

EXHIBIT DRIVE PAVEMENT REHABILITATION

Orange County Convention Center

Project Manual

**Bid Documents
December 11, 2012**



Prepared For:

Orange County Convention Center
Construction Division
Post Office Box 691509
Orlando, Florida 32869-1509

Prepared By:

WBQ Design & Engineering Inc.
201 North Magnolia Avenue, Suite 200
Orlando, Florida 32801

EXHIBIT DRIVE PAVEMENT REHABILITATION DIVISION 1 SPECIFICATIONS

SECTION NUMBER	SECTION TITLE
01005	Administrative Provisions
01010	Summary of Work
01027	Applications for Payment
01035	Modification Procedures
01040	Project Coordination
01045	Cutting and Patching
01095	Reference Standards and Definition
01150	Measurement and Payment
01200	Project Meetings
01300	Submittals
01400	Quality Control Services
01410	Testing Laboratory Services
01500	Temporary Facilities
01631	Product Substitutions
01700	Project Close-Out
01740	Warranties and Bonds

DIVISION 2 SPECIFICATIONS

02110	Site Clearing
02200	Earthwork
02514	Portland Cement Concrete Paving

**SECTION 01005
ADMINISTRATIVE PROVISIONS**

PART I GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of this Contract comprises site work and related construction work to produce a complete and functional facility for the construction of Exhibit Drive Pavement Rehabilitation Project at the Orange County Convention Center.

1.02 CONTRACT METHOD

- A. Construct the work under a Unit Price contract basis.

1.03 COORDINATION

- A. Coordinate work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements.
- B. Verify characteristics of elements of interrelated work; coordinate work of various Sections having interdependent responsibilities for construction. Differences shall be brought to the Owner's attention during bid process or remain the responsibility of the Contractor.
- C. Coordinate space requirements required for construction activities. Follow routing shown for concrete paving as closely as practicable.

1.04 FIELD ENGINEERING SURVEYING

- A. Control datum for project is shown on the Map of Topographic Survey, Sheets 1 through 4, as prepared by Amec E&I, Inc. and dated April 19, 2012.

1.05 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect when a specified date is specified.
- C. Obtain copies of referenced standards listed in individual specification sections. Maintain copy at job site during progress of the specific work.

END OF SECTION 01005

**SECTION 01010
SUMMARY OF WORK**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 PROJECT DESCRIPTION

- A. Performance of all tasks specified in the contract documents shall be the responsibility of the contractor unless specified otherwise.

1.03 BUILDING/SITE SECURITY

- A. The construction site, to the limits indicated on the site plan drawings, shall be secured by means of a construction fence, located around the entire perimeter of the construction site. This construction fence shall be required to be secure from unwarranted entry at the end of each day.
- B. Refer to Section 01500 for specified requirements for construction fence.

1.04 CONTRACTOR USE OF PREMISES

- A. General: During the construction period, the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of the project.
- B. General: Limited use of the premises to construction activities in areas indicated within the limit of the premises. The Contractor may use any portion of the site for storage or work areas or any legal purpose.
 - 1. Confine operations to areas within Contract limits indicated on the Drawings. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
 - 2. Keep driveways and entrances serving the premises clear and available to the Owner and the Owners' employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
 - 3. Burial of Waste Materials: Do not dispose of organic and hazardous material on site, either by burial or by burning.

1.05 DISTRIBUTION OF RELATED DOCUMENTS

- A. The Contractor is solely responsible for the distribution of ALL related documents/drawings to ALL appropriate vendors/subcontractors to ensure proper co-

ordination of all aspects of the project and its related parts during bidding and construction.

1.06 CONSTRUCTION BULLETIN BOARD

- A. The Contractor shall erect and maintain a weather protected bulletin board of sufficient size to display all permits, notices and other documents required to be posted for the Project. Said bulletin board shall be in a location that provides unobstructed access for inspection by the Architect, the Project Manager, County Representatives, and authorities having jurisdiction over the project.

PART 2 PRODUCTS

2.01 ASBESTOS FREE MATERIAL

- A. Contractor shall provide a written and notarized statement on company letter-head(s) to certify and warrant that ONLY ASBESTOS FREE MATERIALS AND PRODUCTS were provided as required by the Architect in Section 01400, QUALITY CONTROL. Such statement shall be submitted with the final payment request. Final payment shall not be made until such statement is submitted. Contractor agrees that if materials containing asbestos are subsequently discovered at any future time to have been included in the construction, the Contractor shall be liable for all costs related to the redesign or modification of the construction of the project so that materials containing asbestos are removed from the facility. If construction has begun or has been completed pursuant to a design that includes asbestos containing materials, the Contractor shall also be liable for all costs related to the abatement of such asbestos.

PART 3 EXECUTION (Not applicable).

END OF SECTION 01010

**SECTION 01027
APPLICATION FOR PAYMENT**

PART I GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
- B. The Contractor's Construction Schedule and Submittal Schedule are included in Section 01300 – SUBMITTALS.

1.03 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as reviewed by the Owner representative and paid for by the Owner.
 - 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the Final Application for Payment involve additional requirements.
- B. Payment Application Times: The period of construction work covered by each Application of Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use the County's most updated form as the form for Application for Payment. Form given at the Preconstruction Conference.
- D. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.
 - 1. Entries shall match the Contractors' Construction Schedule. Use updated schedules if revisions have been made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- E. Transmittal: Submit five (5) original executed copies of each Application for Payment to the Project Manager by means ensuring receipt within 24 hours; one copy shall be complete, including waivers of lien and similar attachments, when required.
 - 1. Transmit each copy with a transmittal form listing attachments, and

recording appropriate information related to the application in a manner acceptable to the Project Manager.

- F. Payment will be processed once a month. Payment will be based on percentage completed as determined and approved by the County Project Manager or invoice for stored materials. Retainage (10%) will be held for all applications.
- G. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. Application shall also include all items listed above.
- H. Final Payment Application: Administrative actions and submittals, which must precede or coincide with submittal of the final payment. Application for Payment includes the following:
 - 1. Completion of Project Close-Out requirements
 - 2. Completion of items specified for completion after Substantial Completion (Punch List)
 - 3. Contractor's release of lien (on Owner's form)
 - 4. Subcontractor and material supplier release of lien
 - 5. Consent of Surety
 - 6. Power of attorney
 - 7. Asbestos-free letter

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 01027

**SECTION 01035
MODIFICATION PROCEDURES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.02 SUMMARY

- A. This section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.03 MINOR CHANGES IN THE WORK

- A. Supplemental instructions authorizing minor changes in the work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Project Manager.

1.04 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Proposed changes in the work that will require adjustment to the Contract Sum or Contract Time will be issued by the Project Manager, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
 - 1. Proposal requests issued by the Project Manager are for information only. Do not consider them instruction either to stop work in progress, or to execute the proposed change.
 - 2. Unless otherwise indicated in the proposal request, within 7 days of receipt of the proposal request, submit to the Project Manager from the Owner's review, an estimate of cost necessary to execute the proposed change.
 - a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the work will have on the Contract Time.
 - d. Contractor and subcontractors will provide a complete detailed labor and material breakdown to justify change order request amount.
- B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions in mutual accord with the Owner Representative's findings

require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.

1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section 01631 – Product Substitutions- if the proposed change in the work requires that substitution of one product or system for a product or system not specified.
5. Contractor and subcontractors will provide a complete detailed labor and material breakdown to justify change order request amounts.

1.05 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Project Manager may issue a Construction Change Directive instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. The Construction Change Directive will contain a complete description of the change in the Work and designate the method to be followed to determine change in the Contract Sum or Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.07 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a Change Order Proposal Request, the Project Manager will issue a Change Order for signatures of the Owner and Contractor on County's Change Order form, as provided in the Conditions of the Contract.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 01035

01035-2

SECTION 01040
PROJECT COORDINATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for project coordination including, but not necessarily limited to:
 - 1. Coordination
 - 2. Administrative and supervisory personnel
 - 3. General installation provisions
 - 4. Cleaning and protection
- B. Progress meetings, coordination meetings And Pre-installation conferences are included in Section 01200 'Project Meetings'.
- C. Requirements for the Contractor' Construction Schedule are included in Section 01300 'Submittals'.

1.03 COORDINATION

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specification that are dependent upon each other for proper installation, connection, and operation.
 - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required: notices, reports, and attendance at meetings.
1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Schedules
 2. Installation and removal of temporary facilities
 3. Delivery and processing of submittals
 4. Progress meetings
 5. Project close-out activities
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment (if any) involved in performance of, but not actually incorporated in, the Work.
- E. Lack of coordination as specified in this and other sections of the contract documents are grounds for assessment of back charges and/or termination in order to remediate the situation.

1.04 SUBMITTALS

- A. Staff Names: At the Preconstruction Conference submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
1. Post copies of the list in the project meeting room, the temporary field office, and each temporary telephone.

PART 2 PRODUCTS (Not Applicable)

01040-2

PART 3 EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to Project Manager for final decision.
- E. Recheck measurements and dimensions, before starting each installation.
- F. Install each component during weather conditions and Project status that will ensure the best possible results.
- G. Coordinate required inspections and tests

3.02 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as directed by the Project Manager and as frequently as necessary to ensure its integrity and safety through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where the applicable, such exposures include, but are not limited to, the following:
1. Excessive static or dynamic loading
 2. Excessively high or low temperatures
 3. Solvents
 4. Chemicals
 6. Soiling, staining and corrosion
 7. Destructive testing
 8. Excessive weathering
 9. Unprotected storage
 10. Vandalism

END OF SECTION 01040

SECTION 01045 CUTTING AND PATCHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.03 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements as well as changes in appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform Work.
 - 4. Indicate dates when cutting and patching is to be performed.
 - 5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

6. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.04 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load carrying capacity or load-deflection ratio.
 1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements.
 - a. Foundation construction
 - b. Retaining walls
 - c. Structural concrete
 - d. Timber and primary wood framing
 - e. Structural decking
- B. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect unless otherwise indicated by Architect/Owner. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 EXECUTION

3.01 INSPECTION

01045-2

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
 - 1. Before proceeding, meet at the site with all parties involved in cutting and patching. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas and interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine such as a Carborundum saw or diamond core drill.
 4. Comply with requirements of applicable Sections of Division-2 where cutting and patching required excavating and backfilling.
 5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3.04 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Restore damaged materials to their original condition.

END OF SECTION 01045

SECTION 01095

REFERENCE STANDARDS AND DEFINITIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated: The term *indicated* refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as shown, noted, scheduled and specified are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as directed, requested, authorized, selected, accepted, required, and permitted mean directed by the Project Manager, requested by the Architect/Project Manager and similar phrases.
- D. Approved: This term approved means accepted, where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulations: The term Regulations includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish: The term furnish is used to mean supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. Install: The term install is used to describe operations at project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting,

cleaning, and similar operations.

- H. Provide: The term provide means to furnish and install, complete and ready for the intended use.
- I. Installer: An Installer is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term experienced, when used with the term Installer, means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
 - 2. Trades: Use of titles such as carpentry is not intended to imply that 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 persons of the corresponding generic name.
- J. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. Testing Laboratories: A testing laboratory is an independent entity engaged to perform specific inspections or tests, either at the Project sites or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16 Division format and MASTER FORMAT numbering system.
- B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These

conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Words and meaning shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - a. The words, shall be shall be included by inference wherever a colon (:) is used within a sentence or phrase.

1.04 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copies directly into the Contract Documents to the extend reference. Such standards are made part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standard in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliances with two or more standards are specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer requirements that are different, but apparently equal, and uncertainties to the Architect for a decision before proceeding.
 1. Minimum Quantity or Quality Levels: The quantity of quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the

context of the requirements. Refer uncertainties to the Architect/Owner for a decision before proceeding.

- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed for performance of a required construction activity. The Contractor shall obtain copies directly from the publication source or any other authorized source.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. See Trade Reference List at the end of this Section refer to the Encyclopedia of Associations, published by Gale Research Co., available in most libraries.

1.05 GOVERNING REGULATIONS/AUTHORITIES

- A. The Architect has contacted authorities having jurisdiction where necessary to obtain information necessary the preparation of Contract Documents. Contact authorities having jurisdiction directly for information and decisions having a bearing on the work.

1.06 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulation bearing upon performance of the Work.

1.07 TRADE REFERENCES

Acronyms for abbreviations used in the Specifications or other Contract Documents

mean the recognized name of the trade association, standards generating organization, authority that have jurisdiction or other entity applicable to the context of the text provision.

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturer=s Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
ACPA	American Concrete Pipe Association
ADC	Air Diffusion Council
AGA	American Gas Association
AHA	American Hardboard Association
AI	Asphalt Institute
AIHA	American Industrial Hygiene Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
ARI	Air Conditioning and Refrigeration Institute
ASA	Acoustical Society of America

ASC	Adhesive and Sealant Council
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society of Testing of Materials
AWI	Architectural Woodwork Institute
AWPB	American Wood Preservers Bureau
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
DHI	Door and Hardware Institute
DLPA	Decorative Laminate Products Association
EIMA	Exterior Insulation Manufacturers Association
FGMA	Flat Glass Marketing Association
FM	Factory Mutual Engineering and Research
GA	Gypsum Association
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronic Engineers
IESNA	Illuminating Engineering Society of North America

MBMA Metal Building Manufacturer's Association

ML/SFA Metal Lath/Steel Framing Association

MSS Manufacturers Standardization Society of the Valve and Fittings Industry

NAAMM National Association of Architectural Metal Mfgs.

NAPA National Asphalt Pavement Association

NAPF National Association of Plastic Fabricators (Now DLPA)

NBHA National Builder's Hardware Association (Now DHI)

NCMA National Concrete Masonry Association

NEC National Electric Code

NECA National Electric Contractors Association

NFPA National Fire Protection Association

NHLA National Hardwood Lumber Association

NPA National Particle board Association

NPCA National Paint and Coatings Association

NRCA National Roofing Contractors Association

NSF National Sanitation Foundation

NWMA National Woodwork Manufacturers Association (Now NWWDA)

NWWDA National Wood Window and Door Association (Formerly NWMA)

PDI Plumbing and Drainage Institute

RFCI Resilient Floor Covering Institute

RMA Rubber Manufacturers Association

SDI Steel Deck Institute

S.D.I.	Steel Door Institute
SGCC	Safety Glazing Certification Council
SHLMA	Southern Hardwood Lumber Manufacturers Association (Now HMA)
SIGMA	Sealed Insulating Glass Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SJI	Steel Joist Institute
SPRI	Single Ply Roofing Institute
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TCA	Tile Council of America
UL	Underwriters Laboratories
WCMA	Wall Covering Manufacturers Association
WRI	Wire Reinforcement Institute
WSFI	Wood and Synthetic Flooring Institute

1.08 FEDERAL GOVERNMENT AGENCIES

- A. Names and titles of federal government standard or Specification producing agencies are frequently abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard or Specification producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up-to-date as of the date of the Contract Documents.

CE	Corps of Engineers (US Department of the Army) Chief of Engineers - Referral Washington, DC 20314	(202) 272-0660
CFR	Code of Federal Regulations Available from the Government Printing Office North Capitol St. Between G and H Street, NW Washington, DC 20402	(202) 783-3238

(MATERIAL IS USUALLY FIRST PUBLISHED IN THE FEDERAL REGISTER)

CPSC	Consumer Product Safety Commission 5401 Westbard Avenue Washington, DC 20816	(800) 638-2772
CS	Commercial Standard (US Department of Commerce) Government Printing Office Washington, DC 20402	(202) 377-2000
DOC	Department of Commerce 14th Street and Constitution Ave., NW Washington, DC 20230	(202) 377-2000
DOT	Department of Transportation 400 Seventh St., SW Washington, DC 20590	(202) 426-4000
EPA	Environmental Protection Agency 401 M. St., SW Washington, DC 20460	(202) 382-2090

FAA	Federal Aviation Administration (U.S. Department of Transportation) 800 Independence Avenue SW Washington, DC 20590	(202) 366-4000
FCC	Federal Communications Commission 1919 M. Street NW Washington, DC 20554	(202) 632-7000
NBS	National Bureau of Standards (U.S. Department of Commerce) Gaithersburg, MD 20899	(301) 921-1000
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) Government Printing Office Washington, DC 20402	(202) 523-7001
PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	(202) 783-3238
USDA	U.S. Department of Agriculture Independence Avenue Between 12th and 14 Street, SW Washington, DC 20250	(202) 447-8732

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01095

**SECTION 01150
MEASUREMENT AND PAYMENT**

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDE:

- A. Payment for all work done in compliance with the Contract Documents, inclusive of furnishing all manpower, equipment, materials, and performance of all operations relative to construction of this project, will be made under the Pay Items listed on the Bid Item Schedule. Should the Contractor feel that the cost of any part of the Work has not been identified by an item on the Bid Item Schedule, he shall include the cost of the work in some other applicable bid item, so that his proposal for the project reflects his total price for completing the Work in its entirety. Work for which there is not a Pay Item will be considered incidental to the Contract and no additional compensation will be allowed.
- B. The Owner reserves the right to modify work as may be necessary, and increase or decrease quantities of work to be performed, including deduction or cancellation of any one or more of the Pay Items. Changes in the work shall not be considered as a waiver of any conditions of the Contract nor invalidate any provisions thereof. When changes result in changes in the quantities of the work to be performed, the Contractor will accept payment according to Contract Unit Prices that appear in the Bid Item Schedule, subject to Contract Provisions.
- C. The quantities for payment of unit price items under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the Owner, in accordance with the applicable method of measurement therefore contained herein. A representative of the Contractor shall witness and verify all field measurements with the Owner's representative.
- E. Work performed by the Contractor outside the limits of construction shall be at the Contractor's expense.

PART 2 - SPECIFIC PAY ITEMS

2.1 MEASUREMENT AND PAYMENT:

- A. Measurement and payment for work items shall be in accordance the following:
 - 1. Mobilization and Demobilization shall be paid as a lump sum amount. Payment will be made under Pay Item No. 0101-1 – Mobilization and Demobilization - per lump sum.
 - 2. Maintenance of Traffic/Utilities shall be paid as a percentage of work completed during the pay period, and the total shall not exceed the lump sum bid pay item amount. The bid price and payment shall be full compensation for all materials, labor and equipment necessary for the initial installation and continual maintenance of traffic during all phases of the work, including but not limited to, temporary barricades, drums, signage, and advance warning arrow

panels shown in the plans and described in the specifications. The maintenance of utilities shall include coordination with the Owner and all affected utility agencies for the location, protection and/or adjustment of existing utilities to accommodate construction. Payment will be made under Pay Item No. 0102-1 - Maintenance of Traffic/Utilities – per lump sum.

3. Sediment Barrier, Silt Fencing and Inlet Protection shall be measured for payment by the percentage of work completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary for the initial installation and continual maintenance of all measures required by the Demolition and Erosion Protection Plan during all phases of the work. Payment will be made under Pay Item No. 104-13- Sediment Barrier, Silt Fencing and Inlet Protection - per lump sum.
4. Clearing and Grubbing shall be paid as a percentage of work completed during the pay period, and the total shall not exceed the lump sum bid pay item amount. The bid price and payment shall be full compensation for all materials, labor and equipment necessary for complete removal and disposal of all vegetation, debris, above grade and below grade improvements, or any other obstructions in all areas where excavation is to be done, including removal of flexible asphalt pavement, concrete pavement, curbs and base course material as specified in Section 02110 of the Project Manual. Payment will be made under Pay Item No. 0110-1- Clearing and Grubbing - per lump sum.
5. Regular Excavation shall be measured for payment by the cubic yard completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary for excavation required to obtain sub-grade elevations for the new concrete pavement section, including the 6" thick crushed concrete base course material, as shown and detailed in the plans, and as specified in Section 02200 of the Project Manual. Payment will be made under Pay Item No. 0120-4 – Regular Excavation – per lump sum.
6. 6" Base Course Material (Crushed Concrete, 300 PSI), shall be measured for payment by the square yard completed and accepted by the Engineer. The bid price and payment shall be full compensation to furnish all materials, labor and equipment necessary to construct the 6" thick graded crushed concrete base, including dewatering, if required, and sub-grade preparation as shown and detailed in the plans, and as specified in Section 02200 and the Geotechnical Report located in the Project Manual. Payment will be made under Pay Item No. 285-7-11 - 6" Base Course Material (Crushed Concrete, 300 PSI) - per square yard.
7. Cement Concrete Pavement, Reinforced, 8" (5,000 psi), shall be measured for payment by the square yard completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary to construct 8" thick reinforced concrete pavement as shown in the plans and per Section 02514 of the Project Manual. Payment will be made under Pay Item No. 0350-2-3 – Cement Concrete Pavement, Reinforced, 8" (5,000 psi) - per square yard.

8. Underdrain, Type I shall be measured for payment by the linear foot completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary to furnish and install the Type I underdrain system, including cleanouts, core drilling of existing inlet structures, connecting the underdrain pipe to the inlet structures and dewatering as required, as shown on the plans and as detailed in the Geotechnical Report located at the end of Section 02200 of the Project Manual. Payment will be made under Pay Item No. 0440-1-30- Underdrain, Type I - per linear foot.
9. Curb & Gutter (Type F) shall be measured for payment by the linear foot completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary to construct Type F concrete curb & gutter, including sub-grade stabilization, as shown and detailed in the plans, and as described in Section 02514 of the Project Manual. Payment will be made under Pay Item No. 0520-1-10 - Curb & Gutter (Type F) - per linear foot.
10. Special Concrete Gutter (Drop Curb) shall be measured for payment by the linear foot completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary to construct concrete drop curb, including sub-grade stabilization, as shown and detailed in the plans, and as described in Section 02514 of the Project Manual. Payment will be made under Pay Item No. 0520 - 4 – Special Concrete Gutter (Drop Curb) - per linear foot.
11. Patterned/Textured Pavement (Stamped Concrete) shall be measured for payment by the square yard completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary for the placement of a patterned, textured, stamped or colored treatment to the concrete pavement. The underlying concrete pavement is paid separately under Cement Concrete Pavement. Payment will be made under Item No. 0523-1 - Patterned/Textured Pavement - per square yard.
12. Sodding, Match Existing shall be measured for payment by the square yard completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary to properly install sod as shown on the plans, including cutting-in, rolling, watering and maintenance until project final completion. Payment will be made under Item No. 575 -1 - Sodding, Match Existing - per square yard.
13. Vehicle Detector Assemblies, Replace shall be measured for payment by each assembly completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary to properly install new vehicle detector assemblies as shown on the plans, including saw cutting, installation, connection to existing traffic signal control equipment, testing and adjustment required by the Orange County Traffic Engineering Department. All work for this item shall be in accordance

with Orange County Standard Specifications and Section 660 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition. Payment will be made under Item No. 660-1 – Vehicle Detector Assembly, Replace - per each.

14. Thermoplastic Pavement Markings, including, but shall not be limited to, stop bars, arrows, and travel lane markings shall be measured for payment by each element completed and accepted by the Engineer. The bid price and payment shall be full compensation for all materials, labor and equipment necessary to complete all pavement markings on the concrete pavement surface of Exhibit Drive per the layout and details shown on the plans using alkylid thermoplastic pavement markings and glass beads per FDOT Section 711. Payment will be made under Pay Item No. 711as follows:

711-11111 - Thermoplastic Traffic Stripe, 6" Solid White - per linear foot
711-11125 - Thermoplastic Traffic Stripe, 24" Solid White - per linear foot
711-11131 - Thermoplastic Traffic Stripe, 6" Skip White - per linear foot
711-11170 - Thermoplastic Traffic Arrow - Standard White - per each

15. As-Built Plans shall be prepared by the Contractor and submitted as part of the project close-out documents. As-Built Plans shall show the elevations of paving, curbing, pipe inverts and structures constructed, as well as all relocated or reset property corners, if applicable. The plans shall be submitted on 24-inch by 36-inch paper full size drawings and include a Statement of Certification, certifying that the project was constructed according to the Construction Plans and Specifications, and that the As-Built Plans are a correct representation of what was constructed. The plans shall delineate all red line information contained on the As-Built Plans. The Statement of The Statement of Certification shall be on the cover sheet certifying all of the plan sheets or shall appear on each individual sheet, and shall be signed by a Florida Registered Professional Engineer and/or Professional Surveyor and Mapper. Payment will be made under Pay Item 900-1 – As-Built Plans– per lump sum.
16. Indemnification: A bid allowances shall be included on the Bid Item Form in the amount of One Hundred Dollars (\$100.00) for indemnification of Orange County and all its officers, agents and employees. The Contractor shall indemnify, defend and hold harmless from all claims, losses, damages, costs, charges or expenses arising out of any acts, action, neglect, or omission by the Contractor during the performance of the Contract, whether direct or indirect, and whether to any person or property to which the County or said parties may be subject. The Contractor nor any of its subcontractors are liable under this provision for damages arising out of the injury or damage to persons or property directly caused or resulting from the sole negligence of the County or any of its officers, agents or employees. Payments shall be made under Pay Item 900-2 – Indemnification – per lump sum

END SECTION 01150

01150-4

SECTION 01200
PROJECT MEETINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
 - 1. Pre-Construction Conference
 - 2. Pre-Installation Conference
 - 3. Coordination Meetings
 - 4. Progress Meetings
- B. Construction schedules are specified in Section 01300 Submittals.

1.03 PRE-CONSTRUCTION CONFERENCE

- A. Schedule a pre-construction conference and organizational meeting at the project site or other convenient location no later than 20 days after execution of the agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attends: The OWNERS, Representative, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda: Discuss items of significance that could affect progress including such topics as:
 - 1. Tentative construction schedule
 - 2. Critical Work sequencing and/coordinating
 - 3. Designation of responsible personnel
 - 4. Procedures for processing field decisions and Change Orders

5. Procedures for processing Applications for Payment
6. Distribution of Contract Documents
7. Submittal of Shop Drawings, Product Data and Samples
8. Preparation of record documents
9. Use of the Premises
10. Office, Work and storage areas
11. Equipment deliveries and priorities
12. Safety procedures
13. First aid
14. Security
15. Housekeeping
16. Working hours

D. Contractor must submit at the time of the meeting at least the following items:

1. Schedule of Values
2. Listing of key personnel including project superintendent and subcontractors with their addresses, telephone numbers, and emergency telephone numbers.
3. Preliminary Construction Schedule
4. Submittal Schedule

1.04 PRE-INSTALLATION CONFERENCE

A. Conduct a Pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise at least 48 hours in advance the Project Manager of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
 - a. Contract Documents
 - b. Options
 - c. Related Change Orders
 - d. Purchases
 - e. Deliveries
 - f. Shop Drawings, Product Data and Quality Control Samples
 - g. Possible conflicts

- h. Compatibility problems
 - l. Time schedules
 - j. Weather limitations
 - k. Manufacturer's recommendations
 - l. Comparability of materials
 - m. Acceptability of substrates
 - n. Temporary facilities
 - o. Space and access limitations
 - p. Governing regulations
 - q. Safety
 - r. Inspection and testing requirements
 - s. Required performance results
 - t. Recording requirements
 - u. Protection
2. Record significant discussions and agreements and disagreements of each conference along with and approved schedule. Distribute the record of the meeting to everyone concerned promptly including the Owner and Architect.
3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.05 COORDINATION MEETINGS

- A. Conduct project coordination meeting at weekly intervals on day and time as established by the Project Manager or more frequently, if necessary convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved, to include subcontractors and representatives.
- C. Contractor shall record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.06 PROGRESS MEETINGS

- A. Conduct progress meetings at the Project site at bimonthly intervals or more frequently if necessary as directed by the Project Manager. Notify the Owner at least 48 hours in advance of scheduled meeting time and dates. Coordinate dates of meetings with preparation of the payment request.
- B. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress of involved in planning, coordination or performance of future activities with the project and authorized to conclude matters relating to progress.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
 - 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time, ahead, or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 2. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements
 - b. Time
 - c. Sequences
 - d. Deliveries
 - e. Off-site fabrication problems
 - f. Access
 - g. Site utilization
 - h. Temporary facilities and services
 - i. Hours of work
 - j. Hazards and risks
 - k. Housekeeping
 - l. Quality and work standards
 - m. Change Orders
 - n. Documentation of information for payment requests.

- D. Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01200

SECTION 01300 SUBMITTALS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:
 - 1. Contractor's Construction Schedule
 - 2. Submittal Schedule
 - 3. Daily Construction Reports
 - 4. Shop Drawings
 - 5. Product Data
 - 6. Samples
- B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:
 - 1. Permits
 - 2. Applications for Payment
 - 3. Performance and Payment Bonds
 - 4. Insurance Certificates
 - 5. List of Subcontractors with start and finish dates (update as necessary)
 - 6. Construction Schedule
- C. The procedures for submittal of Payment Applications are included in Section 01027.
- D. Inspection and test reports are included in Section 01044 - Quality Control Services.

1.03 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
1. Coordinate each submittal with purchasing, testing, delivery, other submittals and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Project Manager reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
 - a. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Project Manager will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. Allow two weeks for reprocessing each submittal.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. Include the following information on the label for processing and

recording action taken:

- a. Project name
 - b. Date
 - c. Name and address of Architect
 - d. Name and address of Contractor
 - e. Name and address of subcontractor
 - f. Name and address of supplier
 - g. Name of manufacturer
 - h. Number and title of appropriate Specification Section
 - i. Drawing number and detail references, as appropriate.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Project Manager using transmittal form as provided by the Project Manager. Submittals received from sources other than the Contractor will be returned without action.
1. On the transmittal record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitation. Include Contractor's certification that information complies with Contract Document requirements.
 2. Transmittal Form: As provide by the Project Manager
- D. Contractor shall be responsible for cost of re-review of rejected submittals, shop drawing, etc. Costs for re-review shall be reimbursed to the County by deducting the cost from the Contractors monthly progress payments. Costs to be determined by applying the consultants standard billing rates, plus 10% handling by the County.
- E. Substitution request to specified products will be made within 30 days of Notice to Proceed. After the 30 day period, no requests for substitutions from the Contractor will be considered.
1. Substitution submitted within the first 30 days will have product data from specified and requested substitute submitted together and demonstrate better quality, cost savings if of equal quality, or show benefit to the County for excepting the substitute.
- F. Once submittals are approved or approved as noted, they will be scanned and converted to PDF documents with OCR (optical character recognition) and given to the owner.

1.04 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Critical Path Method (CPM) Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule. Submit in accordance with Section 01200 Project Meetings.
1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the work as indicated in the Schedule of Values.
 2. Within each time bar, indicate estimated completion percentage in 10 percent increments. As work progresses, place a contrasting mark in each bar to indicate Actual Completion.
 3. Prepare the schedule on a sheet, series of sheets, stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
 4. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the work.
 5. Coordinate the Contractor's construction schedule with the list of subcontracts, submittal schedule, progress reports, payment request and other schedules.
 6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.
- B. Phasing: Provide notations on the schedule to show how the sequence of the work is affected by requirements for phased completion to permit work by separate Contractors and partial occupancy by the Owner prior to Substantial Completion.
- C. Work Stages: Indicate important stages of construction for each major portion of the work, including testing and installation.

- D. Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the work. Indicate where each element in an area must be sequenced or integrated with other activities.
- E. Cost Correlation: At the head of the schedule, provide a two item cost correlation line, indicating precalculated and actual costs. On the line show dollar-volume of work performed as the dates used for preparation of payment requests.
 - 1. Refer to Section 1270 - Applications for Payment for cost reporting and payment procedures.
- F. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the project meeting room and temporary field office.
 - 1. When revision are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- G. Schedule Updating: Revise the schedule monthly or activity, where revisions have been recognized or made. Issue the updated schedule concurrently monthly pay request.

1.05 SUBMITTAL LOG

- A. After development and acceptance of the Contractor's construction schedule, prepare a complete log of submittals.
 - 1. Coordinate submittals log with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
 - 2. Prepare the log in chronological order; include all submittals required. Provide the following information:
 - a. Scheduled date for the first submittal
 - b. Related Section number
 - c. Submittal category
 - d. Name of subcontractor
 - e. Description of the part of the work covered

- f. Scheduled date for resubmittal
 - g. Scheduled date the Architect's final release or approval.
 - 3. All submittals must be received within the first 25% of contract time.
 - B. Distribution: Following response to initial submittal, print and distribute copies to the Project Manager, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the project meeting room and field office.
 - 1. When revision are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
 - C. Log Updating: Revise the log after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.06 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered a Shop Drawings and will be rejected.

PART 2 PRODUCTS

(Not Applicable)

PART 3 Execution

(Not Applicable)

END OF SECTION 01300

SECTION 01400
QUALITY CONTROL SERVICES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division -1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and test, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspection, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitates compliance with Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.03 GENERAL QUALITY CONTROL

- A. The Contractor shall be responsible for maintaining and ensuring quality control over subcontractors, suppliers, manufacturers, materials, equipment, products, services, site conditions and workmanship to product work of specified quality. The completed work shall be of high quality throughout.

1.04 WORKMANSHIP

- A. Comply with well-known standards recognized by each trade except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality. Said qualifications shall be determined by well-known standards recognized by the trade for each respective portion of contract work.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

1.05 MANUFACTURER'S INSTRUCTIONS

- A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect before proceeding.

1.06 MANUFACTURER'S CERTIFICATES

- A. When required by individual Specifications Section, submit manufacturer's certificate and supporting documentation, in duplicate, that products meet or exceed specified requirements.
- B. ASBESTOS FREE MATERIALS - Manufacturer and/or supplier shall provide a written and notarized statement on manufacturer's company letterhead to certify and warrant that product (s) utilized on project are asbestos free.

1.07 TESTING LABORATORY SERVICES

- A. The County shall employ and pay for services of an Independent Testing Laboratory to perform inspections, tests for construction materials (soils,

concrete) and threshold inspections.

- B. Services will be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports will be submitted to the County, Contractor and Architect giving observations and results of tests, indicating compliance or noncompliance with specified standards and with Contract Documents.
- D. Contractor shall cooperate with testing laboratory personnel; furnish tools, samples of materials, design, mix equipment, storage and assistance as requested.
 - 1. The contractor shall be responsible for notifying the testing laboratory at least 24 hours prior to expected time for operations requiring testing services. Longer length of notice to testing laboratory shall be provided by Contractor when required by the testing laboratory to ensure the timely scheduling and performance of all tests required.
 - 2. The Contractor is responsible for obtaining and paying tests including but not limited to test and balance, portable water bacteriological tests and test required in Divisions 7 through 16.
- E. The costs of any tests which fail will be paid for by the Contractor. The amount to be reimbursed to the County by the Contractor, will be the amount invoiced to the County by the testing laboratory in accordance with the testing services fees set forth in its contract with the County.

1.08 RESPONSIBILITIES

- A. The Owner shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and these services include those specified to be performed by an independent agency and not by the Contractor.
- B. The Contractor shall cover all costs of tests or inspections to evaluate means and methods of installation performed as a substitution and not as originally specified.
 - 1. Re-testing: The Contractor is responsible for re-testing where results of required inspections, test or similar services prove unsatisfactory and do not indicate compliance with Contract

Documents requirements, regardless of whether the original test was the Contractor's responsibility.

a. Cost of re-testing construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

2. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to:

- a. Providing access to the work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
- b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
- c. Providing facilities for storage and curing the test samples.
- d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
- e. Security and protection of samples and test equipment at the Project site.

C. Duties of the Testing Agency: The independent testing agency engages to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

- 1. The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
- 2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
- 3. The agency shall not perform any duties of the Contractor.

D. Coordination: The Contractor and each agency engaged to perform inspection, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In

addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.09 SUBMITTALS

- A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are pre-qualified as complying with Recommended Requirements for Independent Laboratory qualification by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for Cutting and Patching.
- B. Protect construction exposed by or for quality control service activities, and protects and repaired construction.
- C. Repair and protection in the Contractor's responsibility regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01400

SECTION 01410
TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selection and payment
- B. Contractor Submittals
- C. Laboratory responsibilities
- D. Laboratory reports
- E. Limits on testing laboratory authority
- F. Contractor responsibilities
- G. Schedule of inspections and tests

1.02 RELATED SECTIONS

- A. Information Available to bidders: Soil Investigation Data.
- B. General Conditions: Inspections, testing, and approvals required by public authorities.
- C. Individual Specification Sections: Inspections and tests required, and standards for testing.

1.03 REFERENCES

- A. ANSI/ASTM D3740 or as required in Specifications Divisions 2-16 - Practice for Evaluation of Agencies Engages in testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ANSI/ASTM E329 or as required in Specifications Divisions 2-16 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

1.04 SELECTION AND PAYMENT

- A. Owner will employ and pay for services of an independent testing laboratory to perform specified inspection and testing.
- B. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of ANSI/ASTM E329 and ANSI/ASTM D3740
- B. Laboratory: Authorized to operate in state in which Project is located.
- C. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
- D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards (NBS) Standards or accepted values of natural physical constants.

1.06 CONTRACTOR SUBMITTALS

NOT USED

1.07 LABORATORY RESPONSIBILITIES

- A. Test samples of mixes
- B. Provide qualified personnel at site when required. Cooperate with Orange County and Contractor in performance of services.
- C. Perform specified inspection, sampling, and testing of Products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Orange County and Contractor of observed irregularities or non-conformance of Work or Products.

- F. Perform additional inspections and test required by Orange County.
- G. Attend preconstruction conferences and progress meetings.

1.08 LABORATORY REPORTS

- A. After each inspection and test, promptly submit four copies of laboratory report to Orange County, and to Contractor.
- B. Include:
 - 1. Date issued
 - 2. Project title and number
 - 3. Name of inspector
 - 4. Data and time of sampling or inspection
 - 5. Identification of product and Specifications Section
 - 6. Location in the Project
 - 7. Type of inspection or test
 - 8. Date of test
 - 9. Results of tests
 - 10. Conformance with Contract Documents
- C. When requested by Orange County, provide interpretation of test results.

1.09 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the work.
- C. Laboratory may not assume any duties of Contractor
- D. Laboratory has no authority to stop the work.

1.10 CONTRACTOR RESPONSIBILITIES

- A. Cooperate with laboratory personnel, and provide access to the work.
- B. Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test

samples.

- C. Notify Orange County and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.
- D. Arrange with laboratory and pay for additional samples and tests required by Contractor beyond specified requirements.

1.11 SCHEDULE OF INSPECTIONS AND TESTS

- A. Section 02200 - Earthwork: Requirements for sampling and testing backfilled materials.
- B. Testing required:
 - 1. Modified proctor maximum density determination tests for each soil type.
 - 2. Field in-place density tests at intervals not to exceed 300 ft. on sub-base and base material.
 - 3. Thickness test for concrete. Cores shall be taken at a maximum of 250 ft. The minimum thickness allowed shall be 1/4" less than the required average thickness.
 - 4. Extraction stability and gradation of combine aggregate - one test per 500 tons or part with minimum of one per day. Bitumen content, stability and gradation of aggregate to conform to intent of job mix formula.
 - 5. Provide concrete mix designs.
 - 6. Strength test for each 50 cubic yard of concrete placed.

END OF SECTION 01410

SECTION 01500 TEMPORARY FACILITIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
- B. Temporary utilities required include but are not limited to:
 - 1. Water service
 - 2. Wastewater service
 - 3. Temporary electric power and light
- C. Security and protection facilities required include but are not limited to:
 - 1. Temporary fire protections
 - 2. Barricades, warning signs, lights
 - 3. Enclosure fence for the site.
 - 4. Environmental protection
 - 5. Fencing
 - 6. Barriers
 - a. Contractor shall be responsible for providing a temporary 6' high chain link construction fence around the entire perimeter of the construction site. Fence shall be removed upon completion of the job. Limits of construction fence indicate on the site plan drawings.
 - b. Contractor shall be responsible for providing security measures as required to prevent public entry to construction areas and adjacent properties from damage from construction operations.
 - c. Contractor shall be responsible for providing a protective barrier around trees and plants designated to remain as indicated in plans. Project against vehicular traffic, stored materials, dumping, chemically injurious materials and

puddling or continuous running water.

7. Security and Maintenance
 - a. Vehicular and pedestrian gates, when indicated or required, shall be securely locked at all times when no work is in progress and when not required for construction activities. During all work hours, gates which must be open shall be continuously monitored by the contractor to prevent unauthorized personnel or vehicles from entering the construction site.
 - b. Fencing shall be as specified in 1.02 D above and shall prevent pedestrian travel through the site for any reason.
 - c. Temporary fencing shall be removed only for construction reasons. If temporary fencing removal is required for non-construction reasons, fencing shall be immediately replaced and secured as soon as the activity for which its removal was required is completed, or if the activity cannot be completed by the end of the work day, temporary security measures shall be taken by the Contractor to ensure that there is no breach of security even during off-work periods.
 - d. 'No Trespassing' and similar signs shall be posted at gates and along fencing adjacent to public areas to inform non-construction personnel of the reason for the fence and potential hazards of entering the construction site. Said signs shall be of a size and spacing to be legible from any point along the entire perimeter of the construction site.

1.03 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.

1.04 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use for the permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, nor permit them to interfere with progress. Do not allow hazardous dangerous, unsanitary conditions, nor public nuisances to develop or persist on the site.

- C. Water Control: Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment if necessary. Provide silt barriers required by the Florida Department of Transportation St. Johns and any other authority having jurisdiction over the Project.
- D. Cleaning During Construction: Control accumulation of waste materials and rubbish so as to maintain a neat, clean and orderly and safe project; periodically dispose of off-site as needed.

Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

- E. Removal: Remove temporary materials, equipment and construction facilities prior to Substantial Completion inspection.

Remove temporary utility services prior to Final Completion Inspection.

Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations; grade and complete all work on site as indicated.

- F. Conversion to Public Utilities: General Contractor is to coordinate and arrange with the appropriate utility service providing agencies and make arrangements for the installation and connection to final utilities prior to Final Completion inspection.

General Contractor shall provide any and all coordination, scheduling and layouts as may be required by the service utilities.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.01 SECURITY AND PROTECTIONS FACILITIES INSTALLATION

- A. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and

needed, provide lighting including flashing red or amber lights.

- B. Enclosure Fence: When excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs and other animals from easily entering the site, except by the entrance gates.
 - 1. Provide open-mesh, chain-link fencing with posts set in a compacted mixture of gravel and earth.
- C. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
 - 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of materials to minimize the opportunity for theft and vandalism.
- D. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possible that air, waterways and sub-soil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which product harmful poise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

END OF SECTION 01500

SECTION 01631
PRODUCTS SUBSTITUTIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling request for substitutions made during bidding and after award of the Contract.
- B. The Contractor's Installation Schedule and the Schedule of Submittals are included under Section "Submittals".
- C. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.
- D. Procedural requirements governing the Contractor's selection of products and product options are included under Section "Materials and Equipment".

1.03 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: The Contract will be awarded based on the design, methods, materials and/or equipment as addressed in the Contract Drawings and/or described in the Contract Specifications, without any consideration for substitution or "or-equal" replacement. Addressing, describing or naming an item is intended to establish the type, function, characteristics and quality required in order to establish a base for bidding.
 - a. Within thirty (30) days after Contract award, the Contractor may submit for approval substitutes for any equipment and/or material. In addition to the product documents, a written certification shall accompany the documentation indicating that the proposed substitute will have the same characteristics, will perform in accordance with the design requirements and that complies with all the requirements set for in the Contract. Any additional information required by the Owner or County Representative shall be provided by the Contractor. Rejection of any proposed substitute will be considered final and the Contractor shall not get into any agreement with manufacturers or providers until the submittal has been finally approved.
 - b. The submission of this documentation shall follow the requirements set quality required in order to establish a base for bidding.

1.04 SUBMITTALS

- A. Substitution Request Submittal: Request for substitution will be considered if received within thirty (30) days after contract award. As long as this time allowance will not impact the construction schedule.
1. Submit three (3) copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
 2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitution, and the following information, as appropriate:
 - a. Product Data, including Drawings, and descriptions of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitution.
 - e. A statement indicating the substitution's effect on the Contractor's construction schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification by the Contractor that the Substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
 3. Architect's Action: Within two weeks of receipt of the request for substitution, the Architect will request additional information or documentation necessary for evaluation of the request if needed. Within two (2) weeks of receipt of the request, or one week of receipt of the additional information or documentation, which ever is later, the Architect will notify the Contractor of acceptance or rejection of the proposed substitution.

If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the project specified by name. Decision on the use of a product substitution or its rejection by the Architect is considered final. Acceptance will be in the form of a Change Order.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

- A. Conditions: The Contractor's substitution request will be received and considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect; otherwise request will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the work promptly or coordinate activities properly.
 5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 6. A substantial advantage is offered to the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar consideration.
 7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
- B. The Contractor's submittal and Project Manager's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

- C. Substitution request constitutes a representation that the Contractor:
1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
 2. Will provide the same warranty for substitution as for specified product.
 3. Will coordinate installation and make other changes which may be required for work to be complete in all respects.
 4. Waives claims for additional costs which may subsequently become apparent. All costs associated with the substitution will be paid by the Contractor regardless of approvals given, and regardless of subsequent difficulties experienced as a result of substitutions.

END OF SECTION 01631

**SECTION 01700
PROJECT CLOSE-OUT**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for project close-out, including but not limited to:
 - 1. Inspection procedures
 - 2. Project record document submittal. (substantial completion requirements)
 - 3. Operating and Maintenance Manual Submittal (substantial completion requirements).
 - 4. Submittal of warranties (substantial completion requirement).
 - 5. Final cleaning
- B. Close-out requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.
- C. Final Payment to be made when the County has received all required close-out documents.

1.03 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for Certification of Substantial Completion, complete the following: List exceptions in the request.
 - 1. In the Application for Payment that coincided with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

- a. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the work is not complete.
 2. Advise Owner of pending insurance change-over requirements.
 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 4. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 5. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the Project Manager will either proceed with inspection or advise the Contractor of unfilled requirements. The Project Manager will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. Results of the completed inspection will form the basis of requirements for final acceptance.
 2. Should the project fail to meet the standards required for Substantial Completion as defined in the documents, the Contractor will pay the expense of a second inspection by the Architect/Consultants and the Owner. Cost will be deducted from the Contractor's retainage.

1.04 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following list exceptions in the request:
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and complete operations where required.

2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Architect or Owner's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Project Manager.
 4. Submit consent of surety to final payment.
 5. Submit a final liquidated damages settlement statement
 6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Reinspection Procedure: The Architect will reinspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Architect.
1. Upon completion of reinspection, the Architect will prepare a certification of final acceptance, or advise the contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

1.05 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect's reference during normal working hours.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation; where the installation varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Provide for project photographs if deemed necessary by Owner's representative.
1. Mark record sets with red erasable pencil; use other colors to

distinguish between variations in separate categories of the work.

2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
3. Note related Change Order numbers where applicable.
4. Organize record drawing sheets, and print suitable titles, dates and other identification on the cover of each set.
5. Provide three (3) additional sets of black line drawing sets of As-Builts Drawings.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the text of the specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Project Data.

1. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.

D. Record Project Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variation in actual work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

1. Upon completion of mark-up, submit complete set of record Product Data in the three ring binder (indexed) to the Architect for the Owner's records.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 CLOSE-OUT PROCEDURES - FINAL CLEANING

01700-4

- A. General: General cleaning during construction is required by the General Conditions and included in Section - Temporary Facilities.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
 - 1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 - a. Clean exposed exterior hard-surfaced finished to a dust-free condition, free of stains, films and similar foreign substances. Leave concrete surfaces broom clean.
 - c. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface. Remove waste and surplus materials from the site in an appropriate manner.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
 - 1. Where extra materials of value remaining after completion of associated work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 01700

SECTION 01740 WARRANTIES AND BONDS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contractor Documents, including manufacturers standard warranties on products and special warranties.
 - 1. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
 - 2. General close-out requirements are included in Section - Project Close-Out.
 - 3. Specific requirements for warranties for the work and products and installations that are specified to be warranted, are included in the individual Sections of Division 2 through 16.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties to not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.

- B. Reinstatement of Warranty. When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligation, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligation, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.04 WARRANTY PERIOD

- A. The Contractor shall participate with the County and the Architect's representative, at the beginning of the tenth month of the warranty period, in conducting an on site review and evaluation of all items of equipment, materials and workmanship covered by the warranties and guarantees. Contractor shall act promptly and without cost to the County to correct all defects, problems, or deficiencies determined as such by the Architect/Owner during on the site review.
- B. All warranties and guarantees shall commence on the date of Substantial Completion except for items which are determined by the County to be incomplete or a non-comply status at the time of Substantial Completion. The coverage commencement date for warranties and guarantees of such work shall be the date of the County's acceptance of that work.
- C. Warranty period shall be manufacturer's standard for product specified except where specific warranty periods are specified in individual sections. But in no case less than one year.

1.05 SUBMITTALS

- A. Submit written warranties to the Owner prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the work, submit written warranties upon request of the Project Manager.
 - 1. When a designated portion of the work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Project Manager within fifteen days of completion of that designated portion of the work.

- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepared a written document that contains appropriate terms and identification, ready for executing by the required parties. Submit a draft to the Architect for approval prior to final execution.
 - 1. Refer to individual Sections of Division 2 through 16 for specific content requirements, and particular requirements for submittal of special warranties.

- C. Form of Submittal: At Final Completion compile two (2) copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

- D. Bind (3) three sets of warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 2/3 by 11" paper.
 - 1. Provide heavy paper dividers with Celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.

2. Identify each binder on the front and the spine with the typed or printed title WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.
3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 01740

**SECTION 02110
SITE CLEARING**

PART I - GENERAL

1.1 SCOPE:

- A. The work consists of furnishing all labor and equipment necessary for the removal of trees, vegetation, above and below grade improvements, and waste materials from designated areas of the site.

1.2 DESCRIPTION OF WORK:

- A. Site clearing shall be performed as designated on the Drawings.
- B. Site clearing work includes, but is not limited to:

- Removal of trees
- Removal of grass and other vegetation
- Topsoil stripping
- Grubbing
- Removal of above grade improvements
- Removal of below grade improvements

1.3 JOB CONDITIONS:

- A. Traffic: Conduct site clearing operations to ensure minimum interference with roads and other adjacent facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.
- B. Protection of Existing Improvements: Provide protection necessary to prevent damage to existing improvements indicated to remain in place.
- C. Protect improvements on adjoining properties and within public rights-of-way.
- D. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.
- E. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.
 - 1. Provide protection for roots over 1" diameter cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues.
 - 2. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

3. Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist, in a manner acceptable to the Owner.

PART II - PRODUCTS

- 2.1 Not Applicable to this Section

PART III - EXECUTION

3.1 SITE CLEARING:

- A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to create a clean, usable, and buildable site within the areas designated for construction as indicated on the drawings. Removal includes digging out stumps and roots.
- B. Carefully and cleanly cut roots and branches of trees where such roots and branches obstruct new construction.
- C. Clearing and Grubbing: Clear site of trees, shrubs, grass and other vegetation.
- D. Completely remove stumps, roots, and other debris.
- E. Use only hand methods for grubbing inside drip line of trees on adjacent properties.
- F. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
- G. Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to a density equal to adjacent original ground.

3.2 REMOVAL OF IMPROVEMENTS:

- A. Remove above-grade and below-grade improvements necessary to permit construction and other work indicated.
- B. Abandonment or removal of certain underground piping or conduit may be shown on the mechanical or electrical drawings, and is included under those sections. Removal of abandoned underground piping and conduit interfering with construction is included under this section.
 1. Existing utilities interfering with construction shall not be abandoned in place. Such utilities shall be relocated, adjusted or removed as necessary to facilitate construction work.
 2. The Contractor shall coordinate with the utility owners to take utilities out of service prior to relocation or removal.

- C. The Contractor shall coordinate with the Owner as to the disposition of materials, equipment and devices the Owner may elect to retain. All other materials and debris shall be disposed of as waste materials.
- D. The Contractor is advised that uncharted utilities may be found to exist within the construction areas and should Perform clearing and grubbing operations with extreme caution.
 - 1. Should the Contractor discover any unforeseen site conditions that conflict with the information provided or would in any way prevent construction the improvements indicated on the drawings, the Contractor shall notify the Architect immediately, in writing, as to the nature of the conflict or discrepancy. The Architect, or his representative, will expeditiously investigate the discrepancy for a determination of the impact to the Contract.
 - 2. No claim by the Contractor will be allowed if the Contractor fails to provide such written notice.

3.3 DISPOSAL OF WASTE MATERIALS:

- 1. Burning on Owner's Property: Burning shall not be permitted.
- 2. Removal from Owner's Property: Remove waste materials, unsuitable spoil material, and excess top soil from Owner's property and dispose of off site in legal manner. It is the Contractor's responsibility to obtain any and all necessary permits for site clearing operations, and for the transportation and disposal of waste materials, including the cost of the permits.

END OF SECTION

**SECTION 02200
EARTHWORK**

PART I - GENERAL

1.1 DESCRIPTION

A. Earthwork shall include, but not be limited to:

1. Import or export of any and all material as required to fill and complete grading work.
2. Excavation, backfilling and compaction for sidewalks and appurtenances and any related groundwater control and dewatering. All dewatering shall be the responsibility of the Contractor.
3. Excavation, backfilling, bedding and any dewatering required for work installed by this Contractor. Particular attention is called to the requirement that no intrusion upon or disturbance of adjacent properties will be allowed.
4. Final grading, shaping and compaction of site and roadways after the mass grading and earthwork is complete.
5. Removal of all materials not to be incorporated into the work.

B. Related Work Specified Elsewhere:

1. 02110 – Site Clearing
2. 02514 – Portland Cement Concrete Paving

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Perform earthwork in compliance with applicable requirements of governing authorities and codes having jurisdiction.
2. Perform earthwork operations as described in these specifications and as described in the Subsurface Soil Exploration and Geotechnical Engineering Evaluation, Exhibit Dive North, Orange County Convention Center, prepared by Ardaman and Associates, dated May 7, 2012 (Copy attached at the end of this Section).

B. Testing Agency: In addition to complying with all other requirements specified in this section, refer to and comply with testing requirements identified elsewhere in the Contract Documents.

1. Prior to the execution of any earthwork operations, the Testing Agency shall be notified to review procedures and assist in the proper implementation of these Specifications. Earthwork preparation, compaction and testing shall be done in accordance with the Specifications and as set forth by the Testing Agency or his designated representative.

C. Reference Specifications and Standards:

1. ASTM: D2922 (Nuclear Method), or ASTM D1556 (Sand-Cone Method) or ASTM D2937 (Drive Sleeve Method).
2. ASTM: D3017 (Nuclear Method), or ASTM D1557 Moisture Density Relations of Soils, using 10-1b, Rammer and 18-in. Drop.
3. AASHTO T-180.

1.3 SUBMITTALS: Comply with the requirements of Section 01300 - Submittals

- A. Submit copies of all soil testing reports directly to the Architect from the testing services.

1.4 PROJECT CONDITIONS

- A. Locate existing underground utilities in the area of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
- B. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult with the utility owner immediately for directions. Cooperate with utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
- C. Do not interrupt existing utilities except when permitted in writing by the Owner and then only after acceptable temporary utility services have been provided.
- D. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. Refer also to Article 3.2, Protection, for additional requirements.
- E. Use of Explosives:
 1. The use of explosives is not permitted.

PART II - PRODUCTS

2.1 SOIL MATERIALS FOR STRUCTURES AND SITE GRADING

- A. On-site materials: Materials obtained by selective stockpiling of the excavated soils. Stockpile materials acceptable to the Owner's designated testing service.
- B. Borrow materials: Non-expansive clean earth and granular materials, with less than 5% passing No. 200 sieve and free of roots or organic materials. Materials with soil fines between 5% and 12% may be used with the permission of the Architect and provided strict moisture control practices are implemented. Do not use rocks or lumps larger than 4 inches in any dimension.

- C. Crushed Stone: Crushed stone shall be provided by the Contractor from off-site sources and in the quantities required for completion of the work and of the quality specified and approved. Crushed stone shall consist of washed clean, hard, durable, angular pieces and shall be satisfactorily free from loam, clay, fine sand and deleterious materials. Crushed stone shall be uniformly graded and range in sizes from 1 inch to 3/8 inch and conforming to ASTM D693, Size No. 57.
- D. Graded Crushed Concrete Base Course Material: graded crushed concrete aggregate material produced by local approved sources, which yields a satisfactory mixture meeting all the requirements of these Specifications.
 - 1. Use graded crushed concrete aggregate material of uniform quality throughout, that is free of foreign and organic matter, shale, metal and clay, and having a Limerock Bearing Ratio value of not less than 160, unless approved by the engineer.
 - 2. Graded crushed concrete aggregate base material shall meet the following gradation:

Sieve Size	Percent by Weight Passing
1- 1/2 inch [37.5 mm]	90 to 100
3/4 inch [19.0 mm]	65 to 90
3/8 inch [9.5 mm]	45 to 75
No. 4 [4.75 mm]	35 to 65
No. 10 [2.00 mm]	25 to 50
No. 50 [300 µm]	5 to 35

- E. Top Soil: All soil above the lower root line of fine vegetation (grasses and sod).

PART III - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which earthwork is to be performed and promptly notify the Architect in writing, of conditions detrimental to the proper and timely completion of work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PROTECTION

- A. Protect public and adjacent properties, on and off site, in accord with applicable laws and ordinances.
- B. Protect from damage all existing on-site features, scheduled or indicated to remain, including flora scheduled to remain.
- C. Utilities:

1. Protect and support active utility lines in a manner to prevent damage. Use methods approved by the Architect and all applicable utility companies.
2. Remove abandoned lines encountered during excavation and dispose of off site.
3. Open trenches: The Contractor shall comply with the provisions of the Trench Safety Act, Chapter 90-96, Laws of Florida and with the O.S.H.A. Safety Standards, 29 C.F.R., S. 1926.650, Subpart B. Cover or barricade all open trenches at the close of the workday.
4. Where excavation for utility lines occurs in the vicinity of existing utilities, whether indicated or not, the Contractor shall be responsible to maintain the existing utility service and to protect and support the utility line in a manner to prevent its damage or failure.
 - a. In the event that damage or failure does occur, immediate repair and replacement shall be made in an acceptable manner as part of the work of this Section.

D. Dust Control:

1. Throughout the entire construction period effectively control dust in work areas, whether on-site or off-site, to prevent adversely affecting adjacent properties.

E. Water Control:

1. Do not allow rain, surface or sub-surface water, or other fluid, to accumulate in excavations nor under or about buildings, manholes, catch basins, tanks, vaults, etc.
2. Should such conditions develop or be encountered, constantly control and legally dispose of the water by temporary pumps, piping, ditches, dewatering or other approved methods. All methods subject to Architect's review and approval.
 - a. Do not allow rain or surface water from construction areas to run off or contaminate areas beyond the limits of the site.
 - b. Maintain adequate pumping equipment and backup equipment on hand at all times to provide for emergencies.

F. Bracing, Cribbing and Shoring:

1. Provide temporary or permanent cribbing, sheeting and shoring as necessary to safely retain earth banks and protect excavations from saving or other damage.
2. Remove cribbing and shoring after use. When or where it is impractical to remove, obtain approval to leave it in place. Note locations of such in-place shoring and bracing on project record documents.

G. Environmental Protection:

1. Erosion Control and Maintenance:

- a. The Contractor shall furnish and install erosion/sediment control fencing. Said fencing shall be constructed of erosion control fabric with both sediment filtration capabilities and a high slurry flow rate. All fencing to be installed as indicated on the Drawings.
- b. Swales and retention ponds shall be provided as necessary to control surface drainage during construction.
- c. Erosion control features shall be repaired as required and maintained until such time as the Architect deems them unnecessary.

3.3 PREPARATION

A. Layout work and Reference Points:

1. Before starting layout work, check through and verify all principal governing dimensions and make a general check of elevations and grades called for on the drawings.
2. Locate benchmarks, monuments and other reference points for elevation and location of new work. Notify the Architect of any apparent discrepancies in indicated locations.
3. Protect reference points from dislocation or damage. Replace or repair immediately any points damaged, destroyed or dislocated.
4. Accurately locate new work on site according to the Contract Documents.
5. Erect batter boards and set grade stakes securely to remain in place until corners and heights are permanently established.
6. Denote areas allocated for storage of various materials. Select storage and working areas to avoid interference with subsequent operations.

3.4 EXCAVATION

- A. Excavation consists of removal and disposal of material of every nature encountered (including man-made objects) when establishing required grade elevations.
- B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions. General Unauthorized excavation, as well as remedial work directed by the Architect, and as recommended by Geotechnical Engineer, shall be at the Contractor's expense.
- C. Additional Excavation:
 1. When excavation has reached required subgrade elevations, notify the Architect and Testing Agency, who will make an inspection of conditions. Do not excavate below indicated depths.

2. If inspection indicates unsuitable materials, additional excavation and corrective work will be authorized and paid for as prescribed by the Contract Documents.

D. Excavation Requirements:

1. The subgrade under the proposed construction shall be stripped of organic matter or soft and yielding materials.
2. Excavate materials of every nature to dimension, and elevations indicated. Use equipment of suitable type for materials and conditions involved.
3. Extend excavation a sufficient distance from structures to allow for forming and shoring, application of dampproofing, and approvals. Do not excavate below indicated depths.
4. Correct unauthorized excavation made below depths indicated, as directed by the Architect, at no additional cost to the Owner.
5. Remove any organic peat or inadequate soils below required subgrade elevation and replace with suitable fill according to Paragraph 3.6(B).
6. After the subgrade has been stripped and the areas have been excavated, the subgrade immediately beneath the proposed footings and structures shall be compacted to a minimum of 98% of the Modified Proctor maximum dry density.

3.5 DEWATERING

- A. All work areas occurring below the groundwater level shall be maintained in a dry condition while work is taking place at those elevations.
- B. The Contractor shall be responsible for maintaining excavations and subgrades continuously while work in each area is being done. Water level shall be reduced to a level of 24 inches below the bottom of all excavations and compaction surfaces.

3.6 FILL, BACKFILL AND COMPACTION

- A. Backfill consists of bedding, backfill and restoration of the surface.
- B. Structures: (Buildings, manholes, catch basins, tanks, vaults, etc.)
 1. Excavation and backfilling procedures beneath all structure shall be in accordance with the soils report.
 2. After excavation, remove any organic peat or inadequate soils below required subgrade elevation, replace with suitable fill and compact in uniform maximum 10 to 12 inch lifts of clean granular fill to a minimum of 98% of the Modified Proctor maximum dry density for a depth of 12-inches below the required subgrade elevation. (See 3.8.)
 3. Use mechanical compactors for compaction of backfill.
 4. Place backfill as promptly as work permits, but only after walls are supported by completion of structure or are braced to resist the imposed loading.

- a. Place backfill against walls below grade after damproofing systems have been completed and approved.
5. If approved by the Architect, hand held compaction equipment may be used. Maximum lifts in this case shall be 6 inches.

D. Compaction:

1. Bring each layer to optimum moisture content before compaction. Add water by uniform sprinkling. Jetting or flooding is prohibited.
2. When moisture content and condition of each layer is satisfactory, compact to a minimum of 98% of the Modified Proctor maximum dry density, or as elsewhere specified. (See 3.8.)
 - a. Compact areas not accessible to motor-driven equipment with mechanical or heavy hand tampers.
3. Rework compacted areas failing to meet specified maximum density as determined by tests. Re-compact and re-test as required to achieve a minimum of 95% of the Modified Proctor maximum dry density.
4. Correct unauthorized excavation made below depth indicated, as acceptable to Test Agency, at no additional cost to Owner.
5. Landscape areas: Compaction below all landscape, planting or sod areas shall be a minimum of 95% of the Modified Proctor maximum dry density for the full depth of fill. (See 3.8.)
6. Concrete Curbs and Pavement: Compaction below all concrete curbs and pavements slabs shall be a minimum of 98% of the Modified Proctor maximum dry density for the full depth of fill. (See 3.8.)

3.7 GRADING

A. General:

1. Uniformly grade areas within limits of grading and adjacent transition areas as work included in this Section. Smooth finished surface within specified tolerances, compact with uniform levels of slopes between points where elevations are shown, or between such points and existing grades.
2. Allowable tolerances for grades:
 - a. All cuts and fills shall be graded to necessary subgrade elevations within a tolerance of 0.0 below to 0.10 feet above grades indicated on drawings.
 - b. Structures at or on grade shall be within 0.02 feet.

3. All elevations and contours shown on the drawings are to finish grade unless otherwise indicated, and allowance shall be made for pavement thickness and sodding.

B. Grading outside building lines:

1. Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes.

C. Grading Surface of Fill Under Walks and Slabs:

1. Grade smooth and even, free of voids, compacted as specified and to required elevation.

3.8 FIELD QUALITY CONTROL

A. Test Methods:

1. Maximum density of backfill materials will be determined by ASTM D1557 Method A (5-layer method), or AASHTO T-180 where called for on drawings.
2. Field tests will be determined by ASTM D2922 (Nuclear Method), or ASTM D-1556 (Sand-Cone Method) or AASHTO T238-79, or ASTM D 2937 (Drive Sleeve Method) unless other applicable method is approved.

B. Required Tests (to be performed by Testing Agency):

1. Backfill material: Determine suitability of backfill material not previously evaluated.
2. Maximum density tests: Determine optimum moisture content and maximum density of backfill materials placed and compacted.
3. Compaction Inspection: Determine degree of backfill compaction.
4. Bedding conditions: Determine and evaluate condition of bedding to receive utility lines.

C. Inspection and Controls (to be performed by Testing Agency):

1. General inspection of stripping of surfaces and removal of root mat, peat, clay and other unsuitable materials or conditions.
2. Detailed inspection of exposed subgrades prior to finishing or placing compacted fills.
3. Continuous control of placing and compacting all compacted fills.
4. Observation and consultation in processes of bank shaping, safety in excavations, dewatering and identification of materials encountered.

- D. Areas which do not comply with the specified densities shall be reworked and compacted by the Contractor at no additional cost to the Owner. The cost of retesting such work shall be paid for by the Contractor.

3.9 DAMAGED WORK AND REPAIRS

A. Repairs:

- 1. Sections of walks, curbing, concrete paving and other permanent features which have been damaged during and as a result of construction operations in connection with the Contract shall be removed and the full section between joints shall be replaced.

B. Replacement of Grass and/or Shrubs:

- 1. All grass areas and/or shrubs which have been rutted and/or damaged or broken during and as a result of construction operations in connection with this Contract shall be removed and replaced. This shall apply to the grass and shrubs outside the Contract limits as shown on the site plan as well as new work within the Contract limits.

C. Protection of Graded Areas:

- 1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- 2. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.

D. Reconditioning Compacted Areas:

- 1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.

E. Debris:

- 1. During construction, debris shall be removed from site as soon as practical and the exterior site shall be kept clean at all times.
- 2. Debris shall be disposed of as waste material at an approved off-site disposal facility.

END OF SECTION

**Subsurface Soil Exploration and
Geotechnical Engineering Evaluation
Exhibit Drive North
Orange County Convention Center
Orlando, Orange County, Florida**



Ardaman & Associates, Inc.

OFFICES

- Orlando** - 8008 S. Orange Avenue, Orlando, Florida 32809 - Phone (407) 855-3860
Alexandria - 3609 Mac Lee Drive, Alexandria, Louisiana 71302 - Phone (318) 443-2888
Bartow - 1525 Centennial Drive, Bartow, Florida 33830 - Phone (863) 533-0858
Baton Rouge - 316 Highlandia Drive, Baton Rouge, Louisiana 70884 - Phone (225) 752-4790
Cocoa - 1300 N. Cocoa Blvd., Cocoa, Florida 32922 - Phone (321) 632-2503
Fort Myers - 9970 Bavaria Road, Fort Myers, Florida 33913 - Phone (239) 768-6600
Miami - 2608 W. 84th Street, Hialeah, Florida 33016 - Phone (305) 825-2683
Monroe - 1122 Hayes Street, West Monroe, Louisiana 71292 - Phone (318) 387-4103
New Orleans - 1305 Distributors Row, Suite I, Jefferson, Louisiana 70123 - Phone (504) 835-2593
Port St. Lucie - 460 Concourse Place NW, Unit 1, Port St. Lucie, Florida 34986 - Phone (772) 878-0072
Sarasota - 78 Sarasota Center Blvd., Sarasota, Florida 34240 - Phone (941) 922-3526
Shreveport - 7222 Greenwood Road, Shreveport, Louisiana 71119 - Phone (318) 636-3673
Tallahassee - 3175 West Tharpe Street, Tallahassee, Florida 32303 - Phone (850) 576-6131
Tampa - 3925 Coconut Palm Drive, Suite 115, Tampa, Florida 33619 - Phone (813) 620-3389
West Palm Beach - 2200 North Florida Mango Road, Suite 101, West Palm Beach, Florida 33409 - Phone (561) 687-8200

MEMBERS:

A.S.F.E.

American Concrete Institute

ASTM International

Florida Institute of Consulting Engineers



Orange County Convention Center
P.O. Box 691509
Orlando, Florida 32869-1509

Attention: Mr. Tim Groth

Subject: Subsurface Soil Exploration and
Geotechnical Engineering Evaluation
Exhibit Drive North
Orange County Convention Center
Orlando, Orange County, Florida

Dear Mr. Groth:

As requested and authorized by you, we have completed a shallow subsurface soil exploration for the subject project. The purposes of performing this exploration were to explore the general subsurface conditions and existing pavement components in the Exhibit Drive North rehabilitation project. We have also provided a typical underdrain cross section for this area. We have also provided earthwork recommendations for the roadway east of the bus turnaround to International Drive. This report documents our findings and presents our engineering recommendations.

SITE LOCATION AND SITE DESCRIPTION

The site of the Exhibit Drive North rehabilitation is located between the intersection of International Drive and Exhibit Drive North, and the intersection of Exhibit Drive North and the personnel access road on the backside of the Convention Center (Section 1, Township 24 South, Range 28 East). The general site location is shown superimposed on the Lake Jessamine, Florida U.S.G.S. quadrangle map presented on Figure 1.

The existing roadway is currently two lanes in each direction, plus turn lanes east of the bus turnaround.

SITE OBSERVATIONS

Observations of the existing roadway were made on April 14, 2012 by Ardaman & Associates engineers, Mr. Jason M. Parker, P.E. and Mr. Gregory S. Stevens, P.E. Based on these observations, the majority of the asphalt pavement appears to be highly oxidized and exhibiting varying degrees of block-type cracking, fatigue-type cracking, and severe rutting within the vehicle wheel paths (particularly on the drive lane adjacent to the wetland). In distressed areas, some patching has been performed. Also, on the two drive lanes farthest from the wetland, what appears to be a speed bump has been installed near the area of the former toll booths. This location is adjacent to Boring TH-11, shown on the Boring Location Plan on Figure 2.

PROPOSED CONSTRUCTION AND GRADING

It is our understanding that the proposed development includes rehabilitation of the asphaltic roadway starting west of the bus turnaround and continuing west, then south to the south end of the project. We also understand that the asphaltic pavement to the east of the bus turnaround is planned to be removed and replaced with concrete pavement. Grading plans are not complete at this time, and we have assumed that the existing grades will be generally kept the same across the site.

FIELD EXPLORATION PROGRAM

SPT Borings

At each boring location, pavement cores were obtained. Where appropriate, the cores were generally placed on cracks and within the wheel paths. The pavement cores were obtained using a 4-inch diameter diamond-tipped core barrel. At each location the asphaltic concrete and underlying base course were measured for thickness and the base type was identified.

The field exploration program included performing 18 Standard Penetration Test (SPT) borings (after obtaining the pavement core). The SPT borings were performed along the existing roadway. The borings were advanced to depths of 10 and 20 feet below the ground surface using the methodology outlined in ASTM D-1586. A summary of this field procedure is included in the Appendix. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the samples were transported to our laboratory in sealed sample jars.

The groundwater level at each of the boring locations was measured during drilling. The borings were backfilled with soil cuttings, then patched with asphaltic "cold patch" material.

Test Locations

The approximate locations of the core/borings are schematically illustrated on a site plan shown on Figure 2. These locations were determined in the field by estimating distances from existing site features and should be considered accurate only to the degree implied by the method of measurement used.

LABORATORY PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification. The soil samples were visually classified in general accordance with the Unified Soil Classification System (ASTM D-2488). The resulting soil descriptions are shown on the soil boring profiles presented on Figures 3 through 5.

In addition, we conducted 1 organic content test (ASTM D2974-87), 5 natural moisture content tests (ASTM D2216), and 4 percent fines analyses (ASTM D1140) on selected soil samples obtained from the borings. The results of these tests are presented adjacent to the sample depth on the boring profiles on Figures 3 through 5.

GENERAL SUBSURFACE CONDITIONS

General Soil Profile

The results of the field exploration and laboratory programs are graphically summarized on the soil boring profiles presented on Figures 3 through 5. The stratification of the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The results of the borings indicate the following general soil profile:

Depth Below Ground Surface (feet)	Description
0 - 0.75	Asphaltic pavement and soil cement base
0.75 - 5	Medium dense to dense fine sand (SP) to fine sand with silt (SP-SM)
5 - 9	Loose to dense fine sand (SP) to fine sand with silt (SP-SM)
9 - 20	Medium dense fine sand (SP) to fine sand with silt (SP-SM)

The above soil profile is outlined in general terms only. Please refer to Figures 3 through 5 for soil profile details.

Measurement of Pavement Cores

At each test location, the thicknesses of the existing asphalt and base pavement were measured and recorded. The base type at all locations was soil cement. The following table summarizes the data obtained from the cores.

Test Location	Asphalt Thickness (in)	Soil Cement Base Thickness (in)
TH-1	1.9	6
TH-2	1.0	6½
TH-3	1.2	6
TH-4	1.6	7
TH-5	1.2	6
TH-6	1.3	6
TH-7	1.4	7
TH-8	1.1	7
TH-9	1.2	6
TH-10	1.0	6
TH-11	4.5	6
TH-12	1.7	8
TH-13	2.8	7
TH-14	2.0	7
TH-15	1.0	6
TH-16	1.5	8
TH-17	1.2	6
TH-18	1.4	7

We note that the core at Boring TH-11 was performed in the existing speed bump.

We also note that the condition of the soil cement base in Borings TH-1 through TH-15 was relatively poor; the soil cement base generally crumbled before or during removal from the core equipment. It is anticipated that the existing soil cement strength is much lower than typical soil cement base used in Central Florida.

Groundwater Level

The groundwater level was measured in the boreholes on the day drilled after stabilization of the downhole water level. As shown on Figures 3 through 5, groundwater was encountered at depths that ranged from 3.5 to 7 feet below the existing ground surface on the dates indicated. Fluctuations in groundwater levels should be anticipated throughout the year primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted.

The absence of groundwater data at some of the boring locations indicates that groundwater was not encountered within the vertical reach of the borings on the date drilled. However, this does not necessarily mean that groundwater would not be encountered at some other time.

NORMAL SEASONAL HIGH GROUNDWATER LEVEL

The normal seasonal high groundwater level each year is the level in the August-September period at the end of the rainy season during a year of normal (average) rainfall. The water table elevations associated with a higher than normal rainfall and in the extreme case, flood, would be higher to much higher than the normal seasonal high groundwater level. The normal high water levels would more approximate the normal seasonal high groundwater levels.

The seasonal high groundwater level is affected by a number of factors. The drainage characteristics of the soils, the land surface elevation, relief points such as drainage ditches, lakes, rivers, swamp areas, etc., and distance to relief points are some of the more important factors influencing the seasonal high groundwater level.

Based on our interpretation of the site conditions using our boring logs, we estimate the normal seasonal high groundwater level at the boring locations to be approximately 3 feet above the groundwater levels measured at the time of our field exploration.

However, the groundwater level will be greatly influenced by the surface water level in the adjacent wetland. If surface water in the adjacent wetland rises above the normal seasonal high groundwater level, the groundwater level under the roadway will likely rise above the estimated normal seasonal high groundwater level. It is recommended that the maximum water level in the wetland be ascertained by a drainage engineer, and that the roadway grade be designed to maintain typical roadway base clearance above the high surface/groundwater level.

ENGINEERING EVALUATION AND RECOMMENDATIONS

General

The results of our exploration indicate that no deleterious soils such as organic muck or abnormally soft or loose soils were encountered in our borings that would cause excessive roadway settlement and premature deterioration to Exhibit Drive North. Based on our observations, it appears that the pavement is failing primarily due to age and inadequate capacity of the pavement components.

The following are our recommendations for foundation soil earthwork in areas where the pavement will be completely reconstructed. The recommendations are made as a guide for the design engineer, parts of which should be incorporated into the project's specifications.

Stripping and Grubbing

The "footprint" of the proposed roadway, plus a minimum margin of five feet, should be stripped of all asphalt, soil cement base, stumps, debris, organic topsoil or other deleterious materials, as encountered.

Proof-rolling

We recommend proof-rolling the cleared surface to locate any unforeseen soft areas or unsuitable surface or near-surface soils, to increase the density of the upper soils, and to prepare the existing surface for the addition of the fill soils (as required). Proof-rolling of the roadway areas should consist of at least 7 passes of a compactor capable of achieving the density requirements described in the next paragraph. Each pass should overlap the preceding pass by 30 percent to achieve complete coverage. If deemed necessary, in areas that continue to "yield", remove all deleterious material and replace with clean, compacted sand backfill. The proof-rolling should occur after cutting and before filling. Heavy vibratory compaction equipment should not be used within 150 feet of existing structures.

A density equivalent to or greater than 95 percent of the modified Proctor (ASTM D-1557) maximum dry density value for a depth of 1 foot in the roadway areas must be achieved beneath the stripped ground surface. Additional passes and/or overexcavation and recompaction may be required if these minimum density requirements are not achieved. The soil moisture should be adjusted as necessary during compaction.

Due to the relatively high groundwater level at this site, proof-rolling may cause upward movement or "pumping" of the groundwater. However, we recommend that the existing surface be level and firm prior to the addition of fill soils. Proof-rolling with a front-end loader may help achieve the desired surface and compaction condition before adding the fill soils. The site should be dewatered as necessary. Depending on the time of year, a 12- to 18-inch layer of clean fine sand (SP) fill may be required prior to proof-rolling.

Care should be exercised to avoid damaging any neighboring structures while the compaction operation is underway. Prior to commencing compaction, occupants of adjacent structures should be notified and the existing condition (i.e. cracks) of the structures documented with photographs and survey (if deemed necessary). Compaction should cease if deemed detrimental to adjacent structures, and Ardaman & Associates should be notified immediately.

Suitable Fill Material and the Compaction of Fill Soils

All fill materials should be free of organic materials, such as roots and vegetation. We recommend using fill with less than 12 percent by dry weight of material passing the U.S. Standard No. 200 sieve size. The fine sand and fine sand with silt (Strata No. 1 and 2 without roots, as shown on Figures 3 through 5) are suitable for use as fill materials and, with proper moisture control, should densify using conventional compaction methods. Soils with more than 12 percent passing the No. 200 sieve can be used in some applications, but will be more difficult to compact due to their inherent nature to retain soil moisture.

All structural fill should be placed in level lifts not to exceed 12 inches in uncompacted thickness. Each lift should be compacted to at least 95 percent of the modified Proctor (ASTM D-1557) maximum dry density value. The filling and compaction operations should continue in lifts until the desired elevation(s) is achieved. If hand-held compaction equipment is used, the lift thickness should be reduced to no more than 6 inches.

The use of soils with relatively high fines content (i.e; silty and clayey soils) as fill should be avoided near the ground surface in green-space areas since these relatively low permeability soils promote ponding of water during and following rainfall. Also, in high groundwater areas, silty and clayey soils may cause a rise in the water table elevation due to capillary action. Additionally, these relatively low permeability soils should not be used directly beneath any pavement section as they may trap water within the pavement section leading to premature pavement failure.

Dewatering

Based on the groundwater conditions encountered, the control of the groundwater may be required to achieve the necessary stripping and subsequent construction, backfilling, and compaction requirements presented in the preceding sections. The requirement for control of groundwater should particularly be anticipated for utility excavations. The actual method(s) of dewatering should be determined by the contractor. However, regardless of the method(s) used, we suggest drawing down the water table sufficiently, say 2 to 3 feet, below the bottom of any excavation or compaction surface to preclude "pumping" and/or compaction-related problems with the foundation soils.

Dewatering should be accomplished with the knowledge that the permeability of soil tends to decrease with an increasing silt and clay content. Therefore, silty fine sand is typically less permeable than fine sand.

Concrete Pavement Earthwork Recommendations

These recommendations apply to the proposed rigid, Portland cement concrete pavement portion of the proposed roadway. We have assumed that the subject pavement will be subjected to truck loads typical of normal street traffic (i.e: maximum 18-kip axle loads). In addition, the average daily truck traffic is assumed to be less than 100 per day. The following site preparation and design recommendations should be utilized.

All areas to be paved should be stripped of existing asphaltic pavement and road base materials. The subgrade should then be compacted to achieve a density equivalent to 95 percent of the modified Proctor (ASTM D-1557; AASHTO T-180) maximum dry density value for a depth of 12 inches. This should provide a modulus of subgrade reaction of at least 100 pounds per cubic inch. All fill beneath concrete pavement areas should comply with the compaction requirements presented in the "Suitable Fill Material and the Compaction of Fill Soils" section of this report. Well-drained soils (Unified Classification SP) must be utilized beneath the concrete pavement. A minimum clearance of 2 feet should be maintained between the bottom of concrete pavement and the seasonal high water table.

We understand that crushed concrete base may be used directly beneath the pavement section. We recommend that the crushed concrete base course be supported by a free-draining subgrade. A minimum clearance of 12 inches should be maintained between the bottom of the crushed concrete base and the seasonal high groundwater table.

The crushed concrete base should have a minimum Limerock Bearing Ratio (LBR) value of 100 and should be compacted to at least 98 percent of the modified Proctor maximum dry density (ASTM D-1557, AASHTO T-180). The crushed concrete should meet Graded Aggregate Base

gradation requirements according to Section 204, of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, 2007 Edition. The subgrade beneath the crushed concrete base should consist of free draining sand compacted to at least 98 percent of the modified Proctor maximum dry density (ASTM D-1557, AASHTO T-180).

We note that if the contractor's means and methods include stabilizing soils beneath the crushed concrete base, then the stabilizing material should be coarse material (e.g; gravel). Low permeability soils (e.g; silt and/or clay) should not be used as stabilizing material beneath crushed concrete base.

UNDERDRAIN ANALYSIS - ROADWAY

Our recommended typical underdrain detail is provided on Figure 7. The soils in the "footprint" of the proposed underdrain should be excavated to the depth of the proposed bottom elevation of the underdrain gravel envelope. After the underdrain has been installed, the soils on top should be replaced with fine sand that is native to the Central Florida region having a Unified Soil Classification of SP and a minimum in-place permeability of 10 feet per day. The sand should be placed to a density within the range of 85 to 90 percent of the maximum modified Proctor dry density. The perforated underdrain pipes should have a minimum diameter of 6 inches, and placed on a slope of at least 0.2%. Underdrain collector pipes should be installed with a positive slope to the outfall(s). We recommend that the underdrains be covered with a filter fabric that will prevent adjacent soils from migrating into the voids in the gravel and pipe perforations. On the detail, FDOT references are to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, 2010 edition.

The underdrains should be located on each side of roadway as shown on the Underdrain Plan Location presented on Figure 6. These alignments were selected by us to help reduce potentially high groundwater levels at the roadway area requested by you.

The underdrain pipes should have clean-outs installed at terminal points, bends greater than 45 degrees and at intervals appropriate for periodic flushing. Development of the drains should be performed by alternately surging and flushing the drainpipe. As with most underdrains, periodic maintenance of the underdrains including internal and external clearing of the drains of inert and biological "silt" buildup should be anticipated.

The underdrains should have outfalls spaced at maximum 300-foot spacings.

Design of the outfall for the underdrains that connects the underdrain pipes to the discharge is the responsibility of others.

Construction of the underdrain system, including excavation of existing soils, backfilling and installation of the underdrain pipe, gravel, and filter fabric should be continuously monitored in the field by a representative of Ardaman & Associates. Testing of all materials should be performed to verify that they meet the specifications.

QUALITY ASSURANCE

We recommend establishing a comprehensive quality assurance program to verify that all site preparation is conducted in accordance with the appropriate plans and specifications. Materials testing and inspection services should be provided by Ardaman & Associates.

As a minimum, an on-site engineering technician should monitor all stripping and grubbing to verify that all deleterious materials have been removed and should observe the proof-rolling operation to verify that the appropriate number of passes are applied to the subgrade. In-situ density tests should be conducted during filling activities and below all pavement areas to verify that the required densities have been achieved. In-situ density values should be compared to laboratory Proctor moisture-density results for each of the different natural and fill soils encountered.

Additionally for the pavements, Limerock Bearing Ratio tests should be performed. The base course(s) should be tested for density and thickness. Soil-cement base should be inspected and sounded for hardness after a minimum 7-day wearing period. Areas determined during the 7-day inspection to be soft or otherwise insufficient should be removed and replaced or otherwise repaired according to the geotechnical engineer's recommendations. During asphalt pavement construction, samples of the asphaltic concrete should be obtained and tested in the laboratory to verify compliance with the mix design, including testing Marshall Stability (Type S asphalt), flow, asphalt content, and aggregate gradation. We also recommend full-time monitoring/testing in the batch plant and on the site during pavement placement. The asphaltic concrete thickness should be verified in the field.

CLOSURE

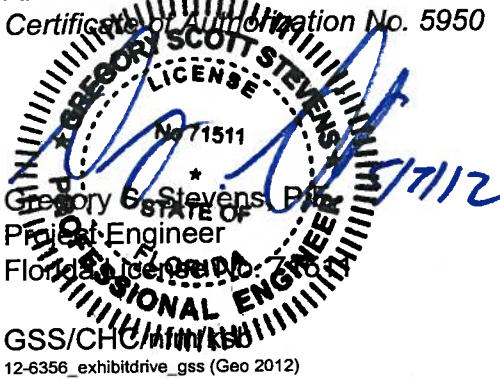
The analyses and recommendations submitted herein are based on the data obtained from the soil borings presented on Figures 3 through 5 and the assumed loading conditions. This report does not reflect any variations which may occur adjacent to or between the borings. The nature and extent of the variations between the borings may not become evident until during construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented in this report after performing on-site observations during the construction period and noting the characteristics of the variations.

This study is based on a relatively shallow exploration and is not intended to be an evaluation for sinkhole potential. This study does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.


This report has been prepared for the exclusive use of the Orange County Convention Center in accordance with generally accepted geotechnical engineering practices. In the event any changes occur in the design, nature, or location of the proposed facility, we should review the applicability of conclusions and recommendations in this report. We recommend a general review of final design and specifications by our office to verify that earthwork recommendations are properly interpreted and implemented in the design specifications. Ardaman and Associates should attend the pre-bid and preconstruction meetings to verify that the bidders/contractor understand the recommendations contained in this report.

We are pleased to be of assistance to you on this phase of the project. When we may be of further service to you or should you have any questions, please contact us.

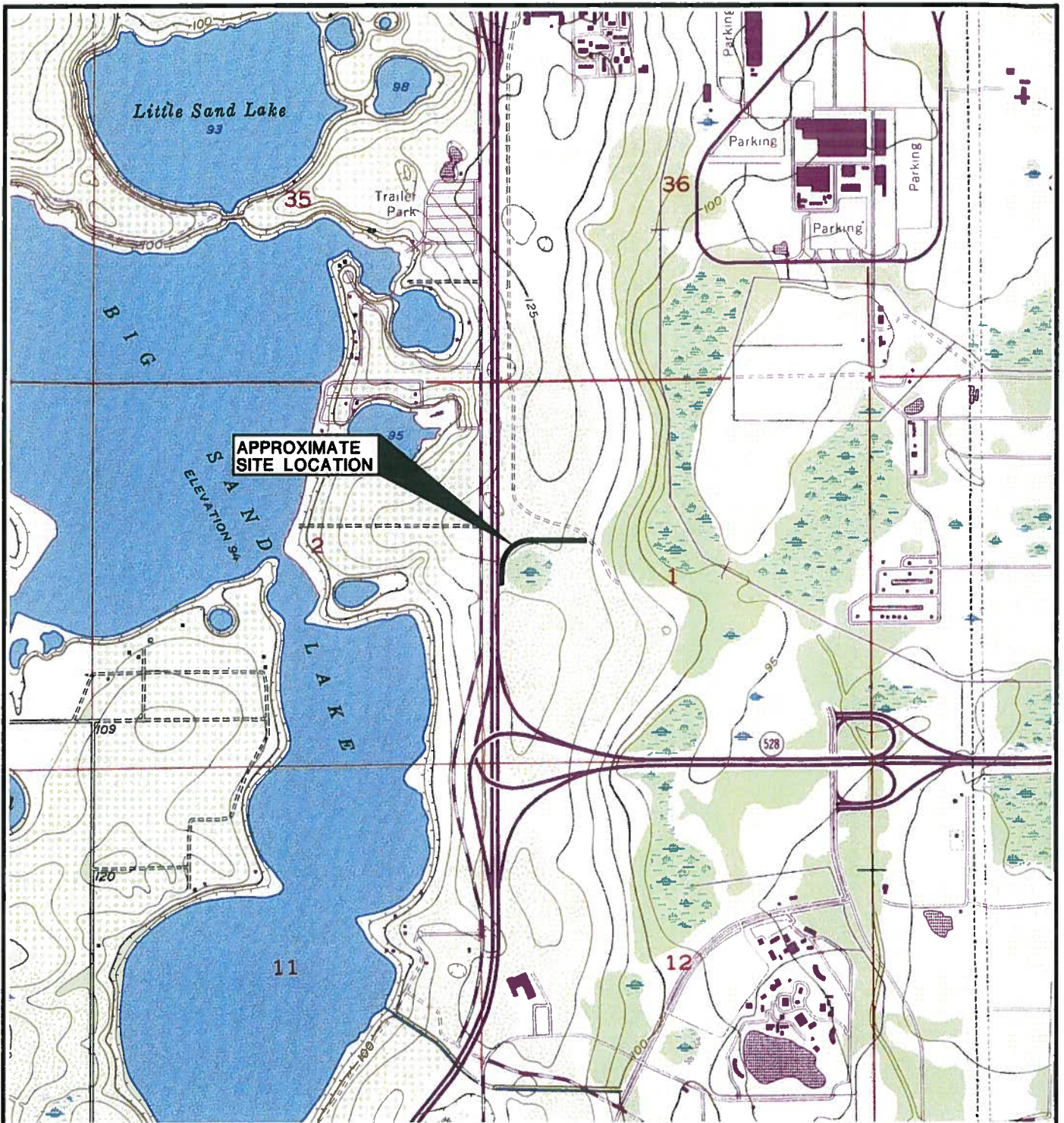
Very truly yours,
ARDAMAN & ASSOCIATES, INC.
Certificate of Authorization No. 5950



Gregory S. Stevens, P.E.
Project Engineer
Florida License No. 71511
Professional Engineer
GSS/CHC/AM/KB
12-6356_exhibitdrive_gss (Geo 2012)

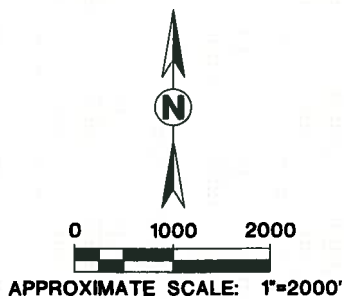


Charles H. Cunningham, P.E.
Orlando Branch Manager
Florida License No. 38189



SECTION 1
TOWNSHIP 24 SOUTH
RANGE 28 EAST

OBTAINED FROM U.S.G.S. QUAD MAP: LAKE JESSAMINE, FLORIDA 1980



SITE LOCATION MAP

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

**SUBSURFACE SOIL EXPLORATION
EXHIBIT DRIVE NORTH
ORANGE COUNTY CONVENTION CENTER
ORLANDO, ORANGE COUNTY, FLORIDA**

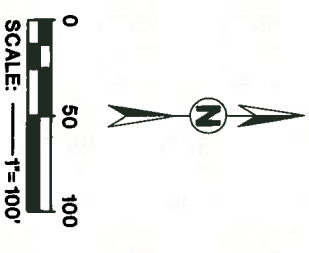
DRAWN BY: CD	CHECKED BY:	DATE: 04/25/12
FILE NO. 12-6356	APPROVED BY:	FIGURE: 1



LEGEND

TH STANDARD PENETRATION TEST (SPT) BORING LOCATION

NOTE: THE AERIAL PHOTOGRAPH FOR THE BORING LOCATION PLAN IS AN AERIAL PHOTOGRAPH BY ORANGE COUNTY PROPERTY APPRAISER (OCPA), DATED JANUARY 2010.

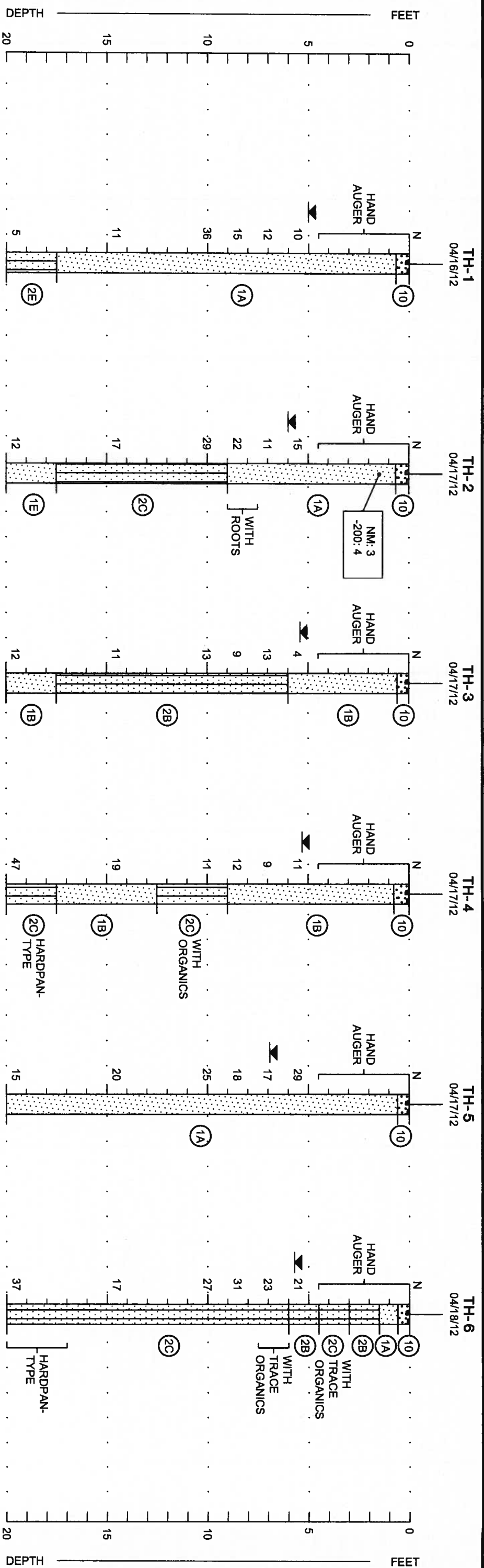


BORING LOCATION PLAN

Ardaman & Associates, Inc.
 Geotechnical, Environmental and
 Materials Consultants

SUBSURFACE SOIL EXPLORATION
 EXHIBIT DRIVE NORTH
 ORANGE COUNTY CONVENTION CENTER
 ORLANDO, ORANGE COUNTY, FLORIDA

DRAWN BY: CD	CHECKED BY:	DATE: 04/25/12	FIGURE: 2
FILE NO. 12-6356	APPROVED BY:		



LEGEND

SOIL DESCRIPTIONS

- ① FINE SAND (SP)
- ② FINE SAND WITH SILT (SP-SM)
- ③ SILTY FINE SAND (SM)
- ④ SILTY CLAYEY FINE SAND (SM/SC)
- ⑤ CLAYEY FINE SAND (SC)
- ⑥ SANDY CLAY (CL)
- ⑦ CLAY (CH)
- ⑧ PEAT (PT)
- ⑨ MUCK OR SANDY MUCK (OL)
- ⑩ ASPHALTIC CONCRETE AND SOIL CEMENT BASE

COLORS

- Ⓐ LIGHT GRAYISH-BROWN OR LIGHT BROWN
- Ⓑ BROWN
- Ⓒ DARK BROWN OR DARK BROWN TO BLACK
- Ⓓ DARK REDDISH-BROWN
- Ⓔ DARK GRAY
- Ⓕ GREENISH GRAY

TH STANDARD PENETRATION TEST (SPT) BORING

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

NM NATURAL MOISTURE CONTENT IN PERCENT (ASTM D-2216)

OC ORGANIC CONTENT IN PERCENT (ASTM D-2974)

-200 PERCENT PASSING NO. 200 SIEVE SIZE (PERCENT FINES) (ASTM D-1140)

▲ GROUNDWATER LEVEL MEASURED ON DATE DRILLED

SP, SP-SM
SM, SC, CH
UNIFIED SOIL CLASSIFICATION SYSTEM

NOTES: 1. UPON COMPLETION OF EACH BORING, THE BOREHOLE WAS GROUTED WITH CEMENT-BENTONITE SLURRY.

2. ALL SPT BORINGS WERE PERFORMED USING A SAFETY HAMMER IN THE UPPER 15 FEET AND AN AUTOMATIC HAMMER BELOW 15 FEET TO THE BORING TERMINATION DEPTH. AUTOMATIC HAMMER N-VALUES WERE CONVERTED TO EQUIVALENT SAFETY HAMMER N-VALUES BY MULTIPLYING BY 1.24. ALL REPORTED N-VALUES ARE SAFETY HAMMER OR EQUIVALENT.

ENGINEERING CLASSIFICATION

DESCRIPTION	BLOW COUNT "N"
VERY LOOSE	0 TO 4
LOOSE	4 TO 10
MEDIUM DENSE	10 TO 30
DENSE	30 TO 50
VERY DENSE	>50

WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLER'S LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BETWEEN SOIL TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED. GROUNDWATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR.

SOIL BORING PROFILES



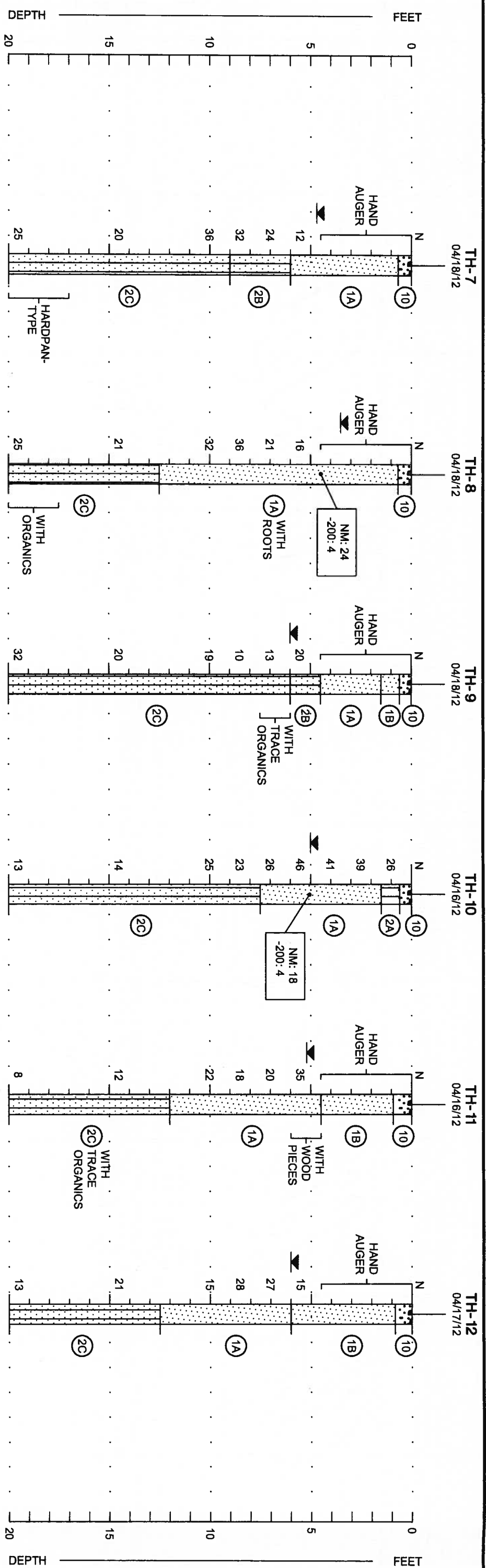
SUBSURFACE SOIL EXPLORATION

EXHIBIT DRIVE NORTH

ORANGE COUNTY CONVENTION CENTER
ORLANDO, ORANGE COUNTY, FLORIDA

DRAWN BY: CD CHECKED BY: DATE: 04/25/12

FILE NO. 12-6356 APPROVED BY: FIGURE: 3



LEGEND

- SOIL DESCRIPTIONS**
- 1 FINE SAND (SP)
 - 2 FINE SAND WITH SILT (SP-SM)
 - 3 SILTY FINE SAND (SM)
 - 4 SILTY CLAYEY FINE SAND (SM/SC)
 - 5 CLAYEY FINE SAND (SC)
 - 6 SANDY CLAY (CL)
 - 7 CLAY (CH)
 - 8 PEAT (PT)
 - 9 MUCK OR SANDY MUCK (OL)
 - 10 ASPHALTIC CONCRETE AND SOIL CEMENT BASE
- COLORS**
- A LIGHT GRAYISH-BROWN OR LIGHT BROWN
 - B BROWN
 - C DARK BROWN OR DARK BROWN TO BLACK
 - D DARK REDDISH-BROWN
 - E DARK GRAY
 - F GREENISH GRAY
- TESTS**
- TH STANDARD PENETRATION TEST (SPT) BORING
 - N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
 - NM NATURAL MOISTURE CONTENT IN PERCENT (ASTM D-2216)
 - OC ORGANIC CONTENT IN PERCENT (ASTM D-2974)
 - 200 PERCENT PASSING NO. 200 SIEVE SIZE (PERCENT FINES) (ASTM D-1140)
 - GROUNDWATER LEVEL MEASURED ON DATE DRILLED
- UNIFIED SOIL CLASSIFICATION SYSTEM**
- SP, SP-SM, SM, SC, CH

NOTES: 1. UPON COMPLETION OF EACH BORING, THE BOREHOLE WAS GROUTED WITH CEMENT-BENTONITE SLURRY.

2. ALL SPT BORINGS WERE PERFORMED USING A SAFETY HAMMER IN THE UPPER 15 FEET AND AN AUTOMATIC HAMMER BELOW 15 FEET TO THE BORING TERMINATION DEPTH. AUTOMATIC HAMMER N-VALUES WERE CONVERTED TO EQUIVALENT SAFETY HAMMER N-VALUES BY MULTIPLYING BY 1.24. ALL REPORTED N-VALUES ARE SAFETY HAMMER OR EQUIVALENT.

ENGINEERING CLASSIFICATION

1 COHESIONLESS SOILS

DESCRIPTION	BLOW COUNT "N"
VERY LOOSE	0 TO 4
LOOSE	4 TO 10
MEDIUM DENSE	10 TO 30
DENSE	30 TO 50
VERY DENSE	>50

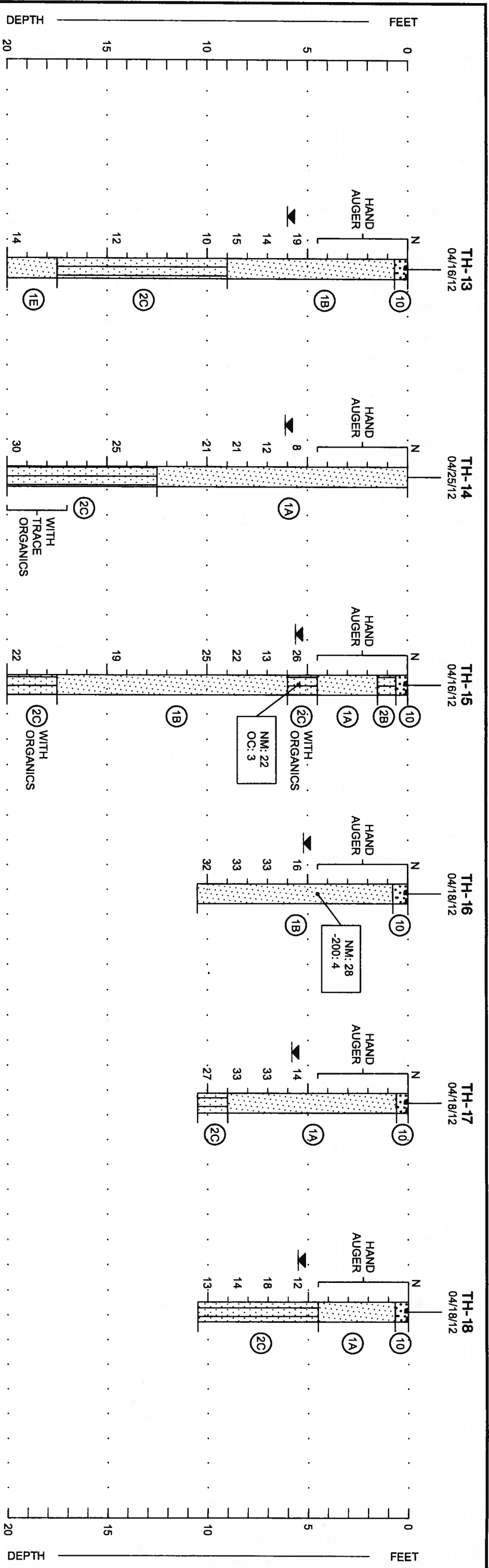
WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLER'S LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BETWEEN SOIL TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED. GROUNDWATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR.

SOIL BORING PROFILES

Ardman & Associates, Inc.
Geotechnical, Environmental, and Materials Consultants

SUBSURFACE SOIL EXPLORATION
EXHIBIT DRIVE NORTH
ORANGE COUNTY CONVENTION CENTER
ORLANDO, ORANGE COUNTY, FLORIDA

DRAWN BY: CD CHECKED BY: DATE: 04/26/12
FILE NO: 12-6356 APPROVED BY: FIGURE: 4



LEGEND

- SOIL DESCRIPTIONS**
- 1 FINE SAND (SP)
 - 2 FINE SAND WITH SILT (SP-SM)
 - 3 SILTY FINE SAND (SM)
 - 4 SILTY CLAYEY FINE SAND (SMSC)
 - 5 CLAYEY FINE SAND (SC)
 - 6 SANDY CLAY (CL)
 - 7 CLAY (CH)
 - 8 PEAT (PT)
 - 9 MUCK OR SANDY MUCK (OL)
 - 10 ASPHALTIC CONCRETE AND SOIL CEMENT BASE
- COLORS**
- A LIGHT GRAYISH-BROWN OR LIGHT BROWN
 - B BROWN
 - C DARK BROWN OR DARK BROWN TO BLACK
 - D DARK REDDISH-BROWN
 - E DARK GRAY
 - F GREENISH GRAY

TH STANDARD PENETRATION TEST (SPT) BORING

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

NM NATURAL MOISTURE CONTENT IN PERCENT (ASTM D-2216)

OC ORGANIC CONTENT IN PERCENT (ASTM D-2974)

-200 PERCENT PASSING NO. 200 SIEVE SIZE (PERCENT FINES) (ASTM D-1140)

▲ GROUNDWATER LEVEL MEASURED ON DATE DRILLED

SP, SP-SM UNIFIED SOIL CLASSIFICATION SYSTEM

SM, SC, CH

NOTES:

- UPON COMPLETION OF EACH BORING, THE BOREHOLE WAS GROUTED WITH CEMENT-BENTONITE SLURRY.
- ALL SPT BORINGS WERE PERFORMED USING A SAFETY HAMMER IN THE UPPER 15 FEET AND AN AUTOMATIC HAMMER BELOW 15 FEET TO THE BORING TERMINATION DEPTH. AUTOMATIC HAMMER N-VALUES WERE CONVERTED TO EQUIVALENT SAFETY HAMMER N-VALUES BY MULTIPLYING BY 1.24. ALL REPORTED N-VALUES ARE SAFETY HAMMER OR EQUIVALENT.

ENGINEERING CLASSIFICATION

I COHESIONLESS SOILS

DESCRIPTION	BLOW COUNT "N"
VERY LOOSE	0 TO 4
LOOSE	4 TO 10
MEDIUM DENSE	10 TO 30
DENSE	30 TO 50
VERY DENSE	>50

WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLER'S LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BETWEEN SOIL TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED. GROUNDWATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR.

SOIL BORING PROFILES

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

SUBSURFACE SOIL EXPLORATION
EXHIBIT DRIVE NORTH
ORANGE COUNTY CONVENTION CENTER
ORLANDO, ORANGE COUNTY, FLORIDA

DRAWN BY: **GD** CHECKED BY: DATE: **04/25/12**
FILE NO: **12-6356** APPROVED BY: FIGURE: **5**



LEGEND

— PROPOSED UNDERDRAIN LOCATIONS

NOTE: THE AERIAL PHOTOGRAPH FOR THE BORING LOCATION PLAN IS AN AERIAL PHOTOGRAPH BY ORANGE COUNTY PROPERTY APPRAISER (OCPA), DATED JANUARY 2010.



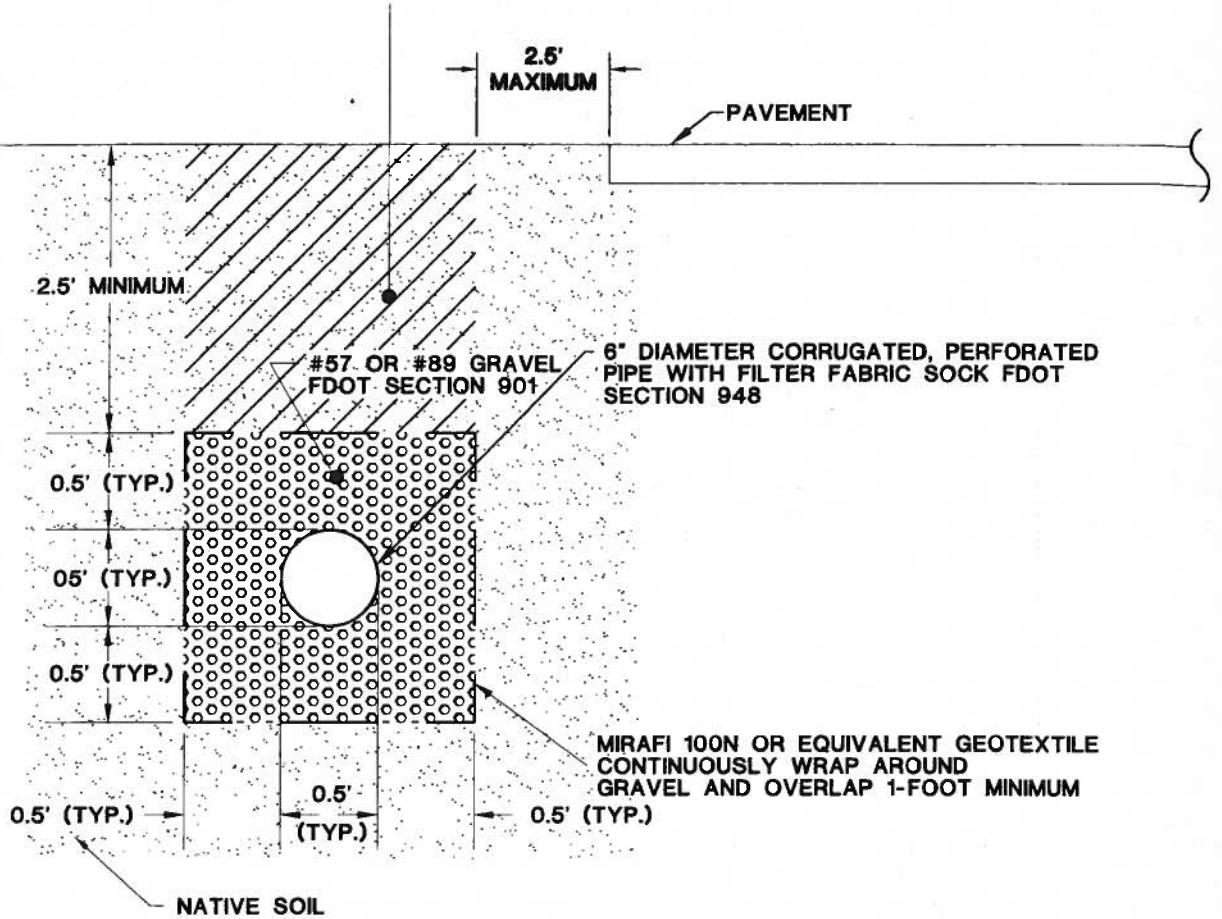
UNDERDRAIN LOCATION PLAN

Ardaman & Associates, Inc.
 Geotechnical, Environmental and Materials Consultants

SUBSURFACE SOIL EXPLORATION
 EXHIBIT DRIVE NORTH
 ORANGE COUNTY CONVENTION CENTER
 ORLANDO, ORANGE COUNTY, FLORIDA


DRAWN BY: CD CHECKED BY: DATE: 04/26/12
 FILE NO. 12-6356 APPROVED BY: FIGURE: 6

SAND BACKFILL
 (UNIFIED SOIL CLASSIFICATION SP
 HAVING A MINIMUM PERMEABILITY
 OF 10 FEET/DAY)



TYPICAL UNDERDRAIN CROSS SECTION
 NOT TO SCALE

T:\Orlando\12\12-6356\12635607.dwg 5/07/2012 4:44:30 PM, Chris.Drew

UNDERDRAIN CROSS SECTION		
 Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants		
SUBSURFACE SOIL EXPLORATION EXHIBIT DRIVE NORTH ORANGE COUNTY CONVENTION CENTER ORLANDO, ORANGE COUNTY, FLORIDA		
DRAWN BY: CD	CHECKED BY:	DATE: 04/25/12
FILE NO. 12-6356	APPROVED BY:	FIGURE: 7

APPENDIX

Standard Penetration Test Procedure

STANDARD PENETRATION TEST

The standard penetration test is a widely accepted test method of *in situ* testing of foundation soils (ASTM D 1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load.

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid.

Representative split-spoon samples from the soils at every 5 feet of drilled depth and from every different stratum are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. Samples not used in testing are stored for 30 days prior to being discarded. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

**SECTION 02514
PORTLAND CEMENT CONCRETE PAVING**

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. All applicable provisions of the Bidding and Contract Requirements, and Division 1 - General Requirements shall govern the work under this Section.

1.2 WORK INCLUDED

- A. Provide all labor, materials, necessary equipment, and services to complete the Portland Cement Concrete Paving work, as indicated on the Plans and Details, as specified herein or both.
- B. Including but not necessarily limited to the following:
 - 1. Concrete work for walks, pavements and curbs
 - 2. Expansion, contraction, and construction joints.
 - 3. Natural gray and colored concrete paving flatwork.
 - 4. Concrete finishing and curing.

1.3 RELATED WORK

- A. Section 02200 - Earthwork

1.4 SUBMITTALS: Comply with the requirements of Section 01300 - Submittals

1.5 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Perform work in accordance with local building and other applicable codes.
- B. Inspection and Testing:
 - 1. Hardrock Aggregate: Test by approved testing laboratory in accordance with ASTM C33.
 - 2. Limerock Aggregate: Test by approved testing laboratory for conformance with local acceptable standards and specified requirements.
 - a. Do not deliver aggregates (hardrock and limerock) to site, or to ready-mix plant, until pit source has been approved, and plant, capacity, and ability to produce a uniform and continuous product has been verified.
 - b. Take samples from aggregate stockpiles assigned to Project.

3. Test Cylinders - As per ASTM C-39.
 - a. Minimum of three (3) concrete test cylinders shall be taken for every 75 or less cubic yards of concrete placed.
 - b. Minimum of one (1) additional test cylinder shall be taken during any cold weather concreting, and be cured on job site under same conditions as the concrete it represents.
 - c. Test cylinders at age of seven (7) days and twenty-eight (28) days.
 - 1) Seven-day Strength: Not less than 60% of specified ultimate 28-day strength.
 - d. Mix Adjustment: Should test results indicate concrete strength below specified seven-day or 28-day minimum requirements, laboratory will adjust mix proportions in future batches as necessary to achieve specified minimum requirements.
 - e. Concrete Failures: Should test result show that concrete strength requirements for any portion of work falls below 28-day minimum requirements, secure core or prism specimens of hardened concrete and test in accordance with ASTM C42.
 - 1) Laboratory will secure and test specimens under Owner's direction.

4. Slump Test - As per ASTM C-143:
 - a. Minimum of one (1) slump test shall be taken for each set of test cylinders taken.

C. Unless otherwise indicated, conform to all materials, workmanship and practice to the requirements of the following standards:

1. Florida Building Code (Latest Edition).
2. The following publications from the American Concrete Institute (ACI) - latest edition:

Number/Title

211.1	Recommended Practice for Selecting Proportions for Normal Weight Concrete
211.2	Recommended Practice for Selecting Proportions for Structural Concrete
301	Specifications for Structural Concrete for Buildings
302	Recommended Practice for Concrete Floor and Slab Construction
304	Recommended Practice for Measuring, Mixing, Transporting Concrete

- 305 Hot Weather Concreting
 - 306 Recommended Practice for Cold Weather Concreting
 - 308 Recommended Practice for Curing Concrete
 - 309 Recommended Practice for Consolidation of Concrete
 - 318 Building Code Requirements for Reinforced Concrete
 - 347 Recommended Practice for Concrete Formwork
3. American Society for Testing and Materials (ASTM) Standard:
- C31-69 Making and Curing Concrete Test Specimen in the Field
 - C33-74a Concrete Aggregates
 - C39-72 Compressive Strength of Cylindrical Concrete Specimens
 - C42-68 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
 - C94-74a Ready-Mixed Concrete
 - C150-76a Portland Cement
 - C171-69 Sheet Materials for Curing Concrete
 - C172-71 Sampling Fresh Concrete
 - C192-69 Making and Curing Concrete Test Specimens in the Laboratory
 - C260-741 Air-Entraining Admixtures for Concrete
 - C309-74 Liquid Membrane-Forming Compounds for Curing Concrete
 - C330-75a Lightweight Aggregates for Structural Concrete
 - C418 Test for Abrasion Resistance of Concrete by Sandblasting
 - C494-71 Chemical Admixtures for Concrete
 - C595-75 Blended Hydraulic Cements
 - C618-73 Fly Ash and Row or Calcined Natural Pozzolan for Use as an Admixture
 - C803 Penetration Resistance of Hardened Concrete
 - C805 Rebound Number of Hardened Concrete

C823 Examination and Sampling of Hardened Concrete in Construction

- D. Where provisions of pertinent codes and standards conflict with this specification, the more stringent provisions govern.

1.5 QUALIFICATIONS OF WORKMEN

- A. Provide at least one (1) person at all times during execution of this portion of the work who is thoroughly trained and experienced in placing the types of concrete specified to direct all work performed under this section. For finishing of exposed surfaces of the concrete, use only thoroughly trained and experienced journeyman concrete finishers.

1.6 PLANT QUALIFICATION

- A. Meet all requirements of the Check List for Certification of Ready Mix Concrete Production Facilities of the National Ready Mixed Concrete Association and ASTM C94.

1.7 SUBMITTALS

- A. Procedures: Submit shop drawings in accordance with the General Requirements of the Owner-Construction Management Contract
- B. Test Reports: Report of concrete compression, yield and slump tests.
- C. Certificates:
 - 1. Submit manufacturer's certification that concrete mix materials meet specified requirements.
 - 2. Material content per cubic yard of each class of concrete furnished:
 - a. Dry weights of cement.
 - b. Saturated surface-dried weights of fine and coarse aggregate.
 - c. Quantities, type and name of admixtures.
 - d. Weight of water.
 - 3. Ready-mix delivery tickets, ASTM C94.
- D. Product Data: Manufacturer's product literature and application/installation procedures for all products intended for use in the work such as, but not limited to, joint sealants, admixtures, and curing materials.
- E. Submit shop drawings and the following to Architect:
 - 1. Plant Qualifications: Submit satisfactory evidence indicating compliance with the specified qualification requirements.
 - 2. Materials: Submit satisfactory evidence indicating that all materials listed in Part 2 meet the specified requirements.
 - 3. Design Mix: Submit the design mix to be used for review prior to placing of concrete. The design of the mix is the responsibility of the Contractor, subject to

the limitations of the specifications.

- F. Do not place concrete until submittals have been approved by the Architect.

1.8 TRANSMIT-MIX DELIVERY SLIPS

- A. Keep a record at the job site showing time and place of each pour of concrete, together with transit-mix delivery slips certifying contents of the pour. Make the record available to the Architect for his inspection upon request. Upon completion of each portion of the work, deliver the record and the delivery slips to the Architect.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original containers, clearly labeled with manufacturer's name and address and product identification.
- B. Store materials in original containers protected from direct contact with the ground and from the elements.

1.10 JOB CONDITIONS

- A. Allowable concrete temperatures:
 - 1. Hot Weather: Maximum 90 Degrees F as per ASTM C-94 and ACI 305.
 - 2. Cold Weather: In accordance with ACI 306.
- B. Do not place concrete during rain, unless adequate protection is provided.
- C. Grade Control: Establish and maintain the existing lines and grades, including crown and cross-slope as indicated on the drawings. All concrete surfaces must positively drain toward drainage structures. Any pavement surface which does not positively drain or allows water to pond shall be removed and replaced by the contractor at no additional cost to the Owner.
- D. Maintain temperature of concrete above 50 Degrees F for seven (7) days after placing. Protect work against frost and rapid drying.
- E. Traffic Control:
 - 1. Restrict vehicular and pedestrian traffic during all paving operations, as required for other construction activities. Obtain Owner approval prior to rerouting any traffic.
 - 2. Provide flagmen, barricade, warning signs, and warning lights for movement of traffic and safety, and to cause the least interruption of work.

PART II - PRODUCTS

2.1 CONCRETE MATERIALS

- A. General: Use ready-mixed concrete, batched, mixed, and transported in accordance with ASTM C94 unless otherwise indicated.
- B. Cement: For all concrete use domestic Portland cement that conforms to the requirements of ASTM C150-76a, Type I.
- C. Fine Aggregate, Hardrock: ASTM C33, consisting of washed sand having hard, strong, durable particles which do not contain more than one percent (1%) by weight of such deleterious substance as clay lumps, shale, schist, alkali, mica, coated grains or soft and flaky particles.
- D. Coarse Aggregate Hardrock:
 - 1. Use clean, coarse limestone aggregate in accordance with ASTM C33-74a.
- E. Water: Clean and potable, free from deleterious amounts of acids, alkalis, salts, or organic matter.

2.2 CONCRETE MIXES

- A. It is intended that concrete for all parts of the concrete work be homogenous, and when hardened, possess the required strength, durability, watertightness, appearance, resistance to deterioration and abrasion, and other qualities as specified or required.
- B. It is also intended that all concrete of the same specified concrete mix shall match throughout the site. Concrete placed adjacent to concrete of the same specified mix that was placed in a previous pour shall be uniform in color to that concrete.
- C. Mix Proportioning: Use only mixes designed by a laboratory selected or approved by Owner. Ready-mixed concrete shall be in accordance with ASTM C94.
 - 1. For concrete curbs and sidewalks, provide concrete which will develop ultimate compressive strength at 28 days equal to 3,000 PSI.
 - 2. For concrete pavement, provide concrete which will develop minimum compressive strength at 28 days equal 5,000 PSI.
- D. Entrained Air: All concrete which will be exposed to water or air shall be designed to entrain 4%-6% air.
- E. Design Slumps: Slabs on Grade shall be four inches (4") plus/minus one inch (+1").
- F. Concrete mix design shall be in accordance with ASTM C94.

2.3 CONCRETE ADMIXTURES

- A. Concrete Admixture Types:
 - 1. ASTM C494, water reducing.
 - 2. ASTM C494, water reducing and retarding.

3. Air Entraining: ASTM C260. For all concrete exposed to water or air.
 - a. Do not use air entraining admixture in concrete with Ipanex special waterstop admixture.

B. Quality: Conform to ASTM designations specified for the various types.

1. Do not use admixtures which cause excessive (up to 10% more than concrete without admixtures) shrinkage.
2. Do not use admixtures which contain calcium chloride or triethanolamine.
3. Do not use admixtures which cause corrosion of embedded steel.

2.4 CURING COMPOUND

- A. Use only compounds that will not affect bond of coatings or toppings in accordance with ASTM C309, Type 1 or Type 2.

2.5 CEMENT GROUT

- A. Cement Grout: Mix one part Portland Cement, 2-1/2 parts fine aggregate, and water enough for required consistency. Depending on space, consistency may range from mortar consistency to a mixture that will flow under its own weight. Use for leveling, preparing setting pads or beds, for filling non-structural voids, and similar uses. Do not use for grouting under bearing plates or structural members in place.

B. Non-Shrink Grout: Acceptable compounds and manufacturers:

1. Master Flo 713, by Masters Builders Company
2. Five Star Grout by U.S. Grout Corporation
3. Upcon by the Upco Co.
4. Horn Non-Metallic Grout by A.C. Horn, Inc.

2.6 FORMWORK AND ACCESSORIES

- A. Formwork: Matched, tight fitting and adequately stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of concrete, conform with ACI 347, Chapter 4, "Materials for Formwork".

- B. Use forms with a depth equal to the plan dimensions for the depth of concrete being deposited against them. Forms shall be straight, free from warp or bends, and of sufficient strength when staked to resist the pressure of the concrete without deviation from line and grade. Clean the forms each time they are used, and saturate with water prior to placing the concrete.

C. Lumber

1. Softwood framing lumber: Kiln dried, PS-20.
- D. Plywood:
1. Exterior type softwood plywood, PS 1-66.
- E. Form Coatings: Non-staining clear coating which does not contain oil or wax and will not prevent proper adhesion of applied finishes.
1. "Formshield", by A.C. Horn, Inc.
 2. "Release", by Burke Concrete Accessories.
 3. "Magic Kote", by Symons.
 4. Form Release-80 or Form Release-100 by Lambert Corp.
 5. "Cast-Off" by Sonneborn Building Products.
- F. Metal Construction Joints: "Keyed-Kold", by Burke Concrete Accessories.
- G. Pressure Sensitive Tape: 3M or equivalent, polyurethane, or mylar faced adhesive backed paper tape, one inch (1") wide. Use for formwork joints.
- H. Formwork Product Handling:
1. Store materials above ground on framework or blocking, and cover with protective waterproof covering. Provide for adequate air circulation throughout material stacks.
- 2.7 PREFORMED EXPANSION JOINT FILLER AND SEALANT
- A. Expansion Joint Filler: Premolded type, ASTM D1751. Approved manufacturers:
1. A.C. Horn Company
 2. Homasote Company
 3. W.R. Meadows Company
- B. Minimum 1/2" thick asphaltic impregnated fiberboard expansion joint filler. Locations as indicated on plans. Expansion joint filler to be full depth of slab thickness at joint as indicated on drawings. Contractor shall install expansion joints as detailed on the drawing where concrete pavement abuts all vertical surfaces including but not limited to all buildings, structures, curbs, columns, walls, light poles, etc.
- C. Expansion Joint Handling:
1. Deliver materials in manufacturer's original containers, clearly labeled with manufacturer's name and address and product identification.
 2. Store materials in original containers protected from direct contact with the ground and from the elements.

3. Store materials above ground on framework or blocking, and cover with protective waterproof covering. Provide for adequate air circulation throughout material stacks.
- D. Expansion joint backer rod shall be round, closed cell polyethylene rod with a diameter of 1/8" (3 mm) larger than the width of the joint.

PART III - EXECUTION

3.1 BARRICADES

- A. Provide substantial temporary barricades around all areas of operation and maintain until work under this section is completed and approved.
- B. Install temporary traffic markers, signals, and signs as per D.O.T. Standard Specifications to:
 1. Eliminate potentially hazardous conditions.
 2. Maintain adequate traffic patterns free of conflict with work under this Contract.

3.2 INSPECTION

- A. Examine all surfaces over which concrete is to be applied.
 1. Ensure that no defects, low sections, depressions, or holes are present which would jeopardize the standard of finish specified.
- B. Compact subgrade using heavy vibratory equipment. Check for unstable areas. Check for areas requiring additional compaction.
- C. Assure that compacted subgrade or base and formwork are completed and that excess water has been removed from excavations.
 1. Verify elevations of base are correct.
- D. Verify that expansion joint materials and other embedded items are in their proper locations and adequately secured against shifting during placement of concrete.
- E. Place no concrete until forms, base, reinforcement, and other embedded items have been reviewed and approved by Owner's Representative or Architect with a minimum of 24 hours notice.

3.3 PLACEMENT OF LIMEROCK BASE

- A. In locations where compacted backfill cannot achieve 98% compaction, place and level limerock base over prepared subgrade to a compacted depth of twelve inches (12") or as required by soils and subsurface investigation, true to lines and levels. Compact to 95% compaction as per AASHTO T-180.

3.4 FORMWORK

- A. Provide formwork design for all concrete paving. Coordinate design, construction, and placement with all other trades and contractors.
- B. Set the forms straight, free from warp or bends, and true to line and grade. Set forms with a 1/8" per foot cross slope or as shown on plans. Construct all concrete paving slab thickness as indicated on plans.
- C. Contractor is responsible for the design, construction, removal, and complete safety of formwork and shoring.
- D. Design formwork so it will be sufficiently tight to prevent leakage during concrete placement.
- E. Construct formwork as required to obtain the exact size, shape, line level, alignment, location, elevation and grades, as indicated on drawings for the finished structure.
- F. Fill voids of plywood joints with sealant and tool smooth.
- G. Form vertical surfaces to full depth and securely position to required lines and levels. Ensure form ties are not placed so as to pass through concrete.
- H. Arrange and assemble formwork to permit easy dismantling and stripping, and to prevent damage to concrete during formwork removal. Avoid hammering or prying against concrete surfaces.
- I. Cleaning and Tightening:
 - 1. Thoroughly clean form and remove chips, wood, sawdust, dirt, or other debris just before concrete is to be placed.
 - 2. Re-tighten forms during or immediately after concrete placement, as may be required, to eliminate any leaks.
- J. Taping of Joints:
 - 1. Apply pressure sensitive tape over all formwork joints which will be exposed in the finish work.
 - 2. Tape joints before form release agent is applied to formwork.
- K. Coat form contact surfaces with form-coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come into contact with surfaces which will be embedded in concrete. Apply in compliance with manufacturer's instructions.
- L. Edge Forms and Screeds Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surfaces. Provide and secure units to support types of screeds required.

- M. Coordinate work of other sections in forming and setting openings, slots, recesses, sleeves, bolts, anchors, and other embedded items.
 - N. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.
 - O. Do not remove forms and shoring until concrete has sufficient strength to support its own weight, and construction and design loads which may be imposed upon it. Remove load supporting forms when concrete has attained seventy-five percent (75%) of required 28-day compressive strength, provided construction is re-shored.
- 3.5 JOINTS (EXPANSION, CONSTRUCTION, AND CONTRACTION)
- A. Form expansion joints one-half inch (1/2") thick with a preformed joint filler. Expansion joints to be located as indicated on plans. Expansion joint to be full depth of slab at joint location. Recess joint filler one-half inch (1/2") from surface.
 - B. Construct doweled expansion joints as designated on the drawings and in the specifications. Insert one end of dowel in Schedule 40PVC pipe and cap so concrete does not bond to dowel in order to permit horizontal movement. Dowels shall be installed level, parallel to one another, parallel to the length of the slab, and positioned as detailed at one-half of the slab's thickness. The expansion joint material shall be centered over the mid-length of the dowels, and installed as specified above. In order to meet the foregoing requirements, use fabricated dowel baskets placed directly on the subgrade as recommended. Contractor shall submit shop drawings of dowel basket for approval if used.
 - C. Construct pour joints (construction joints) at any break in concrete placement lasting more than one (1) hour.
 - 1. Construction pours shall be continuous pours except where joints are indicated. No additional joints other than those shown on plans are allowed.
 - 2. Key all pour joints.
 - 3. Pour joints may be substituted for control joints when treated as part of paving design as indicated on plans.
 - D. Construct control joints (contraction joints) at locations indicated on plans.
 - 1. For four-inch (4") depth concrete slabs on grade, saw cut control joints shall be one-quarter inch (1/4") width and one inch (1") in depth.
 - 2. For eight-inch (8") depth concrete slabs on grade, saw-cut control joints shall be one-quarter inch (1/4") width and two-inch (2") depth.
 - 3. Form open-type contraction joints by staking a metal bulkhead in place and depositing the concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, remove the bulkhead. Finish joint to match appearance of saw cut.

4. Accurately lay out areas according to plans and make all joints straight and true with clear-cut angles.

3.6 INSPECTION

- A. Assure that excavation and formwork are completed, and excess water is removed.
- B. Check that reinforcement is secured in place.
- C. Verify that expansion joint materials, anchors, and other embedded items are secured in position.

3.7 PLACING CONCRETE

- A. Equipment forms and reinforcing shall be clean and wet down, reinforcing firmly secured in place, runways set up and not resting on or displaying reinforcing.
- B. At locations where new concrete is doweled into existing work, drill holes in existing concrete, insert steel dowels as indicated on drawings and pack solid with non-shrink grout. Cover exposed end with capped Schedule 40 PVC sleeve to allow free movement as indicated on drawings.
- C. Place concrete in the forms to the required depth. Tamp and spade until mortar entirely covers its surface.
- D. Place concrete, screed and wood float surfaces to a smooth and uniform finish.
- E. Avoid working mortar to surface.
- F. Round all edges, including edges of expansion, contraction and control joints, with 1/4 inch radius edging tool.
- G. Ensure finished surfaces do not vary from true lines, levels or grade by more than one-eighth inch (1/8") in ten feet (10') when measured with straight edge.
- H. Apply curing compound on finished surfaces immediately after placement. Apply in accordance with manufacturer's recommendations.

3.8 CONCRETE PAVING INSTALLATION

- A. Placing concrete according to ACI.
 1. Before placing any concrete in formwork, thoroughly clean and remove all foreign matter and water from forms or structural excavations.
 2. Mix and deliver concrete only in quantities for immediate use.
 3. Do not re-temper or use set concrete.

4. If earth at bottom of forms has dried out, re-wet so that soil is moist but free of standing water and mud.
5. Convey concrete from mixer to final position by methods which will prevent separation or loss of materials.
6. Maximum height of concrete free fall is four feet (4').
7. Regulate rate of placement so concrete surface is kept level throughout; a minimum being permitted to flow from one area to another. Control rate of pour consistent with form design.
8. Deposit concrete in continuous operation until section being placed has been completed.
9. Ensure finished surfaces do not vary from true lines, levels or grade by more than 1/8 inch in 10 feet when measured with straight edge.
10. Apply curing compound on finished surfaces except exposed aggregate concrete pavement immediately after placement. Apply in accordance with manufacturer's recommendations.

3.9 CONCRETE FINISHES

- A. All concrete flatwork finishes shall be slip resistant with a coefficient of friction of .5 according to ASTM C418. The contractor shall verify slip resistance requirements of all sample panels of finishes prior to executing the work and provide abrasive aggregate as specified, if necessary.
- B. Tamp freshly-placed concrete with approved metal grid tampers not less than 12 inches x 12 inches in size so as to bring fines to top, then rod to uniform surface at required levels.
 1. Float and trowel finish as soon as surface becomes workable.
 2. Provide slopes as indicated on drawings, pitch to drains.
 3. Work and measure concrete flatwork until it is level to within 1/8 inch in 10 feet in any direction.

3.10 PROTECTION

- A. Protect freshly placed concrete from damage due to water, falling objects, or persons marring finish surface of concrete. Surfaces damaged due to lack of protective measures shall be removed and replaced with fresh concrete at no additional cost to the Owner.
- B. Protect finished surface from damage by work of other trades due to subsequent work.
- C. Protect slab surfaces to be left exposed from damage during subsequent construction

operations and make necessary repairs to damaged areas, returning to original condition.

3.11 BACKFILLING AND COMPACTING

- A. After the concrete has set sufficiently, refill the spaces adjacent to the concrete to the required elevation with suitable material. Place and thoroughly compact ninety percent (90%) of relative density.

3.12 FIELD QUALITY CONTROL

- A. Test Cylinders: Take sample test cylinders of each mix design.
 - 1. Test cylinders in accordance with ASTM C39. Test cylinders at (7) days.
 - 2. Perform slump tests for each set of test cylinders.
- B. Certifications:
 - 1. Provide batch tickets signed by the dispatcher and the laboratory inspector at the ready-mix plant. Each batch ticket shall state batch quantities of cement, water, fine aggregates, coarse aggregates, and admixture contained in each truck load.
 - 2. Mixer truck driver shall deliver a properly signed ticket with each load of ready-mix concrete.
- C. Contractor shall provide all test specimens as required by laboratory.

3.13 DEFECTIVE CONCRETE

- A. Concrete will be deemed defective when:
 - 1. Tests on core or prism specimens fail to show strengths specified.
 - 2. Not formed as indicated or detailed.
 - 3. Not plumb or level where so indicated.
 - 4. Not true to intended grades and levels.
 - 5. Cut, filled or resurfaced, unless under direction of Owner.
 - 6. Debris is embedded therein.
 - 7. Not fully in conformance with provision of Contract Documents.
 - 8. Expansion and control joints which do not conform to plan locations or are not straight and true.
 - 9. Does not positively drain toward drainage structures or water ponds on walkway surface.

- B. Defective concrete shall be removed and replaced, or at discretion of the Owner's Representative, adequately strengthened and resurfaced in a manner acceptable to Owner.

3.14 CLEAN-UP

- A. Remove all debris and excess material immediately from project site.
- B. Take down all barricades and temporary traffic markers, signals and signs only after all work included in this section is finished and inspected, and only after so directed by Owner's Representative.
- C. Leave project area neat, orderly, and free of any hazardous conditions.

3.15 GUARANTEE

- A. The Contractor shall guarantee all work and materials contained in the section of the specification and as indicated on the drawing for a two (2) year period commencing on the date on which all of the work or designated portion thereof is substantially complete according to the General Conditions.
- B. The Contractor shall remove and replace any of his work that expands, settles, spalls, cracks (beyond normal shrinkage), chips, or deteriorates during the designated guarantee period at no additional cost to the Owner.

END OF SECTION