



**INVITATION FOR BID
(IFB) #12-1094-OV
53rd Avenue East (S.R. 70) @ 15th Street East
Intersection Improvements
Manatee County Project No.: 323-6029960**

Manatee County, a political subdivision of the State of Florida, (hereinafter the "County") will receive sealed bids from individuals, corporations, partnerships, and other legal entities organized under the laws of the State of Florida or authorized to conduct business in the State of Florida.

NON-MANDATORY INFORMATION CONFERENCE

In order to insure that all prospective bidders have sufficient information and understanding of the County's needs, an **Information Conference** will be held **May 10, 2012 20, 2012 @11:00 AM. Location: Manatee County Public Works Department, Project Management Division, (Conference Room A) at 1022 26th Avenue East, Bradenton, FL 34208.** Attendance is not mandatory, but is highly encouraged.

Reference Bid Article B.04 INSPECTION OF SITE:

Prior to submission of a bid, each bidder shall visit the site to become familiar with all conditions that may affect services that are required to completely execute the full intent of these specifications. Site visit shall be acknowledged in Section 00300, Bid Form, page 00300-1.

DEADLINE FOR CLARIFICATION REQUESTS: May 21, 2012 at 5:00 PM
(Reference Bid Article A.06.)

TIME AND DATE DUE: June 6, 2012 at 2:00 PM

Manatee County Purchasing Division, 1112 Manatee Avenue West, Bradenton, FL 34205

**FOR INFORMATION CONTACT: Olga Valcich (941) 749-3055
email: olga.valcich@mymanatee.org**

AUTHORIZED FOR RELEASE: 

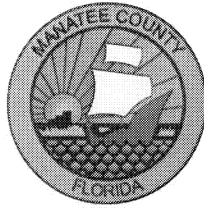


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Plan Set..... (PDF).....Roadway.....November 2011.....	20 Pages
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Including.....Signing and Pavement Marking Plans.....	6 Pages
Special Provisions.....	18 Pages
State of Florida Department of Transportation Driveway/Connection Permit...	78 Pages

Important Note: Lobbying is prohibited (reference Bid Article A.08)

FOR INFORMATION CONTACT
Olga Valcich (941) 749-3055

Email: olga.valcich@mymanatee.org

SECTION 00010
INFORMATION TO BIDDERS

A.01 OPENING LOCATION

These bids will be **publicly opened** at **Manatee County Purchasing, 1112 Manatee Avenue West, Suite 803, Bradenton, Florida 34205** in the presence of County officials at the time and date stated, or soon thereafter. All bidders or their representatives are invited to be present.

Any bids received after the stated time and date will not be considered. It shall be the sole responsibility of the bidder to have their bid **delivered to the Manatee County Purchasing Division** for receipt on or before the stated time and date. If a bid is sent by **U.S. Mail**, the bidder shall be responsible for its timely delivery to the Purchasing Division. Bids delayed by mail shall not be considered, shall not be opened at the public opening, and arrangements shall be made for their return at the respondent's request and expense.

A.02 SEALED & MARKED

One original and two copies of your **signed bid** shall be submitted in **one sealed package**, clearly marked on the outside **"Sealed Bid #12-1094-OV, 53rd East (S.R.70) @ 15th Street East Intersection Improvements** with your company name.

Address package to: Manatee County Purchasing Division
 1112 Manatee Avenue West, Suite 803
 Bradenton, Florida 34205

A.03 SECURING OF DOCUMENTS

Complete individual copies of the bidding documents for the project and/or products can be obtained, free of charge, at the Manatee County Public Works Department located at: 1022 26th Avenue East, Bradenton, FL 34208: 941-708-7450, Extension 7327 or 7334 between the hours of 8:00 AM to 4:00 PM, Monday through Friday, exception of holidays. Complete set of the bidding document must be used in preparing bids. The County assumes no responsibility for errors and misinterpretations resulting from the use of incomplete sets of bidding documents.

A.04 BID DOCUMENTS

Bids on <http://www.mymanatee.org> , Bid documents and the Notices of Source Selection related to those Bids are available for download in a portable document format (.PDF) file on the Manatee County web page on the Purchasing tab under "Bids." You may view and print these files using Adobe Acrobat software. You may download a free copy of this software (Adobe) from the County's web page if you do not have it. **Manatee County collaborates with the Manatee Chamber of Commerce** on distributing solicitations using the RFP Tool web page on the Chambers website: <http://www.Manateechamber.com> to post Bid documents in a portable document

A.04 BID DOCUMENTS (Continued)

format (.PDF) file. This step is in addition to the posting on Manatee County Government web pages.

Manatee County may also use an internet service provider to distribute Bids. A link to that service, <http://www.DemandStar.com>, is provided on this website under the Tab "DemandStar". Participation in the DemandStar system is not a requirement for doing business with Manatee County.

Note: The County posts the Notice of Source Selection seven calendar days prior to the effective date of the award.

IT IS THE RESPONSIBILITY OF EACH VENDOR, PRIOR TO SUBMITTING THEIR BID, TO CONTACT THE MANATEE COUNTY PURCHASING OFFICE (see contact information on page one of this document) TO DETERMINE IF ADDENDA WERE ISSUED AND TO MAKE SUCH ADDENDA A PART OF THEIR BID .

A.05 MODIFICATION OF BID SPECIFICATIONS

If a bidder wishes to recommend changes to the bid specifications, the bidder shall furnish in writing, data and information necessary to aid the County in evaluating the request to modify the specifications. The County is not obligated to make any changes to the bid specifications. Unless an addendum is issued, the bid specifications shall remain unaltered. **Bidders must fully comply with the bid specifications, terms, and conditions.**

A.06 DEADLINE FOR CLARIFICATION REQUESTS

May 21, 2012 at 5:00 PM shall be the deadline to submit all inquiries, suggestions, or requests concerning interpretation, clarification or additional information pertaining to the Invitation for Bids to the Manatee County Purchasing Office.

This deadline has been established to maintain fair treatment for all potential bidders, while maintaining the expedited nature of the Economic Stimulus that the contracting of this work may achieve.

A.07 CLARIFICATION & ADDENDA

Each bidder shall examine all Invitation for Bids documents and shall judge all matters relating to the adequacy and accuracy of such documents. Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to the Invitation for Bids shall be made through the Manatee County Purchasing Office. The County shall not be responsible for oral interpretations given by any County employee, representative, or others. The issuance of a written addendum is the only official method whereby interpretation, clarification or additional information can be given. If any addenda are issued to this Invitation for Bid, the County will Broadcast the addenda on the Demand Star distribution system to "Planholders" on this web service, and post the documents on the Purchasing Division's web page at <http://www.mymanatee.org> which may be accessed by clicking on the Purchasing button and then clicking on the "Bids" button. **It shall be the responsibility of each bidder**

A.07 CLARIFICATION & ADDENDA (Continued)

prior to submitting their bid, to contact Manatee County Purchasing (see contact on page 1) to determine if addenda were issued and to make such addenda a part of their bid.

A.08 LOBBYING

After the issuance of any Invitation For Bid, prospective bidders, or any agent, representative or person acting at the request of such bidder shall not contact, communicate with or discuss any matter relating in any way to the Invitation For Bid with any officer, agent or employee of Manatee County other than the Purchasing Official or as directed in the Invitation For Bid. This prohibition begins with the issuance of any Invitation For Bid, and ends upon execution of the final contract or when the invitation has been canceled. Violators of this prohibition shall be subject to sanctions as provided in the Manatee County Purchasing Code.

The County reserves the right to amend or to add to the names listed as persons to contact. All amendments or additions to the names listed as persons to contact shall be issued by the Purchasing Division, in writing.

A.09 UNBALANCED BIDDING PROHIBITED

Manatee County recognizes that large and/or complex projects will often result in a variety of methods, sources and prices; however, where in the opinion of the County such variation does not appear to be justified, given bid specifications and industry and market conditions, the bid will be presumed to be unbalanced. Examples of unbalanced bids will include:

1. Bids showing omissions, alterations of form, additions not specified or required conditional or unauthorized alternate bids.
2. Bids quoting prices that substantially deviate, either higher or lower, from those included in the bids of competitive bidders for the same line item unit costs.
3. Bids where the unit costs offered are in excess of or below reasonable cost analysis values.

In the event the County determines that a bid is presumed unbalanced, it will request the opportunity to, and reserves the right to, review all sources quotes, bids, price lists, letters of intent, etc., which the bidder obtained and upon which the bidder relied upon to develop the bid. The County reserves the right to reject as non-responsive any presumptive unbalanced bids where the bidder is unable to demonstrate the validity and /or necessity of the unbalanced unit costs(s).

A.10 FRONT END LOADING OF BID PRICING PROHIBITED

Prices offered for performance and/or acquisition activities to occur early in the project schedule, such as: mobilization, clearing and grubbing; or maintenance of traffic, that are substantially higher than pricing of competitive bidders within the same portion of the project schedule, will be presumed to be front end loaded. Front end loaded bids could reasonably appear to be an attempt to obtain unjustified early payments creating a risk of insufficient incentive for the Contractor to complete the work or otherwise creating an appearance of an under-capitalized bidder.

In the event the County determines that a bid is presumed to be front end loaded, it will request the opportunity to, and reserves the right to, review all source quotes, bids, price lists, letters of intent, etc., which the bidder obtained and upon which the bidder relied upon to develop the pricing or acquisition timing for these bid items. The County reserves the right to reject as non-responsive any presumptive front end loaded bids where the bidder is unable to demonstrate the validity and/or necessity of the front end loaded costs.

A.11 WITHDRAWAL OF OFFERS

Vendors may withdraw offers as follows: a) Mistakes discovered before the opening of a solicitation may be withdrawn by written notice from the bidder submitting the offer. This request must be received in the office designated for receipt of offers in the solicitation document prior to the time set for delivery and opening of the offers. A copy of the request shall be retained and the unopened offer returned to that vendor. b) After the responses to a solicitation are opened or a selection has been determined, but before a contract is signed, a vendor alleging a material mistake of fact may be permitted to withdraw their offer if: (1) the mistake is clearly evident on the solicitation document; or (2) the bidder submits evidence which clearly and convincingly demonstrates that a mistake was made. Request to withdraw an offer must be in writing and approved by the Purchasing Official.

A.12 IRREVOCABLE OFFER

Any bid may be withdrawn up until the date and time set for opening of the bid. Any bid not so withdrawn shall, upon opening, constitute an irrevocable offer for a period of 90 days to sell to Manatee County the goods or services set forth in the attached specifications until one or more of the bids have been duly accepted by the County.

A.13 BID EXPENSES

All expenses for making bids to the County are to be borne by the bidder.

A.14 BE GREEN

All Bidders are encouraged to use as many environmentally preferable "green" products, materials, supplies, etc. as possible in order to promote a safe and healthy environment. Environmentally preferable are products or services that have a reduced adverse effect on the environment. Provide detail of your organization's initiative and its ability to meet the goal of environmental sustainability.

A.15 RESERVED RIGHTS

The County reserves the right to accept or reject any and/or all bids, to waive irregularities and technicalities, and to request resubmission. Also, the County reserves the right to accept all or any part of the bid and to increase or decrease quantities to meet additional or reduced requirements of the County. Any sole response received by the first submission date may or may not be rejected by the County depending on available competition and current needs of the County. For all items combined, the bid of the lowest responsive, responsible bidder will be accepted, unless all bids are rejected. The lowest responsible bidder shall mean **that bidder who makes the lowest bid to sell goods and/or services of a quality which** conforms closest to or most exceeds the quality of goods and/or services set forth in the attached specifications or otherwise required by the County, and who is fit and capable to perform the bid as made.

To be responsive, a bidder shall submit a bid which conforms in all material respects to the requirements set forth in the Invitation For Bid. To be a responsible bidder, the bidder shall have the capability in all respects to perform fully the contract requirements, and the tenacity, perseverance, experience, integrity, reliability, capacity, facilities, equipment, and credit which will assure good faith performance. Also, the County reserves the right to make such investigation as it deems necessary to determine the ability of any bidder to furnish the service requested. Information the County deems necessary to make this determination shall be provided by the bidder. Such information may include, but shall not be limited to: current financial statements, verification of availability of equipment and personnel, and past performance records.

A.16 APPLICABLE LAWS

Bidder must be authorized to transact business in the State of Florida. All applicable laws and regulations of the State of Florida and ordinances and regulations of Manatee County will apply to any resulting agreement. Any involvement with any Manatee County procurement shall be in accordance with Manatee County Purchasing Code of Laws as amended. Any actual or prospective bidder who is aggrieved in connection with the solicitation or award of a contract may protest to the Board of County Commissioners of Manatee County as required in Section 2-26/61 of the Purchasing Code.

A protest with respect to this Invitation For Bid shall be submitted in writing prior to the scheduled opening date of this bid, unless the aggrieved person did not know and could not have been reasonably expected to have knowledge of the facts giving rise to such protest prior to the scheduled opening date of this bid. The protest shall be submitted within seven calendar days after such aggrieved person knows or could have reasonably been expected to know of the facts giving rise thereto.

A.17 COLLUSION

By offering a submission to this Invitation for Bid, the bidder certifies that he has not divulged, discussed or compared their bid with any other bidder, and has not colluded with any other bidder or parties to this bid whatsoever.

Also, bidder certifies and in this case of a joint bid each party thereto certifies as to their own organization, that in connection with this bid:

- a. any prices and/or cost data submitted have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices and/or cost data, with any other bidder or with any competitor;
- b. any prices and/or cost data quoted for this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder, prior to the scheduled opening, directly or indirectly to any other bidder or to any competitor;
- c. no attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition;
- d. the only person or persons interested in this bid, principal or principals is/are named therein and that no person other than therein mentioned has any interest in this bid or in the contract to be entered into; and
- e. no person or agency has been employed or retained to solicit or secure this contract upon an agreement or understanding or a commission, percentage, brokerage, or contingent fee excepting bona fide employees or established commercial agencies maintained by bidder for purpose of doing business.

A.18 CODE OF ETHICS

With respect to this bid, if any bidder violates, directly or indirectly, the ethics provisions of the Manatee County Purchasing Code and/or Florida criminal or civil laws related to public procurement, including but not limited to Florida Statutes Chapter 112, Part II, Code of Ethics for Public Officers and Employees, such bidder will be disqualified from eligibility to perform the work described in this Information for Bid, and may also be disqualified from furnishing future goods or services to, and from submitting any future bids or proposals to supply goods or services to, Manatee County.

By submitting a bid, the bidder represents to the County that all statements made and materials submitted are truthful, with no relevant facts withheld. If a bidder is determined to have been untruthful in its proposal or any related presentation, such bidder will be disqualified from eligibility to perform the work described in this Invitation for Bid, and may also be disqualified from furnishing future goods or services to, and from submitting any future bids or proposals to supply goods or services to, Manatee County.

A.19 BID FORMS

Bids must be submitted on attached County forms, although additional pages may be attached. **Bidders must fully comply with all bid specifications, terms and conditions.** Failure to comply shall result in contract default, whereupon, the defaulting vendor shall be required to pay for any and all re-procurement costs, damages, and attorney fees as incurred by the County.

A.20 LEGAL NAME

Bids shall clearly indicate the legal name, address and telephone number of the bidder. Bids shall be signed above the typed or printed name and title of the signer. The signer must have the authority to bind the bidder to the submitted bid.

A.21 PUBLIC CONTRACTING AND ENVIRONMENTAL CRIMES

A person or affiliate who has been placed on the State's convicted vendor list following a conviction for a public entity crime, as that term is defined in Florida Statute § 287.133, may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity in excess of the threshold amount provided in Florida Statute § 287.017 for CATEGORY TWO for a period of 36 months following the date of being placed on the convicted list.

In addition, the Manatee County Code prohibits the award of any contract to any person or entity who/which has, within the past 5 years, been convicted of, or admitted to in court or sworn to under oath, a public entity crime or of any environmental law that, in the reasonable opinion of the purchasing official, establishes reasonable grounds to believe the person or business entity will not conduct business in a responsible matter. To insure compliance with the foregoing, the Code requires all persons or entities desiring to contract with the County to execute and file with the purchasing official an affidavit, executed under the pain and penalties of perjury, confirming that person, entity and any person(s) affiliated with the entity, does not have such a record and is therefore eligible to seek and be awarded business with the County. In the case of a business entity other than a partnership or a corporation, such affidavit shall be executed by an authorized agent of the entity. In the case of a partnership, such affidavit shall be executed by the general partner(s). A Public Contracting and Environmental Crimes Certification is attached for this purpose.

A.22 DISCOUNTS

Any and all discounts must be incorporated in the prices contained in the bid and not shown separately. The prices as shown on the bid form shall be the price used in determining award.

A.23 TAXES

Manatee County is exempt from Federal Excise and State Sales Taxes. (F.E.T. Exempt Cert. No. 59-78-0089K; FL Sales Tax Exempt Cert. NO 85-8012622206C-6); therefore, the vendor is prohibited from delineating a separate line item in his bid for any sales or service taxes. Nothing herein shall affect the vendor's normal tax liability.

A.24 DESCRIPTIVE INFORMATION

Unless otherwise specifically provided in the specifications, all equipment, materials and articles incorporated in the work covered by this contract shall be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in the specifications, reference to any equipment, material, article or patented process, by trade name, brand name, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition.

A.25 AMERICANS WITH DISABILITIES ACT

The Board of County Commissioners of Manatee County, Florida, does not discriminate upon the basis of any individual's disability status. This non-discrimination policy involves every aspect of the County's functions including one's access to, participation, employment, or treatment in its programs or activities. Anyone requiring reasonable accommodation for an **Information Conference** or **Bid Opening** should contact the person named on the first page of this bid document at least twenty-four (24) hours in advance of either activity.

A.26 EQUAL EMPLOYMENT OPPORTUNITY CLAUSE

In accordance with the provisions of Title VI of the Civil Rights Act of 1964 and Title 15, Part 8 of the Code of Federal Regulations, Manatee County hereby notifies all prospective offerors that they will affirmatively ensure minority business enterprises will be afforded full opportunity to participate in response to this advertisement and will not be discriminated against on the grounds of race, color or national origin in consideration for an award of contract.

A.27 MBE/WBE

The State of Florida, **Office of Supplier Diversity** provides the certification process and the database for identifying certified MBE/WBE firms. This service may be directly accessed at: <http://www.osd.dms.state.fl.us/iframe.htm>

If you have any questions regarding this State service, please contact their office at (850) 487-0915.

A.28 MATHEMATICAL ERRORS

In the event of multiplication/extension error(s), the unit price shall prevail. In the event of addition error(s) the extension totals will prevail. All bids shall be reviewed mathematically and corrected, if necessary, using these standards, prior to additional evaluation.

A.29 DISCLOSURE

Upon receipt, all inquiries and responses to inquiries related to this Invitation for Bid become "Public Records" and are subject to public disclosure consistent with Chapter 119, Florida Statutes.

Bids become subject to disclosure 30 days after the Opening or if a notice of intended award decision is made earlier than this time as provided by Florida Statute 119.071 (1)(b). If the County rejects all offers and concurrently notices its intent to reissue the solicitation, initial offers are exempt until the County provides notice of its intended decision, or 30 days after the opening of the new offers.

Based on the above, Manatee County will receive bids at the date and time stated, and will make public at the opening the names of the business entities of all that submitted an offer and any amount presented as a total offer without any verification of the mathematics or the completeness of the offer. Upon the expiration of the statutory term for exemption the actual documents may be inspected or copied. When County staff have completed a mathematic validation and inspected the completeness of the offers, tabulation shall be posted on www.mymanatee.org.

A.30 E-VERIFICATION

Contractor shall utilize the U.S. Department of Homeland Security's E-Verify system, in accordance with the terms governing use of the system, to confirm the employment eligibility of;

1. all persons employed by the Contractor during the term of the Contract to perform employment duties within Florida; and
2. all persons, including subcontractors, assigned by the Contractor to perform work pursuant to the contract with the State Agency.

NOTE: ANY OR ALL STATEMENTS CONTAINED IN THE FOLLOWING SECTIONS: BASIS OF AWARD, TERMS AND CONDITIONS OF THE CONTRACT, OR SPECIFICATIONS, WHICH VARY FROM THE INFORMATION TO BIDDERS, SHALL HAVE PRECEDENCE.

END OF SECTION

SECTION 00020
BASIS OF AWARD

B.01 BASIS OF AWARD

Award shall be to the responsive, responsible bidder meeting specifications and having the lowest Total Bid Price for **Bid "A"**, or the lowest Total Bid Price for **Bid "B"**, for the requirements listed on the Bid Form for the Work as set forth in this Invitation For Bid. Bid Prices shall include costs for furnishing all labor, equipment and/or materials for the completion of the Work in accordance with and in the manner set forth and described in the Contract Documents to the County's satisfaction within the prescribed time.

Two schedules for Completion of the Work shall be considered. Each bid for completion by the specified stated time shall be offered as a separate "Total Bid Price". The County has the sole authority to select the bid based on the Completion Time which is in the best interest of the County. Only one award shall be made.

In evaluating bids, the County shall consider the qualifications of the bidders; and if required, may also consider the qualifications of the subcontractors, suppliers, and other persons and organizations proposed. County may also consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work.

Whenever two or more bids are equal with respect to price, quality and service, the bid received from a local business shall be given preference in award. Whenever two or more bids which are equal with respect to price, quality and service are received, and both bids and neither of these bids are received from a local business, the award shall be determined by a chance drawing conducted by the Purchasing Office and open to the public.

Local business is defined as a business duly licensed and authorized to engage in the sale of goods and/or services to be procured, which has a place of business in Manatee County with full time employees at that location.

B.02 SUBCONTRACTORS

Subcontractors shall be bound by the terms and conditions of this contract insofar as it applies to their Work, but this shall not relieve the prime contractor from the full responsibility of the County for the proper completion of all Work to be executed under this contract.

The employment of unauthorized aliens by any vendor is considered a violation of Section 274 (e) of the Immigration and Employment Act. If the vendor knowingly employs unauthorized aliens, such violation shall be cause for unilateral cancellation of this agreement.

B.03 QUALIFICATIONS OF BIDDERS

Each bidder must secure all licenses required (in accordance with Chapter 489 Florida Statutes) for the Work which is the subject of this bid; and, upon request, shall submit a true copy of all applicable licenses.

The minimum license(s) requirement for this project is an FDOT Pre-Qualified Contractor in the following: Major Classes of Work: "Grading, Drainage and Flexible Paving. Specialty Classes of Work: Traffic Signals, Pavement Markings, and Roadway Signing with a minimum of three (3) years experience in this type of work .

To demonstrate qualifications to perform the Work, each bidder must be prepared to submit within five days of County's request; written evidence such as financial data, previous experience, present commitments and other such data as may be requested. Bidder must be able to provide evidence of Bidder's qualification to do business in the state of Florida. Each bidder shall submit as a portion of their bid, a completed Contractor's Questionnaire included as Section 00430. **A copy of the Contractor's License(s) shall be made a part of the Bid submittal.**

A complete list of all subcontractors proposed for any portion of the Work may be requested of any Bidder deemed necessary by the Owner. Subcontracts shall be awarded only to those subcontractors considered satisfactory by the Owner.

B.04 INSPECTION OF SITE

Prior to the submission of a bid, each bidder shall visit the site to become familiar with all conditions that may affect services that are required to completely execute the full intent of these specifications.

Site visit shall be acknowledged in Section 00300, Bid Form, page 00300-1.

B.05 PREPARATION OF CONTRACT

A written notice confirming award or recommendation thereof will be forwarded to the Successful Bidder accompanied by the required number of unsigned counterparts of the Agreement. Within 10 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement with any other required documents to County. (Note: Contract must be approved in accordance with the Manatee County Code of Laws, Chapter 2-26, Manatee County Purchasing Ordinance and the Standard and Procedures approved by the County Administrator).

END OF SECTION

SECTION 00030
GENERAL TERMS AND CONDITIONS OF THE CONTRACT

C.01 CONTRACT FORMS

The agreement resulting from the acceptance of a bid shall be in the form of the agreement stated in this bid.

C.02 ASSIGNMENT OF CONTRACT

Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this Contract or of his right, title, or interest therein, or his power to execute such Contract, or to assign any monies due or to become due there under to any other person, firm or corporation unless first obtaining the written consent of the County. The giving of such consent to a particular subcontractor assignment shall not dispense with the necessity of such consent to any further or other assignment.

C.03 COMPLETION OF WORK

The Work will be completed and ready for final inspection within the specified calendar days from the date the Contract Time commences to run. Two bids shall be considered based on **Bid "A" 150 calendar days** and **Bid "B" based on 210 calendar days**. The County has the sole authority to select the bid based on the Completion Time which is in the best interest of the County. Only one award shall be made.

C.04 LIQUIDATED DAMAGES

If the Contractor refuses or fails to prosecute the Work, or any separable part thereof, with such diligence as will hinder its completion within the time specified, the County may seek damages. The actual damages for delay will be impossible to determine and in lieu thereof, the Contractor shall pay to the Owner the sum of **\$278.00** as fixed, agreed, and liquidated damages for each calendar day of the delay until the Work is finally accepted by the County and the Contractor and his Surety shall be liable for the amount thereof.

C.05 PAYMENT

Contractor may apply for partial payment on monthly estimates, based on the amount of Work done or completed in compliance with the provisions of the Contract. Contractor shall submit an application, on a form provided or approved by the County, of an approximate estimate of the proportionate value of the Work done, items and locations of the Work performed up to and including the last day of the period then ending. The County will then review said estimate and make any necessary revisions so that the estimate can receive approval for payment. If the Contractor and the County do not agree on the approximate estimate of the proportionate value of the Work done for any pay period, the determination of the County will be binding. The amount of said estimate after deducting any required retainage and all previous payments shall be due and payable to the Contractor within 20 days after the pay estimate has been approved by the County. **If Outside Agent approval is required, payment shall be due 25 business days after the pay estimate has been approved by the Agent for the County.** It is the Contractor's responsibility for the care of the materials.

C.05 PAYMENT (Continued)

Any damage to or loss of said materials is the full responsibility of the Contractor. Any Periodical Pay Estimate signed by the Contractor shall be final as to the Contractor for any or all work covered by the Periodical Pay Estimate. Any requests for payment of materials stored on site must be accompanied with a paid receipt. The Contractor warrants and guarantees that title to all work, materials and equipment covered by any application for payment, whether incorporated in the project or not, will pass to the County at the time of payment free and clear of all liens, claims, security interests and encumbrances (hereafter referred to as "Liens").

The Contractor agrees to furnish an affidavit stating that all laborers, material men, and subcontractors have been paid on the project for Work covered by the application for payment and that a partial or complete release of lien, as may be necessary, be properly executed by the material men, laborers, subcontractors on the project for Work covered by the application for payment, sufficient to secure the County from any claim whatsoever arising out of the aforesaid Work.

When the Contractor has completed the Work in compliance with the terms of the Contract Documents, he shall notify the County in writing that the project is ready for final inspection. The County will then advise the Contractor as to the arrangements for final inspection and what Work, if any, is required to prepare the project or a portion thereof for final inspection. When the County determines the project or portion thereof is ready for final inspection, the County shall perform same. Upon completion of final inspection, the County will notify Contractor of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies. When all such errors have been corrected, a final re-inspection will be made. The process will be repeated until, in the opinion of the County, the project has been completed in compliance with the terms of the Contract Documents.

When final acceptance has been made by the County, the County will make final payment of the Contract amount, plus all approved additions, less approved deductions and previous payments made. The Contract will be considered complete when all work has been finished, the final inspection made, approved as-builts received, and the project finally accepted in writing by the County. The Contractor's responsibility shall then terminate except as otherwise stated.

C.06 RETAINAGE

A **retainage** of 2.5% of the total contract amount shall be withheld from payments after 75% completion of the Work. Upon substantial completion, this retainage shall be reduced to 1% of the total contract amount plus such amount as the Owner may reasonably deem necessary to repair, replace, complete or correct any damaged, defective, incorrect or incomplete work. Upon final acceptance, the remaining retainage shall be included in the final payment.

C.07 WARRANTY AND GUARANTEE PROVISIONS

All work, materials, and equipment furnished as defined herein shall be guaranteed and warranted by the contractor for a minimum period of three (3) years, unless otherwise specified, from final acceptance by the Owner to be free from defects due either to faulty materials or equipment or faulty workmanship.

All materials, equipment, and workmanship furnished and installed by the contractor is warranted and guaranteed by the contractor to meet the required standards and to accomplish the purposes and functions required standards and to accomplish the purposes and functions of the project as defined, detailed, and specified herein.

The Owner shall, following discovery thereof, promptly give written notice to the contractor of faulty materials, equipment, or workmanship within the period of the guarantee and the contractor shall promptly replace any part of the faulty equipment, material, or workmanship at his own cost. These warranty and guarantee provisions create no limitations on the Owner as to any claims or actions for breach of guaranty or breach of warranty that the Owner might have against parties other than the contractor, and do not constitute exclusive remedies of the Owner against the contractor.

C.08 ROYALTIES AND PATENTS

The contractor shall pay all royalties and license fees for equipment or processes in conjunction with the equipment and/or services being furnished. Contractor shall defend all suits or claims for infringement of any patent, trademark or copyright, and shall save the County harmless from loss on account thereof, including costs and attorney's fees.

C.09 AUTHORIZED PRODUCT REPRESENTATION

The contractor, by virtue of submitting the name and specifications of a manufacturer's product, will be required to furnish the named manufacturer's product. Failure to perform accordingly may, in the County's sole discretion, be deemed a breach of contract, and shall constitute grounds for the County's immediate termination of the contract.

C.10 REGULATIONS

It shall be the responsibility of the bidder to assure compliance with any OSHA, EPA and/or other federal or state of Florida rules, regulations or other requirements, as each may apply.

C.11 CANCELLATION

Any failure of the contractor to furnish or perform the Work (including, but not limited to, commencement of the Work, failure to supply sufficient skilled workers or suitable materials or equipment) in accordance with the contract, the County may order the stop of the Work, or any portion thereof, until the cause for such order has been eliminated. If the contractor persistently fails to perform the Work in accordance with the contract, the County reserves the right to terminate the contract and select the next qualified bidder or re-advertise this procurement in part or in whole. The County reserves the right to cancel all or any undelivered or unexecuted portion of this contract with or without cause.

C.12 INDEMNIFICATION

The contractor covenants and agrees to indemnify and save harmless the County, its agents and employees, from and against all claims, suits, actions, damages, causes of action, or judgments arising out of the terms of the resulting agreement for any personal injury, loss of life, or damage to the property sustained as a result of the performance or non-performance of services or delivery of goods; from and against any orders, judgments, or decrees, which may be entered against the County, its agents or employees; and from and against all costs, attorney's fees, expenses and other liabilities incurred in the defense of any such claim, suit or action, and the investigation thereof. Nothing in the award, resulting agreement, contract or Purchase Order shall be deemed to affect the rights, privileges and immunities of the County as set forth in Florida Statute Section 768.28.

C.13 MANUALS, SCHEMATICS, HANDBOOKS

All manuals, schematics and handbooks shall be provided which are applicable to the equipment delivered. An operators manual, parts manual and technician manual must also be provided. Parts lists (manuals) must include OEM part numbers for items not manufactured by the bidder. Vendor shall furnish two (2) copies of each.

C.14 INSURANCE

The contractor will not commence work under a contract until all insurance under this section and such insurance coverage as might be required by the County has been obtained. The contractor shall obtain, and submit to Purchasing within 10 calendar days of request, at his expense, the following minimum amounts of insurance (inclusive of any amounts provided by an umbrella or excess policy):

a. **Workers' Compensation/Employers' Liability**

Part One - There shall be no maximum limit (other than as limited by the applicable statute) for liability imposed by Florida Workers' Compensation Act or any other coverage required by the contract documents which are customarily insured under Part One of the standard Workers' Compensation Policy.

C.14 INSURANCE (Continued)

Part Two - The minimum amount of coverage required by the contract documents which are customarily insured under Part Two of the standard Workers' Compensation Policy shall be:

<u>\$100,000</u>	(Each Accident)
<u>\$500,000</u>	(Disease-Policy Limit)
<u>\$100,000</u>	(Disease-Each Employee)

b. Commercial General Liability

The limits are to be applicable only to work performed under this contract and shall be those that would be provided with the attachment of the Amendment of Limits of Insurance (Designated Project or Premises) endorsement (ISO Form CG 25 03) a Commercial General Liability Policy with the following minimum limits.

General Aggregate:

Products/Completed Operations Aggregate	<u>\$1,000,000</u>
Personal and Advertising Injury	<u>\$1,000,000</u>
Each Occurrence	<u>\$1,000,000</u>
Fire Damage (Any One Fire)	<u>\$Nil</u>
Medical Expense (Any One Person)	<u>\$Nil</u>

c. Business Auto Policy

Each Occurrence Bodily Injury and Property Damage Liability Combined	<u>\$300,000</u>
Annual Aggregate (if applicable):	<u>\$1,000,000</u>

d. Owners Protective Liability Coverage

The minimum OPC Policy limits per occurrence and, if subject to an aggregate, annual aggregate to be provided by the contractor shall be the same as the amounts shown above as the minimum per occurrence and general policy aggregate limits respectively required for the Commercial General Liability coverage. The limits afforded by the OPC Policy and any excess policies shall apply only to the Owner and the Owner's officials, officers, agents and employees and only to claims arising out of or in connection with the work under this contract.

e. Property Insurance

If this contract includes construction of or additions to above ground buildings or structures, contractor shall provide "**Builder's Risk**" insurance with the minimum amount of insurance to be 100% of the value of such addition(s), building(s), or structure(s).

C.14 INSURANCE (Continued)f. Installation Floater

If this contract does not include construction of or additions to above ground building or structures, **but does involve** the installation of machinery or equipment, contractor shall provide an "**Installation Floater**" with the minimum amount of insurance to be 100% of the value of such addition(s), building(s), or structure(s).

g. Certificates of Insurance and Copies of Policies

Certificates of Insurance in triplicate evidencing the insurance coverage specified in the six above paragraphs a., b., c., d., e., and f., shall be filed with the Purchasing Director before operations are begun. The required certificates of insurance shall name the types of policy, policy number, date of expiration, amount of coverage, companies affording coverage, and also shall refer specifically to the bid number, project title and location of project. Insurance shall remain in force at least one year after completion and acceptance of the project by the County, in the amounts and types as stated herein, with coverage for all products and services completed under this contract.

ADDITIONAL INSURED: Manatee County, a political subdivision of the State of Florida shall be specifically named as additional insured on all policies.

If the initial insurance expires prior to the completion of operations and/or services by the contractor, renewal certificates of insurance and required copies of policies shall be furnished by the contractor and delivered to the Purchasing Director thirty (30) days prior to the date of their expiration.

Nothing herein shall in any manner create any liability of the County in connection with any claim against the contractor for labor, services, or materials, or of subcontractors; and nothing herein shall limit the liability of the contractor or contractor's sureties to the County or to any workers, suppliers, material men or employees in relation to this contract.

C.15 BID BOND/CERTIFIED CHECK

By offering a submission to this Invitation For Bid, the bidder agrees should the bidder's bid be accepted, to execute the form of contract and present the same to Manatee County for approval within 10 days after being notified of the awarding of the contract. The bidder further agrees that failure to execute and deliver said form of contract **within 10 days** will result in damages to Manatee County and as guarantee of payment of same a bid bond/certified check shall be enclosed within the submitted sealed bid in the amount of five (5%) percent of the total amount of the bid.

C.15 BID BOND/CERTIFIED CHECK (Continued)

The bidder further agrees that in case the bidder fails to enter into a contract, as prescribed by Manatee County, the bid bond/certified check accompanying the bid shall be forfeited to Manatee County as agreed liquidated damages. If the County enters into a contract with a bidder, or if the County rejects any and/or all bids, accompanying bond will be promptly returned.

C.16 PERFORMANCE AND PAYMENT BONDS

The successful bidder shall furnish surety bonds as security for faithful performance of the contract awarded as a result of this bid, and for the payment of all persons performing labor and/or furnishing material in connection therewith. Surety of such bonds shall be in an amount equal to the bid award (100% each) and from a duly authorized and nationally recognized surety company, authorized to do business in Florida, satisfactory to this County. The attorney-in-fact who signs the bonds must file with the bonds a certificate and effective dated copy of power-of-attorney. (Reference Florida Statute 255.05)

Furnishing the performance and payment bonds shall be requisite to execution of a contract with the County. Said performance and payment bonds will remain in force for the duration of the contract with the premiums paid by the contractor. Failure of successful bidder to execute such contract and to supply the required bonds shall be just cause for annulment of the award.

The County may then contract with another acceptable bidder or re-advertise this Invitation For Bid. If another bidder is accepted, and notice given within 90 days after the opening of bids, this acceptance shall bind the bidder as though they were originally the successful bidder.

Failure of the County at any time, to require performance by the contractor of any provisions set out in the contract will in no way affect the right of the County, thereafter, to enforce the provisions. Bonds to remain in effect for one year after final payment becomes due.

C.17 NO DAMAGES FOR DELAY

No claim for damages or any claim other than for an extension of time shall be made or asserted against the County by reason of any delays. The Contractor shall not be entitled to an increase in the Total Contract Price or payment or compensation of any kind from the County or direct, indirect, consequential impact or other costs, expenses for damages, including but not limited to costs of acceleration or inefficiency arising because of delay, disruption, interference or hindrance from any

C.17 NO DAMAGES FOR DELAY (Continued)

cause whatsoever; provided, however, that this provision shall not preclude recovery or damages by the Contractor for hindrance or delays due solely to fraud, bad faith, or active interference on part of the County or its agents. Otherwise, the Contractor shall only be entitled to extensions of the Contract Time as the sole and exclusive remedy for such resulting delay, in accordance with and to the extent specifically provided above.

C.18 NO INTEREST

Any monies not paid by the County when claimed to be due to the Contractor under this Contract shall not be subject to interest including prejudgment interest. Any monies not paid by the County when claimed to be due to the Contractor for damages awarded in the case of construction delays shall not be subject to prejudgment interest.

C.19 CONSTRUCTION OF CONTRACT

This Contract and the rights and responsibilities hereunder shall not be construed more strongly against either party, regardless of the extent to which such party may have participated in the preparation hereof.

END OF SECTION

SECTION 00100
BID SUMMARY

D.01 THE WORK

The project consists of overlaying the existing Asphalt Pavement and installation of Pavement and Marking adjustments to create dual left turn lanes and signalization along with the installation of a Mast Arm for the South Bound Approach. Also included as part of this project are the Signal Connections for the South Bound approach to the existing cabinet and the installation of new Illuminated Street Name Signs.

The purpose of the intersection improvements is to increase roadway safety and reduce traffic delays.

The Contractor shall furnish all shop drawings, working drawings, labor, materials, equipment, tools, services and incidentals necessary to complete all work required in accordance with the Contract Drawings.

The Contractor shall perform the work complete, in place and ready for continuous service and shall include any repairs, replacements, and / or restoration required as a result of damages caused prior to acceptance by the Owner.

The Contractor shall furnish and install all materials equipment and labor which is reasonably and properly inferable and necessary for the proper completion of the work, whether specifically indicated in the Contract Documents or not.

D.02 SUBCONTRACTORS, SUPPLIERS AND OTHERS

The identity of subcontractors, suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) may be requested by the County for each bid item from any of the Bidders; and the Bidder shall respond within five days after the date of such request. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such subcontractor, supplier, persons or organization if requested by County. If County, after due investigation, has reasonable objection to any proposed subcontractor, supplier, other person or organization, County may, before the Notice of Award is given, request the apparent successful Bidder to submit an acceptable substitute without an increase in Contract Price or Contract Time.

If apparent successful Bidder declines to make any such substitution, County may award the contract to the next lowest qualified Bidder that proposes to use acceptable subcontractors, suppliers, and other persons who County does not make written objection to Contractor shall not be required to employ any subcontractor, supplier, other person or organization who Contractor has reasonable objection to.

D.02 SUBCONTRACTORS, SUPPLIERS AND OTHERS (Continued)

Subcontractors shall be bound by the terms and conditions of this contract insofar as it applies to their Work, but this shall not relieve the prime contractor from the full responsibility to the County for the proper completion of all Work to be executed under this contract.

D.03 BIDS

Bids are to be submitted in triplicate, one original and two copies, upon the County supplied forms. All blank spaces must be filled in as noted with amounts extended and totaled and no changes shall be made in the wording of the forms or in the items mentioned therein. In the event a change is made in your submittal, the Bidder shall write its initials by the change. Any bid may be rejected which contains any omissions, alterations, irregularities of any kind, or which shall in any manner fail to conform to bid requirements.

A bid made by an individual, either in his/her own or proper person or under a trade or firm name, shall be executed under the individual's signature. If made by a partnership, the bid shall be executed by two or more of the general partners. If made by a corporation, the bid shall be executed by its President or other legally authorized corporate officer or agent.

D.04 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Bid Documents thoroughly; (b) visit the site to become familiar with local conditions that may affect cost, progress, performance, or furnishing of the Work; (c) consider federal, state, and local codes, laws, and regulations that may affect costs, progress, performance, or furnishing of the Work; (d) study and carefully correlate Bidder's observations with the Bid Documents; and (e) notify County of all conflicts, errors, or discrepancies in the Bid Document.

The accuracy of the existing utility locations shown on the plans is approximate and without express or implied warranty. Each Bidder may, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies, and obtain any additional information and data which pertain to the physical conditions at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine his Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

D.04 EXAMINATION OF CONTRACT DOCUMENTS AND SITE (Continued)

County will provide each Bidder access to the site to conduct such explorations and tests. Bidder shall fill all holes, clean up and restore the site to its former condition upon completion of such explorations. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by County unless otherwise provided in the Contract Documents.

D.05 MATERIALS AND WORKMANSHIP

All materials and apparatus required for this Work, except as specifically specified otherwise, shall be new, of first class quality, and shall be furnished, delivered, connected and finished in every detail. Construction shall be prescribed by good industry practice and in accordance with manufacturer's recommendations for the type being installed.

Use skilled workman trained and experienced in the necessary trades and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this section.

D.06 REGULATIONS AND MATERIAL DISPOSAL

It shall be the responsibility of the contractor to assure compliance with any OSHA, EPA, federal, state, and/or local rules, regulations or other requirements as each may apply.

D.07 PROJECT CLOSE-OUT

Clean construction site and remove any and all excess materials. Correct any damages to property that may have occurred as a result of installation and/or delivery. Repair and patch all surfaces cut for installation. The Contractor shall remedy any deficiencies promptly should the County determine any work is incomplete or defective.

When the County determines the Work is acceptable in accordance with this Invitation for Bid, the Contractor shall provide the close out submittals, including but not necessarily limited to the following:

- 1 set – Certificate of warranties
- 1 set - Manufacturer's product literature
- 1 set - Project Record Drawings

D.09 DISCRETIONARY WORK

This Bid Item entails minor increases (that may be directed by staff) to existing bid item quantities or minor modification items not bid which were unforeseen and necessary during the construction to provide a safe, complete project in accordance with Bid Documents. (This will not affect the requirement for change orders involving major modifications to the project.) Payment for all Work under this item shall be made only at the County's discretion in order to satisfactorily complete the project. In general, this item is for unanticipated conflicts and/or design changes required during construction which are necessary to complete the project without changing the initial scope of Work and without costly delays.

END OF SECTION

SECTION 00150

MANATEE COUNTY LOCAL PREFERENCE LAW AND VENDOR REGISTRATION**E.01 Vendor Registration**

All vendors are encouraged to register with Manatee County using the on-line "Vendor Registration" web page on www.mymanatee.org.

Enclosed are a copy of the current Manatee County law that details the County's Local Preference and the County's definition of a Local Business.

If you assert that your firm meets the stated definition of a Local Business, we ask that in addition to registering on the County's Web page, you fill out the attached "**Affidavit As To Local Business Form**" that is included in this section, have the completed document notarized, and mail the original to the following address: Manatee County Administration Center, 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205.

Your cooperation in registering your business with Manatee County will enhance our opportunities to identify sources for goods and services, plus identify Local Businesses. This information is used for soliciting quotations up to \$250,000.00 and for competitive solicitations of larger purchases.

You will note that Manatee County collaborates with the Manatee Chamber of Commerce, posting bids on www.manateechamber.com as well as using the same vendor categories for registration.

Our staff can assist you with your registration as needed. Our office hours are 8:00 A.M. to 5:00 P.M., Monday through Friday on regular business days. Please call (941) 749-3014 if you wish to have a purchasing staff member assist you.

Quick steps to registration: **www.mymanatee.org**

A link to "Purchasing" is listed under "Quick Links" on page one of the County Web Site.

On the left hand side of the Purchasing Web page, click on "Vendor Registration".

This will bring up the Vendor Registration form for on-line input. Please note that the definition of a "Local Business" changed on March 17, 2009. The Web page will be updated to include the current Law which has been provided in this section of the bid.

Thank you for reviewing this information and considering registering your business with Manatee County. Registration is not mandatory; however, by taking the time to register, you are helping the County to provide timely notifications of quotation, bid and proposal opportunities to your business.

E.02 Section 2-26-6. Local preference, tie bids, local business defined.

(a) Whenever a responsible local business bidder and a responsible non-local business bidder are found, upon the opening of bids, to have both submitted the lowest responsive bid, the bid of the local bidder shall be awarded the contract. Should more than one responsible local business bidder match the responsible non-local business bidder's lowest responsive bid, or should no responsible local business bidder match the lowest responsive bid but two or more responsible non-local business bidders submit lowest responsive bids for equal amounts, then the award of the contract shall be determined by a chance drawing, coin toss, or similar tie-breaking method conducted by the purchasing office and open to the public. Any bidders seeking to be recognized as local businesses for purposes of this local business preference provision may be required by the terms of the bid announcement to certify they meet the definition of local business set forth in this section, and to register as a local business with the county in the manner prescribed by the county to facilitate the county's ability to track the award of contracts to local businesses and to allow the county to provide future notifications to its local businesses concerning other bidding opportunities.

(b) Nothing herein shall be deemed to prohibit the inclusion of requirements with respect to operating and maintaining a local place of business in any invitation for bids when the bidder's location materially affects the provisions of the services or supplies that are required by the invitation.

(c) Local business is defined as a business legally authorized to engage in the sale of the goods and/or services to be procured, and which certifies within its bid that for at least six (6) months prior to the announcement of the solicitation of bids it has maintained a physical place of business in Manatee, Desoto, Hardee, Hillsborough, Pinellas or Sarasota County with at least one full-time employee at that location.

(d) **Each solicitation for bids made by the county shall contain terms expressly describing the local business preference policies of the county, and shall provide that by electing to submit a bid pursuant to a request for bids, all bidders are deemed to understand and agree to those policies.**

(e) For all contracts for architecture, professional engineering, or other professional services governed by Florida Statute § 287.055, the Consultants' Competitive Negotiation Act, the county shall include the local business status of a firm among the factors considered when selecting which firms are "most highly qualified." In determining which firm is the "most qualified" for purposes of negotiating a satisfactory contract, preference shall be given to a local business where all other relevant factors are equal.

(f) Local preference shall not apply to the following categories of contracts:

1. Goods or services provided under a cooperative purchasing agreement or similar "piggyback" contract;
2. Contracts for professional services subject to Florida Statute § 287.055, the Consultants' Competitive Negotiation Act, except as provided for in subsection (e) above;

E.02 Section 2-26-6. Local preference, tie bids, **local business defined.** (Continued)

3. Purchases or contracts which are funded, in whole or in part, by a governmental or other funding entity, where the terms and conditions of receipt of the funds prohibit the preference;
 4. Purchases or contracts made pursuant to a non-competitive award process, unless otherwise provided by this section;
 5. Any bid announcement which specifically provides that the general local preference policies set forth in this section are suspended due to the unique nature of the goods or services sought, the existence of an emergency as found by either the county commission or county administrator, or where such suspension is, in the opinion of the county attorney, required by law.
- (g) To qualify for local preference under this section, **a local business must certify to the County that it:**
1. Has not within the five years prior to the bid announcement admitted guilt or been found guilty by any court or state or federal regulatory enforcement agency of violation of any criminal law, or a law or administrative regulation regarding fraud;
 2. Is not currently subject to an unresolved citation or notice of violation of any Manatee County Code provision, except citations or notices which are the subject of a current legal appeal, as of the date of the bid announcement;
 3. Is not delinquent in the payment of any fines, liens, assessments, fees or taxes to any governmental unit or taxing authority within Manatee County, except any such sums which are the subject of a current legal appeal.

Ref: Ordinance 09-21 and 09-23 **PASSED AND DULY ADOPTED** in open session, with a quorum present and voting, on the 17th day of March, 2009.

END OF SECTION

**MANATEE COUNTY GOVERNMENT
AFFIDAVIT AS TO LOCAL BUSINESS (Complete and Initial Items B-F)**

A. Authorized Representative

I, [name] _____, am the [title] _____

and the duly authorized representative of: [name of business]_____

_____, and that I possess direct personal knowledge to make informed responses to these certifications and the legal authority to make this Affidavit on behalf of myself and the business for which I am acting; and by electing to submit a bid pursuant to this Invitation for Bids, shall be deemed to understand and agree to the local business preference policies of Manatee County; and that I have the direct knowledge to state that this firm complies with all of the following conditions to be considered to be a Local Business as required by the Manatee County Code of Law, Section 2-26-6.

B. Place of Business: I certify that the above business is legally authorized to engage in the sale of goods and/or services and has a physical place of business in Manatee, DeSoto, Hardee, Hillsborough, Pinellas or Sarasota County with at least one (1) fulltime employee at that location. The physical address of the location which meets the above criteria is: _____ [Initial] _____

Phone No.: _____

email address: _____

C. Business History: I certify that business operations began at the above physical address with at least one fulltime employee on [date] _____ [Initial] _____

D. Criminal Violations: I certify that within the past five years of the date of this Bid announcement, this business has not admitted guilt nor been found guilty by any court or local, state or federal regulatory enforcement agency of violation of any criminal law or administrative regulation regarding fraud. [Initial] _____

E. Citations or Code Violations: I certify that this business is not currently subject to any unresolved citation or notice of violation of any Manatee County Code provision, with the exception of citations or notices which are the subject of a legal current appeal within the date of this bid announcement. [Initial] _____

F. Fees and Taxes: I certify that within this business is not delinquent in the payment of fines, liens, assessments, fees or taxes to any governmental unit or taxing authority within Manatee County, with the exception of those which are the subject of a legal current appeal. [Initial] _____

Each of the above certifications is required to meet the qualification of "Local Business" under Manatee County Code of Law, 2-26-6.

Signature of Affiant _____

STATE OF FLORIDA

COUNTY OF _____

Sworn to (or affirmed) and subscribed before me this ____ day of _____, 20____, by (name of person making statement).

(Notary Seal) Signature of Notary: _____

Name of Notary (Typed or Printed) _____

Personally Known ____ OR Produced Identification ____ Type of Identification Produced _____

Submit executed copy to Manatee County Purchasing, Suite 803, 1112 Manatee Avenue W., Bradenton, FL 34205.

**BID FORM
SECTION 00300 – IFB #12-1094-OV**

**For: 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements
Manatee County Project No.: 323-6-29960**

TOTAL BID PRICE “A”: \$ _____
Based on a Completion Time of 150 calendar days
TOTAL BID PRICE “B”: \$ _____
Based on a Completion Time of 210 calendar days

Two schedules for Completion of the Work shall be considered. Each bid for completion by the specified stated time shall be offered as a separate “Total Bid Price”. The County has the sole authority to select the bid based on the Completion Time which is the best interest of the County. Only one award shall be made.

We, the undersigned, hereby declare that we have carefully reviewed the bid documents, and with full knowledge and understanding of the aforementioned herewith submit this bid, meeting each and every specification, term, and condition contained in the Invitation for Bids.

We understand that the bid technical specifications, terms, and conditions in their entirety shall be made a part of any agreement or contract between Manatee County and the successful bidder. Failure to comply shall result in contract default, whereupon, the defaulting contractor shall be required to pay for any and all re-procurement costs, damages, and attorney fees as incurred by the County.

Communications concerning this Bid shall be addressed as follows:

Person's Name: _____

Address: _____ Phone: _____

Date: _____ FLContractorLicense# _____

Bidder is a WBE/MBE Vendor? _____ Certification _____

COMPANY'S NAME: _____

AUTHORIZED SIGNATURE(S): _____

Name and Title of Above Signer(s) _____

CO. MAILING ADDRESS: _____

STATE OF INCORPORATION _____ (if applicable)

TELEPHONE: (____) _____ FAX: (____) _____

Email address : _____

Acknowledge Addendum No. _____ Dated: _____ Acknowledge Addendum No. _____ Dated _____

SIGN AND CONFIRM DATE OF PROJECT VISIT: _____ DATE: _____

BID FORM

IFB# 12-1094-OV

(Submit in Triplicate)

Section 00300

IFB #12-1094-OV 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements

BID "A" Based on Completion time of 150 Calendar Days (Project No. 307-66029960)

#	FDOT ITEM	DESCRIPTION	U/M	QTY.	BID PRICE PER UNIT	TOTAL BID PRICE
ROADWAY						
1	0101-1	MOBILIZATION	LS	1	\$	\$
2	0102-1	MAINTENANCE OF TRAFFIC	LS	1	\$	\$
3	0104-10-2	SYNTHETIC BALES	LF	25	\$	\$
4	0104-10-3	SEDIMENT BARRIER	LF	1066	\$	\$
5	0104-16	ROCK BAGS	EA	9	\$	\$
6	0110-4	TYPE D CURB TO BE REMOVED	SY	4	\$	\$
7	0120-6	ENBANKMENT	CY	5	\$	\$
8	0327-70-6	MILLING EXISTING ASPHALT PAVEMENT, 1.5"	SY	3055	\$	\$
9	0337-7-5	1.5" FRICTION COURSE 12.5 165#/SY	TN	252	\$	\$
10	0520-1-10	CONCRETE CURB & GUTTER TYPE F	LF	116	\$	\$
11	0522-2-4	CONCRETE CURB, TYPE D	LF	11	\$	\$
12	0522-1	SIDEWALK CONCRETE 4" THICK	SY	14	\$	\$
13	0570-1-2	PERFORMANCE TURF, SOD	SY	6	\$	\$
14	MC-XXX	ADJUST MANHOLE AND WATER VALVE TO GRADE	EA	3	\$	\$
SUB-TOTAL ROADWAY						\$

Bidder: _____

AUTHORIZED SIGNATURE: _____

00300-2

Bid "A" Based on 150 Calendar Day Completion

BID FORM

IFB# 12-1094-OV

(Submit in Triplicate)

Section 00300

IFB #12-1094-OV 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements

BID "A" Based on Completion time of 150 Calendar Days (Project No. 307-66029960)

#	FDOT ITEM	DESCRIPTION	U/M	QTY.	BID PRICE PER UNIT	TOTAL BID PRICE
SIGNALIZATION						
15	555-1-1	DIRECTIONAL BORE, LESS THAN 6"	LF	110	\$	\$
16	630-1-12	CONDUIT - SIGNALS, FURNISH & INSTALL UNDERGROUND	LF	189	\$	\$
17	630-1-13	CONDUIT - SIGNALS, FURNISH & INSTALL, SAWCUT & PLACE UNDER EXISTING PAVEMENT	LF	16	\$	\$
18	632-7-1	CABLE, SIGNAL, FURNISH & INSTALL	PI	1	\$	\$
19	635-1-11	PULL & JUNCTION BOXES, F & I, PULL BOX	EA	4	\$	\$
20	646-1-11	ALUMINUM SIGNAL POLE (PEDESTAL)	EA	1	\$	\$
21	649-31-203	MAST ARM F & I, WIND SPEED 130 WITH SIGNAL BACKPLATES OR 150 WITHOUT	EA	1	\$	\$
22	650-1-311	TRAFFIC SIGNAL, F & I, 3 SECTION, 1 WAY, STANDARD	AS	4	\$	\$
23	653-191	PEDESTRIAN SIGNAL F & I, LED - COUNT DOWN (1 WAY)	AS	2	\$	\$
24	663-74-15	VEHICLE DETECTOR ASSEMBLIES, F & I, VIDEO	EA	1	\$	\$
25	665-12	PEDESTRIAN DETECTOR F & I, DETECTOR STATION WITH POST & SIGN	EA	2	\$	\$
26	665-13	PEDESTRIAN DETECTOR, F & I, DETECTOR WITH SIGN ONLY	EA	2	\$	\$
27	670-5-430	TRAFFIC CONTROLLER ASSEMBLY, MODIFY, SPECIAL	AS	1	\$	\$

Bidder: _____

AUTHORIZED SIGNATURE: _____

00300-3

Bid "A" Based on 150 Calendar Day Completion

BID FORM

IFB# 12-1094-OV

(Submit in Triplicate)

Section 00300

IFB #12-1094-OV 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements

BID "A" Based on Completion time of 150 Calendar Days (Project No. 307-66029960)

#	FDOT ITEM	DESCRIPTION	U/M	QTY.	BID PRICE PER UNIT	TOTAL BID PRICE
28	685-106	SYSTEM AUXILIARIES, F & I, UNINTERRUPTIBLE POWER SOURCE	EA	1	\$	\$
29	690-10	SIGNAL HEAD TRAFFIC ASSEMBLY REMOVAL	EA	2	\$	\$
30	690-20	SIGNAL PEDESTRIAN ASSEMBLY REMOVAL	EA	2	\$	\$
31	690-34-2	POLE REMOVAL - DEEP (BOLT ON ATTACHMENT)	EA	1	\$	\$
32	690-60	DETECTOR VEHICLE ASSEMBLY REMOVE	EA	3	\$	\$
33	690-70	DETECTOR PEDESTRIAN ASSEMBLY REMOVE	EA	4	\$	\$
34	690-90	CONDUIT & CABLING REMOVE	PI	1	\$	\$
35	690-100	SIGNAL EQUIPMENT MISCELLANEOUS REMOVE	PI	1	\$	\$
36	699-1-1	INTERNAL ILLUM SIGN, FURNISH & INSTALL, STREET NAME	EA	1	\$	\$
SUB-TOTAL SIGNALIZATION						\$
SIGNAGE , PAVEMENT AND MARKINGS						
37	700-20-11	SINGLE POST SIGN, F&I, LESS THAN 12 SF	AS	4	\$	\$
38	700-20-12	SINGLE POST SIGN, F & I, 12- 20 SF	AS	2	\$	\$
39	706-3	RETRO-REFLECTIVE PAVEMENT MARKERS (WHITE/RED)	EA	23	\$	\$
40	706-3	RETRO-REFLECTIVE PAVEMENT MARKERS (YELLOW/YELLOW)	EA	54	\$	\$

Bidder: _____

AUTHORIZED SIGNATURE: _____

00300-4

Bid "A" Based on 150 Calendar Day Completion

BID FORM

IFB# 12-1094-OV

(Submit in Triplicate)

Section 00300

IFB #12-1094-OV 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements

BID "A" Based on Completion time of 150 Calendar Days (Project No. 307-66029960)

#	FDOT ITEM	DESCRIPTION	U/M	QTY.	BID PRICE PER UNIT	TOTAL BID PRICE
41	711-11-111	THERMOPLASTIC, STANDARD, WHITE SOLID, 6"	NM	0.217	\$	\$
42	711-11-122	THERMOPLASTIC, REFURBISHMENT, WHITE, SOLID, 8"	LF	208	\$	\$
43	711-11-123	THERMOPLASTIC, REFURBISHMENT, WHITE SOLID, 12"	LF	167	\$	\$
44	711-11-125	THERMOPLASTIC, REFURBISHMENT, WHITE, SOLID, 24"	LF	36	\$	\$
45	711-11-131	SKIP TRAFFIC TRAFFIC (6") - WHITE, THERMOPLASTIC (10'/30')	GM	0.038	\$	\$
46	711-11-151	SKIP TRAFFIC TRAFFIC (6") - WHITE, THERMOPLASTIC (2'/4')	LF	42	\$	\$
47	711-11-160	THERMOPLASTIC, STANDARD, WHITE, MESSAGE - (MERGE)	EA	2	\$	\$
48	711-11-170	THERMOPLASTIC, STANDARD, WHITE, ARROWS, LEFT MERGE	EA	8	\$	\$
49	711-11-211	THERMOPLASTIC, STANDARD, YELLOW, SOLID, 6"	NM	0.252	\$	\$
50	711-11-224	THERMOPLASTIC, STANDARD, YELLOW, SOLID, 18"	LF	139	\$	\$
SUBTOTAL SIGNAGE & PAVEMENT AND MARKINGS						\$
OVERALL SUB-TOTAL						\$
51		DISCRETIONARY	LS	1		\$20,000.00
TOTAL BID PRICE "A"- Based On Completion Time of 150 Calendar Days						\$

Bidder: _____

AUTHORIZED SIGNATURE: _____

00300-5

Bid "A" Based on 150 Calendar Day Completion

BID FORM

IFB# 12-1094-OV

(Submit in Triplicate)

Section 00300

IFB #12-1094-OV 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements

BID "B" Based on Completion time of 210 Calendar Days (Project No. 307-66029960)

#	FDOT ITEM	DESCRIPTION	U/M	QTY.	BID PRICE PER UNIT	TOTAL BID PRICE
ROADWAY						
1	0101-1	MOBILIZATION	LS	1	\$	\$
2	0102-1	MAINTENANCE OF TRAFFIC	LS	1	\$	\$
3	0104-10-2	SYNTHETIC BALES	LF	25	\$	\$
4	0104-10-3	SEDIMENT BARRIER	LF	1066	\$	\$
5	0104-16	ROCK BAGS	EA	9	\$	\$
6	0110-4	TYPE D CURB TO BE REMOVED	SY	4	\$	\$
7	0120-6	ENBANKMENT	CY	5	\$	\$
8	0327-70-6	MILLING EXISTING ASPHALT PAVEMENT, 1.5"	SY	3055	\$	\$
9	0337-7-5	1.5" FRICTION COURSE 12.5 165#/SY	TN	252	\$	\$
10	0520-1-10	CONCRETE CURB & GUTTER TYPE F	LF	116	\$	\$
11	0522-2-4	CONCRETE CURB, TYPE D	LF	11	\$	\$
12	0522-1	SIDEWALK CONCRETE 4" THICK	SY	14	\$	\$
13	0570-1-2	PERFORMANCE TURF, SOD	SY	6	\$	\$
14	MC-XXX	ADJUST MANHOLE AND WATER VALVE TO GRADE	EA	3	\$	\$
SUB-TOTAL ROADWAY						\$

Bidder: _____

AUTHORIZED SIGNATURE: _____

00300-6

Bid "B" Based on 210 Calendar Day Completion

BID FORM

IFB# 12-1094-OV

(Submit in Triplicate)

Section 00300

IFB #12-1094-OV 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements

BID "B" Based on Completion time of 210 Calendar Days (Project No. 307-66029960)

#	FDOT ITEM	DESCRIPTION	U/M	QTY.	BID PRICE PER UNIT	TOTAL BID PRICE
SIGNALIZATION						
15	555-1-1	DIRECTIONAL BORE, LESS THAN 6"	LF	110	\$	\$
16	630-1-12	CONDUIT - SIGNALS, FURNISH & INSTALL UNDERGROUND	LF	189	\$	\$
17	630-1-13	CONDUIT - SIGNALS, FURNISH & INSTALL, SAWCUT & PLACE UNDER EXISTING PAVEMENT	LF	16	\$	\$
18	632-7-1	CABLE, SIGNAL, FURNISH & INSTALL	PI	1	\$	\$
19	635-1-11	PULL & JUNCTION BOXES, F & I, PULL BOX	EA	4	\$	\$
20	646-1-11	ALUMINUM SIGNAL POLE (PEDESTAL)	EA	1	\$	\$
21	649-31-203	MAST ARM F & I, WIND SPEED 130 WITH SIGNAL BACKPLATES OR 150 WITHOUT	EA	1	\$	\$
22	650-1-311	TRAFFIC SIGNAL, F & I, 3 SECTION, 1 WAY, STANDARD	AS	4	\$	\$
23	653-191	PEDESTRIAN SIGNAL F & I, LED - COUNT DOWN (1 WAY)	AS	2	\$	\$
24	663-74-15	VEHICLE DETECTOR ASSEMBLIES, F & I, VIDEO	EA	1	\$	\$
25	665-12	PEDESTRIAN DETECTOR F & I, DETECTOR STATION WITH POST & SIGN	EA	2	\$	\$
26	665-13	PEDESTRIAN DETECTOR, F & I, DETECTOR WITH SIGN ONLY	EA	2	\$	\$
27	670-5-430	TRAFFIC CONTROLLER ASSEMBLY, MODIFY, SPECIAL	AS	1	\$	\$

Bidder: _____

AUTHORIZED SIGNATURE: _____

00300-7

Bid "B" Based on 210 Calendar Day Completion

BID FORM

IFB# 12-1094-OV

(Submit in Triplicate)

Section 00300

IFB #12-1094-OV 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements

BID "B" Based on Completion time of 210 Calendar Days (Project No. 307-66029960)

#	FDOT ITEM	DESCRIPTION	U/M	QTY.	BID PRICE PER UNIT	TOTAL BID PRICE
28	685-106	SYSTEM AUXILIARIES, F & I, UNINTERRUPTIBLE POWER SOURCE	EA	1	\$	\$
29	690-10	SIGNAL HEAD TRAFFIC ASSEMBLY REMOVAL	EA	2	\$	\$
30	690-20	SIGNAL PEDESTRIAN ASSEMBLY REMOVAL	EA	2	\$	\$
31	690-34-2	POLE REMOVAL - DEEP (BOLT ON ATTACHMENT)	EA	1	\$	\$
32	690-60	DETECTOR VEHICLE ASSEMBLY REMOVE	EA	3	\$	\$
33	690-70	DETECTOR PEDESTRIAN ASSEMBLY REMOVE	EA	4	\$	\$
34	690-90	CONDUIT & CABLING REMOVE	PI	1	\$	\$
35	690-100	SIGNAL EQUIPMENT MISCELLANEOUS REMOVE	PI	1	\$	\$
36	699-1-1	INTERNAL ILLUM SIGN, FURNISH & INSTALL, STREET NAME	EA	1	\$	\$
SUB-TOTAL SIGNALIZATION						\$
SIGNAGE , PAVEMENT AND MARKINGS						
37	700-20-11	SINGLE POST SIGN, F&I, LESS THAN 12 SF	AS	4	\$	\$
38	700-20-12	SINGLE POST SIGN, F & I, 12- 20 SF	AS	2	\$	\$
39	706-3	RETRO-REFLECTIVE PAVEMENT MARKERS (WHITE/RED)	EA	23	\$	\$
40	706-3	RETRO-REFLECTIVE PAVEMENT MARKERS (YELLOW/YELLOW)	EA	54	\$	\$

Bidder: _____

AUTHORIZED SIGNATURE: _____

00300-8

Bid "B" Based on 210 Calendar Day Completion

BID FORM

IFB# 12-1094-OV

(Submit in Triplicate)

Section 00300

IFB #12-1094-OV 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements

BID "B" Based on Completion time of 210 Calendar Days (Project No. 307-66029960)

#	FDOT ITEM	DESCRIPTION	U/M	QTY.	BID PRICE PER UNIT	TOTAL BID PRICE
41	711-11-111	THERMOPLASTIC, STANDARD, WHITE SOLID, 6"	NM	0.217	\$	\$
42	711-11-122	THERMOPLASTIC, REFURBISHMENT, WHITE, SOLID, 8"	LF	208	\$	\$
43	711-11-123	THERMOPLASTIC, REFURBISHMENT, WHITE SOLID, 12"	LF	167	\$	\$
44	711-11-125	THERMOPLASTIC, REFURBISHMENT, WHITE, SOLID, 24"	LF	36	\$	\$
45	711-11-131	SKIP TRAFFIC TRAFFIC (6") - WHITE, THERMOPLASTIC (10'/30')	GM	0.038	\$	\$
46	711-11-151	SKIP TRAFFIC TRAFFIC (6") - WHITE, THERMOPLASTIC (2'/4')	LF	42	\$	\$
47	711-11-160	THERMOPLASTIC, STANDARD, WHITE, MESSAGE - (MERGE)	EA	2	\$	\$
48	711-11-170	THERMOPLASTIC, STANDARD, WHITE, ARROWS, LEFT MERGE	EA	8	\$	\$
49	711-11-211	THERMOPLASTIC, STANDARD, YELLOW, SOLID, 6"	NM	0.252	\$	\$
50	711-11-224	THERMOPLASTIC, STANDARD, YELLOW, SOLID, 18"	LF	139	\$	\$
SUBTOTAL SIGNAGE & PAVEMENT AND MARKINGS						\$
OVERALL SUB-TOTAL						\$
51		DISCRETIONARY	LS	1		\$20,000.00
TOTAL BID PRICE "B"- Based On Completion Time of 210 Calendar Days						\$

Bidder: _____

AUTHORIZED SIGNATURE: _____

00300-9

Bid "B" Based on 210 Calendar Day Completion

**SWORN STATEMENT
THE FLORIDA TRENCH SAFETY ACT**

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR BY AN OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. This Sworn Statement is submitted with IFB No. #12-1094-OV
2. This Sworn Statement is submitted by _____
whose business address is _____
and, if applicable, its Federal Employer Identification Number (FEIN) is _____. If
the entity has no FEIN, include the Social Security Number of the individual signing this
sworn statement _____.
3. Name of individual signing this Sworn Statement is: _____,
Whose relationship to the above entity is: _____.
4. The Trench Safety Standards that will be in effect during the construction of this project shall include, but are not limited to: Laws of Florida, Chapters 90-96, TRENCH SAFETY ACT, and OSHA RULES AND REGULATIONS 29 CFR 1926.650 Subpart P, effective October 1, 1990.
5. The undersigned assures that the entity will comply with the applicable Trench Safety Standards and agrees to indemnify and hold harmless the Owner and Engineer, and any of their agents or employees from any claims arising from the failure to comply with said standard.
6. The undersigned has appropriated the following costs for compliance with the applicable standards:

<u>Trench Safety Measure (Description)</u>	<u>Units of Measure (LF, SY)</u>	<u>Unit Quantity</u>	<u>Unit Cost</u>	<u>Extended Cost</u>
a. _____	_____	_____	\$ _____	_____
b. _____	_____	_____	\$ _____	_____
c. _____	_____	_____	\$ _____	_____
d. _____	_____	_____	\$ _____	_____

7. The undersigned intends to comply with these standards by instituting the following procedures:

_____.

THE UNDERSIGNED, in submitting this Bid, represents that they have reviewed and considered all available geotechnical information and made such other investigations and tests as they may deem necessary to adequately design the trench safety system(s) to be utilized on this project.

(AUTHORIZED SIGNATURE / TITLE)

SWORN to and subscribed before me this ___ day of _____, 20___.
(impress official seal)

Notary Public, State of Florida
My commission expires: _____

SECTION 00430
CONTRACTOR'S QUESTIONNAIRE
 (Submit in Triplicate)

The Bidder warrants the truth and accuracy of all statements and answers herein contained.
 (Include additional sheets if necessary.)

THIS QUESTIONNAIRE MUST BE COMPLETED AND SUBMITTED WITH YOUR BID.

License requirement for this project: FDOT Pre-Qualified Contractor w/ 3 years experience in this type of work.

1. LICENSE(S) # and COMPANY'S NAME: _____
 CO. PHYSICAL ADDRESS: _____
 TELEPHONE NUMBER: (____) _____ FAX (____) _____

2. Bidding as an; individual; a partnership; a corporation; a joint venture; ____

3. If a partnership: list names and addresses of partners; if a corporation: list names of officers, directors, shareholders, and state of incorporation; if joint venture: list names and address of ventures' and the same if any venture are a corporation for each such corporation, partnership, or joint venture:

4. Your organization has been in business (under this firm's name) as a _____
 For how many years? _____

5. Describe and give the date and owner of the last three government projects you've completed which are similar in cost, type, size, and nature as the one proposed (for a public entity). Include contact name and phone number:

6. Have you ever been assessed liquidated damages under a contract during the past five (5) years? If so, state when, where (contact name, address, and phone number) and why.

7. Have you ever failed to complete work awarded to you? If so, state when, where (Contact name, address, phone number) and why?

8. Have you ever been debarred or prohibited from bidding on a governmental entity's construction project? If yes, name the entity and describe the circumstances:

9. Name three individuals, governmental entities, or corporations for which you have performed similar work and to which you refer. Include contact name and phone number:

1. _____
2. _____
3. _____

10. What specific steps have you taken to examine the physical conditions at or contiguous to the site, including but not limited to, the location of existing underground facilities?

11. What specific physical conditions, including, but not limited to, the location of existing underground facilities have you found which will, in any manner, affect cost, progress, performance, or finishing of the work?

12. Will you subcontract any part of this Work? If so, describe which major portion(s):

13. If any, list (with contract amount) WBE/MBE to be utilized:

14. What equipment do you own to accomplish this Work?

15. What equipment will you purchase/rent for the Work? (Specify which)

16. List the following in connection with the Surety which is providing the Bond(s):

Surety's Name: _____

Surety's Address: _____

Name, address and phone number of Surety's resident agent for service of process in Florida:

Phone: (_____) _____

PUBLIC CONTRACTING AND ENVIRONMENTAL CRIMES CERTIFICATION

**SWORN STATEMENT PURSUANT TO ARTICLE 6,
MANATEE COUNTY PURCHASING CODE**

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

This sworn statement is submitted to the Manatee County Board of County Commissioners by
_____ [print individual's name and title]

_____ for _____ [print name of entity submitting sworn statement]

Whose business is: _____

and (if applicable) its Federal Employer Identification Number (FEIN) is _____ If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: _____

I understand that no person or entity shall be awarded or receive a county contract for public improvements, procurement of goods or services (including professional services) or a county lease, franchise, concession or management agreement, or shall receive a grant of county monies unless such person or entity has submitted a written certification to the County that it has not:

- (1) been convicted of bribery or attempting to bribe a public officer or employee of Manatee County, the State of Florida, or any other public entity, including, but not limited to the Government of the United States, any state, or any local government authority in the United States, in that officer's or employee's official capacity; or
- (2) been convicted of an agreement or collusion among bidders or prospective bidders in restraint of freedom of competition, by agreement to bid a fixed price, or otherwise; or
- (3) been convicted of a violation of an environmental law that, in the sole opinion of the County's Purchasing Director, reflects negatively upon the ability of the person or entity to conduct business in a responsible manner; or
- (4) made an admission of guilt of such conduct described in items (1), (2) or (3) above, which is a matter of record, but has not been prosecuted for such conduct, or has made an admission of guilt of such conduct, which is a matter of record, pursuant to formal prosecution. An admission of guilt shall be construed to include a plea of nolo contendere; or
- (5) where an officer, official, agent or employee of a business entity has been convicted of or has admitted guilt to any of the crimes set forth above on behalf of such and entity and pursuant to the direction or authorization of an official thereof (including the person committing the offense, if he is an official of the

business entity), the business shall be chargeable with the conduct herein above set forth. A business entity shall be chargeable with the conduct of an affiliated entity, whether wholly owned, partially owned, or one which has common ownership or a common Board of Directors. For purposes of this Form, business entities are affiliated if, directly or indirectly, one business entity controls or has the power to control another business entity, or if an individual or group of individuals controls or has the power to control both entities. Indicia of control shall include, without limitation, interlocking management or ownership, identity of interests among family members, shared organization of a business entity following the ineligibility of a business entity under this Article, or using substantially the same management, ownership or principles as the ineligible entity.

Any person or entity, who claims that this Article is inapplicable to him/her's/it because a conviction or judgement has been reversed by a court of competent jurisdiction, shall prove the same with documentation satisfactory to the County's Purchasing Director. Upon presentation of such satisfactory proof, the person or entity shall be allowed to contract with the County.

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR MANATEE COUNTY IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT ANY CONTRACT OR BUSINESS TRANSACTION SHALL PROVIDE FOR SUSPENSION OF PAYMENTS, OR TERMINATION, OR BOTH, IF THE CONTRACTING OFFICER OR THE COUNTY ADMINISTRATOR DETERMINES THAT **SUCH PERSON OR ENTITY HAS MADE FALSE CERTIFICATION.**

[Signature]

STATE OF FLORIDA
COUNTY OF _____

Sworn to and subscribed before me this _____ day of _____, 2009 by
_____.

Personally known _____ OR produced _____
[Type of identification]

_____ My commission expires _____
Notary Public Signature

[Print, type or stamp Commissioned name of Notary Public]

Signatory Requirement - In the case of a business entity other than a partnership or a corporation, this affidavit shall be executed by an authorized agent of the entity. In the case of a partnership, this affidavit shall be executed by the general partner(s). In the case of a corporation, this affidavit shall be executed by the corporate president.

SECTION 00500
FORM OF AGREEMENT
BETWEEN THE
COUNTY OF MANATEE, FLORIDA
AND THE CONTRACTOR AS IDENTIFIED BELOW
ON THE BASIS OF A STIPULATED UNIT COST CONTRACT PRICE

THIS AGREEMENT is made and entered into by and between the COUNTY OF MANATEE, a political subdivision of the state of Florida, hereinafter referred to as the "COUNTY" and _____, hereinafter referred to as the "CONTRACTOR," duly authorized to transact business in the state of Florida, with offices located at _____.

Article 1. WORK

CONTRACTOR shall furnish all labor, materials, supplies, and other items required to complete the Work for IFB No. **IFB#12-1094-OV, 53rd Avenue East (S.R. 70) @ 15th Street East Intersection Improvements (Project No.: 323-6029960)** in strict accordance with Contract Documents and any duly authorized subsequent addenda thereto, all of which are made a part hereof.

Article 2. ENGINEER

The County of Manatee is responsible as the COUNTY and ENGINEER and designed this project and is responsible for technical/engineering reviews and decisions. The ENGINEER is a member of the COUNTY'S project management team which is collectively responsible in ensuring the Work is completed in accordance with the Contract Documents.

County of Manatee
 Public Works Department
 Project Management Division
 Attn: Mr. Vincent Canna
 Sr. Engineering Specialist
 IFB# 12-1094-OV
 1022 26th Avenue East
 Bradenton, FL 34208
 Phone (941) 708-7450, Ext. 7338

County of Manatee
 Public Works Department
 Attn: Alidys Alicea-Monsantos
 Engineering Specialist I
 1022 26th Avenue East
 Bradenton, FL 34208
 Phone: 941-708-7434

All communications involving this project will be addressed to Mr. Vincent Canna, Sr. Engineering Specialist, Public Works Department.

Where the terms ENGINEER and/or COUNTY are used in the Contract Documents, it shall mean the COUNTY'S project management team.

Article 3. CONTRACTOR'S REPRESENTATIONS

In order to induce COUNTY to enter into this Agreement, CONTRACTOR makes the following representations:

- 3.1 CONTRACTOR has familiarized itself with the nature and extent of the Bid Documents, Work, site, locality and all local conditions and laws and regulations that in any manner may affect cost, progress, performance or furnishing of the Work.
- 3.2 CONTRACTOR has studied carefully all drawings of the physical conditions upon which CONTRACTOR is entitled to rely.
- 3.3 CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies which pertain to the physical conditions at or contiguous to the site or which otherwise may affect the cost, progress, performance or furnishing of the Work as CONTRACTOR considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Bid Documents; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by CONTRACTOR for such purposes.
- 3.4 CONTRACTOR has reviewed and checked all information and data shown or indicated on the Bid Documents with respect to existing underground facilities at or contiguous to the site and assumes responsibility for the accurate location of said underground facilities. Any additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said underground facilities conducted by the CONTRACTOR will be done at the CONTRACTOR'S expense.

- 3.5 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Bid.
- 3.6 CONTRACTOR has given COUNTY written notice of all conflicts, errors or discrepancies that have been discovered in the Bid Documents and the written resolution thereof by OWNER is acceptable to CONTRACTOR.
- 3.7 CONTRACTOR shall schedule and perform the Work subject to COUNTY'S approval and shall hold COUNTY harmless from all liabilities incurred due to CONTRACTOR'S failure to coordinate with the COUNTY.

Article 4. CONTRACT DOCUMENTS

The Contract Documents which comprise entire Agreement between COUNTY and CONTRACTOR concerning the Work consist of the following:

- 4.1 This Agreement and Bid Document **IFB#12-1094-OV**
- 4.2 Performance and/or other Bonds and Insurance Certificate(s)
- 4.3 Drawings (not attached)
- 4.4 Addenda numbers _____ to _____, inclusive.
- 4.5 CONTRACTOR'S Bid Form and any other information submitted by Contractor prior to Notice of Award.

- 4.6 The following which may be delivered or issued after the effective date of the Agreement and are not attached hereto: all written Change Orders and other documents amending, modifying, or supplementing the Contract Documents.
- 4.7 The documents listed in paragraphs above are attached to this Agreement (except as noted otherwise above). There are no Contract Documents other than those listed above in this Article 4.

Article 5. MISCELLANEOUS

- 5.1 Terms used in this Agreement are defined in Article 1 of the General Conditions.
- 5.2 No assignment by a party hereto of any rights under or interest in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law); and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignee from any duty or responsibility under the Contract Documents.
- 5.3 COUNTY and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

The OWNER will pay, and the CONTRACTOR will accept in full consideration for the performance of the Work **IFB No. #12-1094-OV, 53rd Avenue East (S.R. 70) @ 15th Street East, Intersection Improvements, Project No. 323-6029960 Bradenton, Florida**

subject to additions and deductions as provided therein, the sum of _____ **and Zero Cents** for **Bid "X"** based on Completion Time of **XXX calendar days** and the sum of **\$278.00** as liquidated damages for each calendar day of delay.

CONTRACTOR

BY: _____
Signature

Name and Title of Signer (printed)

Date: _____

MANATEE COUNTY GOVERNMENT

BY: _____ For the County
Signature

Melissa M. Wendel, CPPO, Purchasing Official
Name and Title of Signer

Date: _____

SECTION 00700
GENERAL CONDITIONS

ARTICLE I - DEFINITIONS

Whenever used in the Bid Documents, the following terms have the meaning indicated which are applicable to both the singular and plural thereof:

Addendum - Written or graphic instruments issued prior to the opening of bids which clarify or change the bidding documents or the contract documents.

Agreement - The written Agreement between County and Contractor covering the Work to be performed; other contract documents are attached to the Agreement and made a part thereof as provided therein.

Written Amendment - A written amendment of the contract documents, signed by County and Contractor on or after the effective date of the Agreement and normally dealing with the non-engineering or non-technical rather than strictly work related aspects of the contract documents.

Application for Payment - The form accepted by Project Representative which is to be used by Contractor in requesting progress or final payments and which is to include such supporting documentation as is required by the contract documents.

Award - Acceptance of the bid from the person, firm, or corporation which in the County's sole and absolute judgment will under all circumstances best serve the public interest. Award shall be made by a majority vote of a quorum of Manatee County Board of County Commissioners in open session; or by the Purchasing Official in accordance with Ordinance 11-43, Manatee County Purchasing Ordinance.

Bid - The offer of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bidder - One who submits a bid directly to the County, as distinct from a sub-bidder, who submits a bid to a Bidder.

Bidding Documents - Consists of the Invitation For Bid, which includes but is not limited to: the bid form, drawings, Contract Documents, terms and conditions, and the proposed contract documents (including all Addenda issued prior to receipt of bids); and becomes a part of the Agreement.

Bonds - Performance and payment bonds and other instruments of security.

Change Order - A document recommended by Project Representative which is signed by Contractor and County and authorizes an addition, deletion, or revision in the Work or an adjustment in the contract price or the contract time, issued on or after the effective date of the Agreement.

Compensable Delay - Any delay beyond the control and without the fault or negligence of the Contractor resulting from County-caused changes in the Work, differing site conditions, suspensions of the Work, or termination for convenience by County.

Contract Documents - The Agreement, Addenda (which pertain to the contract documents), Contractor's bid (including documentation accompanying the bid and any post-bid documentation submitted prior to the Notice of Award), the bonds, the specifications and the drawings, together with all amendments, modifications and supplements issued on or after the effective date of the Agreement.

Contract Price - The monies payable by County to Contractor under the contract documents as stated in the Agreement.

Contract Time - The number of days or the date stated in the Notice to Proceed for the completion of the Work.

Contractor - The person, firm or corporation with whom County has entered into an Agreement.

Days - All references to days are to be considered calendar days except as specified differently.

Defective - An adjective which when modifying the work refers to work that is unsatisfactory, faulty or deficient, or does not conform to the contract documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the contract documents, or has been damaged prior to Project Representative's recommendation of final payment (unless responsibility for the protection thereof has been assumed by County).

Discretionary – Payment for all work that shall be made only at the County's discretion in order to satisfactorily complete the project in accordance with the Plans and Specifications.

Drawings - The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by Engineer and are referred to in the bidding and contract documents.

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective (date of execution).

Excusable Delay - Any delay beyond the control and without the negligence of the Contractor, the County, or any other contractor caused by events or circumstances such as, but not limited to, acts of God or of the public enemy, fires, floods, freight embargoes, acts of government other than County, or epidemics. Labor disputes and above average rainfall shall give rise only to excusable delays.

Float or Slack Time - The time available in the progress schedule during which an unexpected activity can be completed without delaying substantial completion of the Work.

Inexcusable Delay - Any delay caused by events or circumstances within the control of the Contractor, such as inadequate crewing, slow submittals, etc., which might have been avoided by the exercise of care, prudence, foresight, or diligence on the part of the Contractor.

Non-prejudicial Delay - Any delay impacting a portion of the Work within the available total float or slack time and not necessarily preventing completion of the Work within the contract time.

Notice of Award - The written notice to the successful bidder stating Award has been approved by the Board of County Commissioners; or by the Purchasing Official in accordance with Ordinance 11-43, Manatee County Purchasing Code.

Notice of Intent to Award - The written notice to the apparent low bidder stating Award has been recommended with final Award to be authorized by the Board of County Commissioners.

Notice to Proceed - Written notice by County (after execution of contract) to Contractor fixing the date on which the contract time will commence to run and on which Contractor shall start to perform (ten (10) days from date of such notice) Contractor's obligations under the contract documents.

County - Manatee County, Florida, Board of County Commissioners.

Preconstruction Conference - Prior to starting the Work, a meeting scheduled by County with Contractor to review the Work schedules, to establish procedures for handling shop drawings and other submissions, for processing periodical pay estimates, and such other matters as may be pertinent to the project.

Prejudicial Delay - Any excusable or compensable delay impacting the Work and exceeding the total float available in the progress schedule, thus preventing completion of the Work within the contract time unless the Work is accelerated.

Pre-operation Testing - All field inspections, installation checks, water tests, performance tests and necessary corrections required of Contractor to demonstrate that individual components of the work have been properly constructed and do operate in accordance with the contract documents for their intended purposes.

Project - The total construction of which the Work to be provided under the contract documents may be the whole or a part as indicated elsewhere in the contract documents.

Project Representative - The authorized representative of County who is assigned to the project or any part thereof.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a supplier and submitted by Contractor to illustrate material or equipment for some portion of the Work.

Specifications - Those portions of the contract documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor - An individual or corporation having a direct contact with Contractor or with any other subcontractor for the performance of a part of the Work at the site. Such person or firm has contractual relations with the Contractor, not with the County.

Substantial Completion - The Work (or a specified part thereof) has progressed to the point when, in the opinion of the Engineer as evidenced by Engineer's definitive certificate of Substantial Completion, it is sufficiently complete in accordance with contract documents so that the work can be utilized for the purposes for which it is intended; or if there be no such certificate issued, when final payment is due.

Successful Bidder - The lowest qualified, responsible and responsive bidder to whom an award is made.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman or vendor.

Underground Facilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments and any encasement containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

Unit Price Work - Work to be paid for on the basis of unit prices.

Work - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the contract documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the contract documents.

Work Directive Change - A written directive to contractor, issued on or after the effective date of the Agreement and signed by County and recommended by Project Representative ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed or to emergencies. A work directive change may not change the contract price or the contract time; but is evidence that the parties expect that the change directed or documented by a work directive change will be incorporated in a subsequently issued change order following negotiations by the parties as to its effect, if any, on the contract price or contract time.

ARTICLE 2 - PRELIMINARY MATTERS

Computation of Time: When time is referred to in the contract documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or legal holiday, such day will be omitted from the computation.

- 2.1 The Contractor must submit a proposed schedule of the Work at the preconstruction conference. The purpose of this schedule is to enable the County to govern the Work, to protect the functions of the local government and its citizens and to aid in providing appropriate surveillance. The County shall have the right to reschedule work provided such rescheduling is in accord with the remainder of terms of the contract. The schedule shall show, as a minimum, the approximate dates on which each segment of the work is expected to be started and finished, the proposed traffic flows during each month, the anticipated earnings by the Contractor for each month and the approximate number of crews and equipment to be used. The County, after necessary rescheduling and obtaining additional information for specific purposes, shall review and approve the schedule. The Contractor shall also forward to the County, as soon as practicable after the first day of each month, a summary report of the progress of the various parts of the work under the contract, in fabrication and in the field, stating the existing status, estimated time of completion and cause of delay, if any. Together with the summary report, the Contractor shall submit any necessary revisions to the original schedule for the County's review and approval. In addition, more detailed schedules may be required by the County for daily traffic control.
- 2.2 A Notice to Proceed may be given at any time within thirty (30) days after the effective date of the Agreement. The contract time will commence at the time specified in such notice. Contractor shall start to perform the Work on the date specified in the notice to proceed, but no work shall be done at the site prior to the date on which the contract time commences to run.
- 2.3 If at any time the materials and appliances to be used appear to the County as insufficient or improper for securing the quality of work required or the required rate of progress, the County may order the Contractor to increase his efficiency or to improve the character of his work and the Contractor shall conform to such an order. The failure of the County to demand any increase of such efficiency of any improvement shall not release the County from his obligation to secure the quality of work or the rate of progress necessary to complete the Work within the limits imposed by the contract. The County may require the Contractor to remove from the Work such employees as the County deems incompetent, careless, insubordinate or otherwise objectionable, or whose continued employment on the Work is deemed to be contrary to the County's interest.
- 2.4 The County reserves the right to let other Contracts in connection with this Work. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and execution of their Work, and promptly connect and coordinate the Work with theirs.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, RE-USE

- 3.1 The contract documents comprise the entire Agreement between County and Contractor concerning the work. The contract documents are complementary; what is called for by one is as binding as if called for by all. The contract documents will be construed in accordance with the laws and ordinances of the State of Florida and the County of Manatee.

Should a conflict exist within the contract documents, the precedence in ascending order of authority are as follows: 1) Standard Printed Contract Documents, 2) Special Conditions, 3) General Conditions and 4) Drawings. Note: Computed dimensions shall govern over scaled dimensions.

- 3.2 It is the intent of the contract documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the contract documents. Any work, materials or equipment that may reasonably be inferred from the contract documents as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe work, materials, or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or laws or regulations in effect at the time of opening of bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the contract documents) shall be effective to change the duties and responsibilities of County, Contractor or Engineer, or any of their agents or employees from those set forth in the Contract Documents.

- 3.3 The contract documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

- 3.3.1 A Formal Written Amendment
- 3.3.2 A Change Order
- 3.3.3 Administrative Contract Adjustment (ACA)

- 3.4 In addition, the requirements of the contract documents may be supplemented and minor variations and deviations in the Work may be authorized in one or more of the following ways:

- 3.4.1 Discretionary Work – Field Directive
- 3.4.2 Engineer's approval of a Shop Drawing or sample.

- 7.3 The value of any Work covered by a change order or of any claim for an increase or decrease in the contract price shall be determined in one of the following ways (at County's discretion):
- 7.3.1 Where the Work involved is covered by unit prices contained in the contract documents, cost will be determined by application of such unit prices to the quantities of the items involved.
 - 7.3.2 By mutual acceptance of lump sum.
 - 7.3.3 On the basis of the cost of the Work, plus a 15% Contractor's fee for overhead and profit. (Contractor shall submit an itemized cost breakdown together with supporting data.)
- 7.4 Either County or Contractor may make a claim for an adjustment in the contract price. The unit price of an item of unit price Work shall be subject to re-evaluation and adjustment under the following conditions:
- 7.4.1 If the total cost of a particular item of unit price Work amounts to 5% or more of the contract price and the variation in the quantity of the particular item of unit price Work performed by Contractor differs by more than 15% from the estimated quantity of such item indicated in the Agreement; and
 - 7.4.2 If there is no corresponding adjustment with respect to any other item of Work; and
 - 7.4.3 If a Contractor believes that it has incurred additional expense as a result thereof; or
 - 7.4.4 If County believes that the quantity variation entitles it to an adjustment in the unit price; or
 - 7.4.5 If the parties are unable to agree as to the effect of any such variations in the quantity of unit price Work performed.

ARTICLE 8 - CHANGE OF CONTRACT TIME

- 8.1 Contract time may only be changed by a change order or a written amendment. Any claim for an extension or shortening of the contract time shall be based on written notice delivered by the party making the claim to the other party. Notice of the extent of the claim with supporting data shall be delivered within fifteen (15) days from detection or beginning of such occurrence and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event.

ARTICLE 4 - CONTRACTOR'S RESPONSIBILITIES

- 4.1 Contractor shall keep on the Work at all times during its progress a competent resident superintendent; who shall be the Contractor's representative at the site and shall have authority to act on behalf of Contractor. All communications given to the superintendent shall be as binding as if given to Contractor.
- 4.2 Contractor shall provide competent, suitable qualified personnel to survey and lay out the Work and perform construction as required by the contract documents. Contractor shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto and except as otherwise indicated in the contract documents, all Work at the site shall be performed during regular working hours and Contractor will not permit overtime work or the performance of work on Saturday, Sunday or legal holiday without County's written consent given after prior notice to Engineer (at least 72 hours in advance).
- 4.2.1 Contractor shall pay for all additional engineering charges to the County for any overtime work which may be authorized. Such additional engineering charges shall be a subsidiary obligation of Contractor and no extra payment shall be made by County on account of such overtime work. At County's option, overtime costs may be deducted from Contractor's monthly payment request or Contractor's retainage prior to release of final payment.
- 4.3 Unless otherwise specified, Contractor shall furnish and assume full responsibility for all bonds, insurance, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.
- 4.4 All materials and equipment shall be of good quality and new, except as otherwise provided in the contract documents. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instruction of the applicable supplier except as otherwise provided in the contract documents.
- 4.5 Contractor shall be fully responsible to County for all acts and omissions of the subcontractors, suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between County or Engineer and any such subcontractor, supplier or other person or organization, nor shall it create any obligation on the part of County to pay or to see to the payment of any monies due any such subcontractor, supplier or other person or organization.

- 4.6 Permits: Unless otherwise provided, Contractor shall obtain and pay for all construction permits and licenses. County shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work.
- 4.7 During the progress of the Work, Contractor shall keep the premises free from accumulation of waste materials rubbish and other debris resulting from the Work. At the completion of the Work, Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials and shall leave the site clean and ready for occupancy by County. Contractor shall restore to original conditions all property not designated for alteration by the Contract Documents.
- 4.8 Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.
- 4.9 Safety and Protection: Contractor shall comply with the Florida Department of Commerce Safety Regulations and any local safety regulations. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to:
- 4.9.1 all employees on the work and other persons and organizations who may be affected thereby;
 - 4.9.2 all the work and materials and equipment to be incorporated therein, whether in storage on or off the site; and
 - 4.9.3 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.

Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall provide and maintain all passageways, guard fences, lights and other facilities for the protection required by public authority or local conditions. Contractor shall provide reasonable maintenance of traffic way for the public and preservation of the County's business, taking into full consideration all local conditions. Contractor's duties and responsibilities for the safety and protection of the work shall continue until such time as all the work is completed.

- 4.10 Emergencies: In emergencies affecting the safety or protection of persons or the work or property at the site or adjacent thereto, Contractor, without special instruction or authorization from Engineer or County, is obligated to act to prevent threatened damage, injury or loss. Contractor shall give County prompt written notice if Contractor believes that any significant changes in the work or variations from the contract documents have been caused thereby. If Owner determines that a change in the contract documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variation.
- 4.11 For substitutes not included with the bid, but submitted after the effective date of the Agreement, Contractor shall make written application to Engineer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will also contain an itemized estimate of all costs and delays or schedule impacts that will result directly or indirectly from review, acceptance and provisions of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by the Engineer in evaluating the proposed substitute. Engineer may require Contractor to furnish at Contractor's expense, additional data about the proposed substitute. In rendering a decision, County/Engineer and Contractor shall have access to any available float time in the construction schedule. In the event that substitute materials or equipment not included as part of the bid, but proposed after the effective date of the agreement, are accepted and are less costly than the originally specified materials or equipment, then the net difference in cost shall be credited to the County and an appropriate change order executed.
- 4.11.1 If a specific means, method, technique, sequence of procedure of construction is indicated in or required by the contract documents, Contractor may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to Engineer if Contractor submits sufficient information to allow Engineer to determine that the substitute proposed is equivalent to that indicated or required by the contract documents.
- 4.11.2 Engineer will be allowed a reasonable time within which to evaluate each proposed substitute. Engineer will be the sole judge of acceptability and no substitute will be ordered, installed or utilized without Engineer's prior written acceptance which will be evidenced by either a change order or an approved shop drawing. County may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- 4.11.3 Contractor shall reimburse County for the charges of Engineer and Engineer's Consultants for evaluating each proposed substitute submitted after the effective date of the Agreement and all costs resulting from any delays in the work while the substitute was undergoing review.

- 4.12 The Contractor shall furnish, free of charge, all labor, stakes, surveys, batter boards for structures, grade lines and other materials and supplies and shall set construction stakes and batter boards for establishing lines, position of structures, slopes and other controlling points necessary for the proper prosecution of the construction work. Where rights-of-way, easements, property lines or any other conditions which make the lay-out of the project or parts of the project critical are involved, the Contractor will employ a competent surveyor who is registered in the State of Florida for lay-out and staking. These stakes and marks shall constitute the field control by and in accord with which the Contractor shall govern and execute the work. The Contractor will be held responsible for the preservation of all stakes, marks and if for any reason any of the stakes or marks or batter boards become destroyed or disturbed, they will be immediately and accurately replaced by the Contractor.
- 4.13 The Contractor has, by careful examination, satisfied himself as to the nature and location of the work and all other matters which can in any way affect the work under this contract, including, but not limited to details pertaining to boring, as shown on the drawings, are not guaranteed to be more than a general indication of the materials likely to be found adjacent to holes bored at the site of the work, approximately at the locations indicated. The Contractor shall examine boring data, where available, and make his own interpretation of the subsoil investigations and other preliminary data, and shall base his bid on his own opinion of the conditions likely to be encountered. In no event shall an extension of time be considered for any conditions that existed at the time of bidding, nor shall the Contractor receive extra compensation for completion of the project as intended by the drawings and in keeping with the contract documents. No verbal agreement or conversation with any officer, agent or employee of the County, before or after the execution of this contract, shall affect or modify any of the terms or obligations herein contained.
- 4.14 If the Contractor, in the course of the work, finds that the drawings and/or Contract Documents cannot be followed, he shall immediately inform the County in writing, and the County shall promptly check the accuracy of the information. Any work done after such discovery, until any necessary changes are authorized, will be done at the Contractor's risk.

ARTICLE 5 - OWNER'S RESPONSIBILITIES

- 5.1 County shall furnish the data required of County under the contract documents promptly and shall make payments to the Contractor within a reasonable time (no more than 45 days) after the Work has been accepted by the County. The form of all submittals, notices, change orders and other documents permitted or required to be used or transmitted under the contract documents shall be determined by the County/Engineer. Standard County forms shall be utilized.
- 5.2 The County shall provide the lands upon which the Work under this contract is to be done, except that the Contractor shall provide all necessary additional land required for the erection of temporary construction facilities and storage of his materials, together with right of access to same.

- 5.3 The County shall have the right to take possession of and use any completed portions of the work, although the time for completing the entire work or such portions may not have expired, but such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents.

ARTICLE 6 - CHANGES IN THE WORK

- 6.1 Without invalidating the Agreement and without notice to any surety, County may, at any time, order additions, deletions or revisions in the Work. These will be authorized by a written amendment, a change order, or a work directive change. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the contract documents (except as otherwise specifically provided).
- 6.2 Contractor shall not be entitled to an increase in the contract price or an extension of the contract time with respect to any Work performed that is not required by the contract documents as amended, modified and supplemented.
- 6.3 County and Contractor shall execute appropriate change orders (or written amendments) covering changes in the Work which are ordered by County, or which may be required because of acceptance of defective Work.
- 6.4 At any time Engineer may request a quotation from Contractor for a proposed change in the Work and within twenty-one (21) calendar days after receipt, Contractor shall submit a written and detailed proposal for an increase or decrease in the contract price or contract time for the proposed change. Engineer shall have 21 calendar days after receipt of the detailed proposal to respond in writing. The proposal shall include an itemized estimate of all costs and time for performance that will result directly or indirectly from the proposed change. Unless otherwise directed, itemized estimates shall be in sufficient detail to reasonably permit an analysis by Engineer of all material, labor, equipment, subcontracts, overhead costs and fees, and shall cover all Work involved in the change, whether such Work was deleted, added, changed or impacted. Notwithstanding the request for quotation, Contractor shall carry on the Work and maintain the progress schedule. Delays in the submittal of the written and detailed proposal will be considered non-prejudicial.

ARTICLE 7 - CHANGE OF CONTRACT PRICE

- 7.1 The contract price constitutes the total compensation (subject to authorized adjustments) payable to Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at his expense without change in the contract price.
- 7.2 The contract price may only be changed by change order or by a written amendment. Any claim for an increase or decrease in the contract price shall be based on written notice delivered by the party making the claim to the other party. Notice of the amount of the claim with supporting data shall be delivered within ten (10) days from the beginning of such occurrence and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event.

- 8.2 The contract time will be extended in an amount equal to time lost due to delays beyond the control of Contractor. Such delays shall include, but not be limited to, acts or neglect by County or others performing additional work; or to fires, floods, epidemics, abnormal weather conditions or acts of God.
- 8.3 All time limits stated in the contract documents are of the essence.

ARTICLE 9 - WARRANTY, TEST/INSPECTION, CORRECTION

- 9.1 Contractor warrants (for a minimum period of three years or as otherwise stated herein) and guarantees to County that all work will be in accordance with the contract documents and will not be defective; that County, representatives of County, governmental agencies with jurisdictional interests will have access to the work at reasonable time for their observation, inspecting and testing (Contractor shall give Engineer timely notice of readiness of the work for all required approvals and shall assume full responsibility, including costs, in obtaining required tests, inspections, and approval certifications and/or acceptance, unless otherwise stated by County).
- 9.2 If any work (including work of others) that is to be inspected, tested, or approved is covered without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation. Such uncovering shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice. Neither observations by Engineer nor inspections, tests, or approvals by others shall relieve Contractor from Contractor's obligations to perform the work in accordance with the contract documents.
- 9.3 If the work is defective, or Contractor fails to supply sufficient skilled workers, or suitable materials or equipment, or fails to furnish or perform the work in such a way that the completed work will conform to the contract documents, County may order Contractor to stop the work, or any portion thereof and terminate payments to the Contractor until the cause for such order has been eliminated. Contractor shall bear all direct, indirect and consequential costs for satisfactory reconstruction or removal and replacement with non-defective work, including, but not limited to fees and charges of engineers, architects, attorneys and other professionals and any additional expenses experienced by County due to delays to other Contractors performing additional work and an appropriate deductive change order shall be issued. Contractor shall further bear the responsibility for maintaining schedule and shall not be entitled to an extension of the contract time and the recovery of delay damages due to correcting or removing defective work.
- 9.3.1 If Contractor fails within seven (7) days after written notice to correct defective work, or fails to perform the work in accordance with the contract documents, or fails to comply with any other provision of the contract documents, County may correct and remedy any such deficiency. To the extent necessary to complete corrective and remedial action, County may exclude Contractor from all or part of the site, take possession of all or part of the work, Contractor's tools, construction equipment and machinery at the site or for which County has paid

Contractor but which are stored elsewhere. All direct, indirect and consequential costs of County in exercising such rights and remedies will be charged against Contractor in an amount approved as to reasonableness by Engineer and a change order will be issued incorporating the necessary revisions.

- 9.3.2 If within three years after the date of completion or such longer period of time as may be prescribed by laws or regulations or by the terms of any applicable special guarantee required by the contract documents, any work is found to be defective, Contractor shall promptly, without cost to County and in accordance with County's written instructions, either correct such defective work or if it has been rejected by County, remove it from the site and replace it with non-defective work. If Contractor does not promptly comply with the terms of such instruction, County may have the defective work corrected/removed and all direct, indirect and consequential costs of such removal and replacement will be paid by Contractor.

ARTICLE 10 - SUSPENSION/TERMINATION OF WORK

- 10.1 County may, at any time and without cause, suspend the work or any portion thereof for a period of not more than ninety (90) days by written notice to Contractor, which will fix the date on which work will be resumed. Contractor shall be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to any suspension if Contractor makes an approved claim therefore.
- 10.2 County may terminate the contract if Contractor commences a voluntary case under any chapter of the Bankruptcy Code or any similar action by filing a petition under any other federal or state law relating to the bankruptcy or insolvency; if a petition is filed against the Contractor under any chapter of the Bankruptcy Code or similar relief under any other federal or state law; if Contractor persistently fails to perform the work in accordance with the contract documents; if Contractor disregards laws or regulations of any public body having jurisdiction or the Engineer; or otherwise violates in any substantial way any provisions of the contract.
- 10.2.1 County may, after giving Contractor (and the surety, if there is one) seven (7) days written notice and to the extent permitted by laws and regulations, terminate the services of Contractor; exclude Contractor from the site and take possession of the work and of all Contractor's tools, construction equipment and machinery at the site and use the same to the full extent they could be used (without liability to Contractor for trespass or conversion); incorporate in the work all materials and equipment stored at the site or for which county has paid Contractor but which are stored elsewhere, and finish the work as County may deem expedient. In such case, Contractor shall not be entitled to receive any further payment beyond an amount equal to the value of material and equipment not incorporated in the work, but delivered and suitably stored, less the aggregate of payments previously made. If the direct and indirect costs of completing the work exceed the unpaid balance of the contract price, Contractor shall pay the difference to County. Such costs incurred by County shall be verified by County and incorporated in

a change order; but in finishing the work, County shall not be required to obtain the lowest figure for the work performed. Contractor's obligations to pay the difference between such costs and such unpaid balance shall survive termination of the Agreement.

- 10.3 If, through no act or fault of Contractor, the work is suspended for a period of more than ninety (90) days by County or under an order of court or other public authority, or Engineer fails to act on any application or fails to pay Contractor any sum finally determined to be due; then Contractor may, upon seven (7) days written notice to County terminate the Agreement and recover from County payment for all work executed, any expense sustained plus reasonable termination expenses. In lieu of terminating the Agreement, if Engineer has failed to act on any application of payment or County has failed to make any payment as aforesaid, Contractor may upon seven (7) days written notice to County stop the work until payment of all amounts then due.

ARTICLE 11 - CONTRACT CLAIMS

- 11.1 The rendering of a decision by Engineer with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment) will be a condition precedent to any exercise by County or Contractor of such right or remedies as either may otherwise have under the contract documents or by laws or regulations in respect of any such claim, dispute or other matter. No action, either at law or at equity, shall be brought in connection with any such claim, dispute or other matter later than thirty (30) days after the date on which County/Engineer has rendered such written decision in respect thereof. Failure to bring an action within said thirty (30) day period shall result in Engineer's decision being final and binding on the Contractor. In no event may any such action be brought after the time at which instituting such proceedings would be otherwise barred by the applicable statute of limitations.
- 11.2 Before bringing any action in court pertaining to any claim, dispute or other matter in question(s) arising out of or relating to the contract documents or the breach thereof, or Engineer's final decision, except for claims which have been waived by the making and acceptance of final payment, the Contractor shall first submit written notice(s) of contract claims to the Purchasing Official for a decision; the Contractor may request a conference with the Purchasing Official. Claims include, without limitation, disputes arising under the contract and those based upon breach of contract, mistake, misrepresentation, or other cause for modification or revision. Contract claims shall use the process detailed in The Manatee County Purchasing Code.

ARTICLE 12 - RESIDENT PROJECT REPRESENTATIVE - DUTIES, RESPONSIBILITIES

- 12.1 Resident Project Representative is Engineer/County's Agent, who will act as directed by and under the supervision of the Engineer, and who will confer with County/Engineer regarding his actions. Resident Project Representative's dealing in matters pertaining to the on-site work shall, in general, be only with the

County/Engineer and Contractor and dealings with subcontractors shall only be through or with the full knowledge of Contractor.

12.2 Resident Project Representative will:

- 12.2.1 Review the progress schedule, schedule of shop drawing submissions and schedule of values prepared by Contractor and consult with County/Engineer concerning their acceptability.
- 12.2.2 Attend preconstruction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with County/Engineer and notify those expected to attend in advance. Attend meetings and maintain and circulate copies of minutes thereof.
- 12.2.3 Serve as County/Engineer's liaison with Contractor, working principally through Contractor's superintendent and assist him in understanding the intent of the contract documents. As requested by County/Engineer, assist in obtaining additional details or information when required at the job site for proper execution of the Work.
- 12.2.4 Receive and record date of receipt of shop drawings and samples, receive samples which are furnished at the site by Contractor and notify County/Engineer of their availability for examination.
- 12.2.5 Advise County/Engineer and Contractor or his superintendent immediately of the commencement of any work requiring a shop drawing or sample submission if the submission has not been approved by the County/Engineer.
- 12.2.6 Conduct on-site observations of the work in progress to assist County/Engineer in determining if the work is proceeding in accordance with the contract documents and that completed work will conform to the contract documents.
- 12.2.7 Report to County/Engineer whenever he believes that any work is unsatisfactory, faulty or defective or does not conform to the contract documents, or does not meet the requirements of any inspections, tests or approvals required or if work has been damaged prior to final payment; and advise County/Engineer when he believes work should be corrected or rejected or should be uncovered of observation or requires special testing, inspection or approval.
- 12.2.8 Verify that tests, equipment and system start-ups and operating and maintenance instructions are conducted as required by the contract documents and in the presence of the required personnel, and that Contractor maintains adequate records thereof; observe, record and report to Engineer appropriate details relative to the test procedures and start-ups.

- 12.2.9 Accompany visiting inspectors representing public or other agencies having jurisdiction over the project; record the outcome of these inspections and report to County/Engineer.
- 12.2.10 Transmit to Contractor, County/Engineer's clarifications and interpretations of the contract documents.
- 12.2.11 Consider and evaluate Contractor's suggestions or modifications in drawings or Contract Documents and report them with recommendations to County/Engineer.
- 12.2.12 Maintain at the job site orderly files for correspondence, reports of job conferences, shop drawings and sample submissions, reproductions of original contract documents including all addenda, change orders, field orders, additional drawings issued subsequent to the execution of the contract, County/Engineer's clarifications and interpretations of the contract documents, progress reports and other project related documents.
- 12.2.13 Keep a diary or log book, recording hours on the job site, weather conditions, data relative to questions of extras or deductions; list of visiting officials and representatives or manufacturers, fabricators, suppliers and distributors; daily activities, decisions, observations in general and specific observations in more detail as in the case of observing test procedures. Send copies to County/Engineer.
- 12.2.14 Record names, addresses and telephone numbers of all Contractors, subcontractors and major suppliers of materials and equipment.
- 12.2.15 Furnish County/Engineer periodic reports as required of progress of the work and Contractor's compliance with the approved progress schedule and schedule of shop drawing submissions.
- 12.2.16 Consult with County/Engineer in advance of scheduling major tests, inspections or start of important phases of the work.
- 12.2.17 Report immediately the occurrence of any accident.
- 12.2.18 Review applications for payment with Contractor for compliance with the established procedure for their submission and forward them with recommendations to County/Engineer, noting particularly their relation to the schedule of values, work completed and materials and equipment delivered at the site but not incorporated in the work.
- 12.2.19 During the course of the work, verify that certificates, maintenance and operations manuals and other data required to be assembled and furnished by Contractor are applicable to the items actually installed, and deliver this material to County/Engineer for his review prior to final acceptance of the work.

- 12.2.20 Before County/Engineer issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.
- 12.2.21 Conduct final inspection in the company of County/Engineer and Contractor and prepare a final list of items to be completed or corrected.
- 12.2.22 Verify that all items on final list have been completed or corrected and make recommendations to County/Engineer concerning acceptance.
- 12.3 Except upon written instructions of County/Engineer, Resident Project Representative.
- 12.3.1 Shall not authorize any deviation from the contract documents or approve any substitute materials or equipment;
- 12.3.2 Shall not exceed limitations on County/Engineer's authority as set forth in the contract documents;
- 12.3.3 Shall not undertake any of the responsibilities of Contractor, Subcontractors or Contractor's Superintendent, or expedite the work;
- 12.3.4 Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the contract documents;
- 12.3.5 Shall not advise on or issue directions as to safety precautions and programs in connection with the work;
- 12.3.6 Shall not authorize County to occupy the project in whole or in part; and
- 12.3.7 Shall not participate in specialized field or laboratory tests.

ARTICLE 13 - APPRENTICES

- 13.1 In accordance with the requirement of Section 446.011, Florida Statutes, the following requirements to safeguard the welfare of apprentices and trainees shall be a part of this contract, if applicable.
 - 13.1.1 Contractor agrees to hire for the performance of the contract, a number of apprentices or trainees in each occupation which bears to the average number of the journeymen in that occupation to be employed in the performance of the contract, the ratio of at least one apprentice or trainee to every five journeymen.
 - 13.1.2 Contractor agrees, when feasible to assure that 25% of such apprentices or trainees are in their first year of training, except when the number of apprentices or trainees to be hired is fewer than four.

- 13.1.3 Contractor agrees to submit, at three month intervals, to the Bureau of Apprenticeship of the Division of Labor, records of employment by trade of the number of apprentices or trainees employed; race of all apprentices; the number of apprentices or trainees in their first year of training; and total hours of work of all apprentices, trainees, and journeymen.
- 13.1.4 Contractor agrees to submit to the Bureau of Apprenticeship of the Division of Labor, at three month intervals, a statement describing steps taken toward making a diligent effort in the hiring of apprentices and trainees and containing a breakdown by craft of hours worked and wages paid for first year apprentices or trainees, other apprentices or trainees and journeymen.

NOTE: The form of all submittals, notices, change orders and other documents permitted or required to be used or transmitted under the Contract shall be determined by the County. Standard County forms shall be utilized.

END OF SECTION

SPECIAL PROVISIONS

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SPECIAL PROVISIONS

GENERAL

This Section amends enhances or otherwise revises the Technical Specifications.

STANDARD SPECIFICATIONS

The Standard Specifications to be used for this work shall (Roadway, Signalization, Signage and Pavement Markings) be Division II and III of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction*, 2010 Edition and all Supplemental Specifications thereto, hereinafter referred to as the *Standard Specifications*, for roadway construction, except as amended under this Contract, or as noted on the construction plans meeting the Manatee County Highway, Traffic & Stormwater Standards (dated 2007).

The Contractor's work shall follow the Manatee County Public Works Utility Standards and Specifications (dated March 2009) for the water main work, reclaimed water main, sanitary sewer and force main work.

These specifications cover the usual construction requirements for work specified by the County Public Works Department; however, in the event it is determined that the specific work to be done is of such a nature that the method of construction, type and/or kind of material is not defined by the *Standard Specifications*, such work shall be performed in accordance with the Special Provisions.

The apparent silence of the Specifications as to any detail or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used. Interpretation of these specifications shall be made upon that basis.

NO SEPARATE PAYMENT FOR SPECIAL PROVISIONS

No separate payment will be made for the Contractor to execute Special Provisions. All expenses borne by the Contractor shall be included in the individual unit prices for the particular pay item.

MATERIALS

- a. **Delivery Tickets:** It will be necessary to submit a copy of all delivery tickets for materials used on the project, regardless of the basis of payment.

- b. **Job Mix Formula for Asphaltic Concrete:** Attention is directed to the requirement that job mix formulas for asphaltic concrete, of the type specified, be submitted at least 14 days before plant operations begin. The submitted formula should be derived, or approved, by the laboratory approved by the Owner to make test on the Project. Costs for such job mix formulation will be paid by the Contractor directly to the assigned laboratory.

such job mix formulation will be paid by the Contractor directly to the assigned laboratory.

- c. **Job Mix Formula for Portland Cement Concrete:** Attention is directed to the requirement that job mix design formulas for all Portland Cement Concrete, of the type specified, be submitted at least 14 days prior to use on the project. The submitted formulas shall be derived or approved by the Owner and/or its agents. All concrete mix designs shall meet FDOT Concrete Class mix guidelines, except as follows: when approved, in writing by the Engineer, an Alternate Class I Concrete mix design formula, for concrete curb and gutter to be placed by automated curb machines, may show, as a substitution for #57 aggregate, an amount of #89 aggregate not to exceed 33 percent, by weight, of the #57 aggregate.

LABORATORY TESTING

Testing for the Work shall be performed at no expense to the Contractor. However, any test that fails or is not performed, as a result of the Contractor's action will, in turn, be back-charged to the Contractor, including the cost of all re-testing due to defective materials or construction. The testing laboratory shall be approved by the Owner.

The samples and tests used for determining the quality and acceptability of the materials and workmanship, which have been or are to be incorporated in the Work, shall conform to the requirements of the State of Florida Department of Transportation Materials Sampling, Testing and Reporting Guide, latest edition.

Testing shall also be in accordance with the applicable portions of Section 6 of the *Standard Specifications* and these specifications.

MEASUREMENT AND PAYMENT

- a. All work completed under the terms of this contract shall be measured according to United States Standard Measures.
- b. All measurements shall be taken horizontally or vertically unless specifically provided otherwise.
- c. No payment will be made for construction over a greater area than authorized, nor for material moved from outside of stakes and data shown on the plans, except when such work is performed upon instructions of the Engineer.
- d. The Contractor shall accept compensation provided under the terms of this contract as full payment for furnishing all materials and for performing all work contemplated and embraced under this contract. Such compensation shall also be for any and all loss or damage arising out of the nature of the work or from the action of the elements, or from any unforeseen difficulties or obstructions encountered during the contract period until final acceptance by the Owner.

- e. Whenever any change, or combination of changes, on the plans results in an increase or decrease in the original contract quantities, and the work added or decreased/eliminated is of the same general character as that called for on the plans, the Contractor shall accept payment in full at the original contract unit prices for the actual quantity of work performed, with no allowance for any loss of anticipated profits.
- f. It is the Contractor's responsibility to perform a detailed quantity take-off from the plans to determine actual quantities for ordering and delivery purposes. The Owner will not be responsible for quantities ordered in excess of those installed and constructed. The Contractor should be aware that some of the pay items may have contingency quantities. Payment shall be made only for final in-place quantities.

No payment shall be made for contingency quantities or additional work unless otherwise directed and approved in writing by the Engineer.

- g. Bid Schedule Completion - the blank spaces in the bid schedule shall be filled in correctly where indicated for each and every item for which a description is given, as the bidder must state the unit prices for which he proposes to do each part of the work contemplated, and the total price for all the parts included in any or all of the combinations of the work. In case of a discrepancy, the written words for "unit price", where stated, shall be considered as being the unit price. If the bid schedule does not use the written words for the unit price, then the numerically correct "total price", shall be considered as being the total price.

RESTORATION

Payment for restoration shall be covered under the applicable restoration Pay Items as specified in the proposal. If a specific restoration Pay Item is not listed in the proposal, the cost of such work shall be included in the applicable Pay Item unless otherwise provided under separate restoration section or pay quantity of these Specifications.

COOPERATION WITH OTHERS

The Contractor shall cooperate with the owners of any underground or overhead utility lines in their removal and rearrangement operations, in order that these operations may progress in a reasonable manner and that service rendered by these parties will not be interrupted. The Owner shall not be responsible for costs associated with delays, disruptions and remobilizations attributed to utility agency scheduling.

PRIORITY

In any instance where there is an apparent conflict between these technical specifications special provisions and the corresponding terms of the "Standard Specifications", these special provisions followed by these technical specifications shall be controlling.

SITE INVESTIGATION

The Contractor acknowledges that he has satisfied himself as to the nature and location of the work; the general and local conditions, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials; availability of labor, water, electric power, roads; and uncertainties of weather, water stages, tides or similar physical conditions at the site; the conformation and conditions of the ground; the character of equipment and facilities needed preliminary to and during prosecution of the work.

The Contractor further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered, insofar as this information presented by the drawings and Specifications made a part of this contract.

The Contractor shall carefully review and adhere to conditions and recommendations made in the project geotechnical report.

Any failure by the Contractor to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work.

The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the Owner. The Owner also assumes no responsibility for any understanding or representations made by its officers or agents during or prior to the execution of this Contract, unless (1) such understanding or interpretations are made in writing by the Engineer or are expressly stated in the Contract and (2) the Contract expressly provides that the responsibility therefore is assumed by the Owner.

PROJECT IDENTIFICATION SIGNS

The Contractor shall be responsible for furnishing, installing and maintaining two (2) County project identification signs and removal of same upon completion of the construction. Project identification sign shall be constructed and maintained at the project site as directed by the Owner. The Contractor shall erect, maintain and relocate the sign as directed for the duration of the Project.

The Contractor shall mount the sign using 4-inch pressure treated lumber or as approved by the Engineer, and other supports as required, at a location mutually agreed by the Engineer and the Contractor.

The identification signs shall not be less than 32 square feet in area. The Contractor shall coordinate with the Owner for the sign verbiage before fabrication. The signs shall be painted with graphic content to include:

- Title of Project
- Name of Owner
- Names and Titles of authorities, as directed by Owner

- Prime Contractor
- Construction Cost

The signs shall be erected prior to commencement of work at a lighted location of high public visibility, adjacent to the main entrance at each end of the project, as approved by the Engineer and Owner.

The signs shall be a minimum of 8 feet wide and 4 feet high. The signs shall be constructed of high density ¾-inch exterior plywood without waves or buckles, mounted and braced with pressure treated lumber as necessary and maintained in a presentable condition for the duration of the project. Hardware shall be galvanized. The surface of the sign shall be of exterior softwood plywood with medium density overlay.

Painting shall be constructed with materials to resist weathering and fading during the construction period. Experienced professionals shall perform painting. Graphic design and style shall be in accordance with the following:

- The signs will be placed in accordance with Manatee County Development Code, Ordinance 90-01, Section 724, Signs and Section 713, Visibility Triangles.

Payment for installing and maintaining the project identification signs shall be included as part of the lump sum quantity under Pay Item Number 1 (101-1) for Mobilization. The sign will remain the property of the Owner upon completion of the Project unless otherwise directed.

SPECIAL TERMS AND CONDITIONS

Soil Erosion and Siltation

The Contractor shall plan and control the Work to minimize all soil erosion and the siltation of drains and canals resulting from such erosion.

At the pre-construction meeting, the Contractor shall present his proposed plan and schedule, which shall specifically indicate the proposed usage of temporary erosion control features. The plan shall include:

- **Synthetic Bales, Baled hay and straw barriers** designed, furnished and installed by the Contractor in accordance with the plans, FDOT Section 104-6-4, and FDOT Design Standard Index No. 102.
- **Floating turbidity barriers and staked turbidity barriers** furnished and installed by the Contractor as shown on the plans and/or required by conditions of the permits and as outlined in FDOT Section 104-6.4.11.

Shop Drawings

The Contractor shall submit to the Engineer for approval, all working drawings and shop drawings with descriptive specifications and engineering calculations necessary for the successful completion of the Work.

The working and shop drawings shall be certified by a Florida licensed Professional Engineer and state that the design is sufficient for the successful completion of the Work. The working drawings and shop drawings shall include, but not be limited to:

- Traffic Control Plan
- Erosion Control Plan
- Shop Drawings as required by FDOT Standard Specifications

Temporary Pavement-(If Required)

Temporary pavement shall consist of a minimum of Optional Base Group 04 and one (1) inch of Type SP structural course (Traffic C) over a firm, unyielding, well-compacted subgrade. The Contractor shall immediately repair all potholes that develop within the project limits and shall maintain a supply of cold mix on the project site to expedite these repairs.

MAINTENANCE OF TRAFFIC

The Contractor shall provide access to businesses and local residents at all times. Business Entrance signs per FDOT Index 17355 (FTP-59) shall be placed at all business entrance points and maintained during all phases of construction. Payment for these items shall be included under the pay item for Maintenance of Traffic.

MAINTENANCE OF STORM DRAINAGE SYSTEM

The Contractor shall be responsible at all times to maintain the operation of existing stormwater facilities, or, when existing stormwater facilities are removed, to provide equivalent capacity alternate forms of stormwater removal adequate to prevent upstream flooding in excess of existing conditions. This responsibility shall include the installation of temporary connections, bypass pumping, or other temporary means necessary until the new drainage system is fully operational. Payment for these items shall be included under the applicable pay item.

ACCEPTANCE BY THE CONTRACTOR

The Contractor and the Contractor's Subcontractors shall be required to sign the "Contractor's Acceptance" form, Schedule I, included in the Agreement, prior to commencing work performed in accordance with the Agreement. By signing the "Contractor's Acceptance", the Contractor agrees to abide by and perform all applicable terms of the Agreement.

SIDEWALKS TO REMAIN OPEN

Existing sidewalks and proposed sidewalks completed during construction shall remain open at all times unless approved otherwise by the Engineer. Temporary sidewalk shall be constructed as shown in the plans or as required to maintain pedestrian movement. Payment for these items shall be included under the lump sum pay item for Maintenance of Traffic.

DUST CONTROL

The Contractor shall control dust resulting from construction operations at all times. The locations and frequencies of applications shall be as directed by the Engineer. Dust control is required to be in accordance with the *FDOT Standard Specifications* Section 102-5. Payment for Dust Control shall be made under Mobilization unless separate pay item for Dust Control is specified.

UNDERGROUND UTILITY LOCATIONS

The Contractor shall field verify by means of subsurface locating or other approved method all existing utilities to remain and conditions as may be required for the work area. This shall include all areas of potential conflicts with proposed storm, sanitary, force main and water main. The Contractor shall locate all existing utilities to remain at potential conflict locations prior to construction activities and before ordering any proposed structures. The Contractor shall contact and coordinate with "Sunshine State One Call 811" as well as the individual utilities prior to and during construction for utility locations, relocation and assistance while installing in potential conflict areas. All utility coordination and relocations shall be factored into the Contractor's construction schedule at no additional cost to the Owner.

The cost of all labor, materials and incidentals required for the performance of any survey and utility location work shall be included under the pay item for Mobilization. A Florida registered land surveyor shall perform all survey work.

UTILITY COORDINATION

The Contractor shall be responsible for coordination of the work with all affected utility owners. The Contractor must take into consideration the required utility adjustments and relocations in development of his schedule for completing the work including construction of temporary work to allow phased construction of the permanent facilities.

The Contractor shall coordinate and schedule utility relocations and/or adjustments with the utility owners along the project in order to avoid delays. The work includes remobilization if required after utility relocation is complete. The intent is to coordinate utility construction activities so the project construction continues and is not stopped or delayed at any time due to utility work being done. Once Notice to Proceed is issued, the Contractor shall contact the affected utilities to discuss the Contractor's anticipated means and methods so temporary and permanent relocation plans can be implemented as needed to meet OSHA safety requirements.

UTILITY CONFLICTS

It shall be the Contractor's responsibility to avoid conflicts with other utilities. The Owner will not be responsible for additional costs incurred by the Contractor for incorrect installations, relocations and breaks due to service conflicts.

The contractor's equipment shall maintain a minimum clearance distance (10 feet for voltage up to 50 kv, 15 feet for voltage over 50 to 200 kv, and 20 feet for voltage over 200 to 350 kv, etc.) following new OSHA criteria.

DAILY CLEAN-UP REQUIREMENTS

The Contractor shall clean up the job site at the end of each workday. Clean up will include the elimination of rubble and waste material on public and private property. Driveways shall remain accessible by residents. Each Friday, the Contractor shall prepare the road surface and barricades in an acceptable manner for weekend traffic use.

MAINTENANCE AND RESTORATION OF JOB SITE

The Contractor shall conduct his operations in such a manner as will result in a minimum of inconvenience to occupants of adjacent homes and business establishments and shall provide temporary access as directed or as may be required by the Project Manager. All final restoration must be performed to an equal or better condition than that which existed prior to construction.

Good housekeeping on this project is extremely important and the Contractor will be responsible for keeping the construction site neat and clean, with debris being removed daily as the work progresses or as otherwise directed by the Project Manager. Good housekeeping at the job site shall include: Removing all tools and temporary structures, dirt, rubbish, etc.; hauling all excess dirt, rock, etc., from excavations to a dump provided by the Contractor; and all clean up shall be accomplished to the satisfaction of the Project Manager. Dust will be controlled daily as may be required. Immediately after construction completion in an area or part thereof (including restoration), barricades, construction equipment and surplus and discarded materials shall be removed by the Contractor.

In the event that the timely clean up and restoration of the job site is not accomplished to the satisfaction of the Project Manager, the Project Manager shall make arrangements to affect the necessary clean up by others. The Contractor shall be charged for these costs through deductions in payment due the contractor. If such action becomes necessary on the part of and in the opinion of the Project Manager, the Owner shall not be responsible for the inadvertent removal from the work site of materials which the Contractor would not normally have disposed of had he affected the required clean up.

NOTICE AND SERVICE THEREOF

All notices, which shall include demands, instructions, requests, approvals, and claims shall be in writing. Any notice to or demand upon the Contractor shall be sufficiently given if delivered to the office of the Contractor specified in the bid (or to such other office as the Contractor may, from time to time, designate to the Owner in writing), or if deposited in the United States mail in a sealed, postage prepaid envelope, or delivered, with charges prepaid, sent via fax transmission, or to any telegraph company for transmission, in each case addressed to such office.

All notices required to be hand delivered to the Owner, unless otherwise specified in writing to the Contractor, shall be delivered to the Project Manager, and any notice to or demand upon the Owner shall be sufficiently given as delivered to the office of the Project Manager, or if deposited in the United States mail in a sealed, postage prepaid envelope, sent via fax transmission, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to said Project Manager or to such other representative of the Owner or to such other address as the Owner may subsequently specify in writing to the Contractor for such purposes.

Any such notice or demand shall be deemed to have been given or made as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post or in the case of a fax transmission or telegram at the time of actual receipt, as the case may be.

REQUIREMENTS FOR CONTROL OF THE WORK

Prior to the start of the Work described in this contract, a pre-construction conference may be held by the Project Manager to be attended by the Contractor and representatives of the various utilities and others as required, for the purpose of establishing a schedule of operations which will coordinate the work to be done under this contract with all related work to be done by others within the limits of the project.

All items of work in this contract shall be coordinated so that progress of each related item will be continuous from week to week. The progress of the work will be reviewed by the Project Manager at the end of each week, and if the progress of any item of work during that week is found to be unsatisfactory, the Contractor shall be required to adjust the rate of progress on that item or other items as directed by the Project Manager without additional compensation. The Contractor will continuously control the work until completed.

PROJECT SCHEDULE

The Contractor shall submit a detailed construction bar chart schedule within 15 days of the notification of award or its intent for the County to review. The submittal shall meet the following requirements:

- Schedule will be submitted on 11-inch by 17-inch paper.
- The time scale (horizontal) shall be in weeks. The activities shall be listed on the left hand side (vertical).

- Activities shall show most Work activities. The listing from top to bottom shall be in a logical sequence of how the Work will be accomplished. Space shall be provided between activities or within bars to allow for marking of actual progress.

A copy of the schedule, clearly showing progress made, shall be submitted on a monthly basis during the progress of the work. Review or acceptance will neither impose on the County responsibility for the progress or scheduling of the Work, nor relieve the Contractor from full responsibility therefore.

The Contractor shall provide a revised Work schedule if, at any time, the County considers the completion date to be in jeopardy because of "activities behind schedule". An activity that cannot be completed by its original or latest completion date shall be deemed to be behind schedule. The revised Work schedule is designed to show how the Contractor intends to accomplish the Work to meet the contractual completion date. The form and method employed by the Contractor shall be the same as for the original Work schedule.

The cost to prepare and revise the schedule is considered incidental to the Work.

USE OF PRIVATE PROPERTY

All construction activities required to complete this project in accordance with the Contract Documents shall be confined to public right-of-way, easements of record or temporary construction easements, unless the Contractor makes specific arrangements with private property owners for his use of their property. Written authorization from the granting property owner shall be placed on file with the Project Manager prior to utilization of said private properties. The Owner assumes no responsibility for damage to private property in such instances. The Contractor is responsible for protection of private property abutting all work areas on this project. Adequate equipment storage and material storage shall also be accomplished outside the Owner's right-of-way. Pipe and other materials shall not be strung out along the right-of-way, but will be delivered in quantities adequate for one day's installation. The Owner will coordinate with the Contractor to identify possible storage sites.

CONSTRUCTION PHOTOGRAPHY

General

The Contractor shall employ a competent photographer to take construction record photographs and perform videotaping, including providing all labor, materials, equipment and incidentals necessary to obtain photographs and/or videotapes of all areas specified in the Contract specifications.

The word "Photograph" includes standard photographic methods involving negatives, prints and slides and it also includes digital photographic methods involving computer technology items such as diskettes and CD-ROMs.

Qualifications

A competent camera operator who is fully experienced and qualified with the specified equipment shall do all photography.

For the videotape recording, the audio portion should be done by a person qualified and knowledgeable in the specifics of the Contract, who shall speak with clarity and diction so as to be easily understood.

Project Photographs

Provide photographs of the entire work area prior to any construction for the purpose of records of conditions prior to construction. Photographs should be spaced at approximately 100-foot intervals. In addition, all special features shall be photographed prior to construction.

Provide three prints of each standard photograph to the Owner. In addition to the CD-ROM media, provide one print of each digital/digitized photograph to the Owner.

The Contractor shall pay all costs associated with the required photography and prints. Any parties requiring additional photography or prints will pay the photographer directly.

All project photographs shall be a single weight, color image. All finishes shall be smooth surface and glossy, and all prints shall be 8 inches by 10 inches.

Each print shall have clearly marked on the back the name of the project, the orientation of view, the date and time of exposure, name and address of photographer and the photographers numbered identification of exposure.

All project photographs shall be taken from locations to adequately illustrate conditions prior to construction, or conditions of construction and state of progress. The Contractor shall consult with the Owner at each period of photography for instructions concerning views required.

The Contractor shall deliver prints in conformance with the above requirements to the Owner. No construction shall begin until pre-construction photographs are completed and submitted to the Owner.

Negatives

The Contractor shall require that photographer maintain negatives for a period of two years from date of Substantial Completion of the Project. Negatives shall be conveyed to Owner at the end of the two-year period.

Photographer shall agree to furnish additional prints to Owner at commercial rates applicable at the time of purchase. Photographer shall also agree to participate as required in any litigation requiring the photographer as expert witness.

Videotape Recording

Videotaping may be used in lieu of construction photographs.

Videotaping shall be accomplished along all routes that are scheduled for construction.

The taping shall, when viewed, depict an image with ¼ of the image being the roadway fronting of property and ¾ of the image being of the property. The taping shall be done so as to show the roadway and property in an oblique view (30 degrees).

A complete view, in sufficient detail, of all driveways, with audio description of the exact location shall be provided.

The Engineering plans shall be used as a reference for stationing in the audio portion of the tapes for easy location identifications. If visible, house numbers shall be mentioned on the audio.

Two complete sets of videotapes shall be delivered to the Owner for the permanent and exclusive use of the Owner prior to the start of any construction on the project.

All videotapes shall contain the name of the project, the date and time of the videotaping, the name and address of the photographer and any other identifying information required.

Payment for this item shall be included under the pay item for Mobilization.

CONTRACTOR TO EXECUTE NPDES “NOTICE OF INTENT”

Prior to proceeding with construction, the Contractor shall prepare and submit a “Notice of Intent to Use Generic Permit for Stormwater Discharge from Construction Activities that Disturb One or More Acres of Land” to the Florida Department of Environmental Protection (FDEP). The Contractor shall monitor the site at all times and take appropriate action to prevent erosion including the use of BMPs. No pumping of ground or surface water shall be performed without approval from the Water Management District. Following completion of construction, Contractor shall prepare and submit a “Notice of Termination of Generic Permit Coverage” to FDEP. Payment for this item shall be included under the pay item for Mobilization.

WORKSITE TRAFFIC SUPERVISOR

- a. The Contractor shall have a Worksite Traffic Supervisor who will be responsible for initiating, installing and maintaining all traffic control devices as described in Section 102 of the *FDOT Standard Specifications for Road and Bridge Construction* and in the Plans. The Worksite Traffic Supervisor shall have at least one year of experience directly related to work site traffic control in a supervisory or responsible capacity and shall be certified by the American Traffic Safety Services Association Worksite Traffic Supervisor Certification Program or an equal approved by FDOT. Approved alternate Worksite Traffic Supervisors may be used when necessary.
- b. The Worksite Traffic Supervisor shall be available on a 24-hour per day basis and shall review the project on a day-to-day basis as well as being involved in all changes to traffic control. The Worksite Traffic Supervisor shall have access to all equipment and materials needed to maintain traffic control and handle traffic related situations. The Worksite Traffic Supervisor shall ensure that routine deficiencies are corrected within a 24-hour period.

- c. The Worksite Traffic Supervisor shall be available on the site within 45 minutes after notification of an emergency situation, prepared to positively respond to repair the work zone traffic control or to provide alternate traffic arrangements.
- d. Failure of the Worksite Traffic Supervisor to comply with the provisions of the Sub-article may be grounds for decertification or removal from the project or both. Failure to maintain a designated Worksite Traffic Supervisor or failure to comply with these provisions will result in temporary suspension of all activities except traffic and erosion control and such other activities deemed to be necessary for project maintenance.
- e. Payment for Worksite Traffic Supervisor shall be included under the pay item for Maintenance of Traffic.

CONTRACTOR'S SUPERVISION

- a. Prosecution of Work: The Contractor shall give the work the constant attention necessary to assure the scheduled progress. He shall cooperate fully with the Project Manager and with other Contractors at work in the vicinity.
- b. Contractor's Superintendent: The Contractor shall at all times have on the work site as his agent, a competent superintendent capable of thoroughly interpreting the plans and specifications and thoroughly experienced in the type of work being performed, who shall receive the instructions from the Project Manager or his authorized representatives. The superintendent shall have full authority to execute the orders or directions of the Project Manager and to supply promptly any materials, tools, equipment, labor and incidentals that may be required. Such superintendence shall be furnished regardless of the amount of work sublet.
- c. The Contractor's superintendent shall speak and understand English, and at least one responsible person who speaks and understands English shall be on the project during all working hours, and wherever work is being done by the contractor.
- d. Supervision for Emergencies: The Contractor shall have a responsible person available at or reasonably near the work site on a 24-hour basis, 7 days a week, in order that he may be contacted for emergencies and in cases where immediate action must be taken to maintain traffic or to handle any other problem that may arise. The Contractor's responsible person for supervision for emergencies shall speak and understand English. The Contractor shall submit, by certified mail, phone numbers and names of personnel designated to be contacted in cases of emergencies along with a description of the project location to the Florida Highway Patrol and all other local law enforcement agencies.

LIST OF EMERGENCY CONTACT NUMBERS & UTILITY SERVICE MAINTENANCE

The Contractor shall obtain and maintain a list of emergency contact phone numbers for all utilities during the course of the project. The Contractor shall maintain utility service during the project except for interruptions authorized by the utility owner. If interruptions are required, the Contractor shall notify the Owner 48 hours in advance.

EXISTING SIDEWALK

If the Contractor, in the process of performing his contract operations, breaks any of the existing sidewalk that is to remain in place, replacement of this sidewalk will be at the Contractor's expense.

PEDESTRIAN ACCESS

The Contractor shall provide access and make provisions to maintain school zones during construction. The Contractor is to facilitate pedestrian traffic whether for school or public transportation.

RECORD DRAWINGS AND PROJECT CERTIFICATION

This section and number of copies applies only to roadway (including signalization) and drainage record drawings.

The Owner and/or Engineer will furnish the Contractor copies of the bid plans to be used for the record drawings. A Florida Registered Surveyor shall perform a field survey and any differences between the plan elevations or dimensions shall be marked through and the as-built elevation or dimension legibly entered. All elevations and dimensions that are correct shall have a check mark placed beside it.

The Contractor shall keep a complete set of surveyed "As-built" records. These records shall show all items of Work and existing features of utilities revealed by excavation work. The records shall be kept in a professional manner, in a form that shall be approved by the County prior to the Work. These results shall be available at all times during construction for reference by the Engineer and shall be delivered to the Engineer upon completion of the Work. All completed "As-builts" must be certified by a Florida Licensed Surveyor or Engineer per Chapter 61 G 17-6, Florida Administrative Code, pursuant to Sec. 47207, Florida Statutes. At a minimum all Utility Record Drawings shall be in accordance with Manatee County Standards.

The following information is required on the "Record Drawings":

- A. Roadway centerline profile [100-foot maximum interval].
- B. Roadway cross sections [100-foot maximum interval].
- C. Field changes of dimensions and details.
- D. Details not on original contract drawings.
- E. Benchmarks and elevation datum shall be indicated.
- F. Additional elevations or dimensions as required by the Engineer

Following completion of construction and prior to final payment, the Contractor shall submit a Certification by the Contractor and Manufacturer including test data that the materials (filter fabric, filter media, etc.) installed meet plan specifications and regulatory requirements.

Upon completion of the work, four (4) sets of draft "Record Drawings" shall be submitted to the Owner for review. Such drawings shall accurately show all approved field changes to the original Construction Drawings, including actual locations, dimensions and elevations and shall be subject to a field review in the presence of the Engineer or his designated representative. The drawings are to be prepared by competent personnel, neatly drafted and certified, signed and sealed by a Florida Registered Surveyor.

Upon completion of the work three (3) sets of Record Drawings and one compact disk of Record Drawings in Adobe and AutoCAD format to the Manatee County Traffic Engineering Division (Attn: Mr. Vishal S. Kakkad, P.E., PTOE) at 2101 47th Terrace East Bradenton, FL 34203. Record Drawings must be delivered to the county at least two (2) business days prior to scheduling the final inspection.

The Contractor shall incorporate any comments from the Owner and/or Engineer and shall submit two write-only CD-ROMs, one set of 24-inch by 36-inch mylar record drawings and four sets of 24-inch by 36-inch certified prints with the Surveyor's certification.

All Digital Drawings shall be identical to those submitted as hard copy. The Digital Drawing files shall be AutoCAD format (Release 2004 or later, but no later than 2010) and shall include all external reference drawings, text fonts, shape files and all other files necessary to make use of the drawings.

In addition, \$25,000 or five percent (whichever is smaller) of the Contract price shall be retained until the Owner has approved the "Record Drawings". The Owner and/or Engineer will review and approve the "Record Drawings within 30 days unless additional information is required. No final payment shall be made until such time as the "Record Drawings" have been approved and accepted.

COMPLIANCE WITH THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT (SWFWMD) STORMWATER MANAGEMENT AND DISCHARGE PERMIT REQUIREMENTS AND/OR THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) DREDGE AND FILL PERMIT REQUIREMENTS

Southwest Florida Water Management District Stormwater Management and Discharge permits or exemptions, if any, and/or a Department of Environmental Protection Dredge and Fill permit, if any, required for this project have been obtained by the Owner. The Contractor shall comply with the stipulations of the Permits or Exemptions as stated herein.

The Contractor shall allow periodic inspection of the work by authorized representatives of the Department of Environmental Protection, the Southwest Florida Water Management District, as well as other duly authorized law enforcement officers of the State.

DISCRETIONARY WORK (Contingency)

The discretionary work (Contingency) pay item shall cover the cost for various contingencies and contract amendments authorized by the Owner. Any amount of extra work and/or alterations to the proposed work charged to the allowance shall be fully documented and authorized by the Project Manager before the start of the work. No payment shall be made for work completed without written authorization from the Owner or Engineer.

Method of Measurement and Basis of Payment

Payment for authorized work shall be on a lump sum basis.

MATERIAL TESTING TABLE

ITEM	TEST	TEST IDENTIFICATION	TEST REQUIREMENTS VERTICAL	TEST FREQUENCY HORIZONTAL
UTILITY TRENCH BACKFILL	MAXIMUM DENSITY OPTIMUM MOISTURE	AASHTO T-180	N/A	PER SOIL CLASSIFICATION/ PER LABORATORY ONE PER 200 LF
	FIELD DENSITY	AASHTO T-180	PER PLANS	
SUBGRADE UNCLEAR NEW CURB	MAXIMUM DENSITY OPTIMUM MOISTURE	AASHTO T-180	N/A	PER SOIL CLASSIFICATION/ PER LABORATORY ONE PER 200 LF
	FIELD DENSITY	AASHTO T-180	PER PLANS	
CONCRETE	COMPRESSIVE STRENGTH (THREE CYLINDERS/TEST)	AASHTO T-23 AND AASHTO T-119	PER SPECS	PER SPECS/MIN. OF ONE SET/DAY FOR POURS BETWEEN 10 & 50 CY
	SLUMP, AIR CONTENT	AASHTO T-22 AND AASHTO T-180	PER SPECS	ADDITIONAL SET FOR EACH 50 CY DAILY OR 1 PER 50 CY MAX
ASPHALT	MATERIAL QUALITY GRADATION, STABILITY BITUMEN CONTENT	FLORIDA D.O.T.	PER SPECS	PER SPECS DAILY OR 1 PER 50 CY MAX

CENTER IS NOTIFIED 48 HRS IN ADVANCE OF STARTING WORK
PHONE 941-359-7300
VERIFICATION NO _____

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
**DRIVEWAY/CONNECTION PERMIT
FOR ALL CATEGORIES**

**SUBCONTRACTORS SHALL
BE RESPONSIBLE FOR
COMPLIANCE WITH
PERMITTED NOT
PLAN.**

PART 1: PERMIT INFORMATION

Application Number: 2011-A-194-0011

Permit Category: J-Govt. Access Classification: 6

Project: 15th Street East at 53rd Avenue East

Permittee: Manatee County

Section/Mile Post: 13162 / 1.747 State Road: SR-70

Section/Mile Post: 13162 / 1.761 State Road: SR-70

11/10/11 - 12/11/11 - 1/11/12

PART 2: PERMITTEE INFORMATION

Permittee Name: Manatee County Public Works Department

Permittee Mailing Address: 1022 26th Ave. East

City, State, Zip: Bradenton, Florida 34208

Telephone: 941-708-7462

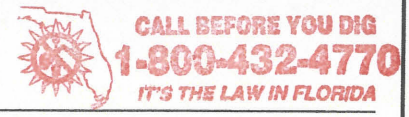
Engineer/Consultant/or Project Manager: Vince Canna, Project Manager

Engineer responsible for construction inspection: Sia Mollanazar P.E. Deputy Director 42903
NAME P.E. #

Mailing Address: 1022 26th Ave. East

City, State, Zip: Bradenton, Florida 34208

Telephone: 941-708-7487 Mobile Phone: _____



If a lane closure is within the project limits, the permittee must notify the Department 7 days prior to a lane closure to allow the Department to inform the motoring public. Failure to call may result in a delay to begin work.

PART 3: PERMIT APPROVAL

The above application has been reviewed and is hereby approved subject to all Provisions as attached.

Permit Number: 2011-A-194-0011
Department of Transportation

Signature: Albert Rosenstern Title: ENGINEERING MANAGER

Department Representative's Name: ALBERT ROSENSTEIN

Temporary Permit: YES NO (if temporary, this permit is only valid for 6 months)

Special provisions attached: YES NO

Date of Issuance: 9.21.11

If this is a normal (non-temporary) permit it authorizes construction for one year from the date of issuance. This can only be extended by the Department as specific in 14-96.007(6).

See following pages for General and Special Provisions

DISTRICT ONE LANE CLOSURE POLICY MAY REQUIRE WORK TO BE PERFORMED DURING NIGHT TIME HOURS DUE TO LANE ANALYSIS AND/OR LANE RESTRICTIONS

God All Portions of Disturbed Right-Of-Way.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
DRIVEWAY/CONNECTION PERMIT
FOR ALL CATEGORIES

PART 4: GENERAL PROVISIONS

1. Notify the Department of Transportation Maintenance Office at least 48 hours in advance of starting proposed
Phone: 941-708-7338, Attention: Vince Canna, Project Manager
2. A copy of the approved permit must be displayed in a prominent location in the immediate vicinity of the connection of construction.
3. Comply with Rule 14-96.008(1), F.A.C., Disruption of Traffic.
4. Comply with Rule 14-96.008(7), F.A.C., on Utility Notification Requirements.
5. All work performed in the Department's right of way shall be done in accordance with the most current Department standards, specifications and the permit provisions.
6. The permittee shall not commence use of the connection prior to a final inspection and acceptance by the Department.
7. Comply with Rule 14-96.003(3)(a), F.A.C., Cost of Construction.
8. If a Significant Change of the permittee's land use, as defined in Section 335.182, Florida Statutes, occurs, the Permittee must contact the Department.
9. Medians may be added and median openings may be changed by the Department as part of a Construction Project or Safety Project. The provision for a median might change the operation of the connection to be for right turns only.
10. All conditions in NOTICE OF INTENT WILL APPLY unless specifically changed by the Department.
11. All approved connection(s) and turning movements are subject to the Department's continuing authority to modify such connection(s) or turning movements in order to protect safety and traffic operations on the state highway or State Highway System.
12. **Transportation Control Features and Devices in the State Right of Way.** Transportation control features and devices in the Department's right of way, including, but not limited to, traffic signals, medians, median openings, or any other transportation control features or devices in the state right of way, are operational and safety characteristics of the State Highway and are not means of access. The Department may install, remove or modify any present or future transportation control feature or device in the state right of way to make changes to promote safety in the right of way or efficient traffic operations on the highway.
13. The Permittee for him/herself, his/her heirs, his/her assigns and successors in interest, binds and is bound and obligated to save and hold the State of Florida, and the Department, its agents and employees harmless from any and all damages, claims, expense, or injuries arising out of any act, neglect, or omission by the applicant, his/her heirs, assigns and successors in interest that may occur by reason of this facility design, construction, maintenance, or continuing existence of the connection facility, except that the applicant shall not be liable under this provision for damages arising from the sole negligence of the Department.
14. The Permittee shall be responsible for determining and notify all other users of the right of way.
15. Starting work on the State Right of Way means that I am accepting all conditions on the Permit.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
**DRIVEWAY/CONNECTION PERMIT
FOR ALL CATEGORIES**

PART 5: SPECIAL PROVISIONS

NON-CONFORMING CONNECTIONS: YES NO

If this is a non-conforming connection permit, as defined in Rule Chapters 14-96 and 14-97, then the following shall be a part of this permit.

1. The non-conforming connection(s) described in this permit is (are) not permitted for traffic volumes exceeding the Permit Category on page 1 of this permit, or as specified in "Other Special Provisions" below.
2. All non-conforming connections will be subject to closure or relocation when reasonable access becomes available in the future.

OTHER SPECIAL PROVISIONS:

PART 6: APPEAL PROCEDURES

You may petition for an administrative hearing pursuant to sections 120.569 and 120.57, Florida Statutes. If you dispute the facts stated in the foregoing Notice of Intended Department Action (hereinafter Notice), you may petition for a formal administrative hearing pursuant to section 120.57(1), Florida Statutes. If you agree with the facts stated in the Notice, you may petition for an informal administrative hearing pursuant to section 120.57(2), Florida Statutes. You must file the petition with:

Clerk of Agency Proceedings
Department of Transportation
Haydon Burns Building
605 Suwannee Street, M.S. 58
Tallahassee, Florida 32399-0458

The petition for an administrative hearing must conform to the requirements of Rule 28-106.201(2) or Rule 28-106.301(2), Florida Administrative Code, and be filed with the Clerk of Agency Proceedings by 5:00 p.m. no later than 21 days after you received the Notice. The petition must include a copy of the Notice, be legible, on 8 1/2 by 11 inch white paper, and contain:

1. Your name, address, telephone number, any Department of Transportation identifying number on the Notice, if known, the name and identification number of each agency affected, if known, and the name, address, and telephone number of your representative, if any, which shall be the address for service purposes during the course of the proceeding.
2. An explanation of how your substantial interests will be affected by the action described in the Notice;
3. A statement of when and how you received the Notice;
4. A statement of all disputed issues of material fact. If there are none, you must so indicate;
5. A concise statement of the ultimate facts alleged, including the specific facts you contend warrant reversal or modification of the agency's proposed action, as well as an explanation of how the alleged facts relate to the specific rules and statutes you contend require reversal or modification of the agency's proposed action;
6. A statement of the relief sought, stating precisely the desired action you wish the agency to take in respect to the agency's proposed action.

If there are disputed issues of material fact a formal hearing will be held, where you may present evidence and argument on all issues involved and conduct cross-examination. If there are no disputed issues of material fact an informal hearing will be held, where you may present evidence or a written statement for consideration by the Department.

Mediation, pursuant to section 120.573, Florida Statutes, may be available if agreed to by all parties, and on such terms as may be agreed upon by all parties. The right to an administrative hearing is not affected when mediation does not result in a settlement.

Your petition for an administrative hearing shall be dismissed if it is not in substantial compliance with the above requirements of Rule 28-106.201(2) or Rule 28-106.301(2), Florida Administrative Code. If you fail to timely file your petition in accordance with the above requirements, you will have waived your right to have the intended action reviewed pursuant to chapter 120, Florida Statutes, and the action set forth in the Notice shall be conclusive and final.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
**DRIVEWAY/CONNECTION APPLICATION
 FOR ALL CATEGORIES**

OFFICE USE ONLY

Application Number: _____	Received By: _____ <small>FDOT STAFF (TYPE OR PRINT)</small>
Category: _____	Date: _____
Section/Mile Post: _____	State Road: <u>SR 70</u>
Section/Mile Post: _____	State Road: <u>SR 70</u>

Instructions – To Applicant

- Contact the Department of Transportation to determine what plans and other documents you are required to submit with your application.
- Complete this form (some questions may not apply to you) and attach all necessary documents and submit it to the Department of Transportation.
- For help with this form contact your local Maintenance or District Office.
 - Or visit our website at www.dot.state.fl.us/onestoppermitting for the contact person and phone number in your area.
 - You may also email – driveways@dot.state.fl.us
 - Or call your District or local Florida Department of Transportation Office and ask for Driveway Permits.

Please print or type

APPLICANT:

Check one:
 Owner Lessee Contract to Purchase

Name: Manatee County Public Works Department

Responsible Officer or Person: Sia Mollanazar, P.E., Deputy Director

If the Applicant is a Company or Organization, Name: Manatee County Public Works Department.

Address: 1022 26th Avenue East

City, State: Bradenton, Fl

Zip: 34208 Phone: 941-708-7487 Fax: 941-708-7475

Email: Sia.Mollanazar@mymanatee.org

LAND OWNER: (If not applicant)

Name: _____

If the Applicant is a Company or Organization, Name: _____

Address: _____

City, State: _____

Zip: _____ Phone: _____ Fax: _____

Email: _____

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
**DRIVEWAY/CONNECTION APPLICATION
FOR ALL CATEGORIES**

AUTHORIZED REPRESENTATIVE: If specified by Applicant to handle, represent, sign, and file the application –
NOTE: A notarized letter of authorization must be provided with the Application.

Name: _____

Company Name: _____

Address: _____

City, State: _____

Zip: _____ Phone: _____ Fax: _____

Email: _____

Address of property to be served by permit (if known):

If address is not known, provide distance from nearest intersecting public street (such as, 500 feet south of Main St.)

Check here if you are requesting a

new driveway temporary driveway modification to existing driveway safety upgrade

Does the property owner own or have any interests in any adjacent property?

No Yes, if yes – please describe:

Are there other existing or dedicated public streets, roads, highways or access easements bordering or within the property?

No Yes, if yes – list them on our plans and indicate the proposed and existing access points.

Local Government Development Review or Approval Information:

Local Government Contact: _____

Name: _____

Government Agency: _____

Phone #: _____

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
DRIVEWAY/CONNECTION APPLICATION
FOR ALL CATEGORIES

If you are requesting commercial or industrial access, please indicate the types and number of businesses and provide the floor area square footage of each. Use additional sheets if necessary.

Business (Name and Type)	Square Footage	Business (Name and Type)	Square Footage
1. N/A		3.	
2. N/A		4.	

If you are requesting a residential development access, what is the type (single family, apartment, townhouse) and number of units?

Type	Number of Units
N/A	
N/A	

Provide an estimate of the daily traffic volume anticipated for the entire property at build out. (An individual single family home, duplex, or quad-plex is not required to complete this section).

Daily Traffic Estimate = _____ (Use the latest Institute of Transportation Engineers (ITE) Trip Generation Report)

If you used the ITE Trip Generation Report, provide the land use code, independent variable, and reference page number.

ITE Land Use Code	Independent Variable	ITE Report page number reference

Check with the Florida DOT Office where you will return this form to determine which of the following documents are required to complete the review of your application.

Plans should be 11" x 17" (scale 1" x 50') Note: No plans larger than 24" x 36" will be accepted a) Highway and driveway plan profile b) Drainage plan showing impact to the highway right-of-way c) Map and letters detailing utility locations before and after Development in and along the right of way d) Subdivision, zoning, or development plans e) Property map indicating other access, bordering roads and streets	f) Proposed access design g) Parcel and ownership maps including easements (Boundary Survey) h) Signing and striping plans i) Traffic Control/Maintenance of Traffic plan j) Proof of liability insurance k) Traffic Impact Study l) Cross section of roadway every 100' if exclusive turn lanes are required
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Important Notices to Applicant Before Signing Application

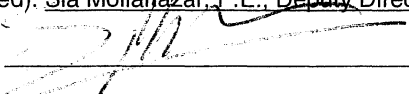
The Department Reserves The Right To Change Traffic Features And Devices In Right Of Way At Any Time
 Proposed traffic control features and devices in the right of way, such as median openings and other traffic control devices, are not part of the connection(s) to be authorized by a connection permit. The Department reserves the right to change these features and devices in the future in order to promote safety in the right of way or efficient traffic operations on the highway. Expenditure by the applicant of monies for installation or maintenance of such features or devices shall not create any interest in the maintenance of such features or devices.

Significant Changes In Property Use Must Undergo Further Review
 If an access permit is issued to you it will state the terms and conditions for its use. Significant changes in the use as defined in Section 335.182(3), Florida Statutes, of the permitted access not consistent with the terms and conditions listed on the permit may be considered a violation of the permit.

All Information I Give Is Accurate
 I certify that I am familiar with the information contained in this application and that to the best of my knowledge and belief, such information is true, complete and accurate.

Starting Work On The Driveway Connection After I Get My Permit Means I Accept All the Conditions In My Permit
 I will not begin work on the connection until I receive my Permit and I understand all the conditions of the Permit. When I begin work on the connection, I am accepting all conditions listed in my Permit.

Applicant Name (Printed): Sia Mollanazar, P.E., Deputy Director - Engineering Services, Manatee County Public Works Dept

Applicant's signature:  Date: 5-10-11

SIGNING AND MARKING ☺

SIGNALS - Subhasis Ghosh 863-519-2773

All previous comments have been satisfactorily addressed. I don't have any further comments.



ANALYSIS

Signal Timing- Ken Bass

Sept. 13, 2011

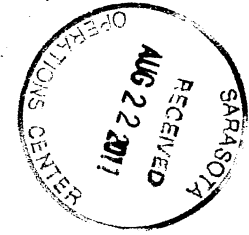
I have no further comments. ☺

Equipment – Steve Miller





MANATEE COUNTY FLORIDA



August 18, 2011

Mr. Ed Giddens, Permits Supervisor
FDOT
1840 61st Street
Sarasota, FL 34243-2224

**Re: 15th Street East @ 53rd Avenue East Intersection Improvements
Section 131600-131620, M.P. 0.00 to M.P. 1.761 Manatee County, FL**

Dear Mr. Giddens:

Please find enclosed four (4) sets of signed and sealed pavement and marking plans and four (4) sets of signalization plans and four (4) set of "HDR Review Comments" and one (1) CD.

Please see attached "HDR Review Comments" for responses to your review comment letter from Valerie A. Everts, dated July 20, 2011.

Manatee County's proposed scope of work includes resurfacing, a proposed traffic signal light, and pavement and marking within the FDOT Right-of-Way. The Construction plans have not been included in this submittal based on "no comments" received under Access Management in the July 22, 2011, FDOT correspondence.

If you have any questions, please call me at (941) 708-7462.

Sincerely,

Christopher L. Mowbray, P.E.
Division Manager – Highway Engineering

CLM/amm/jh

Attachments: Four (4) sets of pavement and marking plans
Four (4) sets of signalization plans
Four (4) set of HDR Review Comments
One (1) CD

cc: Sia Mollanazar, P.E. Deputy Director-Engineering Services-w/out attachments via email
Bruce Simmington, Project Management Division Manager-w/out attachments via email
Vincent Canna, Project Manager– w/attachments

Public Works Department – Highway Engineering Division
Mailing Address: P.O. Box 1000* Bradenton, Florida 34206-1000
Street Address: 1022 26th Avenue East* Bradenton, Florida 34208
PHONE: 941-708-7462 * FAX: 941-7108-7475

www.mymanatee.org



Review Comments

HDR ENGINEERING, INC.
 5426 Bay Center Drive
 Suite 400
 Tampa, FL 33609-3444

Submittal: Permit (No. 2011-A-194-0011)
 Discipline: Signal
 Reviewer: Subhasis Ghosh
 Date of Review: July 20, 2011
 Response By: Anu Weerasuriya
 Date of Response: August 05, 2011

FPN: N/A
 Description: 15th St and SR 70

Comment No.	Sheet No.	COMMENT	RESPONSE	Designer Will Incorporate		Incorporation Verified
				YES	NO	
SIGNALS						
1.	T-5	Please replace note 3. Of Controller Operation Notes: "When signal is in flashing mode, movements 2 and 6 shall flash yellow. All other movements shall flash red".	Note has been revised accordingly.	X		
2.	T-5	Pay Item 665-12 is for detection station with post and sign. Please add "and sign" after 'Install the post with pedestrian push button' to Notes 3 and 4 of the Notes to the contractor.	Note has been revised accordingly.	X		

Reviewer's Concurrence to Responses: _____
 Date: _____

HDR ENGINEERING, INC.
5426 Bay Center Drive
Suite 400
Tampa, FL 33609-3444

Submittal: Permit (No. 2011-A-194-0011)
Discipline: Analysis
Reviewer: Ken Bass
Date of Review: July 20, 2011
Response By: Anu Weerasuriya
Date of Response: August 05, 2011

FPN: N/A
Description: 15th St and SR 70

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified	
			YES	NO	YES	NO
ANALYSIS						
1.	Gen.	Provide a capacity analysis showing the effects of the proposed lane configuration.			X	
2.	Gen.	Controller timing is incomplete.			X	
3.	Gen.	Add note: "contact Renjan Joseph, P.E. at (863) 519-2746 for coordination timings."			X	



Florida Department of Transportation

RICK SCOTT
GOVERNOR

1840 61st Street
Sarasota, FL 34243

ANANTH PRASAD, P.E.
SECRETARY

July 20, 2011

Mr. Christopher L. Mowbray
Manatee County
1022 26th Avenue East
Bradenton, Florida 34208

RE: SR 70/53th Ave @ 15th Street East
Connection #: 2011-A-194-0011
SR 70/53th Ave. East, Section 13162, M.P. 1.747 +/-

Dear Mr. Mowbray:

Our District Traffic Operation Office has reviewed the above referenced project and offers the following comments. Please resubmit four sets of plans.

SIGNING AND MARKING

All previous comments have been satisfactorily addressed. I don't have any further comments.

SIGNALS

Sheet No. T-5

1. The following comments from previous review have not been addressed. Please verify.

Comment No. 14: Please replace Note 3. of Controller Operation Notes: "When signal is in flashing mode, movements 2 and 6 shall flash yellow. All other movements shall flash red".

Comment No. 15: Pay Item 665-12 is for detection station with post and sign. Please add "and sign" after 'Install the post with pedestrian push button' to Notes 3 and 4 of the Notes to the contractor.

ANALYSIS

- Provide a capacity analysis showing the effects of the proposed lane configuration.
- Controller timing is incomplete.
- Add note: "Contact Renjan Joseph, P.E. at (863) 519-2746 for coordination timings."

EQUIPMENT

No comment

DISCLAIMER STATEMENT

Our review comments are not intended to be inclusive of all errors and omissions. Our comments are also not intended to affect the scope of work or to be contrary to FHWA policy, FDOT design criteria or sound engineering practice. The Consultant is solely responsible for the technical accuracy, engineering judgment, and quality of his work.

If you have any questions concerning our comments, please call the appropriate number list below.

Subhasis Ghosh	Signal, Signing and Markings	(863)519-2773
Ken Bass	Signal Timings	(863)519-2788

These comments are not intended to be all-inclusive and it should not be assumed that any issues not addressed in this correspondence are acceptable to this Department. According to Rule 14-96, (applicants must provide requested information within 60 days... if additional information has not been received by the Department within the prescribed time from the date of notification; the application shall be processed with the information provided. This may result in an automatic denial of the application”.

If you have any questions, or need any further information, please give me a call at (941) 359-7305.

Sincerely,

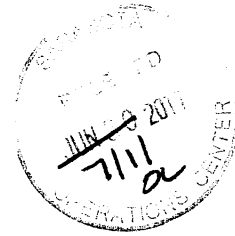


Valerie A. Everts,
Sarasota Operations,
Permits Coordinator

CC: Permit File



MANATEE COUNTY
FLORIDA



June 27, 2011

Mr. Ed Giddens, Permits Supervisor
FDOT
1840 61st Street
Sarasota, FL 34243-2224

**Re: 15th Street East @ 53rd Avenue East Intersection Improvements
Section 131600-131620, M.P. 0.00 to M.P. 1.761 Manatee County, FL**

Dear Mr. Giddens:

Please find enclosed four (4) sets of signed and sealed pavement and marking plans and four (4) sets of signalization plans and four (4) set of "HDR Review Comments".

Please see attached "HDR Review Comments" for responses to your review comment letter from Valerie A. Everts, dated June 06, 2011.

Manatee County's proposed scope of work includes resurfacing, a proposed traffic signal light, and pavement and marking within the FDOT Right-of-Way. The Construction plans have not been included in this submittal based on "no comments" received under Access Management in the June 06, 2011, FDOT correspondence.

If you have any questions, please call me at (941) 708-7462.

Sincerely,

Christopher L. Mowbray, P.E.
Division Manager – Highway Engineering

CLM/amm/jh

Attachments: Four (4) sets of pavement and marking plans
Four (4) sets of signalization plans
Four (4) set of HDR Review Comments

cc: Sia Mollanazar, P.E. Deputy Director-Engineering Services-w/out attachments via email
Bruce Simmington, Project Management Division Manager-w/out attachments via email
Vincent Canna, Project Manager– w/attachments

Public Works Department – Highway Engineering Division
Mailing Address: P.O. Box 1000* Bradenton, Florida 34206-1000
Street Address: 1022 26th Avenue East* Bradenton, Florida 34208
PHONE: 941-708-7462 * FAX: 941-7108-7475

www.myanatee.org

Submittal: Permit (No. 2011-A-194-0011) FPN: N/A
 Discipline: Signal, Signing and Markings Description: 15th St and SR 70
 Reviewer: Subhasis Ghosh
 Date of Review: June 06, 2011
 Response By: Anu Weerasuriya
 Date of Response: June 14, 2011

HDR ENGINEERING, INC.
 5426 Bay Center Drive
 Suite 400
 Tampa, FL 33609-3444

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified
			Designer Will Incorporate	Initials	
YES	NO				

SIGNING AND MARKING

1.	S-1	<p>Please add County Section No. 13162 & M.P. 1.747 – M.P. 1.761 to title.</p> <p>Please add the following notes:</p> <p>AT LEAST 72 HOURS IN ADVANCE OF BEGINNING CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL CONTACT THE LOCAL MAINTENANCE FDOT ENGINEER'S OFFICE TO SECURE GENERAL USE PERMITS AND/OR OTHER PERMITS AS REQUIRED FOR WORKING WITHIN THE DEPARTMENT'S RIGHT-OF-WAY.</p> <p>THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (DATED 2010) AND DESIGN STANDARDS BOOKLET (DATED 2010).</p> <p>APPLICABLE DESIGN STANDARDS MODIFICATIONS: 7/1/2011. FOR DESIGN STANDARDS MODIFICATIONS, CLICK ON "DESIGN STANDARDS" AT THE FOLLOWING WEB SITE: http://www.dot.state.fl.us/rddesign/</p>	X		
2.	S-1	<p>Please delete the note "Governing Standards and Specifications....."</p>	X		
3.	S-1	<p>Please delete the note "Governing Standards and Specifications....."</p>	X		

Reviewer's Concurrence to Responses: _____
 Date: _____

HDR ENGINEERING, INC.
5426 Bay Center Drive
Suite 400
Tampa, FL 33609-3444

Submittal: Permit (No. 2011-A-194-0011)
Discipline: Signal, Signing and Markings
Reviewer: Subhasis Ghosh
Date of Review: June 06, 2011
Response By: Anu Weerasuriya
Date of Response: June 14, 2011

FPN: N/A
Description: 15th St and SR 70

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified	
			YES	NO	YES	NO
4.	S-3	Please add the following plan note: ALL PAVEMENT MARKINGS WITHIN FDOT RIGHT-OF-WAY SHALL BE THERMOPLASTIC.			X	
5.	S-4	Please design transition distance and taper length for the left turn lanes as per standard index 17346 (11 of 14).	X			
6.	S-6	The posted speed limit on 15 th St. E is 40 mph. Please design Advance Street Name signs as per Traffic Engineering Manual, Table 2.3-7-2, Design Guidelines for Advance Street Name Signs.			X	
SIGNALS						
1.	T-1	Please add County Section No. 13162 & M.P. 1.761 to title.	X			
2.	T-1	Please add the following notes: AT LEAST 72 HOURS IN ADVANCE OF BEGINNING CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL CONTACT THE LOCAL MAINTENANCE FDOT ENGINEER'S OFFICE TO SECURE GENERAL USE PERMITS AND/OR OTHER PERMITS AS REQUIRED FOR WORKING WITHIN THE DEPARTMENT'S RIGHT-OF-WAY. THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (DATED 2010) AND DESIGN STANDARDS BOOKLET (DATED 2010). APPLICABLE DESIGN STANDARDS		X		

HDR ENGINEERING, INC.
 5426 Bay Center Drive
 Suite 400
 Tampa, FL 33609-3444
 Submittal: Permit (No. 2011-A-194-0011) FPN: N/A
 Discipline: Signal, Signing and Markings Description: 15th St and SR 70
 Reviewer: Subhasis Ghosh
 Date of Review: June 06, 2011
 Response By: Anu Weerasuriya
 Date of Response: June 14, 2011

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified
			YES	NO	
3.	T-1	<p>MODIFICATIONS: 7/1/2011. FOR DESIGN STANDARDS' MODIFICATIONS, CLICK ON "DESIGN STANDARDS" AT THE FOLLOWING WEB SITE: http://www.dot.state.fl.us/trdesign/</p> <p>Please delete the note "Governing Standards and Specifications....."</p>	X		
4.	T-1	Please show location of Signal, Mile Post and Signal ID on a map similar to the map on roadway plan set.	X		
5.	T-2	Pay Item 649-31-203 doesn't match plan T-5. Please verify.	X		
6.	T-3	Note 12. Please add the contact no. (1-800-432-4470) of Sunshine State One Call of Florida.	X		
7.	T-3	Please review all District 1 signalization notes and incorporate them under general notes as applicable to this project. The current versions of the files – permit notes definition.docx- available at ftp://ftp.dot.state.fl.us/fdot/d1/traffops/Signal%20Design%20Updates/SIGNAL%20NOTES/	X		
8.	T-4	635-1-1: Please add to the existing note – Pull boxes are to be placed behind curb and gutter. If there is no curb and gutter, pull boxes shall be placed a minimum of 7' from the edge of pavement.	X		
9.	T-4	Pay Item Note 649-31-999: Please add to the existing note – Use three 2" and one 3/4" conduit stubbed out through the mast arm pole foundation and temporarily seal.	X		
10.	T-4	Pay Item Note 650-51-311: Please add to the existing note – Use B-cap (non-silicone filled) twist wire nuts for all connections in the disconnect. Use red, yellow, green, and white THHN # 14 copper wires from disconnect to signal head. Place a permanent marking on the wire designating the phase use.	X		

HDR ENGINEERING, INC.

5426 Bay Center Drive
Suite 400
Tampa, FL 33609-3444

Submittal: Permit (No. 2011-A-194-0011)
Discipline: Signal, Signing and Markings
Reviewer: Subhasis Ghosh
Date of Review: June 06, 2011
Response By: Anu Weerasuriya
Date of Response: June 14, 2011

FPN: N/A
Description: 15th St and SR 70

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified
			YES	NO	
11.	T-4	653-191: Please replace the existing note with – Pedestrian signal heads to be 16" international symbol, LED countdown type.	X		
12.	T-4	659-107: Please add to the existing note – Use locking collars when mounting pedestrian signal heads to pedestrian pedestals. Use locking collars when mounting aluminum pedestrian poles to pedestrian pedestal bases.	X		
13.	T-4	Please add Pay Item Note 685-106: Include an uninterrupted power supply unit (UPS) with an 8 hour run time at 450 watts. Attach UPS unit to the outside of the controller cabinet. Install UPS unit in accordance with manufacturer's specifications. UPS equipment to be compatible with maintaining agency existing system.	X		

HDR ENGINEERING, INC.
5426 Bay Center Drive
Suite 400
Tampa, FL 33609-3444

Submittal: Permit (No. 2011-A-194-0011)
Discipline: Access Management
Reviewer: Theresa Myers
Date of Review: June 06, 2011
Response By: Anu Weerasuriya
Date of Response: June 14, 2011

FPN: N/A
Description: 15th St and SR 70

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified	
			Designer Will Incorporate	NO	YES	NO

SIGNING AND MARKING

ACCESS MANAGEMENT

1.	Gen.	No comments.	Acknowledged.	N/A	N/A
----	------	--------------	---------------	-----	-----

HDR ENGINEERING, INC.
5426 Bay Center Drive
Suite 400
Tampa, FL 33609-3444

Submittal: Permit (No. 2011-A-194-0011)
Discipline: Analysis
Reviewer: Ken Bass
Date of Review: June 06, 2011
Response By: Anu Weerasuriya
Date of Response: June 14, 2011

FPN: N/A
Description: 15th St and SR 70

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified	
			Designer Will Incorporate	NO	YES	NO

ANALYSIS

1.	Gen.	Provides a capacity analysis showing the effects of the proposed lane configuration.	Per coordination with Mr. Ken Bass, a capacity analysis is not required for the proposed lane configuration.	X	
2.	Gen.	Use approach speed to determine the yellow and all red intervals per <i>FDOT Traffic Engineering Manual Section 3.6</i> .	The vehicle clearance timings have been calculated using approach speeds per the Traffic Engineering Manual. Per coordination with Mr. Ken Bass, proposed yellow and all-red timings are to remain.	X	
3.	Gen.	Add note: "Contact Renjan Joseph, P.E. at (863) 519-2746 for coordination timings."	Agree. Note has been added to sheet T-5 under controller operations notes.	X	



Review Comments

ONE COMPANY
Many SolutionsSM

Submittal: Permit (No. 2011-A-194-0011) FPN: N/A
Discipline: Equipment Description: 15th St and SR 70
Reviewer: Steve Miller
Date of Review: June 06, 2011
Response By: Anu Weerasuriya
Date of Response: June 14, 2011

HDR ENGINEERING, INC.
5426 Bay Center Drive
Suite 400
Tampa, FL 33609-3444

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified			
			YES	NO	YES	NO	Initials	
1.	T-4	Remove "polycarbonate" from note and change to metal. There are no poly back plates fabricated with the reflective sheeting.			X			

EQUIPMENT



Review Comments

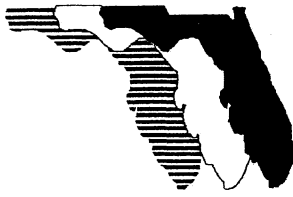
ONE COMPANY
Many SolutionsSM

Submittal: Permit (No. 2011-A-194-0011) FPN: N/A
Discipline: Structures Description: 15th St and SR 70
Reviewer: Gerard Mollere
Date of Review: June 06, 2011
Response By: Anu Weerasuriya
Date of Response: June 14, 2011

HDR ENGINEERING, INC.
5426 Bay Center Drive
Suite 400
Tampa, FL 33609-3444

Comment No.	Sheet No.	COMMENT	RESPONSE		Incorporation Verified			
			YES	NO	YES	NO	Initials	
1.		The DSDO has reviewed the subject permit plans. The mast arm design appears to be acceptable. We offer no comment.			N/A		N/A	

STRUCTURES



Florida Department of Transportation

RICK SCOTT
GOVERNOR

1840 61st Street
Sarasota, Florida 34243

ANANTH PRASAD, P.E.
SECRETARY

June 6, 2011

Mr. Christopher L. Mowbray
Manatee County
1022 26th Avenue East
Bradenton, Florida 34208

RE: SR 70/53th Ave @ 15th Street East
Connection #: 2011-A-194-0011
SR 70/53th Ave. East, Section 13162, M.P. 1.747 +/-

Dear Mr. Mowbray:

Our District Traffic Operation Office has reviewed the above referenced project and offers the following comments. Please resubmit four sets of plans.

SIGNING AND MARKING

Sheet No. S-1

1. Please add County Section No. 13162 & M.P. 1.747 – M.P. 1.761 to title.
2. Please add the following notes:

AT LEAST 72 HOURS IN ADVANCE OF BEGINNING CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL CONTACT THE LOCAL MAINTENANCE FDOT ENGINEER'S OFFICE TO SECURE GENERAL USE PERMITS AND/OR OTHER PERMITS AS REQUIRED FOR WORKING WITHIN THE DEPARTMENT'S RIGHT-OF-WAY.

THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (DATED 2010) AND DESIGN STANDARDS BOOKLET (DATED 2010).

APPLICABLE DESIGN STANDARDS MODIFICATIONS: 7/1/2011. FOR DESIGN STANDARDS MODIFICATIONS, CLICK ON "DESIGN STANDARDS" AT THE FOLLOWING WEB SITE: <http://www.dot.state.fl.us/rddesign/>.

3. Please delete the note "Governing Standards and Specifications"

Sheet No. S-3

4. Please add the following plan note:

ALL PAVEMENT MARKINGS WITHIN FDOT RIGHT-OF WAY SHALL BE THERMOPLASTIC.

Sheet No. S-4

5. Please design transition distance and taper length for the left turn lanes as per standard index 17346 (11 of 14).

Sheet No. S-6

6. The posted speed limit on 15th St. E is 40 mph. Please design Advance Street Name signs as per Traffic Engineering Manual, Table 2.37-2, Design Guidelines for Advance Street Name Signs.

SIGNALS

Sheet No. T-1

1. Please add County Section No. 13162 & M.P. 1.747 – M.P. 1.761 to title.
2. Please add the following notes:

AT LEAST 72 HOURS IN ADVANCE OF BEGINNING CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL CONTACT THE LOCAL MAINTENANCE FDOT ENGINEER'S OFFICE TO SECURE GENERAL USE PERMITS AND/OR OTHER PERMITS AS REQUIRED FOR WORKING WITHIN THE DEPARTMENT'S RIGHT-OF-WAY.

THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (DATED 2010) AND DESIGN STANDARDS BOOKLET (DATED 2010).

APPLICABLE DESIGN STANDARDS MODIFICATIONS: 7/1/2011. FOR DESIGN STANDARDS MODIFICATIONS, CLICK ON "DESIGN STANDARDS" AT THE FOLLOWING WEB SITE: <http://www.dot.state.fl.us/rddesign/>.

3. Please delete the note "Governing Standards and Specifications"
4. Please show location of Signal, Mile Post and Signal ID on a map similar to the map on roadway plan set.

Sheet No. T-2

5. Pay Item 649-31-203 doesn't match plan T-5. Please verify.

Sheet No. T-3

6. Note 12. Please add the contact no. (1-800-432-4770) of Sunshine State One Call of Florida.
7. Please review all District 1 signalization notes and incorporate them under general notes as applicable to this project. The current versions of the files – permit notes definition. docx- available at <ftp://ftp.dot.state.fl.us/fdot/d1/traffops/Signal%20Design%20Updates/SIGNAL%20NOTES/>

Sheet No. T-4

8. 635-1-11: Please add to the existing note – Pull boxes are to be placed behind curb and gutter. If there is no curb and gutter, pull boxes shall be placed a minimum of 7' from the edge of pavement.
9. Pay Item Note 649-31-999: Please add to the existing note – Use three 2" and one 3/4" conduit stubbed out through the mast arm pole foundation and temporarily seal.
10. Pay Item Note 650-51-311: Please add to the existing note – Use B-cap (non-silicone filled) twist wire nuts for all connections in the disconnect. Use red, yellow, green, and white THHN # 14 copper wires from disconnect to signal head. Place a permanent marking on the wire designating the phase used.

11. 653-191: Please replace the existing note with – Pedestrian signal heads to be 16” international symbol, LED countdown type.
12. 659-107: Please add to the existing note – Use locking collars when mounting pedestrian signal heads to pedestrian pedestals. Use locking collars when mounting aluminum pedestrian poles to pedestrian pedestal bases.
13. Please add Pay Item Note 685-106: Include an uninterrupted power supply unit (UPS) with an 8 hour run time at 450 watts. Attach UPS unit to the outside of the controller cabinet. Install UPS unit in accordance with manufacturer’s specifications. UPS equipment to be compatible with maintaining agency existing system.

Sheet No. T-5

14. Please replace Note 3. of Controller Operation Notes: “When signal is in flashing mode, movements 2 and 6 shall flash yellow. All other movements shall flash red”.
15. Pay Item 665-12 is for detection station with post and sign. Please add “and sign” after ‘Install the post with pedestrian push button’ to Notes 3 and 4 of the notes to the contractor.

ACCESS MANAGEMENT

1. No comments.

ANALYSIS

Signal Timings

- Provide a capacity analysis showing the effects of the proposed lane configuration.
- Use approach speed to determine the yellow and all red intervals per *FDOT Traffic Engineering Manual Section 3.6*.
- Add note: “Contact Renjan Joseph, P.E. at (863) 519-2746 for coordination timings.”

EQUIPMENT

T- 4 (Pay Item Note)

- Remove “polycarbonate” from note and change to metal. There are no poly back plates fabricated with the reflective sheeting.

STRUCTURES

The DSDO has reviewed the subject permit plans. The mast arm design appears to be acceptable. We offer no comment.

DISCLAIMER STATEMENT

Our review comments are not intended to be inclusive of all errors and omissions. Our comments are also not intended to affect the scope of work or to be contrary to FHWA policy, FDOT design criteria or sound engineering practice. The Consultant is solely responsible for the technical accuracy, engineering judgment, and quality of his work.

If you have any questions concerning our comments, please call the appropriate number list below.

Subhasis Ghosh	Signal, Signing and Markings	(863)519-2773
Theresa Myers	Access Management	(863)519-2671
Gerard Moliere	Structures	(863)519-2260
Steve Miller	Equipment	(863)519-2511
Ken Bass	Signal Timings	(863)519-2788

These comments are not intended to be all-inclusive and it should not be assumed that any issues not addressed in this correspondence are acceptable to this Department. According to Rule 14-96, (applicants must provide requested information within 60 days... if additional information has not been received by the Department within the prescribed time from the date of notification; the application shall be processed with the information provided. This may result in an automatic denial of the application”.

If you have any questions, or need any further information, please give me a call at (941) 359-7305.

Sincerely,



Valerie A. Everts,
Sarasota Operations,
Permits Coordinator

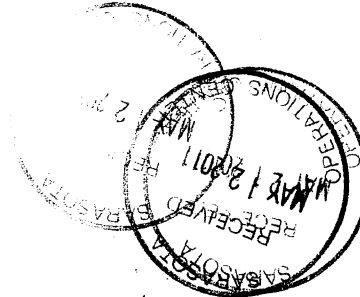
CC: Permit File



MANATEE COUNTY
FLORIDA

May 12, 2011

Mr. Ed Giddens, Permits Supervisor
FDOT
1840 61st Street
Sarasota, FL 34243-2224



**Re: 15th Street East @ 53rd Avenue East Intersection Improvements
Section 131600-131620, M.P. 0.00 to M.P. 1.761 Manatee County, FL**

Dear Mr. Giddens:

Please find enclosed five (5) sets each of the Driveway Connection Application and Permit and five (5) sets of the signed and sealed construction plans and five (5) sets of signed and sealed pavement and marking plans and five (5) sets of signalization plans and one (1) set of Mast Arm I- calculations Report. Manatee County's proposed scope of work includes resurfacing, a proposed traffic light, and pavement and marking within the FDOT Right-of-Way.

If you have any questions, please call me at (941) 708-7462.

Sincerely,

Christopher L. Mowbray, P.E.
Division Manager – Highway Engineering

CLM/amm/jh

Attachments: Five (5) sets of FDOT Driveway Connection Application and Permit
Five (5) sets of construction plans
Five (5) sets of pavement and marking plans
Five (5) sets of signalization plans
One (1) set of Mast Arm I - Calculations Report

cc: Sia Mollanazar, P.E. Deputy Director-Engineering Services-w/out attachments via email
Bruce Simmington, Project Management Division Manager-w/out attachments via email
Vincent Cana, Project Manager– w/attachments

Public Works Department – Highway Engineering Division
Mailing Address: P.O. Box 1000* Bradenton, Florida 34206-1000
Street Address: 1022 26th Avenue East* Bradenton, Florida 34208
PHONE: 941-708-7462 * FAX: 941-7108-7475

www.myanatee.org

FLORIDA DEPARTMENT OF TRANSPORTATION

Stormwater Pollution Control Reminder

- *Stormwater Management*
Contact your local municipality and/or the Southwest Florida Management District.
Bartow (863) 534-1448
Venice (Sarasota) (941) 278-7396
Fort Myers (Sarasota) (941) 278-7396
- Fort Myers is also part of South Florida Water Management District (800) 432-2045.
- *Used Oil recycling*
Contact the Florida Department of Environmental Protection at (813) 744-6100 or your local automotive parts store.
- *Hazardous Waste Disposal*
Contact the Florida Department of Environmental Protection at (813) 744-6100.
- *Spill Reporting*
State Warning Point (800) 320-0519
Federal Response Center (800) 424-8802
- *Pesticides & Fertilizers*
Contact your Local County Agricultural Extension Service.
Charlotte (941) 764-4340
Collier (239) 353-4244
Desoto (863) 993-4846
Glades (863) 946-0244
Hardee (863) 773-2164
Hendry (863) 674-4094
Highlands (863) 402-6540
Lee (239) 461-7500
Manatee (941) 722-4524
Okechobee (863) 763-6469
Polk (863) 519-8677
Sarasota (941) 316-1000

LET'S WORK TOGETHER TO KEEP OUR ENVIRONMENT CLEAN...

AND INVEST IN FLORIDA'S FUTURE



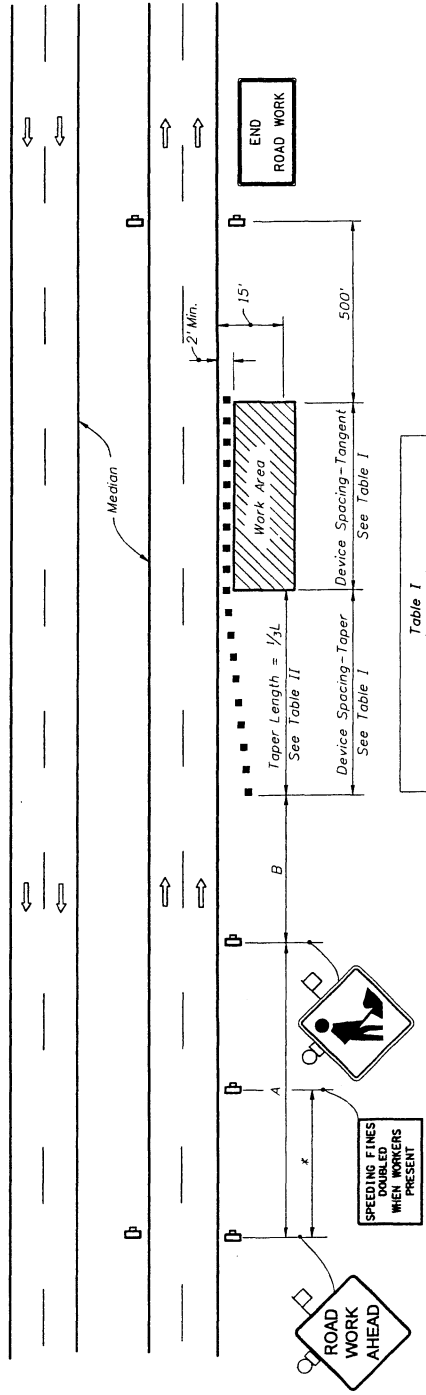


Table II
Taper Length - Shoulder

Speed (mph)	1/2 L (ft.)		Notes
	8' Shldr.	12' Shldr.	
25	28	35	42
30	40	50	60
35	55	68	82
40	72	90	107
45	120	150	180
50	133	167	200
55	147	183	220
60	160	200	240
65	173	217	260
70	187	233	280

8' minimum shoulder width.
 1/2 L = Length of shoulder taper in feet
 W = Width of total shoulder in feet (combined paved and unpaved width)
 S = Posted speed limit (mph)

Table I
Device Spacing

Speed (mph)	Max. Distance Between Devices (ft.)	
	Cones or Type I or Type II Tubular Markers	Barricades or Vertical Panels or Drums
25	25	50
30 to 45	25	50
50 to 70	25	50

DISTANCE BETWEEN SIGNS

Speed	Spacing (ft.)	
	A	B
40 mph or less	200	200
45 mph	350	350
50 mph or greater	500	500

* 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

DURATION NOTES

1. Signs and channelizing devices may be omitted if all of the following conditions are met:
 - a) Work operations are 60 minutes or less.
 - b) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

GENERAL NOTES

1. If the work operation encroaches on the through traffic lanes or in a one hour period, excluding establishing and tearing down the work area, a flagger provided with a FLAGGER sign shall be substituted for the WORKERS sign. The flagger shall be positioned at the point of vehicle entry or departure from the work area.
2. This TCZ plan also applies to work performed in the median more than 2' but less than 15' from the edge of travelway.
3. When work is being performed on a multilane undivided roadway, the signs normally mounted in the median (as shown) shall be omitted.
4. WORKERS signs to be removed or fully covered when no work is being performed.
5. SHOULDER WORK sign may be used as an alternate to the WORKER symbol/sign.
6. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ indexes.
7. For general TCZ requirements and additional information, refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18"x18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Lane Identification + Direction of Traffic

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY.



MULTILANE, WORK ON SHOULDER

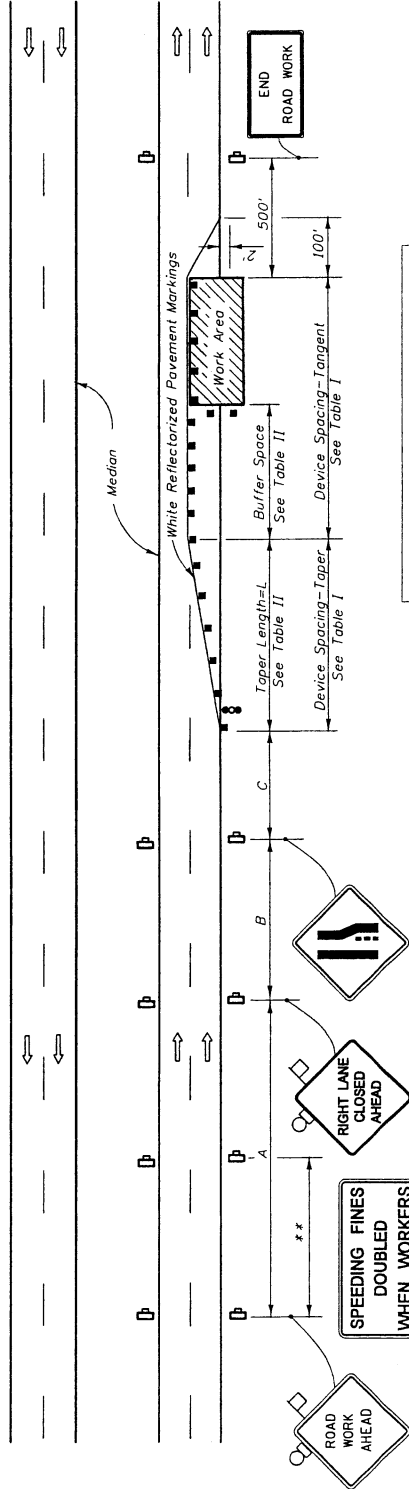


Table II
Buffer Space and Taper Length

Speed (mph)	Buffer Space (ft.)		Taper Length (L - Lateral Transition) (ft.)		Notes (Merge)
	Dist.	L	1	2	
25	155	125	180	180	WS ² L = 60
30	200	180	245	245	
35	250	245	320	320	WS ² L = 60
40	305	320	400	400	
45	360	400	500	500	L = WS
50	425	500	600	600	
55	495	600	720	720	L = WS
60	570	720	840	840	
65	645	840			
70	730				

When Buffer Space cannot be obtained due to geometric constraints, the greatest obtainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12°, use formula for L shown in the notes column. Where:
L = Length of taper in feet
W = Width of lateral transition in feet
S = Posted speed limit (mph)

Table I
Device Spacing

Speed (mph)	Max. Distance Between Devices (ft.)	
	Cones or Tubular Markers	Type I or Type II Barricades or Vertical Panels or Drums
25	25	25
30 to 45	25	50
50 to 70	25	50

GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
2. On undivided highways the median signs as shown are to be omitted.
3. When work is performed in the median lane on divided highways, the channelizing device plan is inverted and left lane closed and lane ends signs substituted for the right lane closed and lane end signs.
 - (a) The same applies to undivided highways with the following exceptions:
 - (i) Work shall be confined within one median lane.
 - (ii) Additional barricades, cones, or drums shall be placed along the centerline abutting the work area and across the trailing end of the work area.

DISTANCE BETWEEN SIGNS

Speed	Spacing (ft.)		
	A	B	C
40 mph or less	200	200	200
45 mph	350	350	350
50 mph	500	500	500
+35 mph or greater	2640	1640	1000

* The ROAD WORK 1 MILE sign may be used as an alternate to the ROAD WORK AHEAD sign and the RIGHT LANE CLOSED 1/2 MILE sign may be used as an alternate to the RIGHT LANE CLOSED AHEAD sign.

** 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

SYMBOLS

- Work Area
- Sign With 18' x 18' (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic

DURATION NOTES

1. Temporary white edgeline may be omitted for work operations less than 3 days.
2. Signs, arrow panels and buffer space may be omitted if all of the following conditions are met:
 - a) Work operations are 60 minutes or less.
 - b) Speed limit is 45 mph or less.
 - c) No sight obstructions to vehicles approaching the work area for a distance equal to the buffer space and the taper length combined.
 - d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - e) Volume and complexity of the roadway has been considered.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRoACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF TRAVEL WAY.



2010 FDOT Design Standards

MULTILANE, WORK WITHIN THE TRAVEL WAY
MEDIAN OR OUTSIDE LANE

Sheet No. 1 of 2
Last Revision 07/01/09
Index No. 613

PERMIT VOID UNLESS DOT SARASOTA OPERATIONS OFFICE NOTIFIED 48 HOURS IN ADVANCE OF STARTING WORK.
PHONE: (941) 359-7300

IF A LANE CLOSURE IS WITHIN THE PROJECT LIMITS, THE PERMITTEE MUST NOTIFY THE DEPARTMENT 7 DAYS PRIOR TO A LANE CLOSURE TO ALLOW THE DEPARTMENT TO INFORM THE MOTORING PUBLIC. FAILURE TO CALL MAY RESULT IN A DELAY TO BEGIN WORK.

IF NO CLOSURES ARE REQUIRED THE SARASOTA OPERATIONS OFFICE MUST BE NOTIFIED 48 HOURS IN ADVANCE OF STARTING WORK. FAILURE TO CALL MAY RESULT IN A DELAY TO BEGIN WORK.

LANE CLOSURES AND OTHER WORK MAY BE RESTRICTED BY THE FDOT DUE TO HEAVY TRAFFIC AND POTENTIAL BACKUPS CAUSED BY THIS CONSTRUCTION. NIGHT WORK MAY BE REQUIRED.

APPLICANT IS RESPONSIBLE FOR NOTIFYING OWNERS OF ALL EXISTING AERIAL AND BURIED UTILITIES OF PROPOSED DRIVEWAY AND RESOLVING ANY CONFLICTS BEFORE CONSTRUCTION BEGINS.

IN ACCORDANCE WITH FLORIDA STATUS 335.18 PERMITTEE SHALL BE REQUIRED TO BEAR THE COST OF FUTURE ACCESS MODIFICATIONS, TRAFFIC CONTROL DEVICES OR OTHER IMPROVEMENTS, WHEN DETERMINED BY THE FLORIDA DEPARTMENT OF TRANSPORTATION TO BE IN CONJUNCTION WITH ACCEPTED ENGINEERING PRACTICES.

ALL CONSTRUCTION AND/OR MAINTENANCE ON THE DEPARTMENT'S RIGHT-OF-WAY SHALL CONFORM TO THE FEDERAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) THE DEPARTMENT'S ROADWAY AND TRAFFIC DESIGN STANDARDS AND BRIDGE CONSTRUCTION.

PERMITTEE/CONTRACTOR MUST WAIT 30 DAYS TO ALLOW ASPHALT FRICTION COURSE TO CURE BEFORE PLACING THERMOPLASTIC STRIPING.

OUR REVIEW COMMENTS ARE NOT INCLUDED TO BE INCLUSIVE OF ALL ERRORS AND OMISSIONS. OUR COMMENTS ARE ALSO NOT INTENDED TO AFFECT THE SCOPE OF WORK OR TO BE CONTRARY TO FHWA POLICY, FDOT DESIGN CRITERIA OR SOUND ENGINEERING PRACTICE. THE CONSULTANT/ENGINEER IS SOLELY RESPONSIBLE FOR THE TECHNICAL ACCURACY, ENGINEERING JUDGEMENT, AND QUALITY OF HIS WORK.

ALL CONTRACTORS AND SUBCONTRACTORS SHALL BE RESPONSIBLE FOR COMPLIANCE WITH PERMITTED M.O.T. PLAN.

SOD ALL PORTIONS OF DISTURED RIGHT-OF-WAY.

NOTE: ALL ABOVE GROUND APPURTENANCES TO BE LOCATED AT RIGHT-OF-WAY LINE.

DENSITY REPORTS ARE TO BE SUBMITTED PRIOR TO PLACEMENT OF PAVEMENT.

"PRIOR TO EXCAVATING CONTACT THE CLERK OF THE CIRCUIT COURT FOR POSSIBLE GASOLINE CONFLICT."

THE APPLICANT SHALL NOT, DURING AND AFTER COMPLETION OF PERMITTED CONSTRUCTION, INTRODUCE ANY FORM OR METHOD OF SITE DRAINAGE DISCHARGE INTO THE DRAINAGE FACILITIES ON THE DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY OR EASEMENT. ANY DISCHARGE SHALL BE IN VIOLATION OF THIS PERMIT.

"PERMITTEE IS CAUTIONED THAT UTILITIES MAY BE LOCATED WITHIN THE CONSTRUCTION AREA."

IT IS THE RESPONSIBILITY OF THE PERMITTEE TO DETERMINE AND COMPLY WITH ALL COUNTY AND MUNICIPAL ORDINANCES THAT ARE RELATIVE TO THE CONSTRUCTION OR OTHER ACTIVITY DESCRIBED ON THIS PERMIT AND ARE MORE STRINGENT THAN DEPARTMENT OF TRANSPORTATION REQUIREMENTS.

N.P.D.E.S. REQUIRES THAT STORM WATER CONTROL MEASURES BE IMPLEMENTED ON ANY PROJECT ON PUBLIC TRANSPORTATION FACILITY RIGHTS-OF-WAY INCLUDING, BUT NOT LIMITED TO MEASURES DESCRIBED IN F.D.O.T. STANDARD DESIGN INDEX DRAWING NUMBERS 102, 103 AND 104.

"IF CONSTRUCTION, RECONSTRUCTION, REPAIR OR MAINTENANCE ACTIVITY NECESSITATES THE CLOSING OF ONE OR MORE TRAVEL LANES OF ANY ROAD ON THE STATE PRIMARY, COUNTY ROAD OR CITY STREET SYSTEM, FOR A PERIOD OF TIME EXCEEDING TWO HOURS, THE PARTY PERFORMING SUCH WORK WILL BE RESPONSIBLE TO GIVE NOTICE TO THE APPROPRIATE LOCAL LAW ENFORCEMENT AGENCY WHICH HAS JURISDICTION WHERE SUCH ROAD IS LOCATED PRIOR TO COMMENCING WORK ON THIS PROJECT"
335.15 F.S.91, 336.048 F.S.91



MAST ARM 1 – STA 9+76, OFFSET 41.90' LT

Sheykhon
02-21-2011

HDR

Arm 2 Signals and Signs

y (ft)	Signal Heads	Arm 2 Connection					Pole Base	
		F _x (lb)	F _z (lb)	M _x (lb-ft)	M _z (lb-ft)	M _y (lb-ft)	M _x (lb-ft)	M _z (lb-ft)
0.00	0	0	0	0	0	0	0	0
0.00	0	0	0	0	0	0	0	0
0.00	0	0	0	0	0	0	0	0
0.00	0	0	0	0	0	0	0	0
0.00	0	0	0	0	0	0	0	0

y (ft)	Height of Sign Dim. (ft.)	Width of Sign Dim. (ft.)	Sign Area (ft ²)	Arm 2 Connection					Pole Base	
				F _x (lb)	F _z (lb)	M _x (lb-ft)	M _z (lb-ft)	M _y (lb-ft)	M _x (lb-ft)	M _z (lb-ft) (Torque)
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0

Total Moments for Arm 2 0 0 0 0 0

Input Configuration of Signals and Signs

	Arm 1 Connection		Arm 2 Connection		Pole Base	
	M _y (lb-ft)	M _z (lb-ft)	M _x (lb-ft)	M _z (lb-ft)	M _x (lb-ft)	M _z (lb-ft)
Additional Moments	0	0	0	0	0	0
Total Moments	10145	61819	0	0	49314	26429

Standard Configurations for Signals and Signs

	Arm 1 Type	Arm 2 Type	Pole Type	Arm 1 Connection		Arm 2 Connection		Pole Base		
				M _y (lb-ft)	M _z (lb-ft)	M _x (lb-ft)	M _z (lb-ft)	M _x (lb-ft)	M _z (lb-ft)	
✗	E1		T1	5040.00	46251.92	0.00	0.00	52727.72	5040.00	19773.38
✗	E3		T2	7998.72	77576.77	0.00	0.00	57305.29	7998.72	33165.22
✓	E5		T3	12116.00	114528.24	0.00	0.00	67537.50	12116.00	48962.52
✓	E6		T4	15805.97	150859.16	0.00	0.00	74416.10	15805.97	64494.52
✓	E7		T6	15840.00	146573.45	0.00	0.00	64183.88	15840.00	62662.32

Selected Standard Mastarm Assembly

The following standard mastarm assembly meets the requirements for arm lengths and moments induced by signals and signs.

Arm 1 Type	FAA (ft)	FBA (in)	Arm 2 Type	FAA (ft)	FBA (in)	Pole Type	UAA (ft)	UB (ft)	UCA (in)
E5	23.5	7.85				T3	22.0	20.0	15.92

Pay Item Number 649-3A-203, A shall be 1-4 to be determined by signalization

FDOT Mast Arm Analysis Program

The new custom file will be a copy of the last file called from the program. A ".dat" extension will be added to the file name.

Custom File Name (optional)

Refresh File List

All data files are in the same directory as the MastArms.mcd file.

Path = "C:\Program Files\Bentley\ProjectWise\bin"

DataFile = "E5T3 - STA 9+7.6.dat"



Reference



Changes

This program works in conjunction with Mastarm Design Standards 17743 and 17745.
 Reference: AASHTO Standard Specifications for Signs, Luminaires and Traffic Signals, 4th Edition.
 For more information see Reference.xmcd and Changes.xmcd.

Read in Data

General Information

Current Values
 Subject = "15th and SR 70 Manatee County" and SR 70 Manate
 ProjectNo = 6029960
 PanelLocation = "Sta. 9+76, 41.90' LT"
 Date = "Feb 14, 2011"
 DesignedBy = "NVE"
 CheckedBy = "FDOT"

Use Control+F9 to recalculate the worksheet, once to write out data, twice to read in data

CAS
 FEB 2011

Wind Speed

Current Value
 WindSpeed = 130 mph
 mph, Structures Manual Vol. 9 3.8.2

Arm 1 Analysis

DataFile = "E5T3 - STA 9+7.6.dat" WindSpeed = 130 mph

Arm 1 Logic

SignalNumber	DistanceToSignal(ft)	NumberOfSignalHeads	BackPlate
1	18	3	"yes"
2	26	3	"yes"
3	34.5	3	"yes"
4	40	1	"yes"
5	45.5	3	"yes"
6	0	0	"yes"
7	0	0	"yes"
8	0	0	"yes"
9	0	0	"yes"
10	0	0	"yes"

SignalData_arm1 =

use X to zero out data
 use 0 to keep current values

"yes" or "no"

New Values

SignalNumber	DistToSignal(ft)	#SignalHeads	BackPlate
1	18	3	yes
2	26	3	yes
3	34.5	3	yes
4	40	1	yes
5	45.5	3	yes
6	X	X	yes
7	X	X	yes
8	X	X	yes
9	X	X	yes
10	X	X	yes

PanelNumber	DistanceToPanelCentroid(ft)	PanelArea(sf)
1	9.5	15
2	0	0
3	0	0
4	0	0
5	0	0

SignalData_arm1 =

New Values

Panel#	DistToCentroid(ft)	PanelArea(sf)
1	9.5	15
2	X	X
3	X	X
4	X	X
5	X	X

use X to zero out data
 use 0 to keep current values

Anti Properties

New Values

$L_{total,arm1} = 47.5 \text{ ft}$ J feet, 40 ft. max. for 1 piece arms
 $Diameter_{base,arm1} = 14 \text{ in}$ inches, measured flat to flat (FG/SG)
 $Dist_{splice,from,base,arm1} = 26 \text{ ft}$ feet, splice distance, for 2 piece arms, length of piece closest to pole (P/SE), use X to zero out
 $t_{wall,arm1} = \begin{pmatrix} 0.25 \\ 0.375 \end{pmatrix} \text{ in}$ inches, this value is used for one piece arms (P/SD)
 inches, for 2 piece arms, wall thickness of piece closest to the pole, use X to zero out (P/SH)

Arm 1 Properties

Analyze Arm 1

Switch values, set values for DataOut

$fSwitchData(orig, new, unit) :=$ if((new == "X") + (new == "X"), 0-unit, if(new == 0, orig, new-unit))
 $Z := 0, 1$

$ZeroSignalData(old, new) :=$ for $n1 \in 0..rows(new) - 1$
 for $n2 \in 0..cols(new) - 1$
 value $n1, n2 \leftarrow 0$ if new $n1, n2 == "X"$
 value $n1, n2 \leftarrow 0$ if new $n1, n2 == "X"$
 value $n1, n2 \leftarrow old_{n1, n2}$ otherwise
 value

out := -1

$Dist_{total,arm1} :=$ fSwitchData($L_{total,arm1}$, new $L_{total,arm1}$, ft) data out = 47.5

$Dist_{splice,from,base,arm1} :=$ fSwitchData($Diameter_{base,arm1}$, new $Diameter_{base,arm1}$, in) data out = 14

$Dist_{splice,from,base,arm1} :=$ fSwitchData($Dist_{splice,from,base,arm1}$, new $Dist_{splice,from,base,arm1}$, ft) data out = 26

$t_{wall,arm1} :=$ out + 1 out = 3
 $t_{wall,arm2} :=$ fSwitchData($t_{wall,arm1}$, new $t_{wall,arm1}$, in) data out = $\begin{pmatrix} 0.25 \\ 0.375 \end{pmatrix}$

$t_{wall,arm1} :=$ if($Dist_{splice,from,base,arm1} == 0$, 0-ft, 0-in, $t_{wall,arm1}$)

$Dist_{total,arm1} :=$ out + 1 out = 4

$WindSpeed :=$ fSwitchData($WindSpeed$, new $WindSpeed$, mph) data out = 130

$Dist_{splice,from,base,arm1} :=$ out + 1 out = 5

$i := 1..rows(newSignalData_{arm1}) - 1$ j := 0..cols(newSignalData_{arm1}) - 1

$SignalData_{arm1,i,j} :=$ if($SignalData_{arm1,i,j} \neq newSignalData_{arm1,i,j}$) (newSignalData_{arm1,i,j}, newSignalData_{arm1,i,j}, SignalData_{arm1,i,j}, SignalData_{arm1,i,j})

$SignalData_{arm1} :=$ ZeroSignalData(SignalData_{arm1}, newSignalData_{arm1})

data out := SignalData_{arm1}

SignalNumber	DistanceToSignal(ft)	NumberOfSignalHeads	BackPlate
1	18	3	"yes"
2	26	3	"yes"
3	34.5	3	"yes"
4	40	1	"yes"
5	45.5	3	"yes"
6	0	0	"yes"
7	0	0	"yes"
8	0	0	"yes"
9	0	0	"yes"
10	0	0	"yes"

$Dist_{total,arm1} :=$ out + 1 out = 6

$i := 1..rows(newSignalData_{arm1}) - 1$ j := 0..cols(newSignalData_{arm1}) - 1

$SignalData_{arm1,i,j} :=$ if($SignalData_{arm1,i,j} \neq newSignalData_{arm1,i,j}$) (newSignalData_{arm1,i,j}, newSignalData_{arm1,i,j}, SignalData_{arm1,i,j}, SignalData_{arm1,i,j})

$SignalData_{arm1} :=$ ZeroSignalData(SignalData_{arm1}, newSignalData_{arm1})

data out := SignalData_{arm1}

PanelNumber	DistanceToPanelCentroid(ft)	PanelArea(sf)
1	9.5	15
2	0	0
3	0	0
4	0	0
5	0	0

Sort Signal and Sign Data

$\#Signal_{arm1} :=$ (match(0, submatrix(SignalData_{arm1}, 1, 7, 0, 2))(0, 0), 0)

$i1 := 1.. \#Signal_{arm1}$

$X_{signal,arm1,i1} :=$ SignalData_{arm1,i1,1}

```

Sections_signal_arm1 := SignalData_arm11,2
Backplate_signal_arm1 := if (SignalData_arm11,3 == "yes", 1, 0)
i1 :=


|   |       |   |   |
|---|-------|---|---|
| 1 | 18 ft | 3 | 1 |
| 2 | 26    | 3 | 1 |
| 3 | 34.5  | 3 | 1 |
| 4 | 40    | 1 | 1 |
| 5 | 45.5  | 3 | 1 |


Sections_signal_arm1 :=


|   |   |
|---|---|
| 3 | 1 |
| 3 | 1 |
| 3 | 1 |
| 1 | 1 |
| 3 | 1 |


Backplate_signal_arm1 :=


|   |
|---|
| 1 |
| 1 |
| 1 |
| 1 |
| 1 |


#Panels_arm1 := (match(0, submatrix(SignData_arm1, 1, 5, 0, 2))0, 0, 0)
temp#Panels_arm1 := #Panels_arm1
#Panels_arm1 := if (#Panels_arm1 == 0, 1, #Panels_arm1)
j1 := 1..#Panels_arm1
X_panel_arm1_j1 := SignData_arm1_j1,1 .ft
Area_panel_arm1_j1 := SignData_arm1_j1,2 .ft^2
X_panel_arm1 := if (temp#Panels_arm1 == 0, 0.1.ft, X_panel_arm1_j1)
Area_panel_arm1 := if (temp#Panels_arm1 == 0, 0.1.ft^2, Area_panel_arm1_j1)
j1 :=


|   |        |         |
|---|--------|---------|
| 1 | 9.5 ft | 15 ft^2 |
|---|--------|---------|


X_panel_arm1 :=


|        |
|--------|
| 9.5 ft |
|--------|


Area_panel_arm1 :=


|         |
|---------|
| 15 ft^2 |
|---------|


```

*Note: for two piece arms (2nd length value greater than 0*ft), the first ArmLength value is entered as the actual length minus a 2 foot splice length. The 2 foot length is added to ArmLength at the end of the file. See drawing in reference file for more details.

Note: To model a damping device the weight is approximately the same as a 3 section signal (58 pounds) and the effective area for wind loading is 2.1 square feet or less than half that of a 3 section signal at around 4.8 square feet

```

Drawsignals :=
count ← 1
for k ∈ 1..#Signals_arm1
start ← (Sections_signal_arm1_k + 0.5) .ft
sd ← 0
for j ∈ 1..Sections_signal_arm1_k
z_count,0 ← (-X_signal_arm1)_k
z_count,1 ← start - j.ft
count ← count + 1
z
Area_panel_arm1_0 := if (#Panels_arm1 ≤ 0, 0.ft^2, Area_panel_arm1_0)
X_panel_arm1_nounits :=  $\frac{X_{panel\_arm1}}{ft}$ 
Area_panel_arm1_nounits :=  $\frac{Area_{panel\_arm1}}{ft^2}$ 
Drawsignals :=
count ← 0
for k ∈ 1..if (#Panels_arm1 ≤ 1, 1, #Panels_arm1)
pd ← 0
pd_0,0 ←  $\frac{-X_{panel\_arm1\_nounits}_k}{2}$ 
pd_0,1 ←  $\frac{-\sqrt{Area_{panel\_arm1\_nounits}_k}}{2}$ 
pd_1,0 ←  $\frac{-X_{panel\_arm1\_nounits}_k}{2} + \frac{\sqrt{Area_{panel\_arm1\_nounits}_k}}{2}$ 
pd_1,1 ←  $\frac{-\sqrt{Area_{panel\_arm1\_nounits}_k}}{2}$ 
pd_2,0 ←  $\frac{-X_{panel\_arm1\_nounits}_k}{2} + \frac{\sqrt{Area_{panel\_arm1\_nounits}_k}}{2}$ 
pd_2,1 ←  $\frac{\sqrt{Area_{panel\_arm1\_nounits}_k}}{2}$ 
pd_3,0 ←  $\frac{-X_{panel\_arm1\_nounits}_k}{2}$ 
pd_3,1 ←  $\frac{\sqrt{Area_{panel\_arm1\_nounits}_k}}{2}$ 
pd_4,0 ← pd_0,0
pd_4,1 ← pd_0,1
array_k ← pd
array
Drawsignals :=  $\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$ 
Placeholder :=  $\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$ 

```

$$\text{estDia}_{\text{tip,arm}_1} := \text{Diameter}_{\text{base,arm}_1} - \text{Dist}_{\text{splice,from,base,arm}_1} \cdot \text{Taper}$$

$$\text{base diameter of the arm rounded to the nearest inch}$$

$$\text{estDia}_{\text{base,arm}_0} := \text{estDia}_{\text{tip,arm}_1} + 2 \cdot \text{ft} \cdot \text{Taper} + 2 \cdot t_{\text{wall,arm}_0}$$

$$\text{Diameter}_{\text{base,arm}_0} := \text{round} \left(\frac{\text{estDia}_{\text{base,arm}_0}}{\text{in}}, 0 \right) \cdot \text{in}$$

$$\text{Diameter}_{\text{base,arm}_1} := \text{if} \left(\left(\text{Diameter}_{\text{base,arm}_0} = \text{Diameter}_{\text{base,arm}_1} \right) + \left(\text{Dist}_{\text{splice,from,base,arm}_1} = 0 \cdot \text{ft}, 0 \cdot \text{ft}, \text{Diameter}_{\text{base,arm}_1} \right) \right)$$

$$\text{Diameter}_{\text{base,arm}_1} = 14 \cdot \text{in}$$

$$\text{estDia}_{\text{tip,arm}_1} := \text{Diameter}_{\text{base,arm}_1} - \text{Dist}_{\text{splice,from,base,arm}_1} \cdot \text{Taper}$$

$$\text{base diameter of the arm rounded to the nearest inch}$$

$$\text{estDia}_{\text{base,arm}_0} := \text{estDia}_{\text{tip,arm}_1} + 2 \cdot \text{ft} \cdot \text{Taper} + 2 \cdot t_{\text{wall,arm}_0}$$

$$\text{Diameter}_{\text{base,arm}_0} := \text{round} \left(\frac{\text{estDia}_{\text{base,arm}_0}}{\text{in}}, 0 \right) \cdot \text{in}$$

$$\text{Diameter}_{\text{base,arm}_1} := \text{if} \left(\left(\text{Diameter}_{\text{base,arm}_0} = \text{Diameter}_{\text{base,arm}_1} \right) + \left(\text{Dist}_{\text{splice,from,base,arm}_1} = 0 \cdot \text{ft}, 0 \cdot \text{ft}, \text{Diameter}_{\text{base,arm}_1} \right) \right)$$

$$\text{Diameter}_{\text{base,arm}_1} = 14 \cdot \text{in}$$

minimum and AASHTO splice length

$$L_{\text{splice,min}} := 24 \cdot \text{in}$$

$$L_{\text{splice,ashto}} := 1.5 \cdot \left(\text{Diameter}_{\text{base,arm}_0} - 2 \cdot t_{\text{wall,arm}_0} \right)$$

$$L_{\text{splice,ashto}} = 15.75 \cdot \text{in}$$

$$L_{\text{splice,ashto}} := \text{Ceil} \left(L_{\text{splice,ashto}}, \text{in} \right)$$

$$L_{\text{splice,ashto}} = 16 \cdot \text{in}$$

$$L_{\text{splice,addl}} := \text{if} \left(L_{\text{total,arm}_1} > 50 \cdot \text{ft}, 03 \cdot \text{in}, 0 \cdot \text{in} \right)$$

$$L_{\text{splice,addl}} = 0 \cdot \text{in}$$

$$L_{\text{splice,arm}_1} := \text{if} \left(L_{\text{splice,min}} > L_{\text{splice,ashto}} + L_{\text{splice,addl}} + L_{\text{splice,addl}} \right)$$

$$L_{\text{splice,arm}_1} = 24 \cdot \text{in}$$

$$L_{\text{splice,arm}_1} := \text{if} \left(\text{Diameter}_{\text{base,arm}_1} = 0 \cdot \text{ft}, 0 \cdot \text{ft}, L_{\text{splice,arm}_1} \right)$$

$$L_{\text{splice,arm}_1} = 24 \cdot \text{in}$$

tip diameter of arm extension

$$\text{estDia}_{\text{tip,arm}_1} := \text{Diameter}_{\text{base,arm}_0} - 2 \cdot t_{\text{wall,arm}_0} - L_{\text{splice,arm}_1} \cdot \text{Taper}$$

$$\text{estDia}_{\text{tip,arm}_1} = 10.22 \cdot \text{in}$$

length of arm extension

$$L_{\text{arm}_1} := \frac{\text{Diameter}_{\text{base,arm}_1} - \text{estDia}_{\text{tip,arm}_1}}{\text{Taper}}$$

$$L_{\text{arm}_1} = 27 \cdot \text{ft}$$

$$L_{\text{arm}_1} := \text{if} \left(\text{Diameter}_{\text{base,arm}_1} = 0 \cdot \text{ft}, 0 \cdot \text{ft}, \text{Ceil} \left(L_{\text{arm}_1}, 6 \cdot \text{in} \right) \right)$$

$$L_{\text{arm}_1} = 27 \cdot \text{ft}$$

$$L_{\text{splice,provided}} := \left[\begin{array}{l} \text{Diameter}_{\text{base,arm}_1} - \left(\text{Diameter}_{\text{base,arm}_0} - 2 \cdot t_{\text{wall,arm}_0} \right) \\ \text{Taper} \end{array} \right]$$

$$L_{\text{splice,provided}} = 24 \cdot \text{in}$$

$$L_{\text{splice,provided}} := \text{if} \left(\text{Diameter}_{\text{base,arm}_1} = 0 \cdot \text{ft}, 0 \cdot \text{ft}, L_{\text{splice,provided}} \right)$$

$$L_{\text{splice,provided}} = 24 \cdot \text{in}$$

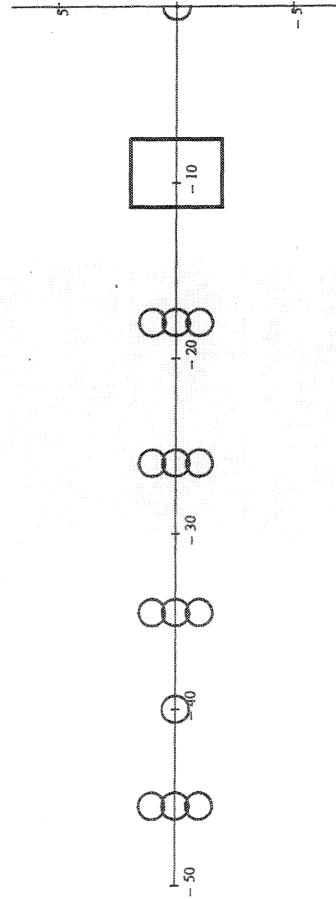
$$\text{Diameter}_{\text{tip,arm}_1} := \text{if} \left(\text{Diameter}_{\text{base,arm}_0} = 0 \cdot \text{ft}, 0 \cdot \text{ft}, \text{Diameter}_{\text{base,arm}_1} - L_{\text{arm}_1} \cdot \text{Taper} \right)$$

$$\text{Diameter}_{\text{tip,arm}_1} = 10.22 \cdot \text{in}$$

```

xsignals := Drawsignals (0)
ysignals := Drawsignals (1)
testval_1 := if (#Panels_arm1 > 0, j1, 1, -1)
Draw_sgn1 := if (max(testval) ≥ 1, Draw_sgn1, Placeholder)
Draw_sgn2 := if (max(testval) ≥ 2, Draw_sgn2, Placeholder)
Draw_sgn3 := if (max(testval) ≥ 3, Draw_sgn3, Placeholder)
Draw_sgn4 := if (max(testval) ≥ 4, Draw_sgn4, Placeholder)

```



Location of Signs and Signals

```

Taper := 0.14 in / ft
SpliceType := 0, 1
0 = user defined
1 = custom design
L_splice,ashto := 24 in

```

```

Custom Design splice length
Diameter_base_arm1 := Diameter_base_arm1
Diameter_base_arm0 := Diameter_base_arm0
initial estimate of the tip diameter of the arm extension

```


$L_{arm1} := \text{if}(\text{SpliceType} = 0, L_{arm1.user}, L_{arm1})$
 $L_{arm0} := \text{if}(\text{SpliceType} = 0, L_{arm0.user}, L_{arm0})$
 $Diameter_{base,arm1} := \text{if}(\text{SpliceType} = 0, Diameter_{base,arm1.user}, Diameter_{base,arm1})$
 $Diameter_{tip,arm1} := \text{if}(\text{SpliceType} = 0, Diameter_{tip,arm1.user}, Diameter_{tip,arm1})$
 $Diameter_{base,arm0} := \text{if}(\text{SpliceType} = 0, Diameter_{base,arm0.user}, Diameter_{base,arm0})$
 $Diameter_{tip,arm0} := \text{if}(\text{SpliceType} = 0, Diameter_{tip,arm0.user}, Diameter_{tip,arm0})$

$L_{arm1} = 26\text{-ft}$
 $L_{arm0} = 23.5\text{ ft}$
 $Diameter_{base,arm1} = 14\text{-in}$
 $Diameter_{tip,arm1} = 10.36\text{-in}$
 $Diameter_{base,arm0} = 11.14\text{-in}$
 $Diameter_{tip,arm0} = 7.85\text{-in}$

AASHTO 5.14.3

Splice Length Check
 $L_{splice,provided,arm1} = 24\text{-in}$ $L_{splice,ashho} = 16\text{-in}$
 $CheckSpliceLength_{arm1} := \text{if}(L_{splice,provided,arm1} \geq L_{splice,ashho}, \text{"OK"}, \text{"No Good"})$

$CheckSpliceLength_{arm1} = \text{"OK"}$
 $CheckSpliceLength_{arm1} = \text{"OK"}$

$L_{total,arm1} = 47.5\text{ ft}$ $L_{arm1} = \left(\frac{23.5}{26}\right)\text{ ft}$ $Diameter_{tip,arm1} = \left(\frac{7.85}{10.36}\right)\text{ in}$
 $Diameter_{base,arm1} = \left(\frac{11.14}{14}\right)\text{ in}$

$L_{total,arm1} = 47.5\text{ ft}$
 $L_{arm1} = 26\text{ ft}$
 $L_{arm0} = 23.5\text{ ft}$
 $Diameter_{base,arm1} = 14\text{-in}$
 $Diameter_{tip,arm1} = 10.36\text{-in}$
 $Diameter_{base,arm0} = 11.14\text{-in}$
 $Diameter_{tip,arm0} = 7.85\text{-in}$

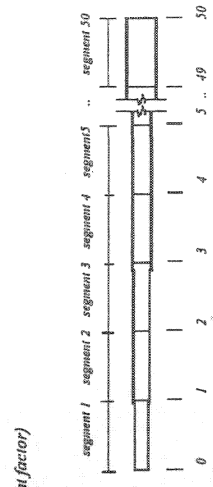
$G_{z,arm} = 11.4$ (gust factor) $I_z = 1.0$ (importance factor)
 $Pressure := (0.00256 \cdot \text{psf}) \cdot \left(\frac{\text{WindSpeed}}{\text{mph}}\right)^2 \cdot G_z \cdot I_z$

$G_{z,arm} = 11.4$
 $I_z = 1.0$
 $Pressure = 49.3\text{ psf}$

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$K_{z,arm} = 0.94$ (height factor)
 $segments\ n = 1..50$
 $sections\ n = 0..50$

$K_{z,arm} = 0.94$
 $segments\ n = 1..50$
 $sections\ n = 0..50$



$Area_{signal,base} = 14\text{ sq ft}$
 $Weight_{signal,base} = 16\text{ lb}$
 $Area_{signal,tip} = 136\text{ sq ft}$
 $Weight_{signal,tip} = 2\text{ lb}$
 $Area_{tip,base} = 528\text{ sq ft}$
 $C_{tip,base} = 1.2$
 $C_{tip,tip} = 1.4$ (coeff drag)

Signal DL and WL Moments and Shears

$L_{splice,provided,arm1} = 24\text{-in}$
 $L_{splice,provided,arm0} = 24\text{-in}$
 $Diameter_{tip,arm1} = 7.85\text{-in}$
 $Diameter_{tip,arm0} = 24\text{-in}$
 $L_{splice,provided,arm1} = 24\text{-in}$
 $L_{splice,provided,arm0} = 24\text{-in}$

$L_{splice,provided,arm1} = 24\text{-in}$
 $L_{splice,provided,arm0} = 24\text{-in}$
 $Diameter_{tip,arm1} = 7.85\text{-in}$
 $L_{splice,provided} = 24\text{-in}$
 $L_{splice,provided,arm1} = 24\text{-in}$

$$\text{Weight}_{\text{signal},\text{section},\text{arm}_1} := \text{if}(\#\text{Signals}_{\text{arm}_1} = 0), (0, \text{lbft}), (\text{Weight}_{\text{signal},\text{head}})$$

$$\text{Area}_{\text{signal},\text{section},\text{arm}_1} := \text{if}(\#\text{Signals}_{\text{arm}_1} = 0), (0, \text{ft}^2), (C_{\text{d},\text{signal}} \cdot \text{Area}_{\text{signal},\text{head}})$$

$$\text{Weight}_{\text{backplate},\text{arm}_1} := \text{if}(\#\text{Signals}_{\text{arm}_1} = 0), (0, \text{lbft}), (\text{Weight}_{\text{backplate}})$$

$$\text{Area}_{\text{backplate},\text{arm}_1} := \text{if}(\#\text{Signals}_{\text{arm}_1} = 0), (0, \text{ft}^2), (C_{\text{d},\text{backplate}} \cdot \text{Area}_{\text{backplate}})$$

$$\text{Weight}_{\text{bracket},\text{arm}_1} := \text{if}(\#\text{Signals}_{\text{arm}_1} = 0), (0, \text{lbft}), (\text{Weight}_{\text{bracket}}) \quad \text{BracketArea} := 0.0 \text{ ft}^2$$

$$\text{Area}_{\text{backplate},\text{arm}_1} := \text{if}(\text{Sections}_{\text{signal},\text{arm}_1,11} = 4), C_{\text{d},\text{backplate}} (5.97 \text{ ft}^2), \text{Area}_{\text{backplate},\text{arm}_1,11}$$

$$\text{Area}_{\text{backplate},\text{arm}_1} := \text{if}(\text{Sections}_{\text{signal},\text{arm}_1,11} = 5), C_{\text{d},\text{backplate}} (6.3 \text{ ft}^2), \text{Area}_{\text{backplate},\text{arm}_1,11}$$

$$\text{Weight}_{\text{signal},\text{arm}_1} := \text{Sections}_{\text{signal},\text{arm}_1,11} \cdot \text{Weight}_{\text{signal},\text{section},\text{arm}_1} + \text{Weight}_{\text{backplate},\text{arm}_1,11} + \text{if}(\text{X}_{\text{signal},\text{arm}_1,11} = 0, \text{ft}), ($$

$$\text{Pressure}_{\text{signal},\text{arm}_1,11} := (\text{Sections}_{\text{signal},\text{arm}_1,11} \cdot \text{Area}_{\text{signal},\text{section},\text{arm}_1} + \text{Backplate}_{\text{signal},\text{arm}_1,11} \cdot \text{Area}_{\text{backplate},\text{arm}_1,11} + \text{BracketArea}) \cdot \text{Pressure}_{K_{z,11}}$$

0	520.7
60	520.7
60	520.7
32	369.4
60	520.7

$$\text{Weight}_{\text{signal},\text{arm}_1} = \begin{pmatrix} 0 \\ 520.7 \\ 60 \\ 60 \\ 32 \\ 60 \end{pmatrix} \cdot \text{lbft}$$

$$\text{Pressure}_{\text{signal},\text{arm}_1} = \begin{pmatrix} 0 \\ 520.7 \\ 520.7 \\ 369.4 \\ 520.7 \end{pmatrix} \cdot \text{lbft}$$

$$\text{NumberOFSections} := 20 \quad n := 0.. \text{NumberOFSections}$$

$$\text{X}_{\text{section},\text{arm}_1} := L_{\text{total},\text{arm}_1} - L_{\text{total},\text{arm}_1} \cdot \frac{\text{NumberOFSections}}{n}$$

$$M_{\text{dl},\text{signal},\text{arm}_1} := \sum_{11} \text{Weight}_{\text{signal},\text{arm}_1,11} \cdot \text{if}(\text{X}_{\text{signal},\text{arm}_1,11} < 0, \text{ft}), (0, \text{ft}), \text{X}_{\text{signal},\text{arm}_1,11} - \text{X}_{\text{section},\text{arm}_1,11}$$

$$M_{\text{wl},\text{signal},\text{arm}_1} := \sum_{11} \text{Pressure}_{\text{signal},\text{arm}_1,11} \cdot \text{if}(\text{X}_{\text{signal},\text{arm}_1,11} < 0, \text{ft}), (0, \text{ft}), \text{X}_{\text{signal},\text{arm}_1,11} - \text{X}_{\text{section},\text{arm}_1,11}$$

$$V_{\text{dl},\text{signal},\text{arm}_1} := \sum_{11} \text{Weight}_{\text{signal},\text{arm}_1,11} \cdot \text{if}(\text{X}_{\text{signal},\text{arm}_1,11} < 0, \text{ft}), (0, 1)$$

$$V_{\text{wl},\text{signal},\text{arm}_1} := \sum_{11} \text{Pressure}_{\text{signal},\text{arm}_1,11} \cdot \text{if}(\text{X}_{\text{signal},\text{arm}_1,11} < 0, \text{ft}), (0, 1)$$

Sign Panel DL and WL Moments and Shears

UnitWeight _{panel}	= 10.0
	lbft
	ft ²

C _{d,panel}	= 1.1
	(coeff drag)

$$\text{Area}_{\text{panel},\text{arm}_1,11} := \text{if}(\#\text{panels}_{\text{arm}_1} = 0), (0, \text{ft}^2), \text{Area}_{\text{panel},\text{arm}_1,11}$$

$$j1 := 1$$

$$\text{X}_{\text{panel},\text{arm}_1,11} = 9.5 \text{ ft}$$

$$\text{Area}_{\text{panel},\text{arm}_1,11} = 15 \text{ ft}^2$$

$$\text{Weight}_{\text{panel},\text{arm}_1} = \begin{pmatrix} 0 \\ 150 \end{pmatrix} \cdot \text{lbft}$$

$$\text{Pressure}_{\text{panel},\text{arm}_1} = \begin{pmatrix} 0 \\ 834.5 \end{pmatrix} \cdot \text{lbft}$$

$$M_{\text{dl},\text{panel},\text{arm}_1} := \sum_{j1} \text{Weight}_{\text{panel},\text{arm}_1,j1} \cdot \text{if}(\text{X}_{\text{panel},\text{arm}_1,j1} < 0, \text{ft}), (0, \text{ft}), \text{X}_{\text{panel},\text{arm}_1,j1} - \text{X}_{\text{section},\text{arm}_1,11}$$

$$M_{\text{wl},\text{panel},\text{arm}_1} := \sum_{j1} \text{Pressure}_{\text{panel},\text{arm}_1,j1} \cdot \text{if}(\text{X}_{\text{panel},\text{arm}_1,j1} < 0, \text{ft}), (0, \text{ft}), \text{X}_{\text{panel},\text{arm}_1,j1} - \text{X}_{\text{section},\text{arm}_1,11}$$

$$V_{\text{dl},\text{panel},\text{arm}_1} := \sum_{j1} \text{Weight}_{\text{panel},\text{arm}_1,j1} \cdot \text{if}(\text{X}_{\text{panel},\text{arm}_1,j1} < 0, \text{ft}), (0, 1)$$

$$V_{\text{wl},\text{panel},\text{arm}_1} := \sum_{j1} \text{Pressure}_{\text{panel},\text{arm}_1,j1} \cdot \text{if}(\text{X}_{\text{panel},\text{arm}_1,j1} < 0, \text{ft}), (0, 1)$$

Mast Arm Bare Steel Section Properties, Moments, and Shears

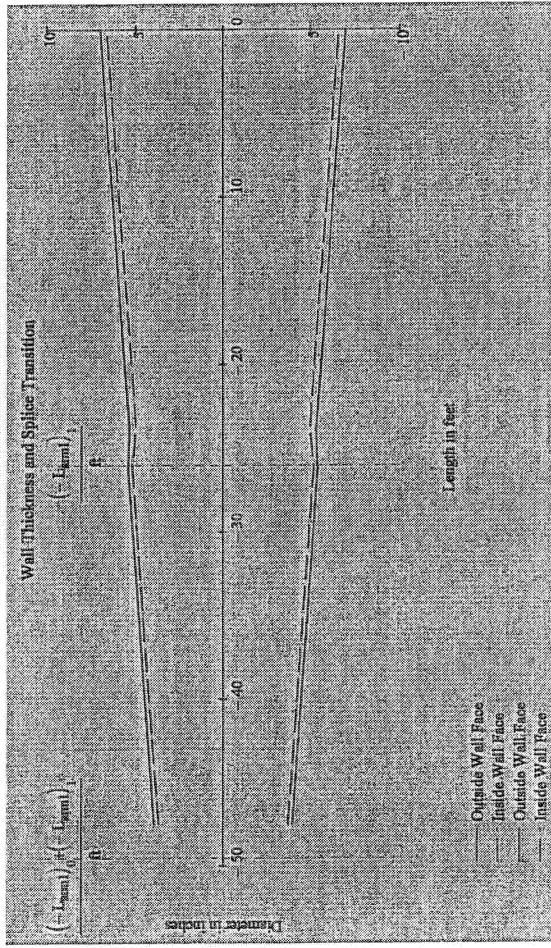
1. Section Properties (assume a 12 sided section) Sides := 12 **AASHTO Appendix Table B-1**

$$R_{\text{rod}} := \frac{1}{2} \left(\text{Diameter}_{\text{tip},\text{arm}_1,0} + \frac{L_{\text{total},\text{arm}_1}}{\text{NumberOFSections}} \cdot n \cdot \text{Taper} \right) - \text{if} \left(\frac{L_{\text{arm}_1,0}}{\text{NumberOFSections}} \geq \frac{L_{\text{total},\text{arm}_1}}{\text{NumberOFSections}} - n, 0, \text{in}, t_{\text{wall},\text{arm}_1,0} \right)$$

$$\phi := \frac{180 \cdot \text{deg}}{\text{Sides}} \quad \theta_{\text{rod},n} := 2 \cdot \tan(\phi) \cdot R_{\text{rod},n} \quad t_{\text{arm}_1,n} := \text{if}(\text{X}_{\text{section},\text{arm}_1,n} - L_{\text{arm}_1,1} < 0, \text{in}), t_{\text{wall},\text{arm}_1,1}, t_{\text{wall},\text{arm}_1,0}$$

$$R_{\text{fil},n} := R_{\text{rod},n} - t_{\text{arm}_1,n} \quad R_{\text{mid},n} := R_{\text{rod},n} - \frac{t_{\text{arm}_1,n}}{2}$$

$$\Delta\phi_n := 6.43 \cdot R_{\text{mid},n} \cdot t_{\text{arm}_1,n} \quad I_n := 3.29 \cdot (R_{\text{mid},n})^3 \cdot t_{\text{arm}_1,n} \quad F_{\text{fn}} := 0.715 \cdot R_{\text{mid},n}$$



$$M_{dl,tube,arm1}_n := \sum_{k=1}^n \left[\text{Weight}_{segment,k} \cdot (X_{segment,k} - X_{section,arm1}_n) \right] \quad V_{dl,tube,arm1}_n := \sum_{k=1}^n \text{Weight}_{segment,k}$$

3. Bare Arm WL Moment and Shear (assume a min. ratio of break radius to tube radius of 0.25)
(Divide arm into 20 segments and use the average diameter to calculate the wind loading)

$$n := 1 \dots \text{NumberOfSections} \quad \text{Diameter}_{segment,n} := R_{cd,n-1} + R_{wd,n} \quad d_n := \text{Diameter}_{segment,n} \quad V_{w,n} := \text{WindSpeed}$$

$$C_v := 1.0$$

(velocity conversion factor)

$$C_{d,segment,n} := \begin{cases} \frac{10.8}{\left(\frac{C_v \cdot V \cdot d}{\text{mph} \cdot \text{ft}}\right)^{0.6}} & \text{if } C_v \cdot V \cdot d > 39 \text{ mph} \cdot \text{ft} \\ 0.79 & \text{if } C_v \cdot V \cdot d \geq 78 \text{ mph} \cdot \text{ft} \\ 1.2 & \text{otherwise} \end{cases}$$

AASHTO Table 3-4

AASHTO Table 3-6

$$F_{segment,n} := \sum_{L_{arm1}} \text{NumberOfSections} \cdot \text{Diameter}_{segment,n} \cdot C_{d,segment,n} \cdot \text{Pressure} \cdot K_{z,arm}$$

$$M_{wt,tube,arm1}_n := \sum_{k=1}^n \left[P_{segment,k} \cdot (X_{segment,k} - X_{section,arm1}_n) \right] \quad V_{wt,tube,arm1}_n := \sum_{k=1}^n P_{segment,k}$$

Total DL and WL Moments and Shears

$$n := 0 \dots \text{NumberOfSections}$$

$$M_{dl,arm1}_n := M_{dl,signal,arm1}_n + M_{dl,passel,arm1}_n + M_{dl,tube,arm1}_n \quad V_{dl,arm1}_n := V_{dl,signal,arm1}_n + V_{dl,passel,arm1}_n + V_{dl,tube,arm1}_n$$

$$M_{wl,arm1}_n := M_{wl,signal,arm1}_n + M_{wl,passel,arm1}_n + M_{wl,tube,arm1}_n \quad V_{wl,arm1}_n := V_{wl,signal,arm1}_n + V_{wl,passel,arm1}_n + V_{wl,tube,arm1}_n$$

2. Bare Arm DL Moment and Shear (divide arm into twenty segments, twenty one sections)

$$L_{splice,provided} = 24 \text{ in}$$

$$\text{SpliceIndex}_n := \text{if} \left[\left(\frac{L_{arm1}}{\text{NumberOfSections}} > \frac{L_{total,arm1}}{\text{NumberOfSections}} \right), \text{NumberOfSections}, n \right] \quad \min(\text{SpliceIndex}) = 10$$

$$\text{Weight}_{splice} := \text{if} \left[\left(\min(\text{SpliceIndex}) = \text{NumberOfSections} \right), 0 \cdot \text{lb} \cdot \text{ft}, A_{min}(\text{SpliceIndex}) \cdot L_{splice,provided} \left(\frac{\text{lb} \cdot \text{ft}}{\text{ft}^3} \right) \right] \quad \text{Weight}_{splice} = 84.51 \text{ lb} \cdot \text{ft}$$

$$n := 1 \dots \text{NumberOfSections}$$

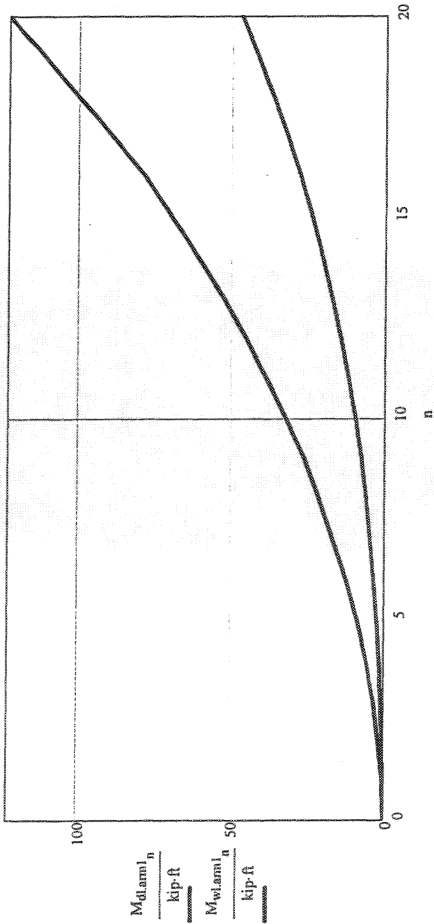
$$\text{Weight}_{segment,n} := \left(\frac{A_{n-1} + A_n}{2} \right) \left(\frac{L_{total,arm1}}{\text{NumberOfSections}} \right) \left(\frac{\text{lb} \cdot \text{ft}}{\text{ft}^3} \right) \quad \max(\text{Weight}_{segment}) = 131.1 \text{ lb} \cdot \text{ft}$$

$$\text{Weight}_{segment}(\min(\text{SpliceIndex})) := \text{Weight}_{segment}(\min(\text{SpliceIndex})) + \text{Weight}_{splice} \quad \max(\text{Weight}_{segment}) = 169.1 \text{ lb} \cdot \text{ft}$$

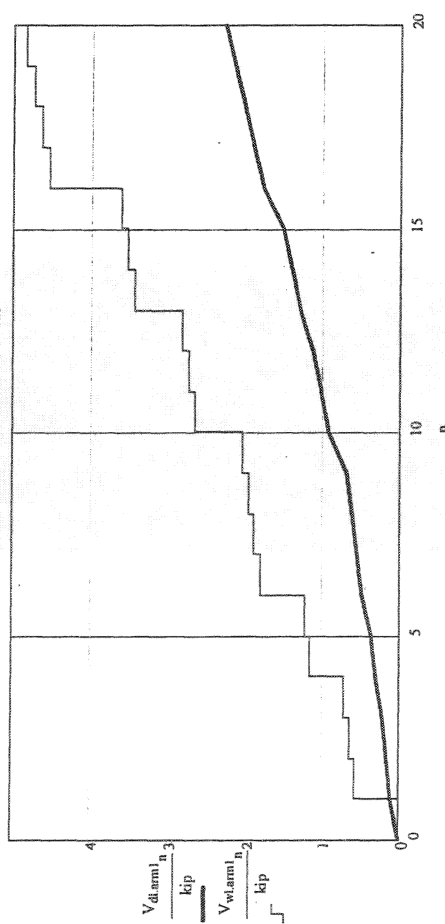
$$\sum \text{Weight}_{segment} = 1866 \text{ lb} \cdot \text{ft}$$

$$X_{segment,n} := X_{section,arm1}_{n-1} + \left[\frac{L_{total,arm1}}{\text{NumberOfSections}} \cdot 3 \cdot \left(\frac{A_n + A_{n-1}}{A_n + A_{n-1}} \right) \right]$$

Moments due to Dead and Wind Loads



Shears due to Dead and Wind Loads



Total Bending Stress on the Section

$$f_{b,d,arm1,n} := \frac{M_{d,arm1,n} \left(\frac{e_{od,n}}{2 \cdot \sin(\phi)} \right)}{I_n}$$

$$f_{b,w,arm1,n} := \frac{M_{w,arm1,n} \left(\frac{e_{od,n}}{2 \cdot \sin(\phi)} \right)}{I_n}$$

$$f_{max,arm1,n} := \max \left(\left(\begin{array}{l} f_{b,d,arm1,n} \\ f_{b,w,arm1,n} \end{array} \right) \right)$$

$$f_{min,arm1,n} := \min \left(\left(\begin{array}{l} f_{b,d,arm1,n} \\ f_{b,w,arm1,n} \end{array} \right) \right)$$

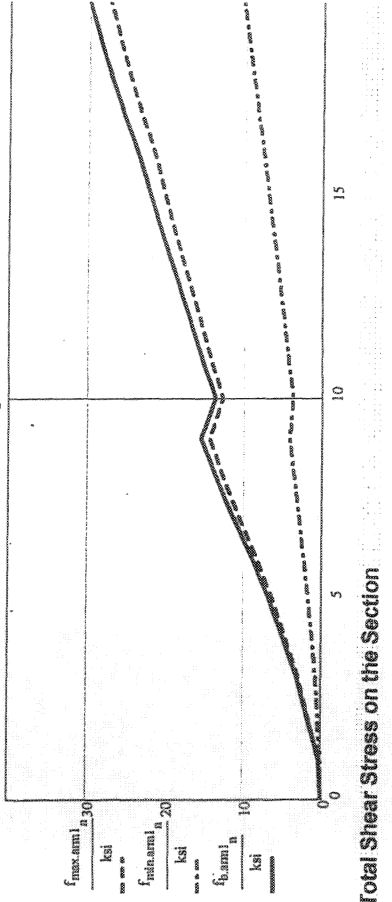
$$f_{b,arm1,n} := \max \left[\begin{array}{l} f_{max,arm1,n} + 0.268 \cdot f_{min,arm1,n} \\ 0.732 \cdot (f_{max,arm1,n} + f_{min,arm1,n}) \end{array} \right]$$

2/14/2011

Pole1SR70xmcd.xrncd v4.3

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Bending Stresses



Total Shear Stress on the Section

$$V_{s,arm1,n} := \sqrt{(V_{d,arm1,n})^2 + (V_{w,arm1,n})^2}$$

$$f_{v,arm1,n} := 2.025 \cdot \frac{V_{s,arm1,n}}{A_n}$$

AASHTO Appendix Table B-2

Allowable Polygonal Tube Bending Stresses

$$F_y := 50 \text{ ksi} \quad (\text{Yield strength}) \quad E := 29000 \text{ ksi} \quad (\text{modulus of elasticity})$$

$$b_n := e_{od,n}$$

$$F_{b,arm1,n} := \begin{cases} F_b \leftarrow 0.75 \cdot F_y \left[1 - \left(\frac{0.2197}{F_y} \right) \left(\frac{b_n}{t_{arm1,n}} \right) \left(\frac{b_n}{t_{arm1,n}} \right) \right] & \text{if } \frac{b_n}{t_{arm1,n}} < 2.143 \cdot \sqrt{\frac{E}{F_y}} \\ F_b \leftarrow 1.152 \cdot F_y \left[1 - \left(\frac{0.39}{F_y} \right) \left(\frac{b_n}{t_{arm1,n}} \right) \left(\frac{b_n}{t_{arm1,n}} \right) \right] & \text{if } \frac{b_n}{t_{arm1,n}} < 1.409 \cdot \sqrt{\frac{E}{F_y}} \\ F_b \leftarrow 0.65 \cdot F_y & \text{if } \frac{b_n}{t_{arm1,n}} < 1.116 \cdot \sqrt{\frac{E}{F_y}} \\ F_b \leftarrow 0.1 \cdot F_y & \text{otherwise} \end{cases}$$

Allowable Round Tube Bending Stresses

$$D_n := 2 \cdot R_{od,n}$$

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$$F_{b,arm1,n} := \begin{cases} F_b \left[0.39 + \frac{\frac{E}{F_y} \left(\frac{D_n}{t_{arm1,n}} \right)}{29.41 \left(\frac{D_n}{t_{arm1,n}} \right)} \right] F_y & \text{if } \frac{D_n}{t_{arm1,n}} < 0.4483 \frac{E}{F_y} \\ F_b \left[0.66 - F_y \right] & \text{if } \frac{D_n}{t_{arm1,n}} < 0.1259 \frac{E}{F_y} \\ F_b \left[0.1 F_y \right] & \text{otherwise} \end{cases}$$

$$F_{v,arm1,n} := \min \left(\begin{matrix} F_{b,arm1,n} \\ F_{c,arm1,n} \end{matrix} \right) \quad \left(F_v \text{ for polygonal tubes cannot exceed } F_b \text{ for round tubes} \right)$$

Allowable Polygonal Tube Shear Stress at the Base

$$F_{v,arm1,n} := \begin{cases} \left(\frac{b_n}{t_{arm1,n}} \leq 2.23 \sqrt{\frac{E}{F_y}} \right) \cdot 0.33 \cdot F_y \cdot \left(\frac{1.64 E}{F_y} \right) \left(\frac{b_n}{t_{arm1,n}} \right)^2 \\ \left(\frac{b_n}{t_{arm1,n}} > 2.23 \sqrt{\frac{E}{F_y}} \right) \cdot 0.33 \cdot F_y \cdot \left(\frac{1.64 E}{F_y} \right) \left(\frac{b_n}{t_{arm1,n}} \right)^2 \end{cases}$$

Arm 1 Combined Stress Ratio

base1 := last(1)

$$CSR_{arm1,n} := \frac{F_{b,arm1,n}}{F_{b,arm1,n} \cdot 1.33} + \left(\frac{F_{v,arm1,n}}{F_{v,arm1,n} \cdot 1.33} \right)^2$$

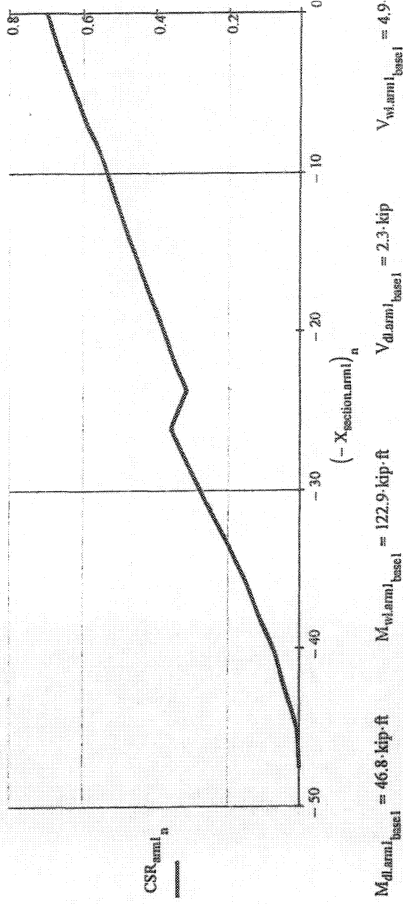
$$max(CSR_{arm1,n}) = 0.699$$

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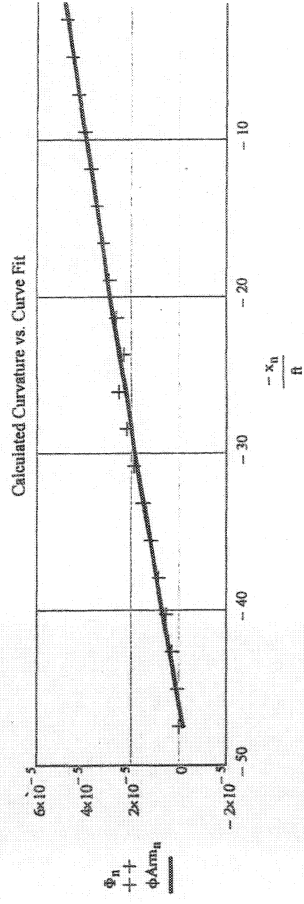
Combined Stress Ratio



$$M_{d,arm1,base1} = 46.8 \text{ kip-ft} \quad M_{d,arm1,base1} = 122.9 \text{ kip-ft} \quad V_{d,arm1,base1} = 2.3 \text{ kip} \quad V_{d,arm1,base1} = 4.9$$

Dead Load Deflection

Curvature_n := $\frac{M_{d,arm1,n}}{E \cdot I_n}$ $X_n := X_{section,arm1,n}$ $\phi_n := \text{Curvature}_n \cdot \Delta X_n$
 degree of polynomial fit $k := 3$ number of data points $Z := \text{regress} \left(\frac{X_n}{in}, \phi_n \right)$
 polynomial coefficients $coeffs := \text{submatrix}(Z, 3, \text{length}(Z) - 1, 0, 0)$ $(coeffs)^T = (4.98 \times 10^{-5} \quad -9.07 \times 10^{-8} \quad 2.36 \times 10^{-11} \quad -4.0)$
 polynomial function $\phi_{curve}(x) := coeffs_0 + coeffs_1 \cdot x + coeffs_2 \cdot x^2 + coeffs_3 \cdot x^3$ $\phi_{Arm}_n := \phi_{curve} \left(\frac{X_n}{in} \right)$
 note: origin is the base of the arm



now integrate the curvature function twice to get deflections. Note: assuming pole connection to the foundation is rigid, the constants of integration are zero for both slope and deflection

$$\int \int \left(coeffs_0 + coeffs_1 \cdot x + coeffs_2 \cdot x^2 + coeffs_3 \cdot x^3 \right) dx \quad \text{evaluates to} \quad \frac{1}{2} \cdot coeffs_0 \cdot x^2 + \frac{1}{6} \cdot coeffs_1 \cdot x^3 + \frac{1}{12} \cdot coeffs_2 \cdot x^4 + \frac{1}{20} \cdot coeffs_3 \cdot x^5$$

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General Input

This spreadsheet computes the moments due to the input configuration of signs and signals, then compares them to the standard configurations. The spreadsheet then selects an appropriate standard mastarm assembly for the input configuration. The coordinate system is set up to produce maximum moments: arm 1 points in the +x direction, arm 2 points in the +y direction, and the pole points in the +z direction. Input cells are boxed.



Station	9+76
Offset	41.90' LT
County	Manatee
Wind speed	130 mph
Grout Pad (Y or N)	N
Luminaire (Y or N)	N
Signal Orientation (V or H)	V
Backplates (Y or N)	Y
Elevation below Arm 1 tip	35.14 ft
Elevation below Arm 2 tip	N ft
Elevation at top of foundation	35.16 ft
Arm center to signal bottom	2.3 ft
Arm connection height (min)	19.6 ft
Arm connection height	20.0 ft
Arm connection height (max)	21.1 ft
Arm 1 length	47.5 ft
Arm 2 length	N ft
Illuminated Signs (Y or N)	Y
Sign weight	10.0 psf
Soil Type	1
Effective Soil Weight	37.6 pcf
Phi	28.0 deg.

Basic wind speed for Manatee County is 130 per FDOT LTS4 Modifications, Jan. 2009, Table 1 District 1 does not prefer grout pads.

Enter N for no arm 2

Minimum dimension shall be 2 ft (actual tabulated distance is 2.3 ft)

Based on 17.5 ft clearance

Dimension "UB"

Based on 19.0 ft clearance

Arm 1 is the longer arm.

Enter N for no arm 2

Illuminated sign pay item is 699-1-AB

10.0 psf for internally illuminated sign

0 for cohesive soil, 1 for sands

USE SPECIAL DRILLED SHAFT DESIGN

Arm 1 Signals and Signs

x (ft)	Signal Heads	Arm 1 Connection				Pole Base		
		F _y (lb)	F _z (lb)	M _y (lb-ft)	M _z (lb-ft)	M _x (lb-ft)	M _y (lb-ft)	M _z (lb-ft)
18.00	3	315	60	1080	5678	6309	1080	2427
26.00	3	315	60	1560	8202	6309	1560	3506
34.50	3	315	60	2070	10883	6309	2070	4653
40.00	1	369	32	1280	14776	7388	1280	6317
45.50	3	315	60	2730	14353	6309	2730	6136

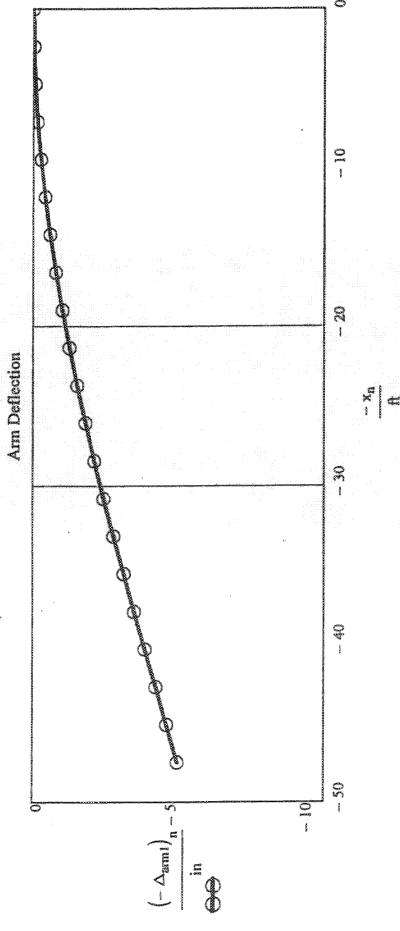
x (ft)	Height of Sign Dim. (ft.)	Width of Sign Dim. (ft.)	Sign Area (ft ²)	Arm 1 Connection				Pole Base		
				F _y (lb)	F _z (lb)	M _y (lb-ft)	M _z (lb-ft)	M _x (lb-ft)	M _y (lb-ft)	M _z (lb-ft)
9.50	2.50	6.00	15.0	835	150	1425	7928	16690	1425	3389
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0
0.00	0.00	0.00	0.0	0	0	0	0	0	0	0
Total Moments for Arm 1				10145	61819	49314	10145	26429		

34.2
40
45.5
3

Arm 1 Combined Stress Ratio and Deflection

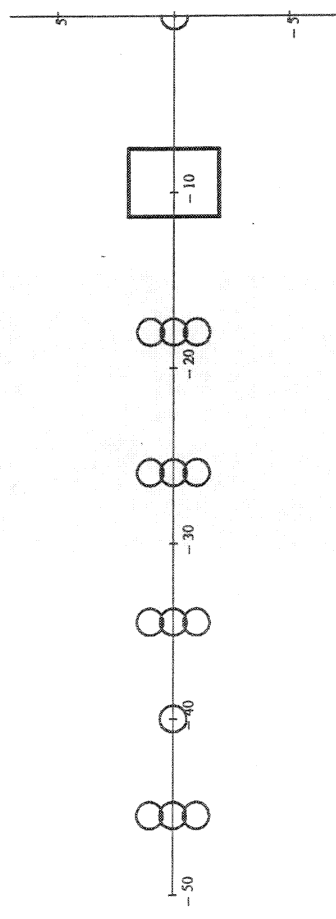
max(CSR_{arm1}) = 0.699 max(Δ_{arm1}) = 5.381 in 2-deg ∑(L_{arm1} - L_{apptize, provided}) = 19.06 in

$$\Delta_{curve}(x) := \left(\frac{1}{2} \text{coeffs}_0 x^2 + \frac{1}{6} \text{coeffs}_1 x^3 + \frac{1}{12} \text{coeffs}_2 x^4 + \frac{1}{20} \text{coeffs}_3 x^5 + \frac{1}{20} \text{coeffs}_4 x^6 \right) \cdot \Delta_{arm1} := \Delta_{curve} \left(\frac{x}{\text{in}} \right) \cdot \text{in} \quad \text{max}(\Delta_{arm1}) = 5.38 \text{ in}$$



Analyze Arm.1

Summary - Arm 1 Geometry and Loading



Location of Signs and Signals

WindSpeed = 130 mph L_{total, arm1} = 47.5 ft

Diameter_{tip, arm1} = $\begin{pmatrix} 7.85 \\ 10.36 \end{pmatrix}$ in Diameter_{base, arm1} = $\begin{pmatrix} 11.14 \\ 14 \end{pmatrix}$ in L_{arm1} = $\begin{pmatrix} 23.5 \\ 26 \end{pmatrix}$ ft t_{width, arm1} = $\begin{pmatrix} 0.25 \\ 0.375 \end{pmatrix}$ in

X_{signal, arm1, i1} = $\begin{pmatrix} 18 \text{ ft} \\ 26 \end{pmatrix}$ Section_{signal, arm1, i1} = $\begin{pmatrix} 3 \\ 3 \\ 3 \end{pmatrix}$

X_{panel, arm1, j1} = $\begin{pmatrix} 9.5 \text{ ft} \\ 15 \text{ ft}^2 \end{pmatrix}$ Area_{panel, arm1, j1} = $\begin{pmatrix} 15 \text{ ft}^2 \end{pmatrix}$

18 ft
26
3
3
3

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Arm 2 Analysis

Details = B5T3 - STA 9+7.6 data WindSpeed = 130 mph

SignalData_{arm2} =

"SignalNumber"	"DistanceToSignal(ft)"	"NumberOfSignalHeads"	"BackPlate"
1	24.5	3	"yes"
2	34.5	3	"yes"
3	42	1	"yes"
4	44.5	5	"yes"
5	0	0	"yes"
6	0	0	"yes"
7	0	0	"yes"
8	0	0	"yes"
9	0	0	"yes"
10	0	0	"yes"

use X to zero out data
use 0 to keep current values "yes" or "no"

New Values

"SignalNumber"	"DistToSignal(ft)"	"#SignalHeads"	"BackPlate"
1	24.5	3	"yes"
2	34.5	3	"yes"
3	42	1	"yes"
4	44.5	5	"yes"
5	0	0	"yes"
6	0	0	"yes"
7	0	0	"yes"
8	0	0	"yes"
9	0	0	"yes"
10	0	0	"yes"

SignalData_{arm2} =

"PanelNumber"	"DistanceToPanelCentroid(ft)"	"PanelArea(sf)"
1	18	16
2	0	0
3	0	0
4	0	0
5	0	0

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Upright Analysis Details = H573 - STA.9'-7.6.dia' WindSpeed = 130.mph

Pole Properties

New Values

Current Values
 $Y_{pole} = 22$ ft
 $Y_{arm,conn} = 20$ ft
Diameter_{base,pole} = 19-in
 $t_{wall,pole} = 0.375$ -in
Gap = $\begin{pmatrix} 11.5 \\ 0 \end{pmatrix}$ -in

Common wall thicknesses:
0.1793 in.
0.2391 in.
0.25 in.
0.313 in.
0.375 in.
0.5 in.

Pole Properties

Analyze Pole

Switch values, set values for DataOut

$RM_{out+1} = out + 1$ out = 21
 $RM_{out+1} = out + 1$ out = 22
 $RM_{out+1} = out + 1$ out = 23
 $Y_{pole} := fSwitchData(Y_{pole}, newY_{pole}, ft)$
 $RM_{out+1} = out + 1$ out = 24
 $Y_{arm,conn} := fSwitchData(Y_{arm,conn}, newY_{arm,conn}, ft)$
 $RM_{out+1} = out + 1$ out = 25
Diameter_{base,pole} := fSwitchData(Diameter_{base,pole}, newDiameter_{base,pole}, in)
 $RM_{out+1} = out + 1$ out = 26
 $t_{wall,pole} := fSwitchData(t_{wall,pole}, newt_{wall,pole}, in)$
 $RM_{out+1} = out + 1$ out = 27
 $QR_{out+1} = fSwitchData3(Gap, newGap, in)$
Gap₁ := if(L_{total,arm2} = 0-ft, 0-in, Gap₁)

$RM_{out+1} = out + 1$ out = 28

$Y_{arm,conn}$
data_{out} := $\frac{\text{ft}}{\text{ft}}$ data_{out} = 0

Design Parameters

Design Criteria: CSR (combined stress ratio) must be less than 1

WindSpeed = 130-mph Taper = $0.14 \cdot \frac{\text{in}}{\text{ft}}$ $K_{sp} = 1.26$ (shape factor)

Diameter_{tip,pole} := Diameter_{base,pole} + Y_{pole} · Taper Diameter_{tip,pole} = 15.92-in

Diameter_{conn,pole} := Diameter_{tip,pole} + Taper · (Y_{pole} - Y_{arm,conn}) Diameter_{conn,pole} = 16.2-in

Gap = $\begin{pmatrix} 11.5 \\ 0 \end{pmatrix}$ -in
(measured from face of upright to Arm Base Plate, same value is used in the Connection Uprights is 5 1/2 inches to allow for fabrication and erection)

Angle between arms, $\alpha \leq 360$ degrees (this variable is ignored for single arm structures)

E = 29000-ksi

F_y = 50-ksi

NumberOfSections = 10

n := 0..NumberOfSections

WindSpeed = 130-mph

Pressure = $49.32 \cdot \frac{\text{lb}}{\text{ft}^2}$

Applied Loads

(Mast Arm Loads + Luminaire Loads)
For analysis purposes, place the arm with the greater DL Moment as Arm1 on the X axis, and then place Arm2 on an angle α up 360 degrees. When including a Luminaire, add forces to Arm1 (conservative).

arm 1 forces

$M_{d0} := M_{dl,arm1,base1} + M_{dl,luminaire}$ $M_{d0} = 46.8$ -kip-ft $V_{dl,arm1,base1} = 2.3$ -kip (Mast Arm on)

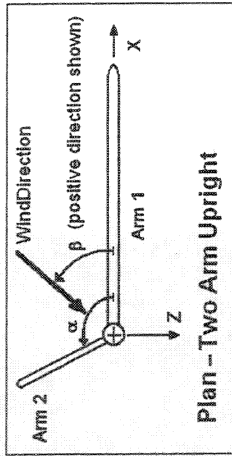
$M_{w0} := M_{wl,arm1,base1} + M_{wl,luminaire}$ $M_{w0} = 122.9$ -kip-ft $V_{wl,arm1,base1} = 4.9$ -kip (Mast Arm on)

$M_{x,w,luminaire} = 0.0$ -kip-ft (from Luminaire only) $V_{w,luminaire} = 0.0$ -kip (from Lumina.

$M_{x,w,tip} := M_{x,w,luminaire} + V_{w,luminaire} \cdot (Y_{pole} - 1.0\text{-ft} - Y_{arm,conn})$ $M_{x,w,tip} = 0.0$ -kip-ft

arm 2 forces

$\alpha = 270$ -deg



$$M_{d1} := M_{d,arm2_base2}$$

$$M_{w1} := M_{w,arm2_base2}$$

$$V_{d,arm2_base2} := 0 \text{ kip}$$

$$M_{d1} := 0.0 \text{ kip-ft}$$

$$M_{w1} := 0.0 \text{ kip-ft}$$

$$V_{w,arm2_base2} := 0 \text{ kip}$$

$$V_{d,arm} := \begin{pmatrix} V_{d,arm1_base1} \\ V_{d,arm2_base2} \end{pmatrix}$$

$$V_{w,arm} := \begin{pmatrix} V_{w,arm1_base1} \\ V_{w,arm2_base2} \end{pmatrix}$$

Combined Applied Pole Loads

$$S_{D'} := \text{if}(L_{total,arm2} = 0 \text{ ft}, 0, \alpha)$$

$$\text{Axial Load on pole} \quad Axial_{top} := V_{d,arm1_base1} + V_{d,arm2_base2} + V_{d,t,um}$$

$$\text{Arm dead and wind loads on pole} \quad M_{d1,poleip1} := M_{d1} + V_{d,arm1} \left(\text{Gap}_1 + \frac{\text{Diameter}_{conn,pole}}{2} \right)$$

$$M_{w1,poleip1} := M_{w1} + V_{w,arm1} \left(\text{Gap}_1 + \frac{\text{Diameter}_{conn,pole}}{2} \right)$$

$$\text{Total Pole Moments} \quad M_{z,poleip} := - (M_{d1,poleip0} + \sin(\alpha + 90 \text{ deg}) M_{d1,poleip1})$$

$$M_{x,poleip} := \cos(\alpha + 90 \text{ deg}) M_{d1,poleip1}$$

Wind Load Case 1
wind on arm 1 only, wind direction equals 90 or 270 degrees. Note b = 90 for one arm uprights.

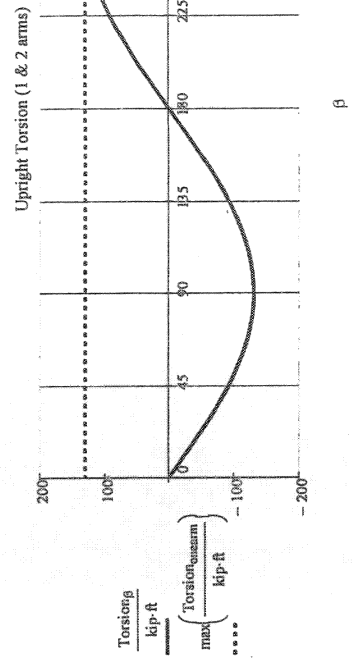
$$\text{WindDirection}_2 := \text{if} \left(\left[\left(M_{d1} = 0 \text{ kip-ft} \right), 90 \text{ deg}, \text{if} \left(\left[\left(\alpha > 180 \text{ deg} \right), 90 \text{ deg}, 270 \text{ deg} \right] \right) \right] \right)$$

$$\text{Torsion}_{onearm,\beta} := -\sin(\beta \text{ deg}) M_{w1,poleip0}$$

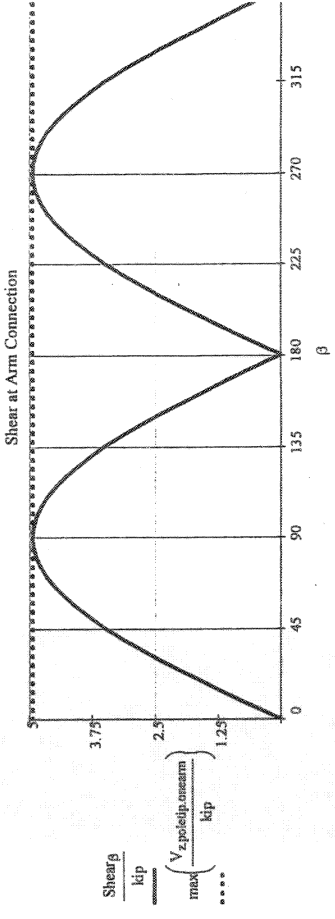
$$V_{z,poleip,onearm} := 0 \text{ kip} \quad V_{z,poleip,onearm,\beta} := V_{w1,arm0} \sin(\beta \text{ deg})$$

Wind Load Case 2 - calculate the torsion and shear for two arm uprights. Set wind direction from the X direction, b = 0, and rotate the wind in increments of 5 degrees up to 360 degrees.

$$\text{Torsion}_{\beta} := -\sin(\beta \text{ deg}) M_{w1,poleip0} + \sin(\beta \text{ deg} - \alpha) M_{w1,poleip1}$$



$$\text{Shear}_{\beta} := \sqrt{(\sin(\beta \text{ deg}) V_{w1,arm0} + \sin(\beta \text{ deg} - \alpha) V_{w1,arm1} \cos(\alpha))^2 + (\sin(\beta \text{ deg} - \alpha) V_{w1,arm1} \sin(\alpha))^2}$$



Wind Direction for Maximum Torsion on Upright

$$\beta := 0, 5, \dots, 180 \quad M_{y,poleip,\beta} := \text{Torsion}_{\beta}$$

$$M_{y,max} := \text{if} \left(\left[\min(M_{y,poleip}) \right] > \max(M_{y,poleip}), \min(M_{y,poleip}), \max(M_{y,poleip}) \right)$$

$$\text{FindDirection}_{\beta} := \text{if} \left(\left[M_{y,max} = M_{y,poleip,\beta} \right], \beta, 0 \right)$$

$$\text{WindDirection}_0 := \text{if} \left(\left[M_{d1} = 0 \text{ kip-ft} \right], 90 \text{ deg}, \max(\text{FindDirection}) \text{ deg} \right)$$

$$\text{WindDirection}_{\beta} := \text{if} \left(\left[\alpha > 180 \text{ deg} \right], \text{WindDirection}_0, \text{WindDirection}_0 + 180 \text{ deg} \right)$$

$$M_{y,max} = -131.0 \text{ kip-ft}$$

$$\text{WindDirection}_0 = 90 \text{ deg}$$

$$\text{WindDirection}_{\beta} = 270 \text{ deg}$$

Wind Direction for Maximum Shear on Upright

$\beta := 0, 5, 360$ $V_{poleip} := \text{Shear } \beta$
 $\text{max}(V_{poleip}) = 4.9 \text{ kip}$
 $\text{FindDirection}_\beta := \text{if}(\text{max}(V_{poleip}) = V_{poleip_\beta}, \beta, 0)$
 $\text{WindDirection}_1 := \text{if}([M_{d1} = 0 \text{ kip-ft}], 90 \text{ deg}, \text{max}(\text{WindDirection}) \text{ deg}]$
 $\text{WindDirection}_1 := \text{if}([\text{WindDirection}_1 = 360 \text{ deg}], 270 \text{ deg}, \text{WindDirection}_1]$
 $\text{WindDirection}_1 := \text{if}([\alpha < 180 \text{ deg}], \text{WindDirection}_1, \text{WindDirection}_1 - 180 \text{ deg}]$
summary of load case 2 torsion and shears in the x and z directions

$\text{Axial}_{top} = 2.3 \text{ kip}$ $M_{x,poleip} = 0.0 \text{ kip-ft}$ $M_{z,poleip} = -50.6 \text{ kip-ft}$ $M_{y,poleip_\beta} := \text{Torsion } \beta$
 $V_{x,poleip_\beta} := \sin(\beta \text{ deg} - \alpha) \cdot V_{wl,arm_1} \cdot \sin(\alpha)$ $V_{z,poleip_\beta} := \sin(\beta \text{ deg}) \cdot V_{wl,arm_0} + \sin(\beta \text{ deg} - \alpha) \cdot V_{wl,arm_1} \cdot \cos(\alpha)$

$M_{y,poleip} \text{ T} =$

0	1	2	3	4	5	6
0	0.0	0.0	0.0	0.0	-11.4	...

$\cdot \text{kip-ft}$

$V_{x,poleip} \text{ T} =$

0	1	2	3	4	5	6	7	8	9
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

$\cdot \text{kip}$

$V_{z,poleip} \text{ T} =$

0	1	2	3	4
0	0.0	0.0	0.0	0.0

$\cdot \text{kip}$

Divide pole from the centerline of both arms to base into 10 segments and check each section for capacity

NumberOfSections = 10

$Y_{section_n} := Y_{arm,conn} - Y_{arm,conn} \cdot \text{NumberOfSections}$

Upright Bare Steel Section Properties, Moments and Shears

section properties (assume a 12 sided section)

AASHTO Appendix Table B-1

$R_{rod_n} := \frac{\text{Diameter}_{conn,pole} + \frac{Y_{arm,conn}}{\text{NumberOfSections}} \cdot n \cdot \text{Taper}}{2}$ $\phi_{rod_n} := \frac{180 \text{ deg}}{\text{sides}}$ $a_{rod_n} := 2 \cdot \tan(\phi) \cdot R_{rod_n}$

$R_{id_n} := R_{rod_n} - t_{wall,pole}$ $R_{mid_n} := R_{rod_n} - \frac{t_{arm1}}{2}$

$A_n := 6.43 \cdot R_{mid_n} \cdot t_{wall,pole}$ $I_{pole_n} := 3.29 \cdot (R_{mid_n})^3 \cdot t_{wall,pole}$ $I_{b_n} := 0.715 \cdot R_{mid_n}$

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weight per segment $n := 1 \dots \text{NumberOfSections}$

$\text{Weight}_{segment_n} := \left(\frac{A_{n-1} + A_n}{2} \right) \cdot \left(\frac{Y_{arm,conn}}{\text{NumberOfSections}} \right) \cdot \left(\frac{\text{lb/ft}}{\text{ft}^3} \right)$

$\text{Atip}_{od} := \left(\frac{\text{Diameter}_{tip,pole}}{2} \right)^2 \cdot \text{sides} \cdot \tan(\phi)$ $\text{Atip}_{id} := \left(\frac{\text{Diameter}_{tip,pole} - t_{wall,pole}}{2} \right)^2 \cdot \text{sides} \cdot \tan(\phi)$

$\Delta_{tip} := \text{Atip}_{od} - \text{Atip}_{id}$ $j := 1 \dots \text{NumberOfSections}$

$\text{Weight}_{segment,top} := \left(\frac{A_{tip} + A_0}{2} \right) \cdot (Y_{pole} - Y_{arm,conn}) \cdot \left(\frac{\text{lb/ft}}{\text{ft}^3} \right)$

$\text{SegmentAxialLoad}_n := \text{Weight}_{segment,top} + \text{Axial}_{top} + \sum_{j=1}^n \text{Weight}_{segment,j}$

$\text{SegmentAxialLoad}_0 := \text{Weight}_{segment,top} + \text{Axial}_{top}$

Height Coefficient (K_z)

$Y_{segment_n} := \frac{Y_{arm,conn} \cdot (n) \cdot 2 - 1}{2 \cdot \text{NumberOfSections}} \cdot Y_{arm,conn}$

$K_{z,pole_n} := 2.01 \cdot \left(\frac{Y_{segment_n}}{900 \text{ ft}} \right)^{9.5}$

$K_{z,pole_n} := \text{if}(K_{z,pole_n} < 0.87, 0.87, K_{z,pole_n})$

$K_{z,pole,top} := 2.01 \cdot \left(\frac{Y_{pole} + Y_{arm,conn}}{2 \cdot 900 \text{ ft}} \right)^{9.5}$

Wind Load and Moments and Shears (assume a min. ratio of break radius to tube radius of 0.25)
(Divide arm into ten segments and use the average diameter to calculate the wind loading)

$\text{SegmentDiameter}_{top} := \frac{\text{Diameter}_{tip,pole} + \text{Diameter}_{conn,pole}}{2}$ $n := 1 \dots \text{NumberOfSections}$

$\text{SegmentDiameter}_n := \text{Diameter}_{conn,pole} + \frac{(n) \cdot 2 - 1}{2 \cdot \text{NumberOfSections}} \cdot Y_{arm,conn} \cdot \text{Taper}$ $V_{w,n} := \text{WindSpeed}$

$d_{pole_n} := \text{SegmentD}$

2/14/2011

Pole1SR70xmcd.xmcd v4.3

27

$$C_v = 1.00$$

AASHTO Table 3-4

$$C_{d,segment,pole,n} := \begin{cases} \frac{10.8}{\left(\frac{C_v \cdot V \cdot d_{pole,n}}{\text{mph} \cdot \text{ft}}\right)^{0.6}} & \text{if } C_v \cdot V \cdot d_{pole,n} > 39 \text{ mph} \cdot \text{ft} \\ 0.79 & \text{if } C_v \cdot V \cdot d_{pole,n} \geq 78 \text{ mph} \cdot \text{ft} \\ 1.2 & \text{otherwise} \end{cases}$$

AASHTO Table 3-6

$$C_{d,segment,pole,top} := \begin{cases} \frac{10.8}{\left(\frac{C_v \cdot V \cdot \text{SegmentDiameter}_{top}}{\text{mph} \cdot \text{ft}}\right)^{0.6}} & \text{if } C_v \cdot V \cdot (\text{SegmentDiameter}_{top}) > 39 \text{ mph} \cdot \text{ft} \\ 0.79 & \text{if } C_v \cdot V \cdot (\text{SegmentDiameter}_{top}) \geq 78 \text{ mph} \cdot \text{ft} \\ 1.2 & \text{otherwise} \end{cases}$$

$$\text{SectionForce}_n := \frac{Y_{arm,conn} \cdot \text{SegmentDiameter}_n \cdot C_{d,segment,pole,n} \cdot \text{Pressure} \cdot K_z \cdot \text{pole}_n}{\text{NumberOfSections}}$$

$$\text{SectionForce}_{up} := (Y_{pole} - Y_{arm,conn}) \cdot \text{SegmentDiameter}_{top} \cdot C_{d,segment,pole,top} \cdot \text{Pressure} \cdot K_z \cdot \text{pole}_{top}$$

$$M_{wl,pole,n} := \sum_{p=0}^n \left[\text{SectionForce}_p \cdot (Y_{segment_p} - Y_{section_n}) \dots \right. \\ \left. + \text{SectionForce}_{up} \cdot \left(\frac{Y_{pole} + Y_{arm,conn}}{2} - Y_{section_n} \right) + M_{x,wl,luminaire} \dots \right. \\ \left. + V_{wl,luminaire} \cdot (Y_{pole} - 1.0 \cdot \text{ft} - Y_{section_n}) \right]$$

$$M_{wl,pole_0} := \text{SectionForce}_{up} \cdot \frac{Y_{pole} - Y_{arm,conn}}{2} + M_{x,wl,tip}$$

$$V_{wl,pole_n} := \text{SectionForce}_{up} + \sum_{p=0}^n \text{SectionForce}_p \quad V_{wl,pole_0} := \text{SectionForce}_{up}$$

$$M_{x,wl,pole_{\beta,n}} := M_{wl,pole_n} \cdot \cos(\beta \cdot \text{deg} - 90 \cdot \text{deg})$$

$$V_{x,wl,pole_{\beta,n}} := V_{wl,pole_n} \cdot (-\cos(\beta \cdot \text{deg}))$$

$$M_{z,wl,pole_{\beta,n}} := M_{wl,pole_n} \cdot (-\sin(\beta \cdot \text{deg} - 90 \cdot \text{deg}))$$

$$V_{z,wl,pole_{\beta,n}} := V_{wl,pole_n} \cdot \sin(\beta \cdot \text{deg})$$

for one arm poles, the controlling load case is wind acting perpendicular to the arm, therefore use 20% of the Basic Load as the transverse loading component for this loading case.

$$M_{x,wl,pole_{\beta,n}} := \text{if} \left[\left[M_{dl_1} = 0 \cdot \text{kip} \cdot \text{ft} \right], \left[0.2 \cdot M_{x,wl,pole_{\beta,n}} \right], M_{x,wl,pole_{\beta,n}} \right]$$

$$V_{x,wl,pole_{\beta,n}} := \text{if} \left[\left[M_{dl_1} = 0 \cdot \text{kip} \cdot \text{ft} \right], \left[0.2 \cdot V_{z,wl,pole_{\beta,n}} \right], V_{x,wl,pole_{\beta,n}} \right]$$

AASHTO 3.9.3

$$\min(M_{z,wl,pole}) = -2.3 \cdot \text{kip} \cdot \text{ft}$$

$$\max(V_{x,wl,pole}) = 0.2 \cdot \text{kip}$$

Total Forces at a Section

$$M_{y,pole_{\beta,n}} := \left| M_{y,pole_{up}} \right| \quad M_{y,pole_{\beta,n}} := \max \left(\left| \left(\text{Torsion}_{onearm,\beta} \right) \right|, \left| M_{y,pole_{up}} \right| \right)$$

$$M_{x,pole,n} := \left| M_{x,pole_{up}} + V_{z,pole_{up}} \cdot (Y_{arm,conn} - Y_{section_n}) + M_{x,wl,pole_{\beta,n}} \right|$$

$$M_{z,pole,n} := \left| M_{z,pole_{up}} - V_{x,pole_{up}} \cdot (Y_{arm,conn} - Y_{section_n}) + M_{z,wl,pole_{\beta,n}} \right|$$

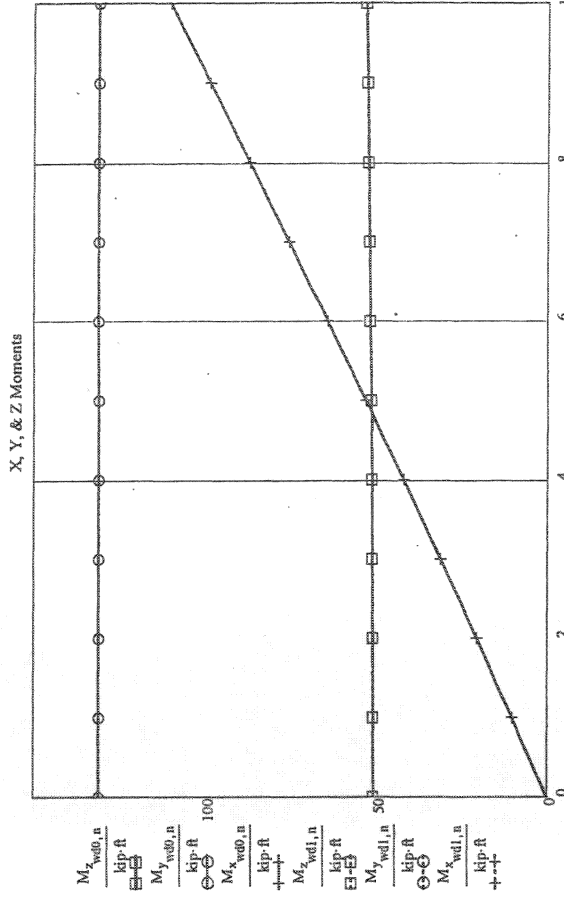
$$\text{AxialForce}_{\beta,n} := \left| \text{SegmentAxialLoad}_n \right| \quad V_{z,pole,n} := \left| V_{x,pole_{up}} + V_{x,wl,pole_{\beta,n}} + V_{wl,luminaire} \right|$$

$$V_{y,pole,n} := \left| V_{z,pole_{up}} + V_{z,wl,pole_{\beta,n}} \right| \quad V_{z,pole,n} := \max \left(\left| V_{z,pole_{up}} + V_{z,wl,pole_{\beta,n}} \right|, \left| V_{z,pole_{up,onearm,\beta}} \right| \right)$$

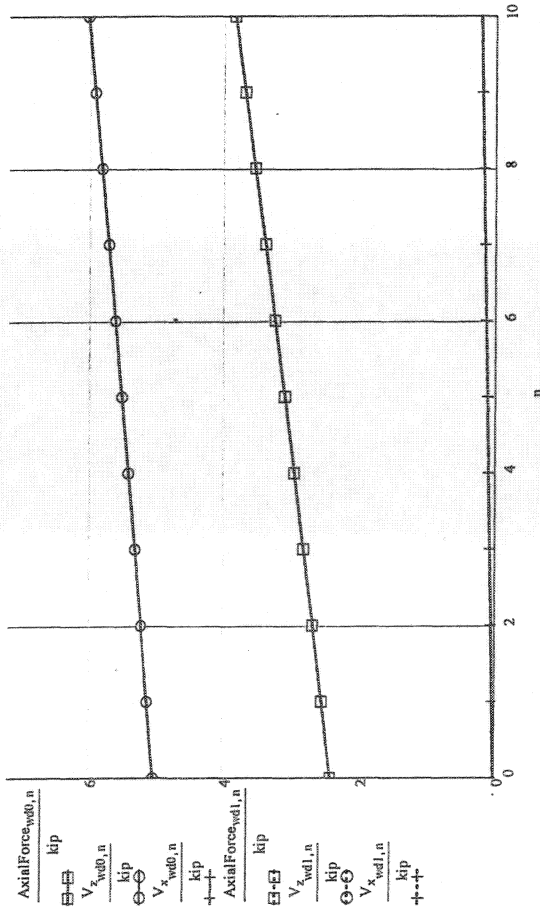
wind direction for maximum torsion

$$\text{WindDirection}_c = 270 \quad \text{WindDirection}_l = 90$$

wind direction for maximum overturning



Axial and Shear Forces



Total Bending Stress on the Section

(ref. AASHTO, Table 1.3.1B(3))

$$f_{b,x,\beta,n} := \frac{M_{x,\beta,n} \left(\frac{r_{out,n}}{2 \sin(\phi)} \right)}{I_{pole,n}}$$

$$f_{max,pole,\beta,n} := \max \left(\begin{matrix} f_{b,x,\beta,n} \\ f_{b,z,\beta,n} \end{matrix} \right)$$

$$f_{\beta,pole,\beta,n} := \max \left[\begin{matrix} f_{max,pole,\beta,n} + 0.268 \cdot f_{min,pole,\beta,n} \\ 0.732 \cdot (f_{max,pole,\beta,n} + f_{min,pole,\beta,n}) \end{matrix} \right]$$

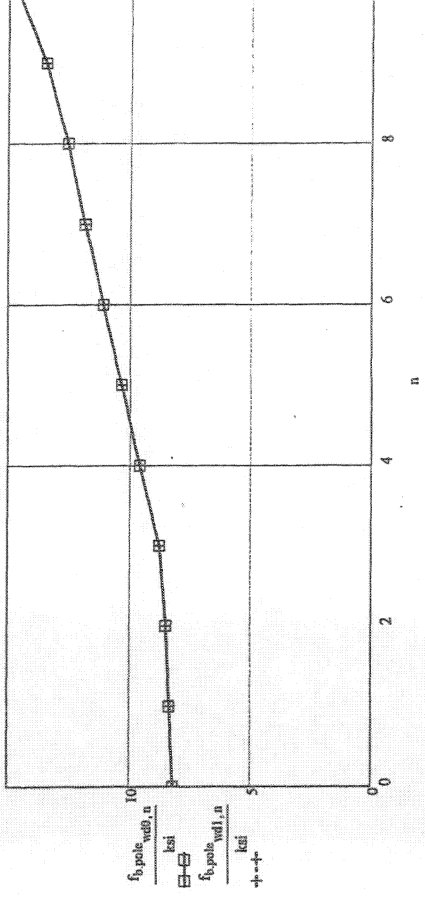
$$f_{b,z,\beta,n} := \frac{M_{z,\beta,n} \left(\frac{r_{out,n}}{2 \sin(\phi)} \right)}{I_{pole,n}}$$

$$f_{min,pole,\beta,n} := \min \left(\begin{matrix} f_{b,x,\beta,n} \\ f_{b,z,\beta,n} \end{matrix} \right)$$

AASHTO Appendix Table B-2

max(f_{β,pole}) = 14.8 ksi

Bending Stresses (fb), Load Cases 1 - 3



Total Shear Stress on a Section

R_{corner} := if (Diameter_{base,pole} > 24-in, 4-in, if (Diameter_{base,pole} ≤ 16-in, 2-in, 3-in))

R_{corner} = 3-in

$$t_{pole} := t_{wall,pole}$$

$$V_{s,pole,\beta,n} := \sqrt{(V_{x,\beta,n})^2 + (V_{y,\beta,n})^2}$$

$$f_{vs,pole,\beta,n} := 2.025 \cdot \frac{V_{s,pole,\beta,n}}{A_n}$$

AASHTO Appendix Table B-2

$$N_n := \frac{R_{corner}}{t_{pole}}$$

$$R_{\beta,\beta} := \frac{R_{od,n} + R_{id,n}}{2}$$

$$k_n := \frac{f_{pole}}{R_{\beta,n}} \left[\frac{R_{\beta,n}}{N_n \cdot t_{pole}} - \frac{1}{2} \left(1 + \frac{N_n + 1}{N_n} \right) \right] + \frac{N_n \cdot t_{pole}}{R_{\beta,n}}$$

AASHTO Appendix Fig B-1

$$f_{v,\beta,pole,\beta,n} := \frac{M_y \cdot k_n}{6.43 \cdot (R_{\beta,n})^2 \cdot t_{pole}}$$

$$f_{v,\beta,pole,\beta,n} := f_{vs,pole,\beta,n} + f_{v,\beta,pole,\beta,n}$$

Total Axial Stress on a Section

$$f_{a,pole,n} := \frac{\text{AxialForce}_{\beta_1,n}}{A_n}$$

AASHTO Table 5-3 & 5-1

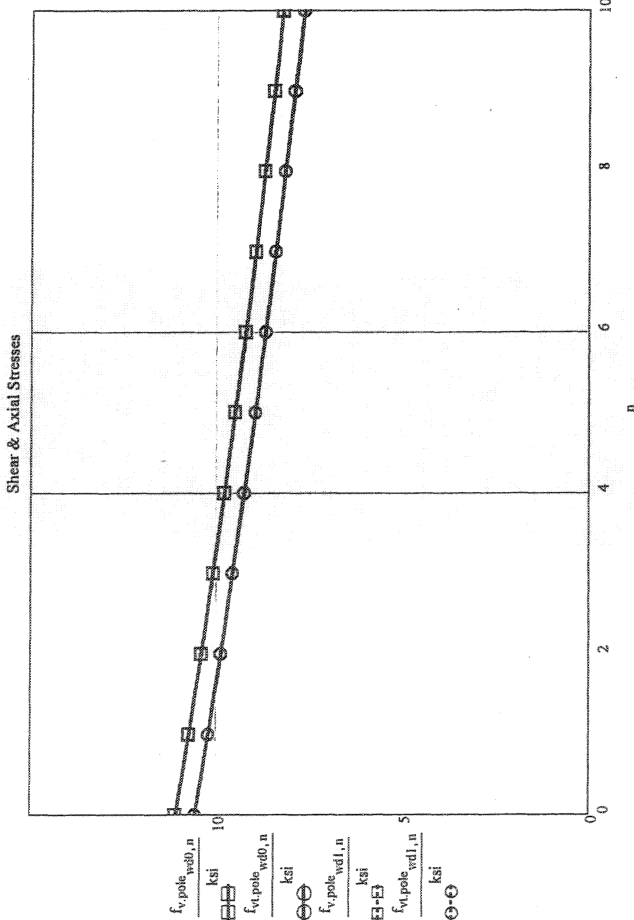
$$F_{b,pole,n} := \begin{cases} F_b \left[1 - \left(\frac{0.2197}{\frac{b_n}{t_{pole}}} \right) \left(\frac{E}{F_y} \right) \right] & \text{if } \frac{b_n}{t_{pole}} < 2.143 \cdot \sqrt{\frac{E}{F_y}} \\ F_b \left[1 - \left(\frac{0.39}{\frac{b_n}{t_{pole}}} \right) \left(\frac{E}{F_y} \right) \right] & \text{if } \frac{b_n}{t_{pole}} < 1.409 \cdot \sqrt{\frac{E}{F_y}} \\ 0.65 \cdot F_y & \text{if } \frac{b_n}{t_{pole}} < 1.116 \cdot \sqrt{\frac{E}{F_y}} \\ 0.1 \cdot F_y & \text{otherwise} \end{cases}$$

Allowable Round Tube Bending Stresses

$$D_n := 2 \cdot R_{od,n}$$

AASHTO 5.8

$$F_{br,pole,n} := \begin{cases} \left[\frac{E}{F_y} + \frac{D_n}{29.41 \cdot \left(\frac{D_n}{t_{pole}} \right)} \right] \cdot F_y & \text{if } \frac{D_n}{t_{pole}} < 0.4483 \cdot \frac{E}{F_y} \\ 0.66 \cdot F_y & \text{if } \frac{D_n}{t_{pole}} < 0.1259 \cdot \frac{E}{F_y} \\ 0.1 \cdot F_y & \text{otherwise} \end{cases}$$



Coefficient for Amplification

$$polebase := \text{last}(I_{pole})$$

AASHTO 4.8.1

$$P_1 := \text{AxialLoad}_{polebase} - \text{AxialLoad}_{polebase}$$

$$C_{a,pole} := 1 - \frac{\left(\frac{I_{pole,polebase}}{I_{pole_0}} \right)^3 + 0.38 \cdot D_p}{\frac{2.46 \cdot E \cdot I_{pole,polebase}}{Y_{arm,conv}} + 0.38 \cdot D_p}$$

$$C_{a,pole} = 1$$

Allowable Polygonal Tube Bending Stresses

$$F_y = 50 \text{ ksi} \quad E = 290000 \text{ ksi} \quad b_n := 8_{od,n}$$

Allowable Polygonal Tube Shear Stress

$$F_{v,pole,n} := \begin{cases} 0.33 \cdot F_y \cdot \left(\frac{b_n}{t_{pole}} \right)^2 & \text{if } \frac{b_n}{t_{pole}} \leq 2.23 \cdot \sqrt{\frac{E}{F_y}} \\ 1.64 \cdot \frac{E}{F_y} \cdot \left(\frac{b_n}{t_{pole}} \right)^2 & \text{otherwise} \end{cases}$$

AASHTO 5.11.2

$$F_{b,pole,n} := \min \left(\begin{matrix} F_{b,pole,n} \\ F_{br,pole,n} \end{matrix} \right) \quad \left(F_y \text{ for polygonal tubes cannot exceed } F_y \text{ for round tubes} \right)$$

Combined Stress Ratio (CSR)

AASHTO Eqn 5-18

AASHTO Table 3-1

$$CSR_{pole, \beta, n} := \frac{f_{u, pole, \beta, n}}{0.6 \cdot F_y \cdot 1.33} + \frac{f_{v, pole, \beta, n}}{C_{na, pole} \cdot F_{v, pole} \cdot 1.33} + \left(\frac{f_{v, pole, \beta, n}}{F_{v, pole} \cdot 1.33} \right)^2 \cdot \max(CSR_{pole}) = 0.49$$

to clarify the stresses distributions and load cases for two arm uprights, graph CSR if minimum values for one arm shear and one arm torsion are not used

$$M_{y, \beta, n} := |M_{y, pole, tip, \beta}|$$

$$V_{s, \beta, n} := \sqrt{(V_{z, \beta, n})^2 + (V_{x, \beta, n})^2}$$

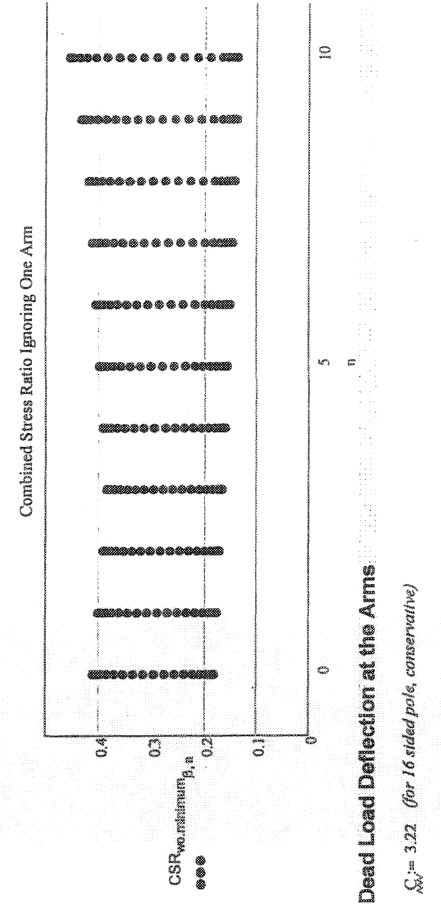
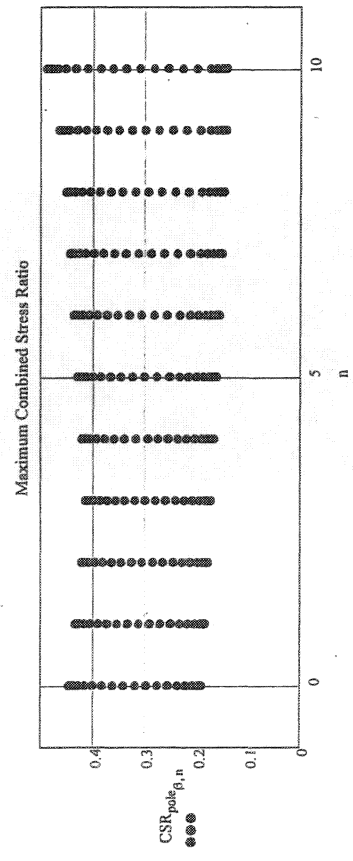
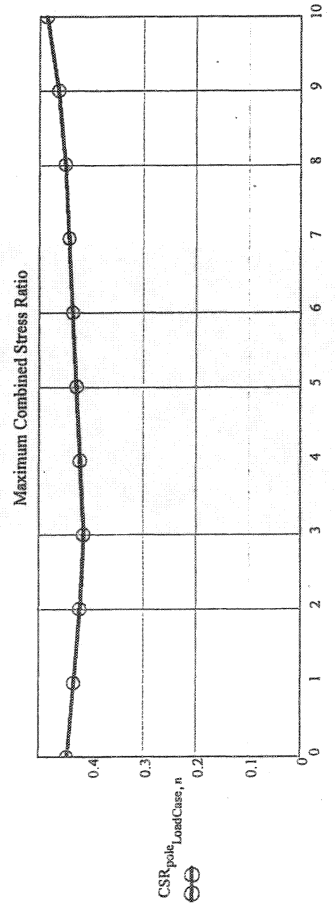
$$f_{u, pole, \beta, n} := \frac{f_{u, pole, \beta, n}}{0.6 \cdot F_y \cdot 1.4} + \frac{f_{v, pole, \beta, n}}{C_{na, pole} \cdot F_{v, pole} \cdot 1.4} + \left(\frac{f_{v, pole, \beta, n}}{F_{v, pole} \cdot 1.4} \right)^2$$

$$CSR_{wo, minimum, \beta, n} := \frac{f_{u, pole, \beta, n}}{0.6 \cdot F_y \cdot 1.4} + \frac{f_{v, pole, \beta, n}}{C_{na, pole} \cdot F_{v, pole} \cdot 1.4} + \left(\frac{f_{v, pole, \beta, n}}{F_{v, pole} \cdot 1.4} \right)^2$$

$$\max(CSR_{wo, minimum}) = 0.46$$

LoadCase_{β, n} := if(max(CSR_{pole}) = CSR_{pole, β, n}, β, -1) LoadCase := max(LoadCase) LoadCase = 270 degrees

CSR_{pole, LoadCase, 0} = 0.45 CSR_{pole, LoadCase, polebase} = 0.49 CSR_{pole, w/o, polebase} = 0.49 CSR_{pole, w/1, polebase} = 0.487



Dead Load Deflection at the Arms

CS_{dl} := 3.22 (for 16 sided pole, conservative)

$$R_{arm} := \frac{\text{Diameter}_{tip, pole} + \text{Taper} \cdot (Y_{pole} - Y_{arm, conn})}{2} \cdot \frac{t_{wall, pole}}{2}$$

$$\Delta_{x, dl} := \frac{-M_{z, pole, tip} \cdot L^2}{2 \cdot (R_{arm} + T.L.)^2 \cdot C \cdot E \cdot t_{pole} \cdot R_{arm}}$$

$$\Delta_{z, dl} := \frac{M_{x, pole, tip} \cdot L^2}{2 \cdot (R_{arm} + T.L.)^2 \cdot C \cdot E \cdot t_{pole} \cdot R_{arm}}$$

$$\text{Slope}_x := \frac{-M_{z, pole, tip} \cdot L}{2 \cdot (R_{arm} + T.L.)^2 \cdot C \cdot E \cdot t_{pole} \cdot R_{arm}}$$

$$\text{Slope}_z := \frac{-M_{x, pole, tip} \cdot L}{2 \cdot (R_{arm} + T.L.)^2 \cdot C \cdot E \cdot t_{pole} \cdot R_{arm}}$$

$\Delta_{x, dl} = 0.7$ in
 $\Delta_{z, dl} = 0$ in
 Slope_x = 0.378 deg
 Slope_z = 0 deg

$M_{z_LoadCase_polebase} = 52.9 \text{ kip}\cdot\text{ft}$ $V_{z_LoadCase_polebase} = 6.03 \text{ kip}$ Diameter_{conn,pole} = 16-in
 $M_{x_LoadCase_polebase} = 110.44 \text{ kip}\cdot\text{ft}$ $V_{x_LoadCase_polebase} = 0.22 \text{ kip}$ Diameter_{base,pole} = 19-in
 $M_{y_LoadCase_polebase} = 130.96 \text{ kip}\cdot\text{ft}$ AxialForce_{LoadCase_polebase} = 3.84 \text{ kip} t_{wall,pole} = 0.38-in}

$M_{z_polebase_0} := 0 \text{ kip}\cdot\text{ft}$ $M_{y_polebase_0} := M_{y_wd0_polebase}$
 $V_{z_polebase_0} := 0 \text{ kip}$ AxialForce_{polebase_0} := AxialForce_{wd0_polebase}
 $M_{z_polebase_1} := M_{z_wd1_polebase}$ $M_{y_polebase_1} := 0 \text{ kip}\cdot\text{ft}$
 $V_{z_polebase_1} := V_{z_wd1_polebase}$ AxialForce_{polebase_1} := AxialForce_{wd1_polebase}
 $M_{z_polebase_2} := M_{z_LoadCase_polebase}$ $M_{y_polebase_2} := M_{y_LoadCase_polebase}$
 $V_{z_polebase_2} := V_{z_LoadCase_polebase}$ AxialForce_{polebase_2} := AxialForce_{LoadCase_polebase}

$t_{arm} := \begin{cases} t_{arm1_base1} \\ t_{arm2_base2} \end{cases}$ $d_{base,arm} := \begin{cases} \max(\text{Diameter}_{base,arm1}) \\ \max(\text{Diameter}_{base,arm2}) \end{cases}$ $d_{base,pole} := \text{Diameter}_{base,pole}$

Analyze Pole
Summary - Upright Geometry
 $Y_{pole} = 22 \text{ ft}$ $Y_{arm,conn} = 20 \text{ ft}$ $\alpha = 0 \text{ deg}$ Gap = $\begin{pmatrix} 11.5 \\ 0 \end{pmatrix} \cdot \text{in}$
 Diameter_{tip,pole} = 15.92-in Diameter_{base,pole} = 19-in t_{wall,pole} = 0.375-in

Upright Combined Stress Ratio and Deflections
 $\max(\text{CSR}_{pole}) = 0.487$ $\max(\Delta_{z,d}) = 0.73 \text{ in}$ $\max(\Delta_{z,d}) = 0 \cdot \text{in}$

Mast Arm Connection(s) Analysis Database = FST13_STA-9-17_6.dat WindSpeed = 130 mph
 Connection Properties

Current Values

h_{conn,plate} = 30-in

t_{vertical,plate} = $\begin{pmatrix} 0.75 \\ 0 \end{pmatrix}$ in

d_{bolt,conn} = $\begin{pmatrix} 1.25 \\ 0 \end{pmatrix}$ in

t_{baseplate,arm} = $\begin{pmatrix} 2.75 \\ 0 \end{pmatrix}$ in

Connection Properties

New Values

inches, for two arm Mast Arms both connection plate heights must be equal

inches [(FL)]

inches, use X to zero out [(SL)]

inches [(TP)]

inches, use X to zero out [(ST)]

inches [(PK)]

inches, use X to zero out [(SK)]

Analyze Connection

Switch values, set values for DataOut

SRV_{out + 1} out = 29 data_{out} := $\frac{h_{conn,plate}}{in}$ data_{out} = 30

h_{conn,plate} := fSwitchData(h_{conn,plate}, new_{h,conn,plate}, in)

SRV_{out + 1} out = 30

fSwitchData3 := fSwitchData3(t_{vertical,plate}, new_{t,vertical,plate}, in)

t_{vertical,plate} := if(L_{total,arm2} = 0-ft, 0-in, t_{vertical,plate})

SRV_{out + 1} out = 31

d_{bolt,conn} := fSwitchData3(d_{bolt,conn}, new_{d,bolt,conn}, in)

d_{bolt,conn} := if(L_{total,arm2} = 0-ft, 0-in, d_{bolt,conn})

SRV_{out + 1} out = 32

fSwitchData2 := fSwitchData2(t_{baseplate,arm}, new_{t,baseplate,arm}, in)

t_{baseplate,arm} := if(L_{total,arm2} = 0-ft, 0-in, t_{baseplate,arm})

data_{out} := $\begin{pmatrix} 0.7 \\ 0 \end{pmatrix}$

data_{out} := $\begin{pmatrix} 1.2 \\ 0 \end{pmatrix}$

data_{out} := $\begin{pmatrix} 2.7 \\ 0 \end{pmatrix}$

Design Parameters

Tripl Plate Thicknesses and Bolt Diameter

$$j := 0.1$$

Design Criteria:

$PR_{bolt} < 1$ (performance ratio of bolt), $PR_{baseplate arm} < 1$ (performance ratio of arm base plate), & $CSR_{vertical plate} < 1$ (combined stress ratio of vertical plate).

$$\#ConnBolts := \begin{bmatrix} 6 \\ 6 \end{bmatrix}$$

$$F_{tension plate} := 36 \text{ ksi}$$

(for the base plate)

Applied Loads

From Mast Arm Design

$$M_{dt} = \begin{pmatrix} 46.8 \\ 0.0 \end{pmatrix} \text{ kip-ft} \quad V_{d,arm} = \begin{pmatrix} 2.3 \\ 0.0 \end{pmatrix} \text{ kip} \quad t_{arm} = \begin{pmatrix} 0.375 \\ 0.25 \end{pmatrix} \text{ in} \quad d_{base,arm} = \begin{pmatrix} 14 \\ 0 \end{pmatrix} \text{ in}$$

$$M_{wt} = \begin{pmatrix} 122.9 \\ 0.0 \end{pmatrix} \text{ kip-ft} \quad V_{wt,arm} = \begin{pmatrix} 4.9 \\ 0.0 \end{pmatrix} \text{ kip} \quad \text{Gap} = \begin{pmatrix} 11.5 \\ 0 \end{pmatrix} \text{ in}$$

Note: Gap is the distance between the upright and the Arm Base Plate. (5.5 inches is a suggested minimum for two arm poles)

DiameterConnPole = 16.2 in

From Upright Design(at arm connection)

$$\text{Offset}_{conn} := \text{Gap} + \frac{\text{Diameter}_{conn,pole}}{2}$$

$$\text{Offset}_{conn} = \begin{pmatrix} 19.6 \\ 8.1 \end{pmatrix} \text{ in}$$

Total Factored Moment and Shear

$$M_{u,conn,j} := \sqrt{(1.2 \cdot M_{dt})^2 + (1.3 \cdot M_{wt})^2}$$

$$V_{u,conn,j} := \sqrt{(1.2 \cdot V_{d,arm})^2 + (1.3 \cdot V_{wt,arm})^2}$$

$$\text{Offset}_{conn} = \begin{pmatrix} 19.5 \\ 19.5 \end{pmatrix} \text{ in}$$

$$M_{u,conn} = \begin{pmatrix} 169.4 \\ 0.0 \end{pmatrix} \text{ kip-ft}$$

$$V_{u,conn} = \begin{pmatrix} 7.0 \\ 0.0 \end{pmatrix} \text{ kip}$$

Arm Base Plate Dimensions

Control dimensions

$$\text{Distance}_{bolt,edge,j} := \text{Ceil} \left(2 \cdot d_{bolt,conn,j} \cdot \frac{1}{4} \right)$$

$$\text{Distance}_{bolt,edge} = \begin{pmatrix} 2.5 \\ 0 \end{pmatrix} \text{ in}$$

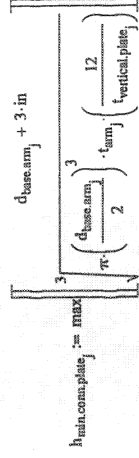
rounded up to the next 1/4 inch dimension

$$\text{ControlDim}_j := \text{if} \left(d_{base,arm,j} > \text{Diameter}_{conn,pole} \right), \text{Ceil} \left(d_{base,arm,j} \cdot \frac{1}{2} \right), \text{Ceil} \left(\text{Diameter}_{conn,pole} \cdot \frac{1}{2} \right)$$

$$\text{ControlDim} = \begin{pmatrix} 16.5 \\ 16.5 \end{pmatrix} \text{ in}$$

Minimum Mast Arm base plate height

$$t_{vertical,plate_j} := \text{if} \left(t_{vertical,plate_j} = 0 \text{ in}, 1 \text{ in}, t_{vertical,plate_j} \right)$$



$$h_{min,conn,plate} = \begin{pmatrix} 1 \end{pmatrix}$$

$$h_{conn,plate} = 30 \text{ in}$$

Mast Arm base plate height, rounded up to next 1 inch dimension if necessary

$$h_{conn,plate} := \text{if} \left(h_{conn,plate} > \max(h_{min,conn,plate}), h_{conn,plate}, \text{Ceil}(\max(h_{min,conn,plate})) \right) \text{ in}$$

$$h_{conn,plate} = 30 \text{ in}$$

Mast Arm base plate width

$$b_{conn,plate_j} := (\text{ControlDim}_j + 2 \cdot \text{Distance}_{bolt,edge_j} + 4 \cdot d_{bolt,conn,j} + 2 \cdot t_{vertical,plate_j})$$

$$b_{conn,plate} = \begin{pmatrix} 28 \\ 16.7 \end{pmatrix}$$

Mast Arm base plate width round up to next 1 inch dimension

$$b_{conn,plate_j} := \text{if} \left(t_{vertical,plate_j} = 0 \text{ in}, 0 \text{ in}, \text{Ceil}(b_{conn,plate_j}, \text{in}) \right)$$

$$b_{conn,plate} = \begin{pmatrix} 28 \\ 17 \end{pmatrix}$$

Bolt spacing

$$\text{SpacingBolts}_{conn,j} := \text{if} \left(t_{vertical,plate_j} = 0 \text{ in}, 0 \text{ in}, \frac{h_{conn,plate} - (2 \cdot \text{Distance}_{bolt,edge_j})}{0.5 \cdot \#ConnBolts_j - 1} \right)$$

$$b_{conn,plate} = \begin{pmatrix} 32 \\ 32 \end{pmatrix} \text{ in}$$

$$\text{SpacingBolts}_{conn} = \begin{pmatrix} 12.5 \\ 15 \end{pmatrix} \text{ in}$$

D. Calculate Bolt Loads

Calculate Capacities of Connection Elements Based on the AISC LRFD Code, 2nd Edition

(Research Report 1126-4F by the Bureau of Engineering Research at the Univ. of Texas at Austin) (Design of bolts and plates based on "Design Guide for Steel to Concrete Connections by Cook, Doerr & Klingner)

$$F_{y,bolt,j} := \text{if} \left(d_{bolt,conn,j} \leq 1.0 \text{ in}, 92 \text{ ksi}, 81 \text{ ksi} \right) \quad \text{min. yield stress for A325 bolts} \quad F_{y,bolt} = \begin{pmatrix} 81 \\ 92 \end{pmatrix} \text{ ksi}$$

$$A_{A325,bolts} = \begin{pmatrix} 0.5 & 0.625 & 0.75 & 0.875 & 1 & 1.125 & 1.25 & 1.375 & 1.5 & 0 & 1.75 \end{pmatrix} \text{ bolt diameter}$$

$$A_{A325,bolts} = \begin{pmatrix} 0.142 & 0.226 & 0.334 & 0.462 & 0.606 & 0.763 & 0.969 & 1.16 & 1.41 & 0 & 1.9 \end{pmatrix} \text{ net tensile area}$$

$$A_{net,bolt,j} := \text{hlookup} \left(\frac{d_{bolt,conn,j}}{\text{in}}, A_{A325,bolts}, 1 \right) \cdot \phi \text{ in}^2$$

$$A_{net,bolt} = \begin{pmatrix} 0.97 \\ 0 \end{pmatrix} \text{ in}^2$$

$$T_{u,bolts} := \left[\frac{\#ConnBolts_j}{2} \right] \cdot \left(F_{y,bolt,j} \right) \cdot \left(\frac{\#ConnBolts_j}{2} \right)$$

$$T_{u,bolts} = \begin{pmatrix} 235.5 \\ 0.0 \end{pmatrix} \text{ kip}$$

Bending plane under full dead and wind load

New Values

Panel #	Dist to Centroid (ft)	Panel Area (sq ft)
1	18	16
2	0	0
3	0	0
4	0	0
5	0	0

use X to zero out
use 0 to keep current values

Arm 2 Combined Stress Ratio and Deflection

$\max(CSR_{arm2}) = 0$

$\max(\Delta_{arm2}) = 0$ in

$2 \cdot \deg \sum (L_{arm2}) - L_{splice, provided} = -1.68$ in

Arm 2 Loads

Arm 2 Properties

Current Values

$L_{total, arm2} = 0$ ft

$Diameter_{base, arm2} = 0$ in

$Dist_{splice, from, base, arm2} = 0$ ft

$t_{wall, arm2} = \begin{pmatrix} 0.25 \\ 0 \end{pmatrix}$ in

Arm 2 Properties

Summary - Arm 2 Geometry and Loading

New Values

feet, 40 ft. max. for 1 piece arms, use X to zero out set $L_{total, arm2} = 0$ ft. for NO ARM2

inches, measured flat to flat, use X to zero out

feet, splice distance, for 2 piece arms, length of piece closest to pole(FESE), for NO SPLIK';

inches, use X to zero out

inches, for 2 piece arms, wall thickness of piece closest to the pole, use X to zero out

See Design Standards 17743 and 17745 for input values.

Current Values

$Y_{luminaire} = 0$ ft

$X_{luminaire} = 10$ ft

$Diameter_{base, lumarm} = 3$ in

$t_{wall, lumarm} = 0.13$ in

$Slope_{lumarm} = 0.5$

$t_{lumarm} = 8$ ft

$d_{bolt, lum} = 0.5$ in

$t_{baseplate, lum} = 0.75$ in

New Values

feet, use X to zero out (Standard LA = 40 feet) set $Y_{luminaire} = 0$ ft. for NO LUMINAIRE

feet, use X to zero out (Standard LB = 10 feet)

inches, use X to zero out (Standard LC = 3 inches)

inches, use X to zero out (Standard LD = 0.125 inches)

rise/run, use X to zero out (Standard LE = 0.5)

feet, use X to zero out (Standard LF = 8 feet)

inches, use X to zero out (Standard LG = 0.5 inches)

inches, use X to zero out (Standard LH = 0.75 inches)

Luminaire Properties

Analyze Luminaire

Summary - Luminaire Arm Geometry

$Y_{luminaire} = 0$ ft

$X_{luminaire} = 0$ ft

$Slope_{lumarm} = 0$

$W_{base, lum} = 0$ in

$Diameter_{base, lumarm} = 0$ in

$d_{bolt, lum} = 0$ in

$W_{channel, lum} = 0$ in

$t_{wall, lumarm} = 0$ in

$t_{baseplate, lum} = 0$ in

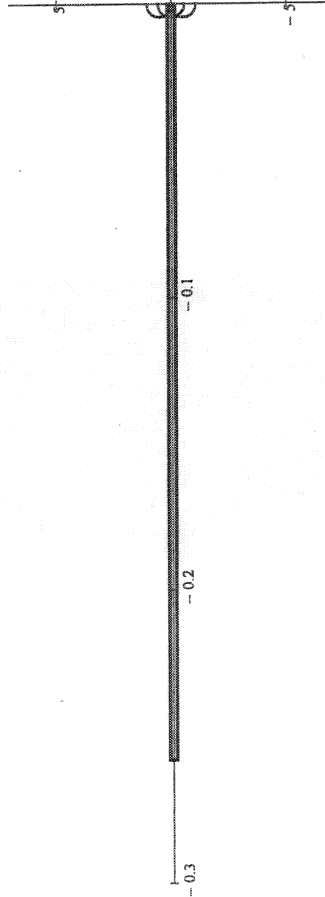
Luminaire Arm Ratios

$CSR_{base, lumarm} = 0$

$PR_{bolt, lum} = 0$

$PR_{baseplate, lum} = 0$

$PR_{com, plate, lum} = 0$



Location of Signs and Signals

WindSpeed = 130-mph $L_{total, arm2} = 0$ ft

$Diameter_{tip, arm2} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ in $Diameter_{base, arm2} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ in $L_{arm2} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ ft

$X_{signal, arm2, j2} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ ft $Sections_{signal, arm2, j2} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ $X_{panel, arm2, j2} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ ft

$Area_{panel, arm2, j2} = \begin{pmatrix} 0.1 \\ 0 \end{pmatrix}$ ft²

$t_{wall, arm2} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ in

$$\theta_j := \text{atan} \left(\frac{1.2 \cdot M_{d1}}{1.3 \cdot M_{d1}} \right)$$

Calculate the bolt moment arm

$$R_{C_j} := \left(\frac{b_{\text{conn,plate}}}{2} - \text{Distance}_{\text{bolt,edge}} + \frac{d_{\text{base,arm}}}{2} \right) \cdot \cos(\theta_j)$$

$$M_{p,plate_j} := \frac{h_{\text{conn,plate}} \cdot F_y \cdot b_{\text{baseplate}} \cdot \left(\frac{b_{\text{baseplate,arm}}}{4} \right)^2}{\cos(\theta_j)}$$

See Reference file for variable definitions

$$\text{CompForceOffset}_j := \begin{cases} \frac{b_{\text{conn,plate}}}{\cos(\theta_j)} - 0.5 \text{ in} < \frac{M_{p,plate}}{T_{n,\text{bolts}}} \\ \frac{M_{p,plate}}{T_{n,\text{bolts}}} - 0.5 \text{ in} < \frac{M_{p,plate}}{T_{n,\text{bolts}}} \end{cases}$$

$$T_{u,\text{conn}_j} := \frac{M_{u,\text{conn}_j}}{R_{C_j} + \text{CompForceOffset}_j + t_{\text{arm}_j}}$$

$$\text{DistA}_j := \frac{b_{\text{conn,plate}}}{2} - \text{Distance}_{\text{bolt,edge}_j}$$

$$T_{u,\text{bolt,max}_j} := \frac{T_{u,\text{conn}_j} + \text{DistA}_j \cdot \tan(\theta_j) \cdot T_{u,\text{conn}_j} \cdot (\#\text{ConnBolts}_j - 0.25 - 0.5) \cdot \text{Spacing}_{\text{bolts,conn}_j}}{0.5 \cdot \#\text{ConnBolts}_j + \frac{\text{floor}(0.25 \cdot \#\text{ConnBolts}_j) \cdot \left[\left(\frac{\#\text{ConnBolts}_j - 1}{2} - 1 \right) - 2 \cdot n \right]}{2} \cdot \text{Spacing}_{\text{bolts,conn}_j}^2}$$

$$V_{u,\text{bolt}_j} := \frac{V_{u,\text{conn}_j}}{\#\text{ConnBolts}_j} \quad \text{Shear per Bolt}$$

$$A_{\text{gross,bolt}_j} := \pi \cdot \left(\frac{d_{\text{bolt,conn}_j}}{2} \right)^2 \quad \text{Gross Bolt Area used for shear}$$

$$f_v_j := \frac{V_{u,\text{bolt}_j}}{A_{\text{gross,bolt}_j}} \quad \text{Bolt Shear Stress}$$

$$f_t_j := \frac{T_{u,\text{bolt,max}_j}}{A_{\text{gross,bolt}_j}} \quad \text{Bolt Tensile Stress}$$

$$\theta = \begin{pmatrix} 19.4 \\ 0.0 \end{pmatrix} \text{deg}$$

$$RC = \begin{pmatrix} 21.3 \\ 16 \end{pmatrix} \text{in}$$

$$M_{p,plate} = \begin{pmatrix} 180.4 \\ 0 \end{pmatrix} \text{kip-ft}$$

$$\text{CompForceOffset} = \begin{pmatrix} 9.19 \\ 0 \end{pmatrix} \text{in}$$

$$T_{u,\text{conn}} = \begin{pmatrix} 65.8 \\ 0.0 \end{pmatrix} \text{kip}$$

$$\text{DistA} = \begin{pmatrix} 13.5 \\ 16 \end{pmatrix} \text{in}$$

$$T_{u,\text{bolt,max}} = \begin{pmatrix} 34.4 \\ 0.0 \end{pmatrix} \text{kip}$$

$$V_{u,\text{bolt}} = \begin{pmatrix} 1.16 \\ 0.00 \end{pmatrix} \text{kip}$$

$$A_{\text{gross,bolt}} = \begin{pmatrix} 1.227 \\ 0 \end{pmatrix} \text{in}^2$$

$$f_v = \begin{pmatrix} 0.95 \\ 0.00 \end{pmatrix} \text{ksi}$$

$$f_t = \begin{pmatrix} 28.1 \\ 0.0 \end{pmatrix} \text{ksi}$$

$$F_y := \min \left(\begin{pmatrix} 117 \text{ ksi} - 1.9 \cdot f_u \\ 90 \text{ ksi} \end{pmatrix} \right) \quad \text{Tension Stress Limit (4325 bolts)} \\ \text{AISC Table 13.5}$$

$$\phi_{t_j} = 0.75$$

$$PR_{\text{bolt}_j} := \frac{f_y}{\phi_t \cdot F_y} \quad \text{Bolt Capacity Ratio}$$

$$F_u = \begin{pmatrix} 90 \\ 90 \end{pmatrix} \text{ksi}$$

$$\phi_t \cdot F_u = \begin{pmatrix} 67.5 \\ 67.5 \end{pmatrix} \text{ksi}$$

$$PR_{\text{bolt}} = \begin{pmatrix} 0.42 \\ 0 \end{pmatrix}$$

(if $PR < 1$, then ok)

Check Arm Base Plate Thickness

See Reference file for formula derivations $\phi_b := 0.90$

$$t_{\text{baseplate,arm,reqd}_j} := \text{if} \left(\sqrt{V_{u,\text{conn}_j}^2 + T_{u,\text{conn}_j}^2} > 0 \right), 0 \text{ in}, \sqrt{\frac{4 \cdot T_{n,\text{bolts}} \cdot \text{DistA}_j \cdot \left(\frac{d_{\text{base,arm}}}{2} \right)}{(\phi_b \cdot F_y \cdot b_{\text{baseplate}}) \cdot h_{\text{conn,plate}}}}$$

$$t_{\text{baseplate,arm}} = \begin{pmatrix} 2.1 \\ 0 \end{pmatrix}$$

$$PR_{t,\text{baseplate,arm}} = \begin{pmatrix} 0.9 \\ 0 \end{pmatrix}$$

(if $PR < 1.0$ ok)

Upright Connection Plate Thickness

See Reference file for formula derivations

$$t_{\text{conn,plate,reqd}_j} := \sqrt{\frac{4 \cdot T_{n,\text{bolts}} \cdot \left(\frac{b_{\text{conn,plate}} - \text{Diameter}_{\text{conn,pole}} - 2 \cdot t_{\text{vertical,plate}}}{2} - 2 \cdot \text{Distance}_{\text{bolt,edge}} \right) \cdot h_{\text{conn,plate}}}{(\phi_b \cdot F_y \cdot b_{\text{baseplate}}) \cdot h_{\text{conn,plate}}}}$$

$$t_{\text{conn,plate,reqd}} = \begin{pmatrix} 2 \\ 0 \end{pmatrix}$$

$$t_{\text{conn,plate}} = \begin{pmatrix} 2.125 \\ 0.000 \end{pmatrix}$$

$$t_{\text{conn,plate}} = \begin{pmatrix} 2.2 \\ 2.25 \end{pmatrix} \text{in}$$

$$PR_{t,\text{complete,arm}} = \begin{pmatrix} 0.1 \\ 0 \end{pmatrix}$$

Weld Size of Arm to Plate Connection

(Design welds of the socket joint to carry 100% of the design load using an E70 electrode.)

$$S_{weld,j} := \pi \cdot \left(\frac{d_{base,arm}}{2} \right)^2$$

Weld Properties

$$L_{weld,j} := \pi \cdot d_{base,arm}$$

Total Stress on Weld

$$f_{weld,j} := \sqrt{\left(\frac{M_{u,conn}}{S_{weld,j}} \right)^2 + \left(\frac{V_{u,conn}}{L_{weld,j}} \right)^2}$$

Max. Bottom Weld Size

$$w_{bot,arm,j} := \text{if} \left[\left(t_{arm,j} = 0 \cdot \text{in} \right) \vee \left(t_{arm,j} < \left(\frac{1}{16} \right) \cdot \text{in} \right) \right]$$

$$w_{bot,arm,j} := \text{Ceil} \left(w_{bot,arm,j} \cdot \frac{1}{16} \right)$$

Bottom Weld Stress

$$f_{bot,weld,j} := w_{bot,arm,j} \cdot \left[(0.75) \cdot (0.6) \cdot (70 \cdot \text{ksi}) \cdot \left(\frac{1}{\sqrt{2}} \right) \right]$$

$$f_{top,weld,j} := f_{weld,j} - f_{bot,weld,j}$$

Top Weld Stress

$$w_{top,arm,j} := \frac{f_{top,weld,j}}{(0.75) \cdot (0.6) \cdot (70 \cdot \text{ksi}) \cdot \left(\frac{1}{\sqrt{2}} \right)}$$

$$w_{top,arm,j} := \text{Ceil} \left(w_{top,arm,j} \cdot \frac{1}{16} \right)$$

$$w_{top,arm,j} := \text{if} \left[\left(w_{top,arm,j} > t_{arm,j} \right) \vee \left(w_{top,arm,j} > \text{Ceil} \left(t_{arm,j} \cdot \frac{1}{16} \right) \right) \right]$$

Round up to next 1/16 inch

$$w_{top,arm} = \begin{pmatrix} 0.3125 \\ -0.1875 \end{pmatrix} \cdot \text{in}$$

$$w_{bot,arm} = \begin{pmatrix} 6.96 \\ 4.18 \end{pmatrix} \cdot \text{kip}$$

Size of Vertical Welds to Upright

(Design welds to resist dead load moment, wind load moment, and dead load shear using an E70 electrode)

$$S_{d1,arm} := \frac{h_{conn,plate}^2}{3}$$

Weld Properties

$$S_{weld,arm} := \text{Diameter}_{conn,pole} \cdot h_{conn,plate}$$

$$A_{d1,shr} := 2 \cdot h_{conn,plate}$$

Upright

$$t_{upright} := \frac{\text{Diameter}_{conn,pole}}{2}$$

$$f_{weld,j} := \sqrt{\left[\frac{1.2 \cdot [M_{dl} + V_{dl,arm}] \cdot \left[t_{upright} + \text{Gap} \right]}{S_{d1,arm}} \right]^2 + \left[\frac{1.3 \cdot [M_{wl} + V_{wl,arm}] \cdot \left[t_{upright} + \text{Gap} \right]}{S_{weld,arm}} \right]^2} + \left(\frac{1.2 \cdot V_{dl,arm}}{A_{d1,shr}} \right)^2$$

$$f_{weld} = \begin{pmatrix} 4.9 \\ 0.0 \end{pmatrix} \cdot \frac{\text{kip}}{\text{in}}$$

Plate/Upright Weld size

$$w_{vert,plate,j} := \frac{f_{weld,j}}{0.75 \cdot (0.6 \cdot 70 \cdot \text{ksi}) \cdot \left(\frac{1}{\sqrt{2}} \right)}$$

AISC Table J2.5

$$w_{vert,plate,j} := \text{Ceil} \left(w_{vert,plate,j} \cdot \frac{1}{16} \right)$$

$$w_{vert,plate} = \begin{pmatrix} 0.2500 \\ 0.0000 \end{pmatrix} \cdot \text{in}$$

$$w_{p,min,j} := \text{if} \left[\left(t_{vertical,plate} > \frac{1}{2} \cdot \text{in} \right) \vee \left(\frac{1}{4} \cdot \text{in} < \frac{3}{16} \cdot \text{in} \right) \right]$$

min weld size

AISC Table J2.4

$$w_{p,min,j} := \text{if} \left[\left(t_{vertical,plate} = 0 \cdot \text{in} \right) \vee \left(0 \cdot \text{in} < w_{p,min,j} \right) \right]$$

$$w_{vertical,plate} := \text{if} \left[\left(w_{vert,plate} > w_{p,min,j} \right) \vee \left(w_{vert,plate} < w_{p,min,j} \right) \right]$$

$$w_{vertical,plate} = \begin{pmatrix} 0 \\ 0.1 \end{pmatrix}$$

Size of Vertical Welds to Connection Plate

$$w_{conn,plate,j} := w_{vert,plate}$$

$$w_{conn,plate} = \begin{pmatrix} 0.2500 \\ 0.0000 \end{pmatrix}$$

$$w_{c,min,j} := \text{if} \left[\left(t_{conn,plate} > \frac{3}{4} \cdot \text{in} \right) \vee \left(\frac{5}{16} \cdot \text{in} < \frac{1}{4} \cdot \text{in} \right) \right]$$

min weld size

AISC Table J2.4

$$w_{c,min,j} := \text{if} \left[\left(w_{c,min,j} > t_{vertical,plate} \right) \vee \left(t_{vertical,plate} < w_{c,min,j} \right) \right]$$

min weld size

AISC B.8-119

$$w_{conn,plate,j} := \text{if} \left[\left(w_{conn,plate} > w_{c,min,j} \right) \vee \left(w_{conn,plate} < w_{c,min,j} \right) \right]$$

$$w_{conn,plate} = \begin{pmatrix} 0.3125 \\ 0.1 \end{pmatrix}$$

Check Thickness of Vertical Plates

$$t_{vertical,plate} = \begin{pmatrix} 0.750 \\ 0.100 \end{pmatrix} \cdot \text{in}$$

Tripl Plate Thickness

$$h_{vertical,plate} := h_{conn,plate}$$

Vertical plate

$$h_{vertical,plate} := t_{vertical,plate} \cdot h_{vertical,plate}$$

$$A_{vertical,plate} = \begin{pmatrix} 22.5 \\ 3 \end{pmatrix}$$

$$L_{b,j} := \frac{\text{Diameter}_{conn,pole}}{2} + \text{Gap}_j - t_{conn,plate}$$

Diameter

$$t_{y,j} := \frac{t_{vertical,plate}}{\sqrt{12}}$$

$$\lambda_j := \text{if} \left[\left(t_{vertical,plate} = 0 \cdot \text{in} \right) \vee \left(0 < \frac{L_{b,j}}{t_{y,j}} \right) \right]$$

Controlling Slenderness Parameter

$$M_{p,j} := \frac{h_{vertical,plate}^2 \cdot t_{vertical,plate} \cdot F_{y,baseplate}}{4}$$

Plastic Moment

$$M_{p,j} = \begin{pmatrix} 506.2 \\ 67.5 \end{pmatrix} \cdot \text{kip}$$

$$M_{l,j} := \frac{h_{vertical,plate}^2 \cdot t_{vertical,plate} \cdot F_{y,baseplate}}{6}$$

Limiting Buckling Moment

$$M_{l,j} = \begin{pmatrix} 337.5 \\ 45.0 \end{pmatrix} \cdot \text{kip}$$

$$\lambda_y := 0.3 \cdot \left(\frac{b_{\text{vertical plate}}}{M_{p_j}} \right)^2 \cdot b_{\text{vertical plate}} \quad \lambda_y := A_{\text{vertical plate}} \quad E_s := 29000 \text{ ksi}$$

$$\lambda_j := \frac{(3750 \text{ ksi}) \cdot \sqrt{I_j \cdot A_j}}{M_{p_j}} \quad \text{Flexural Slenderness Parameters}$$

$$\lambda_j := \frac{(57000 \text{ ksi}) \cdot \sqrt{I_j \cdot A_j}}{M_{f_j}} \quad \text{AISC Table A-F1.1}$$

$$M_{n_j} := M_{p_j} - (M_{p_j} - M_{r_j}) \cdot \left(\frac{\lambda_j - \lambda_{p_j}}{\lambda_j - \lambda_{r_j}} \right) \quad \text{For } \lambda_j < \lambda_{r_j}$$

$$M_{cr_j} := \frac{(57000 \text{ ksi}) \cdot \sqrt{I_j \cdot A_j}}{\lambda_j} \quad \text{Nominal Flex. Strength} \quad \text{AISC Eqn A-F1-3}$$

$$\phi M_{n_j} := \text{if} \left[(\lambda_{p_j} < \lambda_j), 0.9 \cdot M_{n_j}, 0.9 \cdot M_{p_j} \right]$$

$$\phi M_{n_j} := \text{if} \left[(\lambda_{r_j} < \lambda_j), 0.9 \cdot M_{cr_j}, \phi M_{n_j} \right]$$

$$M_{u_j} := \frac{1.2 \cdot [M_{d_j} + V_{d, \text{arm}} \cdot (t_{\text{upright}} + \text{Gap}_j)]}{2} \quad \text{Required Flexural Strength}$$

$$\lambda_{c_j} := \text{if} \left[(t_{\text{vertical plate}} \neq 0 \text{ in}), \frac{L_{b_j}}{r_{y_j} \cdot \pi} \cdot \sqrt{\frac{F_{y, \text{baseplate}}}{E}}, 0 \right] \quad \text{Column Slenderness Parameter} \quad \text{AISC Eqn E2-1}$$

$$F_{cr_j} := \text{if} \left[(\lambda_{c_j} \leq 1.5), 0.658 \cdot \left(\frac{\lambda_{c_j}}{\lambda_{c_j}} \right)^2 \cdot F_{y, \text{baseplate}}, \left[\frac{0.877}{(\lambda_{c_j})^2} \cdot F_{y, \text{baseplate}} \right] \right] \quad \text{Nominal Critical Stress} \quad \text{AISC Eqns E2-2 & E2-3}$$

$$\phi P_{n_j} := 0.85 \cdot A_j \cdot F_{cr_j} \quad \text{Nominal Compressive Strength} \quad \text{AISC Eqn E2-1}$$

$$P_{u_j} := \frac{1.3 \cdot [M_{u_j} + V_{u, \text{arm}} \cdot (t_{\text{upright}} + \text{Gap}_j)]}{\text{Diameter}_{\text{conn.pole}}} \quad \text{Required Compressive Strength}$$

$$\text{CSR}_{\text{vert.plate}_j} := \text{if} \left[\left(\frac{P_{u_j}}{\phi P_{n_j}} \geq 0.2 \right), \left(\frac{P_{u_j}}{\phi P_{n_j}} + \frac{8}{9} \cdot \frac{M_{u_j}}{\phi M_{n_j}} \right) \cdot \left(\frac{P_{u_j}}{2 \cdot \phi P_{n_j}} + \frac{M_{u_j}}{\phi M_{n_j}} \right), 0 \right] \quad \text{Combined Stress Ratio} \quad \text{Flexure and Tension memb.}$$

AISC Eqns H1-1a & H1-1b

$$\text{PR}_0 := \max \left(\begin{array}{l} \text{PR}_{\text{baseplate.am}_0} \\ \text{PR}_{\text{connplate.am}_0} \\ \text{CSR}_{\text{vert.plate}_0} \end{array} \right) \quad \text{PR}_1 := \text{if} \left(M_{d_1} = 0 \text{ kip-ft}, 0, \max \left(\begin{array}{l} \text{PR}_{\text{baseplate.am}_1} \\ \text{PR}_{\text{connplate.am}_1} \\ \text{CSR}_{\text{vert.plate}_1} \end{array} \right) \right)$$

$$\text{PR} = \begin{pmatrix} 0.943 \\ 0.000 \end{pmatrix} \quad \text{(if } \text{PR} < 1, \text{ then}$$

$$j := 0 \dots 1 \quad \text{vert.plt.width}_j := t_{\text{upright}} + \text{Gap}_j - t_{\text{conn.plate}_j} \quad \text{vert.plt.width}_1 := \text{if} \left(M_{d_1} = 0 \text{ kip-ft}, 0 \text{ in}, \text{vert.plt.width}_j \right)$$

set variables equal to zero if there is no second arm

$$\lambda_{\text{connplate}_1} := \text{fSetZero}(b_{\text{conn.plate}_1}, \text{in}) \quad t_{\text{vertical plate}_1} := \text{fSetZero}(t_{\text{vertical plate}_1}, \text{in})$$

$$\text{Gap}_1 := \text{fSetZero}(\text{Gap}_1, \text{in}) \quad d_{\text{bolt conn}_1} := \text{fSetZero}(d_{\text{bolt conn}_1}, \text{in})$$

$$\lambda_{\text{baseplate.am}_1} := \text{fSetZero}(t_{\text{conn.plate}_1}, \text{in}) \quad \# \text{ConnBolts}_1 := \text{fSetZero}(\# \text{ConnBolts}_1, 1)$$

$$t_{\text{baseplate.am}_1} := \text{fSetZero}(t_{\text{baseplate.am}_1}, \text{in}) \quad w_{\text{bot.am}_1} := \text{fSetZero}(w_{\text{bot.am}_1}, \text{in})$$

$$\lambda_{\text{wtop.am}_1} := \text{fSetZero}(w_{\text{top.am}_1}, \text{in}) \quad \text{SpacingBolts.conn}_1 := \text{fSetZero}(\text{SpacingBolts.conn}_1, \text{in})$$

$$\lambda_{\text{wbot.am}_1} := \text{fSetZero}(w_{\text{bot.am}_1}, \text{in}) \quad \lambda_{\text{wtop.am}_1} := \text{fSetZero}(w_{\text{top.am}_1}, \text{in})$$

$$\text{OffsetConn}_1 := \text{fSetZero}(\text{OffsetConn}_1, \text{in})$$

$$\text{PR}_{\text{bolt}_1} := \text{if} \left[(L_{\text{total.arm}_2} = 0 \text{ ft}) + (newL_{\text{total.arm}_2} = "x") + (newL_{\text{total.arm}_2} = "X"), 0, \text{PR}_{\text{bolt}_1} \right]$$

$$\text{PR}_{\text{baseplate.am}_1} := \text{if} \left[(L_{\text{total.arm}_2} = 0 \text{ ft}) + (newL_{\text{total.arm}_2} = "x") + (newL_{\text{total.arm}_2} = "X"), 0, \text{PR}_{\text{baseplate.am}_1} \right]$$

$$\text{CSR}_{\text{vert.plate}_1} := \text{if} \left[(L_{\text{total.arm}_2} = 0 \text{ ft}) + (newL_{\text{total.arm}_2} = "x") + (newL_{\text{total.arm}_2} = "X"), 0, \text{CSR}_{\text{vert.plate}_1} \right]$$

$$\text{PR}_{\text{connplate.am}_1} := \text{if} \left[(L_{\text{total.arm}_2} = 0 \text{ ft}) + (newL_{\text{total.arm}_2} = "x") + (newL_{\text{total.arm}_2} = "X"), 0, \text{PR}_{\text{connplate.am}_1} \right]$$

Analyze Connection

Summary - Connection Geometry

$$h_{\text{conn.plate}} = 30 \text{ in} \quad \text{Gap} = \begin{pmatrix} 11.5 \\ 0 \end{pmatrix} \text{ in} \quad \text{OffsetConn} = \begin{pmatrix} 19.5 \\ 0 \end{pmatrix} \text{ in}$$

$$d_{\text{bolt.conn}} = \begin{pmatrix} 1.25 \\ 0 \end{pmatrix} \text{ in} \quad \# \text{ConnBolts} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \quad \text{SpacingBolts.conn} = \begin{pmatrix} 12.5 \\ 0 \end{pmatrix} \text{ in}$$

$$t_{\text{conn.plate}} = \begin{pmatrix} 2.25 \\ 0 \end{pmatrix} \text{ in} \quad b_{\text{conn.plate}} = \begin{pmatrix} 32 \\ 0 \end{pmatrix} \text{ in} \quad t_{\text{vertical plate}} = \begin{pmatrix} 0.75 \\ 0 \end{pmatrix} \text{ in} \quad t_{\text{baseplate.am}} = \begin{pmatrix} 2.75 \\ 0 \end{pmatrix} \text{ in}$$

$$A_{net,rod} := \frac{\pi}{4} \left(d_{bolt,pole} - \frac{0.9743}{4} \right)^2$$

$$f_{t,rod} := \frac{T_{u,rod}}{A_{net,rod}}$$

$$f_{v,rod} := \frac{V_{u,rod}}{A_{net,rod}}$$

$$F_{y,rod} := 55 \text{ ksi}$$

$$F_{t,rod} := 0.5 \cdot F_{y,rod}$$

$$F_{v,rod} := 0.3 \cdot F_{y,rod}$$

$$CSR_{rod} := \left(\frac{f_{t,rod}}{1.33 \cdot F_{t,rod}} \right)^2 + \left(\frac{f_{v,rod}}{1.33 \cdot F_{v,rod}} \right)^2$$

Use the AISC LRFD Code, 2nd Edition, for Design of Elements Where Possible
(Design of bolts based on "Design Guide for Steel to Concrete Connections by Cook, Doerr, & Klingner"
(Research Report 1126-4F by the Bureau of Engineering Research at the Univ. of Texas at Austin)

$$T_{u,rod,old} := 1.3 \cdot T_{u,rod}$$

$$V_{u,rod,old} := 1.3 \cdot V_{u,rod}$$

$$A_{net,rod,old} := 0.75 \cdot \pi \cdot \left(\frac{d_{bolt,pole}}{2} \right)^2$$

$$F_{y,rod} := 75 \text{ ksi}$$

$$T_{s,rod} := A_{net,rod,old} \cdot F_{u,rod}$$

$$\gamma := 0.5 \text{ (property of embedded rods)}$$

$$T_{u,rod} := \sqrt{T_{s,rod}^2 + \left(\frac{V_{u,rod}}{\gamma} \right)^2}$$

$$PR_{rod} := \frac{T_{u,rod,old}}{0.75 \cdot T_{u,rod}}$$

Base Plate Thickness

Design plate thickness based on yield line theory

$$\phi_b = 0.90$$

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Pole1SR70xrcd.xmcd v4.3

$$A_{net,rod} = 2.42 \text{ in}^2 \quad \text{AASHTO Eqn 5-23}$$

$$f_{t,rod} = 15.01 \text{ ksi}$$

$$f_{v,rod} = 8.42 \text{ ksi}$$

$$F_{t,rod} = 27.5 \text{ ksi} \quad \text{AASHTO Eqn 5-21}$$

$$F_{v,rod} = 16.5 \text{ ksi} \quad \text{AASHTO Eqn 5-22}$$

$$CSR_{rod} = 0.316 \quad \text{AASHTO Eqn 5-24}$$

$$T_{u,rod,old} = 47.3 \text{ kip}$$

$$V_{u,rod,old} = 26.5 \text{ kip}$$

$$A_{net,rod,old} = 2.36 \text{ in}^2$$

$$T_{s,rod} = 176.7 \text{ kip}$$

$$0.75 \cdot T_{u,rod} = 129.0 \text{ kip}$$

(if greater than actual rod tension, bolts are OK)

$$PR_{rod} = 0.367$$

$$t_{baseplate,pole,reqd} := \left[(1.3) \cdot \frac{M_{tot,pole}}{\phi \cdot F_{y,baseplate}} + \frac{\text{Diameter}_{bolt,pole}}{2} + \frac{\text{Diameter}_{nut,pole}}{2} + \frac{\text{Diameter}_{base,pole}}{2} \right]^{\frac{1}{2}}$$

minimum base plate thickness calc not used, for future use

$$t_{baseplate,pole,reqd} := \text{if} \left(t_{baseplate,pole,reqd} < d_{bolt,pole} + d_{nut,pole} + t_{baseplate,pole,reqd} \right)$$

$$t_{baseplate,pole} := \text{Ceil} \left(\frac{1}{8} \text{ in} \right)$$

Round up to next 1/8 inch dim.

$$PR_{plate,pole} := \frac{t_{baseplate,pole,reqd}}{t_{baseplate,pole}}$$

Weld Sizes of Upright to Base Plate Connection

(Design welds of the socket joint to carry 100% of the design load using an E70 electrode.)

$$S_{weld,pole} := \pi \cdot \left(\frac{\text{Diameter}_{base,pole}}{2} \right)^2 \cdot L_{weld,pole} := \pi \cdot \text{Diameter}_{base,pole}$$

$$f_{weld,pole} := \left[\frac{1.3 \cdot M_{tot,pole}}{S_{weld,pole}} \right]^2 + \left[\frac{1.3 \cdot V_{tot,pole}}{L_{weld,pole}} \right]^2 + \left[\frac{1.3 \cdot M_{y,pole,base} \cdot \text{LoadCaseCSR}}{2 \cdot \pi \cdot \text{Diameter}_{base,pole}} \right]^2$$

$$w_{tot,pole} := t_{pole} - \left(\frac{1}{16} \right)$$

$$w_{tot,pole} := \text{Ceil} \left(w_{tot,pole} \cdot \frac{1}{16} \right)$$

$$f_{bot,weld,pole} := w_{tot,pole} \cdot \left[(0.75) \cdot 0.6 \cdot (70 \text{ ksi}) \cdot \left(\frac{1}{\sqrt{2}} \right) \right]$$

AISC Table J2.5

$$f_{top,weld,pole} := f_{weld,pole} - f_{bot,weld,pole}$$

$$w_{top,weld,pole} := \frac{f_{top,weld,pole}}{(0.75) \cdot (0.6) \cdot 70 \text{ ksi} \cdot \left(\frac{1}{\sqrt{2}} \right)}$$

$$w_{top,weld,pole} := \text{Ceil} \left(w_{top,weld,pole} \cdot \frac{1}{16} \right)$$

$$w_{weld,pole} := \text{if} \left(w_{top,weld,pole} > t_{wall,pole}, w_{top,weld,pole}, \text{Ceil} \left(t_{wall,pole} \cdot \frac{1}{16} \right) \right)$$

$$t_{baseplate,pole,reqd} = 1.36 \text{ in}$$

AASHTO 5.17.6.4
Commentary

$$t_{baseplate,pole} = 1.375 \text{ in}$$

$$PR_{plate,pole} = 2.5$$

$$PR_{plate,pole} = 0.54$$

$$f_{weld,pole} = 7.7 \frac{\text{kip}}{\text{in}}$$

$$w_{tot,pole} = 0.3125 \text{ in}$$

$$f_{bot,weld,pole} = 7 \frac{\text{kip}}{\text{in}}$$

$$f_{top,weld,pole} = 0.7 \frac{\text{kip}}{\text{in}}$$

$$w_{top,weld,pole} = 0.0625 \text{ in}$$

$$w_{weld,pole} = 0.3750 \text{ in}$$

Summary - Upright Base Plate Geometry

$$\#AnchorRods = 6$$

$$d_{bolt,pole} = 2 \text{ in}$$

$$t_{baseplate,pole} = 2.5 \text{ in}$$

$$\text{Diameter}_{baseplate,pole} = 35 \text{ in}$$

$$w_{top,pole} = 0.375 \text{ in}$$

$$w_{tot,pole} = 0.3125 \text{ in}$$

Upright Base Plate Performance Ratios

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$$W_{top,arm} = \begin{pmatrix} 0.5 \\ 0 \end{pmatrix} \cdot \text{in}$$

$$W_{left,arm} = \begin{pmatrix} 0.3125 \\ 0 \end{pmatrix} \cdot \text{in}$$

$$W_{com,plate} = \begin{pmatrix} 0.375 \\ 0 \end{pmatrix} \cdot \text{in}$$

$$W_{vertical,plate} = \begin{pmatrix} 0.375 \\ 0 \end{pmatrix} \cdot \text{in}$$

Connection Ratios

$$PR_{bolt} = \begin{pmatrix} 0.416 \\ 0 \end{pmatrix}$$

$$CSR_{vert,plate} = \begin{pmatrix} 0.331 \\ 0 \end{pmatrix}$$

$$PR_{baseplate,arm} = \begin{pmatrix} 0.913 \\ 0 \end{pmatrix}$$

$$PR_{complate,arm} = \begin{pmatrix} 0.943 \\ 0 \end{pmatrix}$$

Applied Loads (from Upright Design)

$$M_{x,polebase} = \begin{pmatrix} 0.0 \\ 110.4 \\ 110.4 \end{pmatrix} \cdot \text{kip} \cdot \text{ft}$$

$$M_{y,polebase} = \begin{pmatrix} 131.0 \\ 0.0 \\ 131.0 \end{pmatrix} \cdot \text{kip} \cdot \text{ft}$$

$$M_{z,polebase} = \begin{pmatrix} 52.9 \\ 52.9 \end{pmatrix} \cdot \text{kip} \cdot \text{ft}$$

maximum torsion (Mx & Mz not maximum overturning (My not maximum CSR)

$$V_{x,polebase} = \begin{pmatrix} 0.0 \\ 0.2 \\ 0.2 \end{pmatrix} \cdot \text{kip}$$

$$\text{AxialForce}_{polebase} = \begin{pmatrix} 3.8 \\ 3.8 \\ 3.8 \end{pmatrix} \cdot \text{kip}$$

$$V_{z,polebase} = \begin{pmatrix} 6.0 \\ 6.0 \end{pmatrix} \cdot \text{kip}$$

Diameter_{base,pole} = 19.0 in
 $t_{pole} = 0.3750$ in
 $C_{a,pole} = 1$

load cases for maximum torsion (T), overturning (OT), and Combined Stress Ratio (CSR)

$$\text{LoadCaseT} := 0 \quad \text{LoadCaseOT} := 1 \quad \text{LoadCaseCSR} := 2$$

$$M_{x,polebase,LoadCaseT} = 0.0 \cdot \text{kip} \cdot \text{ft} \quad M_{y,polebase,LoadCaseT} = 131.0 \cdot \text{kip} \cdot \text{ft} \quad M_{z,polebase,LoadCaseT} = 0.0 \cdot \text{kip} \cdot \text{ft}$$

$$M_{x,polebase,LoadCaseOT} = 110.4 \cdot \text{kip} \cdot \text{ft} \quad M_{y,polebase,LoadCaseOT} = 0.0 \cdot \text{kip} \cdot \text{ft} \quad M_{z,polebase,LoadCaseOT} = 52.9 \cdot \text{kip} \cdot \text{ft}$$

$$M_{x,polebase,LoadCaseCSR} = 110.4 \cdot \text{kip} \cdot \text{ft} \quad M_{y,polebase,LoadCaseCSR} = 131.0 \cdot \text{kip} \cdot \text{ft} \quad M_{z,polebase,LoadCaseCSR} = 52.9 \cdot \text{kip} \cdot \text{ft}$$

Base Plate Size

$$\text{Diameter}_{baseplate,pole} := \text{Diameter}_{base,pole} + 8 \cdot \text{d}_{bolt,pole}$$

β

$$\text{Diameter}_{polecircle,pole} := \text{Diameter}_{base,pole} + 2 \cdot (2 \cdot \text{d}_{bolt,pole})$$

$$\text{Diameter}_{baseplate,pole} = 35 \text{ in}$$

$$\text{Diameter}_{polecircle,pole} = 27 \text{ in}$$

Base Plate Analysis

Data File = FE513 - STA 9+7.648 - WindSpeed = 30 mph

Current Values

#AnchorRods = 6

$d_{bolt,pole} = 2$ in

Base Plate Properties

New Values

use 6 bolts minimum

Inches (BC)

Analyze Base Plate & Anchors

Switch values, set values for DataOut

out = 1 out = 33

AnchorRods := fSwitchData(#AnchorRods, new#AnchorRods, 1)

out = 1 out = 34

d_{bolt,pole} := fSwitchData(d_{bolt,pole}, newd_{bolt,pole}, in)

$$T_{u,rod} := \frac{M_{csr,pole}}{S_{rod,group}}$$

$$V_{csr,pole} := \sqrt{\left(\frac{V_{x,polebase,LoadCaseCSR}}{\text{Diameter}_{polecircle,pole}} \right)^2 + \left(\frac{V_{z,polebase,LoadCaseCSR}}{\text{Diameter}_{polecircle,pole}} \right)^2}$$

$$V_{u,rod} := \frac{V_{csr,pole}}{\text{AnchorRods}} + \frac{M_{y,polebase,LoadCaseCSR}}{\left(\frac{\text{Diameter}_{polecircle,pole}}{2} \right) \cdot \text{AnchorRods}}$$

Bolt Load

AASHTO anchor bolt CSR calcs not used, for future use

$$M_{csr,pole} := \sqrt{\left(M_{x,polebase,LoadCaseCSR} \right)^2 + \left(M_{z,polebase,LoadCaseCSR} \right)^2} \cdot C_{a,pole}$$

$$M_{csr,pole} = 122.8 \text{ kip} \cdot \text{ft}$$

AASHTO 5.11

PR_{rod} = 0.367

PR_{plate pole} = 0.543

Foundation Analysis Cohesionless or Cohesive Soil

DataFile = TEST3 - STA 9+76.6.dat

Soil Properties

Current Values

SoilType = 1

φ_{soil} = 28 deg

c_{soil} = 2000 psf

γ_{soil} = 37.6 pcf

New Values

φ_{soil} = 28

c_{soil} = 2000

γ_{soil} = 37.6

0 - clay / - sand

degrees, for sand

pcf, for clay

pcf, Unit weight of the soil

Soil Properties

Analyze Foundation

Switch values, set values for DataOut, and Write Out Data to DataFile and Temp.dat

SoilType := out + 1 out = 35

SoilType := if(newSoilType = 0, 0, 1)

φ_{soil} := out + 1 out = 36

φ_{soil} := fSwitchData(φ_{soil}, newφ_{soil}, deg)

c_{soil} := out + 1 out = 37

c_{soil} := fSwitchData(c_{soil}, newc_{soil}, psf)

γ_{soil} := out + 1 out = 38

γ_{soil} := fSwitchData(γ_{soil}, newγ_{soil}, pcf)

Subject := out + 1 out = 39

Subject := if(newSubject = 0, Subject, newSubject)

ProjectNo := out + 1 out = 40

ProjectNo := if(newProjectNumber = 0, ProjectNo, newProjectNumber)

PoleLocation := out + 1 out = 41

PoleLocation := if(newPoleLocation = 0, PoleLocation, newPoleLocation)

out := out + 1 out = 42

Data := if(newData = 0, Data, newData)

data_{out} := "Sta. 9+76, 41.90' LT"

data_{out} := Date

data_{out} := "Feb 14, 2011"

Design := out + 1 out = 43

Design := if(newDesignBy = 0, DesignBy, newDesignBy)

Design := out + 1 out = 44

Design := if(newCheckedBy = 0, CheckedBy, newCheckedBy)

WRITEPRN(DataFile) := data WRITEPRN("temp.dat") := data

Design Parameters

Factor = 4 ksi Factor = 60 ksi

Applied Loads

(From Arm! Design)

WindSpeed = 130 mph

(From Base Plate Design)

#AnchorRods = 6

(From Upright Design)

$$\text{ServiceFactor} := \left(\frac{85 \text{ mph}}{\text{WindSpeed}} \right)^2$$

ServiceFactor = 0.43

Plans Prep Manual 2

VALUE USED IN TOES SPREADSHEET

d_{bolt, pole} = 2-in

Diameter_{bolt, pole} = 27-in

T_{rod} = 36.4-kip

VALUE USED IN FOOT MAN

$$M_{z, polebase} = \begin{pmatrix} 0 \\ 110.4 \end{pmatrix} \text{ kip-ft}$$

$$M_{y, polebase} = \begin{pmatrix} 131 \\ 0 \end{pmatrix} \text{ kip-ft}$$

$$M_{z, polebase} = \begin{pmatrix} 0 \\ 52.9 \end{pmatrix} \text{ kip-ft}$$

LoadCaseI = 0

LoadCaseOT = 1

LoadCaseCSR = 2

TOESION

$$V_{z, polebase} = \begin{pmatrix} 0 \\ 0.2 \end{pmatrix} \text{ kip}$$

$$\text{AxialForce}_{polebase} = \begin{pmatrix} 3.8 \\ 3.8 \end{pmatrix} \text{ kip}$$

$$V_{z, polebase} = \begin{pmatrix} 0 \\ 6 \end{pmatrix} \text{ kip}$$

Foundation Diameter

Diameter_{shaft} := Diameter_{bolt, pole} + 6-in + 12-in

Diameter_{shaft} = 3.75-ft

round shaft diameter up to the nearest half foot dimension to accommodate available coring equipment

$$Diameter_{shaft} := \text{Ceil} \left(Diameter_{shaft} \cdot \frac{1}{2} \right)$$

Diameter_{shaft} = 4 ft

Diameter_{shaft} = 4.5 ft

(D/E)

Foundation Depth Required to Resist Overturning

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Pole1SR70xmcd.xmcd v4.3

$SF_{ot} := 2$ (safety factor against overturning)

offset := 0.0 ft

vertical distance between top of foundation and groundline

$$M_{total} := (SF_{ot}) \cdot \sqrt{\left(\frac{M_x \cdot polebase_{LoadCaseOT}}{C_a \cdot pole} \right)^2 + \left(\frac{M_z \cdot polebase_{LoadCaseOT}}{C_a \cdot pole} \right)^2}$$

$M_{total} = 245.6 \text{ kip}\cdot\text{ft}$

$$P := SF_{ot} \cdot \sqrt{\left(V_x \cdot polebase_{LoadCaseOT} \right)^2 + \left(V_z \cdot polebase_{LoadCaseOT} \right)^2}$$

$P = 12.1 \text{ kip}$

(short free-head pile in cohesionless soil using Broms method)

$b :=$ Diameter_{shaft}

$$K_{sp} := \tan\left[(45 \text{ deg}) + \frac{\phi_{soil}}{2} \right]$$

$K_{sp} :=$ offset

Guess v_{z1}

$L_{ot,sand} := 9 \text{ ft}$

Given $\frac{K_{sp} \cdot b \cdot L_{ot,sand}^3 \cdot K_p}{2} = M_{total} + P(e + L_{ot,sand})$

$L_{ot,sand,reqd} := \text{Find}(L_{ot,sand})$

$L_{ot,sand,reqd} = 11.83 \text{ ft}$

(round up to next foot dimension)

$L_{ot,sand,prov} := \text{Ceil}(L_{ot,sand,reqd}, \text{ft})$

$L_{ot,sand,prov} = 12 \text{ ft}$

$$PR_{ot,sand} := \frac{M_{total} + P(e + L_{ot,sand,prov})}{\gamma_{soil} \cdot b \cdot L_{ot,sand,prov}^3 \cdot K_p}$$

$$PR_{standard} := \frac{M_{total} + P(e + L_{standard})}{\gamma_{soil} \cdot b \cdot L_{standard}^3 \cdot K_p}$$

$PR_{ot,sand} = 0.96$

$PR_{standard} = 0.96$

short free-head pile in cohesive soil, formulas derived using a modified Broms Method assuming L is less than 3^*b .

Modified Broms Method (see reference file for derivation.)

Slope := $8 \cdot \frac{c_{soil}}{3 \cdot b}$

$K_{sp} := \frac{M_{total}}{P} + \text{offset}$

$Nforce(M, N) := \left[\text{Slope} \cdot (2 \cdot M + N) + 2 \cdot c_{soil} \right] \cdot N \cdot \frac{b}{2}$

$Mforce(M) := (2 \cdot c_{soil} + M \cdot \text{Slope}) \cdot M \cdot \frac{b}{2}$

$MArm(M) := e + \frac{M \cdot 2 \cdot (M \cdot \text{Slope} + c_{soil}) + c_{soil}}{M \cdot \text{Slope} + 2 \cdot c_{soil}}$

$NArm(M, N) := e + M + \frac{N \cdot 2 \cdot (N \cdot \text{Slope} + M \cdot \text{Slope} + c_{soil}) + (M \cdot \text{Slope} + c_{soil})}{\text{Slope} \cdot (2 \cdot M + N) + 2 \cdot c_{soil}}$

Guess value $M := 1 \text{ ft}$

$N := 1 \text{ ft}$

Given $P + Nforce(M, N) = Mforce(M)$

$Mforce(M) \cdot MArm(M) = Nforce(M, N) \cdot NArm(M, N)$

$\left(\frac{M}{N} \right) := \text{Find}(M, N)$

$L_{ot,clay,mod,reqd} := M + N$

$L_{ot,clay,mod,reqd} = 6.99 \text{ ft}$

$L_{ot,clay,mod,prov} := \text{Ceil}(L_{ot,clay,mod,reqd}, \text{ft})$

$L_{ot,clay,mod,prov} = 7 \text{ ft}$

Regular Broms Method

$f := \frac{P}{9 \cdot c_{soil} \cdot b}$

$M_{max} := P(e + 1.5 \cdot b + 0.5 \cdot f)$

$K_{sp} := \sqrt{\frac{M_{max}}{2.25 \cdot c_{soil} \cdot b}}$

$L_{ot,clay,reg,reqd} := (1.5 \cdot b + f + g)$

(round up to next foot dim.)

$L_{ot,clay,reg,prov} := \text{Ceil}(L_{ot,clay,reg,reqd}, \text{ft})$

$L_{ot,clay,prov} := \text{if}(L_{ot,clay,reg,prov} > 3 \cdot b, L_{ot,clay,reg,prov}, L_{ot,clay,mod,prov})$

$$PR_{ot,clay} := \text{if}\left(L_{ot,clay,reg,prov} > 3 \cdot b, \frac{\frac{M_{max}}{2.25 \cdot c_{soil} \cdot b} + \frac{P}{9 \cdot c_{soil} \cdot b}}{L_{ot,clay,reg,prov} - 1.5 \cdot b}, \frac{L_{ot,clay,mod,reqd}}{L_{ot,clay,mod,prov}} \right)$$

$L_{ot} := \text{if}(\text{SoilType} = 1), L_{ot,sand,prov}, L_{ot,clay,prov}$

$L_{ot} = 12 \text{ ft}$

$PR_{ot} := \text{if}(\text{SoilType} = 1), PR_{ot,sand}, PR_{ot,clay}$

$PR_{ot} = 0.96$

$L_{shaft} := L_{ot}$

$PR_{foundation} := PR_{ot}$

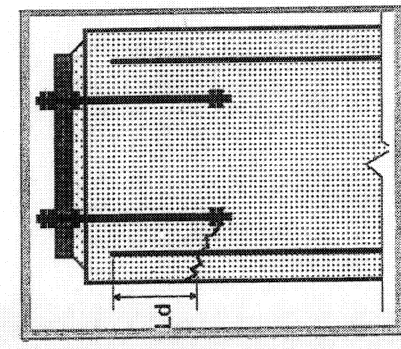
$PR_{foundation} = 0.96$

$K_{sp} := \text{if}(L_{ot} > L_{standard}), L_{ot}, L_{standard}$

$PR_{standard} = 0.96$

*if $L_{ot} > 3^*b$, use regular Broms method*

F. Calculate the Required Anchor Bolt Embedment



$A_{bar} = 1.56 \text{ in}^2$
 $d_{bar} = 1.41 \text{ in}$
 $Gap_{shaft} := \frac{Diameter_{shaft} - Diameter_{boltcircle_pole} - d_{bar}}{2}$
 $Gap_{shaft} = 6.8 \text{ in}$
 $Diameter_{rebar_circle} := Diameter_{shaft} - 12 \text{ in} - d_{bar} - 1 \text{ in}$
 $Diameter_{rebar_circle} = 39.6 \text{ in}$

$Design A_{req} = ratio_{筋, reqd} A_{concrete}$
 $ratio_{筋, reqd} := 0.135 \frac{f_c}{F_{y, rebar}}$
 $ratio_{筋, reqd} = 0.0090$
 $ratio_{筋, reqd} := \text{if}(ratio_{筋, reqd} \leq 0.01, 0.01, ratio_{筋, reqd})$
 $ratio_{筋, reqd} = 0.0100$
 $\#BarsProvided := \text{ceil} \left[\frac{ratio_{筋, reqd} \pi \left(\frac{Diameter_{shaft}}{2} \right)^2}{A_{bar}} \right]$
 $\#BarsProvided = 15$

$\phi_s = 0.9$ #BarsReqdPerRod := $\min \left(\frac{\#BarsProvided}{\#AnchorRods}, \frac{T_u, reqd}{A_{bar} (\phi_s F_{y, rebar})} \right)$
 Use a maximum of three rebar per anchor bolt (conservative)
 #BarsReqdPerRod = 2.67

$area \text{ ratio} = A_{min, reqd} / A_{reqd, provided}$
 $AreaRatio := \frac{\#BarsReqdPerRod}{\#BarsProvidedPerRod}$
 $AreaRatio = 0.16$
 $L_{d, bar} := \max \left[\frac{1.25 (A_{bar}) F_{y, rebar}}{\sqrt{f_c} \text{ ksi in}}, \frac{0.4 (d_{bar}) F_{y, rebar}}{\text{ksi}} \right]$
 $L_{d, bar} = 58.5 \text{ in}$
 development length of bar

$Spacing := \text{floor} \left(\frac{\pi \cdot Diameter_{rebar_circle} \cdot 0.5}{\#BarsProvided} \right) \cdot 0.5$
 $Spacing = 6.0 \text{ in}$

$SpacingFactor := \max \left(\frac{\#BarsProvidedPerRod \cdot 0.5 - 0.5}{0.5} \right)$
 $SpacingFactor = 0.83$
 $L_{added_embedment} := \sqrt{(Spacing \cdot SpacingFactor)^2 + Gap_{shaft}^2}$
 $L_{added_embedment} = 8.4 \text{ in}$
 $L_{embedment, rod} := \max \left[L_{clear} (AreaRatio) + 12 \text{ in} + L_{added_embedment}, 20 \cdot d_{bolt, pole} \right]$
 $L_{embedment, rod} = 40 \text{ in}$
 $L_{embedment, reqd} := \text{Ceil}(L_{embedment, rod, in})$
 $L_{embedment, reqd} = 48 \text{ in}$

$M_x, polebase = \begin{pmatrix} 0.0 \\ 110.4 \end{pmatrix} \cdot kip$
 $M_y, polebase = \begin{pmatrix} 131.0 \\ 0.0 \end{pmatrix} \cdot kip$
 $M_z, polebase = \begin{pmatrix} 0.0 \\ 52.9 \\ 52.9 \end{pmatrix} \cdot \text{kip} \cdot \text{ft}$

maximum torsion (Mx & My not use)
 maximum overturning (My not use)
 maximum CSR
 SDG 3.6.10

Check Reinforcing Clear Spacing
 $Diameter_{shaft} = 4.5 \text{ ft}$
 $\#BarsProvided = 16$
 $d_{bar} = 1.410 \text{ in}$
 $d_{strip} = 0.625 \text{ in}$
 $ReinClearSpacing = \left\lceil \frac{Diameter_{shaft} \cdot 2 \cdot \left(\frac{cover + d_{strip}}{2} \right) + d_{bar}}{\#BarsProvided} \right\rceil$
 $ReinClearSpacing = 0.625 \text{ in}$
 ReinfClearSpacing =

CheckReinClearSpacing := if (ReinClearSpacing \geq 6-in, "OK", "No Good")
 CheckReinClearSpacing = "OK"

Analyze Foundation
Summary - Soil Properties and Drilled Shaft Geometry
 $SoilType = 1$ (clay / sand)
 $\phi_{soil} = 28 \text{ deg}$
 $\gamma_{soil} = 2000 \text{ pcf}$
 $\gamma_{soil} = 37.6 \text{ pcf}$
 $Diameter_{shaft} = 4.5 \text{ ft}$
 $L_{shaft} = 12 \text{ ft}$
 $L_{embedment, rod} = 40 \text{ in}$
 $L_{embedment, rod} = 48 \text{ in}$
 $\#BarsProvided = 16$
 $d_{bar} = 1.41 \text{ in}$

Foundation Performance Ratios
 $PR_{foundation} = 0.964$
 $PR_{slenderness} = 0.96$
 NOTE: Foundation does not include torsion analysis
 PR_slenderness is based on the standard shaft length DA from Index No. 177.43

Subject = "15th and SR 70 Manatee Cour PoleLocation = "Sta. 9+76.41,90" L.I. DesignedBy = "NVE" Date = "Feb 14, 2011"
 ProjectNo = 6029960 SitedBy = "FDOT" Date := "

1st Mast Arm
 #Signals_arm1 = 5 #Panels_arm1 = 1

$$X_{\text{signal,arm1}} = \begin{pmatrix} 18 \\ 26 \\ 34.5 \\ 40 \\ 45.5 \end{pmatrix} \text{ ft}$$

$$Section_{\text{signal,arm1}} = \begin{pmatrix} 3 \\ 3 \\ 3 \\ 1 \\ 3 \end{pmatrix}$$

$$Backplate_{\text{signal,arm1}} = \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}$$

$X_{\text{panel,arm1}} = (9.5) \text{ ft}$ $Area_{\text{panel,arm1}} = (15) \text{ ft}^2$

$L_{\text{total,arm1}} = 47.5 \text{ ft}$ $L_{\text{splice,provided,arm1}} = 24 \text{ in}$

$'FA'_{\text{arm1}} = \begin{pmatrix} 23.5 \\ 26 \end{pmatrix} \text{ ft}$ $'FB'_{\text{arm1}} = \begin{pmatrix} 7.85 \\ 10.36 \end{pmatrix} \text{ in}$ $'FC'_{\text{arm1}} = \begin{pmatrix} 11.14 \\ 14 \end{pmatrix} \text{ in}$

$'FD'_{\text{arm1}} = \begin{pmatrix} 0.25 \\ 0.375 \end{pmatrix} \text{ in}$ $'FE'_{\text{arm1}} = \begin{pmatrix} 5.38 \\ 6.99 \end{pmatrix} \text{ in}$ $max(\Delta_{\text{arm1}}) = 5.38 \text{ in}$ $max(CSR_{\text{arm1}}) = 0.699$

2nd Mast Arm
 #Signals_arm2 = 0 #Panels_arm2 = 1

$X_{\text{signal,arm2}} = (0) \text{ ft}$ $Section_{\text{signal,arm2}} = (0)$ $Backplate_{\text{signal,arm2}} = (0)$

$X_{\text{panel,arm2}} = (0.1) \text{ ft}$ $Area_{\text{panel,arm2}} = (0.1) \text{ ft}^2$

$L_{\text{total,arm2}} = 0 \text{ ft}$ $L_{\text{splice,provided,arm2}} = 24 \text{ in}$

$'SA'_{\text{arm2}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ ft}$ $'SB'_{\text{arm2}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ in}$ $'SC'_{\text{arm2}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ in}$ $'SD'_{\text{arm2}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ in}$ $'SE'_{\text{arm2}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ in}$

$max(\Delta_{\text{arm2}}) = (0) \text{ in}$ $max(CSR_{\text{arm2}}) = 0$

Luminaire Arm and Connection

$'UF'_{\text{arm}} = \alpha = 0 \text{ deg}$ (Angle Between Arms)

$'SA'_{\text{arm}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ ft}$ $'SB'_{\text{arm}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ in}$ $'SC'_{\text{arm}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ in}$ $'SD'_{\text{arm}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ in}$ $'SE'_{\text{arm}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \text{ in}$

Pole Baseplate

$'PR'_{\text{baseplate,arm}_1} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$

$'CSR'_{\text{vert,plate}_1} = 0$

1st Arm/Upright Connection

$'HT'_{\text{arm}} = h_{\text{conn,plate}_0} = 30 \text{ in}$

$'FL'_{\text{arm}} = t_{\text{vertical,plate}_0} = 0.75 \text{ in}$

$'FO'_{\text{arm}} = \text{Offset}_{\text{conn}_0} = 19.5 \text{ in}$

$'FQ'_{\text{arm}} = W_{\text{top,arm}_0} = 0.5 \text{ in}$

$'FS'_{\text{arm}} = \text{Spacing}_{\text{bolts,conn}_0} = 12.5 \text{ in}$

$'FT'_{\text{arm}} = W_{\text{conn,plate}_0} = 0.375 \text{ in}$

$\#ConnBolts_0 = 6$

$'FK'_{\text{arm}} = t_{\text{baseplate,arm}_0} = 2.75 \text{ in}$

$'FN'_{\text{arm}} = W_{\text{vertical,plate}_0} = 0.375 \text{ in}$

$'FP'_{\text{arm}} = d_{\text{bolt,conn}_0} = 1.25 \text{ in}$

$'FR'_{\text{arm}} = t_{\text{conn,plate}_0} = 2.25 \text{ in}$

$'FT'_{\text{arm}} = W_{\text{conn,plate}_0} = 0.375 \text{ in}$

2nd Arm/Upright Connection

$\#ConnBolts_1 = 0$

$'SK'_{\text{arm}} = t_{\text{baseplate,arm}_1} = 0 \text{ in}$

$'SN'_{\text{arm}} = W_{\text{vertical,plate}_1} = 0 \text{ in}$

$'SP'_{\text{arm}} = d_{\text{bolt,conn}_1} = 0 \text{ in}$

$'SR'_{\text{arm}} = t_{\text{conn,plate}_1} = 0 \text{ in}$

$'ST'_{\text{arm}} = W_{\text{conn,plate}_1} = 0 \text{ in}$

'LA' = $Y_{\text{luminaire}} = 0 \text{ ft}$ 'LB' = $X_{\text{luminaire}} = 0 \text{ ft}$ 'LC' = Diameter_{base,lumarm} = 0 in
 'LD' = $t_{\text{wall,lumarm}} = 0 \text{ in}$ 'LE' = Slope_{lumarm} = 0 'LF' = $t_{\text{lumarm}} = 0 \text{ ft}$
 'LG' = $d_{\text{bolt,lum}} = 0 \text{ in}$ 'LH' = $t_{\text{baseplate,lum}} = 0 \text{ in}$
 'LI' = $W_{\text{base,lum}} = 0 \text{ in}$ 'LJ' = $W_{\text{channel,lum}} = 0 \text{ in}$ 'LK' = $W_{\text{channel,lum}} = 0 \text{ in}$
 'LL' = $W_{\text{base,lumarm}} = 0$ 'LM' = $PR_{\text{baseplate,lum}} = 0$ 'LN' = $PR_{\text{conn,plate,lum}} = 0$
 'LO' = $Y_{\text{pole}} = 22 \text{ ft}$ 'LP' = $Y_{\text{arm,conn}} = 20 \text{ ft}$ 'LQ' = Diameter_{tip,pole} = 19 in
 'LR' = $t_{\text{wall,pole}} = 0.375 \text{ in}$ 'LS' = $\Delta_{\text{x,d1}} = 0.73 \text{ in}$ 'LT' = Slope_x = 0.38 deg
 'LU' = $\Delta_{\text{x,d2}} = 0 \text{ in}$ 'LV' = Slope_z = 0 deg
 'LW' = $C_{\text{tip,pole}} = 0.997$ 'LX' = $max(CSR_{\text{pole}}) = 0.487$

'UB' = $Y_{\text{arm,conn}} = 20 \text{ ft}$ 'UC' = Diameter_{tip,pole} = 15.92 in
 'UD' = $t_{\text{wall,pole}} = 0.375 \text{ in}$ 'UE' = $\alpha = 0 \text{ deg}$ 'UF' = Slope_x = 0.38 deg
 'UG' = $\Delta_{\text{x,d1}} = 0.73 \text{ in}$ 'UH' = Slope_z = 0 deg
 'UI' = $C_{\text{tip,pole}} = 0.997$ 'UJ' = $max(CSR_{\text{pole}}) = 0.487$

'HT' = $h_{\text{conn,plate}} = 30 \text{ in}$ 'SJ' = $b_{\text{conn,plate}_1} = 0 \text{ in}$
 'FL' = $t_{\text{vertical,plate}_0} = 0.75 \text{ in}$ 'SM' = $W_{\text{base,arm}_1} = 0 \text{ in}$
 'FO' = $\text{Offset}_{\text{conn}_0} = 19.5 \text{ in}$ 'SO' = $\text{Offset}_{\text{conn}_1} = 0 \text{ in}$
 'FQ' = $W_{\text{top,arm}_0} = 0.5 \text{ in}$ 'SQ' = $W_{\text{top,arm}_1} = 0 \text{ in}$
 'FS' = $\text{Spacing}_{\text{bolts,conn}_0} = 12.5 \text{ in}$ 'SS' = $\text{Spacing}_{\text{bolts,conn}_1} = 0 \text{ in}$
 'FT' = $W_{\text{conn,plate}_0} = 0.375 \text{ in}$ 'ST' = $W_{\text{conn,plate}_1} = 0 \text{ in}$

DataFile = "E5T3 - STA 9+7.6.dat" WindSpeed = 130 mph
 Pole1SR70xmcd.xmcd v4.3
 2/14/2011

#AnchorRods = 6

'BA' := Diameter_baseplate.pole = 35 in

'BB' := baseplate.pole = 2.5 in

'BC' := d_bolt.pole = 2 in

'BD' := w_esp.pole = 0.375 in

'BE' := w_bot.pole = 0.3125 in

'BF' := L_embdment rod = 40 in

Diameter_boltcircle.pole = 27 in

PR_rod = 0.367

PR_plate.pole = 0.543

Foundation

'DA' := L_shaft = 12 ft *Increase to standard length of shaft per FHWA-19743*

d_bar = 1.41 in *J*

'DB' := #BarsProvided = 16

PR_foundation = 0.964 *Using L_c*

PR_standard = 0.96 *Using L_c standard*

WRITEPRN to Line 1-2-3

Mast Arm Tip Deflection

Compare Mast Arm deflection of each arm to a proposed camber

Camber_arm1 := 2 deg Camber_arm2 := 2 deg

$$L_{arm1} := \sum L_{arm1} - \text{if}(L_{arm1} = 0 \text{ ft}, 0 \text{ ft}, 2 \text{ ft})$$

$$L_{arm2} := \sum L_{arm2} - \text{if}(L_{arm2} = 0 \text{ ft}, 0 \text{ ft}, 2 \text{ ft})$$

Deflection_arm1 := Slope_x L_arm1 + max(Δ_arm1)

Deflection_arm1 = 9.14 in

CamberArm1_upward := sin(Camber_arm1) L_arm1

CamberArm1_upward = 19.89 in

Deflection_arm2 := [Slope_x L_arm2 cos(α) + Slope_y L_arm2 cos(α) + max(Δ_arm2)]

Deflection_arm2 = 0 in

CamberArm2_upward := sin(Camber_arm2) L_arm2

CamberArm2_upward = 0 in

Check Clearance Between Connection Plates

(for Two Arm Structures only)

α := 0 deg α_0 := if((α > 180 deg), (360 deg - α), α)

Offset_conn_0 = 19.5 in b_conn_plate_0 = 32 in h_conn_plate = 30 in

Offset_conn_1 = 0 in b_conn_plate_1 = 0 in

$$x_1 := \text{Offset}_{conn_0} - t_{conn_plate_0} - h_{conn_plate_0} \frac{\sin(\text{Camber}_{arm1})}{2} \quad y_1 := \frac{b_{conn_plate_0}}{2}$$

x_1 = 16.73 in y_1 = 16 in

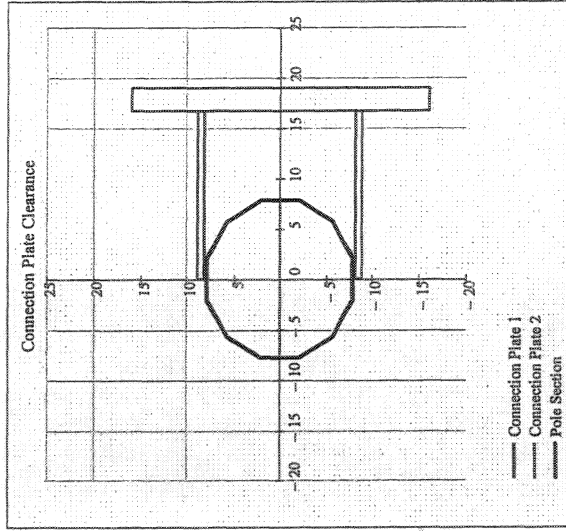
$$x_2 := \left(\text{Offset}_{conn_1} - t_{conn_plate_1} - h_{conn_plate_1} \frac{\sin(\text{Camber}_{arm2})}{2} \right) \cos(\alpha) + \frac{b_{conn_plate_1}}{2} \sin(\alpha)$$

$$y_2 := \left(\text{Offset}_{conn_1} - t_{conn_plate_1} - h_{conn_plate_1} \frac{\sin(\text{Camber}_{arm2})}{2} \right) \sin(\alpha) - \frac{b_{conn_plate_1}}{2} \cos(\alpha)$$

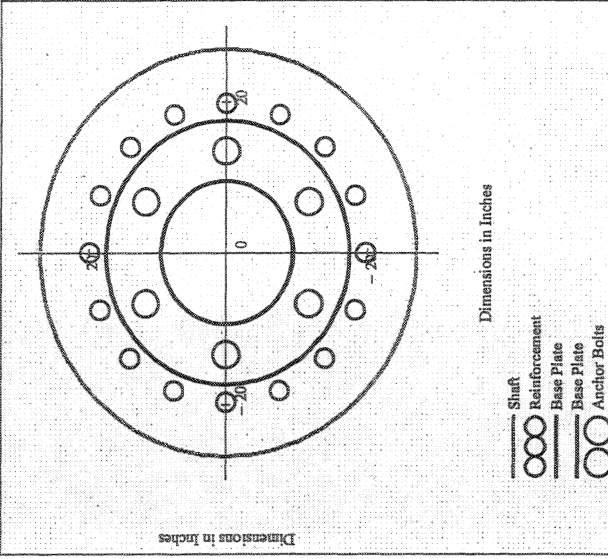
x_2 = -0.52 in y_2 = 0 in

Clearance := $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ *Clearance = 23.53 in*

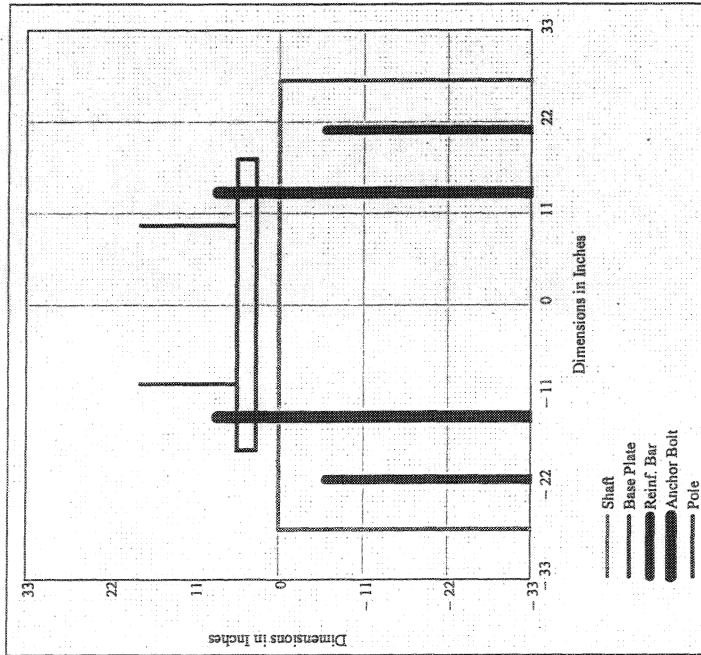
(if Clearance equals 0, then Connection Plates intersect and redesign is required)



Plan View - Drilled Shaft, Base Plate, Anchor Bolts, & Reinforcing Steel



Elevation View - Drilled Shaft, Base Plate, Anchor Bolts, & Reinforcing Steel



FOUNDATION DESIGN AND VERIFICATION





ONE COMPANY
Many Solutions®

Project: 10 01 0 / 011 1 - 10001	Computer: NVC	Date: 2/10/11
Subject: FOUNDATION DESIGN	Checked: CAS	Date: FEB 2011
Task: SERVICE FACTOR EXPLANATION	Page:	of:
Job #:	No:	

FDOT MATHCAD DRILLED SHAFT

- BASED ON CURRENT FDOT PRACTICE, THE FULL TORSION MUST BE ENTERED WHEN DETERMINING THE SHAFT LENGTH DUE TO TORSION. NO NEED TO INCLUDE SERVICE FACTOR

SPREADSHEET SHAFT 24

- FOR SPREADSHEET IT IS ACCEPTABLE TO REDUCE TORSION BY THE SERVICE FACTOR CALCULATED IN THE MAST ARM DESIGN FILE. THEREFORE, $TORSION \times SERVICE FACTOR = TORSION MOMENT$ FOR SPREADSHEET SHAFT 24

THE DESIGNER WILL USE THE MORE CONSERVATIVE LENGTH PRODUCED BY BOTH METHODS.

Drilled Shaft Foundation for Sign & Signal Structures

© Florida Department of Transportation

SUBJECT S15th St E / SR 70 Pole 1

Proj # 6029960 LOCATION Sta 9+76

DESIGNED BY NVE

DATE 2-14-11

CHECKED BY CAS

DATE Feb 2011

Input

SoilType := 1
0 - clay
1 - sand

$\gamma_{\text{soil.dry}} := 100$ pcf dry soil weight

$\gamma_{\text{water}} := 62.4$ pcf water weight
(zero if no water)

$\gamma_{\text{soil}} := \gamma_{\text{soil.dry}} - \gamma_{\text{water}}$

$\gamma_{\text{soil}} = 37.6$ pcf

$b := 4.5$ ft shaft diameter

Offset := 0.0 ft

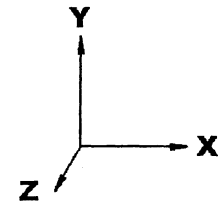
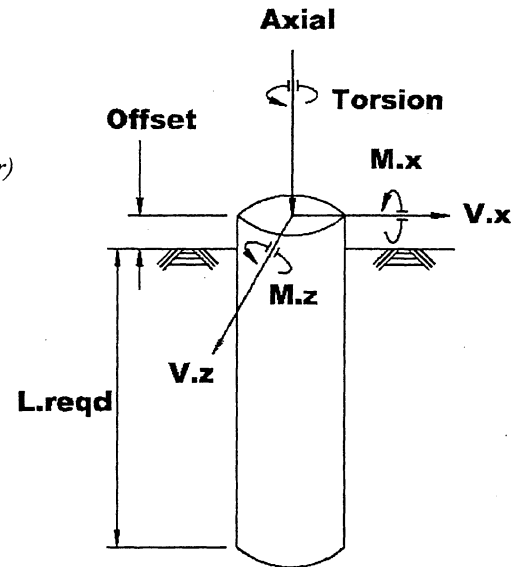
$\phi_{\text{soil}} := 28$ deg soil friction angle
(sand)

$c_{\text{soil}} := 2.0$ $\frac{\text{kip}}{\text{ft}^2}$ soil shear
strength (clay)

Applied Loads

$M_x := 110.4$ kip-ft $V_x := 0.2$ kip Torsion := 131.0 kip-ft

$M_z := 52.9$ kip-ft $V_z := 6.0$ kip Axial := 3.8 kip



Shaft Depth Required to Resist Overturning

SF_{ot} := 2 Safety Factor against Overturning

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$$M_{\text{total}} := (\text{SF}_{\text{ot}}) \cdot \sqrt{M_x^2 + M_z^2}$$

$$P_{\text{total}} := (\text{SF}_{\text{ot}}) \cdot \sqrt{V_x^2 + V_z^2}$$

$$M_{\text{total}} = 244.8 \text{ kip} \cdot \text{ft}$$

$$P_{\text{total}} = 12 \text{ kip}$$

short free-head pile in cohesionless soil using Broms method

$$K_p := \tan\left(45 \text{ deg} + \frac{\phi_{\text{soil}}}{2}\right)^2$$

$$e_{\text{sand}} := \text{Offset}$$

Guess value $L_{\text{otSand}} := 8$ ft

$$\text{Given } \frac{\gamma_{\text{soil}} \cdot b \cdot L_{\text{otSand}}^3 \cdot K_p}{2} - P_{\text{total}} \cdot (e_{\text{sand}} + L_{\text{otSand}}) - M_{\text{total}} = 0 \text{ kip} \cdot \text{ft}$$

Temp := Find(L_{otSand}) $L_{\text{otSand}} := \text{Temp}$

$$L_{\text{otSand}} = 11.818 \text{ ft}$$

(round up to next foot)

$$L_{\text{otSand}} := \text{ceil}\left(\frac{L_{\text{otSand}}}{\text{ft}}\right) \cdot \text{ft}$$

$$L_{\text{otSand}} = 12 \text{ ft}$$

short free-head pile in cohesive soil using Modified Broms method for $L < 3b$ (see reference file for derivation)

$$\text{Slope} := 8 \cdot \frac{c_{\text{soil}}}{3 \cdot b} \quad e_{\text{clay}} := \frac{M_{\text{total}}}{P_{\text{total}}} + \text{Offset}$$

$$\text{nforce}(M, N) := \left[\text{Slope} \cdot (2 \cdot M + N) + 2 \cdot c_{\text{soil}} \right] \cdot N \cdot \frac{b}{2} \quad \text{mforce}(M) := (2 \cdot c_{\text{soil}} + M \cdot \text{Slope}) \cdot M \cdot \frac{b}{2}$$

$$\text{m_arm}(M) := e_{\text{clay}} + \frac{M}{3} \cdot \frac{2 \cdot (M \cdot \text{Slope} + c_{\text{soil}}) + c_{\text{soil}}}{M \cdot \text{Slope} + 2 \cdot c_{\text{soil}}}$$

$$\text{n_arm}(M, N) := e_{\text{clay}} + M + \frac{N}{3} \cdot \frac{2 \cdot (N \cdot \text{Slope} + M \cdot \text{Slope} + c_{\text{soil}}) + (M \cdot \text{Slope} + c_{\text{soil}})}{\text{Slope} \cdot (2 \cdot M + N) + 2 \cdot c_{\text{soil}}}$$

Guess value $M := 4.0 \cdot \text{ft}$ $N := 4.0 \cdot \text{ft}$

Given $P_{\text{total}} + \text{nforce}(M, N) = \text{mforce}(M)$ $\text{mforce}(M) \cdot \text{m_arm}(M) = \text{nforce}(M, N) \cdot \text{n_arm}(M, N)$

$$\begin{pmatrix} M \\ N \end{pmatrix} := \text{Find}(M, N) \quad L_{\text{ot1Clay}} := M + N \quad L_{\text{ot1Clay}} = 6.98 \cdot \text{ft}$$

(round up to next foot) $L_{\text{ot1Clay}} := \text{ceil}\left(\frac{L_{\text{ot1Clay}}}{\text{ft}}\right) \cdot \text{ft} \quad L_{\text{ot1Clay}} = 7 \cdot \text{ft}$

short free-head pile in cohesive soil using Regular Broms method for $L > 3b$

$$f_{\text{clay}} := \frac{P_{\text{total}}}{9 \cdot c_{\text{soil}} \cdot b} \quad M_{\text{maxtemp}} := P_{\text{total}} \cdot (e_{\text{clay}} + 1.5 \cdot b + 0.5 \cdot f_{\text{clay}}) \quad g := \sqrt{\frac{M_{\text{maxtemp}}}{2.25 \cdot c_{\text{soil}} \cdot b}}$$

$$L_{\text{ot2Clay}} := (1.5 \cdot b + f_{\text{clay}} + g) \quad L_{\text{ot2Clay}} = 10.915 \cdot \text{ft}$$

(round up to next foot) $L_{\text{ot2Clay}} := \text{ceil}\left(\frac{L_{\text{ot2Clay}}}{\text{ft}}\right) \cdot \text{ft} \quad L_{\text{ot2Clay}} = 11 \cdot \text{ft}$

$$L_{\text{otClay}} := \text{if}(L_{\text{ot1Clay}} < 3 \cdot b, L_{\text{ot1Clay}}, L_{\text{ot2Clay}}) \quad L_{\text{otClay}} = 7 \cdot \text{ft}$$

(If $L_{\text{ot}} < 3b$, use Modified Broms method)

$$L_{\text{reqdOT}} := \text{if}(\text{SoilType} = 1, L_{\text{otSand}}, L_{\text{otClay}}) \quad L_{\text{reqdOT}} = 12 \cdot \text{ft}$$

Shaft Depth Required to Resist Torsion

SF_{tor} := 1.0 Safety Factor against Torsion
 1.0 for Mast Arm signal structures
 1.3 for Overhead Cantilever sign structures

SM Vol-9 13.6

ω_{fdot} := 1.5 load transfer ratio SM Vol-9 13.6

$\mu := \tan(\phi_{soil})$ coefficient of friction between shaft and soil $\mu = 0.532$

$\gamma_{concrete}$:= 150 pcf

$\gamma_{concrete} := \gamma_{concrete} - \gamma_{water}$

$\gamma_{concrete} = 87.6$ pcf

CohesionFactor := 0.55

$f_{se} := CohesionFactor \cdot c_{soil}$

short free-head pile in cohesionless soil

Guess value $L_{torSand} := L_{reqdOT}$

Given

$$Torsion = \frac{\left[\pi \cdot b \cdot (L_{torSand}) \cdot \gamma_{soil} \left(\frac{L_{torSand}}{2} \right) \cdot (\omega_{fdot}) \cdot \frac{b}{2} + \pi \cdot \left(\frac{b}{2} \right)^2 \cdot L_{torSand} \cdot (\gamma_{concrete}) \cdot \frac{b}{3} \cdot \mu \right]}{SF_{tor}}$$

Temp := Find($L_{torSand}$)

$L_{torSand} := Temp$

$L_{torSand} = 11.5$ ft

(round up to next foot)

$L_{torSand} := \text{ceil} \left(\frac{L_{torSand}}{\text{ft}} \right) \cdot \text{ft}$

$L_{torSand} = 12$ ft

short free-head pile in cohesive soil

Guess value $L_{torClay} := L_{reqdOT}$

$$\text{Given} \quad \left[f_{se} \cdot (\pi \cdot b) \cdot (L_{torClay} - 1.5 \cdot \text{ft}) \cdot \frac{b}{2} \right] + \left[f_{se} \cdot \pi \cdot \left(\frac{b}{2} \right)^2 \cdot \left(\frac{b}{3} \right) \right] = Torsion \cdot SF_{tor}$$

Temp := Find($L_{torClay}$)

$L_{torClay} := Temp$

$L_{torClay} = 4.49$ ft

(round up to next foot)

$L_{torClay} := \text{ceil} \left(\frac{L_{torClay}}{\text{ft}} \right) \cdot \text{ft}$

$L_{torClay} = 5$ ft

$L_{reqdTor} := \text{if}(\text{SoilType} = 1, L_{torSand}, L_{torClay})$

$L_{reqdTor} = 12$ ft

$L_{reqd} := \text{if}(L_{reqdTor} > L_{reqdOT}, L_{reqdTor}, L_{reqdOT})$

$L_{reqd} = 12$ ft *

Unfactored Maximum Moment in Snaft

short free-head pile in cohesionless soil using Broms method

$$f_{\text{sand}} := \sqrt{\frac{2 \cdot \frac{P_{\text{total}}}{\text{SF}_{\text{ot}}}}{3 \cdot \gamma_{\text{soil}} \cdot b \cdot K_p}} \quad f_{\text{sand}} = 2.922 \text{ ft}$$

$$M_{\text{maxSand}} := \frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} \cdot (e_{\text{sand}} + f_{\text{sand}}) - \frac{\frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} \cdot f_{\text{sand}}}{3} + \frac{M_{\text{total}}}{\text{SF}_{\text{ot}}} \quad M_{\text{maxSand}} = 134.1 \cdot \text{kip} \cdot \text{ft}$$

short free-head pile in cohesive soil using Modified Broms method for $L < 3b$ (see reference file for derivation)

Guess value $f_{\text{mod}} := 4.0 \cdot \text{ft}$

Given $\frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} = \frac{f_{\text{mod}} \cdot b}{2} \cdot (2 \cdot c_{\text{soil}} + f_{\text{mod}} \cdot \text{Slope})$

$$f_{\text{mod}} := \text{Find}(f_{\text{mod}}) \quad f_{\text{mod}} = 0.571 \text{ ft}$$

$$M_{\text{modBroms}} := \frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} \cdot (e_{\text{clay}} + f_{\text{mod}}) - \frac{c_{\text{soil}} \cdot b \cdot f_{\text{mod}}^2}{2} - \frac{b \cdot f_{\text{mod}}^3 \cdot \text{Slope}}{6} \quad M_{\text{modBroms}} = 124.2 \cdot \text{kip} \cdot \text{ft}$$

short free-head pile in cohesive soil using Regular Broms method for $L > 3b$

$$M_{\text{Broms}} := \frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} \cdot (e_{\text{clay}} + 1.5 \cdot b + 0.5 \cdot f_{\text{clay}}) \quad M_{\text{Broms}} = 163.4 \cdot \text{kip} \cdot \text{ft}$$

$$M_{\text{maxClay}} := \text{if}(L_{\text{otClay}} < 3 \cdot b, M_{\text{modBroms}}, M_{\text{Broms}}) \quad M_{\text{maxClay}} = 124.2 \cdot \text{kip} \cdot \text{ft}$$

(If $L_{\text{ot}} < 3b$, use Modified Broms method)

$$M_{\text{max}} := \text{if}(\text{SoilType} = 1, M_{\text{maxSand}}, M_{\text{maxClay}}) \quad (\text{this is a Service moment}) \quad M_{\text{max}} = 134.1 \cdot \text{kip} \cdot \text{ft}$$

Minimum Reinforcing and Spacing

$F_{y,\text{rebar}} := 60 \cdot \text{ksi}$ reinforcing yield strength

$f_c := 4.0 \cdot \text{ksi}$ concrete strength Spec 346-3

cover := 6 in cover SDG Table 1.4.2-1

$A_{\text{bar}} := 1.56 \cdot \text{in}^2$ longitudinal bar area

Num 11 bars

$d_{\text{bar}} := 1.41 \cdot \text{in}$ longitudinal bar diameter

$A_{v,\text{bar}} := 0.31 \cdot \text{in}^2$ stirrup area

Num 5 bars

SM Vol-9 13.6.2

$d_{v,\text{bar}} := 0.625 \cdot \text{in}$ stirrup diameter

$s_{v1} := 4 \cdot \text{in}$ stirrup spacing, depth = 0 ft-2 ft

SM Vol-9 13.6.2

$s_{v2} := 12 \cdot \text{in}$ stirrup spacing, depth = 2 ft-depth.stir

$s_{v3} := 12 \cdot \text{in}$ stirrup spacing, depth > depth.stir

$\text{depth}_{\text{stir}} := 12.0 \cdot \text{ft}$ stirrup depth, see s.v2 and s.v3 above

b = 4.5 ft shaft diameter

$$\text{Num}_{\text{bar}_1} := \frac{0.01}{A_{\text{bar}}} \cdot \frac{\pi \cdot b^2}{4}$$

$$\text{Num}_{\text{bar}_1} = 14.7$$

LRFD 5.7.4.2

$$\text{Num}_{\text{bar}_2} := \frac{0.135}{A_{\text{bar}} \cdot F_{y,\text{rebar}}} \cdot \left(\frac{\pi \cdot b^2}{4} \cdot f_c \right)$$

$$\text{Num}_{\text{bar}_2} = 13.2$$

$$\text{Num}_{\text{bar}} := \text{ceil}(\max(\text{Num}_{\text{bar}_1}, \text{Num}_{\text{bar}_2}))$$

$$\text{Num}_{\text{bar}} = 15$$

number of longitudinal bars

~~$$\text{Num}_{\text{bar}} := 16$$~~

Per Design Standard Index 17743 and Mast Arm Design File

$$\text{ReinfClearSpacing} := \left[b - 2 \cdot \left(\text{cover} + d_{v,\text{bar}} + \frac{d_{\text{bar}}}{2} \right) \right] \cdot \frac{\pi}{\text{Num}_{\text{bar}}} - d_{\text{bar}}$$

$$\text{ReinfClearSpacing} = 6.31 \cdot \text{in}$$

CheckReinfClearSpacing := if(ReinfClearSpacing ≥ 6in, "OK", "No Good")

CheckReinfClearSpacing = "OK"

SDG 3.6.10

Check Shear and Torsion

$LF_{shr} := 1.3$	Shear Load Factor	1.3 is a reasonable Load Factor for combined WL + DL on sign and signal structures
$LF_{tor} := 1.3$	Torsion Load Factor	
$\phi_{shr} := 0.90$	Shear Resistance Factor	<u>LRFD 5.5.4.2.1</u>
$\phi_{tor} := 0.90$	Torsion Resistance Factor	<u>LRFD 5.5.4.2.1</u>

$$V_u := LF_{shr} \cdot \sqrt{V_x^2 + V_z^2} \quad V_u = 7.8 \cdot \text{kip}$$

$$T_u := LF_{tor} \cdot \text{Torsion} \quad T_u = 170.3 \cdot \text{kip} \cdot \text{ft}$$

Area and perimeter of concrete cross-section

$$A_{cp} := \pi \cdot \left(\frac{b}{2}\right)^2 \quad A_{cp} = 2290.2 \cdot \text{in}^2$$

$$p_{cp} := 2 \cdot \pi \cdot \left(\frac{b}{2}\right) \quad p_{cp} = 169.6 \cdot \text{in}$$

Diameter, perimeter and area enclosed by the centerline of the outermost closed transverse torsion reinforcement

$$d_{oh} := b - 2 \cdot \left(\text{cover} + \frac{d_{v,bar}}{2}\right) \quad d_{oh} = 41.4 \cdot \text{in}$$

$$p_h := \pi \cdot d_{oh} \quad p_h = 130 \cdot \text{in}$$

$$A_{oh} := \pi \cdot \left(\frac{d_{oh}}{2}\right)^2 \quad A_{oh} = 1344.5 \cdot \text{in}^2$$

$$A_o := 0.85 \cdot A_{oh} \quad A_o = 1142.8 \cdot \text{in}^2 \quad \text{LRFD C5.8.2.1}$$

Check Shear Strength

$$V_c := 0.0316 \cdot (2.0) \cdot \sqrt{\frac{f_c}{\text{ksi}}} \cdot 0.8 \cdot \left(\frac{b}{\text{in}}\right)^2 \cdot \text{kip} \quad V_c = 294.9 \cdot \text{kip}$$

LRFD Eqn 5.8.3.3-3
LRFD 5.8.3.4.1

ACI 11.3.3

$$V_s := \frac{A_{v,bar} \cdot F_{y,rebar} \cdot (0.8 \cdot b)}{\max(s_{v1}, s_{v2}, s_{v3})} \quad V_s = 67.0 \cdot \text{kip}$$

LRFD Eqn 5.8.3.3-4

$$\phi_{shr} = 0.9 \quad V_u = 7.8 \cdot \text{kip}$$

$$\text{ShearRatio} := \frac{V_u - \phi_{shr} \cdot V_c}{\phi_{shr} \cdot V_s} \quad \text{ShearRatio} = -4.274$$

$$\text{ShearRatio} := \text{if}(\text{ShearRatio} \leq 0, 0, \text{ShearRatio}) \quad \text{ShearRatio} = 0$$

Check Torsion Strength

$$T_{n1} := \frac{2 \cdot A_o \cdot A_{v,bar} \cdot F_{y,bar}}{s_{v1}} \quad T_{n1} = 885.7 \cdot \text{kip} \cdot \text{ft}$$

LRFD Eqn 5.8.3.6.2-1

LRFD 5.8.3.4.1

$$T_{n2} := \frac{2 \cdot A_o \cdot A_{v,bar} \cdot F_{y,bar}}{s_{v2}} \quad T_{n2} = 295.2 \cdot \text{kip} \cdot \text{ft}$$

$$T_{n3} := \frac{2 \cdot A_o \cdot A_{v,bar} \cdot F_{y,bar}}{s_{v3}} \quad T_{n3} = 295.2 \cdot \text{kip} \cdot \text{ft}$$

$$\phi_{tor} = 0.9$$

$$T_u = 170.3 \cdot \text{kip} \cdot \text{ft}$$

$$L_{reqdTor} = 12 \text{ ft}$$

L_{DESIGN} = 15 FT, THIS IS CONSERVATIVE

$$\text{TorsionRatio}_{n1} := \frac{T_u}{\phi_{tor} \cdot T_{n1}} \quad \text{TorsionRatio}_{n1} = 0.214$$

$$\text{TorsionRatio}_{n2} := \frac{\frac{L_{reqdTor} - 2 \cdot \text{ft}}{L_{reqdTor}} \cdot T_u}{\phi_{tor} \cdot T_{n2}} \quad \text{TorsionRatio}_{n2} = 0.534$$

$$\text{TorsionRatio}_{n3} := \frac{\frac{L_{reqdTor} - \text{depth}_{stir}}{L_{reqdTor}} \cdot T_u}{\phi_{tor} \cdot T_{n3}} \quad \text{TorsionRatio}_{n3} = 0$$

$$\text{TorsionRatio} := \max(\text{TorsionRatio}_{n1}, \text{TorsionRatio}_{n2}, \text{TorsionRatio}_{n3})$$

$$\text{TorsionRatio} = 0.534$$

$$T_{cr} := 0.125 \sqrt{\frac{f_c}{\text{ksi}}} \left(\frac{A_{cp}^2}{p_{cp} \cdot \text{in}^3} \right) \cdot \text{kip} \cdot \text{in} \quad T_{cr} = 644.1 \cdot \text{kip} \cdot \text{ft}$$

LRFD Eqn 5.8.2.1-4

$$\text{TorsionRatio} := \text{if}(T_u \leq 0.25 \cdot \phi_{tor} \cdot T_{cr}, 0, \text{TorsionRatio}) \quad \text{TorsionRatio} = 0.534$$

LRFD Eqn 5.8.2.1-3

$$\text{ShearRatio} = 0$$

$$\text{CheckShearTorsion} := \text{if}(\text{ShearRatio} + \text{TorsionRatio} \leq 1, \text{"OK"}, \text{"No Good"})$$

$$\text{CheckShearTorsion} = \text{"OK"}$$

Check Maximum Spacing Transverse Reinforcement

$$v_u := \frac{V_u}{\phi_{shr} \cdot b \cdot (0.8 \cdot b)}$$

$$v_u = 0.003717 \cdot \text{ksi}$$

LRFD Eqn 5.8.2.9-1

$$0.125 \cdot f_c = 0.5 \cdot \text{ksi}$$

$$s_{max1} := \text{if}[0.8 \cdot (0.8 \cdot b) < 24 \cdot \text{in}, 0.8 \cdot (0.8 \cdot b), 24 \cdot \text{in}]$$

$$s_{max1} = 24 \cdot \text{in}$$

LRFD Eqn 5.8.2.7-1

$$s_{max2} := \text{if}[0.4 \cdot (0.8 \cdot b) < 12 \cdot \text{in}, 0.4 \cdot (0.8 \cdot b), 12 \cdot \text{in}]$$

$$s_{max2} = 12 \cdot \text{in}$$

LRFD Eqn 5.8.2.7-2

$$s_{max} := \text{if}(v_u < 0.125 \cdot f_c, s_{max1}, s_{max2})$$

$$s_{max} = 24 \cdot \text{in}$$

$$\max(s_{v1}, s_{v2}, s_{v3}) = 12 \cdot \text{in}$$

$$\text{CheckMaxSpacingTransvReinf} := \text{if}(\max(s_{v1}, s_{v2}, s_{v3}) \leq s_{max}, \text{"OK"}, \text{"No Good"}) \quad \text{CheckMaxSpacingTransvReinf} = \text{"OK"}$$

Check Longitudinal Reinforcement for Combined Shear and Torsion

LRFD Eqn 5.8.3.6.3-1

$$M_u := L F_{tor} \cdot \sqrt{M_x^2 + M_z^2}$$

$$M_u = 159.1 \cdot \text{kip} \cdot \text{ft}$$

LRFD 5.8.3.4.1

$$V_{temp} := \text{if}\left(\frac{V_u}{\phi_{shr}} - 0.5 \cdot V_s > 0 \cdot \text{kip}, \frac{V_u}{\phi_{shr}} - 0.5 \cdot V_s, 0 \cdot \text{kip}\right) \quad V_{temp} = 0 \cdot \text{kip}$$

$$\text{LongReinf}_{shr.tor} := \frac{\frac{M_u}{\phi_{tor} \cdot (0.8 \cdot b)} + \sqrt{\left(\frac{V_{temp}}{\text{kip}}\right)^2 + \left(\frac{0.45 \cdot p_h \cdot T_u}{2 \cdot A_o \cdot \phi_{tor} \cdot \text{kip}}\right)^2}}{F_{y.rebar}} \cdot \text{kip}$$

$$\text{LongReinf}_{shr.tor} = 1.787 \cdot \text{in}^2$$

$$\text{Num}_{bar} \cdot A_{bar} = 24.96 \cdot \text{in}^2$$

$$\text{CheckLongReinf}_{shr.tor} := \text{if}(\text{Num}_{bar} \cdot A_{bar} \geq \text{LongReinf}_{shr.tor}, \text{"OK"}, \text{"No Good"}) \quad \text{CheckLongReinf}_{shr.tor} = \text{"OK"}$$

Anchor Bolt Embedment

$Num_{anchor} := 6$ *number of anchor bolts*

$d_{anchor} := 2.0 \text{ in}$ *anchor bolt diameter*

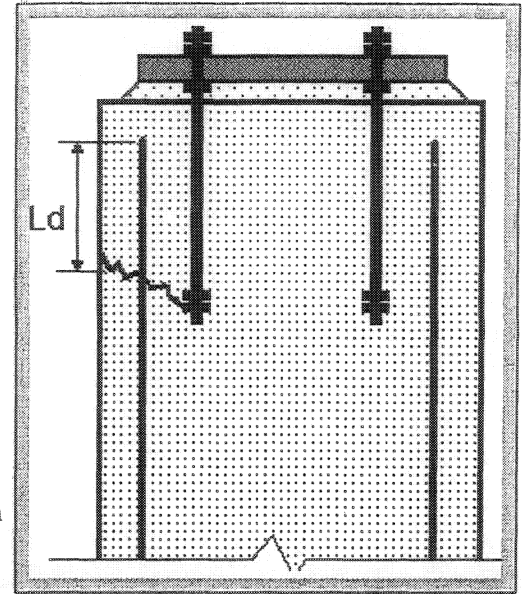
$Diameter_{boltcircle.anchor} := 27 \text{ in}$ *anchor bolt circle diameter*

$F_{t.anchor} := 36.4 \text{ kip}$ *anchor bolt tensile load*

* PREVIOUSLY CALCULATED IN MAST ARM DESIGN FILE, SEE FOUNDATION ANALYSIS SECTION.

$Gap_{shaft} := \frac{b - 2 \cdot cover - Diameter_{boltcircle.anchor} - d_{bar}}{2}$ $Gap_{shaft} = 6.8 \text{ in}$

$Diameter_{bar.circle} := b - 2 \cdot cover - d_{bar} - 2 \cdot d_{v.bar}$ $Diameter_{bar.circle} = 39.34 \text{ in}$



$Num_{bars.per.anchor} := \min \left(\left(\frac{Num_{bar}}{Num_{anchor}} \right), 3 \right)$ *Use a maximum of three rebar per anchor bolt (conservative)*

$Num_{bars.per.anchor} = 2.7$

$\phi := 0.9$ $Num_{bars.reqd.per.anchor} := \frac{F_{t.anchor}}{A_{bar} \cdot (\phi \cdot F_{y.rebar})} \cdot \frac{Diameter_{boltcircle.anchor}}{Diameter_{bar.circle}}$

$Num_{bars.reqd.per.anchor} = 0.3$

$AreaRatio := \frac{Num_{bars.reqd.per.anchor}}{Num_{bars.per.anchor}}$

$AreaRatio = 0.11$

$AreaRatio := \text{if}(AreaRatio < 1, AreaRatio, 1)$

$AreaRatio = 0.11$

$L_{d.bar} := \max \left[\frac{1.25 \cdot (A_{bar}) \cdot F_{y.rebar}}{\sqrt{f_c} \cdot \text{ksi} \cdot \text{in}}, \frac{0.4 \cdot (d_{bar}) \cdot F_{y.rebar}}{\text{ksi}} \right]$ *longitudinal bar development length*

$L_{d.bar} = 58.5 \text{ in}$

$SpacingFactor := \max \left(\left(\frac{Num_{bars.per.anchor} \cdot 0.5 - 0.5}{0.5} \right), 0.5 \right)$

$SpacingFactor = 0.833$

$L_{embedment.added} := \sqrt{(ReinfClearSpacing \cdot SpacingFactor)^2 + Gap_{shaft}^2}$

$L_{embedment.added} = 8.6 \text{ in}$

$L_{embedment.anchor} := \max \left[L_{d.bar} \cdot (AreaRatio) + 12 \text{ in} + L_{embedment.added}, 20 \cdot d_{anchor} \right]$

$L_{embedment.anchor} := \text{Ceil}(L_{embedment.anchor}, \text{in})$

$L_{embedment.anchor} = 40 \text{ in}$

Anchor Bolt Shear Break-Out Strength

References:

ACI 318-05 Appendix D.

FDOT/University of Florida Report BD545 RPWO #54.

Anchor Embedment Requirements for Signal/Sign Structures, July 2007.

$$r_b := \frac{\text{Diameter}_{\text{boltcircle.anchor}}}{2} \quad r_b = 13.5 \cdot \text{in}$$

$$r := \frac{b}{2} \quad r = 27 \cdot \text{in}$$

$$c_{a1} := \frac{\sqrt{r_b^2 + 3.25 \cdot (r^2 - r_b^2)} - r_b}{3.25} \quad c_{a1} = 9.47 \cdot \text{in} \quad \text{adjusted cover}$$

UF Report Eqn 3-2

$$L_e := \min(8 \cdot d_{\text{anchor}}, L_{\text{embedment.anchor}}) \quad L_e = 16 \cdot \text{in} \quad \text{load bearing length of anchor for shear}$$

ACI D.6.2.2

$$V_b := 13 \cdot \left(\frac{L_e}{d_{\text{anchor}}} \right)^{0.2} \cdot \sqrt{\frac{d_{\text{anchor}}}{\text{in}}} \cdot \sqrt{\frac{f_c}{\text{psi}}} \cdot \left(\frac{c_{a1}}{\text{in}} \right)^{1.5} \cdot \text{lbf}$$

$$V_b = 51.3 \cdot \text{kip} \quad \text{shear break-out strength (single anchor)}$$

UF Report Eqn 2-11

$$A := \frac{(360 \cdot \text{deg})}{\text{Num}_{\text{anchor}}} \quad A = 60 \cdot \text{deg} \quad \text{UF Report Fig 3-7}$$

$$\alpha := 2 \cdot \text{asin} \left[\frac{(1.5 \cdot c_{a1})}{r} \right] \quad \alpha = 63.5 \cdot \text{deg}$$

OverlapTest := if(A ≤ α, "Overlap of Failure Cones", "No Overlap of Failure Cones")

OverlapTest = "Overlap of Failure Cones"

$$\text{chord} := 2 \cdot r \cdot \sin \left(\frac{A}{2} \right) \quad \text{chord} = 27 \cdot \text{in} \quad \text{UF Report Fig 3-7}$$

$$A_{V_{co}} := 4.5 \cdot c_{a1}^2 \quad A_{V_{co}} = 403.2 \cdot \text{in}^2 \quad \text{projected concrete failure area (single anchor)}$$

ACI Eqn D-23

$$A_{V_c} := \text{chord} \cdot 1.5 \cdot c_{a1} \quad A_{V_c} = 383.4 \cdot \text{in}^2 \quad \text{projected concrete failure area (group)}$$

ACI D.6.2.1

$$A_{V_{c, \text{max}}} := \text{if}(A_{V_c} > A_{V_{co}}, A_{V_{co}}, A_{V_c}) \quad A_{V_c} = 383.4 \cdot \text{in}^2$$

$\psi_{ecV} := 1.0$	<i>eccentric load modifier</i>	ACI D.6.2.5	System not load eccentrically in shear
$\psi_{edV} := 1.0$	<i>edge effect modifier</i>	ACI D.6.2.6	
$\psi_{cV} := 1.0$	<i>cracked section modifier</i>	ACI D.6.2.7	Conservative to used cracked section modifier = 1.0
$\psi_{hV} := 1.0$	<i>member thickness modifier</i>	ACI D.6.2.8	Shall not be taken less than 1.0, $h_a > 1.5c_a$
$\Phi_{breakout} := 0.75$	<i>strength reduction factor</i>	ACI D.4.4.c.i	<i>(shear breakout, condition A)</i>

$$V_{cbg} := \text{Num}_{\text{anchor}} \cdot \left(\frac{A_{Vc}}{A_{Vco}} \right) \cdot (\psi_{ecV} \cdot \psi_{edV} \cdot \psi_{cV} \cdot \psi_{hV}) \cdot V_b$$

$V_{cbg} = 292.8 \cdot \text{kip}$ *concrete breakout strength - shear*
ACI Eqn D-22 *Shear force \perp to edge*

$$V_{cbg_parallel} := 2 \cdot V_{cbg}$$

$V_{cbg_parallel} = 585.6 \cdot \text{kip}$ ACI D.6.2.1.c *Shear force \parallel to edge*

$$T_{n.breakout} := V_{cbg_parallel} \cdot r_b$$

$T_{n.breakout} = 658.8 \cdot \text{kip} \cdot \text{ft}$ *concrete breakout strength - torsion*

$$\Phi_{breakout} \cdot T_{n.breakout} = 494.1 \cdot \text{kip} \cdot \text{ft}$$

$$T_u = 170.3 \cdot \text{kip} \cdot \text{ft}$$

$$\text{BreakoutTest} := \text{if}(\Phi_{breakout} \cdot T_{n.breakout} \geq T_u, \text{"OK"}, \text{"No Good"})$$

BreakoutTest = "OK"

$$\text{OverlapDesign} := \text{if}(A \leq \alpha, \text{"Based on Overlap of Failure Cones"}, \text{"Based on No Overlap of Failure Cones"})$$

OverlapDesign = "Based on Overlap of Failure Cones"

References

LRFD = AASHTO LRFD Bridge Design Specifications

SM = FDOT Structures Manual

SDG = FDOT Structures Design Guidelines

Spec = FDOT Standard Specifications

ACI = ACI 318 Structural Concrete Building Code

UF Report = FDOT/University of Florida Report BD545 RPWO #54

Note: This worksheet is intended to determine total shaft length required for a given structure. For mast arms, the final length will be the greater of the standard shaft length "DA" from the standard index or the exposed shaft length plus the calculated length determined by the soil profile. For other miscellaneous structures it will be the greater of the length from the mathcad results or the calculated results plus the exposed shaft length.

INPUT:

location	15th Street E / SR 70, Sta. 9+76, Offset 41.90' LT	
pole no.	Pole 1	
structure type	mast arm	
boring no.	B-1	
torsional moment	56330	ft-lbs
factor of safety	1.00	
axial load at top of shaft	3800	lbs ← FROM MA DESIGN
water table	0.00	ft; spreadsheet does NOT subtract buoyancy from soil weights entered in table
diameter of shaft	4.50	ft
length of exposed shaft	0.00	ft ← NO OFFSET REQUIRED PER INDCR
standard shaft length, 'DA' from standard index	12.00	ft

layer	layer thickness feet	eff. soil wt. gamma; γ pcf	φ degrees	cohesion c psf	K _o	tan(δ)	α
1	13.50	37.60	28	0	0.531	0.532	
2	5.00	47.60	30	0	0.500	0.577	
3	5.00	42.60	29	0	0.515	0.554	
4	5.00	72.60	0	12000		0.325	0.40
5	1.50	57.60	0	1900		0.325	0.55
6							
7							
8							
9							
10							

OUTPUT:

diameter of shaft	54	in	
length of shaft	15.00	ft	
side resistance	38227	ft-lbs	
plus bottom resistance	21389	ft-lbs	
total resistance	59616	ft-lbs	
total working resistance	59616	ft-lbs	> 56330 ft-lbs

USE THIS MAXIMUM SHAFT LENGTH

↳ THIS WILL GOVERN AT SITE



Note: This worksheet is intended to determine total shaft length required for a given structure. For mast arms, the final length will be the greater of the

RESULTS OF CALCULATIONS:

layer	shaft surface per layer [ft ²]	effective vertical stress at top of layer [psf]	effective vertical stress at bottom of layer [psf]	avg. effective vertical stress per layer [psf]	factored cohesive stress per layer alpha * c [psf]
1	190.85	0.00	507.60	253.80	0.00
2	70.69	507.60	745.60	626.60	0.00
3	70.69	745.60	958.60	852.10	0.00
4	70.69	958.60	1321.60	1140.10	4800.00
5	21.21	1321.60	1408.00	1364.80	1045.00
6	0.00	1408.00	1408.00	1408.00	0.00
7	0.00	1408.00	1408.00	1408.00	0.00
8	0.00	1408.00	1408.00	1408.00	0.00
9	0.00	1408.00	1408.00	1408.00	0.00
10	0.00	1408.00	1408.00	1408.00	0.00

layer	side resistance per layer [ft-lbs]	cumulative side resistance [ft-lbs]	bottom resistance at bottom of layer [ft-lbs]	total resistance at bottom of layer [ft-lbs]	total working resistance [ft-lbs]	length of shaft sufficient?	minimum length of shaft segments per layer [ft]
1	30743.50	30743.50	18031.68	48775.18	48775.18	NG	13.50
2	28768.33	59511.83	25612.29	85124.13	85124.13	depth L=	0.99
3	38701.27	98213.10	30382.19	128595.29	128595.29		
4	763407.01	861620.12	21204.28	882824.39	882824.39		
5	49860.02	911480.14	22222.82	933702.95	933702.95		
6	0.00		0.00	0.00	0.00		
7	0.00		0.00	0.00	0.00		
8	0.00		0.00	0.00	0.00		
9	0.00		0.00	0.00	0.00		
10	0.00		0.00	0.00	0.00		

layer	side resistance per layer [ft-lbs]	bottom resistance at bottom of shaft [ft-lbs]	buoyancy (intermediate result) [lbs]	penetration of shaft into the last layer [ft]	effective vertical stress at bottom of shaft [psf]	avg. effective vertical stress for last layer [psf]
1	30743.50					
2	7483.16	21389.33	936.00	1.50	579.00	543.30
3						
4						
5						
6						
7						
8						
9						
10						

Note: This worksheet is intended to determine total shaft length required for a given structure. For mast arms, the final length will be the greater of the calculation of length of segment (L) per layer

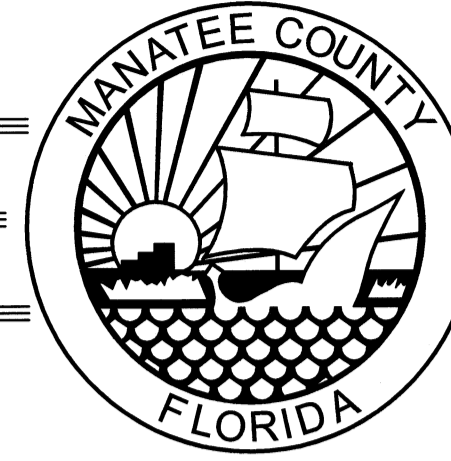
layer	(F.S. * torsion) minus cumm. side resistance layer above	cohesionless soils					
		bottom of shaft below watertable			bottom of shaft above watertable		
		a	b	c	a	b	c
1	56330.00	168.69	1111.18	-53299.26	168.69	0.00	-53299.26
2	25586.50	218.54	5867.53	-6007.02	218.54	0.00	5595.81
3	-3181.83	193.48	7931.25	27771.98	193.48	0.00	43037.60
4	-41883.10	0.00	679.03	59692.25	0.00	1431.39	71058.96
5	-805290.12	0.00	679.03	826494.39	0.00	1968.16	840279.55
6	-855150.14	0.00	0.00	855150.14	0.00	0.00	855150.14
7	56330.00	0.00	0.00	-56330.00	0.00	0.00	-56330.00
8	56330.00	0.00	0.00	-56330.00	0.00	0.00	-56330.00
9	56330.00	0.00	0.00	-56330.00	0.00	0.00	-56330.00
10	56330.00	0.00	0.00	-56330.00	0.00	0.00	-56330.00

layer	L1	L2
1	14.78	
2	0.99	
3	-3.87	
4		
5		
6		
7		
8		
9		
10		

layer	cohesive soils				length of shaft segments per layer L
	b.o.s below watertable		b.o.s above watertable		
	b	c	b	c	
1	1111.18	53299.26	1902.71	53299.26	14.78
2	1206.56	6007.02	2066.03	-5595.81	0.99
3	1158.41	-27771.98	1983.58	-43037.60	-3.87
4	153360.43	-59692.25	153844.12	-71058.96	-0.39
5	33919.04	-826494.39	34402.73	-840279.55	-24.37
6	0.00	-855150.14	0.00	-855150.14	
7	0.00	56330.00	0.00	56330.00	
8	0.00	56330.00	0.00	56330.00	
9	0.00	56330.00	0.00	56330.00	
10	0.00	56330.00	0.00	56330.00	

>>>>IF THE BOTTOM OF THE SHAFT COINCIDES WITH A CHANGE FROM A CLAYEY LAYER TO A SANDY LAYER, L CAN BE SLIGHTLY NEGATIVE, BECAUSE OF A DIFFERENT TANGENT(Delta).

layer	L3	L4
1	47.97	28.01
2	4.98	-2.71
3	-23.97	-21.70
4	-0.39	-0.46
5	-24.37	-24.42
6		
7		
8		
9		
10		



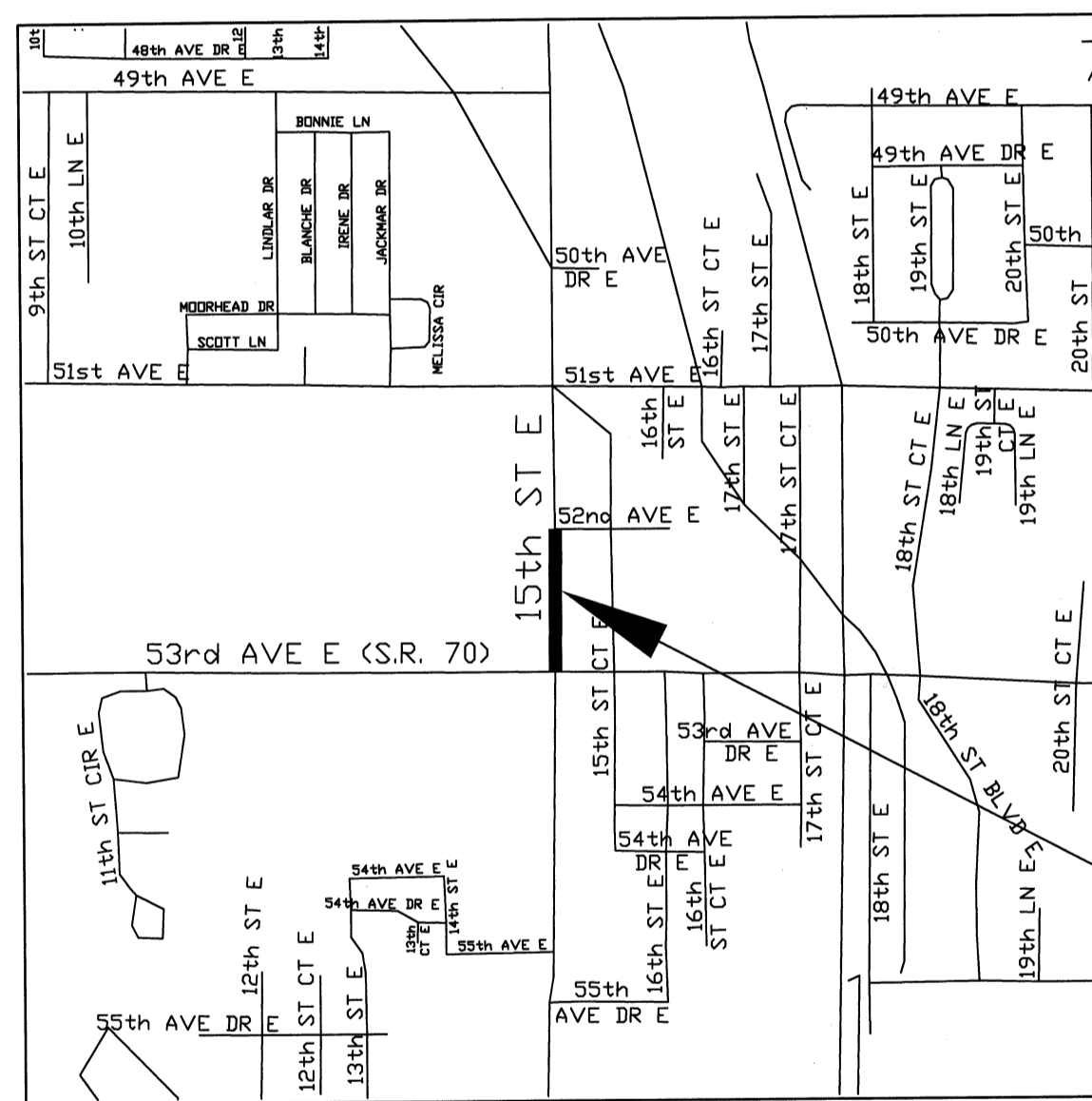
MANATEE COUNTY, FLORIDA

53rd AVENUE EAST (S.R. 70) @ 15th STREET EAST INTERSECTION IMPROVEMENTS

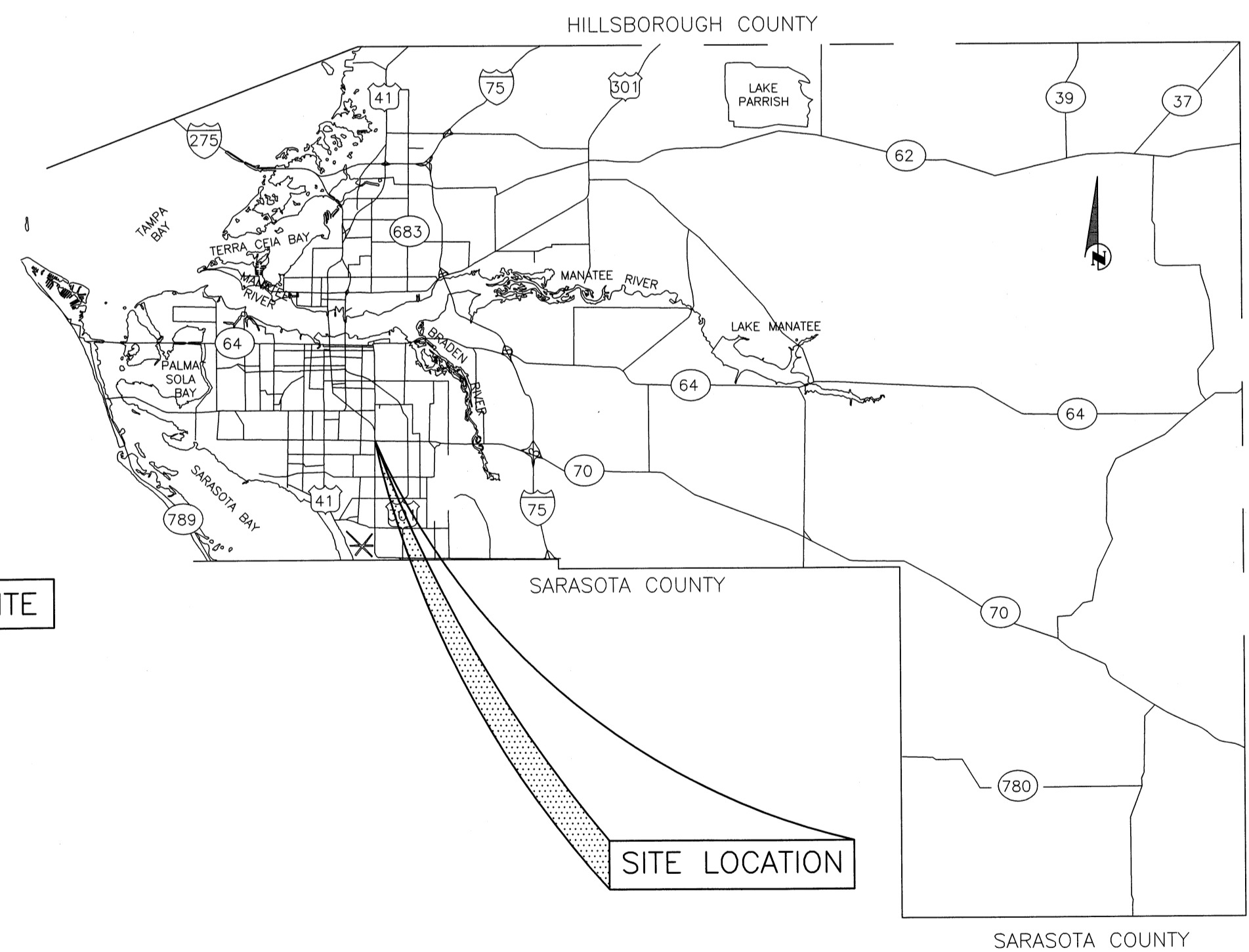
323-6029960

November 2011

100% PLANS



VICINITY MAP
N.T.S.



PROJECT DESCRIPTION

BRIEFLY DESCRIBE THE PROJECT HERE. THIS DESCRIPTION NEED NOT BE AS COMPREHENSIVE OR AS DETAILED AS SECTION 1010 OF THE SPECIFICATIONS, "SUMMARY OF WORK".

NOTES:

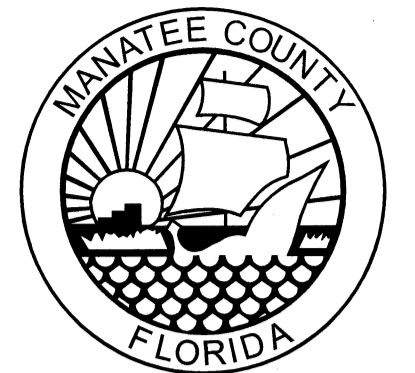
AT LEAST 72 HOURS IN ADVANCE OF BEGINNING CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL CONTACT THE LOCAL MANATEE FDOT ENGINEER'S OFFICE TO SECURE GENERAL USE PERMITS AND/OR OTHER PERMITS AS REQUIRED FOR WORKING WITHIN THE DEPARTMENT'S RIGHT-OF-WAY.

THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (DATED 2010) AND DESIGN STANDARDS BOOKLET (DATED 2010).

APPLICABLE DESIGN STANDARDS MODIFICATIONS: 3/2011. FOR DESIGN STANDARDS MODIFICATIONS, CLICK ON "DESIGN STANDARDS" AT THE FOLLOWING WEB SITE:
<http://www.dot.state.fl.us/rddesign/>

NO.	INDEX OF SHEETS
1.	COVER SHEET
2.	GENERAL NOTES & LEGEND SHEET
3.	SURVEY CONTROL COVER SHEET
	A) SURVEY CONTROL KEY SHEET
	B) SURVEY CONTROL PLAN SHEET
	C) SURVEY CONTROL PLAN SHEET
4.	QUANTITY SHEET
5.	LIMITS OF CONSTRUCTION SHEET
6.	PLAN SHEET STA. 10+00-14+00
7.	PLAN SHEET STA. 14+00-19+00
8.	CROSS SECTION SHEET STA. 12+00-13+00
9.	CROSS SECTION SHEET STA. 14+00-15+00
10.	TYPICAL SECTION SHEET
11.	DETAIL SHEET
12.	EROSION CONTROL LOCATION SHEET
13.	B.M.P. SHEET
14.	UTILITY ADJUSTMENT SHEET 1
15.	UTILITY ADJUSTMENT SHEET 2
T1-T2	MAINTENANCE OF TRAFFIC SHEETS

MANATEE COUNTY, FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES



1022 26th Avenue East
Bradenton, FL 34208

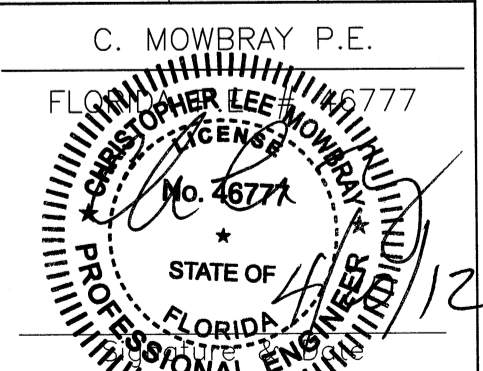
**53rd AVE. E. (S.R. 70) @ 15th ST. E.
INTERSECTION IMPROVEMENTS
COVER SHEET**

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	323-6029960	
SURVEY #	000	
SEC./TWN./RGE	00/00S/00E	
SCALE	N.T.S.	
SURVEYED	RPH	DATE
DESIGNED	AAM	5/4/11
DRAWN	MRJ	11/1/11
CHECKED	AAM	11/2/11



Know what's below
Call before you dig



GENERAL

- 1. ALL CONSTRUCTION ACTIVITIES SHALL BE COORDINATED WITH THE PROJECT MANAGEMENT DIVISION. THE PROJECT MANAGER IS: VINCENT CANNA AND CAN BE REACHED AT (941) 708-7450; EXT. 7338.
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 GEODETIC VERTICAL DATUM OF 1929", (NGVD '29).
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 CONTRACTOR'S 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.
16. ALL CONSTRUCTION WITHIN FDOT RIGHT-OF-WAY IS TO BE IN ACCORDANCE WITH CURRENT FDOT STANDARD SPECIFICATIONS FOR ROADWAY CONSTRUCTION AND THE DESIGN STANDARDS.
17. ALL SIGNING, STRIPING AND RPM PLACEMENT WITHIN THE FDOT RIGHT-OF-WAY IS TO BE IN ACCORDANCE WITH FDOT STANDARD INDEX 17346.

SAFETY

- 18. 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.
19. THE CONTRACTOR SHALL USE SHEET PILING, SHEETING, BRACING, ETC., AS REQUIRED IN ALL EXCAVATION AREAS AND CONFORM TO ALL OSHA REQUIREMENTS.
20. THE CONTRACTOR SHALL USE ALL NECESSARY SAFETY PRECAUTIONS TO AVOID CONTACT WITH OVERHEAD AND UNDERGROUND UTILITIES, POWER LINES, ETC.
21. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. THIS EXCLUSION DOES NOT ALLEVIATE THE CONTRACTOR FOR PROVIDING A CONTINUOUS SAFE WORKSPACE.

ENVIRONMENTAL

- 22. 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 COMPLETION OF THE PROJECT, AND UPON ADEQUATE STABILIZATION OF DISTURBED SOILS.
23. WHEN A BENTONITE SPILL OR FRACK-OUT OCCURS OR THERE IS A LOSS OF RETURN INDICATING EXCESSIVE SEEPAGE OR LOSS OF DRILLING FLUID, DRILLING MUST BE STOPPED UNTIL THE LOCATION OF THE SPILL IS IDENTIFIED. UNDER NO CIRCUMSTANCES WILL DRILLING CONTINUE WHEN A SPILL IS APPARENT.
24. ONCE LOCATED, THE BENTONITE SPILL MUST BE ISOLATED AND SEEPAGE INTO ANY NEARBY WATER BODIES WILL BE BLOCKED DEPENDING ON THE DEGREE OF THE SPILL, THE ISOLATED BENTONITE MUST BE REMOVED MANUALLY OR MECHANICALLY AND DISPOSED OF BY APPROPRIATE MEANS OR REUSED.
25. 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.
26. 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.
27. 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.
28. 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.

- 29. 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.
30. 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.
31. ALL EROSION AND POLLUTION CONTROL DEVICES SHALL BE CHECKED REGULARLY, ESPECIALLY AFTER EACH RAINFALL AND SHALL BE CLEANED OUT AND/OR REPAIRED AS REQUIRED.
32. 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.
33. FOR MORE INFORMATION, SEE THE EROSION CONTROL DETAIL SHEET INCLUDED IN THE PLANS.
RIGHT-OF-WAY
34. ALL CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO WITHIN THE MANATEE COUNTY/FDOT RIGHT-OF-WAY AND/OR EASEMENTS SHOWN ON THE DRAWINGS.
35. 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.
36. 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.
37. 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.
38. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH IN THE FIELD THE RIGHT-OF-WAY LINES, BENCH 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.
39. 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 PLAN. 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.
40. 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.

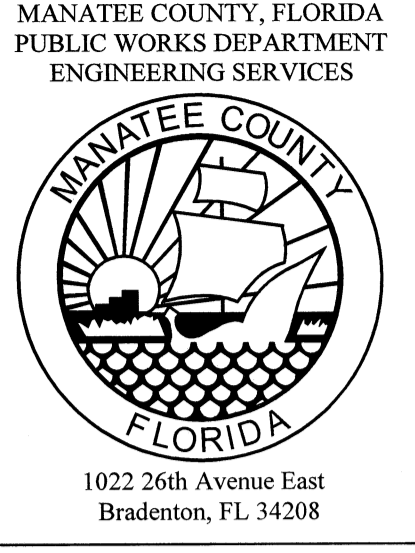
UTILITIES

- 41. 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 VWH 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 24" WATERLINE.
42. 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.
43. THE CONTRACTOR SHALL USE APPROPRIATE TECHNIQUES, AS APPROVED, RECOMMENDED OR OFFERED BY FLORIDA POWER AND LIGHT 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.
44. 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.
45. A FLORIDA POWER AND LIGHT 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.
46. 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.
47. 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.

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 djshahan@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 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
MANATEE COUNTY HEALTH DEPT. HARRY MESSICK 410 6TH AVENUE EAST BRADENTON, FL. 34208(941) 748-0747 EXT. 1355 FAX: (941) 750-9364
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 KENDALL COKER (863) 767-4660 kendell.coker@preco.coop
MANATEE COUNTY PUBLIC WORK DEPT. TRAFFIC ENGINEERING MICHAEL O'REILLY, P.E. (941) 749-3500 EXT. 7859 FAX: (941) 749-3571

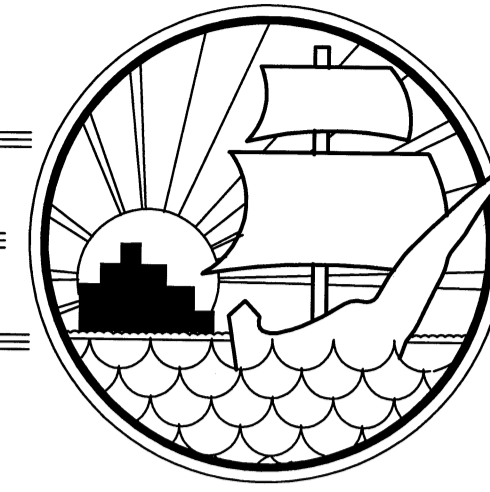
LEGEND
EXISTING
BENCH MARK
CONCRETE MONUMENT
IRON PIPE
IRON ROD
HUB
NAIL & DISK
ELEVATION
PARCEL ID NO.
PARCEL ID NO.
LOT NO.
GUY WIRE
POWER POLE
LIGHT POLE
MAIL BOX
SIGN
REFLECTOR
SPRINKLER
GAS MARKER
BACKFLOW PREVENTER
BLOW OFF VALVE
FIRE HYDRANT
WATER VALVE
AIR RELEASE VALVE
WATER METER
SANITARY SEWER 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
PROPOSED 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



53rd AVE. E.(S.R. 70) @ 15th ST. E. INTERSECTION IMPROVEMENTS GENERAL NOTES & LEGEND

Table with columns: NO., REVISION DESCRIPTION, DATE, BY. Includes project information: PROJECT # 323-6029960, SURVEY # 000, SEC./TWN./RGE 00/005/00E, SCALE N.T.S., SURVEYED BY RPH, DESIGNED AAM 5/4/11, DRAWN MRJ 11/1/11, CHECKED AAM 11/2/11. Includes signature of C. Mowbray P.E. and a circular professional engineer seal for Florida. SHEET 2 OF 15

S:\VMD_Engineering\Shore\Highway_Engineering\INTERSECTION_STUDIES_AND_IMPROVEMENTS\53rd St. E @ 53rd Ave. E\CADD\005r_Cover_Sheet.dwg User: Sheet & Con Notes.dwg Date: 4/20/2012 8:07 AM Thom Forester: 10.03_ARCH D (4x36 in.)

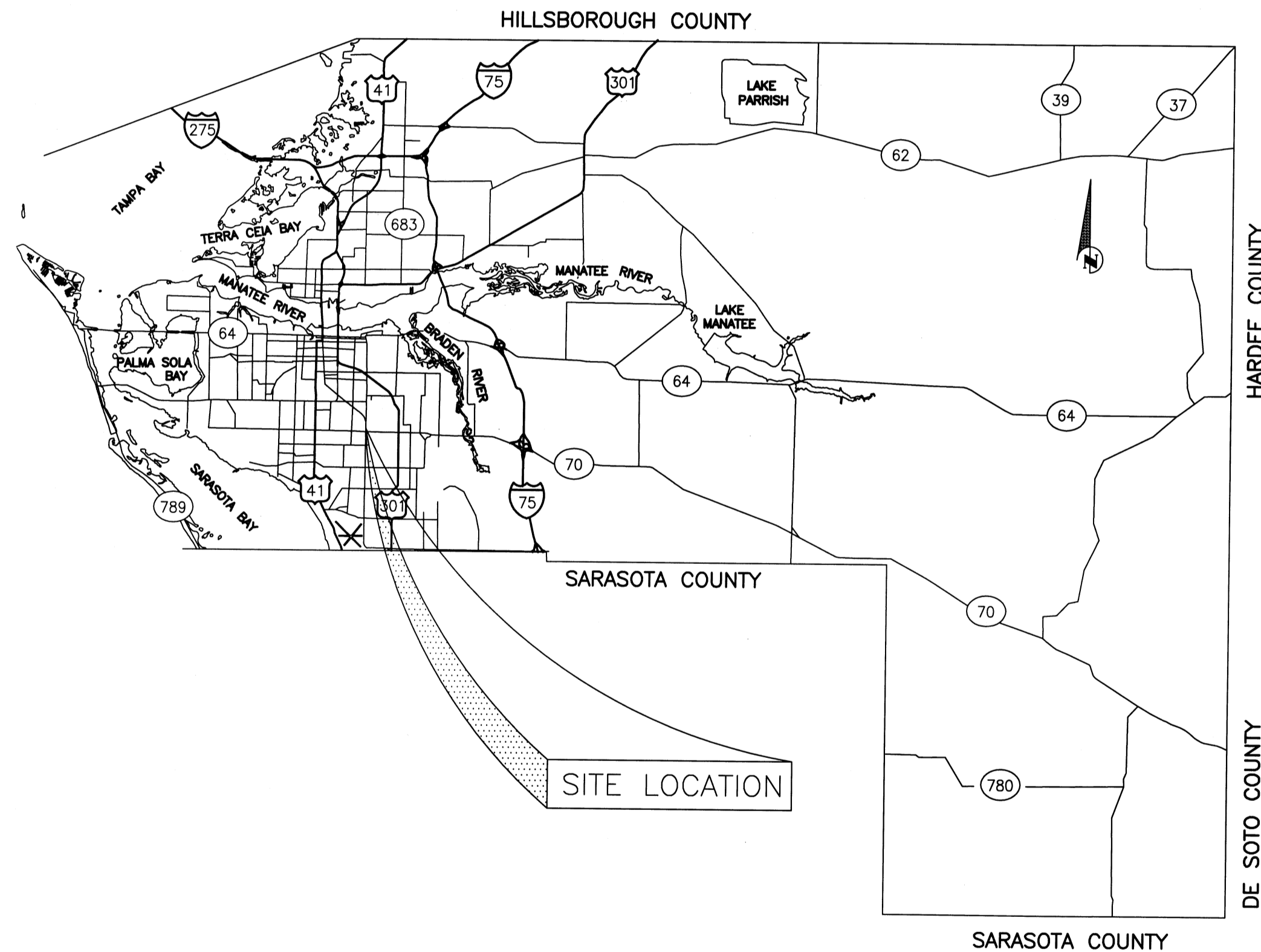


TOPOGRAPHIC SURVEY

US 301/15th St. E.

MANATEE COUNTY, FLORIDA

APRIL 2009



LEGEND

●	IRON ROD	⊙	SANITARY SEWER MANHOLE
○	IRON PIPE	○	SANITARY SEWER CLEAN-OUT
■	CONCRETE MONUMENT	⊕	STORM SEWER MANHOLE
PKD	PK NAIL W/DISC	□	STORM INLET
IRC	IRON ROD W/CAP	○	DRAINAGE PIPE
⊙	BENCHMARK	▨	GRATE INLET
PARCEL ID # 5866600109 (TYP.)		▩	MITERED END SECTION
17.16'	SPOT ELEVATION (TYP.)	⊕	FIRE HYDRANT
R	RADIUS	⊕	WATER VALVE
R/W	RIGHT OF WAY	⊕	WATER METER
Conc	CONCRETE	⊕	UTILITY POLE
Asph	ASPHALT	⊕	GUY WIRE
INV	INVERT	⊕	LIGHT POLE
TOB	TOP OF BANK	⊕	TELEPHONE UTILITY
🌴	PALM TREE	⊕	GAS UTILITY
🌳	OAK TREE	⊕	MAIL BOX
🌲	PINE TREE	⊕	SIGN
🌳	TREE	—	UNDERGROUND UTILITY
⊕	ELECTRIC UTILITY	—	CHAIN LINK FENCE
⊕	TRAFFIC SIGNAL MAST ARM	—	WOOD FENCE


GENERAL NOTES

- THESE PLANS DO NOT REFLECT A TRUE BOUNDARY OR RIGHT-OF-WAY SURVEY. THE LOCATION OF THE STREET RIGHT-OF-WAY LINES SHOWN ARE APPROXIMATE AND HAVE BEEN BASED ON INFORMATION CONTAINED IN THE SUBDIVISION PLATS, RIGHT-OF-WAY MAPS ON RECORD IN MANATEE COUNTY AND TOPOGRAPHIC DATA COLLECTED ALONG EACH OF THE RIGHTS-OF-WAY. CONSEQUENTLY, THE RIGHT-OF-WAY LINES SHOWN ARE NOT INTENDED TO INDICATE THE EXACT BOUNDARIES.
- THIS SURVEY IS SUBJECT TO PERTINENT EASEMENTS, RIGHTS-OF-WAY AND RESTRICTIONS OF RECORD, IF ANY.
- TITLE WORK WAS NOT PROVIDED FOR THIS SURVEY.
- THE BEARINGS INDICATED HEREIN ARE A PROJECTION OF THE FLORIDA STATE PLANE COORDINATE SYSTEM (WEST ZONE NAD 1983/1990).
- THE ELEVATIONS SHOWN HEREIN HAVE BEEN BASED ON THE FOLLOWING BENCHMARKS CONTAINED IN MANATEE COUNTY BENCH RUN # 124:
124-29-01: X-CUT AT THE TOP CENTER ON THE EAST SIDE OF A CONCRETE GRATE INLET, LOCATED 45' +/- SOUTH OF THE CENTERLINE OF THE ENTRANCE TO ONECO SQUARE PLAZA, 510' +/- SOUTH OF THE CENTERLINE INTERSECTION OF 51ST AVE EAST AND 15TH ST. EAST (301 BLVD), AND 36' +/- WEST OF THE CENTERLINE OF 15TH ST. EAST (301 BLVD). ELEV. = 34.226' (N.G.V.D. 1929 DATUM)
- THIS SURVEY DRAWING WAS PREPARED FOR THE EXCLUSIVE USE OF THE PARTY OR PARTIES CERTIFIED TO BELOW FOR THE EXPRESS PURPOSE STATED HEREON AND/OR CONTAINED IN THE CONTRACT BETWEEN HYATT SURVEY SERVICES, INC. AND THE CLIENT FOR THIS PROJECT. COPYING, DISTRIBUTING AND/OR USING THIS DRAWING, IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN ORIGINALLY INTENDED WITHOUT WRITTEN CONSENT FROM HYATT SURVEY SERVICES, INC. IS STRICTLY PROHIBITED AND RENDERS THE SURVEYOR'S CERTIFICATION, SIGNATURE AND SEAL NULL AND VOID. ANY QUESTIONS CONCERNING THE CONTENT OR PURPOSE OF THIS DRAWING SHOULD BE DIRECTED TO HYATT SURVEY SERVICES, INC.
- THE UTILITIES LISTED BELOW WERE PROVIDED FOR THIS SITE BY "SUNSHINE STATE ONE CALL" ON FEBRUARY 25, 2009:
TECO/PEOPLES GAS COMPANY CONTACT: CHRIS COLEMAN 941 915 8915
VERIZON FLORIDA INC. CONTACT: DARRELL DAWSON 813 753 8171
FLORIDA POWER & LIGHT
BRIGHT HOUSE NETWORKS
MANATEE COUNTY UTILITY OPERATIONS CONTACT: JOHN GARDNER
MANATEE COUNTY TRANSPORTATION DEPARTMENT

SHEET INDEX

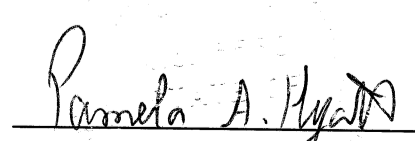
SHEET 1	COVER SHEET
SHEET 2	PLAN INDEX/SURVEY CONTROL
SHEETS 3-4	PLAN SHEETS

THESE PLANS DO NOT REFLECT A TRUE BOUNDARY OR RIGHT-OF-WAY SURVEY. THE LOCATION OF THE STREET RIGHT-OF-WAY LINES SHOWN ARE APPROXIMATE AND HAVE BEEN BASED ON INFORMATION CONTAINED IN THE SUBDIVISION PLATS, RIGHT-OF-WAY MAPS ON RECORD IN MANATEE COUNTY AND TOPOGRAPHIC DATA COLLECTED ALONG EACH OF THE RIGHTS-OF-WAY. CONSEQUENTLY, THE RIGHT-OF-WAY LINES SHOWN ARE NOT INTENDED TO INDICATE THE EXACT BOUNDARIES.

PUBLIC WORKS DEPT.-ENGINEERING DIVISION

 4422-B 66th Street West, Bradenton, FL 34210

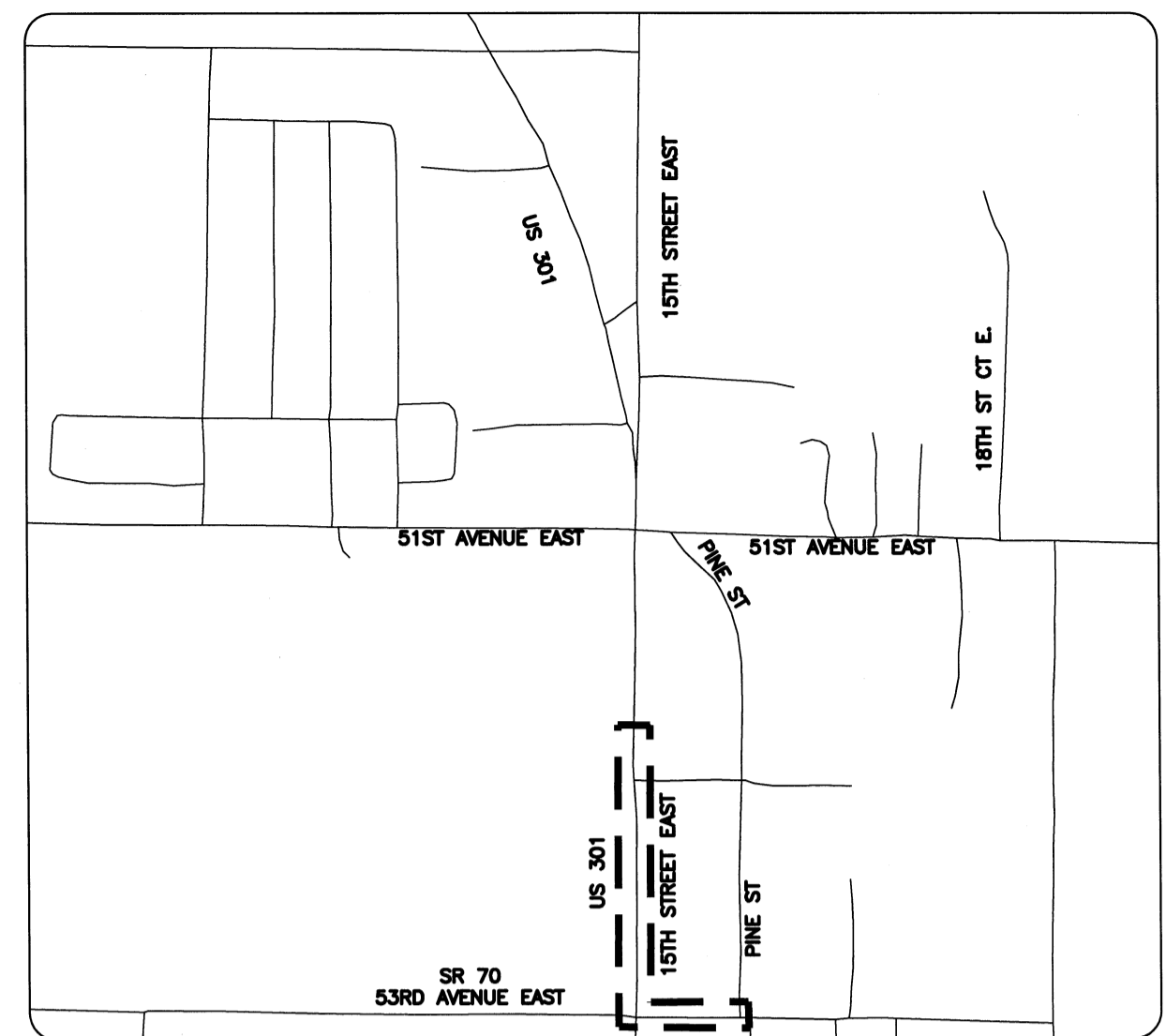
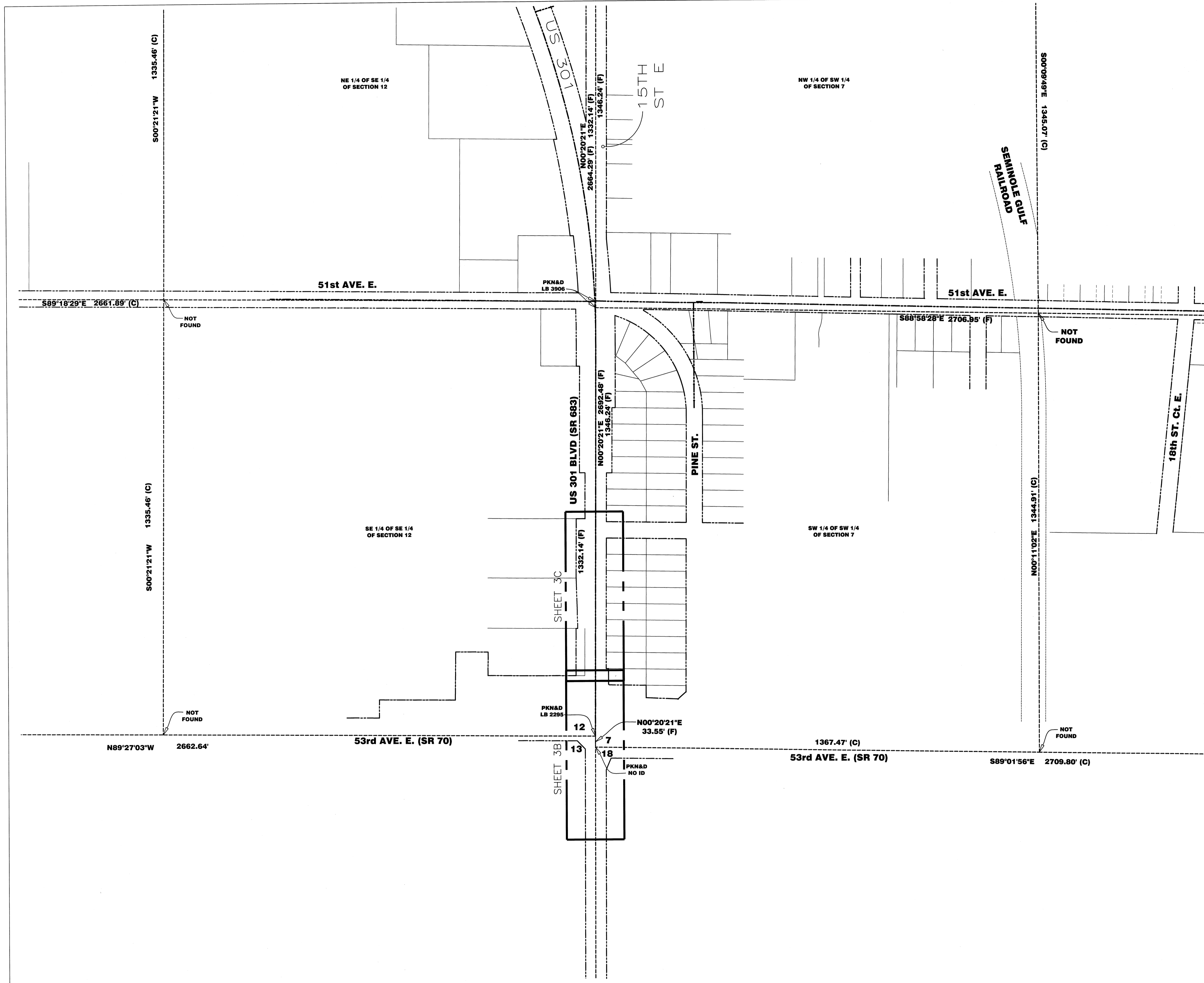
NO.	REVISION DESCRIPTION	BY	DATE
1.	REVISED 15TH ST. RIGHT-OF-WAY LINE	CBW	7/30/10
2.	ADDED SR 70 SOUTH RIGHT-OF-WAY	CBW	1/13/11

Hyatt Survey Services, Inc.
 Geographic Data Specialists
 LB No.: 7203
 11007 8th Avenue East Bradenton, Florida 34212
 Phone: (941) 748-4693 Fax: (941) 744-1643

THIS SURVEY IS NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

 PAMELA A. HYATT, P.S.M.
 FLORIDA SURVEYORS REGISTRATION NO. 5550

COVER SHEET
US 301/15th St. E.
MANATEE COUNTY, FLORIDA

SHEET
3



SITE MAP
Not to Scale
MANATEE COUNTY, FLORIDA

SITE CALIBRATION DATA

DESIGNATION	NORTHING	EASTING
M 080	1126710.76	478876.34
M 081	1143115.24	478968.28
M 082	1143106.22	462931.59
MANAT RESET	1138850.97	484198.48

SITE HORIZONTAL/VERTICAL CONTROL

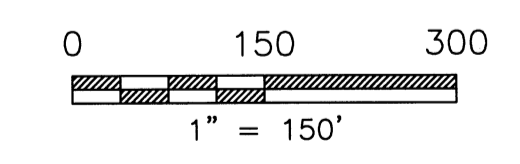
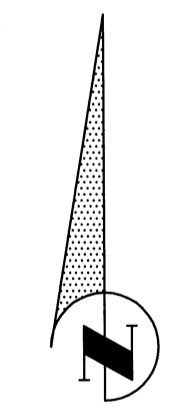
US 301 BLVD

NUMBER	DESCRIPTION	STATION	OFFSET	NORTHING	EASTING	ELEVATION
101	NAIL & TIN TAB	19+00.23	23.66' L	1133072.892	478846.966	34.60'
115	NAIL & TIN TAB	12+54.77	26.41' L	1132527.456	478840.865	35.44'
116	NAIL & TIN TAB	26+20.02	22.63' R	1133894.376	478867.993	37.31'
20004	IRC # 7203	37+26.28	39.63' L	1134910.754	478452.986	37.38'
20007	PKN&D # 7203	32+52.90	24.89' R	1134512.071	478713.015	37.59'

BASELINE CONTROL DATA

US 301 BLVD


STATION	NORTHING	EASTING	C-1
BEGIN 10+00	1132272.527	478865.708	Δ = 53°20'02"
PC 22+03.60	1133476.105	478873.103	D = 02°00'00"
EQUATION 23+32.03	1133604.507	478871.056	T = 1438.77'
EQUATION 23+33.49	1133605.966	478870.999	L = 2866.70'
EQUATION 30+93.91	1134353.021	478741.541	R = 2864.79'
PT 48+70.30	1135781.459	477733.914	P.C. STA. 22+03.60
			P.T. STA. 48+70.30



SEE SHEET 1 OF 4 FOR GENERAL NOTES AND LEGEND

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PUBLIC WORKS DEPT.-ENGINEERING DIVISION

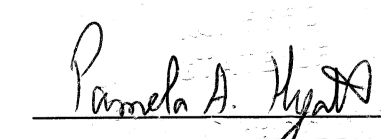


4422-B 66th Street West, Bradenton, FL 34210

NO.	REVISION DESCRIPTION	BY	DATE
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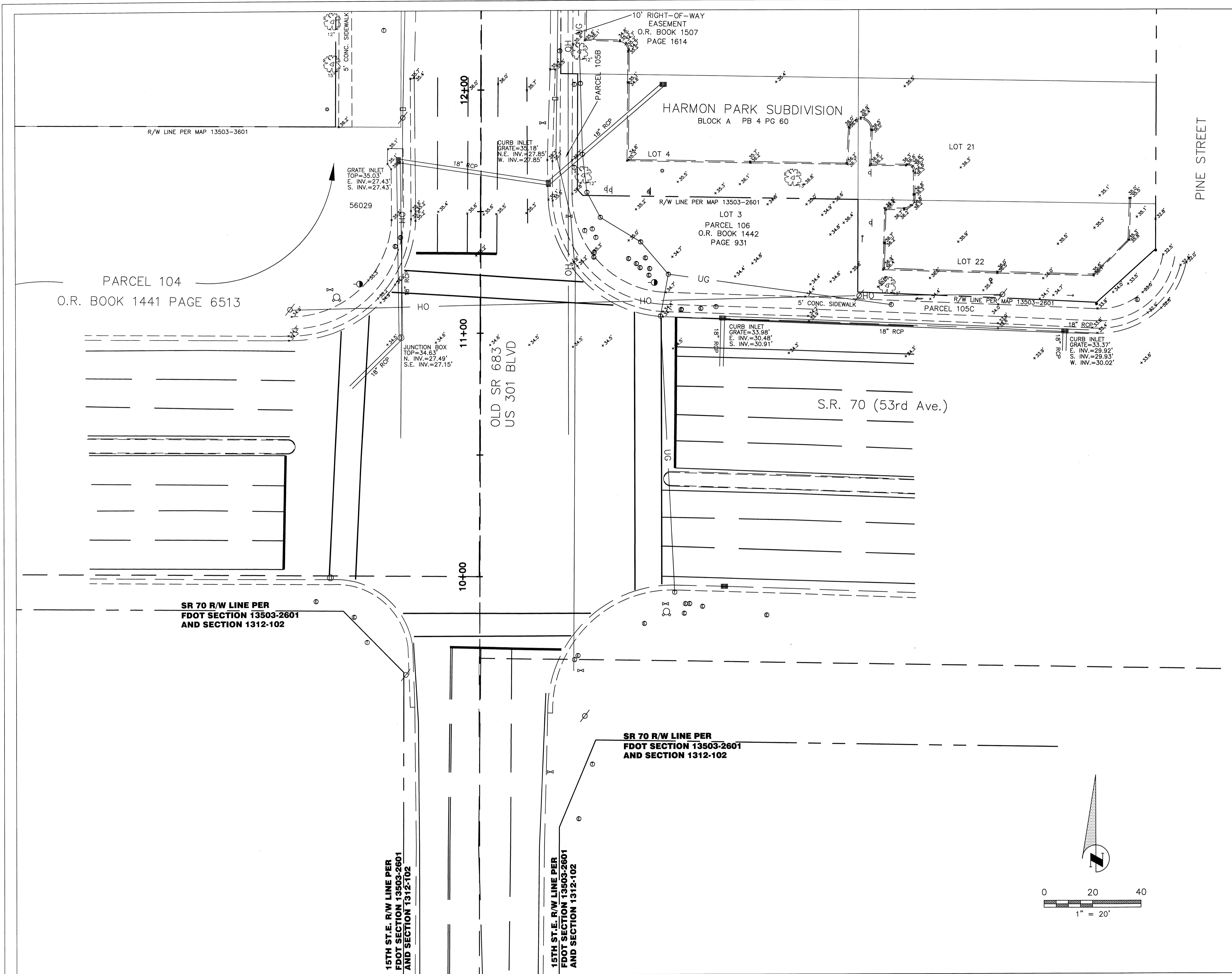
THIS SURVEY IS NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.



PAMELA A. HYATT, PSM
 FLORIDA SURVEYORS' REGISTRATION NO. 5550

KEY SHEET
US 301/15th St. E.
MANATEE COUNTY, FLORIDA

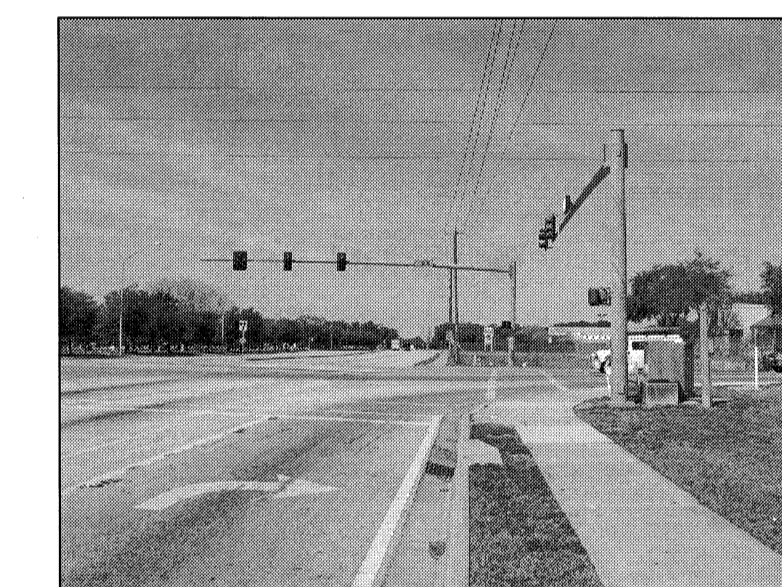
SHEET
3A



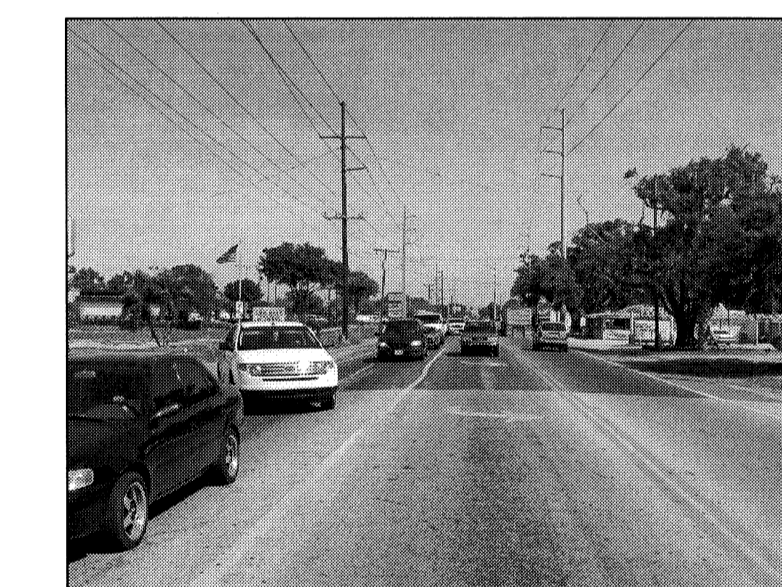
11+00 EAST
SR 70 (53RD AVE)



11+00 NORTH



11+00 WEST
SR 70 (53RD AVE)




12+00 NORTH



14+00 NORTH

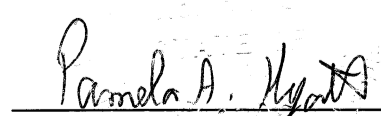
SEE SHEET 1 OF 4 FOR GENERAL NOTES AND LEGEND

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PUBLIC WORKS DEPT.-ENGINEERING DIVISION

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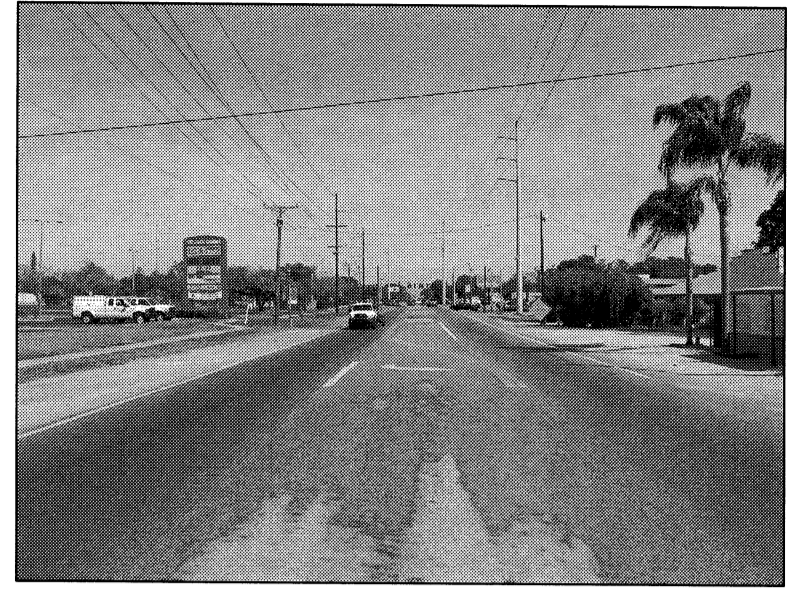
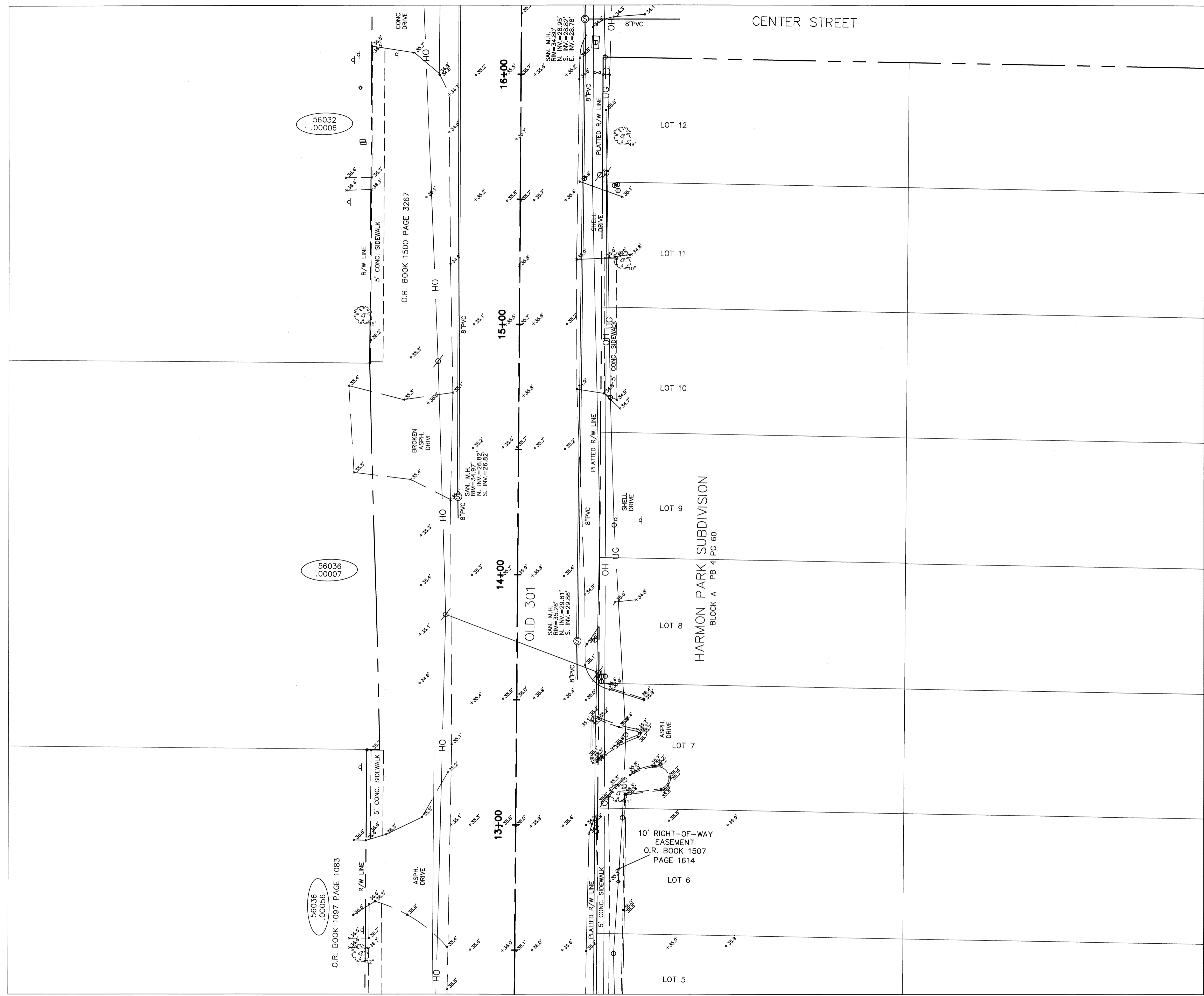
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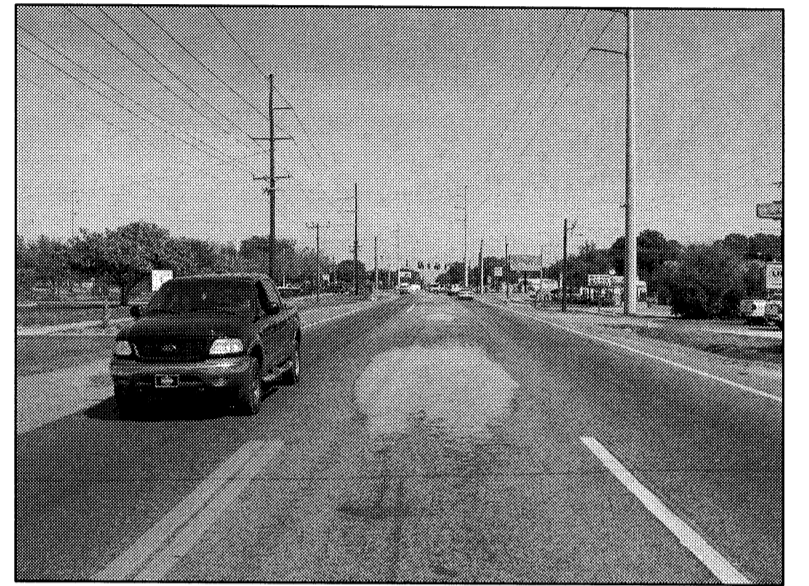
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 PAMELA A. HYATT PSM
 FLORIDA SURVEYORS REGISTRATION NO. 5550

PLAN SHEET
US 301/15th St. E.
MANATEE COUNTY, FLORIDA

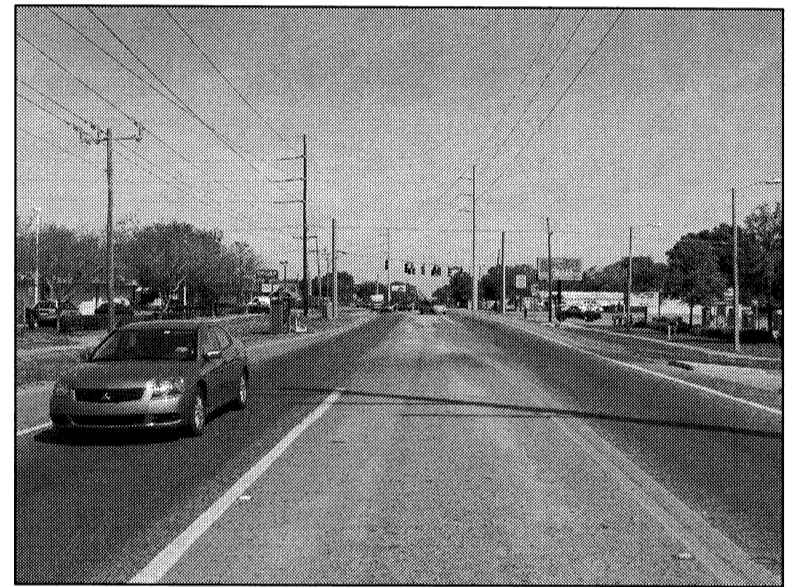
SHEET
3B



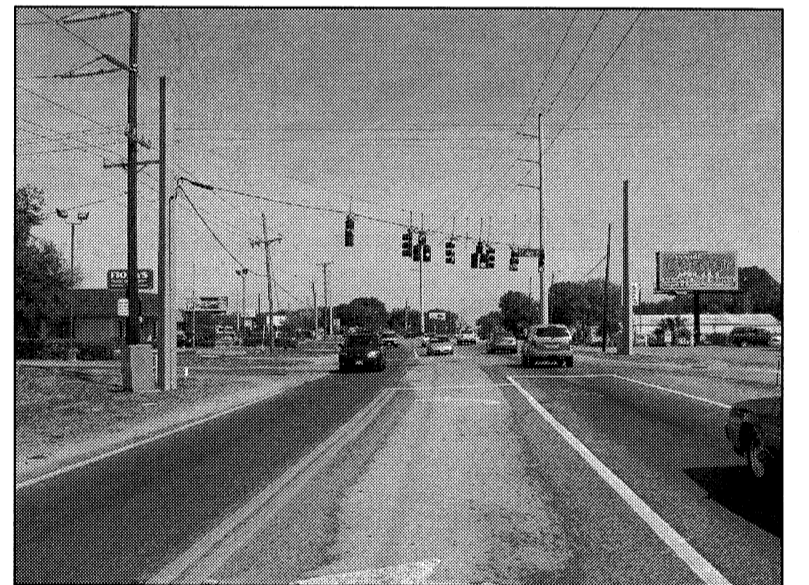
16+00 NORTH



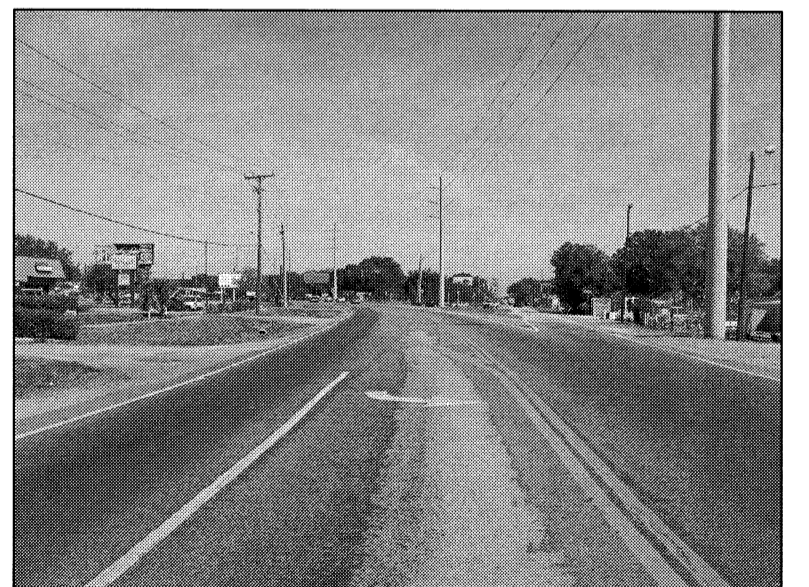
18+00 NORTH



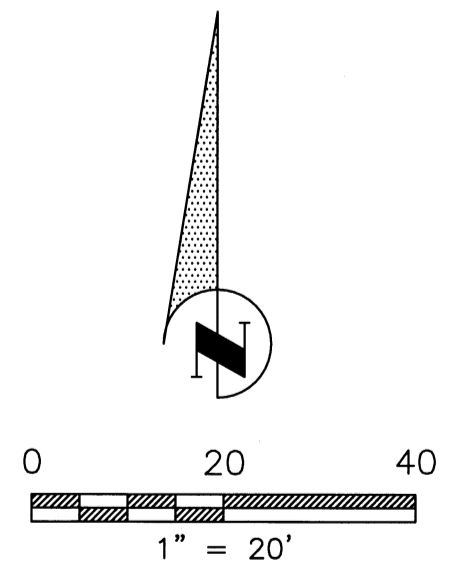
20+00 NORTH



22+00 NORTH



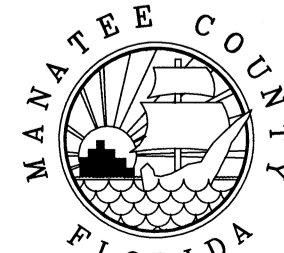
24+00 NORTH



SEE SHEET 1 OF 4 FOR GENERAL NOTES AND LEGEND

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PUBLIC WORKS DEPT.—ENGINEERING DIVISION



4422-B 66th Street West, Bradenton, FL 34210

NO.	REVISION DESCRIPTION	BY	DATE
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Hyatt Survey Services, Inc.

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11007 8th Avenue East Bradenton, Florida 34212
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Pamela A. Hyatt
PAMELA A. HYATT, PSM
FLORIDA SURVEYORS REGISTRATION NO. 5550

PLAN SHEET
US 301/15th St. E.
MANATEE COUNTY, FLORIDA

SHEET

3C

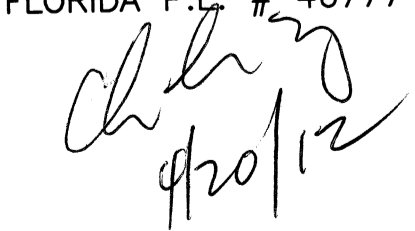
**53rd AVE. E. (SR 70) @ 15th ST. E.
 ASPHALT OVERLAY
 QUANTITY SHEET**

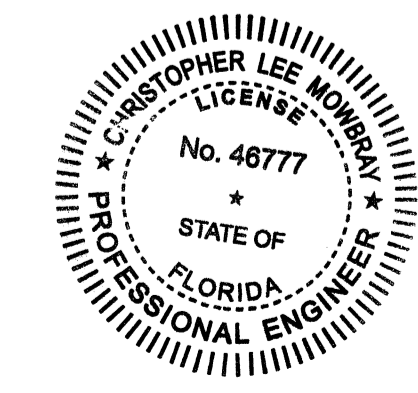
	ITEM NO.	DESCRIPTION ROADWAY	UNIT	QUANTITY
1	0101-1	MOBILIZATION	LS	1
2	0102-1	MAINTENANCE OF TRAFFIC	LS	1
3	0104-10-2	SYNTHETIC BALES	LF	25
4	0104-10-3	SEDIMENT BARRIER	LF	1066
5	0104-16	ROCK BAGS	EA	9
6	0110-4	TYPE D CURB TO BE REMOVED	SY	4
7	0120-6	ENBANKMENT	CY	5
8	0327-70-6	MILLING EXISTING ASPHALT PAVEMENT, 1.5"	SY	3055
9	0337-7-5	1.5" FRICTION COURSE 12.5 165#/SY	TN	252
10	0520-1-10	CONCRETE CURB & GUTTER, TYPE F	LF	116
11	0522-2-4	CONCRETE CURB, TYPE D	LF	11
12	0522-1	SIDEWALK CONCRETE, 4" THICK	SY	14
13	0570-1-2	PERFORMANCE TURF, SOD	SY	6
14	MC-XXX	ADJUST MANHOLE AND WATER VALVE TO GRADE	EA	3

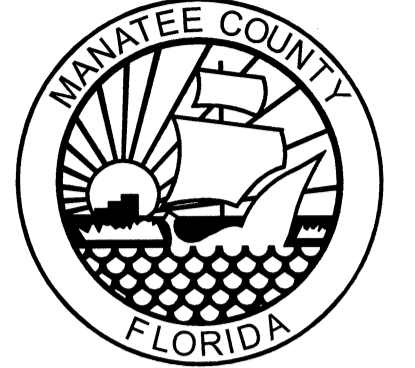
NO.	REVISION DESCRIPTION	BY	DATE
1	Edited Quantity Numbers	AAM	10/19/11

PROJECT #	323-6029960
SURVEY #	000
SEC./TWN./RGE	00/00S/00E
SCALE	N.T.S.

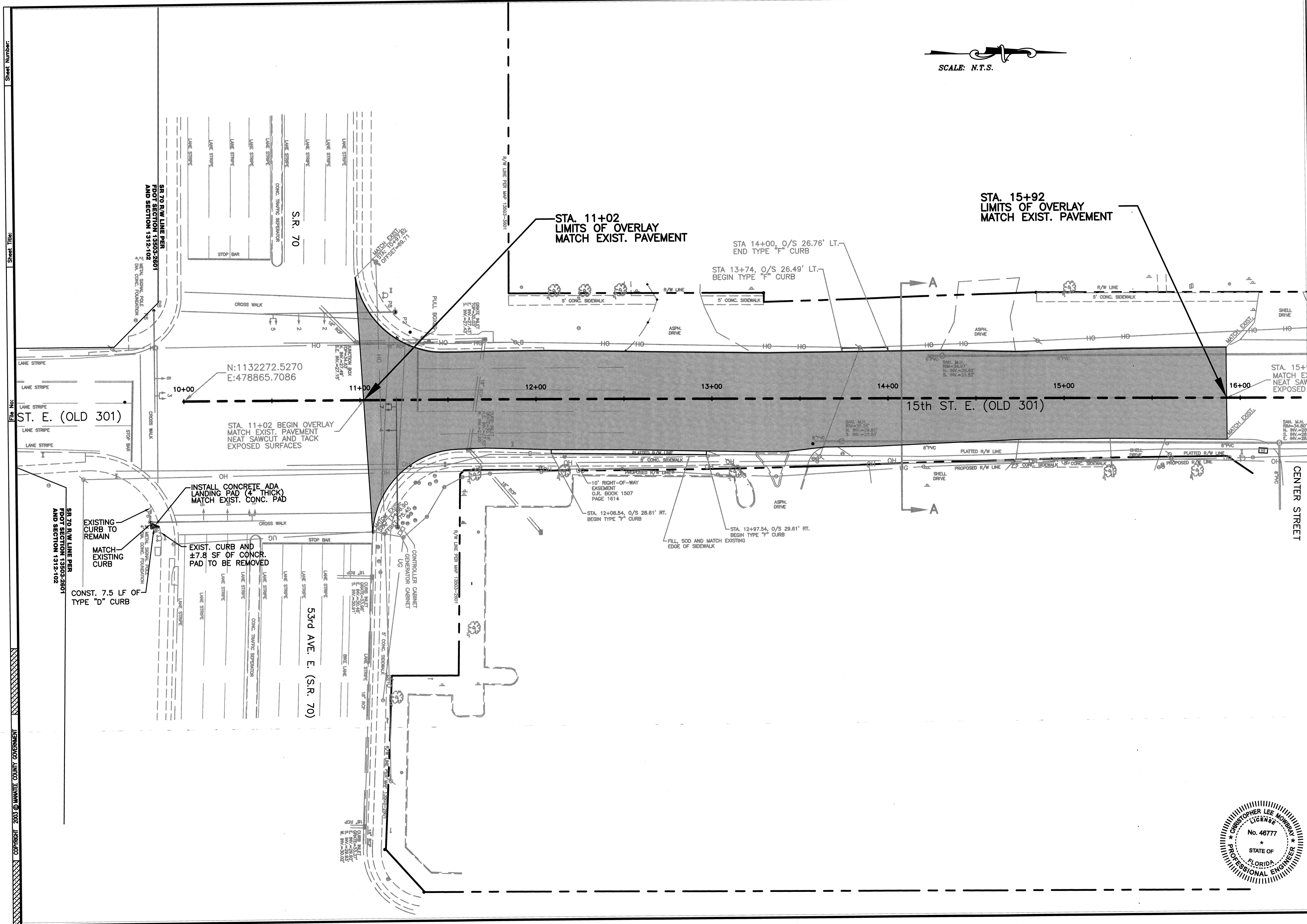
	BY	DATE
SURVEYED	RPH	
DESIGNED	AAM	5/4/11
DRAWN	MRJ	5/4/11
CHECKED	AAM	11/2/11

C.MOWBRAY P.E.
 FLORIDA P.E. # 46777

 Signature & Date





SCALE: N.T.S.

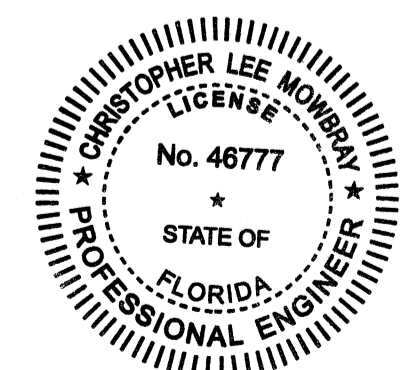


53rd AVE. E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY

LIMITS OF CONSTRUCTION SHEET

REVISION	BY	DATE
SURVEYED	RPH	
DESIGNED	AAM	5/4/11
DRAWN	MRJ	5/4/11
CHECKED	AAM	11/2/11

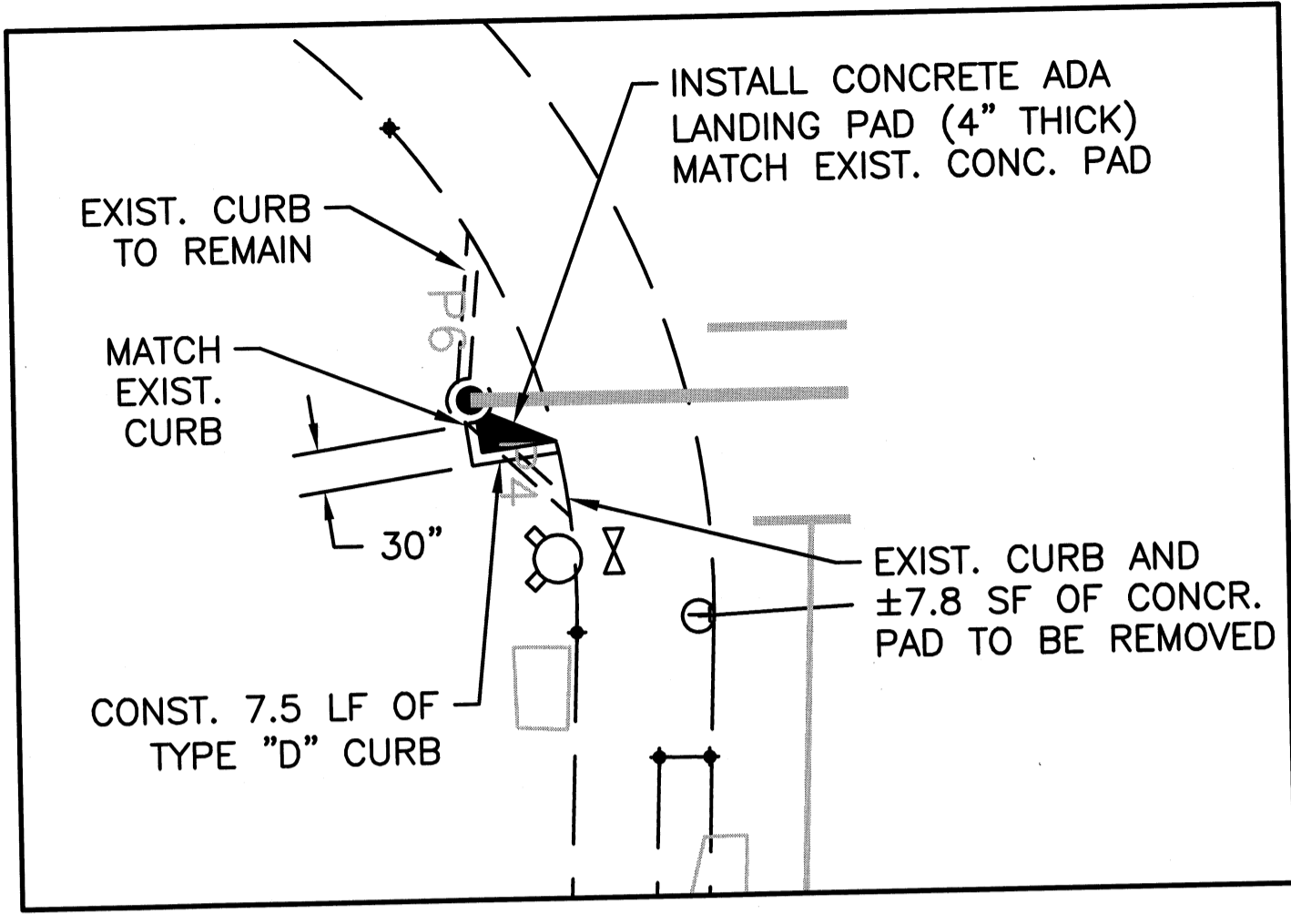
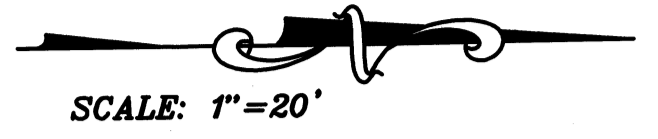
SCALE: N.T.S.



SEAL
APPROVED BY:
Ch Mowbray
CHRISTOPHER LEE MOWBRAY
FLORIDA P.E. # 46777
MANATEE COUNTY GOVERNMENT
PUBLIC WORKS DEPARTMENT
1022 26TH AVENUE EAST
BRADENTON, FL 34208
DATE: 4/20/12

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53rd AVE. E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY
PLAN SHEET
STA. 10+00 TO STA. 14+00



INSET

15TH ST. E. R/W LINE PER
FDOT SECTION 13503-2601
AND SECTION 1312-102

15TH ST. E. R/W LINE PER
FDOT SECTION 13503-2601
AND SECTION 1312-102

15th ST. E. (OLD 301)

53rd AVE. E. (S.R. 70)

SR 70 R/W LINE PER
FDOT SECTION 13503-2601
AND SECTION 1312-102

SR 70 R/W LINE PER
FDOT SECTION 13503-2601
AND SECTION 1312-102

N:1132272.5270
E:478865.7086

STA. 11+02 BEGIN OVERLAY
MATCH EXIST. PAVEMENT
NEAT SAWCUT AND TACK
EXPOSED SURFACES

SEE INSET

INSTALL CONCRETE ADA
LANDING PAD (4" THICK)
MATCH EXIST. CONC. PAD

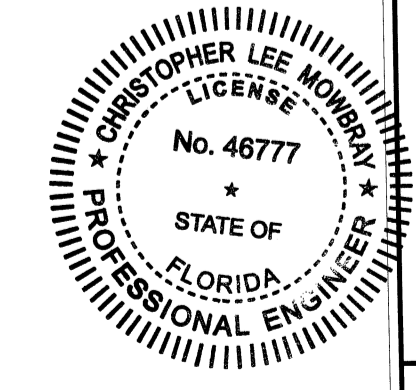
EXIST. CURB AND
±7.8 SF OF CONCR.
PAD TO BE REMOVED

CONST. 7.5 LF OF
TYPE "D" CURB

— AREA OF NEW ASPHALT OVERLAY

NOTES:

- EXISTING AREA OF ASPHALT TO BE MILLED 1.5" THICK
- NEW ASPHALT SHALL CONSIST OF FRICTION COURSE FC-12.5 (TRAFFIC D)(1.5").



REVISION		DATE
BY	DATE	
SURVEYED	RPH	
DESIGNED	AAM	5/4/11
DRAWN	MRJ	5/4/11
CHECKED	AAM	11/2/11

SCALE: 1"=20'

SEAL

APPROVED BY:
Christopher Lee Mowbray
CHRISTOPHER LEE MOWBRAY
FLORIDA P.E. # 46777
MANATEE COUNTY GOVERNMENT
PUBLIC WORKS DEPARTMENT
1022 26TH AVENUE EAST
BRADENTON, FL 34208
DATE: 4/20/12
SHEET 6 OF 15

Sheet Number: _____
Sheet Title: _____
File No: _____
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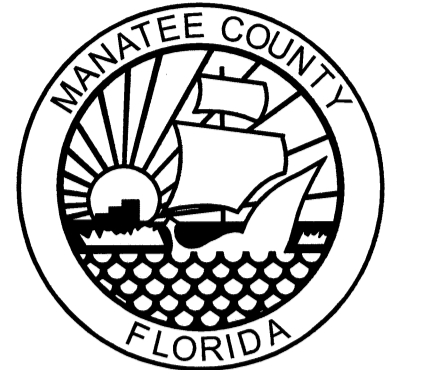
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Sheet Title:

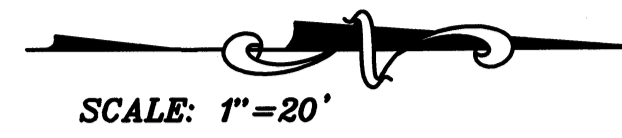
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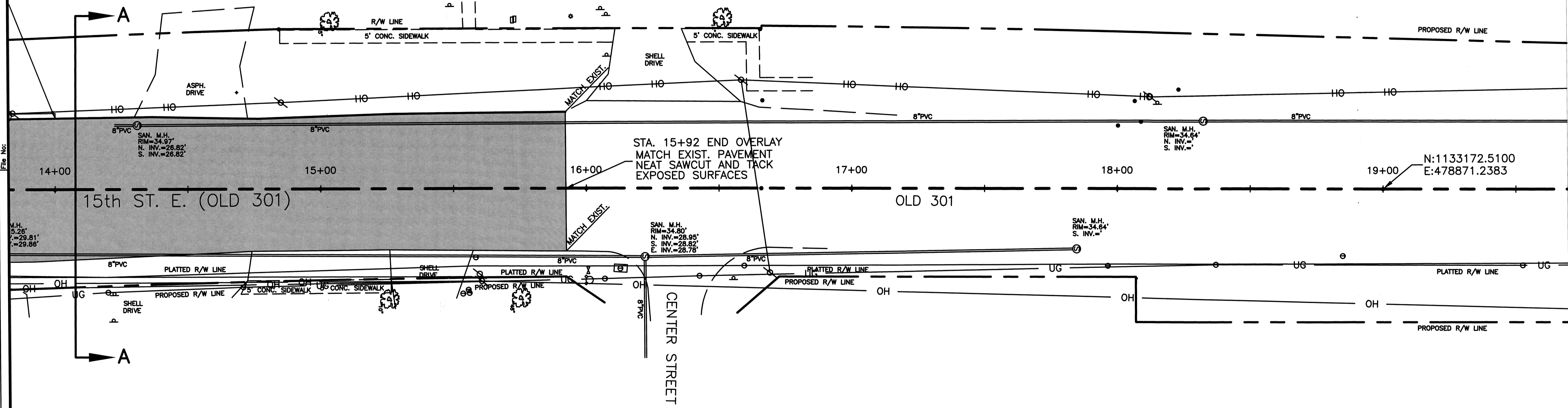
MANATEE COUNTY, FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES



1022 26th Avenue East
Bradenton, FL 34208



SCALE: 1"=20'



53rd AVE. E. (SR 70) @ 15th ST. E.

ASPHALT OVERLAY

PLAN SHEET

STA. 14+00 TO STA. 19+00

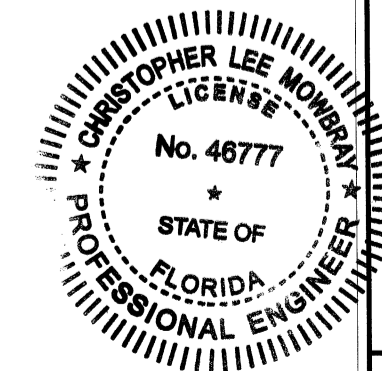
REVISION	BY	DATE
SURVEYED	RPH	
DESIGNED	AAM	5/4/11
DRAWN	MRJ	5/4/11
CHECKED	AAM	11/2/11

SCALE: 1"=20'

█ - AREA OF NEW ASPHALT OVERLAY

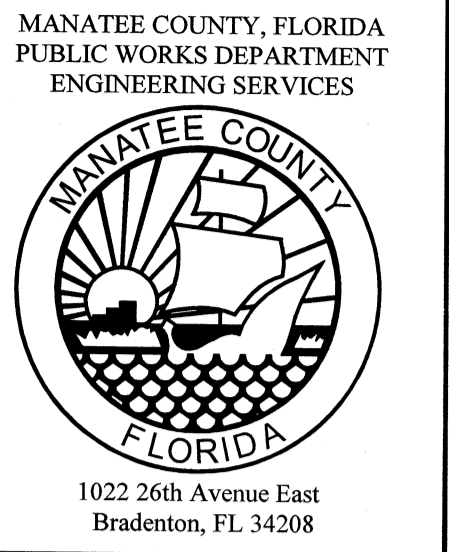
NOTES:

- EXISTING AREA OF ASPHALT TO BE MILLED 1.5" THICK
- NEW ASPHALT SHALL CONSIST OF FRICTION COURSE FC-12.5 (TRAFFIC D)(1.5").

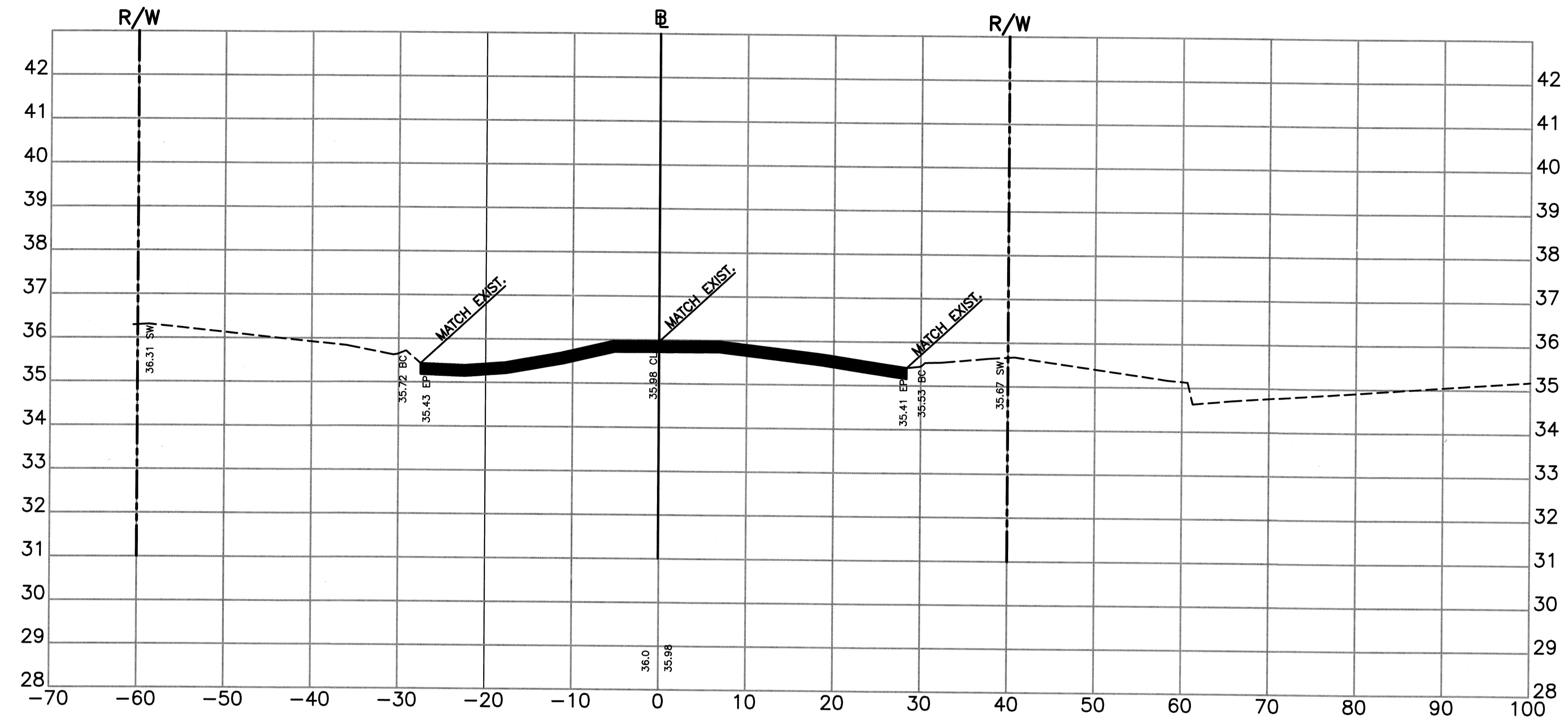


APPROVED BY:
Ch. Mowbray
CHRISTOPHER LEE MOWBRAY
FLORIDA P.E. # 46777
MANATEE COUNTY GOVERNMENT
PUBLIC WORKS DEPARTMENT
1022 26TH AVENUE EAST
BRADENTON, FL 34208
DATE: 4/20/12

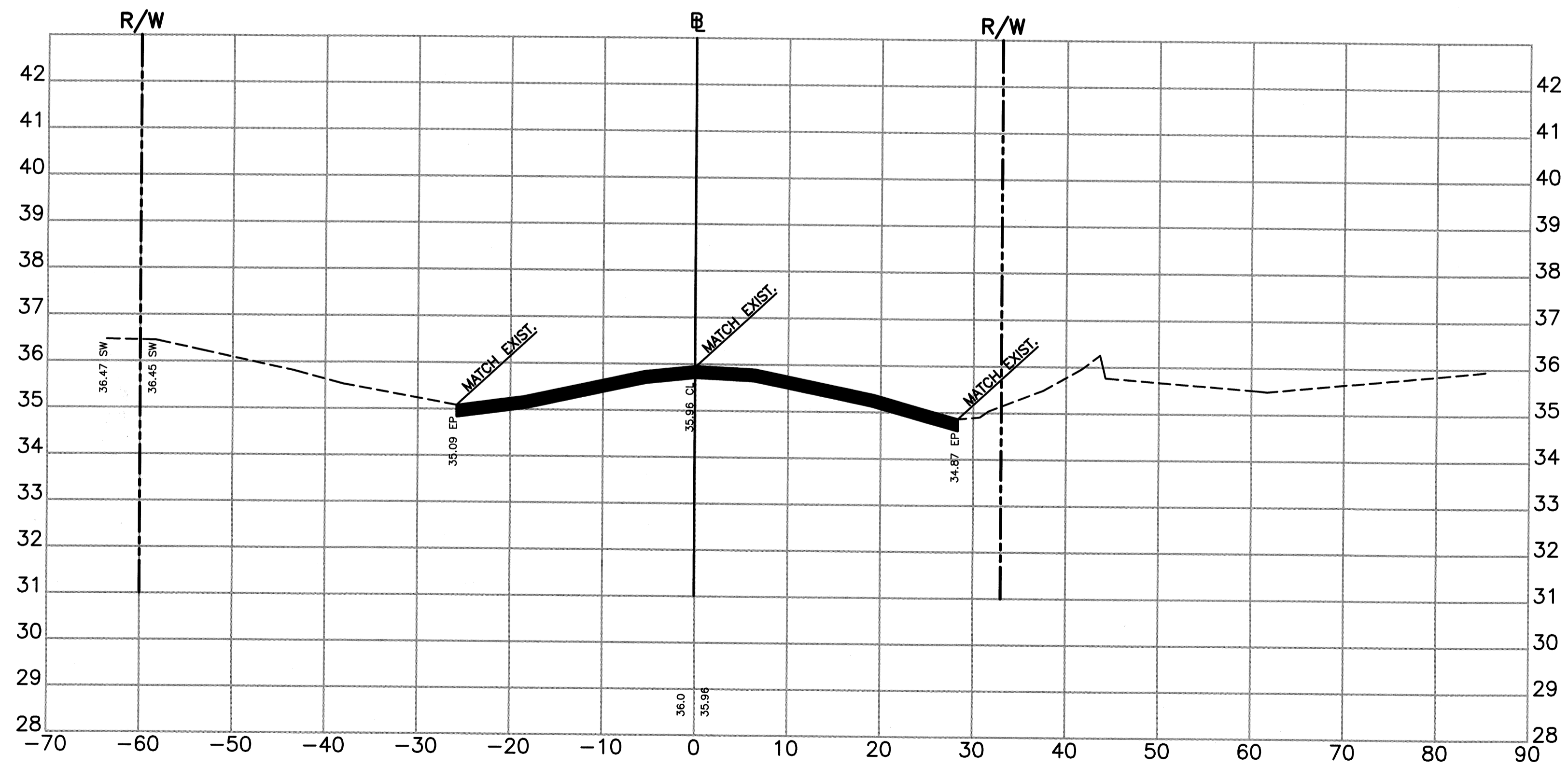
I:\P\01_Engineering_Straight\Highway_Engineering\INTERSECTION STUDIES AND IMPROVEMENTS\15th St. E @ 53rd Ave E\DWG\Cross Sections & Typ Sect.dwg, 11x17 X-Section - Sta. 12+00-13+00 - 4/20/2012 8:38 AM Thom Forrester, 10.5, ARCH D (24x36 in.)



**53rd AVE. E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY
CROSS SECTION SHEET - STA. 12+00-13+00**



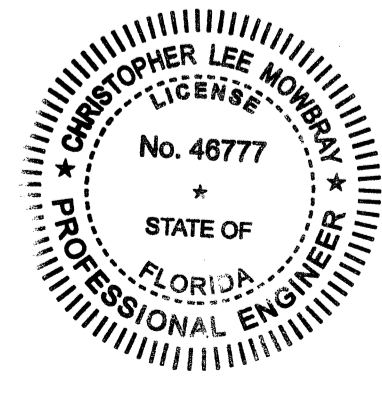
STA. 12+00



STA. 13+00

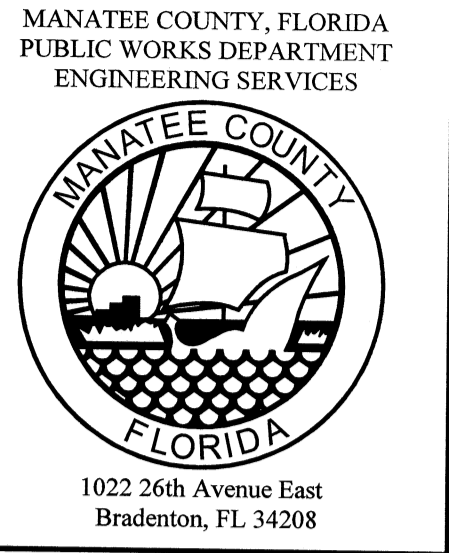
NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	323-6029960
SURVEY #	000
SEC./TWN./RGE	00/00S/00E
SCALE	N.T.S.
SURVEYED	RPH
DESIGNED	AAM 5/3/11
DRAWN	MRJ 5/3/11
CHECKED	AAM 11/2/11

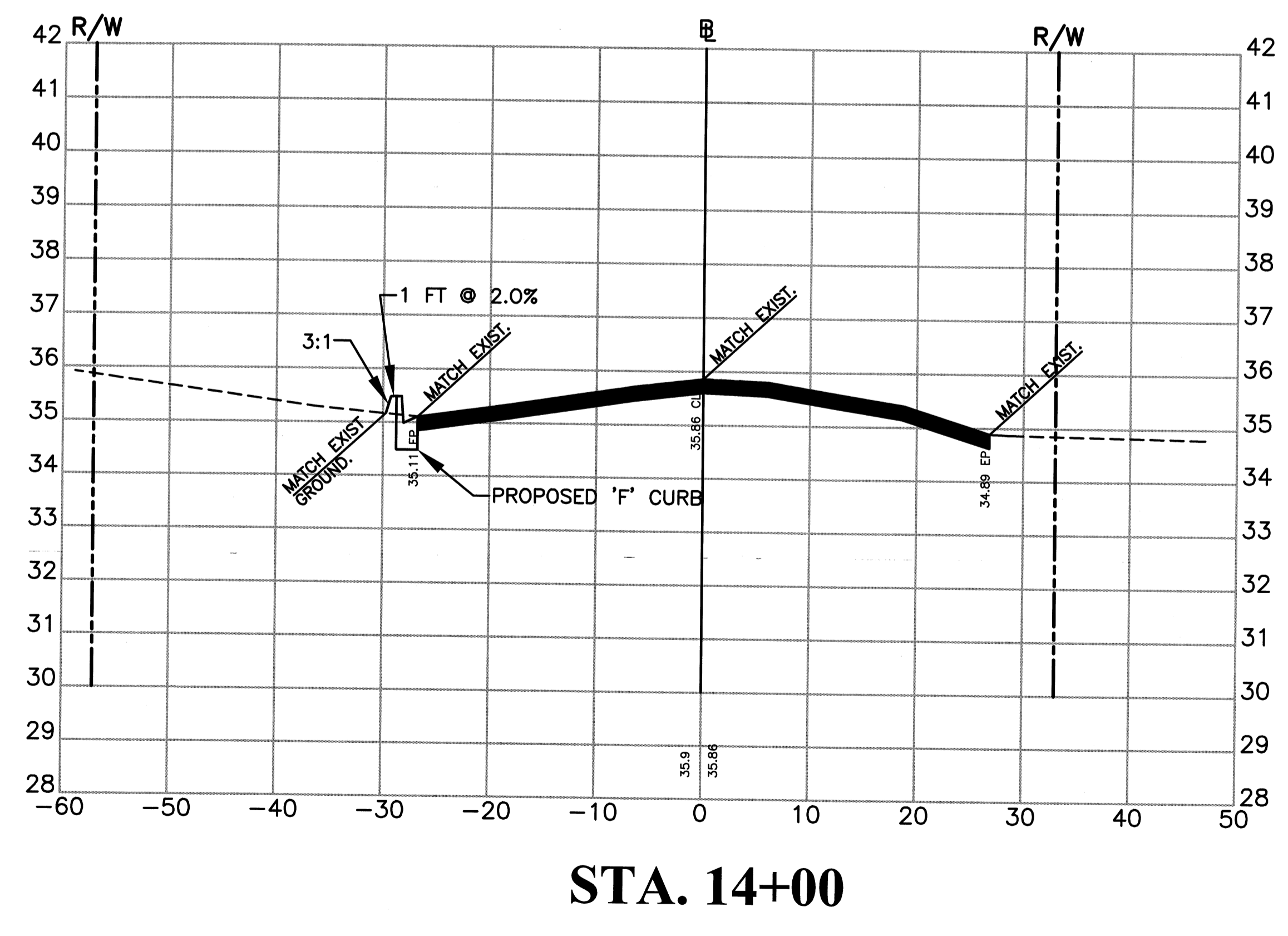
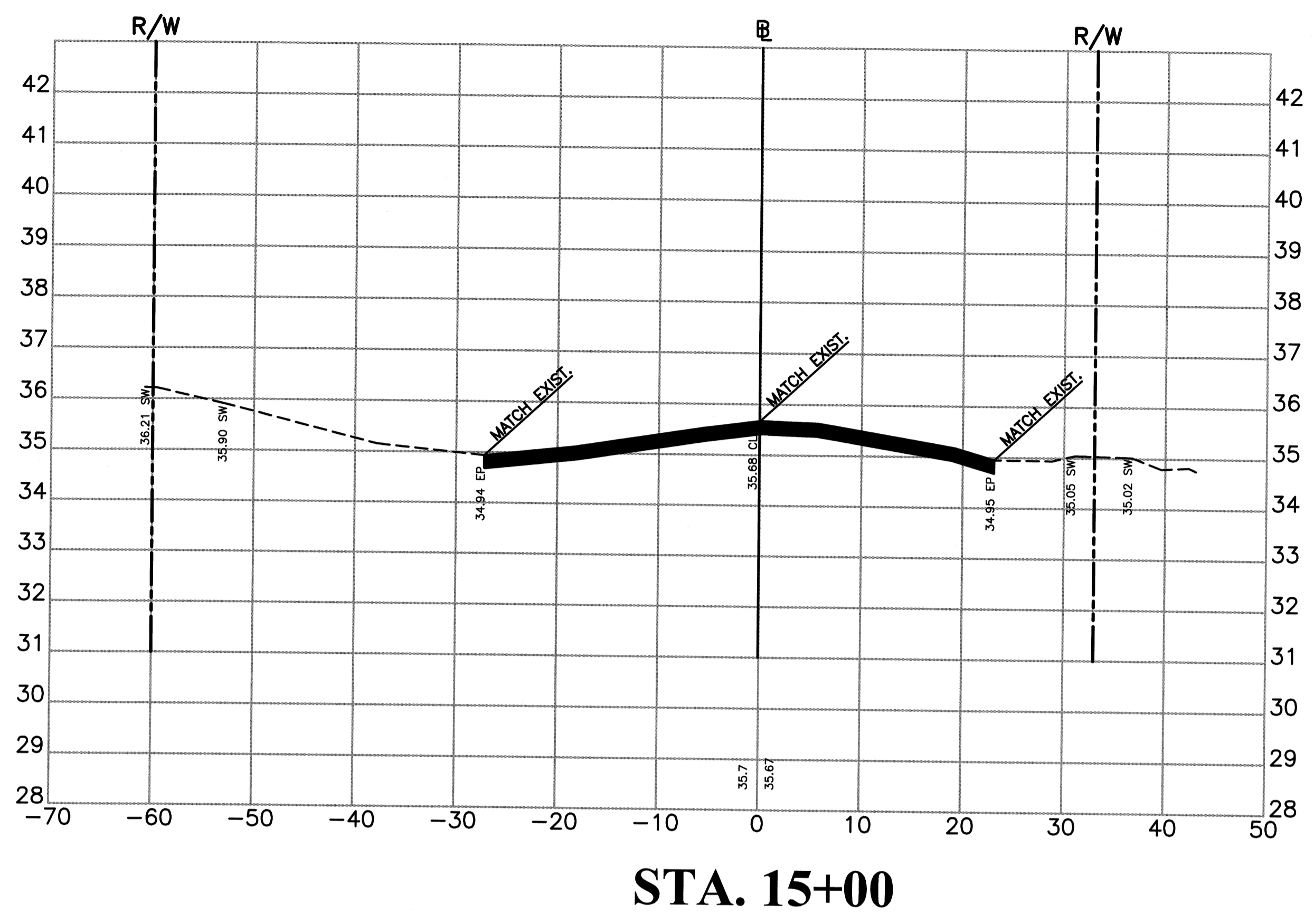


C.MOWBRAY P.E.
FLORIDA P.E. # 46777
Ch Lee
4/20/12
Signature & Date

S:\P\01-Engineering-Shore\Highway Engineering\INTERSECTION STUDIES AND IMPROVEMENTS\15th St. E @ 53rd Ave E\CAD\Cross Sections & Typ. Sect.dwg, 11x17 X-Section - Sta. 14+00-15+00, 4/20/2012 8:38 AM Thom Forrester, 1:0.5, ARCH D (24x36 in.)

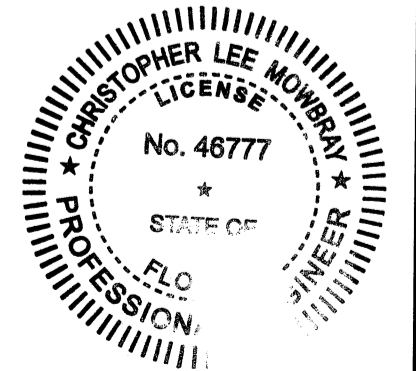


**53rd AVE. E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY
CROSS SECTION SHEET - STA. 14+00-15+00**



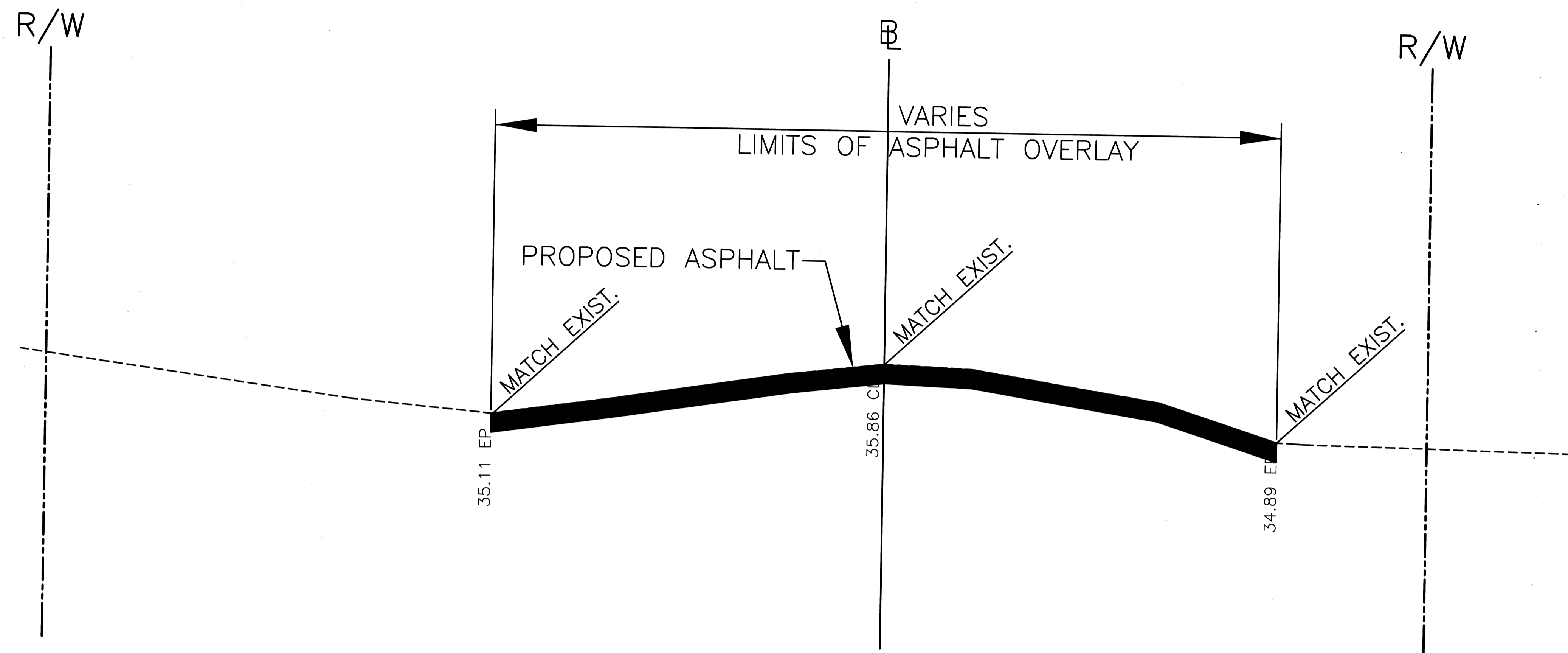
NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	323-6029960
SURVEY #	000
SEC./TWN./RGE	00/00S/00E
SCALE	N.T.S.
SURVEYED	RPH
DESIGNED	AAM 5/3/11
DRAWN	MRJ 5/3/11
CHECKED	AAM 11/2/11



C. MOWBRAY P.E.
FLORIDA P.E. # 46777
Ch Lee
4/20/12
Signature & Date

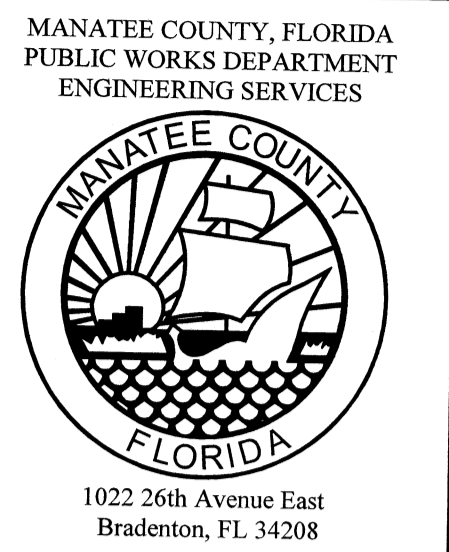
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NOTES:

- EXISTING AREA OF ASPHALT TO BE MILLED 1.5" THICK
- NEW ASPHALT SHALL CONSIST OF FRICTION COURSE FC-12.5 (TRAFFIC D)(1.5").

TYPICAL SECTION 'A-A'



53rd AVE. E. (SR 70) @ 15th ST. E. ASPHALT OVERLAY TYPICAL SECTION SHEET

NO.	REVISION DESCRIPTION	BY	DATE

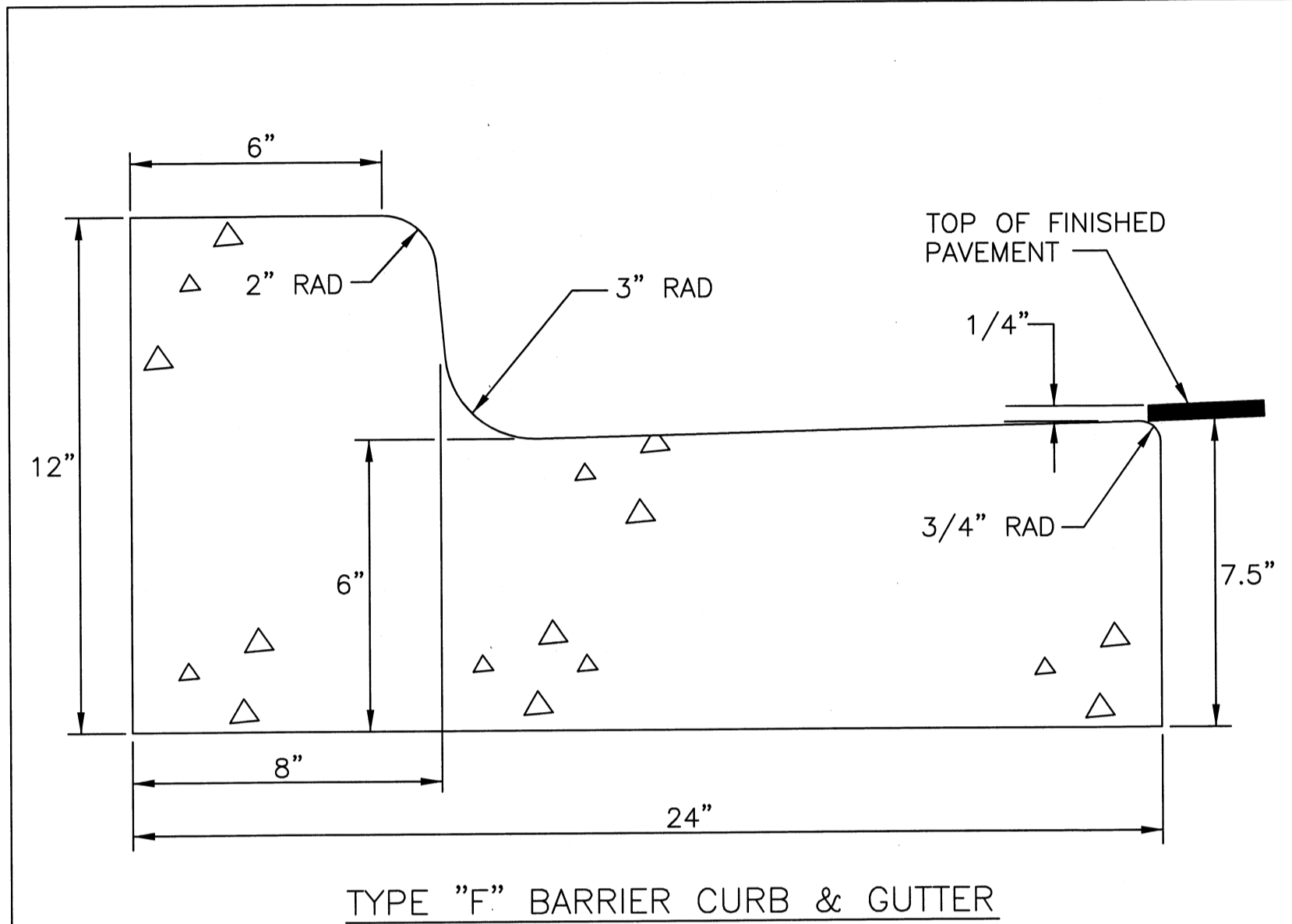
PROJECT #	323-6029960
SURVEY #	000
SEC./TWN./RGE	00/00S/00E
SCALE	N.T.S.

	BY	DATE
SURVEYED	RPH	
DESIGNED	AAM	5/3/11
DRAWN	MRJ	5/3/11
CHECKED	AAM	11/2/11

C.MOWBRAY P.E.	
FLORIDA P.E. # 46777	
	<i>Ch Lee</i> 4/20/12 Signature & Date

S:\P\01 - Engineering - Shore Highway - Engineering\INTERSECTION STUDIES AND IMPROVEMENTS\5th ST. E @ 53rd Ave E\CAD\Quantity - Detail - BMP Structures\1x17 Detail Sheet_4/20/2012 8:43 AM Thom Forrester_10.5_ARCH D (24x36 in.)

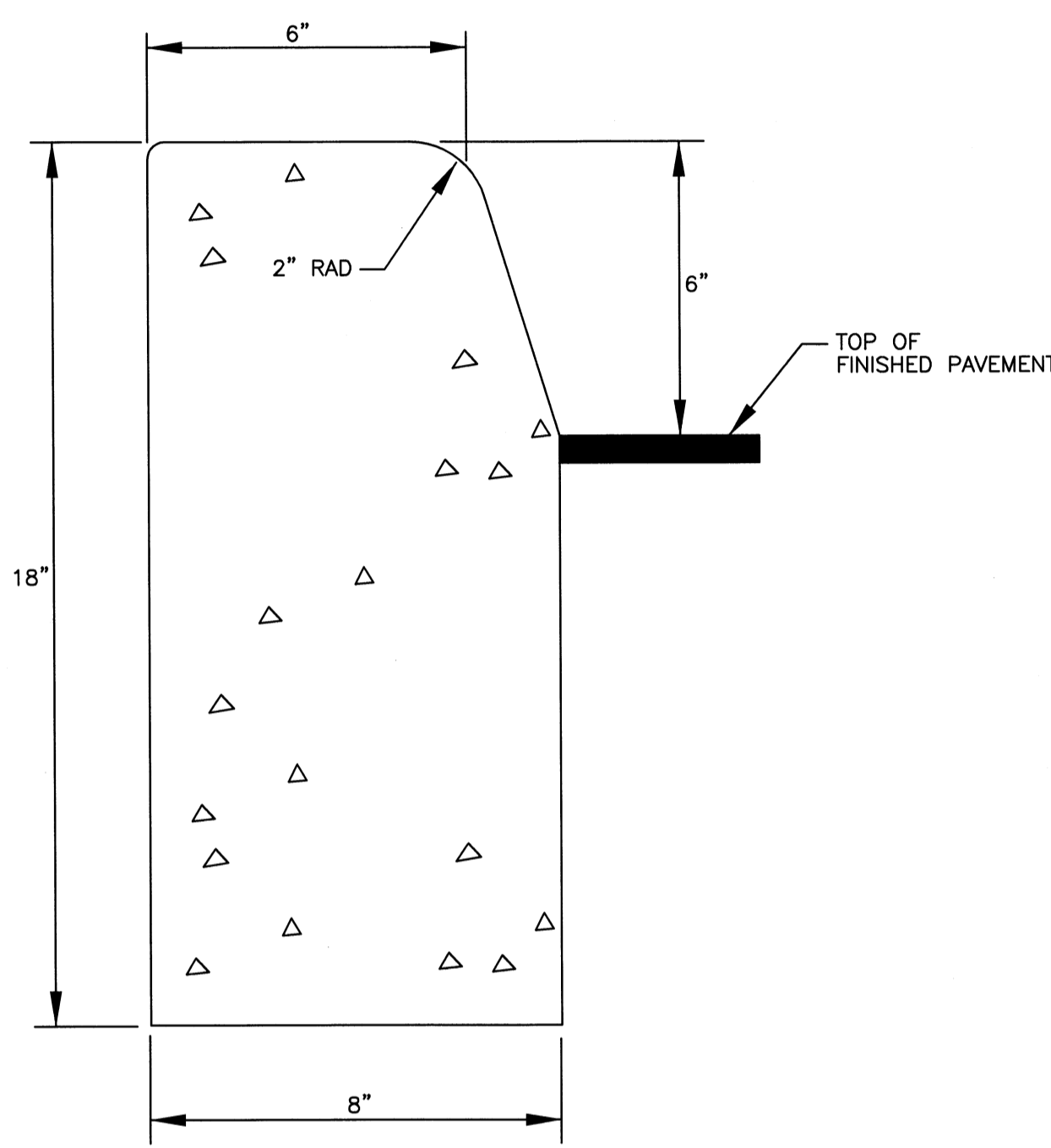
**53rd AVE. E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY
DETAIL SHEET**



TYPE "F" BARRIER CURB & GUTTER

A) CLASS 1 CONCRETE 3,000 P.S.I. AT 28 DAYS.
B) CURB AND GUTTER SHALL MEET THE SPECIFICATIONS ESTABLISHED BY FLORIDA D.O.T. STANDARD SPECIFICATIONS PER F.D.O.T. ROADWAY AND TRAFFIC DESIGN STANDARDS INDEX NO. 300, LATEST REVISION.

MANATEE COUNTY TRANSPORTATION DEPARTMENT		TYPE F CURB & GUTTER	201.2
REV. BY	DATE		
	6/12/07		
	DATE OF B.O.C.C. APPROVAL		



**TYPE "D"
HIGH BACK CURB**

A) CLASS 1 CONCRETE, 3,000 P.S.I. AT 28 DAYS.
B) CURB SHALL MEET THE SPECIFICATIONS ESTABLISHED BY F.D.O.T. STANDARD SPECIFICATIONS PER F.D.O.T. ROADWAY AND TRAFFIC DESIGN STANDARDS INDEX NO. 300, LATEST REVISION.

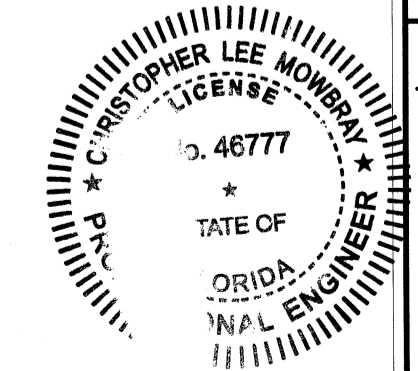
MANATEE COUNTY TRANSPORTATION DEPARTMENT		TYPE D CURB	201.4
REV. BY	DATE		
	6/12/07		
	DATE OF B.O.C.C. APPROVAL		

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	323-6029960
SURVEY #	000
SEC./TWN./RGE	00/00S/00E
SCALE	N.T.S.
SURVEYED	RPH
DESIGNED	AAM 5/4/11
DRAWN	MRJ 5/10/11
CHECKED	AAM 11/2/11

C. MOWBRAY P.E.
FLORIDA P.E. # 46777

Ch L 3
4/20/12
Signature & Date



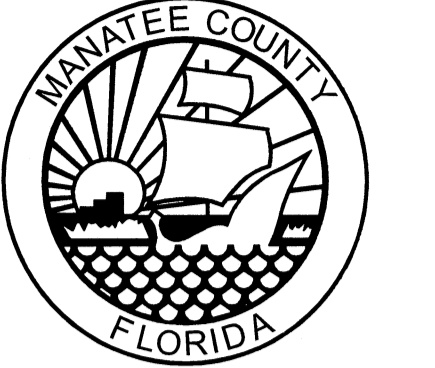
Sheet Number:

Sheet Title:

File No:

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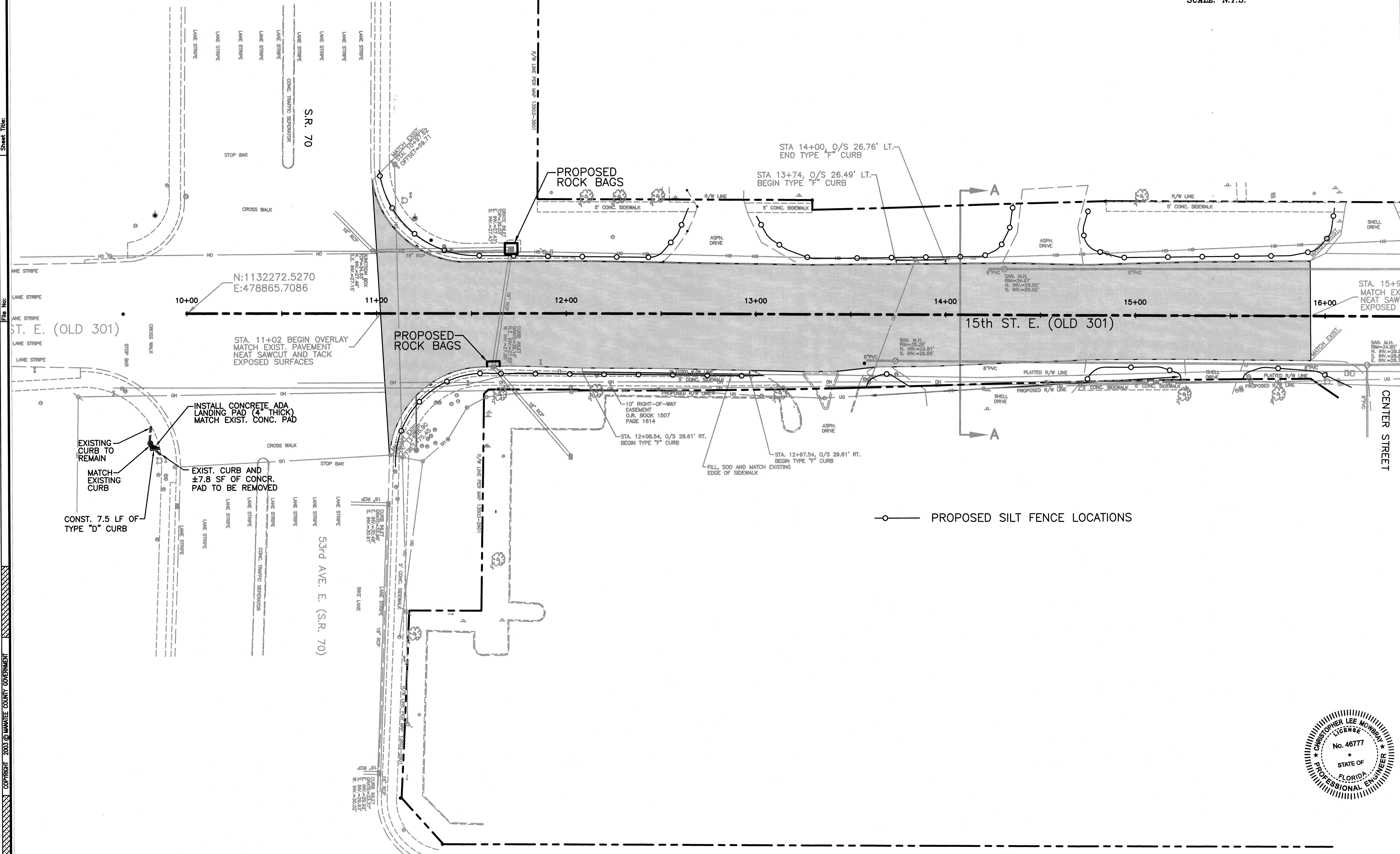
MANATEE COUNTY, FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES



1022 26th Avenue East
Bradenton, FL 34208



SCALE: N.T.S.



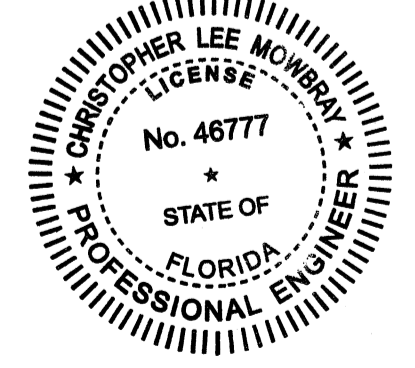
53rd AVE.E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY

EROSION CONTROL LOCATION SHEET

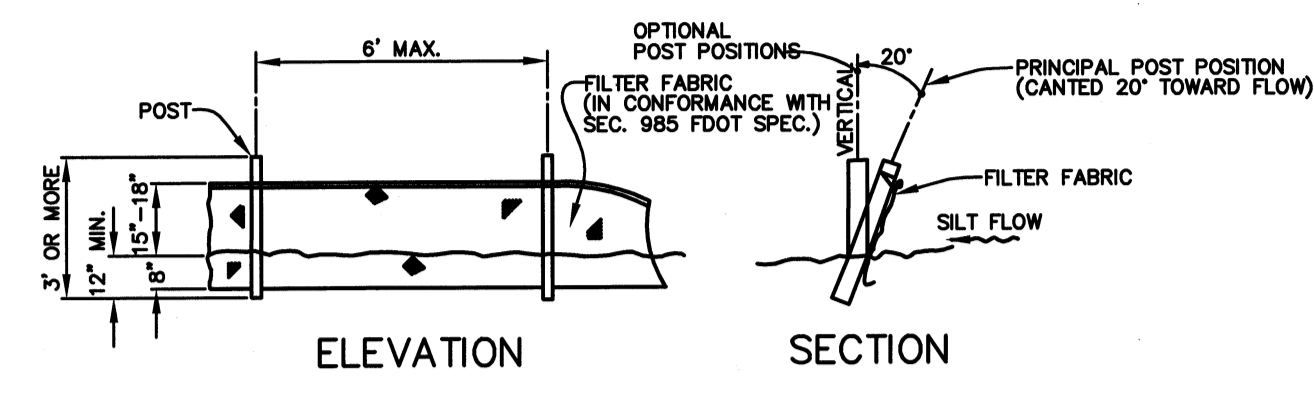
REVISION		DATE
	BY	
SURVEYED	RPH	
DESIGNED	AAM	5/4/11
DRAWN	MRJ	5/10/11
CHECKED	AAM	11/2/11

SCALE: N.T.S.

SEAL

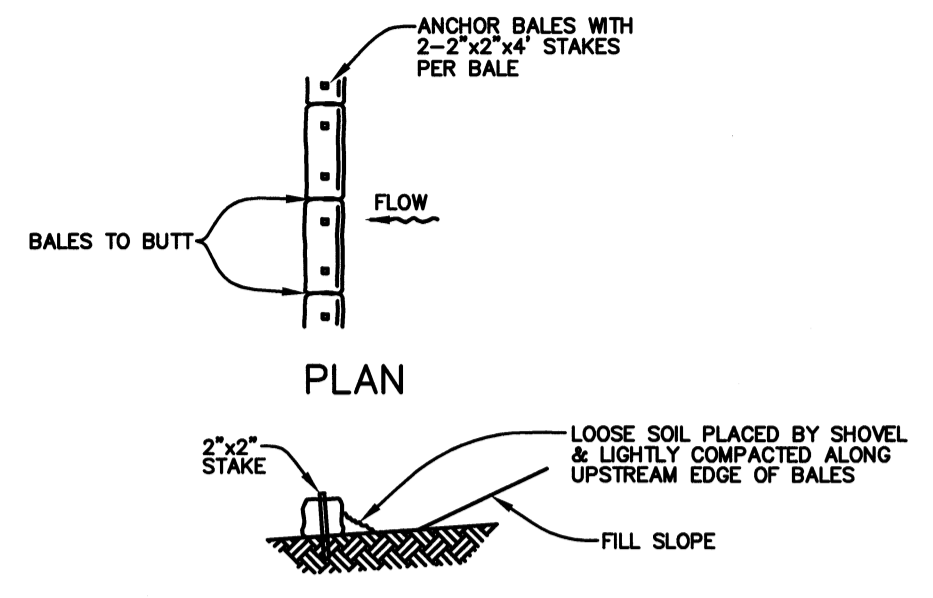


Ch L N
4/20/12

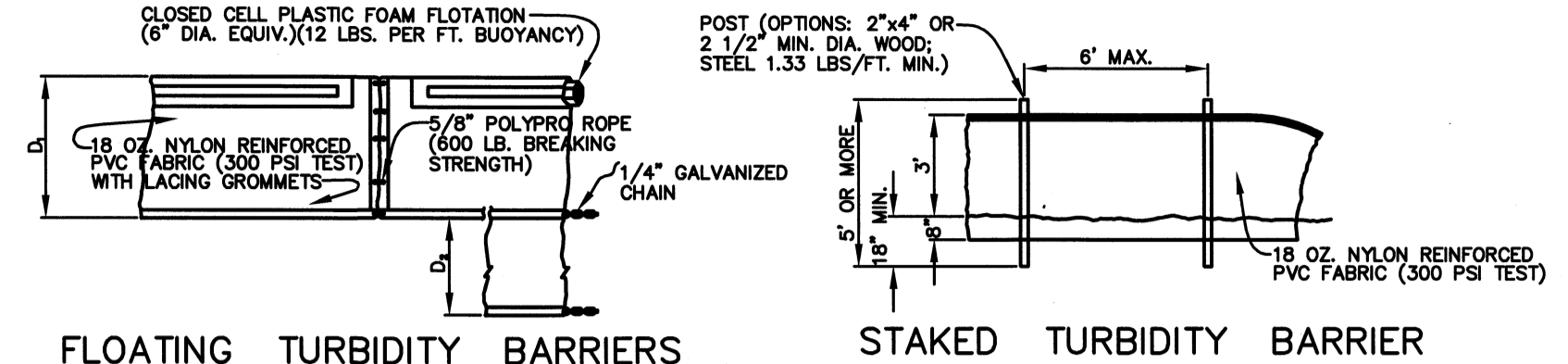


NOTE: SILT FENCE TO BE PAID FOR UNDER THE CONTRACT UNIT PRICE FOR STAKED SILT FENCE (LF).

TYPICAL SILT FENCE
FIGURE 2

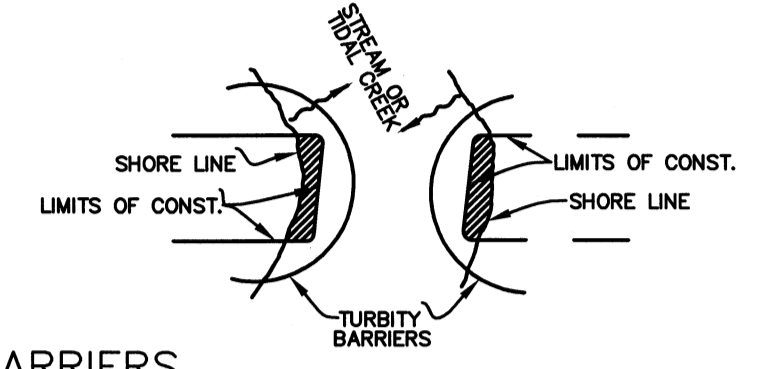


TYPICAL BALE SILT BARRIER
FIGURE 3

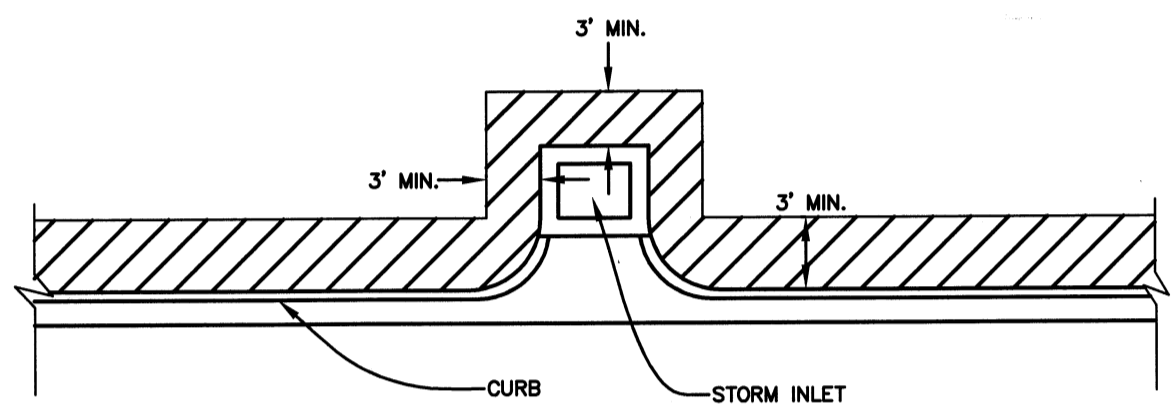


D₁ = 5' STD. (SINGLE PANEL FOR DEPTHS 5' OR LESS).
D₂ = 5' STD. (ADDITIONAL PANEL FOR DEPTHS > 5').
CURTAIN TO REACH BOTTOM UP TO DEPTHS OF 10 FEET.
TWO(2) PANELS TO BE USED FOR DEPTHS GREATER THAN
10 FEET UNLESS SPECIAL DEPTH CURTAINS SPECIFICALLY CALLED
FOR IN THE PLANS OR AS DETERMINED BY THE ENGINEER.

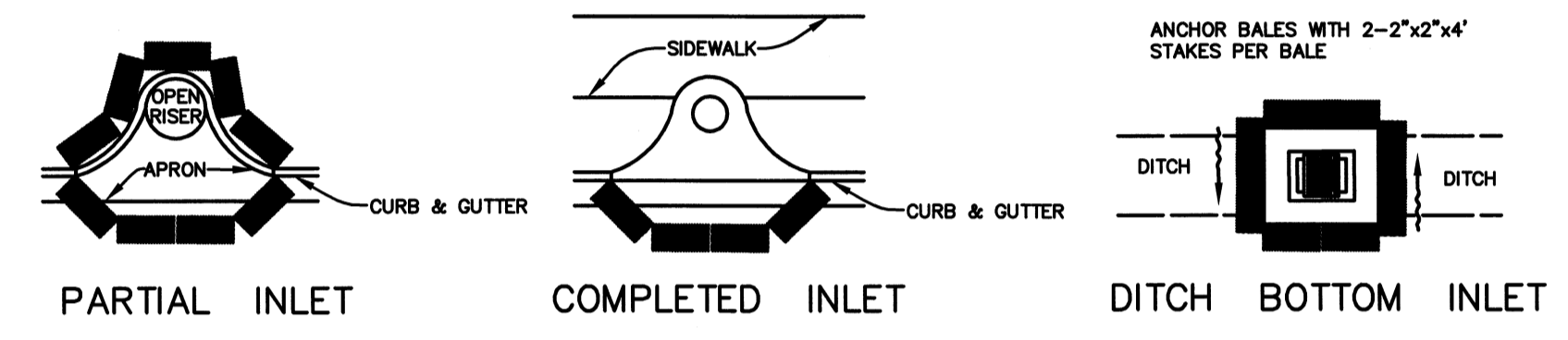
NOTICE: COMPONENTS OF TYPES ~ AND ~~~ MAY BE SIMILAR OR IDENTICAL
TO PROPRIETARY DESIGNS. ANY INFRINGEMENT ON THE PROPRIETARY
RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF
THE USER. SUBSTITUTIONS FOR TYPES ~ AND ~~~ SHALL BE AS
APPROVED BY THE ENGINEER.



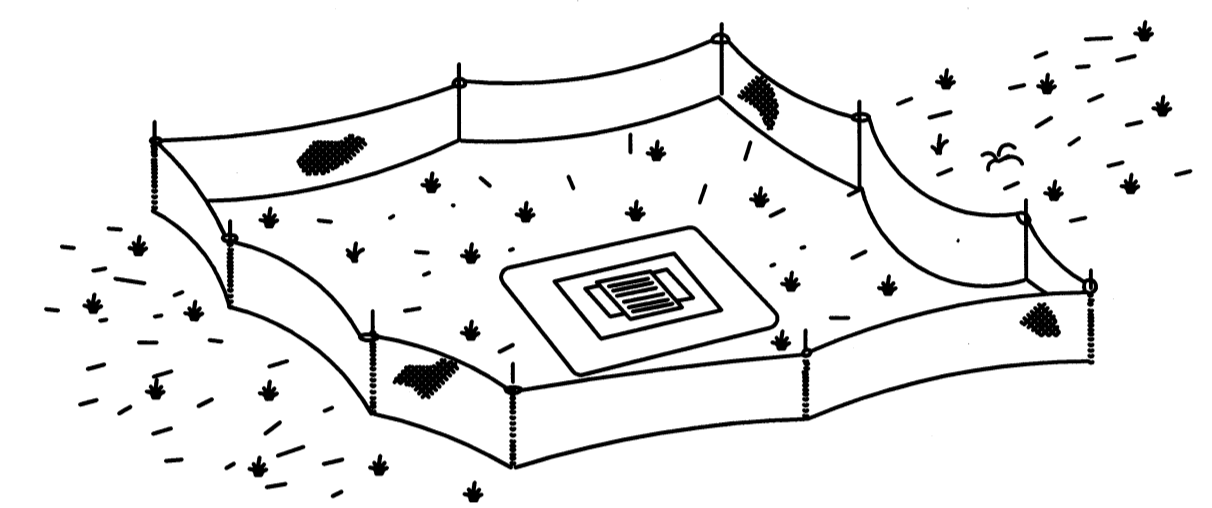
TURBIDITY BARRIERS
FIGURE 4



SOD ALONG CURB
AND AROUND INLET
FIGURE 14



HAY BALE PROTECTION AROUND
INLETS OR SIMILAR STRUCTURES
FIGURE 7

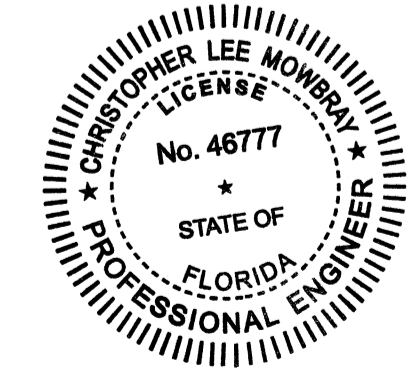


TYPE ~~~ SILT FENCE PROTECTION
AROUND DITCH BOTTOM INLETS
STAKED SILT BARRIER OR SILT FENCE
PROTECTION AROUND DITCH BOTTOM INLETS
FIGURE 8

53rd AVE. E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY
BEST MANAGEMENT PRACTICE SHEET

NO.	REVISION DESCRIPTION	BY	DATE

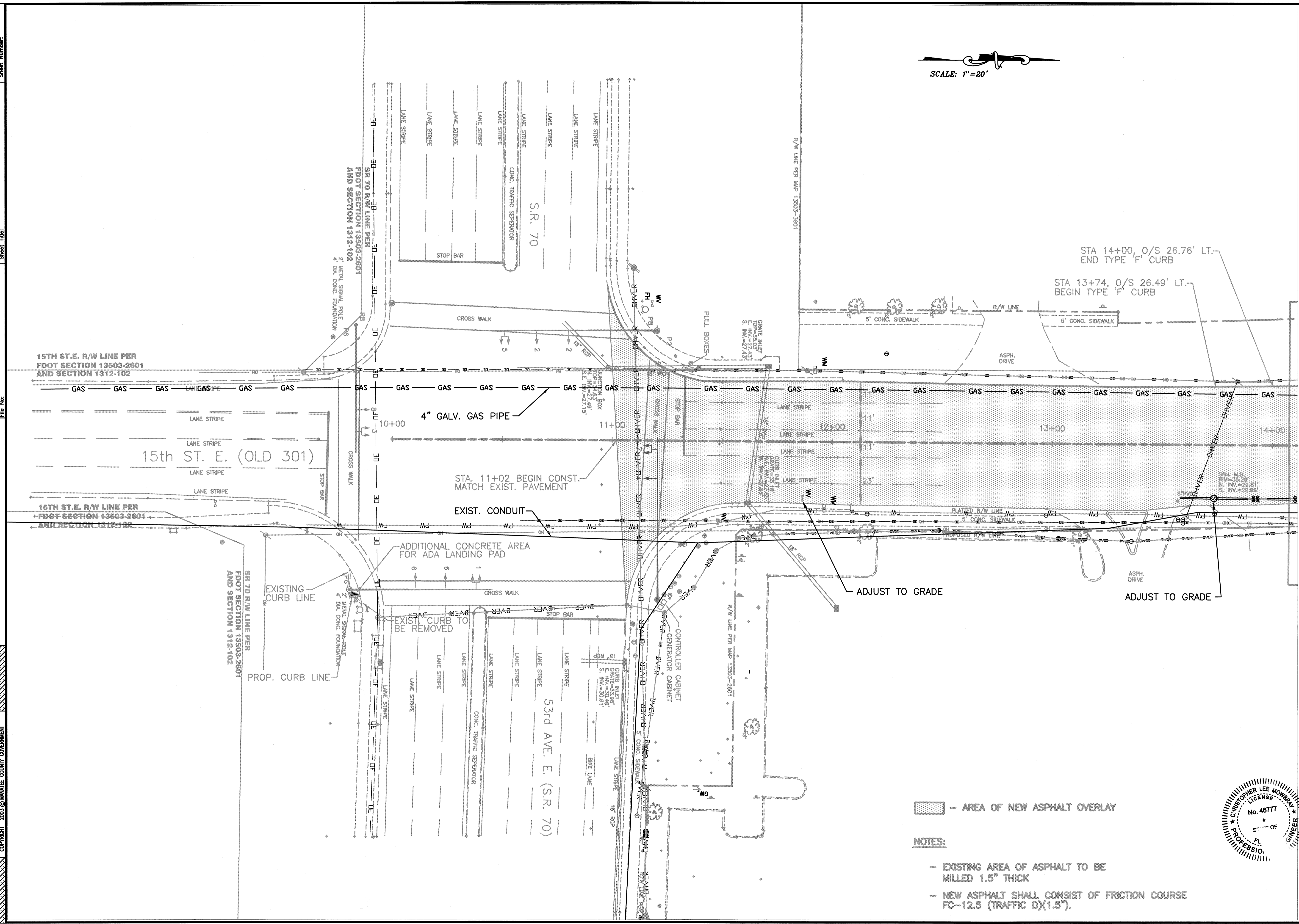
PROJECT #	323-6029960
SURVEY #	000
SEC./TWN./RGE	00/00S/00E
SCALE	N.T.S.
SURVEYED	RPH
DESIGNED	AAM 5/4/11
DRAWN	MRJ 5/4/11
CHECKED	AAM 11/2/11



C.MOWBRAY P.E.
FLORIDA P.E. # 46777
Ch Mowbray
4/20/12
Signature & Date

S:\PWD_Engineering_Short_Highway_Engineering\INTERSECTION STUDIES AND IMPROVEMENTS\15th St E @ 53rd Ave E\CAD\Quantity - Detail - BMP_Sheet.dwg, 11x17 BMP_Sheet, 4/20/2012 8:43 AM Thom Forrester, 1.0.5, ARCH D (24x36 in.)

Sheet Number: File No: Copyright 2003 © MANATEE COUNTY GOVERNMENT



 - AREA OF NEW ASPHALT OVERLAY

- NOTES:
- EXISTING AREA OF ASPHALT TO BE MILLED 1.5" THICK
 - NEW ASPHALT SHALL CONSIST OF FRICTION COURSE FC-12.5 (TRAFFIC D)(1.5").

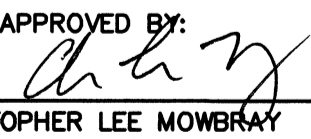
53rd AVE. E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY
UTILITY ADJUSTMENT SHEETS
STA. 10+00 TO STA. 14+00

REVISION	DATE

REVISION	DATE

SCALE: 1"=20'

SEAL

APPROVED BY:

CHRISTOPHER LEE MOWBRAY
FLORIDA P.E. # 46777
MANATEE COUNTY GOVERNMENT
PUBLIC WORKS DEPARTMENT
1022 26TH AVENUE EAST
BRADENTON, FL 34208

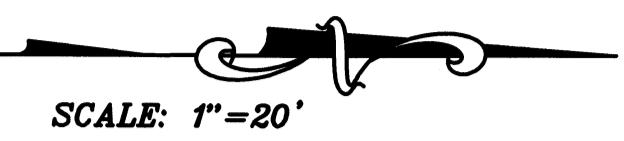
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Sheet Title:

File No:

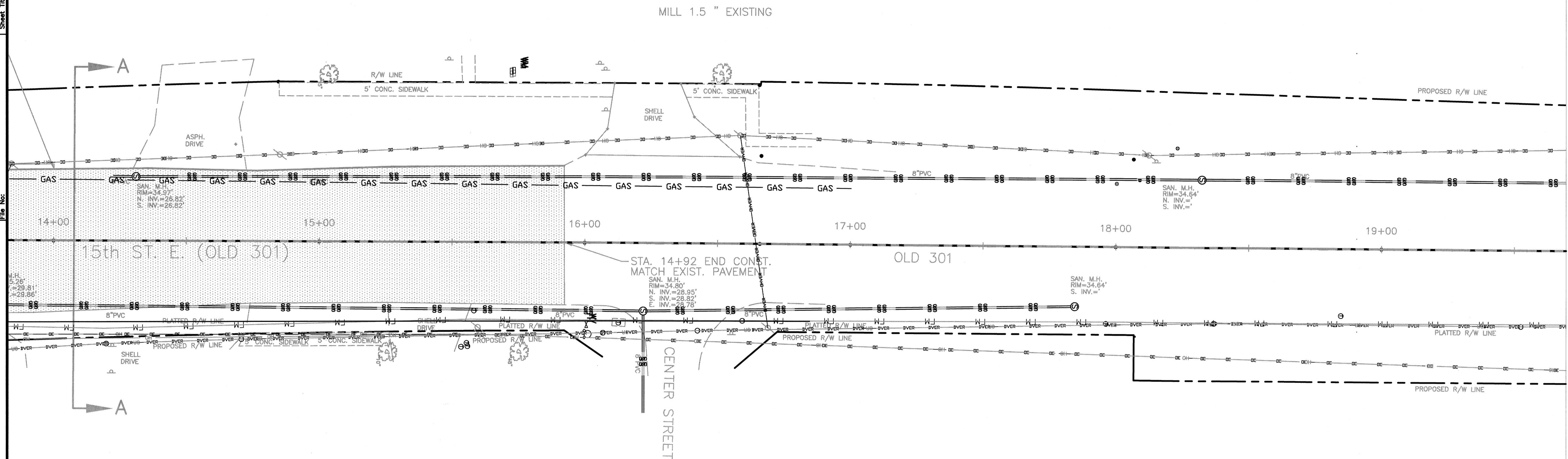
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MANATEE COUNTY, FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES



1022 26th Avenue East
Bradenton, FL 34208



53rd AVE. E. (SR 70) @ 15th ST. E.
ASPHALT OVERLAY
UTILITY ADJUSTMENT SHEETS
STA. 14+00 TO STA. 19+00

- AREA OF NEW ASPHALT OVERLAY

NOTES:

- EXISTING AREA OF ASPHALT TO BE MILLED 1.5" THICK
- NEW ASPHALT SHALL CONSIST OF FRICTION COURSE FC-12.5 (TRAFFIC D)(1.5").

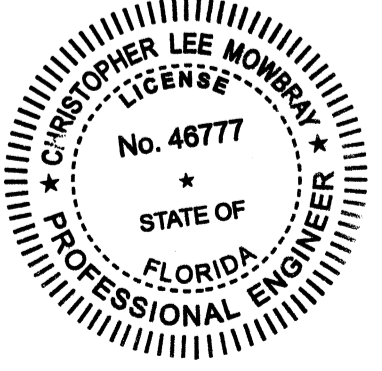
REVISION		DATE
	BY	DATE
SURVEYED	RPH	
DESIGNED	AAM	5/4/11
DRAWN	MRJ	5/4/11
CHECKED	AAM	11/2/11

SCALE: 1"=20'

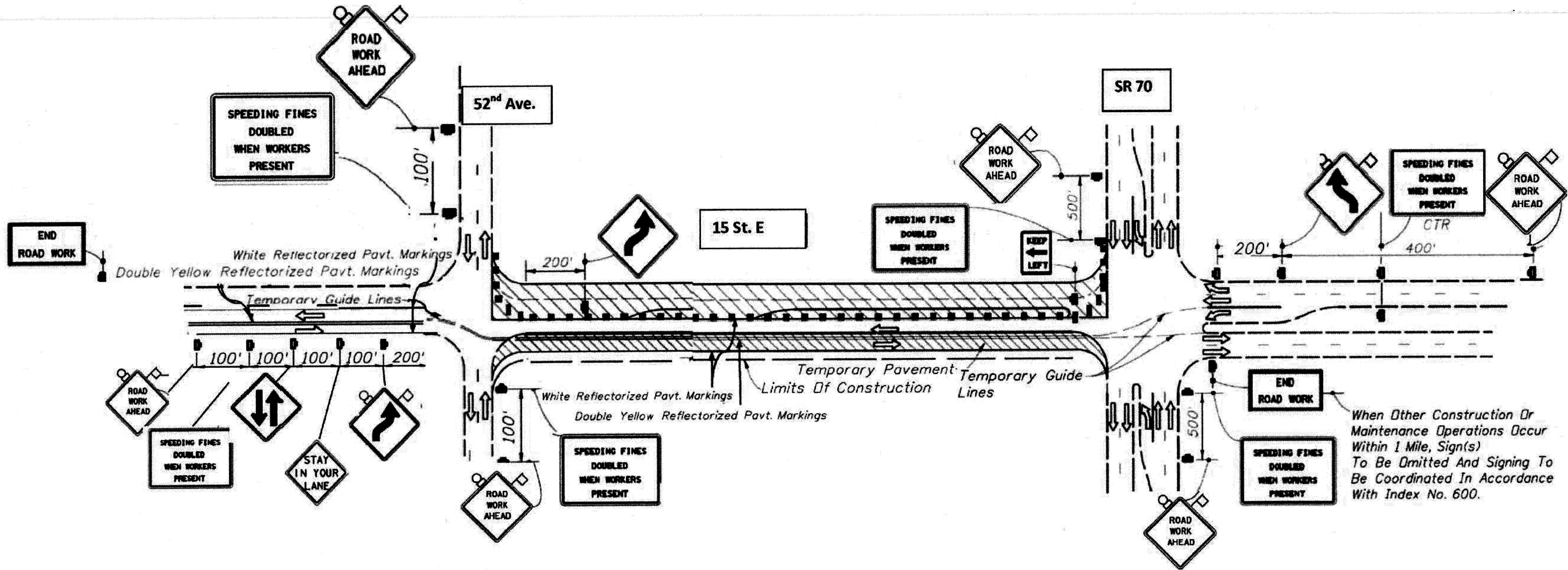
SEAL

APPROVED BY

CHRISTOPHER LEE MOWBRAY
FLORIDA P.E. # 46777
MANATEE COUNTY GOVERNMENT
PUBLIC WORKS DEPARTMENT
1022 26TH AVENUE EAST
BRADENTON, FL 34208









DATE 4/20/12



**15TH STREET EAST @ 53RD AVENUE EAST
TEMPORARY TRAFFIC CONTROL PLAN**

PHASE I

1. Maintain two-lane two-way traffic along existing facility. Install construction signing.
2. Remark existing pavement to facilitate temporary pavement construction. For lane width requirements see Index No. 600.
3. Construct temporary pavement of sufficient width to accommodate two-lane two-way traffic on the temporary pavement and a portion of the existing pavement during Phase I roadway construction. When two-lane two-way traffic can not be maintained during temporary pavement construction one-lane operations shall be maintained in accordance with Index No. 605. Channelizing devices shall be in conformance with 'Drop-Offs in Work Zones' of Index No. 600.
4. Mark the pavement in accordance with the Phase I diagram. Reroute through traffic to the temporary pavement and a portion of the existing pavement. For lane width requirements see Index No. 600.
5. Construct two lanes of the proposed roadway, including the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index Nos. 604, 605 and 615. Barricading shall be in conformance with 'Drop-Offs in Work Zones', Index No. 600. When work extends through an intersection, temporarily reroute the cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane access (minimum) each direction for four-lane two-way cross streets, in accordance with Index Nos. 604, 605 and 615.
6. Contact the Manatee County Traffic Operations Department at (941) 749-3500 at least one week prior to the start of construction for Traffic Signal Coordination requirements.

- SYMBOLS**
-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light
 -  Channelizing Device (See Index No. 600)
 -  Type III Barricade
 -  Work Zone Sign
 -  Stop Bar
 -  Lane Identification + Direction of Traffic

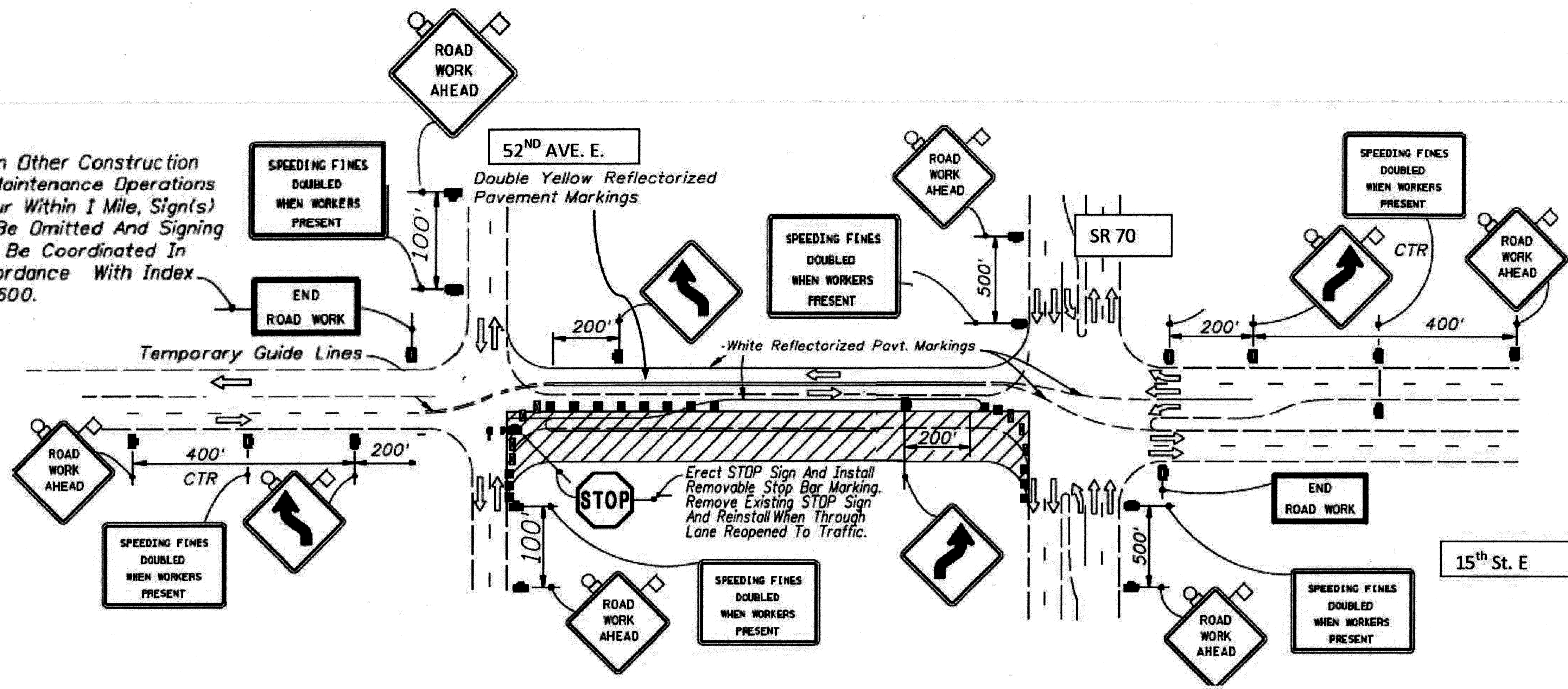
When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

NO.	DATE	BY	REVISION DESCRIPTION

PROJECT #	
SURVEY #	
SEC./TWN./RGE	
SCALE	

BY	DATE

When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.




PHASE II

1. Sign and mark Phase I pavement in accordance with the Phase II diagram. For lane width requirements see Index No. 600.
2. Reroute through traffic to Phase I pavement.
3. Complete all Phase II construction, including the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index Nos. 604, 605 and 615. Channelizing devices shall be in conformance with 'Drop-Offs in Work Zones' of Index No. 600. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane access (minimum) each direction for four-lane two-way cross streets, in accordance with Index Nos. 604, 605 and 615.
4. Contact the Manatee County Traffic Operations Department at (941) 749-3500 at least one week prior to the start of construction for Traffic Signal Coordination requirements.

GENERAL NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to Index No. 600.
2. Lane widths for maintenance of two-way traffic should desirably be equal to lane widths of the existing facility, but lanes shall not be less than 10' in width. When one-lane one-way operations are necessary, a minimum width of 12' should be maintained and traffic controlled in accordance with Index Nos. 604, 605 or 615.
3. At signalized intersections, signals shall be directed or relocated as required to the center of relocated lanes.
4. For reflectORIZED raised pavement marker application, see Index Nos. 600 and 17352.
5. Additional barricades, signing, lighting or other traffic controls for limited work areas shall be provided in accordance with other applicable TCZ Indexes as conditions warrant in each phase.
6. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
7. For general TCZ requirements and additional information, refer to Index No. 600.
8. A lane may be closed only during active work periods; lane closures are not allowed from 6:00 AM to 7:00 PM.

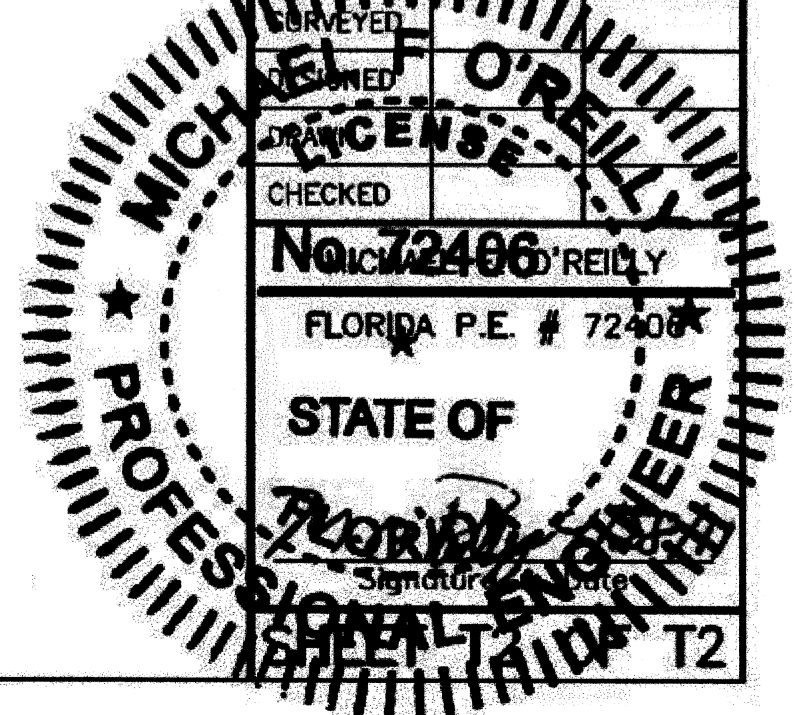
SYMBOLS

-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light
-  Channelizing Device (See Index No. 600)
-  Type III Barricade
-  Work Zone Sign
-  Stop Bar
-  Lane Identification + Direction of Traffic

15TH STREET EAST @ 53RD AVENUE EAST
TEMPORARY TRAFFIC CONTROL PLAN

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	
SURVEY #	
SEC./TWN./RGE	
SCALE	



 MICHAEL J. O'REILLY
 LICENSE NO. 72406
 STATE OF FLORIDA
 PROFESSIONAL ENGINEER

**MANATEE COUNTY
PUBLIC WORKS DEPARTMENT**

CONTRACT PLANS

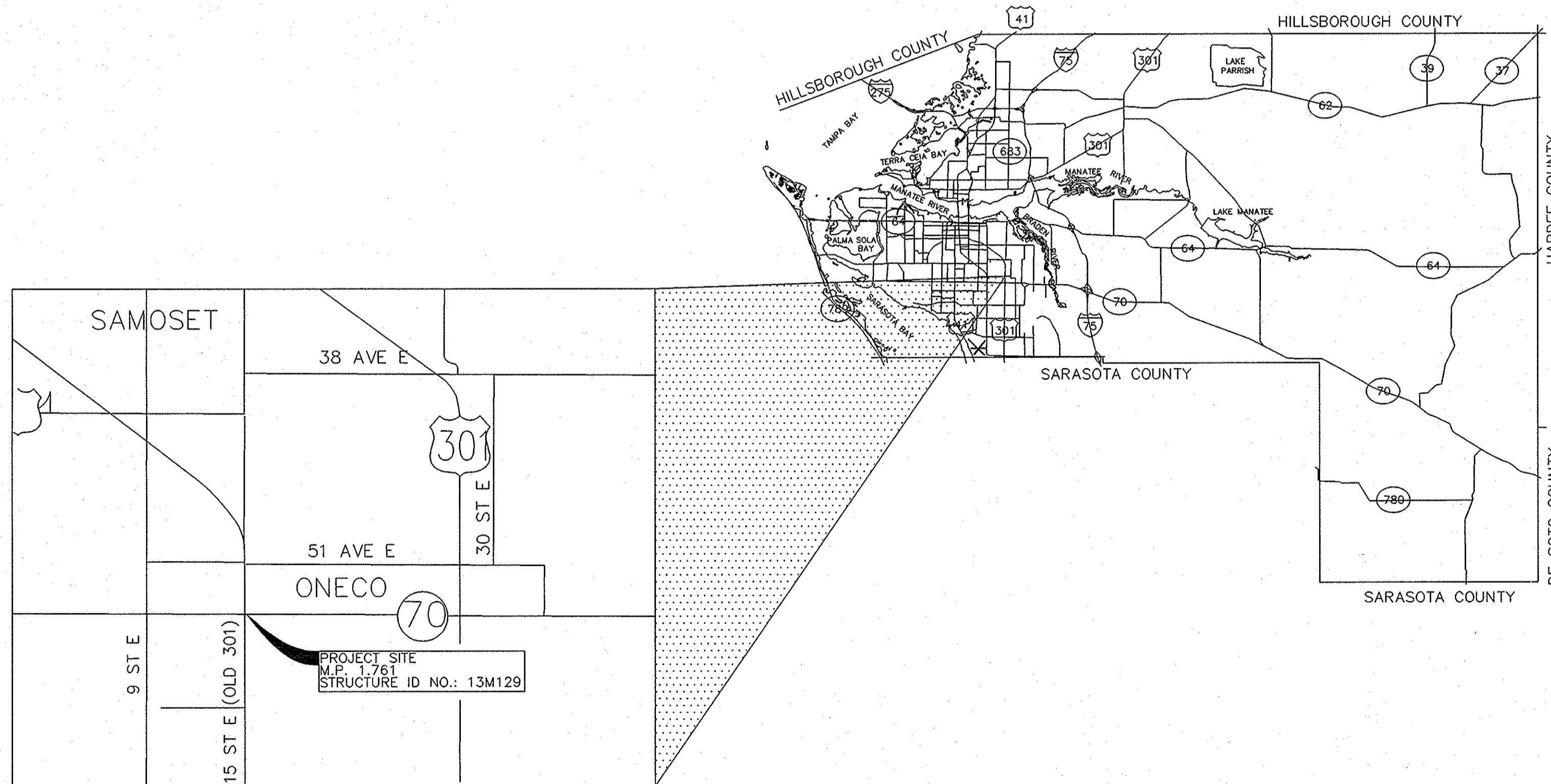
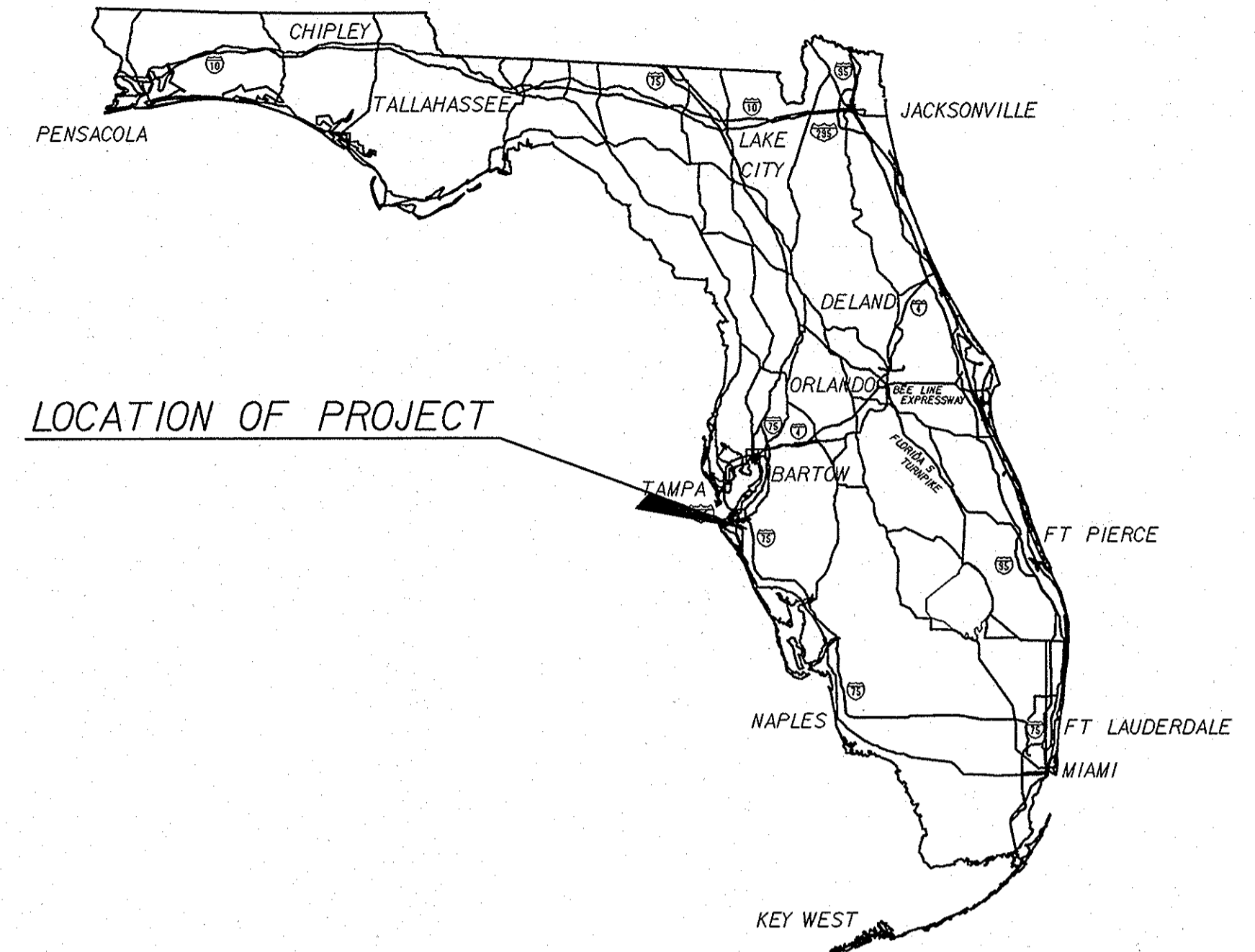
MANATEE COUNTY (13162) (M.P. 1.761)
(6029960)

53RD AVENUE EAST (SR 70) AT 15TH STREET EAST

SIGNALIZATION PLANS

INDEX OF SIGNALIZATION PLANS

SHEET NO.	SHEET DESCRIPTION
T-1	KEY SHEET
T-2	TABULATION OF QUANTITIES
T-3 TO T-4	GENERAL NOTES
T-5	SIGNALIZATION PLAN
T-6	GUIDESIGN WORKSHEET
T-7	MAST ARM TABULATION
T-8	MAST ASSEMBLIES DATA TABLE (STANDARD)
GT-1	REPORT OF CORE BORINGS SIGNALS



SIGNALIZATION SHOP DRAWINGS
TO BE SUBMITTED TO:
SUJEEVA A. WEERASURIYA, P.E.
HDR ENGINEERING, INC.
5426 BAY CENTER DRIVE, STE. 400
TAMPA, FLORIDA 33609-3444
PHONE NO. (813) 282-2300

PLANS PREPARED BY:
HDR ENGINEERING, INC.
2621 CATTLEMEN ROAD., STE. 106
SARASOTA, FLORIDA 34232-6212
PHONE NO. (941) 342-2700
FAX (941) 342-6589
CONTRACT NO. 12348
VENDOR NO. VF-470680568
CERTIFICATE OF AUTHORIZATION No. 4213



NOTE: THE SCALE OF THESE PLANS MAY
HAVE CHANGED DUE TO REPRODUCTION.

AT LEAST 72 HOURS IN ADVANCE OF BEGINNING CONSTRUCTION OF THE PROJECT,
THE CONTRACTOR SHALL CONTACT THE LOCAL MAINTENANCE FDOT ENGINEER'S OFFICE
TO SECURE GENERAL USE PERMITS AND/OR OTHER PERMITS AS REQUIRED FOR WORKING
WITHIN THE DEPARTMENT'S RIGHT-OF-WAY.

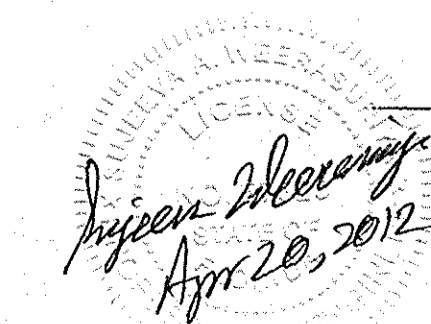
THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR
ROAD AND BRIDGE CONSTRUCTION (DATED 2010) AND DESIGN STANDARDS BOOKLET
(DATED 2010).

APPLICABLE DESIGN STANDARDS MODIFICATIONS: 7/1/2011. FOR DESIGN STANDARDS
MODIFICATIONS, CLICK ON "DESIGN STANDARDS" AT THE FOLLOWING WEB SITE:
<http://www.dot.state.fl.us/rddesign/>

MANATEE COUNTY PROJECT MANAGER: VINCENT CANNA

KEY SHEET REVISIONS		
DATE	BY	DESCRIPTION

SIGNALIZATION PLANS
ENGINEER OF RECORD: SUJEEVA A. WEERASURIYA, P.E.


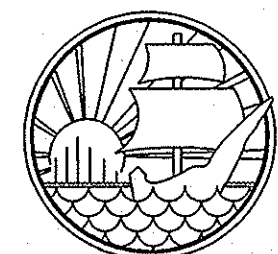


57629	
FISCAL YEAR	SHEET NO.
11	T-1

TABULATION OF QUANTITIES

PAY ITEM NO.	DESCRIPTION	UNIT	SHEET NUMBERS																				TOTAL THIS SHEET		GRAND TOTAL		REF. SHEET
			T-5																								
			PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL							
555-1-1	DIRECTIONAL BORE (LESS THAN 6")	LF	110																			110		110			
630-1-12	CONDUIT (F & I) (UNDERGROUND)	LF	189																			189		189			
630-1-13	CONDUIT (F & I) (UNDERPAVEMENT SAWCUT)	LF	16																			16		16			
632-7-1	CABLE, SIGNAL (F&I)	PI	1																			1		1			
635-1-11	PULL & JUNCTION BOXES (F&I) (PULL BOX)	EA	4																			4		4			
646-1-11	ALUMINUM SIGNAL POLE, (PEDESTAL)	EA	1																			1		1			
649-31-203	MAST ARM (F&I) (WIND SPEED -130) (SINGLE ARM) (W/O LUMINAIRES) (60)	EA	1																			1		1			
650-1-311	TRAFFIC SIGNAL (F&I) (3 SECT.) (1 WAY) (STANDARD)	AS	4																			4		4			
653-191	PEDESTRIAN SIGNAL (F&I) (LED-COUNTDOWN) (1 WAY)	AS	2																			2		2			
663-74-15	VEHICLE DETECTOR ASSEMBLIES (F&I) (VIDEO)	EA	1																			1		1			
665-12	PEDESTRIAN DETECTOR (F&I) (DET. STATION WITH POST & SIGN)	EA	2																			2		2			
665-13	PEDESTRIAN DETECTOR (F&I) (DETECTOR WITH SIGN ONLY)	EA	2																			2		2			
670-5-430	TRAFFIC CONTROLLER ASSEMBLY (MODIFY) (SPECIAL)	AS	1																			1		1			
685-106	SYSTEM AUX. (F&I) (UNINTERRUPTIBLE POWER SOURCE)	EA	1																			1		1			
690-10	TRAFFIC SIGNAL HEAD ASSEMBLY, REMOVAL	EA	2																			2		2			
690-20	SIGNAL PEDESTRIAN ASSEMBLY, REMOVE	EA	2																			2		2			
690-34-2	POLE REMOVAL - DEEP (BOLT ON ATTACHMENT)	EA	1																			1		1			
690-60	DETECTOR VEHICLE ASSEMBLY, REMOVE	EA	3																			3		3			
690-70	DETECTOR PEDESTRIAN ASSEMBLY, REMOVE	EA	4																			4		4			
690-90	REMOVE CONDUIT & CABLING	PI	1																			1		1			
690-100	SIGNAL EQUIPMENT, MISCELLANEOUS REMOVE	PI	1																			1		1			
699-1-1	INTERNALLY ILLUMINATED SIGN (F&I)	EA	1																			1		1			

Sujeeva A. Weerasuriya
Apr 20, 2012

	SCALE AS NOTED	 HDR <small>Employee-owned</small>	HDR Engineering, Inc. 2621 Cattlemen Road Suite 106 Sarasota, FL 34232-6212 FBPR Certificate of Authorization No. 4213	DATE 02/21/11	 MANATEE COUNTY PUBLIC WORKS	DESIGN ENGINEER SUJEEVA A. WEERASURIYA	TABULATION OF QUANTITIES	SHEET NO. T-2
	DESIGNED BY LIR			PROJECT NO. 6029960				FL. LICENSE NO. 57629
	DRAWN BY GAS							
	CHECKED BY SAW							
No.	REVISIONS	DATE	BY					

GENERAL NOTES

1. THE CONTRACTOR SHALL CONTACT MANATEE COUNTY PROJECT MANAGEMENT DIVISION BEFORE STARTING WORK. COUNTY STANDARD UPDATES OR OTHER INFORMATION SHALL BE OBTAINED.
2. THE CONTRACTOR SHALL COORDINATE WITH MANATEE COUNTY'S TRAFFIC ENGINEERING DIVISION (941-749-3502 EXT. 7817), AT LEAST TWO WEEKS, BEFORE ANY CABINET MODIFICATIONS ARE TO BE PERFORMED. MANATEE COUNTY ENGINEERING DIVISION PERSONNEL WILL REVIEW, ASSIST AND PROVIDE TECHNICAL SUPPORT RELEVANT TO ANY FIELD MODIFICATIONS THAT ARE NECESSARY. THE CONTRACTOR MAY OPTION OUT OF THIS PROPOSITION, IF THEY FEEL ASSISTANCE AND OVERSIGHT ARE NOT NECESSARY.
3. AT LEAST TWO (2) FULL BUSINESS DAYS PRIOR TO BEGINNING THE TRAFFIC SIGNAL INSTALLATION, PERMITTEE TO CONTACT THE TRAFFIC SIGNAL INSPECTOR/LIASON:

MR. CARLOS CABRERA
FLORIDA DEPARTMENT OF TRANSPORTATION
SARASOTA OPERATIONS CENTER
1840 61ST STREET
SARASOTA, FL 34243
PH: (941) 359-7317

4. ONE WEEK PRIOR TO THE BEGINNING OF THE TRAFFIC SIGNAL INSTALLATION, LOOP CUTTING, OR TURN ON OF A NEW SIGNAL, THE CONTRACTOR SHALL NOTIFY:

MANATEE COUNTY PROJECT MANAGEMENT DIVISION
1026 26TH AVENUE EAST
BRADENTON, FLORIDA 34208
PHONE: 941-708-7510

MANATEE COUNTY TRAFFIC ENGINEERING DIVISION
2101 47TH TERRACE EAST
BRADENTON, FLORIDA 34203
PHONE: 941-749-3502

5. THE CONTRACTOR SHALL PERFORM ALL WORK AS PER LATEST FDOT SPECIFICATIONS AT TIME OF BID, INCLUDING THE 2010 DESIGN STANDARDS AND THE 2010 FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS WITH CURRENT SUPPLEMENTAL SPECIFICATIONS THERETO. FDOT SPECIFICATIONS SHALL BE FOLLOWED. WHEN FDOT AND MANATEE COUNTY SPECIFICATIONS DIFFER, THE MORE STRINGENT SPECIFICATIONS WILL TAKE PRECEDENCE. MANATEE COUNTY TRAFFIC SPECIFICATIONS SHALL BE OBTAINED BY THE CONTRACTOR FROM THE PROJECT MANAGEMENT DIVISION.
6. THE PRIME CONTRACTOR SHALL BE RESPONSIBLE FOR THE SIGNAL MAINTENANCE, TIMING AND OPERATION OF ALL SIGNALS AND SIGNAGE FROM THE COMMENCEMENT OF WORK TO FINAL ACCEPTANCE OF THE PROJECT (I.E. EXISTING LOOPS CUT, SYSTEM COMMUNICATION TERMINATED, LANE OR PAVEMENT MODIFICATIONS, PEDESTRIAN MODIFICATIONS). MANATEE COUNTY WILL ASSIST IN PROVIDING EXISTING SYSTEM TIMING WHEN POSSIBLE.
7. THE CONTRACTOR SHALL HAVE AN I.M.S.A. CERTIFIED LEVEL II (ELECTRONICS OR ELECTRICAL TECHNICIAN) ON THE JOB SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. ALL SIGNAL INSTALLATION TECHNICIANS SHALL HAVE A MINIMUM OF I.M.S.A. LEVEL I CERTIFICATION. CERTIFICATIONS OF ALL TECHNICIANS SHALL BE PROVIDED TO THE COUNTY PRIOR TO BEGINNING WORK.

UPON PROJECT COMMENCEMENT THE SIGNAL SUBCONTRACTOR SHALL BE AVAILABLE TO RESPOND TO ALL SIGNAL RELATED MALFUNCTIONS AND POWER OUTAGES. THE CONTRACTOR SHALL MAINTAIN A ADEQUATE REPAIR INVENTORY, EQUIPMENT AND NEARBY PERSONNEL TO RESPOND AND CORRECT TRAFFIC SIGNAL MALFUNCTIONS AND MOT RELATED PHASING AND TIMING ISSUES FOR THE DURATION OF THE PROJECT. THE CONTRACTOR SHALL PROVIDE A QUALIFIED SIGNAL TECHNICIAN WHO CAN RESPOND WITHIN A MINIMUM OF TWO HOURS, 24 HOURS A DAY, 7 DAYS A WEEK.

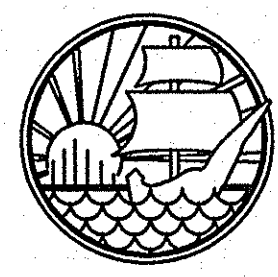
FAILURE TO MEET THE TIME REQUIREMENTS SHALL GIVE THE COUNTY, AT ITS DISCRETION, THE RIGHT TO REQUEST ASSISTANCE FROM THE MANATEE COUNTY SHERIFF'S DEPARTMENT TO CONTROL TRAFFIC FOR THE PERIOD OF TIME UNTIL THE CONTRACTOR RESPONDS AND MAKES THE NEEDED REPAIRS. THE COST FOR THE MANATEE COUNTY SHERIFF'S OFFICE SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

8. PRIOR TO ORDERING MATERIALS, THE SIGNAL CONTRACTOR SHALL CONTACT THE TRAFFIC OPERATIONS DIVISION THROUGH THE PROJECT MANAGEMENT DIVISION AND VERIFY CURRENT COLOR CODES TO BE USED FOR SIGNAL CABLE.
9. WHEN A CONTRACTOR IS WORKING ON A SIGNAL IN AN INTERSECTION (INSTALLING CONDUIT IN THE STREET, REMOVING EXISTING SIGNAL EQUIPMENT, INSTALLING SIGNAL EQUIPMENT, LOOPS, HOMERUNS OR TURNING ON OF NEW SIGNAL) WHERE A LANE IS CLOSED, THE PROJECT MANAGER MAY REQUIRE AN OFF DUTY LAW ENFORCEMENT OFFICER TO DIRECT TRAFFIC. THE HOURLY RATE OF PAY FOR AN OFF DUTY LAW ENFORCEMENT OFFICER CAN BE OBTAINED FROM THE LOCAL LAW ENFORCEMENT OFFICE. THE COST OF THE OFFICER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
10. DELIVER THREE SETS OF RECORD DRAWINGS TO THE MANATEE COUNTY TRAFFIC ENGINEERING DIVISION MANAGER AT 2101 47TH TERRACE EAST BRADENTON, FL 34203. RECORD DRAWINGS MUST BE DELIVERED TO THE COUNTY 48 HOURS PRIOR TO SCHEDULING THE FINAL INSPECTION.
11. UPON PASSING THE FINAL INSPECTION THE CONTRACTOR SHALL SEND A WRITTEN REQUEST TO THE PROJECT MANAGEMENT DIVISION AND THE TRANSPORTATION DIVISION TO TRANSFER MAINTENANCE FROM THE CONTRACTOR TO MANATEE COUNTY. MANATEE COUNTY WILL RESPOND WITHIN 5 WORKING DAYS TO ESTABLISH A TIME TABLE FOR THE TRANSFER OF MAINTENANCE RESPONSIBILITY.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE LOCAL POWER COMPANY PROVIDING ELECTRICAL POWER TO DETERMINE IF A SERVICE PROCESSING FEE IS REQUIRED. ANY FEE SHALL BE INCLUDED AS PART OF PAYMENT FOR THE ELECTRICAL POWER SERVICE ASSEMBLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS OF THE ELECTRICAL SERVICE. THE CONTRACTOR SHALL COORDINATE THE CONSTRUCTION, INSPECTION AND ENERGIZING OF THE NEW POWER SERVICE IN A TIMELY MANNER IN ORDER TO PROMOTE PROJECT COMPLETION WITHIN CONTRACT TIME.
13. THE LOCATION OF UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR, VIA SUNSHINE STATE ONE CALL OF FLORIDA, INC AT 1-800-432-4470, IN COORDINATION WITH UNDERGROUND AND OVERHEAD UTILITY OWNERS. A MINIMUM OF 2 FULL BUSINESS DAYS PRIOR TO DIGGING IS REQUIRED.
14. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS IN ADVANCE OF POLE SETTING OPERATIONS WHERE CONFLICT WITH OVERHEAD ELECTRICAL CONDUCTORS IS EXPECTED AND IN ALL CASES WHERE JOINT USE POLES ARE CALLED FOR.
15. THE CONTRACTOR SHALL HAND DIG THE FIRST 48 INCHES OF THE HOLE FOR THE POLE FOUNDATION OR CONDUIT RUN WHERE UTILITIES ARE IN CLOSE PROXIMITY.
16. THE CONTRACTOR IS TO DE-WATER THE POLE FOUNDATION EXCAVATION IF THE ELEVATION OF WATER IS HIGHER THAN THE ELEVATION OF THE FOUNDATION BASE.
17. ALL MATERIALS, EQUIPMENT, AND OTHER CONTRACTOR SUPPLIED ITEMS SHALL BE INSTALLED AND MAINTAINED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS, UNLESS SPECIFICALLY DIRECTED OTHERWISE BY MANATEE COUNTY.
18. #14 XHHW PULL WIRE SHALL BE INSTALLED IN ALL CONDUITS. AT LEAST 2 FEET OF PULL WIRE SHALL BE ACCESSIBLE AT EACH CONDUIT TERMINATION AND SECURED IN THE PULL BOX OR PLACE OF TERMINATION.
19. UNLESS OTHERWISE NOTED ALL REMOVED EQUIPMENT EXCEPT CONCRETE POLES SHALL BE TURNED OVER TO MANATEE COUNTY AND DELIVERED TO THE TRAFFIC OPERATIONS DIVISION LOCATED AT 2404 12TH STREET COURT EAST, BRADENTON, FLORIDA 34208, AS DIRECTED BY THE ENGINEER. CONCRETE POLES SHALL BE DISPOSED OF BY THE SIGNAL CONTRACTOR IN AREAS PROVIDED BY THE CONTRACTOR.
20. THE CONTRACTOR SHALL CONTACT THE LOCAL POWER COMPANY FOR ITS ASSISTANCE IN PERFORMING ALL NECESSARY WORK UNDER POWER LINES AT SIGNAL POLES SUCH AS THE INSTALLATION OF SIGNAL CABLE, FIBERGLASS INSULATORS, AND SIGNAL POLES.

AT LOCATIONS WHERE THE REQUIRED VERTICAL CLEARANCE TO THE POWER LINES CANNOT BE MAINTAINED, A QUALIFIED REPRESENTATIVE FROM THE POWER COMPANY SHALL BE PRESENT DURING ALL WORK UNDER POWER LINES. ANY COST ASSOCIATED WITH THIS SHALL BE INCLUDED IN THE RELATED PAY ITEMS.

21. ALL ELECTRICAL WIRING SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE PUBLISHED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.
22. GROUNDING: ALL ITEMS SHALL BE GROUNDED IN ACCORDANCE WITH FDOT SPECIFICATION SECTION 620 AND THE CURRENT SUPPLEMENTS THERETO AT TIME OF BID. ALL COSTS FOR GROUNDING SHALL BE INCLUDED IN THE COST OF THE ITEM BEING GROUNDED. ALL GROUND ROD ASSEMBLIES FOR POLES, SERVICES, CABINETS, AND OTHER RELATED EQUIPMENT SHALL BE BONDED TOGETHER TO FORM AN INTEGRATED GROUNDING SYSTEM USING #6 AWG THHN COPPER WIRE. THE UPPER END OF ALL GROUND RODS SHALL BE 18 INCHES BELOW GROUND ELEVATION. MARK GROUND ROD LOCATION WITH PERMANENT MARKER SUCH AS AN EPOXIED STICKER LOCATED ON THE NEAREST CURB, AND PROVIDE AS-BUILT DRAWINGS WITH THE LOCATION OF GROUND RODS MARKED. GROUNDING CONDUCTOR MUST BE #6 OR LARGER INSULATED COPPER.
23. CONNECTING DEVICES SHALL BE NON-CORROSIVE SPLIT BOLTS, CLAMPS, PRESSURE CONNECTORS, OR OTHER APPROVED MEANS TO ENSURE A POSITIVE CONNECTION.
24. GROUND RESISTANCE TESTER, OR OTHER APPROVED MEANS WILL BE USED TO ACQUIRE THE GROUND ROD RESISTANCE. A MEMBER OF THE TRAFFIC OPERATIONS DIVISION STAFF SHALL BE PRESENT DURING THE TEST.
25. ELEVATION OF THE TOP OF THE MAST ARM FOUNDATION SHALL BE SIX INCHES ABOVE EXISTING GRADE. IF LOCATED DIRECTLY BACK OF SIDEWALK, THE FOUNDATION ELEVATION SHALL MATCH SIDEWALK GRADE.
26. IT SHOULD BE NOTED THAT NO TEST BORINGS WERE MADE WHERE CONDUIT RUNS ARE TO BE INSTALLED BY JACKING OR BORING.
27. CONTRACTOR SHALL SUPPLY ALL MATERIAL SUBMITTALS TO MANATEE COUNTY TRAFFIC OPERATIONS DIVISION PRIOR TO CONSTRUCTION FOR APPROVAL.
28. THE TYPE OF EQUIPMENT USED IN THE INSTALLATION OF MAST ARMS/ FOUNDATIONS SHALL MEET THE FOLLOWING REQUIREMENTS: 1) OVERHEAD LINES SHALL STAY IN PLACE BOTH VERTICALLY AND HORIZONTALLY; AND 2) CONTRACTOR SHALL MEET ALL APPLICABLE OSHA REQUIREMENTS (20 FEET MINIMUM DISTANCE MAINTAINED BETWEEN THE EQUIPMENT AND THE ELECTRICAL OVERHEAD FACILITY). ANY COST ASSOCIATED WITH THE TYPE OF EQUIPMENT REQUIRED FOR THIS INSTALLATION SHALL BE INCLUDED IN THE RELATED PAY ITEMS.
29. EXISTING SPEED LIMITS ON ROADWAYS ARE AS FOLLOWS:
40 MPH ON 53RD AVE (SR 70)
40 MPH ON 15TH ST E
30. CONTRACTOR SHALL UTILIZE FDOT STANDARD INDEX 600 AND 604 DURING MAINTAINANCE OF TRAFFIC OPERATIONS.
31. THE CONTRACTOR TO PROVIDE A WARRANTY/MAINTENANCE BOND FOR SIGNAL INSTALLATIONS IN ACCORDANCE WITH F.D.O.T. SPECIFICATION SECTION 611-5.

Sujeewa Weerasuriya
Apr 20, 2012

		SCALE AS NOTED	HDR HDR Engineering, Inc. 2621 Cattlemen Road Suite 106 Sarasota, FL 34232-6212 FBPR Certificate of Authorization No. 4213		DATE 02/21/11	 MANATEE COUNTY PUBLIC WORKS	DESIGN ENGINEER SUJEEVA A. WEERASURIYA	GENERAL NOTES	SHEET NO. T-3
		DESIGNED BY LIR		PROJECT NO. 6029960	FL. LICENSE NO. 57629				
No.	REVISIONS	DATE	BY	CHECKED BY SAW					

PAY ITEM NOTES

1. 555-1-1:
CONDUITS INSTALLED WITH THE DIRECTIONAL BORE METHOD SHALL BE HDPE WITH A MINIMUM SIZE OF 2" UNLESS OTHERWISE NOTED IN THE PLANS. COST OF PULL WIRE SHALL BE INCLUDED UNDER THIS PAY ITEM.
2. 630-1-12:
ALL CONDUIT RUNS SHOWN ON THE PLANS ARE SCHEMATIC AND FIELD ADJUSTMENTS MAY BE NECESSARY. WITH THE EXCEPTION OF ELECTRICAL POWER SERVICE DUCTS, JACK & BORE SLEEVES, AND DIRECTIONAL BORE CONDUITS, ALL UNDERGROUND AND UNDER PAVEMENT CONDUITS SHALL BE SCHEDULE 40 PVC WITH A MINIMUM SIZE OF 2" UNLESS OTHERWISE SPECIFIED IN THE PLANS. COST OF PULL WIRE SHALL BE INCLUDED UNDER THIS PAY ITEM.

TWO SEPARATE UNDERGROUND CONDUIT RUNS LOCATED 180 DEGREES APART ARE REQUIRED FOR ALL MAST ARMS. THE SPARE CONDUIT SHALL BE CAPPED IN THE NEAREST PULL BOX. THERE SHALL BE A MINIMUM OF TWO RUNS OF 2" CONDUIT BETWEEN THE LAST LOW VOLTAGE PULL BOX LOCATED NEAR THE CONTROLLER CABINET & THE CONTROLLER CABINET, ITSELF
3. 632-7-1:
USE A MINIMUM OF 7 CONDUCTOR SIGNAL CABLES FOR SIGNAL HEADS AND PEDESTRIAN HEADS.
4. 635-1-11:
PULL BOXES SHALL BE TRAFFIC BEARING, ALL POLYMER CONSTRUCTION (NOT CONCRETE), PULL BOXES AND LIDS. (QUAZITE OR ANOTHER EQUIVALENT FDOT APPROVED MANUFACTURER). PULL BOXES ARE TO BE PLACED BEHIND CURB AND GUTTER. IF THERE IS NO CURB AND GUTTER, PULL BOXES SHALL BE PLACED A MINIMUM OF 7' FROM THE EDGE OF PAVEMENT.
5. 646-1-11:
SHALL INCLUDE ADDITIONAL COST TO FURNISH & INSTALL A BREAKAWAY TRANSFORMER BASE. INSIDE DIAMETER OF PEDESTALS SHALL BE 4". USE LOCKING COLLARS WHEN MOUNTING PEDESTRIAN SIGNAL HEADS TO PEDESTRIAN PEDESTALS. USE LOCKING COLLARS WHEN MOUNTING ALUMINUM PEDESTRIAN POLES TO PEDESTRIAN PEDESTAL BASES.
6. 649-31-203:
THE CONTRACTOR SHALL CONTACT THE LOCAL POWER COMPANY FOR THEIR ASSISTANCE IN PERFORMING ALL NECESSARY WORK UNDER POWER LINES AT SIGNAL POLE(S), SUCH AS THE INSTALLATION OF MAST ARM FOUNDATIONS OR POLES. USE THREE 2" AND ONE 3/4" CONDUIT STUBBED OUT THROUGH THE MAST ARM POLE FOUNDATION AND TEMPORARILY SEAL.
7. 650-1-311:
USE SIGNAL HEAD SUPPORTING TUBE THAT IS CAPABLE OF ADJUSTING VERTICALLY A MINIMUM OF 1.5'.

ALL SIGNAL HEADS SHALL HAVE ALUMINUM LOUVERED BACK PLATES INSTALLED. BACKPLATES SHALL BE MANUFACTURED FOR THE SIGNAL HEADS USED & INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS. THE BACK PLATE SHALL HAVE A 2" YELLOW REFLECTORIZED (TYPE III REFLECTIVITY) OUTER EDGE BORDER UNLESS SPECIFIED OTHERWISE IN THE PLANS.

THE EXTERNAL COLOR OF SIGNAL HOUSING SHALL BE BLACK. ALL TRAFFIC SIGNAL HEAD INDICATIONS SHALL BE 12" LED. ALL SIGNAL HEADS SHALL HAVE TUNNEL VISORS. THE COST FOR THE TUNNEL VISORS SHALL BE INCLUDED UNDER THIS PAY ITEM.
8. 653-191:
PEDESTRIAN SIGNAL HEADS TO BE 16" INTERNATIONAL SYMBOL, LED COUNTDOWN TYPE.


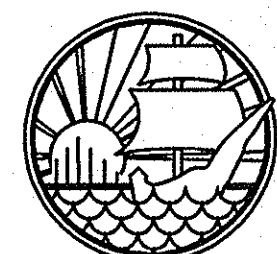
9. 663-74-15:
THE CONTRACTOR SHALL INSTALL THE VANTAGE VIDEO DETECTION SYSTEM IN STRICT ACCORDANCE WITH THE GUIDANCE CONTAINED IN THE VIDEO DETECTION SYSTEM'S INSTALLATION MANUALS. THE CONTRACTOR SHALL ONLY USE MANUFACTURER APPROVED CABLING CONNECTORS AND COMPONENTS TO COMPLETE THE INSTALLATION OF THE VIDEO DETECTION SYSTEM. THE SIGNAL CONTRACTOR SHALL CONSULT WITH THE TECHNICAL REPRESENTATIVES PRIOR TO ORDERING THE SYSTEM COMPONENTS AND TO OBTAIN OPTIMUM CAMERA PLACEMENT AND MOUNTING HEIGHT FOR EACH CAMERA PRIOR TO INSTALLATION. AFTER THE SYSTEM INSTALLATION IS COMPLETE THE CONTRACTOR SHALL REQUEST A SYSTEM CRITIQUE FROM THE VIDEO DETECTION EQUIPMENT SUPPLY MANUFACTURER. THE RESULTS OF THE SYSTEM CRITIQUE SHALL BE PROVIDED, IN WRITING, TO MANATEE COUNTY PRIOR TO SCHEDULING THE FINAL INSPECTION OF THE SIGNAL SYSTEM.

SEE PLAN SHEETS FOR THE NUMBER OF VIDEO CAMERAS INCLUDED IN THE VIDEO DETECTION ASSEMBLY.

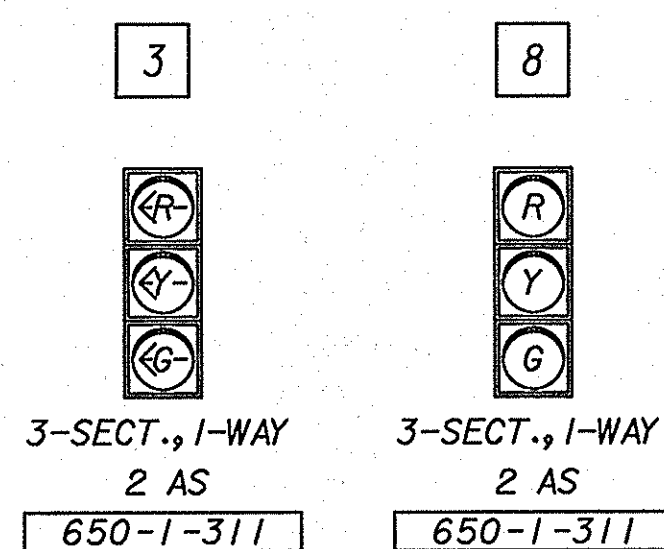
THE COST OF THIS ITEM SHALL ALSO INCLUDE A FACTORY CERTIFIED REPRESENTATIVE FROM THE SUPPLIER TO BE ON-SITE DURING INSTALLATION & SETUP.
10. 665-12 & 665-13:
SHALL INCLUDE ADDITIONAL COST OF LABOR AND MATERIALS REQUIRED FOR INSTALLATION OF PEDESTRIAN SIGNAL SIGN FTP-688-06. THIS SIGN SHALL BE MOUNTED ABOVE EACH PEDESTRIAN DETECTOR. ALL PEDESTRIAN PUSH BUTTONS SHALL BE A.D.A. COMPLIANT. STREET NAMES SHALL BE IN ACCORDANCE WITH THE STREET NAMES ON THE PLAN SHEETS.
11. 670-5-430:
MODIFY EXISTING CONTROLLER TO ADD VIDEO DETECTION AND AN UNINTERRUPTED POWER SUPPLY UNIT (UPS) AND PERFORM ANY CABINET AND FIELD WIRING NECESSARY.

CORE-DRILL EXISTING CONTROLLER CABINET BASE AND INSTALL NEW CONDUITS IF SPARE CONDUIT STUB-OUTS CANNOT BE USED. INSTALL NEW CONDUITS INTO THE EXISTING FOUNDATION AS REQUIRED IN PLANS. WHEN ADDITIONAL CONDUITS ARE REQUIRED, THE CONDUIT SHALL BE A MINIMUM OF 3" IN DIAMETER. LOCATE NEW CONDUITS SO THEY WILL NOT OBSTRUCT THE MAINTENANCE OF EQUIPMENT IN THE CABINET OR THE ANCHORING OF THE CABINET FLANGE TO THE CONCRETE FOUNDATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING INTERNAL CABINET AND EQUIPMENT FROM DUST AND DEBRIS CAUSED BY CORE DRILLING.
12. 685-106:
INCLUDE AN UNINTERRUPTED POWER SUPPLY UNIT (UPS) WITH AN 8 HOUR RUN TIME AT 450 WATTS. ATTACH UPS UNIT TO THE OUTSIDE OF THE CONTROLLER CABINET. INSTALL UPS UNIT IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. UPS EQUIPMENT TO BE COMPATIBLE WITH MAINTAINING AGENCY'S EXISTING SYSTEM.
13. 699-1-1:
ALL INTERNALLY ILLUMINATED STREET NAME SIGNS SHALL BE EDGE LIT LED TYPE AND SHALL BE LISTED IN THE FDOT APPROVED PRODUCT LIST. THE COST OF THIS ITEM SHALL INCLUDE PROPERLY DESIGNED AND SIZED ADJUSTABLE HANGERS, BRACKETS, CLAMPS, AND ALL MISCELLANEOUS HARDWARE NECESSARY TO RIGID MOUNT THE SIGNS AS SHOWN IN THE PLANS. THE SIGNS SHALL BE POWERED USING IMSA 50-2 CABLE. THIS ITEM SHALL ALSO INCLUDE INSTALLATION OF THE PHOTOCELL ON THE SERVICE POLE.

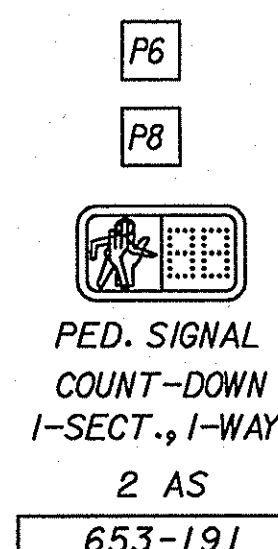
Sujeeva Weerasuriya
Apr 20, 2012

		SCALE AS NOTED	 HDR Employee-owned HDR Engineering, Inc. 2621 Cattlemen Road Suite 106 Sarasota, FL 34232-6212 FBPR Certificate of Authorization No. 4213	DATE 02/21/11	 MANATEE COUNTY PUBLIC WORKS	DESIGN ENGINEER SUJEEVA A. WEERASURIYA	GENERAL NOTES	SHEET NO. T-4
		DESIGNED BY LIR		PROJECT NO. 6029960		FL. LICENSE NO. 57629		
		DRAWN BY GAS						
		CHECKED BY SAW						
No.	REVISIONS	DATE	BY					

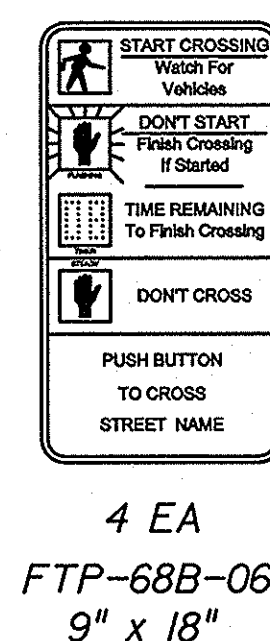
SIGNAL HEAD DETAILS



PEDESTRIAN HEAD DETAILS

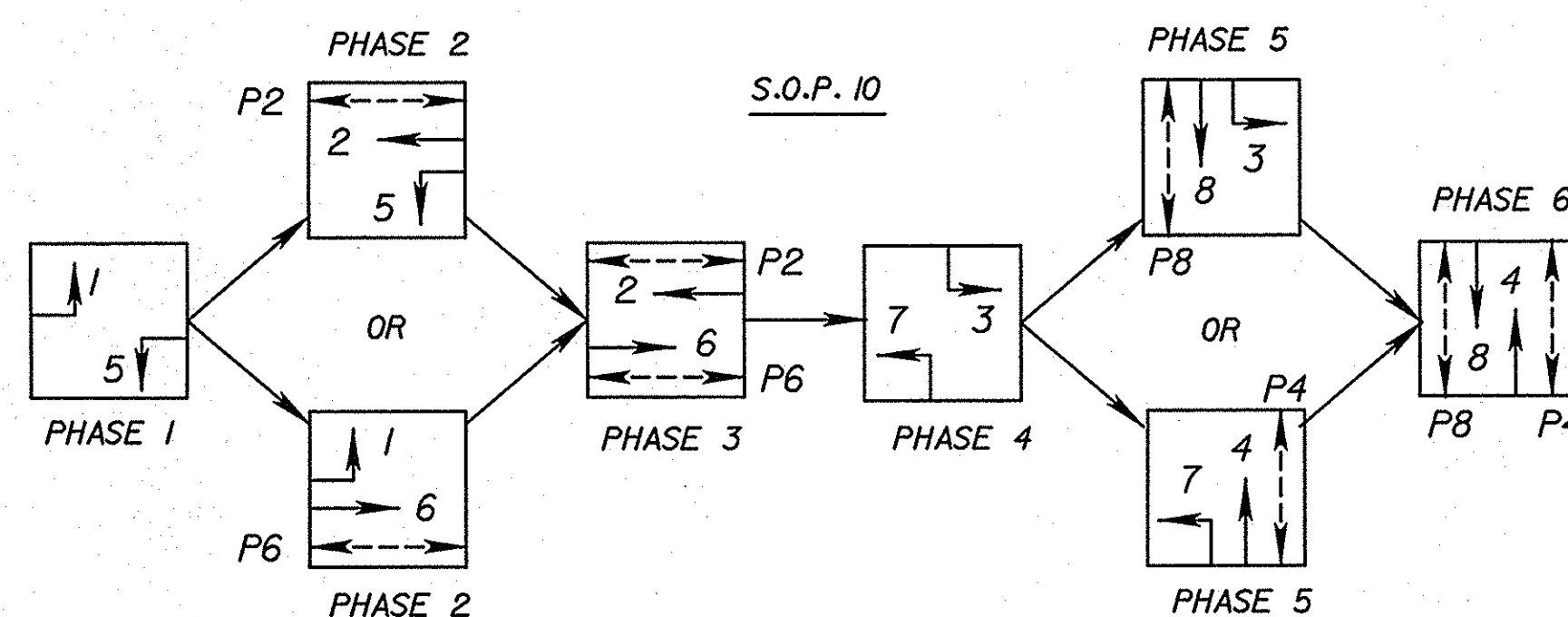


PEDESTRIAN DETECTOR SIGN



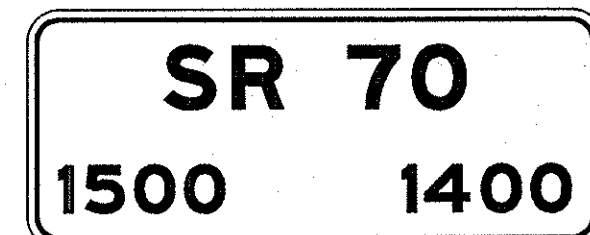
CONTROLLER OPERATIONS:

- MAJOR STREET IS SR 70/53RD ST. (MOVEMENTS 2 AND 6) AND MINOR STREET IS 15TH ST. E. (MOVEMENTS 4 AND 8).
- EXISTING SIGNAL OPERATION PLAN (S.O.P. 10) AND SIGNAL TIMINGS TO REMAIN EXCEPT EXISTING PEDESTRIAN AND VEHICLE CLEARANCE TIMINGS TO BE UPDATED AS SHOWN. CONTACT RENJAN JOSEPH, P.E. AT (863) 519-2746 FOR COORDINATION TIMINGS.
- WHILE IN FLASH MODE, MOVEMENTS 2 & 6 SHALL FLASH YELLOW. ALL OTHER MOVEMENTS SHALL FLASH RED. A FIVE SECTION HEAD SHALL BE FLASHED THE SAME COLOR AS THE APPROACH THROUGH LANE.



LEGEND

D2	DETECTION ZONE (VIRTUAL LOOPS) (30' x 6') POSITIONED 2' BEYOND STOP BAR
D3	DETECTION ZONE (VIRTUAL LOOPS) (6' x 6') POSITIONED 24' BEHIND STOP BAR
VD	VIDEO VEHICLE DETECTOR



699-1-1 1 EA

CONTROLLER TIMINGS

TIMING FUNCTION	1	2	3	4	5	6	7	8
MOVEMENT NUMBER	1	2	3	4	5	6	7	8
MINIMUM GREEN *	10	20	10	10	10	20	10	10
EXTENSION *	3	5	3	5	3	5	3	5
MAXIMUM GREEN 1*	20	40	20	40	20	40	20	40
MAXIMUM GREEN 2								
YELLOW CLEARANCE	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
ALL RED	3.2	2.2	3.5	2.4	3.7	2.2	3.2	2.5
PEDESTRIAN WALK	-	7	-	7	-	7	-	8
PED. CLEARANCE	-	25	-	34	-	25	-	34
RECALL	-	MIN	-	MIN	-	MIN	-	MIN

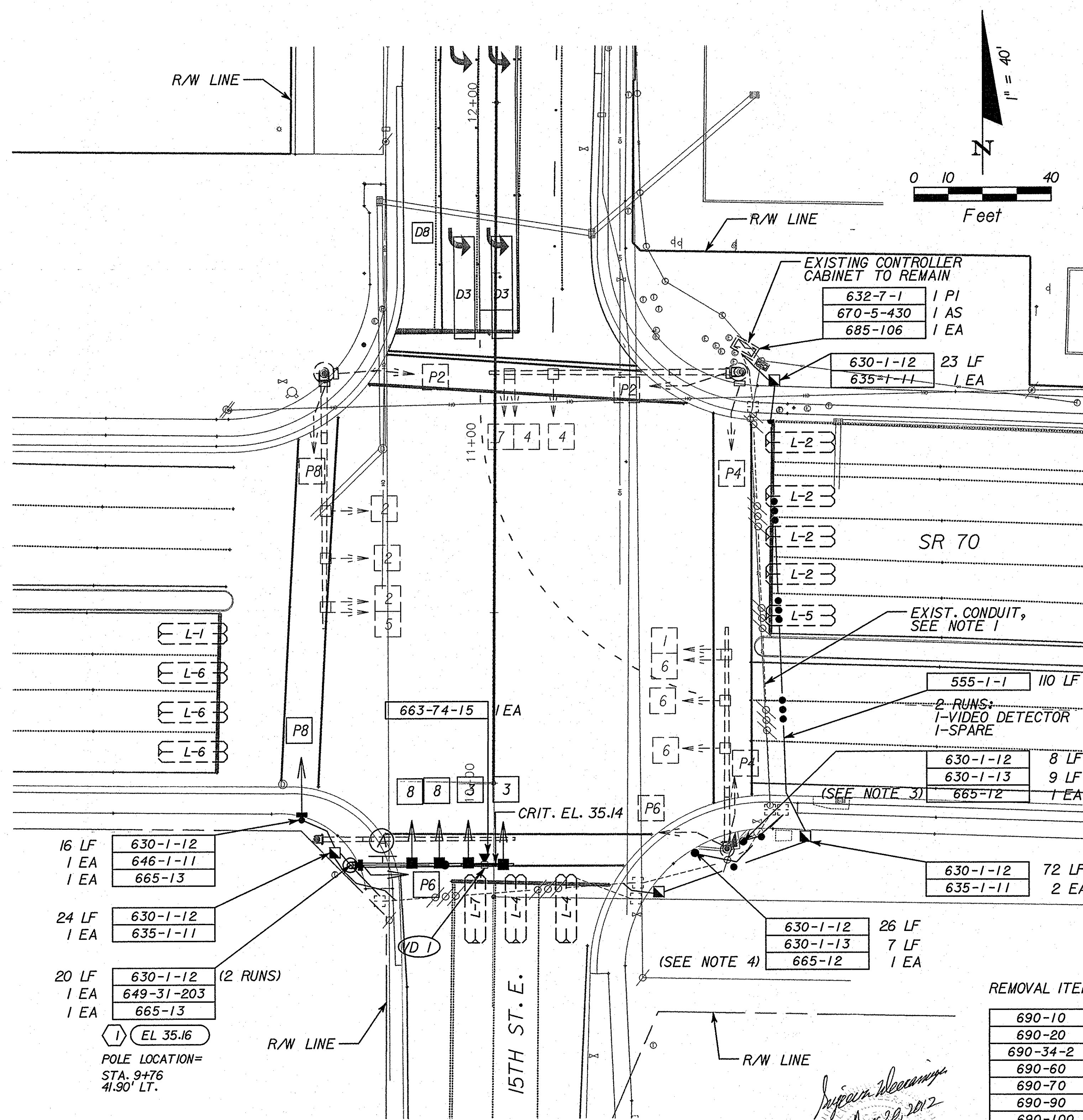
* - EXISTING TIMINGS TO REMAIN.

TIMINGS ARE INITIAL AND MAY REQUIRE FIELD ADJUSTING AS DIRECTED BY PROJECT ENGINEER.

VIDEO VEHICLE DETECTION ASSIGNMENTS

VIDEO DETECTION	DETECTION ZONE	DELAY TIME (SECS.)
VD 1	D 3	5
	D 8	-

DELAY TIME IS INITIAL AND MAY REQUIRE FIELD ADJUSTING AS DIRECTED BY PROJECT ENGINEER.



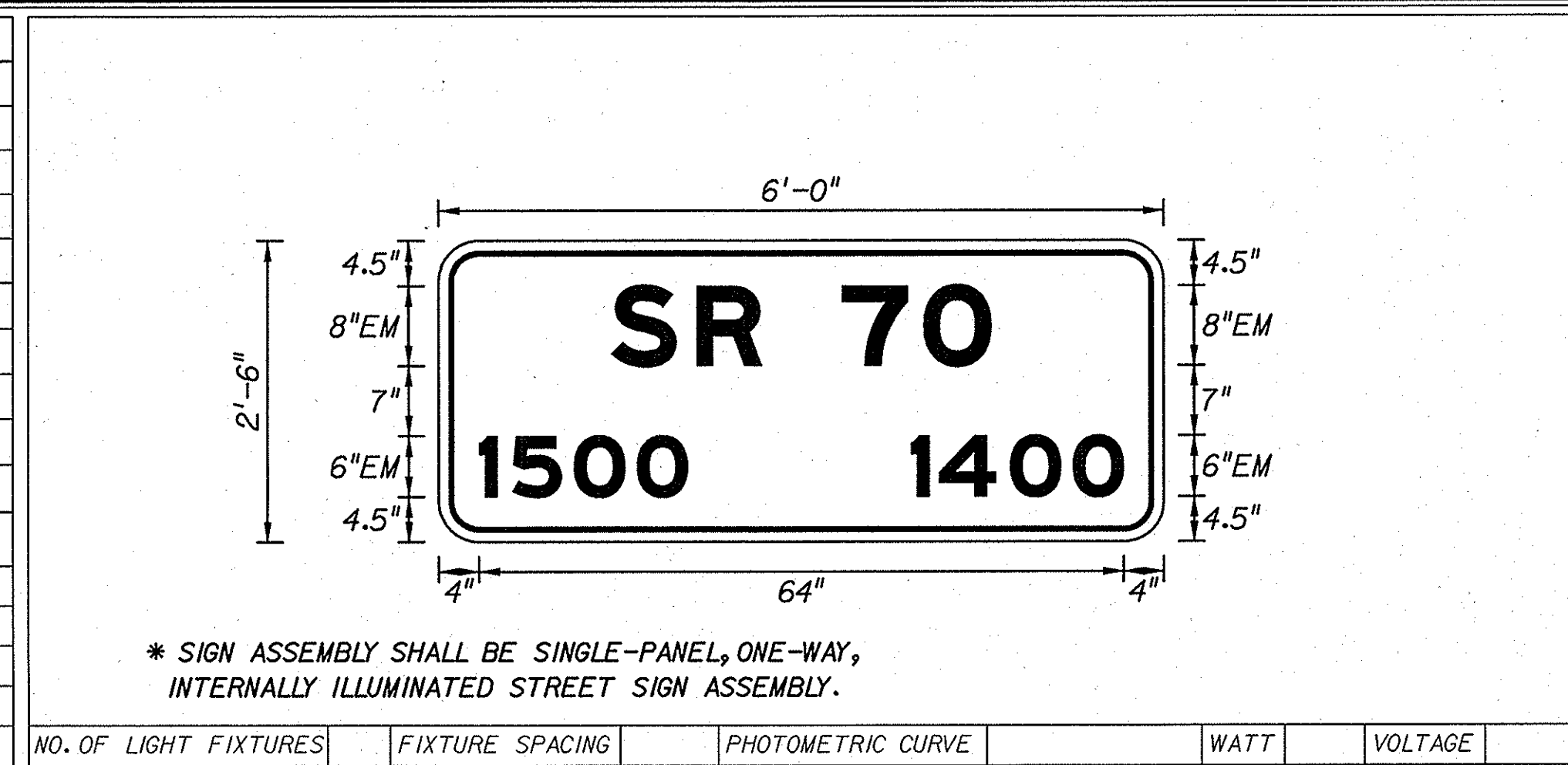
NOTES TO CONTRACTOR:

- LOCATION OF EXISTING CONDUITS AND PULL BOXES SHOWN ARE APPROXIMATE ONLY AND THE CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATIONS.
- INSTALL NEW PULL BOXES AND CONDUITS AS SHOWN. CONNECT NEW SIGNAL WITH THE EXISTING CONTROLLER THROUGH EXISTING AND NEW PULL BOXES AND CONDUITS.
- INSTALL THE POST WITH PEDESTRIAN PUSH BUTTON AND SIGN INSIDE THE EXISTING SIDEWALK NEXT TO THE FRONT FACE OF THE CURB AROUND THE BACK OF THE SIDEWALK.
- INSTALL THE POST WITH PEDESTRIAN PUSH BUTTON AND SIGN BEHIND THE EXISTING SIDEWALK IN THE AREA WHERE THERE IS NO CURB AROUND THE BACK OF THE SIDEWALK.

SCALE AS NOTED	<p>HDR Engineering, Inc. 2621 Cattlemen Road Suite 106 Sarasota, FL 34232-6212 FBPR Certificate of Authorization No. 4213</p>	DATE 02/21/11	<p>MANATEE COUNTY PUBLIC WORKS</p>	DESIGN ENGINEER SUJEEVA A. WEERASURIYA	<p>SIGNALIZATION PLAN 15TH ST. E. AND SR 70</p>	SHEET NO. T-5
DESIGNED BY LIR		PROJECT NO. 6029960		FL. LICENSE NO. 57629		
DRAWN BY GAS						
CHECKED BY SAW						

No.	REVISIONS	DATE	BY

SIGN NAME	A	QTY	1	SIGN NUMBER		STATION(S)	
PANEL	BORDER						none
WIDTH	6'-0"	WIDTH	0.5"				
HEIGHT	2'-6"	RADIUS	3"				
LEGEND	White	COLOR	White				
COLOR	Green						
SYMBOL(S)		ANGLE	X	Y	WID	HT	
SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge of Lane	COLUMN SIZE		AVERAGE LENGTH		



NO. OF LIGHT FIXTURES	FIXTURE SPACING	PHOTOMETRIC CURVE	WATT	VOLTAGE

COPY	S	R	7	0	L										
SPACE	17.1	8.5	6.5	8	8.1	6.7	17.1	37.8							
COPY	1	5	0	0	1	4	0	0	L						
SPACE	4	3.3	6.1	6.2	5	22.2	2.8	7	6.2	5	4	64			

SIGN NAME		QTY		SIGN NUMBER		STATION(S)	
PANEL	BORDER						
WIDTH	WIDTH						
HEIGHT	RADIUS						
LEGEND	COLOR						
COLOR							
SYMBOL(S)		ANGLE	X	Y	WID	HT	
SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge of Lane	COLUMN SIZE		AVERAGE LENGTH		

NO. OF LIGHT FIXTURES	FIXTURE SPACING	PHOTOMETRIC CURVE	WATT	VOLTAGE

COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												

SIGN NAME		QTY		SIGN NUMBER		STATION(S)	
PANEL	BORDER						
WIDTH	WIDTH						
HEIGHT	RADIUS						
LEGEND	COLOR						
COLOR							
SYMBOL(S)		ANGLE	X	Y	WID	HT	
SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge of Lane	COLUMN SIZE		AVERAGE LENGTH		

NO. OF LIGHT FIXTURES	FIXTURE SPACING	PHOTOMETRIC CURVE	WATT	VOLTAGE

SIGN NAME		QTY		SIGN NUMBER		STATION(S)	
PANEL	BORDER						
WIDTH	WIDTH						
HEIGHT	RADIUS						
LEGEND	COLOR						
COLOR							
SYMBOL(S)		ANGLE	X	Y	WID	HT	
SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge of Lane	COLUMN SIZE		AVERAGE LENGTH		

NO. OF LIGHT FIXTURES	FIXTURE SPACING	PHOTOMETRIC CURVE	WATT	VOLTAGE

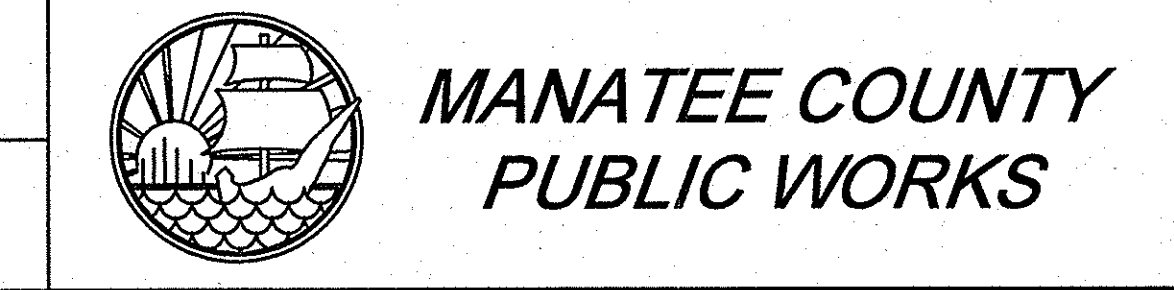
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												
COPY												
SPACE												

No.	REVISIONS	DATE	BY

SCALE AS NOTED
 DESIGNED BY LIR
 DRAWN BY GAS
 CHECKED BY SAW

HDR Employee-owned
 HDR Engineering, Inc.
 2821 Cattleman Road
 Suite 106
 Sarasota, FL 34232-6212
 FBPR Certificate of Authorization No. 4213

DATE 02/21/11
 PROJECT NO. 6029960



DESIGN ENGINEER
 SUJEEVA A. WEERASURIYA
 FL. LICENSE NO. 57629

GUIDE SIGN WORKSHEET

SHEET NO.
 T-6

STANDARD MAST ARM ASSEMBLIES DATA TABLE

POLE NO.	STRUCTURE ID NUMBERS ⁽⁵⁾	ASSEMBLY NUMBERS ⁽¹⁾	FIRST ARM			SECOND ARM			UF (deg)	LL (deg)	POLE			SPECIAL DRILLED SHAFT ⁽⁴⁾								
			ARM TYPE	FAA ⁽²⁾ (ft.)	FBA ⁽²⁾ (in.)	ARM TYPE	FAA ⁽²⁾ (ft.)	FBA ⁽²⁾ (in.)			POLE TYPE	UAA ⁽³⁾ (ft.)	UB (ft.)	UCA ⁽³⁾ (in.)	DA (ft.)	DB (ft.)	RA	RB	RC	RD (in.)		
1	13M129	E5-T3	E5	23.5	7.85	--	--	--	--	--	T3	22	20	15.92	15	4.5	11	16	10	12		

TABLE NOTES:


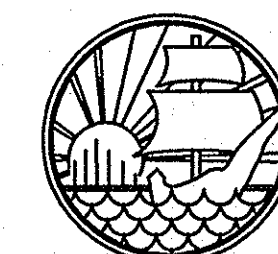
- Assembly Number Legend
 Single Arm:
 Arm Type - Pole Type = D# - S#
 = E# - T#
 = F# - W#

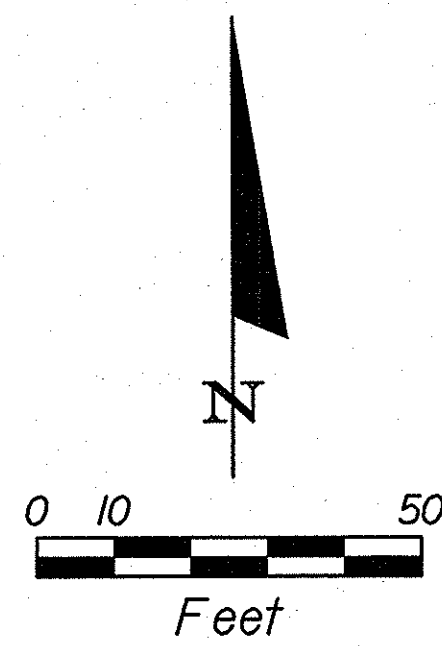
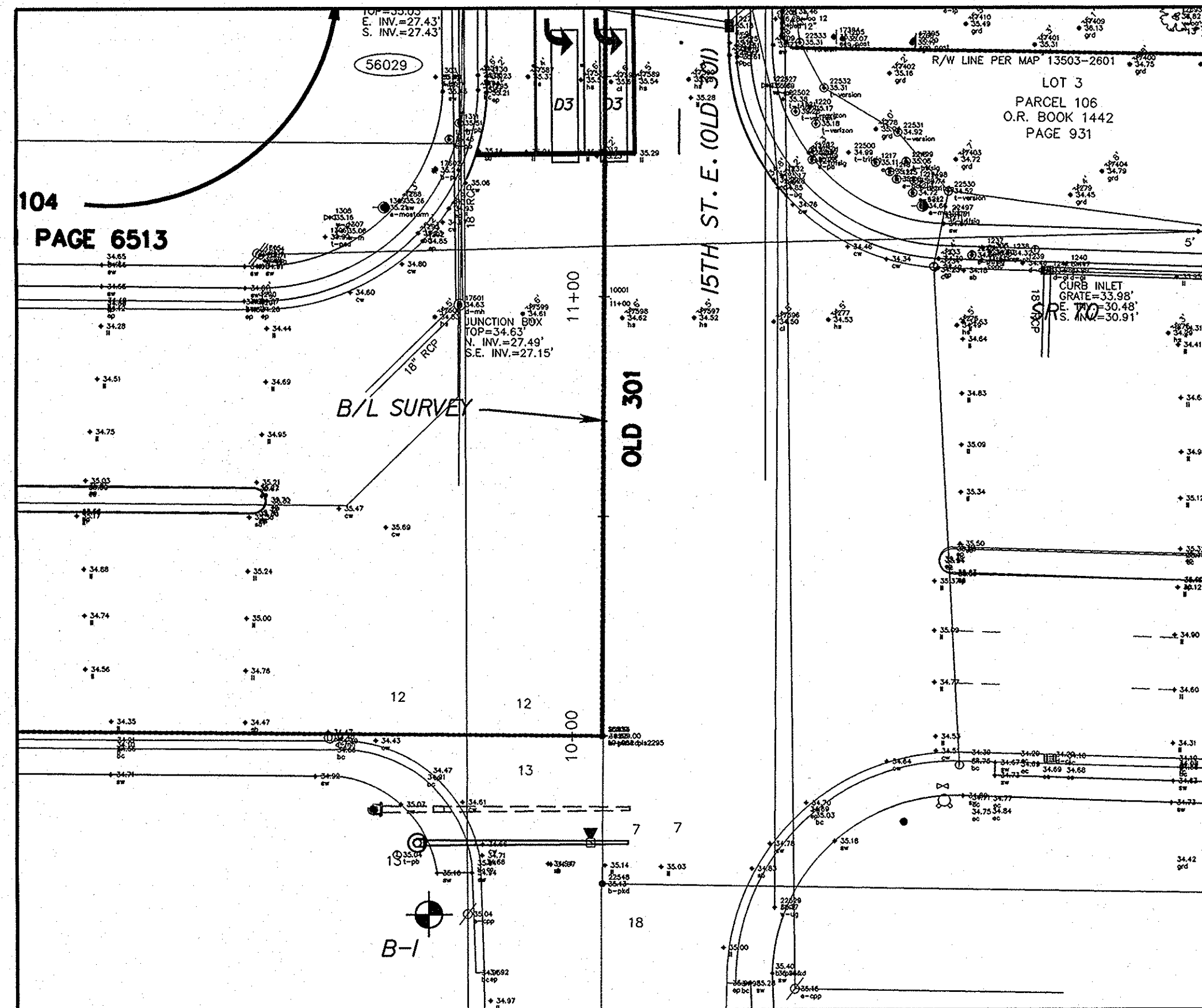
 Double Arm:
 First Arm Type - Second Arm Type - Pole Type = D# - D# - S#
 = E# - E# - T#
 = F# - F# - W#
- If an entry appears in columns "FAA" and "FBA", a shorter arm is required. This is obtained by removing length from the arm tip. For these cases the mast arm length shall be shortened from "FA" to "FAA" and the tip diameter shall be increased from "FB" to "FBA".
- If an entry appears in columns "UAA" and "UCA", a shorter pole is required. This is obtained by removing length from the pole tip. For these cases the pole height shall be shortened from "UA" to "UAA" and the pole tip diameter shall be increased from "UC" to "UCA".
- The foundations for Standard Mast Arm Assemblies are designed based upon the soil information parameters presented on Report of Core Borings Signals Sheet.
- The Structure ID Number shall be stamped on the Aluminum Identification Tag, which is attached to the pole. See Index No. 17745 Sheet No. 1 of 5 for additional information.

GENERAL NOTES:

- Work this sheet with the Signal Designer's "Mast Arm Tabulation". See "Mast Arm Tabulation" for special instructions that include non-standard Handhole location, paint color, terminal compartment requirement, and pedestrian features.
- Work with Index Nos. 17743 and 17745.
- See Report of Core Borings Signals Sheet for additional notes.

Shinji Konno
04-20-2012

No.	REVISIONS	DATE	BY	SCALE	 HDR Engineering, Inc. 2621 Cattlemen Road Suite 106 Sarasota, FL 34232-6212 FBPR Certificate of Authorization No. 4213	DATE	 MANATEE COUNTY PUBLIC WORKS	DESIGN ENGINEER	SHEET NO. T-8
				NTS		02/21/11		SHINJI KONNO	
				DESIGNED BY		PROJECT NO.		FL. LICENSE NO.	
				NVE		6029960		39536	
				DRAWN BY					
				GAS					
				CHECKED BY					
				CAS					



NOTES:

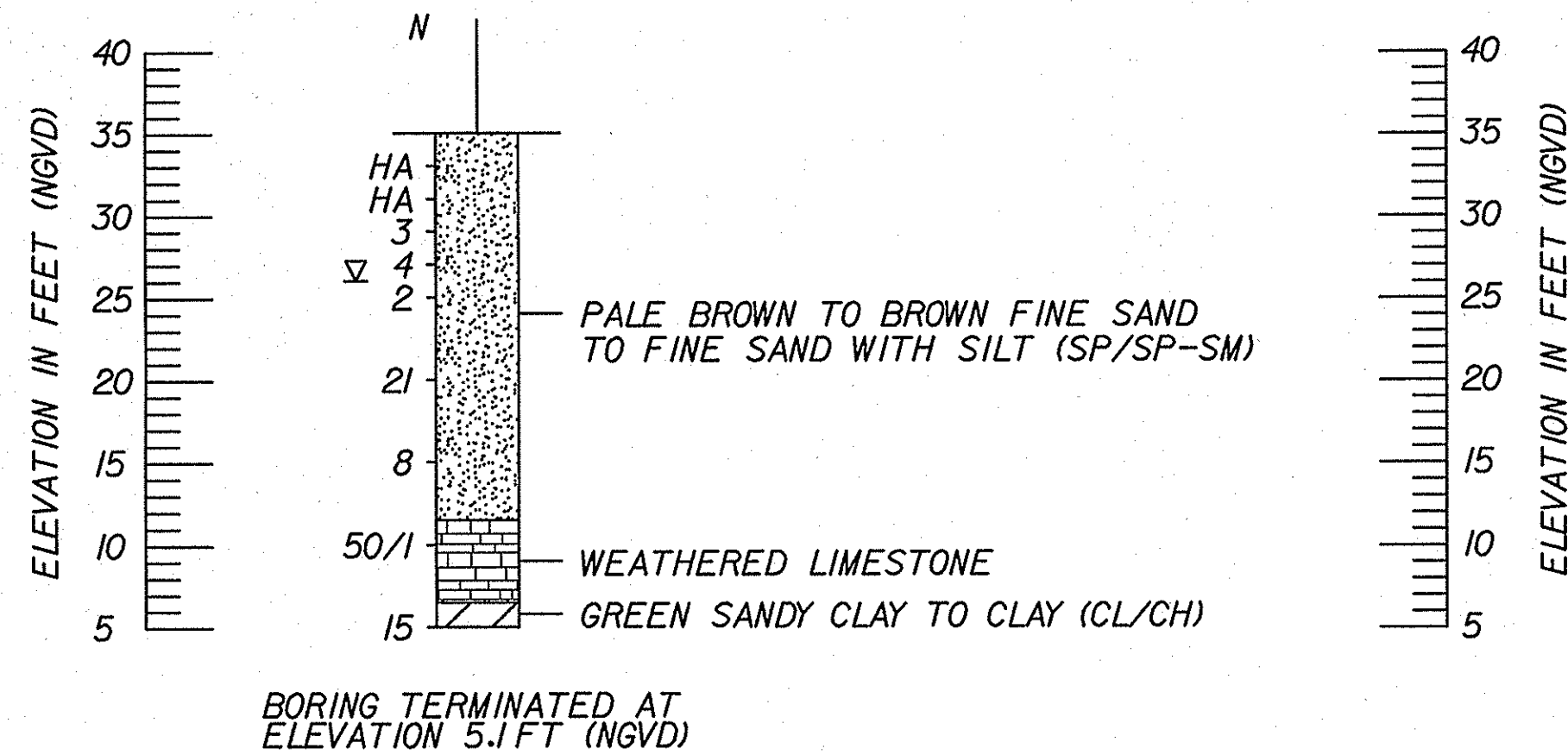
- WEATHERED LIMESTONE WAS ENCOUNTERED WITHIN THE BORING DEPTHS. FOUNDATION EXCAVATION INTO AND/OR THROUGH THIS MATERIAL MAY BE DIFFICULT AND MAY REQUIRE SPECIALIZED EQUIPMENT. THE CONTRACTOR SHOULD BE PREPARED FOR EXCAVATION INTO OR THROUGH THIS MATERIAL.
- TEMPORARY CASING FOR SHAFT INSTALLATION MAY BE REQUIRED IN ORDER TO PREVENT THE COLLAPSE/SLOUGHING OF THE SANDY SOILS AND/OR GROUNDWATER INTRUSION DURING THE SHAFT EXCAVATION.
- STATION, OFFSET AND ELEVATION OF BORINGS WERE ESTIMATED USING MICROSTATION FILES IN CONJUNCTION WITH THE UTM COORDINATES OBTAINED IN THE FIELD BY TIERRA, INC. USING A GPS DEVICE AND THEREFORE SHOULD BE CONSIDERED APPROXIMATE.

LEGEND

- PALE BROWN TO BROWN FINE SAND TO FINE SAND WITH SILT (SP/SP-SM)
- WEATHERED LIMESTONE
- GREEN SANDY CLAY TO CLAY (CL/CH)
- SP UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW
- N NUMBERS TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED).
- 50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
- HA HAND AUGERED TO VERIFY UTILITY CLEARANCE
- ∇ GROUNDWATER LEVEL ENCOUNTERED DURING FIELD EXPLORATIONS
- APPROXIMATE SPT BORING LOCATION
- B/L SURVEY BASELINE OF SURVEY OF 15TH ST. E. (OLD 301)
- NGVD NATIONAL GEODETIC VERTICAL DATUM OF 1929

BORING LOCATION PLAN

BOR # B-1
 STA. 9+49
 REF. B/L SURVEY
 OFF. 39 LT
 ELEV. 35.1
 DATE 12/6/2010
 DRILLER I. POORAN
 HAMMER SAFETY
 RIG D-25

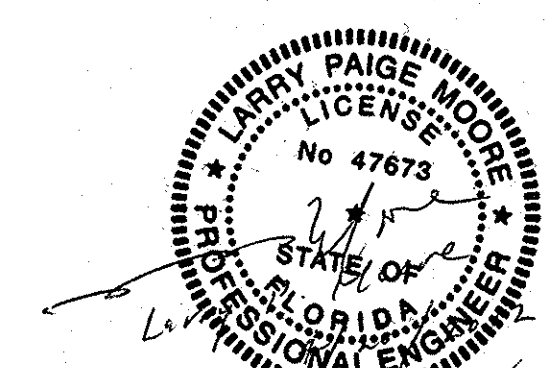


BORING TERMINATED AT ELEVATION 5.1 FT (NGVD)

BORING NUMBER	DEPTH	N	SOIL CLASSIFICATION	SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	EARTH PRESSURE COEFFICIENT	
				γ SAT	γ SUB			ACTIVE (Ka)	PASSIVE (Kp)
B-1	0 to 13.5	HA to 4	SP/SP-SM	100	37.6	28	0	0.361	2.77
	13.5 to 18.5	21	SP/SP-SM	110	47.6	30	0	0.333	3.00
	18.5 to 23.5	8	SP/SP-SM	105	42.6	29	0	0.347	2.88
	23.5 to 28.5	50/1	WEATHERED LIMESTONE	135	72.6	0	12000*	1.000	1.00
	28.5 to 30	15	CL/CH	120	57.6	0	1900	1.000	1.00

* ULTIMATE SHEAR STRENGTH

SAFETY HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	LESS THAN 4
LOOSE	4 to 10
MEDIUM DENSE	10 to 30
DENSE	30 to 50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	2 to 4
FIRM	4 to 8
STIFF	8 to 15
VERY STIFF	16 to 30
HARD	GREATER THAN 30



15TH STREET EAST/53RD AVENUE EAST (SR 70)

SCALE AS NOTED	E.O.R.: LARRY P. MOORE, P.E. P.E. LICENSE NUMBER 47673	DATE 02/12/11	DESIGN ENGINEER LARRY P. MOORE	SHEET NO. GT-1
DESIGNED BY BJS	TERRA INC 7351 TEMPLE TERRACE HIGHWAY, TAMPA, FL. 33637 CERTIFICATE OF AUTHORIZATION: 6486	PROJECT NO. 6029960	FL. LICENSE NO. 47673	
DRAWN BY BJS		MANATEE COUNTY PUBLIC WORKS		REPORT OF CORE BORINGS
CHECKED BY IK				
No. REVISIONS	DATE	BY		

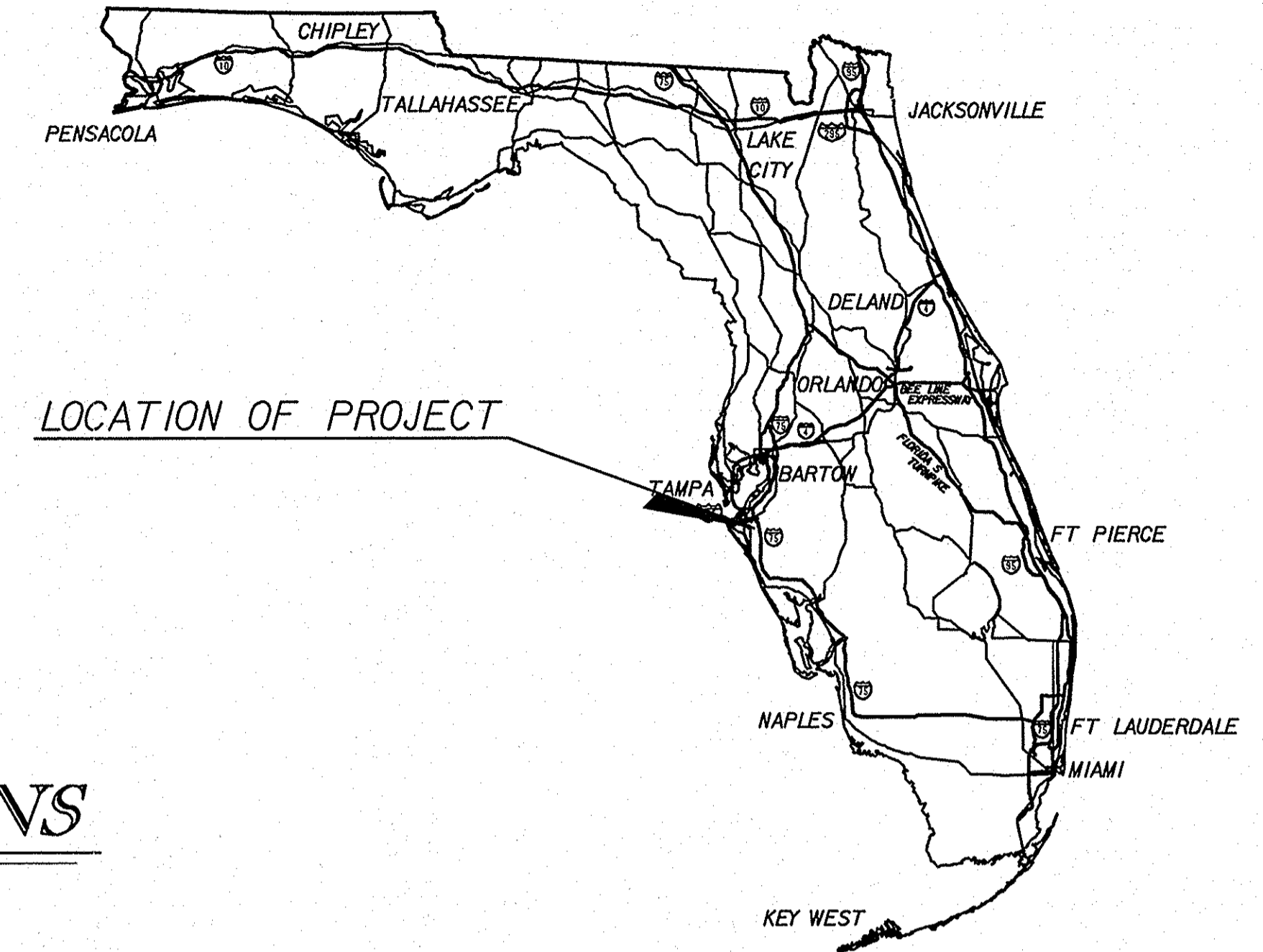
**MANATEE COUNTY
PUBLIC WORKS DEPARTMENT**

CONTRACT PLANS

MANATEE COUNTY (13162) (M.P. 1.747 - M.P. 1.761)
(6029960)

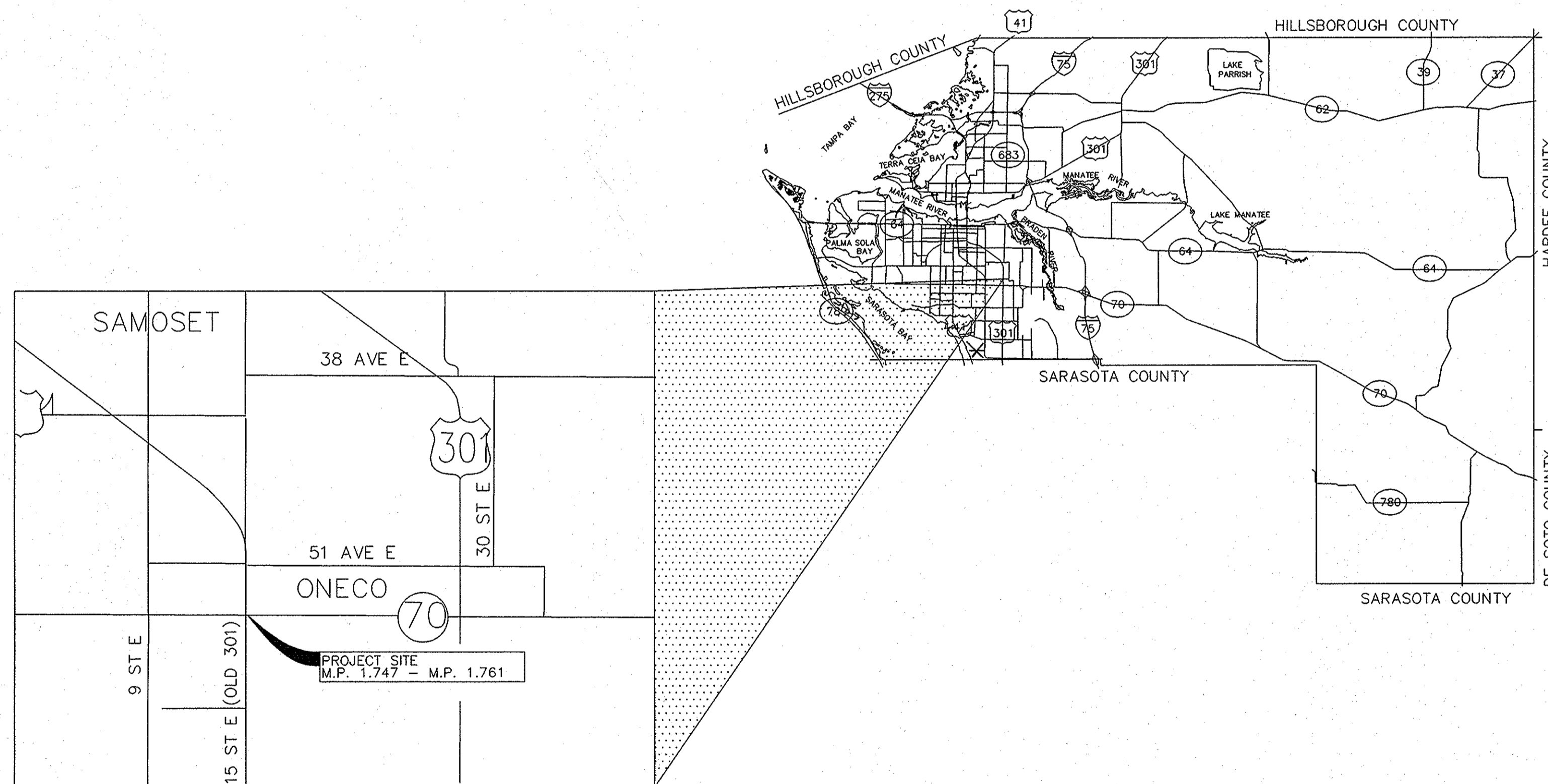
53RD AVENUE EAST (SR 70) AT 15TH STREET EAST

SIGNING AND PAVEMENT MARKING PLANS



INDEX OF SIGNING AND PAVEMENT MARKING PLANS

SHEET NO.	SHEET DESCRIPTION
S-1	KEY SHEET
S-2	TABULATION OF QUANTITIES
S-3	GENERAL NOTES
S-4 THRU S-5	SIGNING AND PAVEMENT MARKING PLAN
S-6	GUIDESIGN WORKSHEET



SIGNING AND PAVEMENT MARKING SHOP DRAWINGS TO BE SUBMITTED TO:
SUJEEVA A. WEERASURIYA, P.E.
HDR ENGINEERING, INC.
5426 BAY CENTER DRIVE, STE. 400
TAMPA, FLORIDA 33609-3444
PHONE NO. (813) 282-2300

PLANS PREPARED BY:
HDR ENGINEERING, INC.
2621 CATTLEMEN ROAD., STE. 106
SARASOTA, FLORIDA 34232-6212
PHONE NO. (941) 342-2700
FAX (941) 342-6589
CONTRACT NO. 12348
VENDOR NO. VF-470680568
CERTIFICATE OF AUTHORIZATION No. 4213



NOTE: THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO REPRODUCTION.

AT LEAST 72 HOURS IN ADVANCE OF BEGINNING CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL CONTACT THE LOCAL MAINTENANCE FDOT ENGINEER'S OFFICE TO SECURE GENERAL USE PERMITS AND/OR OTHER PERMITS AS REQUIRED FOR WORKING WITHIN THE DEPARTMENT'S RIGHT-OF-WAY.

THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (DATED 2010) AND DESIGN STANDARDS BOOKLET (DATED 2010).

APPLICABLE DESIGN STANDARDS MODIFICATIONS: 7/1/2011. FOR DESIGN STANDARDS MODIFICATIONS, CLICK ON "DESIGN STANDARDS" AT THE FOLLOWING WEB SITE: <http://www.dot.state.fl.us/rddesign/>

MANATEE COUNTY PROJECT MANAGER: VINCENT CANNA

KEY SHEET REVISIONS		
DATE	BY	DESCRIPTION

SIGNING AND PAVEMENT MARKING PLANS
ENGINEER OF RECORD: SUJEEVA A. WEERASURIYA, P.E.


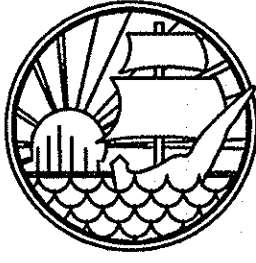
P.E. NO.: 57629

FISCAL YEAR	SHEET NO.
11	S-1

TABULATION OF QUANTITIES

PAY ITEM NO.	DESCRIPTION	UNIT	SHEET NUMBERS																				TOTAL THIS SHEET		GRAND TOTAL		REF. SHEET
			S-4		S-5																						
			PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL	PLAN	FINAL					
700-20-11	SINGLE POST SIGN (F&I) (< 12 SF)	AS	3		1																	4		4			
700-20-12	SINGLE POST SIGN (F&I) (12-20 SF)	AS	1		1																	2		2			
706-3	RETRO-REFLECTIVE PAVEMENT MARKERS (WHITE/RED)	EA	22		1																	23		77			
	(YELLOW/YELLOW)	EA	52		2																	54					
711-11-111	THERMOPLASTIC (STD., WHITE, SOLID, 6")	NM	0.196		0.021																	0.217		0.217			
711-11-122	THERMOPLASTIC (STD., WHITE, SOLID, 8")	LF	208																			208		208			
711-11-123	THERMOPLASTIC (STD., WHITE, SOLID, 12")	LF	167																			167		167			
711-11-125	THERMOPLASTIC (STD., WHITE, SOLID, 24")	LF	36																			36		36			
711-11-131	SKIP TRAFFIC STRIPE (6") - WHITE, THERMOPLASTIC (10'/30')	GM	0.038																			0.038		0.038			
711-11-151	SKIP TRAFFIC STRIPE (6") - WHITE, THERMOPLASTIC (2'/4')	LF	42																			42		42			
711-11-160	THERMOPLASTIC (STD., WHITE, MESSAGE) (MERGE)	EA	2																			2		2			
711-11-170	THERMOPLASTIC (STD., WHITE, ARROWS)	EA																						8			
	LEFT		5		1																	6					
	MERGE		2																			2					
711-11-211	THERMOPLASTIC (STD., YELLOW, SOLID, 6")	NM	0.238		0.014																	0.252		0.252			
711-11-224	THERMOPLASTIC (STD., YELLOW, SOLID, 18")	LF	139																			139		139			


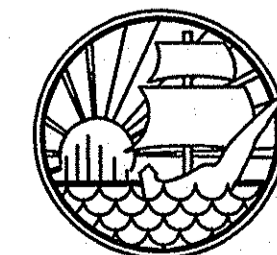
Project Approved
Apr 20, 2012

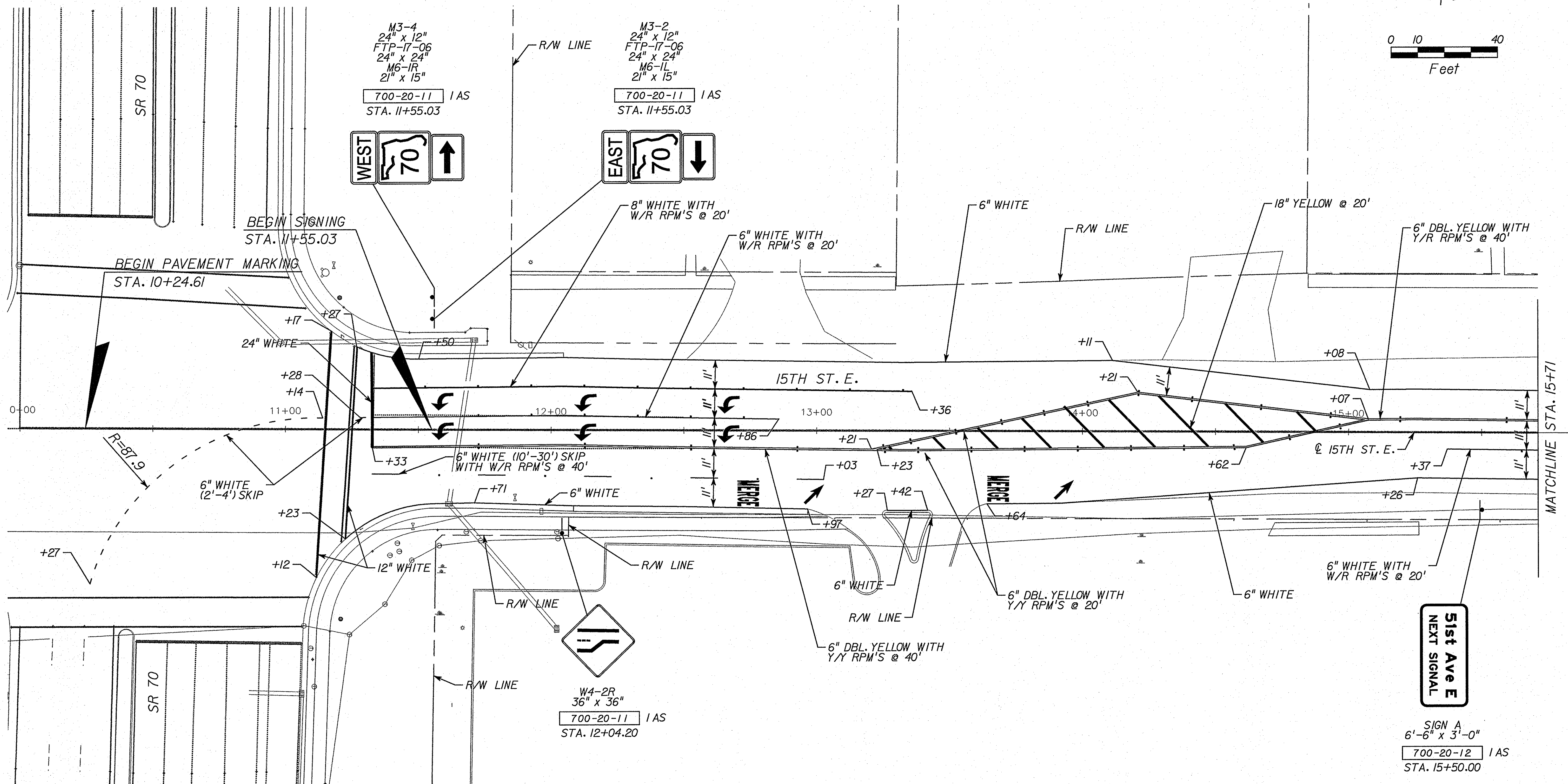
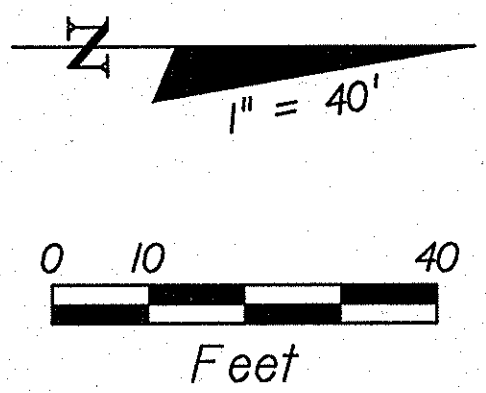
	SCALE AS NOTED	 HDR <small>Employee-owned</small>	HDR Engineering, Inc. 2621 Cattlemen Road Suite 106 Sarasota, FL 34232-6212 FBPR Certificate of Authorization No. 4213	DATE 07/16/10	 MANATEE COUNTY PUBLIC WORKS	DESIGN ENGINEER SUJEEVA A. WEERASURIYA	TABULATION OF QUANTITIES	SHEET NO. S-2
	DESIGNED BY LIR			PROJECT NO. 6029960		FL. LICENSE NO. 57629		
	DRAWN BY GAS							
	CHECKED BY SAW							
No.	REVISIONS	DATE	BY					

SIGNING AND PAVEMENT MARKING GENERAL NOTES:

1. PAVEMENT MARKINGS SHOULD BE PLACED AS SHOWN IN THE PLANS AND THE APPROPRIATE FDOT DESIGN STANDARDS INDEX.
2. THE SIGN LOCATIONS SHOWN ARE APPROXIMATE AND MAY REQUIRE FIELD ADJUSTMENT AS DIRECTED BY THE ENGINEER.
3. THE RETRO REFLECTIVE PAVEMENT MARKER ADHESIVE USED SHALL BE THE ONE CURRENTLY ON THE FDOT QUALIFIED PRODUCTS LIST (QPL).
4. REFER TO FDOT STANDARD INDEX NO. 17352 FOR RPM PLACEMENT DETAILS.
5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LENGTH OF SIGN COLUMN SUPPORTS IN THE FIELD PRIOR TO FABRICATION.
6. ALL ROUTE MARKER AUXILIARIES SHALL MATCH THE COLOR COMBINATION OF THE RESPECTIVE MARKER WHICH THEY SUPPLEMENT.
7. ALL STRIPING SHALL BE APPLIED BEFORE RAISED MARKERS ARE INSTALLED.
8. FOR MARKING PLACEMENT REQUIREMENTS SEE FDOT DESIGN STANDARD INDEX NO. 17346.
9. SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH FDOT STANDARD INDEX NO. 11860 AND NO. 17302.
10. THE NEW PAVEMENT STRIPING ENDS MUST MATCH EXISTING STRIPING.
11. ALL EXISTING STRIPING THAT IS IN CONFLICT WITH PROPOSED STRIPING AS SHOWN IN THESE PLANS IS TO BE REMOVED PER FDOT SPECIFICATIONS.
12. CROSSWALKS SHALL BE 10' IN WIDTH UNLESS OTHERWISE INDICATED.
13. SIZES FOR ALL PROPOSED SIGNS SHALL CONFIRM TO SIZES SHOWN IN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), LATEST EDITION.
14. THE CONTRACTOR IS TO USE CAUTION WHEN WORKING IN OR AROUND AREAS OR EXISTING LOOP AND LEAD IN WIRES, OVERHEAD TRANSMISSION LINES AND UNDERGROUND UTILITIES.
15. FORTY EIGHT HOURS PRIOR TO DIGGING, THE CONTRACTOR SHALL CALL SUNSHINE STATE ONE CALL OF FLORIDA, TELEPHONE NUMBER 1-800-432-4770, AND THE UTILITY OWNER TO REQUEST UTILITY LOCATIONS. A CONTRACTOR'S REPRESENTATIVE MUST BE PRESENT WHEN THE UTILITY COMPANY LOCATES THEIR FACILITIES.
16. SEE MANATEE COUNTY TRANSPORTATION DEPARTMENT TRAFFIC SUPPLEMENTAL SPECIFICATION 553 FOR STREET SIGN SPECIFICATIONS.
17. EXISTING SPEED LIMITS ON ROADWAYS ARE AS FOLLOWS:
40 MPH ON 53RD AVE (SR 70)
40 MPH ON 15TH ST E
18. CONTRACTOR SHALL UTILIZE FDOT STANDARD INDEX 600 AND 604 DURING MAINTAINANCE OF TRAFFIC OPERATIONS.

Sujeewa A. Weerasuriya
Apr 20, 2012

		SCALE AS NOTED	 HDR Employee-owned HDR Engineering, Inc. 2621 Cattlemen Road Suite 106 Sarasota, FL 34232-6212 FBPR Certificate of Authorization No. 4213	DATE 07/16/10	 MANATEE COUNTY PUBLIC WORKS	DESIGN ENGINEER SUJEEVA A. WEERASURIYA	GENERAL NOTES	SHEET NO.	
		DESIGNED BY LIR		PROJECT NO. 6029960		FL. LICENSE NO. 57629		GENERAL NOTES	S-3
		DRAWN BY GAS							
No.	REVISIONS	DATE		BY		CHECKED BY SAW			



No.	REVISIONS	DATE	BY

SCALE AS NOTED
 DESIGNED BY LJR
 DRAWN BY GAS
 CHECKED BY SAW

HDR
 Employee-owned

HDR Engineering, Inc.
 2621 Cattlemen Road
 Suite 106
 Sarasota, FL 34232-6212
 FBPR Certificate of
 Authorization No. 4213

DATE
 07/16/10

PROJECT NO.
 6029960

**MANATEE COUNTY
 PUBLIC WORKS**

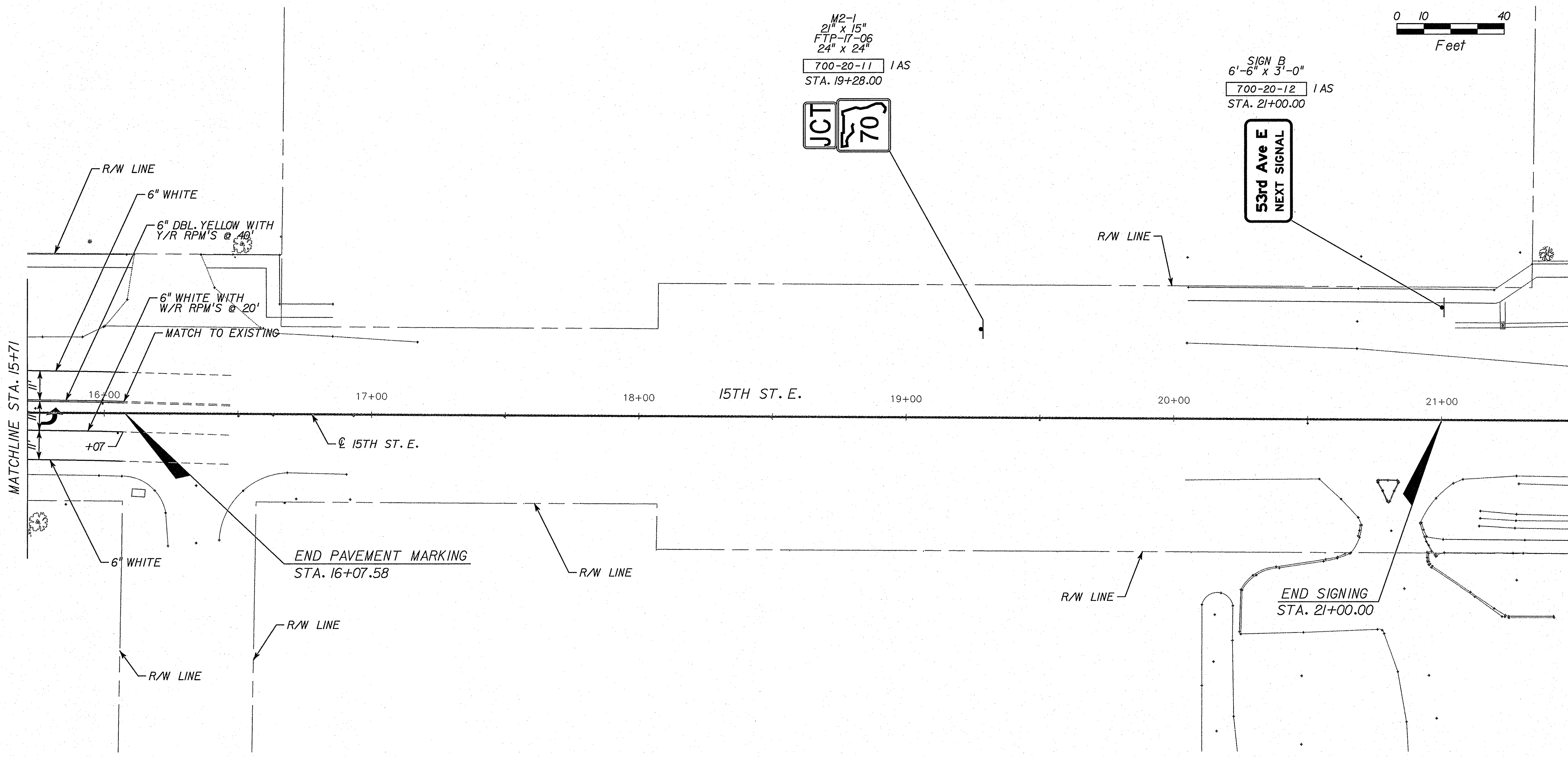
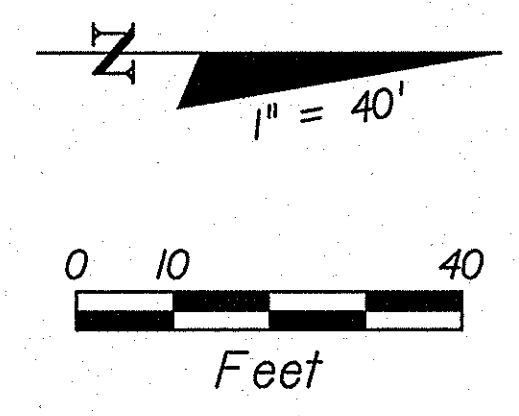
DESIGN ENGINEER
 SUJEEVA A.
 WEERASURIYA

FL. LICENSE NO.
 57629

**SIGNING AND PAVEMENT
 MARKING PLAN**

SHEET NO.
 S-4


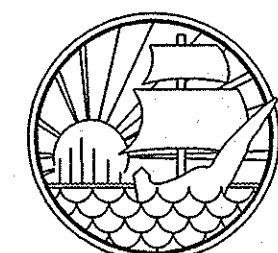
Sujeeva A. Weerasuriya
 July 20, 2012



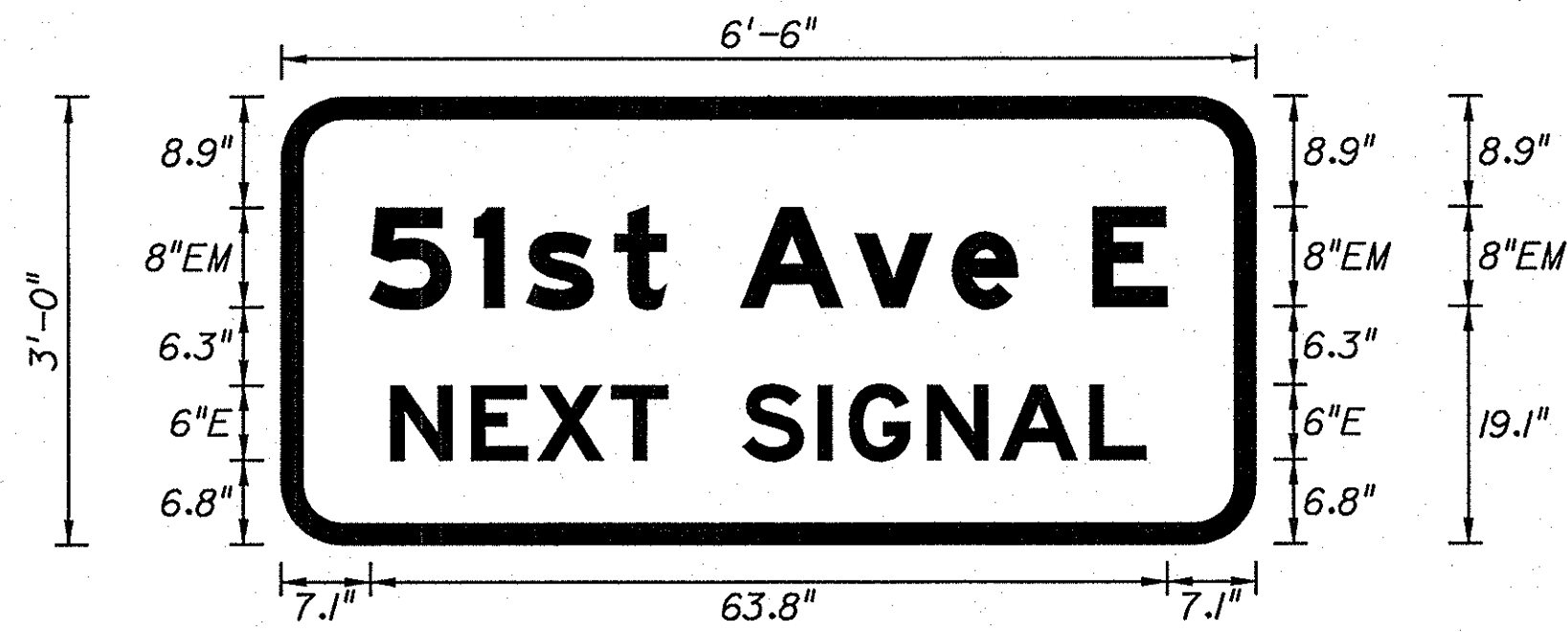
M2-1
21" x 15"
FTP-17-06
24" x 24"
700-20-11 IAS
STA. 19+28.00

SIGN B
6'-6" x 3'-0"
700-20-12 IAS
STA. 21+00.00

Sujeeva A. Weerasuriya
Apr 22, 2012

No.	REVISIONS	DATE	BY	SCALE	AS NOTED	 HDR Employee-owned HDR Engineering, Inc. 2621 Cattlemen Road Suite 106 Sarasota, FL 34232-6212 FBPR Certificate of Authorization No. 4213	DATE	07/16/10	 MANATEE COUNTY PUBLIC WORKS	DESIGN ENGINEER	SUJEEVA A. WEERASURIYA	SIGNING AND PAVEMENT MARKING PLAN	SHEET NO.	S-5
				DESIGNED BY	LIR		PROJECT NO.	6029960		FL. LICENSE NO.	57629			
				DRAWN BY	GAS									
				CHECKED BY	SAW									

SIGN NAME A		QTY	SIGN NUMBER	STATION(S)
PANEL	BORDER			
WIDTH 6'-6"	WIDTH 1.75"			
HEIGHT 3'-0"	RADII 5"			
LEGEND White	COLOR White			
COLOR Green				
SYMBOL(S)	ANGLE	X	Y	WID
				HT
SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge of Lane	COLUMN SIZE	AVERAGE LENGTH



NO. OF LIGHT FIXTURES	FIXTURE SPACING	PHOTOMETRIC CURVE	WATT	VOLTAGE
-----------------------	-----------------	-------------------	------	---------

COPY	5	1	s	t	A	v	e	E	L					
SPACE	7.1	8.3	4.2	7	4.2	6	9.1	7.8	5.3	6	5.9	7.1	63.8	
COPY	N	E	X	T	S	I	G	N	A	L	L			
SPACE	8.8	6.4	5.3	5.9	4.5	6	6.1	2.5	6.2	5.9	7.1	4.5	8.8	60.4

SIGN NAME B		QTY	SIGN NUMBER	STATION(S)
PANEL	BORDER			
WIDTH 6'-6"	WIDTH 1.75"			
HEIGHT 3'-0"	RADII 5"			
LEGEND White	COLOR White			
COLOR Green				
SYMBOL(S)	ANGLE	X	Y	WID
				HT
SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge of Lane	COLUMN SIZE	AVERAGE LENGTH



NO. OF LIGHT FIXTURES	FIXTURE SPACING	PHOTOMETRIC CURVE	WATT	VOLTAGE
-----------------------	-----------------	-------------------	------	---------

COPY	5	3	r	d	A	v	e	E	L					
SPACE	8.2	6.8	7.1	4.3	5.3	6	8.4	6.6	5.3	6	5.9	8.1	61.7	
COPY	N	E	X	T	S	I	G	N	A	L	L			
SPACE	8.8	6.4	5.3	5.9	4.5	6	6.1	2.5	6.2	5.9	7.1	4.5	8.8	60.4

SIGN NAME		QTY	SIGN NUMBER	STATION(S)
PANEL	BORDER			
WIDTH	WIDTH			
HEIGHT	RADII			
LEGEND	COLOR			
COLOR				
SYMBOL(S)	ANGLE	X	Y	WID
				HT
SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge of Lane	COLUMN SIZE	AVERAGE LENGTH

NO. OF LIGHT FIXTURES	FIXTURE SPACING	PHOTOMETRIC CURVE	WATT	VOLTAGE
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COPY				
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SIGN NAME		QTY	SIGN NUMBER	STATION(S)
PANEL	BORDER			
WIDTH	WIDTH			
HEIGHT	RADII			
LEGEND	COLOR			
COLOR				
SYMBOL(S)	ANGLE	X	Y	WID
				HT
SIGN NUMBER	NUMBER OF POSTS	CLEARANCE Edge of Lane	COLUMN SIZE	AVERAGE LENGTH

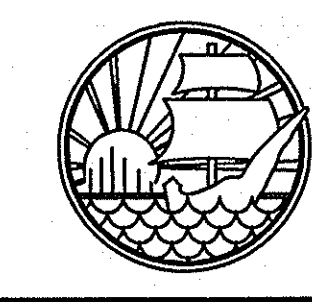
NO. OF LIGHT FIXTURES	FIXTURE SPACING	PHOTOMETRIC CURVE	WATT	VOLTAGE
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SCALE	AS NOTED		
DESIGNED BY	LIR		
DRAWN BY	GAS		
CHECKED BY	SAW		
No.	REVISIONS	DATE	BY

HDR
Employee-owned
HDR Engineering, Inc.
2621 Cattlemen Road
Suite 106
Sarasota, FL 34232-6212
FBPR Certificate of
Authorization No. 4213

DATE
07/16/10
PROJECT NO.
6029960



**MANATEE COUNTY
PUBLIC WORKS**

DESIGN ENGINEER
SUJEEVA A. WEERASURIYA
FL. LICENSE NO.
57629

GUIDESIGN WORKSHEET

SHEET NO.
S-6

Sujeeva A. Weerasuriya
Apr 20, 2012