SPECIFICATIONS INDEX

DIVISION 16 - ELECTRICAL

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SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Bidding Requirements and Contractual Requirements of Division 1 shall apply to all work hereunder.

B. Bidders of work in Sections under Division 16 are expected to have read the above requirements and, upon subcontracting for work called for in such Sections, shall be responsible for compliance with such Sections.

1.02 INTENT

A. It is the intention of these specifications and drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."

B. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

1.03 SURVEYS AND MEASUREMENTS

A. Base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work. All material take-offs for the site shall be field measured prior to bids.

1.04 DRAWINGS

A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. Drawings are not to be scaled. The architectural drawings and details shall be examined for exact location of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the Architect.

B. If directed by the Architect or Engineer, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

C. At the time of each shop drawing submission, the Contractor shall call the Engineer's attention (in writing) to, and plainly mark on shop drawings, any deviations from the Contract Documents.

D. At the close of the job, prior to final review, five (5) bound copies of the following shall be submitted by transmittal letter to the Engineer for review and acceptance.

1. Equipment warranties.

2. Contractor's warranty.

3. Parts list and manuals for all equipment.

4. Operating Instructions (in writing).

5. Written instructions on maintenance and care of the system.

1.05 REFERENCES

A. ANSI/NFPA 70—National Electrical Code.

B. Florida Fire Prévention Code.

1.06 SUBSTITUTIONS

A. The intention of the terms of these Contract Documents is for the Contractor to furnish and the Owner to receive the exact materials and equipment specified in (a) the originally published Specifications and Drawings or, (b) as previously specified in any addendum issued by the Engineer during bidding and prior to bid opening.

B. Therefore, it is the intention of the Project Architect and Engineers to prohibit substitutions after the time of bid opening. Manufacturers and others with interests in providing materials or equipment other than that originally specified have ample opportunity to request inclusion up to ten (10) days before bids open.

C. The limited conditions for which a substitution may be considered are set forth in the above listed articles/paragraphs. Substitutions on any other basis will be considered not in the Owner's best interest and as non-competitive.

D. The Project Architect/Engineer, on advice of the Electrical Engineer, shall turn down appeals for substitutions after the award of the Contract.

E. Contractor options:

1. For products specified only by a referenced standard, such as ASTM, ANSI, etc., select any product meeting that standard.

2. For products specified by naming several products or manufacturers, select any one of the products or manufacturers names, which complies with the Contract Documents. To comply, a product must be acceptable to the Owner

and the Project Architect/Engineer in quality, performance, space requirements and maintenance requirements. This Contractor must prove product acceptability.

3. For a product specified by naming only one product and manufacturer, there is no option.

4. When products are provided as an option if this Contractor selects an option, this Contractor shall be responsible for modifications required for his work and work of other trades at no additional cost to the Owner.

F. Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality and performance required. The drawings are based upon equipment scheduled on drawings and specified. If another manufacturer is considered for substitution during the bidding process, the Electrical Contractor shall be responsible for coordinating all electrical, mechanical, structural, or architectural changes. Comparable equipment manufacturers which are listed as equals shall be considered as substitutes. Manufacturers other than the basis of design shall submit a catalog information and 1/4" scale plan and section drawings showing proper fit and all clearances for maintenance items.

G. Substitutions of other manufacturers will be considered for use if, in the Engineers opinion, the item requested for substitution is equal to that specified. The Contractor shall provide to the Engineer a typed comparative list of the basis of design and the proposed substitute.

Request for approval of substitutions or equals prior to bid must be made in writing. The approval of any substitutions or equals prior to bid shall not be construed as a shop drawing approval. The substitute or equal must be submitted as described in the specifications and meet all the requirements of the specifications and drawings.

H. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawing, which requires any redesign of the structure, partitions, foundations, piping, wiring, or any other part of the mechanical or electrical, all such redesign, and all new drawings and detailing required therefore, shall be prepared by the Subcontractor at his own expense and submitted to the Architect/Engineer for approval.

I. Where such approved deviation requires quantity and arrangement of equipment from that specified or indicated on the drawings, any other additional equipment required by the system, shall be provided by this Contractor at no additional cost to the Owner.

J. Disconnect Switches (Section 16440) and Panelboards (Section 16470) shall be of the same manufacturer.

1.07 SUBMITTALS

A. Submit under provisions of Division 1.

B. Proposed Products List: Include Products specified in the following Sections, but not limited to:

1. Section 16010..... Basic Electrical Requirements

3. Section 16110..... Conduit and Raceways.

4. Section 16120..... Building Wire and Cable.

5. Section 16130..... Boxes.

6. Section 16160..... Cabinets and Enclosures.

7. Section 16170..... Grounding and Bonding.

8. Section 16420..... Service Entrance.

4. Section 16440..... Disconnect Switches.

5. Section 16470..... Panelboards.

6. Section 16530..... Site Lighting.

7. Section 16600..... Surge Protective Devices (SPD).

C. It shall be understood that review of shop drawings by the Engineer does not supersede the requirement to provide a complete and functioning system in compliance with the Contract Documents.

D. Samples, drawings, specifications, catalogs, submitted for approval, shall be properly labeled indicating specific service for which material or equipment is to be used, location, section and article number of specifications governing, Contractor's name, and name of job. All equipment shall be labeled to match labeling on contract documents.

E. Catalogs, pamphlets, or other documents submitted to describe items on which approval is being requested, shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.

F. Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

G. All shop drawings shall be submitted to the Architect/Engineer by Contractor no later than thirty (30) days from the day of contract award.

H. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.

I. Submit all Division 16 submittals at one (1) time in one (1) integral group. Piece-by-piece submission of individual items will not be acceptable. Engineer may check contents of each submittal set upon initial delivery; if not complete as set forth herein, submittal sets may be returned to Contractor without review and approval and will not be accepted until made complete.

J. The Project Architect/Engineer shall have the authority to determine the method of submitting shop drawings whether in multiple sets or by the reproducible transparency technique. The Project Architect/Engineer shall instruct the Contractor and the Subcontractors at the pre-construction meeting as to the method to be used. The Contractor shall submit shop drawings and technical data for each product within thirty (30) calendar days of award of the Contract by the Owner.

K. However, the following number of shop drawings and submittals shall be the minimum number reproduced for distribution:

1. For the Project Architect/Engineer and the Owner, furnish the quantity set forth in each pertinent subparagraph under Division 1. In particular, furnish the following.

    a. 1 copy for the Contractor's main office file.

    b. 1 copy for the Contractor's field office.

    c. 1 copy for the Subcontractor's file.

    d. 1 copy for the Subcontractor's field office.

    e. 1 copy for the workers in the field.

    f. 1 copy for the Maintenance Department file (AFTER APPROVAL).

L. Submittals are required for all items of mechanical and electrical equipment and products provided by this Contractor. Refer to each Section for additional requirements.

M. Submittals shall be referenced correctly to the Contract Documents.

N. Manufacturer's catalog cuts may be submitted for all standard cataloged equipment, provided that the item required to meet the Project Specifications is not modified in any way from the standard catalog version of said item.

O. Cuts shall be clearly marked to indicate the exact size, type, rating, capacity, etc., of the item to be furnished.

P. Bind shop drawings/catalog-cuts in folders with a title sheet and identification on front of the folder. Submit all at one time. Allow space for Contractor, Project Architect, and Engineer review stamps.

Q. All submittals must bear the handwritten signature of the Contractor and his stamp of approval before being considered for review by the Project Architect/Engineer.

R. Shop drawings and submittals which have not been previously approved and corrected and so marked by the Contractor, will be returned to the Contractor for such action before the Project Architect or Engineer will review and comment on such submittals.

S. Partial submittals will not be accepted for review and approval.

T. Full submittal shall be made for all equipment (whether or not it is exactly as specified) on the basis of design. Any items marked REJECTED or similarly marked shall be resubmitted and furnished exactly as specified.

U. Full electrical characteristics for each motor, piece of equipment or device shall be prominently displayed on the shop drawings or submittal. Prominently displayed on the shop drawings or prominently attached to the submittal shall mean a statement signed by maker of the submittal to the Contractor that he or she has carefully examined the electrical characteristics specified in the Contract Documents (and if remodeling or an addition, conformed to existing electrical characteristics), and that the motors, equipment or devices proposed to be furnished are compatible.

This signed statement shall be on the shop drawings or submittal before forwarding to the Contractor who shall otherwise return these documents to the Subcontractor for resubmittal. The Contractor shall not forward incomplete documents to the Project Architect/Engineer. The responsibility to provide motors and equipment having compatibility with electric service provided shall rest with the Subcontractor furnishing the equipment, at no additional cost to the Owner.

V. Operating and maintenance manuals shall be provided in an organized manner. They should include instructions, wiring/control diagrams, spare parts list, warranties and test certificates. Any special tools or keys should also be included.

W. Test and Certifications:

1. Provide insulation resistance at ground continuity tests for all feeders, branch circuits, or other equipment.

    a. In no case shall the insulation resistance be less than 50,000 ohms at 600 volts.

2. Written test results and certification shall be required for proper fire alarm operation from the installer of the fire alarm equipment.

3. Optimum phase balance under full load conditions shall be obtained. Special care shall be taken to prevent reverse rotation of motors during these adjustments.

1.08 COOPERATION WITH OTHER TRADES

A. Give full cooperation to other trades and furnish in writing to the General Contractor, with copies to the Architect, any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. When work installed under this Division will be in close proximity to, or will interfere with work of other trades, assist in working out space conditions to make a satisfactory adjustment. If so directed by the Engineer/Architect, prepare composite working drawings and sections at a suitable scale not less than 1/4" = 1'0", clearly showing how work is to be installed in relation to the work of other trades. If the work is installed before coordinating with other trades, or so as to cause any interference with work of other trades, make all the necessary changes in work to correct the condition without extra charge.

C. Furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

D. This Contractor shall coordinate the layout of electrical work with other trades involved. Locations of structural systems, plumbing, and heating work should take preference over the location of conduit runs.

1.09 PROTECTION

A. Protect all work and material provided under this Division from damage. All damaged equipment work or material provided under this Division shall be replaced with new. Rebuilts are not acceptable.

B. Protect all work and equipment until inspected, tested, and accepted. Protect work against theft, injury, or damage; and carefully store material and equipment received on site which are not immediately installed. Close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

1.10 SCAFFOLDING, RIGGING, AND HOISTING

A. Provide all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

1.11 REMOVAL OF RUBBISH

A. This Contractor shall at all times keep premises free from accumulations of waste materials or rubbish caused by his employees or work. At completion of work he shall remove all his tools, scaffolding, materials, and rubbish from the building and site. He shall leave the premises and his work in a clean, orderly, and acceptable condition.

1.12 SAFETY

A. This Contractor shall comply with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.333), Title 29—Labor, Chapter XIII, Bureau of Standards, Department of Labor, Part 1518—Safety and Health Regulations for Construction; and that his housekeeping and equipment be maintained in such a manner that they comply with the Florida Industrial Commission Safety Code and Regulations of the Federal Williams—Steiger Occupational Safety and Health Act of 1970 (OSHA), wherein it states that the Contractor shall not require any laborer or mechanic employed in the performance of the contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety.

1.13 SUPERVISION

A. This Contractor shall provide a competent, experienced, full time superintendent who is acceptable to the Architect/Engineer and Owner, and who is authorized to make decisions on behalf of the Contractor. Working foreman on jobs over $50,000 shall not be considered proper supervision.

1.14 MATERIAL AND WORKMANSHIP

A. All materials and apparatus required for the work, except as specifically specified otherwise, shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article as approved by the Engineer shall be furnished. Refer to substitutions in this Section.

B. Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed with the approval of the Architect and Engineer in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

1.15 QUIET OPERATION AND VIBRATION

A. All work shall operate under all conditions of load without any sound or vibration which is objectionable in the opinion of the Engineer and the Owner. In case of moving machinery, sound, or vibration noticeable outside of room in which it is installed, or annoyingly noticeable inside its own room, will be considered objectionable. Sound or vibration conditions considered objectionable by the Engineer and the Owner shall be corrected in an approved manner at no additional expense to the Owner.

1.16 FOUNDATIONS, SUPPORTS, PIERS, ATTACHMENTS

A. This Contractor shall furnish and install all necessary foundations, supports, pads, bases and piers required for all equipment furnished under this Division, and shall submit drawings to the Architect and Engineer for approval before purchase, fabrication, or construction of same.

B. For all floor mounted equipment, provide concrete pads which extend six inches (6") beyond equipment base in all directions with top edge chamfered. Inset six inches (6") steel dowel rods into floors to anchor pads. Shop drawings of all foundations and pads shall be submitted to the Architect and Engineer for approval before same are constructed.

C. Construction of foundations, supports, pads, bases, and piers where mounted on the floor, shall be the same materials and same quality of finish as the adjacent and surrounding flooring material.

D. All equipment, unless shown otherwise, shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong and durable nature and any attachments that are, in the opinion of the Architect and the Engineer, not strong enough shall be replaced as directed.

1.17 ACCESS DOORS FOR WALLS AND CEILINGS

A. Provide flush panel access doors with a 16 gauge steel frame and a 14 gauge steel door panel.

B. Finish is to be primed painted steel.

C. Provide concealed hinges which allow the door to open 175 degrees and have a removable pin.

D. Provide access doors with a locked flush mounted vandal proof spanner head operated steel cams.

E. Provide 1-1/2 hour "B" label door for rated chase walls.

F. Furnish masonry anchors for installation in masonry walls and metal lath wings with casing bead for plaster installation.

G. Provide a minimum 2'-0" by 2'-0" access doors unless shown or noted otherwise on the drawings.

H. Access doors for chase walls shall be mounted 16" off the finish floor.

I. Access doors for electrical equipment shall be a minimum of 12" larger than equipment all around.

J. Each pertinent Subcontractor shall furnish access doors for access to all electrical pull boxes, dampers, and other electrical equipment the Subcontractor furnishes

which are concealed in walls, furring and in hung ceilings, or where may be necessary.

K. Delivery: These access doors shall be delivered to the Contractor for installation by the appropriate trade. Delivery of the access doors shall be made so as not to cause delay in the work of the Contractor or other trades.

L. Material and Finish: Access doors shall conform to the finish of adjacent construction as indicated in the Project Architect's finish schedule. Access doors shall be as specified by the Project Architect/Engineer.

M. Quality Control: Each Subcontractor shall inspect the installation of the access doors and shall immediately inform the Contractor in writing if they are not being located and installed to afford proper access to the equipment.

1.18 COORDINATION WITH FACILITY OPERATIONS

A. Subcontractors doing work in Sections under Division 16 shall read and comply with requirements set forth in Division 1, as to keeping facilities operating in a safe and practical fashion.

1.19 MINIMUM HEAD CLEARANCE IN OCCUPIED SPACES

A. No electrical or other equipment, piping, conduit, structural framing and support elements of suspended equipment or boxed-in soffits shall be installed in a manner which occurs lower than 8'-0" above the finished floor of the area it occurs above, if people can stand or walk under it.

1.20 USE OF SITE FOR CONSTRUCTION PURPOSES

A. Comply with the requirements set forth in Division 1, Section 1H, Special Requirements, for use of the site for access and construction purpose.

1.21 PROJECT CONDITIONS

A. All existing electrical utilities shall be located prior to the beginning of work. Any conflicts should be identified and noted on As-Built (Record) drawings.

B. Adequate means of protection for all utilities should be provided and, if damaged during working operations, such shall be repaired to the satisfaction of the utility owner at this Contractor's expense.

C. Where existing devices are permanently abandoned, each outlet, branch circuit, etc. shall be removed completely and the conduit plugged or capped at a point well behind the proposed new finished closures or newly finished surfaces.

D. Install Work in locations shown on Drawings, unless prevented by Project conditions.

E. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

F. The Contractor shall inform the Engineer of any work or materials which conflict with any of the applicable codes, standards, laws and regulations before submitting his bid.

G. The scope of the work included under this Division of the Specifications shall include complete electrical systems as shown on the plans and as specified herein. The General Conditions and Special Conditions of these specifications shall form a part and be included under this Section of the Specifications. Provide all supervision, labor, material, equipment, machinery, factory trained personnel, and any and all other items necessary to complete the electrical systems. All items of equipment are specified in the singular; however, provide and install the number of items of equipment as indicated on the drawings, and as required for complete systems.

1.22 CONDUITS

A. When conduit is required for low voltage wiring, the Electrical Subcontractor shall provide and install same under Division 16.

1.23 MOTORS

A. Motors shall be furnished by the manufacturer or supplier of the specified equipment.

B. General purpose motors shall be open drip-proof conforming to NEMA Design B, Class B insulation, continuous 40 degree C ambient, 60 Hz, 1.15 service factor, and 1800 RPM maximum speed unless specified otherwise. Voltage shall be as specified in individual Specification Sections. All motors 3/4 HP and smaller shall be self lubricating. Larger motors shall be self lubricated, if specified.

C. Motors shall be protected with thermal overload devices at the motor, or by the motor starter. Disconnect switch at motors are for service purposes and shall be unfused type, unless fusing is specifically required by the manufacturer.

D. Motors smaller than 3/4 HP shall be single phase and shall be three phase when 3/4 HP and larger, unless specified otherwise.

1. Single phase motors 1/2 HP and smaller shall have built-in overload protection furnished by the Mechanical Subcontractor; single phase and three phase motors larger than 1/2 HP shall have separate motor starters furnished by the Mechanical Subcontractor and installed by the Electrical Subcontractor as overload protection.

2. Single phase motors shall be capacitor start, capacitor run.

3. Equipment requiring 1,000 watts or more shall have a power factor of 85% or greater at rated load conditions. Equipment with a power factor less than 85% shall be corrected to at least 90% power factor under full load operating conditions. Power factor corrective devices shall be switched with related equipment.

4. Motor characteristics which change from that specified, due to the Contractor electing to use one of the optional manufacturers, or an updated model, etc., shall be coordinated with the Electrical Subcontractor, through the General Contractor.

    a. The Contractor making the change is responsible for the cost and design of any revisions necessary to provide proper power and control connections in full accordance with the National Electrical Code, and State and Local Codes.

5. Phase monitors shall be provided by this Contractor for motors over 3/4 HP.

E. The Electrical Contractor shall install under Division 16 all motor starters and contactors, except when specified to be furnished by the equipment manufacturer under Division 15. **Separate motor starters shall be provided by the Mechanical Subcontractor and installed by the Electrical Subcontractor, ANY WORK IN DIVISIONS 15 AND 16 TO THE CONTRARY NOT WITHSTANDING.**

F. Electrical work provided and installed by Subcontractors under Divisions 15 and 16 shall be performed by electrical contractors licensed under the Florida Construction Industries Licensing Board, and by properly qualified foremen, journeymen and apprentices. At least one electrician licensed by the State of Florida shall be on the site whenever any electrical work is being done. All fire alarm wiring shall be by licensed and experienced technicians trained by the manufacturer of the equipment.

G. Where specific instructions are not indicated or specified, provide the following items on the installation of motor equipment furnished under Division 16:

1. Provide templates and anchor bolts.

2. For equipment placed on the ground floor or on the structural system, provide a minimum of a four inch (4") thick reinforced concrete equipment pads, and also provide resilient isolation pads between equipment and slab or structure. Such slabs shall be designed and reinforced to meet the conditions.

3. For suspended equipment, this Contractor shall provide structural supports designed to carry all loads, with "simple" framing, anchoring devices and vibration isolation devices approved by the Project Architect/Engineer.

H. Control devices, such as thermostats, firetraps, step controllers, strip heat contactors, etc., shall be installed in place under the Mechanical Sections of these Specifications and shall be wired complete under the pertinent Mechanical Section. All control circuiting shall be installed in accordance with diagrams furnished under the appropriate Mechanical Section, and which have been approved by the Project Architect/Engineer.

1.24 PAINTING

A. General:

1. All field painting shall be performed under the subcontract for electrical work and shall be as specified in the Painting Section of Division 9 of the Specifications. Each Subcontractor shall leave his work clean and free from oil, dirt, and grease and shall do field painting, where required.

B. The Contractor providing equipment, conduit, raceways, piping, etc., shall, upon completion, thoroughly clean all work to remove all dirt, grease, rust and oil. The Contractor shall vacuum clean the inside and outside of panel box and equipment cabinets. The Contractor shall clean galvanized piping, conduit, raceway, and work in exposed areas with diluted acetic acid. He shall thoroughly prepare all such work for painting.

C. Equipment:

1. All equipment shall have factory standard finish. Where zinc chromate paint is specified to be left for painting by each Subcontractor, it shall be made up in synthetic resin vehicle.

2. Factory finished equipment which has rusted or been damaged shall be repaired, cleaned, spot primed and entirely repainted the original color by this Contractor.

3. Insulation coverings shall be cleaned, sized (if necessary), and painted for service identification by this Contractor.

D. Ferrous metal installed under this Division 16 of the Specifications which is exposed to view or to the weather, such as conduits, raceway, supports, etc., shall first be painted with one coat of priming zinc chromate. Finished paint shall be in accordance with the Painting Section of Division 9 by the Contractor providing the work under the Electrical SectionE. Painting Schedule for visible equipment & conduit:

Table 1. Color Identification

Classification	Predominant Color of System	Color of Letters for Legend
F - Fire protection materials and equipment	Red	White
D - Dangerous	Yellow (or Orange)	Black
S - Safe materials	Green (or the achromatic colors): white, black, gray, or aluminum	
P - Protective materials	Bright Blue	White

1.25 PENETRATION OF WATERPROOFING (INCLUDING WATERPROOF CONCRETE)

A. Quality Control:

1. Where any work pierces waterproofing including waterproof concrete, the method of installation shall be as approved by the Project Architect/Engineer before work is done.

B. Materials and Installation:

1. The Subcontractor causing the penetration shall furnish and install in a timely fashion all necessary sleeves, caulking, and flashing materials required to make openings absolutely water tight.

1.26 DEFINITIONS

A. Additional Technical Definitions:

1. "Raceway" shall mean pipe, conduit, fittings, flanges, controls, hangers, and items customarily required in connection with the transmission of electrical energy.

2. "Concealed" shall mean embedded in masonry or other construction, installed within or behind wall furring, within partitions or double partitions or hung ceilings, in crawl spaces, in shafts, in chases, buried in trenches.

3. "Exposed" shall mean not concealed.

4. "Demolition" shall be the removal of any existing equipment, and the capping or plugging of any existing services to that equipment. (See paragraph 1.26 above.)

5. "Furnish" means to purchase and deliver products and equipment to the project site and prepare for installation.

6. "Install" means to uncrate, assemble, erect, place, anchor and connect furnished products into satisfactory operation.

7. "Provide" means to furnish and install.

C. The term "this Contractor" when used refers to the Subcontractor of each pertinent Section of Division 16.

1.27 AMPLIFICATION

A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of an item, in the Drawings or Specifications either or both, carries with it the intent to furnish and install the item, regardless of whether or not this is explicitly stated as part of the indication or description.

B. Article 1.2.3 of the General Conditions is repeated here:

> *"1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings."*

C. In case of discrepancy concerning quality and/or quantity within the Contract Documents, this Contractor shall provide the better quality and/or the greater quantity unless otherwise determined in writing by the Project Architect/Engineer, at no increase to the Contract amount.

D. No exclusions from, or limitations in, the language used in the Drawings or Specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted. This Contractor shall furnish and install such at no increase to the Contract amount.

E. The Drawings, of necessity, utilize symbols and schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The Work shall be installed, in accordance with the diagrammatic intent expressed on the electrical and mechanical drawings, and in conformity with the dimensions indicated on final architectural and structural drawings. Such may be adjusted to accommodate equipment shop drawings.

F. Where Drawings and Specifications conflict, it shall be the responsibility of this Contractor to bring such conflict to the attention of the Project Architect/Engineer for clarification. In general, the architectural drawings shall take precedence over the mechanical or electrical drawings with reference to building construction. Any change from the Drawings necessary to make the work conform with the building as constructed and to fit the work of other trades or to the rules of authorities having jurisdiction, shall be made at no expense to the Owner.

G. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete Work are excluded.

H. Certain details appear on the Drawings which are specific with regard to the dimensioning and positioning of the Work. These details are intended only for the purpose of establishing general feasibility. They do not obviate this Contractor's responsibility for field coordination for the indicated Work. It shall be the duty of this Contractor to supplement any plans and details shown with his own knowledge and experience concerning good installation practice and, with the approval of the inspecting authority, to make any modifications necessary to fit the specific equipment for use, to avoid conflicts with other trades, and to execute this work properly in accordance with the full intent and meaning of the Drawings and Specifications.

I. Capacities, sizes and conditions specified or shown are allowable minimums. Based on design and rated operating conditions of systems, motors shall not be overloaded. Equipment shall not operate at speeds or temperatures greater than manufacturer's published recommendations, and no strain or demand shall be imposed upon any component of any system, structure or building. Also, no quality of architectural feature, function, or end result shall be adversely affected.

J. Information as to the general construction shall be derived from structural and architectural Drawings and Specifications.

K. The use of a word in the singular shall not be considered as limiting where other indications denote that more than one item is required. The determining of correct quantities in compiling his bid shall be the responsibility of this Contractor. The authority for determining the intent of the Contract Documents shall, in the first instance, be that of the Project Architect/ Engineer.

L. In the event that extra work is authorized and performed by this Contractor, Work shown on Drawings depicting such extra work, and/or described by Addendum, or by Change Order, shall be subject to the basic building and Contract Specifications in all respects.

1.28 QUALITY ASSURANCE

A. Standards: Certain standard materials and installation requirements are described by reference to standard specifications. These standards include the following:

1. ASA..... American Standards Association.

2. ASTM ..... American Society for Testing and Materials.

3. ASME ..... American Society of Mechanical Engineers - Code of Unfired Pressure Vessels.

4. NFPA ..... National Fire Protection Association.

5. NEMA..... National Electrical Manufacturers Association.

6. UL ..... Underwriters Laboratories.

7. ANSI ..... American National Standards Institute.

8. ASHRAE..... American Society of Heating, Refrigerating, and Air Conditioning Engineers.

9. SMACNA..... Sheet Metal and Air Conditioning Contractors' National Association.

10. AMCA..... Air Moving and Conditioning Association.

11. ARI..... Air Conditioning and Refrigeration Institute.

12. AMA ..... Acoustical Materials Association.

13. NEC..... National Electrical Code.

14. IEEE..... Institute of Electrical and Electronic Engineers.

15. EIA..... Electric Industries Associates.

16. IES..... Illuminating Engineering Society.

B. Whenever a reference is made to a standard, installation and materials, the intention is such shall comply with the latest published edition at the time project is bid, unless the edition is otherwise specified herein.

C. Materials and equipment herein shall be new and standard catalogued items manufactured by reputable concerns regularly supplying such materials. Material shall bear the Underwriters' Laboratories, Inc. label (or other appropriate label) where such is required or allowed by code, by Contract Documents or by authorities having jurisdiction.

D. Product deliveries shall be arranged in accordance with construction schedules and to avoid conflict with work and site conditions.

1. Deliver and store products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

2. Immediately upon delivery, this Contractor shall inspect shipments to assure compliance with the requirements of the Contract Documents and approved submittals, and that products are properly protected and undamaged.

3. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

E. Codes and Rules:

1. All material furnished and all work installed shall comply with the following codes as they apply to this project:

| NFPA 70, 72 and NFPA 101.

| Florida Building Code/SREF, Current Edition.

| Regulations of the Florida Industrial Commission Concerning Safety.

| Applicable County, State and Local Building Codes.

| Local and State Fire Marshal Rules and Regulations.

| Chapter 4A-47, Florida Administrative Code—Uniform Fire Safety Standards for Elevators.

- Occupational Safety and Health Agency Standards (OSHA).
- Florida State Board of Health Rules and Regulations.
- Florida Department of Education - Office of Educational Facilities; State Requirements for Educational Facilities (SREF), Current Edition.

Applicable codes shall be those adopted by the authority having jurisdiction at the time project is bid.

F. Permits, Fees, and Inspections

1. The Contractor shall give all necessary notices, obtain all permits, and pay all government fees, sales taxes, and other costs, including utility connections or extensions, in connection with this work; file all necessary approvals of all governmental departments having jurisdiction.

2. Obtain all required certificates of inspection for their work and deliver to the Owner/Engineer the same certificates before request for acceptance and final payment for the work.

3. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, and drawings required to comply with all applicable laws, ordinances, rules, and regulations.

4. The Contractor shall inform the Engineer of any work or materials which conflict with any of the applicable codes, standards, laws, and regulations before submitting their bid.

1.29 CONTRACTOR QUALIFICATIONS

A. The Contractor or Subcontractors performing work under all Sections of this Division 16 shall be regularly engaged in the type of work to be furnished under these Sections and shall be licensed under the Florida Construction Industries Licensing Boards for such specialty trades, and such firms shall employ properly qualified foremen, journeymen and apprentices as appropriate and in keeping with best trade practices.

B. Each firm shall be able to provide, upon request, a list of similar jobs it has completed.

C. The Project Architect/Engineer and the Owner reserve the right to reject Subcontractors who have seriously questionable capabilities to perform the specific type and quality of work intended, or who have a poor record in performance. (See Division 1, Section 1F, Supplementary General Conditions.)

1.30 ORGANIZATION OF THE WORK

A. Each Subcontractor in Division 16 (i.e., this Contractor) shall put his work in place as fast as possible to meet all construction schedules, but only after coordinating his

own work and the work priorities of other Subcontractors and the General Contractor.

B. Prior to starting the work, this Contractor shall carefully verify all measurements at the site and determine that the work will properly clear openings, structural members and the work of other trades. Correlate the time of each work item with all other items to the best advantage of the completed job. Furnish, in ample time to avoid delays in the work, all information required to revise footing elevations, structural elements, chases and openings in floors and walls, and to provide clearances which may be required to accommodate the work. Set all sleeves, anchor bolts and inserts required to accommodate equipment before concrete is poured or masonry is started.

C. Locate existing utilities prior to beginning work. Reroute or replace existing utilities where necessary to permit installation of Work. Provide adequate means of protection during work operations. Repair existing utilities damaged during work operations to the satisfaction of the utility and at this Contractor's expense.

D. Should uncharted or incorrectly charted electrical or other utilities be encountered during work operations, notify the Project Architect/Engineer and Owner immediately for procedure directions. Cooperate with utility companies in maintaining active utilities in operation.

E. It is this Contractor's responsibility to immediately act to put any damaged utilities back in functioning conditions. Resolution to establish obligation to bear the cost will follow.

F. Each Subcontractor in Division 16 shall, at all times while work under such subcontract is taking place, keep on the site a competent superintendent in charge of the Work. Such superintendent shall be replaced if unsatisfactory to the Owner and/or Project Architect/Engineer.

G. Each Subcontractor shall maintain a complete file of all Contract Drawings, Specifications, and approved shop drawings at the site to be made available for inspection by Owner’s and/or Project Architect/Engineer's representatives.

H. Installation and equipment shop drawings shall be initialed and dated upon installation. This procedure will serve to ensure proper scheduling and enable Owner's representatives to check the work in progress.

I. Each Subcontractor shall be responsible for his work until its acceptance and final Substantial Completion, and shall replace any of the same which may be damaged, lost or stolen without additional cost to the Owner.

J. Unless otherwise set forth in the subcontracting agreement, each Subcontractor shall furnish all scaffolding, rigging, hoisting and services necessary for erection and delivery to and removal from the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

K. Each Subcontractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by his employees or his work.

1. Normal construction cleaning: For new facilities and new additions, or portions there of not yet certified as Substantially Complete and thereafter during holidays as above defined, only normal construction cleaning need be maintained by the Contractor. Such shall include complete removal of debris from the immediate construction areas and adjacent areas to one or more Contractor provided on-site refuse containers which containers the Contractor shall have emptied no less than once a week.

2. Special cleaning: At all other times (except holidays) the Contractor, in addition to normal construction cleaning, shall keep the areas needed by staff (including corridor, exit ways) free of all debris, materials, storage materials, and trash and periodically during business hours shall clean-up to a stage of being "broom clean." The Contractor shall periodically "dust (oil) mop" the flooring as may be practical and as may be necessary to minimize dust.

3. Upon completion of the Contract or portions thereof and prior to or shortly after the Date of Substantial Completion, the Contractor shall clean all windows, glass, aluminum/steel or other metal, floors, walls, and other surfaces and make such surfaces clean and free of stain or discoloration. All surfaces shall be left by the Contractor in a first class finished condition as determined appropriate by the Project Architect.

L. The Contractor is required to minimize construction noise levels in all locations adjacent to or in occupied areas.

M. The Owner reserves that right to prevent use of any tools which cause detrimental vibration or noise when the facility is occupied.

N. Protect equipment and materials during construction from damage from water, dirt, welding and cutting splatter, paint droppings, etc., by use of shields and drop cloths. Damaged equipment or materials shall be repaired or replaced by the responsible Subcontractor to the Project Architect/Engineer's satisfaction.

O. Products stored outside shall be covered with waterproof drop cloths or tarpaulins. Equipment which may be damaged by the elements shall not be stored outside. Condensation shall be prevented by heating and ventilating.

P. During construction, maintain materials and equipment in an orderly manner.

Q. Provide the following accessory materials for electrical systems. Where similar accessory materials are specified with material and/or equipment, or are shown on the Drawings, the requirements of the Technical Specification Section or Drawings shall govern.

1. Anchor bolts or other anchoring devices be of the size and type recommended by equipment manufacturer for specific application.

2. Structural support (steel) for elevated or suspended mechanical items shall be made with connections using "simple" framing.

3. Resilient isolation pads for motors and equipment shall be rubber-in-shear pads and of type recommended by manufacturer of the motor and equipment unless otherwise specified. (See sound proofing requirements.)

4. Dielectric fittings shall be provided where copper joins steel, aluminum or iron, or any dissimilar metals such as insulating bushings or unions.

5. Escutcheons shall be provided where conduits pierce exposed partitions, floors, walls or ceilings, to cover raw edge. Escutcheons shall be chrome plated. (See sound proofing requirements.)

R. Delay caused by equipment not being on the job site when required shall be avoided in the following manner:

1. This Contractor shall furnish and install a temporary substitute piece of equipment (subject to approval of the Project Architect/Engineer), allowing the building to become operative. The temporary substitute equipment shall later be removed and replaced with that originally specified (or originally approved) when it arrives, all at the convenience of and at no additional cost to the Owner.

1.31 EXCAVATION

A. Each Subcontractor shall do trench and pit excavating and backfilling inside and outside the building, as required by his work, including shoring and bracing, pumping and protection for safety of persons and property. Trench excavations performed under this Contract whether by the Contractor or any Subcontractor shall be done in strict compliance with Florida Statute Chapter 553 Part VI "The Trench Safety Act" (See Section 553.60-553.64). This pertains to the design of the trench safety system and shoring.

B. Backfill shall be compacted in layers not exceeding six inches (6") in depth. Completed backfill shall conform to surrounding ground and finished.

1. Concrete encasement: Piping passing under footings, foundations and other locations, as shown on Drawings, shall be encased on all sides.

2. Extend concrete encasement around piping and each side of footings or foundations.

C. Remove non-usable excavated material from the site. Deposit any usable surplus material on site where directed by the Project Architect/Engineer. Do not remove usable material from site.

D. Provide and maintain bracing, shoring, sheet piling, or sheathing as required to safely support sides of excavations. The Contractor doing the excavation and the Contractor using the excavation are responsible for safety in excavations.

E. This Contractor shall provide and operate pumping equipment to keep excavations free of water.

F. This Contractor is responsible for repairing and restoring paving, streets, curbs, walks, and other work in the area where excavations are made. Any existing underground piping, conduit, etc. damaged during construction, shall be returned to original condition at no additional cost to Owner.

G. Provide additional excavation and backfill where required to resolve conflicts in buried lines.

H. Coordinate timing of excavations in advance with other trades.

I. Excavation shall be open cut from the surface.

J. Hold trench width to a minimum.

K. Do not excavate utility trenches parallel to building footings closer than four feet (4') from the footings except by approval of the Project Architect/Engineer. When parallel trenches require cuts deeper than the building footings, the horizontal distance from the footing shall be equal to or greater than one and one half (1-1/2) times the vertical distance below the footing, but in no case shall the horizontal distance be less than four feet (4') except by the approval of the Project Architect/Engineer.

L. Mechanical excavation shall be held to four inches (4") above final grade of the bottom of trench. The remainder shall be shaped by manual excavation, so that piping is fully supported on undisturbed soil. Shoring of piping in trench will not be allowed. Piping must be suspended from above.

M. Whenever, in the opinion of the Project Architect/Engineer, the soil is unsuitable for supporting raceway and appurtenances, provisions for proper foundations shall be made at no additional cost to the Owner. Soil test reports are bound in the Specification book.

N. The Drawings for this project show the anticipated underground utilities. Where locations will interfere with proposed construction such shall be assumed to be a known factor to each Subcontractor unless such locations can be shown to be in error.

O. Wherever trenching or excavating, assume utilities may exist in area without such being shown on the Drawings. Exorcise extrême caution. Should existing facilities be damaged, repair such to Project Architect/Engineer's satisfaction at no additional cost to the Owner.

1.32 CHASE, CUTTING AND PATCHING

A. Provide and place required sleeves, forms and inserts before walls, ceilings, partitions, floors or roofs are built. The cost of cutting and patching of walls, partitions, ceilings, roofs and floors necessary for reception of this Contractor's work caused by his failure to provide or properly locate sleeves, forms and inserts, or caused by incorrect location of his Work, shall be borne by the offending Contractor.

B. Cutting of Finished Materials:

1. When it becomes necessary to cut finished materials, submit to the Project Architect/Engineer for approval, drawings showing the work required, and obtain approval before doing such cutting.

C. Chases and Openings:

1. Chases and openings in walls will be provided under the work of other Sections of these Specifications. This Contractor shall furnish exact dimensions and locations of these openings to suit the apparatus to be used before such walls are built, or shall bear the cost of the additional work to correct and provide for installation of such work.

D. Cutting of Work by Others:

1. No cutting or altering the work of other sections in these Specifications will be permitted without the approval of the Project Architect/Engineer and the Contractor. No structural members shall be cut without the previous written approval of the Project Architect/Engineer.

E. Core Boring:

1. Any holes in existing slabs or other concrete or finished work required for the installation of new piping shall be core bored and this Contractor shall seal around pipe or material. All fire ratings of slabs shall be maintained with approved UL listed fire rated products.

2. Prior to commencement of work, the area to be core drilled shall be examined by X-ray or ground penetrating radar.

F. Finish patch cut areas with floor tile, gypsum wallboard, plaster, ceiling panels or tiles as required to match existing. Paint entire disturbed area to match existing. This Contractor shall provide, at his expense, new ceiling panels and grid which his employees may have damaged during construction, utilizing skilled Subcontractors for each trade. Such work shall match existing.

1.33 LUBRICATION AND PACKING

A. Equipment furnished under Sections in Division 16 shall be lubricated by the Contractor furnishing such equipment, using manufacturer's recommended lubricants, with correct type and quantity of lubricant before placing into service. Damage caused by not providing proper lubrication shall be repaired at this Contractor's expense.

B. Lubrication of equipment requiring factory supervised start-up shall be verified by manufacturer's representative.

C. Packing glands shall be examined by this Contractor for proper packing. Proper packing seals shall be maintained during construction and during the warranty period.

1.34 QUIET OPERATION AND VIBRATION

A. Scope:

1. All equipment provided under Sections in this Division 16 shall operate (under all conditions of load), free of noise levels higher than specified in the pertinent Section and shall not be in excess of the requirements in Section 15B, Testing and Balance, Paragraph 2-E, Sound Testing. Such shall be free of annoying vibrations. Sound and vibration conditions considered objectionable by the Project Architect/Engineer shall be corrected by whatever additional work is required in an approved manner at no cost to the Owner.

B. Quality Control:

1. Vibration control shall be by means of approved vibration eliminators (or suppressors) in a manner as specified and as recommended by the manufacturer of the eliminators. Submit shop drawings for review by the Project Architect/Engineer.

1.35 INSTRUCTIONS

A. After the systems are in operation, the Contractor furnishing the equipment will thoroughly instruct the designated Owner's personnel on operation and maintenance of electrical equipment and systems.

1.36 CLEANING

A. This Contractor shall comply with cleaning requirements set forth in Section 1G - Standard Requirements.

B. Further, upon completion, raceways, panels, cabinets and equipment shall be thoroughly cleaned of dirt, grease, rust and oil, primed where necessary, and made ready for painting.

C. Clean galvanized work in exposed areas with diluted acetic acid.

D. Clean copper in exposed areas with emery cloth and solvent.

E. Clean gauges, thermostats and fittings.

1.37 LICENSE

A. The Subcontracting Firm for the electrical and systems installation shall be licensed by the State of Florida and the local authorities, regularly engaged in the installation of electrical systems, and other related equipment. The Subcontracting Firm shall be familiar with all local conditions including interpretations, codes and shall have at

least five (5) years of successful installation experience on similar projects of the same magnitude and scope.

B. The Subcontracting Firm shall list at least three (3) projects it has successfully completed over the last five (5) years for proof of experience of this caliber. This list shall be included with submittals for review by Architect/Engineer. The Subcontracting Firm shall hold a Florida State Certified Electrical Contractor license for this project. The Subcontracting firm for the fire alarm system shall be a certified "EF" installer.

1.50 AS-BUILT DRAWINGS

A. This Contractor shall provide as-built drawings before final payment will be issued.

*** END OF SECTION ***

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SECTION 16110

CONDUIT AND RACEWAYS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal Conduit.

B. Flexible Metal Conduit.

C. Liquidtight Flexible Metal Conduit.

D. Electrical Metallic Tubing.

E. Non-Metal Conduit.

F. Fittings and Conduit Bodies.

1.02 RELATED SECTIONS

A. Section 16130 ..... Boxes.

B. Section 16170 ..... Grounding and Bonding.

C. Section 16190 ..... Supporting Devices.

D. Section 16195 ..... Electrical Identification.

1.03 REFERENCES

A. ANSI C80.1—Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3—Electrical Metallic Tubing, Zinc Coated.

C. ANSI/NEMA FB 1—Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

D. ANSI/NFPA 70—National Electrical Code.

E. NECA "Standard of Installation."

F. NEMA TC 2—Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

G. NEMA TC 3—PVC Fittings for Use with Rigid PVC Conduit and Tubing.

H. UL651A—Type EB and A Rigid PVC Conduit and HDPE Conduit.

I. UL651B—Continuous Length HDPE Conduit.

1.04 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70.

1.05 PROJECT RECORD DOCUMENTS

A. Accurately record actual routing of conduits larger than 1-1/4 inches.

B. Accurately record actual routing of all underground conduits.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle Products to site under provisions of Division 1.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.

1.07 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Homerun shall mean first outlet box or adjacent J-box for lighting branch circuits. Homeruns shall be a minimum size of three-quarter inch (¾"), unless otherwise specified.

B. Underground Installations:

1. Use thickwall nonmetallic conduit, Schedule 40 PVC.

2. In or Under Slab-on-Grade: Use Schedule 40 PVC or gray HDPE pipe, per NEC requirements. Use only UL listed and approved fittings for coupling and change-over to different type raceways.

3. Minimum Size: ¾".

4. Install rigid steel, long radius elbows for conduits larger than two inches (2").

5. Under slab metal conduit or poured-in concrete metal conduit shall be painted with a coat of bitumastic. The bitumastic shall be continuous and continue up through penetration of concrete slabs, up to 12" A.F.G. Corrosion tape is acceptable.

C. Outdoor Locations, Above Grade: Use rigid steel and liquidtight flexible metal conduit.

D. Wet and Damp Locations: Use rigid steel, aluminum, intermediate, and liquidtight flexible metal conduit.

E. Dry Locations:

1. Concealed: Use rigid steel, aluminum, intermediate metal conduit, and electrical metallic tubing.

2. Exposed:

a. Exterior—Rigid Steel only.

b. Interior—Rigid Steel to 4'0" A.F.G., then Electrical Metallic Tubing.

F. Fire alarm systems raceways/conduits shall be RED its entire length as applied by the manufacturer.

2.02 METAL CONDUIT

A. Rigid Steel, Aluminum, and Intermediate Metal Conduit: ANSI C80.1.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; all steel fittings.

C. Provide a minimum of half-inch (½") for flexible connections to equipment.

2.03 FLEXIBLE METAL CONDUIT

A. Description: For exposed locations, interlocked steel construction. For concealed locations, interlocked steel construction or aluminum.

B. Fittings: ANSI/NEMA FB 1.

2.04 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction with PVC jacket.

B. Fittings: ANSI/NEMA FB 1.

2.05 ELECTRICAL METALLIC TUBING (EMT)

A. Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel set screw or steel compression coupling or connectors. All connectors shall be insulated throat, up to one inch.

2.06 NONMETALLIC CONDUIT

A. Description: NEMA TC 2; Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC 3.

2.07 HIGH DENSITY POLYETHYLENE (HDPE) CONDUIT

A. Description: UL651A; UL651B, extruded rigid, Schedule 40, high density polyethylene. Gray in color.

B. Fittings: UL651A.

PART 3 EXECUTION

3.01 INSTALLATION

A. All work shall be done in a neat and workman like manner per NECA "Standard of Installation."

B. PVC conduits and raceways are only permitted underground or under slabs. Exception: PVC is permitted within block walls to first outlet box A.F.F. if PVC raceway is one inch (1") trade size or smaller.

C. All underground conduits and raceways, not under building slabs, shall have a yellow marker tape for communication or a red marker tape for power installed above its entire length and placed approximately 12" below finished grade. Exception: Raceway installation by directional boring.

D. Provide a yellow marker ribbon for communication conduits and a red marker ribbon for power conduits installed underground. Exception: Raceway installation by directional boring.

E. Contractor shall provide a one-inch (1") conduit from the nearest mechanical room to the electrical service meter. Provide a 'FD' type cast junction box and cover at the electrical meter and a 4" x 4" square box and cover in the mechanical room. Provide a nylon pullstring. Locate box adjacent to controls equipment cabinet. Coordinate with Mechanical Engineer/Mechanical Contractor.

F. All thru-slab conduits and raceways larger than one inch (1") installed into block masonry walls and through slabs shall be rigid galvanized conduit to the first enclosure, cabinet, panelboard/switchboard, or box/outlet. All exposed/surface mounted raceways thru slabs to panelboards/switchboards, enclosures, cabinets, conduits and boxes shall be rigid galvanized conduits entering into same enclosures with no junction boxes. All 90° ells and sweeps larger than 1" shall be rigid galvanized conduit.

G. All raceways and conduits within concrete second floor and above slabs shall be intermediate metal conduit, rigid galvanized conduit, or PVC. EMT is not acceptable. EMT conduits may be used in tilt-wall construction using approved fittings and methods and coated with an asphalt trim paint, corrosive tape or other approved coating.

H. All raceway and conduits installed under-slabs and under-buildings shall be installed under the slab and not within the concrete pour or slab.

I. All exterior conduits and raceways shall be rigid galvanized steel or aluminum conduit, or intermediate metal conduit. EMT and PVC shall not be used. Exterior conduits that transition to underground shall be rigid galvanized steel or intermediate metal conduit.

J. All conduit shall be concealed whenever possible. Concealed conduit run above the ceiling shall be supported independent of ceiling supports. When a lay-in type ceiling is utilized, the conduit must be installed high enough to permit removal of ceiling tile.

K. Exposed and surface mounted raceway systems shall have two approved supporting devices per 10' length as equally spaced as practical.

L. Route exposed conduit parallel and perpendicular to walls. Exposed conduits shall only be run in mechanical and electrical rooms unless otherwise specified.

M. Conduit/raceway chases to above-ceiling spaces for all cable drops communication, data, CATV and telephone shall have a bushing at the top of the conduit/raceway for protection or terminated in an approved box.

N. All above ceiling and within partition wall raceways and conduits shall be EMT, intermediate metal conduit or rigid galvanized conduit. PVC is not permitted above the ceiling spaces.

O. All conduit and raceway systems shall have UL approved supports (equal to Erico Caddy® SK-I Clamp) within three feet (3') of boxes or enclosures and couplings/fittings/condulets. Bar Joist spacing exceeding three feet (3') shall meet the N.E.C. 5' exception to the rule for support.

P. Tie-wire, tie-wrap, duct tape, etc. shall not be permitted as a means of support for any conduit or raceway system. All conduits and raceways shall be adequately supported with U.L. approved supporting devices. Tie wire or tie wraps shall not be permitted for support and/or securing of electrical raceways, boxes, or equipment.

Q. Conduit systems shall be racked and run in parallel and perpendicular from its point or origin (i.e., panelboard/panel/switchboard, systems cabinet, etc.) to its destination or first termination. Authority having jurisdiction shall approve any deviation or conflicts with this rule. All conduits after the first point of termination shall be run parallel with or at right angles to building walls or building structure.

R. Arrange supports to prevent misalignment during wiring installation.

S. Horizontal runs of conduit in masonry walls is not permissible.

T. Home-Run conduits are to be a minimum of ¾" trade size to first point of use box/enclosure. Branch circuit conduits for lighting and receptacles shall be filled a maximum of three (3) phase/hot conductors.

U. A minimum of two spare ¾" conduits shall be stubbed out of each panelboard or panel to building structure above and terminated in a J-box with cover. Conduits stubs shall also be capped at top with approved fittings where not terminating in a box.

V. Conduit shall be continuous from outlet to outlet, from outlet to cabinet, junction box to pull box in such a manner that each system shall be electrically continuous from point of service to all outlets.

W. Any conduit that penetrates a firewall shall be sealed with a fire barrier caulk or similar compound to preserve the fire rating of the wall. Fire-rated foam spray is acceptable.

X. Conduits not terminating in boxes and unused shall be capped.

Y. All empty conduits and raceways shall have a pull-string installed capable of pulling conductors typical of conduit size.

Z. Arrange conduit to maintain headroom and present neat appearance. Minimum headroom for equipment suspended from ceiling or building structure shall be 6’8” unless otherwise specified.

AA. Maintain 12" clearance between conduit and surfaces with temperatures exceeding 104°F (40°C) unless otherwise specified.

BB. Cut conduit square using saw or pipecutter; de-burr cut ends. Bring conduit to shoulder of fittings; fasten securely.

CC. Install no more than equivalent of four (4) 90° bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender or factory elbows for bends in metal conduit larger than 2" size.

DD. Provide fittings designed to accommodate expansion and deflection where conduit crosses, control, and expansion joints.

EE. Threadless connectors and couplings for intermediate metal conduit and rigid galvanized conduits are not permitted. Exception: By approval of the "Authority Having Jurisdiction" for special conditions.

FF. EMT Fittings (connectors/couplings) shall be steel set screw or steel compression type. Fittings in wet locations shall be compression type.

GG. When hot dipped rigid galvanized steel conduit is installed below grade, it shall be coated with an asphalt trim paint or approved corrosion tape.

HH. PVC sweeps into utility transformers shall be permitted.

II. Install nonmetallic conduit in accordance with manufacturer's instructions.

JJ. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting.

KK. Corrosive environments/pool pump houses:

1. PVC conduits, fitting, conduit fittings, boxes, and enclosures shall be permitted.

2. Additional conduit supports shall be provided if PVC conduit is exposed.

LL. HDPE conduit shall not be installed above grade per NEC.

MM. All flexible conduits in exposed areas shall be steel or metal seal-tite. All flexible raceways in damp or wet locations shall be metal seal-tite. All flexible conduits above suspended lay-in ceilings shall be aluminum or steel. Flexible conduits are not permitted above drywall, plaster or hard ceilings where not accessible. Minimum size flexible conduits for all installations shall be ½" trade size and shall not exceed 6' in length. Flexible metal conduit fittings and connectors shall be clamp-type. Set screw type fittings and connectors are not permitted. Exceptions as approved by Project Architect.

NN. Seal tight or flexible conduit shall NOT be installed through walls.

OO. Flexible metal conduit shall be used for a flexible connection only, not raceways.

PP. All raceway terminations at boxes and enclosures one inch (1") and smaller shall be made with insulated throat connectors. RMC, aluminum, intermediate metal conduit to comply with NEC.

QQ. All raceway terminations at boxes and enclosures larger than one inch (1") shall be made with insulated throat connectors or metallic insulated bushings. Plastic bushings are not acceptable. Conduits/raceways enclosing #3 or larger conductors shall have connectors with insulated throat or use metal insulated bushings.

RR. Install metallic insulated grounding bushings with lug on all mains, sub-feeders, switchboards, panelboards, transformers, chillers, disconnects, and equipment rated at 100 amps and above.

SS. No conduit system or raceway system will be installed on or under walkway roofs. Only raceways required for walkway lighting will be permissible. Walkway raceways shall be aluminum and installed under walkway roof decks with approved aluminum or stainless steel supports and hardware. Also see walkway roof specifications, Section 16530A (walkway lighting).

TT. Install and seal boxes and conduit in acoustical treated walls and ceilings per architectural acoustics specifications.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods that are UL listed and tested.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation specified under Division 7.

3.03 BASKETBALL/TENNIS COURT/PLAYCOURT POLE RECEPTACLE INSTALLATION

A. Install a 20 amp, Spec Grade, receptacle on the backside of the nearest basketball post at minimum of 18" above finished grade. Provide a separate branch-circuit homerun to the panelboard in a 1" minimum conduit. Install a single-pole toggle switch adjacent to the panelboard to control the receptacle on the basketball court. Use type FD box. Use gasketed type weather-proof in-use cover.

B. Exterior conduits installed in areas above finished grade shall be 1" rigid hot dipped galvanized steel. Rigid conduit shall extend down to and include a 90 degree factory elbow. Then, it is permissible to change over the Schedule 40 PVC conduit.

C. The branch-circuit conductors shall be #10 THHN/THWN the entire length from the over current device to the receptacle.

D. Provide and install a 20 amp GFCI breaker of the same manufacturer of the panelboard in which the branch-circuit originates.

E. Install ground rod at one corner of the court in accordance with Grounding and Bonding specification section.

F. Provide a #4 AWG solid copper grounding electrode conductor from the ground rod to structural steel. All connections shall be exothermically welded.

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SECTION 16117

PRE-FABRICATED IN-GROUND PULL BOXES

PART 1 GENERAL

1.01 GENERAL

A. This section is intended for telecommunication systems only (i.e., not power).

1.02 SECTION INCLUDES

A. Pre-Fabricated Ground Pull Boxes (GPBs).

B. GPB Accessories.

1.03 RELATED SECTIONS

A. Section 16010 ..... Basic Electrical Requirements.

B. Section 16190 ..... Supporting Devices.

C. Section 16742 ..... Structured Cabling.

1.04 PRE-BID PRODUCT APPROVAL

A. All Manufacturers, including the Basis of Design, shall submit product data for approval prior to bids. Accepted Manufacturers shall be approved in Addendum format—only those products approved prior to bid shall be allowed to be used on this project.

B. The pre-submittal shall include data on the specific products intended for use on this project. Provide data on dimensions, weight, construction, cover plates, accessories, etc.

1.05 SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 1 and Section 16010.

B. Indicate material specifications, dimensions, capacities, size and location of openings, reinforcing details, and accessory locations.

C. Provide product data for accessories.

D. Provide installation instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Quazite (Pre-Bid Submittal Required).

B. Brooks (Pre-Bid Submittal Required).

C. Others as submitted prior to Bid and approved via Addendum.

2.02 PRE-FABRICATED IN-GROUND PULL BOXES AND ACCESSORIES

A. Provide pre-fabricated, pre-cast ground pull boxes formed out of polymer concrete and reinforced by heavy weave fiberglass sized for indicated application +20%. Ground pull boxes shall be provided with composite traffic covers rated at 8,000 psi over 10" square, pulling irons, and gravel base. Units may be stackable to achieve required depth provided the boxes are designed for stacking.

B. Covers shall be labeled identifying the system enclosed and shall have a minimum coefficient of friction of 0.5.

C. Provide pull slots on covers. Provide two pulling irons to facilitate lifting of covers.

D. Provide necessary hangers to keep conduit and cable in an orderly fashion.

E. Provide pull rings on all sides of box to facilitate cable pulls.

PART 3 EXECUTION

3.01 INSTALLATION

A. In ground pull boxes shall not be installed unless prior approval is obtained by Owner’s Representative.

B. Excavate and install base material (gravel or crushed rock) to 6" below bottom of box. Compact base material prior to setting box. Set the top of the box's finished elevation flush with adjacent ground.

C. Size boxes accordingly.

D. Seal between punchouts and conduit after installing conduit.

E. Route internal cabling, conduit, and pull wires in a neat and orderly fashion.

F. Clearly and permanently mark each conduits' point of origin.

G. Backfill around all boxes and compact accordingly. Make any adjustments to the top of the box's height prior to backfilling.

H. After in ground pull box and conduits are installed, provide a one piece, poured in place, 2,500 PSI concrete apron around perimeter of box. Apron shall be minimum 6" deep and extend 12" out on all sides. Top of box and concrete shall be at same elevation.

I. Splices shall not be permitted.

***** END OF SECTION *****

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SECTION 16120

BUILDING WIRE AND CABLE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building Wire and Cable.

B. Remote Control and Signal Cable.

C. Power Limited Fire Protective Signaling Cable.

D. Wiring Connectors and Connections.

1.02 RELATED SECTIONS

A. Section 16110 ..... Conduit and Raceways.

B. Section 16130 ..... Boxes.

C. Section 16195 ..... Electrical Identification.

1.03 REFERENCES

A. ANSI/NFPA 70—National Electrical Code.

B. NEMA WC5—Thermoplastic-insulated wire and cable for the transmission and distribution of electrical energy.

1.04 PROJECT CONDITIONS

A. Verify that field measurements are as shown on drawings.

B. All conductors shall be copper.

C. Conductor sizes are based on copper.

D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.05 COORDINATION

A. Coordinate work under provisions of Division 1.

B. Determine required separation between cable and other work.

C. Determine cable routing to avoid interference with other work.

PART 2 PRODUCTS

2.01 BUILDING WIRE AND CABLE

A. Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: ANSI/NFPA 70, Type THHN/THWN, XHHW material rated 90°C.

2.02 CLASS 1 REMOTE CONTROL AND SIGNAL CABLE

A. Description: ANSI/NFPA 70, Type TFFN, THHN.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

2.03 CLASS 2 OR 3 REMOTE CONTROL AND SIGNAL CABLE

A. Description: NEMA/ICEA WC5, thermoplastic insulated cable, individual insulated conductors twisted together, metallic shielded and covered with PVC jacket when installed in metal raceway.

B. Conductor: Copper, stranded.

C. Insulation Voltage Rating: 300 volts.

2.04 CLASS 1 AND NON POWER—LIMITED FIRE PROTECTIVE SIGNALING CABLES

A. Description: NEMA/NFPA 70, Type TFFN, THHN installed in metal raceway.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

2.05 POWER LIMITED FIRE PROTECTIVE SIGNALING CABLES

A. Description: NEMA/NFPA 70, Type TFFN, THHN installed in metal raceway.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

2.06 POWER LIMITED FIRE PROTECTIVE SIGNALING CABLES

A. Description: NEMA/NFPA 70, Type FPL, FPLR installed in metal raceway.

B. Conductor: Copper.

C. Insulation Voltage Rating: 300 Volts.

2.07 POWER LIMITED FIRE PROTECTIVE SIGNALING CABLES

A. Description: NEMA/NFPA 70, Type FPLP installed in metal raceway.

B. Conductor: Copper.

C. Insulation Voltage Rating: 300 volts.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work, likely to damage wire and cable, has been completed.

3.02 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.03 WIRING METHODS

A. Concealed Dry Interior Locations: Use only building wire and cable (all types) in raceway.

B. Exposed Dry Interior Locations: For feeders, branch circuits, and Class 1 remote control circuits, use only building wire in raceway. For Class 2 or 3 control cable and power limited fire protective signaling cables, run in raceway.

C. Above Accessible Ceilings: For feeders, branch circuits and Class 1 remote control cables use only building wire in raceway. For Class 2 or 3 remote control cables run exposed. For power limited fire protective signaling cables, run in raceway.

D. Wet or Damp Interior Locations: For feeders, branch circuits and Class 1 remote control cables use only building wire in raceway. For Class 2 or 3 remote control cable and power limited fire protective signaling cables run in raceway.

E. Exterior Locations: For feeders, branch circuits and Class 1 remote control cables, use only building wire run in raceway. For Class 2 or 3 remote control cables and fire protective signaling cables, run in raceway.

F. Underground Installations: For feeders, branch circuits and Class 1 remote control cables, use only building wire run in raceway. For Class 2 or 3 remote control cables and power limited fire protective signaling cables, run in raceway.

G. Use wiring methods indicated on drawings.

3.04 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Each computer/clean power receptacle and lighting circuits shall have a dedicated neutral conductor.

C. If stranded conductors are used for branch-circuits, the devices shall be pressure terminal type.

D. Use stranded conductors for control circuits and for feeder and branch circuits No. 10 and larger.

E. Use conductor not smaller than #12 AWG for power and lighting circuits.

F. Use conductor not smaller than #14 AWG for control circuits.

G. Use #10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 200 feet throughout the entire length of the branch circuit. Branch circuits of exceptionally longer lengths (i.e., site lighting, marquee signs, basketball court power, etc.) shall require an increase in conductor size.

H. Use #10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet.

I. All phase conductors shall have color coded insulation. Conductors size #8 and larger shall be color coded by the use of colored plastic tape applied within 6" of each conductor end. All color coding shall be with the same color being used with its respective phase or bus through the entire length of conductor with enclosures, boxes, cabinets, wireways, panels, switchboards, as follows:

120/240 VOLTS	120/208 VOLTS	277/480 VOLTS
Phase A…..Black	Phase A.....Black	Phase A….Brown
Phase B…..Orange (Hi-Leg)	Phase B.....Red	Phase B….Orange
Phase C…..Blue	Phase C.....Blue	Phase C….Yellow
Neutral…..White	Neutral.....White	Neutral..... Gray
Ground…..Green	Ground.....Green	Ground ..... Green
Travelers…Purple	Travelers……Purple	Travelers..... Purple

J. Grounded conductors (neutral) shall be identified with a continuous outer finish that is white or gray. Color coding with plastic tape is not acceptable. Grounded conductors (larger than size #6) shall be color coded at 12" intervals with a continuous white or gray outer finish or by white plastic tape on other than green insulation along its entire length at its terminations. This marking shall encircle the conductor or insulation and cover the entire exposed portion of the conductor at the terminations.

K. Equipment grounding conductors shall be identified with a continuous outer finish that is green or green with one or more yellow stripes. Color coding with plastic tape is not acceptable. Grounding conductors (larger than size #6) shall be color coded at each end and at every point where the conductor is accessible. Identification shall encircle the conductor and shall be accomplished by one of the following:

1. Stripping the insulation or covering from the entire exposed length.

2. Cover the entire length of exposed insulation with green plastic tape at all locations the conductor is accessible.

L. Use suitable wire pulling lubricant for building wire #4 AWG and larger.

M. Protect exposed cable from damage.

N. All conduits entering boxes, enclosures, cabinets, wireways, etc., shall be labeled with a suitable approved permanent marker identifying the appropriate panel/panelboard and branch circuit number serving same. The same shall apply to all enclosure covers.

O. Use suitable cable fittings and connectors.

P. Neatly train and lace wiring inside boxes, equipment, and panelboards.

Q. Clean conductor surfaces before installing lugs and connectors.

R. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

S. Use Utilco blocks for copper conductor splices and taps, #6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

T. Terminate spare conductors with electrical tape or wirenut.

U. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, #8 AWG and smaller.

V. Splice only in accessible junction boxes.

W. Do not use quick-connect splice devices.

X. Feeders and service entrance conductors (as defined by NEC Article 100) shall not be spliced.

3.05 INTERFACE WITH OTHER PRODUCTS

A. Identify wire and cable under provisions of Section 16195.

3.06 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of Division 1.

B. Inspect wire and cable for physical damage and proper connection.

C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

D. Verify continuity of each branch circuit conductor.

E. Verify continuity of each control circuit conductor.

F. Verify proper phasing of conductors prior to energizing or reenergizing any and all electrical equipment.

***** END OF SECTION *****

SECTION 16130

BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall and Ceiling Outlet Boxes.

B. Floor Boxes.

C. Pull and Junction Boxes.

D. In-Ground Cast Concrete Boxes.

E. FS/FD Cast Device Boxes.

1.02 RELATED SECTIONS

A. Section 16010 ..... Basic Electrical Requirements.

B. Section 16141 ..... Wiring Devices.

C. Section 16160 ..... Cabinets and Enclosures.

D. Section 16170 ..... Grounding and Bonding.

E. Section 16195 ..... Electrical Identification.

1.03 REFERENCES

A. ANSI/NEMA OS 1—Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

B. ANSI/NFPA 70—National Electrical Code.

C. NEMA 250—Enclosures for Electrical Equipment (1,000 Volts Maximum).

1.04 PROJECT CONDITIONS

A. Verify field measurements are as shown on drawings.

B. Verify locations of floor boxes and outlets to rough-in.

C. Electrical boxes are shown on drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

PART 2 PRODUCTS

2.01 OUTLET BOXES

A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required. Minimum depth—2½-inches.

2. Concrete Ceiling Boxes: Concrete type.

B. Cast Boxes: NEMA FB 1, Type FD, cast feralloy deep type. Provide gasketed cover by box manufacturer. Provide threaded hubs.

2.02 FLOOR BOXES

A. Floor Boxes: ANSI/NEMA OS 1, fully adjustable.

B. Material: Cast metal with brass cover plate.

C. Shape: Round or Rectangular.

D. Conform to regulatory requirements for concrete-tight floor boxes.

E. Hubbell: B-2436, B-4233, and B-4333 Series.

F. Walker: 880CS1, 880CS2, and 880CS3.

G. Replace trims, covers, and device with new in existing floor boxes.

2.03 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel. Minimum depth—2½-inches.

B. Surface-Mounted Cast Metal Box: NEMA 250, Type 4, flat-flanged, surface-mounted junction box.

1. Material: Stainless Steel.

2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install electrical boxes, as shown on drawings and as required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements.

B. Install electrical boxes to maintain headroom and to present neat mechanical appearance.

C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Boxes shall not be installed more than 4 feet above finished ceiling. Use 1/4" threaded rod for box support up to 4' in length and 3/8" threaded rod for box supports exceeding 4' in length.

D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire. Openings shall be a minimum 24” x 24” hinged door with cylinder cam.

E. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods that are UL listed and tested.

F. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.

G. Use flush mounting outlet boxes in finished areas.

H. Do not install flush mounting boxes back-to-back in walls; provide minimum 12 inch separation. Provide minimum 24 inches separation in fire-rated walls. Through-the-wall boxes are not allowed.

I. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

J. Use stamped steel bridges to fasten flush mounting outlet box between studs.

K. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

L. Use adjustable steel channel fasteners for hung ceiling outlet box.

M. Do not fasten boxes to ceiling support wires.

N. All boxes and enclosures, including wiremold boxes, shall be grounded by use of a threaded ground lug/screw. No ground clips acceptable. This shall apply to new and existing installations.

O. Use gang box where more than one device is mounted together. If sectional boxes are used, barriers are required to separate different voltage systems.

P. Use gang box with plaster ring for multiple devices mounted together.

Q. Use FD malleable outlet boxes in exterior locations exposed to the weather, wet locations, kitchens, and toilet rooms where surface mounted with weatherproof "while-in-use" cover. Standard weather proof cast boxes are not acceptable.

R. Set floor boxes level.

S. Large Pull Boxes: Boxes larger than 100 cubic inches (1-600 cubic centimeters) in volume or 12 inches (300 mm) in any dimension.

1. Interior Dry Locations: Use hinged enclosure under provisions of Section 16160.

2. Other Locations: Use surface-mounted cast metal box.

T. Interior PVC boxes, PVC junction boxes, PVC pull boxes, and PVC enclosures are not acceptable for any purpose.

U. Cabinets, enclosures, wire-ways, junction boxes, etc., shall be color identified per the following color schedule. Also, each raceway entry shall be similarly identified for approximately 12" in length at the box/conduit termination for all items listed below and at ten foot intervals for Fire Alarm and Emergency.

Fire Alarm: ..... Red

Emergency: ..... Orange

Data/Tech/Telephone: ..... Black

C.C.T.V.: ..... Green

Intercom: ..... Blue

V. All boxes are to be supported to building structure or building structural support with approved supports and hardware suitable for the task. No box, cabinet, or enclosure will be supported by the conduit or raceway only. Tie wraps, tie wire, or any other non-approved supports shall not be permitted.

W. All boxes, junction boxes, and enclosures shall have the exterior cover marked identifying the branch circuit and panelboard of origination with an indelible ink marker or grease pencil.

X. Myers hubs shall be used on all exterior boxes or enclosures where the conduits terminate on top of box or enclosure. Sealing lock nuts or Myers hubs shall be used where the conduits enter the side or bottom of the box or enclosure.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations and sizes of required access doors with Construction Manager/General Contractor and other trades.

B. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

C. Coordinate heights and locations of outlets mounted above counters, benches, and backsplashes.

D. Position outlet boxes to locate luminaries as shown on reflected ceiling plan.

E. Outlet boxes for exit lights shall be wall-mounted, where possible, and installed no higher than 24 inches above door frame. Where exit lights are suspended, the box and/or light fixture shall be rigidly secured.

3.03 ADJUSTING

A. Adjust floor box flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closures in all unused box openings.

***** END OF SECTION *****

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SECTION 16160

CABINETS AND ENCLOSURES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Hinged Cover Enclosures.

B. Cabinets.

C. Terminal Blocks and Accessories.

1.02 REFERENCES

A. NEMA 250—Enclosures for Electrical Equipment (1000 Volts Maximum).

B. ANSI/NEMA ICS 1—Industrial Control and Systems.

C. ANSI/NEMA ICS 4—Terminal Blocks for Industrial Control Equipment and Systems.

D. ANSI/NEMA ICS 6—Enclosures for Industrial Control Equipment and Systems.

1.03 SUBMITTALS

A. Submit product data under provisions of Division 1.

B. Shop Drawings for Equipment Panels: Include wiring schematic diagram, wiring diagram, outline drawing and construction diagram as described in ANSI/NEMA ICS 1.

PART 2 PRODUCTS

2.01 HINGED COVER ENCLOSURES

A. Construction: NEMA 250; Type 1 steel.

B. Finish: Manufacturer's standard enamel finish.

C. Covers: Continuous hinge, held closed by flush latch operable by key.

D. Panel for Mounting Terminal Blocks or Electrical Components: 14 gauge steel, white enamel finish.

2.02 CABINETS

A. Cabinet Boxes: Galvanized steel, 24 inches wide, 24 inches high, 6 inches deep minimum. Provide ¾" thick, AC-grade, plywood backboard, painted on all six sides with two coats of flame retardant paint, as manufactured by Pathway & Spaces, Inc. If voltage exceeds 50 volts to ground, backboard shall be metal. Backboard shall stand off cabinet backwall a minimum of ½ inch. Minimum thickness of backboard shall be 16 gauge.

B. Cabinet Fronts: Steel, surface type with screw cover front, concealed hinge; finish in gray baked enamel.

2.03 ENCLOSURES AND CABINETS FOR LIFT STATIONS AND BALL FIELDS

A. Construction: NEMA 250; Type 4X Stainless Steel.

B. Finish: Smooth brushed stainless steel.

C. Covers: Continuous hinged, held closed by flush latch operable by key.

2.04 TERMINAL BLOCKS AND ACCESSORIES

A. Terminal Blocks: ANSI/NEMA ICS 4; UL listed.

B. Power Terminals: Unit construction type, closed-back type, with tubular pressure screw connectors, rated 600 volts.

C. Signal and Control Terminals: Modular construction type, channel mounted; tubular pressure screw connectors, rated 300 volts.

D. Copper Ground Bar Strip with #6 Copper Grounding: Bonding conductor to building main grounding buss.

2.05 MANUFACTURERS

A. Burndy #RK Series.

B. Buss.

C. Belden.

2.06 FABRICATION

A. Shop assemble enclosures and cabinets housing terminal blocks or electrical components in accordance with ANSI/NEMA ICS 6.

B. Provide conduit hubs on enclosures.

C. Provide protective pocket inside front cover with schematic diagram, connection diagram, and layout drawing of control wiring and components within enclosure.

PART 3 EXECUTION

3.01 INSTALLATION

A. All cabinets shall have hinge type doors.

B. Cabinets shall have built in locks and keys provided unless installed in mechanical, electrical, or communication rooms.

C. Install cabinets and enclosures plumb; anchor securely to wall and structural supports at each corner, minimum.

D. Provide accessory feet for free-standing equipment enclosures.

E. Install trim plumb.

F. All exterior mounted enclosures shall be either NEMA 4X.

G. Any conduit penetrations made on the top or sides of exterior mounted enclosures shall be made using a manufactured hub or hub assembly.

H. No penetrations shall be made in an exterior mounted enclosure on the sides of enclosure higher than the bottom third of the enclosure.

***** END OF SECTION *****

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SECTION 16170

GROUNDING AND BONDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding Electrodes and Conductors.

B. Equipment Grounding Conductors.

C. Power System Grounding/Bonding.

D. Communication System Grounding.

E. Electrical Equipment and Raceway Grounding and Bonding.

F. Building Grounding/Bonding Detail.

1.02 RELATED SECTIONS

A. Section 16420 ..... Service Entrance.

B. Section 16600 ..... Transient Voltage Surge Suppression (TVSS).

C. Section 16610 ..... Transient Voltage Surge Protectors for Data and Electronic Equipment.

D. Section 16670 ..... Lightning Protection Systems.

1.03 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70 / NEC Article 250.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. (UL) or NRTL, as suitable for purpose specified and shown.

1.04 SYSTEM DESCRIPTION

A. Ground the electrical service system neutral and each separately-derived system (i.e., transformers and generators) neutral at service entrance equipment within five feet (5') of entrance to building to metallic water service, concrete encased rebar, to building steel, and to supplementary grounding electrodes.

B. All low voltage communication systems shall be bonded per the grounding detail.

1.05 SUBMITTALS

A. Submit shop drawings under provisions of Division 1.

B. Indicate location of system grounding electrode connections and routing of grounding electrode conductor.

1.06 PERFORMANCE REQUIREMENTS

A. The grounding system installed on permanent building and structures shall provide a maximum of 10 ohms resistance to ground. Grounding systems installed on relocatable structures and playcourts shall provide a maximum of 25 ohms resistance to ground.

PART 2 PRODUCTS

2.01 ROD ELECTRODE

A. Material: Copper-clad steel.

B. Diameter: 3/4 inch for permanently installed buildings and structures; 5/8 inch for relocatables and playcourts.

C. Length: 20 feet minimum.

2.02 MECHANICAL COUPLINGS (GROUND RODS)

A. Material: Bronze.

2.03 WIRE

A. Material: Solid copper 4 AWG and smaller. Stranded copper larger than 4 AWG.

B. Foundation Electrodes: 3/0 copper conductor.

C. Grounding Electrode Conductor: Size to meet National Electrical Code Table 250-66 requirements.

2.04 GENERAL

A. All connections shall be exothermic welds to made electrodes (Erico CADWELD or equal). Access boxes shall be provided for inspections, whether in sidewalks, concrete, or landscape areas. Provide an Eritech T416B HDP inspection well for each driven ground rod.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.

C. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing. Minimum twenty feet (20') continuous/unbroken per NEC.

D. Provide grounding and bonding at Utility Company's metering equipment and pad-mounted transformer.

E. Connect grounding electrode conductors to metal water pipe using a suitable ground clamp. Make connections to flanged piping at street side of flange. Provide bonding jumper around water meter.

F. Provide bonding to meet Regulatory Requirements.

G. Bond together metal siding not attached to grounded structure.

H. Bond together each metallic raceway, pipe, and other metal objects.

I. Provide equipment grounding conductors in all raceways including FAS/Intercom or Paging/CATV/Data/Telecommunications/Power/Lighting/etc. per NEC. A minimum #6 AWG insulated bonding/grounding conductor shall be installed for telecommunication, CATV, intercom and data systems. A minimum #12 shall be installed for fire alarm and power/lighting systems. Color of conductor shall be per Section 16120-3.04 (J).

J. Provide a separate, insulated equipment grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, bus, or ground bar.

K. Provide a system bonding jumper from each separately derived system to connect the equipment grounding conductors of the separately derived system to the grounded conductor. The grounded conductor of the separately derived system shall be bonded to the to equipment grounding conductors at the transformer of origin.

L. The following systems and/or equipment shall be bonded in strict accordance with the NEC as minimum requirements:

1. Fire alarm systems.

2. Intercommunication systems.

3. Building power/lighting systems.

4. Raceway and conduit systems.

5. Telecommunication systems.

6. Lightning protection systems/TVSS.

7. Non-current carrying metal parts of all motors, panels, and other electrically operated equipment.

8. CATV Systems.

M. Use minimum 4 AWG copper conductor for communications service bonding conductor.

N. All connections to ground rods, footer steel and ground rings shall be made by exothermic welds. Also see Electrical Distribution Grounding System detail and ground buss on contract drawings.

O. All ground rod installations shall be a minimum 20' in total length.

3.03 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Prior to energizing, measure ground resistance from system neutral connection at service entrance to convenient ground reference point using suitable ground testing equipment. Resistance shall not exceed 10 ohms for permanent buildings and structures and 25 ohms for relocatables and playcourts.

C. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method. Submit test results to Engineer for review and approval.

3.04 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record actual locations of grounding electrodes.

C. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

Appendix Reference: Electrical Distribution Grounding System Detail (2 pages)

***** END OF SECTION *****

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SECTION 16420

SERVICE ENTRANCE

PART 1 GENERAL

1.01 WORK INCLUDED

A. Arrangement with Utility Company for permanent electric service including payment of Utility Company charges for service.

B. Underground Service Entrance.

1.02 SYSTEM DESCRIPTION

A. System Voltage: 120/208 volts or 277/480 volts, three phase, four-wire, 60 Hertz.

1.03 QUALITY ASSURANCE

A. Utility Company: Progress Energy.

B. Install service entrance in accordance with Utility Company's rules and regulations.

PART 2 PRODUCTS (NOT APPLICABLE)

2.01 NOT USED

PART 3 EXECUTION

3.01 INSTALLATION

A. Make arrangements with Utility Company to obtain permanent electric service to the Project and to maintain existing electrical service.

B. Underground: Install service entrance conduits and feeders from the transformer location to building service entrance equipment. Install primary conduits and coordinate routing. Overhead services are not permitted for new construction.

C. Make arrangements with the Utility Company for extending and relocating primary feeder and transformer. The Electrical Contractor shall pay all costs incurred. Coordinate these requirements prior to bidding.

D. Furnish and install concrete pad in a suitable size in accordance with Utility Company's requirements, if not provided by the Utility Company.

E. This Contractor shall be responsible for the coordination of fencing around transformers. If fencing is not indicated, this Contractor shall provide.

F. All electrical service and distribution equipment shall be located indoors for new construction; except for lift stations, relocatables, outdoor signs, etc.

G. Engineer shall coordinate, with the local Electrical Utility Company, for any necessary conduits needed for primary and secondary services and have electrical contractor include in bid.

H. Service entrance raceways shall have a minimum burial depth of 36" to top of raceway.

I. Service Entrance Raceways shall have a yellow marker tape installed above its entire length placed approximately 12" below the finished grade. (Horizontal boring methods are the exception.)

***** END OF SECTION *****

SECTION 16440

DISCONNECT SWITCHES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Disconnect Switches.

B. Fuses.

C. Enclosures.

1.02 REFERENCES

A. ANSI/UL 198C—High-Intensity Capacity Fuses; Current Limiting Types.

B. ANSI/UL 198E—Class R Fuses.

C. FS W-F-870—Fuseholders (For Plug and Enclosed Cartridge Fuses).

D. FS W-S-865—Switch, Box, (Enclosed), Surface-Mounted.

E. NEMA KS 1—Enclosed Switches.

1.03 SUBMITTALS

A. Submit product data under provisions of Division 1.

B. Include outline drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS—DISCONNECT SWITCHES

A. Square D.

B. Cutler Hammer.

C. Siemens.

D. General Electric

E. Substitutions: Under provisions of Division 1.

2.02 DISCONNECT SWITCHES

A. Fusible Switch Assemblies: NEMA KS 1; Type HD, FS W-S-865; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: FS W-F- 870.

B. Nonfusible Switch Assemblies: NEMA KS 1; Type HD, FS W-S-865; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

C. Enclosures: NEMA KS 1; as indicated on drawings.

D. All service disconnects shall be "Heavy-Duty Type." General duty equipment is not acceptable.

2.03 ACCEPTABLE MANUFACTURERS—FUSES

A. Bussmann.

B. Gould-Schawmut.

C. Littelfuse Tracor.

D. Substitutions: Under provisions of Division 1.

2.04 FUSES

A. Fuses 600 Amperes and Less: ANSI/UL 198E, Class J for feeders and transformer loads and Class RK 5 for motor loads. Dual element, current limiting, time delay, one-time fuse, 250 or 600 volt.

B. Interrupting Rating: 200,000 rms amperes.

C. Spare fuses shall be provided in the amount of 10% of each size and type of fuse installed; but, in no case, shall be less than three (3) spares for each different size and class of fuse being provided. Store in fuse cabinet of sufficient size to house all fuses (provided by Electrical Contractor), located by Architect/Engineer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install disconnect switches where indicated on drawings. Where equipment is manufactured/provided with integral disconnecting means, disconnect switches shall not be required.

B. Install fuses in fusible disconnect switches.

C. Fuses and fuse holders shall be equipped with UL Class "R" rejection clips.

D. All fusible switches which contain current limiting fusing shall have UL Class "R" rejection clips

E. Fuses shall be dual element and current limiting.

F. When using fuses of ratings above 600 amperes, specify 600 volt UL Class "L", current limiting/ time delay/dual element with 200,000 ampere interrupting capacity (AIC).

G. When using fuses of ratings 600 ampere and below, specify UL Class RK1 current limiting/time delay/dual element with 200,000 ampere interrupting capacity (AIC).

H. All fuses shall be by the same manufacturer.

I. All multi-pole breakers shall have factory installed common trip handle ties.

J. Install in accordance with manufacturer's instructions and per NEC 110-26.

***** END OF SECTION *****

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SECTION 16470

PANELBOARDS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Distribution Panelboards.

B. Lighting and Appliance Branch Circuit Panelboards.

1.02 REFERENCES

A. FS W-C-375—Circuit Breakers, Molded Case, Branch Circuit and Service.

B. FS W-P-115—Power Distribution Panel.

C. NEMA PB 1—Panelboards.

D. NEMA PB 1.1—Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

E. NEMA PB 1.2—Application Guide for Ground-fault Protective Devices for Equipment.

1.03 SUBMITTALS

A. Submit shop drawings for equipment and component devices under provisions of Division 1.

B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement, and sizes.

1.04 SPARE PARTS

A. Keys: Furnish five (5) each to Owner [one (1) for Electrical Manager in Maintenance Department].

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS—PANELBOARDS

A. Square D.

B. Cutler Hammer.

C. Siemens.

D. General Electric.

E. Substitutions: Under provisions of Division 1.

2.02 GENERAL

A. All panelboards and circuit breakers shall be fully rated for available fault current.

B. All panelboards shall be MCB type. No MLO panelboards shall be accepted. Any exceptions shall be prior approved by Owner.

2.03 DISTRIBUTION PANELBOARDS

A. Panelboards: NEMA PB 1; bolted circuit breaker type.

B. Provide cabinet front with concealed trim clamps and hinged door with flush lock. Finish in manufacturer's standard gray enamel.

C. Provide panelboards with copper bus, ratings as scheduled on drawings. Provide copper ground bus in all panelboards.

D. Minimum Integrated Short Circuit Rating: As shown on drawings.

E. Molded Case Circuit Breakers: NEMA AB-3; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

F. Current Limiting Molded Case Circuit Breakers: NEMA AB-3, Federal Specification WC-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.

2.04 BRANCH CIRCUIT PANELBOARDS

A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB1; bolted circuit breaker type.

B. Enclosure: NEMA PB 1; Type 1 or 3 R as shown on drawings.

C. Cabinet Size: 6 inches deep.

D. Provide flush or surface cabinet front with concealed trim clamps, concealed hinge, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel. Panelboards to have hinge-type interior access.

E. Provide panelboards with copper bus, ratings as scheduled on drawings. Provide copper ground bus in all panelboards.

F. Minimum Integrated Short Circuit Rating: 10,000 amperes rms symmetrical for 240 volt panelboards; 14,000 amperes rms symmetrical for 480 volt panelboards, or as shown on drawings. These ratings may be lowered by short circuit calculations performed by manufacturer stating actual A.I.C. ratings throughout entire system.

G. Molded Case Circuit Breakers: NEMA AB-3; bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on drawings.

H. Current Limiting Molded Case Circuit Breakers: FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.

I. All multi-pole breakers shall have factory installed common trip handle ties.

2.05 EXISTING BRANCH CIRCUIT PANELBOARDS

A. Distribution, Lighting, and Appliance Branch Circuit Panelboards: NEMA PB1; bolted circuit breaker type or plug-in circuit breaker type to match existing.

B. Minimum Integrated Short Circuit Rating: Match existing rms symmetrical amperes in existing panels.

C. Molded Case Circuit Breakers: FS W-C-375; bolt-on or plug-in type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on drawings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install panelboards plumb [and flush with wall finishes], in conformance with NEMA PB 1.1.

B. Height: 6 feet 6 inches.

C. Provide filler plates for unused spaces in panelboards.

D. Provide typed circuit directory for each branch circuit panelboard by building and room FISH number, new or existing. Revise directory to reflect circuiting changes required to balance phase loads. Trace out all circuits in existing panelboards to indicate an accurate directory per new space changes and room numbers. Indicate type of load served.

E. Stub three (3) empty ¾" conduits and two (2) empty 1" conduits to accessible location above ceiling out of each recessed panelboard. Install duct tape in ends of conduits to prevent insects and rodents from entering panelboard.

F. Panelboards/switchboards shall be provided with a minimum of 20% spare spacing for future additions.

G. All panelboards shall have built in locks and keys provided.

H. Load centers shall not be permitted.

I. Branch circuits/conductors originating from different panelboards shall not be in same raceway(s).

J. Panelboards shall not be used as raceways.

K. Install lightning surge protector per manufacturer's recommendations on all service entrances, as shown on drawings, and connect to ground bus.

L. Install in accordance with manufacturer's instructions and per NEC 110-26.

3.02 FIELD QUALITY CONTROL

A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed twenty percent (20%), rearrange circuits in the panelboard to balance the phase loads within twenty percent (20%). Take care to maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

***** END OF SECTION *****

SECTION 16530

SITE LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior Luminaires and Accessories.

B. Poles.

1.02 REFERENCES

A. ANSI/NFPA 70—National Electrical Code.

B. ANSI/IES RP-20—Lighting for Parking Facilities.

1.03 SYSTEM DESCRIPTION

A. Parking area/exterior lighting as indicated on documents and described herein.

1.04 DESIGN REQUIREMENTS

A. Design and layout lighting system in conformance with IES recommended procedures.

1.05 PERFORMANCE REQUIREMENTS

A. Parking Area: Provide illumination levels and uniformity indicated on Drawings.

1.06 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop Drawings: Indicate dimensions and components for each luminaire which is not a standard product of the manufacturer.

C. Product Data: Provide dimensions, ratings, and performance data.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under "Regulatory Requirements".

E. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

1.07 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record actual locations of each luminaire.

1.08 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division 1.

B. Maintenance Data: Include instructions for maintaining luminaires.

1.09 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years experience.

1.10 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Division 1.

B. Accept products on site. Inspect for damage.

C. Protect poles from finish damage by handling carefully.

1.12 COORDINATION

A. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

1.13 EXTRA MATERIALS

A. Furnish under provisions of Division 1.

PART 2 PRODUCTS

2.01 LUMINAIRES

A. Furnish products as specified on Drawings.

B. Substitutions: Under provisions of Division 1.

2.02 POLES

A. Manufacturers: As noted on documents.

B. Material and Finish: As noted on documents.

C. Section Shape and Dimensions: As scheduled.

D. Height: As scheduled.

E. Base: As indicated on drawings.

F. Accessories:

1. Handhole.
2. Fusing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine excavation and concrete foundation for lighting poles.

B. Examine each luminaire to determine suitability for lamps specified.

3.02 INSTALLATION

A. Install in accordance with manufacturers' instructions.

B. Install lighting poles at locations indicated.

C. Install poles plumb. Provide means to adjust plumb. Grout around each base.

D. Install lamps in each luminaire.

E. Bond luminaires, metal accessories, and metal poles to branch circuit equipment grounding conductor. Provide supplementary grounding electrode at each pole.

3.03 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

3.04 ADJUSTING

A. Adjust work under provisions of Division 1.

B. Aim and adjust luminaires to provide illumination levels and distribution as directed.

C. Relamp luminaires which have failed lamps at Date of Substantial Completion.

3.05 CLEANING

A. Clean work under provisions of Division 1.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosure.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

*** END OF SECTION ***

SECTION 16600

SURGE PROTECTIVE DEVICES (SPD)

PART 1 GENERAL

1.01 WORK INCLUDED

A. The work required under this Division shall include all materials, labor and auxiliaries required to furnish and install complete surge suppression for the protection of building electrical and electronics systems from the effects of line induced transient voltage surge and lightning discharge as indicated on drawings and specified in this Section.

B. Related work specified elsewhere:

1. Section 16010..... Basic Electrical Requirements.

2. Section 16110..... Conduit and Raceways.

3. Section 16120..... Building Wire and Cable.

4. Section 16130..... Boxes.

1.02 QUALITY ASSURANCE

A. All transient voltage surge suppression (TVSS) devices shall be manufactured by a company normally engaged in the design, development, and manufacture of such devices for electrical and electronics systems equipment.

B. The surge suppressor manufacturer shall offer technical assistance through support by a factory representative and local stocking distributor.

C. Submittals: Surge suppression submittal shall include:

1. Schematic data on each suppressor type indicating component types.

2. Dimensioned drawing of each suppressor type.

3. Manufacturer's performance data for each suppressor type.

4. Manufacturer shall furnish complete maintenance and installation manuals and a list of replacement parts.

5. The manufacturer shall certify that their TVSS device has been designed and tested to fail in a safe, non-violent mode with no smoke, fire, flame, case, or module physical damage.

6. Manufacturer shall provide independent third party test data confirming unit will not have any holdover current.

7. Manufacturer shall submit the cover page of the manufacturer's UL Test Report to show compliance with UL 1449, Second Edition.

D. Equipment Certification: Items shall be listed by Underwriters' Laboratories as an assembly, shall bear the UL seal and be marked in accordance with referenced standard U.L. 1449, Revision 2.5. Protection modes shall be as follows: seven (7) modes Wye = L-N, L-G, N-G; six (6) modes Delta = L-G, L-L.

E. Surge suppression devices shall be installed and located in accordance with requirements of all applicable National Fire Protection Association (NFPA) Codes.

F. Manufacturer shall have a minimum of ten (10) years experience in the design, development, and manufacture of TVSS equipment and a minimum of one (1) year experience with the technology being submitted and installed in the field.

1.03 WARRANTY

A. All surge suppression devices shall be warranted for a minimum period of five (5) years with free replacement of the device by the Manufacturer if the device fails to perform for any reason within those five (5) years. Replacement shall be interpreted to include parts and shipping costs only.

B. It is the intent that failed devices shall be replaced at no cost to Owner throughout the 5-Year Warranty period.

1.04 CODES AND STANDARDS

A. The following standards and publications are referenced in various parts of this specification and shall apply.

1. UL 1449, Revision 2.5—Transient Voltage Surge Suppressors.

2. ANSI/IEEE C62.41-1991 (IEEE 587)—Guide for Surge Voltages in Low-Voltage AC Power Circuits.

3. ANSI/IEEE 62.11-1987—Standard for Testing Heavy Duty Service Entrance Surge Arrestor.

4. ANSI/IEEE C62.45-1992—IEEE Guide for Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits.

5. UL 1283—Standard for Electromagnetic Interference Filters.

1.05 REQUIRED SUPPRESSORS

A. Provide U.L. transient voltage surge suppression for the equipment described herein and as indicated on the drawings:

1. On electrical service entrance panels.

2. On distribution and branch circuit panels.

PART 2 PRODUCTS

2.01 SUPPRESSORS FOR ELECTRICAL SERVICE ENTRANCE PANELS, SECONDARY PANELS, OR BRANCH PANELS

A. Transient voltage surge suppressors shall be installed at the service entrance on the load side of the first main disconnect.

B. Suppressors shall be installed as close as feasible to the device being protected in a position which will minimize lead length between suppressor and the buses or control breaker to which the suppressor connects. Suppressor leads shall not extend beyond the suppressor manufacturer's recommended maximum lead length without specific approval of the Engineer.

C. Suppressors shall be designed for the specific type and voltage of electrical service and shall provide clamping action for line to neutral, line to ground, and neutral to ground.

D. Suppressors shall be designed to withstand a maximum continuous operating voltage of not less than 125% of nominal RMS line voltage for 120V and 115% of nominal RMS line voltage for 277V.

E. The Transient Voltage Surge Suppressor shall be life cycle tested as per ANSI/IEEE 62.45-1992 to withstand 1,000 test surges at 10 KA for service entrance devices and 1,000 test surges at 3 KA for all other applications without failure or degradation of UL 1449 clamp voltages by more than 10%.

F. Suppressors shall be UL 1449, Second Edition, listed for all specified suppression modes and shall be approved for the location in which they are installed.

G. Suppressors shall have an operating temperature range of -10 degrees C to +50 degrees C.

H. Provide visible/audible or redundant visible alarm systems to indicate when the unit is operable and when it has failed. The alarm system shall be provided for each coupling mode.

I. Suppressors shall be marked with their short circuit current rating as per Article 285.6 of the 2002 NEC and shall be rated as such to comply with the minimum A.I.C. rating of the service gear and or panelboard in which the TVSS is to be installed.

2.02 SUPPRESSOR CRITERIA: SUPPRESSORS SHALL MEET OR EXCEED THE FOLLOWING CRITERIA

A. Service Entrance (2 device types)

1. 277/480 Volt, 3 Phase, 4 Wire plus ground, Wye and 120/208 Volt, 3 Phase, 4 Wire plus ground, Wye.

a. Minimum Single Impulse Current Rating: 75,000 amperes per coupling mode (8/20 μs waveform).

b. Suppressors shall be failsafe, shall not holdover current, shall have repeated surge capability, shall be self-restoring, and shall be fully automatic.

c. The ANSI/IEEE C62.41.2—2002, Category B/'C Low' clamping voltage shall not exceed the following (not including any integral disconnects):

VOLTAGE	L-N	N-G	L-G
120/208	750	750	750
277/480	1200	1200	1200

d. Where direct connections are not provided, terminals shall be provided for all of the necessary power, neutral, and ground connections. Each terminal shall accommodate a minimum wire size of #8 AWG.

B. Distribution and Branch Circuit Panels: (1 device type)

1. 277/480 Volt, 3 Phase, 4 Wire plus ground, Wye.

a. Minimum Single Impulse Current Rating: 40,000 amperes per coupling mode (8/20 μs waveform).

b. Suppressors shall be failsafe, shall not holdover current, shall have repeated surge capability, shall be self-restoring, and shall be fully automatic.

c. The ANSI/IEEE C62.41.2-2002 Category B/'C Low' clamping voltage shall not exceed the following (not including any integral disconnects):

VOLTAGE	L-N	N-G	L-G
277/480	1200	1200	1200

d. Where direct connections are not provided, terminals shall be provided for all of the necessary power and ground connections. Each terminal shall accommodate a minimum wire size of #8 AWG.

2. 120/208 Volt, 3 Phase, 4 Wire plus ground, Wye (1 device type)

a. Minimum Single Impulse Current Rating: 40,000 amperes per coupling mode (8/20 μs waveform).

b. Suppressors shall be failsafe, shall not holdover current, shall have repeated surge capability, shall be self-restoring, and shall be fully automatic.

c. The ANSI/IEEE C62.41.2-2002 Category B/'C Low' clamping voltage shall not exceed the following (not including any integral disconnects):

VOLTAGE	L-N	N-G	L-G
120/208	750	750	750

d. Where direct connections are not provided, terminals shall be provided for all of the necessary power and ground connections. Each terminal shall accommodate a minimum wire size of #8 AWG.

e. All computer power panelboards shall have integral TVSS protection.

2.03 ACCEPTABLE MANUFACTURERS

A. PQ Protection.

B. Ditek Corporation.

C. Erico, Inc.

D. L.E.A. International.

E. Surge Suppression, Inc.

F. Advanced Protection Technologies (A.P.T.)

PART 3 EXECUTION

3.01 INSTALLATION OF SUPPRESSORS

A. Suppressors shall be installed as close as practical to the electric panel to be protected.

B. Suppressors shall be installed in a neat, workmanlike manner. Lead dress shall be as short and as straight as possible and be consistent with recommended industry practices for the system on which these devices are installed.

C. Equipment shall be installed following manufacturer's recommendations and guidelines in compliance with NEC Article 280/250 for grounding and bonding; NEC Article 110-9 and 110-10 for overcurrent protection.

D. All surge suppression devices specified in this specification section shall be designed and installed such that normal operation of the system shall not be impaired by the installation of these devices.

E. All TVSS devices shall be installed and connected to overcurrent devices. Tap or Buss connections are not acceptable.

***** END OF SECTION *****

NOTES AND DEFINITIONS

Saddle Calculations

1. Designs are based upon International Building Code IBC-2009, ASCE Standard ASCE7-05, Pressure Vessel Handbook (Twelfth Edition) by Eugene F. Megyesy, andPressure Vessel Design Manual by Dennis R. Moss (second edition).

2. Tank design must be completed prior to designing saddles. Minimum thicknesses and other requirements shall be per the applicable code.

3. The saddle design is valid for atmoshperic tanks without corrosion allowance only.

4. Saddle inputs must be completed and checked for validity before Foundation inputs can be completed and checked for validity. The Saddles can be designed without designing Foundations.

5. Tank head depth is assumed to be 0.625" for flat flanged heads. This is the distance from the outside of the head to the end of the radius portion of the head created by flanging the head. It can be set to zero as a minimum if desired.

6. The saddle location, "A", is the distance from the end of the Outer tank to the center of the saddle. It cannot exceed the diameter of the tank divided by 4. Nor can it be less than the width of the saddle wear plate divided by 2.

7. The saddle contact angle is the total angle of the saddle inself. This cannot be less than 120 nor more than 168.

8. The saddle width is the total width of the saddle above the base plate.

9. The saddle height is the distance from the center of the tank to the bottom of the base plate of the saddle.

10. The base plate thickness is the thickness of the bottom base plate.

11. The wear plate thickness is the thickness of the wear plate attached to the tank between the saddle and the tank.

12. The web plate thickness is the thickness of the back, vertical, curve cut plate that extends between the base plate and the wear plate.

13. The rib plate thickness is the thickness of the vertical ribs that are attached to the web plate and extend between the base plate and the wear plate. It is the same thickness as the web plate.

14. There is a rib plate at each of the outer edges of the web plate. In addition, Saddle Variables E1 and RS designate how many internal ribs must be added and their spacing respectively.

15. Saddle variable L specifies the minimum length the saddle wear plate must be for this design.

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16. The "Additional Loads" are loads other than the weight of the tank steel and contents. This would include loads imposed by platforms and equipment. If the loads are not centered on the tank, then multiply the load by 2 for maximum load per saddle.

17. The Yield Strength of the shell and saddle material is dependent upon the grade of material being used. For A36 material this would be 36000. The shell and saddle may be of different material.

18. The Modulus of Elasticity of the shell and saddle material is dependent upon whether it is carbon steel or stainless steel. For carbon steel it is usually set at 29000000.

19. The Wind Speed is obtained either from the customer or taken from ASCE7-05 Code or from local codes. This value ranges from 70 to 130.

20. The Exposure is determined by the area surrounding the tank. Exposure D is the worst case.
Exposure B has terrain with buiildings, forest or surface irregularities, covering at least 20% of the the ground level area extending 1 mile or more from the site
Exposure C has terrain which is flat and generally open, extending one-half mile or more from the site in any full quadrant.

Exposure D respresents the most severe exposure in areas with basic wind speeds of 80 miles per hour or greater and has terrain which is flat and unobstructed facing large bodies of water over one mile or more in width relative to any quadrant of the building site. Exposure D extends inland from the shoreline 1/4 mile.

21. The Seismic values are obtanined from the customer, taken from ASCE7-05, determined by some other method or from local codes. The Mapped Spectral Acceleration values are to be given by the customer or determined from ASCE7-05 based upon the installation location of the tank.

22. The wind calculation variables Ce,Cq, qs, Iw, and Pw are based upon ASCE7-02. The remainder of the values are from the Pressure Vessel Design Manual.

23. The seismic calculation variables are based upon ASCE7-05 or the Pressure Vessel Design Manual.

24. Check the "Validation Statements" for any conditions that exceed the limits. Review the notes attached to the particular statement for suggestions on correcting the condition.

25. All welds shall be continuous with 3/16" minimum leg size.

26. You must "Enable Macros" Excel will show a Security Warning indicating "Macros have been disable. Clicke the OPTIONS button and select "Enable this content"

26. NOTE: There is now a "Calculate" button that MUST be hit to cause enable a visual basic program. This was done to eliminate a problem with circular calculations.

Foundations

1. Designs are based upon 2009 International Building Code, ASCE7-05, Pressure Vessel Handbook (Twelfth Edition) by Eugene F. Megyesy, Pressure Vessel Design Manual by Dennis R. Moss, and Standard Handbook for Civil Engineers (3rd Edition) by Frederick S. Merritt.

2. Saddle inputs must be completed and checked for validity before Foundation inputs can be completed and checked for validity. The Saddles can be designed without designing Foundations.

3. The structure classification is set to III or IV per ASCE7-05.

4. Concrete compressive strength (f'c) shall be specified by the customer. Cannot exceed 4000 psi.

5. The allowable soil bearing shall be specified by the customer.

6. The rebar yield strength is set at 40000 psi minimum and cannot exceed 80000 psi.

7. Footing width and length must exceed the saddle base plate width and length.

8. Footing depth is to be determined by calculation and/or as specified by the customer or local codes. Frost depth must be taken into consideration.

9. Rebar spacing should be kept to 18" maximum for the footing. There must be a miniumum of 2 bars running in each direction.

10. Footing width and length must distribute the total load sufficiently to not exceed the soil bearing pressure.

11. Anchor bolt quantity is per saddle and must be an even number to distribute evenly either side of center line of the saddle. Anchor bolts are considered to be all in a row.

12. Anchor bolt length is the length embedded in the concrete. Additional length must be allowed for extending through the saddle base plate and allowing for nuts.

13. Any required corrosion allowance must be added to anchor bolt diameters.

14. Check the "Validation Statements" for any conditions that exceed the limits. Review the notes attached to the particular statement for suggestions on correcting the condition.

#6 REBAR

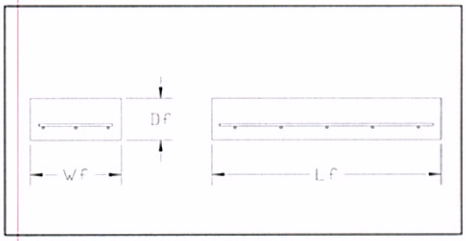
FOUNDATION DESIGN

Revised 02/2005

DATE: 8/26/2014 14:13

CONCRETE FOUNDATION REQUIREMENTS	
OCCUPANCY CATEGORY:	4
f '$_c$ (psi) :	4000
ALLOW. SOIL BEARING (SB) (psf) :	3000
REBAR F_y (psi) :	40000

CONCRETE FOOTING DIMENSIONS	
FOOTING WIDTH (W_f) (feet) :	1.50
FOOTING LENGTH (L_f) (feet) :	4.50
FOOTING DEPTH (D_f) (feet) :	0.50
REBAR SIZE (# 4,# 6, or # 8) :	6
REBAR MAX. SPACING (inches) :	18



ANCHOR BOLTS	
ANCHORS PER SUPPORT (A_n) :	2
ANCHOR BOLT DIA. (inches) (B_d) =	0.750
ANCHOR BOLT LEN. (inches) (B_l) =	4.000
ANCHOR BOLT SPACING (inches) (AB_s) =	32.000

Saddle footing Design DEC2009_June 2011C(1)(2).pdf

#6 Rebar

FOUNDATION DESIGN

Revised 02/2005

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MIN. FOOTING DIM. : 1.5 FT. WIDE X 4.5 FT. LONG X 0.5 FT. DEEP
W/ # 6 REBAR @ 18 IN. O.C. EACH WAY
df = 3 inches
USE (2) 0.75"ø x 4" EMBEDDED LENGTH HEADED ANCHOR BOLTS PER SUPPORT
DISTANCE FROM EDGE TO ANCHOR BOLT (ABe) = 11.8134 INCHES
ANCHOR BOLT SPACING (ABs) = 32 INCHES
ANCHOR BOLT DIAMETER IS THE MINIMUM REQUIRED FOR STRENGTH.
ANCHOR BOLT LENGTH IS EMBEDDED LENGTH ONLY. ACTUAL LENGTH VARIES.
ANY REQUIRED CORROSION ALLOWANCE WILL INCREASE THE BOLT DIAMETER.

#8 REBAR

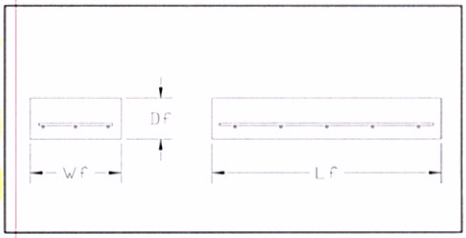
FOUNDATION DESIGN

Revised 02/2005

DATE: 9/2/2014 12:34

CONCRETE FOUNDATION REQUIREMENTS	
OCCUPANCY CATEGORY:	4
f'_c (psi) :	4000
ALLOW. SOIL BEARING (SB) (psf) :	3000
REBAR F_y (psi) :	40000

CONCRETE FOOTING DIMENSIONS	
FOOTING WIDTH (W_f) (feet) :	3.00
FOOTING LENGTH (L_f) (feet) :	13.00
FOOTING DEPTH (D_f) (feet) :	1.00
REBAR SIZE (# 4,# 6, or # 8) :	8
REBAR MAX. SPACING (inches) :	16



ANCHOR BOLTS	
ANCHORS PER SUPPORT (A_n) :	2
ANCHOR BOLT DIA. (inches) (B_d) =	0.750
ANCHOR BOLT LEN. (inches) (B_l) =	6.000
ANCHOR BOLT SPACING (inches) (AB_s) =	112.000

FG Saddle footing design IBC 2009-June 2010c (1) Foundation FOOT.pdf

#8 Rebar

FOUNDATION DESIGN

Revised 02/2005

DATE: 9/2/2014 12:34

MIN. FOOTING DIM. : 3 FT. WIDE X 13 FT. LONG X 1 FT. DEEP
W/ # 8 REBAR @ 16 IN. O.C. EACH WAY
df = 8 inches
USE (2) 0.75"ø x 6" EMBEDDED LENGTH HEADED ANCHOR BOLTS PER SUPPORT
DISTANCE FROM EDGE TO ANCHOR BOLT (ABe) = 18.3451 INCHES
ANCHOR BOLT SPACING (ABs) = 112 INCHES
ANCHOR BOLT DIAMETER IS THE MINIMUM REQUIRED FOR STRENGTH.
ANCHOR BOLT LENGTH IS EMBEDDED LENGTH ONLY. ACTUAL LENGTH VARIES.
ANY REQUIRED CORROSION ALLOWANCE WILL INCREASE THE BOLT DIAMETER.

TANK FOUNDATION (LONGITUDINAL FORCE)

DATE: 9/2/2014

DESIGN PER IBC-2009/ASCE7-05 and ACI-318-02				
DESIGN CONDITIONS			TANK INFORMATION	
WIND (MPH):	180		WEIGHT per SADDLE (WT) (lbs):	103000
EXPOSURE:	C			
SEISMIC ZONE:	5.6		LENGTH OF SUPPORT (L_S) (inches):	126.31
OCCUPANCY CATEGORY:	4			
f'_c (psi) :	4000			
ALLOW. SOIL BEARING (SB) (psf) :	3000			
REBAR F_y (psi) :	40000			
REBAR F_s (psi) :	20000			

FOOTING DESIGN			
WIND LOAD		SEISMIC LOAD	
(per ACI318-02 9.2) 1.6 * F_L (lbs) =	21523	(per ACI318-02 9.2) 1.0 * F_L (lbs) =	4614
H_{cgf} =	84.375	H_{cgf} =	84.375
M_{otf} (in-lbs) = F_L * H_{cgf} =	1816037	M_{otf} (in-lbs) = F_L * H_{cgf} =	389306.25
		Vertical Load due to Seismic Effect (V) =	1231
(WIND CONTROLS)			
FOOTING DIMENSIONS			
FOOTING WIDTH (W_f) (feet) :	3.00	A_f (feet^2) = W_f * L_f =	39.00
FOOTING LENGTH (L_f) (feet) :	13.00	S_f (feet^3) = W_f * L_f * L / 12 =	1141
FOOTING DEPTH (D_f) (feet) :	1.00	DISTANCE TO REBAR (d) (inches) =	8.00
		WT_f (lbs) = 150 * W_f * L_f * D_f =	5850
P_f (lbs/ft^2) =(WT+WTf)/A_f=	2791	MOMENT ARM (ARM_1) (long.) (feet) =	1.24
M_f (lbs/ft^2) = Motf / (12 * Sf) =	133	MOMENT ARM (ARM_2) (lat.) (feet) =	1.50
Q_{max} (lbs/ft^2) = P_f + M_f =	2924	<= 1.33 * SB = 3990 lbs/ft^2 O.K.	
Q_{min} (lbs/ft^2) = P_f - M_f =	2658	>= 0 (NO UPLIFT) O.K.	
Q_{min} (lbs/ft^2) (wind with tank empty) =	372		
		M_{ftg} (long.) (ft-lbs/ft) = Q_{max} * ARM_1^2 / 2 =	2237
		M_{ftg} (lat.) (ft-lbs/ft) = Q_{max} * ARM_2^2 / 2 =	3289
REBAR SIZE (# 4,# 6, or # 8) :	# 8	A_s (in^2/ft) = M_{ftg}*12/[(1.33 * F_s)*(.89)* d] =	0.2084
REBAR MAX. SPACING (inches) :	16	A_s (in^2/ft) = P_f*12/[(F_s)*(.89)* d] =	0.2352
		A_s (in^2/ft) (for temp. & shrinkage) =	0.2880
REBAR AREA (in^2/ft) :	0.5890	O.K.	

MIN. FOOTING DIM. : 3 FT. WIDE X 13 FT. LONG X 1 FT. DEEP

IBC2009-June 2010 C (6.pdf

TANK FOUNDATION (LONGITUDINAL FORCE)

DATE: 9/2/2014

W/ # 8 REBAR @ 16 IN. O.C. EACH WAY

ANCHORAGE REQUIREMENTS

ANCHORS PER SUPPORT (A_n) :	2		
AVE. DIST. TO ANCHORS (D_1) (in) :	351.00	N_u (lbs) =	0
EDGE DISTANCE (E_1) (in) :	18.35	V_u (lbs) =	9379

CHECK BOLT STRESSES PER IBC 2003/ASCE7-02 and ACI-318-02

ANCHOR BOLT DIA. (inches) (B_d) =	0.750	ANCHOR BOLT SPACING (inch) (AB_s) =	112.0000
ANCHOR BOLT LEN. (inches) (B_l) =	6.000		
AREA OF BOLT (in^2) (A_{se}) =	0.334	BEARING AREA OF BOLT (in^2) (A_{brg}) =	0.911
Anchor Bolt Min. Yield Strength:	30000	l =	6
ø = 0.75 for Bolt. For concrete =	0.7	ø = 0.65 for Bolt. For concrete =	0.7
f_{ut} (psi) =	57000	c_1 =	9

TENSION		SHEAR	
$N_s = A_{se} * f_{ut} * A_n / 2 =$	19038	$V_s = 0.6 * A_{se} * f_{ut} * A_n / 2 =$	11423
øNs =	14279	øVs =	7425
A_N / A_{NO} =	1.000	A_V / A_{VO} =	0.889
N_b (lbs) = $24 * (B_l)^{1.5} * (f'_c)^{0.5}$ =	22308	$V_b = 7*(l/B_d)^{0.2} * Bd^{0.5} * f'_c{}^{0.5} * c_1{}^{1.5}$ =	15691
øNcb =	15616	øVcbg =	9763
øNpn =	20406	øVcp =	31232
ADEQUATE FOR TENSION		ADEQUATE FOR SHEAR	

COMBINED TENSION AND SHEAR

øNn =	15616	øVn =	9763
Nu/øNn + Vu/øVn =	0.961	<= 1.2 O.K.	

USE (2) 0.75"ø x 6" EMBEDDED LENGTH HEADED ANCHOR BOLTS PER SUPPORT
ANCHOR BOLT DIAMETER IS THE MINIMUM REQUIRED FOR STRENGTH.
ANCHOR BOLT LENGTH IS EMBEDDED LENGTH ONLY. ACTUAL LENGTH VARIES.
ANY REQUIRED CORROSION ALLOWANCE WILL INCREASE THE BOLT DIAMETER.
EMBEDDED LENGTH IS FROM TOP OF CONCRETE TO START OF HEAD

TANK FOUNDATION (TRANSVERSE FORCE)

DATE: 9/2/2014

DESIGN PER IBC-2009/ASCE7-05 and ACI-318-02				
DESIGN CONDITIONS			TANK INFORMATION	
WIND (MPH):	180		WEIGHT per SADDLE (WT) (lbs):	103000
EXPOSURE:	C			
SEISMIC ZONE:	5.6		LENGTH OF SUPPORT (L_S) (inches):	126.31
OCCUPANCY CATEGORY:	4			
f '$_c$ (psi) :	4000			
ALLOW. SOIL BEARING (SB) (psf) :	3000			
REBAR F_y (psi) :	40000			
REBAR F_s (psi) :	20000			

FOOTING DESIGN				
WIND LOAD			SEISMIC LOAD	
(per ACI-318-02 9.2) 1.6 * F_t (lbs) =	15670		(per ACI-318-02 9.2) 1.0 * F_t (lbs) =	4614
H_{cgf} =	84.375		H_{cgf} =	84.375
M_{otf} (in-lbs) = F_t * H_{cgf} / 2 =	661066		M_{otf} (in-lbs) = F_t * H_{cgf} / 2 =	194653
			Vertical Load due to Seismic Effect (V) =	1231
(WIND CONTROLS)				
FOOTING DIMENSIONS				
FOOTING WIDTH (W_f) (feet) :	3.00		A_f (feet^2) = W_f * L_f =	39.00
FOOTING LENGTH (L_f) (feet) :	13.00		S_f (feet^3) = W_f * L_f^2 / 6 =	84.50
FOOTING DEPTH (D_f) (feet) :	1.00		DISTANCE TO REBAR (d) (inches) =	8.00
			WT_f (lbs) = 150 * W_f * L_f * D_f =	5850
P_f (lbs/ft^2) =(WT+WTf)/A_f=	2791		MOMENT ARM (ARM_1) (long.) (feet) =	1.24
M_f (lbs/ft^2) = Motf / (12 * Sf) =	652		MOMENT ARM (ARM_2) (lat.) (feet) =	1.50
Q_{max} (lbs/ft^2) = P_f + M_f =	3443		<= 1.33 * SB = 3990 lbs/ft^2 O.K.	
Q_{min} (lbs/ft^2) = P_f - M_f =	2139		>= 0 (NO UPLIFT) O.K.	
Q_{min} (lbs/ft^2) (wind with tank empty) =	-147			
			M_{ftg} (long.) (ft-lbs/ft) = Q_{max} * ARM_1^2 / 2 =	2635
			M_{ftg} (lat.) (ft-lbs/ft) = Q_{max} * ARM_2^2 / 2 =	3873
REBAR SIZE (# 4,# 6, or # 8) :	# 8		A_s (in^2/ft) = M_{ftg}·12/[(1.33 * F_s)*(.89)* d] =	0.2454
REBAR MAX. SPACING (inches) :	16		A_s (in^2/ft) = P_f·12/[(F_s)*(.89)* d] =	0.2352
REBAR AREA (in^2/ft) :	0.5890		O.K.	

MIN. FOOTING DIM. : 3 FT. WIDE X 13 FT. LONG X 1 FT. DEEP
W/ # 8 REBAR @ 16 IN. O.C. EACH WAY

IBC 2009-June 2010 c(1) 5.pdf

TANK FOUNDATION (TRANSVERSE FORCE)

DATE: 9/2/2014

ANCHORAGE REQUIREMENTS

ANCHORS PER SUPPORT (A_n) :	2		
AVE. DIST. TO ANCHORS (D_1) (in) :	120.31	N_u (lbs) =	0
EDGE DISTANCE (E_1) (in) :	18.35	V_u (lbs) =	6452

CHECK BOLT STRESSES PER IBC 2003/ASCE7-02 and ACI-318-02

ANCHOR BOLT DIA. (inches) (B_d) =	0.750	ANCHOR BOLT SPACING (inch) (AB_s) =	112.0000
ANCHOR BOLT LEN. (inches) (B_l) =	6.000		
AREA OF BOLT (in^2) (A_b) =	0.334	BEARING AREA OF BOLT (in^2) (A_{brg}) =	0.911
		l =	6
ø = 0.75 for Bolt. For concrete =	0.7	ø = 0.65 for Bolt. For concrete =	0.7
f_{ut} (psi) =	58000	c_1 =	9

TENSION		SHEAR	
$N_s = A_{se} * f_{ut} * A_n / 2 =$	19372	$V_s = 0.6 * A_{se} * f_{ut} * A_n / 2 =$	11623
øNs =	14529	øVs =	7555
A_N / A_{NO} =	1.000	A_V / A_{VO} =	0.889
N_b (lbs) = $24 * (B_l)^{1.5} * (f'_c)^{0.5}$ =	22308	$V_b = 7*(l/B_d)^{0.2} * B_b^{0.5} * f'^{0.5}_c * c_1^{1.5}$ =	15691
øNcb =	15616	øVcbg =	9763
øNpn =	20406	øVcp =	31232
ADEQUATE FOR TENSION		ADEQUATE FOR SHEAR	

COMBINED TENSION AND SHEAR

øNn =	15616	øVn =	9763
Nu/øNn + Vu/øVn =	0.661	<= 1.2 O.K.	

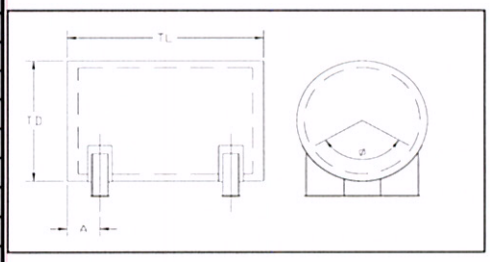
USE (2) 0.75"ø x 6" EMBEDDED LENGTH HEADED ANCHOR BOLTS PER SUPPORT
ANCHOR BOLT DIAMETER IS THE MINIMUM REQUIRED FOR STRENGTH.
ANCHOR BOLT LENGTH IS EMBEDDED LENGTH ONLY. ACTUAL LENGTH VARIES.
ANY REQUIRED CORROSION ALLOWANCE WILL INCREASE THE BOLT DIAMETER.
EMBEDDED LENGTH IS FROM TOP OF CONCRETE TO START OF HEAD

STRESSES IN FIREGUARD ON TWO SADDLES

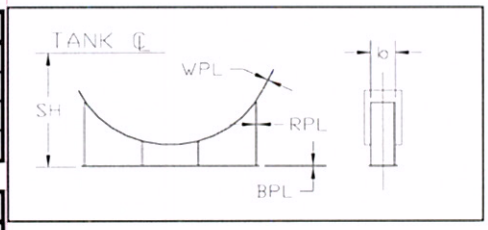
User instructions found here http://tinyurl.com/6ftrq75

IBC-2009/ASCE 7-05 DATE: 9/2/2014 10:25

INPUT VARIABLES	
Outer Tank Outside Diameter (feet) (TD)	10.500
Outer Tank Length (feet) (TL)	34.500
Inner Tank Diameter (feet)	10.000
Inner Tank Length (feet)	34.000
Depth of Head (inches) (HD)	0.625
Saddle Location (inches) (A)	31.500
Saddle Contact Angle (degrees) (ø)	168
Shell Thickness (inches) (Outer Tank) (ts)	0.250
Head Thickness (inches) (Outer Tank) (th)	0.313
Shell Thickness (inches) (Inner Tank) (tss)	0.250
Head Thickness (inches) (Inner Tank) (ths)	0.313
Saddle Width (inches) (b)	9.750
Additional Loads (lbs)	0
Total Load per Saddle (lbs)	103000
Yield Strength of Shell Material (psi)	36000
Modulus of Elasticity of Shell Material (psi)	29000000
Yield Strength of Saddle Material (psi)	36000
Modulus of Elasticity of Saddle Material (psi)	29000000



SADDLE INPUT VARIABLES	
Saddle Height (inches) (SH)	72.375
Base Plate Thickness (inches) (BPL)	0.750
Wear Plate Thickness (inches) (WPL)	0.375
Web Plate and Rib Thickness (inches) (RPL)	0.375



WIND AND SEISMIC REQUIREMENTS	
Wind Speed (mph)	180
Exposure (B,C,D)	C
Mapped Spectral Acceleration (S_s %)	5.6
Site Class	D
Occupancy Category (I, II, III, or IV)	III
WIND CALCULATIONS	
Structure Classification :	III
Velocity Pressure Exposure Coefficient (K_z)=	0.90
Directionality Factor (K_d)=	0.95
Topographic Factor (K_{zt})=	1.00
Importance Factor (I_w)=	1.15
q_z (psf) = 0.00256 * K_z * K_{zt} * K_d * V^2 * I_w =	81.55
Gust Factor (G) :	0.85
Net Force Coefficient (flat) (C_f) =	1.40
Net Force Coefficient (round) (C_{f1}) =	0.60
A_f (ft^2) =	106.62
A_{f1} (ft^2) =	362.25
F_L (lbs) = 1.3*q_z * G * C_f * A_f =	13452
F_t (lbs) = 1.3*q_z * G * C_{f1} * A_{f1} / 2 =	9794
Q_{wL} (lbs) =	105774
Q_{wt} (lbs) =	119969

Saddle Input 1.pdf

STRESSES IN FIREGUARD ON TWO SADDLES

User instructions found here http://tinyurl.com/6ftrq75

IBC-2009/ASCE 7-05 DATE: 9/2/2014 10:25

SEISMIC CALCULATION	
Mapped Spectral Acceleration (S_s %)	5.6
Seismic Importance Factor (I)	1.25
Site Class	D
Occupancy Category	III
Site Coefficient (F_a)	1.6
Maximum Spectral Response Acceleration (S_{MS})	0.090
Design Spectal Response Acceleration (S_{DS})	0.060
Reliability factor	1.0
Design Base Shear	
V = (per ASCE7-05 Eq. 15.4-5)	4614
E (longitudinal) =	2198
E (transverse) =	5228
Q_{sL} (lbs) =	104570
Q_{st} (lbs) =	106734

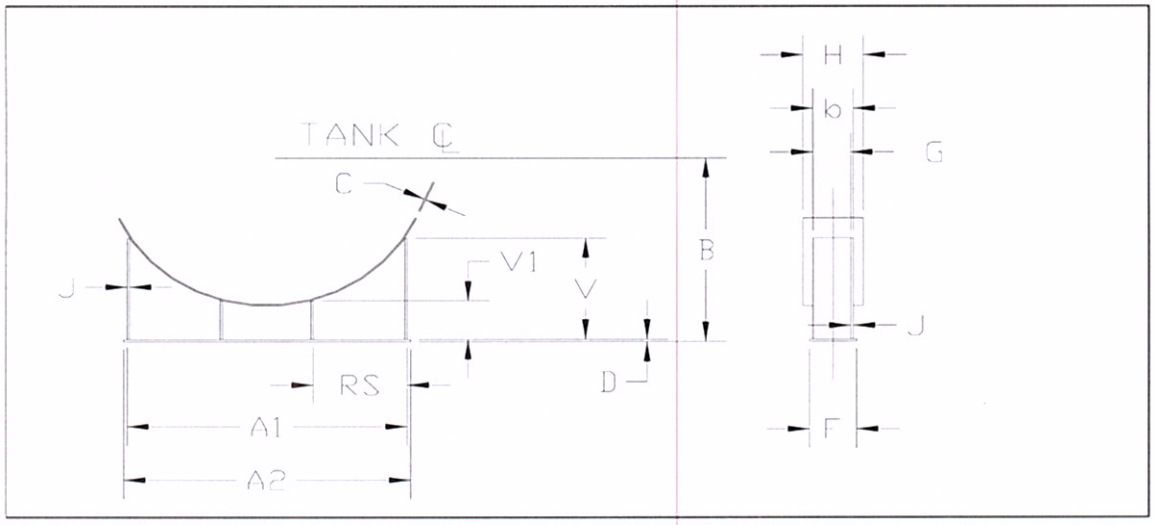
STRESSES IN FIREGUARD ON TWO SADDLES

User instructions found here http://tinyurl.com/6ftrq75

IBC-2009/ASCE 7-05 DATE: 9/2/2014 10:25

INVALIDATION STATEMENTS

SADDLE VARIABLES	
A2	126.3098
A1	125.3098
B	72.3750
C	0.3750
D	0.7500
E1	5.0000
F	10.7500
G	9.3750
H	15.9411
J	0.3750
RS	20.8225
V	65.0005
V1	23.6910
L	198.5094



STRESSES IN VESSEL ON TWO SADDLES

DATE: 9/2/2014 10:34

INPUT VARIABLES	
Tank Diameter (feet)	10.500
Tank Length (feet)	34.500
Total Load per Saddle (lbs)	103000
Depth of Head (inches)	0.625
Saddle Location (from tangent line)(inches)	31.500
Saddle Contact Angle (degrees)	168.000
Shell Thickness (inches)	0.250
Head Thickness (inches)	0.313
Saddle Width (inches)	9.750
Yield Strength of Shell Material (psi)	36000
Modulus of Elasticity of Shell Material (psi)	29000000

SADDLE INPUT VARIABLES	
Saddle Height (distance from center of tank to base plate) (inches)	72.375
Base Plate Thickness (inches)	0.750
Wear Plate Thickness (inches)	0.375
Web Plate and Rib Thickness (inches)	0.375
Yield Strength of Saddle Material (psi)	36000
Modulus of Elasticity of Saddle Material (psi)	29000000
INVALIDATION STATEMENTS	

Compressive Stress (psi)	6886

CALCULATE STRESSES	
Longitudinal Bending (psi):	
at the Saddles (Tension at the Top): S1:	-77
at the Saddles (Compression at the Bottom): S1c:	229
at Midspan (Tension at the Bottom,Compression at the Top): S1m:	2530
Tangential Shear (Saddles Close to Head A<=R/2) (psi)	
in Shell: S2s:	2197
in Head: S2h:	1757
Additional Stess in Head: S3:	1281
Circumferential Stresses (Unstiffeded and L<8R) (psi)	
at Horn of Saddle: S4:	-7770
at Bottom of Shell: S5:	-5399
at Top of Wear Plate: S4a:	-19703
Circumferential Stress due to Pressure (psi)	
Sp:	572
Spm:	572

VARIABLES	
Q	103000
R	63.0000
L	414.0000
H	0.6250
A	31.5000
ø	1.4661
ts	0.2500
tsm	0.2500
th	0.3125
b	9.7500
P	4.5465
K1	3.1400
K2	0.6540
K3	0.3190
K4	0.3360
K5	0.2450
K6	0.0056
K6a	0.0044
K7	0.6400
K8	1.0540
K11	0.2942
F_y	36000.0000
S	21600.0000
E	29000000.0000
e	0.7000

SADDLE VARIABLES	
A2	126.3098
A1	125.3098
B	72.3750
C	0.3750
D	0.7500
E1	5.0000
F	10.7500
G	9.3750
H	15.9411
J	0.3750
RS	20.8225
V	65.0005
V1	23.6910
L	198.5094

IBC 2009-June 2010c(1) 7. pdf

STRESSES IN VESSEL ON TWO SADDLES

DATE: 9/2/2014 10:34

Combined Stresses (psi)		Allowable Stresses (psi)		
S1+Sp:	495	S*e:	15120	O.K.
S1c+Sp:	801	Sc:	6886	O.K.
S1m+Spm:	3102	S*e or Sc:	6886	O.K.
S2s:	2197	0.8*S:	17280	O.K.
S2h:	1757	0.8*S:	17280	O.K.
S3+Sp:	1853	1.25*S:	27000	O.K.
S4:	-7770	1.5*S:	32400	O.K.
S4a:	-19703	1.5*S:	32400	O.K.
S5:	-5399	0.5*F_y:	18000	O.K.

DESIGN OF SADDLE PARTS

Calculate Area of Saddle (sq. inches)	
ABP:	8.0625
AWP:	5.9779
AWEB:	3.0938
ASHELL:	5.5330
AT:	22.6672

Calculate A*Y (cubic inches)	
AYBP:	3.0234
AYWP:	54.9219
AYWEB:	15.0820
AYSHELL:	52.5638
AYT:	125.5912

Calculate Centroid (inches)	
c:	5.5407

Calculate Moment of Inertia (inches^4)	
I:	400.78

Calculate Section Moduls (cubic inches)	
Sis:	98.1250
Sos:	72.3335

Calculate Splitting Force	
Fh:	30303
CG:	29.6386
M:	898126
Lc:	822
ðt:	1769
ðb:	12416
ðc:	2192

Calculate Allowable Stresses (psi)	
ßa:	23760
ßb:	14804

Calculate Combined Stresses (psi)	
ðcomb:	0.7451

STRESSES IN VESSEL ON TWO SADDLES

DATE: 9/2/2014 10:34

Check Base Plate Thickness	
Equivalent Width (inches): EW:	2.1919
Overall Length of Webs (L) =	190.18
Unit Linear Load (fu) =	541.58
l1 =	1.88
l2 =	8.88
Loads Moment (M) =	1126.28
Required Thickness (tb) =	0.5333

STRESSES IN VESSEL ON TWO SADDLES (SEISMIC/WIND)

DATE: 9/2/2014 10:59

INPUT VARIABLES	
Tank Diameter (feet)	10.500
Tank Length (feet)	18.000
Total Load per Saddle (lbs)	63393
Depth of Head (inches)	0.625
Saddle Location (from tangent line)(inches)	31.000
Saddle Contact Angle (degrees)	130.000
Shell Thickness (inches)	0.250
Head Thickness (inches)	0.313
Saddle Width (inches)	11.000
Yield Strength of Shell Material (psi)	36000
Modulus of Elasticity of Shell Material (psi)	29000000

SADDLE INPUT VARIABLES	
Saddle Height (distance from center of tank to base plate) (inches)	66.250
Base Plate Thickness (inches)	0.750
Wear Plate Thickness (inches)	0.313
Web Plate and Rib Thickness (inches)	0.313
Yield Strength of Saddle Material (psi)	36000
Modulus of Elasticity of Saddle Material (psi)	29000000

INVALIDATION STATEMENTS

VARIABLES	
Q	63393
R	63.0000
L	216.0000
H	0.6250
A	31.0000
ø	1.1345
ts	0.2500
tsm	0.2500
th	0.3125
b	11.0000
P	4.5465
K1	3.1400
K2	1.0220
K3	0.3190
K4	0.7220
K5	0.3620
K6	0.0110
K6a	0.0088
K7	0.7260
K8	0.6890
K11	0.2220
F_y	36000.0000
S	28728.0000
E	29000000.0000
e	0.7000

Compressive Stress (psi)	6886

CALCULATE STRESSES	
Longitudinal Bending (psi):	
at the Saddles (Tension at the Top): S1:	-94
at the Saddles (Compression at the Bottom): S1c:	426
at Midspan (Tension at the Bottom,Compression at the Top): S1m:	649
Tangential Shear (Saddles Close to Head A<=R/2) (psi)	
in Shell: S2s:	2906
in Head: S2h:	2324
Additional Stess in Head: S3:	1165
Circumferential Stresses (Unstiffeded and L<8R) (psi)	
at Horn of Saddle: S4:	-16847
at Bottom of Shell: S5:	-4029
at Top of Wear Plate: S4a:	-34928
Circumferential Stress due to Pressure (psi)	
Sp:	572
Spm:	572

SADDLE VARIABLES	
A2	115.1948
A1	114.1948
B	66.2500
C	0.3130
D	0.7500
E1	4.0000
F	12.0000
G	10.6870
H	17.1911
J	0.3130
RS	22.7764
V	38.7428
V1	12.0960
L	156.5250

IBC 2009 – June 2010C(1) Seismic

STRESSES IN VESSEL ON TWO SADDLES (SEISMIC/WIND)

DATE: 9/2/2014 10:59

Combined Stresses (psi)		Allowable Stresses (psi)	
S1+Sp:	478	S*e:	20110
S1c+Sp:	998	Sc:	6886
S1m+Spm:	1221	S*e or Sc:	6886
S2s:	2906	0.8*S:	22982
S2h:	2324	0.8*S:	22982
S3+Sp:	1737	1.25*S:	35910
S4:	-16847	1.5*S:	43092
S4a:	-34928	1.5*S:	43092
S5:	-4029	0.5*F_y:	18000

DESIGN OF SADDLE PARTS

Calculate Area of Saddle (sq. inches)	
ABP:	9.0000
AWP:	5.3808
AWEB:	0.6845
ASHELL:	5.8455
AT:	20.9109

Calculate A*Y (cubic inches)	
AYBP:	3.3750
AYWP:	16.6455
AYWEB:	1.2619
AYSHELL:	19.7287
AYT:	41.0111

Calculate Centroid (inches)	
c:	1.9612

Calculate Moment of Inertia (inches^4)	
I:	42.01

Calculate Section Moduls (cubic inches)	
Sis:	27.2984
Sos:	21.4180

Calculate Splitting Force	
Fh:	14073
CG:	15.9202
M:	224049
Lc:	555
ðt:	934
ðb:	10461
ðc:	1774

Calculate Allowable Stresses (psi)	
ßa:	31601
ßb:	13373

Calculate Combined Stresses (psi)	
ðcomb:	0.4932

STRESSES IN VESSEL ON TWO SADDLES (SEISMIC/WIND)

DATE: 9/2/2014 10:59

Check Base Plate Thickness	
Equivalent Width (inches): EW:	1.4804
Overall Length of Webs (L) =	177.69
Unit Linear Load (fu) =	356.76
l1 =	1.81
l2 =	10.19
Loads Moment (M) =	893.43
Required Thickness (tb) =	0.4119

K-Values

CONTACT ANGLE	K1	K2	K3	K4	K5	K6	K7	K8
120	3.14000	1.17100	0.31900	0.88000	0.40100	0.01300	0.76000	0.60300
122	3.14000	1.13900	0.31900	0.84600	0.39300	0.01260	0.75300	0.61800
124	3.14000	1.10800	0.31900	0.81300	0.38500	0.01220	0.74600	0.63400
126	3.14000	1.07800	0.31900	0.78100	0.37700	0.01180	0.73900	0.65100
128	3.14000	1.05000	0.31900	0.75100	0.36900	0.01140	0.73200	0.66900
130	3.14000	1.02200	0.31900	0.72200	0.36200	0.01100	0.72600	0.68900
132	3.14000	0.99600	0.31900	0.69400	0.35500	0.01060	0.72000	0.70500
134	3.14000	0.97100	0.31900	0.66700	0.34700	0.01020	0.71400	0.72200
136	3.14000	0.94600	0.31900	0.64100	0.34000	0.00980	0.70800	0.74000
138	3.14000	0.92300	0.31900	0.61600	0.33400	0.00940	0.70200	0.75900
140	3.14000	0.90000	0.31900	0.59200	0.32700	0.00900	0.69700	0.78000
142	3.14000	0.87900	0.31900	0.56900	0.32000	0.00880	0.69200	0.79600
144	3.14000	0.85800	0.31900	0.54700	0.31400	0.00860	0.68700	0.81300
146	3.14000	0.83700	0.31900	0.52600	0.30800	0.00840	0.68200	0.83100
148	3.14000	0.81800	0.31900	0.50500	0.30100	0.00820	0.67800	0.85300
150	3.14000	0.79900	0.31900	0.48500	0.29500	0.00800	0.67300	0.87600
152	3.14000	0.78100	0.31900	0.46600	0.28900	0.00768	0.66900	0.89400
154	3.14000	0.76300	0.31900	0.44800	0.28300	0.00736	0.66500	0.91300
156	3.14000	0.74600	0.31900	0.43000	0.27800	0.00704	0.66100	0.93300
158	3.14000	0.72900	0.31900	0.41300	0.27200	0.00672	0.65700	0.95400
160	3.14000	0.71300	0.31900	0.39600	0.26600	0.00640	0.65400	0.97600
162	3.14000	0.69800	0.31900	0.38000	0.26100	0.00620	0.65000	0.99400
164	3.14000	0.68300	0.31900	0.36500	0.25600	0.00600	0.64700	1.01300
166	3.14000	0.66800	0.31900	0.35000	0.25000	0.00580	0.64300	1.03300
168	3.14000	0.65400	0.31900	0.33600	0.24500	0.00560	0.64000	1.05400
170	3.14000	0.64000	0.31900	0.32200	0.24000	0.00540	0.63700	1.07900
172	3.14000	0.62700	0.31900	0.30900	0.23500	0.00520	0.63500	1.09700
174	3.14000	0.61400	0.31900	0.29600	0.23000	0.00500	0.63200	1.11600
176	3.14000	0.60100	0.31900	0.28300	0.22500	0.00480	0.62900	1.13700
178	3.14000	0.58900	0.31900	0.27100	0.22000	0.00460	0.62700	1.15800
180	3.14000	0.57700	0.31900	0.26000	0.21600	0.00440	0.62400	1.18300

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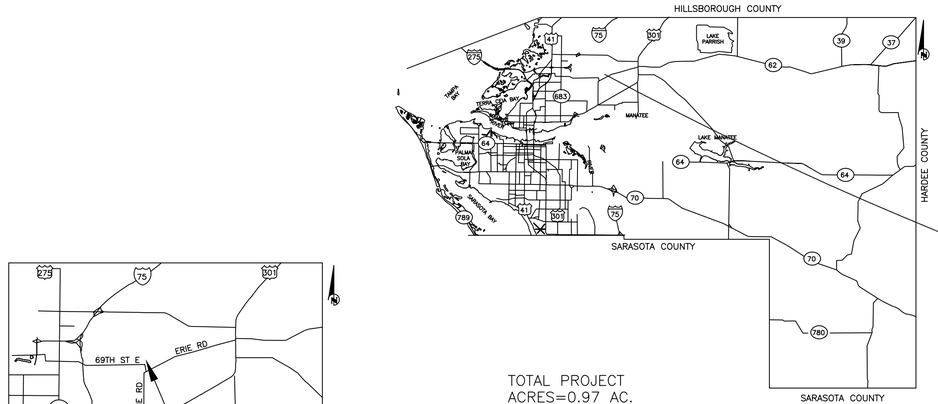
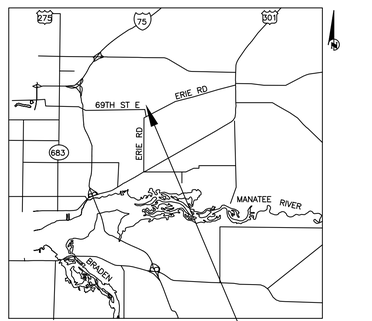
K9	K10	K11
0.34000	0.05300	0.20400
0.33800	0.05140	0.20760
0.33600	0.04980	0.21120
0.33400	0.04820	0.21480
0.33200	0.04660	0.21840
0.33000	0.04500	0.22200
0.32800	0.04340	0.22580
0.32600	0.04180	0.22960
0.32400	0.04020	0.23340
0.32200	0.03860	0.23720
0.32000	0.03700	0.24100
0.31600	0.03600	0.24460
0.31200	0.03500	0.24820
0.30800	0.03400	0.25180
0.30400	0.03300	0.25540
0.30000	0.03200	0.25900
0.29800	0.03080	0.26300
0.29600	0.02960	0.26700
0.29400	0.02840	0.27100
0.29200	0.02720	0.27500
0.29000	0.02600	0.27900
0.28600	0.02520	0.28280
0.28200	0.02440	0.28660
0.27800	0.02360	0.29040
0.27400	0.02280	0.29420
0.27000	0.02200	0.29800
0.26600	0.02100	0.30200
0.26200	0.02000	0.30600
0.25800	0.01900	0.31000
0.25400	0.01800	0.31400
0.25000	0.01700	0.31800

NORTH COUNTY FUEL DEPOT
ELECTRICAL PLANS



TOTAL PROJECT
ACRES=0.97 AC.



VICINITY MAP
N.T.S.

PROJECT DESCRIPTION

The proposed fuel depot facility will include:
Three (3) fuel pumps to accommodate two (2) diesel and one (1) gasoline vehicles at the same time,
One (1) "Diesel Exhaust Fluid" (urea) Dispenser for compliance with EPA emissions,
Two (2) above ground tanks:
- a 20,000 gallon tank with two compartments, one for gasoline (5,000 gallons), and one for diesel (15,000 gallons), and
- a 1,000 gallon DEF tank to support EPA compliance.

NO.	INDEX OF SHEETS
E0.0	COVER SHEET
E0.1	ELECTRICAL GENERAL NOTES AND LEGEND
E1.1	ELECTRICAL SITE PLAN
E2.1	NOT USED
E3.1	NOT USED
E4.1	NOT USED
E5.1	NOT USED
E6.1	NOT USED
E7.1	ELECTRICAL PANEL SCHEDULES & RISER DIAGRAM
E8.1	NOT USED
E9.1	NOT USED
E10.1	ELECTRICAL SPECIFICATIONS

PREPARED BY:

GLOBAL SANCHEZ, INC.
BUILDING SYSTEMS ENGINEERING
info@global-sanchez.com CA#: 6237

Bradenton: 816 Manatee Ave. E, Suite 18
Bradenton, FL 34208
Phone: 941-758-2551

Tampa: 3825 Henderson Blvd., Suite 103
Tampa, FL 33629
Phone: 813-281-0001

PROJECT:
MANATEE COUNTY
NORTH COUNTY FUEL DEPOT

PREPARED FOR:

REVISIONS:

#	DATE	DESCRIPTION
-	11.18.2014	ISSUED FOR PERMIT

DRAWN BY: N.HAVEN
CHECKED BY: P.FEIKEMA
GS JOB #: 4268.14.00
PLOT SCALE (WHEN PRINTED ON 24x36): AS NOTED

NOT VALID UNLESS SIGNED/DATED/SEALED HERE BY EOR

SHEET TITLE
COVER SHEET

SHEET NUMBER
E0.0

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG NUMBER	LAMPS QTY	LAMPS WATTS/TYPE	VOLTS	MOUNTING	COMMENTS
S	LITHONIA	CSX1 LED 60C 700 40K TFTM 120 RPA DBLXD	LED	134W/LED	120V	16' POLE	-
	APPROVED EQUAL FROM TAMPA BAY LIGHTING						
	APPROVED EQUAL FROM SESCO LIGHTING						
	APPROVED EQUAL FROM WESTERN FLORIDA LIGHTING						

ELECTRICAL SYMBOL LEGEND

SWITCHES

- $ — WATTSTOPPER AS-100 MANUAL/AUTOMATIC SWITCH. SWITCH CAN BE MANUALLY OPERATED AND IS ALSO CONTROLLED BY LIGHTING CONTROL CABINET FOR "SWEEP OFF" WITHIN A 24 HOUR PERIOD PER FLORIDA ENERGY CODE REQUIREMENTS. SWITCH HAS PUSHBUTTON OVERRIDE IF OCCUPANTS ARE PRESENT. RECESS MOUNT 48"AFF TO CENTER OF BACKBOX. "3" OR "4" INDICATES SWITCH IS USED FOR 3-WAY OR 4-WAY OPERATION, FOLLOW MANUFACTURER'S WIRING DIAGRAM FOR CONNECTION OF SWITCHES.
- "2P" INDICATES A 2-POLE SWITCH
- "3" INDICATES THREE-WAY SWITCH
- "4" INDICATES FOUR-WAY SWITCH
- "30A" INDICATES THE AMPERAGE OF THE SWITCH FOR NON-STANDARD SWITCHES
- D — "D" INDICATES DIMMER SWITCH
- "K" INDICATES KEY SWITCH. PROVIDE OWNER WITH (2) KEYS PER SWITCH. MATCH ANY EXISTING KEYED SWITCHES IF RENOVATION. VERIFY KEY TYPE (MANUFACTURER) WITH OWNER
- $M — "M" INDICATES THE SWITCH SHALL BE MOTOR DUTY RATED
- "MMS" INDICATES MANUAL MOTOR STARTER WITH SINGLE POLE, GUARD/LOCK- OFF, RED PILOT LIGHT AND THERMAL OVERLOAD IN NEMA-1 ENCLOSURE
- $OS — "OS" INDICATES OCCUPANCY SENSOR SWITCH (SENSOR SWITCH WSX PDT)
- "P" INDICATES SWITCH WITH PILOT LIGHT.
- "R" INDICATES DEVICE SHALL BE A RED COLOR. DEVICE IS CONNECTED TO A CIRCUIT FED FROM A GENERATOR (IF APPLICABLE).
- $a — LOWER CASE LETTER (i.e. "a") INDICATES THE FIXTURE(S) CONTROLLED BY THE SWITCH.

LIGHTING FIXTURES (REFER TO THE "LIGHTING FIXTURE SCHEDULE")

- A2 / b — 2' x 4' FLUORESCENT LIGHT FIXTURE (SEE LIGHT FIXTURE SCHEDULE)
  NOTE: THE FOLLOWING ABBREVIATIONS APPLY TO LIGHTING FIXTURES WHERE INDICATED:
  UPPER CASE LETTER/NUMBER (i.e. "A2") INDICATES FIXTURE TYPE.
  LOWER CASE LETTER (i.e. "b") INDICATES CONNECTION TO INDICATED SWITCH.
- EM — NOTE: THE FOLLOWING ABBREVIATIONS APPLY TO LIGHTING FIXTURES WHERE INDICATED:
  "EM" INDICATES LIGHT FIXTURE WITH EMERGENCY BATTERY PACK.
- FLUORESCENT LIGHT FIXTURE (SEE LIGHT FIXTURE SCHEDULE)
- DOWNLIGHT
- WALL SCONCE
- EXIT SIGN WITH BATTERY PACK MOUNTED 7'-6" AFF, OR AS INDICATED. FACES AND ARROWS AS INDICATED. CONNECT FIXTURE TO LIGHTING CIRCUIT SERVING THE AREA, AHEAD OF ANY SWITCHING OR CONTROLS.
- EMERGENCY EGRESS LIGHTING UNIT WITH BATTERY PACK MOUNTED 7'-6" AFF OR AS INDICATED. CONNECT FIXTURE TO LIGHTING CIRCUIT SERVING THE AREA, AHEAD OF ANY SWITCHING OR CONTROLS.
- EXIT SIGN AND EMERGENCY EGRESS LIGHTING COMBO UNIT WITH BATTERY PACK MOUNTED 7'-6" AFF. CONNECT FIXTURE TO LIGHTING CIRCUIT SERVING THE AREA, AHEAD OF ANY SWITCHING OR CONTROLS.
- PASSIVE INFRARED (PIR) OCCUPANCY SENSOR. 360°. 450 SQ. FT. COVERAGE. LEVITON #OSC04-INW. CONNECT TO LOCAL POWER PACK.
- MULTI-TECHNLOGY (PIR & ULTRASONIC) OCCUPANCY SENSOR. 360°. 1000 SQ. FT. COVERAGE. SENSOR SWITCH CM-PDT-1D. CONNECT TO LOCAL POWER PACK.
- EXT. — EXTERIOR PASSIVE INFRARED (PIR) OCCUPANCY SENSOR SBG-10-OEX. CONNECT TO LOCAL POWER PACK. PROVIDE BOX FOR CEILING MOUNTING.
- PP — OCCUPANCY SENSOR POWER PACK. 20A @120/277VAC. PROVIDE QUANTITY AS NEEDED. SENSOR SWITCH PP-20-2P. CONNECT TO LOCAL OCCUPANCY SENSORS.
- PS — LED POWER SUPPLY (TECLED MODEL: VBS-12060D024)

COMMUNICATIONS

- 1-GANG DEEP BOX FOR TELEPHONE OUTLET, RECESS MOUNT 18" TO CENTER OF BACKBOX AFF, ABOVE COUNTER OR AS NOTED. INSTALL 3/4" CONDUIT WITH BUSHINGS AND PULL STRING STUBBED INTO ACCESSIBLE CEILING SPACE ABOVE BACKBOX. INSTALL BLANK COVERPLATE. NUMBER OF PHONE JACKS AS INDICATED OR INSTALL BLANK COVERPLATE. 'W' INDICATES PHONE WILL BE WALL MOUNTED, MOUNT AT 48" AFF TO CENTER OF BACKBOX AND INSTALL WALL PHONE PLATE.
- TV — (2) GANG DEEP BOX FOR DECORA STYLE DUPLEX RECEPTACLE AND TELEVISION OUTLET. COORDINATE MOUNTING HEIGHT AND LOCATION. INSTALL 3/4" CONDUIT FOR LOW VOLTAGE WIRING WITH BUSHINGS AND PULL STRING STUBBED INTO ACCESSIBLE CEILING SPACE ABOVE BACKBOX. INSTALL DECORA COVERPLATE.
- 1-GANG DEEP BOX FOR TELEPHONE / DATA OUTLET, RECESS MOUNT 18" TO CENTER OF BACKBOX AFF, ABOVE COUNTER OR AS NOTED. INSTALL 3/4" CONDUIT WITH BUSHINGS AND PULL STRING STUBBED INTO ACCESSIBLE CEILING SPACE ABOVE BACKBOX. INSTALL BLANK COVERPLATE.
- CABINET. SEE PLANS AND SPECIFICATIONS FOR USAGE AND REQUIREMENTS.

MISCELLANEOUS

- 1 — KEYED NOTE INDICATOR. REFER TO THE "KEYED NOTES" WHERE INDICATED.
- R T — EXHAUST FAN.
  'R' SYMBOL INDICATES TO PROVIDE AND INSTALL 10 MINUTE TIME DELAY OFF RELAY. EXHAUST FAN SHALL OPERATE FOR 10 MINUTES AFTER LIGHTING SWITCH IS TURNED OFF. CONNECT HOT LEAD FROM AHEAD OF SWITCH TO RELAY FOR DELAYED OPERATION AND SWITCH LEG TO RELAY FOR NORMAL OPERATION.
  'T' SYMBOL INDICATES TO PROVIDE AND INSTALL 277V-120V TRANSFORMER. WATTAGE OF TRANSFORMER VA SHALL BE A MINIMUM 20% GREATER THAN EXHAUST FAN POWER REQUIREMENTS, COORDINATE WITH MECHANICAL CONTRACTOR.
- MD — MOTORIZED DAMPER. PROVIDE POWER AND MAKE CONNECTIONS AS INDICATED. COORDINATE WITH MECHANICAL CONTRACTOR.
- SP — CEILING MOUNTED SPEAKER LOCATIONS ON A/V SYSTEM

ABBREVIATIONS

A	AMPERE	NF	NON-FUSED
AFF	HEIGHT ABOVE FINISHED FLOOR	P	POLE
AFG	HEIGHT ABOVE FINISHED GRADE	PH	PHASE
ETR	EXISTING TO REMAIN	REL	RELOCATED
EXT	EXTERIOR	REM	TO BE REMOVED
GFI	GROUND FAULT CIRCUIT INTERRUPTING TYPE WIRING DEVICE OR CIRCUIT BREAKER	REP	REPLACE WITH NEW
		TBR	TO BE RELOCATED
KW	KILOWATT	U.N.O.	UNLESS NOTED OTHERWISE
LTG	LIGHTING	VA	VOLT AMPERE (POWER)
MTR	MOTOR	WP	WEATHERPROOF ENCLOSURE
N.I.C.	NOT IN CONTRACT	XFMR	TRANSFORMER
		+48"	DEVICE MOUNTED AT HEIGHT INDICATED

WIRING DEVICES

NOTE: THE FOLLOWING ABBREVIATIONS APPLY TO WIRING DEVICES WHERE INDICATED:
'WP' INDICATES WEATHERPROOF WHILE-IN-USE ENCLOSURE. ENCLOSURE SHALL HAVE LOCKABLE COVER.
'EWC' INDICATES DEVICE MOUNTED BEHIND ELECTRIC WATER COOLER ENCLOSURE. COORDINATE DEVICE LOCATION WITH PLUMBING CONTRACTOR AND APPROVED SHOP DRAWINGS PRIOR TO ROUGH-IN.
'H' INDICATES HORIZONTALLY MOUNTED WIRING DEVICE.
'R' INDICATES DEVICE SHALL BE A RED COLOR. DEVICE IS CONNECTED TO A CIRCUIT FED FROM THE GENERATOR (IF APPLICABLE).
"FD" INDICATES RECEPTACLE MOUNTED IN FLOOR DUCT. INSTALL ACCESSORIES FOR MOUNTING OF RECEPTACLE IN FLOOR DUCT SYSTEM.

- 20 AMP SIMPLEX RECEPTACLE, RECESS MOUNT 18" AFF TO CENTER OF BACKBOX OR AT HEIGHT INDICATED.
- 20 AMP DUPLEX RECEPTACLE, RECESS MOUNT 18" AFF TO CENTER OF BACKBOX.
- 20 AMP DUPLEX RECEPTACLE, RECESS MOUNT AT HEIGHT INDICATED OR ABOVE COUNTER, CASEWORK, ETC. COORDINATE MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS AND EXISTING CONDITIONS PRIOR TO ROUGH-IN.
- AFCI — 20 AMP DUPLEX RECEPTACLE WITH ARC FAULT CIRCUIT INTERRUPTER (AFCI) PROTECTION, RECESS MOUNT AT HEIGHT INDICATED OR ABOVE COUNTER, CASEWORK, ETC. COORDINATE MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS AND EXISTING CONDITIONS PRIOR TO ROUGH-IN.
- AFCI — 20 AMP DUPLEX RECEPTACLE WITH ARC FAULT CIRCUIT INTERRUPTER (AFCI) PROTECTION, RECESS MOUNT 18" AFF TO CENTER OF BACKBOX. 1 OF 2 RECEPTACLES IS SWITCHED, REMOVE JUMPER BETWEEN OUTLETS.
- AFCI — 20 AMP DUPLEX RECEPTACLE WITH ARC FAULT CIRCUIT INTERRUPTER (AFCI) PROTECTION, RECESS MOUNT 18" AFF TO CENTER OF BACKBOX.
- 20 AMP DOUBLE DUPLEX (QUAD) RECEPTACLE WITH COMMON COVER PLATE, RECESS MOUNT 18" AFF TO CENTER OF BACKBOX.
- 20 AMP DOUBLE DUPLEX (QUAD) RECEPTACLE WITH COMMON COVER PLATE, RECESS MOUNT ABOVE COUNTER, CASEWORK, ETC OR AT HEIGHT INDICATED, COORDINATE MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS AND CONDITIONS PRIOR TO ROUGH-IN.
- 20 AMP DUPLEX RECEPTACLE, RECESS MOUNT 18" AFF TO CENTER OF BACKBOX. 1 OF 2 RECEPTACLES IS SWITCHED, REMOVE JUMPER BETWEEN OUTLETS.
- 20 AMP DUPLEX RECEPTACLE. RECESS FLUSH WITH FLOOR IN SINGLE GANG FLOOR BOX. COVER SHALL BE BRASS WITH HINGED LID FOR EACH OUTLET OF RECEPTACLE.
- 20 AMP DOUBLE DUPLEX (QUAD) RECEPTACLE. RECESS FLUSH WITH FLOOR IN DOUBLE GANG FLOOR BOX. COVER SHALL BE BRASS WITH HINGED LID FOR EACH OUTLET OF RECEPTACLES.
- GFI — GFCI TYPE SIMPLEX RECEPTACLE MOUNTED AT HEIGHT OR AS INDICATED. VERIFY RATING AND NEMA CONFIGURATION FOR EQUIPMENT TO BE CONNECTED.
- GFI — 20 AMP GFCI TYPE DUPLEX RECEPTACLE, RECESS MOUNT 18" AFF TO CENTER OF BACKBOX.
- GFI — 20 AMP GFCI TYPE DUPLEX RECEPTACLE, RECESS MOUNT ABOVE SINK, COUNTER, CASEWORK, ETC. OR AT HIEGHT INDICATED. COORDINATE MOUNTING HEIGHT WITH ARCHITECTURAL ELEVATIONS AND CONDITIONS PRIOR TO ROUGH-IN.
- GFI — 20 AMP GFCI TYPE DOUBLE DUPLEX (QUAD) RECEPTACLE WITH COMMON COVER PLATE, RECESS MOUNT 18" AFF TO CENTER OF BACKBOX.
- MULTI-POLE RECEPTACLE FOR APPLIANCE MOUNTED AS INDICATE. COORDINATE AMPERAGE RATING, POLES, NEMA CONFIGURATION, ETC. WITH EQUIPMENT TO BE CONNECTED.
- MULTI-POLE SPECIALTY RECEPTACLE MOUNTED AS INDICATED. COORDINATE AMPERAGE RATING, POLES, NEMA CONFIGURATION, ETC. WITH EQUIPMENT TO BE CONNECTED.
- 20 AMP DUPLEX RECEPTACLE, RECESS MOUNT HORIZONTALLY AT HEIGHT INDICATED.
- 20 AMP DOUBLE DUPLEX MOUNTED 18" AFF, ABOVE COUNTER, OR AT HEIGHT INDICATED (INDICATES RECEPTACLE COORDINATED WITH DATA OUTLET FOR COMPUTER USE).
- 20 AMP DOUBLE DUPLEX (QUAD) RECEPTACLE MOUNTED 18" AFF, ABOVE COUNTER, OR AT HEIGHT INDICATED (INDICATES RECEPTACLE COORDINATED WITH DATA OUTLET FOR COMPUTER USE).
- POWER POLE. 2-SECTION (POWER AND COMMUNICATIONS), 2" SQUARE METALLIC, BRUSHED ALUMINUM FINISH. DEVICES MOUNTED AT POLE AS SHOWN. POLE SHALL EXTEND FROM FLOOR TO CEILING, SECURE TO CEILING.
- 20 AMP DUPLEX RECEPTACLE, FLUSH MOUNT AT CEILING. SUPPORT BACKBOX FROM STRUCTURE, NOT GRID.
- 2-SECTION FLOOR BOX WITH DUPLEX RECEPTACLE AND DATA SECTION. FLOOR BOX SHALL BE FLUSH WITH FLOOR WITH CARPET/TILE PLATE AND TRAP DOOR FOR WIRING OUT OF BOX.
- J — JUNCTION BOX.
- DC — DROP CORD. RECEPTACLE AND BOX SUSPENDED FROM JUNCTION BOX AT CEILING WITH S/O CORD. PROVIDE STRAIN RELIEF AT EACH END OF CORD. RECEPTACLE SHALL BE TYPE OF DEVICE SHOWN.
- PLUGMOLD WITH RECEPTACLES 12" ON-CENTER. PLUGMOLD SHALL BE NON-METALLIC, 2-PIECE. MOUNT AS INDICATED. VERIFY COLOR OF FINISH.

POWER DISTRIBUTION (REFER TO THE "ELECTRICAL RISER DIAGRAM")

- PANEL — PANELBOARD, RECESS MOUNT IN FINISHED SPACES, SURFACE MOUNT IN BACK OF HOUSE. REFER TO THE "PANELBOARD SCHEDULE".
- FEEDER OR BRANCH CIRCUIT RACEWAY CONCEALED IN WALL, CEILING.
- FEEDER OR BRANCH CIRCUIT RACEWAY CONCEALED UNDER FLOOR, IN SLAB OR BELOW GRADE.
- DISCONNECT SWITCH. PROVIDE DISCONNECT SWITCH AS INDICATED ON THE SCHEDULES. REFER TO PLANS AND SCHEDULES FOR ADDITIONAL REQUIREMENTS. FUSES SHALL BE DUAL ELEMENT TIME DELAY. VERIFY NAMEPLATE RATINGS OF FRAME SIZE AND FUSING OF THE ACTUAL EQUIPMENT TO BE INSTALLED.
  DRY-TYPE VENTILATED TRANSFORMER. SEE SPECIFICATIONS, PLANS AND RISER FOR REQUIREMENTS. TRANSFORMERS SHALL BE NEMA 1 UNLESS AT THE EXTERIOR OR IN AREAS WHERE WATER MAY BE PRESENT. MOUNT ON 4" HOUSE KEEPING PAD BOLTED TO PAD. MAINTAIN REQUIRED CLEARANCE FROM WALLS OR OBSTRUCTIONS FOR VENTILATION.
- GROUND TO METAL FRAME OF BUILDING, SLAB STEEL, OTHER MADE ELECTRODES, AND METAL UNDERGROUND WATER PIPE. PROVIDE A MINIMUM OF (2) 3/4" DIA, 10 FOOT LONG COPPER CLAD GROUND RODS LOCATED AT LEAST 6 FEET APART. ALL CONCEALED CONNECTIONS SHALL BE EXOTHERMICALLY WELDED. INTERIOR GROUND RODS SHALL STUB ABOVE FLOOR AT LOCATIONS NOT INTERFERING WITH FOOT TRAFFIC. LOCATE EXTERIOR GROUND ROD ASSEMBLY IN LANDSCAPE AREA OR PROVIDE WELL FOR ACCESS TO EACH GROUND ROD IF ASSEMBLY IS LOCATED IN HARD SURFACE AREAS, SUCH AS CONCRETE, ASPHALT, ETC. PROVIDE BOLTED PRESSURE CLAMP WITH AT LEAST TWO BOLTS ON RODS IN TEST WELLS. ALL GROUND ROD LOCATIONS SHALL BE ACCESSIBLE.
- VFD — VARIABLE FREQUENCY DRIVE. REFER TO SPECIFICATIONS, AND FLOOR PLANS FOR ADDITIONAL ELECTRICAL REQUIREMENTS. VFD SUPPLIED BY MECHANICAL CONTRACTOR (U.N.O.) AND INSTALLED BY ELECTRICAL CONTRACTOR. ALL CONNECTIONS TO VFD, DISCONNECT AND EQUIPMENT SERVED SHALL BE BY THE ELECTRICAL CONTRACTOR.
  CIRCUIT SHALL UTILIZE METAL CONDUIT TO MINIMIZE RFI NOISE.
- PANEL HOMERUN/CIRCUIT
- LP-1 — PANEL DESIGNATION/CIRCUIT NUMBER

NOTE:
NOT ALL SYMBOLS SHOWN ON LEGEND ARE USED ON FLOOR PLANS.

SPECIAL INFORMATIONAL NOTE:

THIS DRAWING PREPARED FOR TENANT IMPROVEMENTS TO AN EXISTING BUILDING OR BUILDING CONSTRUCTED BY OTHERS

IT IS UNDERSTOOD THAT ANY WARRANTY INFORMATION CONCERNING EQUIPMENT INSTALLED MUST BE FORWARDED TO THE OWNER AND THAT ANY AND ALL CONTRACTORS SHALL GUARANTEE THEIR WORK FOR A PERIOD OF ONE YEAR FROM THE DATE OF OWNERS ACCEPTANCE.

ENGINEER IS NOT RESPONSIBLE FOR MATERIALS, METHODS, INSTALLATION, AND CONSTRUCTION WHICH DEVIATE FROM CONSTRUCTION DOCUMENTS AND SPECIFICATIONS.

GENERAL NOTES

GENERAL NOTES APPLY TO ALL ELECTRICAL SHEETS

1. DO NOT SCALE FROM THESE DRAWINGS.
2. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC).
3. SPECIFICALLY, ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH NEC ARTICLE 514 - MOTOR FUEL DISPENSING FACILITIES AND ARTICLE 515 - BULK STORAGE PLANTS.
4. ELECTRICAL CONTRACTOR SHALL COORDINATE WORK WITH ALL OTHER TRADES TO ASSURE PROPER CLEARANCES FOR EQUIPMENT AND TO KEEP THE JOB PROGRESSING.
5. DRAWINGS ARE BASED ON FIELD OBSERVATION AND EXISTING RECORD DOCUMENTS. REPORT ANY DISCREPANCIES TO THE ARCHITECT/ ENGINEER BEFORE DISTURBING EXISTING INSTALLATION.
6. USE 10 AWG CU. CONDUCTORS FOR 20 AMPERE, 120 VOLT BRANCH CIRCUITS LONGER THAN 75 FEET. USE 10 AWG CU. WHERE WIRE SIZE IS INCREASED IN SIZE FOR VOLTAGE DROP, E.G SHALL BE INCREASED PROPORTIONATELY. PER NEC 250.122 (B).
7. WHERE DISCONNECTING MEANS IS NOT PROVIDED "WITHIN SIGHT" OF EQUIPMENT, THE OVERCURRENT DEVICE SERVING SUCH EQUIPMENT SHALL HAVE APPROVED "LOCKED-OFF" PROVISION.
8. CONDUIT RUNS SHOWN ARE DIAGRAMMATIC IN NATURE. CONTRACTOR SHALL BE RESPONSIBLE FOR SIZING AND LOCATING PULL BOXES PER NEC.
9. PROVIDE ALL LIGHT FIXTURES WITH INTEGRAL FUSING.
10. RECEPTACLES SHALL BE G.F.C.I. TYPE.

CONDUIT AND CONDUCTOR SCHEDULE

C.B.	POLES	WIRE SIZE (TYPE THW)	CONDUIT	PHASE
20A	1	2-#12, 1-#12 E.G.	3/4"	1ø 2W
	2	2-#12, 1-#12 E.G.		1ø 2W
	3	3-#12, 1-#12 E.G.		3ø 3W
	3	3-#12, 1-#12 N., 1-#12 E.G.		3ø 4W
25A	1	2-#10, 1-#10 E.G.	3/4"	1ø 2W
	2	2-#10, 1-#10 E.G.		1ø 2W
	3	3-#10, 1-#10 E.G.		3ø 3W
	3	3-#10, 1-#10 N., 1-#10 E.G.		3ø 4W
30A	1	2-#10, 1-#10 E.G.	3/4"	1ø 2W
	2	2-#10, 1-#10 E.G.		1ø 2W
	3	3-#10, 1-#10 E.G.		3ø 3W
	3	3-#10, 1-#10 N., 1-#10 E.G.		3ø 4W
35A	3	3-#8, 1-#10 E.G.	1"	3ø 3W
	3	3-#8, 1-#8 N., 1-#10 E.G.		3ø 4W
40A	2	2-#8, 1-#10 E.G.	1"	1ø 2W
	3	3-#8, 1-#10 E.G.		3ø 3W
	3	3-#8, 1-#8 N., 1-#10 E.G.		3ø 4W
45A	2	2-#8, 1-#10 E.G.	1"	1ø 2W
	3	3-#8, 1-#10 E.G.		3ø 3W
	3	3-#8, 1-#8 N., 1-#10 E.G.		3ø 4W
50A	2	2-#8, 1-#10 E.G.	1"	1ø 2W
	3	3-#8, 1-#10 E.G.		3ø 3W
	3	3-#8, 1-#8 N., 1-#10 E.G.		3ø 4W
60A	2	2-#6, 1-#10 E.G.	1"	1ø 2W
	3	3-#6, 1-#10 E.G.		3ø 3W
	3	3-#6, 1-#6 N., 1-#10 E.G.	1 1/4"	3ø 4W
70A	2	2-#4, 1-#8 E.G.	1"	1ø 2W
	3	3-#4, 1-#8 E.G.	1 1/4"	3ø 3W
	3	3-#4, 1-#4 N., 1-#8 E.G.		3ø 4W
80A	2	2-#4, 1-#8 E.G.	1"	1ø 2W
	3	3-#4, 1-#8 E.G.	1 1/4"	3ø 3W
	3	3-#4, 1-#4 N., 1-#8 E.G.		3ø 4W
90A	2	2-#3, 1-#8 E.G.	1 1/4"	1ø 2W
	3	3-#3, 1-#8 E.G.		3ø 3W
	3	3-#3, 1-#3 N., 1-#8 E.G.		3ø 4W
100A	2	2-#3, 1-#8 E.G.	1 1/4"	1ø 2W
	3	3-#3, 1-#3 N., 1-#8 E.G.		3ø 3W
	3	3-#3, 1-#3 N., 1-#8 E.G.		3ø 4W

NOTES:
1. ALL CONDUCTORS SHALL BE COPPER
2. ALL CONDUIT SHALL HAVE EQUIPMENT GROUNDING CONDUCTOR INSTALLED.
3. CONDUIT BELOW GRADE OUTSIDE OF BUILDING SHALL BE 1" MINIMUM.
4. SIZING OF CONDUCTORS SHALL BE ALTERED FOR DERATING PER N.E.C. OR VOLTAGE DROP CONSIDERATIONS.
5. SEE RISER DIAGRAM FOR SIZING OF CIRCUITS GREATER THAN 100A.
6. USE #10 AWG, COPPER CONDUCTORS FOR 20 AMPERE, 120 VOLT BRANCH CIRCUITS LONGER THAN 75 FEET. USE #10 AWG, COPPER CONDUCTORS FOR 20 AMPERE, 277 VOLT BRANCH CIRCUITS LONGER THAN 200 FEET. WHERE WIRE SIZE IS INCREASED IN SIZE FOR VOLTAGE DROP, EQUIPMENT GROUND SHALL BE INCREASED PROPORTIONATELY. PER NEC 250.122 (B).
7. WHERE MC CABLE IS ALLOWED BY THE AUTHORITY HAVING JURISDICTION, THE CONDUCTORS FOR MC CABLE SHALL BE THHN, JACKET SHALL BE THE MANUFACTURER'S STANDARD SIZE FOR CONDUCTORS UTILIZED.

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PROJECT:

MANATEE COUNTY
NORTH COUNTY FUEL DEPOT

PREPARED FOR:

Manatee County FLORIDA

REVISIONS:

#	DATE	DESCRIPTION
-	11.18.2014	ISSUED FOR PERMIT

DRAWN BY: N.HAVEN
CHECKED BY: P.FEIKEMA
GS JOB #: 4268.14.00
PLOT SCALE (WHEN PRINTED ON 24x36): AS NOTED

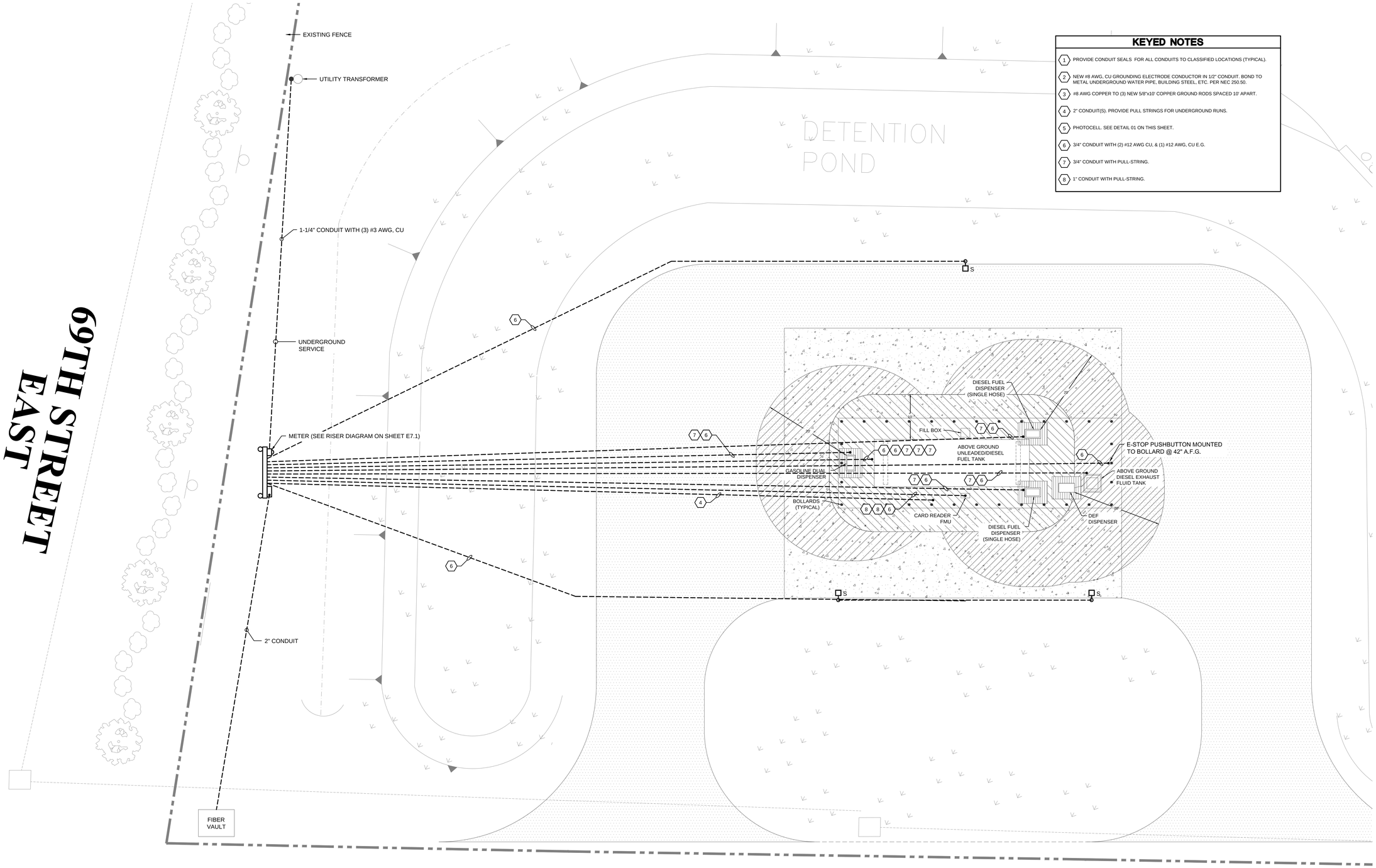
NOT VALID UNLESS SIGNED/DATED/SEALED HERE BY EOR

SHEET TITLE

ELECTRICAL GENERAL NOTES AND LEGEND

SHEET NUMBER

E0.1



KEYED NOTES

1. PROVIDE CONDUIT SEALS FOR ALL CONDUITS TO CLASSIFIED LOCATIONS (TYPICAL).
2. NEW #8 AWG, CU GROUNDING ELECTRODE CONDUCTOR IN 1/2" CONDUIT. BOND TO METAL UNDERGROUND WATER PIPE, BUILDING STEEL, ETC. PER NEC 250.50.
3. #8 AWG COPPER TO (3) NEW 5/8"x10' COPPER GROUND RODS SPACED 10' APART.
4. 2" CONDUIT(S). PROVIDE PULL STRINGS FOR UNDERGROUND RUNS.
5. PHOTOCELL. SEE DETAIL 01 ON THIS SHEET.
6. 3/4" CONDUIT WITH (2) #12 AWG CU, & (1) #12 AWG, CU E.G.
7. 3/4" CONDUIT WITH PULL-STRING.
8. 1" CONDUIT WITH PULL-STRING.

PRIVATE DRIVEWAY

N

ELECTRICAL SITE PLAN

0 5' 10' 20'

SCALE: 1" = 10'-0"

LEGEND

- CLASS 1, DIVISION 2, UP TO 18"A.F.G.
- CLASS 1, DIVISION 2, UP TO 10' FROM TANK
- CLASS 1, DIVISION 2, UP TO HEIGHT OF DISPENSERS

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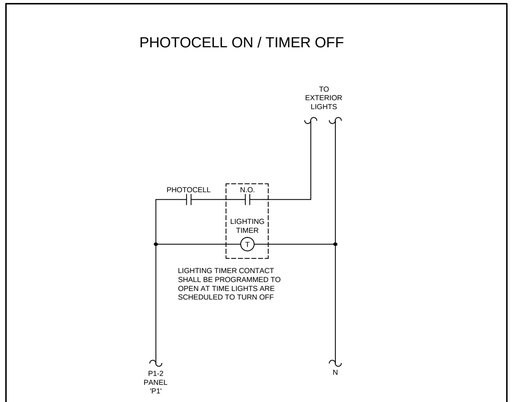
SHEET TITLE

ELECTRICAL SITE PLAN

SHEET NUMBER

E1.1



EXTERIOR LIGHTING CONTROLS

SCALE: NOT TO SCALE

01

PANELBOARD: 'P1'
ELECTRICAL SERVICE CALCULATION

LOAD	CONNECTED	DEMAND
LIGHTING	402	503
SUBMERSIBLE TURBINE PUMP 1	1,600	2,000
SUBMERSIBLE TURBINE PUMP 2	1,600	1,600
FUEL MASTER UNIT	288	288
COMMUNICATIONS	500	500
VEEDER ROOT	500	500
DEF DISPENSER	1,200	1,200
DISPENSERS	300	300
TOTAL	6,390	6,891
29 AMP DEMAND		
100A SERVICE @ 240V, 1-PHASE PROVIDED		

PANELBOARD DESIGNATION: 'P1'

VOLTAGE: 240/120V | 1Ø-3W | MAINS RATING: 100 AMPS | MAIN CB TRIP RATING: 100A
■ SURFACE ■ MCB ** | COPPER BUS | INTERRUPTING RATING: 65000 AIC
□ FLUSH □ MLO | ENCLOSURE: NEMA 3R

SERVES	CB SIZE	LOAD VA	CKT#		CKT#	LOAD VA	CB SIZE	SERVES
COMMUNICATIONS (GFI)	20	500	1	●	2	402	20	SITE LIGHTS
VEEDER ROOT	20	500	3	●	4	100	20	* DISPENSER #1
* SUBMERSIBLE TURBINE PUMP (STP) #1	20	800	5	●	6			
		800	7	●	8	100	20	* DISPENSER #2
			9	●	10			
* SUBMERSIBLE TURBINE PUMP (STP) #2	20	800	11	●	12	100	20	* DISPENSER #3
		800	13	●	14			
			15	●	16		20	SPARE
* DEF DISPENSER	20	1200	17	●	18		20	SPARE
			19	●	20		20	SPARE
* FUEL MASTER UNIT	20	288	21	●	22		20	SPARE
			23	●	24		-	SPACE
SPACE	-		25	●	26		-	SPACE
SPACE	-		27	●	28		30	SPD
SPACE	-		29	●	30			
CONNECTED:		6.4 KVA	A	B	EST. DEMAND:		0.0 KVA	

* PROVIDE CIRCUIT BREAKER WITH SWITCHED NEUTRAL AND LOCKED OFF PROVISION PER NEC 514.
** MAIN CIRCUIT BREAKER SHALL HAVE SHUNT TRIP CONNECTED TO E-STOP PUSHBUTTONS

KEYED NOTES

1. PROVIDE CONDUIT SEALS FOR ALL CONDUITS TO CLASSIFIED LOCATIONS (TYPICAL).
2. NEW #8 AWG, CU GROUNDING ELECTRODE CONDUCTOR IN 1/2" CONDUIT. BOND TO METAL UNDERGROUND WATER PIPE, BUILDING STEEL, ETC. PER NEC 250.50.
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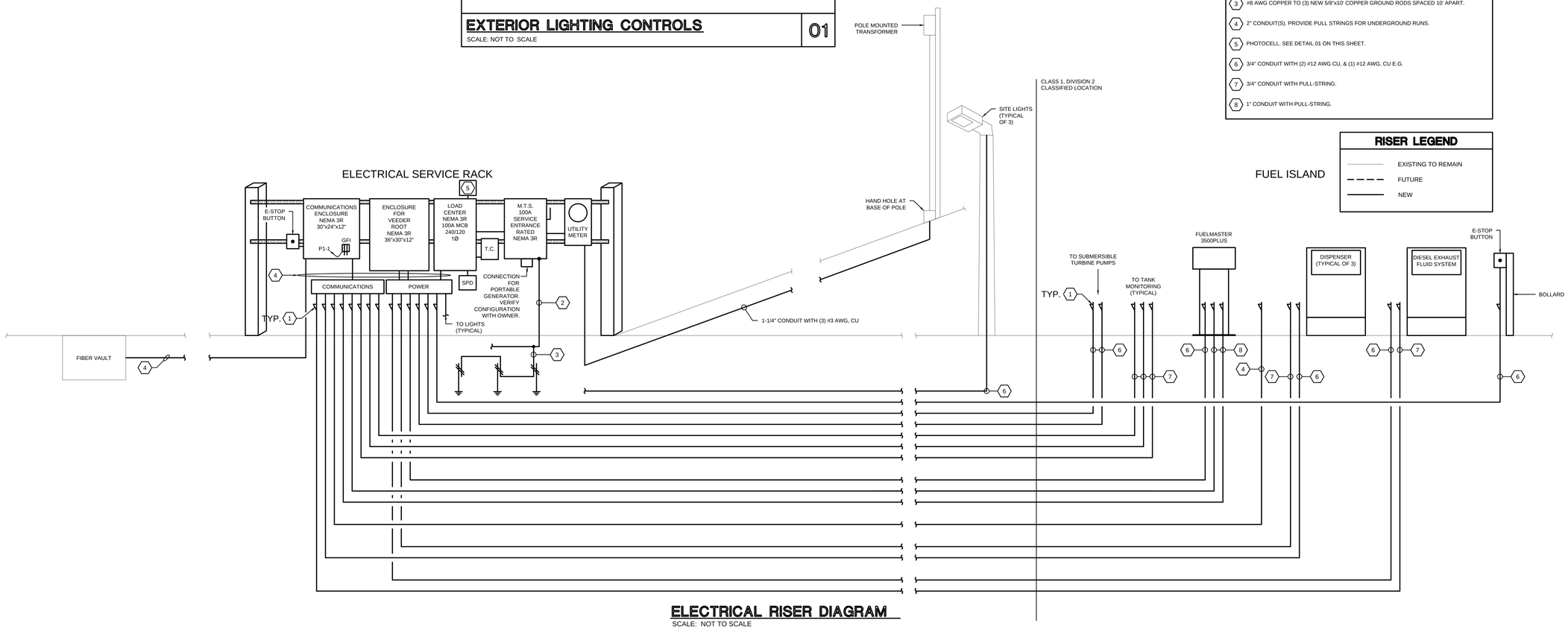
6. 3/4" CONDUIT WITH (2) #12 AWG CU, & (1) #12 AWG, CU E.G.
7. 3/4" CONDUIT WITH PULL-STRING.
8. 1" CONDUIT WITH PULL-STRING.

RISER LEGEND

EXISTING TO REMAIN
FUTURE
NEW



ELECTRICAL RISER DIAGRAM

SCALE: NOT TO SCALE

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NORTH COUNTY FUEL DEPOT

PREPARED FOR:

Manatee County FLORIDA

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PLOT SCALE (WHEN PRINTED ON 24x36): AS NOTED

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SHEET TITLE

ELECTRICAL PANEL SCHEDULES AND RISER DIAGRAM

SHEET NUMBER

E7.1

ELECTRICAL SPECIFICATIONS - DIVISION 16

ELECTRICAL

PART 1 - GENERAL

0.01 GENERAL SCOPE

A. THIS PROJECT WILL REQUIRE POWER DISTRIBUTION, LIGHTING, AND LIGHTING CONTROLS SYSTEMS AS SHOWN ON THE PLANS AND INCLUDED IN THE SPECIFICATIONS.

B. THE SCOPE OF WORK SPECIFIED HEREIN CONSISTS OF PROVIDING (DEFINED AS FURNISH AND INSTALL) ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES REQUIRED TO COMPLETE THE ELECTRICAL AND RELATED WORK INDICATED ON THE DRAWINGS, AS SPECIFIED HEREIN AND SUBJECT TO THE TERMS AND CONDITIONS OF THE CONTRACT. ELECTRICAL WORK INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:
- PANELBOARDS
- CIRCUIT BREAKERS
- DISCONNECT SWITCHES
- GROUNDING
- RACEWAY FOR POWER DISTRIBUTION
- CONDUCTORS FOR POWER DISTRIBUTION
- WIRING DEVICES
- LIGHTING FIXTURES
- RACEWAY FOR COMMUNICATIONS WIRING (VOICE, DATA, CABLE TELEVISION)
- CONNECTION OF MOTORS, CONTROL DEVICES AND ELECTRICAL EQUIPMENT FURNISHED BY OTHERS
- TESTING
- FINAL ACCEPTANCE/WARRANTY
- RECORD DRAWINGS

C. ITEMS SPECIFIED HEREIN, SHOWN ON THE DRAWINGS, AND/OR REASONABLY INTERPRETED FROM THE DRAWINGS THAT ARE NECESSARY TO COMPLETE THE ELECTRICAL WORK SHALL BE PROVIDED BY THIS DIVISION, WHETHER ITEM IS SPECIFICALLY SHOWN OR NOT.

1.01 GENERAL DOCUMENTS

A. CONTRACTOR SHALL BECOME THOROUGHLY ACQUAINTED WITH THE PROJECT SITE (e.g. EXISTING CONDITIONS) AND THE ENTIRE CONSTRUCTION DOCUMENTS PACKAGE (e.g. ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, FIRE PROTECTION, ELECTRICAL DRAWINGS AND SPECIFICATIONS) BEFORE BID SUBMISSION. WORK OF THE ELECTRICAL CONTRACTOR MUST BE COORDINATED WITH THE WORK OF ALL TRADES.

B. THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO DESCRIBE THAT COMPLETE ELECTRICAL AND SPECIAL SYSTEMS ARE REQUIRED. HOWEVER, THE WORK SHALL BE COMPLETE EVEN THOUGH ITEMS MAY NOT BE SPECIFICALLY CALLED FOR OR SHOWN. INSTALLATIONS SHALL MEET ALL GOVERNING CODES, SHALL BE SUBJECT TO THE APPROVAL OF THE ARCHITECT/ENGINEER AND ALL AGENCIES HAVING JURISDICTION.

C. WORK NOT COVERED IN THIS SECTION. RECESSES, CHASES, AND OTHER PROVISIONS TO BE MADE IN THE STRUCTURE AS REQUIRED TO ACCOMMODATE ELECTRICAL ITEMS, SUCH AS CONDUIT, PANELS, SWITCHES, ETC, SHALL BE PROVIDED BY THE TRADES CONCERNED. THE ELECTRICIAN SHALL, HOWEVER, NOTIFY ALL SUCH TRADES OF HIS EXACT REQUIREMENTS AHEAD OF TIME AND SHALL PAY THE COSTS OF ANY CUTTING OR PATCHING CAUSED BY FAILURE TO DO SO. ALL SUCH REMEDIAL WORK SHALL BE DONE ONLY BY MECHANICS OF THE TRADES INVOLVED.

1.02 PERMITS, TAXES, FEES.

A. CONTRACTOR SHALL OBTAIN ALL GOVERNMENTAL PERMITS, PAY ALL SALES TAXES AND OTHER ASSOCIATED FEES INCLUDING COSTS FOR UTILITY CONNECTIONS, REQUIRED TO PERFORM THE INTENDED ELECTRICAL WORK. CONTRACTOR SHALL FILE ALL NECESSARY PLANS, PREPARE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS OF ALL GOVERNMENTAL AGENCIES HAVING JURISDICTION. CONTRACTOR SHALL OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION FOR ELECTRICAL WORK AND DELIVER SAME TO THE OWNER AND ARCHITECT BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK.

B. CONTRACTOR SHALL INCLUDE IN THE WORK, WITHOUT EXTRA COST TO THE OWNER, ALL LABOR, MATERIALS, SERVICES, APPARATUS, OR DRAWINGS NECESSARY TO COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS, WHETHER OR NOT SHOWN ON DRAWINGS AND/OR SPECIFIED.

C. ALL MATERIALS FURNISHED AND ALL WORK INSTALLED SHALL COMPLY WITH THE FOLLOWING:
- NATIONAL ELECTRIC CODE
- APPLICABLE STATE AND LOCAL CODES
- NATIONAL BUREAU OF FIRE UNDERWRITERS
- REGULATIONS OF THE SERVING UTILITY COMPANIES

D. ALL MATERIAL AND EQUIPMENT PROVIDED FOR THE ELECTRICAL WORK SHALL BEAR THE APPROVAL LABEL, OR SHALL BE LISTED, BY UNDERWRITERS' LABORATORIES, INC.

1.03 MEASUREMENTS

A. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCY BETWEEN ACTUAL MEASUREMENTS AND THOSE INDICATED ON THE DRAWINGS, WHICH PREVENTS FOLLOWING GOOD PRACTICE OR THE INTENT OF THE DRAWINGS AND SPECIFICATIONS, HE SHALL NOTIFY THE ARCHITECT/ENGINEER THROUGH THE GENERAL CONTRACTOR, AND SHALL NOT PROCEED WITH HIS WORK UNTIL HE HAS RECEIVED INSTRUCTIONS FROM THE ARCHITECT/ENGINEER. ALL REQUESTS FOR INFORMATION (RFI) SHALL INCLUDE A PROPOSED SOLUTION.

B. PRIOR TO ROUGH-IN OF EQUIPMENT THE OWNER, ARCHITECT AND ENGINEER RESERVE THE RIGHT TO RELOCATE ANY PANELBOARD, DISCONNECT, STARTER, LIGHTING FIXTURE, WIRING DEVICE, COMMUNICATIONS OUTLET, ETC THREE (3) FEET IN ANY DIRECTION WITHOUT ANY ADDITIONAL CHARGE, FEE, OR CHANGE ORDER.

1.04 DRAWINGS

A. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF THE ELECTRICAL AND SPECIAL SYSTEMS WORK INCLUDED IN THE CONTRACT. THE ENTIRE CONSTRUCTION DOCUMENTS PACKAGE (DRAWINGS AND SPECIFICATIONS) SHALL BE EXAMINED FOR EXACT LOCATION OF FIXTURES, DEVICES AND EQUIPMENT. WHERE ITEMS ARE NOT LOCATED BY THE DRAWINGS OR SPECIFICATIONS OF OTHER CONSULTANTS THEN THE ITEMS SHALL BE LOCATED PER THE ENGINEERING DRAWINGS, HOWEVER, THE DRAWINGS ARE NOT TO BE SCALED.

B. CONTRACTOR SHALL FOLLOW THE ELECTRICAL DRAWINGS IN LAYING OUT WORK AND SHALL COORDINATE WITH THE DRAWINGS OF OTHER TRADES TO VERIFY SPACES IN WHICH WORK WILL BE INSTALLED. MAINTAIN MAXIMUM HEADROOM AND SPACE AT ALL LOCATIONS. WHERE HEADROOM OR SPACE CONDITIONS APPEAR INADEQUATE, THE ARCHITECT/ENGINEER SHALL BE NOTIFIED BEFORE PROCEEDING WITH INSTALLATION. ALL REQUESTS FOR INFORMATION (RFI) SHALL INCLUDE A PROPOSED SOLUTION.

C. IF DIRECTED BY THE ARCHITECT/ENGINEER, THE CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LOCATIONS OF ELECTRICAL WORK AS NEEDED TO PREVENT CONFLICTS WITH WORK OF OTHER TRADES AND FOR PROPER INSTALLATION OF THE WORK.

1.05 SUBSTITUTION OF SPECIFIED EQUIPMENT

A. MATERIALS OR PRODUCTS SPECIFIED BY TRADE NAME, MANUFACTURER'S NAME OR CATALOG NUMBER SHALL BE PROVIDED AS SPECIFIED.

B. SUBSTITUTIONS ARE NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM THE ENGINEER VIA THE ARCHITECT TEN (1O) WORKING DAYS PRIOR TO BID DATE. APPROVALS OF "EQUIVALENT" MATERIALS OR PRODUCTS WILL BE MADE AVAILABLE TO ALL KNOWN BIDDERS AND ISSUED AS AN ADDENDUM (PRIOR TO BID) TO THE CONTRACT DOCUMENTS IF SUBSTITUTED MATERIALS OR PRODUCTS ARE APPROVED BY ARCHITECT/ENGINEER.

C. ANY CONTRACTOR PROPOSING AN 'EQUIVALENT' MATERIAL OR PRODUCT MUST SUBMIT, WITH THE REQUEST, COMPLETE CATALOG INFORMATION TO PERMIT EVALUATION OF THE PRODUCT. IN THE CASE OF LIGHTING FIXTURES, AN INDEPENDENT TESTING LABORATORY TEST REPORT (NOT THE MANUFACTURER'S) STATING FIXTURE EFFICIENCY AND PERFORMANCE, SHALL ACCOMPANY THE REQUEST.

D. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE CORRECTIONS TO ALL SITUATIONS CREATED BY THE SUBSTITUTION OF MATERIALS OR PRODUCTS. THE ACCEPTANCE OF SUBSTITUTED MATERIALS OR PRODUCTS, EITHER PRIOR TO BID OR THEREAFTER, DOES NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY TO PROVIDE CORRECTIONS, AT THEIR EXPENSE, FOR ALL DISCREPANCIES AND CONFLICTS CREATED BY THE SUBSTITUTION OF MATERIALS OR PRODUCTS.

1.06 SHOP DRAWINGS

A. CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL SHOP DRAWINGS OF ALL MATERIALS OR PRODUCTS REQUIRED TO COMPLETE THE PROJECT AND NO MATERIALS OR PRODUCTS SHALL BE DELIVERED TO THE JOB SITE OR INSTALLED UNTIL THE CONTRACTOR HAS ENGINEER APPROVED SHOP DRAWINGS. SHOP DRAWINGS FOR MATERIALS OR PRODUCTS SHALL BE SUBMITTED AS ONE COMPLETE PACKAGE. CONTRACTOR SHALL FURNISH THE NUMBER OF COPIES REQUIRED BY THE GENERAL AND SPECIAL CONDITIONS OF THE CONTRACT, BUT IN NO CASE LESS THAN SIX (6) IDENTICAL COPIES. SHOP DRAWINGS SHALL BE REVIEWED AND STAMPED BY THE ELECTRICAL AND GENERAL CONTRACTORS FOR COMPLIANCE WITH THE SPECIFIED MATERIALS AND PRODUCTS PRIOR TO SUBMISSION TO THE ARCHITECT/ENGINEER.

B. SAMPLES, DRAWINGS, SPECIFICATIONS, CUT SHEETS, ETC SUBMITTED FOR REVIEW SHALL BE PROPERLY LABELED AND SHALL INDICATE THE SPECIFIC ITEM FOR WHICH THE CONTRACTOR IS PROPOSING TO PROVIDE.

C. "NO EXCEPTION" RENDERED ON SHOP DRAWINGS SHALL NOT BE CONSIDERED AS A GUARANTEE THAT THE MATERIAL OR PRODUCTS COMPLY WITH THE BUILDING CONDITIONS OR MEASUREMENTS. WHERE SHOP DRAWINGS ARE REVIEWED, SAID "NO EXCEPTION" DOES NOT IN ANY WAY RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY OF PROVIDING LABOR, MATERIAL OR PRODUCTS REQUIRED TO PERFORM THE WORK AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS.

D. SHOP DRAWINGS SUBMITTALS ARE REQUIRED ON ELECTRICAL DISTRIBUTION EQUIPMENT, PANELBOARDS, TRANSFORMERS, CONDUIT, CONDUCTORS (WIRE), CIRCUIT BREAKERS, DISCONNECT SWITCHES, WIRING DEVICES, FLOOR BOXES, LIGHT FIXTURES, TIMECLOCKS, CONTACTORS AND SURGE PROTECTION DEVICES (SPD)

PART 2 - PRODUCTS

2.01 SERVICE ENTRANCE

A. SERVICE ENTRANCE SHALL BE UNDERGROUND FROM THE POWER COMPANY TRANSFORMER OR OTHER SERVICE POINT TO THE SERVICE ENTRANCE METER/ EQUIPMENT SHOWN ON THE ELECTRICAL RISER DIAGRAM AND/OR SITE PLAN. VOLTAGE/PHASE OF INCOMING POWER SHALL BE AS INDICATED ON THE ELECTRICAL RISER DIAGRAM AND SHALL BE VERIFIED WITH THE SERVING UTILITY COMPANY PRIOR TO BID.

2.02 PANELBOARDS

A. PROVIDE POWER DISTRIBUTION EQUIPMENT AS INDICATED ON THE ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES. PANELBOARDS SHALL BE OF DEAD FRONT CONSTRUCTION AND SHALL BE MANUFACTURED BY SQUARE "D", GENERAL ELECTRIC, CUTLER-HAMMER OR SIEMENS.

B. PANELBOARDS SHALL NOT BE LESS THAN 20" WIDE AND SHALL BE FABRICATED FROM CODE GAUGE STEEL WITH A POST FABRICATION APPLIED GRAY ENAMEL FINISH.

C. PANELBOARD AND INTERNAL COMPONENTS SHALL BE CONSTRUCTED AND U.L. LISTED TO WITHSTAND THE SYMMETRICAL SHORT CIRCUIT AMPERES INDICATED ON THE ELECTRICAL RISER DIAGRAM OR PANEL SCHEDULES.

D. WIRE GUTTER SPACE SHALL COMPLY WITH U.L. AND NEC STANDARDS FOR PANELBOARDS.

E. PANELBOARDS SHALL BE SURFACE OR FLUSH MOUNTED AS SHOWN ON PANEL SCHEDULES AND/OR FLOOR PLANS. PANEL SHALL BE EQUIPPED WITH RECESSED HINGES, FLUSH LOCK WITH CATCH AND SPRING LOADED DOOR PULL. ALL LOCKS SHALL BE KEYED A LIKE. TURN OVER ALL KEYS TO OWNER.

F. PROVIDE TYPED CIRCUIT IDENTIFICATION CARD INSIDE EACH PANEL. BASE DESCRIPTION ON LOAD SERVED.

G. PROVIDE LAMINATED, ENGRAVED PLASTIC NAMEPLATE WITH WHITE LETTERS STATING PANELBOARD NAME MOUNTED ON FRONT OF EACH PANEL. MOUNT NAMEPLATE WITH METAL FASTNERS. MINIMUM NAMEPLATE SIZE SHALL BE 3" WIDE BY 1-1/2" HIGH WITH 1/2" HIGH ENGRAVED LETTERS. PROVIDE BLACK NAMEPLATE COLOR FOR NORMAL AND RED NAMEPLATE COLOR FOR EMERGENCY PANELBOARDS OR COLOR AS REQUIRED TO MEET OWNERS STANDARD NAMEPLATE COLORS.

2.03 CIRCUIT BREAKERS:

A. CIRCUIT BREAKERS SHALL BE QUICK-MAKE, QUICK-BREAK, THERMAL MAGNETIC MOLDED CASE OF FRAME SIZE, NUMBER OF POLES AND TRIP RATINGS AS SHOWN ON THE ELECTRICAL RISER DIAGRAM AND/OR PANEL SCHEDULES. MULTI-POLE BREAKERS SHALL HAVE A SINGLE HANDLE TO TRIP ALL POLES AT ONCE. CIRCUIT BREAKERS SHALL BE FROM THE SAME MANUFACTURER AS THE POWER DISTRIBUTION EQUIPMENT. PROVIDE CIRCUIT BREAKERS WITH GROUND FAULT AND ARC FAULT PROTECTION WHERE REQUIRED.

2.04 DISCONNECT SWITCHES

A. DISCONNECT SWITCHES SHALL BE U.L. LISTED AND FROM SAME MANUFACTURER AS POWER DISTRIBUTION EQUIPMENT. SWITCH BLADES SHALL BE FULLY VISIBLE IN THE "OFF" POSITION WITH THE DOOR OPEN. ALL CURRENT CARRYING PARTS SHALL BE PLATED TO RESIST CORROSION.

B. SWITCHES SHALL BE QUICK-MAKE, QUICK-BREAK SUCH THAT, DURING NORMAL OPERATION, THE CONTACTS SHALL NOT BE CAPABLE OF BEING RESTRAINED BY THE OPERATING HANDLE AFTER THE CLOSING OR OPENING ACTION OF THE CONTACTS HAS STARTED. THE HANDLE AND MECHANISM SHALL BE AN INTEGRAL PART OF THE BOX, NOT THE COVER, WITH POSITIVE PADLOCKING PROVISIONS IN THE "OFF" POSITION.

C. PROVIDE HEAVY-DUTY, NEMA-1 ENCLOSURE UNLESS NEMA-3R (RAIN PROOF) IS REQUIRED BY THE SWITCH LOCATION. ENCLOSURES SHALL BE PROVIDED WITH A POST FABRICATION APPLIED GRAY ENAMEL FINISH.

D. FUSIBLE SWITCHES SHALL BE CAPABLE OF FIELD CONVERSION FROM STANDARD CLASS-H FUSE SPACING TO CLASS-J FUSE SPACING WITHOUT AFFECTING THE U.L. LISTING. THE SWITCH MUST ALSO ACCEPT CLASS-R FUSES AND HAVE A FIELD INSTALLABLE U.L. LISTED REJECTION FEATURE TO REJECT ALL FUSES EXCEPT CLASS-R. THE U.L. LISTED SHORT CIRCUIT RATING, WHEN EQUIPPED WITH CLASS-J OR CLASS-R FUSES, SHALL BE 200,000 AMPERES RMS SYMMETRICAL.

2.05 GROUNDING AND BONDING

A. PROVIDE A SINGLE, COMPLETE GROUNDING NETWORK FOR THE ENTIRE ELECTRICAL AND SPECIAL SYSTEMS WHICH COMPLIES WITH NEC REQUIREMENTS.

B. SERVICE NEUTRAL AND EQUIPMENT GROUND SHALL BE CONNECTED AT ONE POINT INSIDE THE MAIN DISTRIBUTION PANEL WITH ONE CONTINUOUS CONDUCTOR FROM THIS LOCATION TO THREE 10 FOOT LONG DRIVEN GROUND RODS LOCATED IN A TRIANGULAR PATTERN, TO BUILDING STEEL AND TO METAL WATER PIPE.

C. PROVIDE BONDING CONNECTION WITH GROUND BUSHING TO CONDUIT FROM DISTRIBUTION PANEL TO THE BREAKERS AND PANELS SERVED.

D. CONNECTIONS TO GROUND RODS SHALL BE MADE WITH EXOTHERMIC WELDS. PROVIDE TEST WELL OVER EACH GROUND ROD.

2.06 CONDUIT FOR POWER DISTRIBUTION WIRING

A. WIRING FOR POWER DISTRIBUTION SHALL BE INSTALLED IN RIGID METALLIC (GALVANIZED STEEL) CONDUIT (RMC), INTERMEDIATE METAL CONDUIT (IMC), ELECTRICAL METALLIC TUBING (EMT), FLEXIBLE METAL CONDUIT OR SCHEDULE 40/80 PVC CONDUIT. PROVIDE THE CONDUIT TYPE INDICATED IN THIS SPECIFICATION WHERE CONDUIT TYPE IS NOT NOTED ON THE DRAWINGS.

B. RIGID GALVANIZED STEEL (RGS) CONDUIT WITH THREADED FITTINGS SHALL BE PROVIDED ABOVE GROUND AT EXPOSED INTERIOR AND EXTERIOR LOCATIONS WHERE CONDUIT MAY BE SUBJECTED TO PHYSICAL DAMAGE FROM VEHICLES, MAINTENANCE EQUIPMENT, ETC. PROVIDE LARGE RADIUS SWEEP ELBOWS FOR RGS CONDUIT.

C. IMC CONDUIT WITH THREADED FITTINGS SHALL BE PROVIDED IN ABOVE GROUND, EXPOSED INTERIOR AND EXTERIOR LOCATIONS WHERE CONDUIT WILL NOT BE SUBJECTED TO PHYSICAL DAMAGE, BUT WILL BE EXPOSED TO RAIN WATER, HAZARDOUS CONDITIONS, ETC. THREADLESS FITTINGS FOR IMC IS NOT ACCEPTABLE.

D. EMT CONDUIT WITH SET SCREW FITTINGS SHALL BE PROVIDED IN ABOVE GROUND INTERIOR LOCATIONS WHERE CONDUIT WILL NOT BE SUBJECTED TO PHYSICAL DAMAGE AND WILL REMAIN COMPLETELY DRY DURING ALL WEATHER CONDITIONS.

E. EMT CONDUIT SHALL NOT BE USED IN LOCATIONS WHERE CONDUIT COULD BE EXPOSED TO DIRECT/INDIRECT RAIN/WATER/LIQUIDS, WIND DRIVEN RAIN, HOSE DOWN AREAS, OPEN AIR AREAS WITHOUT AIR CONDITIONING (UNLESS CONDUIT WILL REMAIN COMPLETELY DRY DURING ALL WEATHER CONDITIONS) AND AREAS WHERE RAIN/WATER/LIQUIDS MIGHT DRIP OR RUN INTO CONDUIT, BACKBOXES OR DEVICES.

F. SCHEDULE 80 PVC CONDUIT SHALL BE USED FOR UNDERGROUND SERVICE ENTRANCE FEEDERS AND ALL CONDUIT BELOW ROADWAYS U.N.O. ON THE RISER DIAGRAMS AND/OR FLOOR PLANS. PROVIDE LARGE RADIUS RIGID GALVANIZED STEEL ELBOWS FOR SCHEDULE 80 PVC CONDUIT. COAT RGS ELBOWS WITH BLACK MASTIC.

G. SCHEDULE 40 PVC CONDUIT SHALL BE USED FOR ALL UNDERGROUND FEEDERS AND WIRING EXCEPT FOR SERVICE ENTRANCE FEEDERS AND UNDER ROADWAYS. PROVIDE LARGE RADIUS RIGID GALVANIZED STEEL ELBOWS FOR SCHEDULE 40 PVC CONDUIT WHERE OVERALL CONDUIT RUN IS GREATER THAN 100 FEET. COAT RGS ELBOWS WITH BLACK MASTIC.

H. PVC CONDUIT SHALL NOT BE USED MORE THAN SIX INCHES ABOVE FINISHED GRADE IN EITHER INTERIOR OR EXTERIOR LOCATIONS. PVC CONDUIT SHALL TRANSITION TO METAL CONDUIT NO MORE THAN SIX INCHES ABOVE GRADE.

I. ALL PVC CONNECTIONS SHALL BE WATERTIGHT.

J. FLEXIBLE METAL CONDUIT SHALL BE USED TO CONNECT LIGHTING FIXTURES AND EQUIPMENT SUBJECT TO VIBRATION, INCLUDING A/C EQUIPMENT, MOTORS, TRANSFORMERS, ETC. PROVIDE LIQUID TIGHT FLEXIBLE METAL CONDUIT AND FITTINGS FOR EXTERIOR APPLICATIONS.

K. CONCEAL ALL CONDUIT IN WALLS, PARTITIONS, OR CEILINGS IN FINISHED AREAS. CONDUIT SHALL NOT BE EXPOSED IN FINISHED AREAS EXCEPT WHEN ABSOLUTELY NECESSARY. CONDUIT SHALL BE STRAIGHT AND PARALLEL TO BUILDING LINES.

L. DURING CONSTRUCTION CONDUIT SHALL BE PROTECTED AGAINST DAMAGE AND ENTRANCE OF WATER, DIRT OR FOREIGN MATERIAL WITH WATERTIGHT CAPS. FIRE RATED ASSEMBLIES SHALL BE PROVIDED WHERE CONDUIT PASSES THROUGH FIRE RATED CONSTRUCTION. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF FIRE RATED CONSTRUCTION. REFER TO THE FIRE STOP PENETRATION DETAILS ON THE ELECTRICAL DRAWINGS.

M. INSULATING BUSHINGS WITH DOUBLE LOCK-NUTS SHALL BE USED WHEREVER A NEW CONDUIT 1-1/4" DIA OR LARGER ENTERS A BOX, PANEL, DISCONNECT OR ELECTRICAL EQUIPMENT.

N. CONDUIT SIZES SHOWN ON THE DRAWINGS AND SCHEDULES ARE THE MINIMUM SIZES REQUIRED. LARGER SIZE CONDUIT TO FACILITATE WIRE PULLS, ETC, IS PERMITTED.

2.07 CONDUCTORS

A. PROVIDE 75 DEGREE CELSIUS (167 DEGREE FAHRENHEIT) TYPE THHW, THW, THWN, OR XHHW INSULATED COPPER CONDUCTORS RATED AT 600V FOR POWER DISTRIBUTION WIRING. CONDUIT WIRE FILL SHOWN ON THE DRAWINGS AND FEEDER SCHEDULES ARE BASED ON TYPE THW WIRE UNLESS NOTED OTHERWISE.

B. CONDUCTORS UP TO AND INCLUDING NO. 10 AWG SHALL BE SOLID AND CONDUCTORS NO. 8 AWG AND LARGER SHALL BE STRANDED. MINIMUM CONDUCTOR SIZE SHALL BE NO.12 AWG. CONDUCTORS SHALL BE CONTINUOUS BETWEEN EQUIPMENT AND DEVICES. SPLICES ARE TO BE MADE ONLY IN ACCESSIBLE JUNCTION OR OUTLET BOXES AND SHOULD BE KEPT TO A MINIMUM. SPLICES ON NO.12 AND NO.10 WIRE SHALL BE MADE WITH PRESSURE CONNECTORS CAPABLE OF CARRYING FULL WIRE CAPACITY. SPLICES ON NO.8 WIRE AND LARGER SHALL BE MADE WITH SOLDERLESS LUGS WRAPPED WITH BOTH RUBBER AND PLASTIC ELECTRICAL TAPE. CONNECTIONS TO FIXED EQUIPMENT TERMINALS ARE TO BE MADE WITH SOLDERLESS LUGS.

C. ALL NEW CONDUIT USED FOR POWER DISTRIBUTION SHALL CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR. CONDUIT RACEWAY SHALL NOT BE USED IN PLACE OF A GROUNDING CONDUCTOR.

D. MC TYPE CABLE MAY BE UTILIZED IF ALLOWED BY THE AUTHORITY HAVING JURISDICTION.

2.08 WIRING DEVICES

A. THE EXTENT OF WIRING DEVICE WORK IS INDICATED ON THE DRAWINGS. WIRING DEVICES ARE DEFINED AS SINGLE DISCRETE UNITS OF ELECTRICAL DISTRIBUTION SYSTEMS THAT ARE INTENDED TO CARRY BUT NOT UTILIZE ELECTRIC ENERGY. TYPES OF WIRING DEVICES IN THIS SECTION INCLUDE:
- RECEPTACLES
- GROUND FAULT CIRCUIT INTERRUPTERS
- ARC FAULT CIRCUIT INTERRUPTERS
- LIGHT SWITCHES

B. PROVIDE WHITE COLORED WIRING DEVICES AND MATCHING THERMOPLASTIC COVERPLATES UNLESS NOTED OTHERWISE. FINAL COLOR SELECTION SHALL BE COORDINATED WITH OWNER/ARCHITECT PRIOR TO BID.

C. QUALITY ASSURANCE

1. NEC COMPLIANCE: COMPLY WITH NEC AS APPLICABLE TO INSTALLATION AND WIRING OF ELECTRICAL WIRING DEVICES.

2. UL COMPLIANCE: COMPLY WITH APPLICABLE REQUIREMENTS OF U.L. 20, 486A, 498 AND 943 PERTAINING TO INSTALLATION OF WIRING DEVICES. PROVIDE WIRING DEVICES WHICH ARE U.L. LISTED AND LABELED.

3. IEEE COMPLIANCE: COMPLY WITH APPLICABLE REQUIREMENTS OF IEEE STANDARD 241, "RECOMMENDED PRACTICE FOR ELECTRIC POWER SYSTEMS IN COMMERCIAL BUILDINGS", PERTAINING TO ELECTRICAL WIRING SYSTEMS.

4. NEMA COMPLIANCE: COMPLY WITH APPLICABLE PORTIONS OF NEMA STANDARDS PUBLICATION NUMBER WD-1, "GENERAL PURPOSE WIRING DEVICES", WD-2, "SEMICONDUCTOR DIMMERS FOR INCANDESCENT LAMPS", AND WD-5, "SPECIFIC PURPOSE WIRING DEVICES".

D. RECEPTACLES

1. SIMPLEX: PROVIDE SPECIFICATION GRADE 20-AMPERE, 125 VOLT, HEAVY-DUTY, 2-POLE, 3-WIRE, RECEPTACLE WITH GREEN HEXAGONAL EQUIPMENT GROUND SCREW AND METAL PLASTER EARS DESIGNED FOR SIDE AND BACK WIRING WITH SPRING LOADED, SCREW ACTIVATED PRESSURE PLATE IN NEMA 5-20R CONFIGURATION UNLESS NOTED OTHERWISE. COORDINATE ALL "SPECIAL" RECEPTACLES WITH THE EQUIPMENT SERVED PRIOR TO ROUGH-IN. PROVIDE RECEPTACLE RATING AND CONFIGURATION TO MATCH EQUIPMENT SERVED.

2. DUPLEX: PROVIDE SPECIFICATION GRADE 20-AMPERE, 125 VOLT, HEAVY-DUTY, 2-POLE, 3-WIRE, RECEPTACLE WITH GREEN HEXAGONAL EQUIPMENT GROUND SCREW AND METAL PLASTER EARS DESIGNED FOR SIDE AND BACK WIRING WITH SPRING LOADED, SCREW ACTIVATED PRESSURE PLATE IN NEMA 5-20R CONFIGURATION.

E. GROUND-FAULT CIRCUIT INTERRUPTERS

1. PROVIDE SPECIFICATION GRADE "FEED-THRU" TYPE GROUND-FAULT CIRCUIT INTERRUPTERS, WITH HEAVY-DUTY DUPLEX RECEPTACLES, CAPABLE OF PROTECTING CONNECTED DOWNSTREAM RECEPTACLES ON SINGLE CIRCUIT, AND OF BEING INSTALLED IN A 2-3/4" DEEP OUTLET BOX WITHOUT ADAPTER, GROUNDING TYPE U.L. RATED CLASS A, GROUP 1, RATED 20-AMPERES, 120-VOLTS, 60 HZ, WITH SOLID-STATE GROUND-FAULT SENSING AND SIGNALING, WITH 5 MILLIAMPERES GROUND-FAULT TRIP LEVEL, EQUIP WITH NEMA 5-20R CONFIGURATION.

F. LIGHT SWITCHES

1. SINGLE AND TWO POLE: PROVIDE HARD USE SPECIFICATION GRADE RECESS MOUNTED SINGLE AND TWO-POLE QUIET TOGGLE SWITCHES, 20-AMPERE, 120/277 VOLTS AC. PROVIDE WITH MOUNTING YOKE INSULATED FROM MECHANISM, PLASTER EARS, SWITCH HANDLE, AND SIDE-WIRED SCREW TERMINALS.

2. THREE AND FOUR WAY: PROVIDE HARD USE SPECIFICATION GRADE RECESS MOUNTED 3 AND 4-WAY AC QUIET SWITCHES, 20-AMPERES, 120/277 VOLTS PROVIDE WITH MOUNTING YOKE INSULATED FROM MECHANISM, PLASTER EARS, SWITCH HANDLE, SIDE-WIRED SCREW TERMINALS, WITH BREAK-OFF TAB FEATURES, WHICH ALLOWS WIRING WITH SEPARATE OR COMMON FEED.

2.09 LIGHTING FIXTURES

A. CONTRACTOR SHALL PROVIDE, WIRE AND LAMP ALL LIGHTING FIXTURES SHOWN ON SITE PLAN, FLOOR PLANS AND LIGHTING FIXTURE SCHEDULE. AT SUBSTANTIAL COMPLETION, CONTRACTOR SHALL CLEAN DUST, DEBRIS, FINGERPRINTS, ETC FROM ALL FIXTURE LENSES, LOUVERS, AND REFLECTORS AND SHALL REPLACE ALL LAMPS, BALLASTS, ETC THAT ARE NOT WORKING.

B. CONTRACTOR SHALL REVIEW THE ARCHITECTURAL DRAWINGS (SECTIONS, ELEVATIONS, DETAILS, ETC.) FOR LIGHTING FIXTURES WHICH MAY BE SHOWN AND SHALL NOTIFY THE ARCHITECT/ ENGINEER PRIOR TO BID IF FIXTURES APPEAR ON THE ARCHITECTURAL DRAWINGS THAT DO NOT APPEAR ON THE ELECTRICAL DRAWINGS.

C. CONTRACTOR SHALL PROVIDE AND INSTALL PATH OF EGRESS LIGHTING AND EXIT SIGNAGE AS SHOWN ON THE PLANS AND AS REQUIRED BY APPLICABLE LIFE SAFETY CODE(S).

2.10 LIGHTING CONTROLS

A. EXTERIOR. PROVIDE TIMECLOCK(S) FOR EXTERIOR LIGHTING CONTROL. TIME CLOCKS SHALL BE 7-DAY, 24-HOUR MECHANICAL OR ELECTRONIC WITH CARRYOVER PROVISIONS FOR A MINIMUM OF 16 HOURS. PROVIDE PHOTOCELL FOR AUTOMATIC FIXTURE SWITCHING WHERE INDICATED ON SITE AND FLOOR PLANS. PHOTOCELL SHALL BE RATED FOR REQUIRED LOAD AND VOLTAGE WITH BUILT-IN DELAY FOR TRANSIENT LIGHT FLASHES AND LIGHT LEVEL ADJUSTMENT.

2.11 EQUIPMENT FURNISHED BY OTHERS

A. CONTRACTOR SHALL PROVIDE ELECTRICAL SERVICE TO EQUIPMENT PROVIDED BY OTHERS INCLUDING, BUT NOT LIMITED TO, CIRCUIT BREAKERS, CONDUIT, WIRE, DISCONNECT SWITCHES, ETC AS REQUIRED BY OTHERS.

2.12 MOTOR CONTROLLERS

A. PROVIDE FULL-VOLTAGE, NON-REVERSING, ACROSS-THE-LINE, MAGNETIC MOTOR CONTROLLER(S). COORDINATE THE FEATURES OF EACH MOTOR CONTROLLER WITH THE RATINGS AND CHARACTERISTICS OF THE SUPPLY CIRCUIT, THE MOTOR, THE REQUIRED CONTROL SEQUENCE, THE DUTY CYCLE OF THE MOTOR, DRIVE, AND LOAD, AND THE PILOT DEVICE, AND CONTROL CIRCUITING AFFECTING CONTROLLER FUNCTIONS. PROVIDE CONTROLLERS THAT ARE HORSEPOWER RATED TO SUIT THE MOTOR CONTROLLED.

B. CONTACTS SHALL OPEN EACH UNGROUNDED CONNECTION TO THE MOTOR.

C. OVERLOAD RELAYS: AMBIENT-COMPENSATED TYPE WITH INVERSE-TIME-CURRENT CHARACTERISTIC. PROVIDE WITH HEATERS OR SENSORS IN EACH PHASE MATCHED TO NAMEPLATE FULL-LOAD CURRENT OF THE SPECIFIC MOTOR TO WHICH CONNECTED WITH APPROPRIATE ADJUSTMENT FOR DUTY CYCLE.

D. ENCLOSURES: FOR INDIVIDUALLY MOUNTED MOTOR CONTROLLERS AND CONTROL DEVICES, COMPLY WITH NEMA STANDARD 250, "ENCLOSURES FOR ELECTRICAL EQUIPMENT (1000 VOLTS MAXIMUM)." PROVIDE ENCLOSURES SUITABLE FOR THE ENVIRONMENTAL CONDITIONS AT THE CONTROLLER LOCATION.

E. PROVIDE CONTROL POWER TRANSFORMER INTEGRAL WITH CONTROLLER WHERE NO OTHER SUPPLY OF CONTROL POWER TO CONTROLLER IS INDICATED. PROVIDE CONTROL POWER TRANSFORMER WITH ADEQUATE CAPACITY TO OPERATE CONNECTED PILOT, INDICATING AND CONTROL DEVICES.

F. COMBINATION CONTROLLER: SWITCH TYPE; FUSED, QUICK-MAKE, QUICK-BREAK SWITCH, FACTORY ASSEMBLED WITH CONTROLLER AND ARRANGED TO DISCONNECT IT. PROVIDE REJECTION-TYPE FUSE CLIPS AND FUSES RATED PER MANUFACTURERS RECOMMENDATION. INTERLOCK SWITCH WITH UNIT COVER OR DOOR.

G. AUXILIARY CONTROL DEVICES SHALL BE FACTORY INSTALLED IN CONTROLLER ENCLOSURE.

H. AUTOMATIC SELECTOR SWITCHES: INSTALL IN COVERS OF CONTROLLERS OF MOTORS STARTED AND STOPPED BY AUTOMATIC CONTROLS OR INTERLOCKS WITH OTHER EQUIPMENT. MAKE CONTROL CONNECTIONS SO ONLY THE MANUAL AND AUTOMATIC CONTROL DEVICES THAT HAVE NO SAFETY FUNCTIONS WILL BE BYPASSED WHEN THE SWITCH IS IN THE HAND POSITION. CONNECT MOTOR CONTROL CIRCUIT IN BOTH HAND AND AUTOMATIC POSITIONS FOR SAFETY TYPE CONTROL DEVICES SUCH AS "LOW" AND "HIGH" PRESSURE CUTOUTS, HIGH TEMPERATURE CUTOUTS, AND MOTOR OVERLOAD PROTECTORS. MAKE CONTROL CIRCUIT CONNECTIONS TO A HAND-OFF-AUTOMATIC SWITCH OR TO MORE THAN ONE AUTOMATIC CONTROL DEVICE IN ACCORDANCE WITH MANUFACTURER PROVIDED WIRING DIAGRAM.

2.13 RACEWAY FOR COMMUNICATIONS WIRING

A. REFER TO THE COMMUNICATIONS RISER DIAGRAM AND ELECTRICAL SYMBOL LEGEND FOR ADDITIONAL REQUIREMENTS.

B. ROUTE CONDUIT THROUGH RATED WALLS AND FLOORS USING U.L. APPROVED FIRE RATED PENETRATION MATERIALS.

PART 3 - EXECUTION

3.01 COOPERATION WITH OTHER TRADES

A. CONTRACTOR SHALL GIVE FULL COOPERATION TO OTHER TRADES AND SHALL FURNISH IN WRITING TO THE ARCHITECT/ENGINEER ANY INFORMATION NECESSARY TO PERMIT THE WORK OF OTHER TRADES TO BE INSTALLED SATISFACTORILY AND WITH THE LEAST POSSIBLE INTERFERENCE OR DELAY.

B. WHERE ELECTRICAL WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO, OR MAY INTERFERE WITH, WORK OF OTHER TRADES THE CONTRACTORS SHALL ASSIST EACH OTHER IN WORKING OUT A SATISFACTORY SPACE FOR EACH CONTRACTORS WORK. IF DIRECTED BY THE ARCHITECT/ENGINEER, THE CONTRACTOR SHALL PREPARE COMPOSITE WORKING DRAWINGS AND SECTIONS AT SUITABLE SCALE, NOT LESS THAN 1/4" = 1'-0", CLEARLY SHOWING HOW WORK IS TO BE INSTALLED IN RELATION TO WORK OF OTHER TRADES. IF THE CONTRACTOR INSTALLS HIS WORK BEFORE COORDINATING WITH OTHER TRADES, OR CAUSES ANY INTERFERENCE WITH WORK OF OTHER TRADES, THE CONTRACTOR SHALL MAKE THE NECESSARY CHANGES IN THE ELECTRICAL WORK TO CORRECT THE CONDITIONS WITHOUT EXTRA CHARGE.

C. CONTRACTOR SHALL FURNISH TO OTHER TRADES, AS REQUIRED, ALL NECESSARY TEMPLATES, PATTERNS, AND ASSEMBLY DETAILS FOR THE PROPER INSTALLATION OF WORK AND FOR THE PURPOSE OF COORDINATING ADJACENT WORK.

3.02 SCAFFOLDING, RIGGING, HOISTING

A. CONTRACTOR SHALL PROVIDE ALL SCAFFOLDING, RIGGING AND HOISTING NECESSARY FOR ERECTION AND DELIVERY INTO THE PREMISES OF ALL ELECTRICAL EQUIPMENT. REMOVE SAME FROM PREMISES WHEN NO LONGER REQUIRED.

3.03 EXCAVATING AND BACKFILLING

A. CONTRACTOR SHALL PROVIDE ALL TRENCH AND PIT EXCAVATION AND BACKFILLING REQUIRED FOR WORK UNDER THIS SECTION OF THE SPECIFICATIONS, BOTH INSIDE AND OUTSIDE OF THE BUILDING, INCLUDING REPAIRING OF FINISHED SURFACES, ALL REQUIRED SHORING, BRACING, PUMPING, AND ALL PROTECTION FOR SAFETY OF PERSONS AND PROPERTY. LOCAL OR STATE SAFETY CODES SHALL BE FOLLOWED.

B. IN ADDITION, THE CONTRACTOR SHALL CHECK THE ELEVATIONS OF THE UTILITIES ENTERING AND LEAVING THE BUILDING. IF SUCH ELEVATIONS REQUIRE EXCAVATIONS LOWER THAN THE FOOTING LEVELS, THE ARCHITECT/ENGINEER SHALL BE NOTIFIED OF SUCH CONDITIONS BEFORE EXCAVATIONS COMMENCE. CONTRACTOR SHALL MAKE EXCAVATIONS AT THE MINIMUM REQUIRED DEPTHS IN ORDER NOT TO UNDERCUT THE FOOTINGS. CONFORM TO THE REQUIREMENTS OF THE STATE OF FLORIDA "TRENCH SAFETY ACT". FILLING, BACKFILLING AND COMPACTION SHALL BE AS SPECIFIED IN OTHER AREAS OF THE CONTRACT DOCUMENTS AND SPECIFICATIONS.

3.04 MATERIAL AND WORKMANSHIP

A. ALL MATERIALS AND APPARATUS REQUIRED FOR ELECTRICAL WORK, EXCEPT AS SPECIFICALLY NOTED OTHERWISE, SHALL BE NEW, OF FIRST CLASS QUALITY, AND SHALL BE FURNISHED, DELIVERED, ERECTED, CONNECTED AND FINISHED IN EVERY DETAIL AND SHALL BE SO SELECTED AND ARRANGED AS TO FIT PROPERLY INTO THE BUILDING SPACES. WHERE NO SPECIFIC KIND OR QUALITY OF MATERIAL IS GIVEN, A FIRST CLASS STANDARD ARTICLE, AS APPROVED BY THE ENGINEER, SHALL BE PROVIDED.

B. CONTRACTOR SHALL PROCURE THE SERVICES OF AN EXPERIENCED SUPERINTENDENT, WHO SHALL BE CONSTANTLY IN CHARGE OF THE INSTALLATION OF THE WORK, TOGETHER WITH ALL SKILLED WORK PERSONNEL, FITTERS, METAL WORKERS, WELDERS, HELPERS, AND LABOR REQUIRED TO UNLOAD, TRANSFER, ERECT, CONNECT, ADJUST, START, OPERATE AND TEST EACH SYSTEM.

C. ALL EQUIPMENT AND MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER. THIS INCLUDES THE PERFORMANCE OF ALL TESTS RECOMMENDED BY THE MANUFACTURER.

3.05 CUTTING AND PATCHING

A. CONTRACTOR SHALL PROVIDE ALL CUTTING AND PATCHING NECESSARY TO INSTALL ELECTRICAL WORK. PATCHING SHALL MATCH ADJACENT SURFACES AND SHALL MEET THE APPROVAL OF THE ARCHITECT AND OWNER.

B. NO STRUCTURAL MEMBERS SHALL BE CUT OR MODIFIED IN ANY WAY WITHOUT THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER. ANY MODIFICATION SHALL BE DONE IN A MANNER APPROVED BY THE STRUCTURAL ENGINEER.

3.06 SLEEVES AND PLATES

A. CONTRACTOR SHALL PROVIDE AND LOCATE ALL SLEEVES REQUIRED FOR ELECTRICAL WORK BEFORE THE FLOORS, WALLS AND CEILINGS ARE CONSTRUCTED, OR SHALL BE RESPONSIBLE FOR THE COST OF CUTTING AND PATCHING WHERE SLEEVES WERE NOT INSTALLED, OR WHERE INCORRECTLY LOCATED. CONTRACTOR SHALL PROVIDE ALL DRILLING REQUIRED FOR THE INSTALLATION OF HIS HANGERS. SLEEVES SHALL BE PROVIDED FOR ALL CONDUIT PASSING THROUGH CONCRETE FLOOR SLABS ABOVE GRADE AND CONCRETE, MASONRY, TILE AND GYPSUM WALL CONSTRUCTION.

B. CONDUIT THROUGH FLOORS AND WALLS SHALL UTILIZE A U.L. APPROVED FIRE RATED PENETRATION SYSTEM. WHERE SLEEVES ARE PLACED IN EXTERIOR WALLS BELOW GRADE, THE SPACE BETWEEN THE CONDUIT AND THE SLEEVES SHALL BE SEALED WATERTIGHT.

C. WHERE CONDUIT MOTION DUE TO EXPANSION AND CONTRACTION WILL OCCUR, PROVIDE SLEEVES OF SUFFICIENT DIAMETER TO PERMIT FREE MOVEMENT OF THE CONDUIT. CHECK FLOOR AND WALL CONSTRUCTION FINISHES TO DETERMINE PROPER LENGTH OF SLEEVES FOR VARIOUS LOCATIONS. PROVIDE ACTUAL LENGTHS TO SUIT THE FOLLOWING:

1. TERMINATE SLEEVES FLUSH WITH WALLS, PARTITIONS AND CEILING.
2. IN AREAS WHERE CONDUIT IS CONCEALED, AS IN CHASES, TERMINATE SLEEVES 1" ABOVE FLOOR.
3. IN AREAS WHERE CONDUIT IS EXPOSED, EXTEND SLEEVES 2" ABOVE FINISHED FLOOR.
4. SLEEVES SHALL BE CONSTRUCTED OF SCHEDULE 40 STEEL PIPE.

D. FASTEN SLEEVES SECURELY IN FLOORS AND WALLS SO THEY WILL NOT BECOME DISPLACED WHEN CONCRETE IS POURED OR WHEN OTHER CONSTRUCTION IS BUILT AROUND THEM. TAKE PRECAUTIONS TO PREVENT CONCRETE, PLASTER OR OTHER MATERIALS FROM BEING FORCED INTO THE SPACE BETWEEN PIPE AND SLEEVE DURING CONSTRUCTION.

3.07 PENETRATIONS

A. ALL PENETRATIONS THROUGH FIRE RATED FLOORS, WALLS AND CEILINGS SHALL BE PROVIDED WITH A U.L. APPROVED FIRE STOP METHOD IN ACCORDANCE WITH THE 2010 FLORIDA FIRE PREVENTION CODE.

3.08 PROJECT CLOSE-OUT

A. TESTING: FINAL TESTS SHALL BE MADE AFTER WORK HAS BEEN COMPLETED. PROVIDE COPY OF FINAL TEST TO OWNER/ ARCHITECT/ ENGINEER. WHEN REQUESTED, THE CONTRACTOR SHALL CONDUCT REQUIRED OPERATING TEST(S) IN THE PRESENCE OF THE ARCHITECT/ENGINEER AND OTHER AUTHORIZED PERSONS.

B. TESTS SHALL DEMONSTRATE THAT THE SYSTEM FUNCTIONS PROPERLY THROUGHOUT, THAT IT IS FREE FROM GROUNDS AND SHORTS, AND THAT ALL REQUIREMENTS HEREIN HAVE BEEN COMPLIED WITH. CONTRACTOR SHALL PROVIDE ALL NECESSARY INSTRUMENTS AND PERSONNEL FOR TESTS AND THE OWNER WILL SUPPLY THE CURRENT. TESTS SHALL BE AS PRESCRIBED BY THE AUTHORITY HAVING JURISDICTION AND ENGINEER AND SHALL INCLUDE MEGGER TESTS IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS.

3.09 FINAL ACCEPTANCE

A. AFTER TESTING, A FINAL INSPECTION SHALL BE MADE BY THE OWNER/ ARCHITECT/ ENGINEER AND OTHER AUTHORIZED PERSONS WITH THE CONTRACTOR. THE INSPECTION SHALL INCLUDE, BUT NOT BE LIMITED TO, CHECK ALL PANELS ARE COMPLETE WITH NAMEPLATES AND CIRCUIT DIRECTORIES, ALL LIGHTING FIXTURES ARE OPERATING, PROPERLY CLEANED AND LAMPED, AND THAT ALL WORK HAS BEEN PERFORMED IN PROFESSIONAL MANNER.

B. FINAL ACCEPTANCE OF THE PROJECT SHALL NOT PREJUDICE THE OWNER'S RIGHT TO REQUIRE REPLACEMENT AND/OR REPAIR OF ANY DEFECTIVE WORK OR MATERIALS.

3.10 WARRANTY

A. ALL PARTS, MATERIALS, EQUIPMENT AND LABOR FURNISHED UNDER THIS SECTION OF THE SPECIFICATIONS SHALL BEAR A ONE (1) YEAR, NO COST TO THE OWNER, WARRANTY FROM THE DATE OF FINAL ACCEPTANCE. CONTRACTOR SHALL PROVIDE ALL OF THE ABOVE WARRANTY REQUIREMENTS IN A WRITTEN STATEMENT ALONG WITH EQUIPMENT MANUFACTURER'S WARRANTIES.

3.11 RECORD DRAWINGS

A. CONTRACTOR SHALL KEEP ACCURATE RECORDS OF ACTUAL CONDITIONS INCLUDING DEVICE LOCATIONS AND CONDUIT RUNS WHERE DIFFERENT FROM THE CONTRACT DOCUMENTS. CONTRACTOR SHALL PROVIDE OWNER WITH A REPRODUCIBLE SET OF "AS BUILT" PLANS SHOWING THE COMPLETE ELECTRICAL AND FIRE ALARM SYSTEMS AS INSTALLED (AS BUILT DRAWINGS). THE SCALE ON THESE AS BUILT DRAWINGS SHALL BE NO SMALLER THAN THE SCALE USED ON THE ORIGINAL PLANS.

END OF DIVISION 16

PREPARED BY:

GLOBAL SANCHEZ, INC.
BUILDING SYSTEMS ENGINEERING
info@global-sanchez.com CA#: 6237
Bradenton: 816 Manatee Ave. E, Suite 18
Bradenton, FL 34208
Phone: 941-758-2551
Tampa: 3825 Henderson Blvd., Suite 103
Tampa, FL 33629
Phone: 813-281-0001

PROJECT:
MANATEE COUNTY
NORTH COUNTY FUEL DEPOT

PREPARED FOR:
Manatee County
FLORIDA

REVISIONS:

#	DATE	DESCRIPTION
-	11.18.2014	ISSUED FOR PERMIT

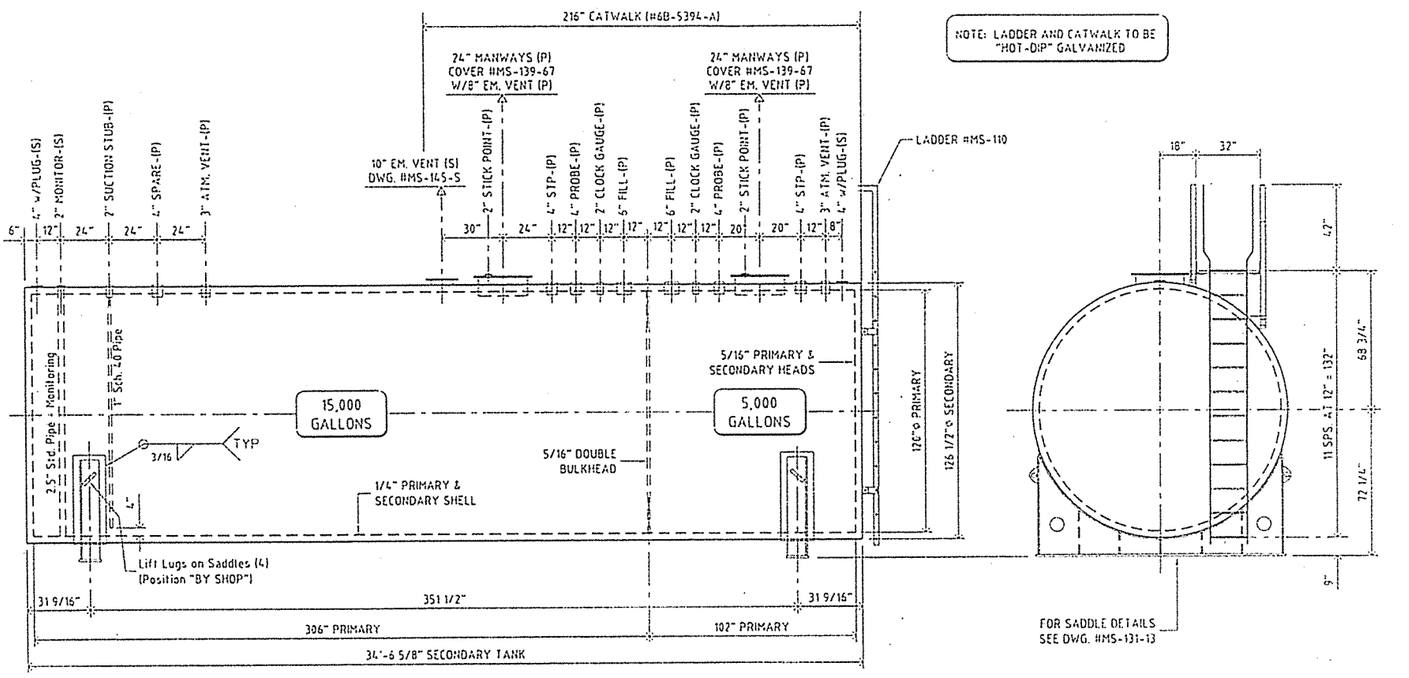
DRAWN BY: N.HAVEN
CHECKED BY: P.FEIKEMA
GS JOB #: 4268.14.00
PLOT SCALE (WHEN PRINTED ON 24x36): AS NOTED

NOT VALID UNLESS SIGNED/DATED/SEALED HERE BY EOR

SHEET TITLE
ELECTRICAL SPECIFICATIONS

SHEET NUMBER
E10.1

Drawing Approved Judy Bernhard 7.1.14



GENERAL NOTES:

1. CAPACITY 15,000/5,000 GALLONS, (20,000 TOTAL).
2. FAB. PER UL-2085, LABEL REQ'D.
3. DOUBLE WALL, TYPE II CONSTRUCTION, 360° WRAP.
4. SHOP TEST AT 3-5 PSI AIR.
5. USE DOUBLE WALL TESTING PROCEDURES.
6. (P)= INDICATES PRIMARY PENETRATION.
7. (S)= INDICATES SECONDARY PENETRATION.
8. FILL INTERSTITIAL SPACE WITH LIGHT WEIGHT INSULATING CONCRETE PER STI SPECIFICATIONS.
9. CLOSE OFF ALL OPENINGS PRIOR TO SHIPMENT.

ALL NOZZLE/MANWAY BOLT HOLES TO STRADDLE NORMAL CENTERLINES OR THEIR PARALLELS, U.N.O.

Mat'l.: CARBON STEEL	Blast Ext.: SSPC-SP6	Int.: - - -
Paint Ext.: Carboguard 8922 Primer + Carbothane 8812 White Polyurethane Finish		
Paint Int.: - - - -		

modern welding company of florida, inc.
ORLANDO - Phone (407) 843-1270 - Fax (407) 423-8187

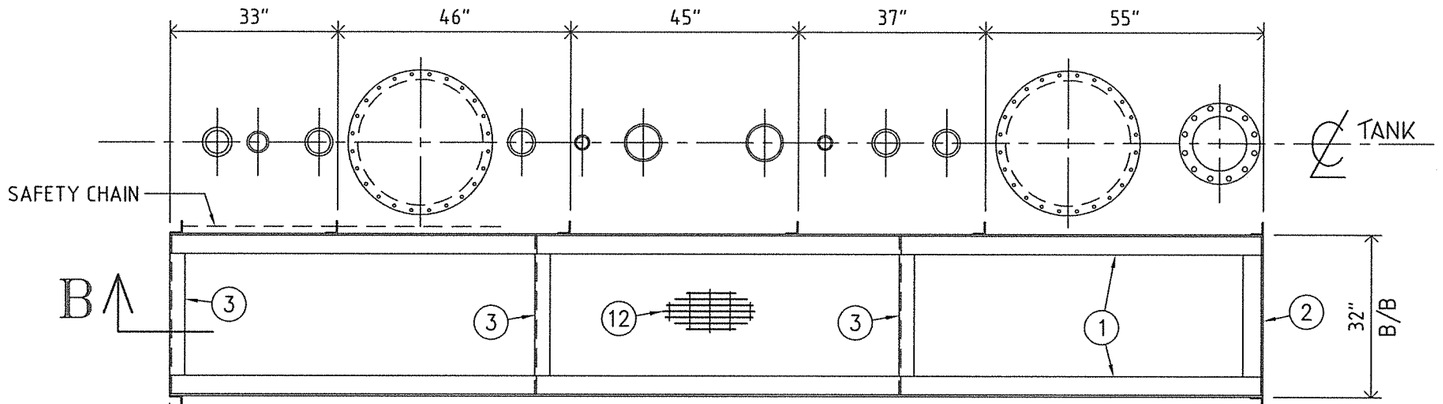
MANATEE COUNTY
20,000 GALLON FIREGUARD TANK

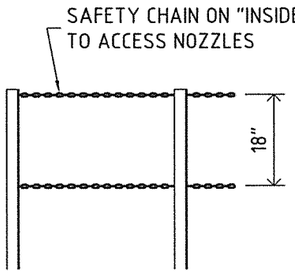
No.	Apr.	Revision	Date

Dwn. by: A.K.	Scale: 1/45	Date: 25 JUNE 2014	Fab/Dwg. No. 6B-5394
Apr. by: J.H.	Job No.:	Sheet 1 of 1	

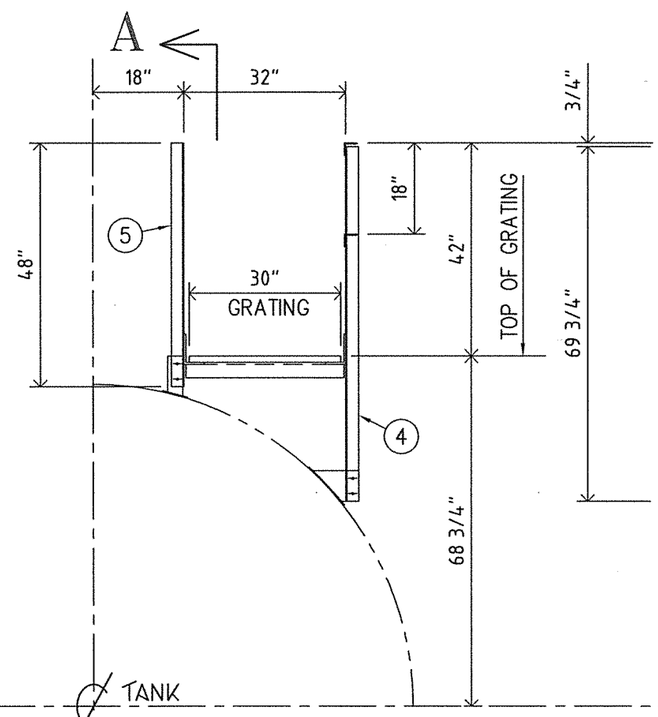
BILL OF MATERIAL

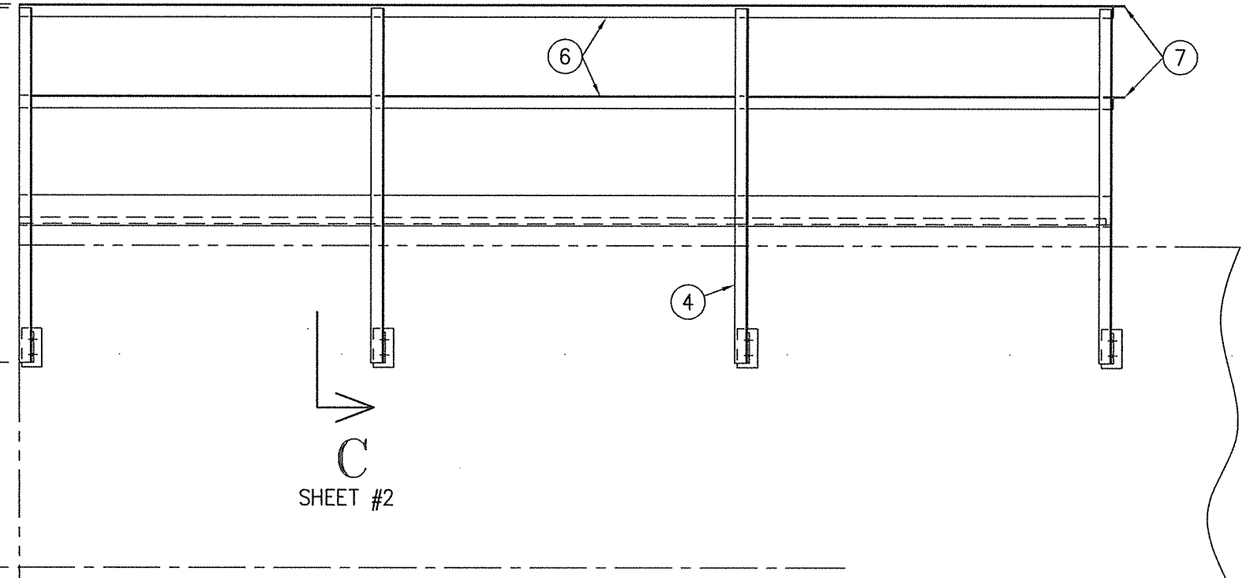
MARK	QTY.	DESCRIPTION	LENGTH	W'GHT.	REMARKS
1	2	L 6" x 4" x 3/8"	216"	443	
2	1	L 6" x 4" x 3/8"	31 1/4"	32	COPE ENDS
3	3	L 3" x 3" x 3/8"	31 1/4"	56	COPE ENDS
4	4	L 2 1/2" x 2 1/2" x 1/4"	69 3/4"	95	
5	6	L 2 1/2" x 2 1/2" x 1/4"	48"	98	
6	2	L 2 1/2" x 2 1/2" x 1/4"	216"	148	
7	2	L 2 1/2" x 2 1/2" x 1/4"	37"	25	
8	4	PL 3/8" x 6"	9"	23	
9	6	FB 3/8" x 4"	7 13/16"	20	
10	4	FB 1/4" x 4"	10 1/4"	12	
11	6	FB 1/4" x 4"	5 1/8"	8	
12	1	GRATING 1 1/2" x 30"	215"	409	
				1369#	TOTAL





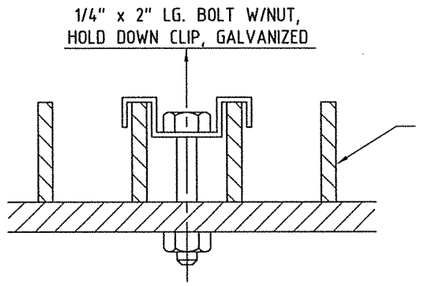
VIEW "A"





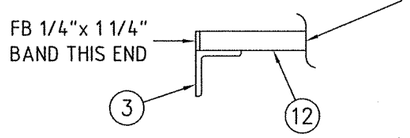
C

SHEET #2



GRATING FASTENING DETAIL
4 CLIPS PER PANEL MIN.
MAX. SPACING: 60"

GRATING: 1 1/4"x 3/16" B/B
ON 1 3/16" CTRS.,
CROSS BARS ON 4" CTRS.



SECTION "B"

No.	Revision	Date

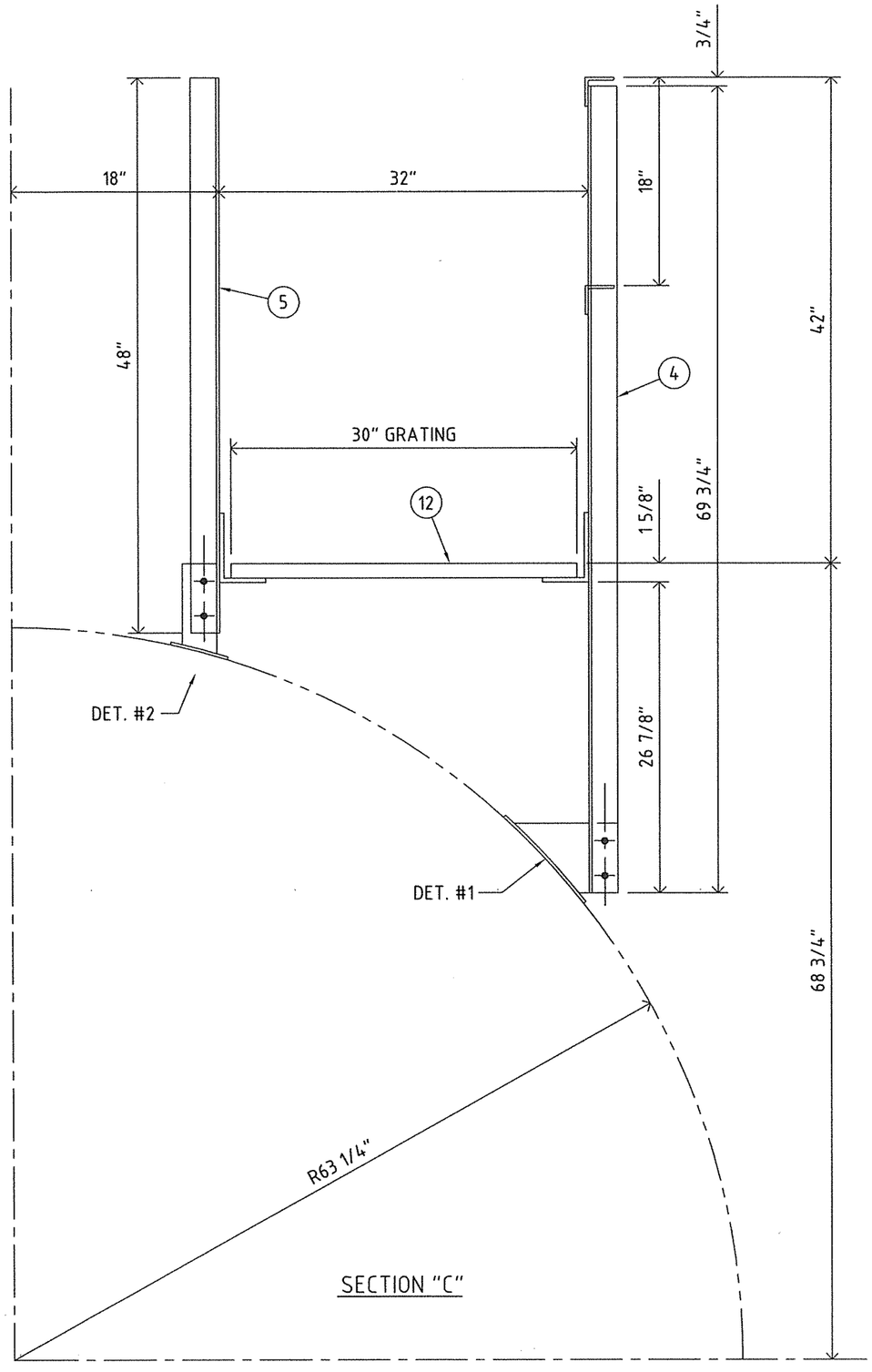
Mat'l.: CARBON STEEL | Blast Ext.:

Paint: "HOT-DIP" GALVANIZED

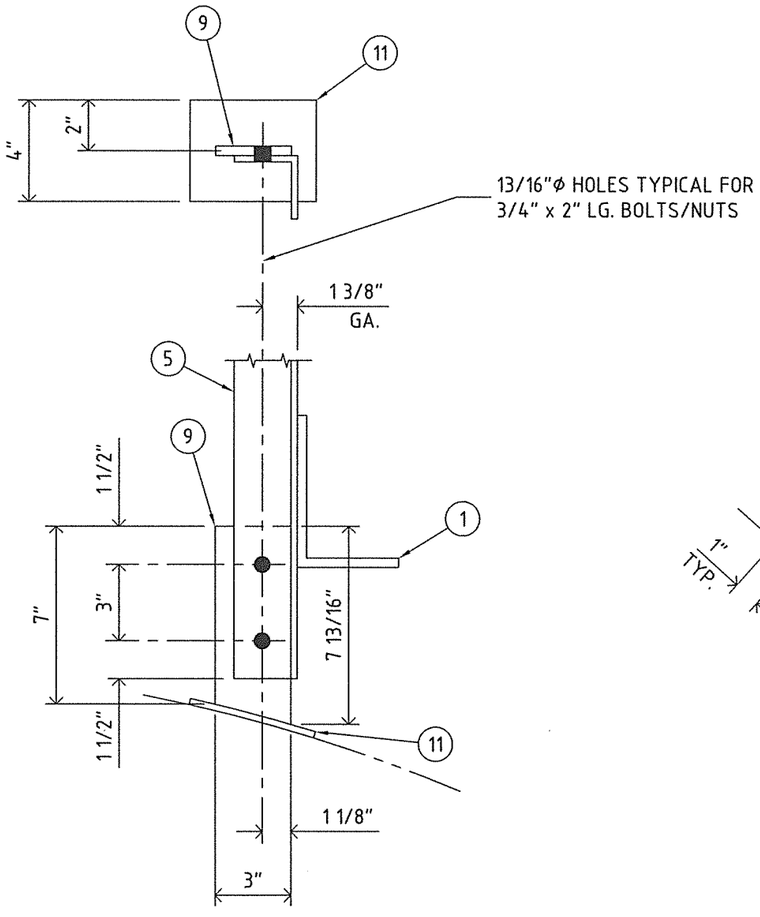
modern welding company of florida, inc.
ORLANDO – Phone (407) 843-1270 – Fax (407) 423-8187

MANATEE COUNTY
CATWALK DETAILS

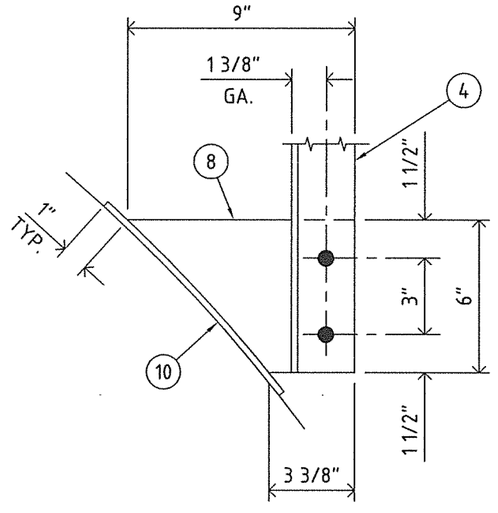
Dwn. by: A.K.	Scale: 1/30	Date: 25 JUNE 2014	File/Dwg. No.
Apr. by: J.H.	Job No.:	Sheet 1 of 2	6B-5394-A



SECTION "C"



DETAIL #2
TYPICAL 6 PLACES



DETAIL #1
TYPICAL 4 PLACES

No.	Revision	Date

Mat'l.: CARBON STEEL | Blast Ext.:

Paint:

modern welding company of florida, inc.
ORLANDO – Phone (407) 843-1270 – Fax (407) 423-8187

MANATEE COUNTY
ADDITIONAL CATWALK DETAILS

Dwn. by: A.K.	Scale: 1"=12"	Date: 25 JUNE 2014	File/Dwg. No.
Apr. by: J.H.	Job No.:	Sheet 2 of 2	6B-5394-A

Building and Development
Services Department
Administrative Review Division
1112 Manatee Avenue West
Bradenton, FL 34205
Phone: (941) 748-4501

May 06, 2014

Mr. Chad Butzow, P.E., Deputy Director
Manatee County Public Works Department
1022 26th Avenue East
Bradenton, Fl. 34208

RE: North County Fuel Depot
7920 69th Street East, Palmetto
PDPI-06-45(P)/FSP-14-24(OSR), DTS#20140172

Dear Mr. Butzow:

The above referenced Final Site Plan has been reviewed by the appropriate reviewing agencies and approved.

This plan is approved under the provisions of Section 508.8.1.3 of the Land Development Code. This site plan expires on 05/06/2018.

The plan shows:

1) The addition of Fuel Pumps at the existing North Water Reclamation Facility (NWRF).

Project Stipulations:

Building and Development:

1) Certification (signed and sealed) or a letter requesting final zoning inspection approval (aka) Certificate of Completion approval from the property owner shall be submitted to Robert Wenzel with the Planning Department once the project is 100% complete and meets substantial compliance with the approved plans. A Final Zoning Inspection will be completed within 48 hours. (two working days) If inadequate, a Deficiency Notice will be forwarded to the Engineer of record and or the owner noting same. Certifications or letters of inspection request listing outstanding construction or substantial deviations are considered STATUS/PROGRESS reports.

RE: North County Fuel Depot, PDPI-06-45(P)FSP-14-24(OSR), DTS#20140172

Please be aware that Impact Fees (if required) will be determined at time of Building Permit. Please contact Ms. Sharla Foquet Impact Fee Coordinator with the Manatee County Financial Management Department at (941) 748-4501 (X)3966 to discuss.

Please contact the Manatee County Building Department to discuss the requirements of building permits (if applicable).

Please do not hesitate to call me at extension 6845 if you have any questions or comments pertaining to this matter.

Sincerely,

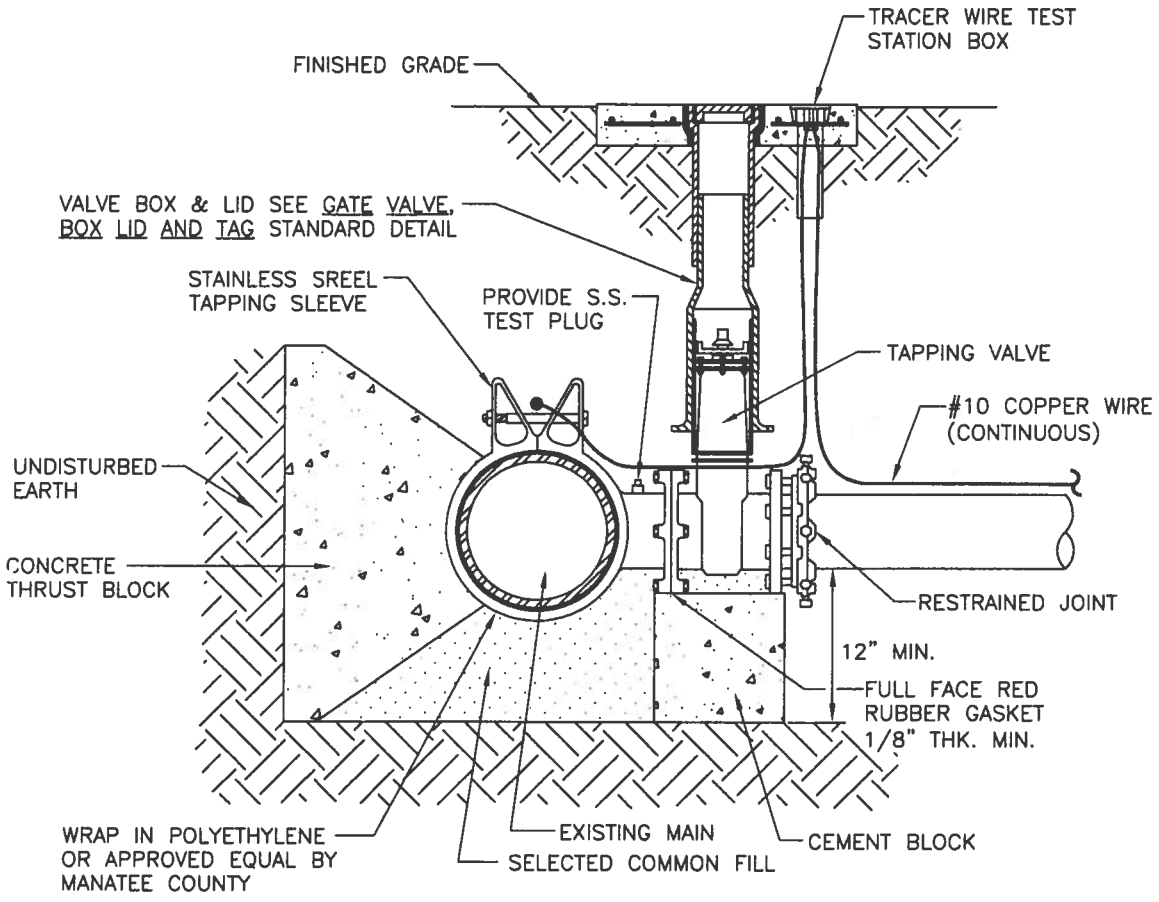
Robert G. Wenzel III
Building and Development Services Department

c: file
DTS

I have read and understand this letter and agree to the conditions and regulations herein.

5/6/14
Date

Property Owner/Developer/Agent



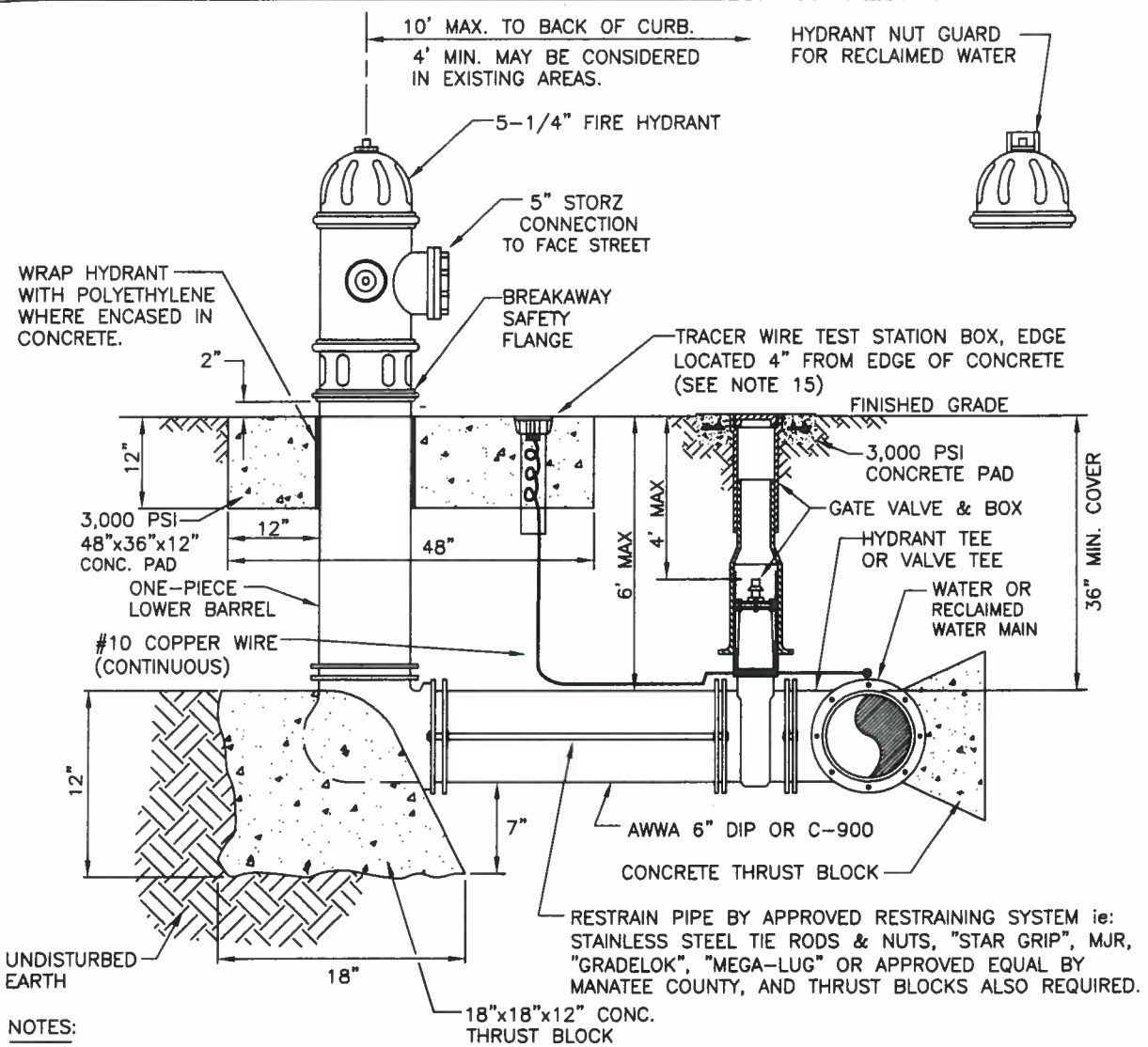
ELEVATION

NOTES:

1. PRIOR TO TAPPING, CONTRACTOR TO DEMONSTRATE 60 MINUTE HYDROSTATIC TEST OF THE TAPPING SLEEVE AND VALVE WITH NO LOSS OF 180 PSI PRESSURE FOR WATER AND RECLAIMED WATER OR 150 PSI FOR FORCE MAIN.
2. ALL FITTINGS TO BE WRAPPED WITH 20 MIL VISQUEEN AT THRUST BLOCK.
3. ALL TAPS ON CONCRETE WATER MAINS AND LARGER THAN 12" ARE TO BE MADE BY A MANATEE COUNTY APPROVED TAPPING COMPANY. ALL MATERIALS TO BE SUPPLIED BY THE CONTRACTOR.
4. ALL TAPS MUST BE OF A SMALLER SIZE THAN THE MAIN BEING TAPPED & PLACED NO CLOSER THAN 30" OR A DISTANCE EQUAL TO (1) MAIN PIPE DIAMETER PLUS (2) TAP PIPE DIAMETERS (WHICHEVER IS GREATER) FROM A JOINT OR FITTING.
5. CONTRACTOR TO SUPPLY A DRY HOLE FOR TAPPING CREW TO WORK IN AND A BACK-HOE TO LOWER TAPPING MACHINE INTO THE HOLE.
6. WHERE THRUST BLOCK NOT USED, RESTRAINED JOINTS MUST THEN EXTEND FROM TEE FULL LENGTH SPECIFIED FOR "TEES."
7. TRACER WIRE TEST STATION BOX IS REQUIRED AT CONNECTIONS TO EXISTING MAINS.

1 ADOPTED 5/1/14

MANATEE COUNTY PUBLIC WORKS DEPARTMENT			TAPPING SLEEVE AND VALVE	UW-4
REV.BY	DATE			
CLB/KE	11/10	MAY 10, 2011 DATE OF APPROVAL		PAGE 122



NOTES:

1. WEEPHOLES SHALL BE EXCLUDED FROM THE FIRE HYDRANT.
2. FIRE HYDRANTS SHALL BE A MINIMUM OF 6' OFF EDGE OF PAVEMENT AND 10' MAX. FROM BACK OF CURB. WHERE POSSIBLE AND WHERE SIDEWALK IS TO BE INSTALLED, FIRE HYDRANT SHALL BE LOCATED BETWEEN SIDEWALK AND RIGHT-OF-WAY LINE.
3. HYDRANTS SHALL BE FUSION BONDED EPOXY COATED SAFETY YELLOW FOR WATER AND PURPLE (PANTONE 522C) FOR RECLAIMED WATER. HYDRANT SHALL BE DUCTILE IRON CONSTRUCTION.
4. FIRE HYDRANTS SHALL BE PLACED SO THAT STORM WATER FLOWS AWAY FROM THE HYDRANT.
5. FIRE HYDRANTS SHALL BE CONSTRUCTED WITH "GROUND LINE" SET TO FINISHED GRADES AS ESTABLISHED IN THE FIELD. NORMAL BURY IS 3 FEET OF COVER FOR ALL WATER LINES.
6. FIRE HYDRANTS MAY BE CONSTRUCTED WITH "GRADELOK" OFFSET FITTING.
7. RAISED REFLECTIVE PAVEMENT MARKER (BLUE) FOR POTABLE WATER (PURPLE) FOR RECLAIMED WATER. SHALL BE INSTALLED AT CENTERLINE OF PAVEMENT ADJACENT TO EACH HYDRANT.
8. PRECAST CONCRETE THRUST BLOCKS & PADS SHALL NOT BE USED.
9. ALL EXPOSED EDGES OF CONCRETE SHALL HAVE 1/2" CHAMFER.
10. FIRE HYDRANT VALVE SHALL BE FASTENED DIRECTLY TO TEE.
11. IN-LINE VALVES SHOULD BE LOCATED AT HYDRANT TEES.
12. HYDRANTS SHALL BE LOCATED ON SAME SIDE OF ROAD AS WATER MAIN UNLESS OTHERWISE APPROVED.
13. THERE MUST BE A CLEARANCE OF 7 1/2 FEET FROM FRONT AND BOTH SIDES, AND FOUR FEET TO THE REAR OF THE HYDRANT, TO ABOVE GRADE OBSTRUCTIONS INCLUDING POSTS, FENCES, TREES, ETC, PER THE FLORIDA FIRE PREVENTION CODE.
14. SEE STANDARD DETAIL GATE VALVE, BOX, LID AND TAG.
15. SHOULD THE FIRE HYDRANT'S CONCRETE PAD OVERLAP THE SIDEWALK, THE TRACER WIRE TEST STATION BOX SHALL NOT BE LOCATED WITHIN THE SIDEWALK.

Δ ADDED 5/1/14

MANATEE COUNTY PUBLIC WORKS DEPARTMENT				
REV.BY	DATE	MAY 10, 2011 DATE OF APPROVAL	FIRE HYDRANT ASSEMBLY	UW-5
CLB/KE	11/10			
				PAGE 123

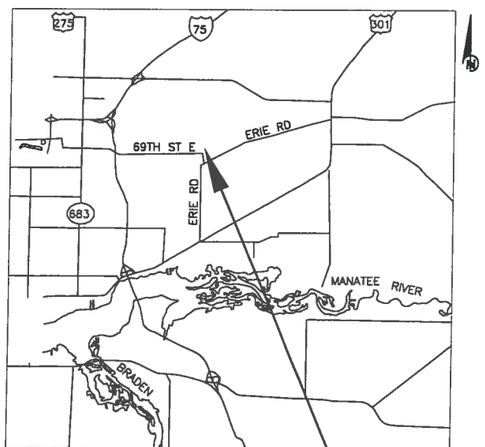
NOTES:

1. SITE PARCEL ID: 655700109
2. ZONING: PD-PI, NCO
3. CURRENT LAND USE DESCRIPTION: WWTP, GOLF COURSE, MAINTENANCE FACILITIES
4. PROPOSED LAND USE DESCRIPTION: FUEL DEPOT
5. THE SITE LIES WITHIN FLOOD ZONES "X" (OUTSIDE THE 500 YEAR FLOOD PLAIN), AS SCALED FROM MANATEE COUNTY FLOOD INSURANCE RATE MAP, PANEL No. 205C
6. THERE ARE NO KNOWN FOUNDATIONS, MOUNDS OR MIDDEN AREAS OF HISTORIC ORIGIN, OR PLATTED STREETS LOCATED ON THIS SITE.
7. THERE ARE NO WETLANDS WITHIN PROJECT LIMITS AND LIMITS ARE 30' AWAY FROM VEGETATION LINE.
8. THERE IS NO KNOWN WELLS ON SITE. EXISTING WELL(S) DISCOVERED WITHIN THE LIMITS OF DISTURBANCE SHALL BE SEALED AND ABANDONED BY A LICENSED WELL CONTRACTOR IN ACCORDANCE WITH RULE 40D-3.531.
9. INFRASTRUCTURE CONSTRUCTION WILL COMMENCE JULY 2014 AND WILL BE COMPLETED WITHIN SIX MONTHS OF PLAN APPROVAL AND CERTIFICATE OF LEVEL OF SERVICE APPROVAL.
10. SEDIMENTATION AND EROSION CONTROL MEASURES WILL BE IN COMPLIANCE WITH SECTION 217 OF THE MANATEE COUNTY LAND DEVELOPMENT CODE. TO PREVENT SEDIMENTARY RUNOFF DURING CONSTRUCTION, STAKED HAY BALES, STAKED SILT SCREENS OR INLET DEBRIS CONTROL SCREENS ARE TO BE PLACED AT STORM INLETS, OUT FALL LOCATIONS AND ADJACENT PROPERTY LINES AS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE SEDIMENTATION BARRIERS IN A WORKING MANNER FOR THE DURATION OF CONSTRUCTION AND SHOULD BE CHECKED DAILY. SILTATION ACCUMULATIONS GREATER THAN THE LESSER OF 12 INCHES OR ONE-HALF OF THE DEPTH OF THE SEDIMENTATION BARRIER SHALL BE IMMEDIATELY REMOVED AND REPLACED IN UPLAND AREAS. IN ADDITION TO SPECIFIED EROSION CONTROL LOCATIONS, THE CONTRACTOR SHALL PERFORM DAILY SITE INSPECTIONS FOR POTENTIAL EROSION PROBLEMS. IF PROBLEMS OCCUR, THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING APPROPRIATE EROSION CONTROL IMMEDIATELY. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING TEMPORARY EROSION CONTROL DEVICES FOLLOWING COMPLETION OF ALL CONSTRUCTION AND FINAL STABILIZATION.
11. NOTIFY MANATEE COUNTY ENVIRONMENTAL PLANNING DIVISION PRIOR TO THE INITIATION OF CONSTRUCTION. A PRE CONSTRUCTION INSPECTION OF THE SEDIMENTATION AND EROSION CONTROL (S&EC) DEVICES MAY BE REQUIRED AND WILL BE THE OPTION OF THE E.P.D. STAFF.
12. EASEMENTS, DEDICATIONS, & RESERVATIONS WILL BE PROVIDED IN ACCORDANCE WITH MANATEE COUNTY LAND DEVELOPMENT CODE.
13. NO WETLAND OR OTHER SURFACE WATERS IMPACTS ARE PROPOSED WITH THIS PLAN.
14. NO POTABLE WATER, SANITARY SEWER, OR RECLAIM/IRRIGATION EXTENSIONS ARE PROPOSED WITH THIS PLAN.

SITE DATA:

SITE ACRES: 2.08

LEGAL DESCRIPTION: ON FILE, SUBMITTED WITH MODIFICATION TO GDP



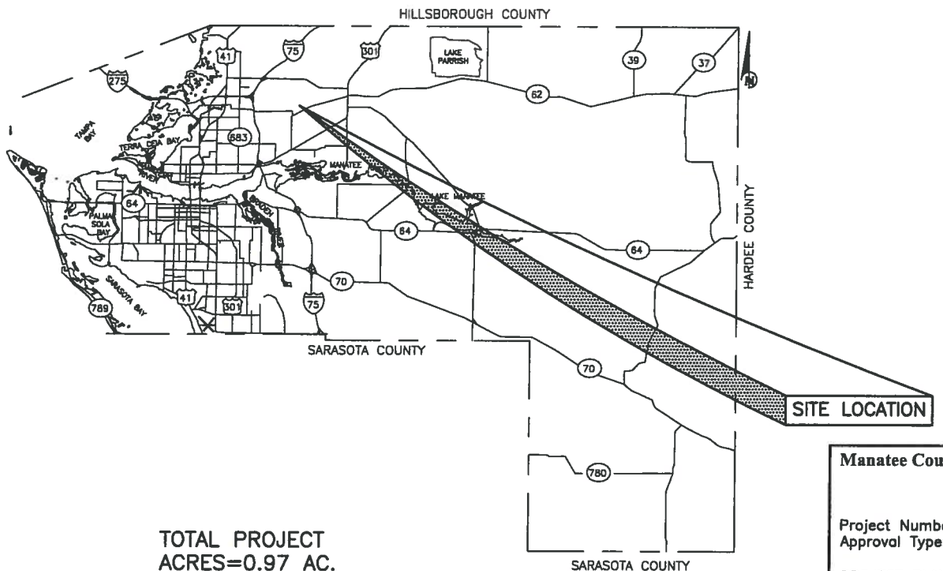
VICINITY MAP
N.T.S.

PROJECT SITE

Manatee County
FLORIDA

NORTH COUNTY FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
501-0003602

APRIL 2014



TOTAL PROJECT
ACRES=0.97 AC.

NO.	INDEX OF SHEETS
1	COVER SHEET
2–3	GENERAL NOTES & LEGEND
4	SURVEY
5	FINAL SITE PLAN W/AERIAL
6	PAVING, GRADING & DRAINAGE PLAN
7	SECTIONS & CONSTRUCTION DETAILS
8	FUEL TANK PLAN
9	FUEL TANK/SLAB DETAILS/LIGHTING
10	LANDSCAPE/IRRIGATION/BMP/UAS PLAN
11	BEST MANAGEMENT PRACTICES DETAILS

PROJECT DESCRIPTION

The proposed fuel depot facility will include:
Three (3) fuel pumps to accommodate two (2) diesel and one (1) gasoline vehicles at the same time,
One (1) "Diesel Exhaust Fluid" (urea) Dispenser for compliance with EPA emissions,
Two (2) above ground tanks:

- **a 20,000 gallon tank with two compartments, one for gasoline (5,000 gallons), and one for diesel (15,000 gallons), and**
- **a 1,000 gallon DEF tank to support EPA compliance.**

Manatee County Building & Development Services Signature Block

Project Number: PDPI–06–45(P) FSP–14–24 (OSR) Project Name: NORTH COUNTY FUEL DEPOT
Approval Type: PSP/FSP DTS Number: 2014 0172

PROJECT PLANNER _____ DATE 05/06/14
PROJECT ENGINEER _____ DATE _____
CONCURRENCY _____ DATE _____
NATURAL RESOURCES _____ DATE _____
ENVIRONMENTAL HEALTH _____ DATE _____
FIRE DISTRICT _____ DATE _____

Attention: The combination of this signed plan and accompanying approval letter constitutes the complete approval document. Both documents should be provided to interested parties and submitted with any building permit application. There may be other documents, including a CCOS that affect this project approval.

Rec'd by OWNER/AGENT _____ DATE 5/6/14

CHRISTOPHER LEE MOWBRAY LICENSE No. 46777 STATE OF FLORIDA PROFESSIONAL ENGINEER

811 Know what's below Call before you dig

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY
FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
COVER SHEET

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	501–0003602
SURVEY #	20130801
SEC./TWN./RGE	26,27,35/33S/18
SCALE	SCALE BAR

	BY	DATE
SURVEYED	T. BOYLE	11/13/13
DESIGNED	C.M.	03/10/14
DRAWN	K.R.	03/10/14
CHECKED	C.M.	04/4/14

CHRISTOPHER MOWBRAY P.E.
FLORIDA P.E. # 46777
4/30/14
Signature & Date

SHEET 1

GENERAL

1. ALL CONSTRUCTION ACTIVITIES SHALL BE COORDINATED WITH THE PROJECT MANAGEMENT DIVISION.
THE PROJECT MANAGER IS: JUDY BERISFORD
AND CAN BE REACHED AT (941) 708-7450; EXT. 7524

2. SITE VISITS ARE MANDATORY FOR ALL BIDDERS. THESE SITE VISITS CAN BE ARRANGED THROUGH THE PROJECT MANAGER.

3. ALL CONSTRUCTION ON THIS PROJECT SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF MANATEE COUNTY UTILITY AND TRANSPORTATION STANDARDS AND/OR FDOT "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" UNLESS OTHERWISE INDICATED ON THE PLANS.

4. VERTICAL CONTROL FOR THIS PROJECT WAS ESTABLISHED BY A MINIMUM OF TWO REFERENCE BENCHMARKS DESCRIBED ON THE "THE NATIONAL AMERICAN VERTICAL DATUM OF 1988", (NAVD '88).

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL CONDITIONS AND REQUIREMENTS OF ALL PERMITS AND ALL GOVERNING FEDERAL, STATE, AND LOCAL AGENCIES. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS THAT ARE NOT PROVIDED IN THE BID DOCUMENTS, AT NO ADDITIONAL COST TO THE OWNER.

6. THE INFORMATION PROVIDED IN THESE PLANS IS SOLELY TO ASSIST THE CONTRACTOR IN ASSESSING THE NATURE AND EXTENT OF THE CONDITIONS WHICH MAY BE ENCOUNTERED DURING THE COURSE OF WORK. ALL CONTRACTORS ARE DIRECTED, PRIOR TO BIDDING, TO CONDUCT WHATEVER INVESTIGATION THEY MAY DEEM NECESSARY TO ARRIVE AT THEIR OWN CONCLUSIONS REGARDING THE ACTUAL CONDITIONS THAT WILL BE ENCOUNTERED, AND UPON WHICH THEIR BIDS WILL BE BASED.

7. THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS ON THE PLANS AND REVIEW ALL FIELD CONDITIONS THAT MAY AFFECT CONSTRUCTION. SHOULD DISCREPANCIES OCCUR, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO OBTAIN THE ENGINEER'S CLARIFICATION BEFORE COMMENCING WITH CONSTRUCTION.

8. AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT SUNSHINE STATE ONE CALL OF FLORIDA AT 1-800-432-4770 OR THE NATIONAL 811 ONE CALL NUMBER WHEN APPLICABLE FOR UTILITY LOCATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL UTILITIES FOR THE POSSIBLE RELOCATION OR THE TEMPORARY MOVEMENT OF ANY EXISTING UTILITIES WITHIN THE RIGHTS-OF-WAY.

9. NO WORK, EXCEPT FOR EMERGENCY TYPE, SHALL BE PERFORMED AFTER 7:00 PM AND BEFORE 7:00 AM. FOR ADDITIONAL PROJECT RESTRAINTS, REFER TO SECTION 01310 OF THE SPECIFICATIONS.

10. ALL STATIONS AND OFFSETS REFER TO BASELINE OF CONSTRUCTION, UNLESS OTHERWISE NOTED.

11. THE CONSTRUCTION LENGTHS IN THESE PLANS ARE APPROXIMATE. ACTUAL LIMITS MAY BE SET IN THE FIELD AS DIRECTED BY THE ENGINEER.

12. SEPARATE PAYMENT SHALL BE MADE ONLY FOR THE ITEMS OF WORK LISTED AND IDENTIFIED BY APPROPRIATE PAY ITEM ON THE BID FORM. THE COST OF ANY RELATED WORK NOT SPECIFICALLY IDENTIFIED, BUT WHICH IS REQUIRED FOR SATISFACTORY COMPLETION OF THE WORK, SHALL BE CONSIDERED TO BE INCLUDED IN THE CONTRACT PRICE FOR THE APPROPRIATE BID ITEM.

13. THE CONTRACTOR SHALL HAVE A FOREMAN, OR RESPONSIBLE PARTY, ON SITE AT ALL TIMES WHEN WORK IS BEING PERFORMED. ALL WORKERS ON THE JOB SITE WILL BE COURTEOUS TO THE PUBLIC AT ALL TIMES, AND SHALL REFER ANY QUESTIONS OR CONCERNS TO THE CONTRACTOR'S FOREMAN OR THE COUNTY INSPECTOR. THE FOREMAN SHALL SPEAK AND UNDERSTAND ENGLISH AND SHALL BE AVAILABLE AT ALL TIMES FOR TIMELY RESOLUTION OF PROJECT-RELATED ISSUES.

14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE COORDINATION OF CONSTRUCTION SCHEDULING BETWEEN CONTRACTOR AND ALL UTILITY AGENCIES.
NOTE:
THIS INCLUDED MEETING WITH UTILITY AGENCIES PRIOR TO THE PRE-CONSTRUCTION CONFERENCE TO ADJUST THEIR SCHEDULES TO COINCIDE WITH THE CONTRACTORS CONSTRUCTION SCHEDULE. (REFERENCE CONTRACT DOCUMENTS)

15. ANY DAMAGE TO STATE, COUNTY, OR LOCAL ROADS CAUSED BY THE CONTRACTOR'S HAULING OR EXCAVATION EQUIPMENT SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTORY OF THE COUNTY PROJECT MANAGER. PAYMENT SHALL NOT BE MADE FOR THIS WORK.

SAFETY

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE FLORIDA TRENCH SAFETY ACT, 90-96, LAWS OF FLORIDA EFFECTIVE OCTOBER 1, 1990 AND THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION EXCAVATION SAFETY STANDARDS, 29 CFR 1926.650, SUBPART P, AS AMENDED. THE CONTRACTOR SHALL INCLUDE IN THE TOTAL BID PRICE ALL COSTS FOR COMPLIANCE WITH THESE REGULATIONS.

17. THE CONTRACTOR SHALL USE SHEET PILING, SHEETING, BRACING, ETC., AS REQUIRED IN ALL EXCAVATION AREAS AND CONFORM TO ALL OSHA REQUIREMENTS.

18. THE CONTRACTOR SHALL USE ALL NECESSARY SAFETY PRECAUTIONS TO AVOID CONTACT WITH OVERHEAD AND UNDERGROUND UTILITIES, POWER LINES, ETC.

19. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. THIS EXCLUSION DOES NOT ALLEVIATE THE CONTRACTOR FOR PROVIDING A CONTINUOUS SAFE WORKSPACE.

ENVIRONMENTAL

20. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION ALL SEDIMENT AND EROSION CONTROL (SEC) DEVICES (E.G., BARRIERS, SEDIMENT TRAPS/BASINS, VEGETATIVE BUFFERS, ETC.) AS SPECIFIED IN THE FINAL APPROVED PLANS FOR THE PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL SEC DEVICES UTILIZED DURING THE PROJECT, AS WELL AS INSTALLATION & MAINTENANCE OF ANY ADDITIONAL MEASURES DEEMED NECESSARY DURING PROJECT IMPLEMENTATION, TO PREVENT EROSION AND OFF-SITE SEDIMENT MIGRATION. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR REMOVAL AND PROPER DISPOSAL OF ALL SEC DEVICES UPON CONCLUSION OF THE PROJECT, AND UPON ADEQUATE STABILIZATION OF DISTURBED SOILS.

21. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY STORM WATER, EROSION, AND SEDIMENTATION CONTROL MEASURES IN ACCORDANCE WITH THE FDEP "FLORIDA STORM WATER, EROSION AND SEDIMENTATION CONTROL INSPECTOR'S MANUAL". IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTROL AND PREVENT EROSION AND TRANSPORT OF SEDIMENT TO SURFACE DRAINS AND TO DITCHES DURING CONSTRUCTION.

22. STOCKPILES SHALL BE PROTECTED AT ALL TIMES BY ON-SITE DRAINAGE CONTROLS WHICH PREVENT EROSION OF THE STOCKPILED MATERIAL. CONTROL OF DUST FROM SUCH STOCKPILES IS REQUIRED, DEPENDING UPON THEIR LOCATION AND THE EXPECTED LENGTH OF TIME THE STOCKPILES WILL BE PRESENT. IN NO CASE SHALL ANY STOCKPILED MATERIAL REMAIN AFTER THIRTY (30) CALENDAR DAYS.

23. STORM WATER INLETS IN THE VICINITY OF THE PROJECT SHALL BE PROTECTED BY SEDIMENT TRAPS SUCH AS SECURED HAY BALES, SOD, STONE, ETC., WHICH SHALL BE MAINTAINED AND MODIFIED AS REQUIRED BY CONSTRUCTION PROGRESS, AND WHICH MUST BE APPROVED BY THE ENGINEER BEFORE INSTALLATION. THIS WILL BE MAINTAINED TO PREVENT DEGRADATION OF THE WATERS OF THE COUNTY AND STATE.

24. SEDIMENT BASINS AND TRAPS, PERIMETER BERMS, SEDIMENT BARRIERS, VEGETATIVE BUFFERS, AND OTHER MEASURES INTENDED TO TRAP SEDIMENT AND/OR PREVENT THE TRANSPORT OF SEDIMENT ONTO ADJACENT PROPERTIES, OR INTO EXISTING BODIES OF WATER, MUST BE INSTALLED, CONSTRUCTED, OR IN THE CASE OF VEGETATIVE BUFFERS, PROTECTED FROM DISTURBANCE, AS A FIRST STEP IN THE LAND ALTERATION PROCESS. SUCH SYSTEMS SHALL BE FULLY OPERATIVE BEFORE ANY OTHER DISTURBANCE OF THE SITE BEGINS. EARTHEN STRUCTURES INCLUDING BUT NOT LIMITED TO BERMS, EARTH FILTERS, DAMS OR DIKES SHALL BE STABILIZED AND PROTECTED FROM DRAINAGE DAMAGE OR EROSION WITHIN ONE (1) WEEK OF INSTALLATION.

25. ALL SWALES, DITCHES, AND CHANNELS LEADING FROM THE SITE SHALL BE PROTECTED FROM SILTATION AND EROSION DURING CONSTRUCTION AND BE SODDED WITHIN THREE (3) DAYS OF EXCAVATION.

26. SOIL DISPLACED BY CONSTRUCTION WILL BE REMOVED. EROSION CONTROL SHALL BE IMPLEMENTED IN AREAS WHICH ARE CONSIDERED ENVIRONMENTALLY SENSITIVE. EROSION CONTROL SYSTEMS SHALL BE REQUIRED FOR ALL WORK WITHIN JURISDICTIONAL AREAS. THESE SYSTEMS MAY INCLUDE STAKED HAY BALES, SILT SCREENS, FILTER FABRIC, AND TURBIDITY SCREENS.

27. ALL EROSION AND POLLUTION CONTROL DEVICES SHALL BE CHECKED REGULARLY, ESPECIALLY AFTER EACH RAINFALL AND SHALL BE CLEANED OUT AND/OR REPAIRED AS REQUIRED.

28. THE CONTRACTOR SHALL NOT ENTER UPON OR IN ANY WAY ALTER WETLAND AREAS THAT MAY BE ON OR NEAR THE CONSTRUCTION SITE. ALL WORK IN THE VICINITY OF OPEN WATER AND/OR WETLANDS IS TO BE PERFORMED IN COMPLIANCE WITH THE ENVIRONMENTAL REGULATIONS AND/OR PERMITS FOR THE SITE. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY FINES RESULTING FROM HIS VIOLATION OF ANY REGULATIONS OR PERMIT CONDITIONS.

29. FOR MORE INFORMATION, SEE THE EROSION CONTROL DETAIL SHEET INCLUDED IN THE PLANS.

RIGHT-OF-WAY

30. ALL CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO WITHIN THE MANATEE COUNTY/FDOT RIGHT-OF-WAY AND/OR EASEMENTS SHOWN ON THE DRAWINGS.

31. THE CONTRACTOR SHALL EMPLOY A LAND SURVEYOR REGISTERED IN THE STATE OF FLORIDA TO REFERENCE AND RESTORE PROPERTY CORNER MONUMENTS, PINS, AND LANDMARKS THAT MAY BE DISTURBED BY CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.

32. THE CONTRACTOR, PRIOR TO CONSTRUCTION AND RESTRICTING ANY TRAFFIC, MUST OBTAIN A RIGHTS-OF-WAY USE PERMIT AND A TRAFFIC CONTROL PLAN. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS FROM OTHER GOVERNMENTAL AGENCIES HAVING RELEVANT JURISDICTION. ALL MAINTENANCE AND PROTECTION OF TRAFFIC SHALL BE IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF THE CURRENT FLORIDA DEPARTMENT OF TRANSPORTATION "MANUAL OF TRAFFIC CONTROL AND SAFE PRACTICES". A TRAFFIC CONTROL PLAN SHALL BE SUPPLIED BY THE CONTRACTOR AT THE PRE-CONSTRUCTION MEETING.

33. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ALL DAMAGED STORM WATER STRUCTURES, PIPING, ENTRANCE PIPE AND HEADWALLS, THAT ARE TO REMAIN, WHETHER SHOWN ON THE PLANS OR NOT.

34. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH IN THE FIELD THE RIGHT-OF-WAY LINES, BASE LINES, BENCH MARKS (ELEV.), CENTER LINES, AND STATIONING AS REQUIRED TO CONSTRUCT THIS PROJECT. ROADWAY PLANS AND PROPOSED DESIGN ARE BASED ON TOPOGRAPHIC SURVEYS PROVIDED BY MANATEE COUNTY PROJECT MANAGEMENT AND ZOLLAR NAJJAR & SHROYER UNDER COUNTY PROJECT NO'S 334-6001060 AND 319-6045661. REFER TO THE ORIGINAL SIGNED AND SEALED SURVEY CONTROL SHEETS IN THE PROJECT FILE.

35. THE CONTRACTOR SHALL COORDINATE THE CUTTING OF DRIVEWAYS WITH THE PROPERTY OWNER PRIOR TO CUT. ALL DRIVEWAYS WILL BE IN PASSABLE CONDITION AT THE END OF THE WORK DAY AND FULLY RESTORED PER SPEC. 2575. THE CONTRACTOR SHALL COORDINATE WITH THE AFFECTED UTILITY COMPANY FOR THE ADJUSTMENT OF ANY EXISTING UTILITIES AND STRUCTURES IN ORDER TO MATCH THE PROPOSED ELEVATIONS AND ALIGNMENTS.

36. A RIGHT OF ENTRY AGREEMENT SHALL BE OBTAINED BY THE PROJECT MANAGER FROM THE PROPERTY OWNER BEFORE ANY DRIVEWAY CONSTRUCTION WORK IS DONE OUTSIDE OF THE RIGHT-OF-WAY OR EASEMENT.

UTILITIES

37. LOCATIONS, ELEVATIONS AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES ARE SHOWN TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS BUT DO NOT PURPORT TO BE ABSOLUTELY CORRECT. THERE MAY BE OTHER IMPROVEMENTS, UTILITIES, ETC. WHICH ARE WITHIN THE PROJECT AREA AND WHICH HAVE NOT BEEN LOCATED OR IDENTIFIED, MAY NOT BE IN THE EXACT LOCATION SHOWN OR RELOCATED SINCE THE PREPARATION OF THESE PLANS. THE CONTRACTOR SHALL VERIFY, PRIOR TO CONSTRUCTION, THE LOCATIONS, ELEVATIONS AND DIMENSIONS OF ALL EXISTING UTILITIES STRUCTURES AND OTHER FEATURES (WHETHER OR NOT SHOWN ON THE PLANS) THAT MAY AFFECT HIS WORK. ALL EXISTING UTILITIES TO BE EXTENDED, CROSSED OR CONNECTION POINTS SHALL BE EXPOSED PRIOR TO CONSTRUCTION TO VERIFY LOCATION AND ELEVATION. ANY DISCREPANCIES OR CONFLICTS FOUND SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR RESOLUTION. UTILITIES DESIGNATED VV, VH, AND VVH ARE BASED ON LIMITED INVESTIGATION TECHNIQUES AND SHOULD BE CONSIDERED APPROXIMATE ONLY. THE VERIFIED LOCATIONS/ELEVATIONS APPLY ONLY AT THE POINTS SHOWN. INTERPOLATIONS BETWEEN THESE POINTS HAVE NOT BEEN VERIFIED. EXTREME CAUTION SHALL BE EXERCISED WHEN WORKING NEAR THE 20"/24" WATERLINE.

38. THE CONTRACTOR SHALL PROTECT ALL EXISTING STRUCTURES, WATER AND SEWER LINES, STORM DRAINS, UTILITIES, DRIVEWAYS, SIDEWALKS, SIGNS, MAIL BOXES, FENCES, TREES, LANDSCAPING, AND ANY OTHER IMPROVEMENT OR FACILITY IN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL REPAIR AND/OR REPLACE ANY DAMAGED ITEM DUE TO HIS CONSTRUCTION ACTIVITIES TO EQUAL OR BETTER THAN PRE-CONSTRUCTION CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.

39. THE CONTRACTOR SHALL USE APPROPRIATE TECHNIQUES, AS APPROVED, RECOMMENDED OR OFFERED BY PEACE RIVER ELECTRIC TO PREVENT UNDERMINING OF POWER POLES DURING CONSTRUCTION. IF HOLDING OF POWER POLES IS RECOMMENDED OR REQUIRED BY THE UTILITY, THE CONTRACTOR SHALL COORDINATE THIS ACTIVITY WITH THE UTILITY AND BEAR ALL RELATED COSTS.

40. ANY TEMPORARY SHUTDOWNS FOR MODIFICATIONS OF EXISTING COUNTY SEWER, POTABLE & RECLAIM WATER SYSTEMS THAT MUST REMAIN IN SERVICE DURING CONSTRUCTION SHALL BE KEPT TO A MINIMUM AND SHALL BE COORDINATED WITH AND APPROVED BY THE MANATEE COUNTY UTILITY OPERATIONS DEPARTMENT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. IT IS NOTED THAT TEMPORARY SHUTDOWNS MAY BE RESTRICTED TO CERTAIN HOURS AT ANY TIME OF THE DAY OR NIGHT AND WILL BE COMPLETED AT NO ADDITIONAL COST TO THE OWNER.

41. EXCEPT WERE THE PLANS AND SPECIFICATIONS PROVIDE THAT SUCH WORK SHALL BE PERFORMED UNDER THE CONTRACT FOR THIS PROJECT. ALL UTILITIES INTERFERING WITH CONSTRUCTION SHALL BE REMOVED, RELOCATED OR ADJUSTED BY THEIR OWNERS, AT THEIR EXPENSE. THE CONTRACTOR SHALL ARRANGE HIS SCHEDULE TO ALLOW UTILITY OWNERS TIME FOR THE NECESSARY RELOCATION AND ADJUSTMENT OF UTILITIES AND RELATED STRUCTURES.

42. A PEACE RIVER ELECTRIC SPECIAL PROVISION IS THAT THE TYPE OF EQUIPMENT USED IN THE INSTALLATION OF MAST ARMS/FOUNDATIONS, OVERHEAD/CANTILEVER SIGNS/ROUNDATIONS, AND THE MOVEMENT/INSTALLATION OF STRAIN POLES SHALL MEET THE FOLLOWING REQUIREMENTS: 1) OVERHEAD LINES SHALL STAY IN PLACE BOTH VERTICALLY AND HORIZONTALLY 2) CONTRACTOR SHALL MEET ALL APPLICABLE OSHA REQUIREMENTS (SEPARATION SHALL FOLLOW FPL GUIDELINES). ANY COST ASSOCIATED WITH THIS TYPE OF EQUIPMENT REQUIRED FOR THIS INSTALLATION IS INCLUDED IN THE RELATED PAY ITEMS. PLEASE REFER TO THE SPECIAL CONDITIONS IN THE UTILITY WORK SCHEDULE AND UTILITY COORDINATION.

43. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL UTILITY COMPANIES FOR THE RELOCATION AND ADJUSTMENT OF ALL UTILITIES, INCLUDING, ANY EXISTING POWER POLES AND/OR UTILITY CONDUITS WITHIN RIGHT-OF-WAY.

44. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH THE APPROPRIATE PARTIES TO DETERMINE THE COUNTY'S FIBER COMMUNICATION NETWORK, KNOWN AS ATMS (COUNTY ISD, SCHOOL BOARD, AND TRAFFIC MANAGEMENT CENTER) IN THE AREA TO ACCOMMODATE ANY POTENTIAL CONFLICTS.
AS-BUILT INFORMATION FOR EXISTING COMMUNICATION CONDUIT AND FIBER IS AVAILABLE FROM OLGA ROSIER, WITH UTILITY RECORDS (941-792-8811 EXT. 5059). CONSTRUCTION PLAN INFORMATION FOR PROJECTS UNDER CONSTRUCTION WITH THE COUNTY'S TRAFFIC MANAGEMENT CENTER ARE AVAILABLE AT WWW.MANATEEATMS.COM AND WWW.MANATEEATMS2.COM.

45. CONTRACTOR SHALL MINIMIZE EROSION OF THE AREA SURROUNDING PEACE RIVER ELECTRIC TRANSMISSION POLES.

46. THE ROADWAY CONTRACTOR MUST MAINTAIN CLEARANCES, AS REQUIRED BY OSHA, WHEN WORKING IN THE PROXIMITY OF PEACE RIVER ELECTRICS's HIGH-VOLTAGE TRANSMISSION AND LOW VOLTAGE DISTRIBUTION CONDUCTORS.

47. THE ROADWAY CONTRACTOR MUST MAINTAIN ACCESS TO ALL PEACE RIVER ELECTRIC FACILITIES AT ALL TIMES DURING HIS CONSTRUCTION, AND PROVIDE PROPER TRAFFIC CONTROL AROUND THEM.

DRAINAGE AND GRADING

48. ALL CONSTRUCTION IS TO BE STAKED IN THE FIELD BY OR UNDER THE SUPERVISION OF A FLORIDA REGISTERED LAND SURVEYOR.

49. THE CONTRACTOR IS TO PROVIDE THE ENGINEER OF RECORD WITH REPRODUCIBLE RECORD DRAWINGS SHOWING ALL IMPROVEMENT LOCATIONS AND ELEVATIONS IN ACCORDANCE WITH LATEST MANATEE COUNTY TRANSPORTATION DEPARTMENT STANDARDS AND SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT (SWFWMD) STANDARDS. THE CONTRACTOR SHALL ALSO PROVIDE FIVE SETS OF PRINTS, SIGNED AND SEALED BY A PROFESSIONAL LAND SURVEYOR, OF THE RECORD DRAWINGS TO THE ENGINEER OF RECORD. THESE RECORD DRAWINGS SHALL BE CERTIFIED TO THE OWNER, APPROPRIATE GOVERNMENTAL AGENCIES. RECORD DRAWINGS SHALL SPECIFICALLY INCLUDE STORMWATER FACILITY LOCATIONS, INCLUDING TOP OF BANK, UNDERDRAIN AND CONTROL STRUCTURES, SHALL BE PERFORMED BY A REGISTERED LAND SURVEYOR AND REVIEWED BY THE ENGINEER OF RECORD PRIOR TO ACCEPTANCE AND PAYMENT. BENCH MARKS WITH THE ELEVATION CLEARLY AND PERMANENTLY MARKED ARE TO BE PLACED ON THE TOP OF ALL PROPOSED OUTFALL CONTROL STRUCTURES. RECORD DRAWINGS OF ALL MITIGATION AREAS INCLUDING ELEVATIONS, ZONES AND LIMITS SHALL BE PERFORMED BY A REGISTERED LAND SURVEYOR AND REVIEWED BY THE ENGINEER OF RECORD PRIOR TO ACCEPTANCE AND PAYMENT. THE RECORD DRAWINGS SHALL SPECIFICALLY INCLUDE THE SURFACE AREA OF STORMWATER FACILITY AREAS AT NORMAL WATER), TOP OF BANK AND ELEVATION (NWL_{25}), AT HIGH WATER ELEVATION (HWL ALL MITIGATION AND/OR LITTORAL SHELF AREAS.

50. TO PREVENT SEDIMENTARY RUNOFF DURING CONSTRUCTION, STAKED HAY BALES, STAKED SILT SCREENS OR INLET DEBRIS CONTROL SCREENS ARE TO BE PLACED AT STORM INLETS, OUTFALL LOCATIONS AND ADJACENT PROPERTY LINES AS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES. SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSTALLED AND THEN VERIFIED/INSPECTED BY MANATEE COUNTY INFRASTRUCTURE INSPECTIONS RESOURCES DIVISION (708-7450) PRIOR TO COMMENCEMENT OF . CONSTRUCTION THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE SEDIMENTATION BARRIERS IN A WORKING MANNER FOR THE DURATION OF CONSTRUCTION AND SHOULD BE CHECKED DAILY. SILTATION ACCUMULATIONS GREATER THAN THE LESSER OF 12 INCHES OR ONE-HALF OF THE DEPTH OF THE SEDIMENTATION BARRIER SHALL BE IMMEDIATELY REMOVED AND REPLACED IN UPLAND AREAS. IN ADDITION TO SPECIFIED EROSION CONTROL LOCATIONS, THE CONTRACTOR SHALL PERFORM DAILY SITE INSPECTIONS FOR POTENTIAL EROSION PROBLEMS. IF PROBLEMS OCCUR, THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING APPROPRIATE EROSION CONTROL IMMEDIATELY. AN INSPECTION LOG SHALL BE MAINTAINED AND AVAILABLE ONSITE AT ALL TIMES. STORMWATER TREATMENT FACILITIES INCLUDING OUTFALL PER DETAIL ARE TO BE CONSTRUCTED EARLY IN SITE DEVELOPMENT, WITH NO OFF- SITE UNTREATED RUN-OFF OCCURRING DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING TEMPORARY EROSION CONTROL DEVICES FOLLOWING COMPLETION OF ALL CONSTRUCTION AND FINAL STABILIZATION.

51. TOPOGRAPHIC AND PROPERTY SURVEYS GIVING LOT SIZE, GROUND ELEVATIONS, OBSTRUCTIONS ON SITE, LOCATIONS AND DEPTHS OF SEWERS, CONDUITS, PIPES, EXISTING STRUCTURES, CURBS, PAVEMENTS, TRACTS, AND SOIL BORING DATA GIVING THE NATURE OF GROUND AND SUBSURFACE CONDITIONS HAVE BEEN OBTAINED FROM RELIABLE SOURCES. THE ACCURACY OF THIS DATA IS NOT GUARANTEED, AND IS FURNISHED SOLELY AS AN ACCOMMODATION TO THE CONTRACTOR. USE OF THIS DATA SHALL BE MADE AT THE CONTRACTOR'S DISCRETION. NO ADDITIONAL COMPENSATION WILL BE GRANTED DUE TO THE CONTRACTOR'S LACK OF KNOWLEDGE OF SITE CONDITIONS. PRIOR TO BID SUBMISSION, THE CONTRACTOR SHALL CONDUCT ANY ADDITIONAL SURVEYS AND SOILS TESTS HE MAY DEEM NECESSARY TO VERIFY THE ACCURACY OF THE INFORMATION PROVIDED.

52. THE CONTRACTOR SHALL VERIFY TOPOGRAPHY AND SATISFY HIMSELF AS TO THE EXTENT OF FILL NECESSARY TO ACHIEVE FINISHED GRADE PRIOR TO AWARD OF CONTRACT. THERE SHALL BE NO CLAIM FOR EXTRAS NOTWITHSTANDING SITE PLAN REVISIONS PROMULGATED SUBSEQUENT TO AWARD OF CONTRACT.

53. SUITABLE FILL MATERIAL FROM EXCAVATION SHALL BE UTILIZED FOR PROJECT FILL PER GRADING SPECIFICATIONS. UNSUITABLE MATERIAL SHALL BE PLACED IN OPEN AREAS ONLY AS DIRECTED BY THE PROJECT ENGINEER AND SOILS ENGINEER IN ACCORDANCE WITH FDOT INDEX 505.

54. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL STRUCTURES PRIOR TO INSTALLATIONS.

55. REFER TO CONSTRUCTION TECHNICAL SPECIFICATIONS FOR COMPACTION REQUIREMENTS, GRASSING/SODDING REQUIREMENTS, AND PAVING CONSTRUCTION MATERIAL SPECIFICATIONS.

56. ALL FILL AREAS ARE TO BE CONSTRUCTED IN 12" MAXIMUM LIFTS.

57. THE CONTRACTOR SHALL REVIEW SOILS TESTS AS PERFORMED BY THE SOIL CONSULTANT AND IS ENCOURAGED TO CONDUCT ON-SITE TESTING TO SATISFY HIMSELF AS TO ACTUAL LIMITS OF REMOVAL AND REPLACEMENT OF UNSUITABLE MATERIALS PRIOR TO BIDDING.

58. ON SLOPES GREATER THAN 3:1 PEGGING OR PINNING OF SOD MAY BE REQUIRED.

59. STATION LOCATIONS AND OFFSETS FOR STORM DRAIN INLETS AND MANHOLES REFERENCE THE CENTER OF THE SPECIFIED STRUCTURE BOTTOM. STATION LOCATION IS CENTER OF STRUCTURE BOTTOM FOR JUNCTION BOXES, CENTER OF RISER FOR CURB INLETS. FOR PIPES WITH MITERED END SECTIONS, THE PROPOSED LENGTHS SHOWN ON THE PLANS INCLUDE THE LENGTH OF THE MITERED END SECTION. PAYMENT FOR PIPE SHALL NOT INCLUDE THE LENGTH OF THE MITERED END SECTION. AS SPECIFIED BY DIMENSION "F" AS SHOWN IN FDOT INDEX 272 AND 273. PAYMENT SHALL BE FROM INSIDE STRUCTURE WALL TO INSIDE STRUCTURE WALL. ANY EXTRA PIPE LENGTH LISTED SHALL BE CONSIDERED CONTINGENT.

60. ALL CURB INLET AND JUNCTION BOX STORMWATER STRUCTURES SHALL HAVE HEAVY DUTY RING AND COVER MANHOLE ACCESS

61. DURING DEWATERING OPERATIONS, THE CONTRACTOR SHALL NOT DISCHARGE DIRECTLY TO RECEIVING WATERS, EXISTING CONVEYANCES TO RECEIVING WATERS, OR WETLAND SYSTEMS. TEMPORARY SEDIMENT BASINS, TRAPS, OR SILTATION REDUCTION DEVICES SHALL BE UTILIZED TO COLLECT THE DISCHARGE FROM DEWATERING ACTIVITIES TO ELIMINATE THE POTENTIAL FOR OFFSITE SEDIMENT TRANSPORT AND TO ENSURE THAT DIRECT DISCHARGE DOES NOT OCCUR.

CHRISTOPHER LEE MOWBRAY
LICENSE
No. 46777
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
GENERAL NOTES & LEGEND

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	501-0003602	
SURVEY #	20130801	
SEC./TWN./RGE	26,27,35/33S/18	
SCALE	SCALE BAR	
	BY	DATE
SURVEYED	T. BOYLE	11/13/13
DESIGNED	C.M.	03/10/14
DRAWN	K.R.	03/10/14
CHECKED	C.M.	04/4/14

CHRISTOPHER MOWBRAY P.E.
FLORIDA P.E. # 46777
4/30/14
Signature & Date

RESTORATION

1. ALL RESTORATION WORK PERFORMED THROUGHOUT THE PROJECT SHALL CONFORM TO EXISTING LINES AND GRADES UNLESS SHOWN OTHERWISE.

2. ALL DISTURBED GRASSED AREAS SHALL BE SODDED. THE TYPE OF SOD USED TO REPLACE OWNER MAINTAINED AREAS IN RIGHT-OF-WAY SHALL BE COORDINATED WITH THE PROPERTY OWNER. ALL EXISTING SHRUBS, TREES, PLANTINGS AND OTHER VEGETATION, OUTSIDE OF RIGHT-OF-WAY DISTURBED DURING CONSTRUCTION SHALL BE REPLACED WITH EQUIVALENT MATERIAL BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

3 CONCRETE DRIVEWAYS OR SIDEWALKS THAT ARE CUT SHALL BE RESTORED TO MATCH EXISTING ACCORDING TO THE CURRENT EDITIONS OF THE F.D.O.T. SPECIFICATIONS FOR ROAD AND BRIDGE DESIGN, SECTION 522, AND SECTION 310 OF THE F.D.O.T. DESIGN STANDARDS LATEST REVISION.

4. ALL CONCRETE THRUST BLOCKS INSTALLED FOR TESTING PURPOSES AND NOT REQUIRED FOR THE OPERATION OF THE PIPELINE SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR, PRIOR TO FINAL ACCEPTANCE, AT NO ADDITIONAL COST TO THE OWNER.

5 WHENEVER A PERMANENT ROADWAY SURFACE IS NOT PLACED IMMEDIATELY AFTER BACKFILLING AND COMPACTION OF THE NEWLY INSTALLED PIPE LINE IN AREAS WHERE TRAFFIC MUST PASS, THE CONTRACTOR SHALL INSTALL A TEMPORARY SURFACE CONSISTING OF NINE INCHES OF COMPACTED LIME ROCK BASE AND A COAT OF ASPHALT EMULSION. PERMANENT ROADWAY REPAIR SHALL BE PERFORMED A MAXIMUM OF TWENTY-ONE CALENDAR DAYS AFTER THE INITIAL OPEN CUTTING.

6 RESTORATION OF CURBS, DRIVEWAYS, SIDEWALKS, AND PLACEMENT OF SOD SHALL BE COMPLETED WITHIN FORTY-FIVE CALENDAR DAYS OF INITIAL DISTURBANCE, OR TWENTY-ONE CALENDAR DAYS OF SUBSTANTIAL COMPLETION, WHICHEVER OCCURS FIRST.

CONSTRUCTION

7. THE EXHAUST SYSTEM OF ALL GASOLINE AND DIESEL ENGINES SHALL BE EQUIPPED WITH MUFFLERS THAT MEET THE EQUIPMENT MANUFACTURER'S REQUIREMENTS FOR NOISE SUPPRESSION. THE CONTRACTOR SHALL INSTALL NOISE ABATEMENT BAFFELS POSITIONED TO BREAK LINE-OF-SITE FROM THE NOISE SOURCE TO AFFECTED RESIDENCES, AS APPROVED BY THE ENGINEER.

8. NO MATERIAL SHALL BE STOCKPILED IN ROADWAYS. ALL DIRT AND DEBRIS SHALL BE REMOVED FROM THE JOB SITE DAILY. ROADS SHALL BE SWEPT DAILY AS PART OF DAILY CLEAN UP.

9. THE CONTRACTOR IS TO CONTROL ALL FUGITIVE DUST ORIGINATING ON THIS PROJECT BY WATERING OR OTHER METHODS AS REQUIRED.

10 INGRESS AND EGRESS TO ALL THE PROPERTIES IN THE CONSTRUCTION AREA SHALL BE MAINTAINED AT ALL TIMES.

11 PRIOR APPROVAL WILL BE REQUIRED FOR REMOVAL OF ANY TREE WITHIN THE CONSTRUCTION AREA, UNLESS OTHERWISE NOTED ON THE PLANS.

12. THE CONTRACTOR SHALL PROVIDE ALL DEWATERING EQUIPMENT NECESSARY TO KEEP ALL EXCAVATIONS DRY. DEWATERING IS REQUIRED TO 18" BELOW TRENCH BOTTOM. THE CONTRACTOR SHALL SUBMIT DEWATERING PLAN TO DISTICT FOR APPROVAL PRIOR TO CONSTRUCTION.

13. ALL PIPING AND FITTINGS USED ON THIS PROJECT SHALL BE AS NOTED ON THE PLANS AND IN THE CONTRACT DOCUMENT AND SHALL BE INSTALLED TO THE LINES AND GRADES SHOWN ON THE PLANS AND PROFILES.

14. ALL PIPE SHALL BE COLOR CODED TO CONFORM TO MANATEE COUNTY STANDARDS.

15. ALL PIPE AND FITTINGS SHALL BE INSTALLED AS RECOMMENDED BY THE MANUFACTURER AND ALL PIPE JOINTS SHALL BE RESTRAINED WHERE REQUIRED.

16. ALL FITTINGS FOR PRESSURE CLASS-RATED PIPE SHALL BE RESTRAINED DUCTILE IRON. RESTRAINED LENGTHS OF PIPE SHALL ADHERE TO THE REQUIREMENTS AS SHOWN ON THE DETAIL SHEETS.

17. ALL PIPE LENGTHS ARE PLUS OR MINUS AND MAY BE ADJUSTED IN THE FIELD AS REQUIRED. PIPE MEASUREMENTS AND STATION OFFSETS ARE TO CENTER OF STRUCTURES OR FITTINGS. REFER TO DETAIL SHEET FOR ALL REFERENCE POINTS.

18. ALL EXISTING MAINS THAT ARE BEING REPLACED SHALL BE ABANDONED IN PLACE UPON ACCEPTANCE AND ACTIVATION OF THE NEW MAINS. ABANDONED MAINS SHALL BE CUT, FILLED WITH GROUT, AND CAPPED. REFER TO SECTION 02064 OF THE SPECIFICATIONS FOR GROUTING OF ABANDONED PIPE.

19. WATER MAINS CROSSING OVER OR UNDER SANITARY SEWERS, FORCE MAINS, AND RECLAIMED WATER LINES SHALL BE LAID PER CURRENT EDITION OF "10 STATE STANDARDS" AND MANATEE COUNTY UTILITY STANDARDS UNLESS NOTED OTHERWISE ON THE PLANS.

20. FIELD CONDITIONS MAY NECESSITATE MINOR ALIGNMENT AND GRADE DEVIATION OF THE PROPOSED UTILITIES TO AVOID OBSTACLES, AS ORDERED BY THE ENGINEER.

21. CONTRACTOR SHALL PROVIDE RECORD DRAWINGS IN ACCORDANCE WITH SECTION 14 IN THE CURRENT MANATEE COUNTY UTILITY STANDARDS AT NO COST TO THE OWNER. RECORD DRAWINGS SHALL BE SIGNED & SEALED BY A SURVEYOR CURRENTLY LICENSED BY THE STATE OF FLORIDA. ALL RECORD DRAWING INFORMATION REQUIREMENTS IN SECTION 14 SHALL BE STRICTLY ENFORCED. A COPY OF SECTION 14 WILL BE PROVIDED UPON REQUEST.

22. ALL ROCKS OR STONES LARGER THAN SIX INCH DIAMETER SHALL BE REMOVED FROM THE BACKFILL MATERIAL. BACKFILL MATERIAL PLACED WITHIN ONE FOOT OF PIPING AND APPURTENANCES SHALL NOT CONTAIN ANY STONES LARGER THAN TWO INCH DIAMETER.

23. ALL PENETRATION OF EXISTING STRUCTURES SHALL BE BY THE MECHANICAL ROTARY CORE BORING METHOD.

24. ALL CONCRETE AND REBAR PENETRATED OR DISTURBED SHALL BE COATED WITH TWO COATS OF EPOXY.

25. CONTRACTOR IS RESPONSIBLE FOR ALL UNSUITABLE MATERIAL REMOVAL WITHIN PROJECT LIMITS. EXCAVATION, EMBANKMENT, INCLUDING UTILIZATION, AND UNSUITABLE MATERIAL REMOVAL SHALL BE IN ACCORDANCE WITH FDOT DESIGN STANDARDS, LATEST VERSION.

26. WHERE EXCAVATION IS REQUIRED FOR CONSTRUCTION OF SIDEWALK, ALL STUMPS, ROOTS, ETC. SHALL BE REMOVED COMPLETELY FROM THE SIDEWALK AREA. ALL STUMPS WITHIN THE PROJECT LIMITS SHALL BE REMOVED COMPLETELY AND REPLACED WITH COMPACTED BACKFILL BEFORE THE AREA IS FILLED. TREE ROOTS IN AREA OF PROPOSED SIDEWALK, RAMP, OR DRIVEWAY REPLACEMENT SHALL BE GROUND OUT TO A DEPTH OF 6" BELOW BOTTOM OF NEW SIDEWALK OR DRIVEWAY. ALL PRUNED ROOT DEBRIS SHALL BE REMOVED FROM THE SUB-BASE MATERIAL PRIOR TO POURING CONCRETE, ASPHALT, OR APPLICATION OF OTHER SPECIFIED MATERIALS. THIS WORK SHALL BE INCLUDED IN AND PAID FOR UNDER THE PAY ITEM FOR CLEARING AND GRUBBING.

27. ALL STUMPS, ROOTS, AND OTHER DEBRIS PROJECTING THROUGH OR APPEARING ON THE SURFACE OF THE GROUND SHALL BE REMOVED TO A DEPTH OF 1-FOOT BELOW THE COMPLETED SURFACE. THIS WORK SHALL BE INCLUDED IN AND PAID FOR UNDER THE PAY ITEM FOR CLEARING AND GRUBBING.

28. ALL MATERIALS NOT CLAIMED BY THE COUNTY SHALL BECOME PROPERTY OF THE CONTRACTOR, AND SHALL BE DISPOSED OF BY THE CONTRACTOR IN AREAS PROVIDED BY THE CONTRACTOR. THIS WORK SHALL BE INCLUDED IN AND PAID UNDER THE PAY ITEM CLEARING AND GRUBBING.

29. THE CONTRACTOR SHALL PROVIDE ALL SHEETING, SHORING, AND BRACING REQUIRED TO PROTECT ADJACENT STRUCTURES OR TO MINIMIZE TRENCH WIDTH. WHERE A SEPARATE PAY ITEM IS NOT PROVIDED, THE COST OF ALL SHEETING, SHORING, AND BRACING REQUIRED SHALL BE INCLUDED IN THE CONTRACT PRICE FOR THE ITEM OF WORK FOR WHICH SHEETING, SHORING, AND BRACING IS REQUIRED.

30. THE CONTRACTOR SHALL DISTURB NO MORE GROUND THAN WHAT IS NECESSARY FOR CONSTRUCTION. NO OPEN EXCAVATED TRENCH, OR OTHER UNSAFE CONDITION WILL BE LEFT OVERNIGHT. ALL WORK SITES WILL BE COMPLETELY RESTORED WITHIN SEVEN (7) CALENDAR DAYS OF THE CONCRETE POUR FOR SIDEWALK.THE INTENT OF THIS PROVISION IS TO "SAFE-UP" THE PROJECT SITE AS WORK PROGRESSES, AND SHALL INCLUDE REMOVING FORMS, FILLING HOLES, GRADING, AND REMOVAL OF DEBRIS.

31. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL REMAIN UNLESS OTHERWISE NOTED IN THE PLANS, OR AS DIRECTED BY THE ENGINEER.

32. ANY EXISTING SIGN TO REMAIN THAT IS DISTURBED OR RELOCATED DURING CONSTRUCTION SHALL BE RESET TO CURRENT STANDARDS FOR HEIGHT, OFFSET, AND METHOD OF INSTALLATION AT NO ADDITIONAL COST TO THE COUNTY.

33. ALL EXISTING SWALES NOT DESIGNATED FOR RECONSTRUCTION SHALL BE REGRADED TO PROMOTE POSITIVE DRAINAGE AND MATCH PROPOSED CENTERLINE SWALE ELEVATION AND ALIGNMENT.

34. ALL STORM DRAINS AND STRUCTURES TO REMAIN SHALL BE CLEANED OF DEBRIS, DIRT, VEGETATION AND OTHER MATERIAL. STORM SEWER INLETS SHALL BE MODIFIED (RAISED/LOWERED) TO MATCH PROPOSED FINISHED GRADE.

35. ALL EXISTING FENCES DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED AND REINSTALLED BY THE CONTRACTOR AT NO ADDITIONAL COST. (EXISTING FENCES WITHIN R/W TAKING LIMITS SHALL BE RECONSTRUCTED TO THE NEW R/W LINE AND ARE TO BE REIMBURSED UNDER THE MISCELLANEOUS BID ITEM).

36. CONTRACTOR SHALL REMOVE ALL BMPS UPON THE COMPLETION OF THE PROJECT.

CONTACTS

MANATEE COUNTY
PUBLIC WORKS DEPT.
INFRASTRUCTURE ENGINEERING
WAYNE TROXLER, P.E.
1022 26TH AVENUE EAST
BRADENTON, FL. 34208
(941) 708-7450 EXT. 7650
FAX: (941) 708-7431

TECO/PEOPLES GAS CO.
DAN SHANAHAN
8261 VICO COURT
SARASOTA, FL. 34240
(941) 342-4030
FAX: (941) 342-4011
EMERGENCY: 1-877-832-6911
djshanahan@tecoenergy.com

SUNSHINE STATE ONE CALL OF FLORIDA
1-(800) 432-4770

VERIZON FLORIDA INC.
WAYNE SUMNER
1701 RINGLING BLVD.
SARASOTA, FL. 34236
(941) 330-9203
WAYNE.SUMNER@verizon.com

FLORIDA POWER & LIGHT DISTRIBUTION
GREG COKER
1253 12TH AVENUE EAST
PALMETTO, FL 34221
(941) 723-4430
FAX: (941) 723-4444
EMERGENCY: 1-800-4-OUTAGE
Greg_Coker@fpl.com

FLORIDA POWER & LIGHT TRANSMISSION
PETER H. WASHIO
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JUNO BEACH, FL. 33408
Peter.H.Washio@ fpl.com

MANATEE COUNTY HEALTH DEPT.
HANS C. ROESE
410 6th AVENUE EAST
BRADENTON, FL. 34208
(941) 748-0747 EXT. 1342
FAX: (941) 750-9364
hans_roese@doh.state.fl.us

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
SARASOTA SERVICE OFFICE
DARYL R. FLATT, P.E.
6750 FRUITVILLE ROAD
SARASOTA, FL. 34240
(941) 377-3722
FAX: (941) 373-7660

FLORIDA GAS TRANSMISSION
SAFETY HARBOR TEAM
7804 ANDERSON RD.
TAMPA, FL. 33634
CHRIS LEE
(813) 466-3327
CELL : (727) 639-7512
christopher.lee@sug.com

BRIGHT HOUSE NETWORKS
TOM WRIGHT
5413 E. STATE ROAD 64
BRADENTON, FL. 34208-5535
(941) 748-3816 EXT. 21348
tom.wright@mybrighthouse.com

DEPARTMENT OF ENVIRONMENTAL PROTECTION
STEPHANIE BARIOS
13051 N. TELECOM PKWY
TEMPLE TERRACE, FL 33637
PHONE: (813) 632-7600, EXT. 408
FAX: (813) 632-7662

PEACE RIVER ELECTRIC COOPERATIVE, INC.
P.O. BOX 1310
WACHULA, FL 33873
KENDELL COKER
(863) 767-4660
kendell.coker@preco.coop

MANATEE COUNTY
PUBLIC WORK DEPT.
TRAFFIC ENGINEERING
PAUL VILLALUZ, P.E.
(941) 749-3500 EXT. 7859
FAX: (941) 749-3571

LEGEND

EXISTING

BENCH MARK
CONCRETE MONUMENT
IRON PIPE
IRON ROD
HUB
NAIL & DISK
ELEVATION
PARCEL ID NO.
PARCEL ID NO.
LOT NO.
GUY WIRE
POWER POLE
LIGHT POLE
MAIL BOX
SIGN
REFLECTOR
SPRINKLER
GAS MARKER
BACKFLOW PREVENTER
BLOW OFF VALVE
FIRE HYDRANT
WATER VALVE
AIR RELEASE VALVE
WATER METER
SANITARY SEWER MANHOLE
SANITARY SEWER CLEAN OUT
SOIL BORING LOCATION
TELEPHONE SERVICE BOX
FLOW DIRECTION
GRATE INLET
MITERED END SECTION

BUSH
TREE
OAK TREE
PALM TREE
PINE TREE
EDGE OF VEGETATION
CHAIN LINK FENCE
WOOD FENCE
BARBED WIRE FENCE
FORCE MAIN
POTABLE WATER
RECLAIMED WATER
SANITARY SEWER
STORM DRAIN
GAS LINE
OVERHEAD_CABLE_TV
BURIED_CABLE_TV
OVERHEAD ELECTRIC
BURIED_ELECTRIC
OVERHEAD VERIZON
BURIED VERIZON
VERIZON
BURIED_UTILITY
OVERHEAD UTILITY
RAIL ROAD TRACKS
EDGE OF CONCRETE
EDGE OF ROAD
TOE OF SLOPE
TOP OF BANK
PROPERTY LINE
RIGHT OF WAY

ABBREVIATIONS

R/W	RIGHT OF WAY
CONC	CONCRETE
ASPH	ASPHALT
DRWY	DRIVEWAY
SWK	SIDEWALK
EP	EDGE OF PAVEMENT
BOC	BACK OF CURB

PROPOSED

MAIN
SERVICE LINE
PROJECTED EASEMENT
FIRE HYDRANT
VALVE
SANITARY SEWER MANHOLE
BLOW-OFF ASSEMBLY
REDUCER
TEE
HORIZONTAL BEND
VERTICAL BEND
PLUG
MASTER METER ASSEMBLY
SERVICE LINE & METER
DOUBLE SERVICE

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
GENERAL NOTES & LEGEND

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	501-0003602
SURVEY #	20130801
SECTION, TWP, RGE	26,27,35/33S/18
SCALE	SCALE BAR

	BY	DATE
SURVEYED	T. BOYLE	11/13/13
DESIGNED	C.M.	03/10/14
DRAWN	K.R.	03/10/14
CHECKED	C.M.	04/4/14

CHRISTOPHER MOWBRAY P.E.
FLORIDA P.E. # 46777

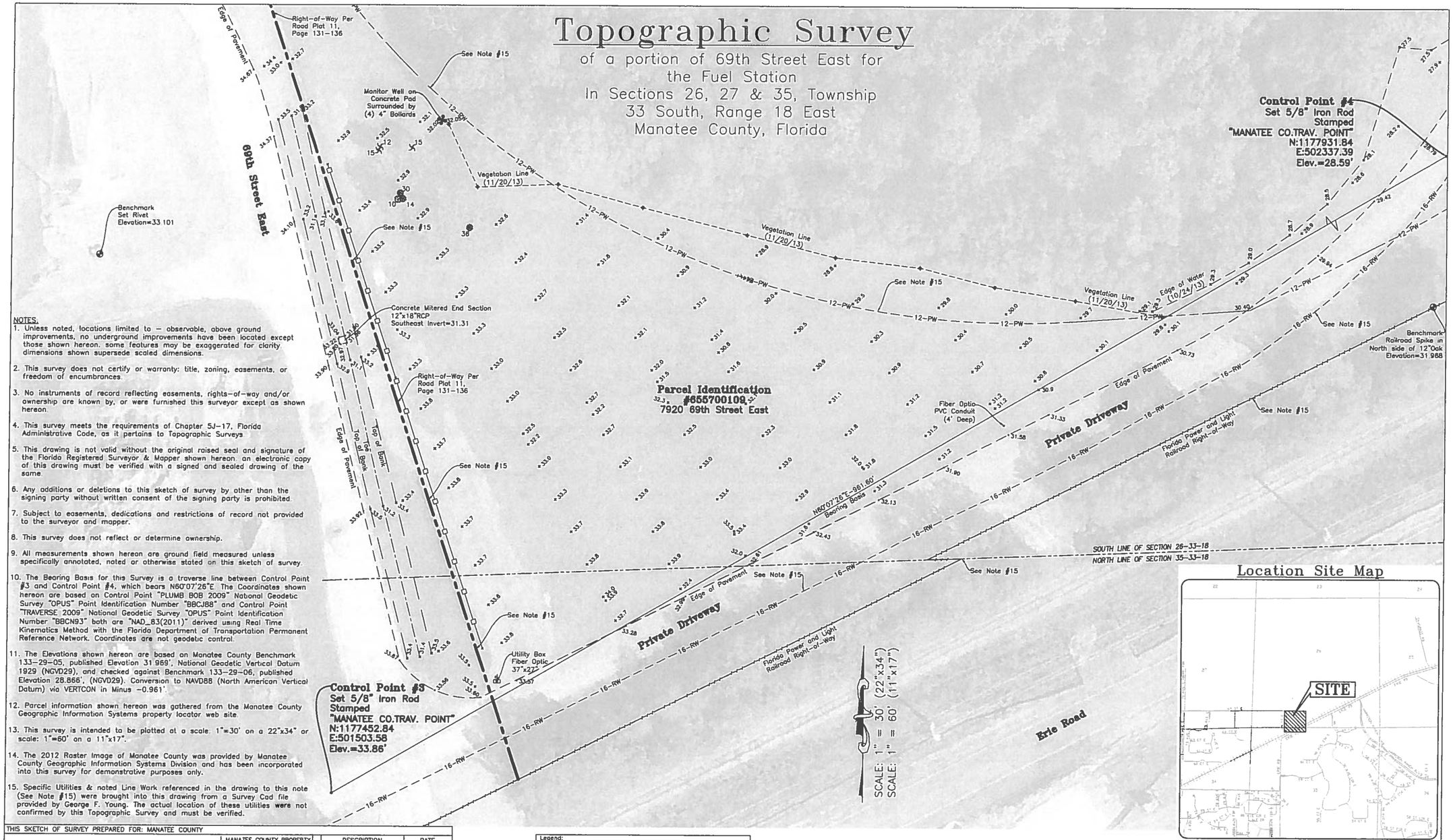
CHRISTOPHER LEE MOWBRAY LICENSE No. 46777 STATE OF FLORIDA PROFESSIONAL ENGINEER

4/30/14
Signature & Date

SHEET 3

Topographic Survey

of a portion of 69th Street East for the Fuel Station
In Sections 26, 27 & 35, Township 33 South, Range 18 East
Manatee County, Florida



Location Site Map

NOTES.

1. Unless noted, locations limited to – observable, above ground improvements, no underground improvements have been located except those shown hereon. some features may be exaggerated for clarity dimensions shown supersede scaled dimensions.
2. This survey does not certify or warranty: title, zoning, easements, or freedom of encumbrances.
3. No instruments of record reflecting easements, rights-of-way and/or ownership are known by, or were furnished this surveyor except as shown hereon.
4. This survey meets the requirements of Chapter 5J-17, Florida Administrative Code, as it pertains to Topographic Surveys.
5. This drawing is not valid without the original raised seal and signature of the Florida Registered Surveyor & Mapper shown hereon. an electronic copy of this drawing must be verified with a signed and sealed drawing of the same.
6. Any additions or deletions to this sketch of survey by other than the signing party without written consent of the signing party is prohibited.
7. Subject to easements, dedications and restrictions of record not provided to the surveyor and mapper.
8. This survey does not reflect or determine ownership.
9. All measurements shown hereon are ground field measured unless specifically annotated, noted or otherwise stated on this sketch of survey.
10. The Bearing Basis for this Survey is a traverse line between Control Point #3 and Control Point #4, which bears N60°07'26"E. The Coordinates shown hereon are based on Control Point "PLUMB BOB 2009" National Geodetic Survey "OPUS" Point Identification Number "BBCJ88" and Control Point "TRAVERSE 2009" National Geodetic Survey "OPUS" Point Identification Number "BBCN93" both are "NAD_83(2011)" derived using Real Time Kinematics Method with the Florida Department of Transportation Permanent Reference Network. Coordinates are not geodetic control.
11. The Elevations shown hereon are based on Manatee County Benchmark 133-29-05, published Elevation 31.969', National Geodetic Vertical Datum 1929 (NGVD29), and checked against Benchmark 133-29-06, published Elevation 28.866', (NGVD29). Conversion to NAVD88 (North American Vertical Datum) via VERTCON in Minus -0.961'.
12. Parcel information shown hereon was gathered from the Manatee County Geographic Information Systems property locator web site.
13. This survey is intended to be plotted at a scale: 1"=30' on a 22"x34" or scale: 1"=60' on a 11"x17".
14. The 2012 Raster Image of Manatee County was provided by Manatee County Geographic Information Systems Division and has been incorporated into this survey for demonstrative purposes only.
15. Specific Utilities & noted Line Work referenced in the drawing to this note (See Note #15) were brought into this drawing from a Survey Cad file provided by George F. Young. The actual location of these utilities were not confirmed by this Topographic Survey and must be verified.

THIS SKETCH OF SURVEY PREPARED FOR: MANATEE COUNTY

ON FILE

Todd E. Boyle, RSM 6047 — DATE OF SIGNATURE

FLORIDA REGISTERED SURVEYOR & MAPPER

MANATEE COUNTY PROPERTY MANAGEMENT DEPARTMENT SURVEY DIVISION

1112 MANATEE AVENUE WEST BRADENTON, FLORIDA, 34205, (941)748-4501

REVISIONS	DESCRIPTION	DATE

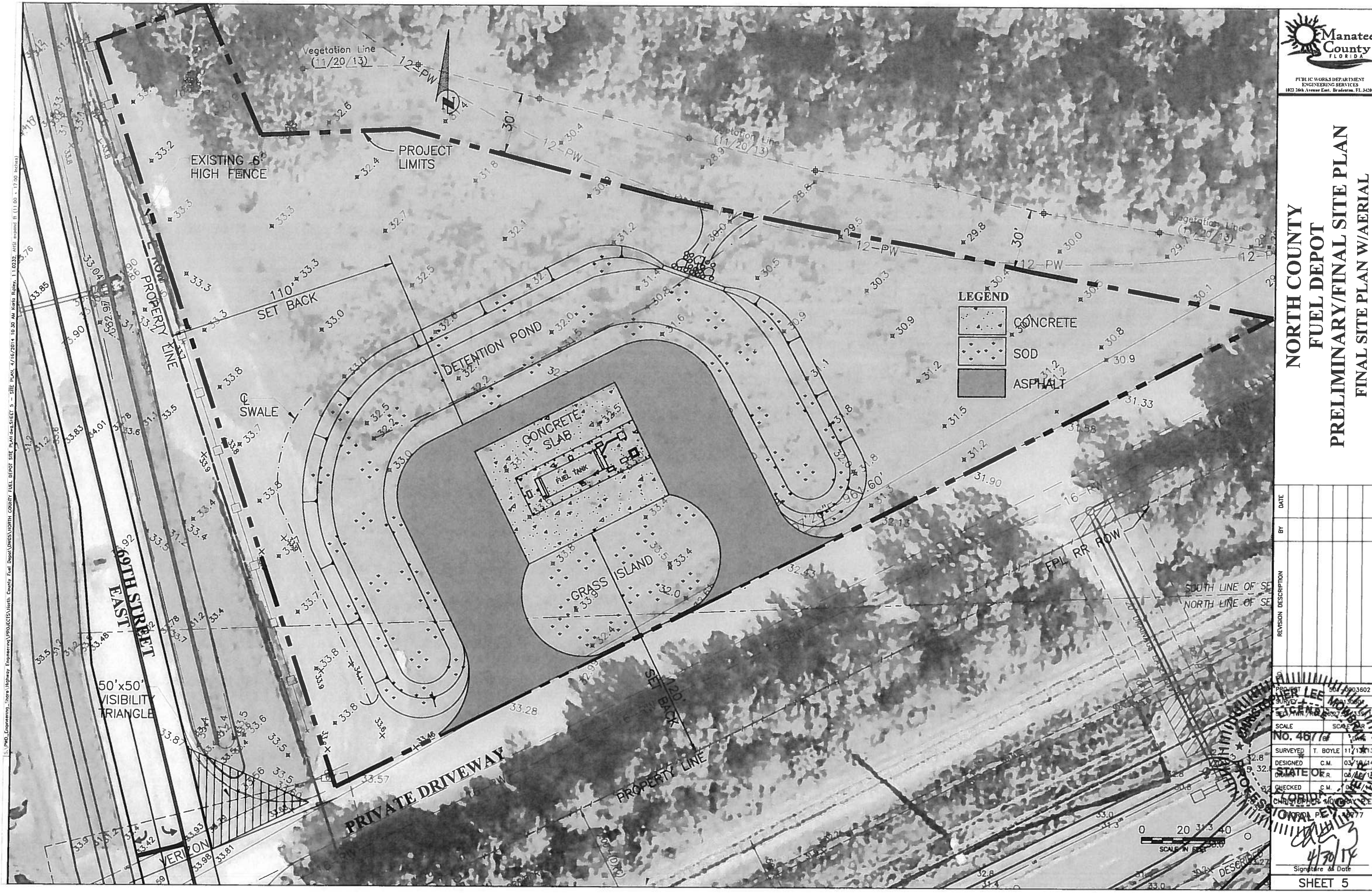
Legend:

BWF	= Barbed Wire Fence	NMF/S	= No Monument Found/Set
CL	= Centerline	OE	= Overhead Utility Line
CLF	= Chain Link Fence	R/W	= Right-of-Way
ELEV.	= Elevation	VF	= Vinyl Fence
EP	= Edge of Asphalt Pavement	WF	= Wood Fence
ES	= Edge of Shell	FH	= Fire Hydrant
ID	= Identification	GA	= Guy Anchor
INV	= Invert	MB	= Mailbox
FCM	= Found Concrete Monument	SN	= Sign
FIP	= Found Iron Pipe	SH	= Sprinkler Head
FIR	= Found Iron Rod	WP	= Wood Utility Pole
FND	= Found Nail and Disk	WM	= Water Meter
IRS	= Iron Rod Set	BOL	= Wood Bollards(Sizes Vary)
NDS	= Nail and Disk Set		

Tree Legend:

= Oak Tree
= Palm Tree
= Pine Tree
= Bush
= Unknown Tree
Size in Inches Diameter Breast Height

Topographic Survey	
69th Street East for the Fuel Station In Sections 26, 27 & 35, Township 33 South, Range 18 East Manatee County, Florida	Field Date: 11/13/13
	DWG. Date: 11/20/13
	DWG. Path: S:\SURVEY\2013 Jobs\08_Aug 13\20130801_ 69th Street East Tape for Fiber Optics \CAD_DWG's\Erie and 89th fuel site
	Sheet: 4
	Checked By: TEB
	Drawn By: PC


Manatee County
FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208
NORTH COUNTY
FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
FINAL SITE PLAN W/AERIAL
LEGEND
CONCRETE
SOD
ASPHALT
Vegetation Line
(11/20/13)
PROJECT
LIMITS
EXISTING 6'
HIGH FENCE
110'
SET BACK
PROPERTY LINE
℄ SWALE
DETENTION POND
CONCRETE
SLAB
FUEL TANK
GRASS ISLAND
120'
SET BACK
PRIVATE DRIVEWAY
PROPERTY LINE
FPL RR ROW
SOUTH LINE OF SE
NORTH LINE OF SE
69TH STREET
EAST
50'x50'
VISIBILITY
TRIANGLE
VERIZON
12-PW
16-RW
30'
60'
SCALE IN FEET
REVISION DESCRIPTION
BY
DATE
SURVEYED
T. BOYLE
DESIGNED
C.M.
CHECKED
C.M.
No. 46777
Signature & Date
4/30/14
SHEET 5

PROJECT AREA=0.97 ACRE
PRE-DELELOPED FLOW RATE=3.0 CFS
POST-DEVELOPED FLOW RATE=1.46 CFS

Manatee County
FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY FUEL DEPOT

PRELIMINARY/FINAL SITE PLAN PAVING, GRADING & DRAINAGE PLAN

EXISTING 6' HIGH FENCE

PROJECT LIMITS

CONSTR. ℄ SWALE @ 4.8%

PLACE 5X5 PAD RIP-RAP (ROCK) TOP ELEV. 31.7

OUTFALL CONTROL STRUCTURE
CONSTR. 16 LF WEIR WALL
TOP OF WEIR EL.=33.7
WEIR EL. = 33.1
(SEE SECTION D-D)

DETENTION POND
DHWL EL=33.7
BOT. EL=32.8
TOB EL=34.2
DITCH BOT. AREA=
10,526 SF (0.242 ACRE)
BANK AREA=
17,690 SF (0.406 ACRE)

Vegetation Line (11/20/13)

12-PW

16-RW

EL=32.8

℄ SWALE

CONCRETE SLAB

FUEL TANK

GRASS ISLAND

69TH STREET EAST

PRIVATE DRIVEWAY

PROPERTY LINE

SOUTH LINE OF SEC

NORTH LINE OF SEC

20' DRAINAGE EASEMENT

TCE A

TCE B

VERIZON

DESCRIBED

LEGEND

CONCRETE

SOD

ASPHALT

0 20 40
SCALE IN FEET

REVISION DESCRIPTION	BY	DATE

PROJECT	581-0003602
SURVEY	20130801
SEC./TWN./RGE.	27,35S,18E
SCALE	1" = 20' BAR

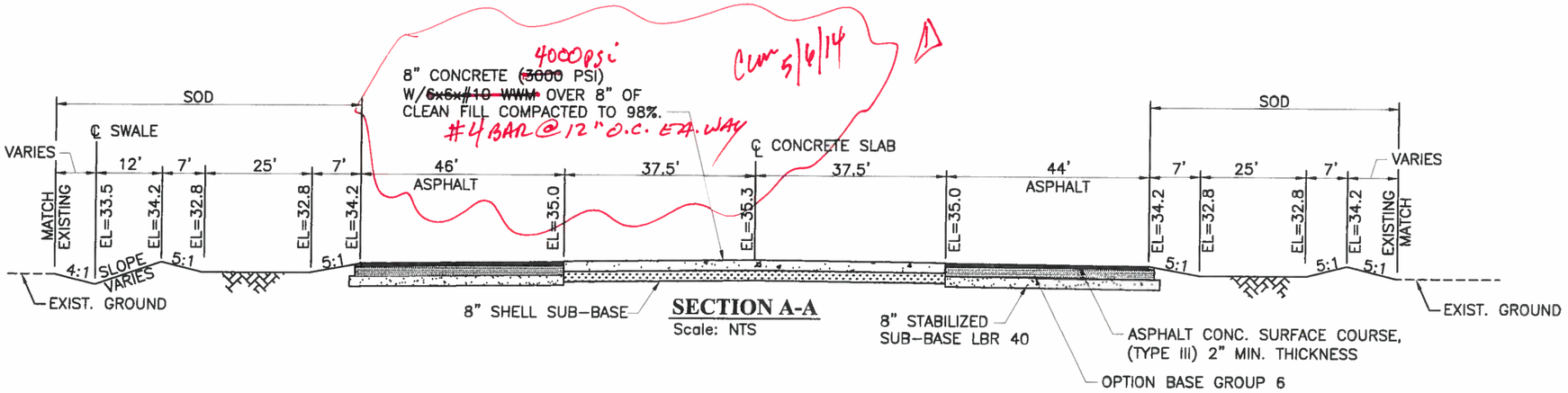
	BY	DATE
SURVEYED	T. BOYLE	11/13/13
DESIGNED	C.W.	03/10/14
DRAWN	K.M.	03/10/14
CHECKED	C.W.	04/4/14

CHRISTOPHER LEE MOWBRAY P.E.
FLORIDA P.E. # 46777

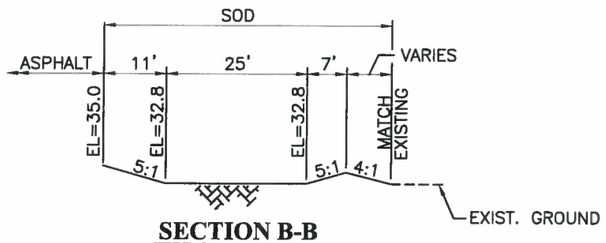
4/30/14
Signature & Date

STATE OF FLORIDA
CHRISTOPHER LEE MOWBRAY
No. 46777
PROFESSIONAL ENGINEER

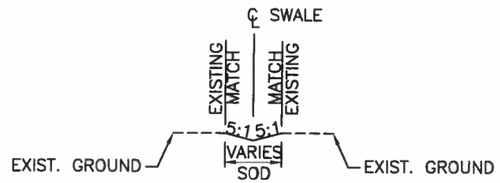
SHEET 6



SECTION A-A
Scale: NTS

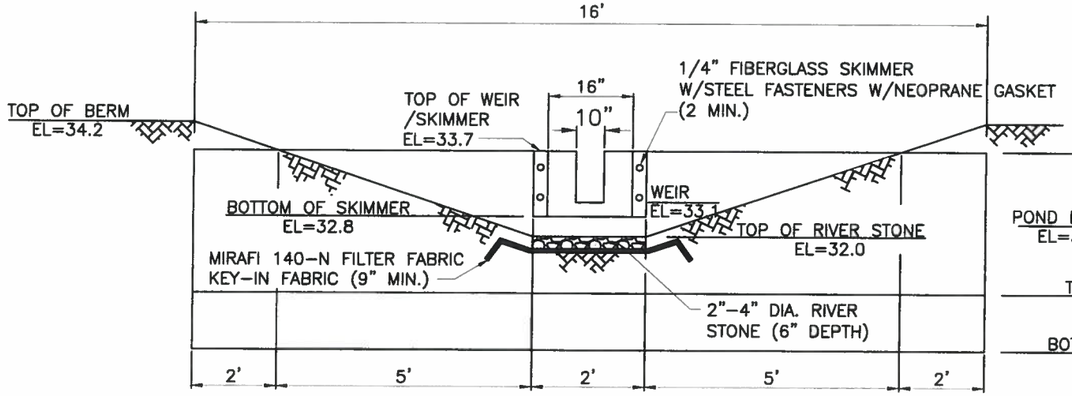


SECTION B-B
Scale: NTS

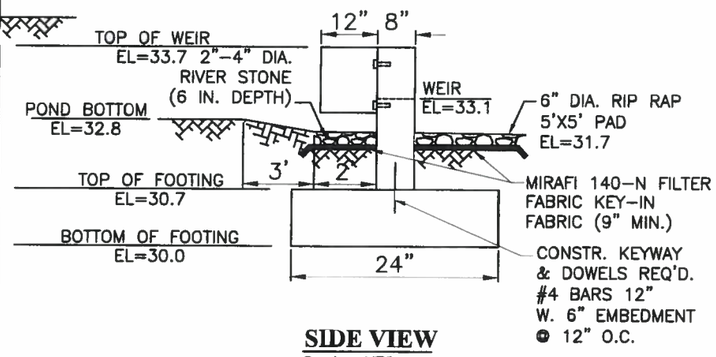


SECTION C-C
Scale: NTS

NOTE: SOD ALL DISTRUBED AREAS.



SECTION D-D
Scale: NTS



SIDE VIEW
Scale: NTS

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
SECTIONS & CONSTRUCTION DETAILS

NO.	REVISION DESCRIPTION	BY	DATE
1	Rev'd per comm	CWM	5/1/14

PROJECT #	501-0003602
SURVEY #	20130801
SEC./TWS./RGE.	22-35/33S/18
SCALE	SCALE BAR

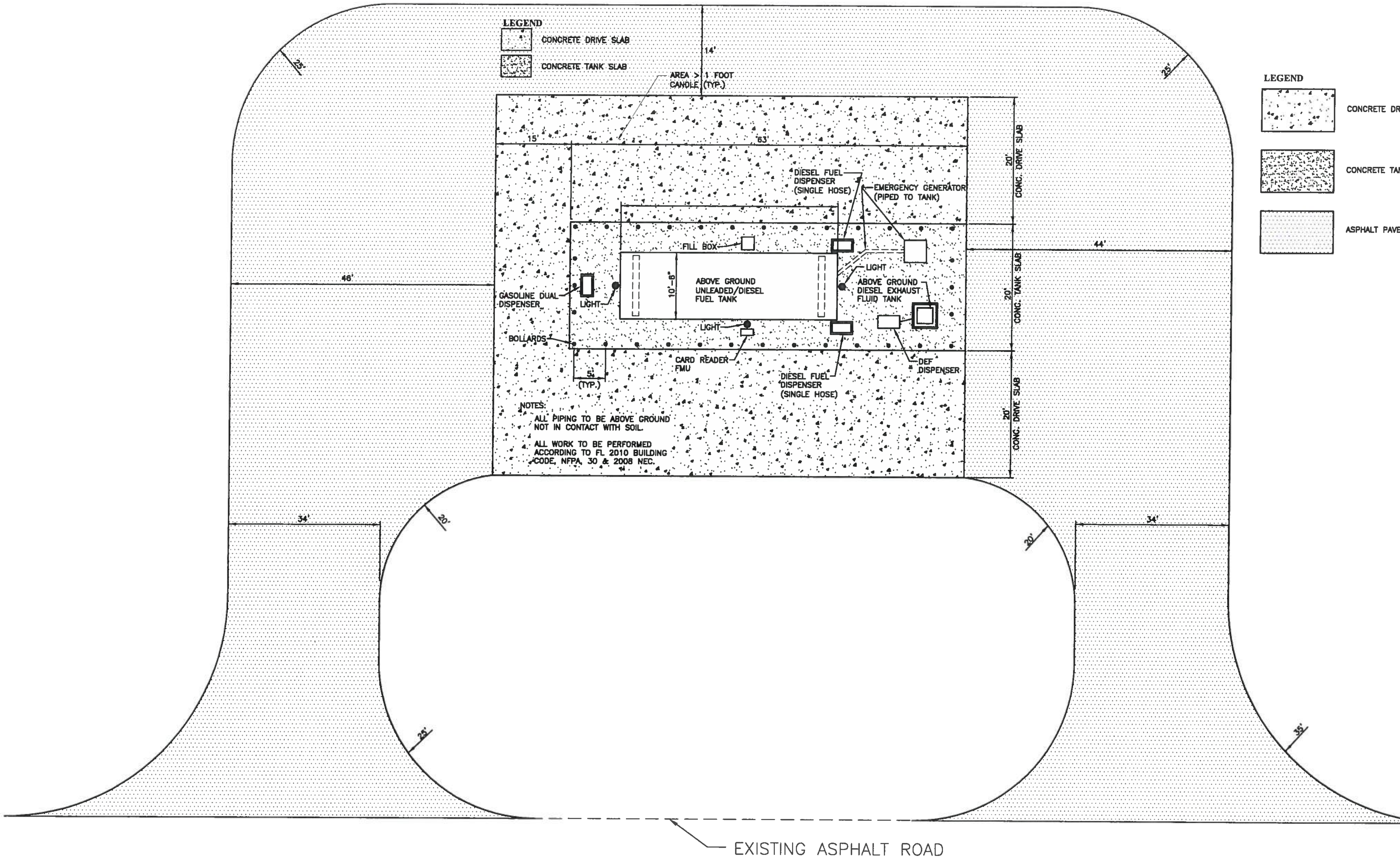
		DATE
SURVEYED	T. BOYLE	11/13/13
DESIGNED	C.W.	03/10/14
DRAWN	K.L.	03/10/14
CHECKED	C.W.	04/4/14

CHRISTOPHER W. OWBRAY P.E.
FLORIDA P.E. # 46777

CHRISTOPHER W. OWBRAY LIC. NO. 46777 STATE OF FLORIDA PROFESSIONAL ENGINEER

4/30/14
Signature & Date

SHEET 7



LEGEND

- CONCRETE DRIVE SLAB
- CONCRETE TANK SLAB
- ASPHALT PAVEMENT

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
FUEL TANK SITE PLAN

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	501-0003602	
SURVEY #	20130801	
SEC./TWP./RGE.	26,27,35/33S/18	
SCALE	N.T.S.	
	BY	DATE
SURVEYED	T. BOYLE	11/13/13
DESIGNED	C.M.	03/10/14
DRAWN	M. JONES	12/04/13
CHECKED	C.M.	04/4/14

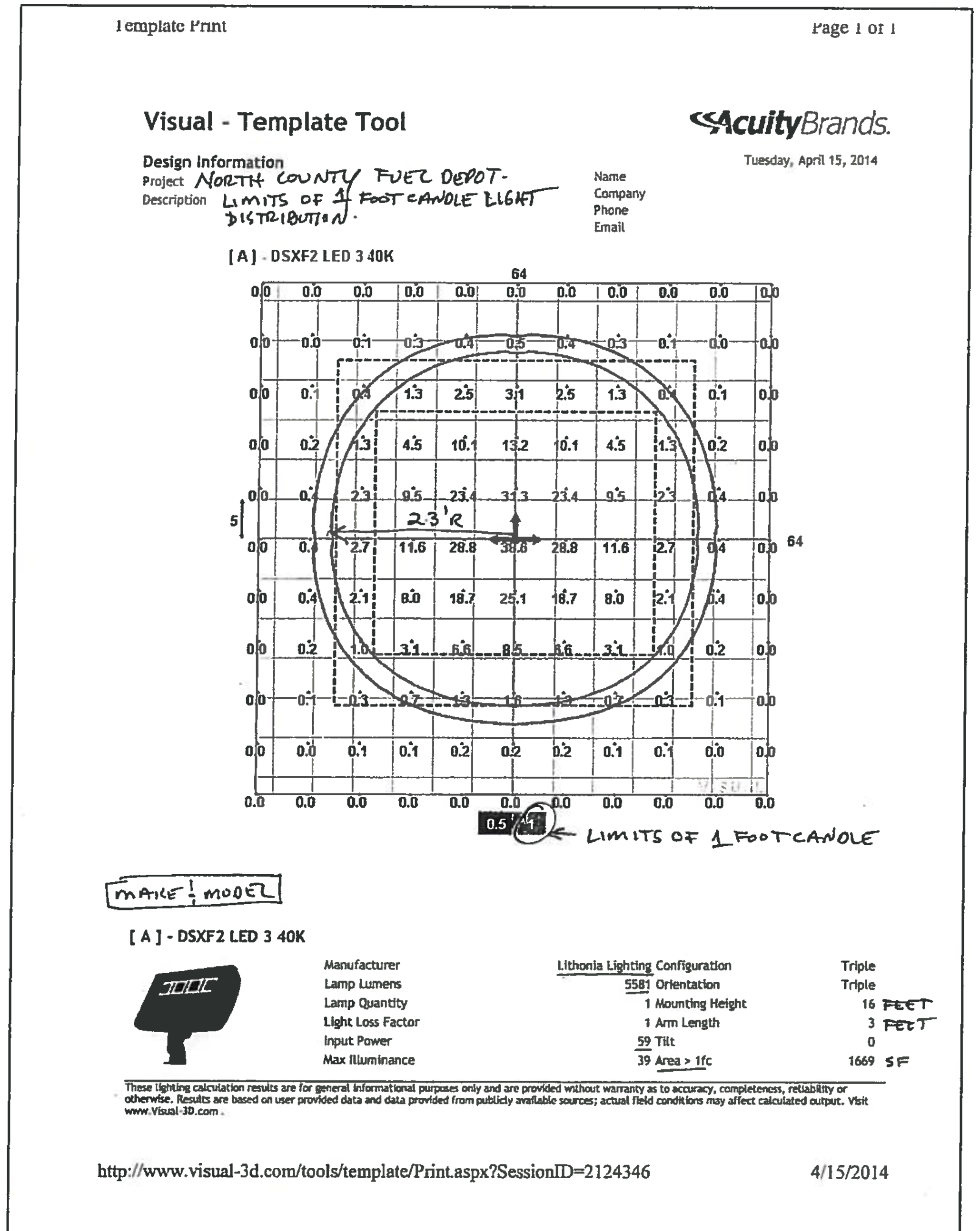
CHRISTOPHER LEE MOWBRAY
LICENSE
No. 46777
STATE OF FLORIDA
PROFESSIONAL ENGINEER

FLORIDA P.E. #

4/30/14

Signature & Date

SHEET 8

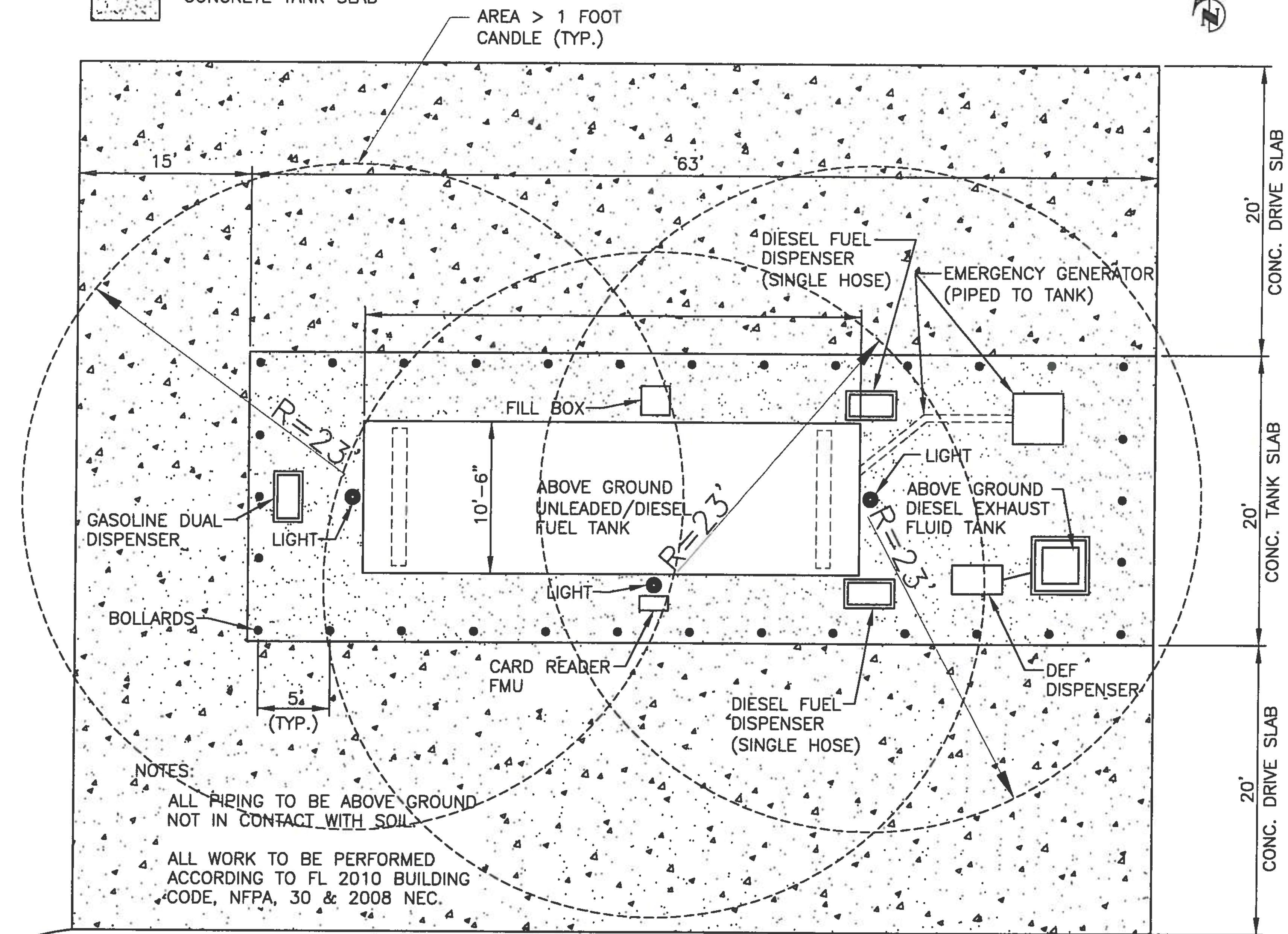

Template Print
Page 1 of 1
Visual - Template Tool
AcuityBrands.
Design Information
Tuesday, April 15, 2014
Project NORTH COUNTY FUEL DEPOT-
Description LIMITS OF 1 FOOT CANDLE LIGHT DISTRIBUTION.
Name
Company
Phone
Email
[A] - DSXF2 LED 3 40K
23'R
LIMITS OF 1 FOOT CANDLE
MAKE ! MODEL
[A] - DSXF2 LED 3 40K
Manufacturer
Lamp Lumens
Lamp Quantity
Light Loss Factor
Input Power
Max Illuminance
Lithonia Lighting Configuration
5581 Orientation
1 Mounting Height
1 Arm Length
59 Tilt
39 Area > 1fc
Triple
Triple
16 FEET
3 FEET
0
1669 SF
These lighting calculation results are for general informational purposes only and are provided without warranty as to accuracy, completeness, reliability or otherwise. Results are based on user provided data and data provided from publicly available sources; actual field conditions may affect calculated output. Visit www.Visual-3D.com.
http://www.visual-3d.com/tools/template/Print.aspx?SessionID=2124346
4/15/2014

LITHONIA LIGHTING PHOTOMETRICS

NOTE: FULL HORIZONTAL CUTOFF OPTICS TO BE MET WITH THE ACCESSORY UPPER VISOR, ORDER NO. DSXP2UBV.

LEGEND

- CONCRETE DRIVE SLAB
- CONCRETE TANK SLAB


AREA > 1 FOOT CANDLE (TYP.)
15'
63'
DIESEL FUEL DISPENSER (SINGLE HOSE)
EMERGENCY GENERATOR (PIPED TO TANK)
FILL BOX
R=23'
GASOLINE DUAL DISPENSER
LIGHT
10'-6"
ABOVE GROUND UNLEADED/DIESEL FUEL TANK
ABOVE GROUND DIESEL EXHAUST FLUID TANK
LIGHT
BOLLARDS
CARD READER FMU
DIESEL FUEL DISPENSER (SINGLE HOSE)
DEF DISPENSER
5' (TYP.)
20' CONC. DRIVE SLAB
20' CONC. TANK SLAB
20' CONC. DRIVE SLAB
NOTES:
ALL PIPING TO BE ABOVE GROUND NOT IN CONTACT WITH SOIL.
ALL WORK TO BE PERFORMED ACCORDING TO FL 2010 BUILDING CODE, NFPA, 30 & 2008 NEC.

FUEL TANK & SLAB DETAIL

NTS

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY FUEL DEPOT

PRELIMINARY/FINAL SITE PLAN

FUEL TANK/ SLAB DETAILS/LIGHTING

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #		501-0003602
SURVEY #		20130801
SEC./TWP./RGE.		26,27,35/33S/18
SCALE		N.T.S.
	BY	DATE
SURVEYED	T. BOYLE	11/13/13
DESIGNED	C.M.	03/10/14
DRAWN	W. GRESS	12/04/13
CHECKED		04/4/14

CHRISTOPHER MOWBRAY LICENSE No. 46777 STATE OF FLORIDA PROFESSIONAL ENGINEER

FLORIDA P.E. #

Signature & Date 4/30/14

SHEET 9

LANDSCAPE MAINTAINED BY PUBLIC WORKS. REPORT PROBLEMS @ (941) 747-4957

6"X10" MIN. PLACARDS SHALL BE PLACED ON ROADSIDE OF EXIST. FENCE. (2 MIN.)

NOTES:
1. CONTRACTOR TO INSTALL SOIL TRACKING PREVENTION DEVICE TYPE A PER FDOT INDEX. 106.0
2. OAK TREES SHALL BE FLORIDA SELECT #1, 10' TALL, 4' SPREAD, 2 1/2" CALIPER @ TIME OF PLANTING.
3. VIBURNUM SHRUBS SHALL BE 3 GAL. MIN. AND 24" TALL @ TIME OF PLANTING.
4. IRRIGATE LANDSCAPING UNTIL SELF SUSTAINING W/ 100% SURVIVABILITY.

Vegetation Line (11/20/13)

PROJECT LIMITS

EXISTING 6' HIGH FENCE

INSTALL APPROX. 900 L.F. OF EROSION CONTROL SILT FENCE PRIOR TO BREAKING GROUND

EXIST. ATMS

(6) FLA. #1 SELECT GRADE TREE @ 33' SPA. O.C.

E ROW

PROPERTY LINE

DETENTION POND

℄ SWALE

CONCRETE SLAB

FUEL TANK

GRASS ISLAND

(2) PLACARDS

69TH STREET EAST

(5) SHRUBS @ 5' SPA. O.C. (TYP)

20' LANDSCAPE BUFFER

EXIST. ATMS HANDHOLD

EXIST. ATMS HANDHOLD

PRIVATE DRIVEWAY

Per Mc UW-5; UW-4 ATTACHED cm 5/6/14 1

PROPOSED RECLAIMED FIRE HYDRANT

VERIZON

INSTALL ATMS 2-2" CONDUITS

EXIST. ATMS

FPL RR ROW

SOUTH LINE OF SECTION

NORTH LINE OF SECTION

20' DRAINAGE EASEMENT

PROPERTY LINE

DITCH

LEGEND

CONCRETE

SOD

ASPHALT

0 20 40
SCALE IN FEET

Manatee County FLORIDA

PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
LANDSCAPE/IRRICATION/BMP/UAS PLAN

NO.	REVISION DESCRIPTION	BY	DATE
1	Rev'd per insp. staff	cm	5/1/14

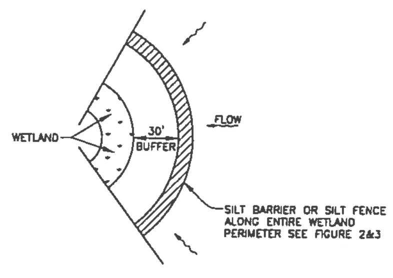
PROJECT #	501-0003602
SURVEY	20130801
SECTION/TWP/RGE	26,27,35/33S/18
SCALE	SCALE BAR

		DATE
SURVEYED	T. BOYLE	11/13/13
DESIGNED	C.M.	03/10/14
DRAWN	C.M.	03/10/14
CHECKED	C.M.	04/4/14

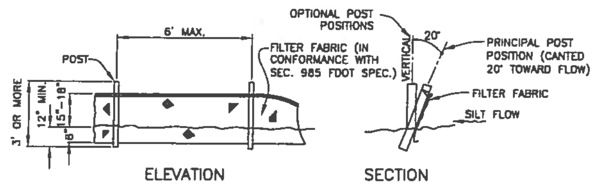
CHRISTOPHER LEE MOWBRAY P.E. LICENSE No. 46777 STATE OF FLORIDA PROFESSIONAL ENGINEER

4/30/14
Signature & Date

SHEET 10

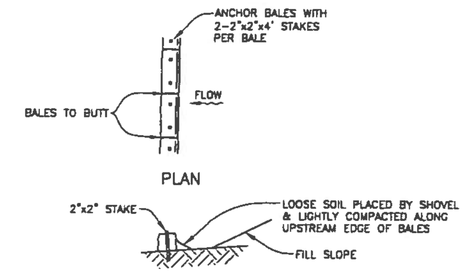


WETLAND BUFFER
FIGURE 1

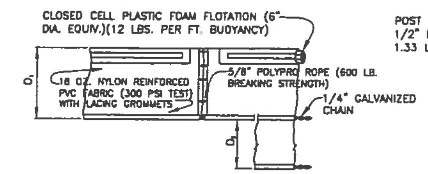


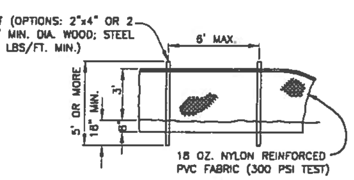
NOTE: SILT FENCE TO BE PAID FOR UNDER THE CONTRACT UNIT PRICE FOR STAKED SILT FENCE (LF).

TYPICAL SILT FENCE
FIGURE 2



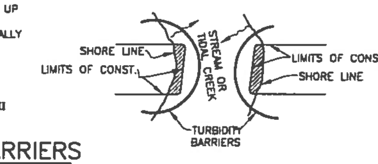
TYPICAL BALE SILT BARRIER
FIGURE 3



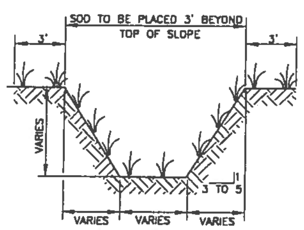


D_1 =5' STD. (SINGLE PANEL FOR DEPTHS 5' OR LESS). D_2 =5' STD. (ADDITIONAL PANEL FOR DEPTHS > 5'). CURTAIN TO REACH BOTTOM UP TO DEPTHS OF 10 FEET. TWO(2) PANELS TO BE USED FOR DEPTHS GREATER THAN 10 FEET UNLESS SPECIAL DEPTH CURTAINS SPECIFICALLY CALLED FOR IN THE PLANS OR AS DETERMINED BY THE ENGINEER.

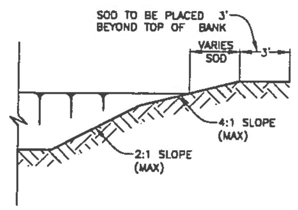
NOTICE: COMPONENTS OF TYPES I AND II MAY BE SIMILAR OR IDENTICAL TO PROPRIETARY DESIGNS. ANY INFRINGEMENT ON THE PROPRIETARY RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF THE USER. SUBSTITUTIONS FOR TYPES I AND II SHALL BE AS APPROVED BY THE ENGINEER.



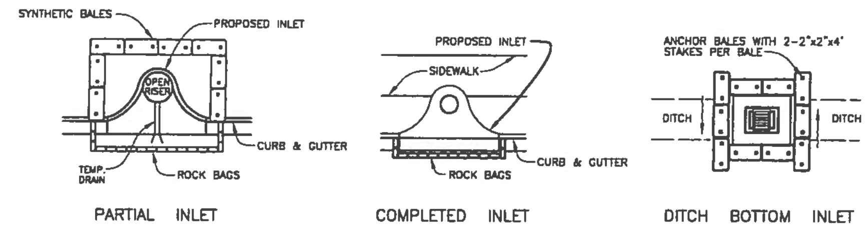
TURBIDITY BARRIERS
FIGURE 4



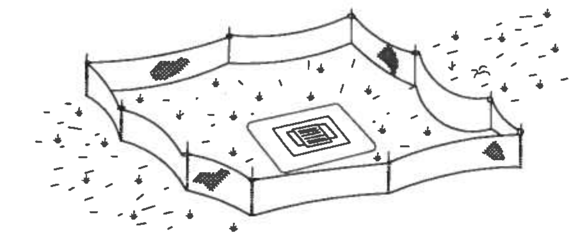
TYPICAL SWALE SECTION
FIGURE 5



TYPICAL RETENTION/DETENTION POND SECTION
FIGURE 6

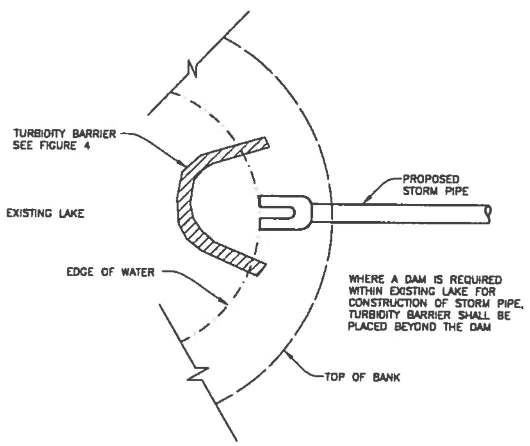


SYNTHETIC BALE PROTECTION AROUND INLETS OR SIMILAR STRUCTURES
FIGURE 7

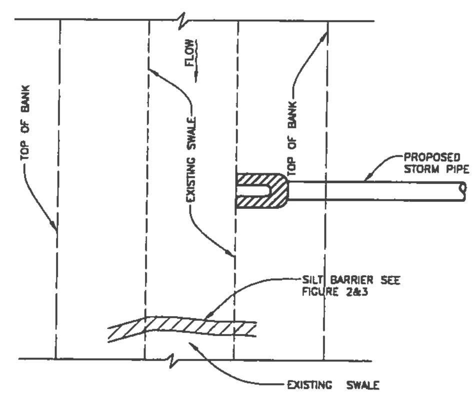


TYPE III SILT FENCE PROTECTION AROUND DITCH BOTTOM INLETS

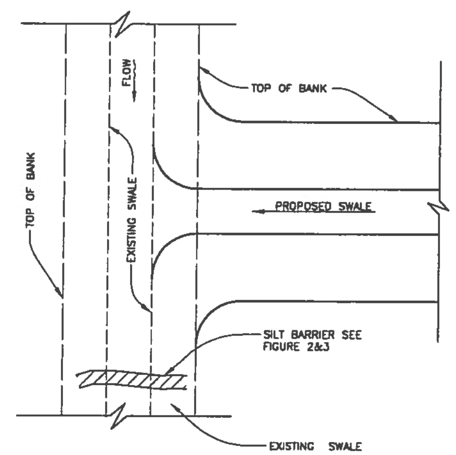
STAKED SILT BARRIER OR SILT FENCE PROTECTION AROUND DITCH BOTTOM INLETS
FIGURE 8



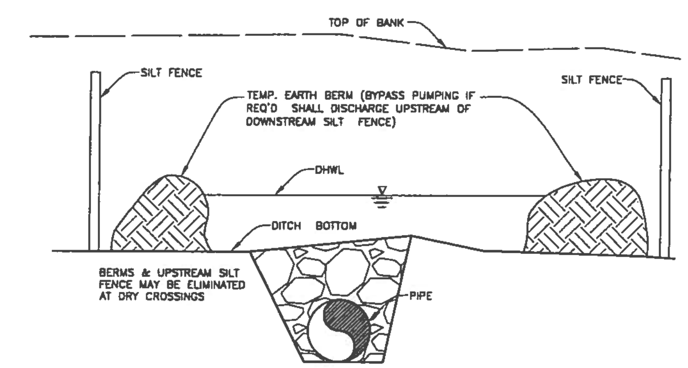
TURBIDITY BARRIER AT CONNECTION OF STORM PIPE TO EXISTING LAKE
FIGURE 9



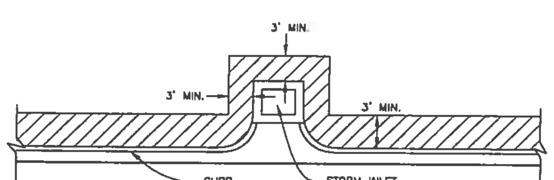
SILT BARRIER AT CONNECTION OF STORM PIPE TO EXISTING SWALE
FIGURE 10



SILT BARRIER AT CONNECTION OF SWALE TO EXISTING SWALE
FIGURE 11

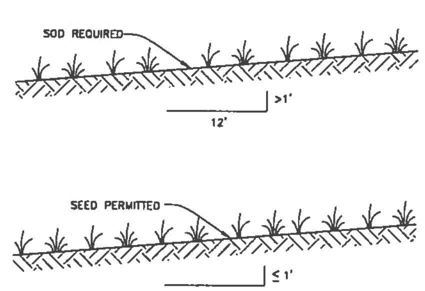


UNDERGROUND PIPE CROSSING
FIGURE 12

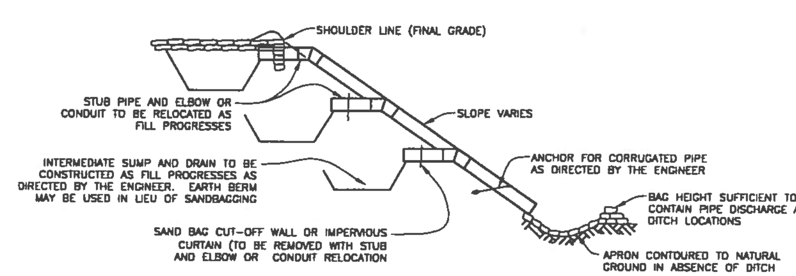


SOD ALONG CURB AND AROUND INLET
FIGURE 14

NOTE:
REFERENCE THE FDOT DESIGN STANDARDS LATEST EDITION FOR ALL TEMPORARY EROSION CONTROL MEASURES.

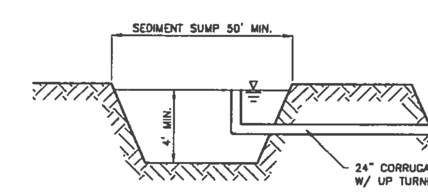


GRASS SLOPES
FIGURE 13



SECTION AA

TEMPORARY SLOPE DRAIN
FIGURE 15



SEDIMENT SUMP SECTION
FIGURE 16

Manatee County FLORIDA
PUBLIC WORKS DEPARTMENT ENGINEERING SERVICES
1022 26th Avenue East, Bradenton, FL 34208

NORTH COUNTY FUEL DEPOT
PRELIMINARY/FINAL SITE PLAN
BEST MANAGEMENT PRACTICES DETAILS

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SHEET 11