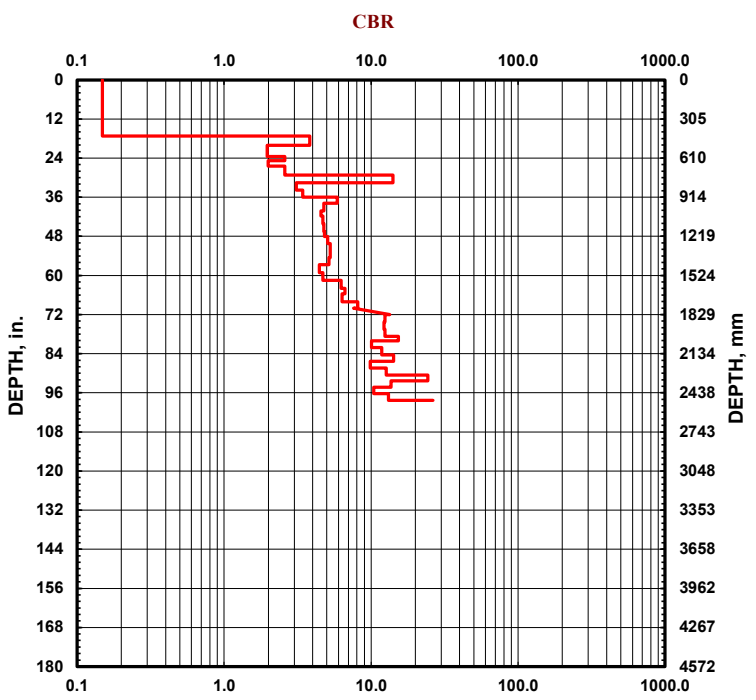
Project No.: 24895 JELA - Boardwalk **Date:** 20-Jan-23

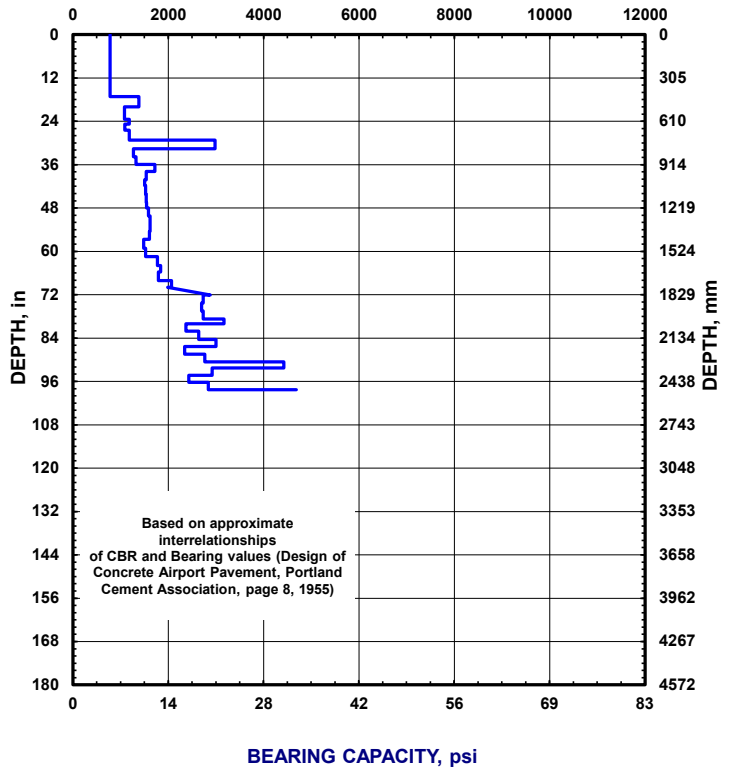
Location: DCPT-2 **Soil Type(s):** Organic Clay and Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	437	2
3	509	2
2	596	2
1	630	2
1	673	2
2	741	2
2	802	2
2	860	2
2	913	2
3	962	2
3	1021	2
2	1062	2
3	1122	2
3	1181	2
2	1220	2
3	1276	2
3	1330	2
3	1384	2
3	1439	2
3	1502	2
3	1562	2
4	1624	2
3	1668	2
4	1729	2
4	1778	2
4	1830	2
4	1886	2
4	1943	2
4	1999	2
3	2033	2
3	2085	2
4	2144	2
4	2193	2
3	2246	2
4	2301	2
3	2344	2
4	2395	2
3	2445	2
4	2498	2





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-3

Project No: 24895
Date: 01/20/2023
Latitude: 29.78343°
Longitude: -90.11589°

Water Depth: See Text
Total Depth: 10.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, dark brown HUMUS	PT	PB-1	0	513										
					Moist, gray & tan FAT CLAY w/trace of silt	CH	PB-2	1											
							PB-3	2											
							PB-4	3											
							PB-5	4	34										
5							PB-6	5	32						54	21	33		
							PB-7	6											
							PB-8	7											
							PB-9	8											
10							PB-10	9											
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES: Approximately 6 inches of water.

DCPT TEST DATA

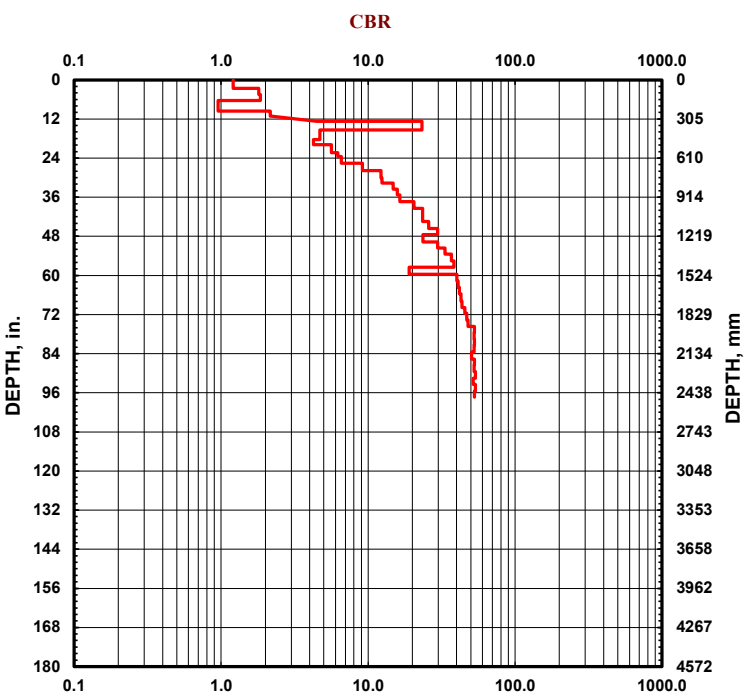
Project No.: 24895 JELA - Boardwalk **Date:** 19-Jan-23

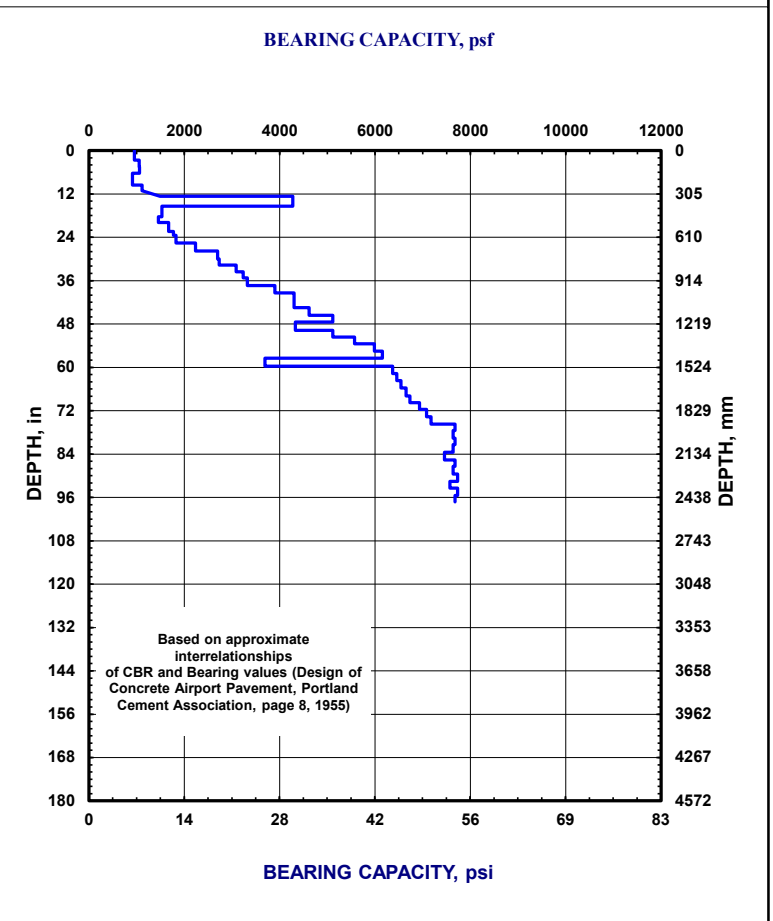
Location: DCPT-3 **Soil Type(s):** Peat and Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	67	2
1	114	2
1	160	2
1	243	2
1	283	2
1	322	2
2	391	2
2	465	2
1	506	2
2	568	2
1	596	2
2	649	2
3	706	2
4	763	2
3	805	2
4	852	2
4	896	2
5	949	2
6	1000	2
7	1052	2
7	1104	2
8	1158	2
8	1205	2
8	1264	2
8	1311	2
9	1358	2
11	1410	2
11	1460	2
6	1515	1
6	1567	1
6	1618	1
6	1668	1
7	1725	1
6	1773	1
6	1819	1
7	1871	1
7	1922	1
7	1968	1
8	2021	1
7	2067	1
8	2120	1
8	2175	1
7	2221	1
8	2274	1
8	2326	1
7	2373	1
8	2425	1
7	2471	1





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-4

Project No: 24895
Date: 01/25/2023
Latitude: 29.78374°
Longitude: -90.11718°

Water Depth: See Text
Total Depth: 10.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Wet, gray & tan LEAN CLAY	CL	PB-1	0											
							PB-2	1											
							PB-3	2	34										
							PB-4	3											
							PB-5	4											
5							PB-6	5											
					Moist, gray & tan FAT CLAY w/trace of silt & concretions	CH	PB-7	6	49						53	23	30		
							PB-8	7											
							PB-9	8											
10							PB-10	9	52										
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES: Approximately 1.5 feet of water.

DCPT TEST DATA

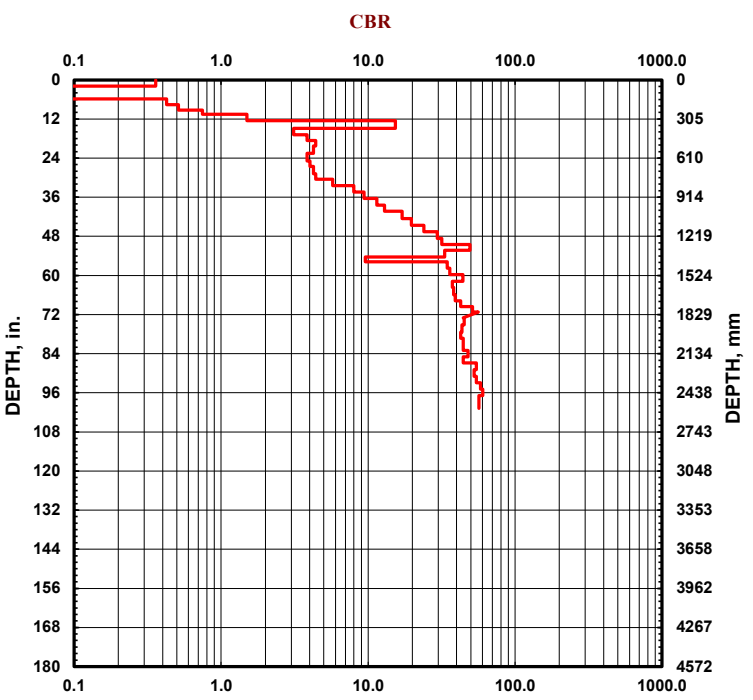
Project No.: 24895 JELA - Boardwalk **Date:** 18-Jan-23

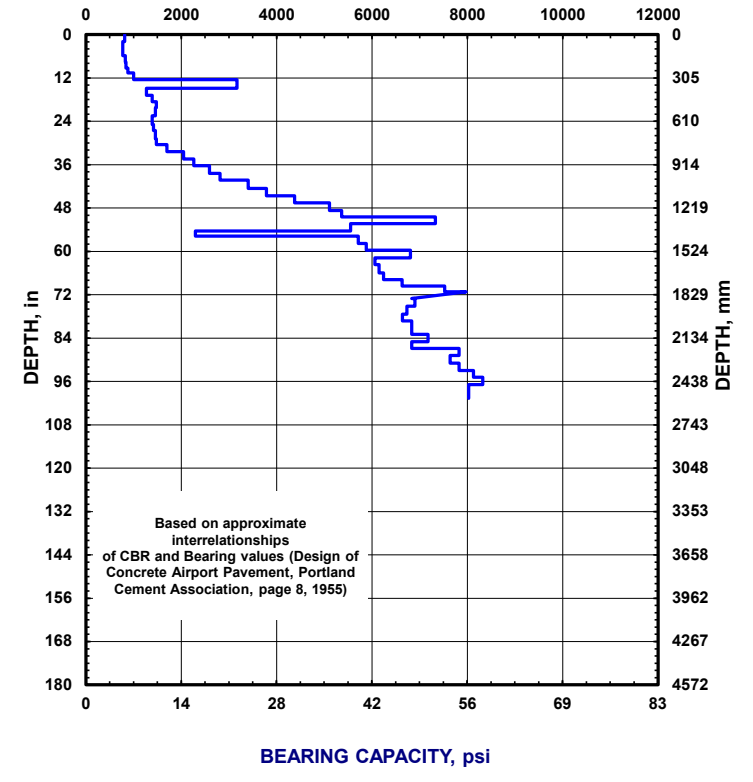
Location: DCPT-4 **Soil Type(s):** Silty Clay and Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	49	2
1	149	2
1	194	2
1	235	2
1	269	2
2	317	2
3	377	2
3	427	2
3	472	2
3	514	2
4	571	2
4	631	2
3	675	2
4	732	2
3	774	2
4	823	2
5	875	2
5	923	2
6	975	2
6	1024	2
8	1081	2
8	1134	2
8	1182	2
10	1236	2
9	1283	2
11	1329	2
10	1380	2
4	1418	1
5	1468	1
5	1517	1
6	1570	1
5	1618	1
6	1675	1
5	1722	1
5	1767	1
5	1808	1
6	1855	1
7	1909	1
7	1965	1
6	2014	1
6	2061	1
6	2108	1
7	2159	1
6	2206	1
8	2257	1
8	2310	1
8	2361	1
8	2409	1
9	2461	1
8	2510	1
8	2559	1





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-5

Project No: 24895
Date: 01/18/2023
Latitude: 29.79289°
Longitude: -90.12471°

Water Depth: See Text
Total Depth: 6.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, tan & brown FAT CLAY w/trace of silt, organic matter, & roots	CH	PB-1	0											
					Moist, dark gray LEAN CLAY w/trace of fine sand	CL	PB-2	1	36										
							PB-3	2	30						48	15	33		
							PB-4	3											
					Moist, gray FAT CLAY `	CH	PB-5	4	38										
5							PB-6	5											
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCPT TEST DATA

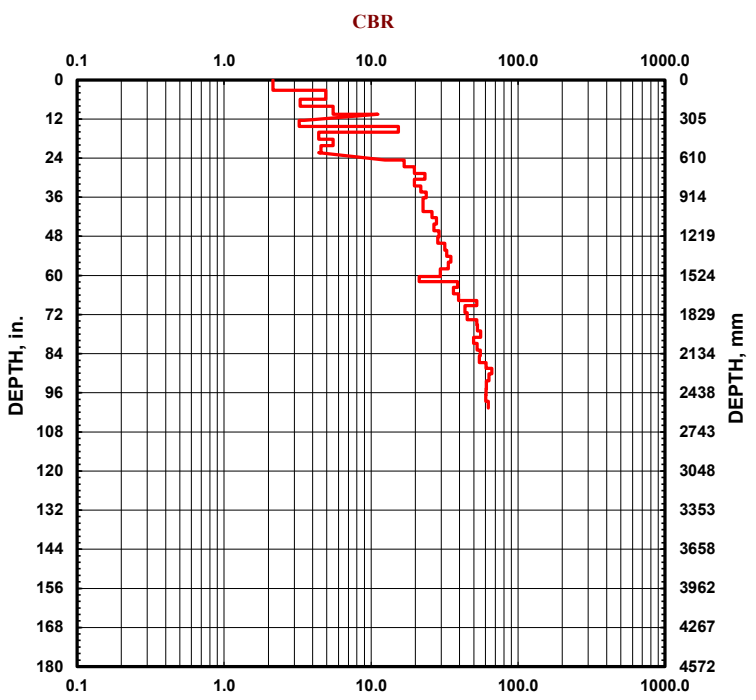
Project No.: 24895 JELA - Boardwalk **Date:** 17-Jan-23

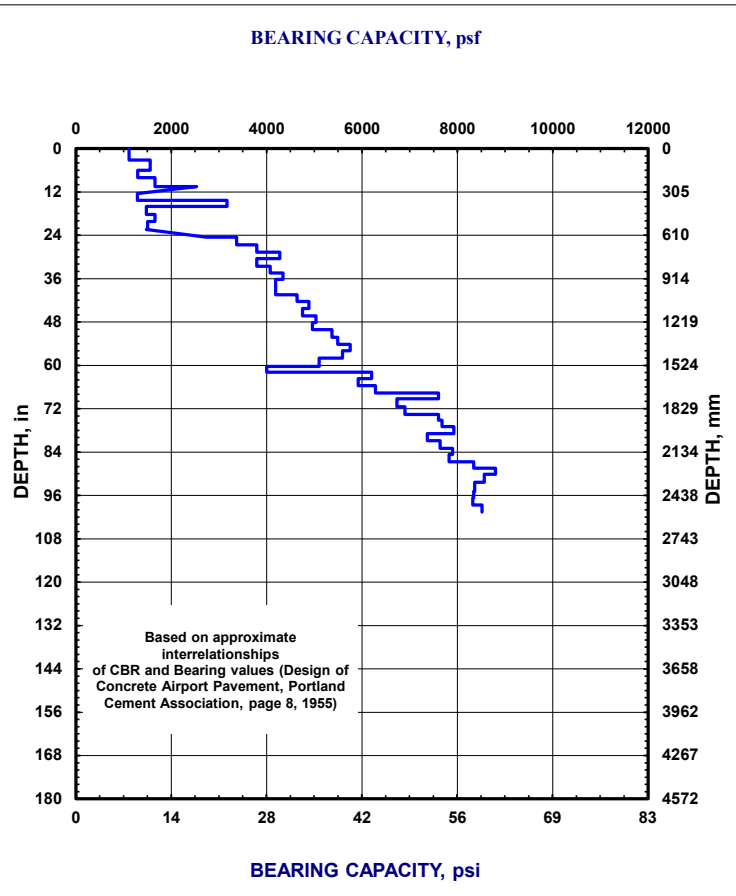
Location: DCPT-5 **Soil Type(s):** Silty Clay and Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	81	2
2	152	2
1	205	2
2	268	2
3	315	2
3	364	2
3	407	2
4	463	2
4	513	2
4	568	2
4	624	2
5	676	2
6	729	2
6	774	2
6	827	2
6	875	2
6	919	2
7	973	2
7	1027	2
7	1074	2
8	1124	2
8	1176	2
8	1224	2
8	1273	2
10	1328	2
9	1376	2
9	1421	2
10	1473	2
10	1532	2
5	1573	1
5	1618	1
5	1666	1
6	1719	1
6	1759	1
7	1815	1
7	1869	1
6	1909	1
7	1955	1
8	2005	1
7	2054	1
8	2107	1
7	2151	1
8	2202	1
8	2248	1
8	2290	1
10	2345	1
11	2408	1
8	2454	1
9	2506	1
9	2556	1





LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-6

Project No: 24895
Date: 01/17/2023
Latitude: 29.79226°
Longitude: -90.12643°

Water Depth: See Text
Total Depth: 8.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, gray & tan FAT CLAY w/trace of silt & roots	CH	PB-1	0											
							PB-2	1	38						51	18	33		
							PB-3	2											
					Wet, dark brown HUMUS	PT	PB-4	3	191										
					w/trace of organic matter & roots		PB-5	4											
5							PB-6	5											
					Moist, gray FAT CLAY w/trace of organic matter & roots	CH	PB-7	6											
							PB-8	7	36										
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCPT TEST DATA

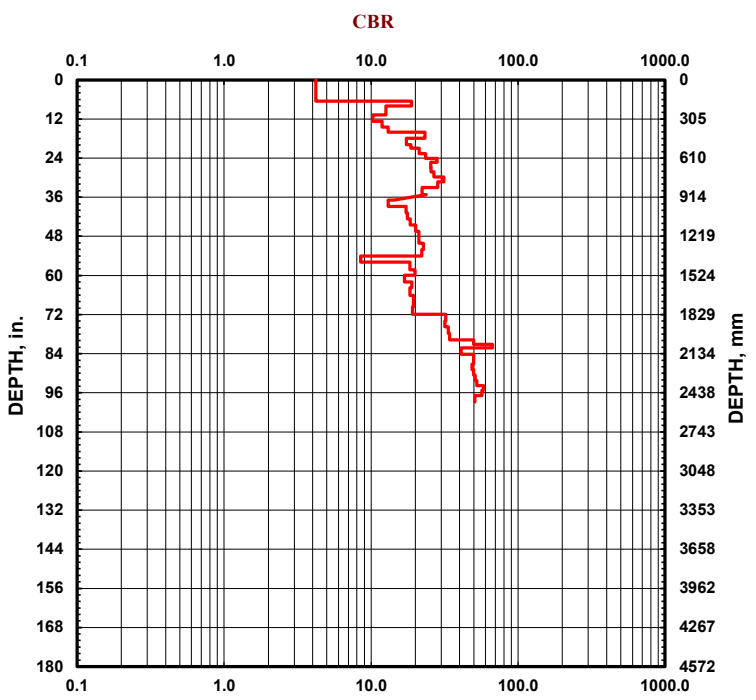
Project No.: 24895 JELA - Boardwalk **Date:** 17-Jan-23

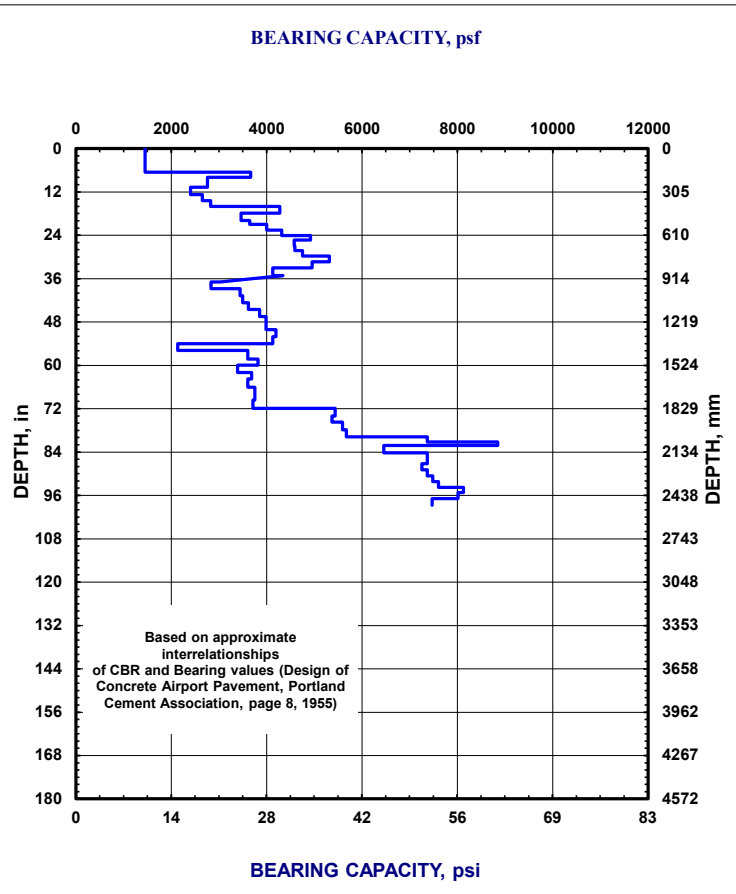
Location: DCPT-6 **Soil Type(s):** Peat and Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
4	166	2
4	203	2
5	272	2
3	323	2
3	367	2
3	407	2
4	455	2
5	505	2
3	533	2
5	574	2
5	611	2
5	642	2
6	683	2
5	717	2
6	756	2
7	795	2
7	838	2
7	893	2
6	937	2
6	985	2
8	1035	2
8	1084	2
8	1131	2
9	1180	2
9	1227	2
9	1274	2
10	1323	2
10	1373	2
4	1420	1
5	1479	1
4	1523	1
4	1574	1
4	1620	1
5	1679	1
4	1724	1
4	1769	1
5	1826	1
5	1880	1
4	1924	1
5	1976	1
5	2027	1
5	2062	1
5	2088	1
6	2139	1
6	2181	1
5	2216	1
6	2259	1
6	2301	1
6	2342	1
6	2382	1
6	2418	1
7	2461	1
7	2509	1
7	2551	1
8	2593	1





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-7

Project No: 24895
Date: 01/17/2023
Latitude: 29.79166°
Longitude: -90.12798°

Water Depth: See Text
Total Depth: 4.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, brown & gray LEAN CLAY W/SAND (fine)	CL	PB-1	0	30										
					Moist, gray & brown LEAN CLAY	CL	PB-2	1	28										
							PB-3	2	30						42	17	25		
							PB-4	3											
5																			
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES: Unable to advance auger beoynd 4ft.

DCPT TEST DATA

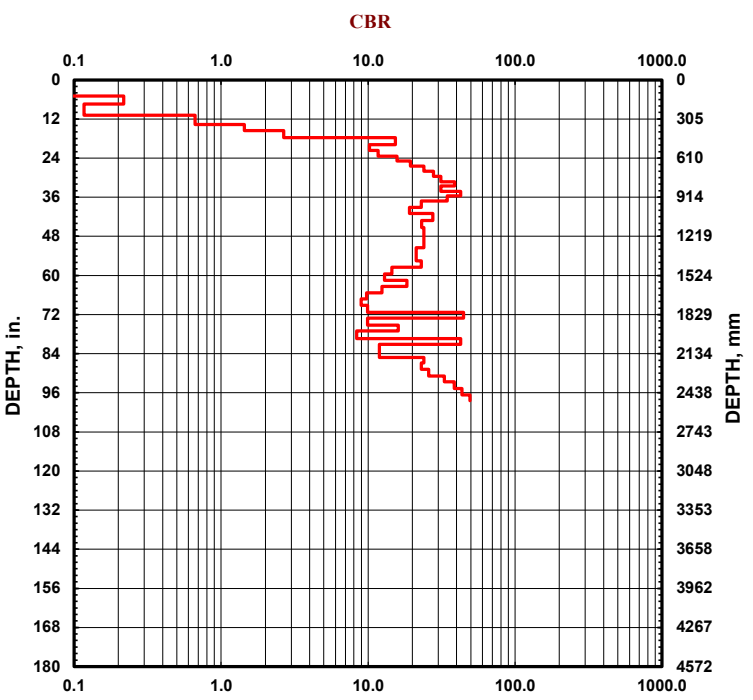
Project No.: 24895 JELA - Boardwalk **Date:** 17-Jan-23

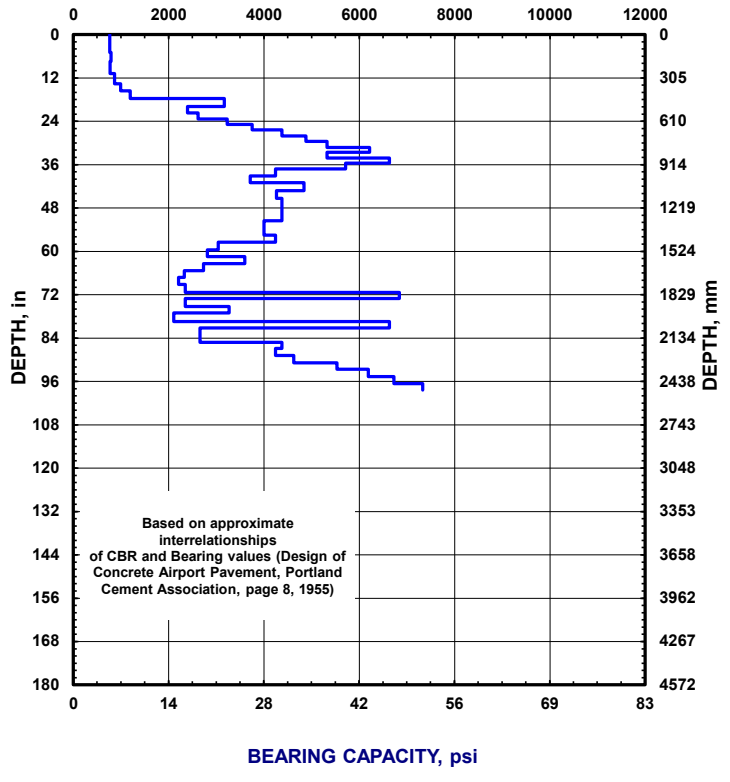
Location: DCPT-7 **Soil Type(s):** Silty Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ◉ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	126	2
1	189	2
1	275	2
2	347	2
2	396	2
3	450	2
4	505	2
5	551	2
5	594	2
5	631	2
6	671	2
7	713	2
7	752	2
8	794	2
7	827	2
8	869	2
8	905	2
8	945	2
8	994	2
7	1041	2
10	1097	2
9	1152	2
9	1206	2
9	1260	2
8	1308	2
8	1359	2
8	1410	2
8	1459	2
7	1513	2
6	1562	2
7	1610	2
6	1660	2
5	1707	2
5	1756	2
6	1812	2
5	1856	2
6	1912	2
6	1956	2
6	2017	2
5	2062	2
6	2113	2
6	2164	2
7	2206	2
8	2255	2
9	2307	2
9	2353	2
11	2405	2
11	2454	2
11	2500	2





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-8

Project No: 24895
Date: 01/17/2022
Latitude: 29.79078°
Longitude: -90.13020°

Water Depth: See Text
Total Depth: 8.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, gray FAT CLAY w/few roots	CH	PB-1	0											
							PB-2	1	88										
							PB-3	2											
					w/trace of silt & roots		PB-4	3											
							PB-5	4	46						69	28	41		
5							PB-6	5	63										
							PB-7	6											
							PB-8	7											
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCPT TEST DATA

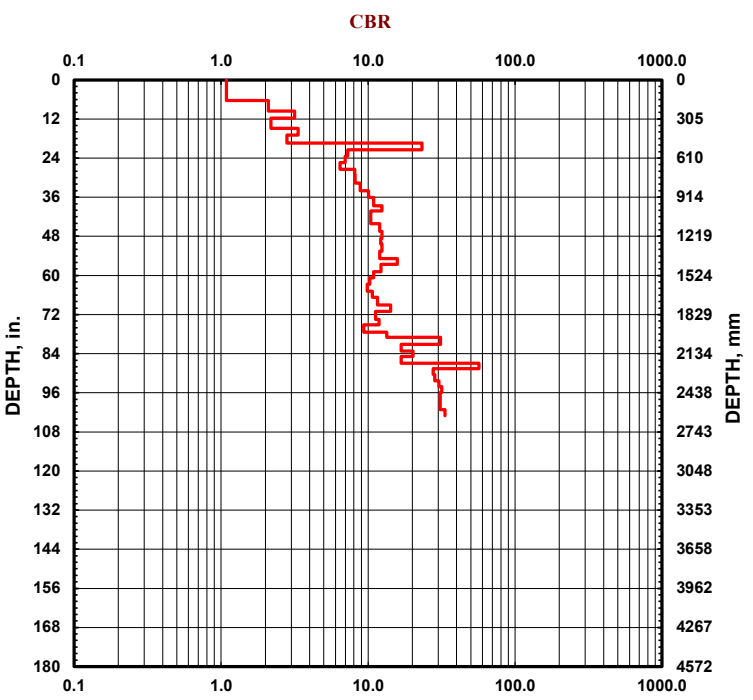
Project No.: 24895 JELA - Boardwalk **Date:** 17-Jan-23

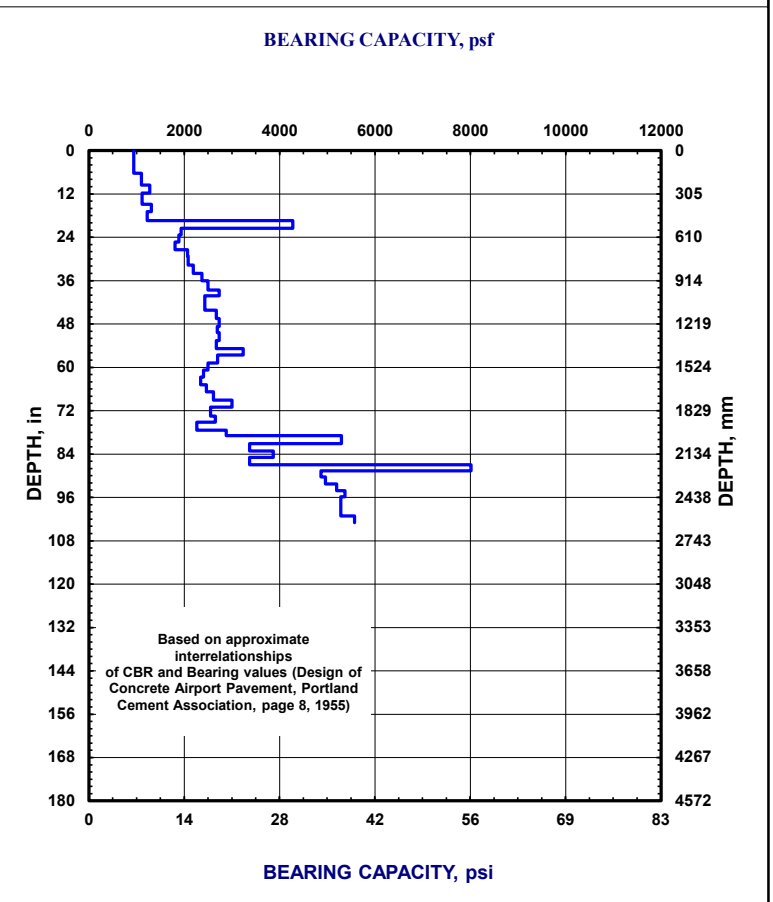
Location: DCPT-8 **Soil Type(s):** Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ◉ CH
- ○ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	160	2
1	243	2
1	298	2
1	378	2
1	430	2
1	492	2
2	546	2
2	594	2
2	644	2
2	698	2
2	741	2
3	805	2
3	864	2
3	916	2
4	980	2
3	1022	2
3	1072	2
3	1122	2
4	1180	2
4	1236	2
3	1279	2
4	1335	2
4	1393	2
4	1437	2
4	1494	2
3	1542	2
3	1593	2
3	1646	2
3	1695	2
4	1755	2
4	1804	2
4	1866	2
3	1910	2
3	1966	2
3	2005	2
5	2061	2
5	2113	2
5	2156	2
5	2208	2
7	2251	2
7	2295	2
8	2344	2
8	2390	2
8	2434	2
8	2479	2
8	2524	2
8	2569	2
9	2616	2





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-9

Project No: 24895
Date: 01/17/2023
Latitude: 29.79111°
Longitude: -90.13084°

Water Depth: See Text
Total Depth: 8.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, gray FAT CLAY w/trace of silt, organic matter, roots, & decayed wood	CH	PB-1	0											
							PB-2	1											
							PB-3	2	48										
							PB-4	3	47						81	31	50		
							PB-5	4											
5					Moist, dark brown ORGANIC CLAY	OH	PB-6	5											
							PB-7	6	122										
							PB-8	7											
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCPT TEST DATA

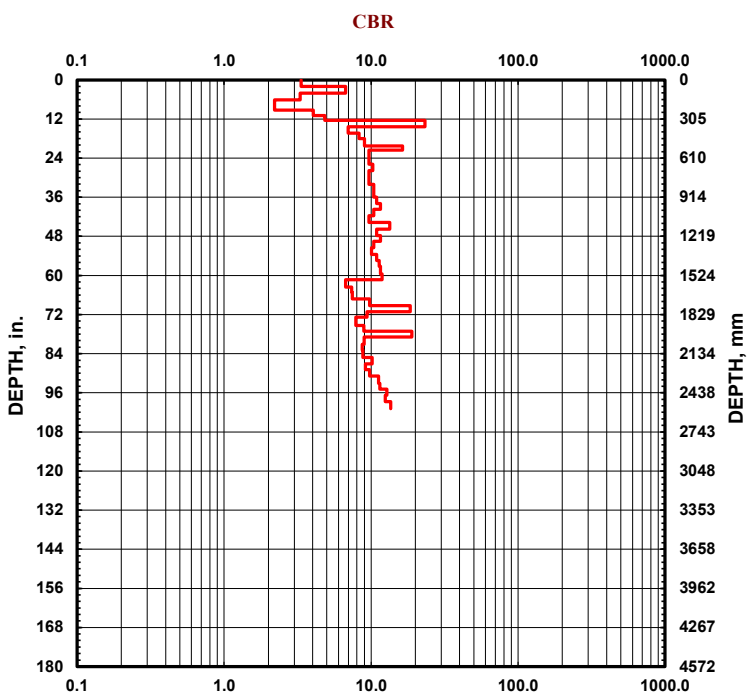
Project No.: 24895 JELA - Boardwalk **Date:** 18-Jan-23

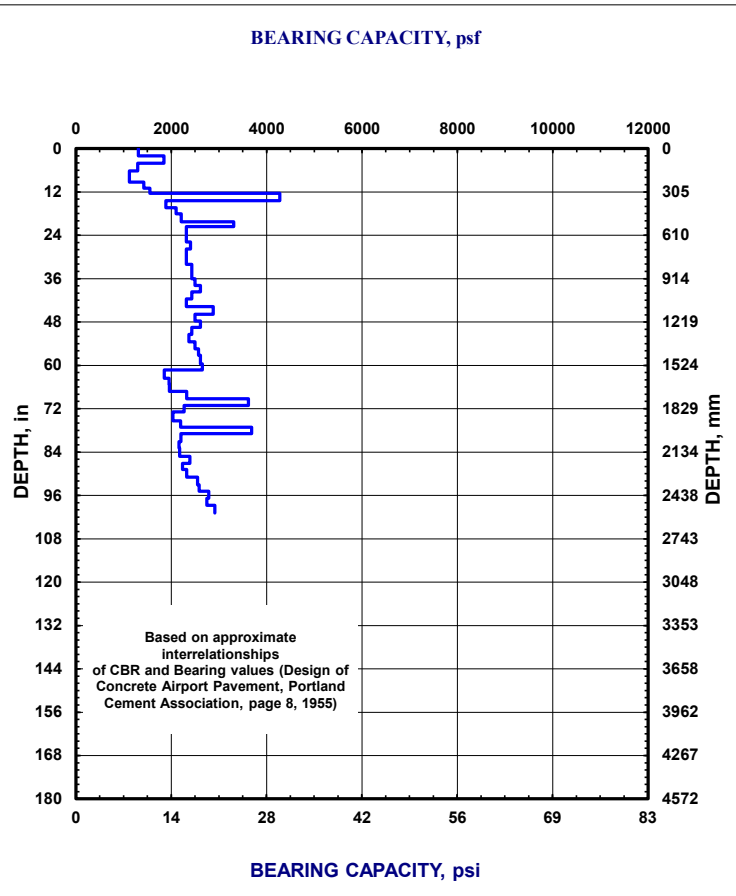
Location: DCPT-9 **Soil Type(s):** Organic Clay and Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	52	2
2	104	2
1	157	2
1	236	2
1	279	2
1	315	2
2	366	2
2	416	2
2	458	2
3	516	2
3	548	2
3	602	2
3	656	2
3	707	2
3	761	2
3	815	2
3	865	2
3	915	2
3	963	2
3	1008	2
3	1058	2
3	1112	2
4	1164	2
3	1212	2
3	1257	2
3	1307	2
3	1359	2
3	1407	2
3	1453	2
4	1513	2
3	1557	2
4	1615	2
3	1655	2
4	1708	2
5	1760	2
4	1807	2
4	1850	2
5	1913	2
4	1958	2
4	2004	2
5	2060	2
4	2106	2
5	2163	2
5	2213	2
4	2257	2
5	2309	2
6	2364	2
5	2409	2
6	2458	2
6	2508	2
7	2562	2





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-10

Project No: 24895
Date: 01/17/2023
Latitude: 29.79311°
Longitude: -90.13256°

Water Depth: See Text
Total Depth: 8.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, gray FAT CLAY w/trace of organic matter & roots	CH	PB-1	0											
							PB-2	1											
							PB-3	2	65										
							PB-4	3											
							PB-5	4											
5					Wet, dark gray ORGANIC CLAY	OH	PB-6	5	126						122	44	78		
							PB-7	6	48										
					Moist, gray FAT CLAY w/trace of silt, organic matter, & roots	CH	PB-8	7											
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCPT TEST DATA

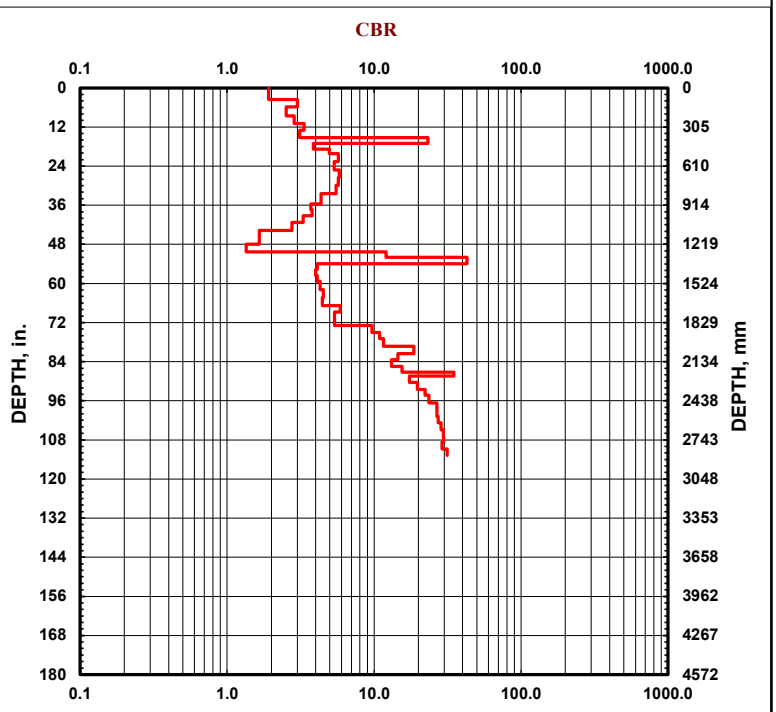
Project No.: 24895 JELA - Boardwalk **Date:** 18-Jan-23

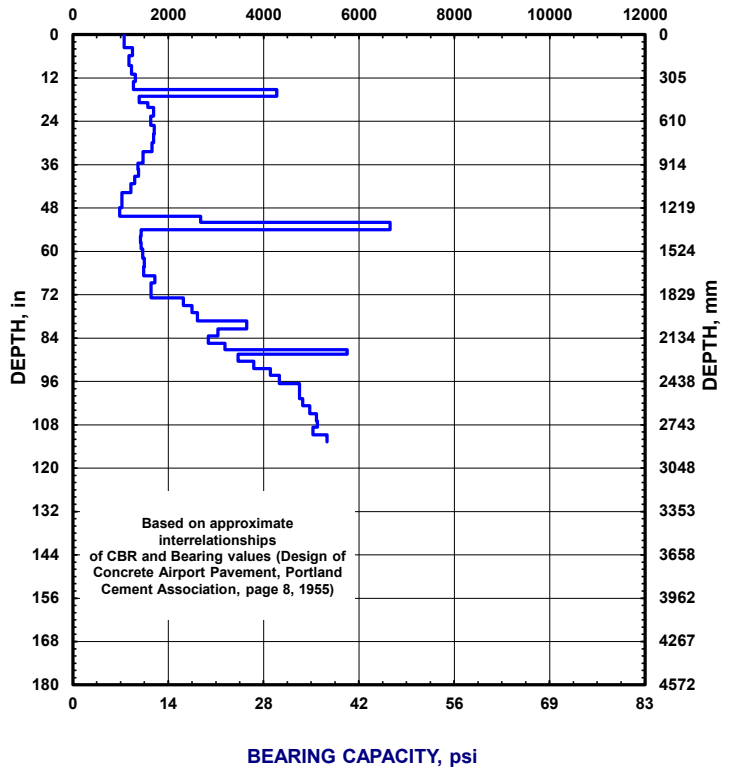
Location: DCPT-10 **Soil Type(s):** Organic Clay and Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	91	2
1	149	2
1	218	2
1	279	2
1	331	2
1	387	2
1	433	2
1	478	2
1	513	2
2	574	2
2	639	2
2	699	2
2	760	2
2	823	2
2	903	2
1	950	2
1	996	2
1	1049	2
1	1112	2
1	1217	2
1	1278	2
5	1321	2
18	1371	2
2	1416	2
2	1462	2
2	1507	2
3	1572	2
3	1634	2
3	1697	2
3	1746	2
3	1799	2
3	1852	2
3	1906	2
3	1954	2
4	2014	2
3	2070	2
4	2118	2
4	2171	2
4	2216	2
3	2246	2
5	2296	2
6	2349	2
6	2396	2
8	2455	2
8	2507	2
8	2559	2
8	2610	2
9	2665	2
9	2718	2
7	2759	2
9	2813	2
9	2863	2
9	2911	2





EUSTIS ENGINEERING SINCE 1946

LOG OF BORING AND TEST RESULTS

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-11

Project No: 24895
Date: 01/18/2023
Latitude: 29.79470°
Longitude: -90.13359°

Water Depth: See Text
Total Depth: 8.0 ft

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Moist, gray FAT CLAY w/trace of silt, organic matter, & roots	CH	PB-1	0											
							PB-2	1											
							PB-3	2	62						80	30	50		
							PB-4	3											
5							PB-5	4	48										
							PB-6	5											
					w/trace of silt pockets, organic matter, & roots		PB-7	6	57										
							PB-8	7											
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCPT TEST DATA

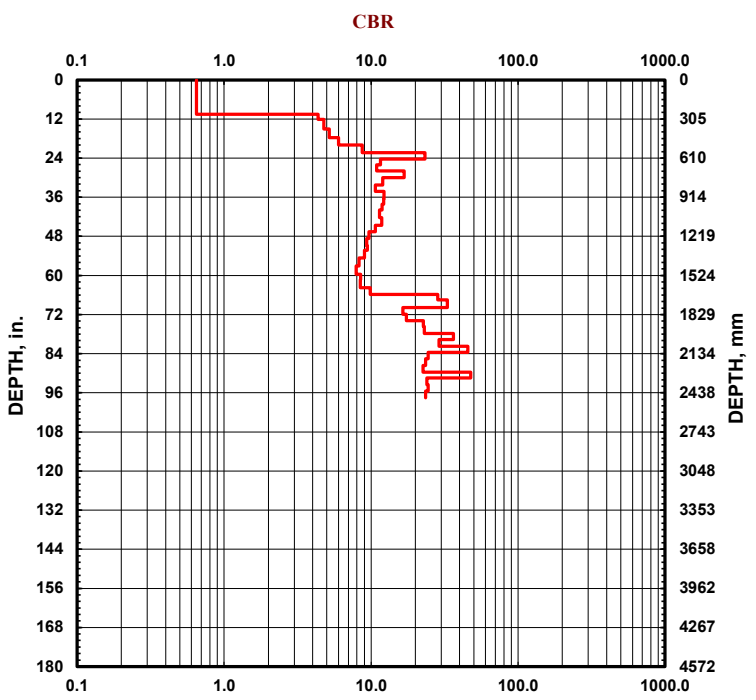
Project No.: 24895 JELA - Boardwalk **Date:** 18-Jan-23

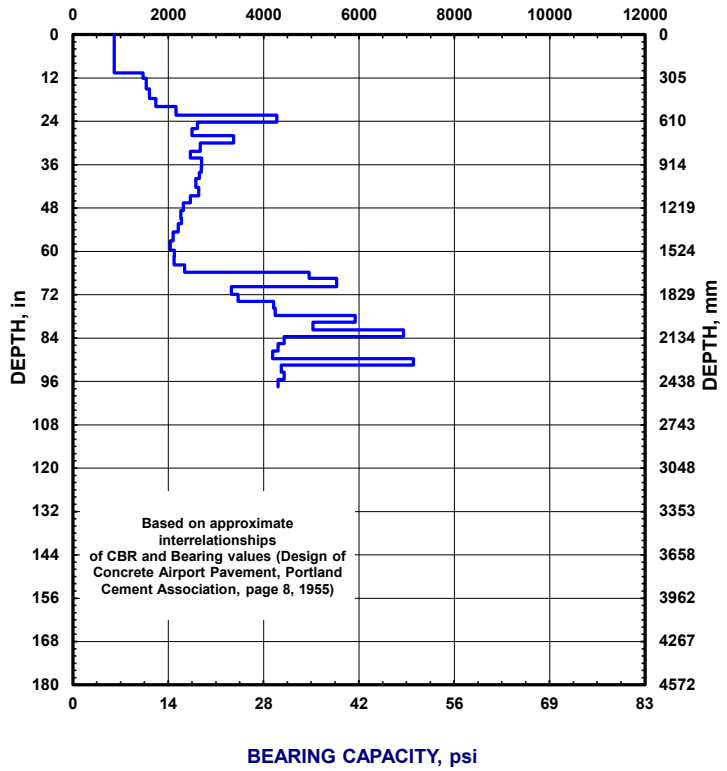
Location: DCPT-11 **Soil Type(s):** Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ◉ CH
- ○ CL
- ○ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	269	2
1	309	2
2	382	2
2	449	2
2	507	2
3	567	2
3	617	2
3	662	2
3	710	2
5	762	2
4	820	2
3	869	2
4	926	2
3	969	2
3	1013	2
4	1074	2
4	1133	2
3	1182	2
3	1236	2
3	1292	2
2	1329	2
3	1387	2
3	1450	2
3	1516	2
2	1557	2
3	1619	2
3	1672	2
7	1715	2
11	1773	2
5	1826	2
5	1876	2
6	1922	2
7	1975	2
10	2023	2
9	2077	2
6	2123	2
7	2173	2
7	2225	2
7	2279	2
6	2323	2
7	2374	2
7	2424	2
7	2476	2





LOG OF BORING AND TEST RESULTS

EUSTIS ENGINEERING SINCE 1946

National Park Service
Jean Lafitte National Historical Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

Boring: A-12

Project No: 24895
Date: 01/19/2023 - 01/25/2023
Latitude: 29.78259°
Longitude: -90.11735°
Water Depth: See Text
Total Depth: 10.0 ft

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content %	Density Dry pcf	Density Wet pcf	Shear Tests Type	Shear Tests ϕ	Shear Tests C psf	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Wet, brown HUMUS w/some roots	PT	PB-1	0	756										
					Moist, gray FAT CLAY w/trace of silt pockets & concretions	CH	PB-2	1											
							PB-3	2											
							PB-4	3											
							PB-5	4											
5							PB-6	5											
							PB-7	6	50										
					w/roots		PB-8	7											
							PB-9	8	63						91	38	53		
							PB-10	9											
10																			
15																			
20																			
25																			

EUSTIS_GINT_LIBRARY_12_21_2022.GLB EE STANDARD BORING LOG 24895.GPJ 2/16/23

NOTES:

DCPT TEST DATA

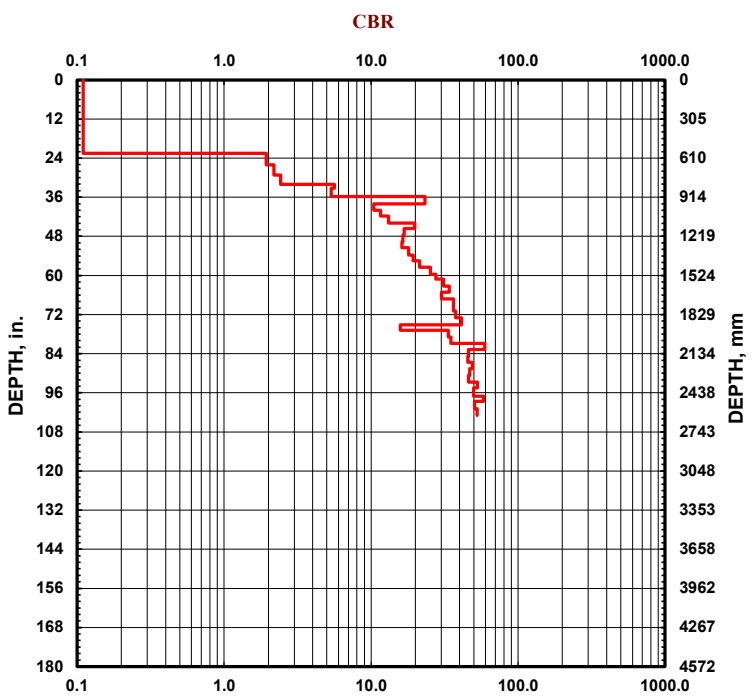
Project No.: 24895 JELA - Boardwalk **Date:** 19-Jan-23

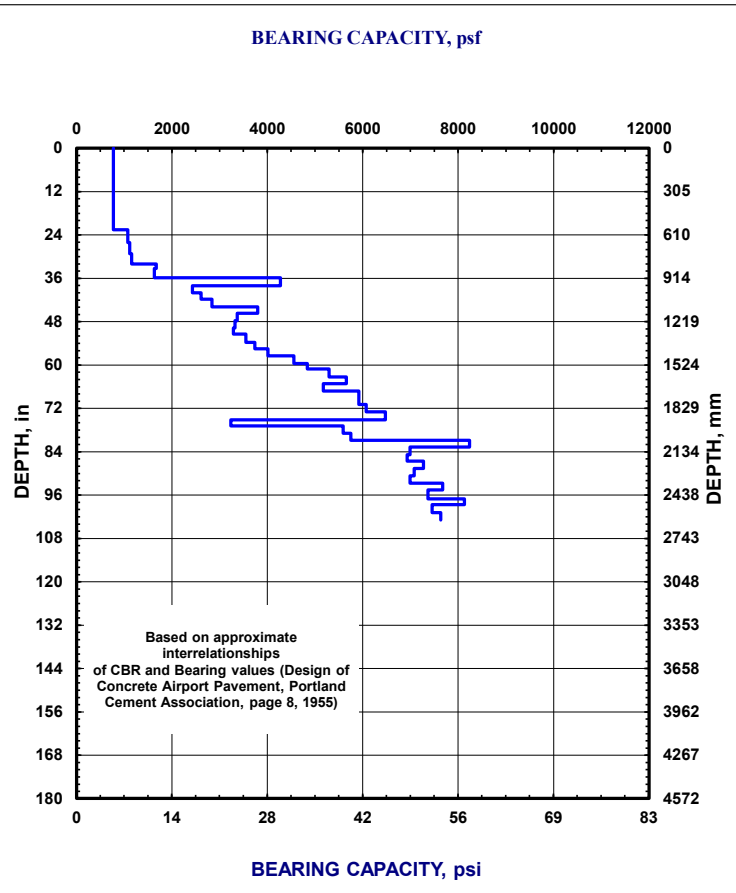
Location: DCPT-12 **Soil Type(s):** Peat and Fat Clay

Hammer
- ○ 10.1 lbs.
- ○ 17.6 lbs.
- ◉ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	2
1	572	2
1	662	2
1	742	2
1	814	2
1	845	2
2	910	2
3	967	2
3	1017	2
3	1062	2
4	1115	2
5	1159	2
5	1211	2
5	1264	2
4	1307	2
6	1365	2
5	1410	2
6	1459	2
8	1514	2
6	1552	2
10	1608	2
9	1654	2
9	1706	2
10	1754	2
10	1802	2
11	1853	2
13	1908	2
4	1952	1
5	2004	1
5	2054	1
8	2101	1
7	2154	1
6	2200	1
7	2250	1
7	2302	1
7	2355	1
7	2401	1
9	2464	1
7	2506	1
8	2561	1
8	2614	1





APPENDIX III

EUSTIS
ENGINEERING
SINCE 1946

CONE PENETRATION
SOIL BEHAVIOR TYPE LEGEND

*OVERCONSOLIDATED OR CEMENTED

EUSTIS ENGINEERING SINCE 1946

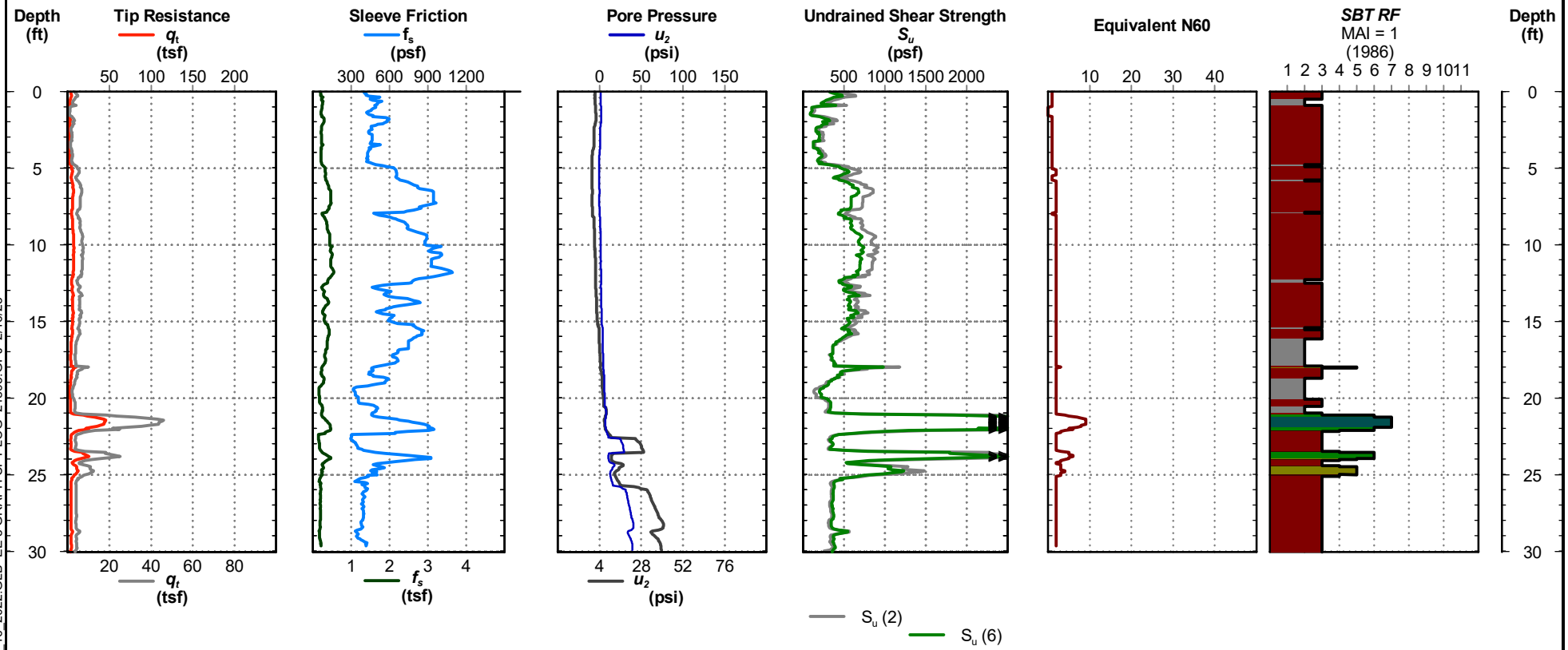
National Park Service
Jean Lafitte National Historical
Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

CONE PENETRATION TEST

CPT-6

Project No: 24895
Date: 02/03/2023
Latitude: 29.79223°
Longitude: -90.12642°
CPT ID: 5389

Est. Water Depth: 0.0 ft
Total Depth: 30.1 ft
Operator: E.Held



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson*et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24895-CPT-6.cpt

EUSTIS ENGINEERING SINCE 1946

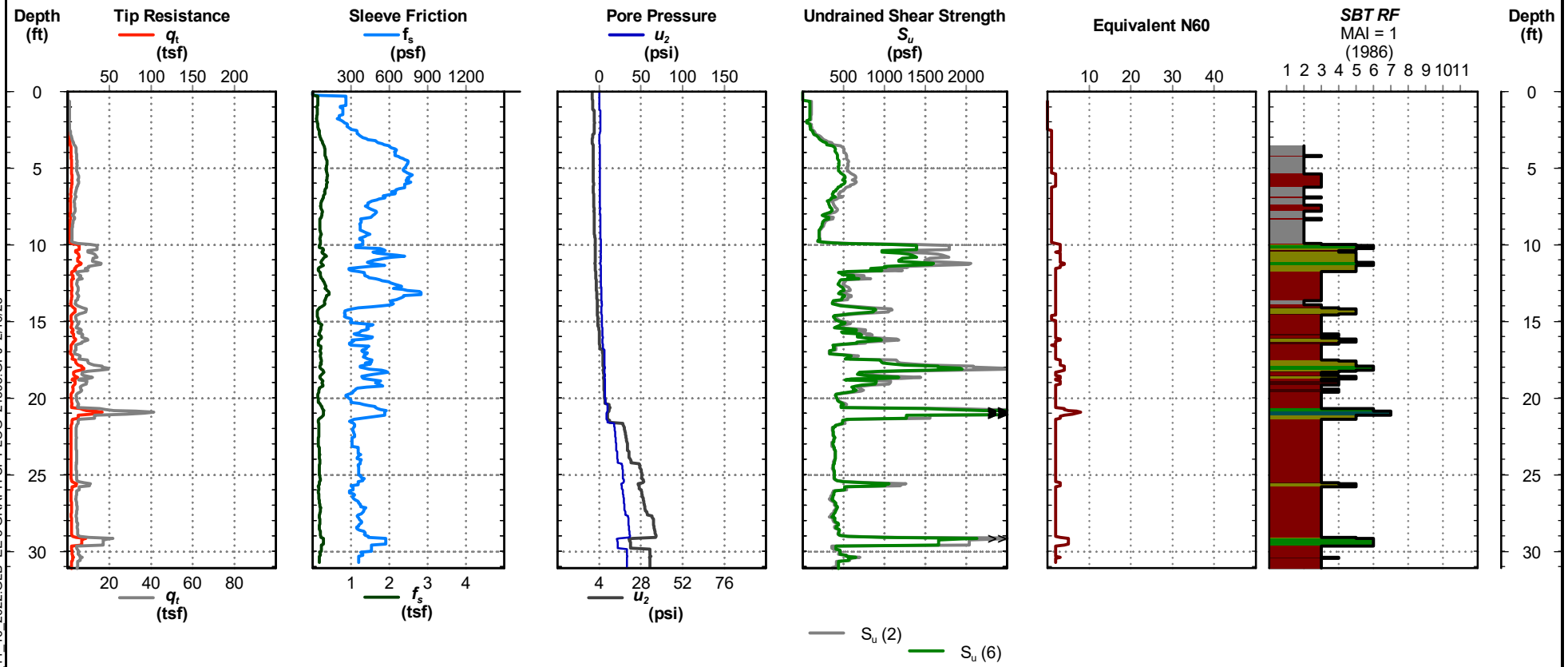
National Park Service
Jean Lafitte National Historical
Park and Preserve
Trail Improvements at Barataria Preserve
New Orleans, Louisiana

CONE PENETRATION TEST

CPT-8

Project No: 24895
Date: 01/31/2023
Latitude: 29.79077°
Longitude: -90.13020°
CPT ID: 5389

Est. Water Depth: 0.0 ft
Total Depth: 31.1 ft
Operator: E. Held



Notes: Soil behavior type was determined using friction ratio classification chart (after Robertson*et al.*, 1986).
Test performed in general accordance with ASTM D5778-20.

Electronic Filename: 24895-CPT-8.cpt

EUSTIS_GINT_LIBRARY_11_16_2022.GLB EE 5 GRAPH CPT LOG 24895.GPJ 2/16/23

CPT Correlations

References are next to the appropriate equation.

General

p_a=atmospheric pressure (for unit normalization)
q_t=corrected cone tip resistance (tsf)
f_s=friction sleeve resistance (tsf)
$R_f = 100\% \cdot (f_s/q_t)$
u_2=pore pressure behind cone tip (tsf)
u_0=hydrostatic pressure

$B_q = (u_2-u_0)/(q_t-\sigma_{vo})$
$Q_t=(q_t-\sigma_{vo})/\sigma'_{vo}$
$F_r=100\% \cdot f_s/(q_t-\sigma_{vo})$
$I_c = ((3.47-\log Q_t)^2 + (\log F_r+1.22)^2)^{0.5}$ 2
$I_{SBT} = ((3.47-\log(q_c/p_a))^2+(\log F_r+1.22)^2)^{0.5}$ 23
$I_{c\ J\&D} = \sqrt{\{3-\log(Q_t\cdot(1-B_q)\}^2 + [1.5+1.3\cdot\log(F_r)]^2}$ 27
$I_{c\ J\&B} = \sqrt{\{3-\log(Q_t\cdot(1-B_q)+1\}^2 + [1.5+1.3\cdot\log(F_r)]^2}$ 28

K_o

K_0 (1) $K_o = (1-\sin\varphi)OCR^{\sin\varphi}$
K_0 (2) $K_o = 0.1(Q_t)$ 1

Stress History

$OCR = \sigma_p'/\sigma'_{vo}$
OCR (1) $\sigma_p' = 0.33(q_t - \sigma_{vo})$ - clays 8
OCR (2) $\sigma_p' = 0.53(u_2 - u_o)$ - clays 9
OCR (3) $\sigma_p' = 0.60(q_t - u_2)$ - clays 9
OCR (4) $OCR = 0.25\ Q_t^{1.25}$ – clays 37
OCR (5) $OCR = \left[\frac{0.192*(q_t/p_a)^{0.22}}{(1-\sin(\phi')\cdot(\sigma'_{v0}/p_a{}^{0.31})}\right]^{\frac{1}{\sin(\phi'-0.27)}}$ – sands 35
OCR (6) $\sigma_p' = .101\cdot p_a{}^{0.102}\cdot G_{max}{}^{0.478}\cdot\sigma'_{v0}{}^{0.420}$ – all soils 36

N-Value

$N_{60} = (q_t/p_a)/[8.5(1-I_c/4.6)]$ 6

Undrained Shear Strength

S_u (1) $S_u = (u_2 - u_o)/N_u$ where $7 \le N_u \le 9$ 10
S_u (2) $S_u = (q_t - \sigma_{vo})/N_{kT}$ where $15 \le N_{kT} \le 20$ 11
S_u (3) $S_u = 0.091 * ((\sigma'_{vo}{}^{0.2}) * (q_t - \sigma_{vo})^{0.8}$ 21
S_u (4) $S_u = (q_c - \sigma_{vo})/N_k$ where $15 \le N_k \le 20$ 11
S_u (5) $S_u = q_t/N_c$ where $XXX \le N_c \le YYY$
S_u (6) $S_u = q_c/N_c$ where $XXX \le N_c \le YYY$

Effective Cohesion

$c' = 0.02 * \sigma_p'$ 38

Drained Friction Angle

φ' (1) $\varphi' = 17.6 + 11.0\text{Log}[q_t/(\sigma_{vo}')^{0.5}]$ 1

φ' (2) $\varphi' = \arctan[0.1 + 0.38\text{Log}(q_t/\sigma_{vo}')]$ 13

φ' (3) $\varphi' = 30.8\text{Log}[(f_s/\sigma_{vo}')+1.26]$ (for clays or sands) 14

φ' (4) $\varphi' = 29.5\ B_q^{0.121}\ (0.256 + 0.33\ B_q + \text{Log}(Q_t))$ 24

Unit Weight

$\rho = \gamma/\gamma_w$

$\rho = 0.8\text{Log}(V_s)$ V_s in m/sec 17

Relative Density and Void Ratio

D_R (1) $D_R = 100(q_{c1}/305)^{1/2}$ where, $q_{c1} = q_c/(\sigma_{vo}')^{1/2}$ 1

D_R (2) $D_R = -1.292 + 0.268\ln(q_c \cdot (\sigma_{vo}'^{-0.5}))$ 18

D_R (3) $D_R = (1/2.41)\cdot\ln(q_{c1}/15.7)$ 3

D_R (4) $D_R = 1/2.91 * \ln((q_c/(61* \sigma'^{0.71}_{vo}))*100$ 20

D_R (5) $D_R = 100*(0.268*\ln((q_t/p_a)/(\sigma'_{vo}/p_a)^{0.5}) - 0.675)$ 34

$e_o = 1.099 - 0.204\log(q_{c1})$ 1

$E_D = 5\ q_t$ $I_D = 2.0 - 0.14(R_f)$ $K_D = E_D/(34.7\cdot I_D\cdot \sigma_{vo}')$

Compressibility

M (1) = $R_m\ E_D$ where R_m= function(I_D, K_D) see the following table 22

$I_D <= 0.6$	$R_M = 0.14 + 2.36 \log K_D$
$I_D >= 3$	$R_M = 0.5 + 2 \log K_D$
$0.6 < I_D < 3$	$R_M = R_{M,D} + (2.5 - R_{M,D})\log K_D$
	$R_{M,D} = 0.14 + 0.15(I_D - 0.6)$
$K_D > 10$	$R_M = 0.32 + 2.18 \log K_D$
$R_M < 0.85$	$R_M = 0.85$

M (2) $M = q_c\cdot 10^{(1.09-0.0075D}R^{)}$ *sands* 1

M (3) $M = 8.25\ (q_t - \sigma_{vo})$ *clays* 1

M (4) $M = \alpha \cdot G_{max}\ where\ 0.02 < \alpha < 2$ and $G_{max}\ is\ from\ Vs$ 33

Rigidity Index

$I_R = exp\left[\left(\frac{1.5}{M} + 2.925\right)\cdot\left(\frac{q_t-\sigma_{vo}}{q_t-u_2}\right) - 2.925\right]$ where $M = 6\sin\emptyset'/(3-\sin\emptyset')$ 39

Sensitivity

S_t (1) $S_t = 7.5/R_f$ 2

S_t (2) $S_t = (q_t - \sigma_{vo})/(15\cdot f_s)$ 2

Fines Content

$FC = [(3.58-\log(q_t))^2+(1.43+\log(R_f))^2]^{1.8}$ 4

$FC = [5.31(I_{cfs})^{2.31}]+9.61$, where $I_{cfs} = [(1.95-\text{Log}Q_t)^2+(\log F_r+1.78)^2]^{0.5}$

Shear Wave Velocity

$V_s(1) = 277 \cdot q_t^{0.13} \cdot {\sigma'_{vo}}^{0.27}$ (sands) - m/s and MPa 29

$V_s(2) = 1.75 \cdot q_t^{0.627}$ (clays) - m/s and kPa 30

$V_s(3) = (10.1 \cdot \log q_t - 11.4)^{1.67} \cdot (\frac{f_s}{q_t} \cdot 100)^{0.3}$ (all soils) – m/s and kPa 31

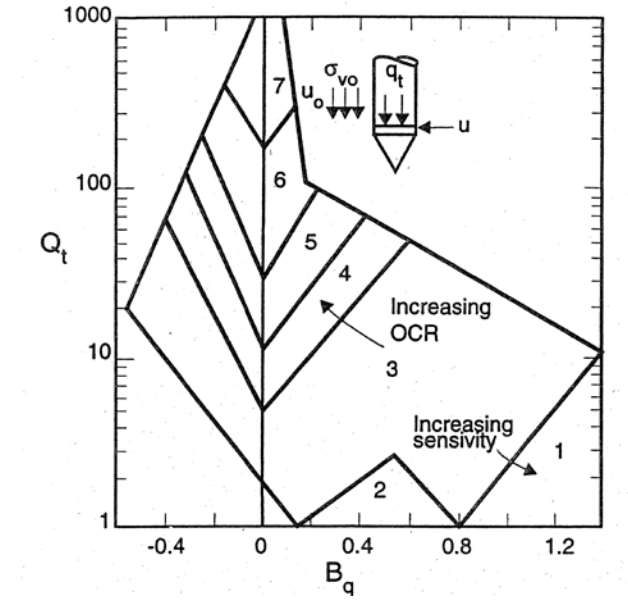
$V_s(4) = 118.8 \cdot \log f_s + 18.5$ (all soils) – m/s and kPa 32

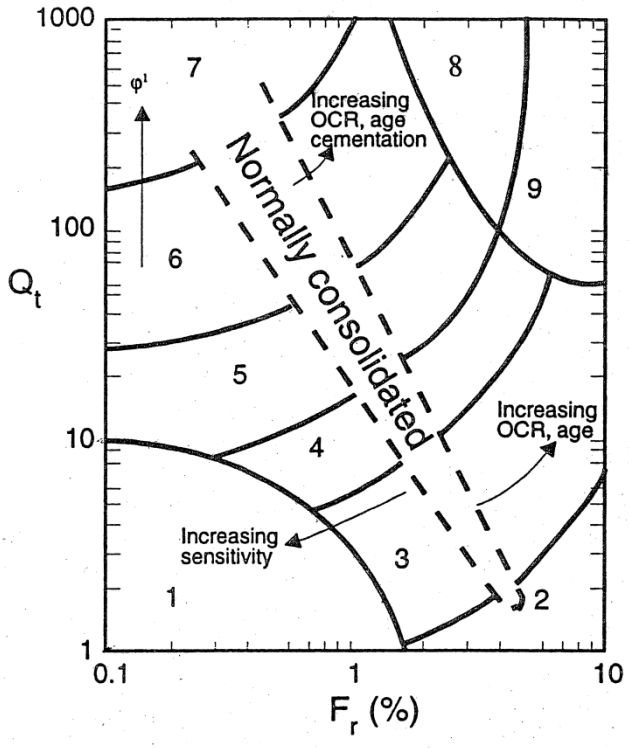
$G_{max} = \rho V_s^2$

Hydraulic Conductivity

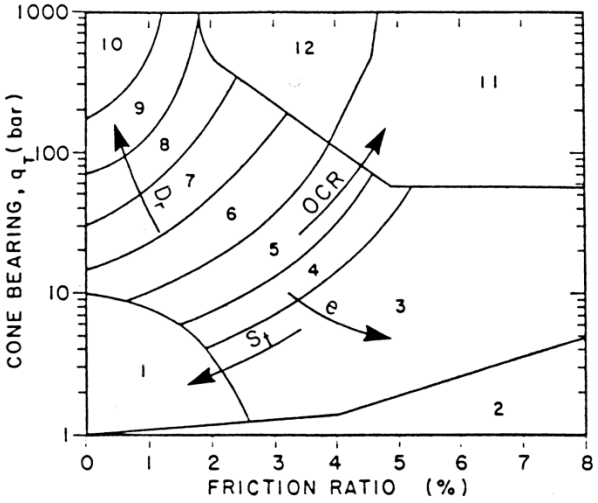
Lookup based on SBT and SBTn (1986 and 1990) 40

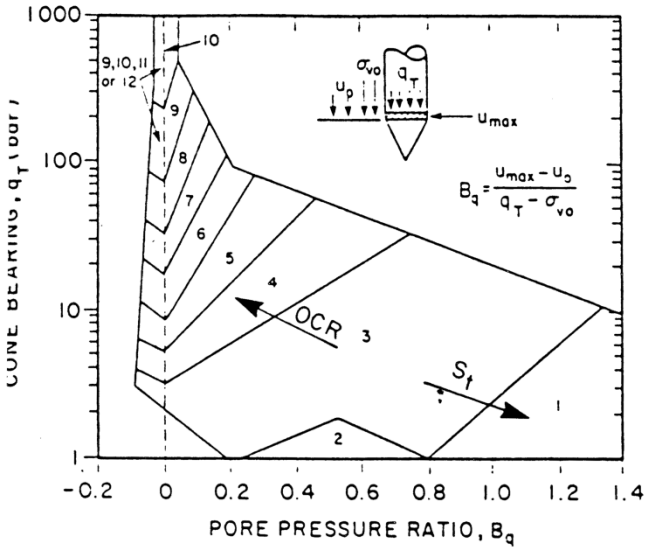
Normalized Soil Behavior Types - Robertson & Campanella (1990)





Non-Normalized Soil Behavior Types – Robertson & Campanella (1986)





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Submittal List with Review Estimate

National Park Service (NPS) - Denver Service Center (DSC) | 1-27-21

SUBMITTAL LIST

Park Acronym/Project Management Information System (PMIS) Number: JELA 318919

Project Title: Barataria Trails Improvement

ACTION SUBMITTAL REVIEW ESTIMATE

(Complete this portion for Architect / Engineer (A/E) construction service task order negotiation.)

SUBMITTAL			REQUIREMENTS (Indicate with **X**)								ARCHITECT / ENGINEER REVIEW TIME (Indicate in whole or partial hours.)							
			INFORMATIONAL				ACTION											
SPECIFICATION SECTION	PARAGRAPH NUMBER	DESCRIPTION	CERTIFICATIONS OR LABORATORY TESTS	REPORTS OR CALCULATIONS OR PLAN	MANUFACTURER DATA AND INSTRUCTIONS	OTHER	SAMPLES	SHOP DRAWINGS	MANUFACTURER DATA AND INSTRUCTIONS	AS-BUILT DRAWINGS	ARCHITECT	CIVIL ENGINEER	STRUCTURAL ENGINEER	MECHANICAL ENGINEER	ELECTRICAL ENGINEER	PROJECT MANAGER COORDINATION	LANDSCAPE ARCHITECT
01 31 00	1.4.A	Coordination Drawings			X												
01 31 00	1.4.B	Coordination Drawing Organization			X												
01 31 00	1.4.C	Coordination Digital Data Files			X												
01 31 00	1.4.D	Letter designating Project Superintendent		X													
01 31 00	1.4.D	List of Subcontractors for this project		X													
01 31 00	1.4.D	Written statements from Subcontractors certifying compliance with applicable labor standard clauses.		X													
01 31 00	1.4.D	Certficicates of Insurance and Standard Form SF 1413 for Contractor and all Subcontractors		X													
01 31 00	1.4.D	Waste Management Plan		X													
01 31 00	1.4.D	Construction Contractor Commissioning Plan		X													
01 32 16	1.3.A	Electronic Schedule		X													
01 32 16	1.3.B	Schedule of Values		X													
01 32 16	1.3.C	Construction Baseline Schedule		X													
01 32 16	1.3.D	Critical Path Method Activity Report		X													
01 32 16	1.3.D	Critical Path Method Logic Report		X													
01 32 16	1.3.D	Critical Path Method Total Float Report		X													
01 32 16	1.3.E	Construction Schedule Updates		X													
01 32 16	1.3.F	Construction Schedule Revisions and Time Impact Analysis		X													
01 32 33	1.2.A	Construction Images		X													

SUBMITTAL LIST

Park Acronym/Project Management Information System (PMIS) Number: JELA 318919

Project Title: Barataria Trails Improvement

ACTION SUBMITTAL REVIEW ESTIMATE

(Complete this portion for Architect / Engineer (A/E) construction service task order negotiation.)

SUBMITTAL			REQUIREMENTS (Indicate with **X**)								ARCHITECT / ENGINEER REVIEW TIME (Indicate in whole or partial hours.)							
			INFORMATIONAL				ACTION											
SPECIFICATION SECTION	PARAGRAPH NUMBER	DESCRIPTION	CERTIFICATIONS OR LABORATORY TESTS	REPORTS OR CALCULATIONS OR PLAN	MANUFACTURER DATA AND INSTRUCTIONS	OTHER	SAMPLES	SHOP DRAWINGS	MANUFACTURER DATA AND INSTRUCTIONS	AS-BUILT DRAWINGS	ARCHITECT	CIVIL ENGINEER	STRUCTURAL ENGINEER	MECHANICAL ENGINEER	ELECTRICAL ENGINEER	PROJECT MANAGER COORDINATION	LANDSCAPE ARCHITECT
01 35 13.22	1.3.A	Daily Work Schedule		X													
01 35 23	1.3.A	Accident Prevention Plan		X													
01 35 91	1.3.A	Historic Preservation Treatment Plan (HPTP)		X													
01 35 91	1.3.B	Alternative Methods and Materials		X													
01 35 91	1.3.C	Photographs or Videotape		X													
01 40 00	1.4.A	Quality Control Plan		X													
01 40 00	1.4.B	Qualitification Data	X														
01 40 00	1.4.C	Contractor Quality Control Daily Reports		X													
01 40 00	1.4.D	Test Reports		X													
01 40 00	1.4.E	Accessibility Inspection Report		X													
01 40 00	1.4.F	Off-Site Inspection Reports	X	X													
01 40 00	1.4.H	Permits, Licenses, and Certificates	X														
01 57 23	1.3.A	Temporary Storm Water Pollution Prevention Plan (SWPPP)		X													
01 57 23	1.3.A	Under-An-Acre Pollution Prevent Plan (UPPP)		X													
01 57 23	1.3.B	Inspection Schedule of Pollution Prevention Measures		X													
01 57 23	1.3.C	Inspection Schedule of Storm Water Pollution Prevention Measures		X													
01 57 23	1.3.D	Erosion Control Products			X												
01 67 00	1.3.A	Affirmative Procurement Reporting Form		X													
01 67 00	1.3.A	Product Environmental Data			X												
01 67 00	1.3.A	Material Safety Data Sheets			X												
01 67 00	1.3.A	Chain of Custody Documentation for Sustainable Forestry			X												

SUBMITTAL LIST

Park Acronym/Project Management Information System (PMIS) Number: JELA 318919

Project Title: Barataria Trails Improvement

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01 73 40	1.2.A	Certicate of Compliance of location and elevation of improvements		X													
01 73 40	1.2.B	Landfill Receipts	X														
01 73 40	1.2.C	Certificied Surveys		X													
01 73 40	1.2.D	Quantity Surveys		X													
01 74 19	1.4.A	Waste Management Plans		X													
01 74 19	1.4.B	Progress Documentation		X													
01 74 19	1.4.C	Waste Reduuction Calculations		X													
01 74 19	1.4.D	Landfill and Incinerator Disposal Records	X														
01 74 19	1.4.E	Updated Project Waste Management Plan Worksheet		X													
01 74 19	1.4.E	Manifests, Weight Tickets, Receipts, and Invoices Identifying Project and Waste Material	X														
01 74 19	1.4.D	Summary of Waste Management Plan Worksheet		X													
01 77 00	1.3.A	Warranties, Guarantees, Bonds, Certifications, etc.			X												
01 77 00	1.3.A	Project Record Documents		X													
01 77 00	1.3.A	Extra Materials			X												
01 77 00	1.3.A	Pre-functional checklists, performance testing reports		X													
01 78 23	1.2.A	Operations and Maintenance Manual		X													
02 41 16	1.4.A	Protection Measures		X													
02 41 16	1.4.B	Schedule of Demoliton Activities		X													
02 41 16	1.4.C	Demolition Plans		X													
02 41 16	1.4.D	Landfille Records		X													
03 30 00	1.3.B	Mix Design							X				4				
03 30 00	1.3.C	Delivery Tickets		X													
03 30 00	1.3.D	Test Data							X				4				
03 30 00	1.3.E	Mill Tests for Cement	X														
03 30 00	1.3.E	Admixture Certification	X														
03 30 00	1.3.E	Aggregate Gradation Test Results and Certification	X														
03 30 00	1.3.E	Materials and Methods for Curing	X														

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05 50 00	1.3.A	Metal Fabrication Shop Drawings						X					4	4				
06 05 73	1.4.A	Treated Wood Preservatives Product Data			X													
06 05 73	1.4.B	Preservative Treatment Certification	X															
06 10 00	1.3.A	Rough Carpentry Shop Drawings						X					4	4				
06 10 00	1.3.B	Nailers and Nailing Strips						X					4	4				
06 10 00	1.3.C	Treated Lumber Product Data			X													
06 10 00	1.3.D	Design Data		X														
06 10 00	1.3.E	Preservative-treated Lumber and Plywood Test Reports	X															
06 10 00	1.3.F	Certficates of Lumber Grades	X															
06 15 00	1.1.A	Thermally Modified Top Rail Product Data							X				4					4
06 15 00	1.1.A	Thermally Modified Top Rail Samples					X											
06 61 00	1.3.A	Grating Shop Drawings						X					8					8
06 61 00	1.3.B	Grating Manufacturer's Shop Drawings						X					8					8
06 61 00	1.3.C	Grating Manufacturer's Published Literature			X													
06 61 00	1.3.D	Grating Samples					X											
12 93 00	1.2.B	Site Furnshing Product Data							X				4					4
12 93 00	1.2.B	Site Furnishing Shop Drawings						X					4					4
22 10 00	1.3.B	Pluming Shop Drawings						X					4					
26 00 10	1.5.B	Electrical Shop Drawings						X								8		
26 05 00	1.3.C	Electrical Component Shop Drawings						X								8		
26 05 00	1.3.C	As-Built Drawings								X						8		
31 25 00	1.2.A	Turbidity Control Plan		X														
31 25 00	1.2.B	Sediment Control Product Data			X													
31 25 00	1.2.C	Sediment Control Material Certificates	X															
31 32 19	1.4.A	Geotextile Fabric Material Certificates	X															
31 32 19	1.4.B	Geotextile Fabric Manufacturing Quality Control Test Results	X															
31 62 19	1.3.A	Composite Pile Shop Drawings						X					4	4				
31 62 19	1.3.A	Composite Pile Product Data							X					4				
31 62 19	1.3.A	Composite Pile Color Samples					X											

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31 62 19	1.3.A	Composite Pile Certificates	X														
31 62 19	1.3.A	Compoiste Pile Driving Records		X													
32 15 00	1.4.A	Aggregate Gradation Test Results and Certification	X														
											Total:	0	48	28	0	24	0	28

Project Waste Management Plan Worksheet Sample

National Park Service (NPS) - Denver Service Center (DSC) | 10-13-21

	A	B	C	D	E	F	G	H	I	J
Material	**Quantity Recycled (in tons)**	**Quantity Salvaged or Reused (in tons)**	**A + B = Total Quantity Diverted from Landfill**	**Quantity to Landfill (in tons)**	**C + D = Total Quantity Generated (in tons)**	**Tip Fee/Ton at Landfill**	**C x F = Tip Fee Savings resulting from Landfill Diversion**	**Cost of Recycling (R), Salvage (S), or Reuse (Re)** (Specify R, S, or Re)	**Revenue from Recycling (R), Salvage (S), or Reuse (Re)** (Specify R, S, or Re)	**G - H + I = Total Cost (-) or Savings (+) from Diversion**
Asphalt/Concrete										
Brick/Masonry/Tile										
Building Materials (doors, windows, fixtures, shingles, lumber, insulation, sheet goods, etc.)										
Carpet										
Carpet Padding, Foam Only										
Cardboard										
Ceiling Tile										
Drywall										
Glass										
Scrap Metal Aluminum										
Copper										
Steel										
Unpainted Wood & Pallets										
Yard Trimmings, Brush, Trees, Stumps, etc.										
Garbage/Trash										
Other										
Column Totals										
	Total Quantity Recycled	Total Quantity Reused or Salvaged	Total Quantity Diverted from Landfill	Total Quantity to Landfill	Total Quantity Generated		Tip Fee Savings from Diversion	Total Cost of Recycling, Salvage, or Reuse	Revenue from Recycling, Salvage, or Reuse	Total Cost (-) or Savings (+) from Diversion

Percentage Diverted = _____ (C divided by E from Column Totals). Should meet 60% diversion goal.

Closeout and Operation & Maintenance (O&M) Requirements

National Park Service (NPS) - Denver Service Center (DSC) | 1-27-21

Topic	Specification Section	Requirement	Submittal Date	Completed	Received by Park
Project Record Drawings	01 77 00	Submit complete record drawings at completion of total project. Include shop drawings, sketches, and additional drawings to be included in final set, with clear instructions showing the location of these drawings			
System Demonstration and Training					
Tools Spare Parts Equipment					
Extra Stock	01 77 00	Deliver extra materials and similar items to location designated by Contracting Officer.			
Reports	01 78 23	Emergency Manual			
		Product Maintenance Manual			
		Operation and Maintenance Manual			
		Testing and Special Inspection Reports			
		Quality Control Daily Reports			
		Manufacturer's Field Report			
Keys & Keying Schedule	01 77 00	Submit keys including duplicates.			
O&M Data Warranties Guarantees	06 61 00	Pultruded Pedestrian Grating Manufacturer's 3-Year Limited Warranty			
	12 93 00	Picnic Table 3 Year Manufacturer's Warranty			
	12 93 00	Park Bench 3 Year Manufacturer's Warranty			
	12 93 00	Trash Receptacle 3 Year Manufacturer's Warranty			
	12 93 00	Sign Frame 10 Year Manufacturer's Warranty			
	22 10 00	O&M data for valves, hose bibs, and piping			
	26 00 10	O&M of Electrical Items			