



**AGENDA
TECHNICAL REVIEW COMMITTEE
REGULAR MEETING
OCTOBER 24, 2019
9:00 AM
CITY HALL COMMISSION CHAMBERS
204 ASH STREET
FERNANDINA BEACH, FL 32034**

- 1. CALL TO ORDER**
- 2. ROLL CALL**
- 3. APPROVAL OF MINUTES**
 - 3.1 September 26, 2019, Draft TRC Minutes
- 4. DISCUSSION ITEMS**
 - 4.1 Change of Use: 201 N. 4th Street - Jose Miranda, Miranda Architects to discuss converting the single family residence to SMCC office space. Medium Density Residential R-2 zoning.
 - 4.2 Pre-Application Discussion: 233 S. 14th Street - Nick Gillette, Gillette & Associates to discuss developing six fee simple townhouses with the associated infrastructure. Mixed Use MU-1 zoning
- 5. NEW BUSINESS**
 - 5.1 SPR 2016-06 Crawford Jewelers, 2149 Sadler Road - 1st Distribution
 - 5.2 SPR 2019-07 COFB Solar Array & 500,000 Gallon Reservoir - 3425 Citation Court
- 6. OLD BUSINESS**
 - 6.1 SPR 2019-02 Canopy Park Subdivision - 420 Citrona Drive - 2nd Distribution
- 7. DEVELOPMENT INQUIRIES FROM APPLICANTS NOT ON THE AGENDA - DISCUSSION ONLY, NO ACTION TO BE TAKEN.**
- 8. COMMITTEE BUSINESS**
- 9. ADJOURNMENT**

NEXT REGULAR TRC MEETING IS SCHEDULED FOR NOVEMBER 14, 2019.

Persons with disabilities requiring accommodations in order to participate in this program or activity should contact 310-3115, TTY 711, or through the Florida Relay Services at 1-800-955-8771 (TTY number for all City offices) at least 24 hours in advance to request such accommodations.



**MINUTES
TECHNICAL REVIEW COMMITTEE
REGULAR MEETING
SEPTEMBER 26, 2019**

1. **CALL TO ORDER – 9:15am (due to technical difficulties)**
2. **ROLL CALL**

MEMBERS PRESENT:

Jacob Platt, Planning
John Mandrick, Utilities
Michelle Forstrom, Code
Terry Cotter, Building

Rex Lester, Streets
Don Kukla, Building
Andre Desilet, Stormwater
Stephen Beckman, Building

3. **APPROVAL OF MINUTES**

3.1 September 12, 2019 Regular Meeting

ACTION TAKEN: A motion was made by Member Forstrom , seconded by Member Lester , to approve the minutes as presented.

Motion passed by unanimous voice vote.

4. **DISCUSSION ITEMS**

- 4.1 Change of Use:** 832 S. 8th Street – Jeff Hall & Matthew Thomas, Owners of Island Glass and Mirror to discuss moving into the currently vacant building. MU-8 zoning.

The applicants were not present. The next agenda item was called.

- 4.2 Change of Use:** 850 Indigo Street – Lauren Templeton, director of Amelia Art Studio to discuss moving into currently occupied office space. MU-8 zoning.

Ms. Templeton was present to discuss the proposed project. Parking was discussed. Mr. Platt advised that number of required parking spaces is determined by square footage, and so a survey is required. Mr. Lester offered that the addition of ADA spaces will be necessary. Mr. Kukla advised the applicant to work with a design professional.

5. **DEVELOPMENT INQUIRIES FROM APPLICANTS NOT ON THE AGENDA- DISCUSSION ONLY, NO ACTION TO BE TAKEN.**

- 5.1** Mark Akins of Rice Architect was present to discuss the addition of an open-air deck on the youth church building. Mr. Akins clients assured the committee that the open-air deck would always be associated with the church and would be for church functions only. This property is in the Downtown Historic District which requires a Certificate of Approval before building permits can be issued.

DRAFT

Mr. Platt advised the applicants to move forward with the Historic District Approval process.

- 5.2 Teresa Prince and Asa Gillette were present to discuss a 4-6 lot subdivision to be located on Elm Street for Habitat for Humanity. Stormwater and drainage were among topics of concern.

Mr. Platt advised the applicants to return for a full site plan review.

6. NEW BUSINESS

6.1 **Distribute: SPR 2019-04 – Page Properties, 224 N. 2nd Street**

6.2 **Distribute: SPR 2019-05 – Lee Hangar, Jamestown Road**

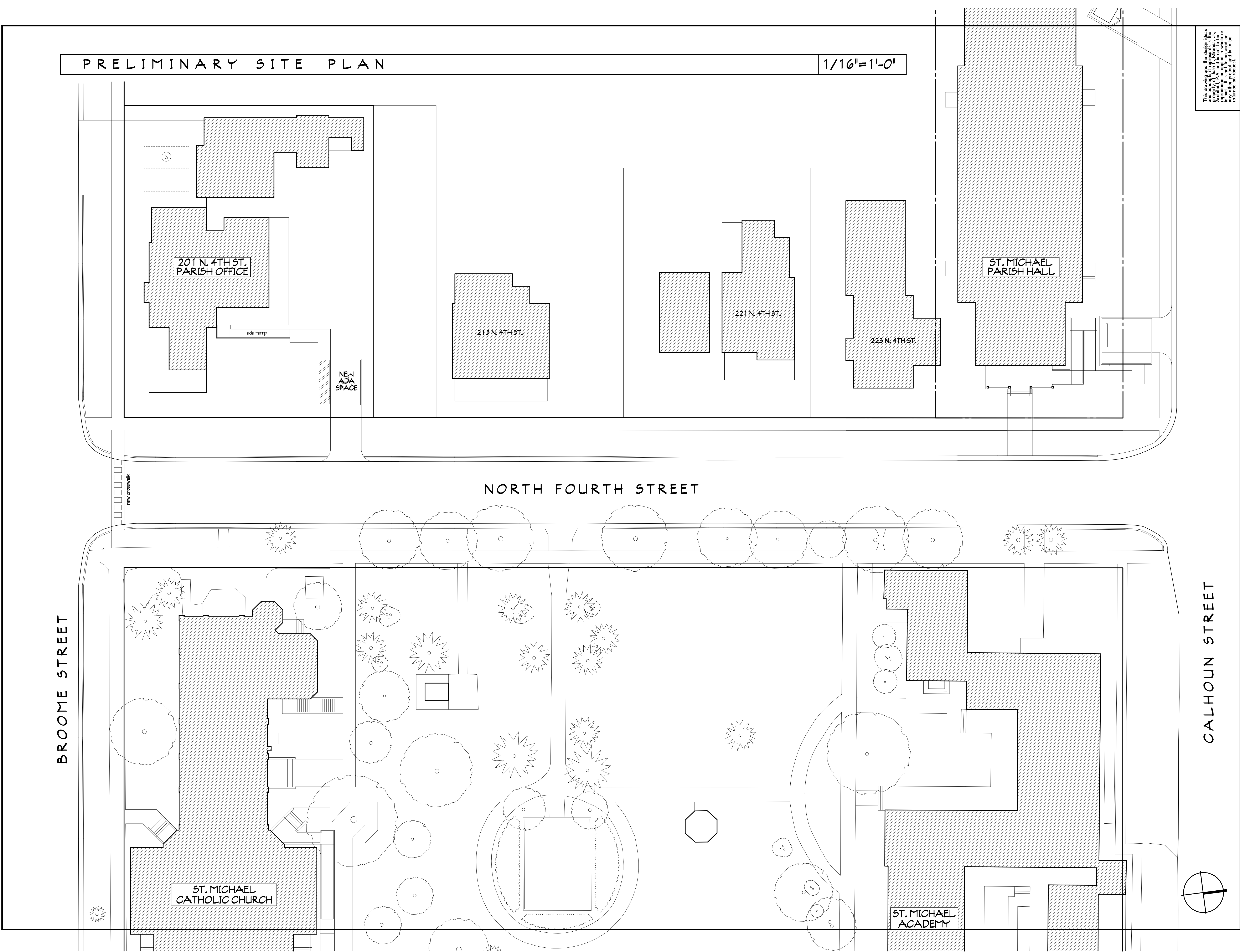
7. OLD BUSINESS

7.1 Distribute: Resubmit SPR 2018-09 WestRock Drop Yard

8. COMMITTEE BUSINESS

9. ADJOURNMENT – 10:05am

Jacob Platt



This drawing and its design ideas and concepts represent the preliminary design and are not to be used for construction or any other project and is to be returned to the originator.

SYCC 201 N. 4TH ST. SITE PLAN
PROJECT # 5190626
DRAWN BY -- JLM
CHKD BY -- JLM
DATE -- 10-07-19

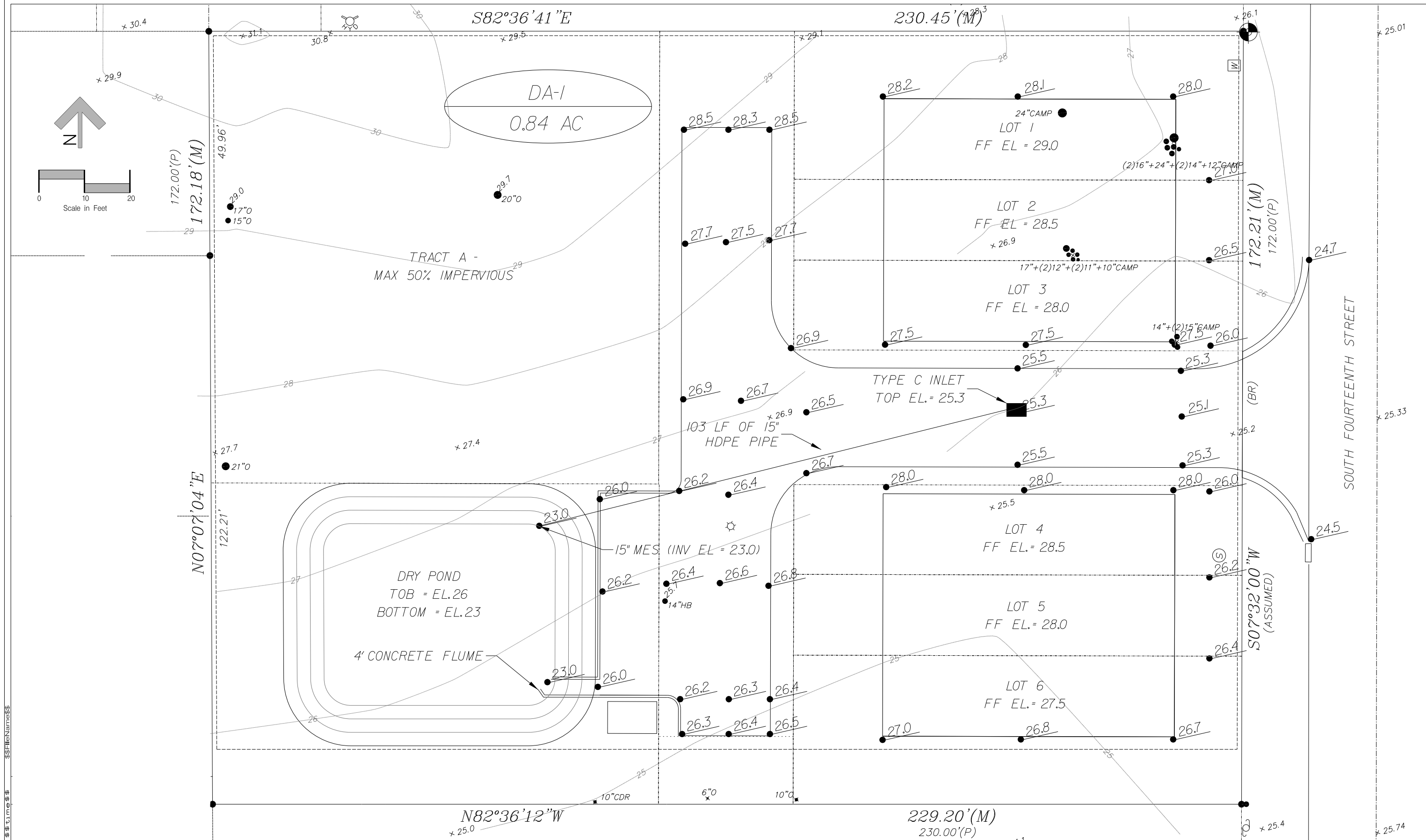
Jose L. Miranda, Jr.
FLA. LR. # 14887

MIRANDA ARCHITECTS
309 1/2 CENTRE STREET, SUITE 208
FERNANDINA BEACH, FL 32034
904.264.5565
www.mirandaarchitects.com

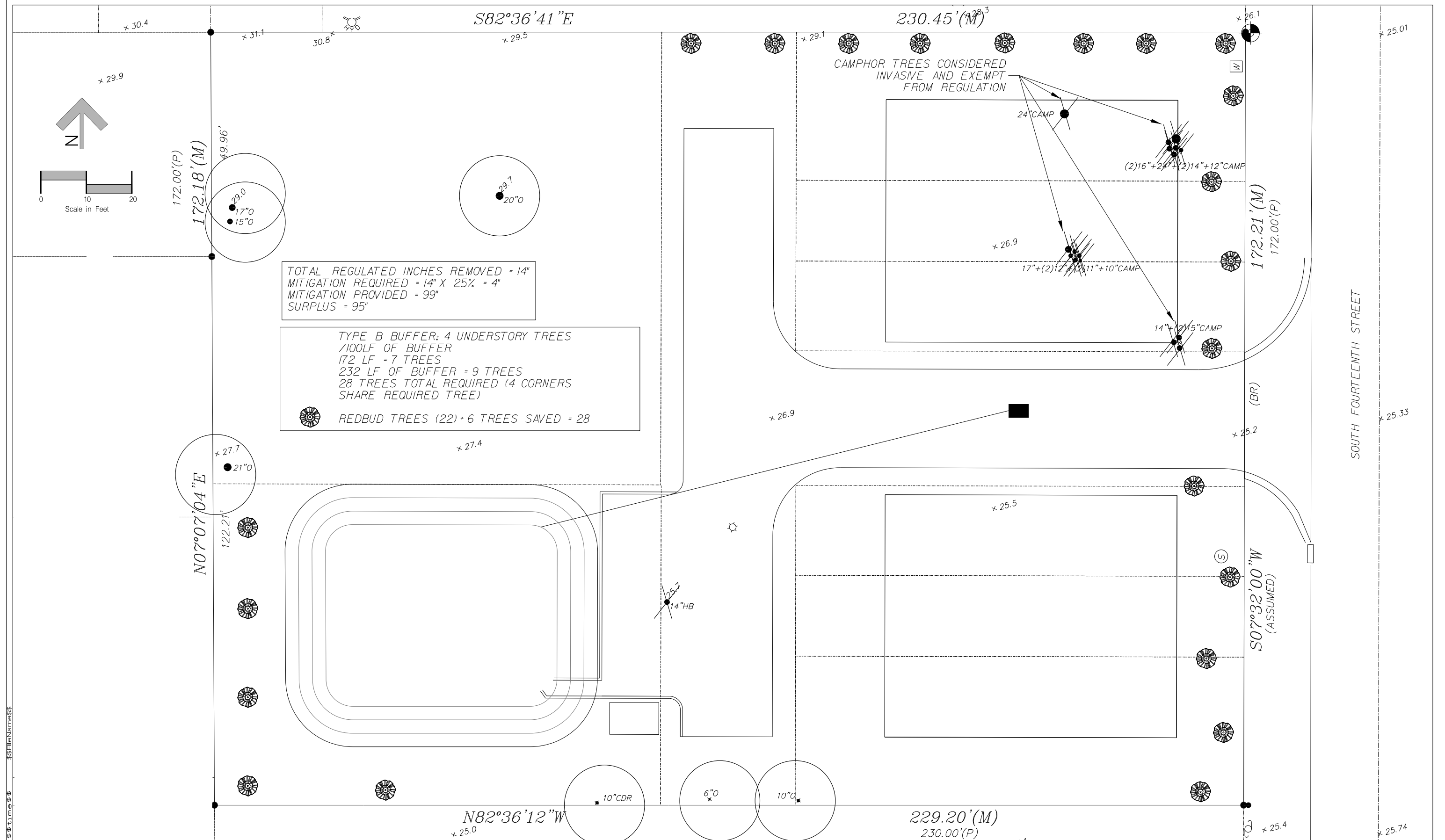


PROPOSED DESIGN FOR
**ST. MICHAEL CATHOLIC CHURCH
PARISH OFFICE RENOVATION**
201 NORTH 4TH STREET
FERNANDINA BEACH, FL 32304

CONCEPTUAL SITE PLAN	
REVISIONS	DATE



L K J I H G F E D C B A				Scale:				G & A ⁺				CYPRESS COVE				SIMMONS 9, LLC				POST DEVELOPMENT DRAINAGE PLAN				SHEET NO. DR-1			
1218				Project Mgr: NG				Gillette & Associates, Inc.																5 of 9			
				Designed by: NG				20 South 4th Street																Issue Date			
				Drawn by: BM				Fernandina Beach, FL 32034																OCTOBER 2019			
				QA/QC: AG				Certificate of Authorization No. 9332																Project No.			
Revised to address City of FB Comments								20 SOUTH 4TH STREET																17-10.35			
Revised								FERNANDINA BEACH, FL 32034																Registered Professional			
								PHONE: (904) 261-8819																			

[illegible]

REVIEW SET
NOT FOR CONSTRUCTION

ENGINEERING PLANS

FOR

CRAWFORD JEWELERS/RETAIL BUILDING

FOR

GARY CRAWFORD

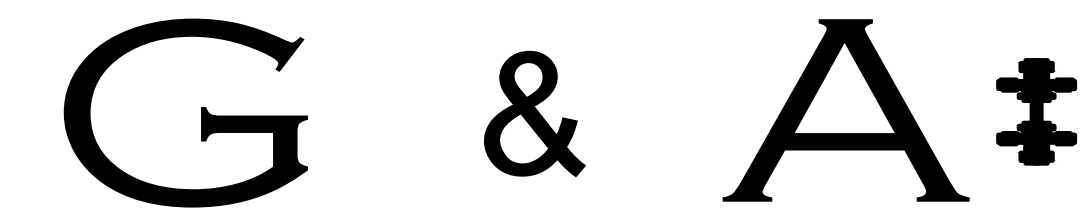
GILLETTE & ASSOCIATES, INC.

CIVIL & ENVIRONMENTAL ENGINEERING
MECHANICAL & STRUCTURAL ENGINEERING
PERMITTING & CONSTRUCTION MANAGEMENT

20 SOUTH 4TH STREET AMELIA ISLAND, FLORIDA 32034
PHONE: 904/261-8819

PERMITTING AGENCIES

CITY OF FERNANDINA BEACH: 904-310-3421
ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
NASSAU COUNTY (RIGHT OF WAY)



ISSUE DATE: OCTOBER 10, 2019

CRAWFORD JEWELERS/RETAIL BUILDING

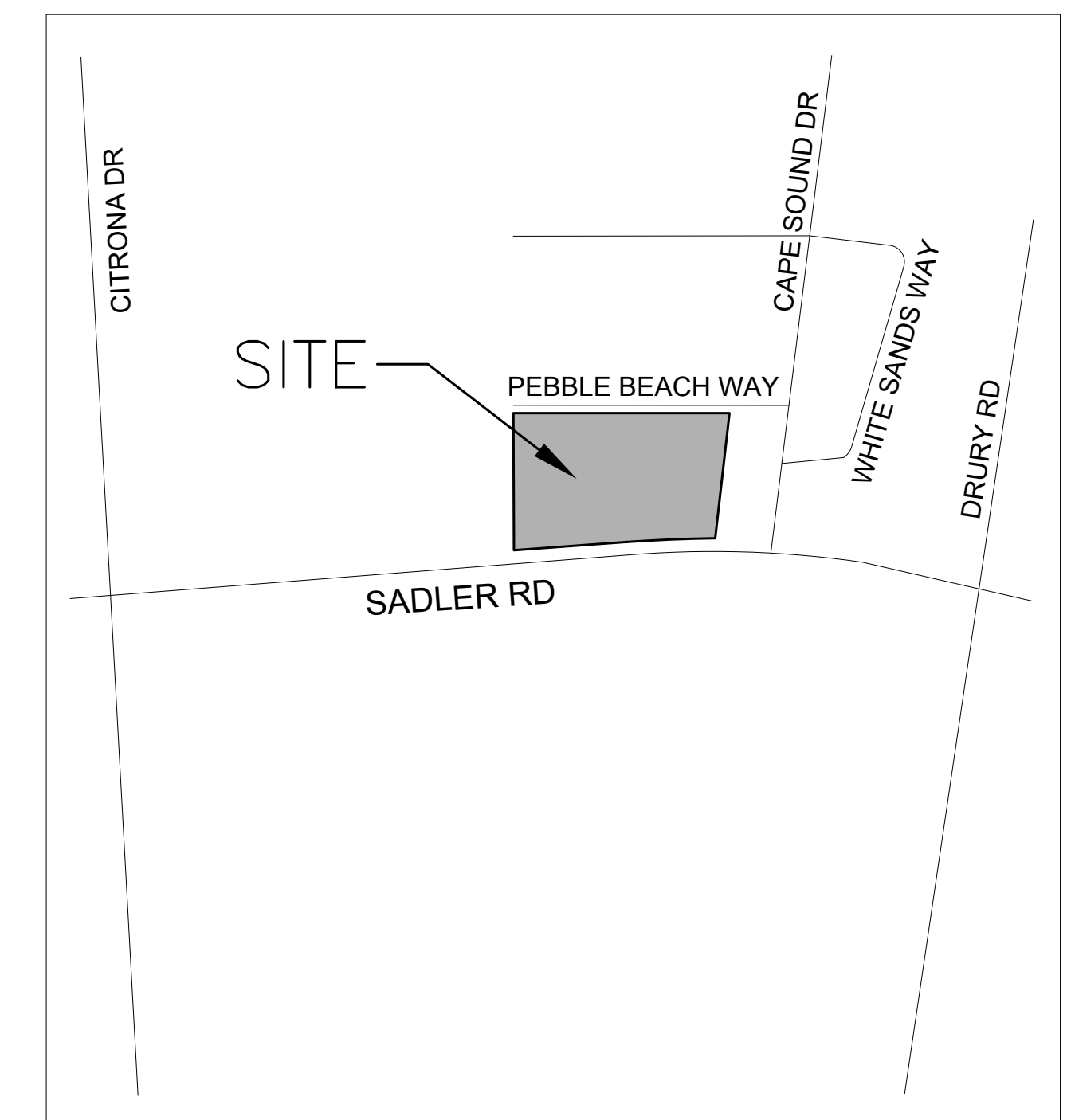
FOR

GARY CRAWFORD

RELEASED FOR CONSTRUCTION BY _____



SITE LOCATION MAP



GENERAL NOTES		INDEX																																		
SITE / GEOMETRY		WATER NOTES																																		
1. ALL WORK SHALL BE PERFORMED IN A SAFE MANNER. ALL SAFETY RULES AND GUIDELINES OF O.S.H.A. SHALL BE FOLLOWED. THE CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR ANY INJURIES OF HIS EMPLOYEES, AND ANY DAMAGE TO PRIVATE PROPERTY OR PERSONS DURING THE COURSE OF THIS PROJECT. ALL COSTS ASSOCIATED WITH COMPLYING WITH REGULATIONS AND THE FLORIDA TRENCH SAFETY ACT MUST BE INCLUDED IN THE CONTRACTOR'S PRICE FOR PERFORMING THE WORK. 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE JOB SITE PRIOR TO PREPARING THE BID FOR THE PURPOSE OF FAMILIARIZING HIMSELF WITH THE NATURE AND THE EXTENT OF THE WORK AND LOCAL CONDITIONS, EITHER SURFACE OR SUBSURFACE, WHICH MAY AFFECT THE WORK TO BE PERFORMED, AND THE EQUIPMENT, LABOR AND MATERIALS REQUIRED. FAILURE TO DO SO WILL NOT RELIEVE THE CONTRACTOR OF COMPLETE PERFORMANCE UNDER THIS CONTRACT. THE CONTRACTOR IS URGED TO TAKE COLOR PHOTOGRAPHS ALONG THE ROUTE OF THIS PROJECT TO RECORD EXISTING CONDITIONS PRIOR TO CONSTRUCTION, AND TO AID IN RESOLVING POSSIBLE FUTURE COMPLAINTS THAT MAY OCCUR DUE TO CONSTRUCTION OF THE PROJECT. ALL COSTS ASSOCIATED WITH PRELIMINARY INVESTIGATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. 3. ALL IMPROVEMENTS SHOWN ARE TO BE WARRANTED BY THE CONTRACTOR TO THE DEVELOPER. 4. ELEVATIONS ARE BASED ON NAVD DATUM OF 1988. 5. TOPOGRAPHIC AND BOUNDARY INFORMATION WAS PROVIDED BY: MANZIE & DRAKE LAND SURVEYING (904-491-5700). 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY BUILDING, RIGHT-OF-WAY PERMITS NOT PROVIDED AND INSURANCE REQUIRED FOR THE PROJECT. 7. THE CONTRACTOR SHALL COORDINATE THE WORK WITHIN CITY, COUNTY OR STATE RIGHT-OF-WAY WITH THE PROPER AGENCIES FOR MAINTENANCE OF TRAFFIC AND METHOD OF CONSTRUCTION & REPAIR. 8. THE CONTRACTOR SHALL ADVISE THE OWNER'S AUTHORIZED REPRESENTATIVE OF PLANNED WORK SCHEDULE. THE CONTRACTOR SHALL COORDINATE THEIR CONSTRUCTION WITH ALL OTHER CONTRACTORS. IN THE EVENT OF ANY CONFLICT WHATSOEVER, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD, AND THE OWNER PRIOR TO PROCEEDING WITH CONSTRUCTION. 9. "AS-BUILT" DRAWINGS - AS-BUILTS ARE REQUIRED TO BE SIGNED AND SEALED BY A FLORIDA REGISTERED LAND SURVEYOR. THEREFORE, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTRACT WITH A LAND SURVEYOR REGISTERED IN THE STATE OF FLORIDA FOR THE PREPARATION, FIELD LOCATIONS, CERTIFICATION, AND SUBMITTAL OF AS-BUILT DRAWINGS. 10. "AS-BUILT" RECORD DATA AND INFORMATION SHALL BE MAINTAINED BY THE CONTRACTOR. RECORD DRAWINGS SHALL BE SUPPLIED TO THE ENGINEER. 11. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF ALL SURVEY AND PROPERTY MONUMENTS. IF A MONUMENT IS DISTURBED, THE CONTRACTOR SHALL CONTRACT WITH THE SURVEYOR OF RECORD FOR REINSTALLATION OF THE MONUMENT. 12. ALL DEBRIS RESULTING FROM ALL ACTIVITIES SHALL BE DISPOSED OF OFF-SITE BY CONTRACTOR ON A DAILY BASIS. 13. ALL EXCESS SUITABLE AND UNSUITABLE MATERIALS SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR UNLESS DIRECTED OTHERWISE BY THE ENGINEER. 14. ALL EXISTING TREES LISTED TO REMAIN SHALL BE PRESERVED AND PROTECTED. 15. THE LOCATION OF ALL EXISTING UTILITIES, STRUCTURES, AND IMPROVEMENTS ON THE DRAWINGS ARE BASED ON LIMITED INFORMATION AND MAY NOT HAVE BEEN FIELD VERIFIED. THE LOCATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL NOTIFY RESPECTIVE UTILITY OWNERS AND FIELD VERIFY LOCATIONS OF EXISTING UTILITIES AND OTHER IMPROVEMENTS PRIOR TO COMMENCING ANY CONSTRUCTION. IF THE LOCATIONS SHOWN ARE CONTRARY TO ACTUAL FIELD LOCATIONS, THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF THE DISCREPANCY. THE DISCREPANCY SHOULD BE RESOLVED PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN WORKING IN AREAS NEAR EXISTING UTILITY IMPROVEMENTS AND SHALL BE RESPONSIBLE FOR REPAIRS OR PAYMENTS FOR ALL DAMAGE MADE TO EXISTING UTILITIES OR OTHER IMPROVEMENTS. PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION, THE CONTRACTOR SHALL VERIFY ALL GRADES, INVERTS, AND TYPE OF MATERIAL OF EXISTING UTILITIES TO WHICH THEY SHALL CONNECT. 16. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER ON ALL MATERIALS, FOR REVIEW AND APPROVAL, PRIOR TO PURCHASE OR CONSTRUCTION OF ANY UTILITY OR STRUCTURE. 17A. UNSUITABLE MATERIALS UNDER WATER, SEWER, OR STORM PIPE AND/OR STRUCTURES SHALL BE REMOVED AND REPLACED WITH SELECTED BACKFILL COMPACTED TO 98% OF IT'S MAXIMUM DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST (ASTM D1557). 17B. ALL FINISH FLOORS SHOWN ON THE PLANS ARE MINIMUM ELEVATIONS	18. ALL WATER & SEWER CONSTRUCTION SHALL BE ACCOMPLISHED BY AN UNDERGROUND UTILITY CONTRACTOR LICENSED UNDER THE PROVISIONS OF CHAPTER 489 FLORIDA STATUTES. 19. WHEN DEWATERING CAPACITY REQUIRES A PERMIT (CUP), IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE PERMIT THROUGH THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT. 20. WATER MAINS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED SANITARY HAZARD. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE WHERE PARALLEL WATER AND SEWER MAINS HAVE LESS THAN 10 FOOT HORIZONTAL SEPARATION. 20 FOOT LENGTHS OF C900 (DR18) WATER QUALITY PIPE SHALL BE USED WITH THE JOINTS STAGGERED AT 10 FOOT INTERVALS. THE PIPES SHALL BE PLACED IN SEPARATE TRENCHES WITH THE WATER MAIN AT LEAST 18 INCHES ABOVE THE SEWER. 21. WATER MAINS CROSSING SANITARY HAZARDS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER MAIN. WHERE WATER AND SEWER MAINS CROSS WITH BETWEEN 18 INCHES AND 6 INCHES OF VERTICAL CLEARANCE, A 20 FOOT SECTION OF C900 (DR18) WATER QUALITY PIPE SHALL BE CENTERED ON THE POINT OF THE CROSSING. THE CONTRACTOR SHALL FIELD VERIFY THE VERTICAL SEPARATION. THE MINIMUM SEPARATION BETWEEN WATER AND SEWER PIPES IS TO BE 6 INCHES OUTSIDE DIAMETER TO OUTSIDE DIAMETER. 22. NO WATER MAIN PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER MANHOLE. 23. BLANK 24. TRACER WIRE SHALL BE PROVIDED ON ALL WATER MAINS AND FORCE MAINS. TRACER WIRE SHALL BE #10 UF SOLID COPPER WIRE, COATED, AND SUITABLE FOR BURIAL. COATING SHALL BE BLUE FOR WATER AND GREEN FOR SEWER MAIN CONNECTIONS. WIRE SHALL BE ATTACHED DIRECTLY TO TOP OF PIPE AND BROUGHT INTO EACH VALVE BOX AND COILED TO ALLOW FOR EASY ACCESS AND EXTENSION ABOVE FINISHED GRADE FOR ATTACHMENT OF LOCATING EQUIPMENT. 25. ALL PIPE LENGTHS ARE APPROXIMATE DIMENSIONS, ALL DRAINAGE STRUCTURES SHALL BE CONSTRUCTED TO CONFORM WITH TYPICAL SECTIONS AND DETAILS AS SHOWN ON THE MISCELLANEOUS DETAILS SHEET AND IN ACCORDANCE WITH THE SPECIFICATIONS. 26. ALL UNDERGROUND UTILITIES MUST BE INSTALLED PRIOR TO PREPARATION OF SUBGRADE FOR PAVEMENT. 27. GRADES SHOWN ON PLANS ARE EDGE OF PAVEMENT FINISHED GRADES UNLESS OTHERWISE NOTED. 28. SHOULD THE SURFACE OR SUBSURFACE CONDITIONS VARY FROM WHAT IS SHOWN ON THE PLANS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER. 29. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE SEEDED AND MULCHED UNLESS OTHERWISE SPECIFICALLY STATED. 30. THE CONTRACTOR IS RESPONSIBLE FOR THE CONTROL OF SEDIMENT-LADEN RUNOFF RESULTING FROM STORM EVENTS DURING THE CONSTRUCTION PHASE. EROSION CONTROL FACILITIES SHOULD BE INSTALLED EARLY DURING THE CONSTRUCTION PERIOD SO AS TO PREVENT THE TRANSPORT OF SEDIMENT INTO SURFACE WATERS. RE-VEGETATION AND STABILIZATION OF DISTURBED AREAS SHOULD BE ACCOMPLISHED IMMEDIATELY TO REDUCE THE POTENTIAL FOR FURTHER SOIL EROSION. 31. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND COUNTY/CITY BEFORE COMMENCING WORK. 32. MINIMUM COVER OVER PIPES SHALL BE 36" UNLESS OTHERWISE INDICATED. 33. ALL UNDERGROUND UTILITY COMPANIES SHALL BE CONTACTED AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION. 34. IN ADDITION TO THE SPECIFICATIONS AND DETAILS PROVIDED FOR THIS CONTRACT, THE NASSAU COUNTY STANDARD DETAILS AND SPECIFICATIONS (LATEST REVISION) SHALL ALSO BE USED FOR ANY ITEMS NOT COVERED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A SET OF STANDARD DETAILS AND SPECIFICATIONS FROM NASSAU COUNTY. 35. BACKFILL MATERIAL SHALL BE COMPACTED TO 100% (2%) PER CITY OF FB REQUIREMENTS UNDER EXISTING AND PROPOSED ROADWAYS. 36. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN TO BE MADE WITHOUT PRIOR APPROVAL OF THE ENGINEER. 37. STATIONING REFERS TO THE CENTERLINE OF THE ROADWAY EXCEPT AS NOTED ON PLANS. WHERE PAVEMENT SPLITS, THE STATIONING FOLLOWS THE INSIDE EDGE OF PAVEMENT UNTIL ROADWAY TRANSITIONS BACK TO THE TYPICAL ROADWAY SECTION 38. ALL CONSTRUCTION, MATERIAL, AND WORKMANSHIP ARE TO BE IN ACCORDANCE WITH CITY OF FB AND COUNTY STANDARDS	1. WATER MAINS SHALL HAVE A MINIMUM OF 36" COVER UNDER PAVEMENT OR 30" COVER FROM FINISHED GRADE UNLESS OTHERWISE SHOWN. ALL WATER MAINS SHALL BE FLUSHED IN ACCORDANCE WITH, AND UNDER THE DIRECTION OF THE UTILITY COMPANY. 2. THRUST RESTRAINTS ARE REQUIRED IN ACCORDANCE WITH THE UTILITY COMPANY STANDARDS WHERE WATER MAINS ARE TERMINATED AND AT ALL BENDS AND TEES. 3. TIE RODS SHALL BE INSTALLED ON ALL VALVES LOCATED AT FITTINGS. ALL 10" AND LARGER VALVES AND LARGER SHALL REQUIRE (4) TIE RODS. MEGA LUG JOINT RESTRAINTS MAY BE USED IN LIEU OF THRUST BLOCKS OR TIE RODS. 4. UNLESS OTHERWISE NOTED, WATER MAINS ARE TO BE PVC DR18, DR-25, C-900 (BLUE), CLASS 150. 5. ALL WATER MAINS SHALL BE BACTERIOLOGICAL AND PRESSURE TESTED IN ACCORDANCE WITH AWWA C-600. NO CONNECTION TO EXISTING POTABLE WATER SYSTEM SHALL BE ALLOWED UNTIL ALL PROPOSED WATER MAINS HAVE BEEN PRESSURE TESTED, DISINFECTED, AND CLEARED FOR SERVICE. THE UTILITY COMPANY'S AUTHORIZED REPRESENTATIVE MUST BE NOTIFIED 48 HOURS PRIOR TO PERFORMING THE PRESSURE TEST AND MUST BE PRESENT. 6. THE CONTRACTOR SHALL AVOID SERVICE INTERRUPTIONS AND MAINTAIN ANY EXISTING WATER SERVICE TO MEET THE SYSTEM DEMANDS AT ALL TIMES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFICATION OF AFFECTED CUSTOMERS OF THE UTILITY. A MINIMUM OF 48 HOURS IN ADVANCE OF ANY INTERRUPTION OF SERVICE. BOIL WATER NOTICES SHALL BE DELIVERED IN ACCORDANCE WITH THE UTILITY COMPANY BOIL WATER NOTICE REQUIREMENTS. 7. ALL MAIN FLUSHING POINTS SHALL BE SAME SIZE AS MAIN UP TO 8 INCH WATER MAINS. FLUSHING POINTS FOR MAINS LARGER THAN 8 INCH SHALL BE REDUCED TO 8 INCH. 8. ALL WATER MAINS SHALL BE DISINFECTED USING LIQUID CHLORINE OR HYPOCHLORITES IN ACCORDANCE TO AWWA C651-86. WATER IN MAIN SHALL MAINTAIN A CHLORINE RESIDUAL OF 50 MG/L FOR A MINIMUM OF 24 HOURS. WATER MAIN SHALL NOT BE PLACED IN SERVICE UNTIL CLEARANCE HAS BEEN PROVIDED BY THE APPROPRIATE REGULATING AGENCY AND CITY OFFERNANDINA BEACH UTILITIES DEPARTMENT. 9. IF SOLVENT CONTAMINATION IS FOUND IN THE PIPE TRENCH, WORK SHALL BE STOPPED AND THE PROPER AUTHORITIES NOTIFIED. BASED ON APPROVAL OF THE PERMITTING AGENCY, DUCTILE IRON PIPE, FITTINGS, AND SOLVENT RESISTANT GASKET MATERIAL SUCH AS FLUOROCARBON SHALL BE USED IN THE CONTAMINATED AREA. THE DUCTILE IRON PIPE SHALL EXTEND AT LEAST 100 FEET BEYOND ANY SOLVENT NOTED. ANY CONTAMINATED SOIL THAT IS EXCAVATED SHALL BE PLACED ON AN IMPERMEABLE MAT AND COVERED WITH A WATER PROOF COVERING. THE PROPER AUTHORITIES WILL BE NOTIFIED AND THE CONTAMINATED SOIL HELD FOR PROPER DISPOSAL. 10. 2" FLUSHING HYDRANTS SHALL BE INSTALLED AT ALL DEAD END LINES AND MAIN LINE STUB-OUTS. 11. A SEPARATE WATER SERVICE SHALL BE REQUIRED FOR EACH UNIT SERVED AND SHALL BE INSTALLED 3 FEET EITHER SIDE OF PROPERTY LINE. ALL WATER SERVICES SHALL BE MARKED WITH A "W" ETCHED ON THE CURB. ALL VALVES SHALL BE MARKED WITH A "V" ETCHED ON THE CURB. 12. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE UTILITY COMPANY'S STANDARDS. 13. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED AT THE CONSUMER'S METER OR AT THE PROPERTY LINE WHEN A METER IS NOT USED. 14. BACKFLOW PREVENTION ASSEMBLIES SHALL BE TESTED BY A CERTIFIED BACKFLOW TEST TECHNICIAN. RESULTS SHALL BE SUBMITTED TO AND APPROVED BY THE UTILITY COMPANY PRIOR TO ACCEPTANCE OF INSTALLATION. 15. MAXIMUM DEPTH ON WATER SERVICES TO METER TO BE 36".	<table><tr><th>PAGE #</th><th>SHEET</th><th>DESCRIPTION</th></tr><tr><td>1</td><td>CVR</td><td>COVER SHEET</td></tr><tr><td>2</td><td>IN-1</td><td>INDEX SHEET</td></tr><tr><td>3</td><td>PRE-1</td><td>PREDEVELOPMENT PLAN</td></tr><tr><td>4</td><td>GE-1</td><td>GEOMETRY PLAN</td></tr><tr><td>5</td><td>DR-1</td><td>DRAINAGE PLAN</td></tr><tr><td>6</td><td>LS-1</td><td>TREE MITIGATION PLAN</td></tr><tr><td>7</td><td>LS-2</td><td>LANDSCAPE PLAN</td></tr><tr><td>8</td><td>DT-1</td><td>MISCELLANEOUS DETAILS</td></tr><tr><td>9</td><td>DT-2</td><td>WATER DETAILS</td></tr><tr><td>10</td><td>DT-3</td><td>SEWER DETAILS</td></tr></table>	PAGE #	SHEET	DESCRIPTION	1	CVR	COVER SHEET	2	IN-1	INDEX SHEET	3	PRE-1	PREDEVELOPMENT PLAN	4	GE-1	GEOMETRY PLAN	5	DR-1	DRAINAGE PLAN	6	LS-1	TREE MITIGATION PLAN	7	LS-2	LANDSCAPE PLAN	8	DT-1	MISCELLANEOUS DETAILS	9	DT-2	WATER DETAILS	10	DT-3	SEWER DETAILS
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		FIRE NOTES																																		
		1. WHERE UNDERGROUND WATER MAINS AND HYDRANTS ARE TO BE PROVIDED, THEY SHALL BE INSTALLED, COMPLETED, AND IN SERVICE PRIOR TO COMMENCING CONSTRUCTION WORK ON ANY STRUCTURE. (NFPA 1, 16.4.3.1.3, 2009 EDITION) 2. CLEARANCES OF SEVEN AND ONE HALF FEET (7 FT-6 IN.) IN FRONT OF AND TO THE SIDES OF THE FIRE HYDRANT, WITH A FOUR FOOT CLEARANCE TO THE REAR OF THE HYDRANT. (NFPA 1, 18.3.4.1, 2009) 3. NEW FIRE HYDRANT(S) SHALL BE INSTALLED SO THAT POSITIONED NOT MORE THAN 7 FEET 6 INCHES AWAY FROM CURB OR BERM OF THE ROADWAY.																																		

LEGEND		SEWER NOTES	
----->X----- WM SAN SAN WM ----- ----- EXISTING VALVE EXISTING WATER LINE EXISTING SANITARY SEWER EXISTING FIRE HYDRANT PROPOSED SANITARY SEWER PROPOSED WATER LINE PROPOSED FIRE HYDRANT EXISTING EDGE OF PAVEMENT EXISTING PROPERTY LINE	15.3 ● S-5 P-1 15.0 ————— ————— ————— ----- ----- ----- ----- PROPOSED SPOT ELEVATION DRAINAGE STRUCTURE PIPE PROPOSED CONTOUR PROPOSED EDGE OF PAVEMENT PROPOSED PROPERTY LINE PROPOSED R.O.W. LINE EXISTING CONTOUR	1. THE CONTRACTOR SHALL PROVIDE, TO THE ENGINEER OF RECORD, A SCHEDULE OF INVERT ELEVATIONS OF ALL SANITARY MANHOLES, PRIOR TO THE PLACEMENT OF THE LIME ROCK BASE COURSE. THIS SCHEDULE TO BE PROVIDED BY THE REGISTERED LAND SURVEYOR SUBMITTING THE "AS-BUILT" DRAWINGS FOR THIS PROJECT. 2. SANITARY SEWER SERVICES SHALL BE 6"PVC WITH A MINIMUM SLOPE OF 0.006 FEET PER FOOT AND SHALL BE TERMINATED AT THE RIGHT-OF-WAY LINE WITH A DEPTH OF 24" TO 48" FROM THE FINAL FINISHED GRADE OF THE DEVELOPED LOTS. DEPTHS GREATER THAN 48" FROM FINAL FINISHED GRADE SHALL BE READJUSTED BY THE DEVELOPER AT HIS COST. 3. GRAVITY SEWER TO BE CLEANED & TV TESTED BY DEVELOPER AT DEVELOPER'S EXPENSE 4. ALL MANHOLE FRAMES AND COVERS TO BE ADJUSTED TO FINAL FINISHED GRADE. 5. A SEPARATE SEWER SERVICE (6" MIN.) SHALL BE PROVIDED TO THE RIGHT-OF-WAY FOR EACH LOT BEING SERVED. AN "S" SHALL BE ETCHED INTO THE CURB DIRECTLY OVER EACH SERVICE LINE OR IN THE STREET SIDE OF A SIDEWALK IN LINE WITH THE CLEANOUT. 6. GRAVITY SEWER TO BE GREEN IN COLOR 7. NEW GRAVITY SEWER SYSTEM SHALL BE PLUGGED AT NEAREST EXISTING DOWNSTREAM MANHOLE AND SHALL NOT BE REMOVED WITHOUT AUTHORIZATION FROM THE UTILITY COMPANY. EXISTING MANHOLES TO BE COREBORED AND ARRANGEMENTS MADE TO BE REFURBISHED WITH COMPATIBLE MATERIALS IF THE EXISTING MANHOLE IS ALLOWED TO BE USED. 8. FINISHED FLOOR ELEVATIONS SHALL BE GREATER (HIGHER) THAN THE ELEVATION OF THE MANHOLE NEAREST THE SERVICE LATERAL IN ORDER TO AVOID A POTENTIAL BACKUP OF SEWERAGE IN THE HOUSE OR BUILDING. 9. ALL GRAVITY SEWER PIPE TO A 10 FOOT DEPTH OF COVER SHALL BE SDR-26 PVC PIPE (MINIMUM). GRAVITY SEWER PIPE WITH COVER OF 15 FEET (AND IN EASEMENTS) AND GREATER SHALL BE C900 - DR18. JOINT SHALL BE OF THE BELL AND SPIGOT TYPE AND MEET THE REQUIREMENTS OF THE PIPE REFERRED BEING USED. 10. WHEN A PROPERTY LINE CAN NOT BE DEFINED, THE SEWER CLEANOUT SHALL BE PLACED IN AN UNPAVED AREA AT A DISTANCE NO GREATER THAN 30 FEET FROM THE SEWER MAIN. 11. NOTE: DR-18 TO BE USED ON SEWER LINE CROSSING WHERE STORM DRAIN IS WITHIN 24 INCHES ABOVE GRAVITY ALSO JOINT TO BE CENTERED AT CROSSING 12. ALL MANHOLES TO HAVE MINIMUM 24" HINGED RING AND COVER EAST JORDAN OR APPROVED EQUIVALENT 13. SEWER PLUGS USED DURING THE CONSTRUCTION OR CONNECTION TO A SYSTEM SHALL HAVE THE CONTRACTOR'S NAME PERMANENTLY STAMPED. 14. THE MANHOLE LINER SHALL BE SPECTRA SHIELD OR APPROVED EQUIVALENT. 15. IN ACCORDANCE WITH THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) REQUIREMENTS, LEAKAGE TESTING SHALL BE PERFORMED ON ALL SEGMENTS OF THE SEWER SYSTEM. TESTING MAY INCLUDE APPROPRIATE WATER OR LOW PRESSURE AIR TESTING. TEST METHODS SHALL TAKE INTO CONSIDERATION THE RANGE IN GROUNDWATER ELEVATIONS DURING THE TEST AND ANTICIPATED DURING THE DESIGNED LIFE OF THE SEWER. NO LEAKAGE ALLOWED IN SYSTEM. 16. ALL FORCE MAIN PIPING TO BE DR-18 GREEN OR BROWN. 17. CONTACT JOHN MANDRICK, COFB UTILITY DIRECTOR AT (904-310-3420) FOR PRE-CONSTRUCTION AND COORDINATION MEETING PRIOR TO WORK COMMENCING.	

CRAWFORD JEWELERS/RETAIL PRELIMINARY BINDING SITE PLAN		GILLETTE & ASSOCIATES, INC. CIVIL, ENVIRONMENTAL, MECHANICAL, & STRUCTURAL ENGINEERING		NOTE: SOME DETAILS IN THESE DRAWINGS ARE TO BE CONSIDERED TYPICAL AND MAY NOT BE CALLED OUT ON PLANS. CONTRACTOR SHALL BECOME FAMILIAR WITH AND FOLLOW ALL DETAILS DURING CONSTRUCTION IN ALL TYPICAL AREAS.	
SADLER ROAD FERNANDINA BEACH, FLORIDA		CERTIFICATE OF AUTHORIZATION NO. 9332 ASA R. GILLETTE, P.E. * FL PE NO. 56177		REGISTERED DESIGN PROFESSIONAL	
		ITEM		ITEM	
		DATE		DATE	
		REV		REV	
		A		A	

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FLORIDA P.E. NO. 56177

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DATE

REV

10/10/19

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CIVIL, ENVIRONMENTAL, MECHANICAL, & STRUCTURAL ENGINEERING

CERTIFICATE OF AUTHORIZATION NO. 9332

ASA R. GILLETTE, P.E. • FL. PE. NO. 56177

20 S. 4th STREET * FERNANDINA BEACH, FL 32034

PHONE: 904-261-8819 * www.gilletteassociates.com

CRAWFORD JEWELERS/RETAIL

PRELIMINARY BINDING SITE PLAN

SADLER ROAD

FERNANDINA BEACH, FLORIDA

DATE: 10/14/19

SCALE: NONE

DRAWING IS REDUCED IF LESS THAN 22" x 34"

INDEX SHEET

North / Elev Key Sheet

W N E S

IN-1

Page 2 of 10

LEGEND

CL = CENTERLINE

[Pattern] = CONCRETE FLATWORK

[Symbol] = FIRE HYDRANT

P.I.N. = PARCEL IDENTIFICATION NUMBER

[Symbol] = WATER VALVE

[Symbol] = WOOD POWER POLE

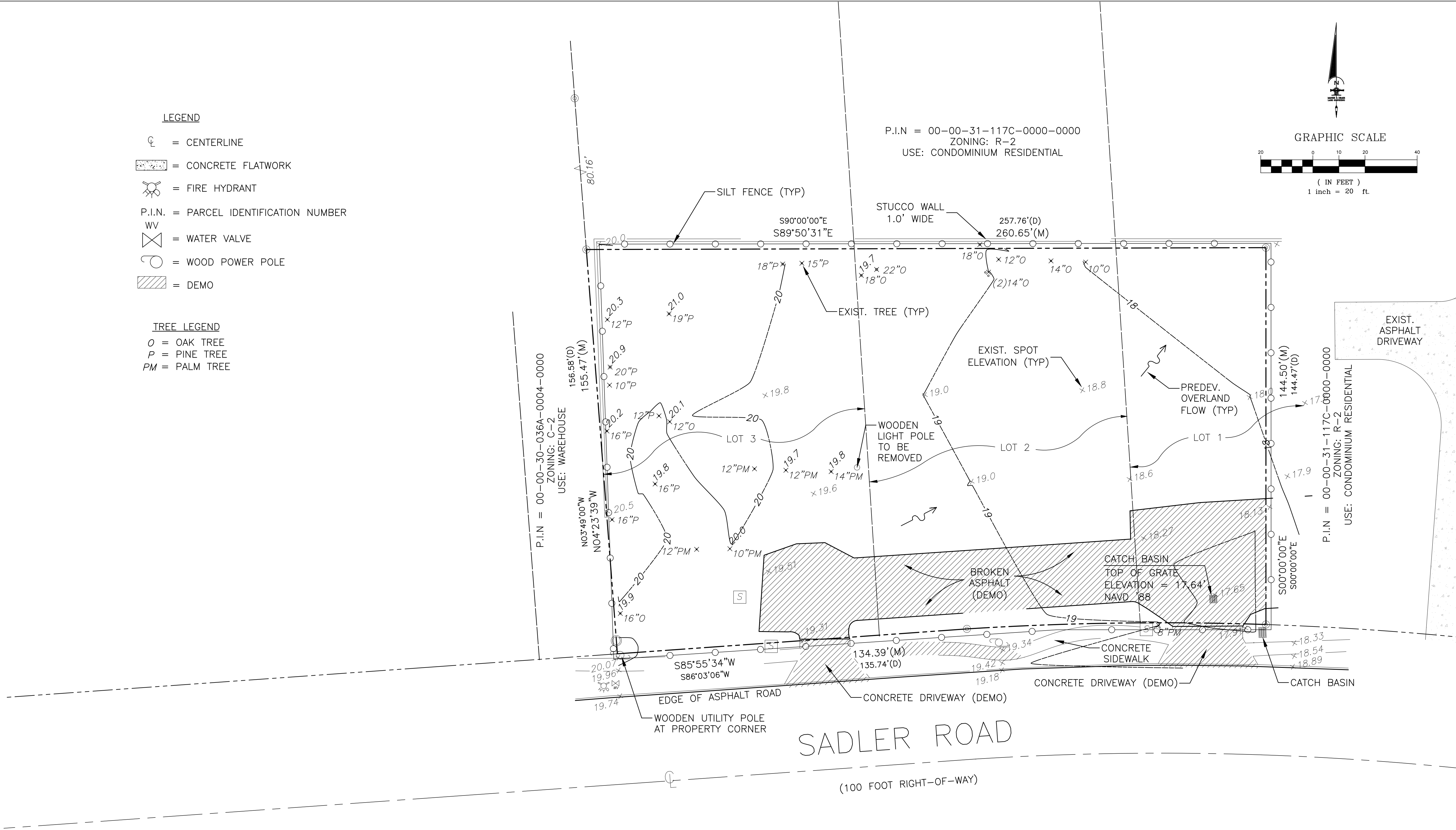
[Pattern] = DEMO

TREE LEGEND

O = OAK TREE

P = PINE TREE

PM = PALM TREE



SURVEY NOTES:

- 1) The "Legal Description" hereon is in accord with with the description provided by the client.
- 2) Underground improvements were not located or shown.
- 3) Lands shown hereon were not abstracted by this office for easements, rights-of-way, ownership or other instruments of record.
- 4) Bearings shown hereon are based on S00°00'00"E for the Easterly line of subject property. The bearing reference line is indicated as thus (BR).
- 5) Unless it bears the signature and the original raised seal of a Florida licensed surveyor and mapper, this map/report is for informational purposes only and is not valid.
- 6) The property shown hereon lies within flood zone "X" as per F.E.M.A. Flood Insurance Rate Map, Panel 12089C 0239G, Dated 08/02/2017. Flood Zone information above and shown on this survey is provided as a courtesy and is approximate at best. All data should be verified by Nassau County Building Department for accuracy. We assume no liability for its accuracy. Flood Zone information is not covered by the certification hereon and is not required to be shown per Chapter 5J-17, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.
- 7) Site Benchmark is as shown hereon.
- 8) Elevations shown hereon refer to North American Vertical Datum of 1988. (N.A.V.D. '88)

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**CRAWFORD JEWELERS/RETAIL
PRELIMINARY BINDING SITE PLAN**

SADLER ROAD
FERNANDINA BEACH, FLORIDA

DATE: 10/14/19
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PREDEVELOPMENT PLAN

North / Elev Key Sheet

PRE-1

Page 3 of 10

PROPERTY
PROPERTY PARCEL: 00-00-31-117C-00CM-0000
LOT AREA: 0.86 ACRE
ZONING: C-2
LAND USE: COMMERCIAL
FLOOD ZONE: X

BUILDINGS
TOTAL FLOOR AREA: 4,100 SF
MAXIMUM FLOOR AREA RATIO: 150%
FLOOR AREA RATIO: 11%
MAXIMUM BUILDING HEIGHT: 45'
PROPOSED BUILDING HEIGHT: 25'
MINIMUM BUILDING SETBACK REQUIREMENTS: NONE

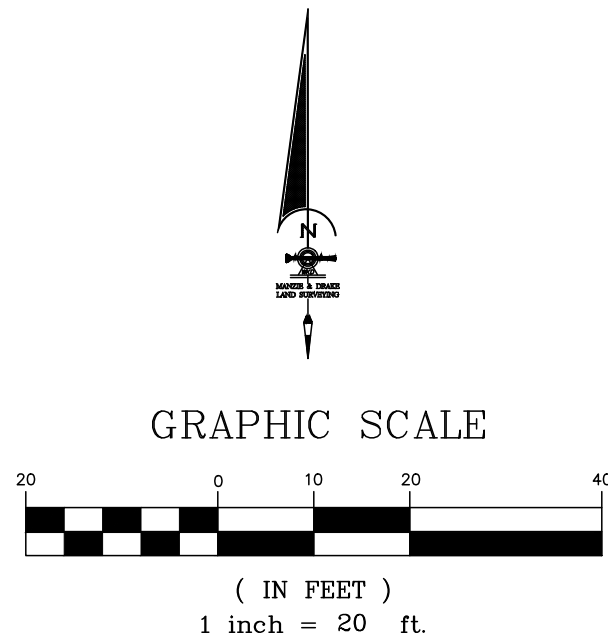
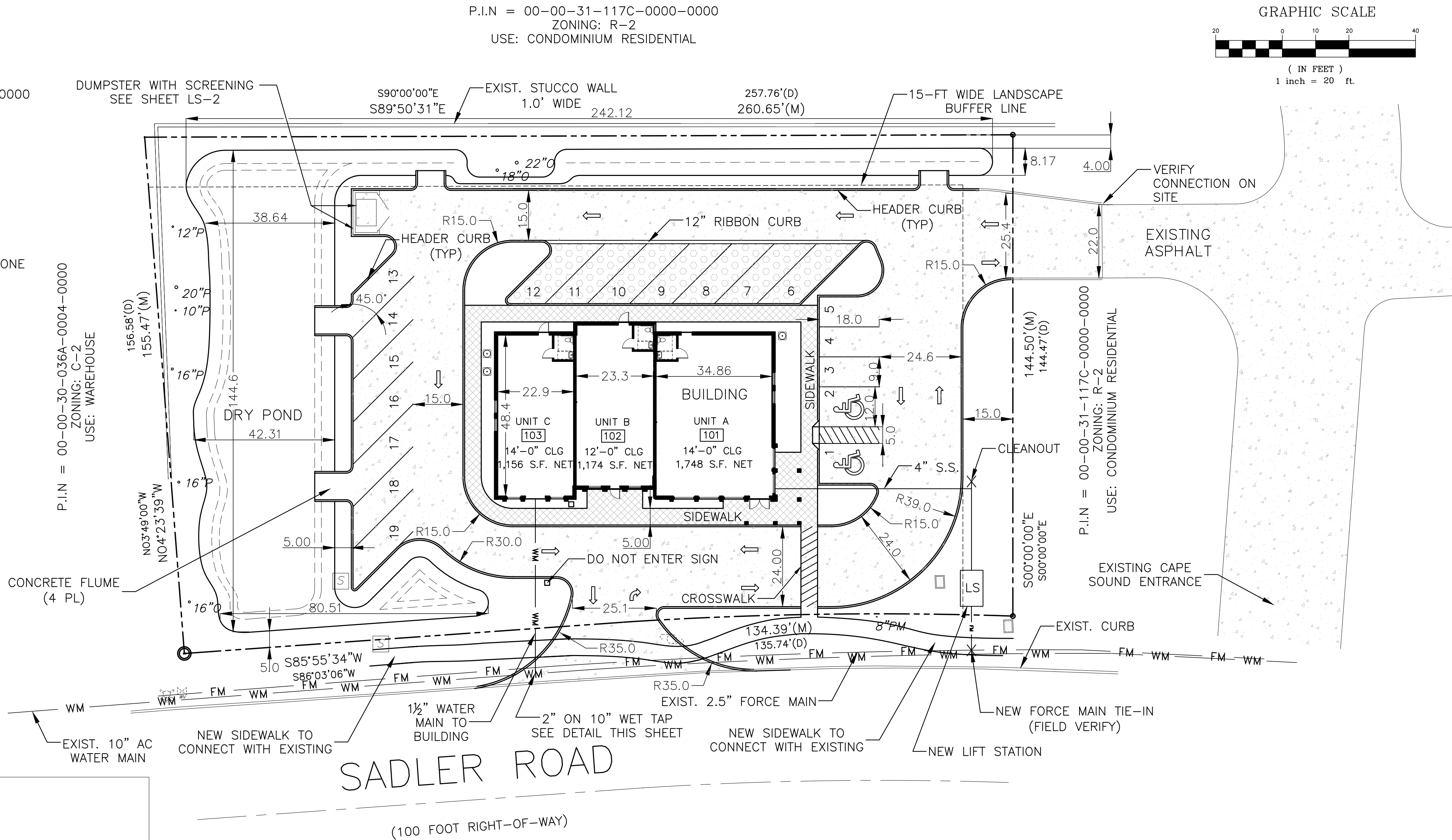
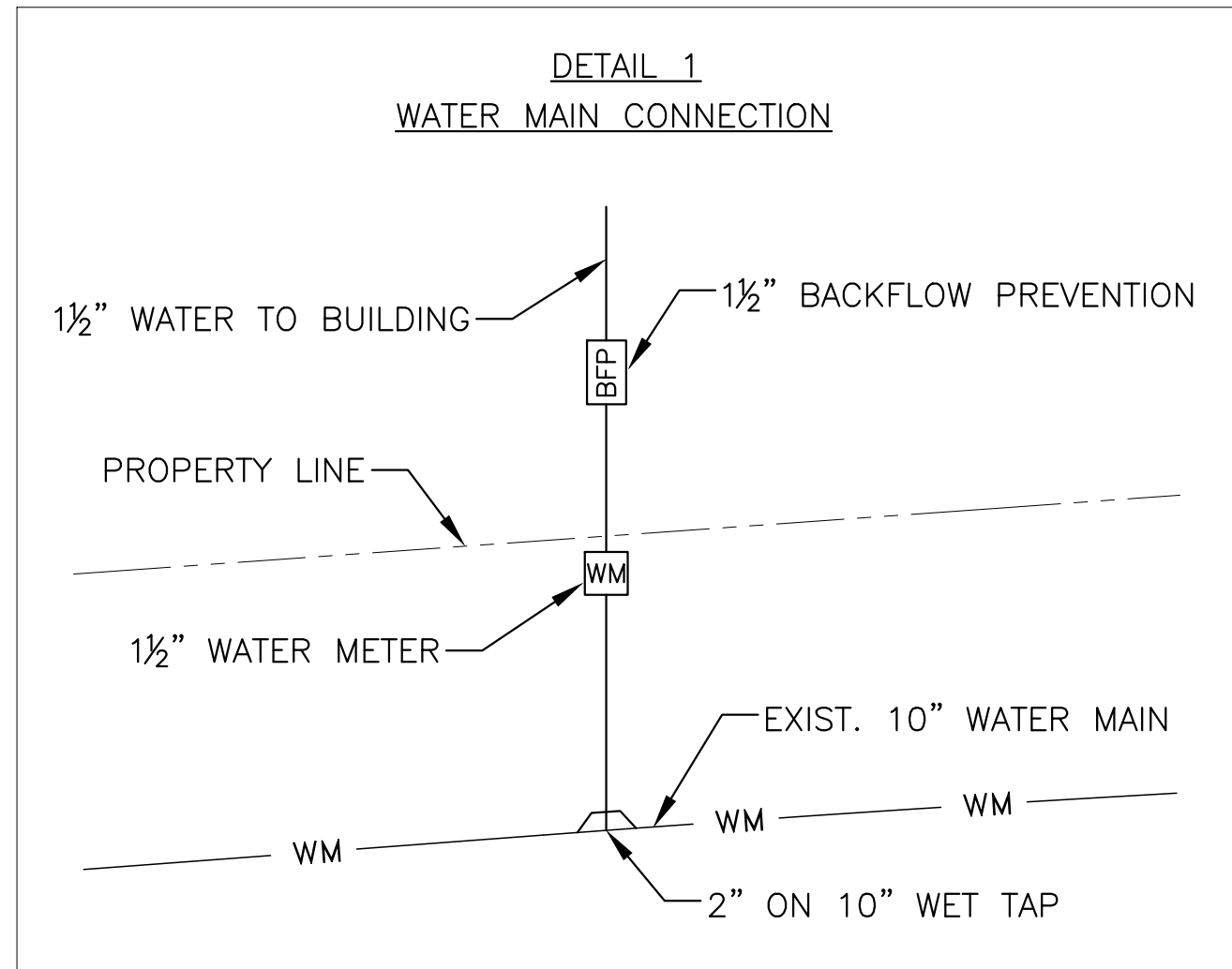
IMPERVIOUS AREA
TOTAL IMPERVIOUS AREA: 0.46 ACRE
MAXIMUM IMPERVIOUS SURFACE RATIO: 60%
IMPERVIOUS SURFACE RATIO: 53%

PARKING
REQUIRED: 1 SPACE/300 SF OF RETAIL
SPACES REQUIRED: 14
SPACES PROVIDED: 19
ADA SPACES: 2
REGULAR SPACES: 10
OVERFLOW SPACES: 7

LANDSCAPE BUFFER REQUIREMENTS
NORTH AND EAST PARCELS:
ZONING DISTRICTS: R-2
REQUIRED BUFFER: 15'

SOUTH AND WEST PARCELS:
ZONING DISTRICTS: C-2
REQUIRED BUFFER: NONE

- LEGEND**
- ASPHALT
 - CONCRETE
 - GRAVEL



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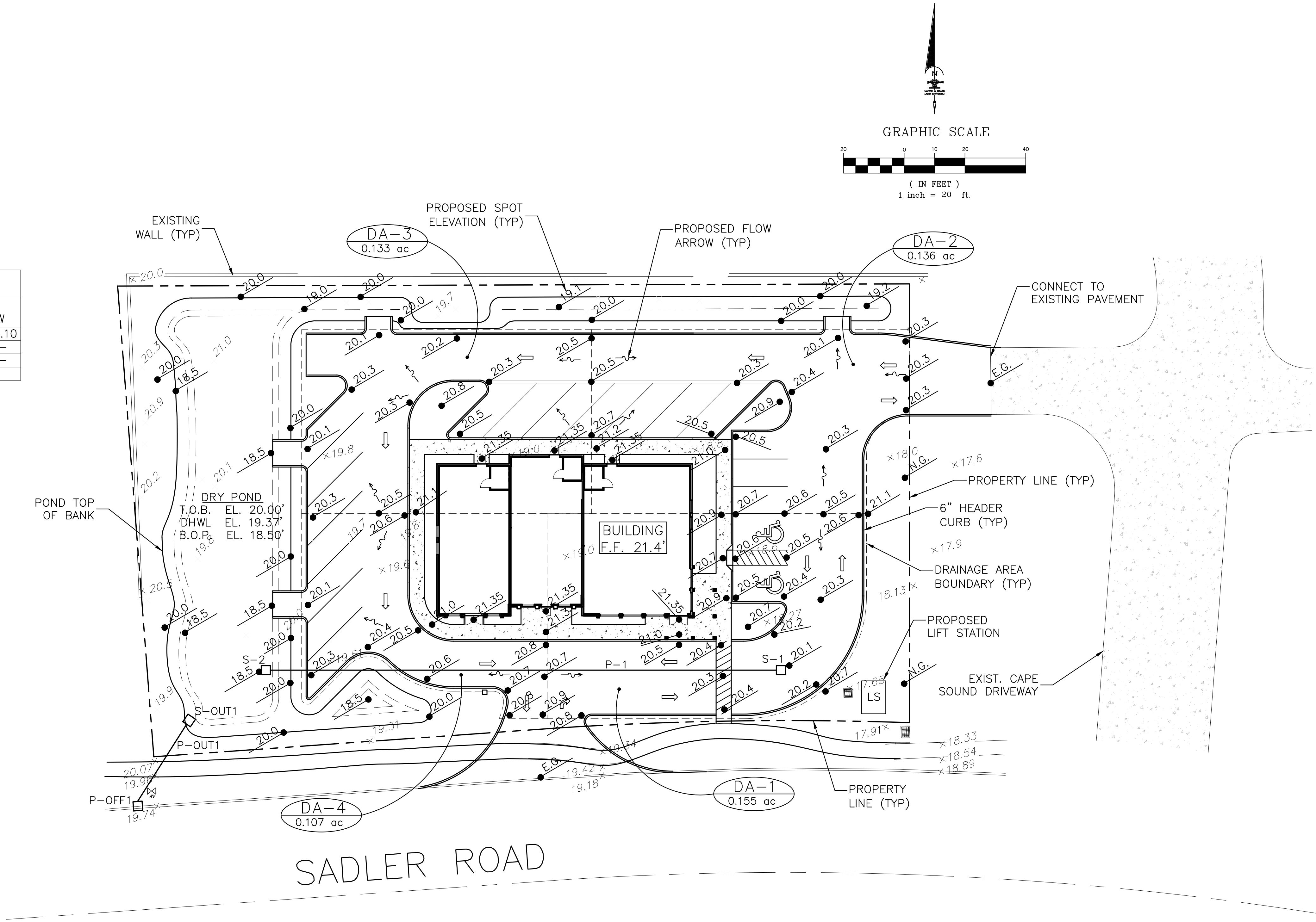
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CRAWFORD JEWELERS/RETAIL
PRELIMINARY BINDING SITE PLAN
SADLER ROAD
FERNANDINA BEACH, FLORIDA

DATE: 10/14/19
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GEOMETRY PLAN
North / Elev Key Sheet
GE-1
Page 4 of 10

STRUCTURE TABLE					
NAME	TYPE	TOP / INLET ELEV.	INVERT ELEVATION		
			N	S	E W
S-1	TYPE C INLET	20.10	-	-	17.10
S-2	TYPE C INLET	18.50	-	-	15.60
S-OUT1	DROP STRUCT.	19.50	-	16.50	-
S-OFF1	EXIST. INLET				

PIPE TABLE					
NAME	FROM	TO	SIZE	LENGTH	MATERIAL
P-1	S-1	S-2	15"	167'	HDPE
P-OUT1	S-OUT1	P-OFF1	15"	25'	HDPE



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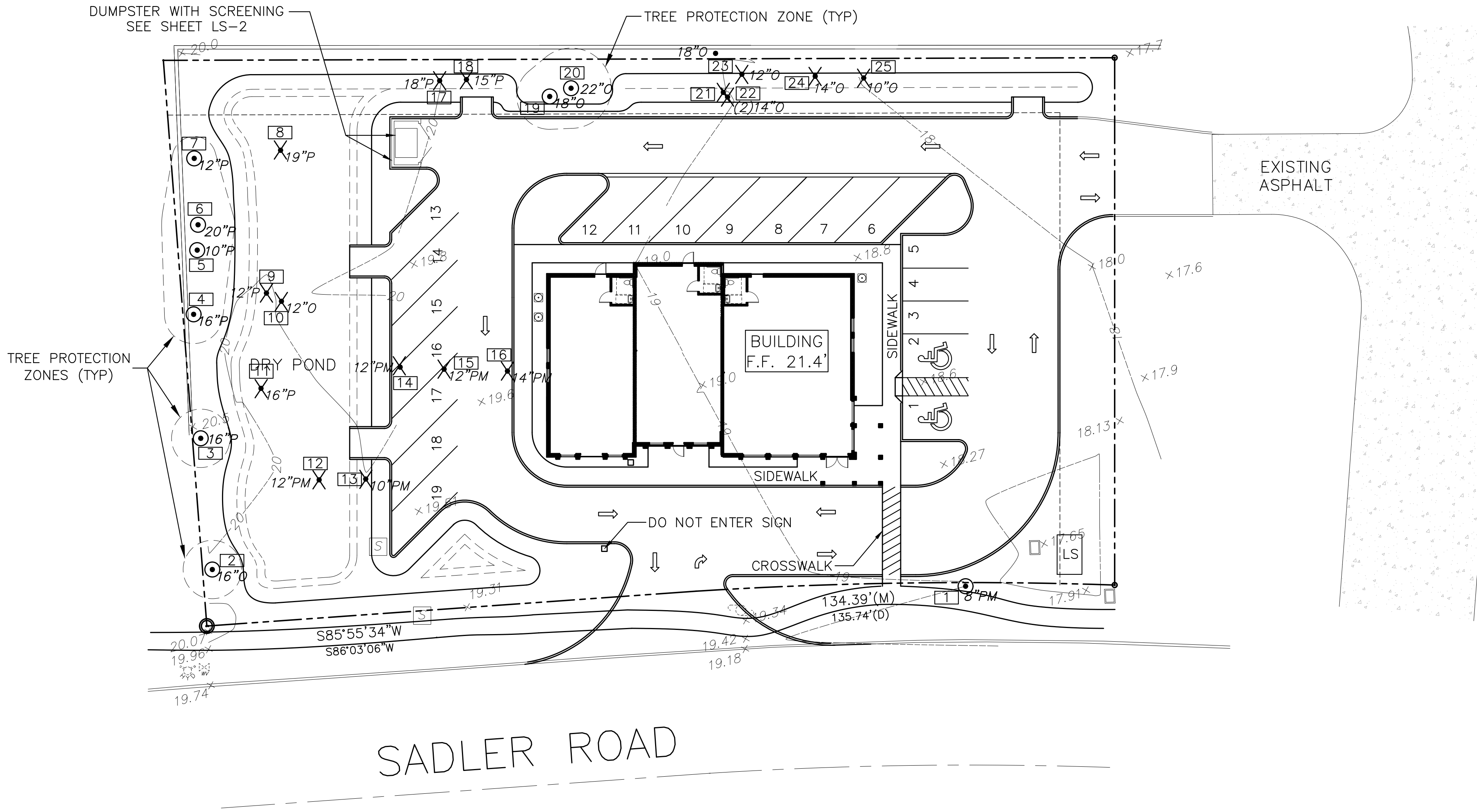
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**CRAWFORD JEWELERS/RETAIL
PRELIMINARY BINDING SITE PLAN**
SADLER ROAD
FERNANDINA BEACH, FLORIDA

TREE PRESERVATION DATA					
TREE ID NO.	SIZE (DBH)	SAVED? (Y/N)	SPECIES	PRESERVATION CREDIT MULTIPLIER	SAVED DBH (INC. PRESERVATION CREDIT)
1	8	Y	PALM	1.50	12.00
2	16	Y	OAK	2	32.00
3	16	Y	PINE	2	32.00
4	16	Y	PINE	2	32.00
5	10	Y	PINE	1.50	15.00
6	20	Y	PINE	3	60.00
7	12	Y	PINE	1.50	18.00
8	19	N	PINE	—	—
9	12	N	PINE	—	—
10	12	N	OAK	—	—
11	16	N	PINE	—	—
12	12	N	PALM	—	—
13	10	N	PALM	—	—
14	12	N	PALM	—	—
15	12	N	PALM	—	—
16	14	N	PALM	—	—
17	18	N	PINE	—	—
18	15	N	PINE	—	—
19	18	Y	OAK	2	36
20	22	Y	OAK	3	66
21	14	N	OAK	—	—
22	14	N	OAK	—	—
23	12	N	OAK	—	—
24	14	Y	OAK	2	28
25	10	N	OAK	—	—
TOTAL	354			TOTAL	331

TREE MITIGATION DATA	
PRE-DEVELOPMENT DBH	354"
DBH SAVED	331"
REQUIRED REPLACEMENT	23"
PROVIDED TREE PLANTING	75"

EXISTING TREE LEGEND		
SYMBOL	DESCRIPTION	QTY.
X	TREE TO BE REMOVED	15
O	TREE TO REMAIN	10
1	TREE ID NO.	—
P	PINE TREE	10
O	OAK TREE	9
PM	PALM TREE	6



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CRAWFORD JEWELERS/RETAIL
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SADLER ROAD
FERNANDINA BEACH, FLORIDA

DATE: 10/14/19
SCALE: 1" = 20'
DRAWING IS REDUCED IF LESS THAN 22" x 34"

TREE MITIGATION PLAN
North / Elev Key Sheet
LS-1
Page 6 of 10

LANDSCAPE BUFFER REQUIREMENTS

PER THE CITY OF FERNANDINA BEACH LAND DEVELOPMENT CODE 4.05.12:

PARCEL ZONING DISTRICT: C-2

NORTHERN PROPERTY LINE

ZONING DISTRICT: R-2

REQUIRED BUFFER: TYPE C

MINIMUM WIDTH: 15'

REQUIRED PLANTS/100':

- 2 SHADE TREES
- 4 UNDERSTORY TREES
- CONTINUOUS UNBROKEN HEDGE

LENGTH: 260'

AVG. PROVIDED BUFFER WIDTH: 15'

PROPOSED PLANTS:

- 5 SHADE TREES (INCLUDING 2 PRESERVED TREES)
- 10 UNDERSTORY TREES
- PROPOSE NO HEDGE, AS THE 6' WALL 2.5' FROM THE PROPERTY LINE ALREADY PROVIDES A SOLID VISUAL SCREEN PER 4.05.07 (E)

EASTERN PROPERTY LINE

ZONING DISTRICT: R-2

REQUIRED BUFFER: TYPE C

MINIMUM WIDTH: 15'

REQUIRED PLANTS/100':

- 2 SHADE TREES
- 4 UNDERSTORY TREES
- CONTINUOUS UNBROKEN HEDGE

LENGTH: 144'

AVG. PROVIDED BUFFER WIDTH: 15'

PROPOSED PLANTS:

- 2 SHADE TREES
- 5 UNDERSTORY TREES
- CONTINUOUS UNBROKEN HEDGE

WEST AND SOUTH PROPERTY LINES

ZONING DISTRICTS: C-2

REQUIRED BUFFER: NONE REQUIRED

LANDSCAPE AREA REQUIREMENTS

TOTAL LOT AREA: 37,636 SF

TOTAL LANDSCAPED AREA: 15,935 SF

TOTAL PARKING AREA: 4,341 SF

TOTAL PARKING LOT LANDSCAPED AREA: 847 SF

MINIMUM LOT LANDSCAPE COVERAGE: 20%

PROPOSED LANDSCAPE COVERAGE: 42%

MINIMUM TREE PLANTING: 1 SHADE TREE/1,500 SF = 25

PROPOSED SHADE TREE PLANTING: 25 (INCLUDING SAVED TREES)

MINIMUM PARKING LOT LANDSCAPE COVERAGE: 10%

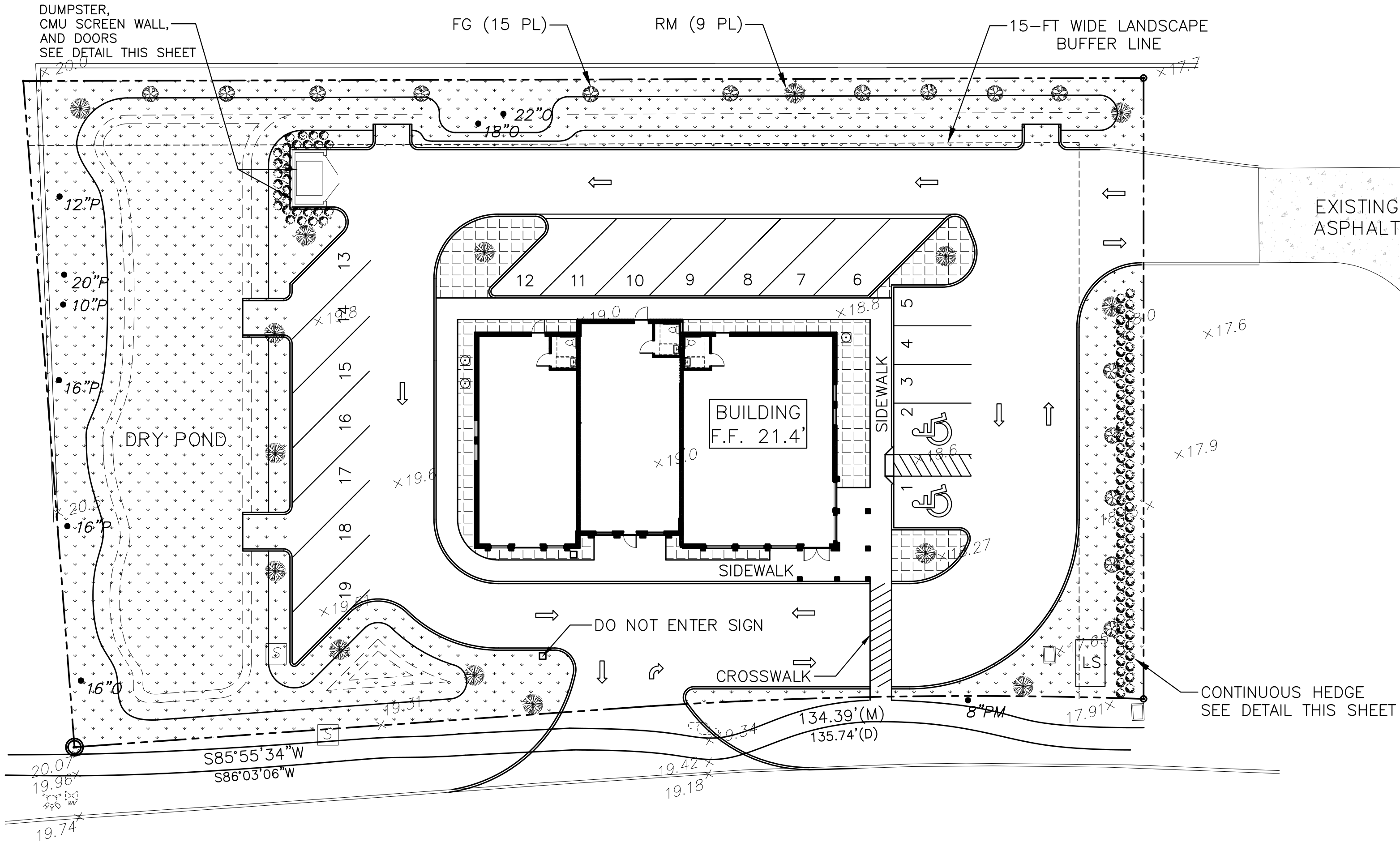
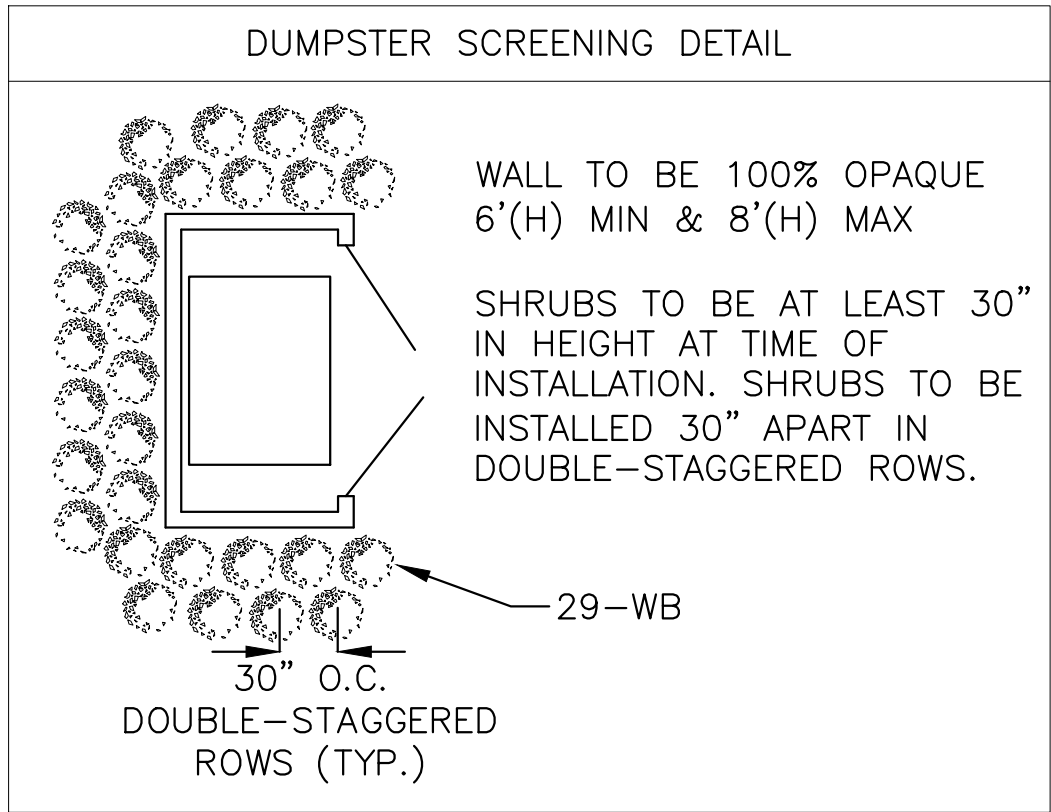
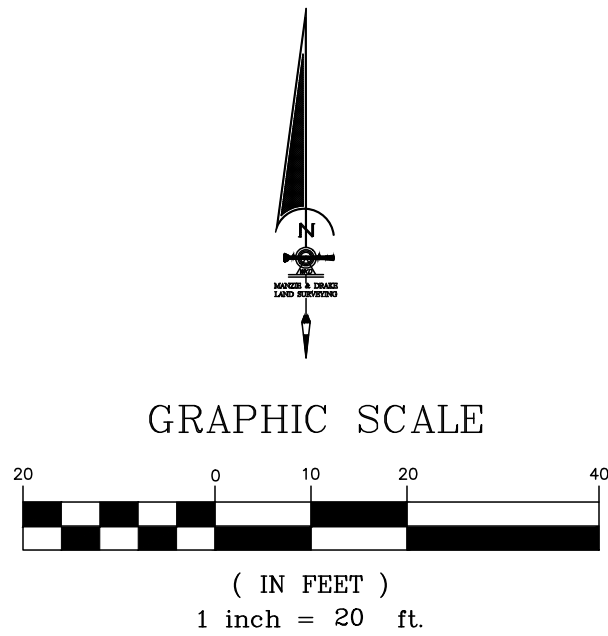
PARKING LOT LANDSCAPE COVERAGE: 20%

LANDSCAPING NOTES

1. PLANT MATERIALS SHALL MEET THE STANDARDS FOR FLORIDA NO.1 OR BETTER, AS SET OUT IN GRADES AND STANDARDS FOR NURSERY PLANTS, DEPARTMENT OF AGRICULTURE, STATE OF FLORIDA.
2. SHRUBS SHALL BE AT LEAST EIGHTEEN (18) INCHES IN HEIGHT AT THE TIME OF INSTALLATION.
3. SHRUBS SHALL BE INSTALLED AT LEAST THIRTY-SIX (36) INCHES APART, MEASURED ON CENTER.
4. ALL SHRUBS AND INTERIOR LANDSCAPING TO RECEIVE 100% IRRIGATION COVERAGE.
5. ALL AREAS SHOWN WITHOUT IMPROVEMENTS AROUND EXISTING TREES SHALL BE LEFT IN THE NATURAL STATE (UNDISTURBED).
6. GRASSED AREAS SHALL BE PLANTED WITH SPECIES NORMALLY GROWN ON PERMANENT LAWNS IN NASSAU COUNTY. GRASSED AREAS MAY BE SODDED, PLUGGED, SPRIGGED, OR SEEDDED, PROVIDED THAT FULL COVERAGE SHALL BE ACHIEVED WITHIN ONE (1) YEAR AFTER PLANTING. SOLID SOD SHALL BE USED IN SWALES OR AREAS SUBJECT TO EROSION. GRASS SOD SHALL BE CLEAN AND REASONABLY FREE OF WEEDS AND NOXIOUS PESTS OR DISEASES. GRASS SEED SHALL BE DELIVERED TO THE JOB SITE IN BAGS WITH FLORIDA DEPARTMENT OF AGRICULTURE TAGS ATTACHED INDICATING THE QUALITY CONTROL PROGRAM.
7. INSTALLATION AND MAINTENANCE OF ALL PLANTINGS SHALL BE IN ACCORDANCE WITH ARTICLES 4.05.03 (D) AND 4.05.03 (E) OF THE CITY OF FERNANDINA BEACH LAND DEVELOPMENT CODE.

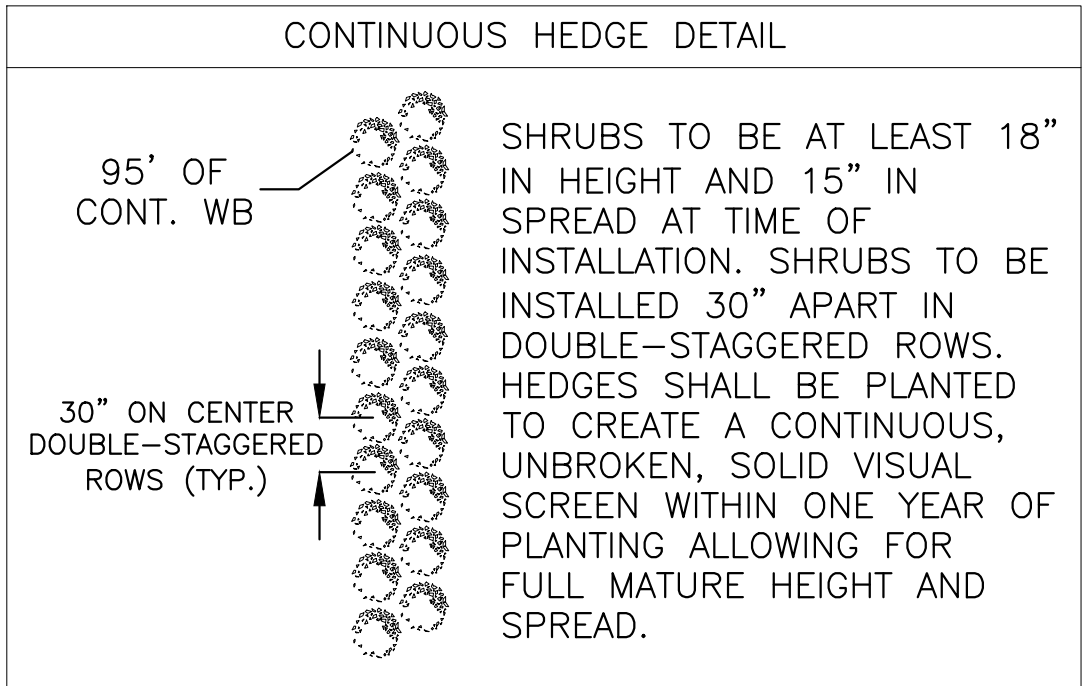
MAINTENANCE REQUIREMENTS

1. ALL PLANTINGS SHALL BE CONTINUALLY MAINTAINED IN AN ATTRACTIVE AND HEALTHY CONDITION. MAINTENANCE SHALL INCLUDE, BUT NOT BE LIMITED TO, WATERING, TILLING, FERTILIZING AND SPRAYING, MOWING, WEEDING, REMOVAL OF LITTER AND DEAD PLANT MATERIAL, AND NECESSARY PRUNING AND TRIMMING.
2. REQUIRED PLANTS THAT BECOME DISEASED OR DIE SHALL BE REPLACED NOT LATER THAN THREE (3) MONTHS FOLLOWING THE LOSS OF THE PLANT.
3. THE PROPERTY OWNER IS RESPONSIBLE FOR THE MAINTENANCE OF ALL REQUIRED LANDSCAPING IN A HEALTHY, THRIVING CONDITION.
4. TREES SHALL BE PRUNED ONLY AS NECESSARY TO PROMOTE HEALTHY GROWTH OR TO AVOID POWER LINES. TREES SHALL NOT BE SEVERELY PRUNED OR "HATRACKED" IN ORDER TO PERMANENTLY MAINTAIN GROWTH AT A REDUCED HEIGHT. PRUNING SHALL COMPLY WITH CURRENT NATIONAL ARBORISTS' SOCIETY STANDARDS.



SADLER ROAD

NEW PLANT/MATERIAL SCHEDULE				
SYMBOL	QTY.	KEY	SPECIES	SIZE/REMARKS
	15	RM	ACER RUBRUM RED MAPLE	2.5" DBH AND 8' HT. MIN.
	15	FG	CORNUS FLORIDA FLOWERING DOGWOOD	2.5" DBH AND 8' HT. MIN.
	~97 95' OF HEDGE 21' OF DUMPSTER SCREENING	WB	VIBURNUM OBOVATUM WALTER'S VIBURNUM	18" HT AND 15" SPREAD MIN. FOR HEDGE 30" HT MIN. FOR 21 SCREENING SHRUBS
	14,529 SF	-	ERIMOCHLOA OPHUIUROIDES CENTIPEDE GRASS	
	1,553 SF	-	MUHLENBERGIA CAPILLARIS MUHLY GRASS	



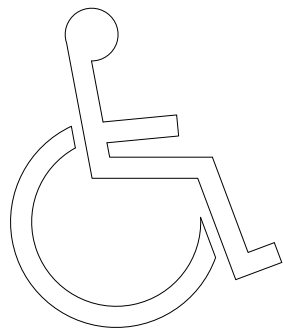
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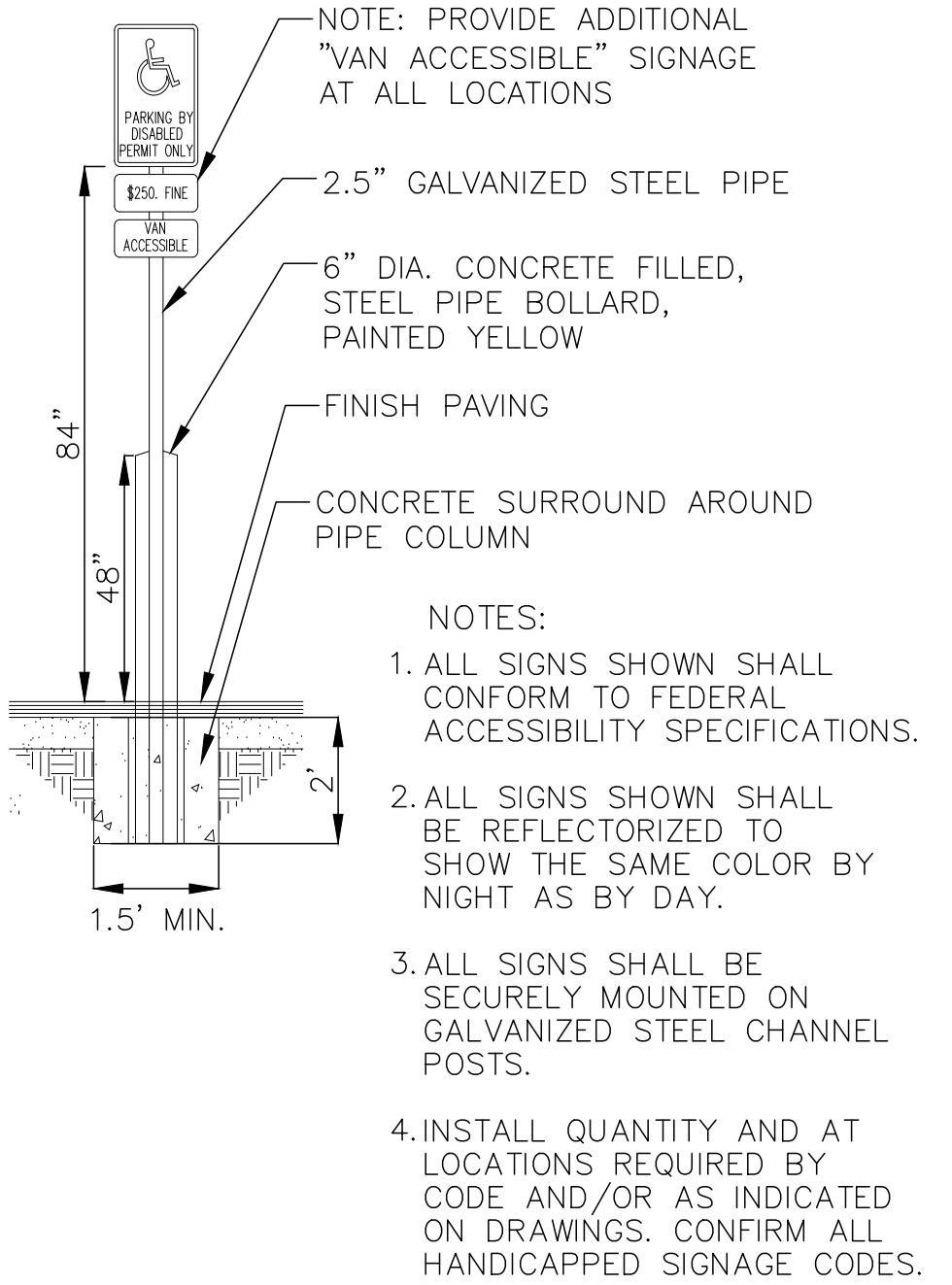
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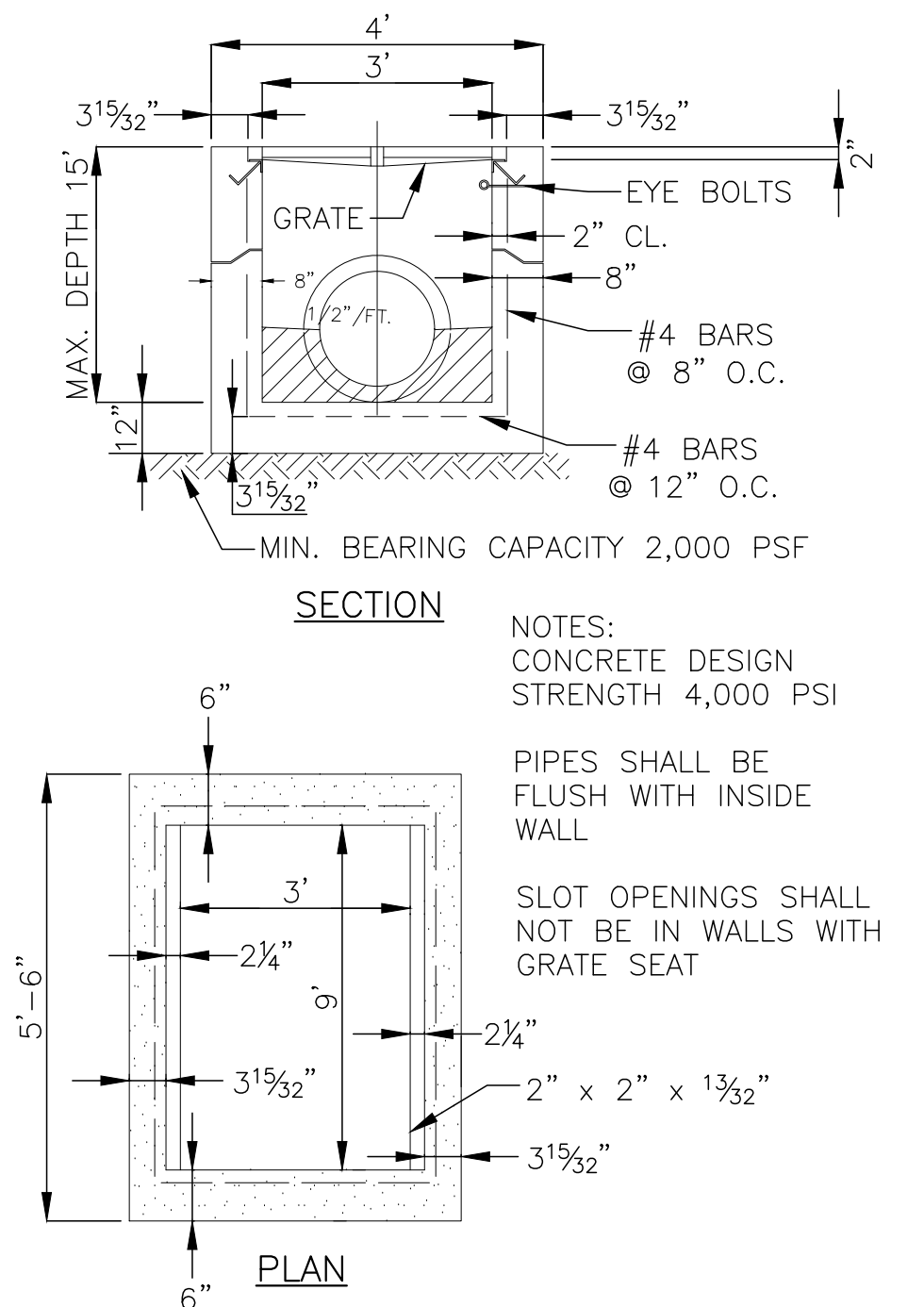


NOTE: PAINT SYMBOL ABOVE ONTO PAVED SURFACE WITH (2) COATS OF HANDI-CAP BLUE PAINT MANUFACTURED AS PER DEPT. OF TRANS. SPECS.

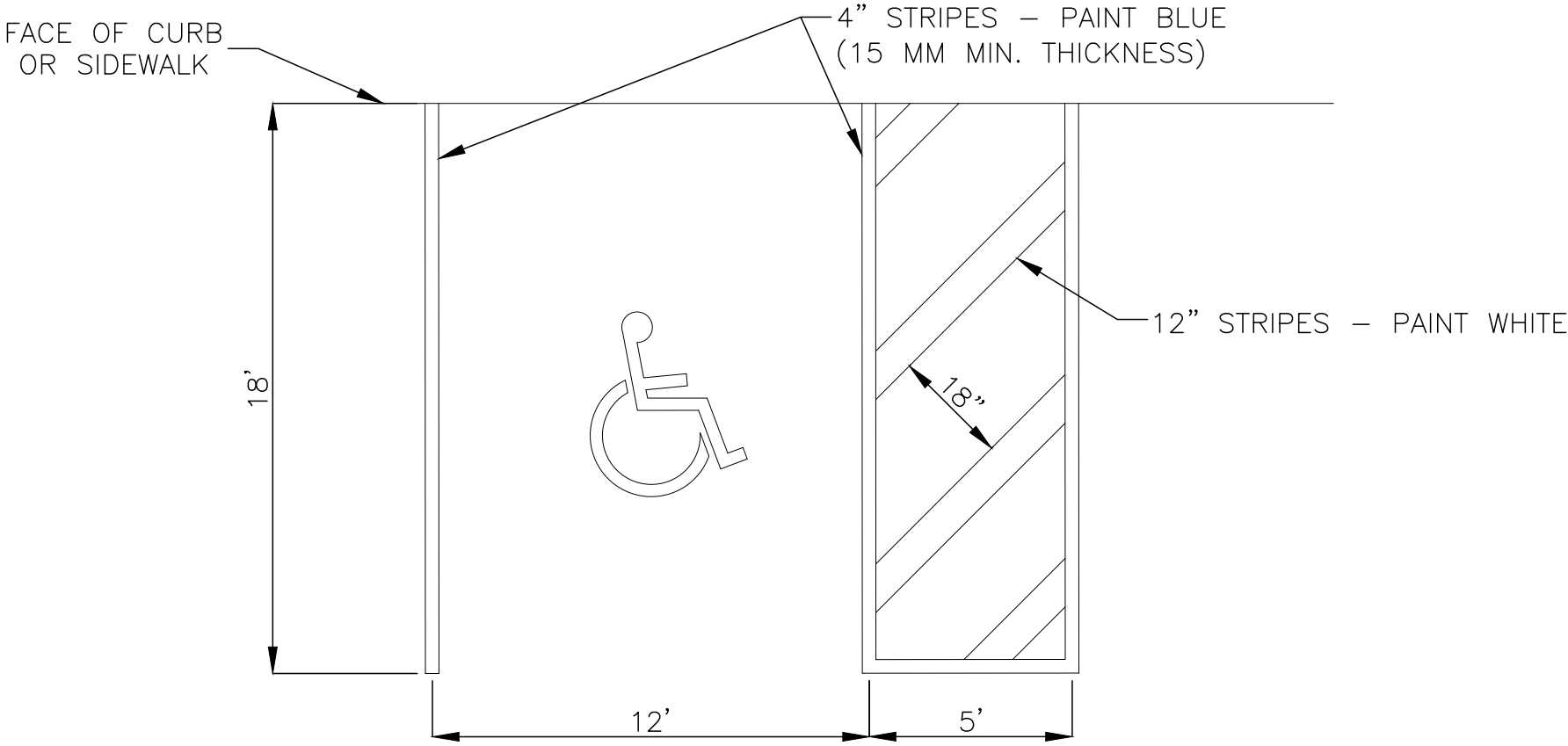
HANDICAPPED SYMBOL



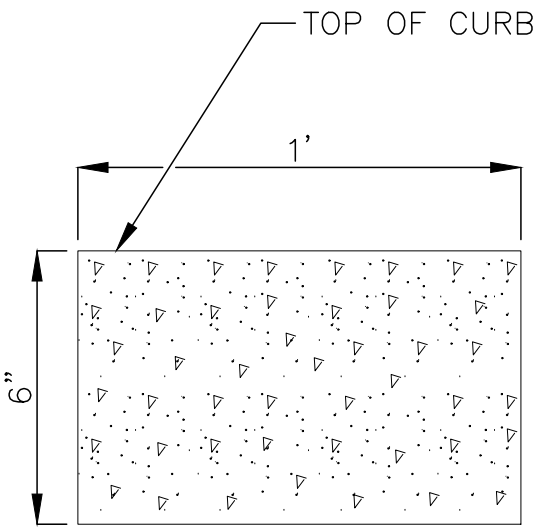
HANDICAP SIGN DETAIL



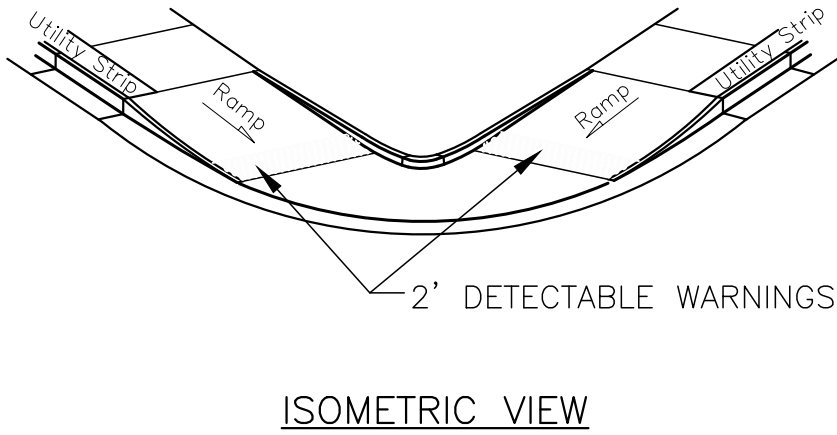
TYPE C INLET DETAIL



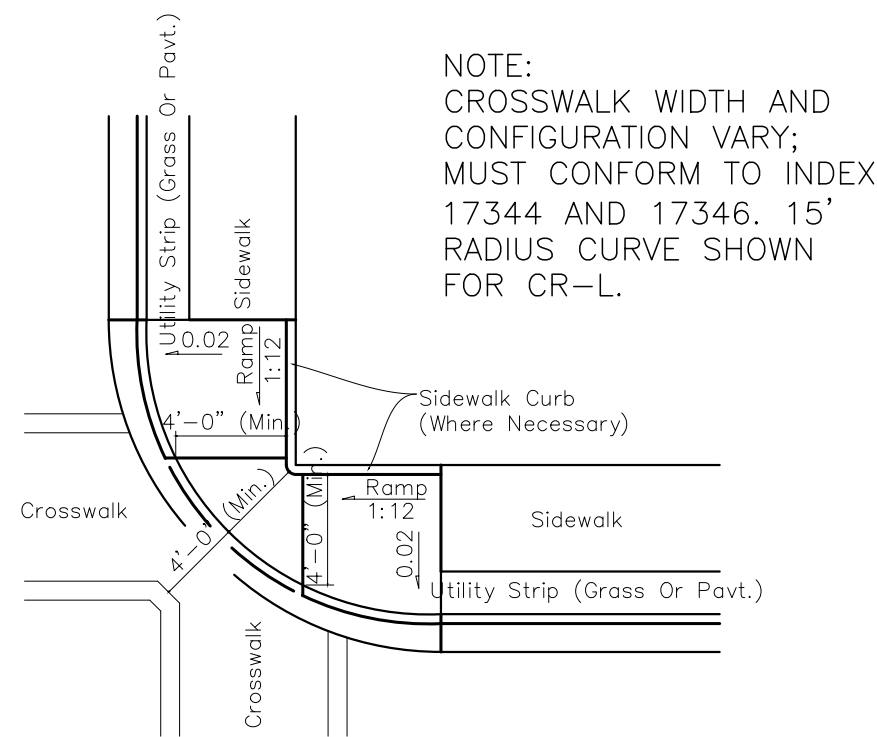
TYPICAL DISABLED PARKING



RIBBON CURB DETAIL

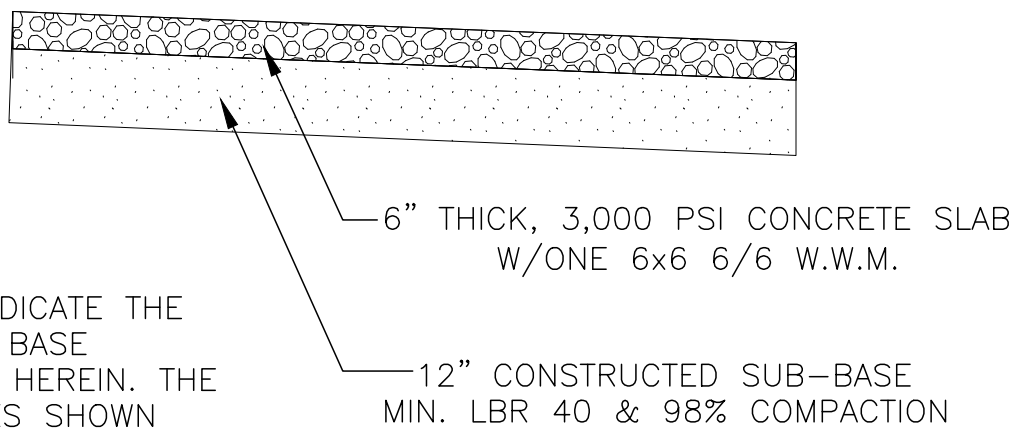


ISOMETRIC VIEW



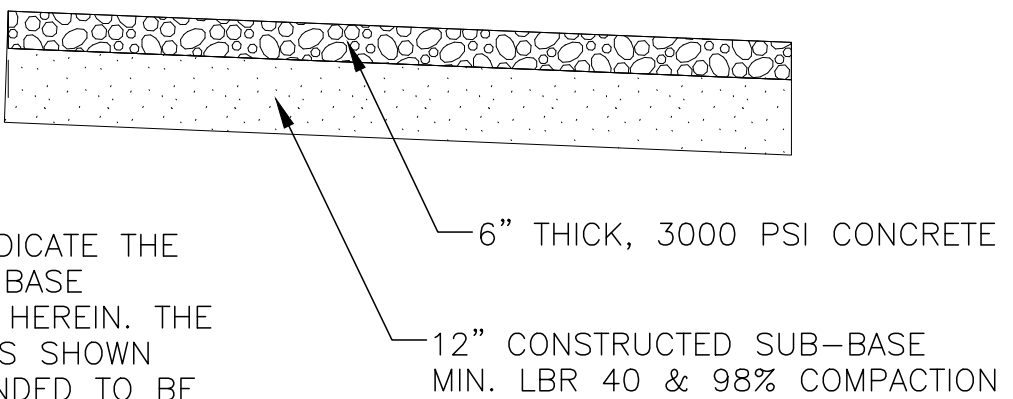
PLAN VIEW

CURB RAMP DETAIL



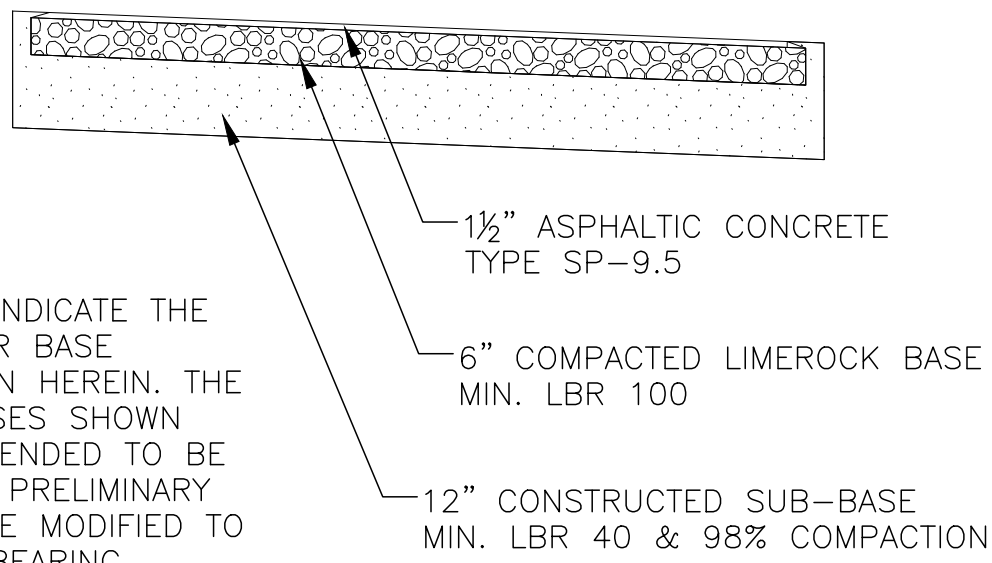
NOTE: SOIL ANALYSIS MAY INDICATE THE NEED FOR A THICKER BASE COURSE THAN SHOWN HEREIN. THE PAVEMENT THICKNESSES SHOWN HEREIN ARE NOT INTENDED TO BE ABSOLUTE, BUT ARE PRELIMINARY CRITERIA AND MAY BE MODIFIED TO ACCOMMODATE THE BEARING CAPACITIES OF VARIOUS SUBGRADES.

DUMPSTER PAD DETAIL



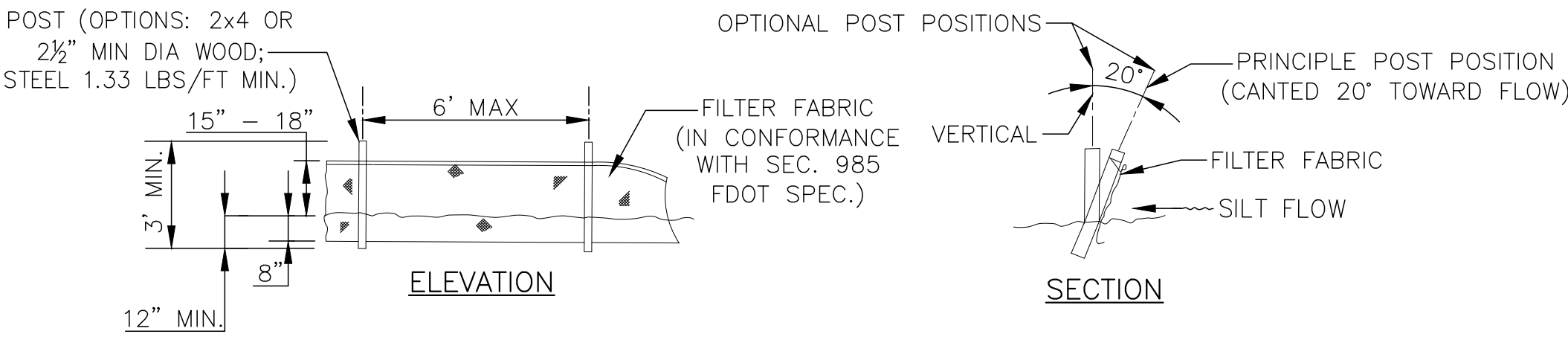
NOTE: SOIL ANALYSIS MAY INDICATE THE NEED FOR A THICKER BASE COURSE THAN SHOWN HEREIN. THE PAVEMENT THICKNESSES SHOWN HEREIN ARE NOT INTENDED TO BE ABSOLUTE, BUT ARE PRELIMINARY CRITERIA AND MAY BE MODIFIED TO ACCOMMODATE THE BEARING CAPACITIES OF VARIOUS SUBGRADES.

DRIVEWAY CONNECTION DETAIL

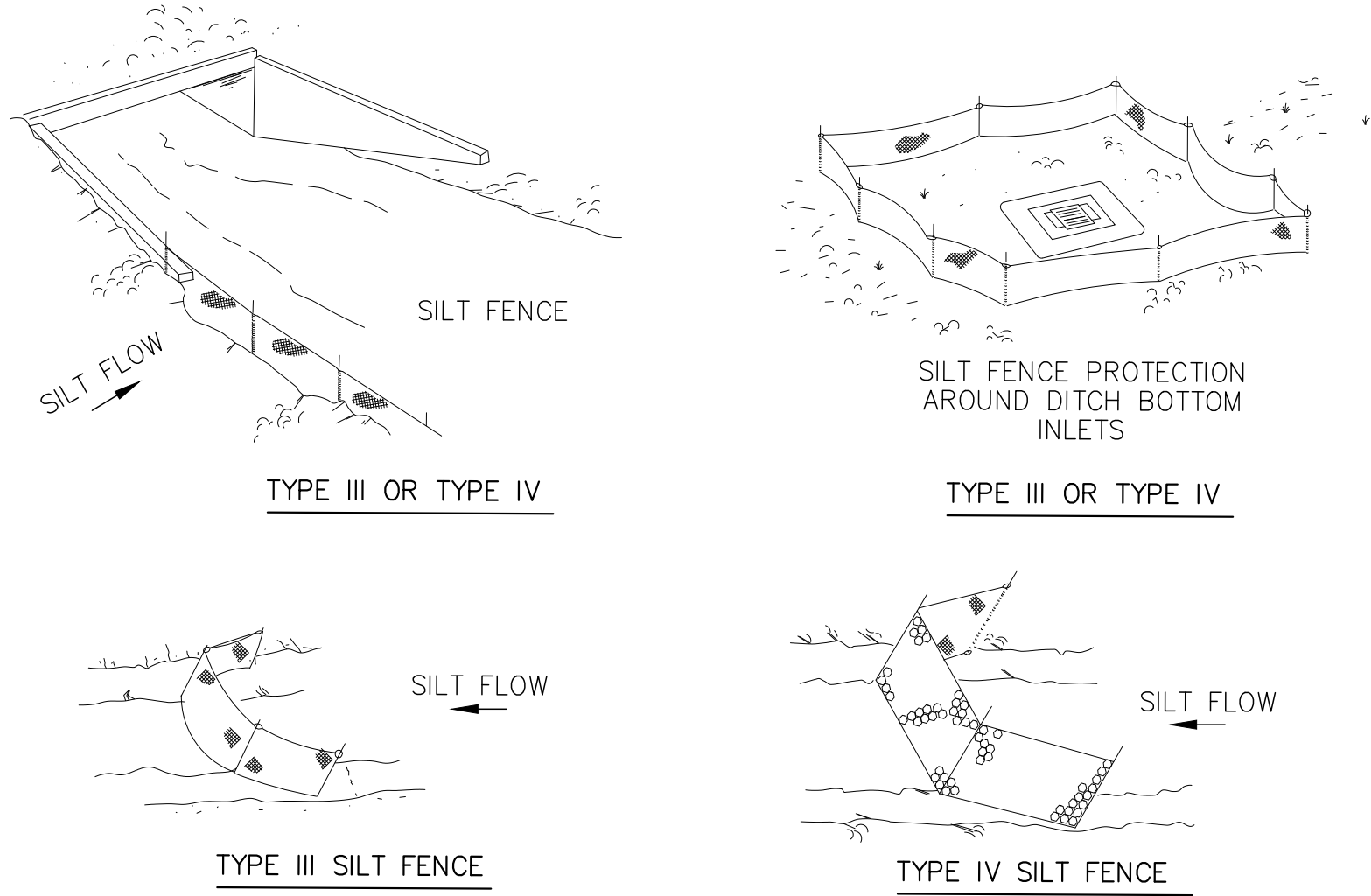


NOTE: SOIL ANALYSIS MAY INDICATE THE NEED FOR A THICKER BASE COURSE THAN SHOWN HEREIN. THE PAVEMENT THICKNESSES SHOWN HEREIN ARE NOT INTENDED TO BE ABSOLUTE, BUT ARE PRELIMINARY CRITERIA AND MAY BE MODIFIED TO ACCOMMODATE THE BEARING CAPACITIES OF VARIOUS SUBGRADES.

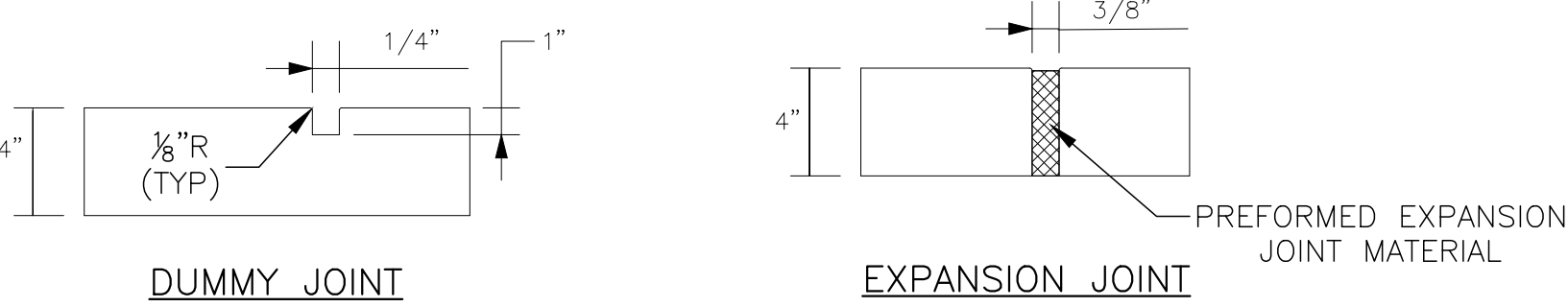
TYPICAL PAVEMENT DETAILS



TYPE III SILT FENCE



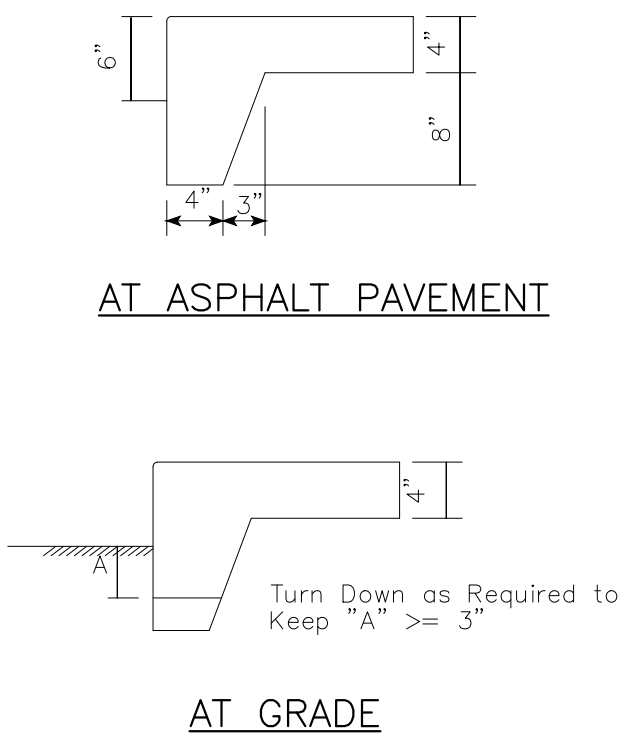
SILT FENCE APPLICATIONS



DUMMY JOINT

EXPANSION JOINT

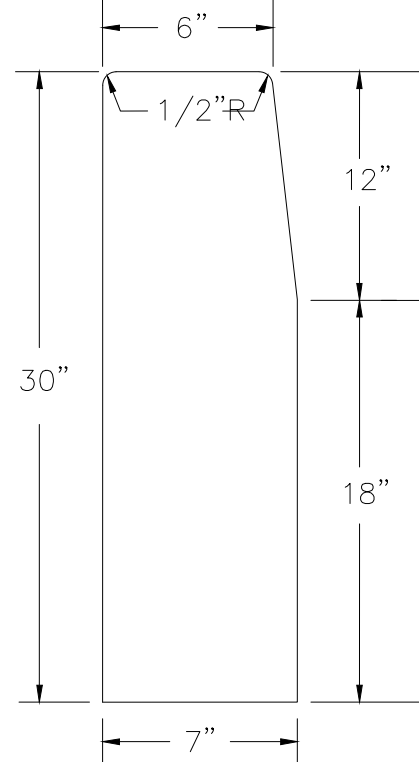
SIDEWALK JOINT DETAILS



AT ASPHALT PAVEMENT

AT GRADE

SIDEWALK TURNDOWN DETAILS



12" HEADER CURB DETAIL

NOTE: SOME DETAILS IN THESE DRAWINGS ARE TO BE CONSIDERED TYPICAL AND MAY NOT BE CALLED OUT ON PLANS. CONTRACTOR SHALL BECOME FAMILIAR WITH AND FOLLOW ALL DETAILS DURING CONSTRUCTION IN ALL TYPICAL AREAS.

REGISTERED DESIGN PROFESSIONAL

ITEM A 10/10/19 TRC SUBMITTAL #1

DATE 10/10/19

REV A

GILLETTE & ASSOCIATES, INC.
CIVIL, ENVIRONMENTAL, MECHANICAL, & STRUCTURAL ENGINEERING
CERTIFICATE OF AUTHORIZATION NO. 9332
ASA R. GILLETTE, P.E. • FL. PE. NO. 56177

20 S. 4th STREET * FERNANDINA BEACH, FL 32034
PHONE: 904-261-8819 * www.gilletteassociates.com

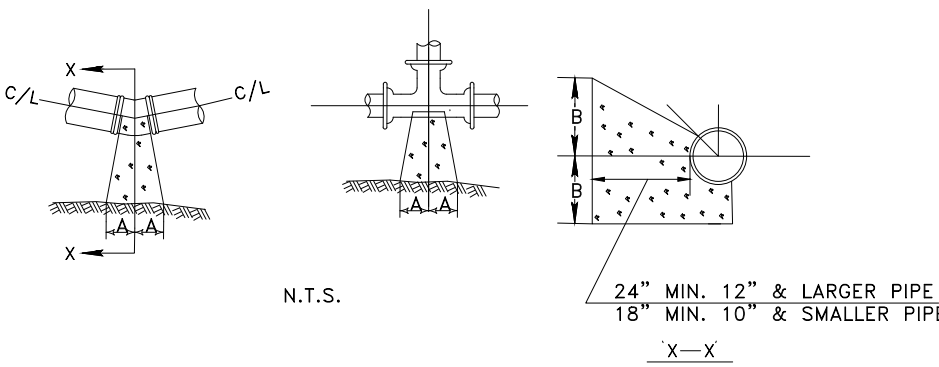
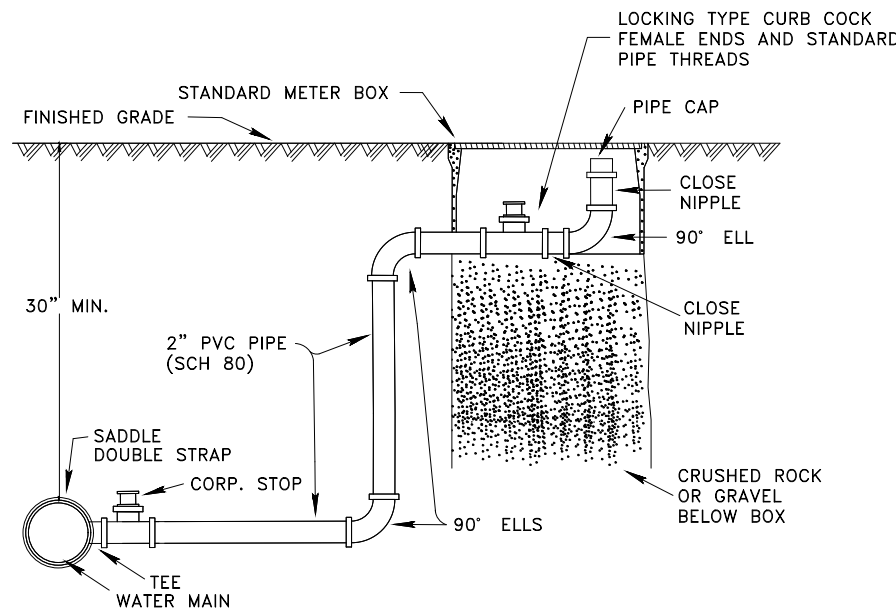
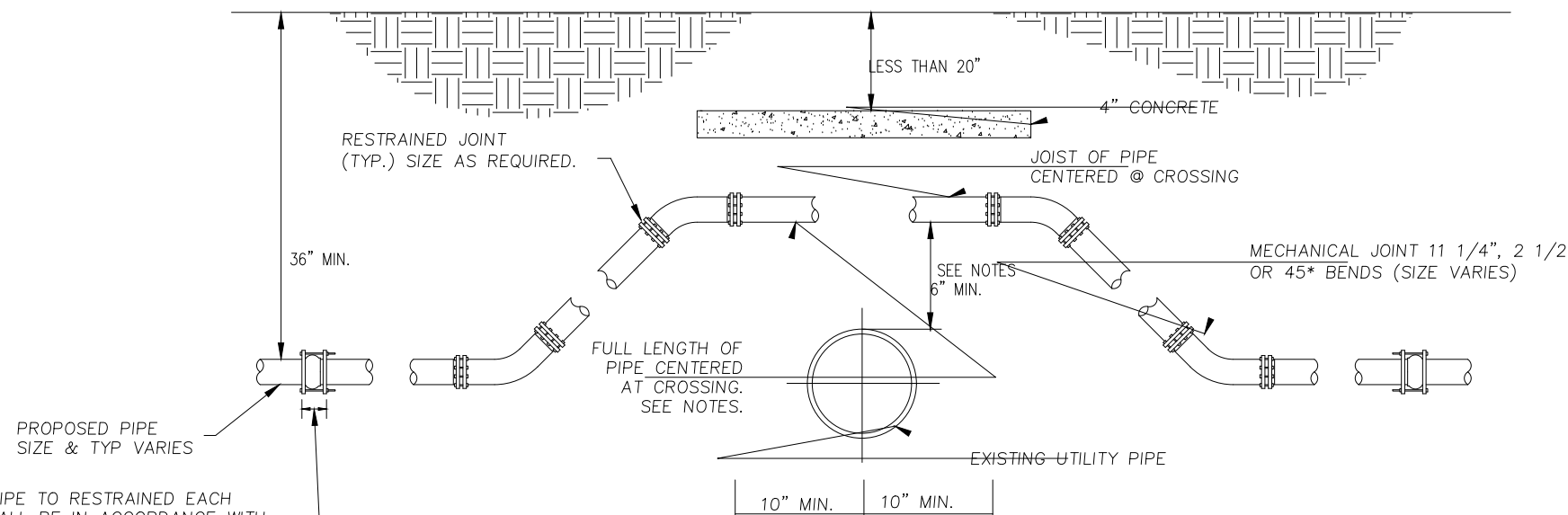
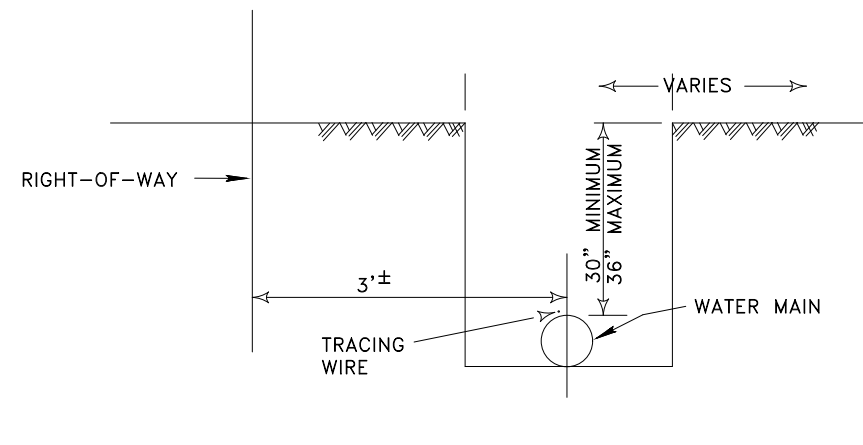
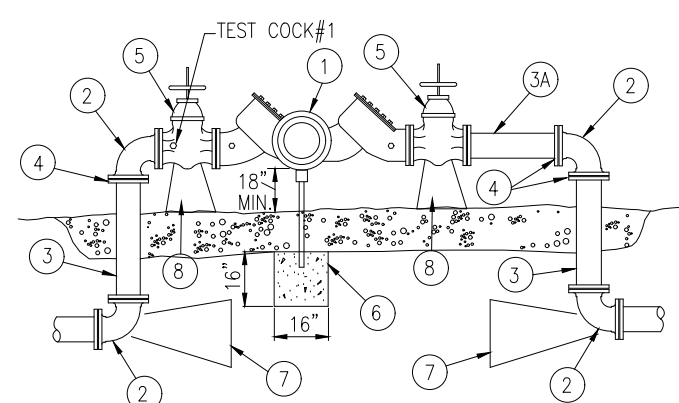
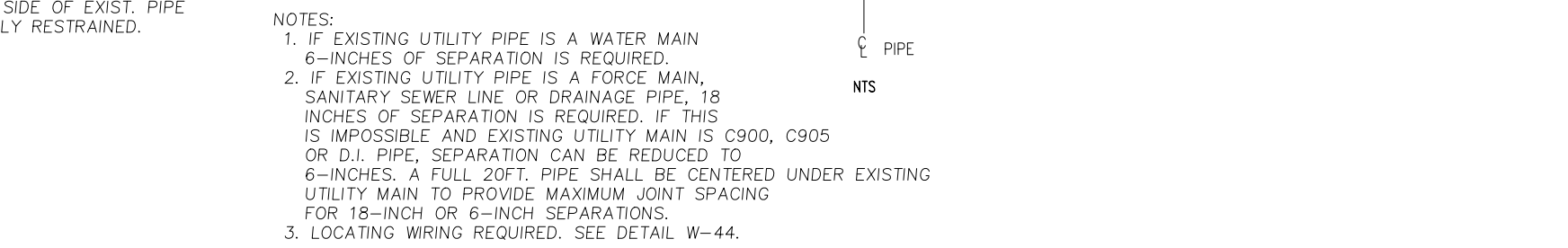
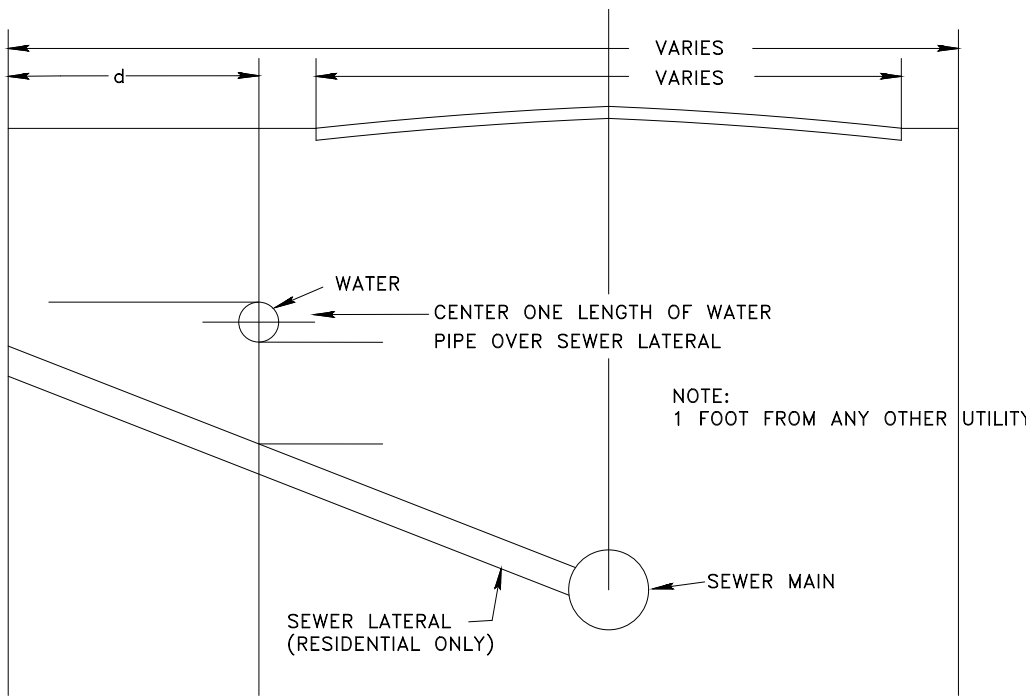
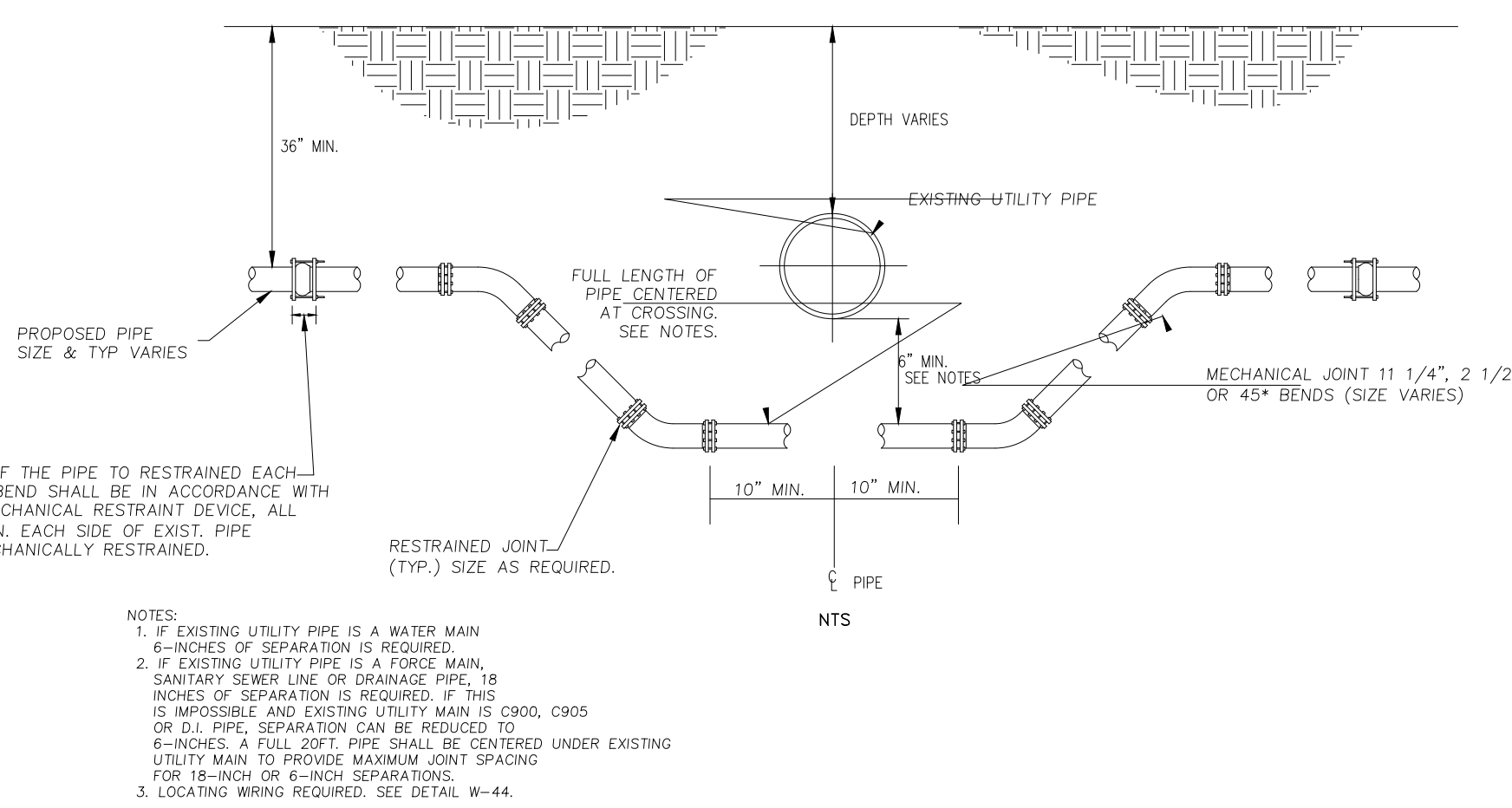
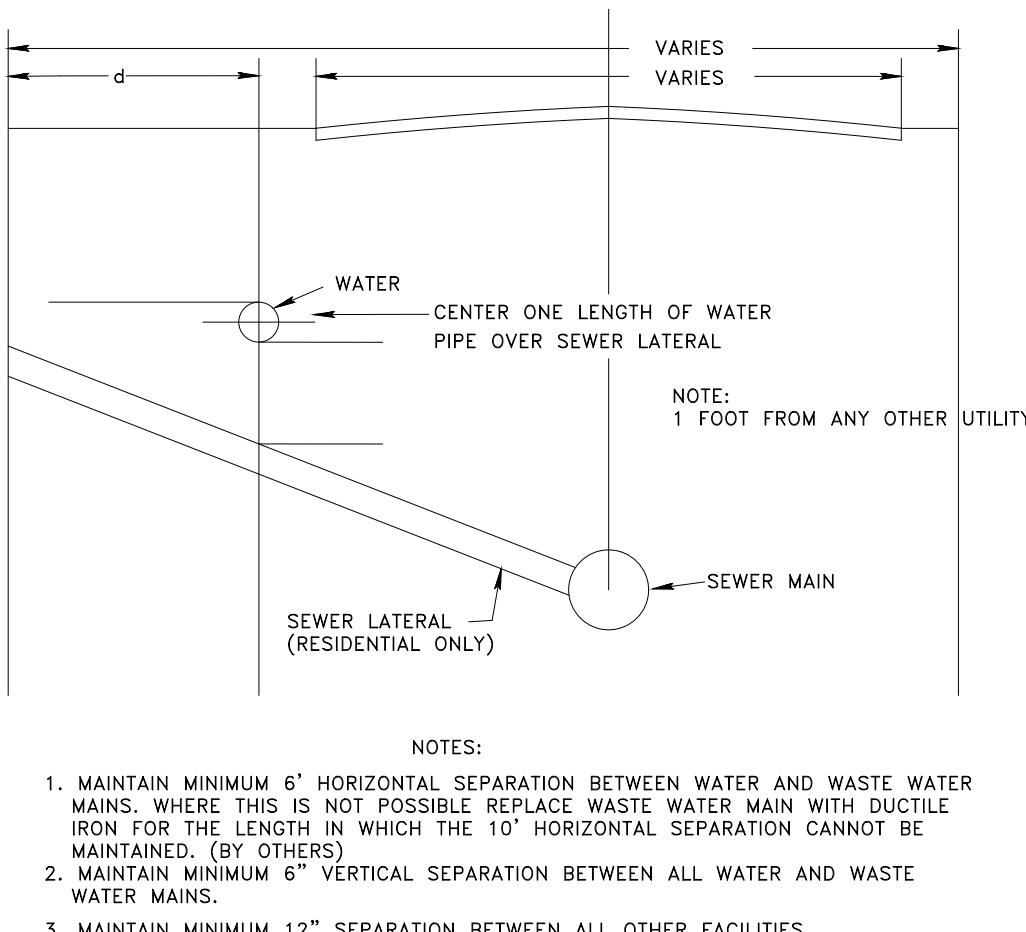
CRAWFORD JEWELERS/RETAIL
PRELIMINARY BINDING SITE PLAN
SADLER ROAD
FERNANDINA BEACH, FLORIDA

DATE: 10/14/19
SCALE: NONE
DRAWING IS REDUCED IF LESS THAN 22" x 34"

MISCELLANEOUS DETAILS

North / Elev Key Sheet
DT-1

Page 8 of 10

 N.T.S. 24" MIN. 12" & LARGER PIPE 18" MIN. 10" & SMALLER PIPE X-X <table><tr><th>SIZE</th><th colspan="3">1/4 BENDS</th><th colspan="3">CU FT</th><th colspan="3">1/8 BENDS</th><th colspan="3">CU FT</th><th colspan="3">1/16 BENDS</th><th colspan="3">CU FT</th><th colspan="3">TEE</th><th colspan="3">CU FT</th></tr><tr><th></th><th>A</th><th>B</th><th>CONC.</th><th>A</th><th>B</th><th>CONC.</th><th>A</th><th>B</th><th>CONC.</th><th>A</th><th>B</th><th>CONC.</th><th>A</th><th>B</th><th>CONC.</th><th>A</th><th>B</th><th>CONC.</th><th>A</th><th>B</th><th>CONC.</th></tr><tr><td>6"</td><td>16"</td><td>10"</td><td>3.2</td><td>9"</td><td>10"</td><td>3.0</td><td>6"</td><td>8"</td><td>1.3</td><td>6"</td><td>10"</td><td>12"</td><td>3.5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8"</td><td>22"</td><td>13"</td><td>7.2</td><td>12"</td><td>13"</td><td>3.7</td><td>8"</td><td>10"</td><td>2.1</td><td>8"</td><td>13"</td><td>16"</td><td>5.4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10"</td><td>26"</td><td>17"</td><td>11.5</td><td>14"</td><td>17"</td><td>5.9</td><td>10"</td><td>13"</td><td>3.6</td><td>10"</td><td>18"</td><td>20"</td><td>9.4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>12"</td><td>29"</td><td>21"</td><td>21.1</td><td>16"</td><td>21"</td><td>8.6</td><td>11"</td><td>16"</td><td>6.6</td><td>12"</td><td>18"</td><td>24"</td><td>16.6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>14"</td><td>35"</td><td>24"</td><td>29.8</td><td>19"</td><td>24"</td><td>14.9</td><td>12"</td><td>20"</td><td>8.9</td><td>14"</td><td>22"</td><td>27"</td><td>23.2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>16"</td><td>38"</td><td>27"</td><td>37.8</td><td>21"</td><td>27"</td><td>18.1</td><td>12"</td><td>24"</td><td>11.2</td><td>16"</td><td>24"</td><td>30"</td><td>28.6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>20"</td><td>47"</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>20"</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> NOTE: 1. ALL BEARING SURFACES TO BE CARRIED TO UNDISTURBED SOIL. 2. THESE TABLES SHOW MINIMUM SIZE THRUST BLOCKS FOR GOOD SOIL, (A-1 THROUGH A-3, CLEAN SAND AND GRAVELS) 3. POOR SOIL (A-4 THROUGH A-8, SILTY SOILS, CLAYS, MUCK AND PEAT) WILL REQUIRE LARGER THRUST BLOCKS.	SIZE	1/4 BENDS			CU FT			1/8 BENDS			CU FT			1/16 BENDS			CU FT			TEE			CU FT				A	B	CONC.	A	B	CONC.	A	B	CONC.	A	B	CONC.	A	B	CONC.	A	B	CONC.	A	B	CONC.	6"	16"	10"	3.2	9"	10"	3.0	6"	8"	1.3	6"	10"	12"	3.5									8"	22"	13"	7.2	12"	13"	3.7	8"	10"	2.1	8"	13"	16"	5.4									10"	26"	17"	11.5	14"	17"	5.9	10"	13"	3.6	10"	18"	20"	9.4									12"	29"	21"	21.1	16"	21"	8.6	11"	16"	6.6	12"	18"	24"	16.6									14"	35"	24"	29.8	19"	24"	14.9	12"	20"	8.9	14"	22"	27"	23.2									16"	38"	27"	37.8	21"	27"	18.1	12"	24"	11.2	16"	24"	30"	28.6									20"	47"									20"												 NTS	TWO RODS ON ALL SIX INCH (6") PIPE THREE RODS ON ALL EIGHT INCH (8") PIPE FOUR RODS ON ALL TEN AND TWELVE INCH (10" & 12") PIPE TIE RODS <table><tr><th colspan="10">MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)</th></tr><tr><th>PIPE SIZE</th><th>11 1/4</th><th>22 1/2</th><th>45</th><th>90</th><th>TEE</th><th>VALVE</th><th>CAP</th><th>REDUCER</th><th></th></tr><tr><td>4</td><td>2</td><td>4</td><td>7</td><td>18</td><td>20</td><td>39</td><td>39</td><td>N/A</td><td></td></tr><tr><td>6</td><td>2</td><td>5</td><td>10</td><td>25</td><td>20</td><td>55</td><td>55</td><td>28</td><td></td></tr><tr><td>8</td><td>3</td><td>6</td><td>13</td><td>32</td><td>20</td><td>72</td><td>72</td><td>30</td><td></td></tr><tr><td>10</td><td>4</td><td>8</td><td>16</td><td>38</td><td>20</td><td>86</td><td>86</td><td>29</td><td></td></tr><tr><td>12</td><td>4</td><td>9</td><td>19</td><td>45</td><td>20</td><td>102</td><td>102</td><td>50</td><td></td></tr><tr><td>16</td><td>6</td><td>11</td><td>23</td><td>57</td><td>20</td><td>131</td><td>131</td><td>30</td><td></td></tr></table>	MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)										PIPE SIZE	11 1/4	22 1/2	45	90	TEE	VALVE	CAP	REDUCER		4	2	4	7	18	20	39	39	N/A		6	2	5	10	25	20	55	55	28		8	3	6	13	32	20	72	72	30		10	4	8	16	38	20	86	86	29		12	4	9	19	45	20	102	102	50		16	6	11	23	57	20	131	131	30	
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THRUST BLOCKS FOR BENDS & TEE'S  NTS	FLUSHING VALVE  NTS	BELL RESTRAINT REQUIREMENTS <table><tr><th colspan="10">MATERIALS</th></tr><tr><th>ITEM</th><th>QUANT.</th><th>DESCRIPTION</th></tr><tr><td>1</td><td>1</td><td>2.5"-10" VALVE, DOUBLE CHECK OR REDUCED PRESSURE</td></tr><tr><td>2</td><td>4</td><td>2.5"-10" BEND - 90° F-F</td></tr><tr><td>3</td><td>2</td><td>2.5"-10" D.I.P. (48" LONG) F-PE</td></tr><tr><td>3A</td><td>1</td><td>2.5"-10" D.I.P. (24" LONG) F-PE (OPT.X)</td></tr><tr><td>4</td><td>3</td><td>2.5"-10" FLANGE, D.I.P.</td></tr><tr><td>5</td><td>2</td><td>2.5"-10" VALVE, GATE, D.I., F-F, OS+Y (RESILIENT SEAT)</td></tr><tr><td>6</td><td>1</td><td>2" IRON PIPE/CONCRETE FOUNDATION</td></tr><tr><td>7</td><td>2</td><td>THRUST BLOCK</td></tr><tr><td>8</td><td>2</td><td>SUPPORT BLOCKING UNDER VALVES (6" AND LARGER SIZES)</td></tr></table> LARGE WATER SERVICE DOUBLE CHECK AND REDUCED PRESSURE BACKFLOW PREVENTION SINGLE SERVICE: 2 1/2" - 10"  N.T.S.	MATERIALS										ITEM	QUANT.	DESCRIPTION	1	1	2.5"-10" VALVE, DOUBLE CHECK OR REDUCED PRESSURE	2	4	2.5"-10" BEND - 90° F-F	3	2	2.5"-10" D.I.P. (48" LONG) F-PE	3A	1	2.5"-10" D.I.P. (24" LONG) F-PE (OPT.X)	4	3	2.5"-10" FLANGE, D.I.P.	5	2	2.5"-10" VALVE, GATE, D.I., F-F, OS+Y (RESILIENT SEAT)	6	1	2" IRON PIPE/CONCRETE FOUNDATION	7	2	THRUST BLOCK	8	2	SUPPORT BLOCKING UNDER VALVES (6" AND LARGER SIZES)																																																																																																																																																																																																																																																	
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UTILITY CONFLICT DETAIL "A"  NTS	TRENCH DETAILS  NTS	BACKFLOW PREVENTER CONTRACTORS ARE REQUIRED TO PAINT NEW HYDRANTS SAFETY YELLOW AND MARK HYDRANTS. THE TOPS AND NOZZLE CAPS SHALL BE PAINTED WITH THE FOLLOWING CAPACITY INDICATOR COLOR SCHEME: <table><tr><th>COLOR</th><th>CAPACITY</th></tr><tr><td>BLUE (SW4079)</td><td>1500GPM AND HIGHER</td></tr><tr><td>GREEN (SW4085)</td><td>1000-1499 GPM</td></tr><tr><td>ORANGE (SW4083)</td><td>500-999 GPM</td></tr><tr><td>RED (SW4081)</td><td>LESS THAN 500 GPM</td></tr></table> IT IS REQUIRED THAT ALL NEW AND RELOCATED WATER MAINS BE PRESSURE TESTED AND LEAKAGE TESTED IN ACCORDANCE WITH AWWA STANDARD C600. IT IS REQUIRED THAT ALL NEW AND RELOCATED WATER MAINS BE DISINFECTED IN ACCORDANCE WITH AWWA STANDARD C651 AND RULE 62-555.345, F.A.C.. ALL WATER MAINS WILL BE CONSTRUCTED WITH BLUE C900-DR25 PIPE ALL WATER SERVICES WILL CONSTRUCTED WITH WHITE PVC SCHEDULE 80 PIPE. BLUE SPRAY PAINT WILL BE APPLIED TO THE TOP SURFACE. JOINT RESTRAINERS MAY BE USED IN PLACE OF THRUST BLOCKS ON C900, DR25 PIPE. WITH APPROVAL OF THE CITY UTILITIES DEPARTMENT.	COLOR	CAPACITY	BLUE (SW4079)	1500GPM AND HIGHER	GREEN (SW4085)	1000-1499 GPM	ORANGE (SW4083)	500-999 GPM	RED (SW4081)	LESS THAN 500 GPM																																																																																																																																																																																																																																																																															
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ORANGE (SW4083)	500-999 GPM																																																																																																																																																																																																																																																																																										
RED (SW4081)	LESS THAN 500 GPM																																																																																																																																																																																																																																																																																										
UTILITY CONFLICT DETAIL "B"  NTS	HORIZONTAL AND VERTICAL CLEARANCES BETWEEN WATER AND SEWER MAINS  NTS																																																																																																																																																																																																																																																																																										

NOTE: SOME DETAILS IN THESE DRAWINGS ARE TO BE CONSIDERED TYPICAL AND MAY NOT BE CALLED OUT ON PLANS. CONTRACTOR SHALL BECOME FAMILIAR WITH AND FOLLOW ALL DETAILS DURING CONSTRUCTION IN ALL TYPICAL AREAS.

REGISTERED DESIGN PROFESSIONAL

DATE: 10/14/19

SCALE: NONE

DRAWING IS REDUCED IF LESS THAN 22" x 34"

WATER DETAILS

North / Elev Key Sheet

DT-2

Page 9 of 10

GILLETTE & ASSOCIATES, INC.

CIVIL, ENVIRONMENTAL, MECHANICAL, & STRUCTURAL ENGINEERING

CERTIFICATE OF AUTHORIZATION NO. 9332

ASA R. GILLETTE, P.E. • FL PE NO. 56177

20 S. 4th STREET * FERNANDINA BEACH, FL 32034

PHONE: 904-261-8819 * www.gilletteassociates.com

CRAWFORD JEWELERS/RETAIL

PRELIMINARY BINDING SITE PLAN

SADLER ROAD

FERNANDINA BEACH, FLORIDA

ASA R. GILLETTE, P.E.

FLORIDA P.E. NO. 56177

CLASS "B"		
BEDDING DETAILS	CLEANOUT	ENCASEMENT AT WATER LINE
		1. ALL MANHOLES SHALL BE PRECAST CONCRETE AND CONFORM TO ASTM C-478 STANDARDS. MANHOLE CONES AND RISERS SHALL BE CONSTRUCTED OF 4,00 PSI, TYPE II CEMENT WITH RIVER ROCK OR GRANITE AGGREGATE. 2. ALL PIPES SHALL BE CONNECTED TO THE MANHOLE USING A LOCK JOINT FLEXIBLE MANHOLE SLEEVE (ASTM C-923) OR APPROVED EQUAL. 3. THE EXTERIOR AND INTERIOR OF THE MANHOLE SHALL BE COATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS WITH FABERTITE AS MANUFACTURED BY BRIGGS BITUMINOUS COMPOSITION COMPANY. 4. AN INSIDE PVC DROP MANHOLE (TYPE "B") SHALL BE REQUIRED FOR MANHOLES WHICH HAVE A DISTANCE OF 18 INCHES OR GREATER BETWEEN INFLUENT PIPE INVERT AND EFFLUENT PIPE INVERT. ALL OTHER DROPS SHALL HAVE A SLIDE CONSTRUCTED TO DIRECT THE FLOW INTO THE INVERT CHANNEL. 5. SEWER SERVICES SHALL BE CAST IRON IF 2FEET OF GROUND COVER CANNOT BE MAINTAINED OVER THE SERVICE LINE. 6. ALL DUCTILE IRON SEWER PIPE, WHERE SPECIFIED, SHALL BE CLASS 51 AND COMPLY WITH ANSI/AWWA C150/A21.50 AND ANSI/AWWA C151/A21.51. DUCTILE IRON PIPE SHALL BE PROVIDED WITH A FACTORY APPLIED INTERIOR POLYETHYLENE LINING IN ACCORDANCE WITH ANSI/ASTM D1248. 7. THE MAXIMUM NUMBER OF DIPS IS ONE, 1-INCH DIP PER 135 LF OF PIPE. NO MORE THAN ONE DIP PER 135 LF OF PIPE. A DIP IS DEFINED AS A CHANGE IN ELEVATION OF 0.5" OR GREATER.
C.I. TO PVC COUPLING ADAPTER	TYPICAL SEWER SERVICE	GRAVITY SEWER STANDARD SPECIFICATIONS

NOTE: SOME DETAILS IN THESE DRAWINGS ARE TO BE CONSIDERED TYPICAL AND MAY NOT BE CALLED OUT ON PLANS. CONTRACTOR SHALL BECOME FAMILIAR WITH AND FOLLOW ALL DETAILS DURING CONSTRUCTION IN ALL TYPICAL AREAS.

REGISTERED DESIGN PROFESSIONAL

ASA R. GILLETTE, P.E.
FLORIDA P.E. NO. 56177

REV	DATE	ITEM	TRC SUBMITTAL #
A	10/10/19		#1

GILLETTE & ASSOCIATES, INC.
CIVIL, ENVIRONMENTAL, MECHANICAL, & STRUCTURAL ENGINEERING
CERTIFICATE OF AUTHORIZATION NO. 9332
ASA R. GILLETTE, P.E. • FL PE NO. 56177

20 S. 4th STREET * FERNANDINA BEACH, FL 32034
PHONE: 904-261-8819 * www.gilletteassociates.com

CRAWFORD JEWELERS/RETAIL
PRELIMINARY BINDING SITE PLAN
SADLER ROAD
FERNANDINA BEACH, FLORIDA

DATE: 10/14/19

SCALE: NONE
DRAWING IS REDUCED IF LESS THAN 22" x 34"

SEWER DETAILS

North / Elev Key Sheet

DT-3

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Civil & Environmental Engineering • Mechanical & Structural Engineering • Construction Management

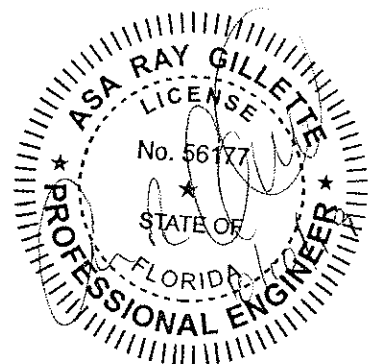
SITE DRAINAGE EVALUATION

**Crawford Jewelers
FERNANDINA BEACH, FLORIDA**

BY

**Gillette & Associates, Inc.
20 South 4th Street
Fernandina Beach, FL**

Issue Date: October 7, 2019



PROJECT DESCRIPTION

The proposed project consists of a commercial building, being constructed on a 37,776 ft² lot, on Sadler Road in the city of Fernandina Beach. The site will be served by a dry retention pond, designed to provide storm water treatment and meet pre vs post discharge requirements for a 10-year storm event, as required by the City of Fernandina Beach Land Development Code.

EXISTING CONDITIONS

The project site is currently vacant with 6,780 ft² impervious concrete on site. In its pre-developed state, the site has a single drainage basin, DA-1. DA-1, is mostly flat and ranges in elevation from 19' to 17', with a gentle slope from west to east. Storm water is currently not contained on the site. This basin, which is the area of study for this report, encompasses the entirety of the 37,776 ft² lot. There are no wetlands on site or surface water on site.

DRAINAGE ANALYSIS

The analysis was conducted over the drainage basin, DA-1, which encompasses the 37,776 ft² lot and all of the improved/developed area. The 37,776 ft² lot, consisting of 19,628 ft² total of impervious area and semi-impervious areas. A composite curve number of 79.8 was used in the simulation based on the ratio of impervious and semi-impervious area to remaining pervious area. The dry retention system provides 4,457 cubic feet of stormwater treatment volume, calculations of the dry retention pond are included in this report.

Stormwater simulations were conducted using MODRET, utilizing geotechnical data conducted on a site, a report is included in this report. MODRET simulations were conducted with an outfall of structure with weir elevation of 18.50'. MODRET simulations for a 10 year storm event are included in this report

<u>Summary of Design:</u>	<u>Pre-Development</u>	<u>Post-Development</u>
Total Drainage Area	10,000 ft ²	10,000 ft ²
Top of Bank Elevation	N/A	19.25'
Bottom Elevation	N/A	17.75'
Treatment Required	N/A	3,617 ft ³
Treatment Provided	N/A	4,457 ft ³
10-yr Max Discharge Rate	2.88 cfs	1.30 cfs

MODRET ANALYSIS

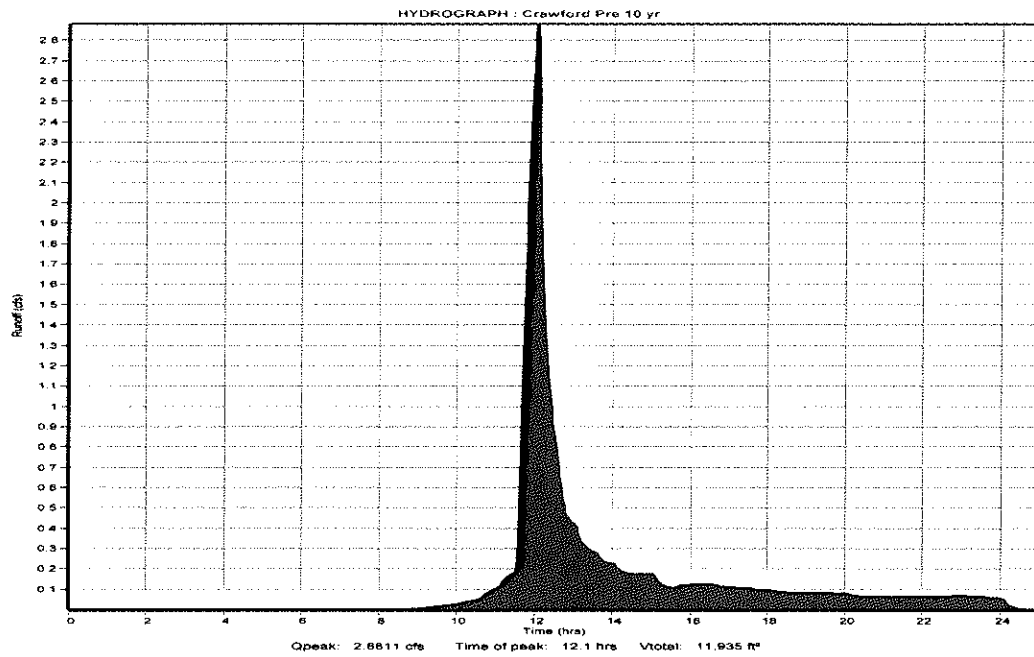
10-Year Storm Event

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : Crawford Pre 10 yr
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area	0.87 ac.
SCS Curve Number	66.80
Time of Concentration	10.00 min.
Rainfall Depth	7.60 in.
Shape Factor	323
Percent DCIA	0.00 %

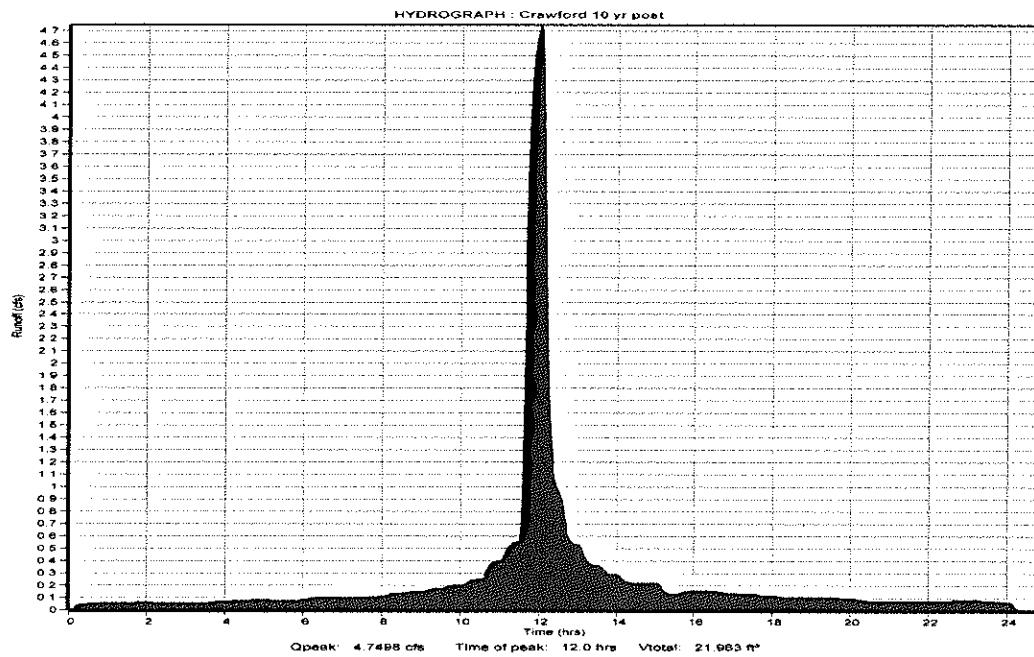


MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : Crawford 10 yr post
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area	0.87 ac.
SCS Curve Number	79.80
Time of Concentration	13.00 min.
Rainfall Depth	7.60 in.
Shape Factor	484
Percent DCIA	72.40 %



MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : Crawford post 10 yr infiltration
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	4,076.00 ft ²
Pond Volume between Bottom & DHWL	4,457.00 ft ³
Pond Length to Width Ratio (L/W)	3.00
Elevation of Effective Aquifer Base	8.00 ft
Elevation of Seasonal High Groundwater Table	13.00 ft
Elevation of Starting Water Level	17.75 ft
Elevation of Pond Bottom	17.75 ft
Is there overflow ?	Y
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.22
Unsaturated Vertical Hydraulic Conductivity	43.40 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	3.50 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.18
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00
Time Increment During Storm Event	1.00 hrs
Time Increment After Storm Event	12.00 hrs
Total Number of Increments After Storm Event	6.00

Runoff Hydrograph File Name: SCS2.SCS

Time of Peak Runoff: 12.03 hrs

Rate of Peak Runoff: 4.75 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond

Elevation of Water Level

Impervious Barrier - Y/N

Elevation of Barrier Bottom

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

N	N	N	N
0.00	0.00	0.00	0.00

MODRET

ELEVATION VS OVERFLOW RELATIONSHIP

PROJECT NAME : Crawford post 10 yr infiltration
Structure Type: SHARP CRESTED

Crest Elevation	18.50 ft
Crest Length	9.00 ft
Coefficient of Discharge	3.31
Weir Flow Exponent	1.50
Number of Contractions	0.00
Design High Water Level Elevation	19.25 ft

MODRET

SUMMARY OF RESULTS

PROJECT NAME : Crawford post 10 yr infiltration

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
00.00 - 0.03	13.000	0.000 *		
			0.00000	
0.03	13.000	0.15618		
			0.10165	
12.06	18.620	0.04712		4,616.30
			0.04250	
13.08	18.621	0.04292		9,307.50
			0.04334	
14.10	18.553	0.04127		10,650.00
			0.03920	
15.12	18.531	0.03843		11,398.00
			0.03766	
16.14	18.518	0.03705		11,841.00
			0.03644	
17.16	18.517	0.03572		12,250.00
			0.03501	
18.18	18.514	0.03441		12,584.00
			0.03381	
19.20	18.511	0.03310		12,851.00
			0.03240	
20.22	18.510	0.03167		13,097.00
			0.03094	
21.24	18.508	0.03052		13,279.00
			0.03011	
22.26	18.507	0.02957		13,455.00
			0.02903	
23.28	18.508	0.02851		13,640.00
			0.02799	
24.30	18.506	0.02738		13,776.00

MODRET

SUMMARY OF RESULTS

PROJECT NAME : Crawford post 10 yr infiltration

[illegible]

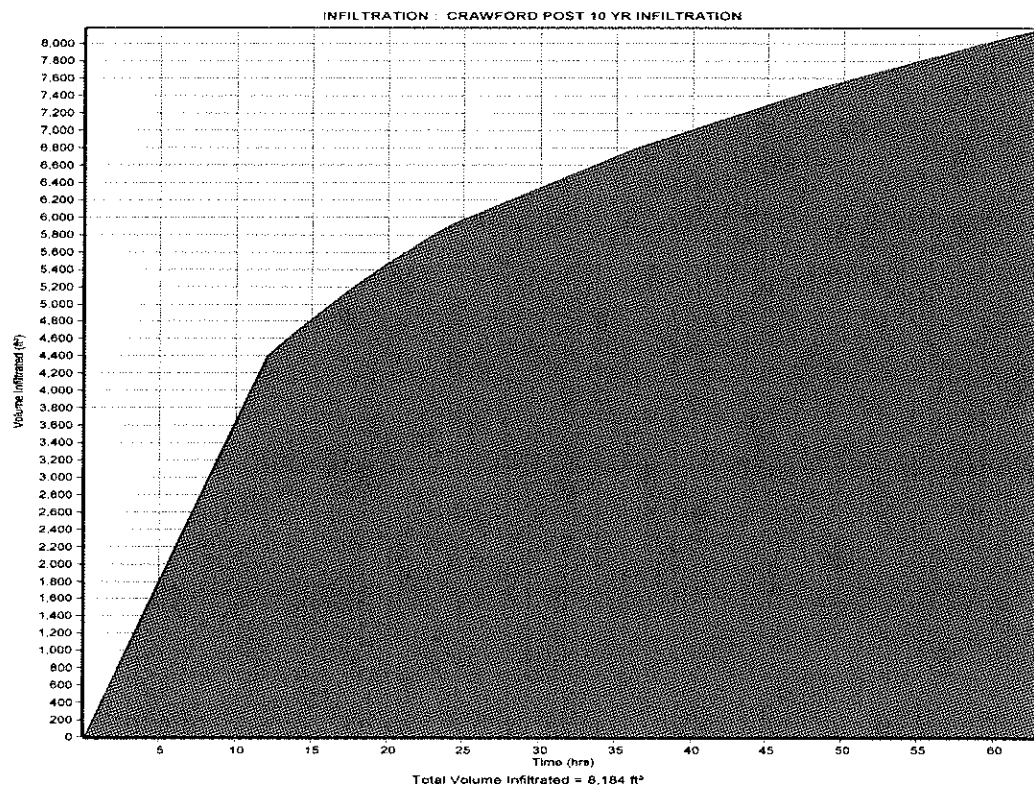
Maximum Water Elevation: 18.621 feet @ 13.08 hours

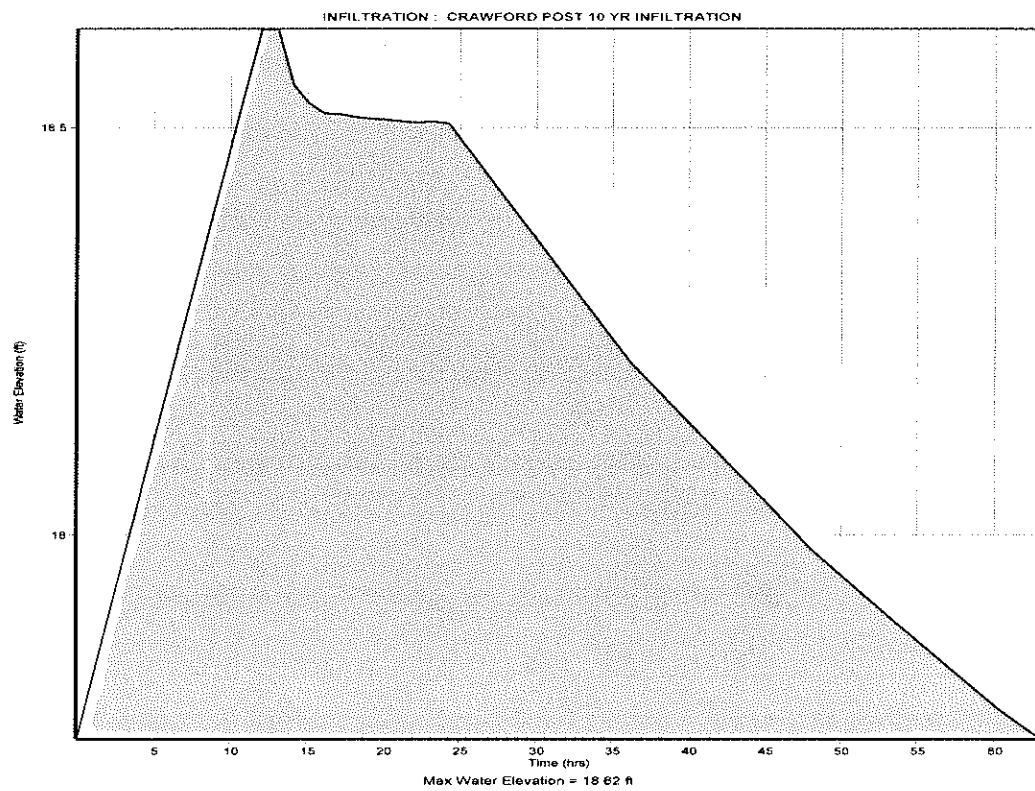
Recovery @ 63.022 hours

* Time increment when there is no runoff

Maximum Infiltration Rate: 2.956 ft/day

Analysis Date: 10/7/2019





DRY POND CALCULATIONS

Crawford Jewelers

Post Developed - Site Calculations

<u>Feature</u>	<u>Type</u>	<u>Area (sqft)</u>
da1	dcia	4310
da2	dcia	3509
da4	dcia	2995
da5	dcia	3406
bldg	icia	3928
sidewalks	icia	1480

Total
19628

14220 0.724475

predeveloped concrete area 6780

Crawford Jewelers Post Developed - Total Area

Basin Calculations

Basin 1

Composite Cn

Total Drainage Area = 37726 ft²
 Impervious Area = 19628 ft²
 Pond Area = 0 ft²

Impervious Cn = 98.0
 Pond Cn = 100.0
 Pervious Cn = 60.0

Composite Cn = 79.8

Time of Concentration, Tc

Minimum Time of Concentration = 10 min.
 Length of Overland Flow @ 1ft/sec. = 75 ft.
 Length of Pipe Flow @ 2.5 ft/sec. = 150 ft.
 Tc = 13 min.

Pond Information (Swales)

El. (ft.)		Area ft ²	Volume ft ³
19.00	TOB	8148	7702.75
18.50	weir	4837	4456.50
17.50		4076	0.00

Treatment Volume Required, TVR (on-line retention)

TVR = 1" * (1/12") * Total Drainage Area = 3144 ft³
 or

TVR = 1.25" * (1/12") * Total Impervious Drainage Area + 0.5" * (1/12") * Total Drainage Area = 3617 ft³

TVR = 3617 ft³

Treatment Volume Provided, TVP

TVP = Vol @ Weir = 4457 ft³ OK

GEOTECHINICAL REPORT



OF JAX, INC.

October 3, 2019

GILLETTE & ASSOCIATES

20 South 4th Street
Amelia Island, FL 32034

Attn: Mr. Asa Gillette, P.E.

Re: Report of Infiltration and Hydraulic Conductivity Testing
Proposed Crawford Jewelry Dry Stormwater Pond
Sandler Road
Fernandina Beach, Florida
AGES Job No. J18941, Report 001

Ladies & Gentlemen:

AGES OF JAX (AGES), INC. has completed the requested testing in the stormwater management facility area of subject site. This report includes a description of the testing that was performed and the results that were obtained.

General information has been provided by Gillette & Associates representative during recent email conversations. We have been provided with a Site Plan which illustrates the property boundaries and the planned stormwater management facility location. No other plans or documents have been provided at this time. **AGES** was requested to conduct double ring and hydraulic conductivity testing at the site to support the stormwater management facility design and permitting process.

AGES field crews performed the requested testing during the period of September 30 through October 1, 2019. We drilled one 15 foot auger boring (LA1) to determine soil type and groundwater level. Adjacent to the boring location, we installed an approximately 13-foot deep temporary 2" diameter monitoring well (TMW1) which was equipped with a 10 foot slotted screen. Rising and Falling Head "slug" tests were performed in accordance with the procedures outlined in ASTM D4044/D4044M - 15, to determine the saturated horizontal hydraulic conductivity (Khsat) of the surface aquifer. The test results were analyzed using Hvorslev Time Lag Analytical procedures. One double ring infiltration test (DRI1) was conducted adjacent to the well location using the procedures outlined in ASTM D3385-18 to determine the vertical unsaturated hydraulic conductivity i.e infiltration rate (Kvunsat) in the vadose zone. The test locations are shown on the attached Field Exploration Plan. Auger boring results, the rising and falling Head "Slug Test" data, and Infiltration Test Data are presented in the attachments.

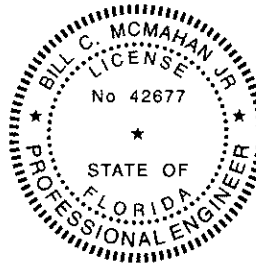
The borings/tests performed in the proposed stormwater treatment pond area encountered slightly silty fine sands (SP-SM) in the upper 15 feet of profile. The groundwater level was encountered 5.0 feet below the ground surface. The seasonal high groundwater level is estimated to be 4 feet below the existing ground surface. The fillable porosity of the sand deposit is estimated to be 0.22. The effective aquifer thickness is estimated to be 15 feet. The saturated horizontal hydraulic conductivity (Khsat, the average of the falling and rising head hydraulic conductivity tests) of the

AGES of JAX, Inc.

P O Box 24008, Jacksonville FL 32241-4008
9556 Historic Kings Road South, Suite 201 • Jacksonville, Florida 32257-2010
(904) 886-0766 • (904) 880-5190 (FAX)

unconfined surface aquifer was calculated to be 3.5 ft/day. The average unsaturated vertical hydraulic conductivity (Kvunsat, infiltration rate) was measured to be 20 inches/hour.

We appreciate the opportunity to be of service as the geotechnical consultant during this phase of your project. Should you have any questions concerning this report or if we may be of any further service to you, please feel free to contact us.



Digitally signed
by Bill C
McMahan JR

Date: 2019.10.03
12:10:17 -04'00'

Very truly yours,

AGES of JAX, INC.

Bill C. McMahan, Jr., P.E.
Principal Engineer/Vice-President
Registered, Florida No. 42677

DATA ATTACHMENTS

Site Location Map

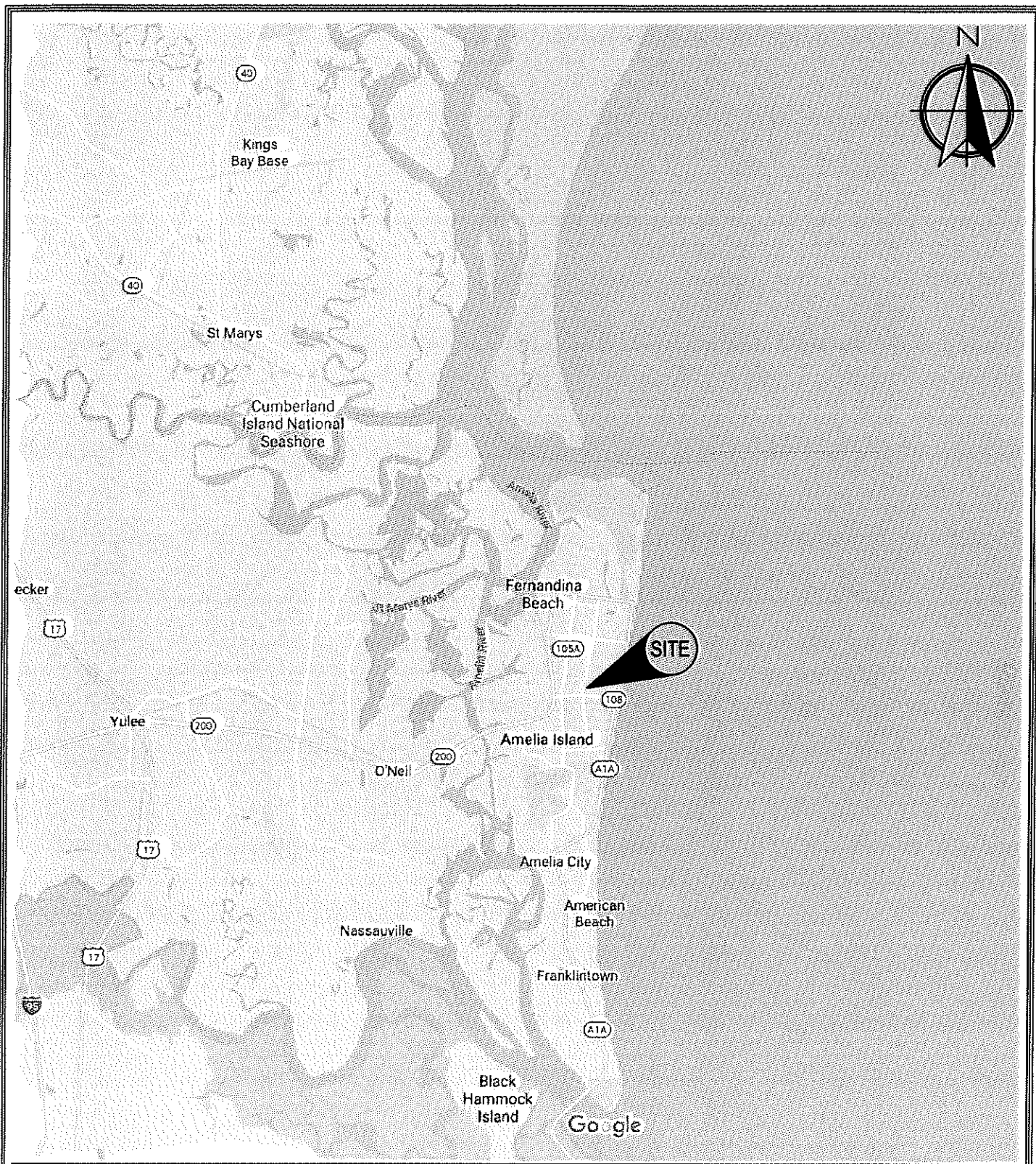
Field Exploration Plan

Key to Soil Classification

Auger Boring Records

Double Ring Infiltration Test Results Sheet

Rising and Falling Head Hydraulic Conductivity Test Results Sheets



REFERENCE:

Google.com



AGES of JAX Inc.
9556 Historic Kings Rd.
Jacksonville, Florida 32257

SITE LOCATION MAP

Crawford Jewelry Dry Pond
Fernandina Beach, Florida

DRAWN: DEP

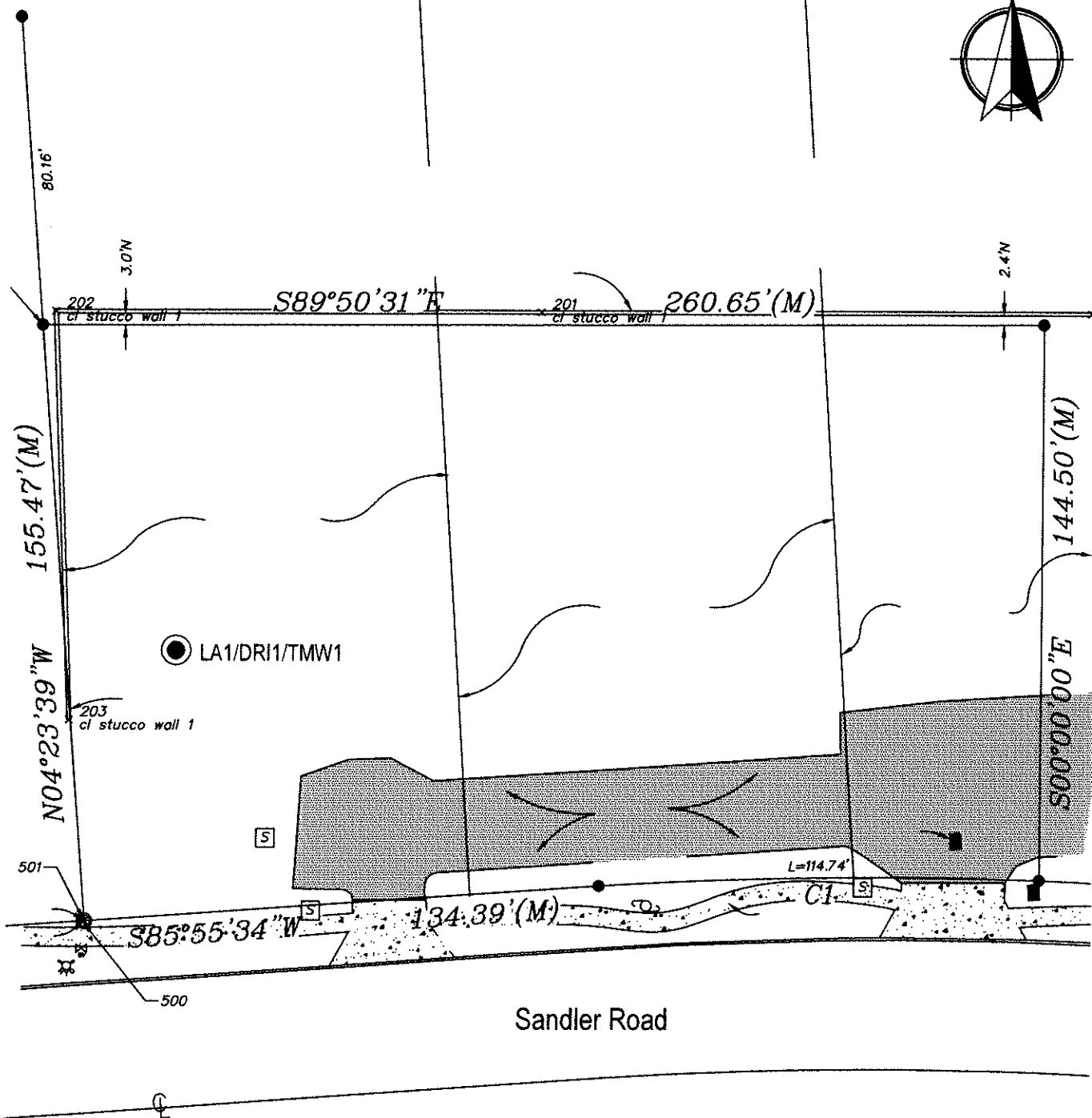
DATE: 10/02/19

SCALE:

CHECKED: BCM

JOB NO: J18941

NTS



LEGEND:

- Double Ring/ Slug Test/ Lake Auger Location

REFERENCE:

Site Plan provided by Gillette & Associates, undated.

NOTES:

The boring locations were established by AGES personnel using handheld GPS Locator Units. Boring locations as shown on this plan are approximate.



AGES of JAX Inc.
9556 Historic Kings Rd.
Jacksonville, Florida 32257

FIELD EXPLORATION PLAN

Crawford Jewelry Dry Pond
Fernandina Beach, Florida

DRAWN: DEP

DATE: 10/02/19

SCALE:

CHECKED: BCM

JOB NO: J18941

1"=40'

KEY TO SOIL CLASSIFICATION

CORRELATION OF N-VALUE WITH RELATIVE DENSITY & CONSISTENCY

SANDS AND GRAVEL	
NO. OF BLOWS, N'	RELATIVE DENSITY
0 - 4	VERY LOOSE
5 - 10	LOOSE
11 - 20	FIRM
21 - 30	VERY FIRM
31 - 50	DENSE
OVER 50	VERY DENSE

SILTS AND CLAYS	
NO. OF BLOWS, N*	CONSISTENCY
0 - 2	VERY SOFT
3 - 4	SOFT
5 - 8	FIRM
9 - 15	STIFF
16 - 30	VERY STIFF
31 - 50	HARD
OVER 50	VERY HARD

PARTICLE SIZE IDENTIFICATION (UNIFIED SOIL CLASSIFICATION SYSTEM)

CATEGORY	DIMENSIONS
Boulders	Diameter exceeds 12 inches
Cobbles	3 to 12 inches
Gravel	Coarse - 0.75 to 3 inches in diameter
Sand	Coarse - 2.0 mm to 4.76 mm diameter Medium - 0.42 mm to 2.0 mm diameter
Silt and Clay	Less than 0.074 mm (Invisible to the naked eye)

MODIFIERS

These modifiers provide our estimate of the amount of minor constituents (sand silt or clay size particles) in the soil sample.

PERCENTAGE OF MINOR CONSTITUENT	MODIFIERS
5% to 12%	Slightly Silty, Slightly Clayey, Slightly Sandy
12% to 30%	Silty, Clayey, Sandy
30% to 50%	Very Silty, Very Clayey, Very Sandy

These modifiers provide our estimate of the amount of other components in the soil sample.

APPROXIMATE CONTENT OF OTHER COMPONENTS (SHELL, GRAVEL, ETC.)	MODIFIERS	APPROXIMATE CONTENT OF ORGANIC COMPONENTS
0% to 5%	TRACE	1% to 2%
5% to 12%	FEW	2% to 4%
12% to 30%	SOME	4% to 8%
30% to 50%	MANY	>8%



OF JAX, INC.

AUGER BORING RECORDS
Crawford Jewelry Dry Pond
Fernandina Beach, Florida
AGES Job No. J18941; Report No. 001

Date Performed: 09/30/19

Performed By: X. J & A. W

Auger ID Lat/Long	Depth (Feet) ^a	SOIL DESCRIPTION (USCS / AASHTO CLASSIFICATION)
LA1/ TMW1 N 30.07323° W 81.63461°	0.0 - 1.0 1.0 - 5.0 5.0 - 7.0 7.0 - 12.0 12.0 - 15.0 A.B.T. ^b	Grey Brown Fine SAND w/ Some Rocks (SP/A-3) Light Grey Slightly Silty Fine SAND (SP-SM/A-3) Brown Slightly Silty Fine SAND (SP-SM/A-3) Dark Brown Slightly Silty Fine SAND (SP-SM/A-3) Brown Slightly Silty Fine SAND (SP-SM/A-3) GWL ^c = 5.0' Estimated Seasonal High GWL ^c = 4.0'

a - Depth measured below ground surface existing at boring location at time of drilling

b - Auger Boring Terminated (A.B.T.)

c - Groundwater Level (GWL) depth below existing ground surface, recorded at time of drilling, unless otherwise noted
J18941A1.wpd JW



DOUBLE RING INFILTRATION TEST RESULTS

PROJECT: Crawford Jewelry Dry Pond
 LOCATION: Fernandina Beach, Florida
 JOB NUMBER: J18941
 TEST NUMBER: DRI1
 LAT/LONG: N30.64050°, W81.44693°

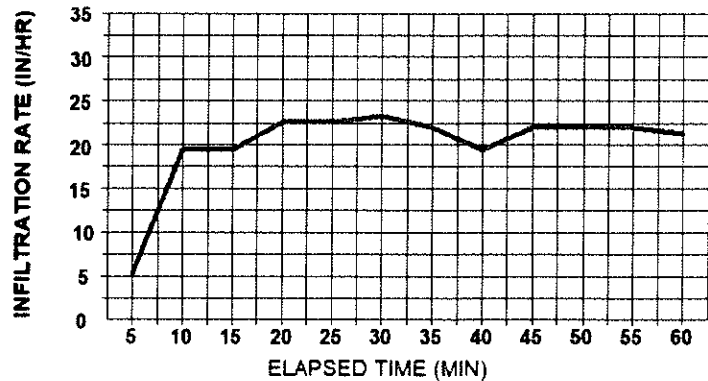
REPORT DATE: 10/01/19
 TEST DATE: 09/30/19
 FIELD PERSONNEL: X.J. & A.W.
 METHOD: ASTM D3385
 WATER HEAD: 6"
 TEST DEPTH: Surface

ELAPSED TIME (MINUTES)	WATER QUANTITY (ML)	INFILTRATION RATE (IN/HOUR)
5	800	5.2
10	3000	19.4
15	3000	19.4
20	3500	22.7
25	3500	22.7
30	3600	23.3
35	3400	22.0
40	3000	19.4
45	3400	22.0
50	3400	22.0
55	3400	22.0
60	3300	21.4

SUMMARY OF TEST DATA & RESULTS

INNER RING SIZE (INCHES): 12
 OUTER RING SIZE (INCHES): 24
 AVERAGE INFILTRATION RATE (IN/HR): 20.1
 STEADY STATE INFILTRATION RATE (IN/HR): 21.7

INFILTRATION RATE VS TIME



Estimated Seasonal High GWL= 4.0 Below Ground Surface

SOIL PROFILE

Depth (ft)	Soil Description (USCS/AASHTO Classification)
0.0 - 1.0	Grey Brown Fine SAND w/ Some Rocks (SP/A-3)
1.0 - 5.0	Light Grey Slightly Silty Fine SAND (SP-SM/A-3)
5.0 - 7.0	Brown Slightly Silty Fine SAND (SP-SM/A-3)
7.0 - 12.0	Dark Brown Slightly Silty Fine SAND (SP-SM/A-3)
12.0 - 15.0	Red Brown Slightly Silty Fine SAND (SP-SM/A-3)
A.B.T.	GWL= 5.0'



INSITU RISING HEAD HYDRAULIC CONDUCTIVITY TEST

Crawford Jewelry Dry Pond
Fernandina Beach, Florida
AGES Job No. J18941

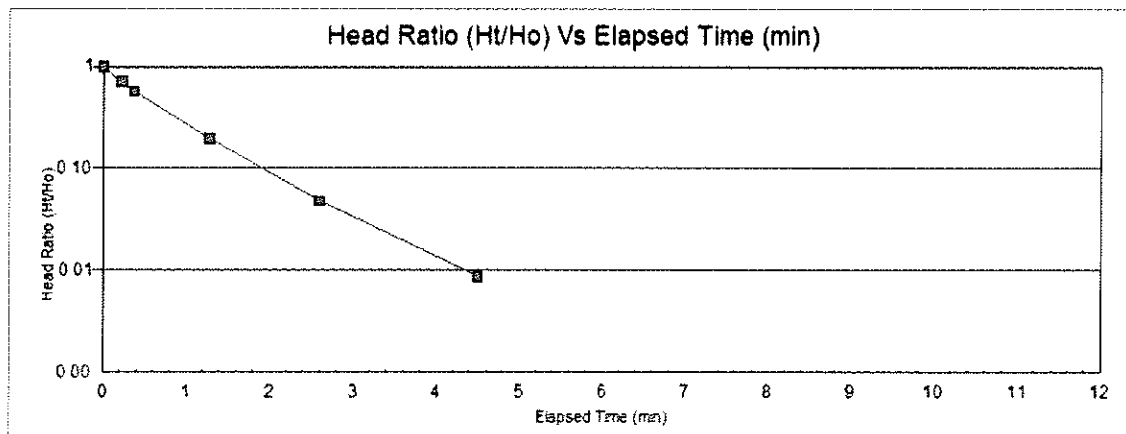
Governing Equation (NAVFAC)

$$K_{hsat} = \frac{r^2}{2L} \ln(L/R) [\ln(H_1/H_2)/(t_2 - t_1)]$$

Date Performed 10/02/19
Performed by D. Anderson

Well Data	
Well ID	TMW1
Well Radius - R (ft)	0.083
Saturated Screen Length - L(ft)	6.76
Well Stickup (ft)	2.00
Well Depth below TOC	15.00
Depth to Static GW below TOC	8.24
Initial Drawdown Depth below TOC	9.36

Field Data			Depth Below TOC (ft)	Head (Ht)	Head Ratio Ht/Ho
Elapsed Time (t)					
min	sec	min			
0	0.1	0.0	9.363	1.122869	1.00
0	13.4	0.2	9.033	0.793058	0.71
0	22.3	0.4	8.887	0.647	0.58
1	16.7	1.3	8.462	0.222488	0.20
2	36	2.6	8.294	0.054365	0.05
4	30	4.5	8.250	0.009819	0.01
Results: Insitu Horizontal Hydraulic Conductivity (k)					
0.002407	ft/min	3.47	ft/day	1.2E-03	cm/sec





INSITU FALLING HEAD HYDRAULIC CONDUCTIVITY TEST

Crawford Jewelry Dry Pond
Fernandina Beach, Florida
AGES Job No. J18941

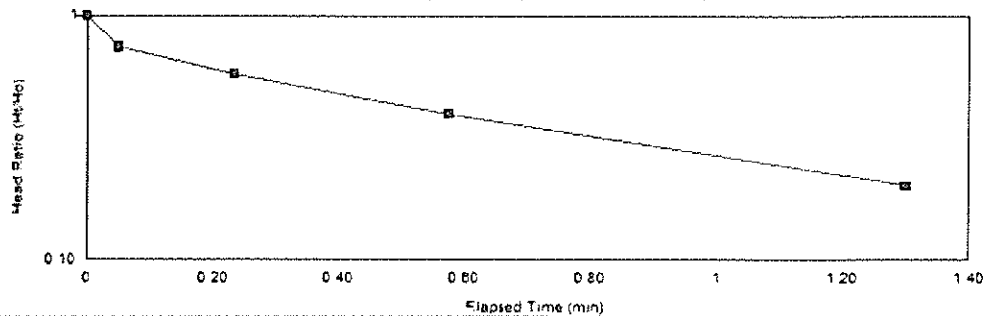
Governing Equation (NAVFAC)
 $K = r^2 / 2L \ln(L/R) [\ln(H_1/H_2) / (t_2 - t_1)]$

Date Performed 10/02/19
Performed by D Anderson

Well Data	
Test ID	TMW1
Well Radius - R (ft)	0.08
Well Stickup (ft)	0
Well Depth below TOC (ft)	15
Saturated Screen Length - L (ft)	6.76
Depth to Static GW below TOC	8.24
Initial Water Depth below TOC Slug In	7.15

Field Data			Water Level TOC (ft)	Head (Ht)	Head Ratio Ht/Ho
Elapsed Time t					
min	sec	min			
0	0.01	0.0	7.15	1.09	1.0
0	3	0.1	7.43	0.81	0.7
0	14	0.2	7.61	0.63	0.6
0	34.5	0.6	7.81	0.43	0.4
1	18	1.3	8.02	0.22	0.2
Results: Insitu Horizontal Hydraulic Conductivity (k)					
0.002463 ft/min		3.55 ft/day	1.3E-03 cm/sec		

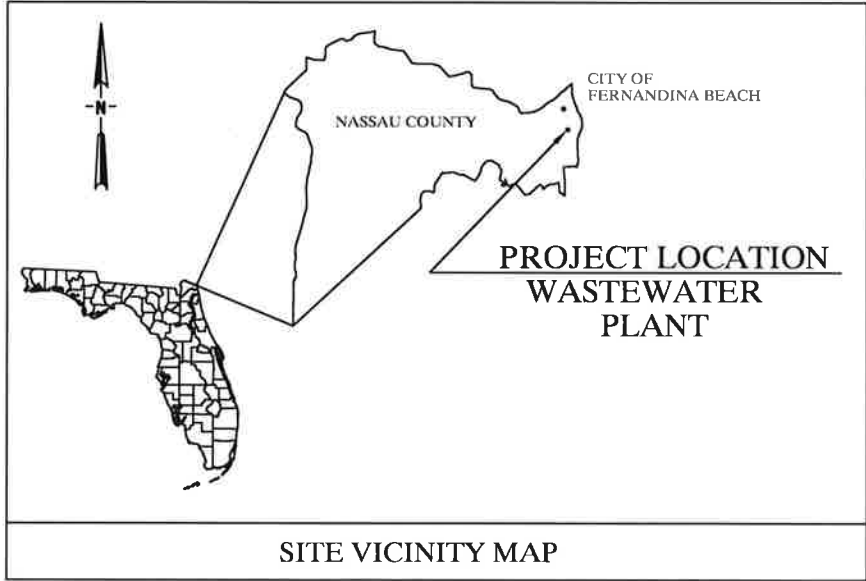
Head Ratio (Ht/Ho) Vs Elapsed Time (min)



#3 WATER PLANT

NEW LARGE RESERVOIR

CITY OF FERNANDINA BEACH UTILITIES DEPARTMENT



RECORD DRAWINGS

CONTRACTOR:
CITY OF FERNANDINA BEACH
AMOUNT: \$800,000.00
DATE: 10/4/2019
PROJECT NO: 20005

PREPARED BY:
JOHN MANDRICK, PE, DIRECTOR

DRAWING INDEX

DWG. NO.	DESCRIPTION
1	COVER
2	VICINTY MAP
3	EXISTING SITE PLAN
4	SITE PLAN
5	TANK PROFILE VIEW
6	TANK PLAN VIEW
7	TANK WALL DETAIL
8	TANK PIPING DETAIL
9	AERATOR
10	DETAILS
11	ACCESSARIES
12	SOLAR LAYOUT
13	ELECTRICAL



CITY OF FERNANDINA BEACH
UTILITIES DEPARTMENT WASTEWATER DIVISION
1180 S. 5TH STREET - FERNANDINA BEACH, FL 32034
TELEPHONE: (904) 310-3421 - FAX (904) 310-3464

COVER

DESIGNED	BY	DATE	PROJECT NO.
DRAWN	JM	10/16/2019	20005
CHECKED	BE	10/16/2019	SCALE
	JM	10/16/2019	NOTED
			SHEET
			1
			OF 13

DATE: _____ FILE: FDEP WP#3

UTILITY AND OTHER CONTACTS			
ORGANIZATION	CONTACT AND TITLE	ADDRESS	TELEPHONE NUMBER
CITY OF FERNANDINA BEACH	MR. JOHN MANDRICK, PE DIR. OF UTILITIES	P.O. BOX 668 FERNANDINA BCH., FL.	904-310-3420
FLORIDA PUBLIC UTILITIES	MR. CURTIS BOATRIGHT ELECTRIC SERVICE	780 AMELIA ISLAND PARKWAY FERNANDINA BCH., FL.	904-430-4709
BELL SOUTH	MIKE DUNGAN	301 W. BAY, RM. 18HHI JACKSONVILLE, FL. 32207	877-737-2478
NASSAU COUNTY	MR. J. PE DIRECTOR ENGINEER	96161 NASSAU PLACE YULEE, FL. 32097	904-530-8225
COMCAST	TIM DENISON	1600 S. 14TH ST. FERNANDINA BEACH, FL. 32034	904-261-3824
SUNSHINE STATE ONE CALL			800-432-4770



GENERAL NOTES

- THE EXISTING WASTEWATER TREATMENT PLANT AND OTHER PRIVATE AND PUBLIC UTILITY SERVICES SHALL BE MAINTAINED DURING THE CONSTRUCTION OF THIS WASTEWATER TREATMENT PLANT EXPANSION PROJECT.
- ALL ELEVATIONS SHOWN ARE IN FEET AND ARE BASED ON N.G.V.D. 1988 DATUM. ALL MECHANICAL EQUIPMENT MOTORS AND ELECTRICAL EQUIPMENT SHALL BE INSTALLED ABOVE THE 100 YEAR FLOOD ELEVATION OF 11.00 FEET.
- ALL WORK AFFECTING EXISTING STRUCTURES, UTILITIES OR TREATMENT PLANT OPERATION SHALL BE COORDINATED WITH THE OWNER A MINIMUM OF 72 HOURS PRIOR TO CONSTRUCTION.
- EXISTING FACILITIES, PIPING, AND UTILITIES ARE SHOWN BASED UPON THE BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL VERIFY THEIR ACCURACY, BY FIELD INVESTIGATION, PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL COORDINATE POTENTIAL CONFLICTS BETWEEN UTILITIES AND OTHER UNDERGROUND STRUCTURES. PROVIDE A 6" MINIMUM CLEARANCE BETWEEN ALL EXISTING UTILITIES AND ANY NEW CONSTRUCTION.
- ALL PIPE SHALL BE LAID WITH A MINIMUM OF 30 INCHES OF EARTH COVER UNLESS OTHERWISE NOTED OR APPROVED BY THE ENGINEER.
- DIMENSIONS TAKEN FROM HORIZONTAL AND VERTICAL CONTROL ARE SUBJECT TO ADJUSTMENTS IN THE FIELD AS REQUIRED TO AVOID CONFLICTS. THE ENGINEER'S APPROVAL SHALL BE REQUIRED IN WRITING PRIOR TO CONSTRUCTION FOR ANY NECESSARY ADJUSTMENTS.
- WHERE THE VERTICAL DISTANCE BETWEEN A WATER AND SEWER MINE CROSSING IS LESS THAN 18 INCHES, THE CONTRACTOR SHALL ENCASE THE SEWER MAIN IN CONCRETE FOR A DISTANCE OF 10 FEET ON BOTH SIDES OF THE CROSSING.
- THE FIELD SURVEY INFORMATION WAS FURNISHED BY:

KENNETH N. DRAKE
474319 E. ST. RD. 200
FERNANDINA BEACH, FLORIDA 32034
(904) 277-4078

MANZIE & DRAKE LAND SURVEYING
117 SOUTH NINTH STREET
FERNANDINA BEACH, FL 32034
(904) 491-5700
- THE CONTRACTOR SHALL EMPLOY A LAND SURVEYOR, REGISTERED IN THE STATE OF FLORIDA, TO REFERENCE AND RESTORE PROPERTY CORNERS AND LAND MARKERS WHICH MAY BE DISTURBED BY CONSTRUCTION AND TO ASSURE ACCURATE HORIZONTAL AND VERTICAL CONTROL DURING THE CONSTRUCTION OF THE NEW WORK. UPON COMPLETION OF CONTRACTION, THE CONTRACTOR SHALL PROVIDE A SITE SURVEY DEPICTING AS-BUILT CONDITIONS.
- CONTRACTOR SHALL NOT DISTURB EXISTING UNDERGROUND UTILITIES, UNLESS OTHERWISE SHOWN. UTILITIES WHICH ARE DISTURBED BY THE CONTRACTOR SHALL BE REPLACED IN STRICT ACCORDANCE WITH THE OWNER'S REQUIREMENTS.
- MATCH SURFACE ELEVATIONS WHERE NEW PAVEMENT OR OVERLAY CONNECTS TO EXISTING PAVEMENT.

A. DESIGN CRITERIA:

- ALL DESIGN IS BASED ON THE LATEST EDITION OF THE FLORIDA BUILDING CODES 2014 5TH EDITION FLORIDA BUILDING CODES AS PUBLISHED BY THE SOUTHERN BUILDING CODE COMGRESS INTERNATIONAL.
- LOADS:
 - WIND LOADS: WIND LOADS ARE APPLIED IN ACCORDANCE WITH THE STANDARD BUILDING CODE AND ASCE 7-10. PRESSURES AND EXPOSURE B ARE BASED ON A BASIC WIND VELOCITY OF 120 MPH.

WIND VELOCITY PRESSURE ON GROUND ARRAY (MONOSLOPE FREE ROOF) HEIGHT ABOVE GROUND ADJACENT TO STRUCTURE < 15 FT.
 $q_z = 0.00256(0.575)(1)(0.85)(120)(120) = 17.86$ PSF
 $p = 17.86 (0.85)(-2.3) = 34.92$ PSF up lift
 $p = 17.86 (0.85)(1.6) = 24.29$ PSF down
 $p = 17.86 (1.85) (1.3) = 4.55$ PSF side load
 - LIVE LOADS (MINIMUM)

ROOFS	20 PSF
OFFICES	50 PSF
STAIRWAYS AND WALKWAYS	100 PSF
MACHINE (PUMP) ROOMS	300 PSF
 - EQUIPMENT (AS NOTED ON DRAWINGS)
- ALLOWABLE SOIL BEARING PRESSURE 2000 PSF

B. SPECIFICATIONS:

- ACT 318-14 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE
- ACI 350-06 CONCRETE SANITARY STRUCTURES
- AISC MANUAL OF STEEL CONSTRUCTION 14TH EDITION
- ACI 344R-T&W DESIGN AND CONSTRUCTION OF CIRCULAR PRESTRESSED CONCRETE STRUCTURES (REVISED 1988)
- ACT 530-13 BUILDING CODE REQUIREMENTS FOR CONCRETE MASONRY STRUCTURES
- AAF - 14 ALUMINUM DESIGN MANUAL 2015 EDITION
- ASCE 24 - 14 FLOOD RESISTANT DESIGN AND CONSTRUCTION
- NEC 2014 NATIONAL ELECTRIC CODE 2014 EDITION

C. CONCRETE:

- DESIGN CONCRETE STRENGTH

PRESTRESSED TANK	_____	Fc' - 5000 psi
STRUCTURES AND FOUNDATIONS	_____	Fc' - 5000 psi
SLABS ON GRADE	_____	Fc' - 4000 psi
SIDEWALKS AND PIPE ENCASEMENTS	_____	Fc' - 3000 psi
- REINFORCING STEEL SHALL BE DEFORMED BILLET STEEL BARS CONFORMING TO ASTM A 615, GRADE 60.
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185.
- UNLESS OTHERWISE SHOWN ON THE DRAWING, MINIMUM COVER FOR REINFORCED STEEL SHALL BE AS FOLLOWS:

#5 AND SMALLER BARS, INCLUDING WIRE	1-1/2"
ALL LARGER BARS	2"
CONCRETE CAST AGAINST EARTH	3"

NOTE: 6 MIL POLYETHYLENE MEMBRANE IS REQUIRED FOR ALL CAST CONCRETE USING EARTH AS A FORM.
- ALL REINFORCING SHALL BE FABRICATED AND HELD SECURELY IN POSITION WITH STANDARD ACCESSORIES IN ACCORDANCE WITH SP-66 ACI DETAILING MANUAL (1980 EDITION) (SUPERSEDES ACI 315-74) (INCLUDES ACI 315-80)
- SPLICES IN REINFORCING, WERE PERMITTED, SHALL BE NOTED AS FOLLOWS:

WELDED WIRE MESH	ONE MESH LAP +2" (MIN)
TEMPERATURE REINF	12" MIN. LAP
ALL OTHER BARS	CLASS "C" LAP (DEFINED IN SP-66)

SPLICES IN TOP REINF. OF BEAMS SHALL BE MADE AT MID SPAN, BOTTOM REINFORCING AT SUPPORT, OR AS NOTED ON DRAWINGS.
- CONSTRUCTION JOINT LOCATIONS PROPOSED BY THE CONTRACTOR SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INITIATION OF CONSTRUCTION OR FABRICATION AFFECTED BY THE JOINTS' LOCATIONS.
- PROVIDE 3/4" CHAMFER ON ALL EXPOSED EDGES OF CONCRETE.
- APPLY 10 MIL DFT. OF BITUMINOUS PAINT COATING BETWEEN DISSIMILAR METALS OR BETWEEN METAL AND CONCRETE OR MASONRY TO ISOLATE AGAINST GALVANIC CORROSION.
- CONCRETE SHALL TO BE PLACED IN THE DRY.
- TO PREVENT UPLIFT, THE CONTRACTOR SHALL KEEP THE SITE OF PARTIALLY UNDERGROUND STRUCTURES DEWATERED OR KEEP THE TANK FULL OF WATER UNTIL BACKFILLING IS COMPLETE.
- UNLESS OTHERWISE SHOWN, FLOOR SLABS SHALL BE PLACED IN UNITS NOT MORE THAN 600 SQUARE FEET IN AREA WITH REINFORCEMENT EXTENDING 36 DIAMETERS THROUGH CONSTRUCTION JOINTS. AT LEAST 36 HOURS SHALL ELAPSE BETWEEN ADJACENT POURS.

LEGEND	
NOTE : IN GENERAL, LIGHT LINES INDICATE EXISTING OR WORK OF OTHER TRADES, BOLD LINES INDICATE NEW WORK.	
SYMBOL	DESCRIPTION
	SANITARY SEWER, MANHOLE, AND SERVICE
	STORM SEWER
	WATER MAIN, SIZE INDICATED
	TELEPHONE, UNDERGROUND
	GAS, SIZE INDICATED
	VALVE
	REDUCER
	DRAINAGE INLET
	W.M.
	FIRE HYDRANT
	C.M.
	RIGHT-OF-WAY LINE
	I.P.
	I.R.
	N&D
	R&C
	INDICATES DRWG. ON WHICH CONSTRUCTION DETAILS ARE SHOWN
	UTILITY POLE (WOOD)
	UTILITY POLE (CONCRETE)
	GUY ANCHOR
	8' C.L.
	12"
	12"
	12"
	D
	REMOVE OR ABANDON
	OP

D. MASONRY

- CONCRETE MASONRY UNITS (CMU) SHALL CONFORM TO ASTM C90, GRADE N-1, WITH A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
- MORTAR SHALL CONFORM TO ASTM C91, TYPE S, WITH A MINIMUM COMPRESSION STRENGTH OF 1800 PSI. F'm - 1350 psi
- CONCRETE GROUT FOR FILLED CELLS SHALL BE A CONCRETE MIX DESIGN UTILIZING PEA GRAVEL FOR COARSE AGGREGATE AND SHALL HAVE A SLUMP OF 8" TO 10" MAXIMUM. WITH A MINIMUM COMPRESSION STRENGTH OF 3000 PSI AT 28 DAYS.
- CONCRETE LINTELS SHALL BE REINFORCED WITH 2 #4 BARS TOP AND BOTTOM AS A MINIMUM AND HAVE MASONRY END BEARING EACH END OF 2" PER FOOT OF SPAN WITH A MINIMUM OF 8" HOWEVER, THE CONTRACTOR MAY SUBMIT FOR APPROVAL A STANDARD PRECAST LINTEL DESIGN TO CARRY THE GRAVITY AND WIND LOADS RELATIVE TO ITS SPAN.

E. STRUCTURAL STEEL: (UNLESS OTHERWISE SHOWN OR SPECIFIED, CONFORM TO THE FOLLOWING SPECIFICATIONS).

- STRUCTURAL STEEL _____ ASTM A 36
- STEEL PIPE _____ ASTM A 53, GR. B
- STEEL TUBE _____ ASTM A 500, RG. B
- STRUCTURAL BOLTS _____ ASTM C 276 TYPE 316 SS
- ANCHOR BOLTS _____ ASTM A 36 OR A 307
- WELDS _____ ASTM E60, E70

F. STRUCTURAL ALUMINUM: (THE ALUMINUM ASSOCIATION ALLDQ DESIGNATION SYSTEM - AA NUMBER)

- STRUCTURAL SHAPES _____ ALLOW AND TEMPER 6061-T6
- WELDS _____ ER 4043
- STRUCTURAL BOLTS _____ ASTM C276 TYPE 316 SS



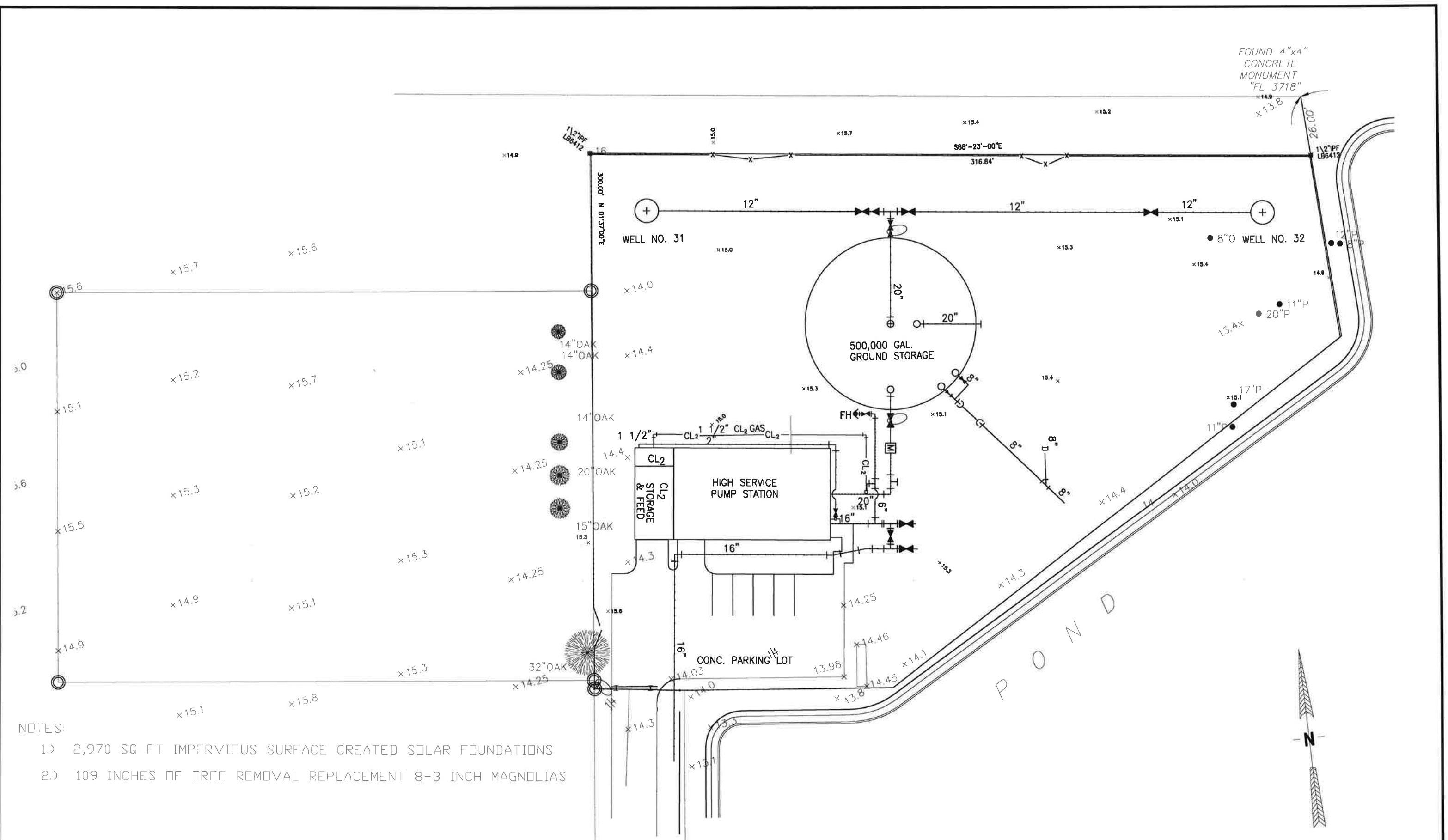
CITY OF FERNANDINA BEACH

UTILITIES DEPARTMENT WASTEWATER DIVISION

1180 S. 5TH STREET - FERNANDINA BEACH, FL. 32034
TELEPHONE: (904) 310-3421 - FAX (904) 310-3464

SITE MAP, LEGEND, NOTES AND UTILITY CONTACTS

DATE: _____	BY	DATE	PROJECT NO.
	DESIGNED	JM	10/16/2019
	DRAWN	BE	10/16/2019
	CHECKED	JM	10/16/2019
FILE: SOLAR GROUND ARRAY3			NOTED
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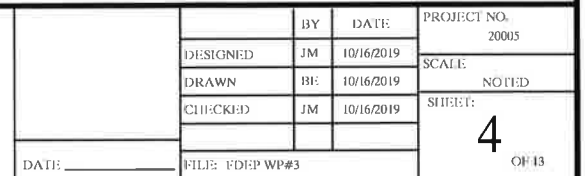


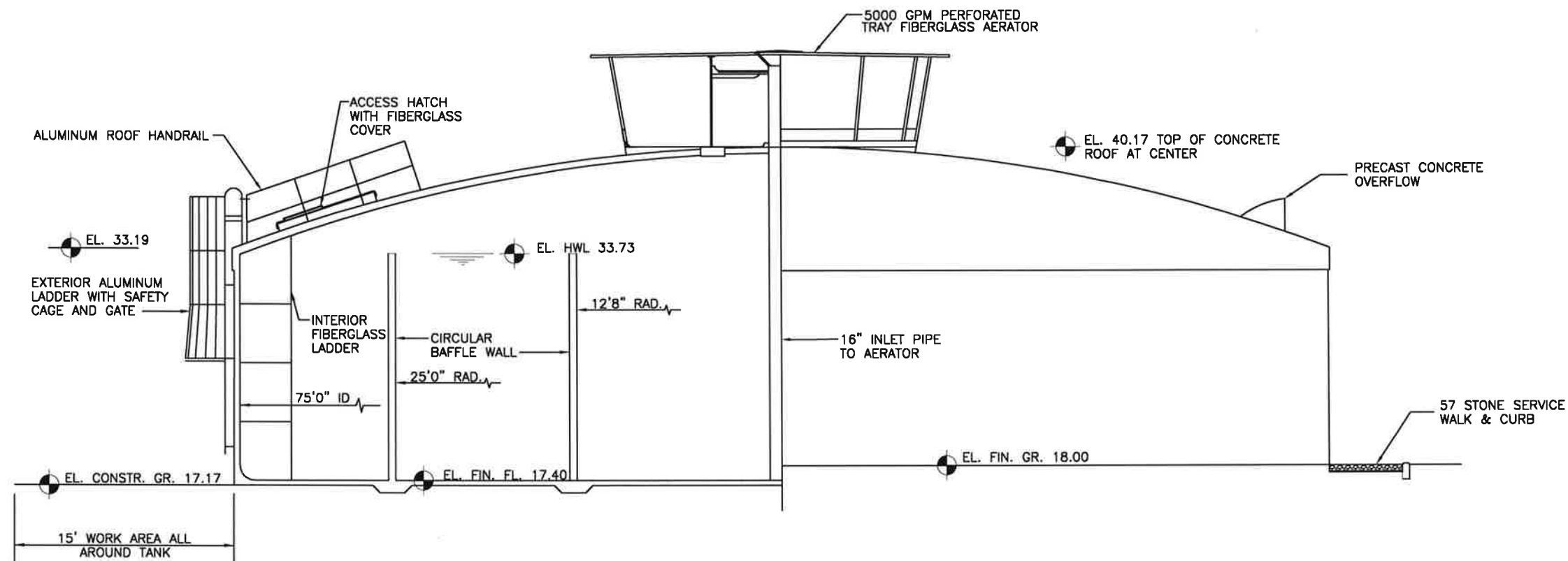
NOTES:

- 1.) 2,970 SQ FT IMPERVIOUS SURFACE CREATED SOLAR FOUNDATIONS
- 2.) 109 INCHES OF TREE REMOVAL REPLACEMENT 8-3 INCH MAGNOLIAS

EXISTING SITE PLAN

- 1.) INSTALL 12 X 16 TEE WITH 16" GV
- 2.) INSTALL TWO 20" BUTTERFLY VALVES
- 3.) INSTALL 20" TEE
- 4.) INSTALL 20" BUTTERFLY VALVE
- 5.) INSTALL 8" GATE VALVE FOR DRAIN
- 6.) ALL PIPE TO HAVE #10 UF TRACE WIRE
- 7.) MINIMUM PIPE DEPTH 30 INCHES
- 8.) ALL PIPE DR 18 C900
- 9.) ALL FITTINGS TO HAVE MEGALUG RESTRAINTS
- 10.) ALL JOINTS TO HAVE BELL RESTRAINTS





SECTION - ELEVATION

NOTE: ALL FIBERGLASS COMPONENTS
IN CONTACT WITH POTABLE WATER
ARE COATED WITH NSF APPROVED EPOXY.

NOTES:

Material & Services By City of Fernandina Beach:

1. Clearing of the site, excavation, fill, compaction to an elevation 4" below top of floor slab on a 104' diameter circle.
2. Dewatering of the 104' diameter work area if required.
3. Furnish adequate working and open storage space for construction equipment and materials.
4. Water and electricity for construction.
5. Building Permit.
6. Testing and disinfection of tank.
7. Final backfill including gravel service walk & curb.
8. All water level controllers and level transmitter on tank roof and all electrical.

Materials & Services Furnished By THE CROM CORPORATION:

- A. Ready-Mixed Shotcrete and Concrete: Use Type II Cement.**
 1. 4000 psi concrete with 3/4" aggregate for floor and roof.
 2. 4000 psi shotcrete grout mix for tank wall and block cells.
- B. Material Testing: (Make 6" X 12" molded cylinders for all samples)**
 1. (3 cylinders per set) Test one at 7 days and two at 28 days.
 - a. 2 sets each for floor, roof, core wall, cover coat, and baffle wall.
- C. Curing:**
 1. Floor, roof and walls to be water-cured during tank construction.
- D. Prestressing Wire: Meets ASTM A821-93 TYPE B**
 1. Aw: 0.0206 square inch
 2. Dia: 0.1620 inch (8 gauge)
 3. Ultimate strength: 231,000 psi
 4. Initial stress: 145,600 psi
 5. Working stress: 115,000 psi-wall
- E. Reinforcing Steel:**
 1. ASTM A-615 grade 60, lap 38 diameters.
 2. Use 2" slab bolsters with plate to support floor resteel.
 3. Use 1 1/2" slab bolsters w/plastic tips to support bottom mat of roof resteel.
- F. Coatings:**
 1. Exterior: single coat of acrylic latex paint.
 2. Interior: two coats of Tenmec Potapox Series 20
- G. Standard Accessories:**
 1. 675 square inch precast overflow
 2. Fiberglass access hatch cover
 3. Interior fiberglass ladder
 4. Exterior aluminum ladder with safety cage and lockable gate
 5. Stainless steel wall manhole.
 6. Fiberglass aerator, 5000 GPM - perforated tray type, with four downcomers, plugs & grates; 4" drain & ball valve.
- H. Special Accessories:**
 1. 2" level control pipe on tank roof.
 2. Liquid level indicator
 3. Aluminum roof handrail
 4. Pipe bracket for 20" DIP overflow.
 5. SS hoist hooks 2 req. Place near aerator curb.
 6. One 1 1/2" thick X 12" wide boss on tank wall for 2" level control conduit.
 7. 3' sq. ss cover at 12'8" radius baffle opening
 8. PIPING:
 - 16" DR 18 C900 inlet to aerator
 - 20" DR 18 C900 outlet
 - 20" DR 18 C900 interconnect
 - 20" DR 18 C900 overflow
 - 8" DR 18 C900 drain
 9. SS Vortex plate for 20" DIP outlet



CITY OF FERNANDINA BEACH

UTILITIES DEPARTMENT WASTEWATER DIVISION

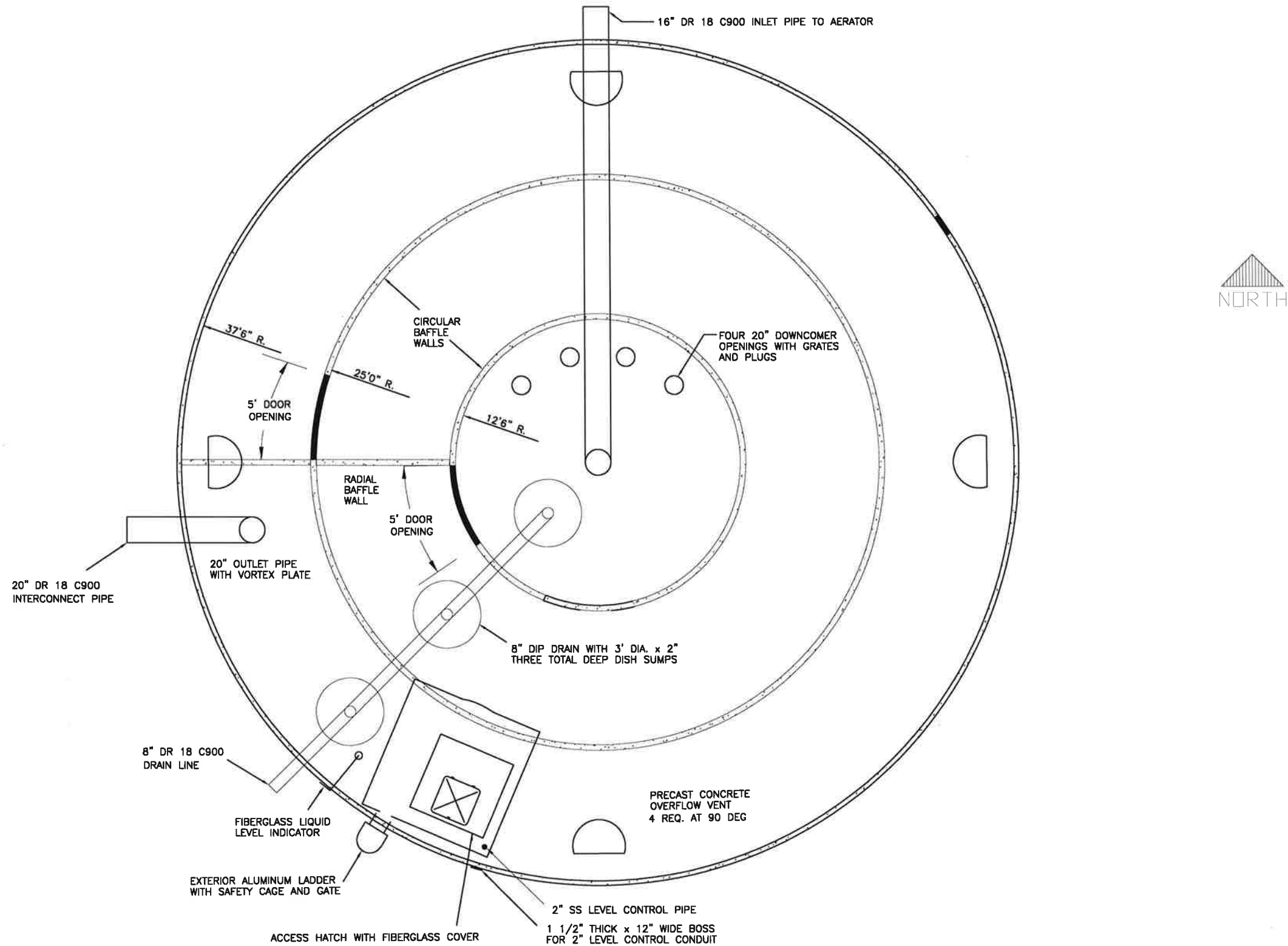
1180 S. 5TH STREET - FERNANDINA BEACH, FL 32034
TELEPHONE (904) 310-3421 - FAX (904) 310-3464

TANK PROFILE VIEW

	BY	DATE	PROJECT NO.
DESIGNED	JM	10/16/2019	20005
DRAWN	BE	10/16/2019	SCALE:
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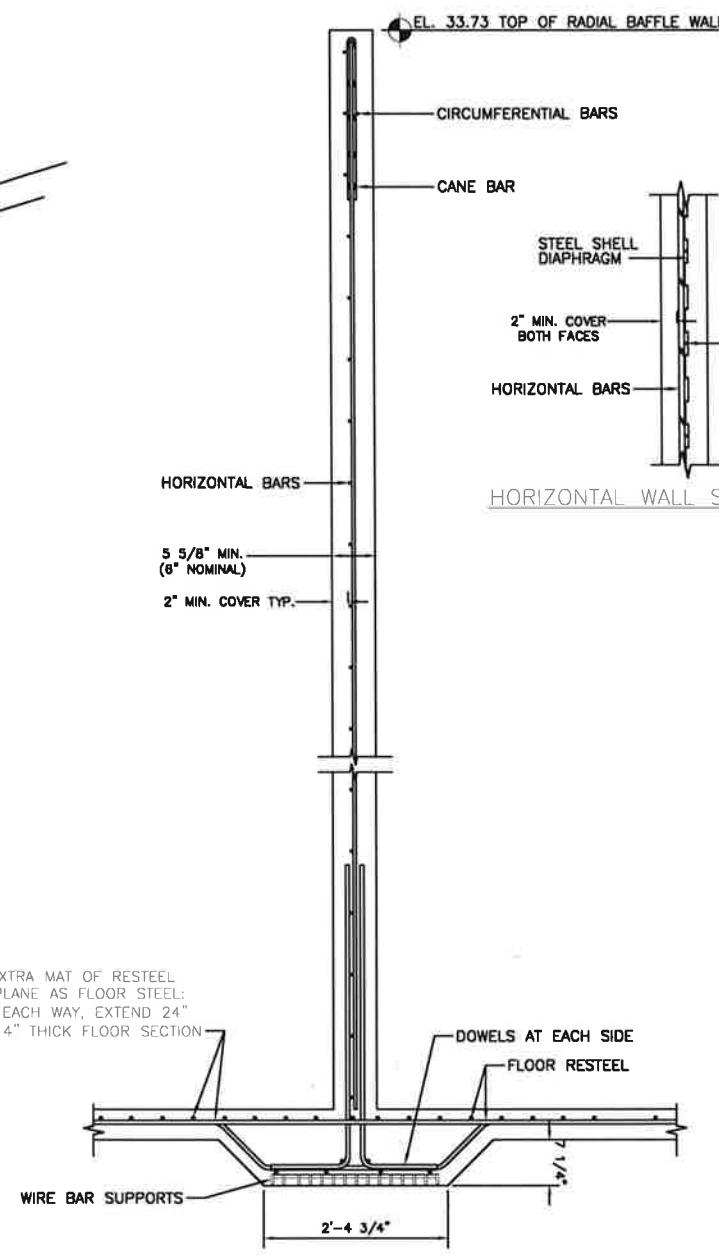
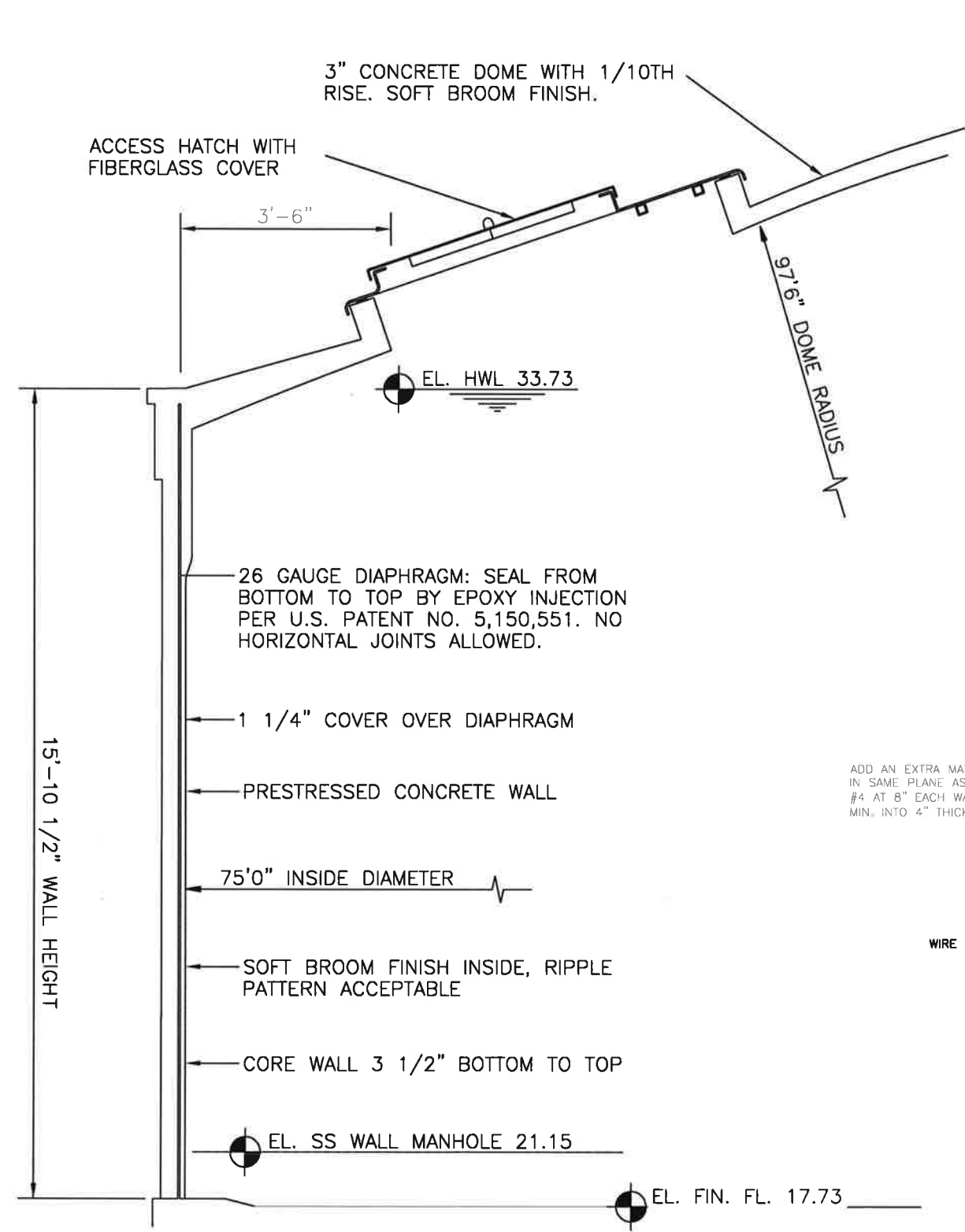
CITY OF FERNANDINA BEACH

UTILITIES DEPARTMENT WASTEWATER DIVISION

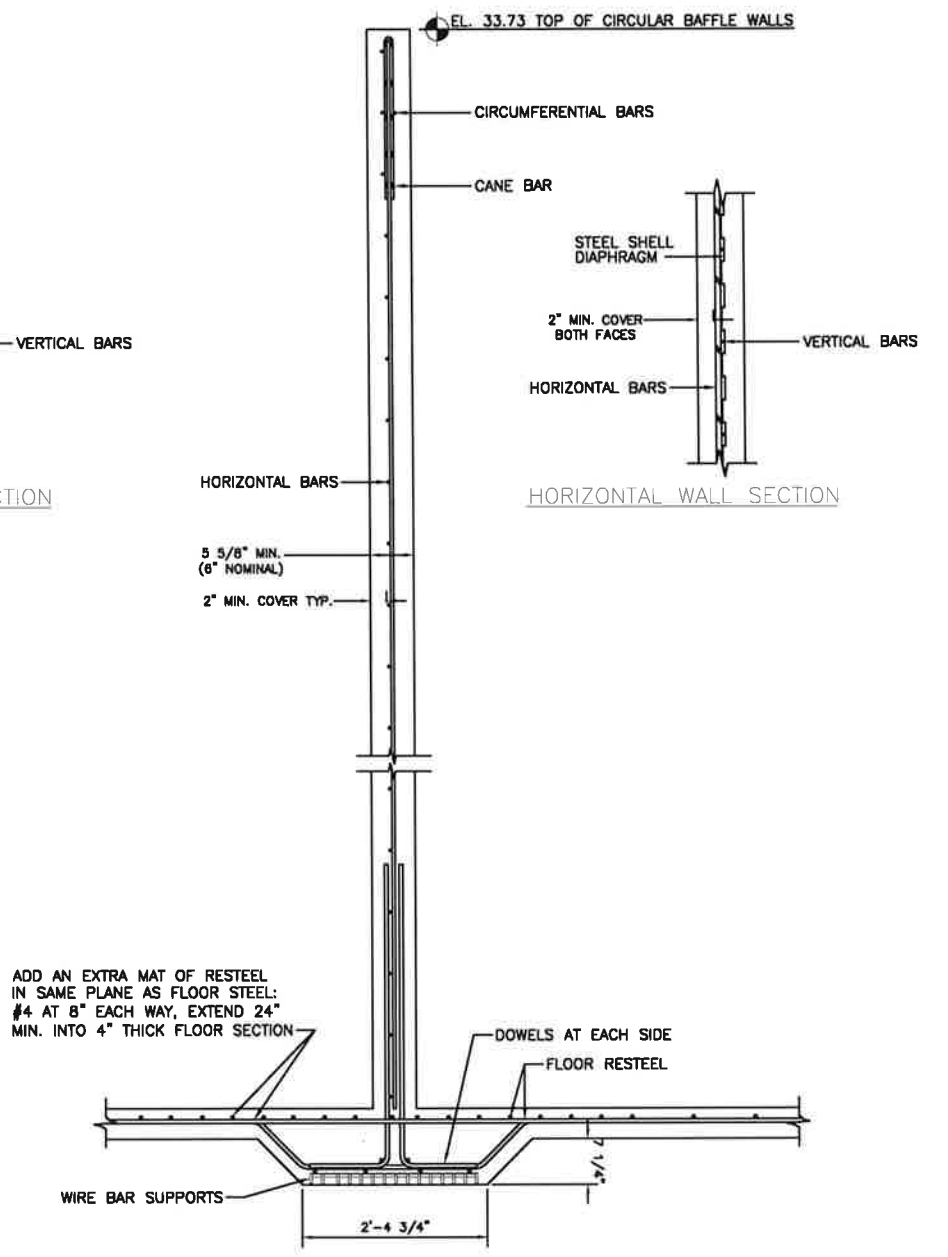
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TANK PLAN VIEW

	BY	DATE	PROJECT NO.
	DESIGNED	JM	10/16/2019
	DRAWN	BE	10/16/2019
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DATE:	FILE: SOLAR GROUND ARRAY3		SCALE: NOTED
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RADIAL SHOTCRETE BAFFLE WALL



CIRCULAR SHOTCRETE BAFFLE WALL

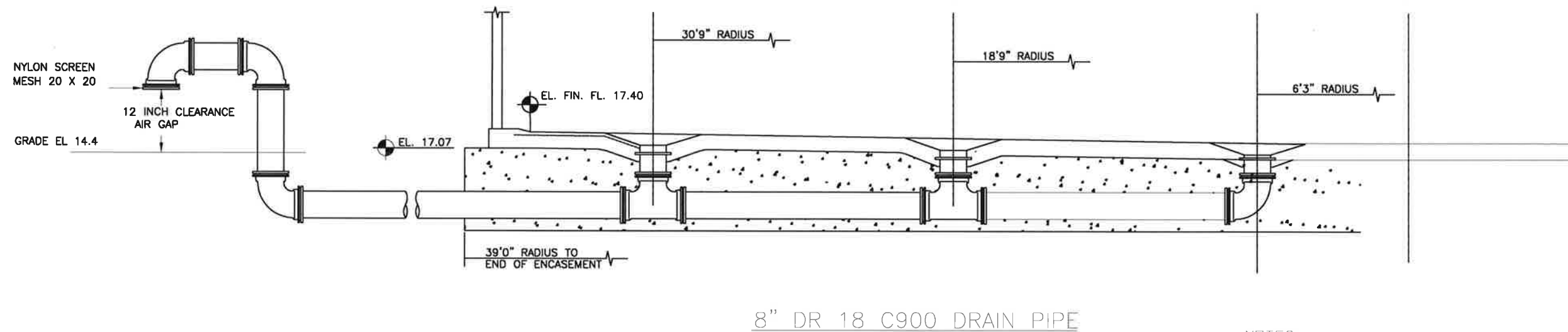
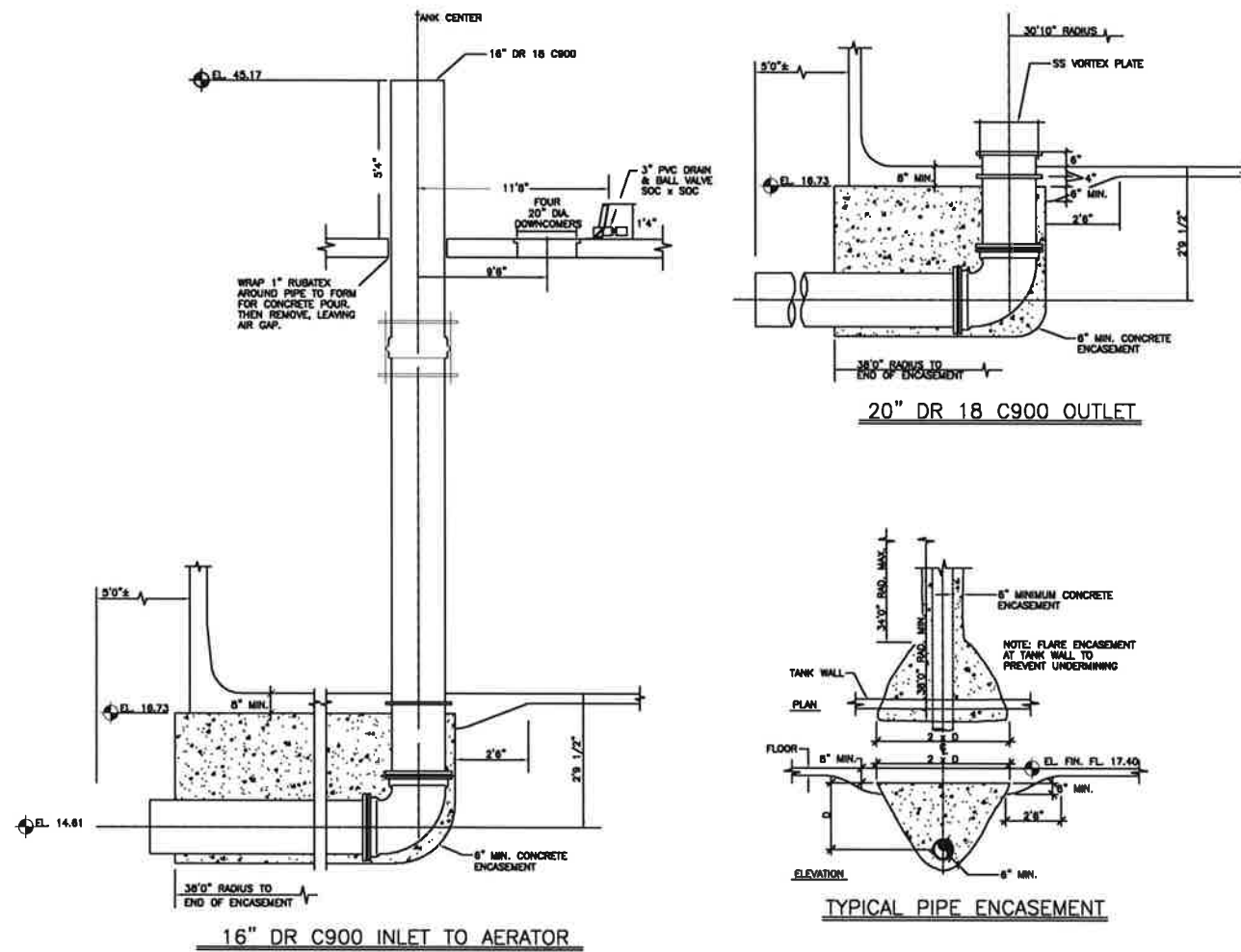
- NOTES:
- SHOTCRETE SHALL BE APPLIED BY OR UNDER DIRECT SUPERVISION OF NOZZLEMEN CERTIFIED BY THE AMERICAN CONCRETE INSTITUTE AS OUTLINED IN ACI CERTIFICATION PUBLICATION CP-60.
 - TENSION IN PRESTRESSING WIRE SHALL BE MEASURED BY AN ELECTRONIC DIRECT-READING STRESSOMETER ACCURATE TO WITHIN 2%.



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TANK WALL DETAIL

DATE: _____	DESIGNED	JM	10/16/2019	PROJECT NO.	20005
	DRAWN	BE	10/16/2019	SCALE	NOTED
	CHECKED	JM	10/16/2019	SHEET	7
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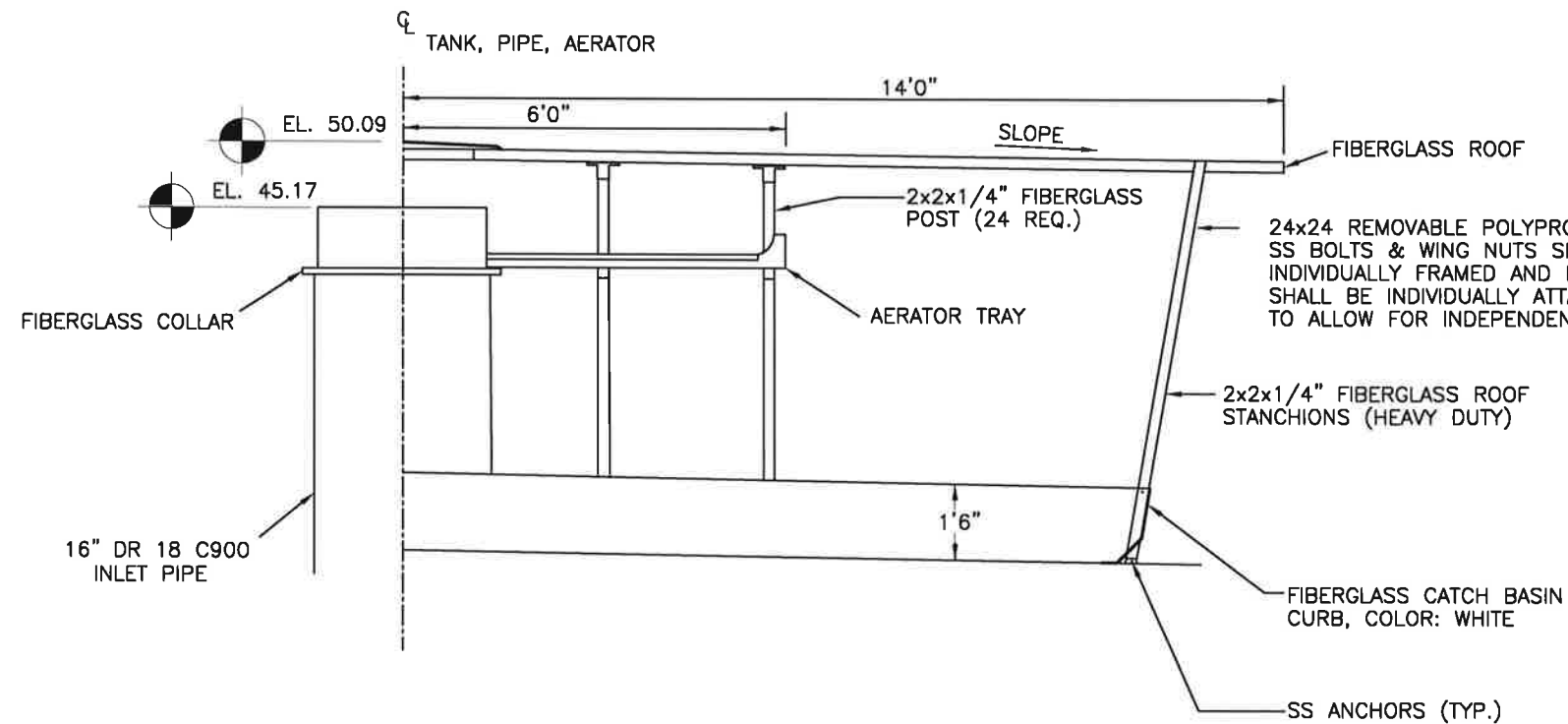
- NOTES:
 1. SUMPS 4 FT. DIA 6 INCH DEPTH
 2. WATER STOPS INSTALL 4" DEPTH



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TANK PIPING DETAIL

DATE: _____	BY	DATE	PROJECT NO.
	DESIGNED	JM 10/16/2019	20005
	DRAWN	BE 10/16/2019	SCALE
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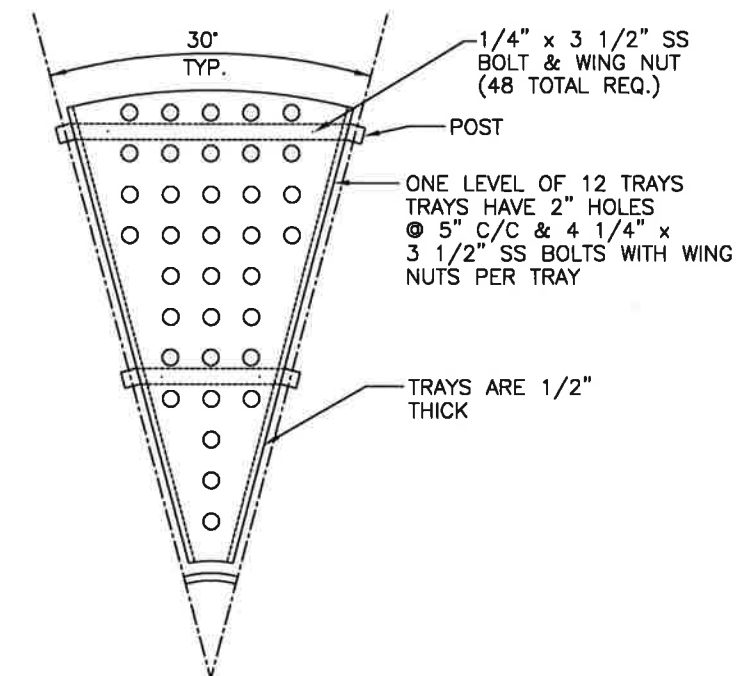
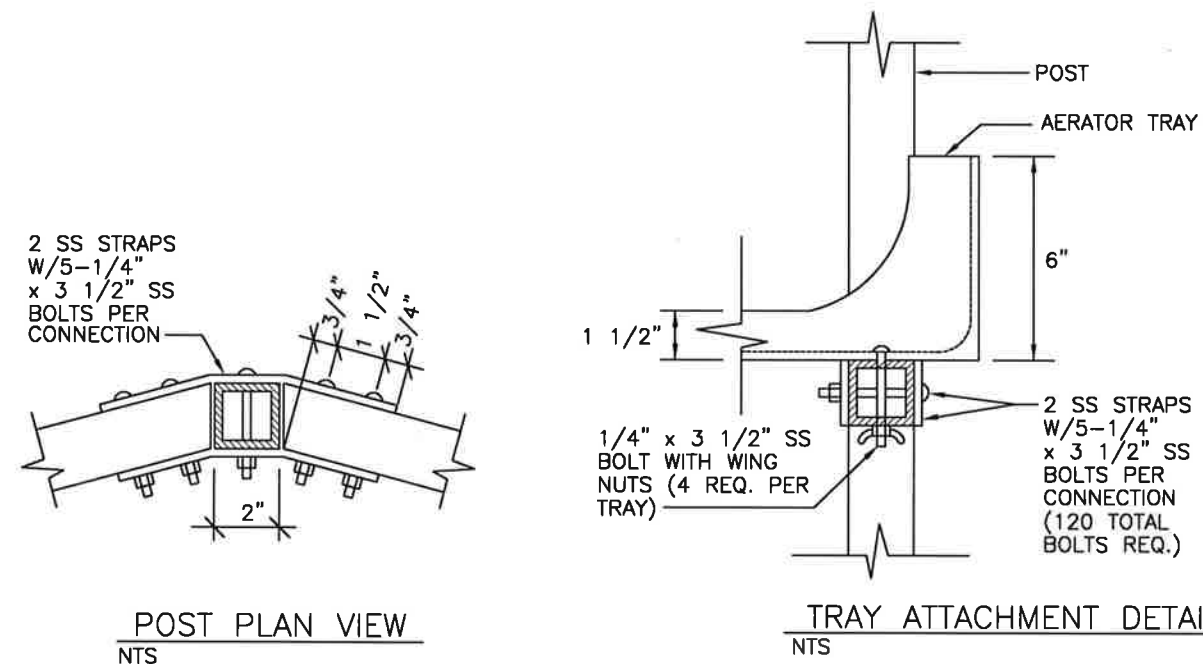


NOTES:

1. ALL WING NUTS MUST BE TIGHT WITH THREAD LOCK.
2. ALL OTHER NUTS ON AERATOR SHALL BE 316 SS LOCK NUTS.
3. ALL FIBERGLASS COMPONENTS IN CONTACT WITH POTABLE WATER TO BE COATED WITH NSF APPROVED EXPOXY.

5000 GPM PERFORATED TRAY FIBERGLASS AERATOR

NTS



AERATOR TRAY (12 REQ.)



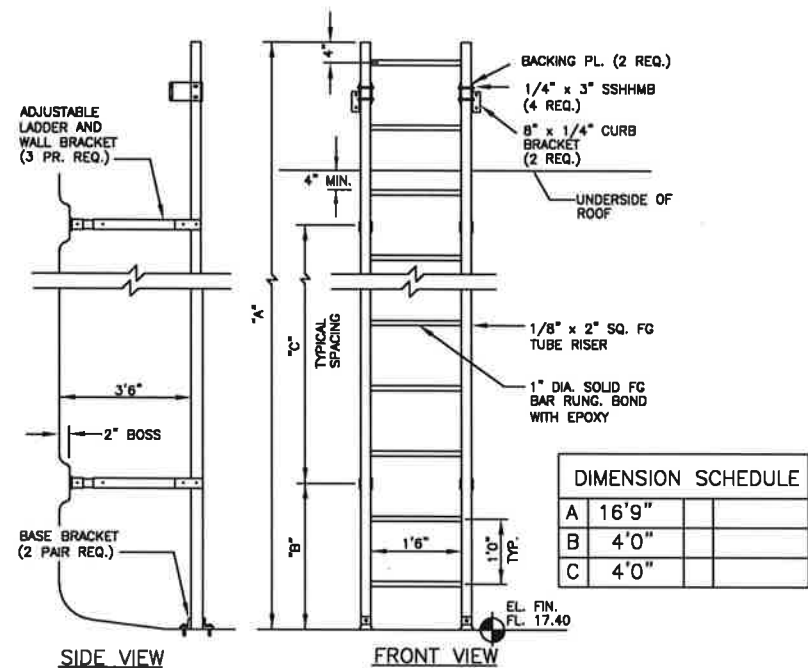
CITY OF FERNANDINA BEACH

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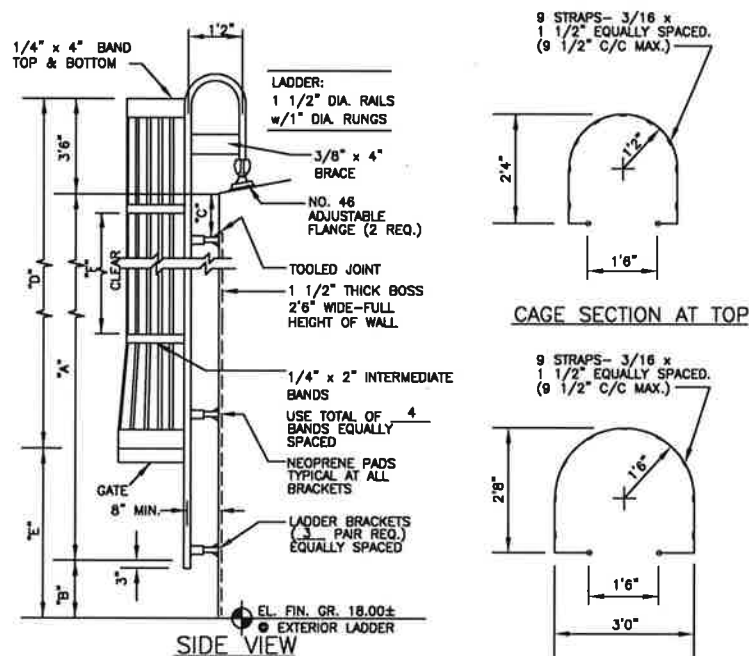
AERATOR

	BY	DATE	PROJECT NO.
DESIGNED	JM	10/16/2019	20005
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NOTE: 1/4" x 2" FLAT BAR FIBERGLASS CROSS-BRACE FOR WALL BRACKET SUPPORTS ON LADDERS OVER 20'0" TALL. INSTALL EVERY OTHER BRACKET

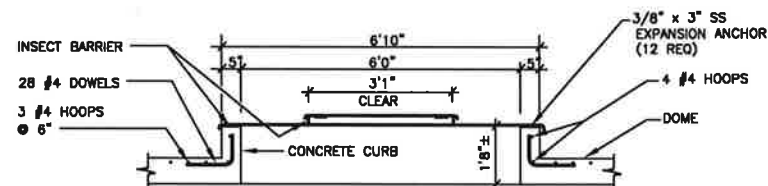
INTERIOR FIBERGLASS LADDER



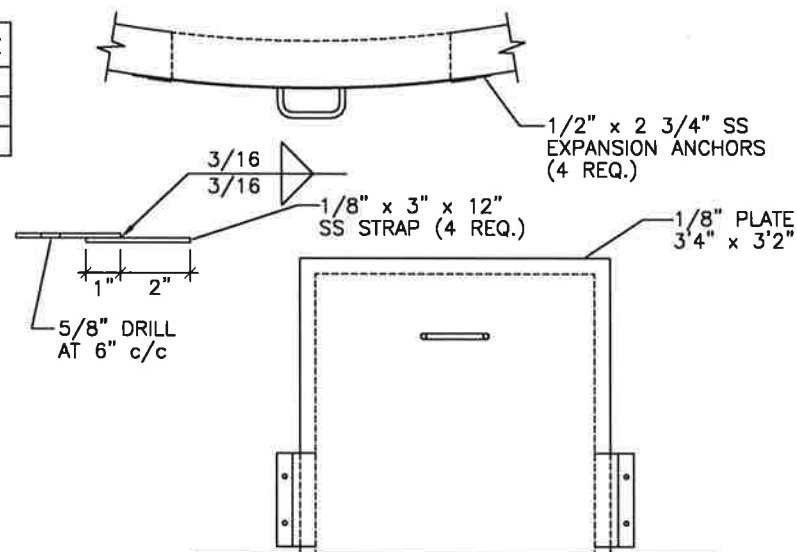
DIMENSION SCHEDULE			
A	14'0"	D	11'0"
B	1'2"±	E	7'8"
C	2'6"	F	3'4"

EXTERIOR ALUMINUM LADDER

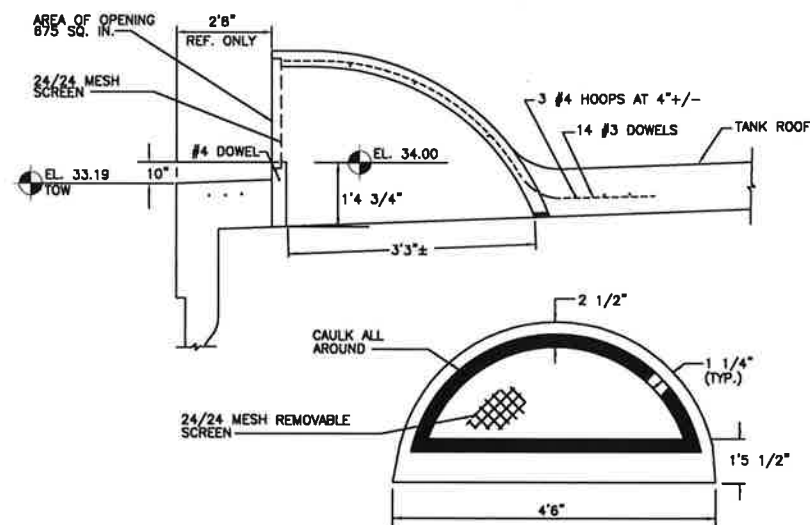
- NOTES: 1. ALL TUBULAR MATERIAL TO BE NOMINAL DIAMETER SCHEDULE 40 ALUMINUM PIPE 6061-T6 OR 6063-T6
2. PLATES AND GUSSETS TO BE STRUCTURAL GRADE ALUMINUM 6061-T6.



FIBERGLASS HATCH SECTION

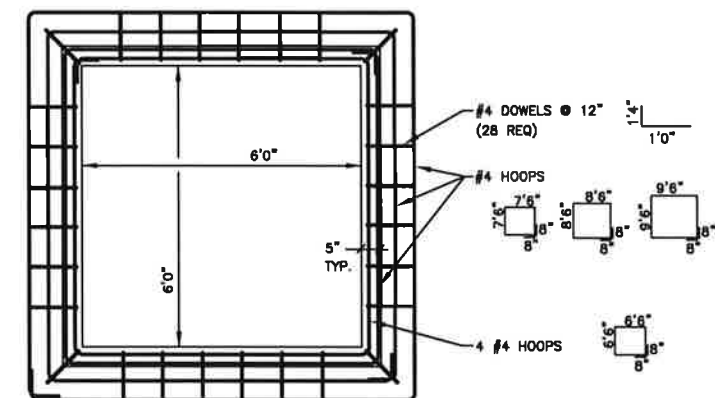
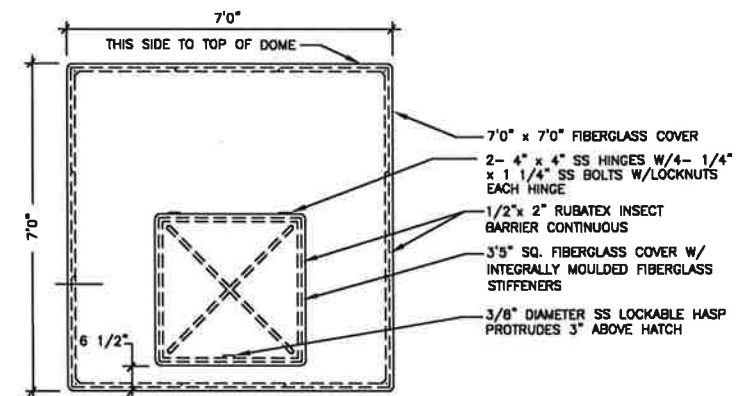


STAINLESS STEEL COVER

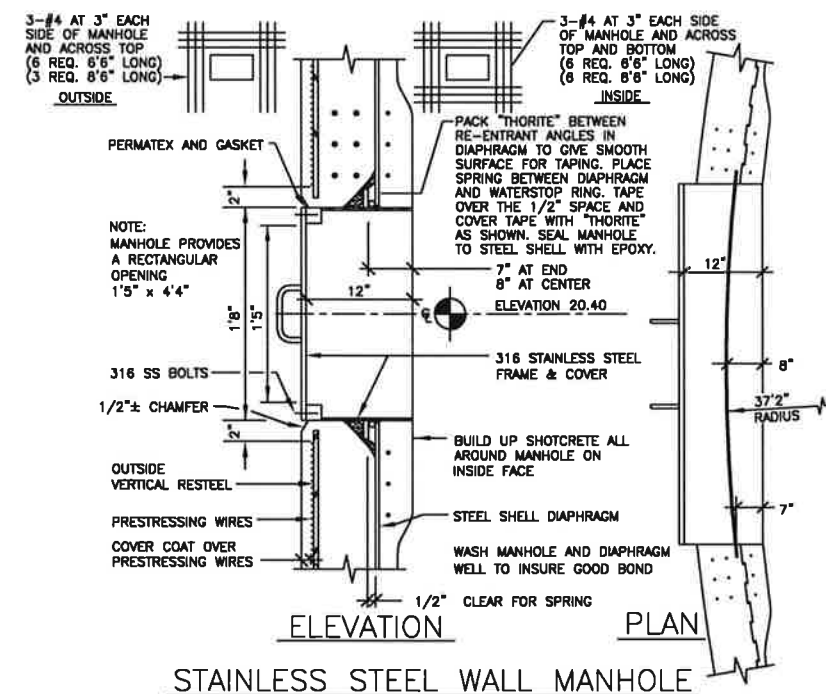


NOTE: KEEP SHOTCRETE REBOUND CLEANED OFF OF OVERFLOW. LEAVE PLYWOOD COVER IN PLACE UNTIL ALL SHOTCRETING IS COMPLETE

#675 PRECAST CONCRETE OVERFLOW



FIBERGLASS HATCH COVER



STAINLESS STEEL WALL MANHOLE



CITY OF FERNANDINA BEACH

UTILITIES DEPARTMENT WASTE-WATER DIVISION

1180 S. 5TH STREET - FERNANDINA BEACH, FL 32034
TELEPHONE: (904) 310-3421 - FAX: (904) 310-3464

DETAILS

DESIGNED	JM	DATE	10/16/2019	PROJECT NO.	20005
DRAWN	BE	DATE	10/16/2019	SCALE	NOTED
CHECKED	JM	DATE	10/16/2019	SHEET	10 OF 13
DATE					FILE: FDEP WP#3



3'0" SQ. x 1/4" THICK 304 SS VORTEX PLATE

5- 1 1/8" x 2'0" LONG 316 S.S. THREADED ROD WITH NUTS AND LOCK WASHERS

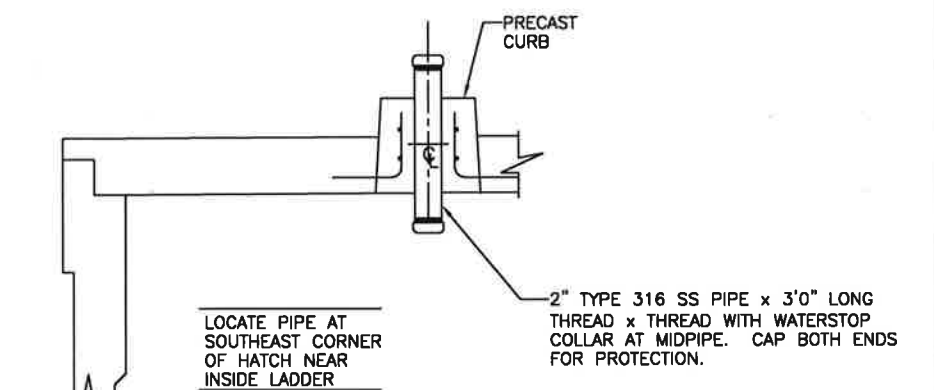
5- 1 1/4" HOLES AT 72"

1'6"

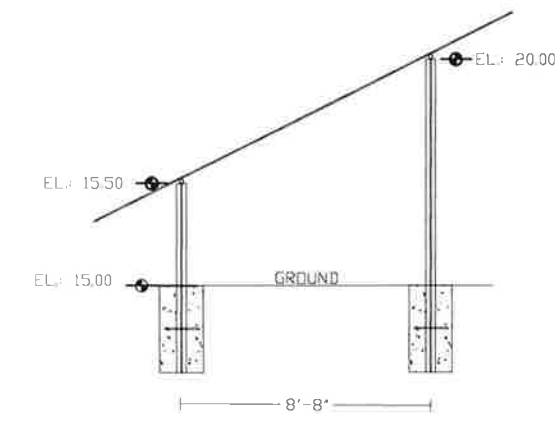
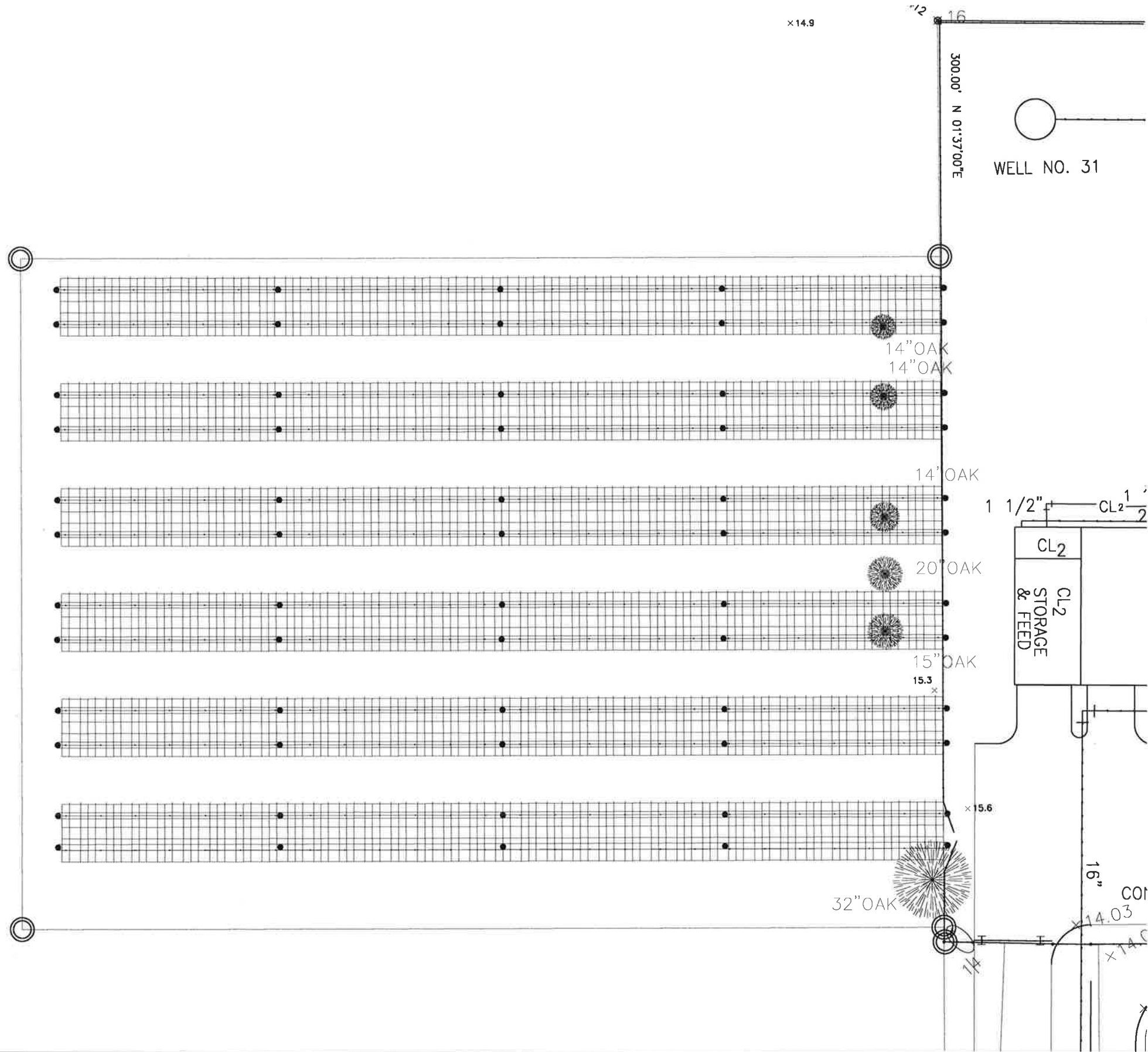
6"

EL. 17.40 FIN. FL.

20" DR 18 C900 OUTLET

SS VORTEX PLATE
NTS

2" LEVEL CONTROL PIPE
NTS



NOTES:

- 1.) INSTALL SIX 224' X 1.5' X 3' FOOTERS WITH FOUR #5 REBARS
- 2.) INSTALL 312 FOUR INCH SDR 26 POSTS WITH #5 REBAR CENTERED
- 3.) INSTALL 1,320 FEET OF SCHEDULE 80 ALUMINUM 6106 PIPE
- 4.) INSTALL 408 UNIRAC HD 204" RAILS
- 5.) INSTALL 12 GROUNDS EAST END OF ARRAYS
- 6.) ALL PIPE TO BE DRILLED TO BOLT ON POSTS
- 7.) INSTALL 1,020 JINKO 400 WATT PANELS MOUNTED 5/16" SS TO UNIRAC
- 8.) INSTALL 12 SOLETRICA
- 9.) INSTALL 10,000# CHANCE SCREW ANCHORS FIVE PER FOOTER
- 10.) REMOVE SIX OAK TREES TOTAL OF 109 INCHES
- 11.) WELD 5/8" SS ONTO #5 REBAR CENTER OF POST TO HOLD PIPE
- 12.) TIGHTEN 5/8 SS LOCK NUT TO HOLD PIPE TO 4 INCH COLUMN
- 13.) FOOTER 5,000 PSI MIX SLUMP OF 4
- 14.) POST 5,000 PSI PUMP MIX SLUMP OF 5
- 15.) POST SPACED 9 FEET CENTER TO CENTER
- 16.) INSTALL INVERTERS ON EAST END SIDE BY SIDE



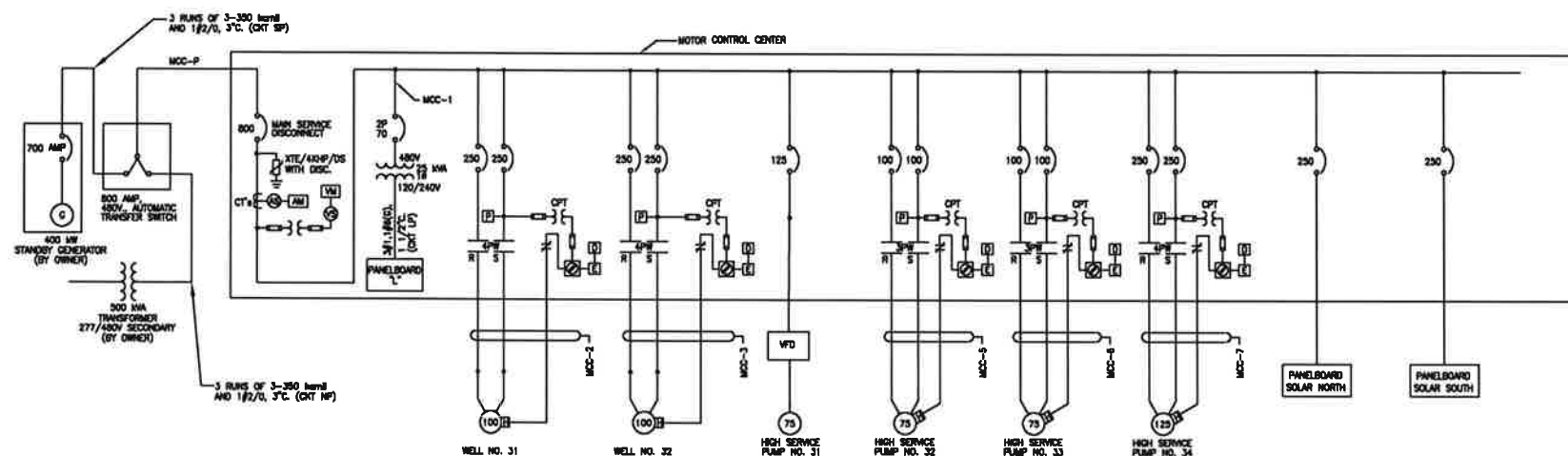
CITY OF FERNANDINA BEACH

UTILITIES DEPARTMENT WASTEWATER DIVISION

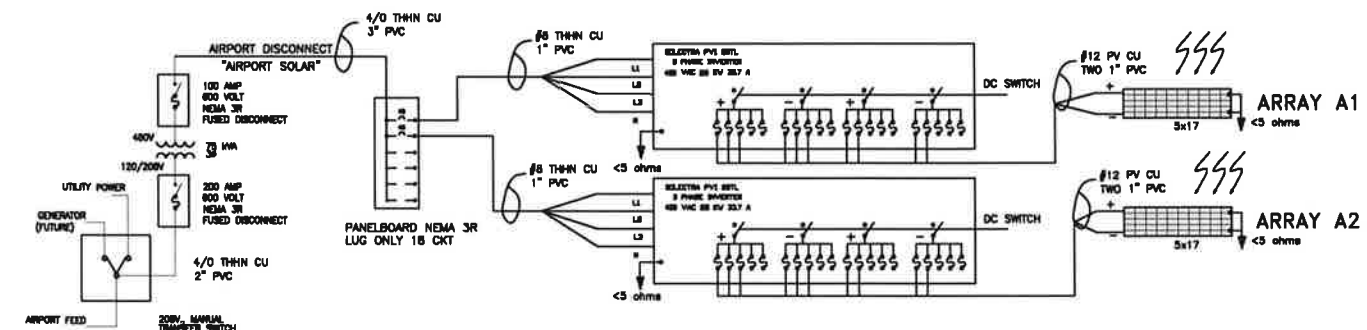
1180 S. 5TH STREET - FERNANDINA BEACH, FL 32034
 TELEPHONE: (904) 310-3421 - FAX (904) 310-3464

SOLAR LAYOUT

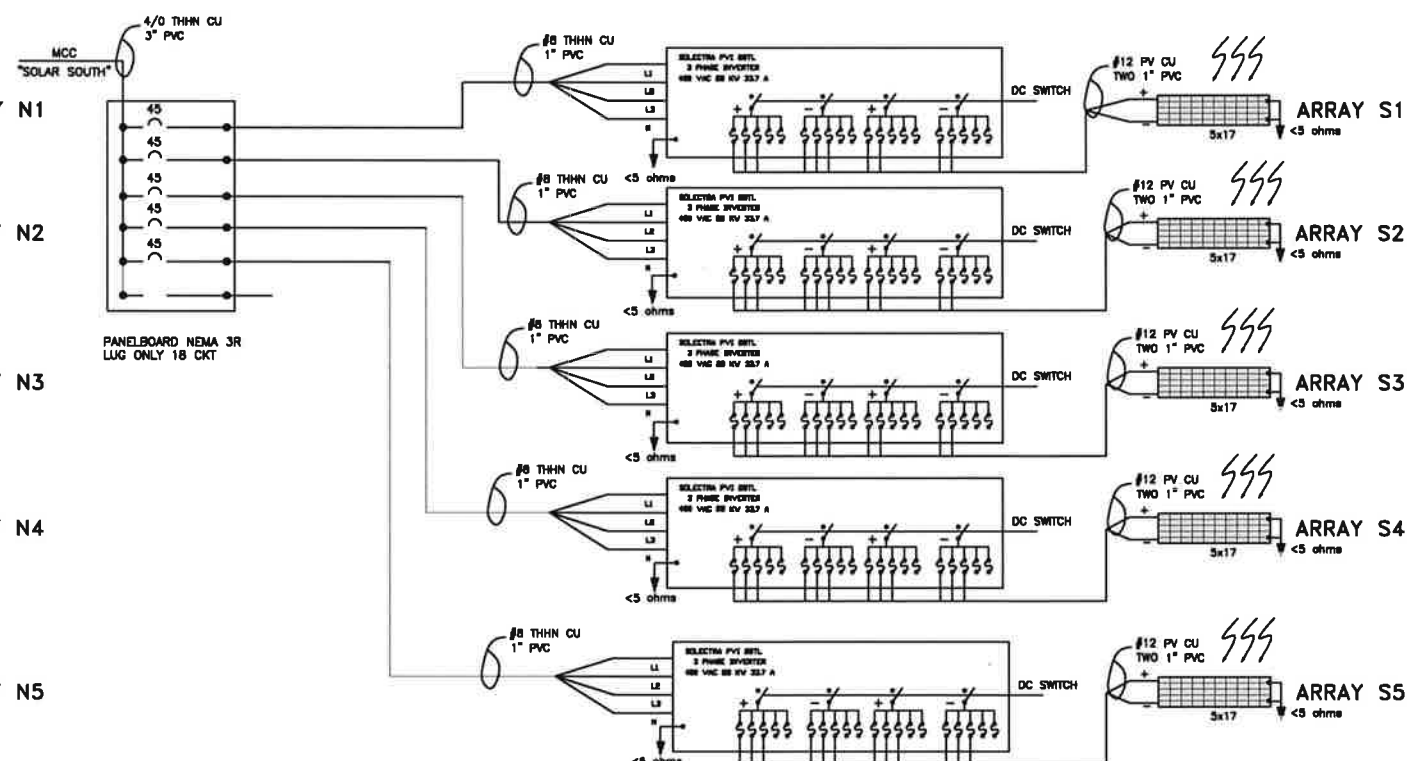
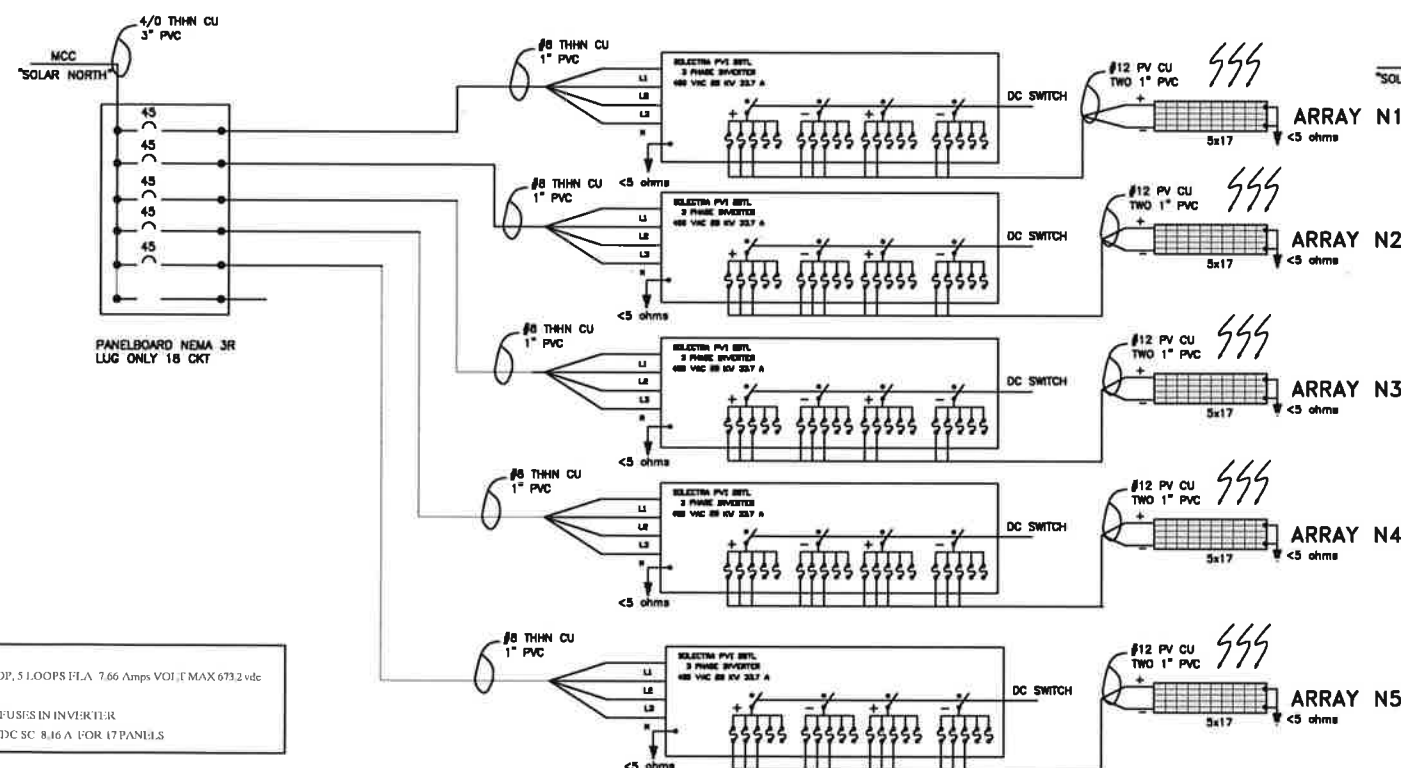
	BY	DATE	PROJECT NO.
DESIGNED	JM	10/16/2019	201900000
DRAWN	BE	10/16/2019	SCALE:
CHECKED	JM	10/16/2019	NOTED
			SHEET:
DATE:			FILE: SOLAR GROUND ARRAY3



WATER PLANT 3 ONE LINE DIAGRAM



AIRPORT SOLAR POWER ONE LINE



- NOTES:
- ARRAY 17 PANELS PER LOOP, 5 LOOPS FLA 7.66 Amps VOLT MAX 673.2 vdc
 - 1000 VOLT PV WIRE #12 CU
 - 15 AMP 1000 VOLT MIDGET FUSES IN INVERTER
 - OPEN CIRCUIT MAX 824.5 VDC SC 8.16 A FOR 17 PANELS



CITY OF FERNANDINA BEACH

UTILITIES DEPARTMENT WASTE WATER DIVISION

1180 S. 5111 STREET - FERNANDINA BEACH, FL 32034
TELEPHONE (904) 310-3421 - FAX (904) 310-3464

ELECTRICAL

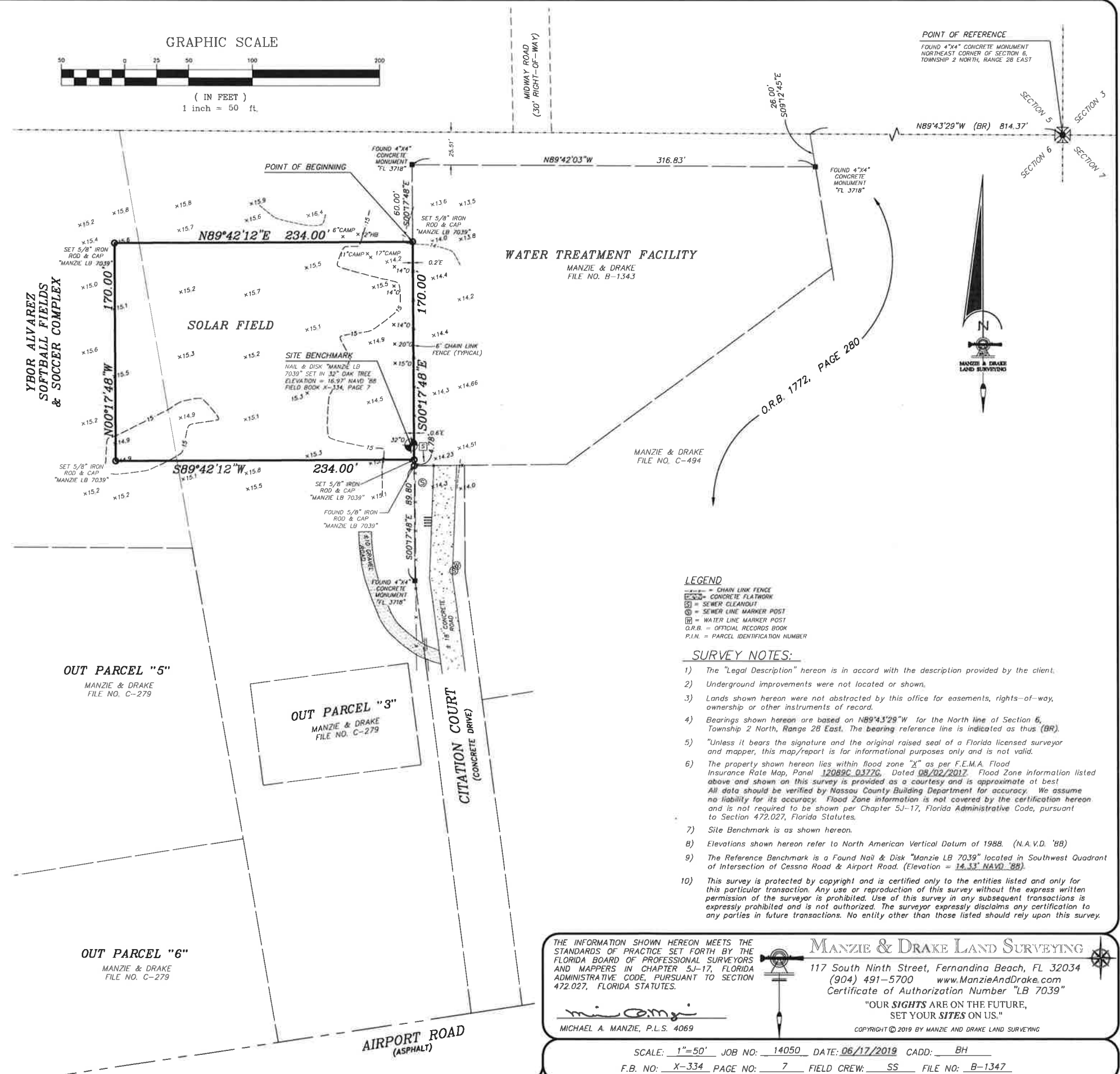
DESIGNED	JM	10/16/219	PROJECT NO.	201900000
DRAWN	BE	10/16/2019	SCALE	NOTED
CHECKED	JM	10/16/2019	SHEET	13
DATE			FILE	SOLAR GROUND ARRAY3

MAP OF BOUNDARY & TOPOGRAPHIC SURVEY

A PORTION OF SECTION 6, TOWNSHIP 2 NORTH, RANGE 28 EAST, NASSAU COUNTY, FLORIDA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

FOR A POINT OF REFERENCE COMMENCE AT THE NORTHEAST CORNER OF SAID SECTION 6; THENCE NORTH 89°43'29" WEST, ALONG THE NORTH LINE OF SAID SECTION 6, A DISTANCE OF 814.37 FEET; THENCE SOUTH 09°12'45" EAST, ALONG THE WESTERLY LINE OF LANDS DESCRIBED IN OFFICIAL RECORDS BOOK 1772, PAGE 280, OF THE PUBLIC RECORDS OF NASSAU COUNTY, FLORIDA, A DISTANCE OF 26.00 FEET; THENCE NORTH 89°42'03" WEST, A DISTANCE OF 316.83 FEET; THENCE SOUTH 00°17'48" EAST A DISTANCE OF 60.00 FEET TO POINT OF BEGINNING; THENCE CONTINUE SOUTH 00°17'48" EAST A DISTANCE OF 170.00 FEET; THENCE SOUTH 89°42'12" WEST A DISTANCE OF 234.00 FEET; THENCE NORTH 00°17'48" WEST A DISTANCE OF 170.00 FEET; THENCE NORTH 89°42'12" EAST A DISTANCE OF 234.00 FEET TO THE POINT OF BEGINNING.

CONTAINING 0.913 ACRES MORE OR LESS.



TREE LEGEND

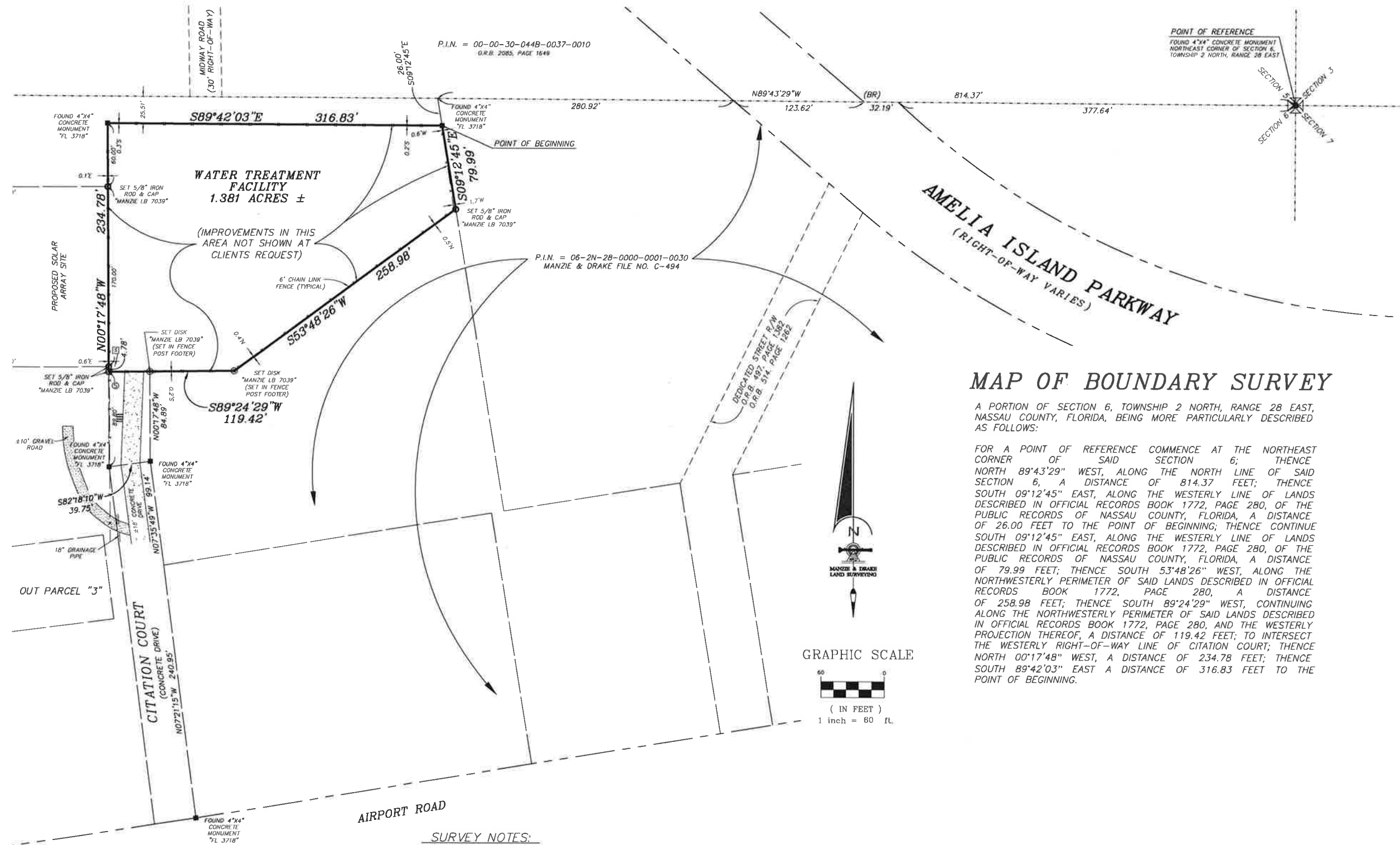
CAMP = CAMPHOR TREE
HB = HACKBERRY TREE
O = OAK TREE

TREE DISCLAIMER

NUMBER OF TREES SHOWN ON SURVEY: 10

SPECIES OF TREES HAVE BEEN IDENTIFIED TO THE BEST OF OUR KNOWLEDGE AND BELIEF; HOWEVER, MANZIE & DRAKE LAND SURVEYING WILL ASSUME NO LIABILITY, EXPRESSED OR IMPLIED, FOR THE CORRECTNESS OF SAID SPECIES IDENTIFICATION.

TREES HAVE BEEN LOCATED AS ACCURATELY AS POSSIBLE UNDER CURRENT CONDITIONS AND HAVE A POSITIONAL TOLERANCE OF APPROXIMATELY 2 TO 3 FEET. CRITICAL TREES SHOULD BE VERIFIED PRIOR TO CONSTRUCTION.



SURVEY NOTES:

- 1) The "Legal Description" hereon is in accord with the description provided by the client.
- 2) Underground improvements were not located or shown.
- 3) Lands shown hereon were not abstracted by this office for easements, rights-of-way, ownership or other instruments of record.
- 4) Bearings shown hereon are based on N89°43'29"W for the North line of Section 6, Township 2 North, Range 28 East. The bearing reference line is indicated as thus (BR).
- 5) "Unless it bears the signature and the original raised seal of a Florida licensed surveyor and mapper, this map/report is for informational purposes only and is not valid."
- 6) The property shown hereon lies within flood zone "X" as per F.E.M.A. Flood Insurance Rate Map, Panel 12089C 0372G, Dated 08/02/2012. Flood Zone information listed above and shown on this survey is provided as a courtesy and is approximate at best. All data should be verified by Nassau County Building Department for accuracy. We assume no liability for its accuracy. Flood Zone information is not covered by the certification hereon and is not required to be shown per Chapter 5J-17, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.
- 7) This survey is protected by copyright and is certified only to the entities listed and only for this particular transaction. Any use or reproduction of this survey without the express written permission of the surveyor is prohibited. Use of this survey in any subsequent transactions is expressly prohibited and is not authorized. The surveyor expressly disclaims any certification to any parties in future transactions. No entity other than those listed should rely upon this survey.

LEGEND

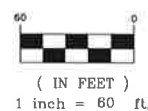
- - - CHAIN LINK FENCE
- CONCRETE FLATWORK
- SEWER CLEANOUT
- SEWER LINE MARKER POST
- WATER LINE MARKER POST
- O.R.B. = OFFICIAL RECORDS BOOK
- P.I.N. = PARCEL IDENTIFICATION NUMBER

MAP OF BOUNDARY SURVEY

A PORTION OF SECTION 6, TOWNSHIP 2 NORTH, RANGE 28 EAST, NASSAU COUNTY, FLORIDA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

FOR A POINT OF REFERENCE COMMENCE AT THE NORTHEAST CORNER OF SAID SECTION 6; THENCE NORTH 89°43'29" WEST, ALONG THE NORTH LINE OF SAID SECTION 6, A DISTANCE OF 814.37 FEET; THENCE SOUTH 09°12'45" EAST, ALONG THE WESTERLY LINE OF LANDS DESCRIBED IN OFFICIAL RECORDS BOOK 1772, PAGE 280, OF THE PUBLIC RECORDS OF NASSAU COUNTY, FLORIDA, A DISTANCE OF 26.00 FEET TO THE POINT OF BEGINNING; THENCE CONTINUE SOUTH 09°12'45" EAST, ALONG THE WESTERLY LINE OF LANDS DESCRIBED IN OFFICIAL RECORDS BOOK 1772, PAGE 280, OF THE PUBLIC RECORDS OF NASSAU COUNTY, FLORIDA, A DISTANCE OF 79.99 FEET; THENCE SOUTH 53°48'26" WEST, ALONG THE NORTHWESTERLY PERIMETER OF SAID LANDS DESCRIBED IN OFFICIAL RECORDS BOOK 1772, PAGE 280, A DISTANCE OF 258.98 FEET; THENCE SOUTH 89°24'29" WEST, CONTINUING ALONG THE NORTHWESTERLY PERIMETER OF SAID LANDS DESCRIBED IN OFFICIAL RECORDS BOOK 1772, PAGE 280, AND THE WESTERLY PROJECTION THEREOF, A DISTANCE OF 119.42 FEET; TO INTERSECT THE WESTERLY RIGHT-OF-WAY LINE OF CITATION COURT; THENCE NORTH 00°17'48" WEST, A DISTANCE OF 234.78 FEET; THENCE SOUTH 89°42'03" EAST A DISTANCE OF 316.83 FEET TO THE POINT OF BEGINNING.

GRAPHIC SCALE



THE INFORMATION SHOWN HEREON MEETS THE STANDARDS OF PRACTICE SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL SURVEYORS AND MAPPERS IN CHAPTER 5J-17, FLORIDA ADMINISTRATIVE CODE, PURSUANT TO SECTION 472.027, FLORIDA STATUTES.

Michael A. Manzie
MICHAEL A. MANZIE, P.L.S. 4069

MANZIE & DRAKE LAND SURVEYING

117 South Ninth Street, Fernandina Beach, FL 32034
(904) 491-5700 www.ManzieAndDrake.com
Certificate of Authorization Number "LB 7039"

"OUR SIGHTS ARE ON THE FUTURE,
SET YOUR SITES ON US."

COPYRIGHT © 2019 BY MANZIE & DRAKE LAND SURVEYING

SCALE: 1"=60' JOB NO: 14050 DATE: 06/17/2019 CADD: BH
F.B. NO: X-334 PAGE NO: 7 FIELD CREW: SS FILE NO: B-1343



WATER REGULATION OF STORMWATER MANAGEMENT SYSTEMS CHAPTER 40C-42, F.A.C. DISTRICT

Henry Dean, Executive Director
John R. Wehle, Assistant Executive Director

POST OFFICE BOX 1429

TELEPHONE 904-329-4500
TDD 904-329-4450

PALATKA, FLORIDA 32178-1429

1-800-451-7106
TDD SUNCOM 860-4450

FAX (Executive) 329-4125 (Legal) 329-4485 (Permitting) 329-4315 (Administration/Finance) 329-4508

618 E. South Street
Jacksonville, Florida 32256
1-877-228-1658
FAX 407-897-4354
TDD 407-897-5960

7775 Baymeadows Way
Jacksonville, Florida 32256
904-730-6270
1-800-852-1563
FAX 904-730-6267
TDD 904-488-7944

PERMITTING:
305 East Drive
Melbourne, Florida 32904
407-984-4940
1-800-295-3264

OPERATIONS:
2133 N. Wickham Road
Melbourne, Florida 32935-8109
407-752-3100
TDD 407-752-3102

PERMIT NO. 42-089-64759-1

AUTHORIZATION:

A new stormwater system with stormwater treatment by dry detention to serve FPU Treatment Plant No 3 Fernandina Beach, a 3.37 acre project to be constructed as per plans received by the District on 3/30/2000.

LOCATION

Section: 6 Township: 2 N Range: 28

County Name: Nassau

ISSUED TO:

Florida Public Utilities Co

PO Box 418

Fernandina Beach, FL, 32034



This document shall serve as the formal permit for construction and operation of stormwater management system in accordance with Chapter 40C-42, F.A.C., issued by the staff of the St. Johns River Water Management District on 4/28/2000. This permit is subject to the standard limiting conditions and other special conditions approved by the staff. These conditions are enclosed.

This permit is a legal document and should be kept with your other important records. The permit requires the submittal of an As-built certification and may require submittal of other documents. All information provided in compliance with permit conditions should be submitted to the District office from which the permit was issued. An As-built certification form is attached. Complete this form within 30 days of completion of construction of the permitted system, including all site work. Upon receipt of the As-built certification, staff will inspect the project site. Once the project is found to be in compliance with all permit requirements, the permit may be converted to its operation phase and responsibility transferred to the operation and maintenance entity in accordance with chapter 40C-42.028, F.A.C.

Permit issuance does not relieve you from the responsibility for obtaining permits from any federal, state, and/or local agencies asserting concurrent jurisdiction over this work. Please note that if dewatering is to occur during any phase of construction or thereafter and the surface water pump(s), wells, or facilities are capable of withdrawing one million gallons of water per day or more, or an average of 100,000 gallons per day or more over a year, and any discharge is to be off-site, you must apply for and obtain a Consumptive Use Permit (40C-2) from the District prior to starting the dewatering. Please contact the District if you need additional information or application materials.

William Kerr, CHAIRMAN
MELBOURNE BEACH

Ometrias D. Long, VICE CHAIRMAN
APOPKA

Jeff K. Jennings, SECRETARY
MAITLAND

Duane Ottenstroer, TREASURER
SWITZERLAND

Dan Roach
FERNANDINA BEACH

William M. Segal
MAITLAND

Otis Mason
ST. AUGUSTINE

Clay Albright
EAST LAKE WEIR

Reid Hughes
DAYTONA BEACH



Federal Aviation Administration

October 07, 2019

TO:

City of Fernandina Beach, Florida

Attn: Nathan Coyle

700 Airport Road

Fernandina Beach, FL 32035

ncogle@fbfl.org

RE: *(See attached Table 1 for referenced case(s))*

****FINAL DETERMINATION****

Table 1 - Letter Referenced Case(s)

ASN	Prior ASN	Location	Latitude (NAD83)	Longitude (NAD83)	AGL (Feet)	AMSL (Feet)
2019-ASO-5784-NRA		FERNANDINA BEACH,FL	30-37-06.68N	81-27-43.20W	25	40
2019-ASO-5785-NRA		FERNANDINA BEACH,FL	30-37-08.35N	81-27-45.89W	25	40
2019-ASO-5786-NRA		FERNANDINA BEACH,FL	30-37-08.32N	81-27-43.25W	25	40
2019-ASO-5787-NRA		FERNANDINA BEACH,FL	30-37-06.66N	81-27-45.69W	25	40

Description: - Proposed solar array site. This case is for the SW corner of the propose development site.

We do not object to the construction described in this proposal provided:

You comply with the requirements set forth in FAA Advisory Circular 150/5370-2, "Operational Safety on Airports During Construction."

- A NOTAM is issued during the construction project alerting aircraft of possible hazards while operating on the airport. Airport manager issues all necessary NOTAMS.
- All RSA, ROFA, TSA and TOFA are clear of all personnel and equipment and no penetrations of the areas during construction. Insure no persons or equipment are any closer than 200 feet of runway centerline while the runway is operational.
- Comply with FAA AC 70/7460-1K, Obstruction Marking and Lighting.
- AC 150/5210-5D, Painting, Marking and Lighting of vehicles used on an Airport must be met.
- The temporary construction equipment is used during daylight hours and VFR conditions only, and is lowered when not in use, during the hours between sunset and sunrise, and/or during IFR weather conditions.

This determination is based, in part, on the foregoing description, which includes specific coordinates, heights, frequencies and power. Any change in coordinates, heights, frequencies or use of greater power will void this

determination. Any future construction or alteration, including increases in heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground. In making this determination, the FAA has considered matters such as the effect the proposal would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA) and natural objects within the affected area would have on the airport proposal.

This determination does not include any environmental analysis or environmental approval for this proposal. All local and state requirements and/or permits must be obtained prior to construction of this proposal. It does not include approval of any lease, does not release any surplus or grant agreement acquired airport property, nor does it relieve the airport owner or the proponent of compliance with FAR, Part 155, or any other law, ordinance, or regulation of federal, state, or local government body or organization.

A separate notice to the FAA is required for any construction equipment, such as temporary cranes, whose working limits would exceed the height and lateral dimensions of your proposal.

This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

When your Airport Layout Plan is updated, please include this new development. In the meantime, we will show this feature on your current ALP approved on 09/19/2016.

This determination expires on April 7, 2021 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for the completion of construction, or the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be obtained at least 15 days prior to expiration date specified in this letter.

If you have any questions concerning this determination contact Richard Owen (407) 487-7236 richard.owen@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2019-ASO-5787-NRA.

Richard Owen

Specialist

Signature Control No: 416629505-419034414

cc:

Land-Use Manager, FDOT/Central Office



SOLAR PHOTOVOLTAIC GLARE ASSESSMENT

Fernandina Beach Municipal Airport

for City of Fernandina Beach

I ADMINISTRATION PAGE

Job Reference:	GAC170
Date:	September 2019
Prepared for:	City of Fernandina Beach
Author:	Cianan Sims
Telephone	(937) 802-5836
Email	cianan@simsindustries.com

Issue	Date	Detail of Changes
I	September 2019	Initial issue

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Sims Industries, LLC
 6077 Far Hills Ave #101
 Centerville, Ohio 45459, USA.

T: (937) 802-5836
 E: info@simsindustries.com
 W: www.simsindustries.com

2 EXECUTIVE SUMMARY

2.1 PURPOSE OF REPORT

This Solar Photovoltaic (“PV”) Glare Assessment demonstrates that the construction and long-term operation of a ground-mount solar installation at Fernandina Beach Municipal Airport (“FBMA”) is acceptably safe for implementation and ongoing airport operations as required by the 2013 FAA Interim Policy 78 FR 63276. The proposed development is located adjacent to the water treatment facility, on airport grounds. This Assessment has been prepared by Sims Industries, LLC (“SI”) for the City of Fernandina Beach, to identify and describe risks due to potential PV glare from the proposed solar facility. All distance values are specified in feet unless otherwise noted.

The current 2013 FAA Interim Policy on glare specifies the following requirements for PV facilities, assuming an annual, minute-by-minute analysis [1]:

- PV arrays may not cause any glare for air traffic controllers
- PV arrays may reflect “green” glare, which has low potential to cause an after-image, toward aircraft on a 2-mile straight approach path

2.2 COMPONENTS UNDER CONSIDERATION

One photovoltaic site was evaluated for potential glare. It comprises a single footprint with six banks of PV panels, each utilizing an orientation of 180.3° and tilt of 27.43°.

Potential glare impacts were assessed for six runway approach paths at FBMA:

- Runway 04/22 heading northeast/southwest
- Runway 09/27 heading east/west
- Runway 13/31 heading southeast/northwest

2.3 ASSESSMENT FINDINGS

The FAA requires no glare of any kind for air traffic controllers to ensure they are not impacted by PV installations. FBMA does not utilize an air traffic control tower.

The FAA allows green glare, but not yellow glare, for 2-mile approach paths [1]. The proposed site at FBMA adheres to these requirements when utilizing the specified module configuration.

Table 1 – Expected glare hazard for runway receptors

	Predicted Glare	Adheres to FAA Policy?
R04	None	✓
R22	None	✓
R09	Green	✓
R27	Green	✓
R13	Green	✓
R31	None	✓

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4 INTRODUCTION TO SOLAR GLARE

4.1 PV MODULES

A PV array comprises many PV panels, or modules. PV modules are typically covered with a layer of glass for protection from damage and soiling. The module components and the glass cover can reflect hazardous amounts of sunlight. The amount of light reflected depends on the amount of incoming sunlight, the position of the sun relative to the panels, and various panel material and environmental properties.

The orientation and tilt of a PV array is referred to as the module configuration. Panel orientation represents the clockwise rotation of the panels from due north at 0° . For example, modules in the U.S. are often oriented 180° , i.e. due south. The panel tilt refers to the elevation of the panel above the horizontal plane. A panel tilted 0° lies flat on the ground, whereas a panel at 90° is propped up to face the horizon.

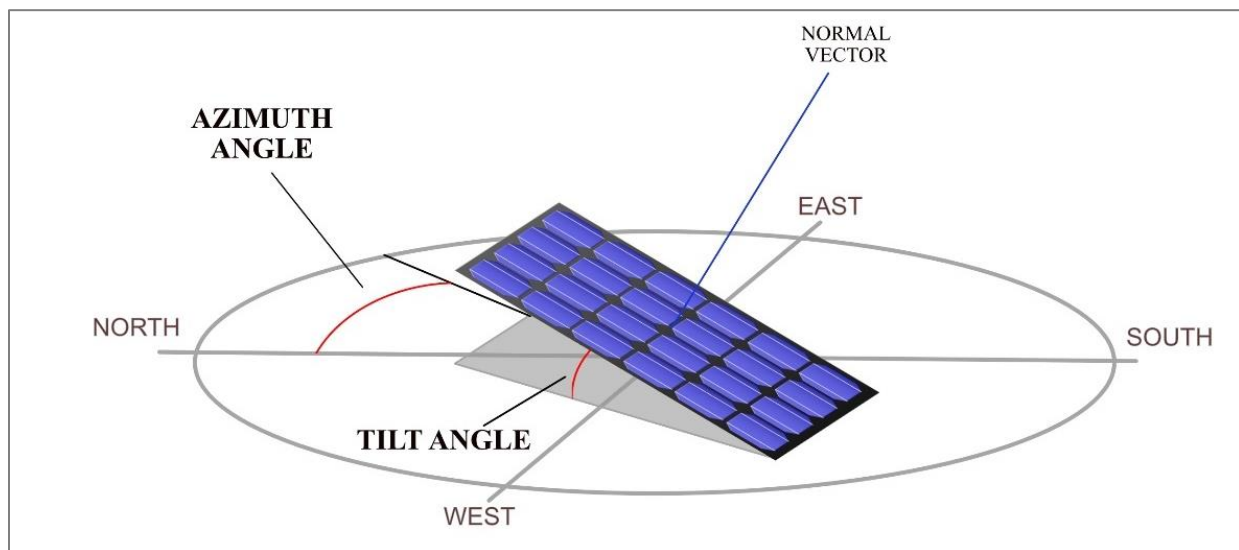


Figure 1 –Panel configuration defined by tilt and orientation

4.2 REFLECTIVITY

Reflections due to solar photovoltaic panels may impair observers. Studies have found that 7 W/m^2 is enough to cause an after-image lasting 4 to 12 seconds [2]. This represents a reflection of only 1-2% of typical solar irradiance (incoming sunlight) for a given location, which typically ranges between $800\text{-}1000 \text{ W/m}^2$.

A key factor of reflectance is the position of PV modules relative to the sun. A panel that absorbs 90% of direct sunlight may reflect up to 60% when the sun is positioned far from direct view, such as during sunset and sunrise for panels with low tilt [3]. The oft-repeated claim that PV panels reflect less than 5% of sunlight only holds true when the panels directly face the sun. For fixed-mount panels, this claim only applies during a few minutes of the day (see Figure 2).

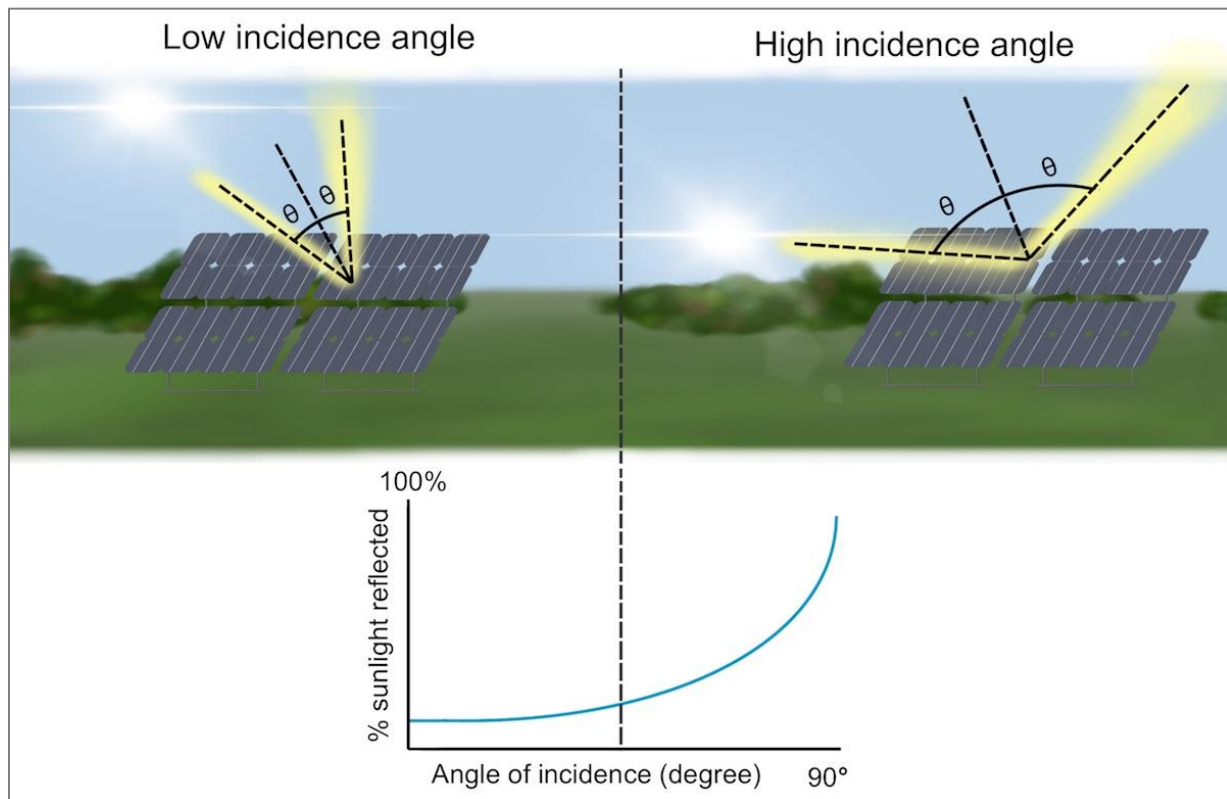


Figure 2 – Sun position with high incidence angle (i.e. glancing angle) yields high panel reflectivity

Anti-reflective coatings (ARC) and surface texturing can reduce panel reflectivity, but this reduction is typically less than 8% [4]. In addition, greater surface texturing can increase the size of subtended source angle (i.e. glare spot). In general, glare impact determinations are not appreciably affected by the use of anti-reflective coatings.

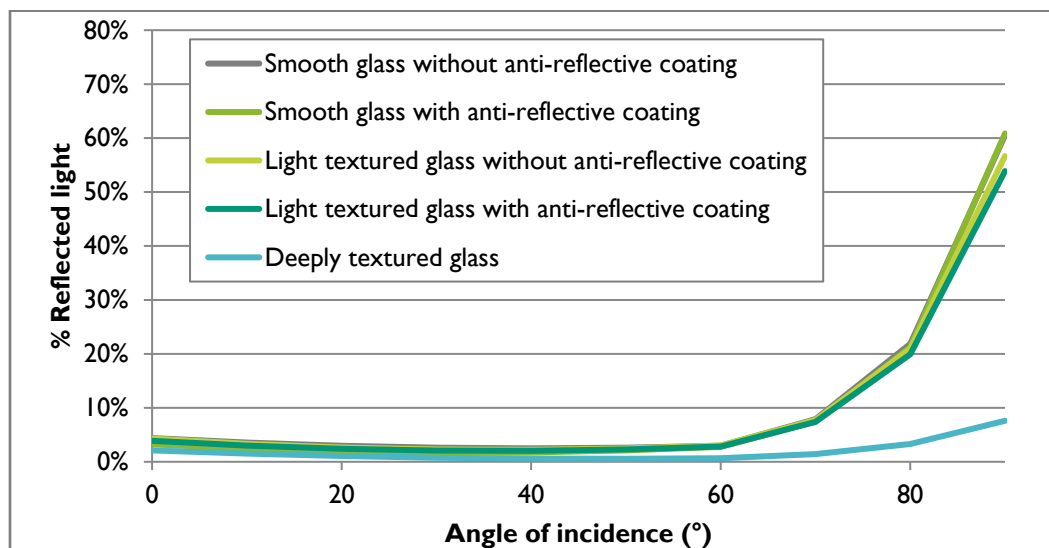


Figure 3 – Module reflectance as function of incidence angle between panel normal and sun

4.3 QUANTIFYING GLARE IMPACTS

Glint is defined as a momentary flash of bright light often caused by sunlight reflecting off a moving source such as a passing car. Glare is defined as a continuous source of bright light and is generally associated with stationary objects, which, due to the slow relative movement of the sun, will reflect light for a longer duration. The ocular impact of solar glare is quantified into three levels [5]:

- Green - low potential for after-image (flash blindness)
- Yellow - potential for temporary after-image
- Red - potential for retinal burn (permanent eye damage)

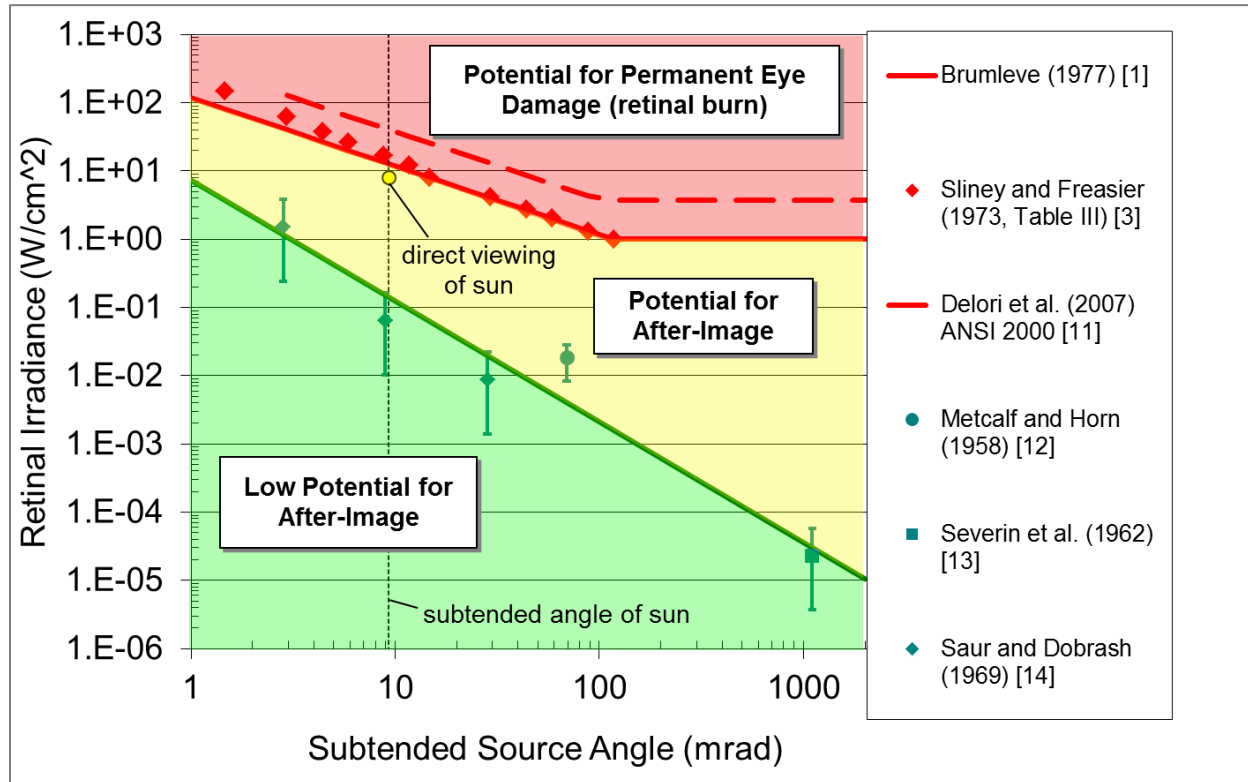


Figure 4 - Glare hazard plot depicting ocular impact regions [6]

4.4 FAA GLARE POLICY

Regulatory authorities are becoming increasingly aware of the need to assess solar glare from photovoltaic installations. Organizations such as neighborhood associations, planning boards, and government agencies, including the United States Federal Aviation Administration (FAA), have begun developing comprehensive guidelines for addressing potentially-hazard solar glare reflections.

FAA guidance on solar glare is described in the *FAA Review of Solar Energy System Projects on Federally Obligated Airports*, 78 FR 63276, which was originally released in 2013 and is current as of 2019. International aviation authorities typically utilize policies similar to those of the FAA.

The FAA Interim Policy specifies the following requirements regarding glare from PV installations on airport property:

1. The use of the ocular impact hazard plot (Figure 4) as the standard for hazard determination
2. No glare of any kind – yellow or green – for Air Traffic Control Towers (ATCT)
3. No yellow glare for aircraft utilizing a 2-mile straight approach path to active airport runways

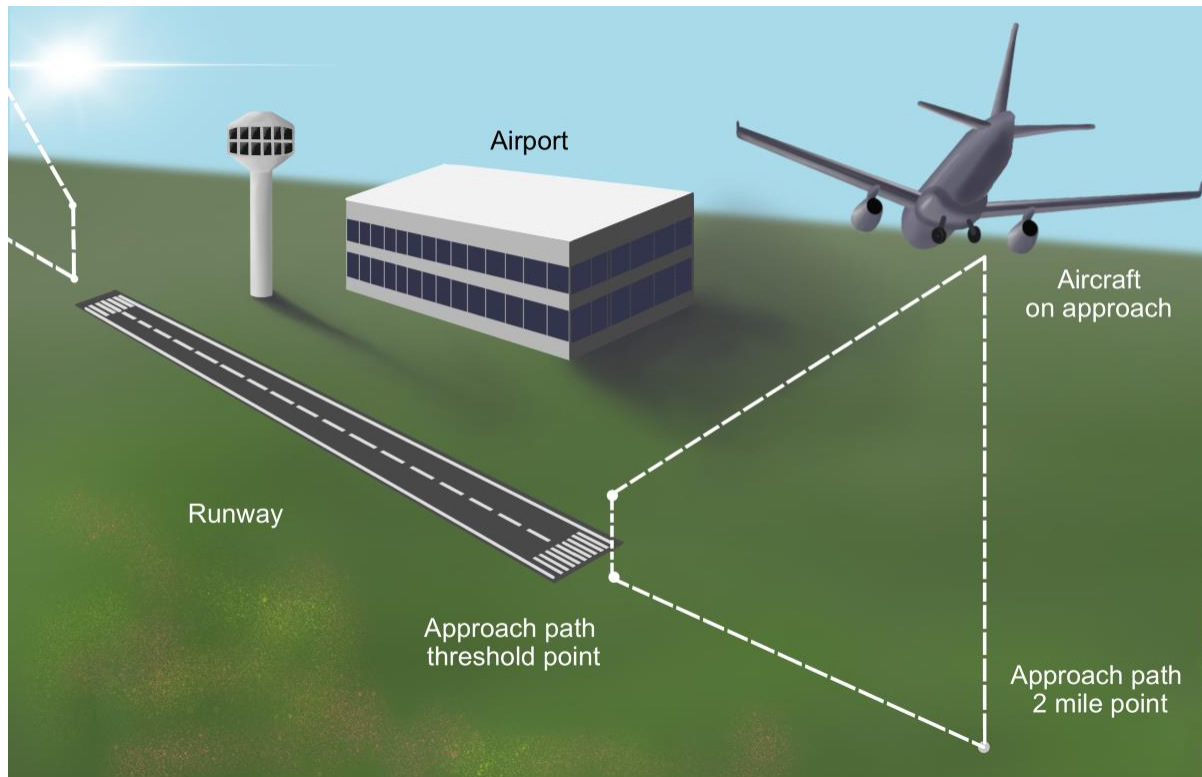


Figure 5 - Illustration of standard runway approach paths and ATCT

The FAA policy recommends the use of the Solar Glare Hazard Analysis Tool to conduct glare analyses on a minute-by-minute interval. ForgeSolar is a licensed and commercialized version of SGHAT operated by SI. The author of this study co-invented SGHAT and assisted the FAA in developing the Interim Policy. ForgeSolar glare analyses satisfy all FAA requirements for glare analysis of solar installations on federally-obligated airports. ForgeSolar has been used by numerous firms to assess glare from existing and proposed PV installations.

5 PROJECT DESIGN

One proposed PV installation at FBMA was assessed. For the purposes of glare analysis, PV arrays are defined primarily by a footprint and module configuration. These parameters determine the times of potential glare and the trajectory of reflected sunlight on a minute-by-minute basis. The project location specifies an elevation of approximately 15.2 ft. above mean sea level (amsl). The vertex locations and altitudes were derived from data provided by the City and are included in the Appendix.

The PV system, located adjacent to the water treatment facility, is a ground-mount array utilizing modules with an orientation of 180.3° (south) and tilt of 27.43° . The elevations of the bottom and top edges of the modules are 17.2 ft. and 22.8 ft., respectively.

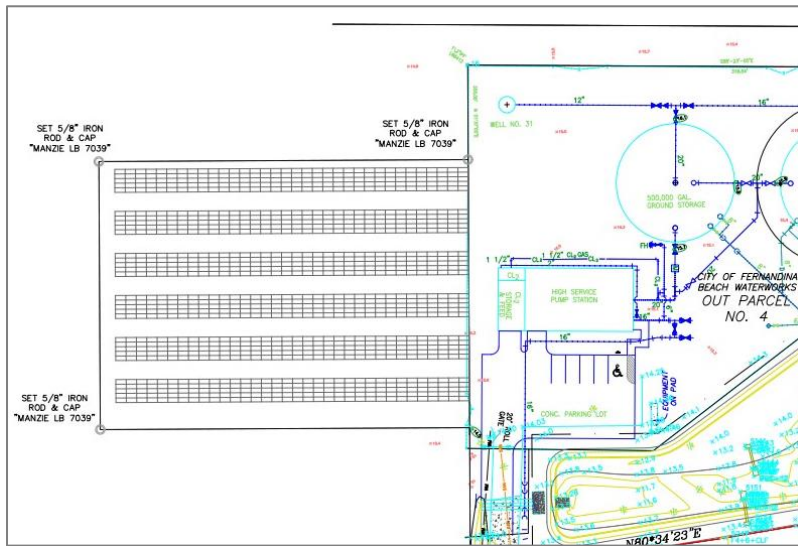


Figure 6 – PV module layout



Figure 7 – PV footprint modeled in ForgeSolar

6 ASSESSMENT RECEPTORS

Six runway approach path receptors at Fernandina Beach Municipal Airport were evaluated for potential glare from the PV plant. The following sections describe each receptor, including its location and simulation parameters. Additional data can be found in the Appendix PDF documents.

FBMA utilizes three runways comprising six approach paths. FBMA does not currently operate an air traffic control tower. Runways were modeled as two flight path (“FP”) approaches to simulate the pilot point-of-view for a two-mile straight-line approach. The pilot view was restricted to 30° below the horizontal and 50° azimuthal (left and right of approach) to ensure glare was only considered when the panels are visible to the flight deck [7]. Parameters were derived from the FAA National Flight Data Center [8]. Note that each flight path is labeled ‘RX’ where ‘X’ represents the runway heading.

Table 2 – Runway threshold parameters

Runway End	Direction (°)	Threshold Latitude (°)	Threshold Longitude (°)	Glide Slope (°)	Threshold Crossing Height (ft.)
R04	36	30.604812	-81.466516	3	47
R22	216	30.615632	-81.457561	3	48
R09	81	30.613360	-81.467969	3	45
R27	261	30.615293	-81.454525	3	37
R13	126	30.614498	-81.468341	3	49
R31	306	30.607558	-81.457129	3	50



Figure 8 – Map representation of standard 2-mile runway thresholds (PV on north side)

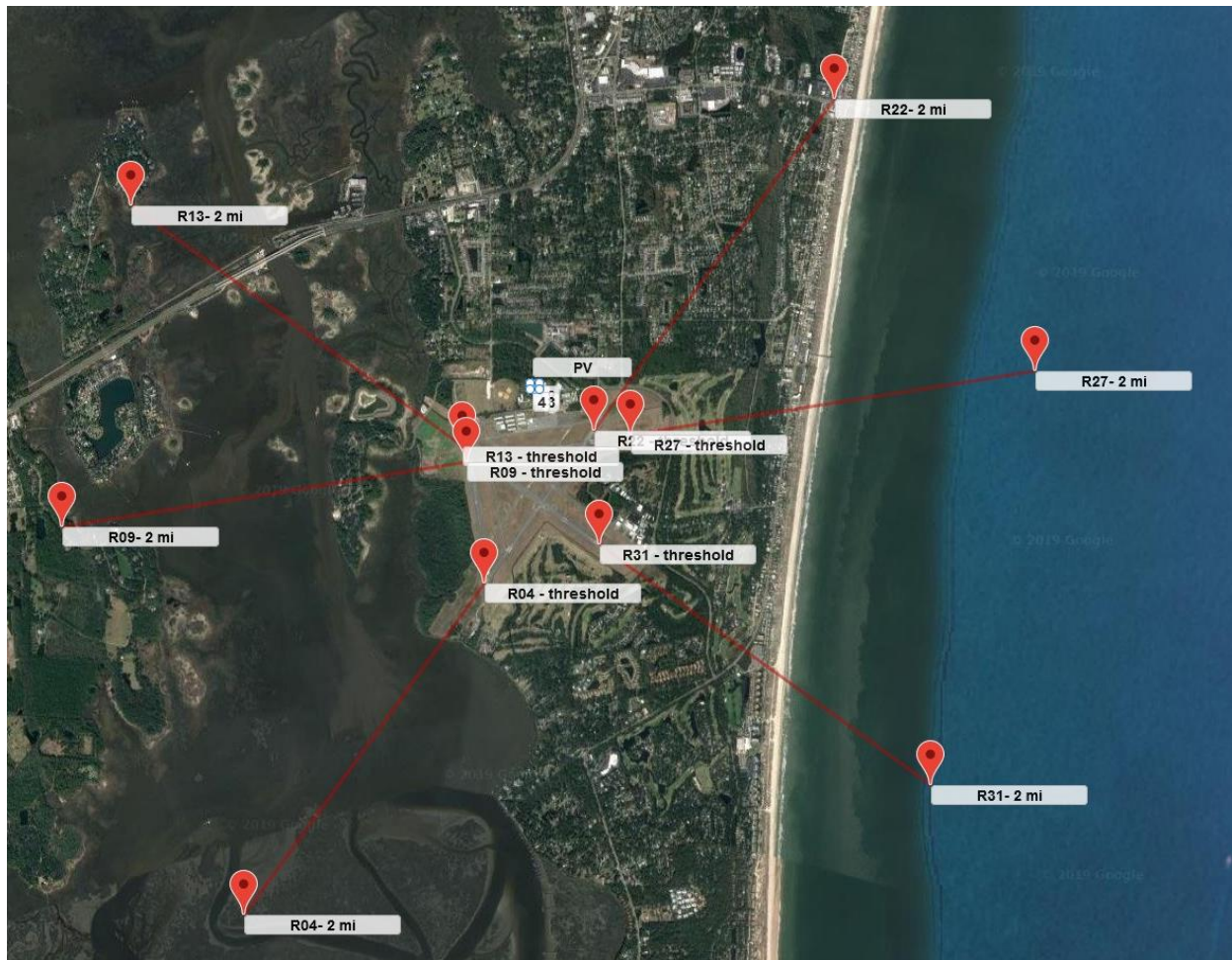


Figure 9 – Map representation of standard 2-mile approach paths

7 ASSESSMENT METHODOLOGY

Sandia National Laboratories developed the Solar Glare Hazard Analysis Tool (“SGHAT”) as a fast and qualitatively accurate tool for assessing solar PV glare. The ForgeSolar toolset utilized during this Assessment is a commercialized version of SGHAT operated by Sims Industries. These tools conduct a geometric analysis of the PV array footprint and receptors to determine annual glare impacts on a minute-by-minute basis. This analytical approach provides an accurate determination of annual glare hazard. Our Glare Assessment process is as follows:

1. Identify or define PV site installation configuration(s) and geometric model
2. Identify or define key receptor components based on site and/or client input, including nearby roads, buildings and/or airport components.
3. Conduct ForgeSolar analysis of site and components to determine hazard and time of glare for receptors.
4. Review physical obstructions and other mitigating factors for affected receptors
5. If applicable, conduct sensitivity/optimization analysis on PV site to evaluate alternate configurations

7.1 SUN MOVEMENT

Analyzing glare on a minute-by-minute basis is an important step in ensuring the entirety of the sun’s path is considered when predicting glare. Because the relative position of the sun changes daily as well as seasonally, glare not evident in the summer months could manifest in the winter with hazardous effect, and vice versa. Figure 10 illustrates the range of movement of the sun throughout the year. In the northern hemisphere, the sun rises and sets farther southward during the winter and farther northward during the summer.

Table 3 – Peak (solstice) range of sun position

Date	Azimuth at Sunrise	Azimuth at Sunset	Elevation at Solar Noon
21 Jun.	62°	298°	83°
21 Dec.	117°	243°	37°

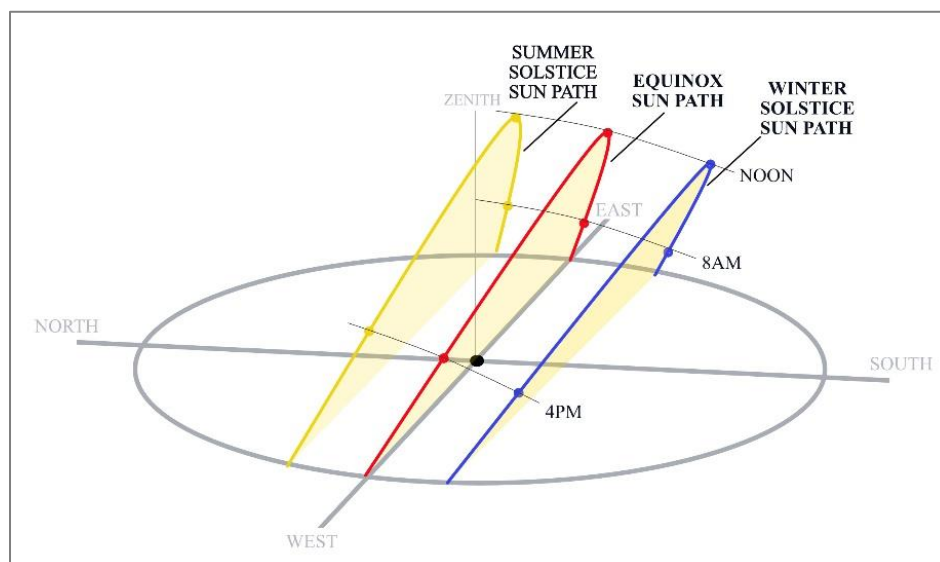


Figure 10 – Annual solar window and seasonal sun paths (northern hemisphere)

8 ASSESSMENT RESULTS

This section presents the compiled results of the Glare Assessment and all included analyses. Receptor-specific results and plots are available in the ForgeSolar Appendix document.

The proposed PV array at FBMA adheres to FAA requirements and is acceptably safe for implementation according to the FAA policy on PV glare. The policy requires that the PV array generate no glare for any air traffic control towers; FBMA does not utilize an ATCT. In addition, the FAA requires that PV arrays generate no yellow glare for runway approach paths. Green glare, which has low potential to cause an after-image, is allowed for runway approach paths. The site adheres to these requirements and is expected to cause green glare for R09, R27, and R13.

Table 4 – Expected glare hazard for runway receptors

	Annual Predicted Glare (minutes)	Adheres to FAA Policy?
R04	<i>None</i>	✓
R22	<i>None</i>	✓
R09	968 Green	✓
R27	913 Green	✓
R13	290 Green	✓
R31	<i>None</i>	✓

Predicted green glare is expected to occur at various times throughout the year. Glare will be apparent for R09 in the early morning during the summer. R27 may see glare in the summer during the evening. Finally, R13 may see glare in the early morning between March and April and between August and September.

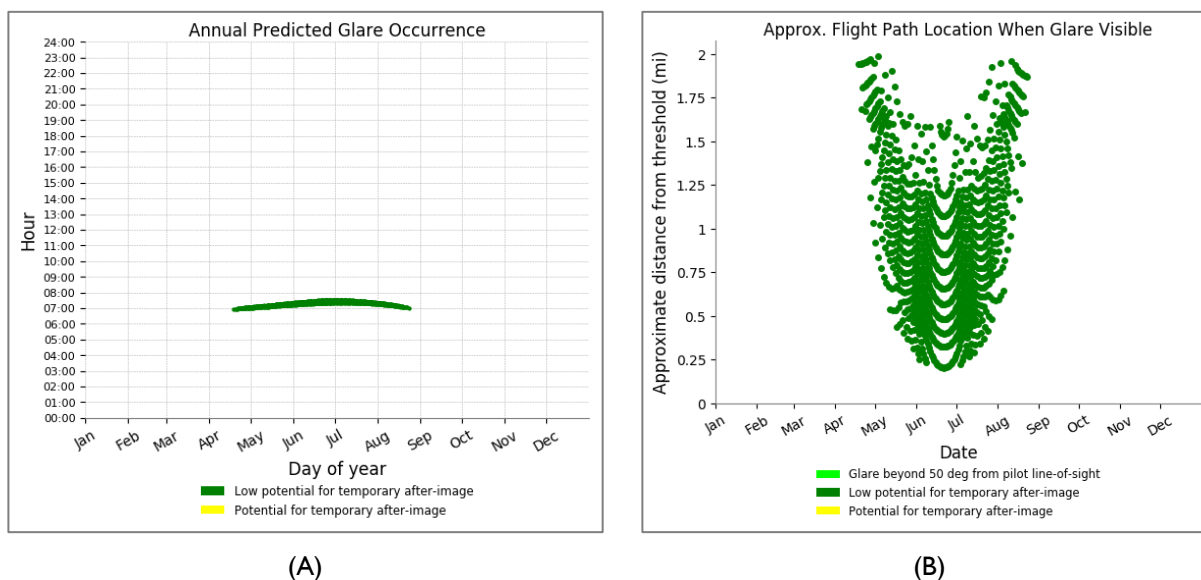
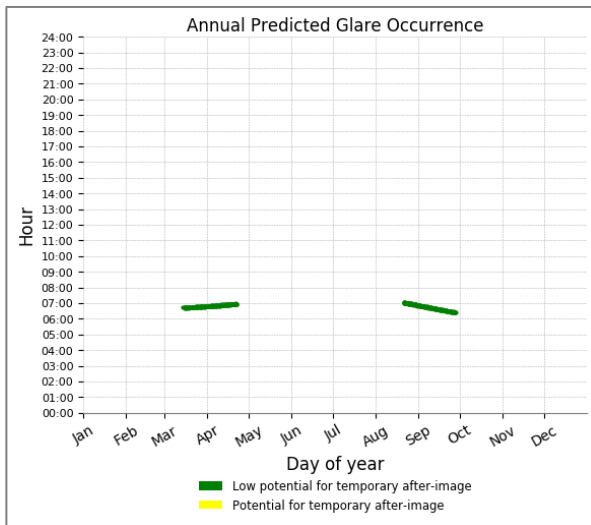
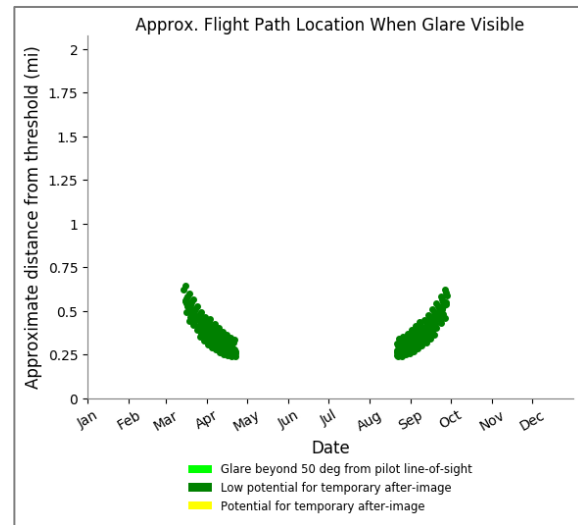


Figure 11 – R09 predicted glare (A) annual occurrence, and (B) approach path locations from which glare will be visible

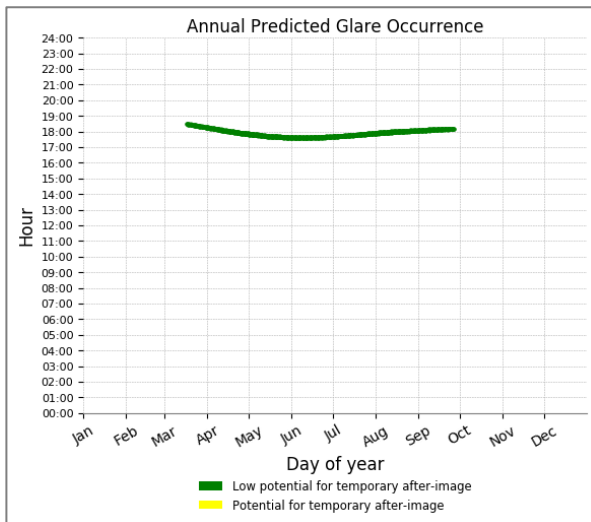


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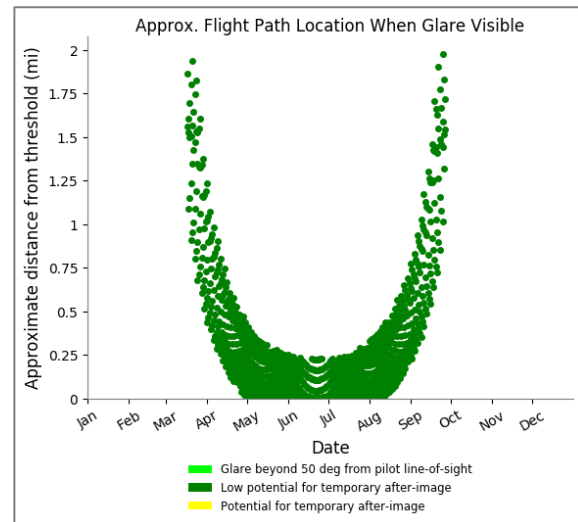


(B)

Figure 12 – R27 predicted glare (A) annual occurrence, and (B) approach path locations from which glare will be visible



(A)



(B)

Figure 13 – R13 predicted glare (A) annual occurrence, and (B) approach path locations from which glare will be visible

9 APPENDIX A: SOLAR DEVELOPMENTS ON & NEAR AIRPORTS

Numerous PV installations have been built on or near airport grounds throughout the U.S. and world. SI and its personnel have personally conducted many assessments of acceptable PV sites in the U.S., Europe, Africa and Australia. Two such sites are described below.

9.1 MANCHESTER-BOSTON REGIONAL AIRPORT (MHT)

Mr. Sims, the author of this assessment, provided a re-configuration evaluation of a rooftop PV array located at MHT while developing the original SGHAT technology. MHT utilizes two runways and a 150' ATCT. The PV array was constructed atop a 74' parking garage due east of the ATCT.

The 530 kW PV installation originally required a change in orientation to avoid yellow glare for the nearby ATCT and flight paths. The recommended re-configuration provided by Mr. Sims and Sandia National Laboratories adhered to FAA policy and was implemented by the PV developer. The PV modules were re-oriented from 200° (south-southwest) to 110° (east).



Figure 14 – Acceptable rooftop PV array at MHT with ATCT positioned due west

9.2 SAN FRANCISCO INTERNATIONAL AIRPORT (SFO)

SFO has several existing PV installations on its campus and is planning to develop more as part of its long-term renewable energy initiatives. SI assisted SFO with a comprehensive airport-wide assessment of optimal PV sites in 2017 and 2018.



Figure 15 – PV array on SFO Terminal 3



Figure 16 – Rooftop PV array on SFO cargo facility

10 APPENDIX B: GLARE ANALYSIS REPORTS

The following analysis result sets are provided separately as PDF documents:

1. *ForgeSolar_glare_report-gac170.pdf* – ForgeSolar summary of glare analysis results

Document #1 can be submitted as part of the FAA 7460 submission process.

11 APPENDIX C: ANALYSIS TOOLS & ASSUMPTIONS

11.1 FORGESOLAR GLAREGAUGE

All glare analyses were performed with the ForgeSolar GlareGauge online application, owned and operated by Sims Industries. GlareGauge relies on the Solar Glare Hazard Analysis Tool (SGHAT) technology which was built by Sandia National Laboratories. (The author is a co-inventor of SGHAT.) GlareGauge assesses potential glare for each minute of the year and provides quantified data on when and where glare occurs, as well as its ocular impact. GlareGauge meets all glare analysis standards required by the U.S. Federal Aviation Administration.

11.2 ASSUMPTIONS

The ForgeSolar tools assume the following:

1. ForgeSolar/SGHAT does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, this methodology has been validated against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and ocular impact of glare at different times and days of the year. Rigorous evaluations requiring one-minute precision and repeatability should utilize alternative custom ray tracing methodologies.
2. ForgeSolar does not consider physical obstacles that may obstruct or impact glare during the analysis
3. The ocular impact regions of solar glare quantification are guides. Actual impacts are influenced by environmental, physical and human factors such as eye size, humidity, etc.
4. The ocular hazard predicted by the tool depends on many environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results.
5. Current path analysis algorithms assume all predicted glare spots are located at the PV footprint centroid.
6. Geo-coordinates rely on the WGS84 datum to represent the Earth
7. Other assumptions can be found in the referenced User's Manual and ForgeSolar Help page.

12 BIBLIOGRAPHY

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6. Ho, C.K., C.M. Ghanbari, and R.B. Diver, *Methodology to assess potential glint and glare hazards from concentrating solar power plants: analytical models and experimental validation*. *Journal of Solar Energy Engineering*, 2011. **133**(3): p. 031021.
7. Rogers, J.A., et al., *Evaluation of Glare as a Hazard for General Aviation Pilots on Final Approach*. 2015, Federal Aviation Administration.
8. FAA. *Airport Data*. 2019; Available from: https://www.faa.gov/air_traffic/flight_info/aeronav/aero_data/Airport_Data/.

Engineering Plans

For

Canopy Park

for

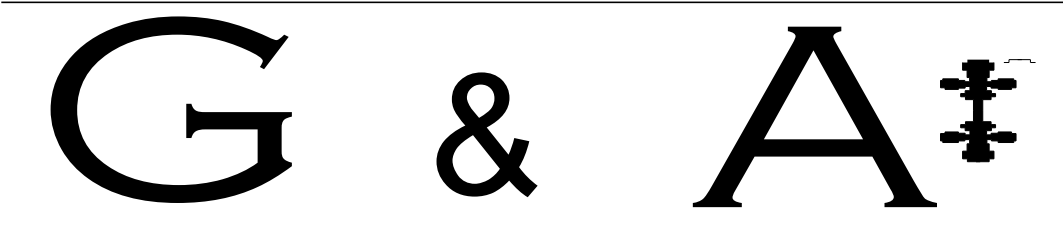
Ed Boner

Citrona Drive
Fernandina Beach, Florida

Gillette & Associates, Inc.

Civil & Environmental Engineering
Mechanical & Structural Engineering
Permitting & Construction Management

20 South 4th Street Amelia Island, Florida 32034
Phone: (904) 261-8819



Issue Date:
June 26, 2019

Revision Date:
September 24 , 2019

Canopy Park

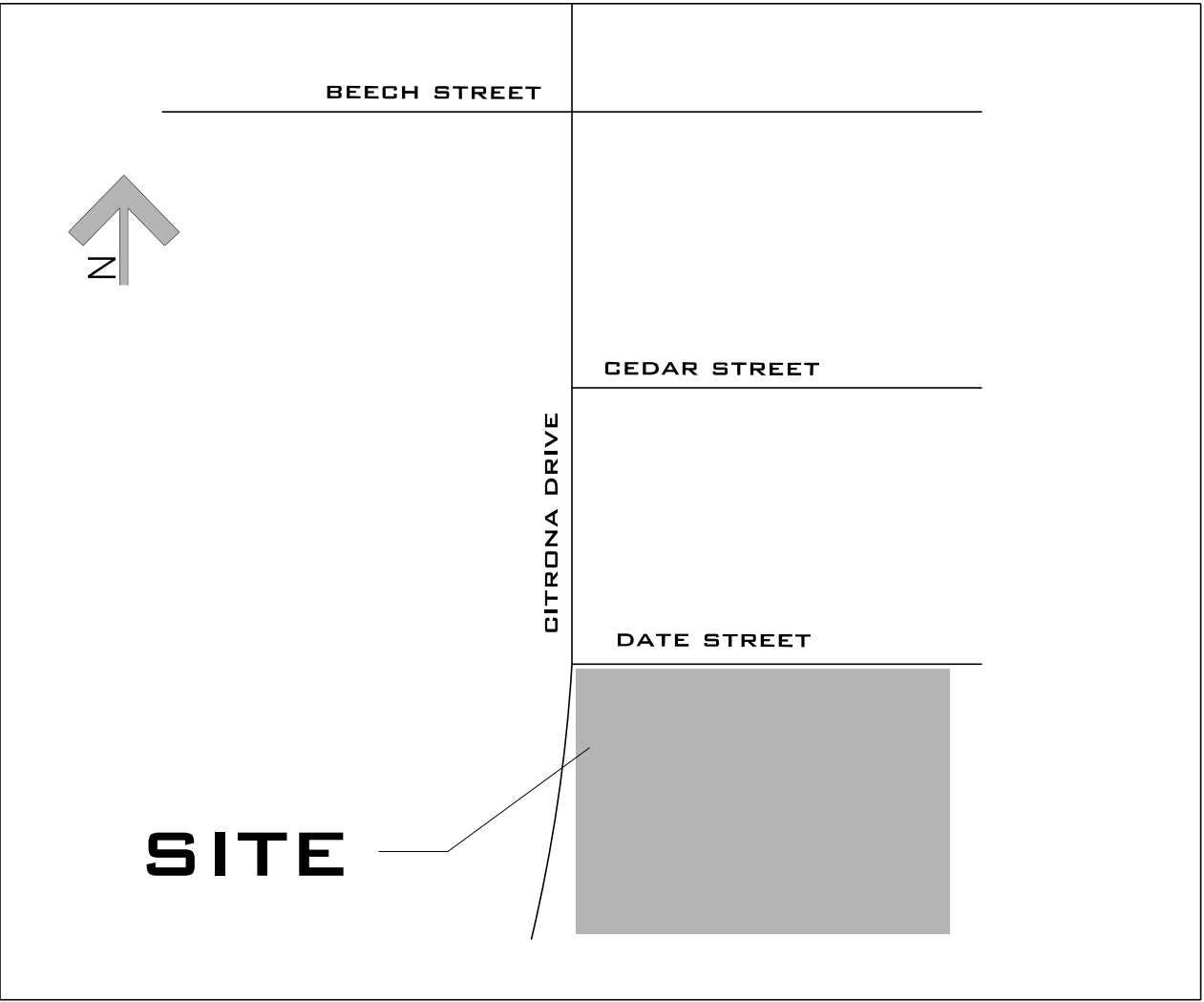
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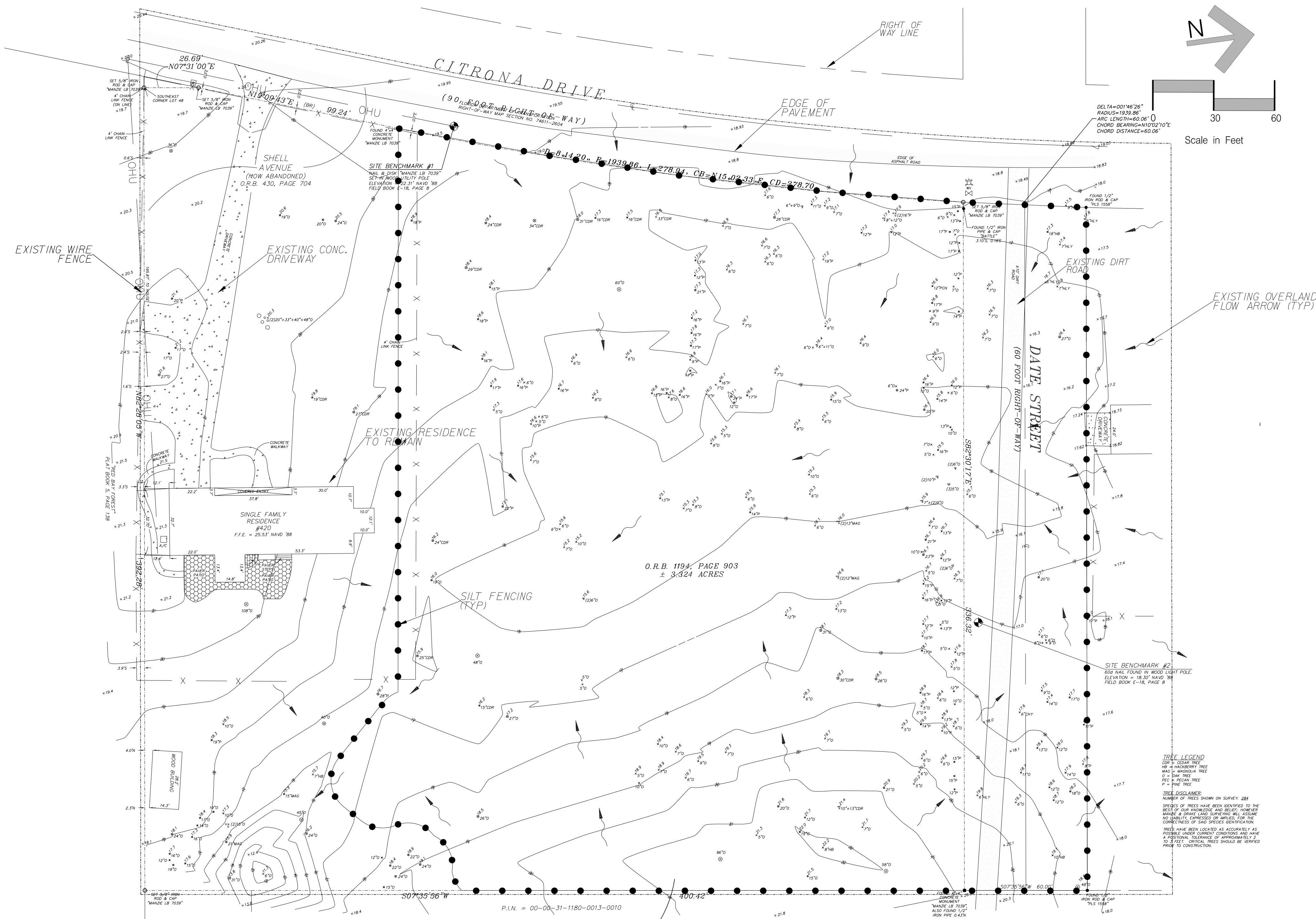
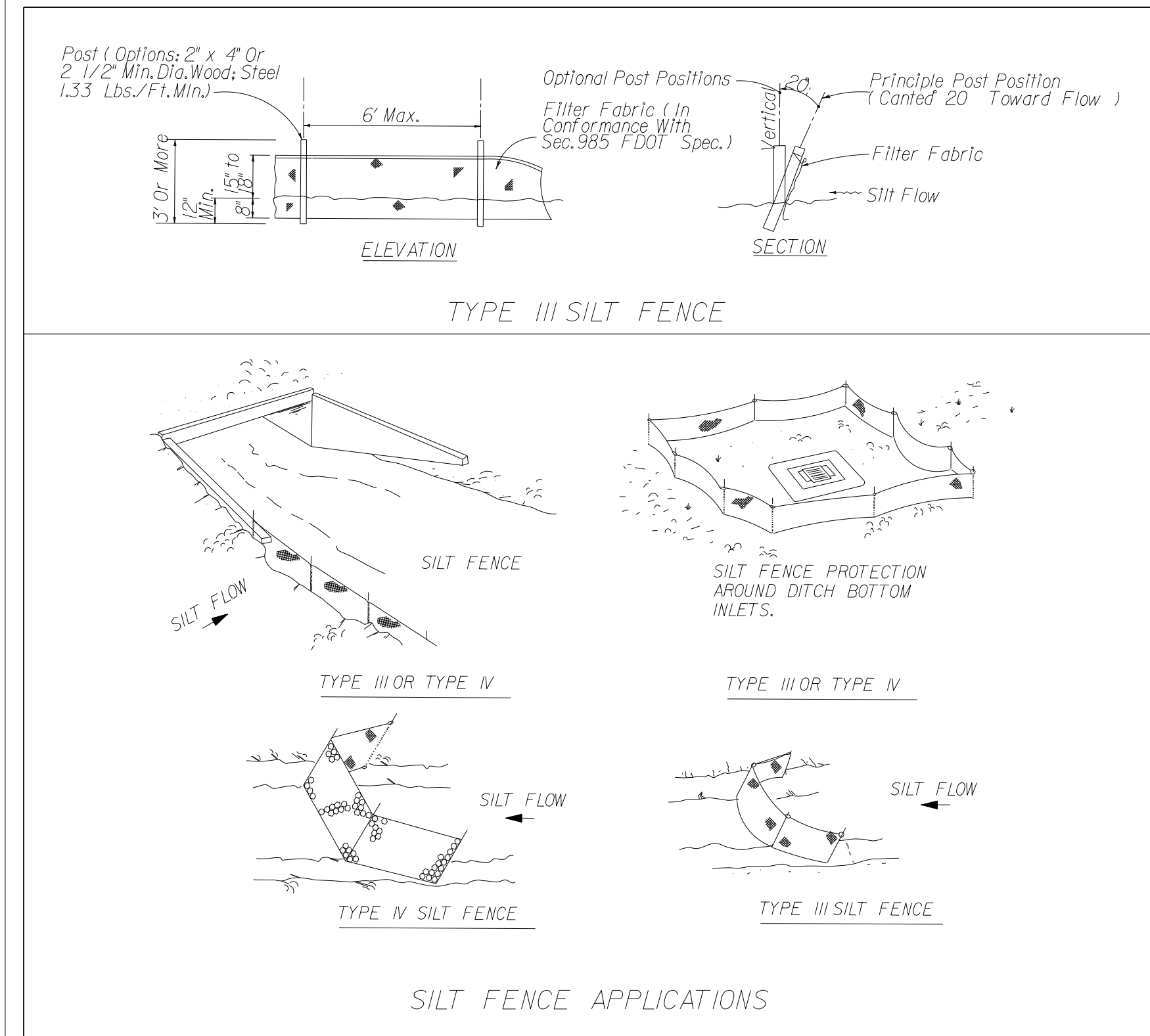
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SITE LOCATION MAP



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Designed by: AG

Drawn by: LA

QAQC: NG

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Registered Professional				

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FLOOD ZONE- X

PROPERTY AREA- 3.32 ACRES

ZONING- R-1 (C.O.F.B.)

FLUM- LOW DENSITY RESIDENTIAL

DEVELOPMENT REQUIREMENTS:

LOT REQUIREMENTS:

MAX. LOT COVERAGE- 40%

MIN. LOT WIDTH- 75 FT

MIN. LOT AREA- 7,500 SF (0.17 AC)

MAX. IMPERVIOUS SURFACE- 60% LOT AREA

MAX FLOOR AREA RATIO- 50% LOT AREA

YARD REQUIREMENTS:

FRONT YARD- 25 FT

BACK YARD- 25 FT

SIDE YARDS- 10% LOT WIDTH

STREET AND DRIVEWAY REQUIREMENTS:

DATE STREET (LOCAL ROAD C.O.F.B.)

MIN. DISTANCE BETWEEN- 50 FT

MIN. DRIVEWAY RADIUS- 15 FT

MIN. DRIVEWAY WIDTH- 12 FT

MAX. DRIVEWAY WIDTH- 20 FT

SIDEWALKS- ONE SIDE OF STREET

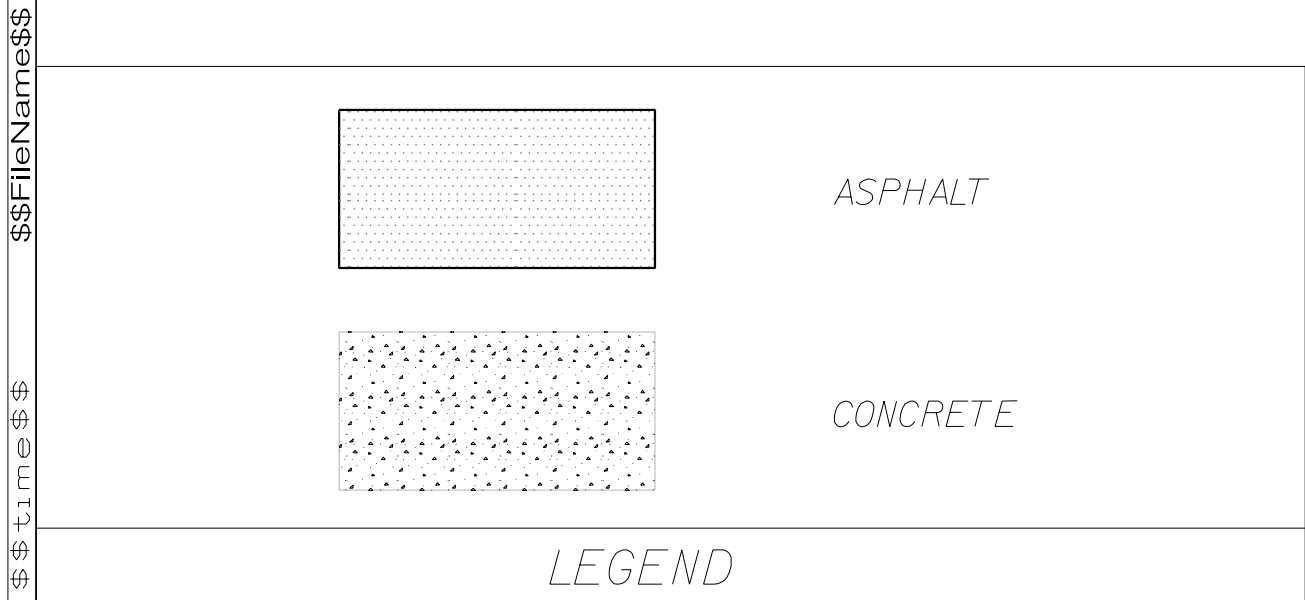
CITRONA DRIVE (MINOR COLLECTOR NASSAU CO.)

MIN. DISTANCE BETWEEN- 100 FT

MIN. DRIVEWAY RADIUS- 15 FT

MIN. DRIVEWAY WIDTH- 24 FT

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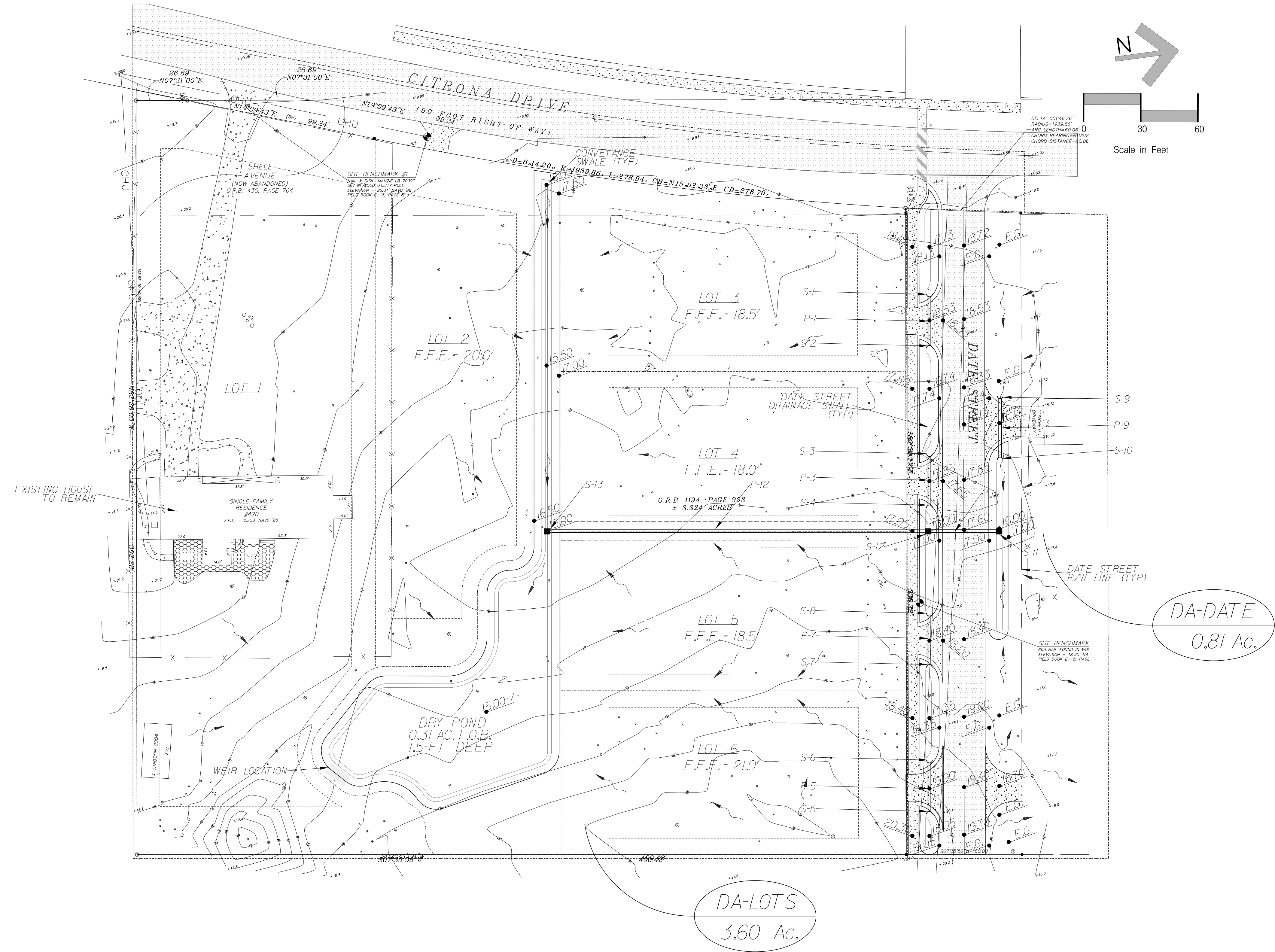
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POST-DEVELOPMENT DRAINAGE PLAN

Registered Professional

Sheet No. DR-1
5 of 12
Issue Date 06-26-19
Project No. 19-10-09



STORM STRUCTURE TABLE						
NAME	TYPE	TOP/ INLET ELEV.	INVERT ELEVATION			
			N	S	E	W
S-1	MES	-	-	-	16.90	-
S-2	MES	-	-	-	-	16.70
S-3	MES	-	-	-	16.40	-
S-4	MES	-	-	-	-	16.15
S-5	MES	-	-	-	-	18.80
S-6	MES	-	-	-	17.90	-
S-7	MES	-	-	-	-	16.95
S-8	MES	-	-	-	16.65	-
S-9	MES	-	-	-	-	16.20
S-10	MES	-	-	-	16.00	-
S-11	TYPE C INLET	16.00	-	14.50	-	-
S-12	TYPE C INLET	16.00	14.40	14.40	-	-
S-13	TYPE C INLET	15.00	14.00	-	-	-

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P-5	S-5	S-6	15"	26'	RCP
P-7	S-7	S-8	15"	26'	RCP
P-9	S-9	S-10	15"	33'	RCP
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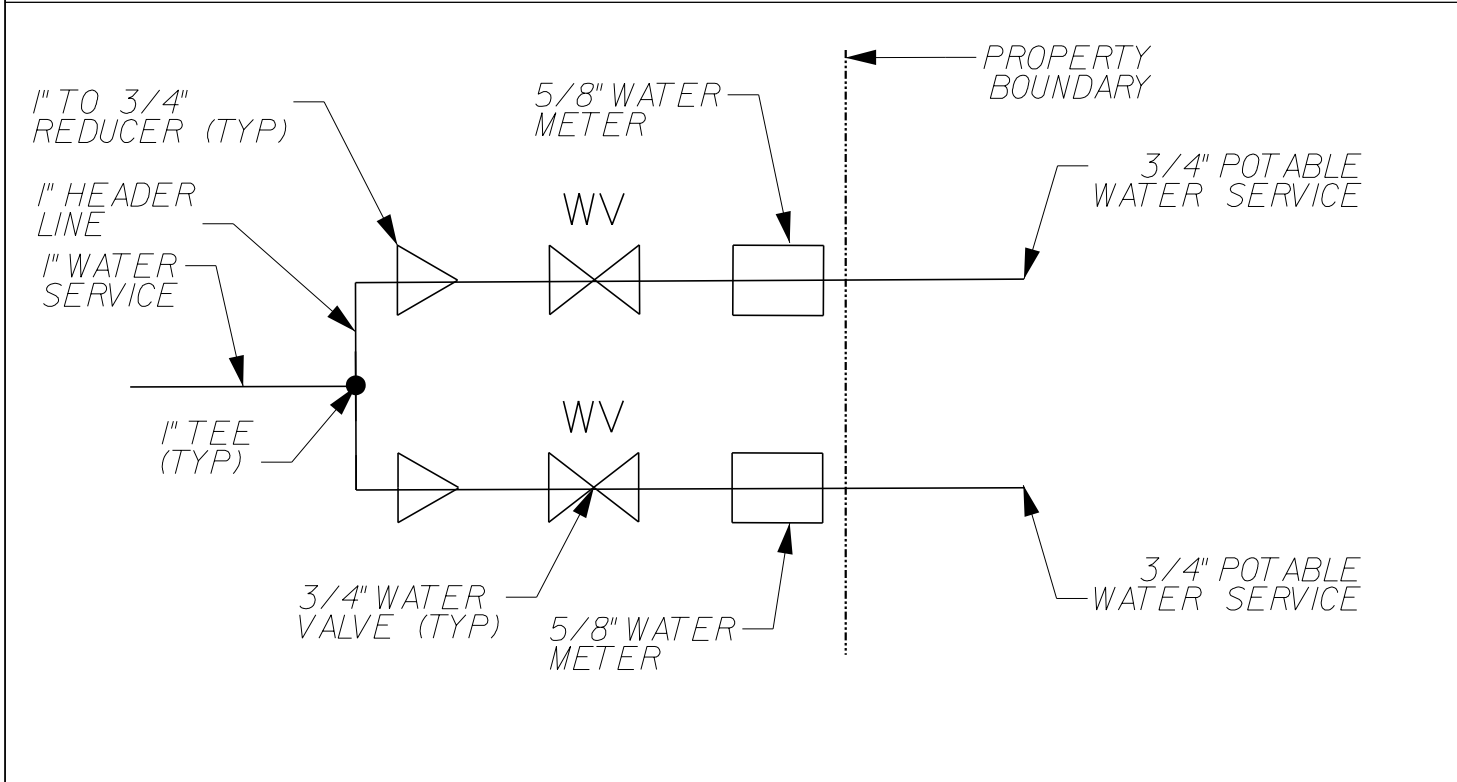
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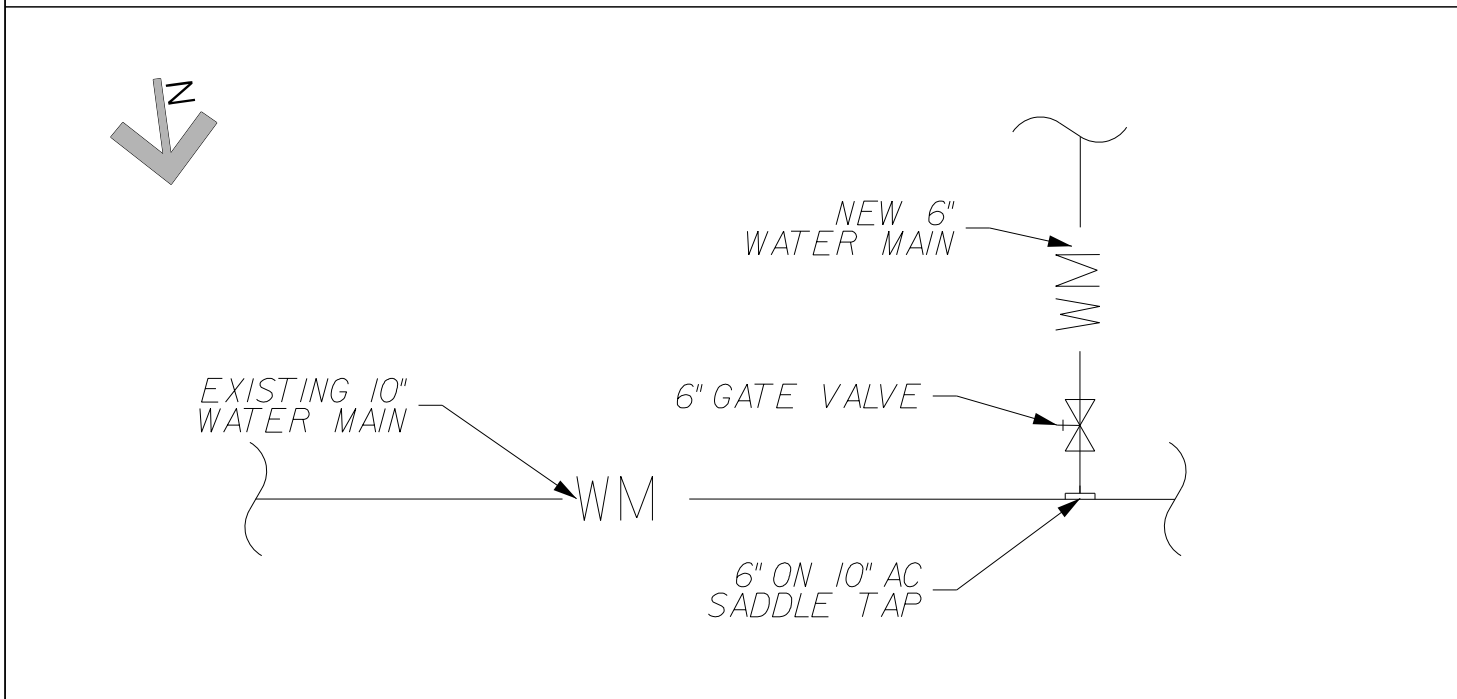
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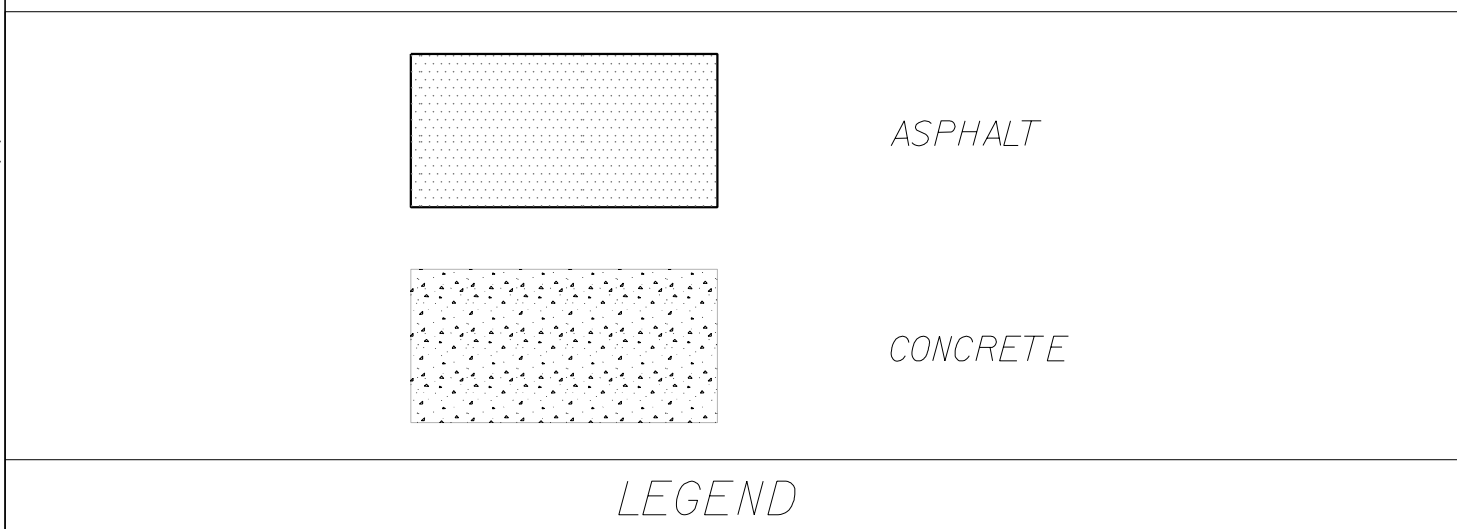
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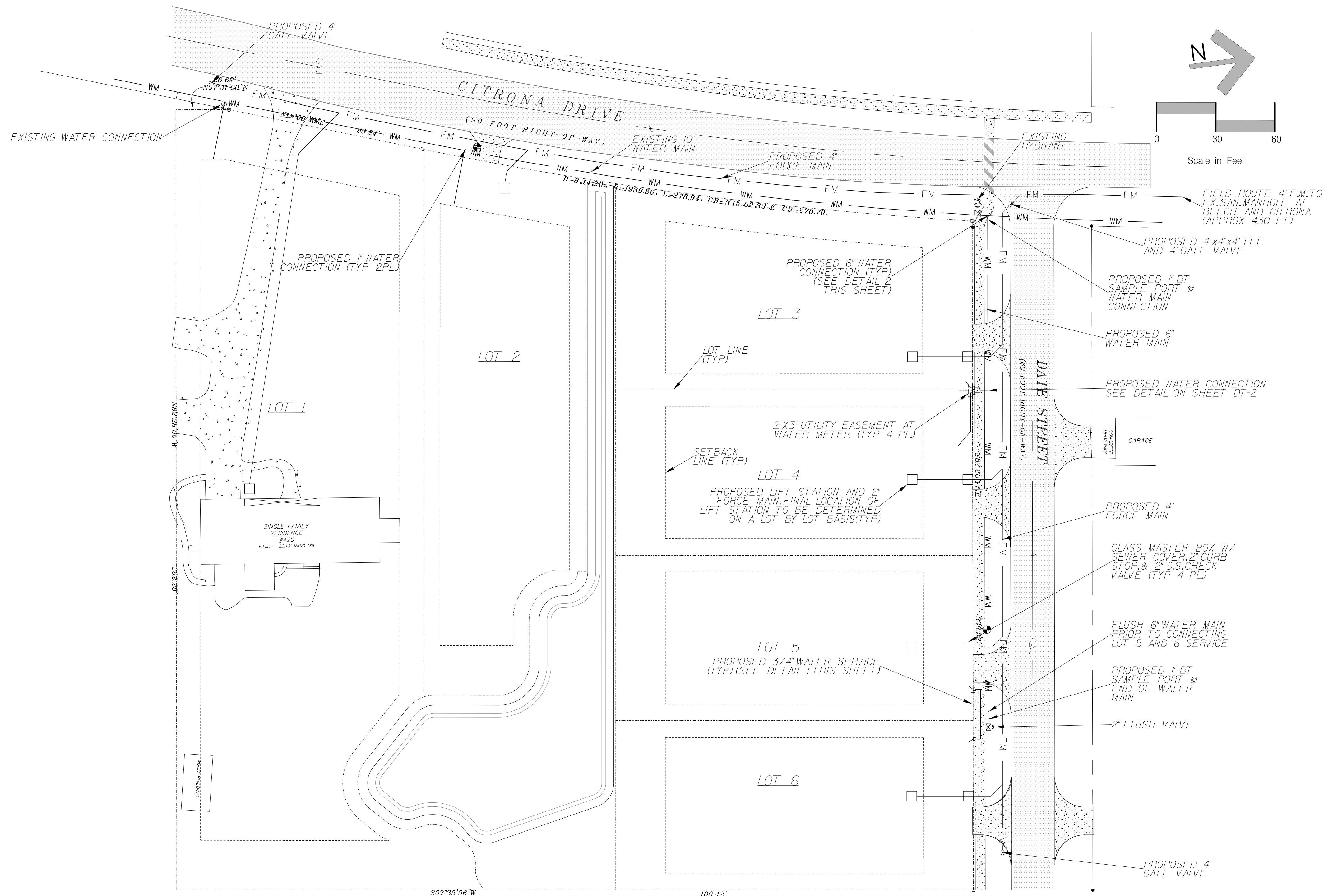
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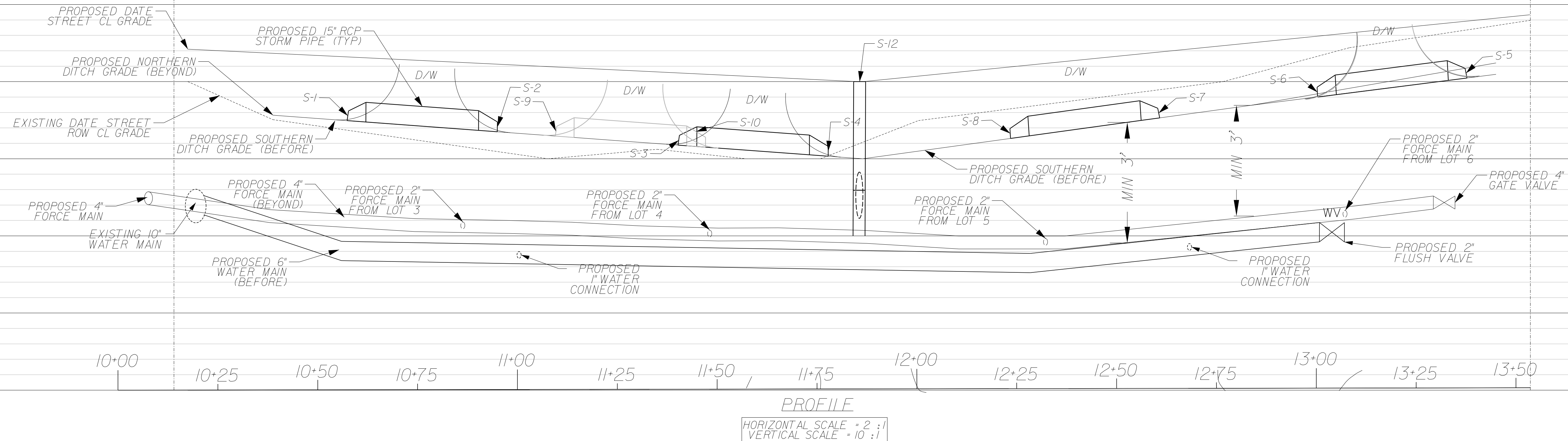
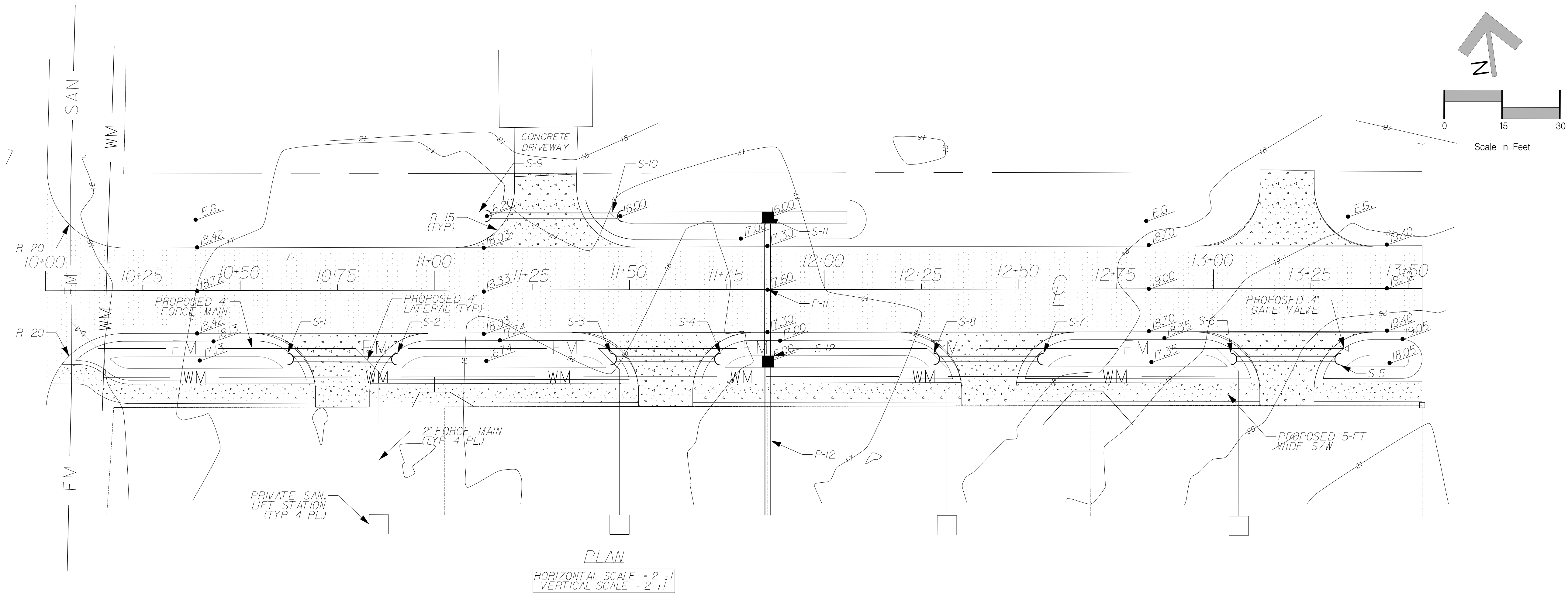
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UTILITY PLAN

Registered Professional

Sheet No. UT-1 6 of 12
Issue Date 06-26-19
Project No. 19-10-09





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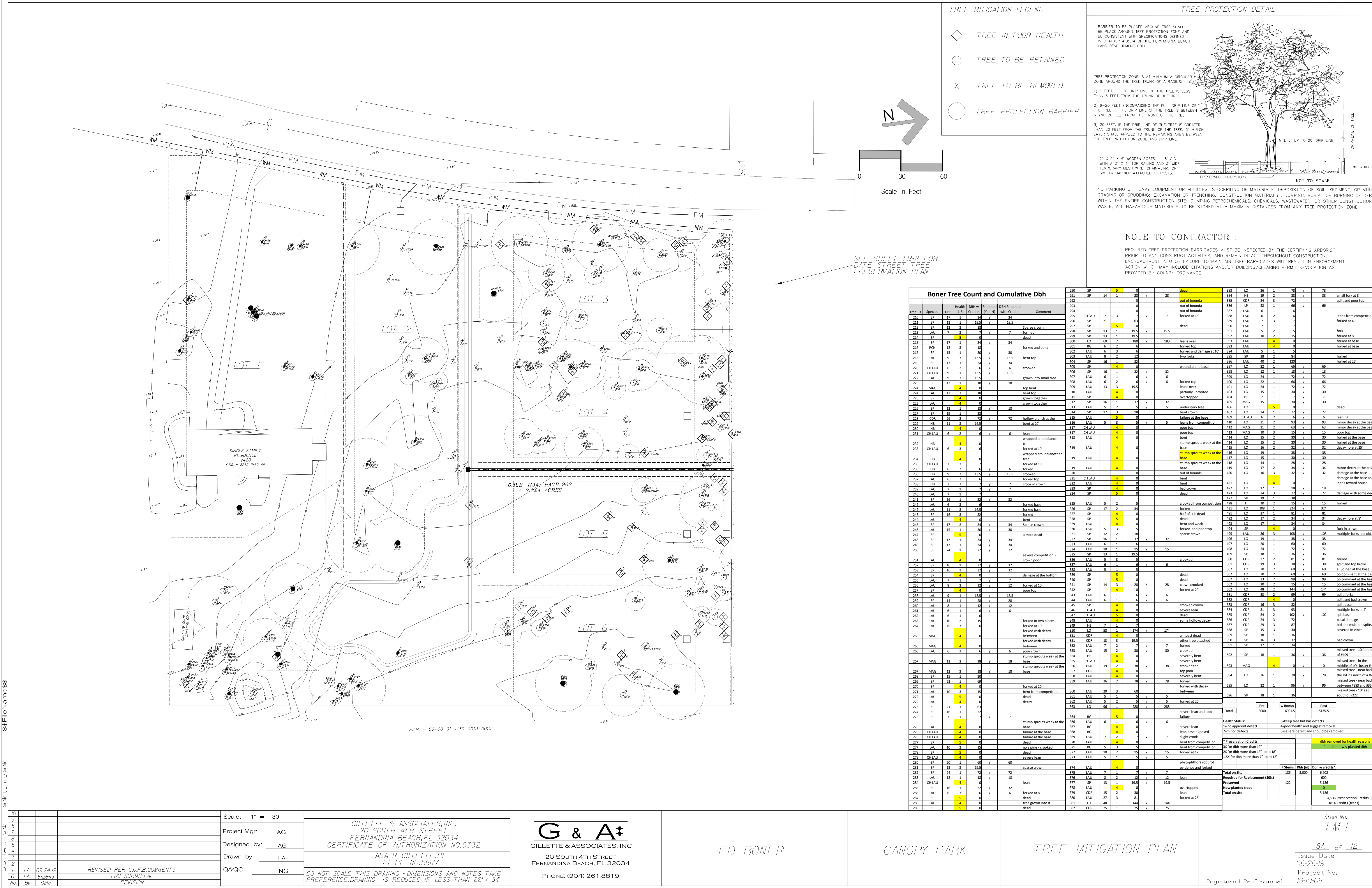
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CANOPY PARK

DATE STREET PLAN
AND PROFILE

Registered Professional

Sheet No. PP-1
7 of 12
Issue Date 06-26-19
Project No. 19-10-09



TREE MITIGATION LEGEND

- TREE IN POOR HEALTH
- TREE TO BE RETAINED
- TREE TO BE REMOVED
- TREE PROTECTION BARRIER

TREE PROTECTION DETAIL

BARREIR TO BE PLACED AROUND TREE SHALL BE PLACED AROUND TREE PROTECTION ZONE AND BE CONSISTENT WITH SPECIFICATIONS DEFINED IN CHAPTER 4.05.14 OF THE FERNANDINA BEACH LAND DEVELOPMENT CODE.

TREE PROTECTION ZONE IS AT MINIMUM A CIRCULAR ZONE AROUND THE TREE TRUNK OF A RADIUS:

- 6 FEET, IF THE DRIP LINE OF THE TREE IS LESS THAN 6 FEET FROM THE TRUNK OF THE TREE.
- 6-20 FEET ENCOMPASSING THE FULL DRIP LINE OF THE TREE, IF THE DRIP LINE OF THE TREE IS BETWEEN 6 AND 20 FEET FROM THE TRUNK OF THE TREE.
- 20 FEET, IF THE DRIP LINE OF THE TREE IS GREATER THAN 20 FEET FROM THE TRUNK OF THE TREE. 3" MULCH LAYER SHALL APPLIED TO THE REMAINING AREA BETWEEN THE TREE PROTECTION ZONE AND DRIP LINE.

2" X 2" X 4" WOODEN POSTS - 8' O.C. WITH A 2" X 4" TOP RAILING AND 3" WIDE TEMPORARY MESH WIRE, CHAIN-LINK, OR SIMILAR BARRIER ATTACHED TO POSTS.

MIN. 6" UP TO 20' DRIP LINE
MIN. 3' HIGH

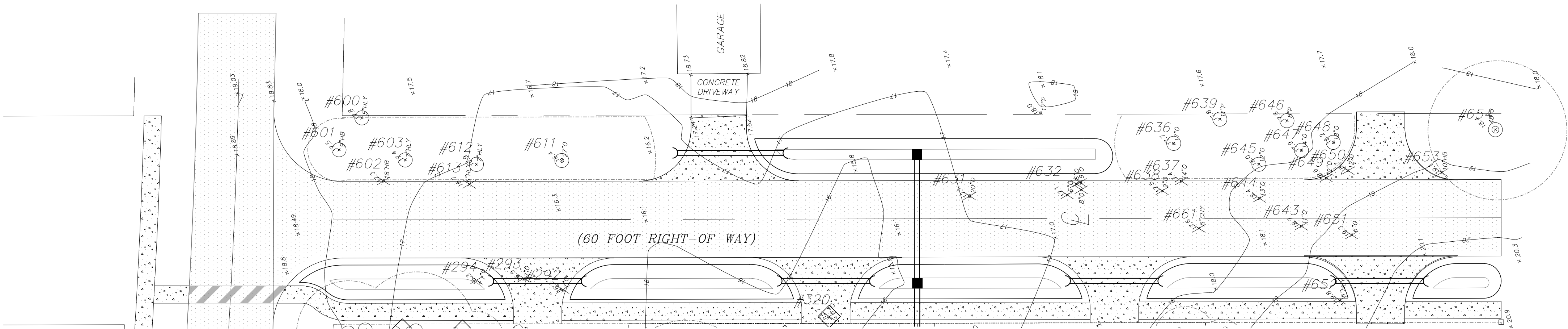
PRESERVED UNDERSTORY
NOT TO SCALE

NO PARKING OF HEAVY EQUIPMENT OR VEHICLES; STOCKPILING OF MATERIALS; DEPOSITION OF SOIL, SEDIMENT, OR MULCH; ENCRoACHMENT INTO OR FAILURE TO MAINTAIN TREE BARRICADES WILL RESULT IN ENFORCEMENT ACTION WHICH MAY INCLUDE CITATIONS AND/OR BUILDING/CLEARING PERMIT REVOCATION AS PROVIDED BY COUNTY ORDINANCE.

NOTE TO CONTRACTOR :

REQUIRED TREE PROTECTION BARRICADES MUST BE INSPECTED BY THE CERTIFYING ARBORIST PRIOR TO ANY CONSTRUCT ACTIVITIES, AND REMAIN INTACT THROUGHOUT CONSTRUCTION. ENCRoACHMENT INTO OR FAILURE TO MAINTAIN TREE BARRICADES WILL RESULT IN ENFORCEMENT ACTION WHICH MAY INCLUDE CITATIONS AND/OR BUILDING/CLEARING PERMIT REVOCATION AS PROVIDED BY COUNTY ORDINANCE.

Boner Tree Count and Cumulative Dbh										290	SP	5	0		295	LO	35	1	78	Y	78			
										291	SP	14	1	28	Y	28								
										292				0		out of bounds	385	LO	26	1	78	Y		
										293				0		out of bounds	386	LP	22	1	66	Y		
										294				0		out of bounds	387	LAU	6	1	66	Y		
										295	CH LAU	7	3	7	Y	7	forked at 15'	388	LAU	6	2	6		
										296	SP	21	1	63			forked at 4'	389	LAU	7	3	7		
										297	SP							390	LAU	7	1	7		
										298	SP	13	1	19.5	Y	19.5		391	LAU	5	2	5		
										299	SP	13	1	19.5				392	LAU	10	2	15		
										300	LO	60	2	180	Y	180	leans over	393	LAU	4	0	0		
										301	BG	6	2	0			forked top	394	LAU	4	0	0		
										302	LAU	6	3	6			forked and damage at 10'	395	SP	28	2	66		
										303	LAU	8	2	12			two forks	396	SP	28	2	66		
										304	SP	16	1	32				397	LO	40	2	120		
										305	SP			4	0		wound at the base	398	LO	12	1	38		
										306	SP	16	1	32	Y	32		399	LO	22	1	66		
										307	LAU	6	1	6	Y	6		400	LO	24	1	72		
										308	LAU	6	2	6	Y	6	forked top	401	LO	24	1	72		
										309	LAU	13	3	19.5			leans over	402	LO	15	2	30		
										310	LAU			4	0		partially supported	403	LO	15	1	30	Y	
										311	SP			4	0		overlapped	404	HB	7	1	7		
										312	SP	16	1	32	Y	32		405	MAG	15	3	30	Y	
										313	LAU	5	2	5	Y	5	understory tree	406	LO	15	0	0		
										314	SP	12	3	18			bent crown	407	LO	24	1	72		
										315	LAU			5	0		failure at the base	408	CH LAU	6	2	6	Y	
										316	LAU	5	3	5	Y	5	leans from competition	409	LO	31	2	63		
										317	CH LAU			4	0		poor top	410	MAG	21	2	63		
										318	LAU			4	0		poor top	411	MAG	10	3	15		
										319	LAU			4	0		poor top	412	LO	15	1	38	Y	
										320	LAU			4	0		poor top	413	LO	15	1	38	Y	
										321	CH LAU			4	0		poor top	414	LO	15	2	30	Y	
										322	LAU			4	0		poor top	415	LO	15	2	30	Y	
										323	LAU			4	0		poor top	416	LO	15	2	30	Y	
										324	SP	15	5	0			poor top	417	LO	15	2	30	Y	
										325	LAU	5	2	5			crooked from competition	418	LO	19	1	38	Y	
										326	SP	17	18	34			forked	419	LO	15	1	38	Y	
										327	SP			4	0		half of it is dead	420	LO	20	1	34	Y	
										328	SP			5	0			421	LO	17	1	38	Y	
										329	LAU	6	4	6	Y	6	leans and weak	422	LO	27	2	63	Y	
										330	LAU	5	3	5			forked and poor top	423	LO	17	1	34	Y	
										331	SP	12	2	18				424	SP	4	0	0		
										332	SP	16	1	32	Y	32		425	LAU	36	3	108	Y	
										333	LAU	10	1	15	Y	15		426	LO	20	1	60	Y	
										334	LAU	10	1	15	Y	15		427	LO	24	1	72	Y	
										335	SP	13	1	19.5			crooked	428	SP	18	1	38	Y	
										336	LAU	5	3	5				429	CDR	27	1	81	Y	
										337	LAU	6	1	6	Y	6		430	LO	19	3	38	Y	
										338	LAU	5	1	5				431	LO	20	2	60	Y	
										339	LO						dead	432	SP	18	1	38	Y	
										340	SP						dead	433	LO	33	2	99	Y	
										341	SP	14	3	28	Y	28	crooked crown	434	LO	30	2	15	Y	
										342	SP						forked at 20'	435	LO	33	2	144	Y	
										343	LAU	6	1	6	Y	6		581	CDR	33	2	99	Y	
										344	LAU	6	1	6	Y	6		582	CDR	34	2	102	Y	
										345	SP						severely crown	583	CDR	34	2	102	Y	
										346	CH LAU			4	0		poor top	584	CDR	31	3	93	Y	
										347	CH LAU			5	0		poor top	585	CDR	34	2	102	Y	
										348	HB						some hollow/decay	586	CDR	34	2	102	Y	
										349	HB							587	CDR	29	3	87	Y	
										350	LO	58	1	174	Y	174		588	SP	15	3	30		
										351	CDR			4	0		almost dead	589	SP	16	1	38	Y	
										352	CDR	13	3	19.5			other tree attached	590	SP	16	1	38	Y	
										353	LAU	7	2	7	Y	7	forked	591	SP	17	1	34		
										354	LAU	15	2	30	Y	30		592	SP	18	1	36		
										355	CH LAU			4	0		severely bent	593	SP	17	1	34		
										356	LAU	19	2	38	Y	38	crooked top	594	MAG	4	0	Y	0	
										357	CDR						poor top	595	LO	26	1	78	Y	
										358	LAU			4	0		severely bent	596	LO	26	1	78	Y	
										359	LAU	26	2	78	Y	78	forked	597	LO	32	1	96	Y	
										360	LAU	20	3	60			between	598	SP	18	1	36		
										361	LAU	5	1	5	Y	5								
										362	LAU	5	1	5	Y	5		forked at 20'						
										363	LO	96	1	288	Y	288								
										364	BG			3	0		severe lean and root failure	Total	Pre	3000	W Bonus	6901.5	Post	
										365	LAU	6	1	6	Y	6		Health Status:						
										366	BG			4	0		severe lean	1= no apparent defect						
										367	BG			4	0		severe lean	4=poor health and suspect removal						
										368	BG			4	0		lean base exposed	5=severe defect and should be removed.						
										369	LAU	7	2	7	Y	7	slight lean	2=Preservation Credits						
										370	LAU	4	0	0			bent from competition							
										371	BG	5	3	5			bent from competition	3x for dbh more than 19"						
										372	LAU	5	1	5	Y	15	bent from competition	5x for dbh more than 15" up to 18"						
										373	LAU	5	1	5	Y	5		1.5x for dbh more than 15" up to 12"						
										374	LAU			4	0		phyllotaxis root not evident and forked							
										375	CDR	15	2	30				Total on site		8 stems	Dbh (in)	Dbh ex credits		
										376	SP	13	1	19.5				Required for Replacement (20%)			6,900			
										377	SP						Preserved	122		1,036				
										378	LAU						New required trees							
										379	CDR	15	2	30				Total on site			5,136			
										380	SP													
										381	LO	48	1	144	Y	144								
										382	SP	12	1	36										
										383	LAU	12	1	36										
										384	CH LAU													
										385	SP	16	1	32	Y	32								
										386	LAU	6	1	6	Y	6	forked at 8'							
										387	SP						forked at 8'							
										388	LAU						forked at base							
										389	LAU						forked at base							
										390	SP	17	1	34	Y	34								
										391	SP	13	1	19.5										
										392	SP	13	1	19.5										
										393	LAU	7	3	7										
										394	LAU	7	1	7										
										395	LAU	5	2	5										
										396	LAU	10	2	15										
										397	LO	22	1	66										
										398	LO	12	1	38										
										399	LO	24	1	72										
										400	LO	24	1	72										
										401	LO	15	1	30	Y									
										402	LO	15	2	30	Y									
										403	HB	7	1	7										
										404	MAG	15	3	30	Y									
										405	MAG	15	3	30	Y									
										406	LO	15	0	0										
										407	LO	24	1	72										
										408	CH LAU	6	2	6	Y									
										409	LO	31	2	63										
										410	MAG	21	2	63										
										411	MAG	10	3	15										
										412	LO	15	2	30	Y									
										413	LO	15	2	30	Y									
										414	LO	15	2	30	Y									
										415	LO	15	2	30	Y									
										416	LO	19	1	38	Y									
										417	LO	15	1	38	Y									
										418	LO	15	2	30	Y									
										419	LO	17	2	34	Y									
										420	LO	16	3	32	Y									
										421	LO	14	4	0										
										422	LO	12	1	18	Y									
										423	LO	10	2	18										
										424	SP	19	1	38										
										425	SP	17	1	34										



NOTE: ALL TREES WITH IN THE DATE STREET RIGHT OF WAY ARE ASSUMED TO BE IN GOOD HEALTH. CITY OF FERNANDINA BEACH IS RESPONSIBLE FOR THE ASSESSMENT OF TREES WITHIN THE PUBLIC RIGHT OF WAY

Health Status:		3=keep tree but has defects	
1= no apparent defect		4=poor health and suggest removal	
2=minor defects		5=severe defect and should be removed.	

* Preservation Credits					dbh removed for health reasons
3X for dbh more than 19"					fill in for newly planted dbh
2X for dbh more than 13" up to 18"					
1.5X for dbh more than 7" up to 12"					

	# Stems	Dbh (in)	Dbh w credits*
Total on Site	32	376	709
Required for Replacement (20%)			75
Preserved	12		402
New planted trees			0
Total on site			402

						327 Preservation Credits (in
						131 Credits (trees)

GILLETTE & ASSOCIATES, INC.
20 SOUTH 4TH STREET
FERNANDINA BEACH, FL 32034
CERTIFICATE OF AUTHORIZATION NO.9332

G & A⁺
GILLETTE & ASSOCIATES, INC.
20 SOUTH 4TH STREET
FERNANDINA BEACH, FL 32034
PHONE: (904) 261-8819

CANOPY PARK

TREE PRESERVATION PLAN
DATE STREET

Registered Professional

Sheet No.
TM-2

8B of 12

Issue Date
06-26-19

Project No.
19-10-09

10
9
8
7
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No. By Date

LA 09-24-19
LA 06-26-19
REVISION

10				
9				
8				
7				
6				
5				
4				
3				
2				
1	LA	09-24-19	REVISED PER C.D.F.B. COMMENTS	
0	LA	06-26-19	TRC SUBMITTAL	
No.	By	Date	REVISION	

Scale:	1" = 30'
Project Mgr:	AG
Designed by:	AG
Drawn by:	LA
QA/QC:	NG

GILLETTE & ASSOCIATES, INC. 20 SOUTH 4TH STREET FERNANDINA BEACH, FL 32034 CERTIFICATE OF AUTHORIZATION NO.9332
ASA R GILLETTE, PE FL PE NO.56177
DO NOT SCALE THIS DRAWING - DIMENSIONS AND NOTES TAKE PREFERENCE. DRAWING IS REDUCED IF LESS THAN 22" x 34"

P.L.N. = 00-00-31-1180-0013-0010

G & A
GILLETTE & ASSOCIATES, INC.
20 SOUTH 4TH STREET
FERNANDINA BEACH, FL 32034
PHONE: (904) 261-8819

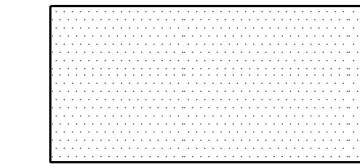
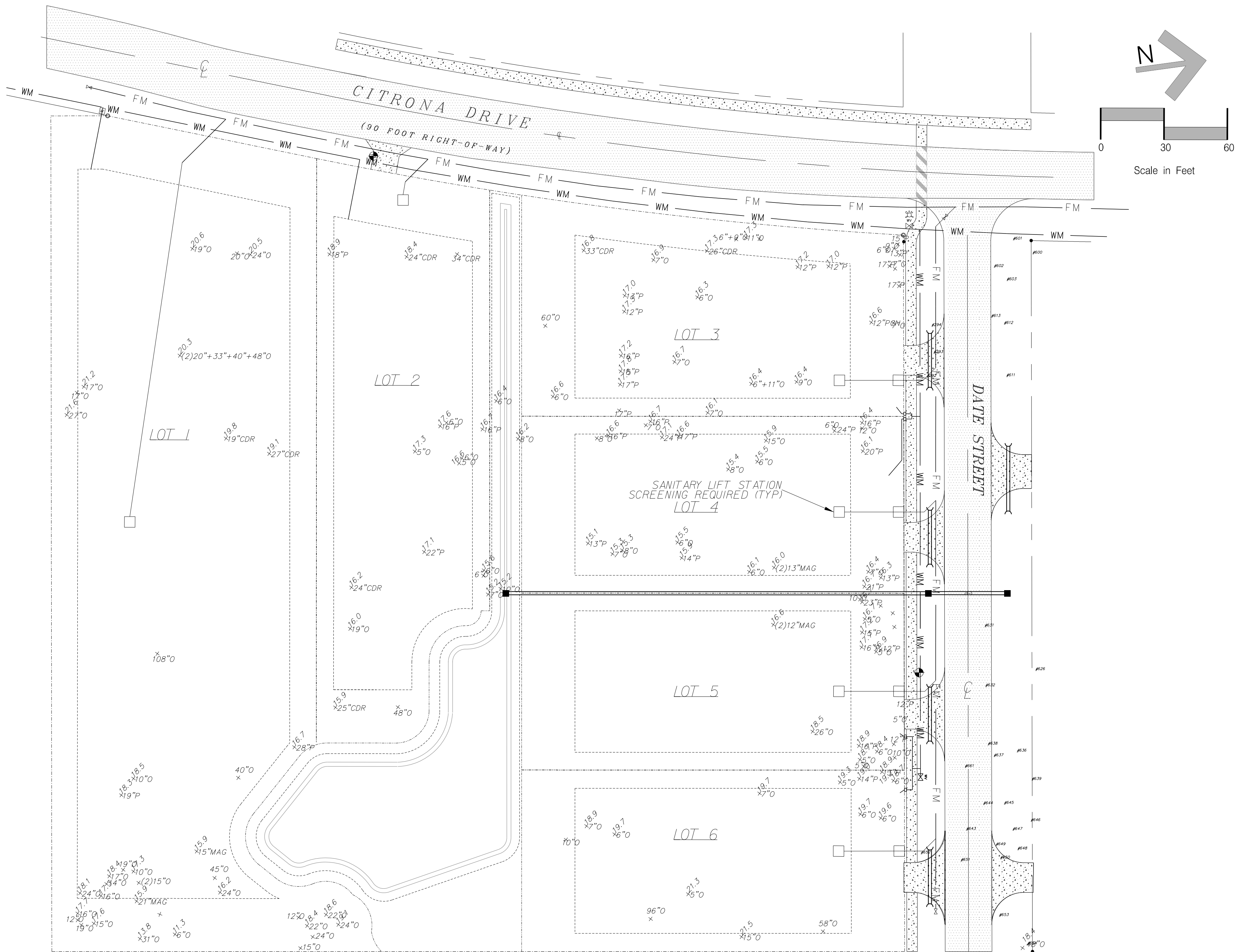
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CANOPY PARK

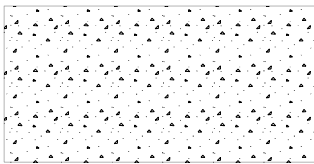
LANDSCAPE PLAN

Registered Professional

Sheet No.	LS-1
Issue Date	06-26-19
Project No.	19-10-09



ASPHALT



CONCRETE

LEGEND

ONE (1) SHADE TREE (ST) FOR EVERY 2500 SQUARE FEET OF LOT AREA OR FRACTION THEREOF. AT LEAST TWO (2) TREES SHALL BE LOCATED IN THE FRONT OR REAR YARD.

(1 ST/2500 SF) x (144,793 SF) = 58 ST REQUIRED

TREE PRESERVATION CREDITS = 0/4 ST = NO REQUIRED TREE PLANTINGS

STREET TREES:
ONE (1) SHADE TREE (ST) FOR EVERY 50 FEET OF SITE/LOT FRONTAGE ALONG THE RIGHT-OF-WAY

NORTH DATE STREET:
(1 ST/50 FT) x (1336 LF) = 6 ST REQUIRED

USE OF UNDERSTORY TREES (UST) ARE PERMITTED IN LIEU OF SHADE TREES AS DETERMINED TO BE PRACTICAL BECAUSE OF OVERHEAD UTILITY LINES OR OTHER INFRASTRUCTURE CONFLICTS. ONE (1) UST FOR EVERY 25 FEET OF SITE/LOT FRONTAGE ALONG THE RIGHT-OF-WAY.

SOUTH DATE STREET:
(1 ST/25 LF) x (1336 LF) = 12 ST REQUIRED

PRESERVED OR RETAINED TREES ON-SITE SHALL COUNT TOWARDS SATISFYING THIS REQUIREMENT IN NEWLY ESTABLISHED RESIDENTIAL SUBDIVISIONS.

DATE STREET TREE PRESERVATION CREDITS = 1/31 ST = NO REQUIRED TREE PLANTINGS

LANDSCAPING REQUIREMENTS

TREES, SHRUBS AND GROUNDCOVERS SHALL BE SELECTED BY USING THE FLORIDAFRIENDLY PLANT DATABASE.

PLANTS IDENTIFIED AS PROHIBITED OR NOXIOUS WEEDS SPECIES ON THE MOST RECENT FLORIDAFRIENDLY PLANT DATABASE, INCLUDING THE MOST RECENT FLORIDAFRIENDLY PLANT DATABASE, SHALL BE PROHIBITED SPECIES WHICH ARE PLANT LIST SHALL BE REMOVED AS PART OF THE REDEVELOPMENT PLAN. PLANTS IDENTIFIED AS INVASIVE MAY BE RETAINED ON A DEVELOPMENT SITE PROVIDED THEY DO NOT MEET THE MINIMUM LANDSCAPING AND BUFFERING REQUIREMENTS.

ALL PLANTS USED AS PART OF ANY LANDSCAPE PLAN SHALL BE HEALTHY, WELL PROPORTIONED, DISEASE FREE, PEST FREE AND HARDY. JUST IN CASE A SPECIES WITH AN AVERAGE NATURAL SPREAD OF AT LEAST TWENTY (20) FEET OR THEY MUST BE GROUPED SO AS TO CREATE A CROWN SPREAD OF AT LEAST TWENTY (20) FEET.

SHRUBS SHALL BE AT LEAST EIGHTEEN (18) INCHES IN HEIGHT AND HAVE A MINIMUM SPREAD OF AT LEAST FIFTEEN (15) INCHES AT THE TIME OF INSTALLATION. SHRUBS SHALL BE INSTALLED AT LEAST THIRTY (30) INCHES SPACED MEASURED ON CENTER AND MAY NOT BE PLACED CLOSER THAN THREE FEET FROM THE EDGE OF ANY IMPERVIOUS AREA.

ALL LANDSCAPED AREAS SHALL BE SOODED OR COVERED WITH GROUND COVER GRASSES. AREAS SHALL BE PLANTED WITH WARM SEASON GRASSES SPECIES NORMALLY GROWN ON PERMANENT LAWNS IN NASSAU COUNTY. SOIL SOD SHALL BE USED IN SWALES OR AREAS SUBJECT TO EROSION.

RETENTION OF NATIVE AND DROUGHT TOLERANT SPECIES IS PREFERRED. AT LEAST FIFTY (50) PERCENT OF THE REQUIRED PLANTS INSTALLED IN LANDSCAPED BUFFERS, LANDSCAPED PARKING AREAS, AND FOR REPLACEMENT SHALL BE NATIVE SPECIES.

A ROOT BARRIER SHALL BE INSTALLED FOR ALL STREET TREES TO AVOID FUTURE ROOT CONFLICTS.

AT LEAST FIFTY (50) PERCENT OF THE REQUIRED TREES INSTALLED IN LANDSCAPED BUFFERS, LANDSCAPED PARKING AREAS, AND TO MEET TREE PLANTING REQUIREMENTS SHALL BE SHADE TREES. EXISTING TREES, OTHER THAN INVASIVE OR PROHIBITED SPECIES, WHICH ARE FIVE FEET OR MORE IN HEIGHT OR PROHIBITED SPECIES, SHALL BE MAINTAINED TO MEET THE REQUIREMENTS FOR LANDSCAPED BUFFERS, LANDSCAPED PARKING AREAS, AND TREE RETENTION.

TREES SHALL BE A MINIMUM OF TWO AND A HALF (2.5) INCHES DBH AND NO LESS THAN EIGHT (8) FEET TALL AT THE TIME OF INSTALLATION. TREES SHALL NOT BE PLANTED CLOSER THAN THREE (3) FEET FROM THE EDGE OF ANY IMPERVIOUS AREA. PLANTED TREES MUST BE A SPECIES WITH AN AVERAGE NATURAL SPREAD OF AT LEAST TWENTY (20) FEET OR THEY MUST BE GROUPED SO AS TO CREATE A CROWN SPREAD OF AT LEAST TWENTY (20) FEET.

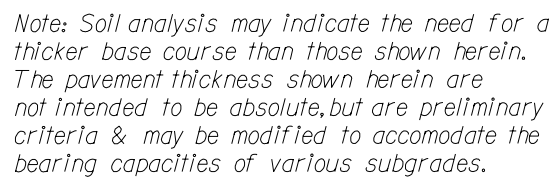
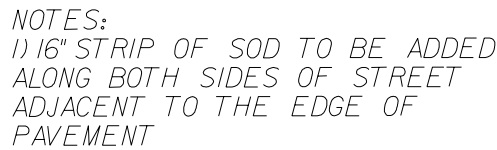
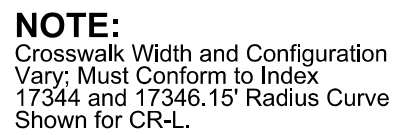
WHEN PALM TREES ARE USED TO SATISFY MINIMUM LANDSCAPE REQUIREMENTS, THREE (3) PALM TREES SHALL COUNT AS ONE (1) SHADE TREE. PALM TREES MUST BE A MINIMUM OF 8 FEET TALL AT TIME OF INSTALLATION.

SHADE TREES SHALL NOT BE INSTALLED UNDER ANY OVERHEAD UTILITY LINE, OVER ANY BURIED UTILITIES, OR WITHIN A UTILITY EASEMENT.

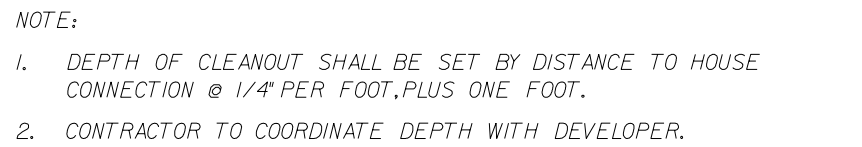
WHERE UTILITIES CONFLICT WITH PROPOSED PLANTINGS, TREES SHALL BE SELECTED FROM A LIST PROVIDED BY THE CITY WHERE UNDERGROUND UTILITIES CONFLICT WITH PROPOSED PLANTINGS, TREE PLACEMENT SHALL BE A MINIMUM OF TEN FEET FROM THE UNDERGROUND UTILITY AND A ROOT BARRIER OF TWO (2) FEET DEEP SHALL BE INSTALLED.

STRUCTURES SUCH AS DUMPSTER ENCLOSURES, MECHANICAL EQUIPMENT BACKFLOW PREVENTERS, WELLS, PUMPS, TANKS, BUFFER WALLS, SHADE UTILITY TRANSFORMERS, LEFT STATIONS, UTILITY CABINETS, ELECTRICAL PANELS, OR CABLE TELEVISION EQUIPMENT SHALL BE FULLY SCREENED WITH PLANTING BEDS IN AREAS VISIBLE FROM THE PUBLIC RIGHTS-OF-WAY. THE HEIGHT OF SUCH SCREENING SHALL BE A MINIMUM OF 30 INCHES AT THE TIME OF INSTALLATION.

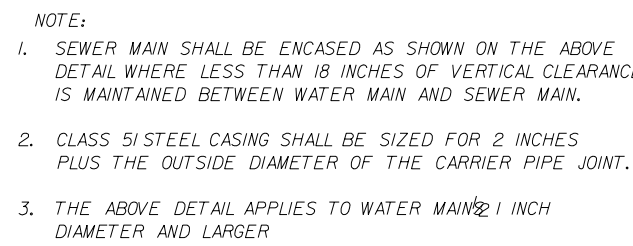
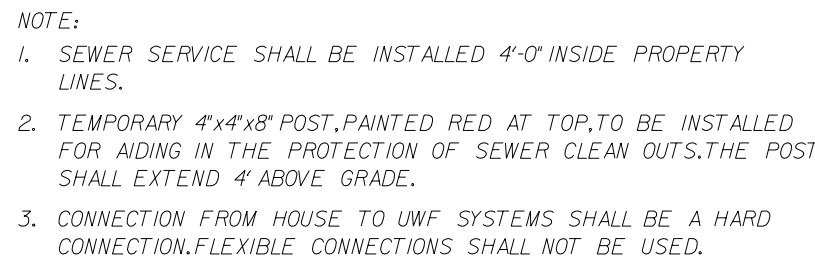
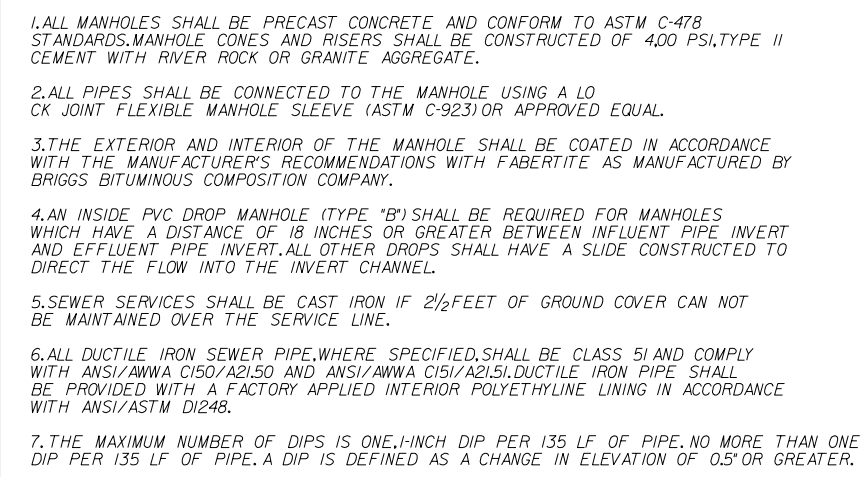
LANDSCAPING NOTES

[illegible]

10				Scale: <u>1" = 30'</u>	GILLETTE & ASSOCIATES, INC. 20 SOUTH 4TH STREET FERNANDINA BEACH, FL 32034 CERTIFICATE OF AUTHORIZATION NO.9332
9				Project Mgr: <u>AG</u>	
8				Designed by: <u>AG</u>	
7				Drawn by: <u>LA</u>	
6				QA/QC: <u>NG</u>	
5					ASA R GILLETTE, PE FL PE NO.56177
4					DO NOT SCALE THIS DRAWING - DIMENSIONS AND NOTES TAKE PREFERENCE. DRAWING IS REDUCED IF LESS THAN 22" x 34"
3					
2	LA	09-24-19	REVISED PER C.O.F.B.COMMENTS		
1	LA	06-26-19	TRC SUBMITTAL		
Np	Bv	03-01-19	REVISION		

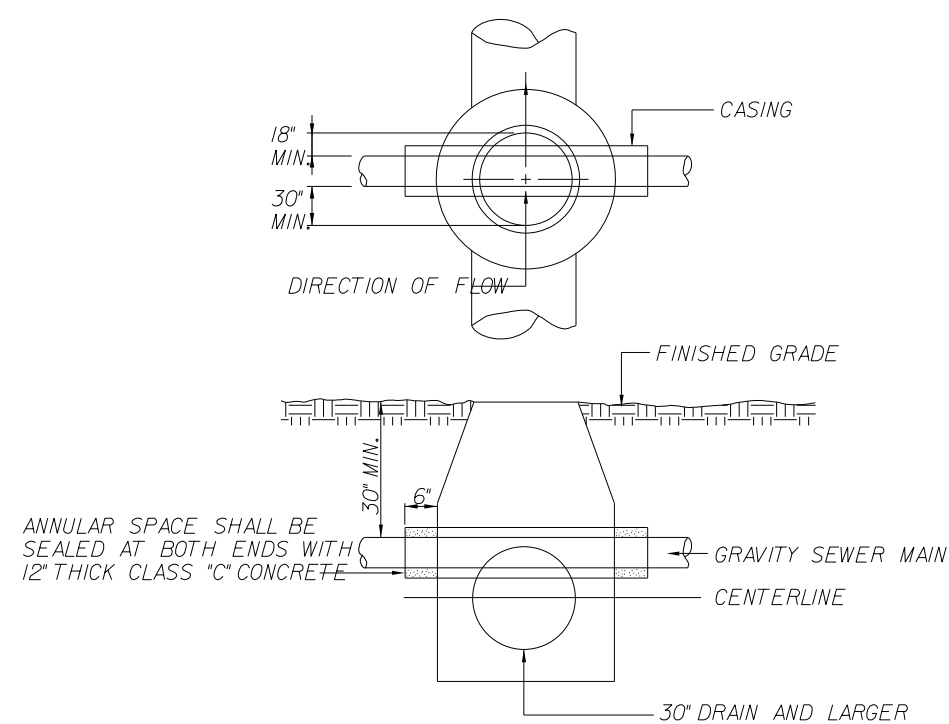


CLASS "B"



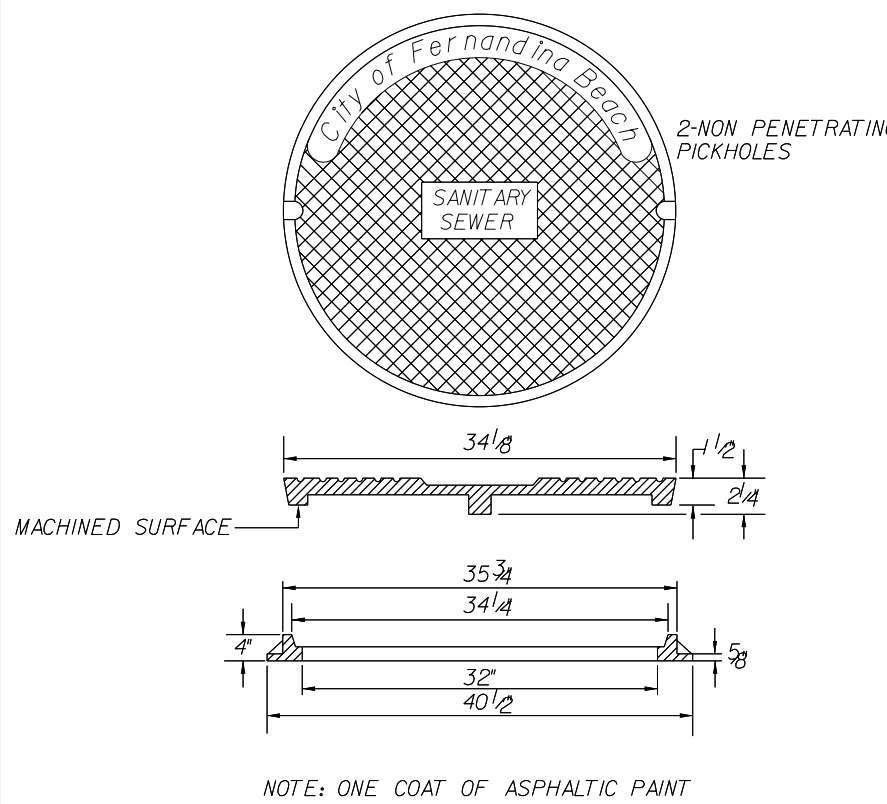
NOTES:

1. THE WOODMERE HOA SHALL PROVIDE THE REQUIRED NUMBER OF SPARE PARTS OF ALL SYSTEM COMPONENTS REQUIRED, AS REQUIRED IN THE "DESIGN AND SPECIFICATION GUIDELINES FOR LOW PRESSURE SEWER SYSTEMS" INCORPORATED INTO DEPARTMENT RULES.
2. THIS LOW PRESSURE (LP) SEWER SERVICE ARRANGEMENT IS FOR "SPECIAL CASES ONLY" AND MUST FIRST BE APPROVED BY FERNANDINA BEACH WTP MANAGEMENT PRIOR TO DESIGN OR CONSTRUCTION. THIS LOW PRESSURE SEWER MAIN/OLD ARRANGEMENT MAY BE UTILIZED TO SERVE UP TO AN EQUIVALENT OF ONE (1) ADDITIONAL SEWER SERVICE LATERAL. THIS STANDARD SHALL APPLY TO RESIDENTIAL CUSTOMERS.
3. RESIDENTIAL PUMP STATION (PS) SHALL BE MAINTAINED BY THE CANOPY PARK PUMP STATION AND SHALL MEET EPIRULE NO.3 (NASSAU COUNTY). THE CUSTOMER IS RESPONSIBLE FOR FINAL PUMP DESIGN AND SELECTION. A CHECK VALVE AND BALL VALVE SHALL BE PROVIDED AT THE PS AND MAINTAINED BY THE WOODMERE HOA.
4. EACH RESIDENTIAL CUSTOMER SHALL HAVE A SEPARATE "LOW PRESSURE SEWER CONNECTION POINT" (SEE ABOVE DETAIL). THE CHECK VALVE LOCATED IN THE PUMP STATION SHALL BE THE "POINT OF ENTRY" TO THE 20" DIAMETER BOLL WITH PVC (4" IN TOP) SHALL BE APPROXIMATELY 7 FEET INSIDE THE ROW AND A MINIMUM OF 6 FEET FROM THE WATER METER BOX (IN FRONT OF CUSTOMER HOME).
5. LOW PRESSURE FORCE MAIN DROP CONNECTION AT MM SHALL INCLUDE A 4" GATE VALVE AND BE IN ACCORDANCE WITH FERNANDINA BEACH WTP STANDARD PLAN NO. 5H-1. PROVIDE PROTECTIVE LINING TO RECEIVING MANHOLE (SEE APPENDIX 4). FOR OTHER LOCATION LIMITATIONS SEE DETAIL (W-10) & W-11.
6. ALL PUMP STATIONS, PIPES (W/LOCATE WIRE), VALVES AND FITTINGS WHICH ARE MAINTAINED BY FERNANDINA BEACH WTP SHALL BE OF FERNANDINA BEACH WTP APPROVED MATERIALS AND SHALL BE INSTALLED/TESTED IN ACCORDANCE WITH FERNANDINA BEACH WTP WAS STANDARD.
7. PER DEED RULES AND EPIRULE NO.3, A LOW PRESSURE PUMP STATION CONNECTION INTO A FERNANDINA BEACH WTP FORCE MAIN IS NOT ALLOWED, (NO EXCEPTIONS).
8. AS BUILDERS FOR ALL UTILITIES WITHIN THE ROW SHALL BE PROVIDED TO FERNANDINA BEACH WTP IN ACCORDANCE WITH IEA STANDARDS.
9. LOCATE WIRE IS REQUIRED ALONG THE MAIN PIPING TO THE LAST CUSTOMER CONNECTION BOX.
10. FOR RESIDENTIAL CUSTOMERS LOCATED IN AREAS OF LOW ELEVATION, THE CUSTOMER MAY BE REQUIRED TO OPERATE AND MAINTAIN A LOW PRESSURE PUMP STATION (SEE NOTE NO.1) MAY DISCHARGE INTO A 4" INCH DIAMETER SEWER SERVICE LATERAL. IN THESE CASES, THE WOODMERE HOA SHALL PROVIDE AND MAINTAIN THE 4" DIAMETER SEWER SERVICE LATERAL.



NOTE:

1. CASING PIPE SHALL BE PLACED ABOVE THE CENTERLINE OF THE CONFLICT DRAIN.
2. MANHOLE SHALL BE CONSTRUCTED IN COMPLIANCE WITH CITY OF JACKSONVILLE STANDARD SPECIFICATIONS AND DETAILS, (WHEN APPLICABLE)
3. INSIDE DIAMETER OF MANHOLE SHALL BE MINIMUM 5 FOOT.
4. EXTERIOR OF CASING PIPE SHALL BE COATED WITH AN ASPHALTIC BITUMINOUS COATING.
5. NO CARRIER PIPE JOINTS SHALL BE INSTALLED INSIDE OF CASING.
6. CLASS 51 CASING PIPE SHALL BE SIZED FOR 2 INCHES PLUS DIAMETER OF CARRIER PIPE JOINT.



NOTE: ONE COAT OF ASPHALTIC PAINT



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GILLETTE & ASSOCIATES, INC.
20 SOUTH 4TH STREET
FERNANDINA BEACH, FL 32034
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ED BONER

CANOPY PARK

SEWER DETAILS

Sheet No.
DT-3

10 of 12

Issue Date
06-26-19

Project No.
19-10-09

Registered Professional



Civil & Environmental Engineering • Mechanical & Structural Engineering • Construction Management

SITE DRAINAGE EVALUATION

Canopy Park Subdivision

**Citrona Drive and Date Street
FERNANDINA BEACH, FLORIDA**

BY

**Gillette & Associates, Inc.
20 South 4th Street
Fernandina Beach, FL**

Issue Date: June 26, 2019
Revision Date: September 24, 2019



PROJECT DESCRIPTION

The proposed project consists of the development of six single family home lots and associated infrastructure, on a 3.32 acre parcel, at the corner of Date Street and Citrona Drive, in Fernandina Beach. The project will also include the development of the Date Street to current City of Fernandina Beach Roadway Standards. The site will be served by a combination of a capture swales and a dry retention pond. The drainage infrastructure is designed to provide storm water treatment and retention for mean annual, ten (10), and twenty-five (25) year rain events. The overall drainage area for the site will be the lots, half of the Citrona Drive right of way, and the entire street and associated right of way for Date Street, as well as 0.35 acres of adjacent property to the north the Date Street right of way which also drains onto Date Street right of way.

EXISTING CONDITIONS

The project site is currently a single 3.32 acre parcel with one single family home onsite. The home and associated structures contains 7,617 ft² (0.17 acres) impervious areas, and no visible surface water onsite, and no wetlands. In its pre-developed state, the site has a single drainage basin, DA-PRE, which encompasses the entire 3.32 acres of the subject property. DA-PRE not only receives runoff from half of Citrona Drive and its associated right of way, but also from the existing Date Street right of way as well as part of the adjacent properties to north of this right of way. The site topography ranges from approximately elevation 12-ft to 22-ft NAVD. The overall pre-developed flow is generally from the northwest to the southeast.

DRAINAGE ANALYSIS

Drainage analysis was conducted over two drainage basins, DA-LOTS and DA-DATE. DA-LOTS encompasses the 3.32 acre parcel including half of the Citrona Drive right-of-way and street (0.28 acres) for a total area of 3.60 acres. For the new residential lots, 40% of the total lot area was assumed to be impervious. A composite curve number of 72.2 was used in the simulation based on the ratio of impervious area to pervious area. DA-DATE encompasses all of the improved Date Street right-of-way, as well as the neighboring lots to the north which drain onto the right of way totaling approximately 0.81 acres. A composite curve number of 72.8 was used in the simulation based on the ratio of impervious area to pervious area. The swale system of DA-DATE, is connected in tandem to the dry retention pond that serves DA-LOTS. Calculations for the dry pond and swale system are included in this report. MODRET simulations were conducted to model the dry storm-water retention pond and Date Street swale system. A geotechnical study was performed on the property in order to provide data used in the MODRET simulations. The geotechnical report is attached at the end of this report.

The Date Street swale system was modeled separately in MODRET and provides treatment and meets pre vs. post discharge requirements for the drainage area DA-DATE. The provided treatment volume from the associated swales on Date Street on the property was 0.05 acre-feet with a top of bank of 17.00' feet and weir elevation of 16.75'. Treatment volume calculations and MODRET simulations show some overflow into the dry retention pond system. This overflow was included in the pre vs. post analysis for the dry pond.

The proposed dry pond encompasses 0.31 acres at the top of bank (16.50'), and provides 0.31 acre-feet of storage between the bottom of the pond and the weir elevation at 16.25'. This provides an excess of 0.10 acre-feet of treatment volume, which is large enough to handle the 0.02 acre-feet deficit of treatment volume in the date street swale system. MODRET simulations for the dry pond show the pond provides treatment and meets pre vs. post discharge requirements for the drainage area DA-LOTS.

Summary of Design Date Street Swales - Mean Annual Storm Event

Predevelopment Discharge (Total):	4,531 ft ³
Post Development Discharge (Total):	0 ft ³
Pre Max Discharge (Rate):	1.21 cfs
Post Max Discharge (Rate):	0.00 cfs
Max Stage Elevation Pond:	16.88 ft
Top of Bank Elevation Pond:	17.00 ft
Recovery Time:	33.10 hrs

Summary of Design Date Street Swales - 10 year Storm Event

Predevelopment Discharge (Total):	13,040 ft ³
Post Development Discharge (Total):	4,641 ft ³
Pre Max Discharge (Rate):	2.40 cfs
Post Max Discharge (Rate):	0.18 cfs
Max Stage Elevation Pond:	16.81 ft
Top of Bank Elevation Pond:	17.00 ft
Recovery Time:	37.02 hrs

Summary of Design Date Street Swales - 25 year Storm Event

Predevelopment Discharge (Total):	15,910 ft ³
Post Development Discharge (Total):	7,070 ft ³
Pre Max Discharge (Rate):	4.10 cfs
Post Max Discharge (Rate):	0.24 cfs
Max Stage Elevation Pond:	16.83 ft
Top of Bank Elevation Pond:	17.00 ft
Recovery Time:	38.37 hrs

Summary of Design Lots Dry Pond – Mean Annual Storm Event

Predevelopment Discharge (Total):	20,170 ft ³
Post Development Discharge (Total):	0 ft ³
Pre Max Discharge (Rate):	8.28 cfs
Post Max Discharge (Rate):	0.00 + 0.00 = 0.00 cfs
Max Stage Elevation Pond:	16.88 ft
Top of Bank Elevation Pond:	16.50 ft
Recovery Time:	33.10 hrs

Summary of Design Lots Dry Pond– 10 year Storm Event

Predevelopment Discharge (Total):	39,749 ft ³
Post Development Discharge (Total):	4,641 ft ³ + 9,940 ft ³ = 14,581 ft ³
Pre Max Discharge (Rate):	10.05 cfs
Post Max Discharge (Rate):	0.18 + 0.33 = 0.57 cfs
Max Stage Elevation Pond:	16.30 ft
Top of Bank Elevation Pond:	16.50 ft
Recovery Time:	71.24 hrs

Summary of Design Lots Dry Pond– 25 year Storm Event

Predevelopment Discharge (Total):	50,622 ft ³
Post Development Discharge (Total):	7,070 ft ³ + 22,381 ft ³ = 29,451 ft ³
Pre Max Discharge (Rate):	17.22 cfs
Post Max Discharge (Rate):	0.24 + 1.73 = 1.91 cfs
Max Stage Elevation Pond:	16.33 ft
Top of Bank Elevation Pond:	16.50 ft
Recovery Time:	71.31 hrs

DATE STREET SWALE & DRY POND CALCULATIONS

Canopy Park Calculations

<u>Impervious Areas</u>	<u>Area (sqft)</u>	<u>Connection Type</u>	
		<u>DCIA</u>	<u>ICIA</u>
driveways	4622		y
pavers	750		y
existing home	2245.2		y
max impervious (40%)	27181.2		y
citrona (1/2)	6693		y
new date street	7254.42		y
new date s/w	1483		y
	<u>Total</u>	<u>date st</u>	<u>lot</u>
area (sqft)	50228.82	13359.42	36869.4
area (acres)	1.15309504	0.3066901	0.846404959
% Total		26.597121	73.40287906
<u>Area</u>		<u>area (sqft)</u>	<u>area (acres)</u>
citrona row		12147	0.278856749
new date row		20028	0.459779614
canopy park lot		144793.44	3.324
additional lot north date street		15246	0.35
<u>Date St. Swales</u>		<u>area (sqft)</u>	<u>area (acres)</u>
tob		3001.284	0.0689
bot		827.64	0.019

Canopy Park (Date St. Swales)

Basin Calculations

Basin 1

Composite Cn

Total Drainage Area =	0.81 ac
Impervious Area =	0.27 ac
Pond Area =	0.07 ac
Impervious Cn =	98.0
Pond Cn =	60.0
Pervious Cn =	60.0
Composite Cn =	72.8

Time of Concentration, Tc

Minimum Time of Concentration =	10 min.
Length of Overland Flow @ 1ft/sec. =	30 ft.
Length of Pipe Flow @ 2.5 ft/sec. =	0 ft.
Tc =	11 min.

Pond Information

El. (ft.)		Volume ac-ft	Area ac.
17.00	TOB	0.05	0.07
16.75	weir	0.03	0.05
16.00		0.00	0.02

Treatment Volume Required, TVR (on-line retention)

$$\text{TVR} = 1" * (1/12") * \text{Total Drainage Area} = 0.07 \text{ Ac.-ft.}$$

or

$$\text{TVR} = 1.25" * (1/12") * \text{Total Impervious Drainage Area} + 0.5" * (1/12") * \text{Total Drainage Area} = 0.062 \text{ Ac.-ft.}$$

$$\text{TVR} = 0.07 \text{ Ac.-ft.}$$

Treatment Volume Provided, TVP

$$\text{TVP} = 0.05 \text{ Ac.-ft.}$$

Canopy Park (Dry Pond)

Basin Calculations

Basin 1

Composite Cn

Total Drainage Area =	3.60 ac	
Impervious Area =	1.15 ac	40% imp./lc
Pond Area =	0.31 ac	1/2 citriona
Impervious Cn =	98.0	
Pond Cn =	60.0	
Pervious Cn =	60.0	
Composite Cn =	72.2	

Time of Concentration, Tc

Minimum Time of Concentration =	10 min.
Length of Overland Flow @ 1ft/sec. =	225 ft.
Length of Pipe Flow @ 2.5 ft/sec. =	194 ft.
Tc =	16 min.

Pond Information

El. (ft.)		Volume ac-ft	Area ac.
16.50	TOB	0.38	0.31
16.25	weir	0.31	0.25
15.50		0.13	0.23
15.10		0.03	0.25
15.00	Bottom	0.00	0.23

Treatment Volume Required, TVR (on-line retention)

$$\text{TVR} = 1" * (1/12") * \text{Total Drainage Area} = 0.30 \text{ Ac.-ft.}$$

or

$$\text{TVR} = 1.25" * (1/12") * \text{Total Impervious Drainage Area} + 0.5" * (1/12") * \text{Total Drainage Area} = 0.270 \text{ Ac.-ft.}$$

Treatment Volume Provided, TVP

$$\text{TVR} = 0.30 \text{ Ac.-ft.}$$

$$\text{TVP} = 0.31 \text{ Ac.-ft.}$$

it+

OK

MODRET ANALYSIS DATE STREET

Mean Annual Storm Event

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

**Project Name : pre boner date mean annual
Rainfall Distribution : SCS Type II (24 hrs)**

Contributing Basin Area

0.81 ac.

SCS Curve Number

60.00

Time of Concentration

11.00 min.

Rainfall Depth

5.40 in.

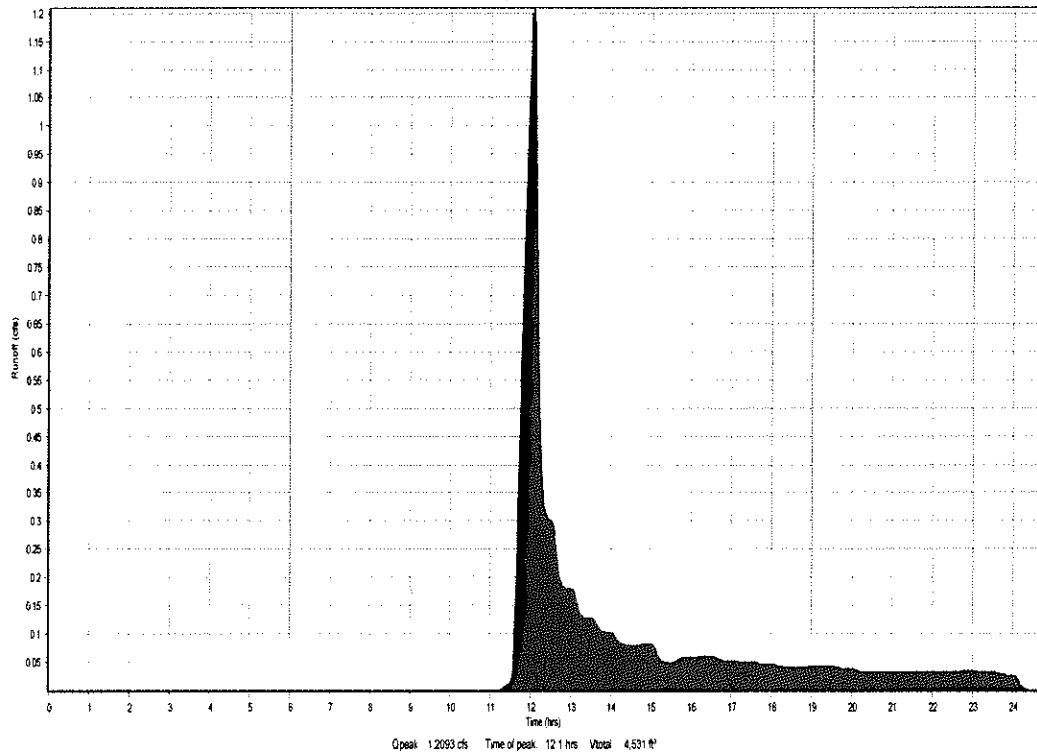
Shape Factor

484

Percent DCIA

0.00 %

HYDROGRAPH: pre-boner cille mean annual

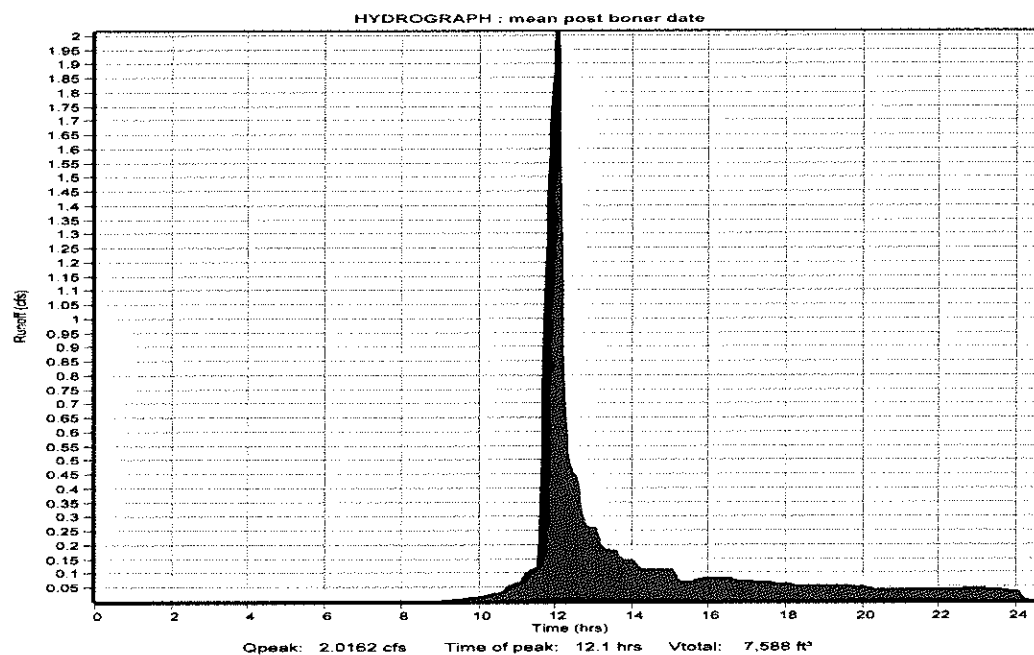


MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : mean post boner date
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area	0.81 ac.
SCS Curve Number	72.80
Time of Concentration	11.00 min.
Rainfall Depth	5.40 in.
Shape Factor	484
Percent DCIA	0.00 %



MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : post boner date mean annual
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	828.00 ft ²
Pond Volume between Bottom & DHWL	3,002.00 ft ³
Pond Length to Width Ratio (L/W)	10.00
Elevation of Effective Aquifer Base	1.00 ft
Elevation of Seasonal High Groundwater Table	11.00 ft
Elevation of Starting Water Level	16.00 ft
Elevation of Pond Bottom	16.00 ft
Is there overflow ?	Y
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.28
Unsaturated Vertical Hydraulic Conductivity	18.80 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	3.70 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.29
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00
Time Increment During Storm Event	2.00 hrs
Time Increment After Storm Event	12.00 hrs
Total Number of Increments After Storm Event	6.00

Runoff Hydrograph File Name: SCS1.SCS

Time of Peak Runoff: 12.06 hrs

Rate of Peak Runoff: 2.02 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond
Elevation of Water Level

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

N	N	N	N
0.00	0.00	0.00	0.00

MODRET

SUMMARY OF RESULTS

PROJECT NAME : post boner date mean annual

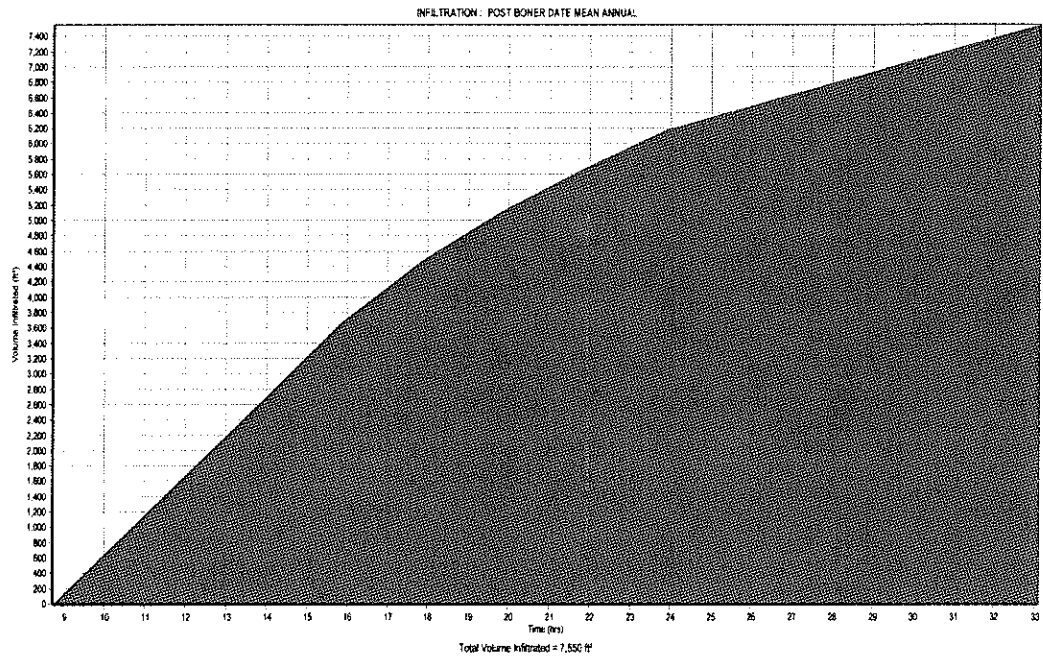
CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
00.00 - 8.73	11.000	0.000 *		
			0.00000	
8.73	11.000	0.14100		
			0.14271	
13.83	16.878	0.14442		0.00
			0.14509	
15.84	16.778	0.12811		0.00
			0.11112	
17.85	16.687	0.10089		0.00
			0.09067	
19.86	16.602	0.08399		0.00
			0.07731	
21.87	16.519	0.07290		0.00
			0.06849	
23.88	16.455	0.06457		0.00
			0.04114	
33.10	16.000	0.03509		0.00
			0.02903	
47.88	15.445	0.02565		0.00
			0.02227	
59.88	15.124	0.02013		0.00
			0.01799	
71.88	14.866	0.01651		0.00
			0.01503	
83.88	14.649	0.01394		0.00
			0.01286	
95.88	14.464			0.00

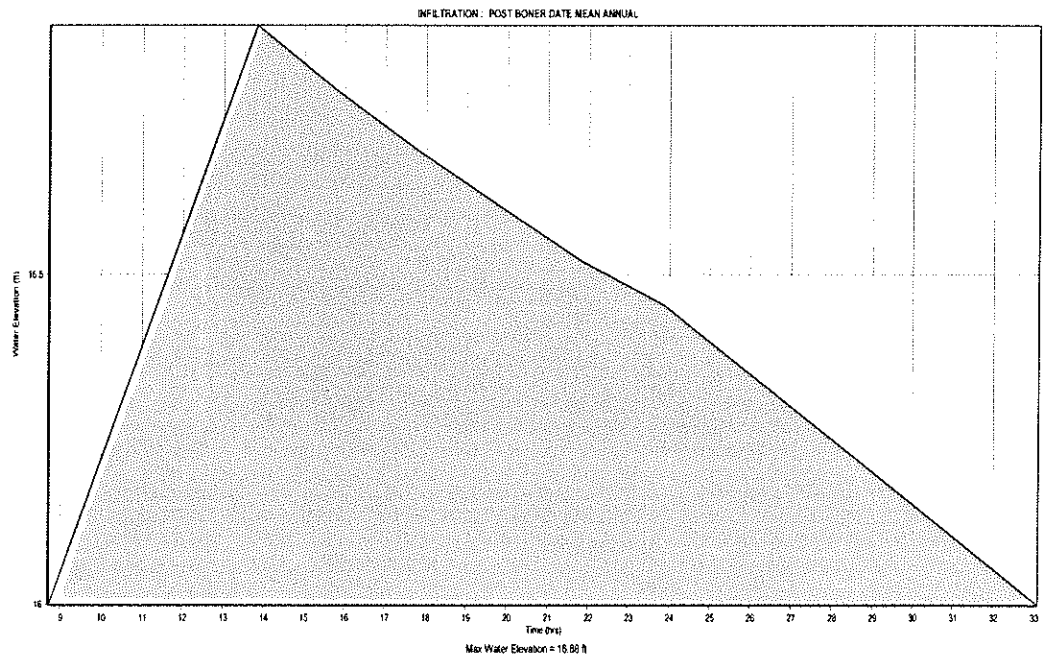
Maximum Water Elevation: 16.878 feet @ 13.83 hours

Recovery @ 33.098 hours

* Time increment when there is no runoff

Maximum Infiltration Rate: 4.176 ft/day





MODRET ANALYSIS DATE STREET

10-Year Storm Event

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : pre boner date 10
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area

0.81 ac.

SCS Curve Number

60.00

Time of Concentration

11.00 min.

Rainfall Depth

7.60 in.

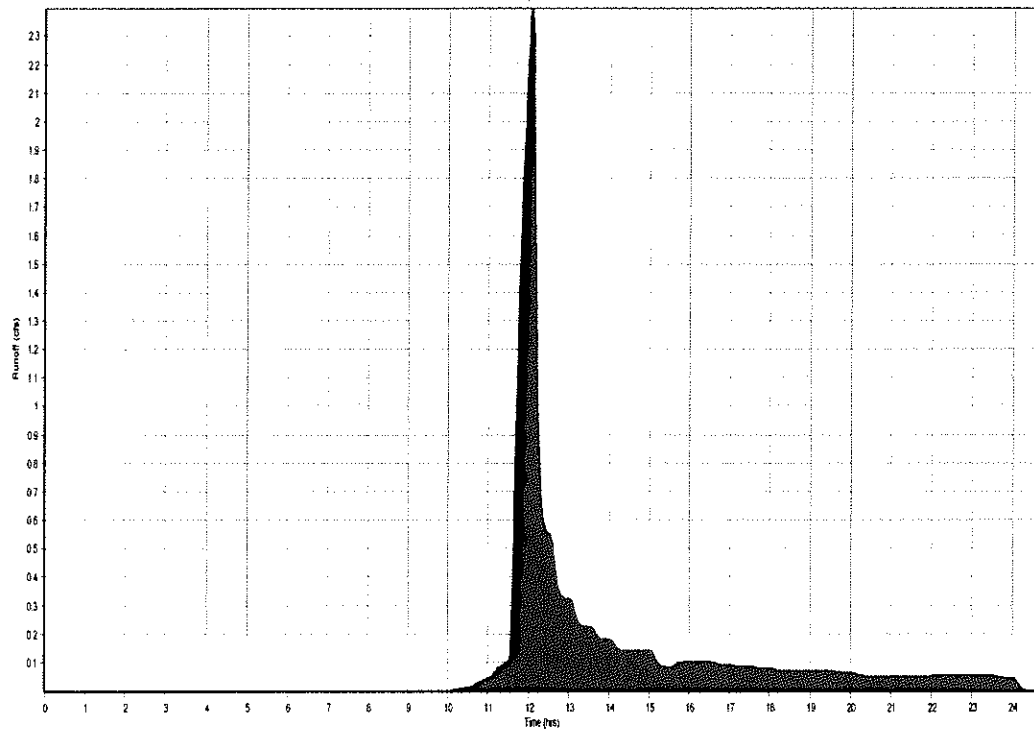
Shape Factor

484

Percent DCIA

0.00 %

HYDROGRAPH : pre boner data 10



Qpeak: 2.3972 cfs Time of peak: 12.1 hrs Vtotal: 8.928 M³

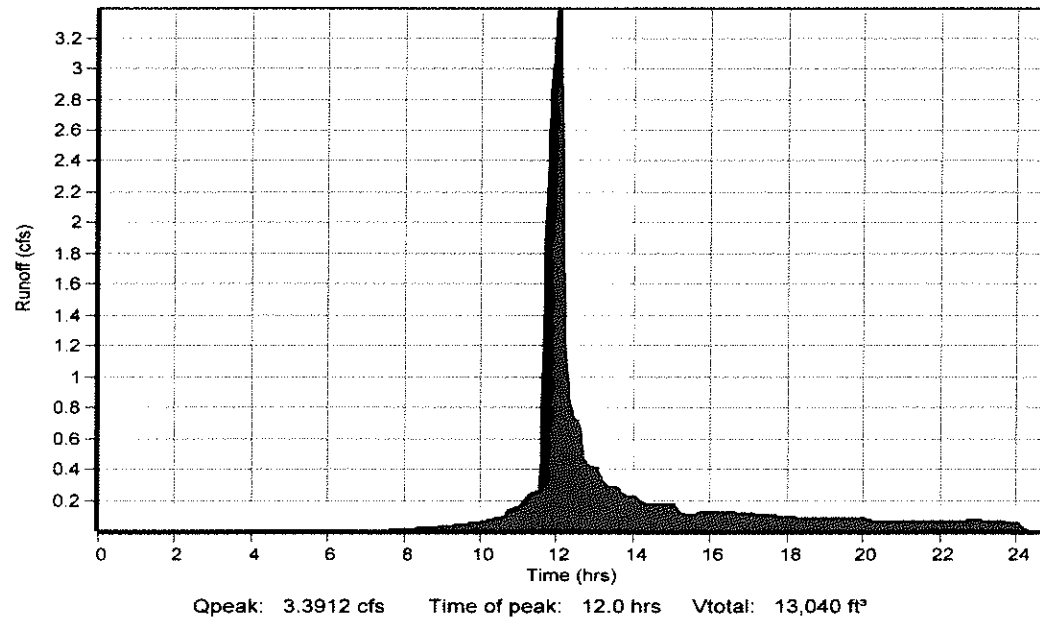
MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : post boner date 10
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area	0.81 ac.
SCS Curve Number	72.80
Time of Concentration	11.00 min.
Rainfall Depth	7.60 in.
Shape Factor	484
Percent DCIA	0.00 %

HYDROGRAPH : post boner date 10



MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : post boner date 10
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	828.00 ft ²
Pond Volume between Bottom & DHWL	3,002.00 ft ³
Pond Length to Width Ratio (L/W)	10.00
Elevation of Effective Aquifer Base	1.00 ft
Elevation of Seasonal High Groundwater Table	11.00 ft
Elevation of Starting Water Level	16.00 ft
Elevation of Pond Bottom	16.00 ft
Is there overflow ?	Y
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.28
Unsaturated Vertical Hydraulic Conductivity	18.80 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	3.70 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.29
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00
Time Increment During Storm Event	2.00 hrs
Time Increment After Storm Event	12.00 hrs
Total Number of Increments After Storm Event	6.00

Runoff Hydrograph File Name: SCS2.SCS

Time of Peak Runoff: 12.03 hrs

Rate of Peak Runoff: 3.39 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond

Elevation of Water Level

Top Bottom Left Right

N

N

N

N

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

N

N

N

N

0.00

0.00

0.00

0.00

MODRET

ELEVATION VS OVERFLOW RELATIONSHIP

PROJECT NAME : post boner date 10
Structure Type: BROAD CRESTED

Crest Elevation	16.75 ft
Crest Length	12.00 ft
Coefficient of Discharge	3.31
Weir Flow Exponent	1.50
Number of Contractions	0.00
Design High Water Level Elevation	17.00 ft

MODRET

SUMMARY OF RESULTS

PROJECT NAME : post boner date 10

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
00.00 - 6.96	11.000	0.000 *		
			0.00000	
6.96	11.000	0.07832		
			0.10723	
13.65	16.809	0.13614		4,239.60
			0.14482	
15.66	16.760	0.12947		4,598.20
			0.11412	
17.67	16.751	0.10474		4,641.00
			0.09536	
19.68	16.733	0.08899		4,641.00
			0.08261	
21.69	16.697	0.07843		4,641.00
			0.07426	
23.70	16.674	0.06985		4,641.00
			0.04352	
35.70	16.048	0.03698		4,641.00
			0.03044	
37.02	16.000	0.02686		4,641.00
			0.02328	
59.70	15.275	0.02102		4,641.00
			0.01876	
71.70	15.005	0.01720		4,641.00
			0.01564	
83.70	14.780	0.01451		4,641.00
			0.01337	
95.70	14.588			4,641.00

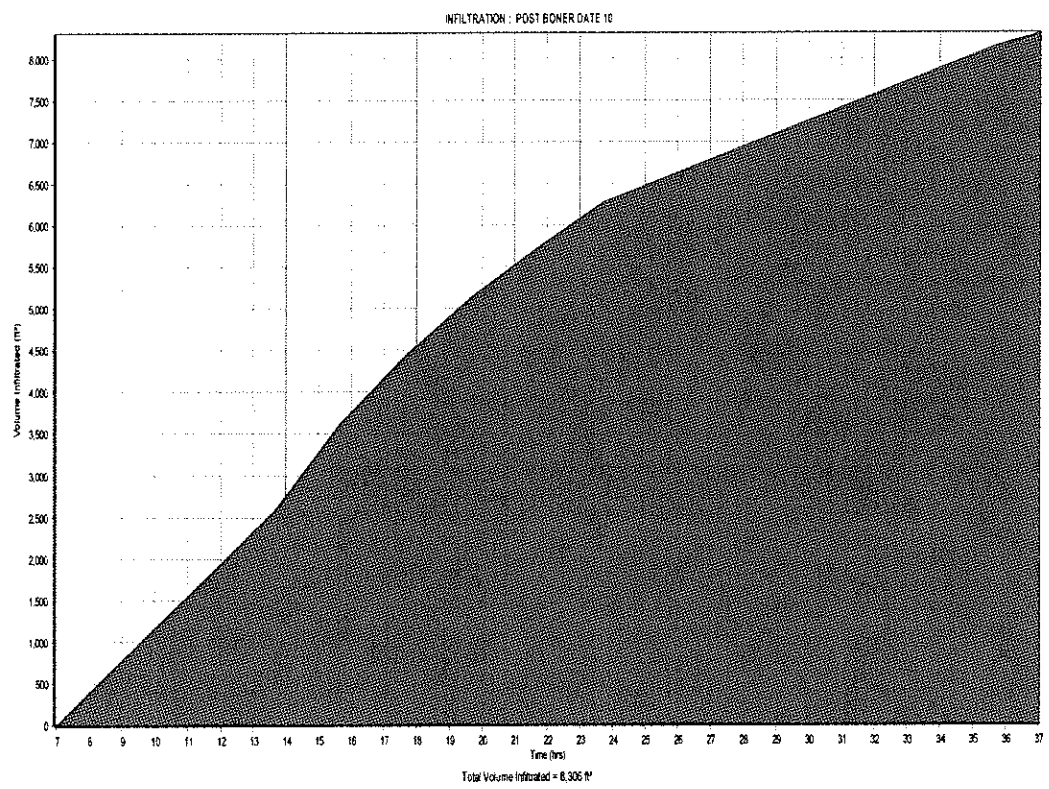
Maximum Water Elevation: 16.809 feet @ 13.65 hours

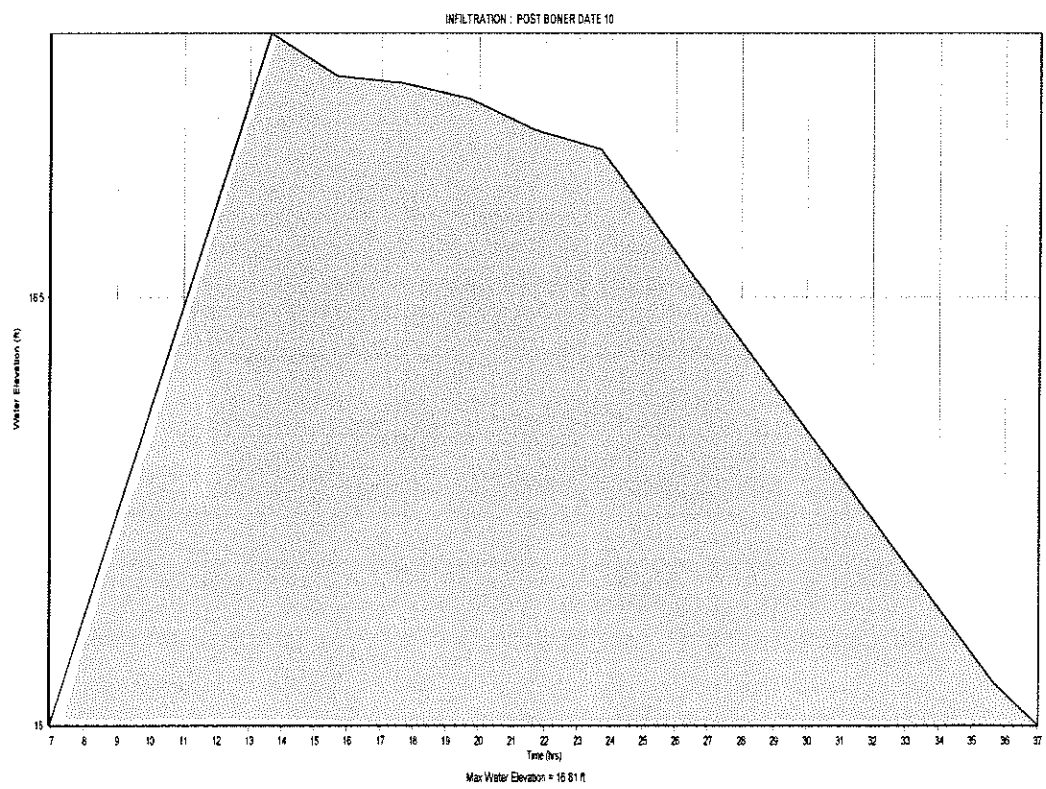
Recovery @ 37.020 hours

* Time increment when there is no runoff

Maximum Infiltration Rate: 4.168 ft/day

Analysis Date: 9/16/2019





MODRET ANALYSIS DATE STREET

25-Year Storm Event

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : pre boner date 25 yr
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area

0.81 ac.

SCS Curve Number

60.00

Time of Concentration

11.00 min.

Rainfall Depth

8.70 in.

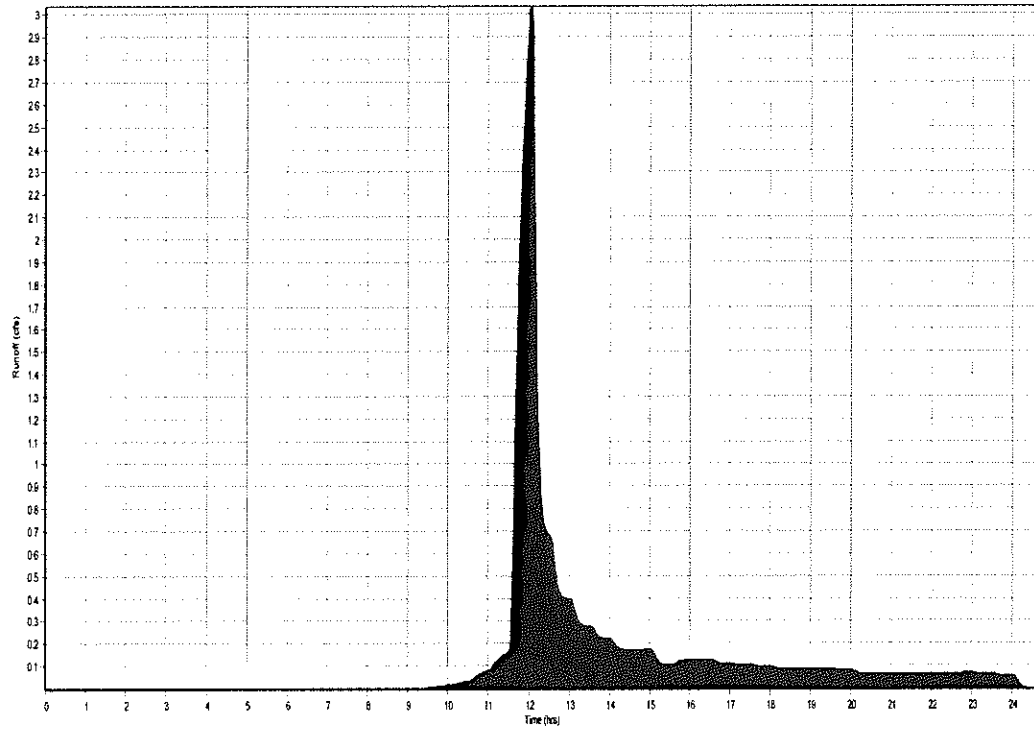
Shape Factor

484

Percent DCIA

0.00 %

HYDROGRAPH : pre-boner date: 25 yr



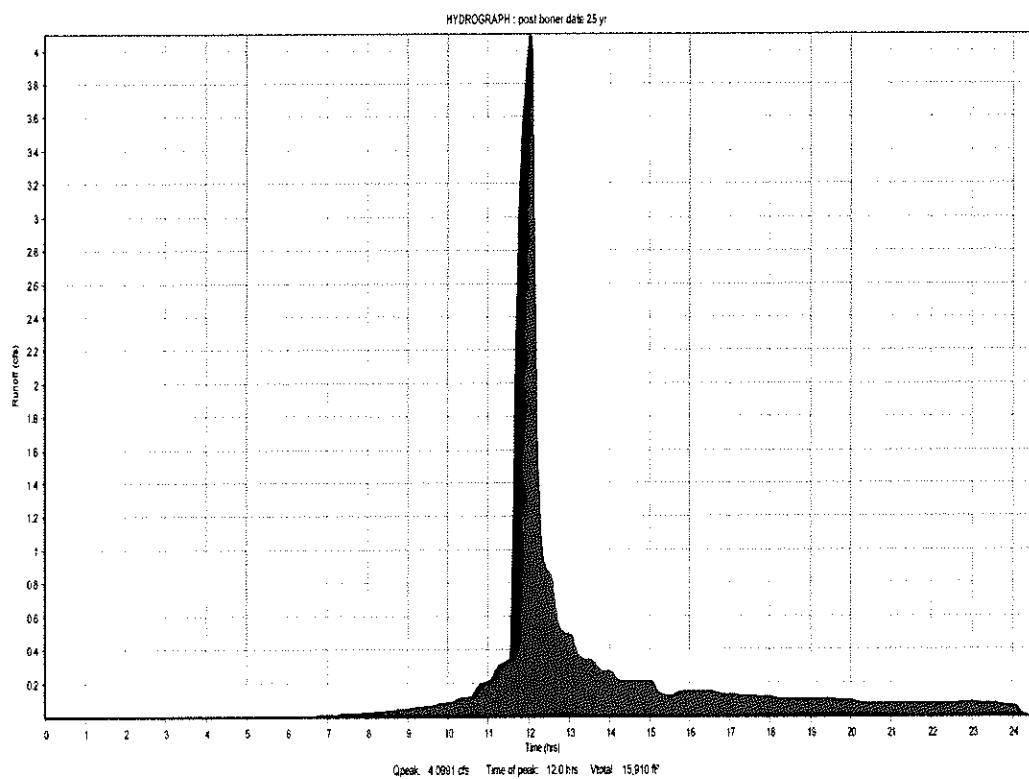
Qpeak: 3.0377 cfs Time of peak: 12.1 hrs Volume: 11,371 ft³

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : post boner date 25 yr
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area	0.81 ac.
SCS Curve Number	72.80
Time of Concentration	11.00 min.
Rainfall Depth	8.70 in.
Shape Factor	484
Percent DCIA	0.00 %



MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : post boner date 25
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	828.00 ft ²
Pond Volume between Bottom & DHWL	3,002.00 ft ³
Pond Length to Width Ratio (L/W)	10.00
Elevation of Effective Aquifer Base	1.00 ft
Elevation of Seasonal High Groundwater Table	11.00 ft
Elevation of Starting Water Level	16.00 ft
Elevation of Pond Bottom	16.00 ft
Is there overflow ?	Y
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.28
Unsaturated Vertical Hydraulic Conductivity	18.80 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	3.70 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.29
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00
Time Increment During Storm Event	2.00 hrs
Time Increment After Storm Event	12.00 hrs
Total Number of Increments After Storm Event	6.00

Runoff Hydrograph File Name: SCS4.SCS

Time of Peak Runoff: 12.03 hrs

Rate of Peak Runoff: 4.10 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond
Elevation of Water Level

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00

MODRET

ELEVATION VS OVERFLOW RELATIONSHIP

PROJECT NAME : post boner date 25
Structure Type: BROAD CRESTED

Crest Elevation	16.75 ft
Crest Length	12.00 ft
Coefficient of Discharge	3.31
Weir Flow Exponent	1.50
Number of Contractions	0.00
Design High Water Level Elevation	17.00 ft

MODRET

SUMMARY OF RESULTS

PROJECT NAME : post boner date 25

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
00.00 - 6.33	11.000	0.000 *		
			0.00000	
6.33	11.000	0.07159		
			0.10475	
13.32	16.825	0.13791		5,930.00
			0.14745	
15.33	16.770	0.13089		6,767.80
			0.11433	
17.34	16.756	0.10523		6,979.70
			0.09614	
19.35	16.752	0.09032		7,068.90
			0.08451	
21.36	16.750	0.08051		7,069.50
			0.07652	
23.37	16.750	0.07191		7,069.90
			0.04440	
35.37	16.111	0.03767		7,069.90
			0.03095	
38.36	16.000	0.02729		7,069.90
			0.02363	
59.37	15.326	0.02132		7,069.90
			0.01902	
71.37	15.052	0.01744		7,069.90
			0.01585	
83.37	14.824	0.01470		7,069.90
			0.01355	
95.37	14.629			7,069.90

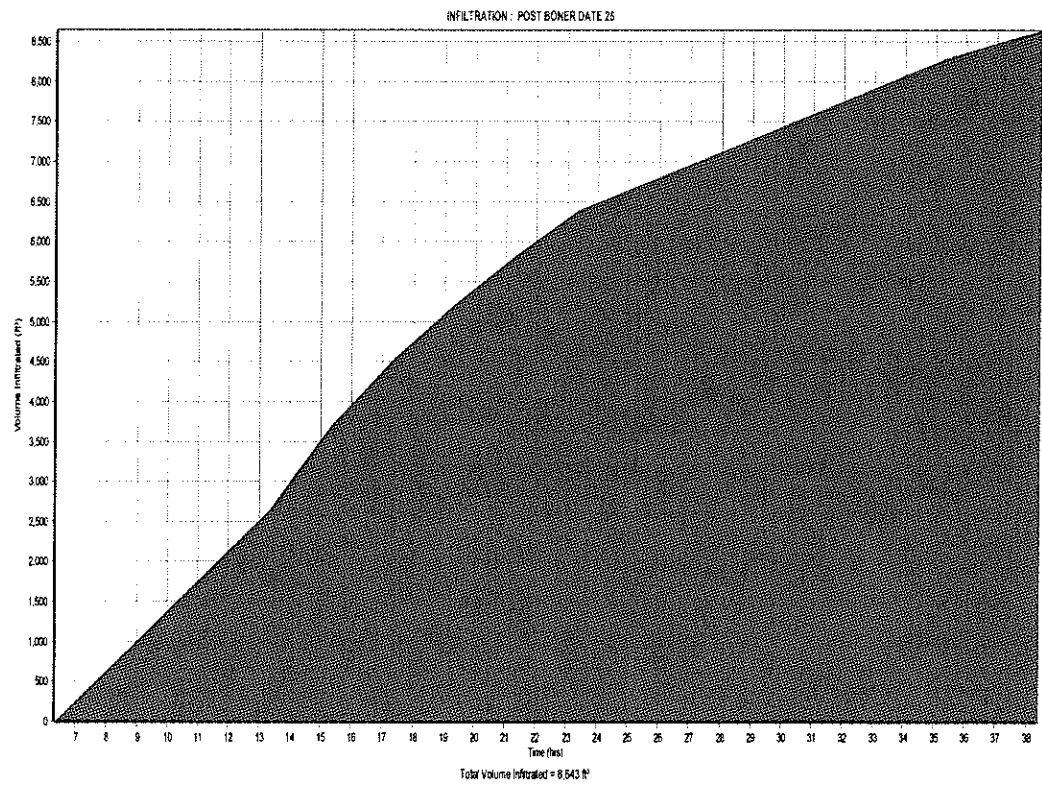
Maximum Water Elevation: 16.825 feet @ 13.32 hours

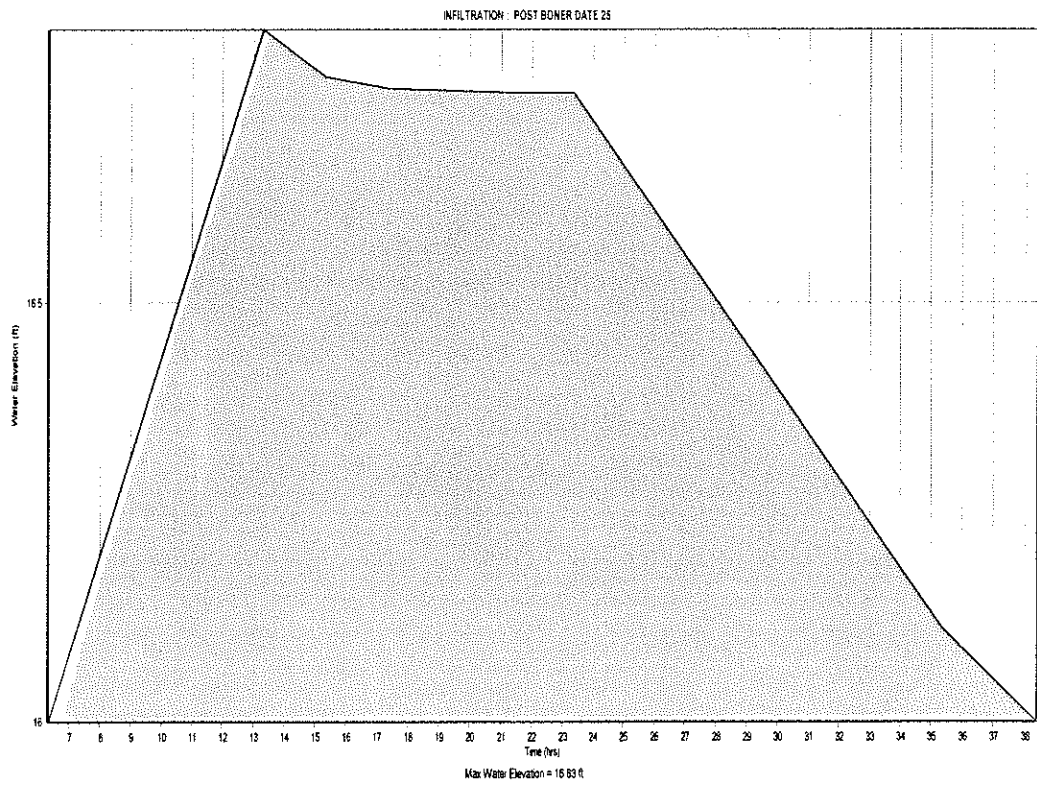
Recovery @ 38.365 hours

* Time increment when there is no runoff

Maximum Infiltration Rate: 4.244 ft/day

Analysis Date: 9/16/2019





MODRET ANALYSIS LOTS

Mean Annual Storm Event

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : pre boner mean annual lot citrona
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area

3.60 ac.

SCS Curve Number

60.00

Time of Concentration

15.00 min.

Rainfall Depth

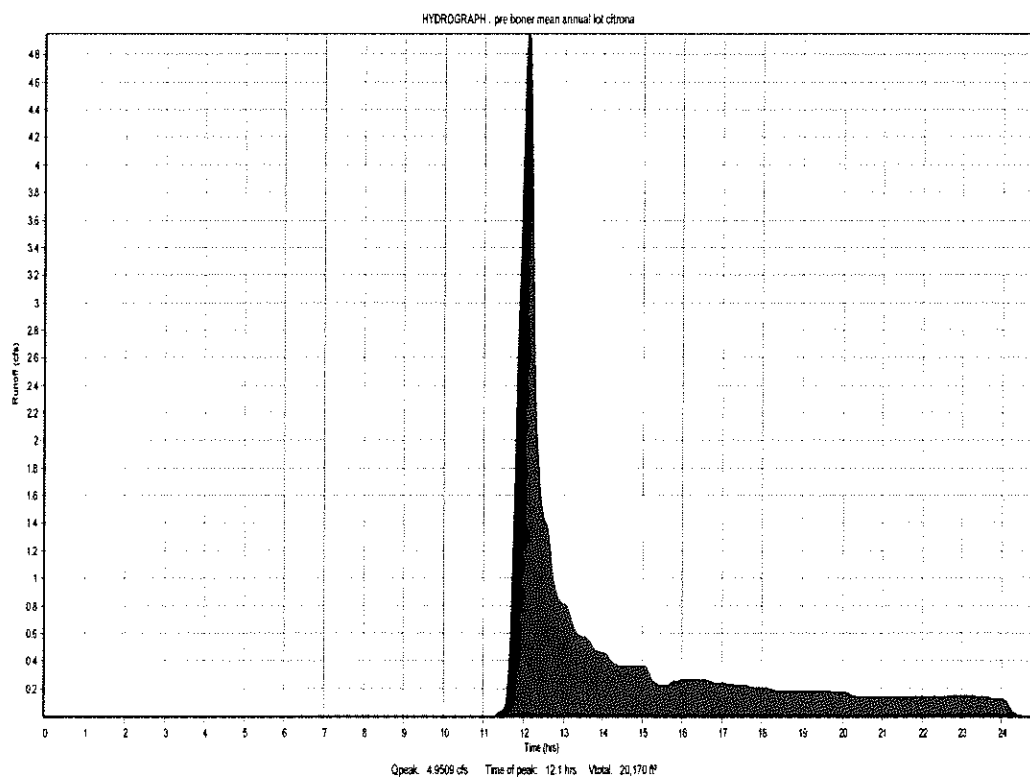
5.40 in.

Shape Factor

484

Percent DCIA

0.00 %



MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : post boner mean annual lot citrona
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area

3.60 ac.

SCS Curve Number

72.20

Time of Concentration

16.00 min.

Rainfall Depth

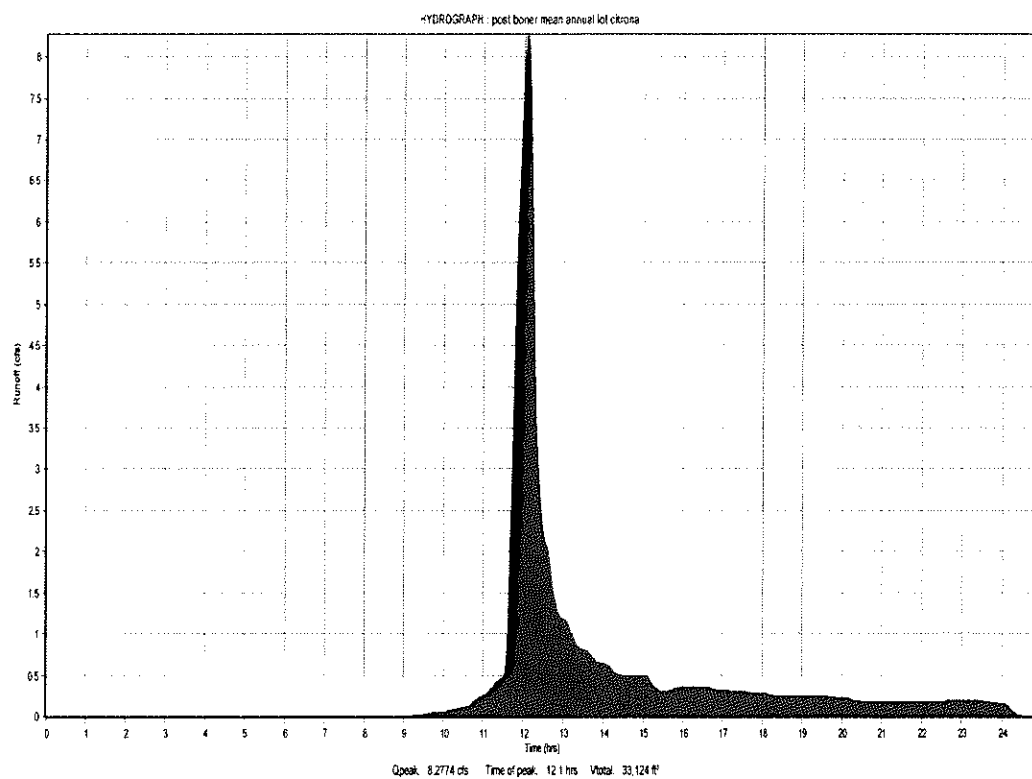
5.40 in.

Shape Factor

484

Percent DCIA

0.00 %



MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

**PROJECT NAME : post boner lots mean annual
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED**

Pond Bottom Area	9,940.00 ft ²
Pond Volume between Bottom & DHWL	16,167.00 ft ³
Pond Length to Width Ratio (L/W)	1.00
Elevation of Effective Aquifer Base	1.00 ft
Elevation of Seasonal High Groundwater Table	5.00 ft
Elevation of Starting Water Level	15.00 ft
Elevation of Pond Bottom	15.00 ft
Is there overflow ?	Y
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.30
Unsaturated Vertical Hydraulic Conductivity	18.80 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	3.70 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.30
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00
Time Increment During Storm Event	2.00 hrs
Time Increment After Storm Event	12.00 hrs
Total Number of Increments After Storm Event	6.00

Runoff Hydrograph File Name: SCS9.SCS

Time of Peak Runoff: 12.08 hrs

Rate of Peak Runoff: 8.28 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond
Elevation of Water Level

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00

MODRET

ELEVATION VS OVERFLOW RELATIONSHIP

PROJECT NAME : post boner lots mean annual
Structure Type: BROAD CRESTED

Crest Elevation	16.25 ft
Crest Length	12.00 ft
Coefficient of Discharge	3.31
Weir Flow Exponent	1.50
Number of Contractions	0.00
Design High Water Level Elevation	16.50 ft

MODRET

SUMMARY OF RESULTS

PROJECT NAME : post boner lots mean annual

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft³)
00.00 - 8.88	5.000	0.000 *		
			0.00000	
8.88	5.000	1.18599		
			0.67093	
21.44	15.089	0.15587		0.00
			0.07386	
23.44	15.164	0.07454		0.00
			0.07865	
29.69	15.000	0.07754		0.00
			0.07643	
47.44	14.542	0.07340		0.00
			0.07036	
59.44	14.260	0.06681		0.00
			0.06326	
71.44	14.007	0.05990		0.00
			0.05655	
83.44	13.780	0.05362		0.00
			0.05070	
95.44	13.577			0.00

Maximum Water Elevation: 15.164 feet @ 23.44 hours

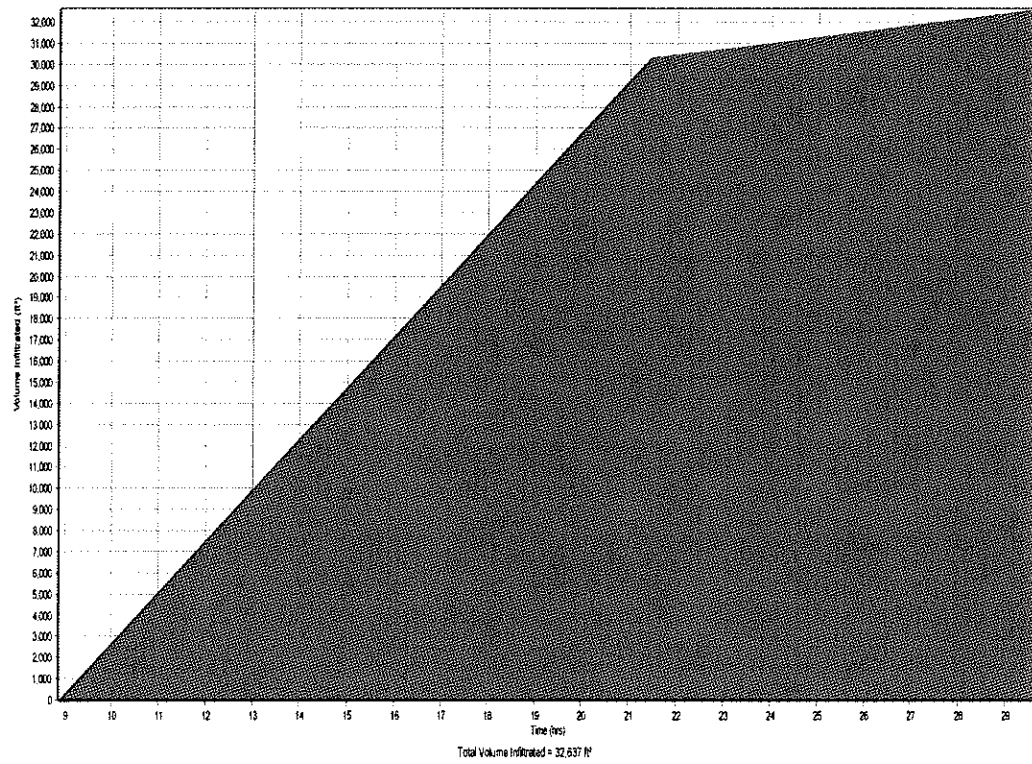
Recovery @ 29.686 hours

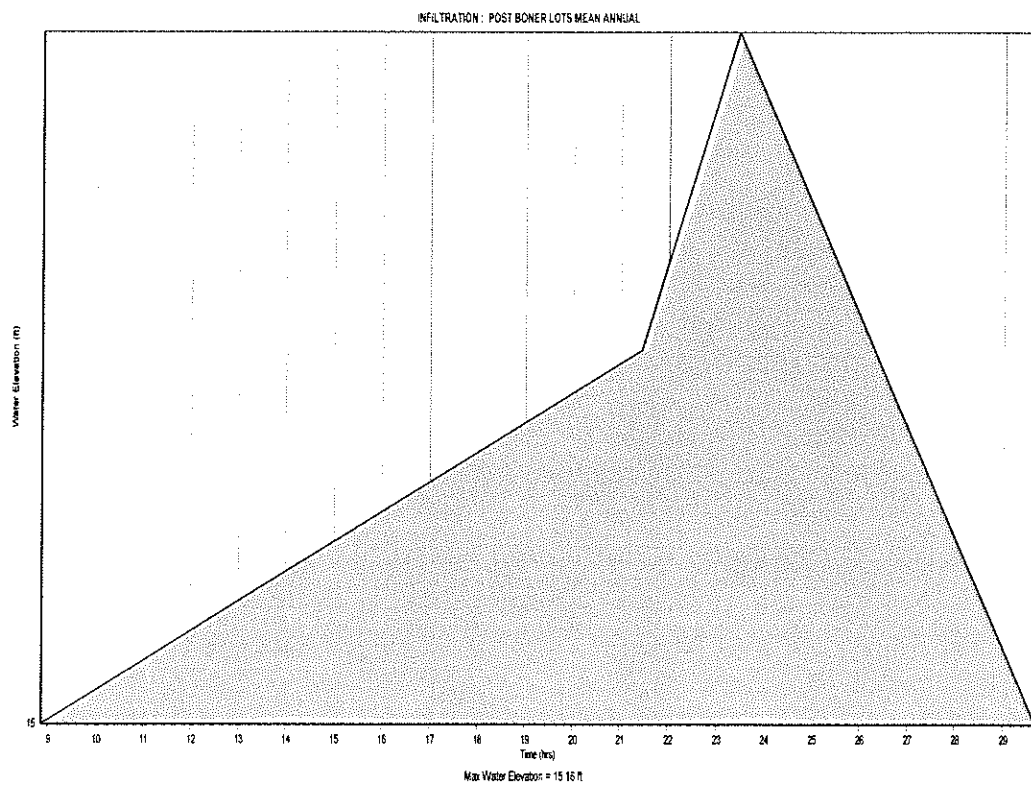
* Time increment when there is no runoff

Maximum Infiltration Rate: 5.378 ft/day

Analysis Date: 9/16/2019

INFILTRATION - POST BOXER LOTS MEAN ANNUAL





MODRET ANALYSIS LOTS

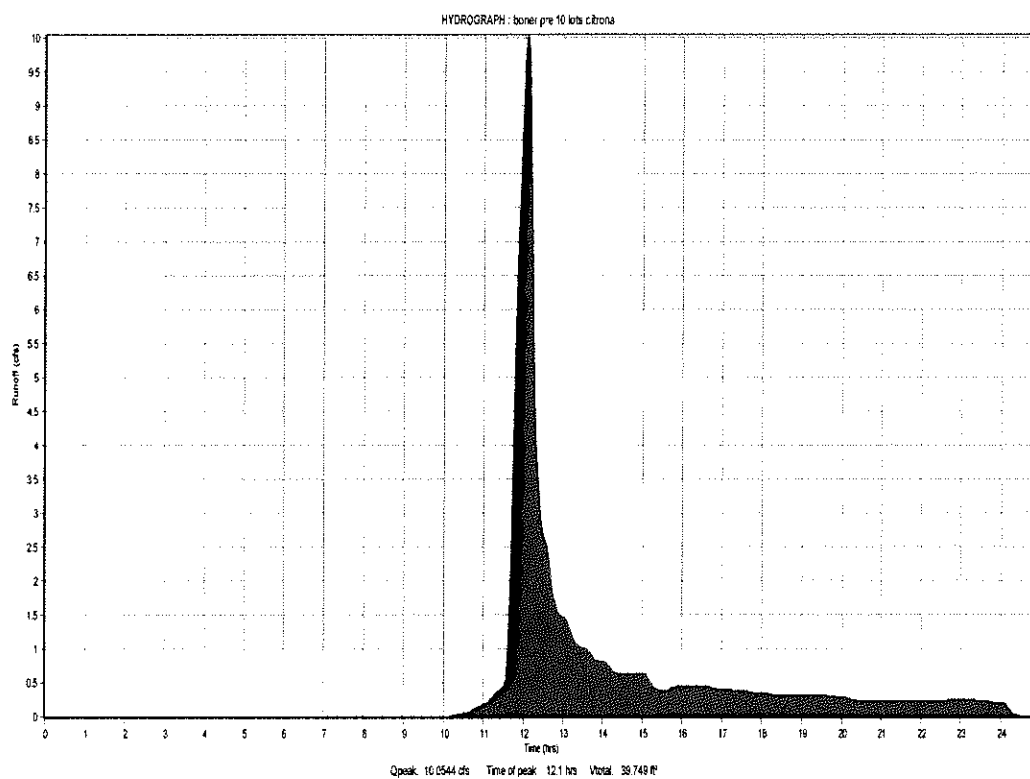
Mean Annual Storm Event

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : boner pre 10 lots citriona
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area	3.60 ac.
SCS Curve Number	60.00
Time of Concentration	15.00 min.
Rainfall Depth	7.60 in.
Shape Factor	484
Percent DCIA	0.00 %

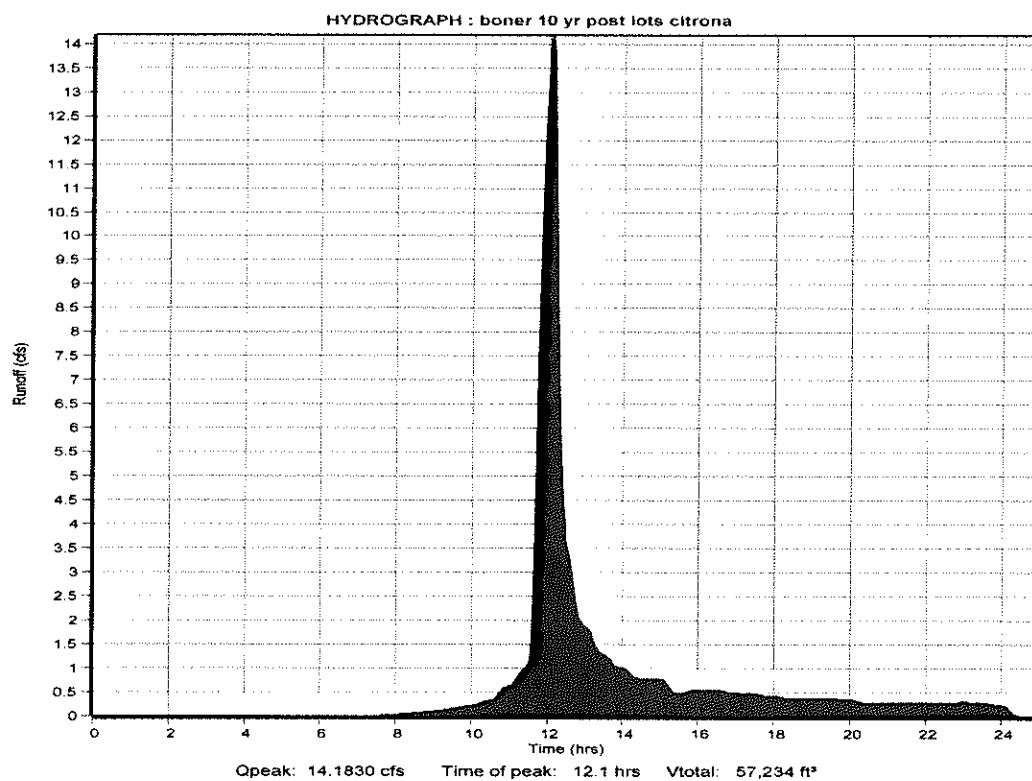


MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : boner 10 yr post lots citriona
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area	3.60 ac.
SCS Curve Number	72.20
Time of Concentration	16.00 min.
Rainfall Depth	7.60 in.
Shape Factor	484
Percent DCIA	0.00 %



MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : post boner lots 10
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	9,940.00 ft ²
Pond Volume between Bottom & DHWL	16,167.00 ft ³
Pond Length to Width Ratio (L/W)	1.00
Elevation of Effective Aquifer Base	1.00 ft
Elevation of Seasonal High Groundwater Table	5.00 ft
Elevation of Starting Water Level	15.00 ft
Elevation of Pond Bottom	15.00 ft
Is there overflow ?	Y
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.30
Unsaturated Vertical Hydraulic Conductivity	18.80 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	3.70 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.30
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00
Time Increment During Storm Event	2.00 hrs
Time Increment After Storm Event	12.00 hrs
Total Number of Increments After Storm Event	6.00

Runoff Hydrograph File Name: SCS1.SCS

Time of Peak Runoff: 12.08 hrs

Rate of Peak Runoff: 14.18 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond
Elevation of Water Level

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00

MODRET

ELEVATION VS OVERFLOW RELATIONSHIP

PROJECT NAME : post boner lots 10
Structure Type: BROAD CRESTED

Crest Elevation	16.25 ft
Crest Length	12.00 ft
Coefficient of Discharge	3.31
Weir Flow Exponent	1.50
Number of Contractions	0.00
Design High Water Level Elevation	16.50 ft

MODRET

SUMMARY OF RESULTS

PROJECT NAME : post boner lots 10

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft³)
00.00 - 7.12	5.000	0.000 *		
			0.00000	
7.12	5.000	2.01556		
			1.16595	
14.36	16.142	0.31634		0.00
			0.08164	
16.36	16.291	0.08421		2,374.60
			0.08679	
18.36	16.295	0.08608		5,117.00
			0.08537	
20.36	16.288	0.08760		7,202.50
			0.08983	
22.36	16.280	0.09078		8,689.50
			0.09173	
24.36	16.276	0.09181		9,940.20
			0.09226	
36.36	15.906	0.08919		9,940.20
			0.08613	
48.36	15.561	0.08181		9,940.20
			0.07749	
60.36	15.251	0.07324		9,940.20
			0.06899	
71.24	15.000	0.06525		9,940.20
			0.06151	
84.36	14.728	0.05835		9,940.20
			0.05518	
96.36	14.506			9,940.20

Maximum Water Elevation: 16.295 feet @ 18.36 hours

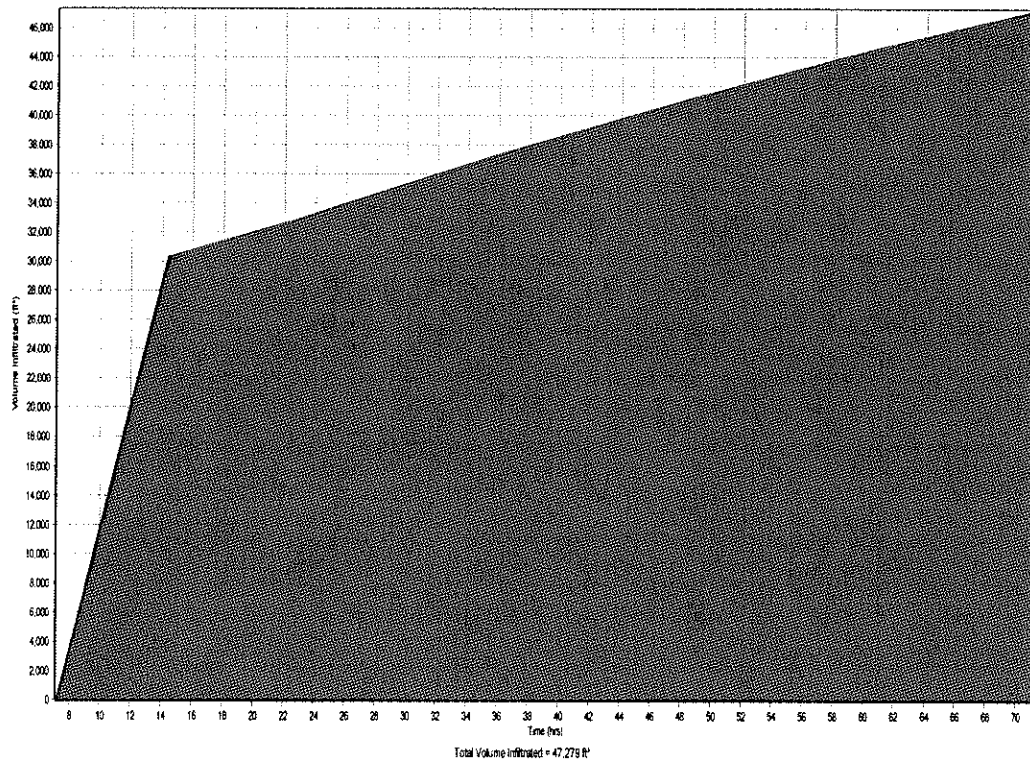
Recovery @ 71.236 hours

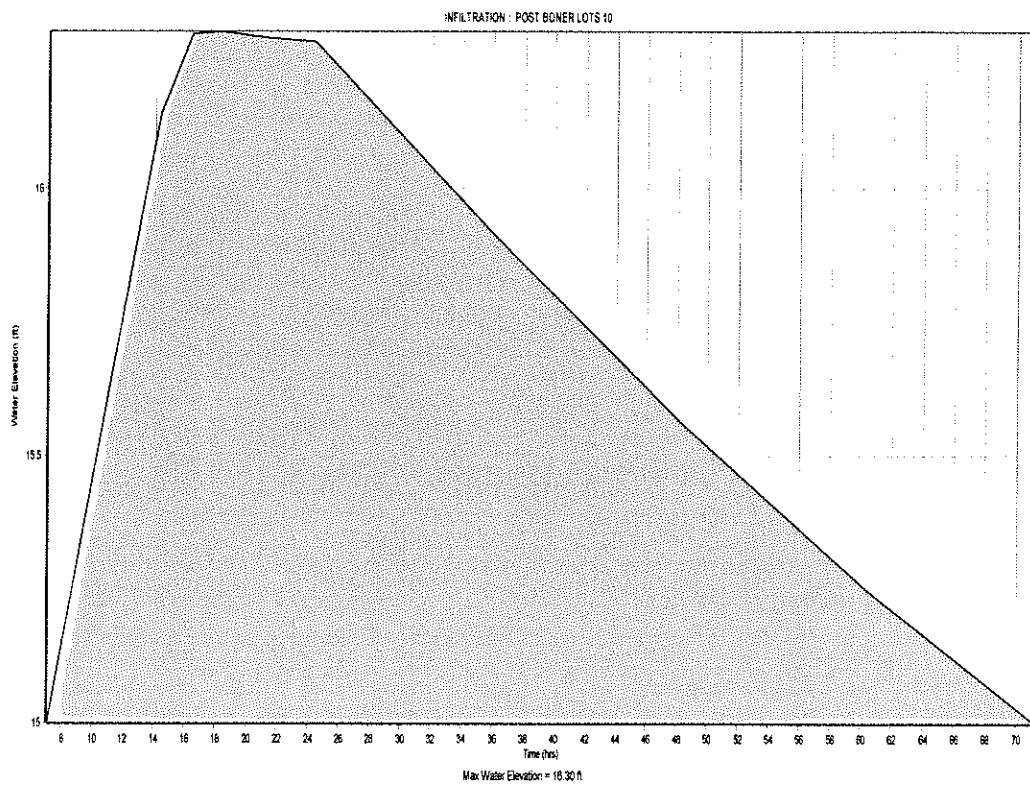
* Time increment when there is no runoff

Maximum Infiltration Rate: 9.347 ft/day

Analysis Date: 9/17/2019

INFILTRATION : POST BOWER LOTS 10





MODRET ANALYSIS LOTS

25-Year Storm Event

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : boner 25 yr pre
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area

3.60 ac.

SCS Curve Number

60.00

Time of Concentration

15.00 min.

Rainfall Depth

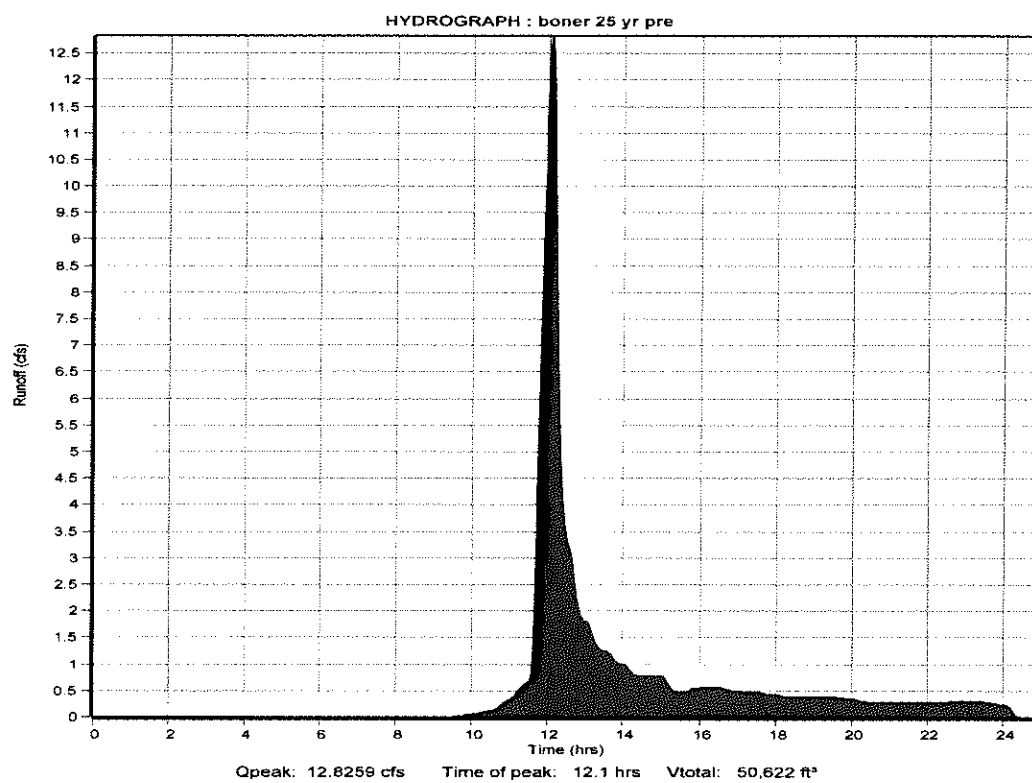
8.70 in.

Shape Factor

484

Percent DCIA

0.00 %



MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : 25 yr boner post citrona
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area

3.60 ac.

SCS Curve Number

72.20

Time of Concentration

16.00 min.

Rainfall Depth

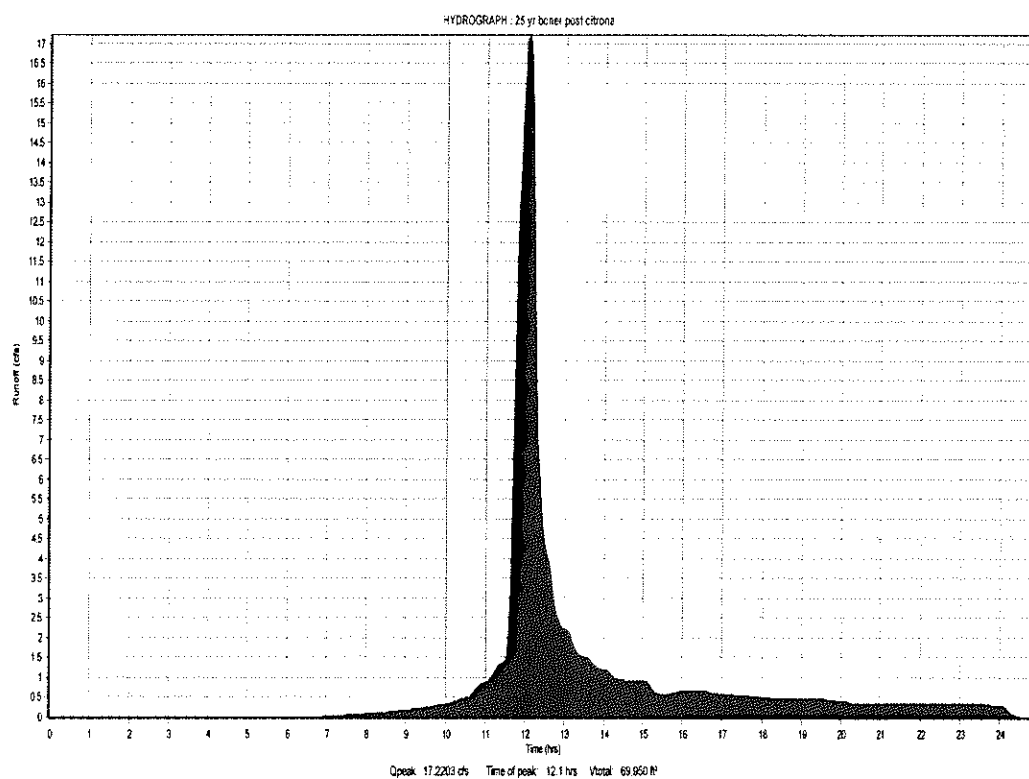
8.70 in.

Shape Factor

484

Percent DCIA

0.00 %



MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : 25 post boner infil
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	9,940.00 ft ²
Pond Volume between Bottom & DHWL	16,167.00 ft ³
Pond Length to Width Ratio (L/W)	1.00
Elevation of Effective Aquifer Base	1.00 ft
Elevation of Seasonal High Groundwater Table	5.00 ft
Elevation of Starting Water Level	15.00 ft
Elevation of Pond Bottom	15.00 ft
Is there overflow ?	Y
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.30
Unsaturated Vertical Hydraulic Conductivity	18.80 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	3.70 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.30
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00
Time Increment During Storm Event	2.00 hrs
Time Increment After Storm Event	12.00 hrs
Total Number of Increments After Storm Event	6.00

Runoff Hydrograph File Name: SCS2.SCS

Time of Peak Runoff: 12.08 hrs

Rate of Peak Runoff: 17.22 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond
Elevation of Water Level

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00

MODRET

ELEVATION VS OVERFLOW RELATIONSHIP

PROJECT NAME : 25 post boner infil
Structure Type: BROAD CRESTED

Crest Elevation	16.25 ft
Crest Length	12.00 ft
Coefficient of Discharge	3.31
Weir Flow Exponent	1.50
Number of Contractions	0.00
Design High Water Level Elevation	16.50 ft

MODRET

SUMMARY OF RESULTS

PROJECT NAME : 25 post boner infil

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft³)
00.00 - 6.44	5.000	0.000 *		
			0.00000	
6.44	5.000	1.89694		
			1.09519	
14.16	16.336	0.29343		7,235.00
			0.08572	
16.16	16.319	0.08716		12,462.00
			0.08860	
18.16	16.305	0.08732		16,144.00
			0.08604	
20.16	16.294	0.08926		18,798.00
			0.09248	
22.16	16.285	0.09181		20,663.00
			0.09115	
24.16	16.283	0.09132		22,381.00
			0.09236	
36.16	15.913	0.08927		22,381.00
			0.08619	
48.16	15.568	0.08186		22,381.00
			0.07753	
60.16	15.257	0.07328		22,381.00
			0.06903	
71.31	15.000	0.06528		22,381.00
			0.06154	
84.16	14.734	0.05838		22,381.00
			0.05521	
96.16	14.512			22,381.00

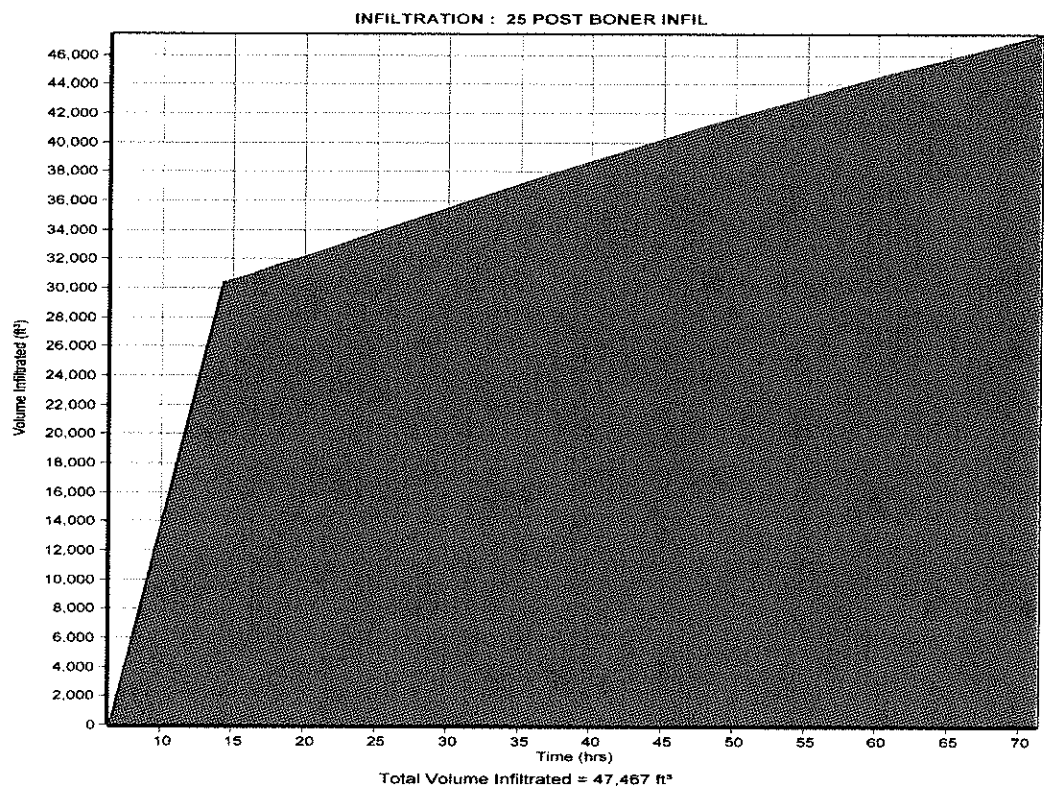
Maximum Water Elevation: 16.336 feet @ 14.16 hours

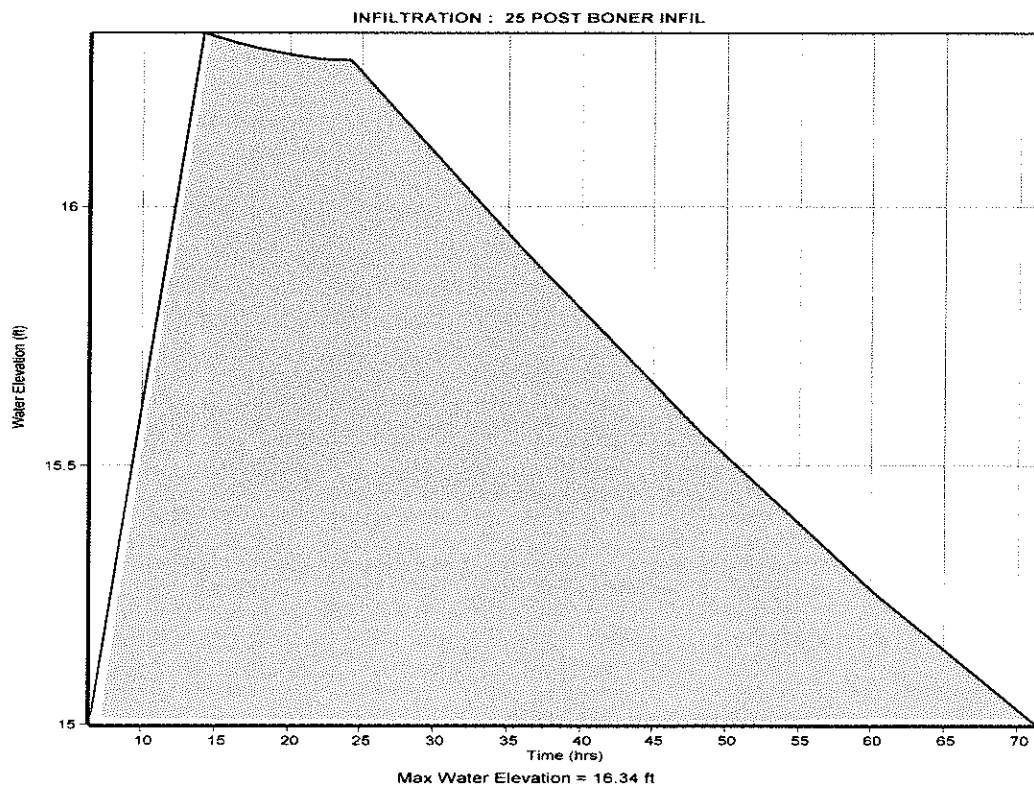
Recovery @ 71.307 hours

* Time increment when there is no runoff

Maximum Infiltration Rate: 8.779 ft/day

Analysis Date: 8/28/2019





GEOTECHNICAL REPORT



OF JAX, INC.

**REPORT OF PRELIMINARY GEOTECHNICAL
EXPLORATION & ENGINEERING EVALUATION
PROPOSED BONER SUBDIVISION - LOTS, ROADWAYS & PONDS
SE QUADRANT OF CITRONA DRIVE & DATE STREET
FERNANDINA BEACH, FLORIDA**

AGES JOB NO. J18307, REPORT NO. 001

FOR

**GILLETTE & ASSOCIATES
20 South 4th Street
Amelia Island, FL 32034**

Attn: Mr. Asa Gillette, P.E.

SEPTEMBER 19, 2018

AGES of JAX, Inc.

**P O Box 24008, Jacksonville FL 32241-4008
9556 Historic Kings Road South, Suite 201 ● Jacksonville, Florida 32257-2010
(904) 886-0766 ● (904) 880-5190 (FAX)**



OF JAX, INC.

September 19, 2018

GILLETTE & ASSOCIATES

20 South 4th Street
Amelia Island, FL 32034
Attn: Mr. Asa Gillette, P.E.

Re: Report of Preliminary Geotechnical Exploration & Engineering Evaluation
Proposed Boner Subdivision - Lots, Roadways & Ponds
SE Quadrant of Citrona Drive & Date Street
Fernandina Beach, Florida
AGES Job No. J18307, Report No. 001

Ladies & Gentlemen:

AGES OF JAX (AGES), Inc. has completed a preliminary geotechnical exploration of the subsurface conditions beneath the construction area for the referenced project. Our services were performed as requested and authorized by Gillette & Associates representative Mr. Asa Gillette PE on August 25, 2018. This report includes: (1) a brief description of the planned construction, (2) a summary of the field exploration performed and results that were obtained, (3) our recommendations for foundation design and construction of the proposed residential structures, (4) guideline pavement design and construction recommendations, (5) evaluation of the suitability of barrow soil located at the site, and (6) surface aquifer characterization parameters for use in stormwater pond design and permitting.

The site preparation recommendations and foundation design recommendations presented herein are specific to the tested lots. Soil conditions on untested lots could be markedly different and the recommendation presented herein may or may not be applicable. If a higher confidence level is desired concerning the soil conditions on the untested lots and/or reclaimed lots, then we recommend that **AGES** be retained to perform supplemental penetration test borings prior to initiation of building construction.

We appreciate the opportunity to be of service as the geotechnical consultant during this phase of your project. Should you have any questions concerning this report or if we may be of any further service to you, please feel free to contact us.

Very truly yours,

Digitally signed by Bill C.
McMahan Jr., PE
Date: 2018.09.19 12:55:23 -04'00'
Adobe Acrobat version:
2018.011.20058

AGES of JAX, INC.

Bill C. McMahan, Jr.

Bill C. McMahan, Jr., P.E.
Principal Engineer/Vice-President
Registered, Florida No. 42677

BCM/bcm/J18307 boner subdivision - Lots Roadways and Ponds.wpd
Attachments
Distribution: Addressee (1) Via Email

AGES of JAX, Inc.

P O Box 24008, Jacksonville FL 32241-4008
9556 Historic Kings Road South, Suite 201 • Jacksonville, Florida 32257-2010
(904) 886-0766 • (904) 880-5190 (FAX)

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REPORT ATTACHMENTS

1.0 PROJECT BACKGROUND INFORMATION

General project information has been provided by Gillette & Associates representative Mr. Asa Gillette P.E. during recent email and telephone calls. We have also received a Boundary Survey/ Site Plan (dated 1/17/05, prepared by Manzie & Drake) which illustrates the site boundaries, the lot layout, the planned stormwater management facility location, and the requested boring/test locations. Neither existing site topographical data nor proposed site grading information has been provided. No other information has been provided at this time.

Based upon the information provided, we understand that a seven lot residential subdivision will be developed in the southeast quadrant of the intersection of Date Street and Citrona Drive in Fernandina Beach, Florida. Date Street will be extend and asphalt paved to provide access to Lots 4-7. Stormwater runoff will be stored and treated in a dry detention pond/swale which will be located on the south end of Lot 7.

We have assumed that the residential structures will be one or two stories and will be either block or wood framed. Detailed structural loading information has not been provided at this time. However, we have assumed maximum individual column loads of 75 kips, maximum wall loads on the order of 1 klf and total floor slab loads of 150 pounds per square foot or less. The proposed building finish floor and existing site topography data have not been provided. However, we have assumed that two feet or less of elevating fill will be added in the building and parking areas.

2.0 PRELIMINARY GEOTECHNICAL EXPLORATION

2.1 Purpose of Exploration

The objective of this preliminary geotechnical exploration was to obtain site and subsurface data for use in: (1) the evaluation of the site with respect to the proposed construction, (2) the development of foundation design and construction recommendations for the proposed building structure, (3) development of guideline pavement design and construction recommendations, (4) evaluation of surface soils for use as transfer fill, and (5) the design and permitting of the stormwater management system. The preliminary geotechnical exploration therefore consisted of field exploratory borings and a geotechnical engineering analysis of the collected test data.

2.2 Subsurface Testing

The field testing was conducted during the period of September 5 - 8, 2018. The lot area testing included four(4) 15- foot deep penetration test borings (B1 -B4). The road extension areas testing includes two(2) 6-foot deep auger borings. Stormwater management facility related testing included one(1) 15-foot deep auger boring (LA1), one double ring infiltration test (DRI1) to measure the insitu vertical unsaturated hydraulic conductivity (Kvunsat), and one fully screened cased borehole hydraulic conductivity test (TMW1) to measure the insitu saturated horizontal hydraulic conductivity (Khsat) of the saturated surface aquifer. The double ring and cased borehole tests were conducted in accordance with the St. Johns River Water Management District testing protocol.

The field testing locations were established by our personnel using hand held GPS locator devices. The borings were located to avoid the existing building structures and other constraints. The boring locations are shown on the attached Field Exploration Plan should be considered approximate. The ground surface elevations at the boring locations were not determined.

The attached Test Boring Records and Auger Boring Records present the descriptions of the subsurface soils encountered, the groundwater levels encountered, and the penetration resistance values recorded when drilling and sampling the test borings. The subsurface conditions are graphically illustrated

on the attached Generalized Subsurface Profile sheet. The stratification lines and depth designations on the boring records and profile represent the approximate boundary between the various soils encountered, as determined in the field by our drillers, and the transition from one strata to the next should be considered approximate. A brief discussion of the drilling, sampling, and field testing techniques used during the geotechnical exploration is provided in the attached Field Exploration Procedures section.

3.0 GEOTECHNICAL FINDINGS

3.1 Site Conditions

The subject site was visited on several occasions by **AGES** personnel to identify site conditions which could impact our site preparation and foundation design recommendations. The site is heavily wooded and relatively level in topography. No standing water was observed on the site at the time of our visits.

3.2 Subsurface Conditions

The subsurface conditions outlined below highlight the major subsurface stratifications encountered during our geotechnical exploration of the site. When reviewing the boring records, the attached Generalized Subsurface Profile and the subsurface conditions outlined below, it should be understood that the subsurface conditions will vary across the proposed construction area and between the boring locations.

3.2.1 Soil Conditions - The penetration test borings typically encountered very loose to loose slightly silty to silty fine sand (SP-SM to SM) in the upper 6 feet of profile. Penetration resistance values within this stratum ranged from 2 to 10 blows/foot. The surface stratum was underlain by loose to firm fine sand (SP, A-3) which extended to a depth of 15 feet. The penetration resistance value within this stratum ranged from 5 to 15 blows/foot.

Auger boring A1 encountered 12-inches of limerock. Both borings encountered fine sand (SP, A-3) which extended to the maximum boring termination depth of 6 feet.

3.2.2 Groundwater Conditions - The groundwater level depths encountered at the time of drilling ranged from approximately 5 to 12 feet below the ground surface. These water levels are estimated to be at seasonal average levels. Seasonal High Groundwater Levels will be approximately 2 feet above the current groundwater levels. The groundwater level should be expected to fluctuate due to seasonal climatic variations, changes in surface water runoff patterns across the site, construction activity and the subsequent development as planned, and other interrelated factors. Since groundwater variations are anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based on the assumption that variations will occur.

3.3 Stormwater Management Facility Test Results

The borings/tests performed in the proposed stormwater treatment pond area encountered permeable fine sands (SP) extending to a depth of 15 feet below the existing ground surface. The groundwater level was encountered 12 feet below the ground surface. The seasonal high groundwater level is estimated to be 10 foot below the ground surface. The aquifer thickness is estimated to be 15 feet. The fillable porosity of the sand deposit is estimated to be 0.22. The saturated horizontal hydraulic conductivity of the surface sand stratum was calculated to be 3.9 ft/day by averaging the rising and falling head slug test data. The average unsaturated vertical hydraulic conductivity (Kvunsat, infiltration rate) was measured to be 4.7 inches/hour at DRI1.

4.0 GEOTECHNICAL ENGINEERING EVALUATION

4.1 Basis of Evaluation & Recommendations

Our geotechnical engineering evaluation of the site and subsurface conditions with respect to the planned construction, and our recommendations for foundation design and site preparation/earthwork construction, are based upon: (1) our site observations; (2) the field test data obtained during this geotechnical exploration of the site; and (3) our understanding of the project information and structural loading conditions as presented in this report. If the structural information or the Site Plan are altered, please contact us so we may review our recommendations. If any site or subsurface conditions are encountered during construction which appear to deviate from data obtained during this geotechnical exploration (as documented herein), please contact us so that we may visit the site, observe the differing conditions, and evaluate the new information relative to our geotechnical evaluation and recommendations.

4.2 Foundation System Evaluation

Based upon our geotechnical findings and our understanding of the proposed construction, we consider the site and subsurface conditions adaptable for support of the proposed structures upon a properly designed and constructed shallow foundation following proper site preparation procedures. The shallow foundation system may be designed using an allowable bearing pressure of 2,500 psf. Provided that the design and construction recommendations outlined subsequently are implemented, we estimate that total structural settlement due to fill and structural loads should be on the order of one inch or less. In addition, post construction differential settlements should be within tolerable magnitudes. The settlements should occur concurrently with construction due to the generally sandy nature of the soils encountered. Site preparation necessary for proper foundation performance includes:

- * Clearing and stripping the existing vegetation and surficial topsoil from within the construction areas.
- * Compaction of the exposed natural soils to densities equivalent to 95 percent of the Modified Proctor maximum dry density (ASTM D 1557).
- * Placement and compaction of any required structural fill to densities equivalent to 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) within the building areas.

4.3 Evaluation of Barrow Soil Suitability

The evaluation of barrow soil suitability depends upon: (1) the planned soil usage, (2) proposed construction methods, (3) the time of year during which site work construction will occur, (4) economic considerations, and (5) other factors. From a building pad perspective, we typically recommend that all fill and backfill soils consist of clean sands (fine sand to slightly silty fine sand) containing less than 12% fines (SP and SP-SM). Higher fines content sandy soils including: silty sands and clayey sands (SM and SC) can also be used in building pad development. However, these soils are more moisture sensitive and re-compaction in Florida during the wet summer months and/or use of the fill on wet sites will significantly increase re-compaction effort and could result in construction delays. Very silty sands, very clayey sands, and/or silts/clays (CH and CL), are not considered to be usable for building pad construction in Florida.

Based upon a review of the boring LA1, it is our opinion that the fine sands encountered throughout the upper 15 foot of profile will be usable as structural fill/backfill.

5.0 PRELIMINARY FOUNDATION DESIGN & SITE PREPARATION RECOMMENDATIONS

5.1 Foundation Design Recommendations

5.1.1 Foundation Type - We consider a conventional shallow foundation system applicable for this project if the site preparation recommendations presented in section 5.2 of this report are performed.

5.1.2 Bearing Pressure & Depth - The maximum allowable soil bearing pressure for use in shallow foundation design should not exceed 2,500 psf. The foundations should be designed based upon the maximum load which could be imposed by all loading conditions. The exterior footings should bear at a depth of at least 12 inches below the exterior final grades and the interior footings should bear at least 12 inches below the interior floor slab. These minimum bearing depths should provide the necessary confinement for the soils at the foundation bearing levels.

5.1.3 Foundation Size - The minimum widths recommended for isolated spread-type footings and continuous wall footings are 24 and 18 inches, respectively. Even though the maximum allowable soil bearing pressure may not be achieved, these minimum width recommendations should still control the size of the foundations.

5.1.4 Bearing Material - The foundations may bear in either the compacted suitable natural granular soils or compacted structural backfill or fill. The bearing level soils, after compaction, should exhibit densities equivalent to 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) to a depth of at least one-foot below the foundation bearing levels.

5.2 Site Preparation Recommendations

5.2.1 Temporary Groundwater Control - During our geotechnical exploration, the groundwater level was encountered at depths of 5 to 12 feet below the existing site grades. Dependent upon the groundwater levels encountered at the time of construction, temporary de-watering may be required in some areas of the site. The groundwater should be controlled at all times at a depth of at least two feet below the construction level. Groundwater drawdowns on the order of one to two feet, if required, can probably be best achieved using temporary perimeter drainage ditches, four to five feet deep, which are graded: (1) to a positive gravity outfall away from the site; or (2) to sumps where the collected groundwater and surface water runoff can be removed by pumping.

5.2.2 Site Clearing & Stripping - Initial site preparation should consist of clearing existing trees, vegetation, root systems and surficial topsoil from within the planned construction area. The clearing/stripping work should be performed within and to a distance of at least five feet beyond the perimeter of the planned building areas and three feet beyond the perimeter of the proposed pavement areas. It should be anticipated that surficial topsoil will be encountered in thicknesses of up to 6 inches. The perimeter areas may then need to be graded to help direct surface water runoff away from the construction areas.

5.2.3 Site & Fill Compaction - After completing the initial site preparation, the exposed sandy soils should be compacted to densities of at least 95 percent of the Modified Proctor maximum dry density to a depth of 24 inches using a vibratory drum roller which has a minimum at-drum weight on the order of five tons and a minimum drum diameter on the order of three feet, with the exception that a lightweight vibratory drum or sled compactor having a maximum static weight on the order of 1000 pounds should be used within 50 feet of existing structures. The roller or dozer will be required to improve the density of the upper approximate two feet of loose fine sands at this site. The structural fill required to raise the site to the planned finished grades may then be placed in loose lifts not exceeding 12 inches in thickness, and should be compacted to densities as recommended above. Loose lifts should not exceed eight inches in areas of the site in which lightweight vibratory equipment is used. Structural fill is defined as a non-plastic, inorganic, granular soil containing less than 12 percent material passing the No. 200 mesh sieve (i.e. a relatively clean sand).

5.2.4 Disturbed Soil Conditions - Should the near-surface soils and/or structural fill material experience "pumping" and subsequent soil strength loss during site work construction, work upon these areas should be immediately terminated and: (1) the disturbed soils removed and backfilled with "dry" structural fill soils, (i.e. percent water content on the order of five to 10 percent) which are then compacted; or (2) the excess moisture content within the disturbed soils allowed to dissipate before recompacting. Furthermore, the groundwater table should be checked and controlled as necessary to help insure proper draw-down of any high groundwater conditions that may be causing the "pumping" conditions during compaction or construction activity upon these soils.

5.2.5 Foundation Areas - After placement and compaction of all structural fill, the foundations may be excavated to their planned bearing levels using a "smoothed" bucket backhoe. All fine sandy soils present at the bearing level should be compacted to densities equal to 95% of the Modified Proctor maximum dry density. Compaction of the fine sandy bearing level soils in the small footing areas may be best achieved using lightweight, walk-behind sleds, rollers, or tampers having a minimum total weight of 100 lbs. Loose lifts of backfilled fine sandy soil in the footing excavations, if needed, should be placed in thicknesses of up to 6 inches, prior to densification with the lightweight compaction equipment.

6.0 PRELIMINARY GUIDELINE PAVEMENT DESIGN AND CONSTRUCTION RECOMMENDATIONS

6.1 General

The subsurface conditions at this site appear favorable for use of flexible and/or rigid pavements in the parking lot and drive-through areas. Guideline pavement design and construction recommendations applicable to this project are presented below. The pavement thickness recommendations and construction recommendations presented in this report are based upon our past experience on similar paving projects. Detailed flexible pavement design calculations have not been performed to verify adequacy of the recommended pavement sections since detailed traffic loading information is unavailable at this time. We request that **AGES** be retained to review the final pavement design, paving and drainage plans, and specifications to evaluate whether our guideline recommendations have been properly interpreted and implemented into the project design.

6.2 Guideline Pavement Design Recommendations

The recommended flexible pavement structure thicknesses for the subject project are provided in the following table.

<u>PAVEMENT COURSE</u>	<u>Automobiles & Light Truck Traffic</u>	<u>Moderate to Heavy Traffic</u>
Asphalt Wearing Surface(In.)*	1.5	2.0
Limerock Base Course (In.)**	6.0	8.0
Prepared Subgrade(In.)***	12.0	12.0

- * Superpave 9.5 Asphaltic Concrete or Type SIII, as defined by the Florida DOT Standard Specifications for Road and Bridge Construction Manual.
- ** Florida Limerock, exhibiting an LBR Value of 100, and meeting the specifications outlined in the Florida DOT manual (Section 200).
- *** Stabilized and compacted subgrade should exhibit a Maximum LBR value of at least 30. Subgrade stabilization should be performed in accordance with Section 160 of the standard FDOT specifications.

6.3 Guideline Pavement Construction Recommendations

6.3.1 Pavement Subgrade Preparation - Site preparation in the pavement areas should be performed in accordance with the guideline procedures outlined above, and should include: (1) clearing/stripping surface vegetation, (2) compaction of the exposed soils using a large vibratory drum roller, and (3) placement/compaction of backfill and any required structural fill (if any) to densities equivalent to 95 percent of the Modified Proctor maximum dry density. In addition, the upper one foot of subgrade in the

pavement areas should be compacted to 98 percent of the Modified Proctor maximum dry density. Shell and or clay additives may be required to obtain the required design LBRs required. Also, the pavement structure should be designed to provide at least 30-inches of fine sands separating the limerock subgrade and any underlying clayey/silty soils. This will help to prevent "pumping" and reduce the chance of premature pavement failures which are caused by "perched" groundwater levels.

6.3.2 Limerock Base Course Preparation - The limerock base course should be placed and compacted to densities equivalent to 98 percent of the Modified Proctor maximum dry density (ASTM D 1557). The surface of the limerock base course material should be "primed" with any of the following cutback asphalt grades: RC-70, RC-250, MC-70, or MC-250. Approximately 0.15 gallons per square yard should be applied to the base course surface. Care should be exercised to prevent over-priming of the base course surface. Prior to asphalt placement, the prime coat should be fully set and cured. The specifications governing the placement of prime coats on pavement base course surfaces and sanding is outlined in Section 300 of the Florida DOT Standard Specifications for Road and Bridge Construction (1986).

The primed base course should be sanded if: (1) more than one day (24 hours) will elapse prior to laying the asphalt wearing surface and excess prime is not absorbed, or (2) construction equipment will operate over the unprotected primed base course. If sanding is required, approximately 10 pounds of sand per square yard of surface (i.e., about 1/4 inch of sand) should be spread over the primed base course. The sand surface coating should contain less than 10 percent fines (i.e., material passing the No. 200 sieve) and be composed of non-elastic, inorganic, granular soil.

6.3.3 Asphalt Preparation - The placement and compaction of an asphaltic concrete wearing surface should be performed in general accordance with specifications outlined in the Florida DOT Road and Bridge Construction manual. Prior to asphalt placement, the base course should be broomed to remove any excess sand and then tacked with a bituminous binder.

6.4 Permanent Groundwater Control Measures

Groundwater control is of utmost importance in maintaining the integrity of flexible pavement structures. In areas where groundwater is anticipated to exist within 24 inches of the bottom of the pavement base course, a properly designed and constructed under drain system will be necessary to maintain this 24-inch separation between the pavement base course and the groundwater level. After finalizing the civil grading plan, we would be pleased to review this plan and evaluate the need for an under drain system. If required, we can design an under drain system for this site.

7.0 QUALITY CONTROL TESTING GUIDELINES

Prior to initiating compaction operations, we recommend that representative samples of the structural fill material and exposed in-place fine sandy soils be collected and tested to determine their compaction and classification characteristics. The maximum dry density, optimum moisture content gradation and plasticity characteristics should be determined. These tests are needed for compaction quality control of the structural fill and existing soils and to determine if the fill material is acceptable.

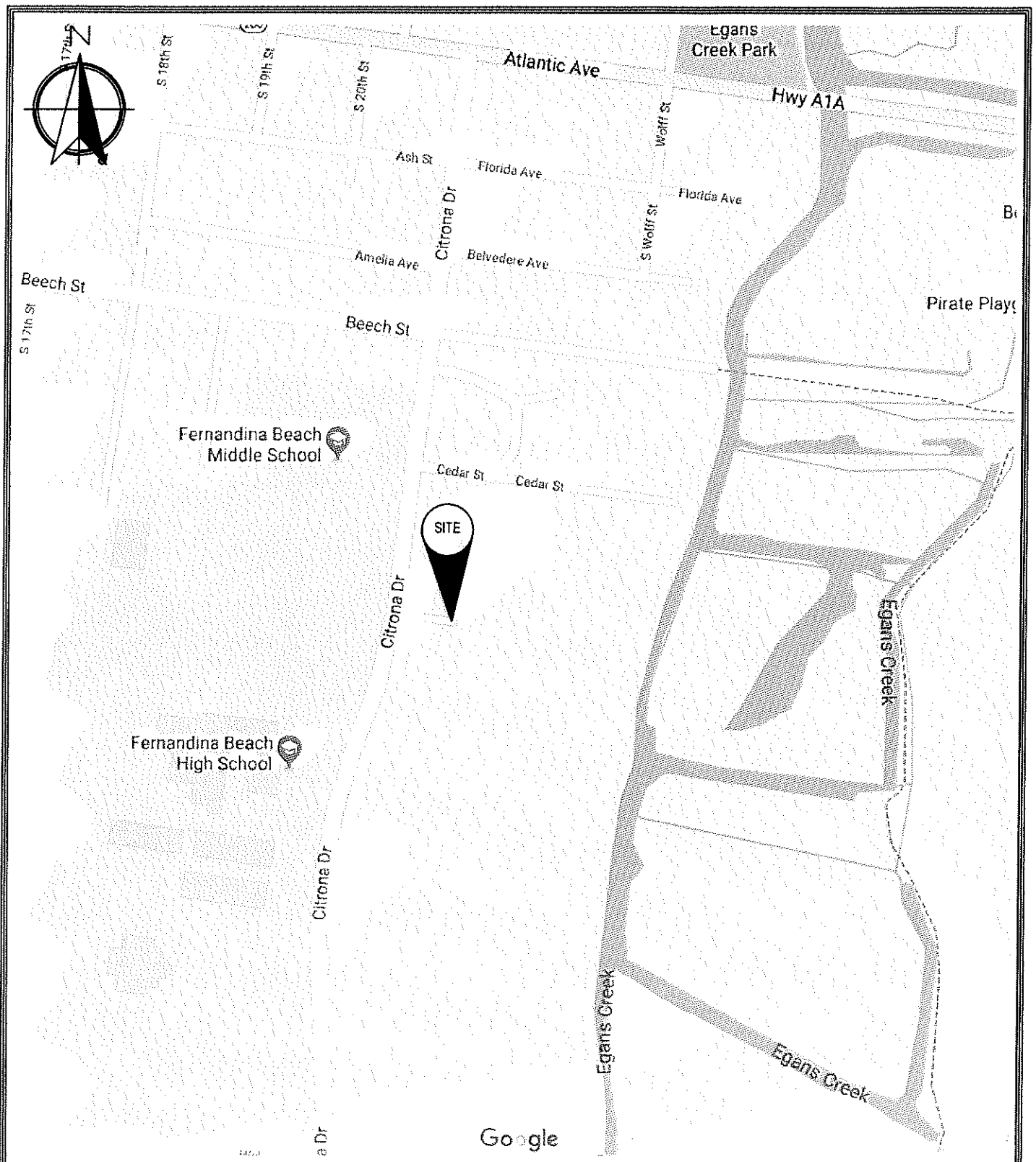
A representative number of field in-place density tests should be performed in the compacted existing soils and in each one foot lift of structural fill/backfill to confirm that the required degree of compaction has been obtained. At each test level, we recommend one density test be performed for every 5,000 square feet of building area (minimum of three locations). In-place density tests should also be performed at representative locations in the bearing level soils of the footings. We recommend that at least one density test be performed at a minimum of 25 percent of the isolated column footing bearing areas, and for every 100 linear feet of continuous footing bearing surface. In addition, in-place density tests should be performed at one location for every 10,000 square feet of pavement area (minimum of three locations).

8.0 CONSTRUCTION PLANS & SPECIFICATIONS REVIEW

We recommend that **AGES** be provided the opportunity to review the plans and the specifications prepared from the recommendations presented in this report. If necessary, we will suggest any modifications that may be required to verify that our recommendations have been properly interpreted and implemented. Our report has been written in a guideline recommendation format and is not appropriate for use as (or inclusion into) the specifications without being reworded in a specification type format. It is recommended that this report not be made part of the contract documents. However, it should be made available to prospective contractors for information purposes only.

DATA ATTACHMENTS

Site Location Map
Field Exploration Plan
Generalized Subsurface Profile
Key to Soil Classification
Test Boring Records
Auger Boring Records
Double Ring Infiltration Test Results Sheet
Rising & Falling Head Hydraulic Conductivity Test Results
Field Exploration Procedures



REFERENCE:

Google.com



AGES of JAX Inc.
9556 Historic Kings Rd.
Jacksonville, Florida 32257

SITE LOCATION MAP

Boner Subdivision
Fernandina Beach, Florida

DRAWN: DEP

DATE: 09/11/18

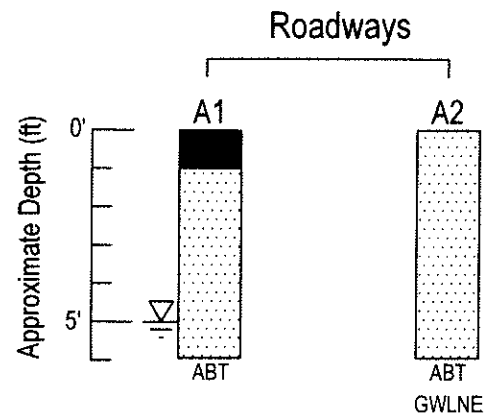
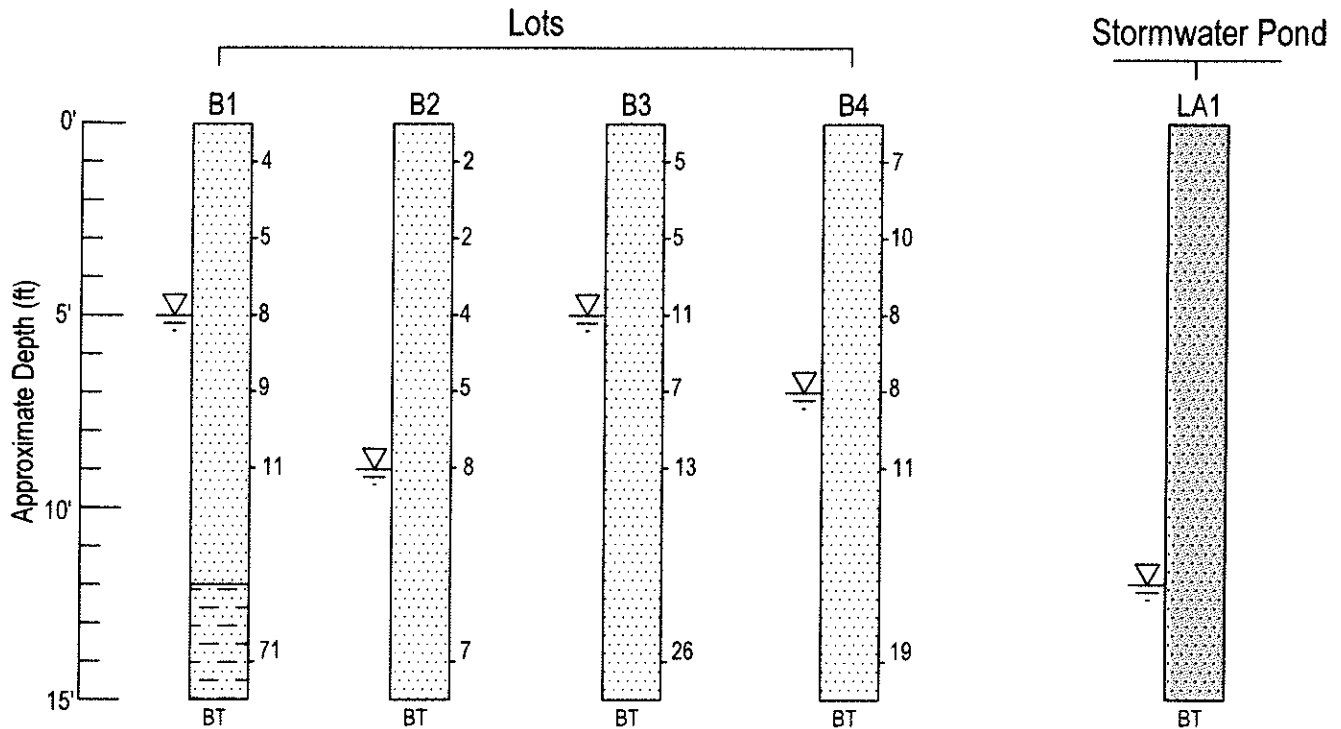
SCALE:

CHECKED: BCM

JOB NO: J18307

NTS

1"=100'



LAKE AUGER FILL/BACKFILL CLASSIFICATION

- CLASS I FILL-** Use as Trench Backfill, Elevating Fill in Roadway & Building Pads Areas
- CLASS II FILL-** Use as Elevating Fill in Building Pad Areas & Green Areas
- UNSUITABLE-** Not Suitable For Use as fill or backfill

LEGEND & SYMBOLS (USCS/AASHTO Classification)

- | | | |
|--------------------------------------|--|----------|
| Fine SAND (SP/A-3) | Sandy SILT (MH/ML/A-4) | Limerock |
| Slightly Silty Fine SAND (SP-SM/A-3) | Variably Cemented Fine SAND (HARDPAN) | |
| Silty Fine SAND (SM/A-2-4) | Fine SAND with Many Organics (A-8) | |
| Very Silty Fine SAND (SM/A-4) | Standard Penetration Resistance (blows/ft) | |
| Clayey Fine SAND (SC/A-2-6) | BT Boring Terminated | |
| Silty Clayey Fine SAND (SC-SM/A-2-5) | ABT Auger Boring Terminated | |
| Very Clayey Fine SAND (SC/A-6) | GWLNE Groundwater Level Not Encountered | |
| Silty CLAY (CL/A-7-6) | Topsoil | |
| CLAY (CL/A-7-6) | Groundwater Level at Time of Drilling | |



AGES of JAX Inc.
9556 Historic Kings Rd.
Jacksonville, Florida 32257

GENERALIZED SUBSURFACE PROFILE

Boner Subdivision
Fernandina Beach, Florida

DRAWN: DEP	DATE: 09/11/18	SCALE: 1"=5'
CHECKED: BCM	JOB NO: J18307	

KEY TO SOIL CLASSIFICATION

CORRELATION OF N-VALUE WITH RELATIVE DENSITY & CONSISTENCY

SANDS AND GRAVEL	
NO. OF BLOWS, N*	RELATIVE DENSITY
0 - 4	VERY LOOSE
5 - 10	LOOSE
11 - 20	FIRM
21 - 30	VERY FIRM
31 - 50	DENSE
OVER 50	VERY DENSE

SILTS AND CLAYS	
NO. OF BLOWS, N*	CONSISTENCY
0 - 2	VERY SOFT
3 - 4	SOFT
5 - 8	FIRM
9 - 15	STIFF
16 - 30	VERY STIFF
31 - 50	HARD
OVER 50	VERY HARD

PARTICLE SIZE IDENTIFICATION (UNIFIED SOIL CLASSIFICATION SYSTEM)

CATEGORY	DIMENSIONS
Boulders	Diameter exceeds 12 inches
Cobbles	3 to 12 inches
Gravel	Coarse - 0.75 to 3 inches in diameter
Sand	Coarse - 2.0 mm to 4.76 mm diameter Medium - 0.42 mm to 2.0 mm diameter
Silt and Clay	Less than 0.074 mm (Invisible to the naked eye)

MODIFIERS

These modifiers provide our estimate of the amount of minor constituents (sand silt or clay size particles) in the soil sample.

PERCENTAGE OF MINOR CONSTITUENT	MODIFIERS
5% to 12%	Slightly Silty, Slightly Clayey, Slightly Sandy
12% to 30%	Silty, Clayey, Sandy
30% to 50%	Very Silty, Very Clayey, Very Sandy

These modifiers provide our estimate of the amount of other components in the soil sample.

APPROXIMATE CONTENT OF OTHER COMPONENTS (SHELL, GRAVEL, ETC.)	MODIFIERS	APPROXIMATE CONTENT OF ORGANIC COMPONENTS
0% to 5%	TRACE	1% to 2%
5% to 12%	FEW	2% to 4%
12% to 30%	SOME	4% to 8%
30% to 50%	MANY	>8%



TEST BORING RECORD

Project Boner Subdivision
 Boring Location (See Field Exploration Plan)
 Ground Elevation NA Datum NA
 Groundwater Depth 5.0' Time: Drilling Date: 09/05/18
 Lat/Long N30.66357° / W81.44395°

JOB NO J18307
 BORING NO B1
 Sheet 1 of 1
 Boring Begun 09/05/18
 Boring Completed 09/05/18
 Driller N.W. W.L. Barry, Pat
 Soil Inspected By B. McMahan

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST				
				BLOWS PER 6-IN. INTERVAL				BLOW COUNT
	0	VERY LOOSE Dark Brown Fine SAND w/ Some Roots (SP)	1	1	2	2	2	4
		VERY LOOSE Brown Fine SAND (SP)						
		LOOSE Tan Fine SAND (SP)	2	2	2	3	4	5
	5	LOOSE to FIRM Brown Fine SAND (SP)	3	4	4	4	4	8
			4	3	4	5	6	9
			5	3	4	7	2	11
	10							
		VERY DENSE Brown Fine SAND (SP) (HARDPAN)						
	15	BORING TERMINATED	6	20	29	42		71
	20							
	25							
	30							

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
 BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.



TEST BORING RECORD

Project Boner Subdivision
 Boring Location (See Field Exploration Plan)
 Ground Elevation NA Datum NA
 Groundwater Depth 9.0' Time: Drilling Date: 09/05/18
 Lat/Long N30.66355° / W81.44321°

JOB NO J18307
 BORING NO B2
 Sheet 1 of 1
 Boring Begun 09/05/18
 Boring Completed 09/05/18
 Driller N.W. W.L
 Soil Inspected By B. McMahan

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST				BLOW COUNT
				BLOWS PER 6-IN. INTERVAL				
	0							
		VERY LOOSE Brown Orange Fine SAND (SP)	1	1	1	1	1	2
			2	2	1	1	3	2
		VERY LOOSE Orange Tan Fine SAND (SP)						
	5		3	2	2	2	3	4
			4	2	2	3	3	5
		LOOSE Light Grey to Tan Fine SAND (SP)						
			5	3	3	5	4	8
	10							
		LOOSE Brown Fine SAND (SP)						
	15		6	2	3	4		7
		BORING TERMINATED						
	20							
	25							
	30							

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
 BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.



TEST BORING RECORD

Project Boner Subdivision
 Boring Location (See Field Exploration Plan)
 Ground Elevation NA Datum NA
 Groundwater Depth 5.0' Time: Drilling Date: 09/05/18
 Lat/Long N30.66336° / W81.44365°

JOB NO J18307
 BORING NO B3
 Sheet 1 of 1
 Boring Begun 09/05/18
 Boring Completed 09/05/18
 Driller N.W. W.L. Barry, Pat
 Soil Inspected By B. McMahan

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST					
				BLOWS PER 6-IN. INTERVAL				BLOW COUNT	
	0								
		LOOSE Dark Grey Fine SAND (SP)	1	1	2	3	2		5
		LOOSE Grey Fine SAND (SP)	2	2	2	3	4		5
	5	FIRM Grey Fine SAND (SP)	3	3	4	7	7		11
			4	4	4	3	4		7
		LOOSE to FIRM Brown Fine SAND (SP)	5	6	6	7	6		13
	10								
		VERY FIRM Brown Fine SAND (SP)							
	15		6	5	10	16			26
		BORING TERMINATED							
	20								
	25								
	30								

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
 BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.



TEST BORING RECORD

Project Boner Subdivision
 Boring Location (See Field Exploration Plan)
 Ground Elevation NA Datum NA
 Groundwater Depth 7.0' Time: Drilling Date: 09/05/18
 Lat/Long N30.66316° / W81.44365°

JOB NO J18307
 BORING NO B4
 Sheet 1 of 1
 Boring Begun 09/05/18
 Boring Completed 09/05/18
 Driller N.W. W.L. Barry, Pat
 Soil Inspected By B. McMahan

ELEV. (FT)	DEPTH (FT)	MATERIAL DESCRIPTION (USCS CLASSIFICATION)	SAMPLE NO.	STANDARD PENETRATION TEST				
				BLOWS PER 6-IN. INTERVAL				BLOW COUNT
	0	LOOSE Dark Brown Fine SAND w/ Some Roots (SP)	1	2	2	5	7	7
		LOOSE Dark Grey Fine SAND (SP)						
		LOOSE to FIRM Brown Fine SAND (SP)	2	5	5	5	5	10
5			3	5	3	5	7	8
			4	4	4	4	7	8
			5	5	5	6	5	11
10								
		BORING TERMINATED	6	7	7	12		19
15								
20								
25								
30								

REMARKS:

BORING & SAMPLING, ASTM D1586/CORE DRILLING, ASTM D213
 BLOW COUNT IS THE NUMBER OF BLOWS OF A 140 LB. HAMMER
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.



AUGER BORING RECORDS
Boner Subdivision
Fernandina Beach, Florida
AGES Job No. J18307, Report No. 001

Date Performed: 09/05/18

Performed By: N. Wheeler, W. Lewallen, Barry, Pat

Auger ID Location	Depth (Feet) ^a	SOIL DESCRIPTION (USCS/ AASHTO CLASSIFICATION)
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Roadway Augers

A1	0.0 - 1.0	Limerock
N 30.66389°	1.0 - 6.0	Grey Brown Fine SAND (SP / A-3)
W 81.44378°	A.B.T.^b	GWL^c = 5.0'

A2	0.0 - 2.0	Dark Brown Fine SAND (SP / A-3)
N 30.66385°	2.0 - 6.0	Brown Fine SAND (SP / A-3)
W 81.44315°	A.B.T.^b	GWL^c = Not Encountered

Stormwater Management Pond

LA1	0.0 - 1.0	Dark Grey Fine SAND w/ Some Roots (SP / A-3)
N 30.66301°	1.0 - 3.0	Light Grey Fine SAND (SP / A-3)
W 81.44333°	3.0 - 7.0	Brown Fine SAND (SP / A-3)
	7.0 - 15.0	Light Brown Fine SAND (SP / A-3)
	A.B.T.^b	GWL^c = 12.0'
		Estimated Seasonal High GWL= 10.0' Below Ground Surface

*- Auger Boring Terminated Due to GWL.

a - Depth measured below ground surface existing at boring location at time of drilling

b - Auger Boring Terminated (A.B.T.)

c - Groundwater Level (GWL) depth below existing ground surface, recorded at time of drilling, unless otherwise noted
 J18307 Boner Subdivision aug1



DOUBLE RING INFILTRATION TEST RESULTS

PROJECT:	Boner Subdivision
LOCATION:	Fernandina Beach, Florida
JOB NUMBER:	J18307
TEST NUMBER:	DRI1
LAT/LONG	N30.66301°, W81.44324°

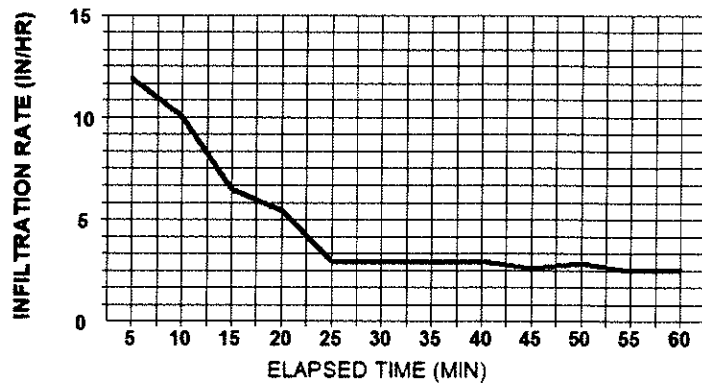
REPORT DATE:	09/05/18
TEST DATE:	09/05/18
FIELD PERSONNEL:	W. Lewallen
METHOD:	ASTM D3385
WATER HEAD:	6"
TEST DEPTH	Surface

[illegible]

SUMMARY OF TEST DATA & RESULTS

INNER RING SIZE (INCHES):	12
OUTER RING SIZE (INCHES):	24
AVERAGE INFILTRATION RATE (IN/HR):	4.7
STEADY STATE INFILTRATION RATE (IN/HR):	2.5

INFILTRATION RATE VS TIME



Estimated Seasonal High GWL= 11.0' Below Ground Surface

SOIL PROFILE

<u>Depth(Ft)</u>	<u>Soil Description (USCS/AASHTO Classification)</u>
0.0 - 1.0	Dark Grey Fine SAND w/ Some Roots (SP / A-3)
1.0 - 3.0	Light Grey Fine SAND (SP / A-3)
3.0 - 7.0	Brown Fine SAND (SP / A-3)
<u>7.0 - 15.0</u>	Light Brown Fine SAND (SP / A-3)
A.B.T.	GW/L = 12.0' Below Ground Surface



INSITU FALLING HEAD HYDRAULIC CONDUCTIVITY TEST

Boner Subdivision
Fernandina Beach, Florida
AGES Job No. J18307

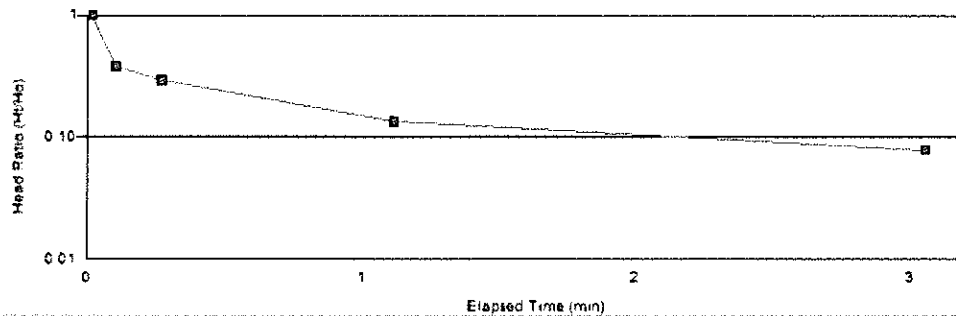
Governing Equation (NAVFAC)
 $K = r^2 / 2L \ln(L/R) [\ln(H_1/H_2) / (t_2 - t_1)]$

Date Performed 09/08/18
Performed by D Anderson

Well Data	
Test ID	TMW1
Well Radius - R (ft)	0.08
Well Stickup (ft)	0.5
Well Depth below TOC (ft)	15.33
Saturated Screen Length - L (ft)	4.51
Depth to Static GW below TOC	10.82
Initial Water Depth below TOC Slug In	10.00

Field Data			Water Level TOC (ft)	Head (Ht)	Head Ratio Ht/Ho
Elapsed Time t					
min	sec	min			
0	1	0.0	10.00	0.824976	1.0
0	6	0.1	10.51	0.31	0.4
0	16	0.3	10.58	0.24	0.3
1	7	1.1	10.71	0.11	0.1
3	3	3.1	10.76	0.06	0.1
Results: Insitu Horizontal Hydraulic Conductivity (k)					
0.0015 ft/min		2.09 ft/day	7.4E-04 cm/sec		

Head Ratio (Ht/Ho) Vs Elapsed Time (min)





INSITU RISING HEAD HYDRAULIC CONDUCTIVITY TEST

Boner Subdivision
Fernandina Beach, Florida
AGES Job No. J18307

Governing Equation (NAYFAC)

$$K = \frac{r^2}{2L} \ln(L/R) \left[\ln(H_1/H_2) / (t_2 - t_1) \right]$$

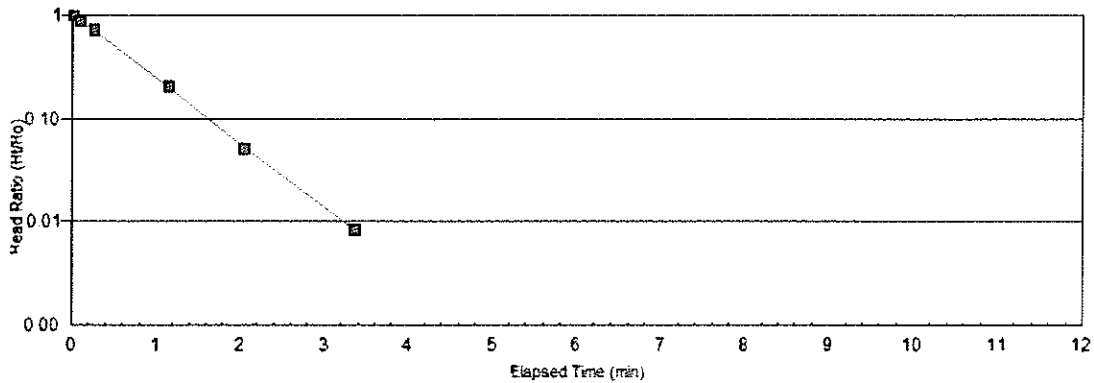
Date Performed 09/08/18

Performed by D Anderson

Well Data	
Well ID	TMW1
Well Radius - R (ft)	0.08
Saturated Screen Length - L (ft)	4.54148
Well Stickup (ft)	0.5
Well Depth below TOC	15.33
Depth to Static GW below TOC	10.78852
Initial Drawdown Depth below TOC	11.57

Field Data			Depth Below TOC (ft)	Head (Ht)	Head Ratio Ht/Ho
Elapsed Time (t)					
min	sec	min			
0	1	0.0	11.566	0.7771	1.00
0	6	0.1	11.465	0.67662	0.87
0	16	0.3	11.348	0.560	0.72
1	9	1.2	10.947	0.15879	0.20
2	3	2.1	10.828	0.03967	0.05
3	22	3.4	10.795	0.0065	0.01
Results: Insitu Horizontal Hydraulic Conductivity (k)					
0.00398	ft/min	5.73	ft/day	2.0E-03	cm/sec

Head Ratio (Ht/Ho) Vs Elapsed Time (min)



FIELD EXPLORATION PROCEDURES

Penetration Borings

The penetration borings were made in general accordance with ASTM D 1586-67, "Penetration Test and Split-Barrel Sampling of Soils". The borings were advanced to the water table by augering and, after encountering the groundwater table, further advanced by rotary drilling techniques using a circulating bentonite fluid for borehole flushing and stability. At two-foot intervals within the upper 10 feet and at five-foot intervals thereafter, the drilling tools were removed from the borehole and a split-barrel sampler inserted to the borehole bottom and driven 18 inches into the material using a 140-pound SPT hammer falling, on the average, 30 inches per hammer blow. The number of hammer blows for the final 12 inches of penetration is termed the "penetration resistance, blow count, or N-value". This value is an index to several in-place geotechnical properties of the material tested, such as relative density and Young's Modulus.

After driving the sampler 18 inches (or less, if in hard rock or rock-like material) at each test interval, the sampler was retrieved from the borehole and a representative sample of the material within the split-barrel was placed in a glass jar and sealed. After completing the drilling operations, the samples for the borings were transported to our laboratory where they were examined by our engineer in order to verify the driller's field classifications. The samples will be kept in our laboratory for a period of two months after submittal of formal written report, unless otherwise directed by the client.

Auger Borings

The auger borings were performed manually using a post-hole auger. The auger borings were drilled in general accordance with ASTM D 1452-80 ("Soil Investigation and Sampling by Auger Borings"). Representative samples of the soils brought to the ground surface by the augering process were placed in glass jars, sealed, and transported to our laboratory where they were examined by a geotechnical engineer to verify the driller's field classification.