REQUEST FOR QUALIFICATIONS (RFQ)
RFQ No. 2020-04

ABBOTT AVENUE DRAINAGE ENGINEERING SERVICES
90TH STREET TO 96TH STREET

TOWN OF SURFSIDE
MIAMI-DADE COUNTY, FLORIDA

June 10, 2020

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PUBLIC NOTICE

REQUEST FOR QUALIFICATIONS (RFQ) No. 2020-04

ABBOTT AVENUE DRAINAGE ENGINEERING SERVICES – 90TH STREET TO 96TH STREET

NOTICE IS HEREBY GIVEN that the Town of Surfside ("Town") is soliciting qualifications for Design Services for the **ABBOTT AVENUE DRAINAGE ENGINEERING SERVICES – 90TH STREET TO 96TH STREET** in Surfside, Florida. Interested firm/individuals ("Proposer(s)") may pick-up a copy of the Request for Qualifications ("RFQ") No. 2020-04 from the Town Clerk's Office, Town Hall, 9293 Harding Avenue, Second Floor, Surfside, Florida, 33154, or may download it from the Town's website at www.townofsurfside.fl.gov. The RFQ contains detailed and specific information about the scope of services, submission requirements, and evaluation and selection procedures.

One (1) original, four (4) hard copies, and one (1) electronic copy on a USB drive of the completed and executed qualifications must be delivered no later than **July 24, 2020 at 2:00 PM** ("Submission Deadline"), to the following address:

Town of Surfside Town Hall
Town Clerk's Office
9293 Harding Avenue
Surfside, Florida, 33154.

The Town reserves the right to reject late submissions, in the sole discretion of the Town Manager or his designee.

The envelope containing the sealed Proposal must be clearly marked as follows**:**

"SEALED PROPOSAL
RFQ NO. 2020-004
ABBOTT AVENUE DRAINAGE ENGINEERING SERVICES – 90TH STREET TO 96TH STREET

OPENING DATE AND TIME/SUBMISSION DEADLINE: July 24, 2020 at 2:00 PM

A **Pre-Proposal Submission Conference** is scheduled for **June 24, 2020 at 11:00 AM** at the Town Commission Chambers, 9293 Harding Avenue, Surfside, Florida. All Proposers planning to submit qualifications are required to attend this meeting. Proposers should allow enough time to ensure arrival prior to the indicated time. The doors to the room will be closed and the meeting will start promptly at the appointed time. Those arriving after the doors have closed will not be considered in attendance. Qualifications from those who have failed to attend will not be accepted.

All persons attending the pre–submission conference may ask questions or seek clarification regarding this RFQ via the procedures outlined below. Any questions or clarifications concerning the proposal specifications must be received by Sandra N. MCCready, M.M.C. Town Clerk, no later than **5:00 PM, July 3, 2020**. Any questions regarding RFQ No. 2020-04 are to submitted either in writing directly to Sandra N. MCCready, Town Clerk, at the following address: 9293 Harding Ave., Second Floor, Surfside, Florida 33154, or via email to: smccready@townofsurfsidefl.gov. Any questions received by the Clerk after the stated deadline will be disregarded. All questions received by the Clerk prior to the stated deadline shall be answered via an Addendum to this RFQ and circulated to all registered Proposers.

The Town shall solicit, evaluate and award the contract in a manner consistent with the Consultants' Competitive Negotiation Act, Section 287.055, Florida Statutes. The Town intends to enter into an agreement with the successful Proposer to provide **Abbott Avenue Drainage Engineering Services – 90th Street To 96th Street** in the Town of Surfside, Florida.

The Town reserves the right to cancel this solicitation, reject any or all submissions, with or without cause, to waive technical errors and informalities, and to accept any proposal from a proposer which is qualified and best serves the interests of or represents the best value to the Town.

The Town hereby provides notice to all proposers of the imposition of a Cone of Silence for this solicitation, as set forth in Section 3-17 of the Town Code. "Cone of Silence," as used herein, means a prohibition on communication regarding a competitive bid or solicitation for a purchase exceeding $25,000.00, including but not limited to, a particular request for qualifications ("RFQ") between (1) A potential respondent, vendor, service provider, proposer, bidder, lobbyist, or consultant, and (2) Town commissioners, Town's staff including, but not limited to, the Town Manager and his or her staff, and any member of the Town's selection or evaluation committee. Please contact the Town Clerk and/or Town Attorney with any questions on the Cone of Silence.

Date Issued: June 10, 2020

TOWN OF SURFSIDE, FLORIDA

REQUEST FOR PROPOSAL (RFQ) NO. 2020- 04

ABBOTT AVENUE DRAINAGE ENGINEERING SERVICES – 90TH STREET TO 96TH STREET

1.1 INTRODUCTION

The Town of Surfside, Florida ("Town"), a municipality located in Miami-Dade County, Florida, requests qualified Design Firms ("Proposers") to submit Qualifications pursuant to the Consultants' Competitive Negotiation Act, Section 287.055, Florida Statutes, to provide Abbott Avenue Drainage Engineering Services – 90th Street To 96th Street.

1.2 BACKGROUND

The Town is located on a low-lying barrier island in northeast Miami-Dade County, Florida, situated between Miami Beach to the south and Bal Harbour Village to the north, and is bounded on the east by the Atlantic Ocean, on the west by Biscayne Bay, on the south by 87th Terrace, and on the north by 96th Street. As such, the Town is susceptible to flooding due to tides, high water table, and low-lying grounds. Drainage improvements were completed by the Town in 2013 under a FEMA grant to address water quality issues prior to discharge to the Bay. While the project did provide quantity/conveyance/storage improvements incidental to the quality improvements, that was not the primary focus of the project. Over the past few years, the Town has received numerous complaints of standing water in the Abbott Avenue roadway during common rain events. In response to these complaints, the Town commissioned Calvin, Giordano and Associates, Inc. ("CGA") to perform a drainage study and prepare a report to identify the likely causes and recommended steps to mitigate or eliminate the standing water.

CGA completed the drainage study and has provided its report (Attachment "F" – Abbott Avenue Drainage Study), which evaluated and assessed the existing drainage conditions along Abbott Avenue from 90th Street to 96th Street and provides recommendations for improvements to resolve issues with reported ponding and setting water. This CGA Report describes related information discovered during site reconnaissance and project research and provides options, based on computer modeling, which alleviate the flooding.

The Town of Surfside seeks an engineering firm to provide review of the previously completed CGA drainage report for options and solutions to the drainage problems on Abbott Avenue located between 90th Street and 96th Street, and evaluate and assess existing stormwater drainage conditions and prepare a report with options for improvements to resolve issues and reported ponding and setting water.

For additional information on the previously completed CGA Abbott Avenue Drainage Report, please refer to Attachment F.

1.3 PROJECT DESCRIPTION

The project site is located on Abbott Avenue between 90th Street and 96th Street, Town of Surfside, Florida 33154.

1.4 SCOPE OF SERVICES

The Town may engage a qualified firm(s) to perform any of the services listed below. The successful engineering firm shall be qualified to perform the following services ("Services"):

Phase 1 (Mandatory Services).

a. Review a previously completed drainage report's options (Attachment F), prepared by Calvin Giordano & Associates;
b. Evaluate and assess the existing stormwater drainage conditions for Abbott Ave from 90th Street to 96th Street;
c. Prepare a report and offer options for improvements to resolve issues with reported ponding and setting water;
    i. Each option should include an Engineer's estimate for the construction of the improvements, including a breakdown of the direct and indirect costs.
    ii. As part of this process, the successful proposer should assume multiple staff meetings as well as Commission Meeting updates including the receipt of feedback and adjustments as directed as well as presentations to both Staff and Commission which may require follow up meetings and presentations at both Staff and Commission Meetings.
    iii. The Town Commission may accept, modify in any way or reject the proposed solution. If the Town rejects or modifies the proposal in any way, then the successful proposer will take that direction and return to Commission with a revised proposed solution in line with Commission and Staff feedback. This process may continue until the project is accepted or canceled.

2. Phase 2 (Optional Services). At the discretion of the Town, the successful qualified firm may be requested to provide any or all of the following additional services:
    a. Collection, review, and confirmation of all as-builts required to complete the scope of work in its entirety;

b. Creation of all plans, specifications and other design documents, ensuring that all are in accordance with all local, county, state and federal laws, regulations and rules;
    i. All plans, specifications and other design documents must be submitted to the Town for review and feedback at 30%/60%/90% and final bid documents.;
c. Preparation, coordination, management and all work associated with permitting;
d. Completion of all survey work required to complete the entirety of the scope of services;
e. Any and all geotechnical engineering as required by any design or permitting requirements, including, but not limited to any information required to design and set structures, pipe, drainage wells or any other required appurtenances; Preparation and management of a Request for Proposals (RFP) for the construction for the selected option/solution;
f. Post-design services as needed;
g. Assistance with any grant application that may be applicable to the project; and
h. Project, bidding, permitting and construction management services, including project closeout.
i. Construction engineering and inspection (CEI) services

The Town reserves the right to approve all services related to all optional services.

All Services shall be performed and completed in compliance with the Florida Building Code, the Town of Surfside Charter and Code, Miami-Dade County Codes, and all other applicable codes and standards governing the Services and the work. The applicable edition of each code shall be that edition which is adopted and in effect at the time of filing of the last permit application governed by each code or standard.

1.5 SUBMITTAL REQUIREMENTS

Any Proposer wishing to provide the services described in Section 1.4 above must submit one (1) original, four (4) additional complete hard copy submittals, and one (1) electronic copy on a USB drive. Submittals shall be tabbed by Section and as thorough and detailed as possible so that the Town may properly evaluate the qualifications and capabilities of respective firms to provide the required services.

All submittals must meet or exceed the specifications and requirements provided in this RFQ.

All submittals by Proposers shall contain no more than twenty-five (25) double-sided pages plus data sheets.

Proposers should prepare their submittals using the following format. Proposers shall label, tab and organize proposal submittal documents utilizing the following format as outlined below. All attachments as requested shall be inserted in the back of each corresponding section.

In preparing your proposal, proposer should assume that the Town has no previous knowledge of their services or capabilities. Each response shall be prepared simply and economically, providing a straightforward and concise description of the respondent's capabilities regarding the specific work to be performed pursuant to this solicitation. Emphasis should be concentrated on conformance to the solicitation instructions, responsiveness to the solicitation requirements, and on completeness and clarity of content.

All abbreviations and acronyms used in the response shall be kept to a minimum and defined upon their first usage. Page size shall be 8.5 x 11 inches, foldouts are not acceptable. The text size should be 11 point or larger using Arial or Times New Roman font only.

<u>Letter of Transmittal:</u> The response format shall contain a letter of transmittal. The Letter of Transmittal will summarize in a brief and concise manner the Proposer's understanding of the scope of work and make a positive commitment to timely perform the work. Provide a statement indicating the proposer's interest in, knowledge of, and resources necessary to provide the services described in this RFQ. An agent authorized to contractually bind Proposer must sign the Letter of Transmittal indicating the agent's title or authority. The transmittal letter shall not exceed two pages in length.

<u>Tab 1: Technical Approach / Implementation Schedule.</u>
Provide in concise narrative form, your overall approach to accomplishing the project. Give an overview on your proposed vision, ideas and methodology. Describe your proposed approach to the project.
The proposer should describe its approach to the project and the technical and design challenges of this scope of work and schedule. The proposer shall also demonstrate how their experience on projects with similar scope and complexities will be implemented in this project. Specifically, the proposer shall present the innovative design solutions applied in their previous projects and how these solutions could be incorporated in the Town of Surfside's. Give an overview on your proposed vision, ideas and methodology. As part of the project approach, the proposer shall propose a scheduling methodology (timeline) for effectively managing and executing the work in the optimum time. Also provide information on your firm's current workload and how this project will fit into your workload. Describe available facilities, technological capabilities and other available resources you offer for the project. Provide examples of ideas / innovative recommendations you may offer.

<u>Tab 2: Company Qualifications / Project Experience.</u>
Firms shall provide a brief profile of their company, which should include their history, firm's years of experience, locations of their corporate and satellite offices, location of their project team, corporate structure, ownership interest, and the length of company's existence. Indicate the company's number of years of experience in providing services with other governmental entities in the State of Florida. List all Florida Clients within the last three (3) years with

client name and dates of contract (from and to).
This RFQ encourages proposers to be innovative and provide new designs or ideas which may further enhance or improve this initiative. Proposers must provide documentation in demonstration of your company's previous completed projects and ability to satisfy the needs of the Town of Surfside initiative. Completed projects must be innovative and reflective of state-of-the art and innovative drainage solutions. Proposers are to include sketches or renderings of completed projects, along with detailed descriptions of their innovative qualities.

References should be of projects with similar scope as listed in this RFQ. Provide references for five (5) drainage and/or stormwater engineering projects. Information should include:

- Client Name, address, contact person telephone and FAX numbers and e-mail addresses;
- Description of work;
- Year the project was completed; and
- Total cost of the construction estimated and actual.

Tab 3: Incorporation of Resiliency Elements.
Provide narrative describing intentions and actions that will include resilient design elements.

Tab 4: Project Team, Experience and Team Organizational Chart.
Provide a summary of the experience and qualifications of the firm's team and individuals who will be involved on this project. In addition, list the tasks, if any, that will be subcontracted out and provide a summary of the experience and qualifications of the lead personnel for each sub-consultant that will oversee performing this work. Provide an Organization Chart.

Tab 5: Insurance.
Provide a statement agreeing to obtain (prior to award) Insurance with coverages as detailed in the RFQ. A certificate of insurance indicating that the firm has coverage in accordance with the requirements herein set forth may be furnished by the firm to the Town along with their qualification data. The Town of Surfside must be named as an additional insured on all policies prior to entering into an agreement.

Tab 6: Other Information
Provide any information pertinent to this project that will provide insight to the evaluators about the qualifications, fitness and abilities of the proposer (please limit this information to two pages).

Tab 7: Addenda (if applicable)
All addenda issued pursuant to this solicitation must be acknowledged and submitted as part of the proposal package.

Tab 8: Previous Work.
List all contracts which the Proposer has performed for the Town of Surfside, if any. The Town will review all contracts the Proposer has performed for the Town. As such, the Proposer must list and describe all services and work performed for the Town of Surfside

and include for each project:

a) Name of the Town Department which administers or administered the contract;
b) Description of work;
c) Total dollar value of the contract;
d) Dates covering the term of the contract;
e) Town contact person and phone number;
f) Statement of whether Proposer was the prime contractor or subcontractor, and
g) The results of the project.

Tab 9: Attached Forms.

- Attachment A - Proposer's Certification Form
- Attachment B - Sworn Statement Pursuant to Section 287.133(3)(A) Florida Statutes, On Public Entity Crimes
- Attachment C - Non-Collusion Affidavit
- Attachment D - Anti-Kickback Affidavit
- Attachment E – Drug-Free Workplace

1.6 PROPOSAL SECURITY

N/A

1.7 PRE- SUBMITTAL CONFERENCE

A Pre-RFQ Submittal Conference is scheduled for **June 24, 2020 at 11:00 AM** at the Town of Surfside Community Center, 9301 Collins Avenue, Surfside, Florida. Please be advised that due to the declared state of emergency for the COVID-19 health pandemic, the meeting may occur virtually via zoom and notice and instructions will be provided by the Town Clerk. All Proposers planning to submit proposals are required to attend this meeting. Proposers should allow enough time to ensure arrival prior to the indicated time. The doors to the room will be closed and the meeting will start promptly at the appointed time. Those arriving after the doors have closed will not be considered to be in attendance. Proposals from those who have failed to attend will not be accepted. All persons attending the pre-submission conference will receive the answers to all questions asked or submitted.

1.8 ADDITIONAL INFORMATION OR CLARIFICATION; ADDENDA

Requests for additional information or clarifications must be received by Sandra N. McCready, M.M.C. Town Clerk, no later than **5:00 PM, July 3, 2020**. Any questions regarding RFQ No. 2020-04 are to be submitted either in writing or via e-mail directly to Sandra N. MCCready, Town Clerk, in accordance with the deadline for receipt of questions also specified in the Public Notice Section of this RFQ. The request for additional information and clarification must contain the RFQ number and title, Proposer's name, name of Proposer's contact person, address, phone number, and e-mail.

Written requests for additional information or clarifications to this RFQ shall be addressed directly to Sandra N. MCCready, M.M.C., Town Clerk, at: **Town Clerk's Office, Surfside Town Hall, 9293 Harding Ave., Second Floor, Surfside, Florida 33154.**

Emails requesting additional information or clarifications for this RFQ must be received by

Sandra N. MCCready, M.M.C., Town Clerk, at the following email: **smccready@townofsurfsidefl.gov**. The request shall include, at a minimum, the RFQ number and title, the Proposer's name, the name of Proposer's contact person, address, phone number, and email.

The Town will issue responses to inquiries and any other corrections or amendments it deems necessary in written addenda issued prior to the Proposal deadline. All persons attending the mandatory pre-proposal conference will receive the Town's response. Proposers should not rely on any representations, statements or explanations other than those made in this RFQ or in any written addendum to this RFQ. Where there appears to be conflict between the RFQ and any addenda issued, the last addendum issued shall prevail.

1.9 SELECTION, AWARD OF AGREEMENT

1) The award of the Agreement will be to the entity the Town determines possesses adequate qualifications in the best interest of the Town and most advantageous to the Town taking into account the evaluation criteria set forth below and whose Proposal complies with the requirements of the RFQ. In no case will the award be made until all necessary investigations have been made into the responsiveness and responsibility of the Proposer(s) and the Town Manager is satisfied that the Proposer is qualified to perform the Services and has the necessary experience, ability, organization, capital and equipment to carry out the Services in accordance with the specifications of this RFQ.

2) Proposals submitted will be evaluated by a Selection Committee ("Selection Committee") consisting of members appointed by the Town Manager, who will review submissions and provide a recommendation to the Town Commission.

3) The Selection Committee shall select in order of preference and rank the three (3) top firm(s) it deems the most highly qualified to perform the required services using evaluation factors including, but not limited to, those as set forth below. The rankings and recommendations of the Committee will be given to the Town Commission for consideration and approval at a Commission meeting. The Town Manager and Town Commission shall have the final authority to select the firm and award the Agreement. After selection of the firm by the Town Commission, the Town will negotiate pricing and terms for the Agreement with the selected firm, which will incorporate the major terms and conditions contained in this RFQ. Upon reaching mutually agreeable terms with the selected firm, the Agreement for the selected firm shall be presented to the Town Commission for final approval.

3) **Qualification Evaluation.**

The Selection Committee shall examine the documentation submitted in the Proposal to determine the responsiveness of each Proposer. Failure to provide the required information may disqualify any such Proposal as non-responsive and such Proposal may not be considered. The Selection Committee will disqualify any Proposers that make false statements. The evaluation of proposals and the determination of conformity and acceptability shall be the sole responsibility of the Selection Committee. Such determination shall be based on information furnished by the Proposer, as well as other information reasonably available to the Town. The Selection Committee may make such investigations as it deems necessary to determine the ability of the Proposer to perform the Services and the Proposer furnish the Town with all such information and date for this purpose as the Town may request before and during the Proposal period. The Selection Committee reserves the right to make additional inquiries, interview some or all Proposers, make site visits, interview references, obtain credit reports, or any other action it deems necessary to fairly evaluate all Proposers. The Selection Committee may at its sole discretion reject a Proposer or qualify a Proposer.

4) **Evaluation.**

The Selection Committee will evaluate and rank each Proposal in each of the categories listed below. Qualifications will be evaluated and ranked based on, among additional factors, the following:

a. Depending on the number of qualifications submitted, the Selection Committee may short-list the Proposers to three (3), and then interview and rank those top three (3) Proposers.

b. The Proposal ranked one (1) will be recommended by the Selection Committee to the Town Commission for award of the Agreement.

c. The Town Commission may consider the selection of a Proposer based upon the recommendation of the Selection Committee, and will make the final selection and award of the proposer.

d. The Selection Committee evaluation and award shall be made to the responsible Proposer(s) whose Statement of Qualifications is determined to be the most qualified and advantageous to the Town, taking into consideration the evaluation factors set forth below:

Criteria	Percentage
Qualifications of Firm: To include years of experience, ability, capacity and skill of firm(s) and personnel to perform, including timeliness, stability and availability, licenses, insurance, etc.	**25**
Qualification of Project Team: To include experience and qualifications of key personnel that will be assigned to the Town's project.-	**30**
Technical Approach to the Projects & Timeliness Indicate Firm's understanding of proposed needs and projects proposed by the Town, technical approach, including incorporation of resiliency elements, timeline for implementation,	**25**
Previous Similar Projects & References	**20**

Experience and background in providing similar services or projects and past performance, including, but not limited to, client references, familiarity with local regulatory agency procedures and requirements, and assisting in the administration of grants requirements.	
Total	**100**

5) The Town will select the most qualified Proposer whose proposal best serves the interests of and represents the best value to the Town. The Town will act, at its sole discretion, in what it considers to be in the best interest of the Town. The Town will evaluate the comparable experience, capability, project management, workload, financial strength, and other factors the Town deems pertinent and will select the Proposer that it deems to be most qualified, in the best interest of the Town and most advantageous in accordance with the criteria and requirements set forth in this RFQ.

6) If the Town selects a Proposal, the Town will provide a written notice of award to the successful Proposer, who meets the requirements and criteria of this RFQ, and the Town may negotiate and enter into an agreement during the agreement negotiation process at compensation which the Town determines is fair, competitive and reasonable.

7) If the successful Proposer to whom an agreement is awarded forfeits the award by failing to execute the agreement, the Town may, at the Town's sole option, discontinue negotiations with the Proposer, award the agreement to the next ranked Proposer and proceed to negotiate an agreement with compensation which the Town determines is fair, competitive and reasonable, reject all proposals or re-advertise for the Services.

8) If the Town and selected Proposer are unable to negotiate a mutually acceptable agreement, the Town may terminate negotiations and begin negotiations with other qualified firms. This process may continue until an agreement has been executed or all proposals have been rejected. No Proposer shall have any rights in the project or against the Town arising from such negotiations.

9) The Town will request, accept and consider proposals for the fees or compensation to be paid under the agreement only during competitive negotiations with the selected proposer, in accordance with Section 287.055, Florida Statutes.

1.10 AGREEMENT EXECUTION

1) Until final award and execution of an Agreement, the Town reserves the right to cancel this solicitation, reject any and all proposals, with or without cause; to waive any informality or irregularity; or to accept the Proposal which is in the best interest of the Town.

2) Upon acceptance of a Proposal and award of the Agreement, the successful Proposer shall deliver the executed Agreement, along with required bonds, insurance and any other items requested, to the Town within 10 days. Failure to do so will be deemed as a breach of agreement by the Proposer and result in forfeiture of proposal security as may be required in this RFQ.

3) The award of the Agreement, if it is awarded, will be to the lowest responsible and responsive proposer whose proposal best serves the interests of, and represents the best value to, the Owner pursuant to the criteria set forth in this RFQ, and the Charter and Code of the Town of Surfside, and whose proposal shall comply with the requirements of this RFQ.

4) Time is of the essence for this project and the time frames set in the proposal, if set by the proposer, will be accorded weight by the Town in the determination of the best proposal.

5) In no case will the award be made until all necessary investigations have been made into the responsibility of the Proposer and until the Town is satisfied that the proposer is qualified to perform the Services and has the necessary organization, capital, and equipment to carry out the provisions of the agreement to the satisfaction of the Town within the time specified.

2.0 INSTRUCTIONS

Careful attention must be given to all requested items contained in this RFQ. Proposers are required to submit QUALIFICATIONS in accordance with the requirements of this RFQ.

PLEASE READ THE ENTIRE SOLICITATION BEFORE SUBMITTING A PROPOSAL.

Proposers shall complete all required forms and information as set forth in this RFQ.

The entire set of documents, together with all attachments hereto, constitutes the RFQ. Each Proposer must return these documents with all information required and necessary for the Town to properly analyze the response in total and in the same order in which it was issued. Proposer's notes, exceptions, and comments may be rendered on an attachment, provided the same format of this RFQ text is followed. All responses to this RFQ shall be returned in a sealed envelope or package with the RFQ number and opening date clearly noted on the outside of the envelope, prior to the stated deadline.

Proposers must provide a response to each requirement of the RFQ. Proposals should be prepared in a concise manner with an emphasis on completeness and clarity.

CONE OF SILENCE. Notwithstanding any other provision of these specifications, the provisions of the Town "Cone of Silence" are applicable to this transaction. The "Cone of Silence", as used herein, means a prohibition on any communication regarding a particular Request for Proposal (RFP), Request for Qualification (RFQ), or bid, between a potential vendor, service provider, contractor, bidder, lobbyist, or consultant, and the Town Commission, Town's professional staff including, but not limited to, the Town Manager and his or her staff, any member of the Town's selection or evaluation committee.

The Cone of Silence shall be imposed upon each RFP, RFQ, and bid after the advertisement of said RFP, RFQ, or bid.

The Cone of Silence shall terminate at time the Town Manager makes his or her written recommendation to the Town Commission. However, if the Town Commission refers the Town's Manager's recommendation back to the Town Manager or staff for further review, the Cone of Silence shall be re-imposed until such time as the Town Manager makes a subsequent written recommendation.

The Cone of Silence shall not apply to:

1. Oral communications at pre-proposal/pre-bid conferences.

2. Oral presentations before selection or evaluation committees.

3. Public presentations made to the Town Commission during any duly noticed public meeting.

4. Communications in writing at any time with any town employee, unless specifically prohibited by the applicable RFP, RFQ, or bid documents. The bidder or proposer shall file a copy of any written communication with the Town Clerk. The Town Clerk shall make copies available to any person upon request.

5. Communications regarding a particular RFP, RFQ, or bid between a potential vendor, service provider, contractor, bidder, lobbyist or consultant and the Town's Purchasing Agent or Town employee designated responsible for administering the procurement process of such RFP, RFQ or bid, provided the communication is limited strictly to matters of process or procedure already contained in the corresponding solicitation document.

6. Communications with the Town Attorney and his or her staff.

7. Duly noticed site visits to determine the competency of bidders regarding a particular bid during the time period between the opening of bids and the time the Town Manager makes his or her written recommendation.

8. Any emergency procurement of goods or services pursuant to Town Code.

9. Responses to the Town's request for clarification or additional information.

10. Contract negotiations during any duly noticed public meeting.

11. Communications to enable Town staff to seek and obtain industry comment or perform market research, provided all communications related thereto between a potential vendor, service provider, contractor, bidder, lobbyist, or consultant and any member of the Town's professional staff including, but not limited to, the Town Manager and his or her staff are in writing or are made at a duly noticed public meeting.

Please contact the Town Clerk and/or Town Attorney for any questions concerning the Cone of Silence compliance.

Violation of the Cone of Silence by a particular bidder or proposer shall render any RFP award, RFQ award, or bid award to said bidder or proposer voidable by the Town Commission and/ or Town Manager

2.1 EXAMINATION OF DOCUMENTS AND SITE.

1) Proposers shall visit the project site and become familiar with the nature and extent of Services and work to be performed and local conditions that may affect the Services.
2) The Solicitation Documents were prepared to present an essentially accurate representation of existing conditions, interpreted from available information on the project site. The Proposer is not relieved, however, of the responsibility of becoming fully informed as to existing conditions at the project site.
3) Proposers shall examine existing site improvements, and conditions, utilities, and streets to determine all conditions which will affect the Services.

2.2 SUBSTITUTIONS

1) N/A

2.3 SUBMISSION RECEIPT/WITHDRAWAL/CHANGES

1) Sealed proposals will be accepted in accordance with the instructions detailed in this RFQ. The Proposer shall file all documents necessary to support its response and shall include them with its Proposal. Each Proposer shall be responsible for the actual delivery of responses no later than the submission deadline to the exact address indicated in this RFQ. The Town reserves the right to accept or reject late submitted qualifications, in the sole discretion of the Town Manager or his designee.
2) A Proposer may withdraw his proposal at any date and time prior to the time the proposals are scheduled to be opened but may not be resubmitted. Proposals may not be modified after submittal. After proposal opening, no proposal may be cancelled or modified.

2.4 DISCREPANCIES, ERRORS, AND OMISSIONS

Any discrepancies, errors, or ambiguities in the RFQ or addenda (if any) should be reported in writing to Sandra N. MCCready, M.M.C., Town Clerk. Should it be necessary, a written addendum will be issued and incorporated to the RFQ. The Town will NOT be responsible for any oral instructions, clarifications, or other communications.

2.5 DISQUALIFICATION

The Town reserves the right to disqualify proposals before or after the submission deadline, upon evidence of collusion with intent to defraud or other illegal practices on the part of the Proposer.

2.6 CAPITAL EXPENDITURES

The selected Proposer understands that any capital expenditures (costs and expenses) that the selected Proposer makes, in order to prepare and submit the proposal or in performance of the

Services required in this RFQ are business risks and may not be recoverable by the proposer. The Town, however, is not and shall not pay or reimburse any capital expenditures or any other expenses incurred by any Proposer.

2.7 PERFORMANCE OF THE SERVICES.

1) The Project Team shall be identified in the RFQ response.

2.8 PERFORMANCE BOND AND PAYMENT BOND

1) N/A

2.9 HOLD HARMLESS AND INDEMNIFICATION

All Proposers shall hold the Town, its officials, and its employees harmless and covenant not to sue the Town, its officials, and its employees in reference to the Town's decision to reject, award, or not award an RFQ, as applicable. Additionally, the selected Proposer shall indemnify, defend, and save harmless the Town, its officers, agents, and employees, from or on account of any injuries or damages, received or sustained by any person or persons during or on account of the Proposer's performance of its Services under this RFQ, or by or in consequence of any negligence (excluding the sole negligence of the Town), in connection with the same; or by use of any improper materials or by or on account of any act or omission of the said selected Proposer or his Sub-Proposers, agents, servants, or employees. The selected Proposer shall indemnify, defend, and hold harmless the Town and their agents or employees from and against all claims, damages, losses, and expenses, including attorneys' fees, arising out of or resulting from the performance of the Services described in the RFQ, provided that any such claim, damage, loss, or expense (a) is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than work itself) including the loss of use resulting wherefrom and (b) is caused in whole or in part by any negligent act or omission of the selected Proposer, Sub-Proposer, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused by a party indemnified hereunder.

2.10 INSURANCE REQUIREMENTS

The selected proposer shall secure and maintain throughout the duration of the agreement, insurance of the type and in the minimum amount specified below and shall demonstrate its ability to do so:

Comprehensive General Liability ("CGL") insurance, with minimum limits of One Million Dollars ($1,000,000) per occurrence, combined single limit for Bodily Injury Liability and Property Damage Liability, and Two Million Dollars ($2,000,000) aggregate.

Professional Liability insurance, with minimum limits of Two Million Dollars ($2,000,000) per occurrence, combined single limit and Two Million Dollars ($2,000,000) aggregate.

Worker's Compensation, as required by law, together with no less than $1,000,000 for Employer's Liability.

Business Automobile Liability which shall include coverage for all owned, non-owned and hired vehicles for minimum limits of not less than One Million Dollars ($1,000,000) per occurrence, One Million Dollars ($1,000,000) per accident for bodily injury and Five Hundred Thousand

Dollars ($500,000) per accident for property damage.

2.11 LAWS AND REGULATIONS

1) Each proposer and the selected proposer shall comply with all applicable laws and regulations of the Federal Government, State of Florida, and local ordinances of Miami-Dade County and the Charter and Code of the Town of Surfside in the preparation and submittal of a proposal in response to this RFQ and in the performance of the Services and any agreement awarded as a result of this RFQ. Specific reference is made to Town Ordinance 09-1543 which allows a five (5%) per cent local preference in scoring to holders of current Town local business receipts for businesses which are physically located with the Town of Surfside limits and three (3%) per cent to local businesses located within a ten (10) mile radius of the Town's corporate limits.

2) Trench Safety Act: The Occupational Safety and Health Administration excavation safety standards, 29 CFR 1926.650 Subpart P trench safety standards will be in effect during the period of construction of the Project. In compliance with current State of Florida statutes, the Proposer shall provide documentation required by the Florida Trench Safety statute to the Owner, in conjunction with the Proposal submission.

2.12 RESERVATION OF RIGHTS

1) The Town reserves the right to:

a. Accept any or all responses**,** waive any immaterial defect or informality in any responses to this RFQ, or to cancel or postpone this RFQ process AT ANY TIME; to reject any or all responses in whole or in part; or to reissue an RFQ for the Services described herein;

b. Accept the Proposer who will, in the Town's sole discretion, best serve the interests of and represent the best value to the Town;

c. Reject any and all qualifications and to seek new qualifications when such a procedure is reasonably in the best interest of the Town;

d. Investigate the financial capability, integrity, experience, and quality of performance of each Proposer, including officers, principals, senior management, and supervisors, as well as staff identified in the response to RFQ;

e. Investigate the Proposer's qualifications or those of its agents, as it deems appropriate;

f. Conduct personal interviews of any or all Proposers prior to selection (the Town shall not be liable for any costs incurred by the Proposer(s) in connection with such interviews);

g. Waive any of the conditions or criteria set forth in this RFQ;

h. Decide whether to select a firm based on submission received in response to this RFQ or whether to hold interviews with the firms the Town deems best qualified for the project.

2) The Town is under no obligation to return the Qualifications.

3) The Town will not be liable for any costs incurred by a proposer in the preparation of the response to this RFQ.

4) Each Proposal shall be prima facie evidence that the respective Proposer has full knowledge of the scope, nature, quantity and quality of the Services to be performed; the detailed requirements of the specifications; and the conditions under which the Services are to be performed.

5) Proposers shall furnish the Town with such additional information as the Town may reasonably require.

6) The Town must be satisfied that the Proposer demonstrates the ability to meet the requirements of this RFQ.

2.13 ATTACHMENTS

The Exhibits to this RFQ are as follows:

Attachment "A" – Proposer's Certification

Attachment "B" - Public Entity Crime Affidavit

Attachment "C" - Non-Collusive Affidavit

Attachment "D" - Anti-Kickback Affidavit

Attachment "E"- Drug Free Workplace Affidavit

Attachment "F"- CGA Abbott Avenue Drainage Report

ATTACHMENT “A”

PROPOSER'S CERTIFICATION

I have carefully examined the RFQ and any other documents accompanying or made a part of this RFQ.

I hereby propose to furnish the services specified in the RFQ. I agree that my Statement of Qualifications will remain firm for a period of 180 days from the date of submittal in order to allow the Town adequate time to evaluate the Statements of Qualifications.

I certify that all information contained in this Statement of Qualifications is truthful to the best of my knowledge and belief. I further certify that I am duly authorized to submit this Statement of Qualification on behalf of the firm as its act and deed and that the firm is ready, willing and able to perform if awarded the contract.

I further certify, under oath, that this Statement of Qualifications is made without prior understanding, agreement, connection, discussion, or collusion with any other person, firm or corporation submitting a Statement of Qualifications l for the same service; no officer, employee or agent of the Town of Surfside or any other Proposer is interested in said Statement of Qualifications; and that the undersigned executed this Proposer's Certification with full knowledge and understanding of the matters therein contained and was duly authorized to do so.

I understand that a person or affiliate who has been placed on the convicted vendor list following a conviction for public entity crimes may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to public entity, may not be awarded or perform work as a contractor, supplier, sub-contractor, or consultant under a contract with a public entity, and may not transact business with any public entity in excess of the threshold amount provided in Sec. 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list.

____
Name of Business
BY:

Sworn to and subscribed before me
this _____ day of _______________, 20___

____
Signature

____
Name and Title, Typed or Printed

____
Mailing Address

____
Notary Public

____
City, State, Zip Code

STATE OF _______________________

ATTACHMENT "B"

SWORN STATEMENT PURSUANT TO SECTION 287.133(3)(a) FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

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

1. This sworn statement is submitted

to

____

by

____

for

____

whose business address is

____

____

and (if applicable) its Federal Employer Identification Number (FEIN)

____

(If the entity had no FEIN, include the Social Security Number of the individual signing this sworn statement:

____

2. I understand that a "public entity crime" as defined in Paragraph 287.133(l)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(l)(b), Florida Statutes means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contenders.
4. I understand that an "affiliate" as defined in Paragraph 287.133(l)(a), Florida Statutes, means:

    a. A predecessor or successor of a person convicted of a public entity crime; or

    b. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity come. The term “affiliate” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a “person” as defined in Paragraph 287.133(l)(e), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term “person” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of any entity.
6. Based on information and belief, the statement which I have marked below is true in a relation to the entity submitting this sworn statement. (Please indicate which one (1) of the following three (3) statements is applicable.)

____ (1) Neither the entity submitting this sworn statement, nor any of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or any affiliate of the entity has been charged with and convicted of a public entity crime within the past 36 months.

_____(2) The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or any affiliate of the entity has been charged with and convicted of a public entity crime within the past 36 months.

_____(3) The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or agents who are active in management of the entity, or any affiliate of the entity has been charged with and convicted of a public entity crime within the past 36 months. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted Proposer list. (Attached is a copy of the final order.)

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THE PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED AND FOR THE PERIOD OF THE CONTRACT ENTERED INTO , WHICHEVER PERIOD IS LONGER. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES FOR THE

CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

______________________________ ______________________________
SIGNATURE OF AFFIANT (Printed or Typed Legal Name of Affiant)

Proposer's Name: ___________________________

STATE OF FLORIDA)
)ss.
COUNTY OF MIAMI-DADE)

The foregoing Form was acknowledged before me this _____ ____ ____________, as day of ____, 2020, by of ___
__________________________, a ________________, on behalf of said corporation. He/She personally appeared before me and is personally known to me.

[redacted]NOTARY SEAL

Notary: ________________________________
Print Name ________________________________
Notary Public, State of Florida
My Commission Expires:___________________

ATTACHMENT "C"

NON-COLLUSION AFFIDAVIT

STATE OF FLORIDA

COUNTY OF MIAMI-DADE

The undersigned being first duly sworn as provided by law, deposes, and says:

1.1. This Affidavit is made with the knowledge and intent that it is to be filed with the Town of Surfside and that it will be relied upon by said Town, in any consideration which may give to and any action it may take with respect to this proposal.

1.2. The undersigned is authorized to make this Affidavit on behalf of, [redacted]

[redacted] (*Name of Corporation, Partnership, Individual, etc.)*

a corporation duly organized and existing under the laws of the State of [redacted]

which he is [redacted] (*Sole Owner, Partner, President, etc.)*

1.3. Neither the undersigned nor any person, firm, or corporation named in above Paragraph 1.2, nor anyone else to the knowledge of the undersigned, have themselves solicited or employed anyone else to solicit favorable action for this proposal by the Town, also that no head of any department or employee therein, or any officer of the Town of Surfside, Florida is directly interested therein.

1.4. This proposal is genuine and not collusive or a sham; the person, firm or corporation named above in Paragraph 1.2 has not colluded, conspired, connived or agreed directly or indirectly with any Proposer or person, firm or corporation, to put in a sham proposal, or that such person, firm or corporation, shall refrain from Proposing, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference with any person, firm or corporation, to fix the prices of said proposal or QUALIFICATIONS of any other Proposer; and all statements contained in the proposal or QUALIFICATIONS described above are true; and further; neither the undersigned, nor the person, firm or corporation named above in Paragraph 1.2, has directly or indirectly submitted said proposal or the contents thereof, or divulged information or data relative thereto, to any association or to any member or agent thereof.

____
AFFIANT'S NAME

____
AFFIANT'S TITLE

____
Name of Proposer

The foregoing Affidavit was acknowledged before me this ______ day of ______, 2020, by

____,as ________________________________ of

_________________________, a Florida corporation, on behalf of said corporation. He/She personally appeared before me and is personally known to me.

NOTARY SEAL

Notary: ______________________________
Print Name: ___________________________
Notary Public, State of Florida
My Commission Expires: _______________

ATTACHMENT "D"

ANTI-KICKBACK AFFIDAVIT

STATE OF FLORIDA }
}SS
COUNTY OF MIAMI-DADE }

I, the undersigned, hereby duly sworn, depose and say that no portion of the sum to be paid for the Services will be paid to any employees of the Town of Surfside, its elected officials, and/or its design Contractors, as a commission, kickback, reward or gift, directly or indirectly by me or any member of my firm or by an officer of the corporation.

By:____________________________

Title:__________________________

Sworn and subscribed before this

_____ day of______________, 2020

____
Notary Public, State of Florida

____
(Printed Name)

My commission expires: _______________________

ATTACHMENT "E"

DRUG-FREE WORKPLACE

The undersigned Proposer (firm) in accordance with Chapter 287.087, Florida Statutes, hereby
certifies that ___________________________________ does:

(Name of Company)

1) Publish a statement notifying employees that the unlawful manufacturing, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.

3. Give each employee engaged in providing the contractual services that are under consideration a copy of the statement specified in subsection (1).

4. In the statement specified in subsection (1), notify the employee that, as a condition of working on the contractual services that are under consideration, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of Chapter 893, Florida Statutes or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.

5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.

Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

As the person authorized to sign the statement, I certify that this firm complies fully with the above requirements.

____

Signature (Blue ink only)

____

Print Name

____

Title

____

Date

Witness my hand and official notary seal/stamp at day and year written above

STATE OF FLORIDA)

COUNTY OF MIAMI-DADE) SS:

BEFORE ME, an officer duly authorized by law to administer oaths and take acknowledgments, personally appeared as ________________________________ of ________________________________an organization authorized to do business in the State of Florida, and acknowledged executing the foregoing Form as the proper official of for the use and purposes mentioned in the Form and affixed the official seal of the corporation, and that the instrument is the act and deed of that corporation. He/She is personally known to me or has produced as identification.

IN WITNESS OF THE FOREGOING, I have set my hand and official seal at in the State and County aforesaid on this_day of, 2020.

____

My Commission Expires:
NOTARY PUBLIC

ATTACHMENT "F"

(Attach CGA Report Abbott Avenue Drainage)

FINAL DRAINAGE REPORT

SURFSIDE ABBOTT AVENUE
(90TH STREET TO 96TH STREET)
DRAINAGE STUDY

Town of Surfside, Miami-Dade County
December, 2018

Prepared by:

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS™
1800 Eller Drive, Suite 600 · Fort Lauderdale, FL 33316
(phone) 954.921.7781 · (fax) 954.266.6487
Certificate of Authorization #514

CGA Project #18-1160

Mohammed Sharifuzzaman, P.E. Project Manager
Florida Registration # 67640

M. Sharifuzzaman
12/3/2018

FINAL DRAINAGE REPORT

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(90TH STREET TO 96TH STREET)
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EXECUTIVE SUMMARY

I. INTRODUCTION

Calvin, Giordano, and Associates, Inc. (CGA) has performed a drainage study to evaluate and assess the existing drainage conditions along Abbott Avenue from 90th Street to 96th Street and to offer recommendations for improvements to resolve issues with reported ponding and setting water. This report describes related information discovered during site reconnaissance and project research and provides options, based on computer modeling, which alleviate the flooding.

II. AREAS OF CONCERN

Flooding with an unspecified elevation and duration has been occurring in the subject site and the adjacent neighborhoods. Recent flood complaints and site observations suggest that the subject corridor experiences approximately 1 foot or higher flood waters during frequent short-duration, high-intensity (±1 inch/hour) rainfall events.

III. CAUSES OF FLOODING

The Town of Surfside is very low-lying area and the existing roadway elevations range from 2.80 feet NGVD to 5.50 feet NGVD on average. The average wet season ground water elevation is 1.60 feet NGVD. There are not sufficient number of storm inlets or catch basins to capture stormwater runoff. The stormwater conveyance system is insufficient and can't carry the stormwater runoff efficiently through the existing pipe network and outfalls. The existing pipe sizes range from 10" diameter to 36" diameter. All the pipe networks are restricted by physical weirs (Elevation 2 feet NGVD) at the outfall locations, which have been mandated by permit for the purpose of maintaining the water quality regulatory requirement. The Town recently constructed three pump stations and nine drainage wells to improve the water quality of the receiving waters and to improve the existing drainage conditions. However, complete stormwater attenuation and level of service protection were not intended by the previous project.

Abbott Avenue is located along the east side of the Town, at the hydraulically most remote point of the drainage basin from the outfall discharge location. It is approximately 2,000 feet away from existing pump stations and outfalls. The elevations of Abbott Avenue are also very low with respect to the adjacent streets and roadways. As such, the following were identified as potential causes of flooding:

1. Abbott Avenue is, hydraulically, the most remote location from outfalls
2. Flat roadway profile and low grades
3. Naturally high ground water elevation
4. Insufficient size of existing conveyance pipe
5. Inadequate number of existing catch basins or storm inlets
6. Presence of permit-mandated water quality weirs within the control structures
7. Capacity of the master drainage system, pump stations, and drainage wells

IV. LEVEL OF SERVICE FOR ROADWAY

The ICPR flood routing model, spread calculations, and storm drain system analysis (ASAD model) indicated that the areas of concern (Abbott Avenue between 90th Street and 93rd Street) do not meet the level of service requirements normally expected by the regulatory agencies. The following are the expected level of service: (1) Flood elevation or storm stage resulting from 5-year design storm events shall not encroach up to the roadway crown elevation. (2) Roadway spread resulting from 4 inch/hour intensity storm shall not encroach more than half of the travel lane width. (3) Hydraulic grade line resulting from 3-year 1-hour design storm shall not exceed the storm inlet grate elevation.

V. SUMMARY

The study reveals that, regardless of the proposed improvements, complete level of service compliance is not feasible, and the identified deficiencies can't be completely eliminated. However, the study also reveals that noticeable improvements in level of service may be achieved by implementing any one or a combination of the following improvements:

1. increasing conveyance pipe sizes,
2. increasing the number of storm inlets,
3. increasing the roadway profile slope,
4. adding a pump station at 92nd Street and Abbott Avenue intersection discharging into the Indian Creek,
5. adding a pump station and 3 associated drainage wells at the west end of 92nd Street, or

   replacing the existing pump station of 92nd Street with a new pump Station and drainage wells.

These improvements are anticipated to reduce or alleviate flooding during most frequent, short-duration storm events. For long-duration storm events, the area of concern will continue to experience flood conditions due to drainage deficiencies of the overall drainage basins and master drainage systems, but the flood conditions should be improved. Since meeting the complete level of service is not feasible, it may be best to view the data in terms of the practical improvements which may be achieved.

We modeled and analyzed the following scenarios:

Option 1 includes constructing a new Pump Station at Abbot Avenue and 92nd Street intersection discharging into Indian Creek via the proposed 12" diameter storm force main along 92nd Street. The proposed stormwater force main (FM) is proposed to replace previously abandoned water main (WM) along 92nd Street to minimize conflicts with existing other utilities. This option also includes addition of storm inlets along Abbott Avenue, upsizing of storm pipes at Abbott Ave and 91st Street intersection, and upsizing of storm pipes at Abbott Avenue and 92nd Street intersection. This option will significantly reduce flooding at a cost of approximately $982,000. Please refer to **Exhibit 9** for specifics and **Exhibit 10** for a breakdown of the costs.

Option 2 includes all proposed improvements of Option 1, and a new proposed Pump Station along with three pressurized drainage wells at the west end of 92nd Street. This will also significantly reduce flooding at a cost of approximately $1,720,000. Please refer to **Exhibit 9** for specifics and **Exhibit 10** for a breakdown of the costs.

Option 3 includes all improvements proposed in Option 1 & 2, and proposed 48" diameter conveyance pipe along 91st Street between Abbott Avenue and Bay Drive. This option will require significant alteration of existing storm pipe networks and other existing utilities along the streets. The construction cost is expected to be approximately $4,971,000. Due to significant disturbance of the existing roadways, utilities and associated cost, this option was considered to be the least feasible option for Abbott Avenue drainage improvements. Please refer to **Exhibit 9** for specifics and **Exhibit 10** for a breakdown of the costs.

The following table presents the reduction in roadway flooding levels which may be achieved with the proposed or equivalent improvements of Option 1, Option 2, and Option 3.

Resultant Road Flooding Depth above Edge of Pavement* (5 Year Frequency Storm)**

Areas of Concern/ Sub-Basin	Existing Flooding Conditions	Inches of Flooding Option 1	Inches of Flooding Option 2	Inches of Flooding Option 3
Abbott Ave (Basin 3)	10.68" to 16.08"	9.84" to 15.60"	5.16" to 12.00"	3.48" to 9.60"
Abbott Ave (Basin 4)	11.88" to 17.28"	11.04" to 16.80"	8.40" to 13.20"	5.52" to 10.80"

*The flood depths presented above are at the lowest edge of pavement grade, and are based on our flood routing model of the 5-year/1-hour and 5-year/24-hour design storm events.

**The rainfall depths of 5-year/1-hour and 5-year/24-hour storm events are 3.20 inches and 6.50 inches respectively.

Resultant Road Flooding Depth above Road Crown* (5 Year Frequency Storm)**

Areas of Concern/ Sub-Basin	Existing Flooding Conditions	Inches of Flooding Option 1	Inches of Flooding Option 2	Inches of Flooding Option 3
Abbott Ave (Basin 3)	0.00" to 5.28"	0.00" to 4.80"	0.00" to 1.20"	0.00" to 0.00"
Abbott Ave (Basin 4)	1.08" to 6.48"	0.24" to 6.00"	0.00" to 2.40"	0.00" to 0.00"

*The flood depths presented above are at the road crown elevations, and are based on our flood routing model of the 5-year/1-hour and 5-year/24-hour design storm events.

**The rainfall depths of 5-year/1-hour and 5-year/24-hour storm events are 3.20 inches and 6.50 inches respectively.

VI. CONCLUSION

It is recommended that improvements be constructed as presented in this study with an emphasis on practical improvement, not in an attempt to meet the full level of service requirements. Option 2 should be viewed as a necessary part of reducing flood stages. However, pipes or pipe replacement sizes would be subject to further design analysis and practical matters like existing utility conflicts, etc.

Due to the magnitude of site disturbance and total reconstruction requirement of roadways, drainage and existing utilities, Option 3 is not recommended by this study. However, it can be considered if the Town desires to make incremental improvements to its master drainage system over time with the ultimate goal of eventually meeting the level of service requirements at some point in the future.

SECTION ONE

INTRODUCTION

1.1 INTRODUCTION

Flooding with an unspecified elevation and duration has been occurring along Abbott Avenue and the surrounding neighborhood. Recent resident complaints and site observations suggest that the subject corridor frequently experiences approximately 1 foot or higher standing flood waters during short-duration, high-intensity (≥1 inch/hour) rainfall events. These neighborhoods are served by the Town of Surfside master drainage system. The recently improved stormwater management system of the Town consists of a network of underground storm sewers and associated outfall control structures discharging into Indian Creek and Biscayne Bay, 3 pump stations discharging into 9 drainage wells, and 1 existing pump station located at the west end of 92nd Street.

As a first step toward addressing these drainage concerns, the Town has retained Calvin, Giordano, and Associates, Inc. (CGA) to perform this drainage study of the subject area of concern to determine the probable cause of street flooding, to evaluate potential drainage improvements for Abbott Avenue and the surrounding neighborhood area, and to recommend appropriate improvements to mitigate the extent of the flooding issues as economically as possible meeting acceptable level of service.

The following is the expected level of service: (1) Flood elevation or storm stage resulting from 5-year design storm events shall not encroach up to the roadway crown elevation. (2) Roadway spread resulting from 4 inch/hour intensity storm shall not encroach more than half of the travel lane width. (3) Hydraulic grade line resulting from 3-year 1-hour design storm shall not exceed the storm inlet grate elevation.

This report describes related information discovered during site reconnaissance and project research and provides options which, based on computer modeling, are expected to mitigate the current flooding conditions.

1.2 BACKGROUND

1.2.1 Location

The Town of Surfside is located between Miami Beach to the south and Bal Harbour Village to the north, with the Atlantic Ocean to the east and the Village of Indian Creek and the Town of Bay Harbor Islands, separated from Surfside by Indian Creek, to the west. Please refer to location map in Appendix A. The Town is located on two barrier islands between Biscayne Bay (including its bayou, Indian Creek) and the Atlantic Ocean. Indian Creek and Biscayne Bay lie adjacent to the Town's western shore, which is entirely lined with concrete sea walls. Indian Creek is a brackish-water bayou of Biscayne Bay. Abbott Avenue is located toward the eastern side of the Town. Please refer to **Exhibit 1**, Location Map and **Exhibit 2**, Aerial Map.

1.2.2 Existing Developments

The Town of Surfside was incorporated on May 18, 1935 and encompasses a total land area of approximately 330 acres. Development began during the 1920's and the Town has been virtually built-out since the late 1980's. Approximately 49% of the residential development was constructed before 1960, and 72% was constructed before 1980, including the supporting infrastructure. The Town is nearly 100% developed with no significant natural vegetative cover, except landscaping on developed land and limited ocean dune vegetation. The Town's street system is configured in a relatively uniform grid, with most blocks being approximately 250-feet wide and 660-feet long. Please refer to the **Exhibit 7**, Existing Drainage Basin Map.

1.2.3 Topography

According to the historical records and survey documents, the average elevations of the study area within the existing road right-of-way range from approximately 2.80' NGVD to 5.50' NGVD. The wet season water table elevation is 1.60' NGVD (see **Exhibit 5**). The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (see **Exhibit 4**) indicates that most of the Town is located primarily in Zone AE (Base Flood Elevation 8.00' NGVD), requiring a minimum Finished Floor Elevation of 8.00' NGVD for the residential home properties.

1.2.4 Existing Drainage Basins and Land Use

The Town's existing stormwater management system consists of 9 drainage basins as shown in Exhibit 7, Existing Drainage Basin Map. The existing drainage basins are as follows:

- Basin 1 – areas served by 95th Street drainage collector;
- Basin 2 – areas served by 94th Street drainage collector;
- Basin 3 – areas served by 92nd Street drainage collector and existing Pump Station;
- Basin 4 – areas contributing into 91st Street drainage collector;
- Basin 5 – areas served by 89th Street drainage collector;
- Basin 6 – areas served by Byron Avenue and 88th Street collector;
- Basin 7 – island area served by Biscaya Drive drainage collector;
- Basin 8 – west 88th Street area served by an exfiltration trench;
- Basin 9 – areas between Harding and Collins Avenues (FDOT) and areas east of Collins Avenue.

Table 1.2 A

Previously Permitted Land Use Breakdown

Drainage Basin	Total Area (ac)	Building Area (ac)	Roadways/pavement (ac)	Total Impervious (ac)	Pervious Area (ac)
Basin 1	27.81	8.46	8.34	16.8	11.01
Basin 2	30.40	9.30	8.83	18.13	12.27
Basin 3	41.04	12.08	11.96	24.04	17.00
Basin 4	32.39	9.46	9.67	19.13	13.26
Basin 5	32.60	9.39	9.68	19.07	13.53
Basin 6	54.60	16.37	15.46	31.83	22.77
Basin 8	7.24	2.35	2.06	4.41	2.83
Total	226.08	67.41	66.00	133.41	92.67
(%)	100%	29.82%	29.19%	59.01%	40.99%
	* Basin 7 and Basin 9 are not included in this study since those are either isolated or independent systems from the subject site * The land use data is obtained from previous permit data of Surfside Master Drainage System				

Further review of right-of-way area and aerial maps reveals that the actual impervious areas are relatively higher than those previously permitted land use data.

Table 1.2 B

Adjusted Land Use Breakdown

Drainage Basin	Total Area (ac)	Building Area (ac)	Roadways/pavement (ac)	Total Impervious (ac)	Pervious Area (ac)
Basin 1	27.81	8.46	10.46	18.92	8.89
Basin 2	30.40	9.30	11.64	20.94	9.46
Basin 3	41.04	12.08	15.75	27.83	13.21
Basin 4	32.39	9.46	12.90	22.36	10.03
Basin 5	32.60	9.39	12.96	22.35	10.25
Basin 6	54.60	16.37	19.98	36.35	18.25
Basin 8	7.24	2.35	2.56	4.91	2.33
Total	226.08	67.41	86.25	153.66	72.42
(%)	100%	29.82%	38.15%	67.97%	32.03%
	* Basin 7 and Basin 9 are not included in this study since those are either isolated or independent systems from the subject site * The land use data is adjusted due to higher percentage of Roadway Imperviousness				

1.2.5 USDA Soil Survey

Based on a review of the Miami-Dade County Soil Survey by United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), it appears that there are three (3) soil-mapping units noted within the overall drainage basin: 15-Urban Land, 39-Beaches, and 99-water. Please refer to **Exhibit 3**, USDA Soil Survey Map.

1.2.6 Existing Utilities

Abbott Avenue is heavily occupied by underground and aboveground utilities. Aboveground FPL facilities and Electric Poles are located behind the curb and gutter along the west side of the roadway. The poles are so close to the existing curb that any proposed drainage pipes along the curb and gutter may require relocation of the existing poles to accommodate the proposed drainage improvements. Existing underground utilities include FPL duct banks, AT&T duct banks, natural gas mains, water mains, water services, sanitary sewer mains, and sanitary sewer service laterals. The proposed drainage improvements will likely be in conflict with these underground facilities or will be at absolute minimum horizontal clearances.

SECTION TWO

EXISTING DRAINAGE CONDITIONS

2.1 EXISTING MASTER DRAINAGE SYSTEM

In 2013, the Town of Surfside completed a retrofit project of the existing drainage system primarily to improve the water quality of the receiving waters. Prior to the retrofit improvements, the existing storm drainage system consisted of a network of underground storm sewers and outfalls discharging directly into Indian Creek and Biscayne Bay. A pumping station at the western end of 92nd Street assisted the drainage of water from that street by pumping to an outfall into Indian Creek. Storm sewer pipe sizes in the system ranged in diameter from 10 inches to 36 inches.

The retrofitted stormwater management system consists of a network of underground storm sewers along with outfall control structures discharging into Indian Creek and Biscayne Bay, and 3 additional pump stations discharging to 9 drainage wells. The newly constructed control structures facilitate well discharge before overflow waters discharge to Biscayne Bay. The project addressed long-term concerns regarding water staging into the streets and poor water quality in the adjacent Biscayne Bay along the Town's shores. The project directly addressed The Trust for Public Land's Biscayne Bay Accessibility report, supported the SFWMD's Biscayne Bay Partnership Initiative (BBPI), and enhanced the level of service. The retrofit project was fully funded by an FDEP grant and utilized no Town funds.

In 2015, the Town completed drainage improvements for Biscaya Island along 88th Street. The Town constructed new check valves to prevent back flow into the existing roadways and upsized one 12" outfall to a 24" diameter outfall to improve conveyance.

The Town of Surfside has two state roadways within the Town; one north-south pair SR A1A/Collins Ave (northbound) and Harding Avenue (southbound); and one east-west SR-922/96th Street. Two pump stations discharging into the drainage wells and large bypass outfall pipes serve these FDOT roadways and the associated drainage basin area (Basin 9). The FDOT pump stations are located along 94th Street and 88th Street and are currently operated by the Town of Surfside.

2.2 EXISTING DRAINAGE OF ABBOTT AVENUE

The Town's street system is configured in a grid with most blocks 250-feet wide and 660-feet long. The existing single-family homes and residential developments drain into the street right-of-way via sheet flow. Every intersection of Abbott Avenue includes three or four storm inlets to collect the storm runoff. Roadway elevations range from 2.80 feet NGVD to 5.50 feet NGVD. The roadway profile is very flat along the north-south direction, causing widespread stormwater flow through the roadway section. Each storm inlet is responsible to serve a contributing area as large as 2.10 acres, which is a considerably large contributing area. The conveyance pipes connected to each storm inlet are as small as 10-inch diameter, causing high hydraulic gradients and resulting in on-street flooding. From each intersection of Abbott Avenue, the conveyance pipe network takes stormwater runoff to the west towards the outfall or pump station locations. These east-to-west conveyance pipe networks consist of 12" diameter (min.) to 36" dimeter (max.) storm pipes along each of the ±2,000 LF pathway to the west and are restricted by permit-mandated water quality weirs in the control structures. When the storm inlets and storm pipes fail to handle the surface runoff or rainfall intensity, flood water rises up to the surrounding street crown elevations and eventually spreads out throughout the drainage basins.

2.3 FIELD OBSERVATION OF RAIN EVENTS

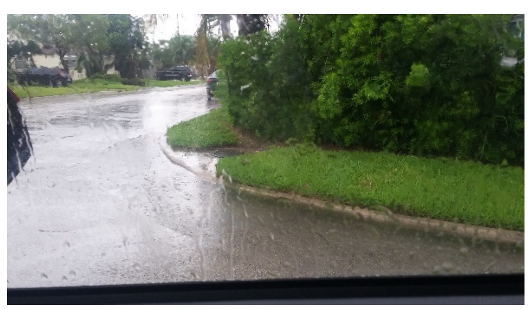
Several attempts have been made to observe actual rainfall events at the subject site. CGA staff visited the site on September 2nd and September 3rd of 2018 to observe the effects of Tropical Storm Gordon. Tropical Storm Gordon brought an average of nearly 1" of rain across the South Florida Water Management District's 16-county region on Labor Day. The heaviest rainfall occurred in the everglades and highly populated areas of Miami-Dade and Broward Counties, with 3 to 5 inches of rain in most basins of southern Miami-Dade County.

CGA staff visited the site at 11:00 am on September 2, 2018, just immediately after a rainfall event. Surface water ponding was observed along Abbott Avenue at the intersections of 91st Street and 92nd Street. The Pump Station at 94th Street was running at the time. The ponding at the Abbott Avenue/91st Street intersection disappeared in less than 30 minutes. The SFWMD rainfall estimates indicate 1.50" of rain occurred during 24-hour period.




11:15 AM, 9-2-2018 11:35 AM, 9-2-2018

CGA staff visited the site once again on September 3rd, 2018 at 7:00 AM. The sky was cloudy with no rain at the time. During the period from 8:30 AM to 10 AM there was a considerable downpour. No surface water ponding was observed during the rain event. Runoff was entering into the inlets at a steady flow rate. The spread did not expand more than 5 feet in the street. The inlets were observed to have hydraulic head up to the top of the curb height for a very short period of time. The SFWMD rainfall estimates indicate 1.50" of rain occurred during 24-hour period.

91st Street and Abbott Ave intersection at 08:45 AM, 9-3-2018

SECTION THREE

DESIGN CRITERIA

3.1 FINISHED FLOOR ELEVATION CRITERIA:

According to SFWMD criteria, residential building floors must be at or above the 100-year flood elevations as determined from the most appropriate information, including Federal Flood Insurance Rate Maps. Both tidal flooding and the 100-year 3-day storm event shall be considered in determining elevations. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) indicates that most of the Town is located primarily in Zone AE (Base Flood Elevation 8.00’ NGVD), requiring a minimum Finished Floor Elevation (FFE) of 8.00’ NGVD. As such it is expected that the residential homes (FFE) are built at or above 8.00’ NGVD.

3.2 ROADWAY LEVEL OF SERVICE (LOS) CRITERIA:

3.2.1 FLOOD ROUTING AND ROAD FLOOD CRITERIA:

According to DRER, all roadways in Miami-Dade County are required to have a minimum longitudinal slope of 0.2 percent for drainage purposes, and the design return periods for roadway drainage systems depend on the type of roadway. Two-lane roads in residential areas must accommodate runoff from all storms with a 5-year return period with maximum encroachment up to the crown of the roadway. As such roadway flooding up to the crown elevation for 5-year design storm is allowed by regulatory agencies. ICPR Modeling (Hydrologic and Hydraulic Model) for existing conditions (**Appendix C**) indicates that the Town roadways do not meet this flood criteria or level of service at this time.

3.2.2 ALLOWABLE SPREAD CRITERIA:

According to the FDOT Drainage Manual and standard engineering practice, the stormwater spread resulting from a rainfall intensity of 4.0” per hour must not encroach more than ½ of travel lane if the design speed is less than or equal to 45 mph. The spread is usually determined or affected by inlet capacity, run-off contributing areas, gutter slope, pavement cross slope, inlets spacing, etc. For 4.0”/hour intensity, the maximum allowable spread of stormwater along Abbott Avenue is calculated to be 9.25’ as measured from face of curb toward the road crown. Spread Calculation (**Appendix A**) indicates that the Town roadways do not meet this criteria or level of service at this time.

3.2.3 STORM DRAIN SYSTEM CRITERIA:

Storm sewers shall be designed and sized for 3-year frequency per FDOT Zone 10 IDF curves. Rational Method for performing hydrologic calculations shall be used for storm drain calculations. Friction losses shall be included in computing the design hydraulic gradient for all storm drain systems. Additionally, energy losses associated with special pollution control structures (weirs, baffles, etc.) and those caused by utility conflict structures shall be included in the calculations. If design includes all major and minor energy losses, it is acceptable for the hydraulic gradient to reach the theoretical gutter elevation. Minor losses include: entrance, exit, junction and manhole, expansion, contraction, and bend. Hydraulic Grade Line (HGL) calculation/storm drain system calculations or ASAD model (**Appendix B**) indicates that the Town’s roadway storm sewer systems do not meet this criteria or level of service at this time.

3.3 WATER QUALITY TREATMENT VOLUME CRITERIA:

SFWMD criteria require treatment of storm water equal to either the first inch of runoff or 2.5 inches times the percent imperviousness, whichever is greater. Dry retention volume shall be provided equal to 50 percent of the amounts computed for wet detention. Additional 50% water quality treatment volume shall be provided for verified impaired water body. To meet the State water quality standards, Miami-Dade County requires 100% of the first-inch of runoff to be retained on site.

Existing conditions of Town of Surfside do not allow for retention/detention areas or exfiltration trenches to provide conventional water quality treatment of the stormwater volume. Existing site conditions, site grades, water table depth, and surficial aquifer depth are more suitable for use of drainage wells accepting discharge from pump stations. As such, the Town has constructed three pump stations and nine drainage wells to reduce pollutants in stormwater discharge from entering Biscayne Bay.

The previous retrofit project by Town addressed the water quality treatment volume requirement. Miami-Dade County has a higher percentage of relatively small rainfall events. 95% of annual rainfall events occurring in Miami-Dade area are anticipated to be 1.50" or less in precipitation. It is expected that retention of stormwater runoff from a rainfall event of 1.5" will reduce by 95% pollutant loads from the contributing sub-basin areas discharging into Indian Creek and Biscayne Bay. As such, the three pump stations with associated drainage wells were designed and permitted with capacity to retain 1.50" of rainfall or precipitation reducing 95% pollutant loads for the receiving waters.

3.4 ALLOWABLE DISCHARGE CRITERIA:

According to SFWMD, for tidal areas, the allowable discharge is based on the proposed project's peak runoff rate after development not exceeding the rate which existed prior to development. The design storm event for allowable discharge calculations is designated as the 25-year/72-hour storm event. Any new improvements of Town's stormwater management system will need to meet this discharge criteria by not exceeding the pre-existing discharge rate established by previous permits. The Town's retrofitted drainage system meets this allowable discharge criteria. Also, all proposed improvements described in Option 1, 2 and 3 will meet this criteria.

SECTION FOUR

STORMWATER MODELING

4.1 FLOOD ROUTING FOR EXISTING CONDITIONS

The previous stormwater retrofit project utilized ICPR software for hydrologic and hydraulic modeling of the master drainage system. The town's master surface water management system was permitted through DERM and FDEP by using the ICPR model. As such, the best methodology to analyze the system, to determine level of service deficiencies, and to determine required improvements for Abbott Avenue drainage system would be to evaluate previously permitted ICPR model of the Town's master drainage system. As previously noted, the previous retrofit project was constructed to primarily improve the water quality of receiving waters and to improve the existing drainage conditions. However, the full level of service requirement was not intended or mandated by that stormwater retrofit project.

Interconnected Channel and Pond Routing Model (ICPR v3.10) is an engineering software tool developed by Streamline Technologies, Inc. and is a comprehensive hydrodynamic stormwater modeling system that includes an integrated hydrology component. It is extremely flexible and can be used for the design of single detention ponds for the smallest site plans or modeling of the largest and most complex regional systems with thousands of nodes and links. ICPR can simulate hydrologic and hydraulic conditions by generating runoff hydrographs and dynamically routing these hydrographs through dendritic, diverging, or looped stormwater management systems.

CGA utilized the previously permitted Interconnected Channel and Pond Routing (ICPR) Stormwater Model to simulate the rainfall events and subsequent storm stages. Please refer to ***Appendix C***, ICPR Model of Existing Conditions. The model indicates roadway level of service deficiencies as indicated in the following tables.

Table 4.1 A

Existing Level of Service Deficiencies (5 Year 1 Day Storm):

Design Storm/Sub-Basin	Rainfall (inches)	Peak Stage (ft NGVD)	Basin Level Min. Road Crown (ft. NGVD)	Abbott Ave Min. Road Crown (ft NGVD)	Basin Level LOS criteria	Abbott Ave LOS criteria
5 Year 1 Day						
Sub-Basin-1	6.50	4.50	3.70	4.90	Not met	Satisfied
Sub-Basin-2	6.50	4.50	3.90	4.80	Not met	Satisfied
Sub-Basin-3	6.50	4.24	3.40	3.80	Not met	Not met
Sub-Basin-4	6.50	4.24	3.80	3.70	Not met	Not met
Sub-Basin-5	6.50	4.04	3.50	4.00	Not met	N/A
Sub-Basin-6	6.50	4.12	3.50	4.00	Not met	Not met
Sub-Basin-8	6.50	4.04	3.30	N/A	Not met	N/A

Table 4.1 B

Existing Level of Service Deficiencies (5 Year 1 Hour Storm):

Design Storm/Sub-Basin	Rainfall (inches)	Peak Stage (ft NGVD)	Basin Level Min. Road Crown (ft NGVD)	Abbott Ave Min. Road Crown (ft NGVD)	Basin Level LOS criteria	Abbott Ave LOS criteria
5 Year 1 Hour						
Sub-Basin-1	6.50	4.09	3.70	4.90	Not met	Satisfied
Sub-Basin-2	6.50	3.84	3.90	4.80	Satisfied	Satisfied
Sub-Basin-3	6.50	3.79	3.40	3.80	Not met	Satisfied
Sub-Basin-4	6.50	3.79	3.80	3.70	Satisfied	Not met
Sub-Basin-5	6.50	3.50	3.50	4.00	Satisfied	N/A
Sub-Basin-6	6.50	3.52	3.50	4.00	Not met	Satisfied
Sub-Basin-8	6.50	3.46	3.30	N/A	Not met	N/A

The above tables indicate that the portion of Abbott Avenue between 90th Street and 93rd Street does not meet the Level of Service requirement for 5 Year frequency storm events. The lowest edge of pavement along this segment of the roadway is 2.80 feet NGVD at 91st Street intersection. The flood depth measures approximately 11.88 inches to 17.28 inches above the lowest edge of pavement grade. The proposed drainage improvements described in Section Five are anticipated to result in less flood depths above edge of pavement grade.

4.2 ROADWAY SPREAD CALCULATIONS

As described in Section 2.2, the Town's street system is configured in a grid with most blocks measuring approximately 250' by 660'. The storm inlets are located at every intersection along Abbot Avenue - approximately 600 LF apart. These existing conditions contribute to wider spread of the stormwater flow along the pavement cross section. The proposed additional storm inlets along Abbott Avenue will reduce the stormwater spread along roadway section. Please see **Appendix A** for existing/proposed spread calculations.

4.2 STORM DRAIN SYSTEM EVALUATION:

As described in Section 3.2.3, hydraulic gradient is allowed to reach the theoretical gutter elevation for a 3-year design storm frequency. To model and analyze the Storm Drain Hydrology and Hydraulics, ASADLt3 (Automated Storm Sewer Analysis & Design) software was utilized. A hypothetical East-to-West direction storm water trunk line was modeled and analyzed to evaluate the system performance (see **Appendix B**). The analysis indicates a 48" dimeter trunk line along each Street (east to west) could be the most appropriate size to meet the allowable hydraulic gradient not exceeding the gutter elevations. As previously described in Section 2.2, the east-west conveyance pipe networks from Abbott Avenue to the outfalls consist of 12" diameter (min.) to 36" dimeter (max.) storm pipes along each of the ±2,000 LF pathways to the west and are restricted by permit-mandated water quality weirs within the control structures. The weir elevation of 2.00' NGVD was utilized in the ASAD model as the tail water condition. The lowest curb inlet gutter elevation along Abbott Avenue is 2.80' NGVD. The existing pump stations and the drainage wells are located approximately 2,000 LF away from Abbott Avenue. Unfortunately, these extreme conditions frequently result in hydraulic gradient failure or flood conditions during high intensity storm events. The proposed improvement with Pump Station at Abbott Ave and 92nd Street intersection is expected to reduce the effects of hydraulic gradient failure.

SECTION FIVE

STORMWATER MODELING – PROPOSED IMPROVEMENTS

5.1 FLOOD ROUTING FOR PROPOSED IMPROVEMENTS

After evaluation of the existing conditions and ICPR model of the Town's master drainage system, CGA analyzed various alternatives and ICPR models to develop recommendations to help alleviate the deficiencies in the drainage system of Abbott Avenue.

The following general considerations were the basis to develop the recommendations:

a) The improvements need to be permittable with all regulatory agencies and be in general compliance with current design criteria set-up for acceptable stormwater practices in SFWMD and DRER.
b) The improvements need to provide a reliable upgrade and upsizing of the system to alleviate flood conditions.
c) The improvements need to be cost effective.
d) The improvements should not negatively impact adjacent properties.
e) The improvements need to be maintainable by the operating entity or the Town's Public Works Department.
f) The proposed improvements need to be feasible and achievable.

5.2 PROPOSED IMPROVEMENTS

Various measures and solutions were researched to improve the existing flood protection level of service. The most appropriate solutions were incorporated into alternative ICPR models for proposed conditions. Please refer to **Appendix D**, **Appendix E**, and **Appendix F** for ICPR Models for Proposed Improvements. Based on the model results, CGA offers the following improvements to be implemented for the Abbott Avenue drainage system and Surfside master drainage system:

Option 1:

a) Replace and upsize the existing conveyance pipes and storm inlets at 91st street /Abbott Avenue intersection.
b) Replace and upsize the existing conveyance pipes and storm inlets at 92nd street /Abbott Avenue intersection.
c) Provide a Pump Station (2,250 GPM) at the intersection of Abbott Avenue and 92st Street discharging into Indian Creek by a 12" diameter force main. The new 12" drainage FM shall be constructed in place of existing abandoned 8" WM along 92nd Street.
d) Provide 24" diameter conveyance pipe along Abbott Avenue between 91st street and the new proposed pump station.
e) Provide additional curb inlets along Abbott Avenue between 90st Street and 92nd Street.
f) The construction constraints for these improvements would be existing underground FPL/AT&T facilities along Abbott Avenue and existing Electric Poles behind back of curb. Relocation of FPL poles and underground FPL and AT&T facilities might be needed for these proposed improvements.

Option 2:

a) Implementation of all improvements of Option 1.
b) Provide three new pressurized drainage wells and a new pump station (10,500 GPM) at the west end of 92nd Street.
c) As an alternate option, the existing Pump Station at 92nd Street can be replaced with the new proposed pump station and the new pressurized drainage wells.

Option 3:

d) Implementation of all improvements of Option 1 and Option 2.
e) Provide 48" conveyance Trunk line along 91st Street.
f) This option will require extensive utility reconstruction/relocation and complete roadway restoration to construct the proposed 48" drainage pipe.

The above described improvements will significantly improve the existing level of service for high intensity short-duration storm events. However, due to the deficiencies of the overall master drainage system including insufficient number of pump stations and drainage wells, inadequate size of storm drains, inadequate number of storm inlets, the required level of service for all drainage basins will never be met. The preliminary construction cost estimate for these options is as follows:

Option 1	$982,000
Option 2	$1,720,000
Option 3	$4,971,000

The following is the proposed level of service (OPTION 1) based on the alternative ICPR models for proposed conditions:

Table 5.2.1 A

Proposed Level of Service (5 Year 1 Day Storm) (OPTION 1):

Design Storm/Sub-Basin	Rainfall (inches)	Exist Peak Stage (ft)*	Prop. Peak Stage (ft)*	Basin Level Min. Road Crown (ft)*	Abbott Ave Min. Road Crown (ft)*	Basin Level LOS criteria	Abbott Ave LOS criteria
5 Year 1 Day							
Sub-Basin-1	6.50	4.50	4.50	3.70	4.90	Not met	Satisfied
Sub-Basin-2	6.50	4.50	4.49	3.90	4.80	Not met	Satisfied
Sub-Basin-3	6.50	4.24	4.20	3.40	3.80	Not met	Not met
Sub-Basin-4	6.50	4.24	4.20	3.80	3.70	Not met	Not met
Sub-Basin-5	6.50	4.04	3.99	3.50	4.00	Not met	N/A
Sub-Basin-6	6.50	4.12	4.06	3.50	4.00	Not met	Not met
Sub-Basin-8	6.50	4.04	3.99	3.30	N/A	Not met	N/A

*Elevations are referenced to National Geodetic Vertical Datum of 1929 (NGVD)

Table 5.2.1 B

Proposed Level of Service (5 Year 1 Hour Storm) (OPTION 1):

Design Storm/Sub-Basin	Rainfall (inches)	Exist. Peak Stage (ft)*	Prop. Peak Stage (ft)*	Basin Level Min. Road Crown (ft)*	Abbott Ave Min. Road Crown (ft)*	Basin Level LOS criteria	Abbott Ave LOS criteria
5 Year 1 Hour							
Sub-Basin-1	6.50	4.09	4.09	3.70	4.90	Not met	Satisfied
Sub-Basin-2	6.50	3.84	3.84	3.90	4.80	Satisfied	Satisfied
Sub-Basin-3	6.50	3.79	3.72	3.40	3.80	Not met	Satisfied
Sub-Basin-4	6.50	3.79	3.72	3.80	3.70	Satisfied	Not met
Sub-Basin-5	6.50	3.50	3.49	3.50	4.00	Satisfied	N/A
Sub-Basin-6	6.50	3.52	3.52	3.50	4.00	Not met	Satisfied
Sub-Basin-8	6.50	3.46	3.45	3.30	N/A	Not met	N/A

*Elevations are referenced to National Geodetic Vertical Datum of 1929 (NGVD)

The following is the proposed level of service (OPTION 2) based on the alternative ICPR models for proposed conditions:

Table 5.2.2 A

Proposed Level of Service (5 Year 1 Day Storm) (OPTION 2):

Design Storm/Sub-Basin	Rainfall (inches)	Exist Peak Stage (ft)*	Prop. Peak Stage (ft)*	Basin Level Min. Road Crown (ft)*	Abbott Ave Min. Road Crown (ft)*	Basin Level LOS criteria	Abbott Ave LOS criteria
5 Year 1 Day							
Sub-Basin-1	6.50	4.50	4.48	3.70	4.90	Not met	Satisfied
Sub-Basin-2	6.50	4.50	4.48	3.90	4.80	Not met	Satisfied
Sub-Basin-3	6.50	4.24	3.90	3.40	3.80	Not met	Not met
Sub-Basin-4	6.50	4.24	3.90	3.80	3.70	Not met	Not met
Sub-Basin-5	6.50	4.04	3.93	3.50	4.00	Not met	N/A
Sub-Basin-6	6.50	4.12	3.99	3.50	4.00	Not met	Satisfied
Sub-Basin-8	6.50	4.04	3.93	3.30	N/A	Not met	N/A

*Elevations are referenced to National Geodetic Vertical Datum of 1929 (NGVD)

Table 5.2.2 B

Proposed Level of Service (5 Year 1 Hour Storm) (OPTION 2):

Design Storm/Sub-Basin	Rainfall (inches)	Exist. Peak Stage (ft)*	Prop. Peak Stage (ft)*	Basin Level Min. Road Crown (ft)*	Abbott Ave Min. Road Crown (ft)*	Basin Level LOS criteria	Abbott Ave LOS criteria
5 Year 1 Hour							
Sub-Basin-1	6.50	4.09	4.08	3.70	4.90	Not met	Satisfied
Sub-Basin-2	6.50	3.84	3.81	3.90	4.80	Satisfied	Satisfied
Sub-Basin-3	6.50	3.79	3.33	3.40	3.80	Satisfied	Satisfied
Sub-Basin-4	6.50	3.79	3.50	3.80	3.70	Satisfied	Satisfied
Sub-Basin-5	6.50	3.50	3.48	3.50	4.00	Satisfied	N/A
Sub-Basin-6	6.50	3.52	3.52	3.50	4.00	Not met	Satisfied
Sub-Basin-8	6.50	3.46	3.44	3.30	N/A	Not met	N/A

*Elevations are referenced to National Geodetic Vertical Datum of 1929 (NGVD)

The following is the proposed level of service (OPTION 3) based on the alternative ICPR models for proposed conditions:

Table 5.2.3 A

Proposed Level of Service (5 Year 1 Day Storm) (OPTION 3):

Design Storm/Sub-Basin	Rainfall (inches)	Exist Peak Stage (ft)*	Prop. Peak Stage (ft)*	Basin Level Min. Road Crown (ft)*	Abbott Ave Min. Road Crown (ft)*	Basin Level LOS criteria	Abbott Ave LOS criteria
5 Year 1 Day							
Sub-Basin-1	6.50	4.50	4.45	3.70	4.90	Not met	Satisfied
Sub-Basin-2	6.50	4.50	4.44	3.90	4.80	Not met	Satisfied
Sub-Basin-3	6.50	4.24	3.70	3.40	3.80	Not met	Satisfied
Sub-Basin-4	6.50	4.24	3.70	3.80	3.70	Satisfied	Satisfied
Sub-Basin-5	6.50	4.04	3.87	3.50	4.00	Not met	N/A
Sub-Basin-6	6.50	4.12	3.95	3.50	4.00	Not met	Satisfied
Sub-Basin-8	6.50	4.04	3.87	3.30	N/A	Not met	N/A

*Elevations are referenced to National Geodetic Vertical Datum of 1929 (NGVD)

Table 5.2.3 B

Proposed Level of Service (5 Year 1 Hour Storm) (OPTION 3):

Design Storm/Sub-Basin	Rainfall (inches)	Exist. Peak Stage (ft)	Prop. Peak Stage (ft)	Basin Level Min. Road Crown (ft)*	Abbott Ave Min. Road Crown (ft)*	Basin Level LOS criteria	Abbott Ave LOS criteria
5 Year 1 Hour							
Sub-Basin-1	6.50	4.09	4.05	3.70	4.90	Not met	Satisfied
Sub-Basin-2	6.50	3.84	3.72	3.90	4.80	Satisfied	Satisfied
Sub-Basin-3	6.50	3.79	3.19	3.40	3.80	Satisfied	Satisfied
Sub-Basin-4	6.50	3.79	3.26	3.80	3.70	Satisfied	Satisfied
Sub-Basin-5	6.50	3.50	3.36	3.50	4.00	Satisfied	N/A
Sub-Basin-6	6.50	3.52	3.46	3.50	4.00	Satisfied	Satisfied
Sub-Basin-8	6.50	3.46	3.37	3.30	N/A	Not met	N/A

*Elevations are referenced to National Geodetic Vertical Datum of 1929 (NGVD)

SECTION SIX

SUMMARY & RECOMMENDATIONS

6.1 SUMMARY

The Abbott Avenue drainage study was conducted to investigate the potential causes of localized flooding along Abbott Avenue in the Town of Surfside. The study reveals that, regardless of the proposed improvements, complete level of service compliance is not feasible due to the absence of adequate retention facilities, drainage well discharge, conveyance pipes, number of storm inlets, and discharge pipes into the Bay. However, the study also reveals that significant improvements in level of service may be achieved by increasing conveyance pipe sizes, by addition of a pump discharge from Abbott Avenue to Indian Creek, and by addition of three new drainage wells and a pump station at the west end of 92nd Street. So, while the adequate level of service can't be achieved with reasonable cost, it may be best to view the data in terms of the practical improvements which may be achieved with relatively low cost.

The following table presents the reduction in road flooding levels which may be achieved with the proposed or equivalent improvements.

Table 6.1 A

Resultant Road Flooding Depth above Edge of Pavement (5 Year Frequency Storm)

Areas of Concern/ Sub-Basin	Existing Flooding Conditions	Inches of Flooding Option 1	Inches of Flooding Option 2	Inches of Flooding Option 3
Abbott Ave (Basin 3)	10.68" to 16.08"	9.84" to 15.60"	5.16" to 12.00"	3.48" to 9.60"
Abbott Ave (Basin 4)	11.88" to 17.28"	11.04" to 16.80"	8.40" to 13.20"	5.52" to 10.80"

The flood depths presented above are based on lowest edge of pavement grade, and 5-year 1-hour/5-year 24-hour design storm events flood routing model.

Table 6.1 B

Resultant Road Flooding Depth above Road Crown (5 Year Frequency Storm)

Areas of Concern/ Sub-Basin	Existing Flooding Conditions	Inches of Flooding Option 1	Inches of Flooding Option 2	Inches of Flooding Option 3
Abbott Ave (Basin 3)	0.00" to 5.28"	0.00" to 4.80"	0.00" to 1.20"	0.00" to 0.00"
Abbott Ave (Basin 4)	1.08" to 6.48"	0.24" to 6.00"	0.00" to 2.40"	0.00" to 0.00"

The flood depths presented above are based on Road Crown elevation and on flood routing models of the 5-year/1-hour and 5-year/24-hour design storm events. It should be noted that this is referencing the roadway crown elevation and not the catch basin grate elevations, which are likely to be lower and experience deeper flooding.

6.2 RECOMMENDATIONS

It is recommended that improvements be constructed as presented in this analysis with an emphasis on practical improvement, not in an attempt to meet the full level of service requirements.

Option 1 will provide a mechanism to remove stormwater from Abbott Ave with some reduction of peak stages. However, it does not provide full level of service requirements. The ICPR model indicates that the peak stages resulting from 5-year/1-hour and 5-year/24-hour storm events reach the road crown elevation along Abbott Ave.

Option 2 should be viewed as a necessary part of reducing flood stages and is recommended by this drainage study. Pipes or pipe replacement sizes would be subject to further design analysis and practical matters like existing utility conflicts. The ICPR model indicates that the peak stages resulting from 5-year/1-hour storm are below the road crown elevation. However, the peak stages resulting from 5-year/24-hour storm events reach the road crown elevation along Abbott Ave.

Due to the magnitude of site disturbance and total reconstruction requirement of roadways, drainage and existing utilities, Option 3 is not recommended by this study. However, it can be considered if the Town desires to make incremental improvements to its master drainage system over time with the ultimate goal of eventually meeting the level of service requirements at some point in the future.

6.3 REFERENCES

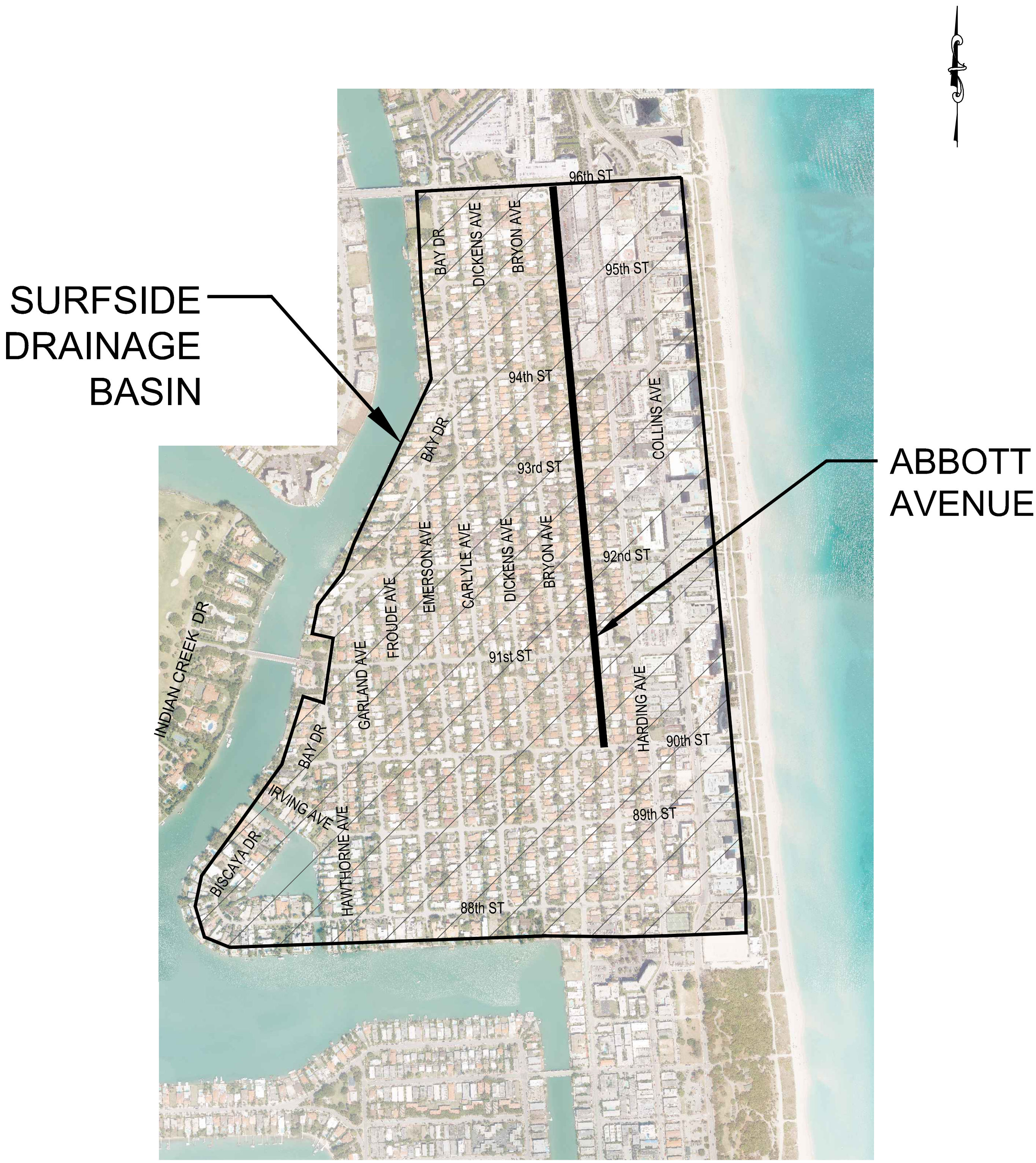
The following reference material has been utilized in the preparation of this report:

1. USDA Urban Hydrology for Small Watersheds TR-55
2. SFWMD ERP Permit Manual
3. DRER Engineering Criteria
4. DRAINAGE REPORT for Town of Surfside Drainage Improvements, September 2008

EXHIBITS

EXHIBIT 1

LOCATION MAP



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EXCEPTIONAL SOLUTIONS™

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

LOCATION MAP

SHEET

EXH1

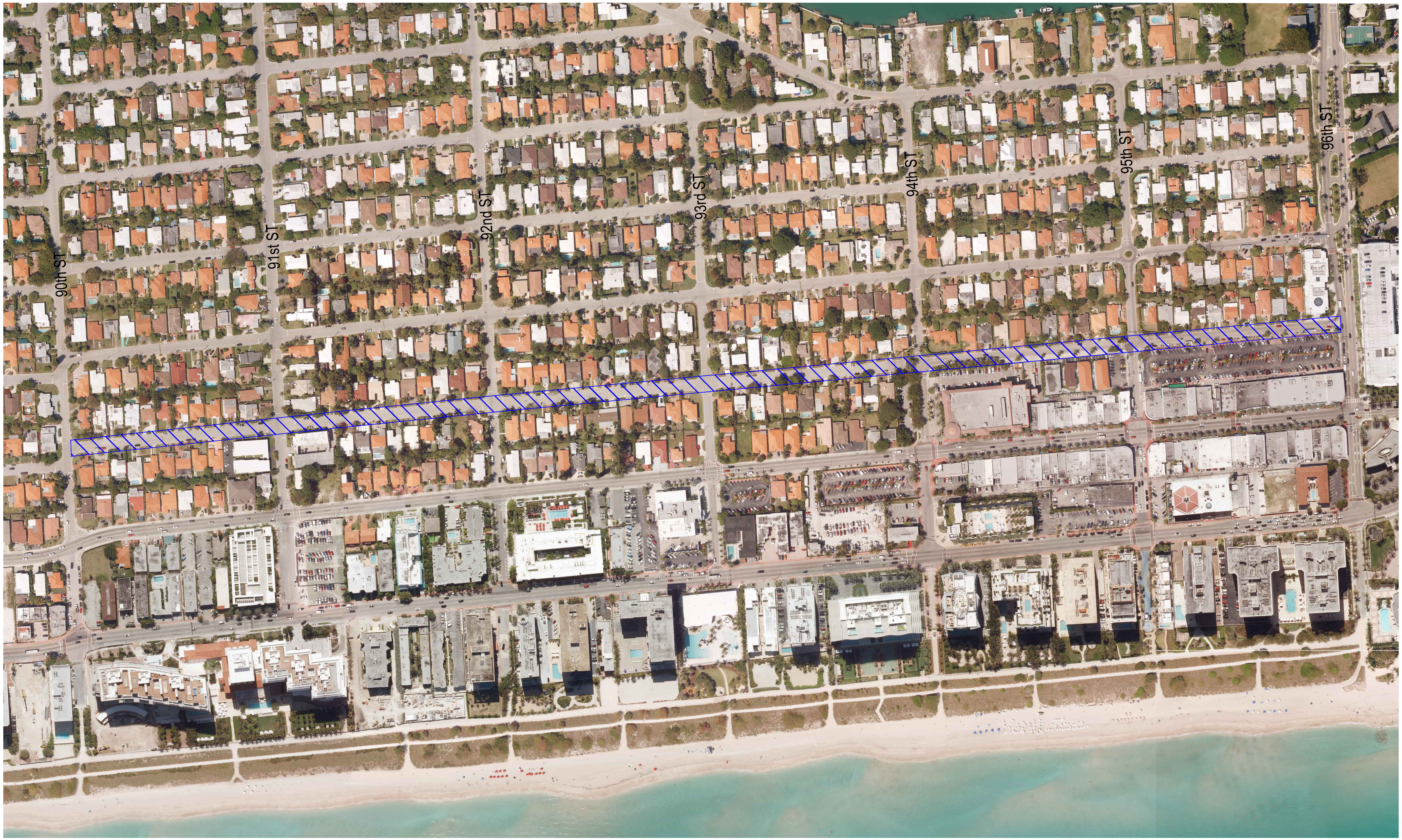
EXHIBIT 2

AERIAL MAP

GRAPHIC SCALE

0 75 150 300

(IN FEET)
1" = 300'



LEGEND

ABBOTT AVENUE STUDY LIMITS

SHEET: EXH2

AERIAL MAP

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

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File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\CADD Files\Drawings\C-EXH 2.dwg — (Plotted by: Katharine Kupsky on Friday, August 31, 2018 10:35:22 AM)

EXHIBIT 3

USDA SOIL SURVEY MAP

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Miami-Dade County Area, Florida

TOWN OF SURFSIDE

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Legend

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Public Land Survey

Township and Range

Section

Municipalities

Cities

Urban Areas

Water Features

Oceans

Streams and Canals

Transportation

Rails

Roads

Interstate Highways

US Routes

State Highways

Local Roads

Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Miami-Dade County Area, Florida
Survey Area Data: Version 1, Jan 22, 2007

Date(s) aerial images were photographed: 2/28/1999; 12/25/1999

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Miami-Dade County Area, Florida (FL686)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
15	Urban land	321.9	95.8%
39	Beaches	3.9	1.1%
99	Water	10.4	3.1%
Totals for Area of Interest (AOI)		336.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Miami-Dade County Area, Florida Version date:1/22/2007 11:40:42 AM

15—Urban land

Map Unit Setting

Mean annual precipitation: 53 to 70 inches
Mean annual air temperature: 69 to 83 degrees F
Frost-free period: 358 to 365 days

Map Unit Composition

Urban land: 98 percent
Minor components: 2 percent

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Minor Components

Udorthents

Percent of map unit: 2 percent
Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

39—Beaches

Map Unit Setting

Elevation: 0 to 20 feet
Mean annual precipitation: 53 to 70 inches
Mean annual air temperature: 69 to 83 degrees F
Frost-free period: 358 to 365 days

Map Unit Composition

Beaches: 95 percent
Minor components: 5 percent

Description of Beaches

Setting

Landform: Beaches on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear

Properties and qualities

Slope: 0 to 2 percent

Drainage class: Poorly drained
Depth to water table: About 0 to 72 inches
Frequency of flooding: Very frequent

Interpretive groups
Land capability (nonirrigated): 8w

Minor Components

Canaveral
Percent of map unit: 5 percent
Landform: Ridges on marine terraces, dunes on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

99—Water

Map Unit Setting
Mean annual precipitation: 62 to 70 inches
Mean annual air temperature: 73 to 81 degrees F
Frost-free period: 358 to 365 days

Map Unit Composition
Water: 100 percent

References

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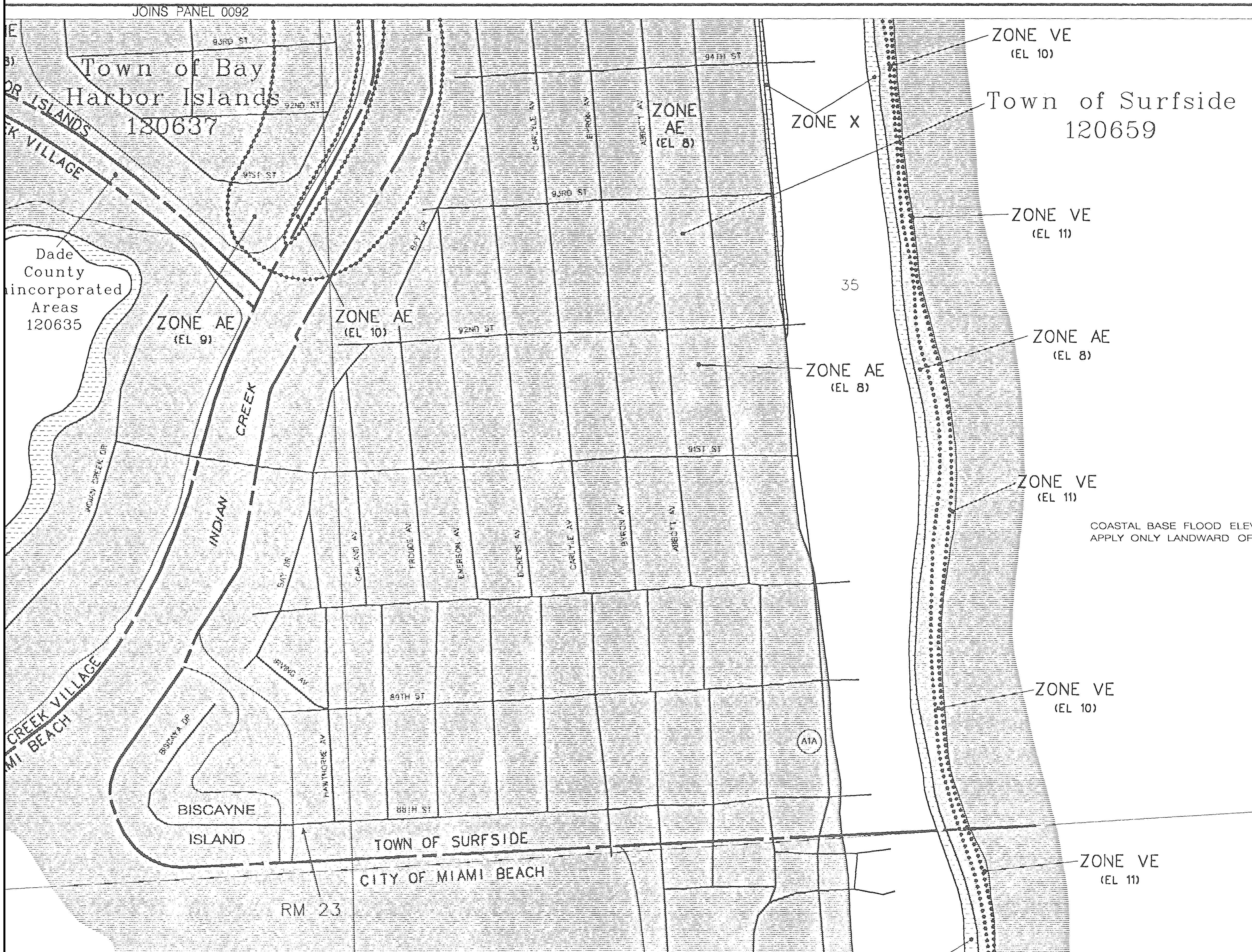
EXHIBIT 4

FEMA FLOOD INSURANCE RATE MAP



APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

DADE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 94 OF 625

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BAY HARBOR ISLANDS, TOWN OF	120637	0094	J
INDIAN CREEK VILLAGE, VILLAGE OF	120646	0094	J
MIAMI BEACH, CITY OF	120651	0094	J
MIAMI SHORES, VILLAGE OF	120652	0094	J
NORTH BAY VILLAGE, CITY OF	120654	0094	J
NORTH MIAMI, CITY OF	120655	0094	J
SURFSIDE, TOWN OF	120659	0094	J
UNINCORPORATED AREAS	120635	0094	J

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
12025C0094 J

MAP REVISED:
MARCH 2, 1994

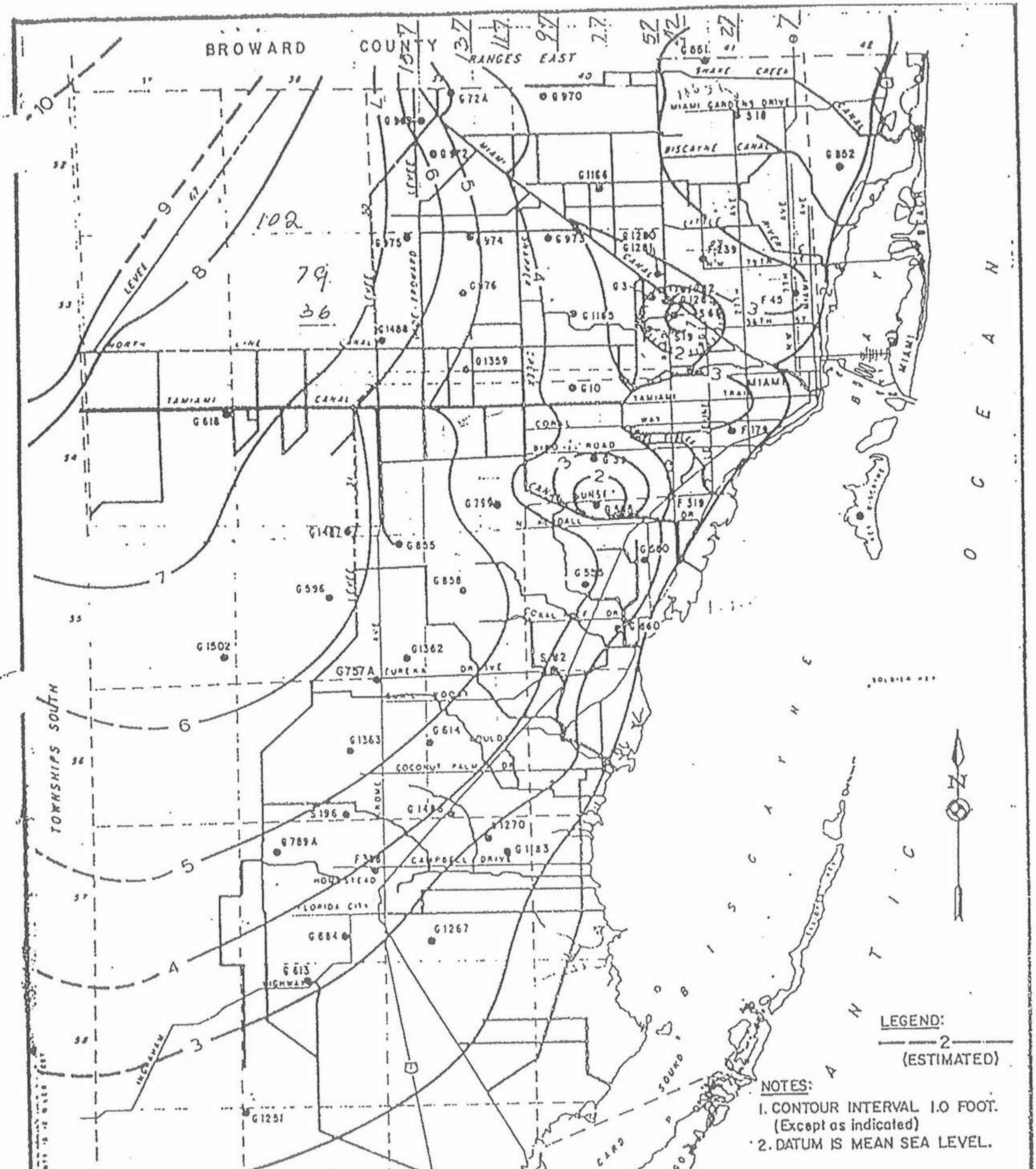
BEST AVAILABLE COPY AT THIS TIME

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

EXHIBIT 5

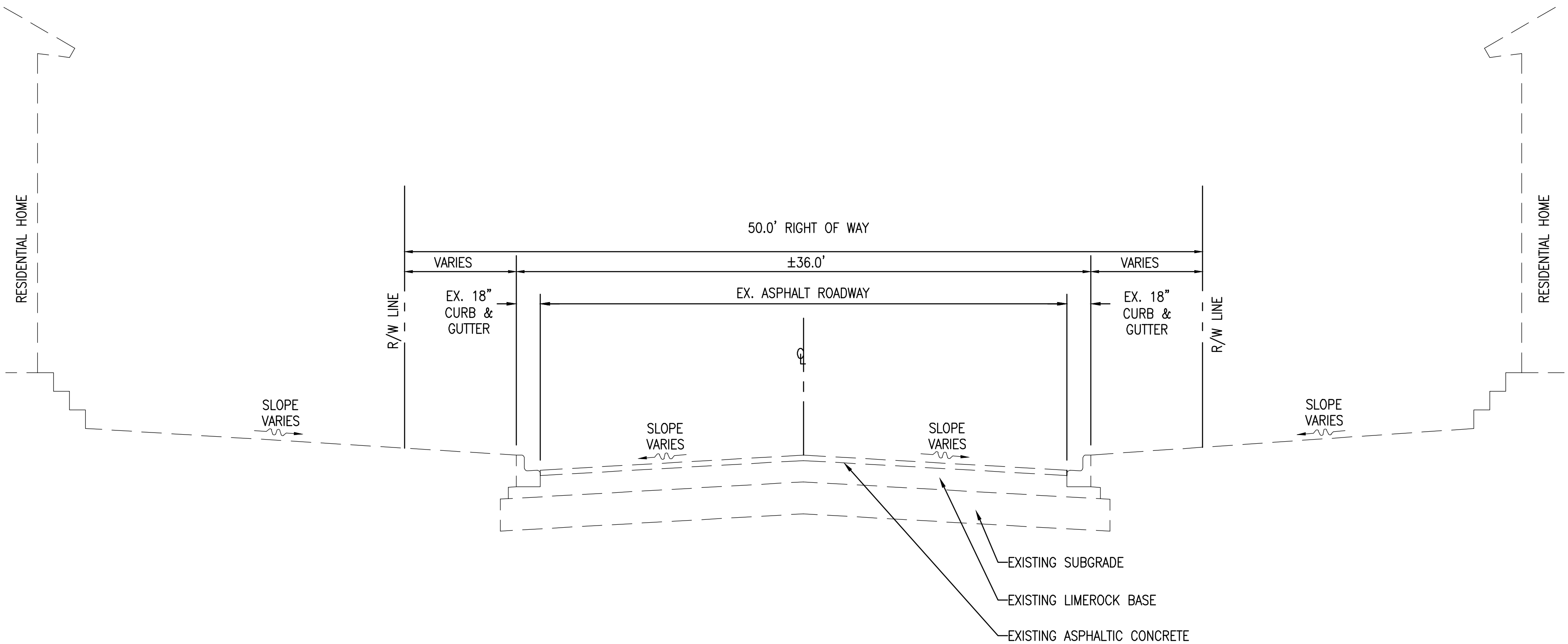
MIAMI-DADE COUNTY AVERAGE OCTOBER GROUND WATER MAP



METROPOLITAN DADE COUNTY PUBLIC WORKS DEPARTMENT	APPROVED 4/5/72	REVISED 2/19/75 4/14/77	DESIGN STANDARDS AVERAGE OCTOBER GROUND WATER LEVEL 1960–75	W.C. 2.2 SHEET 1 OF 1

EXHIBIT 6

ABBOTT AVENUE TYPICAL SECTION



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

TYPICAL SECTION

SHEET

EXH6

EXHIBIT 7

EXISTING DRAINAGE BASIN MAP

GRAPHIC SCALE

0 100 200 400

(IN FEET)
1" = 400'

KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

EXISTING DRAINAGE BASIN MAP

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: NTS

PROJECT No: 181160

SHEET: EXH7

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\C-XX-DRAINAGE MAP.dwg – (Plotted by: Katharine Kupsky on Wednesday, October 17, 2018 4:17:15 PM)

EXHIBIT 8

PROPOSED DRAINAGE IMPROVEMENTS MAPS

GRAPHIC SCALE

0 100 200 400

(IN FEET)
1" = 400'

LEGEND

OPTION 1 - IMPROVEMENTS SHOWN IN GREEN

OPTION 2 - IMPROVEMENTS SHOWN IN GREEN AND RED

OPTION 3 - IMPROVEMENTS SHOWN IN GREEN, RED, AND CYAN

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

PROPOSED DRAINAGE BASIN MAP

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: NTS

PROJECT No: 181160

SHEET: **EXH8**

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\C-XX-DRAINAGE MAP.dwg – (Plotted by: Katharine Kupsky on Wednesday, October 17, 2018 4:15:55 PM)

EXHIBIT 9

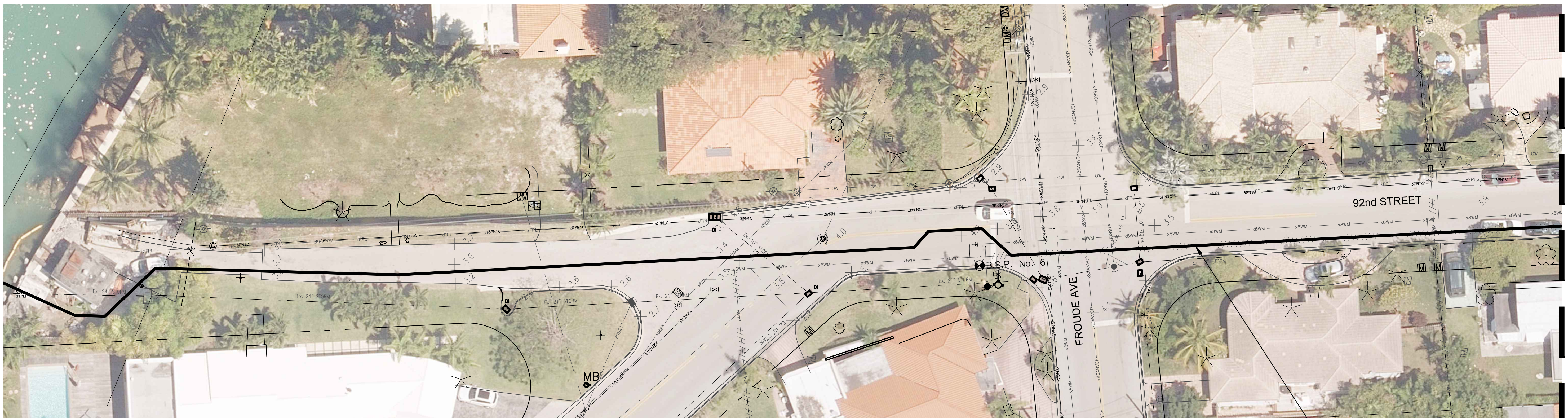
PROPOSED DRAINAGE IMPROVEMENTS

DETAILS

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'



PROPOSED 12" HDPE
DRAINAGE FORCE MAIN

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C1

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:54:32 PM)

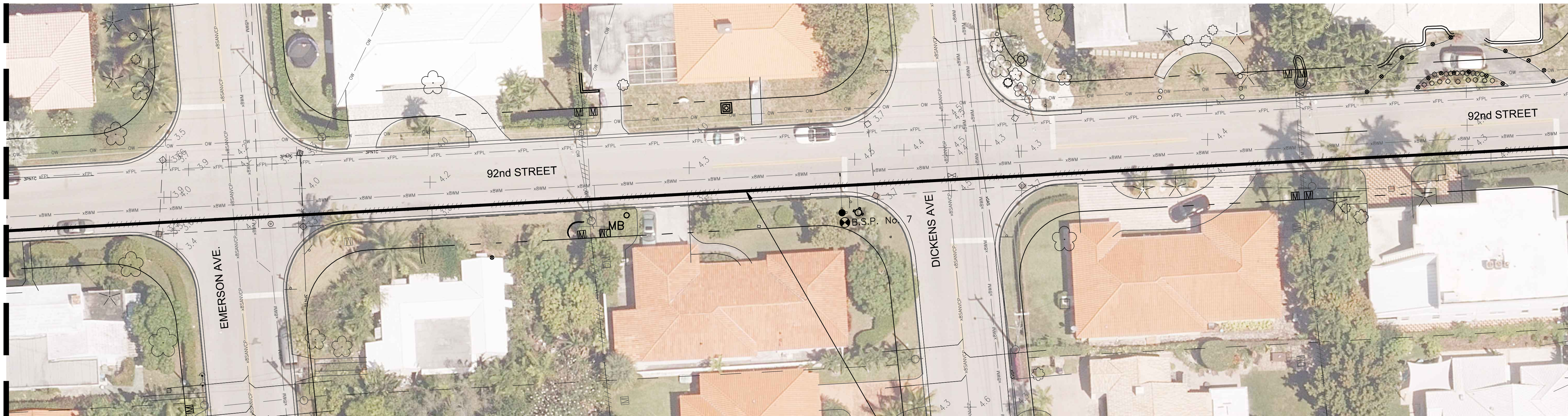
GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

MATCH LINE A

SEE SHEET C1 - OPTION 1



SEE SHEET C3 - OPTION 1

MATCH LINE B

PROPOSED 12" HDPE
DRAINAGE FORCE MAIN

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www.callsunshine.com

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:54:59 PM)

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C2

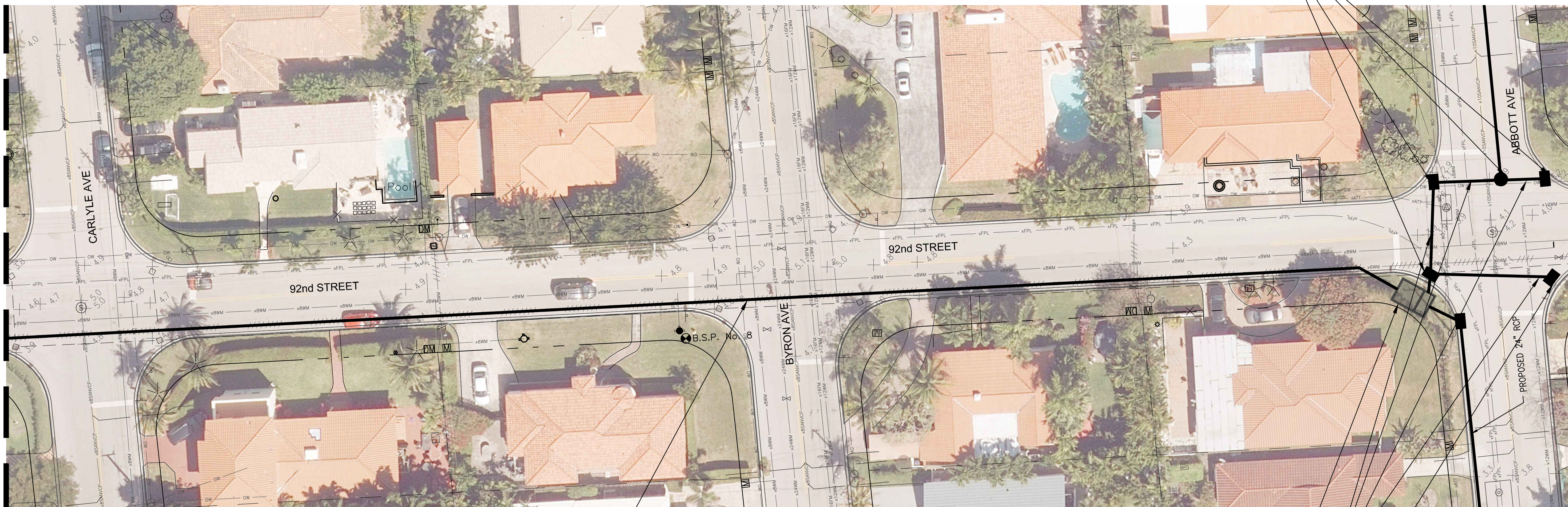
GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

EXISTING DRAINAGE
STRUCTURES TO BE
RECONSTRUCTED

MATCH LINE B SEE SHEET C2 - OPTION 1



PROPOSED
LIFT STATION

PROPOSED 12" HDPE
DRAINAGE FORCE MAIN

PROPOSED
18" PIPE

EXISTING DRAINAGE
STRUCTURES TO BE
RECONSTRUCTED

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File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:55:25 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: **C3**

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg - (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:55:50 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

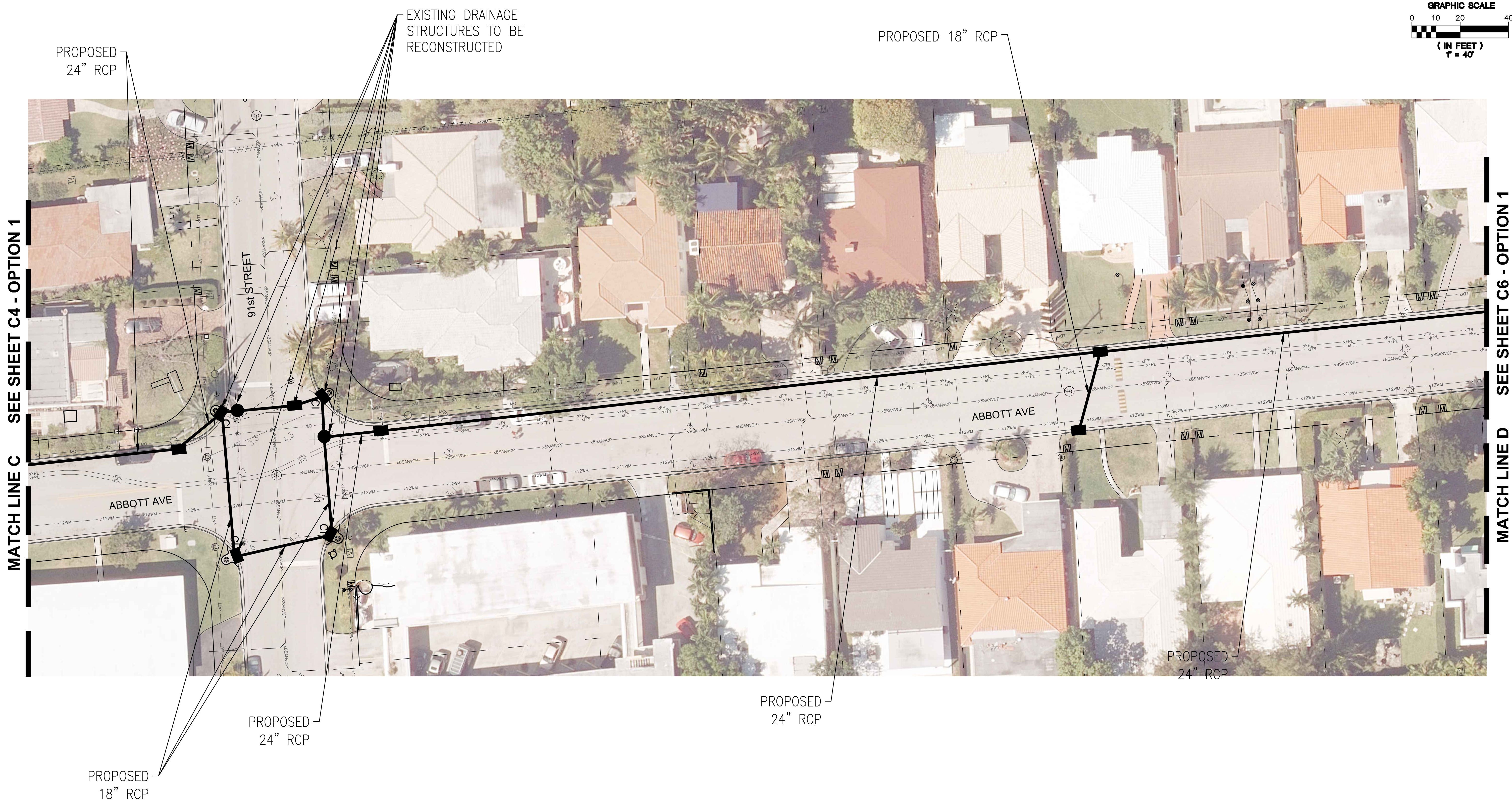
MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C4



GRAPHIC SCALE
0 10 20 40
(IN FEET)
1" = 40'

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

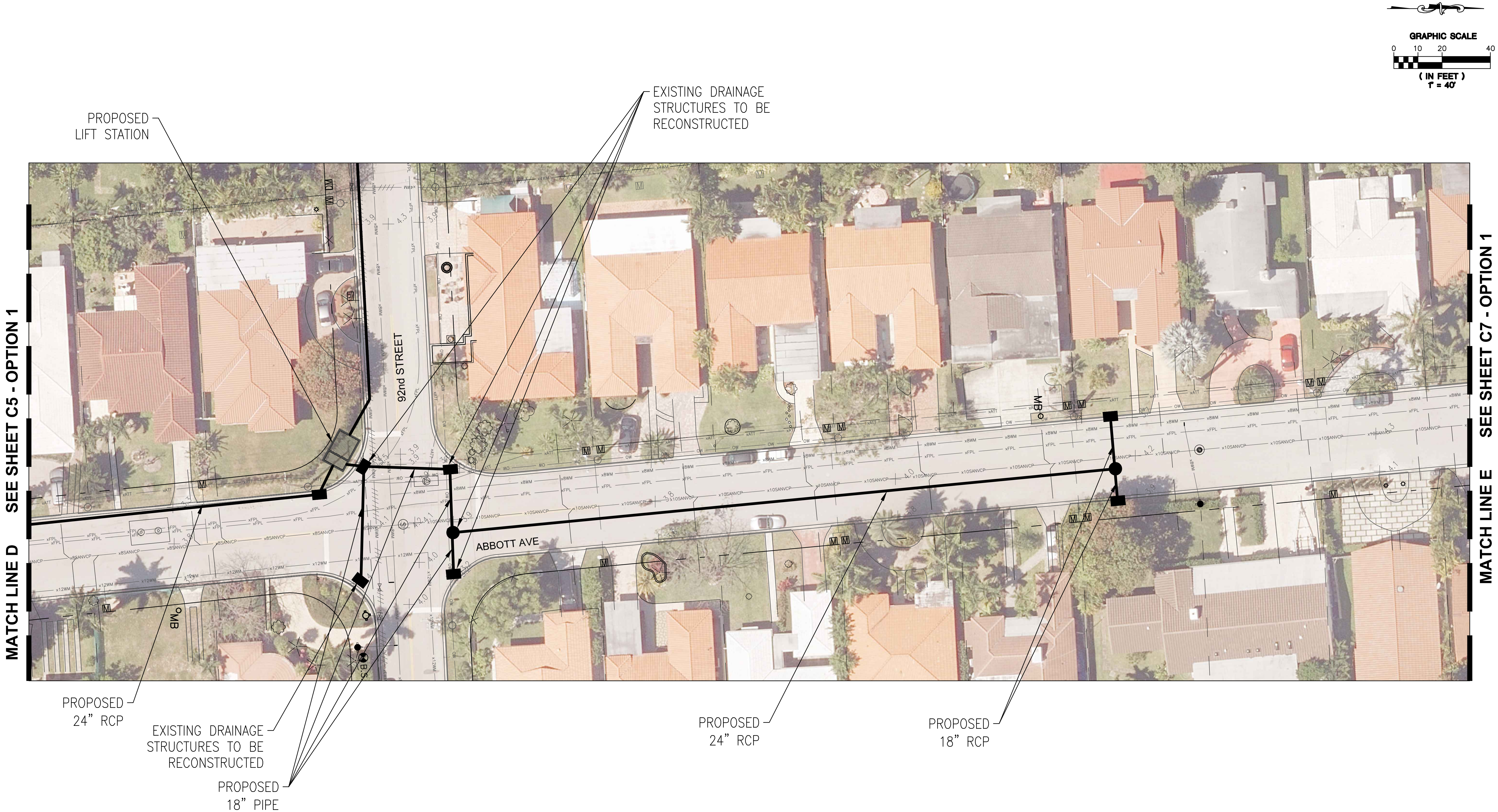
OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: **C5**

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:56:15 PM)



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File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:56:39 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1

PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: **C6**

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

SEE SHEET C6 - OPTION 1

MATCH LINE E

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

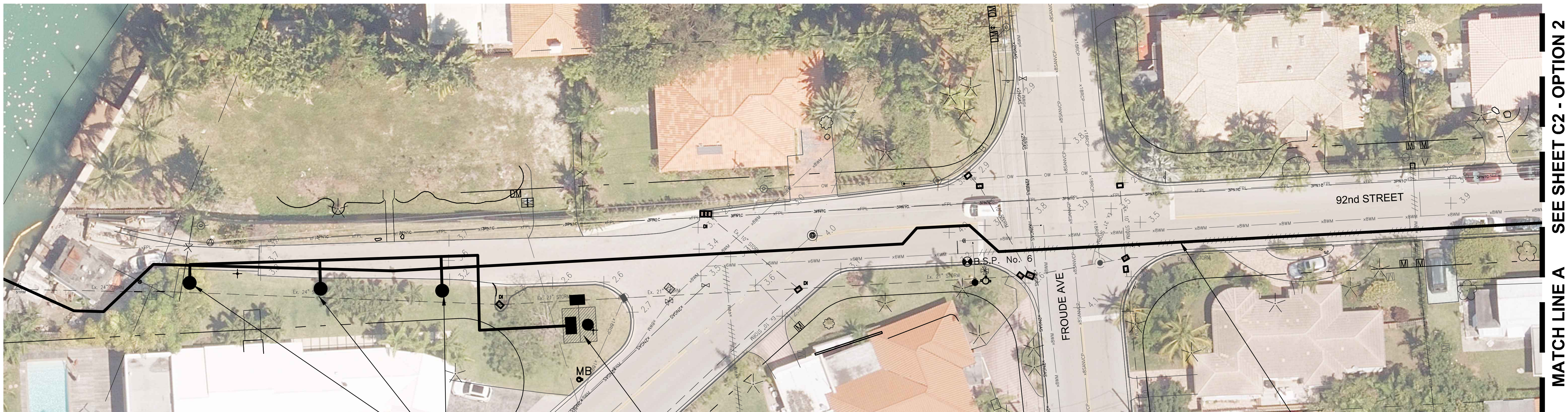
SHEET: C7

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:57:05 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'



PROPOSED DRAINAGE WELLS

PROPOSED LIFT STATION

PROPOSED 12" HDPE DRAINAGE FORCE MAIN

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C1

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:02:31 PM)

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:02:57 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

SEE SHEET C1 - OPTION 2

MATCH LINE A

SEE SHEET C3 - OPTION 2

MATCH LINE B

PROPOSED 12" HDPE
DRAINAGE FORCE MAIN

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE
AS SHOWN

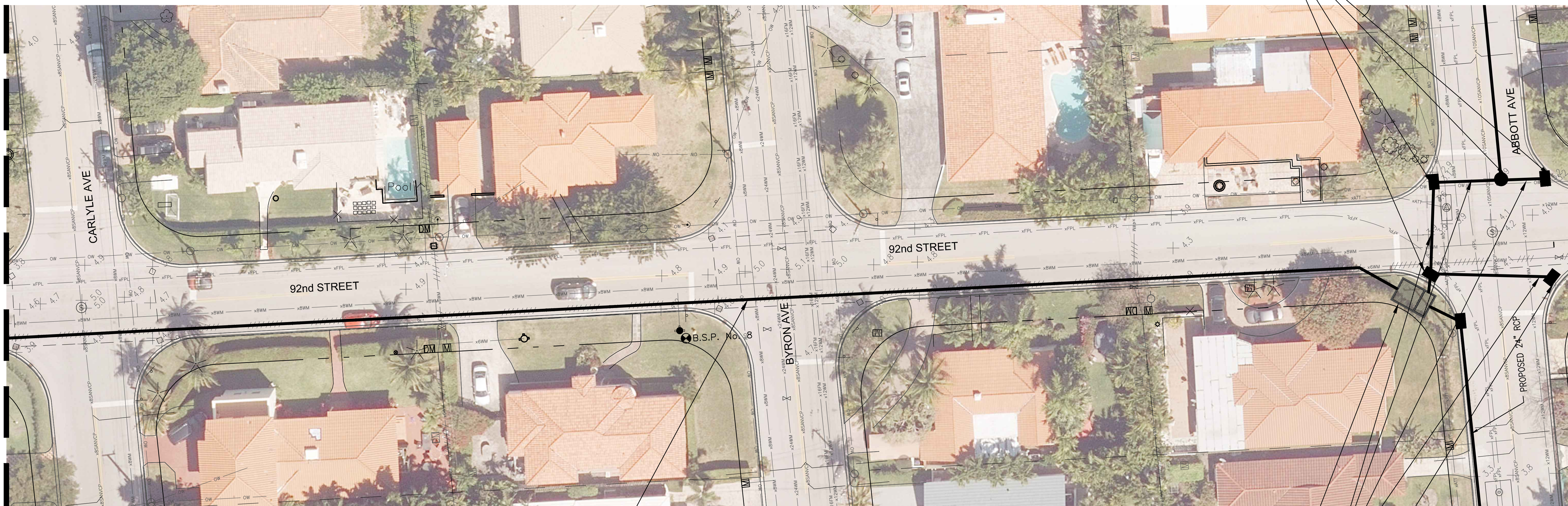
PROJECT No
181160

SHEET:
C2

MATCH LINE B SEE SHEET C2 - OPTION 2

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1" = 40'

EXISTING DRAINAGE
STRUCTURES TO BE
RECONSTRUCTED



PROPOSED 12" HDPE
DRAINAGE FORCE MAIN

PROPOSED
LIFT STATION

PROPOSED
18" PIPE

EXISTING DRAINAGE
STRUCTURES TO BE
RECONSTRUCTED

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C3

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:03:22 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C4

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:03:47 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C5

GRAPHIC SCALE

0 10 20 40

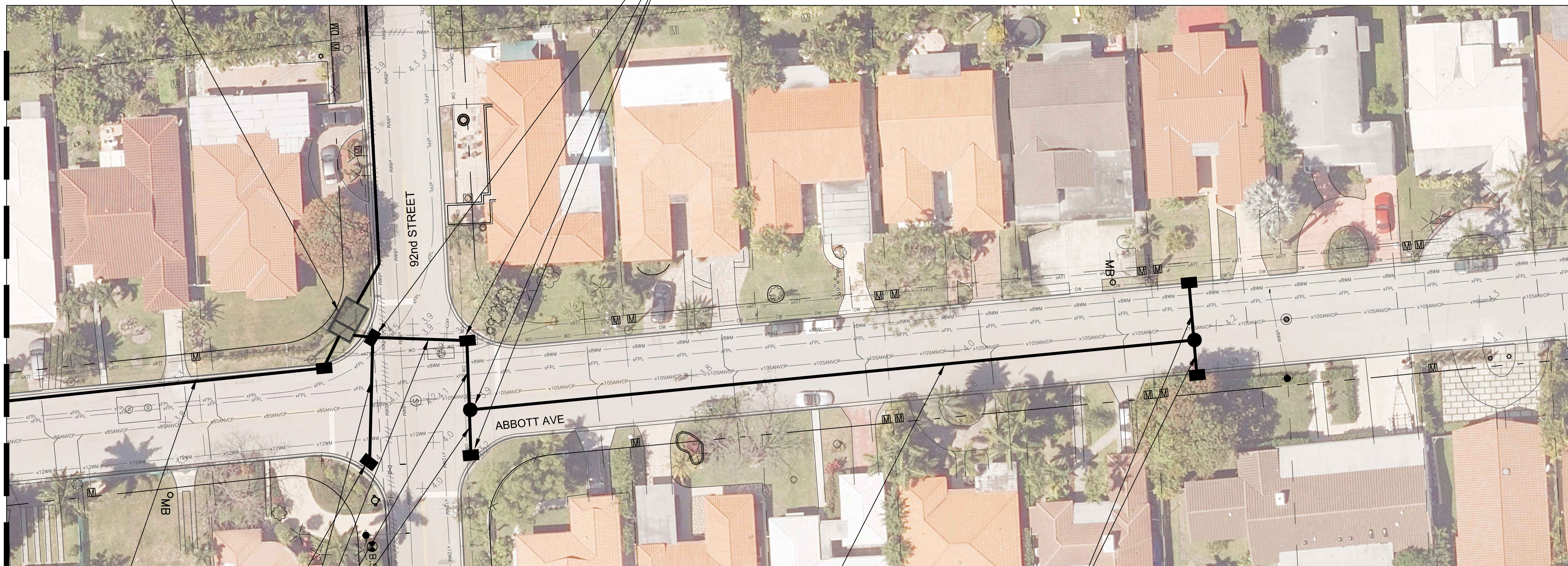
(IN FEET)
1" = 40'

PROPOSED
LIFT STATION

EXISTING DRAINAGE
STRUCTURES TO BE
RECONSTRUCTED

SEE SHEET C5 - OPTION 2

MATCH LINE D



SEE SHEET C7 - OPTION 2

MATCH LINE E

PROPOSED
24" RCP

EXISTING DRAINAGE
STRUCTURES TO BE
RECONSTRUCTED

PROPOSED
18" PIPE

PROPOSED
24" RCP

PROPOSED
18" RCP

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE
AS SHOWN

PROJECT No
181160

SHEET:
C6

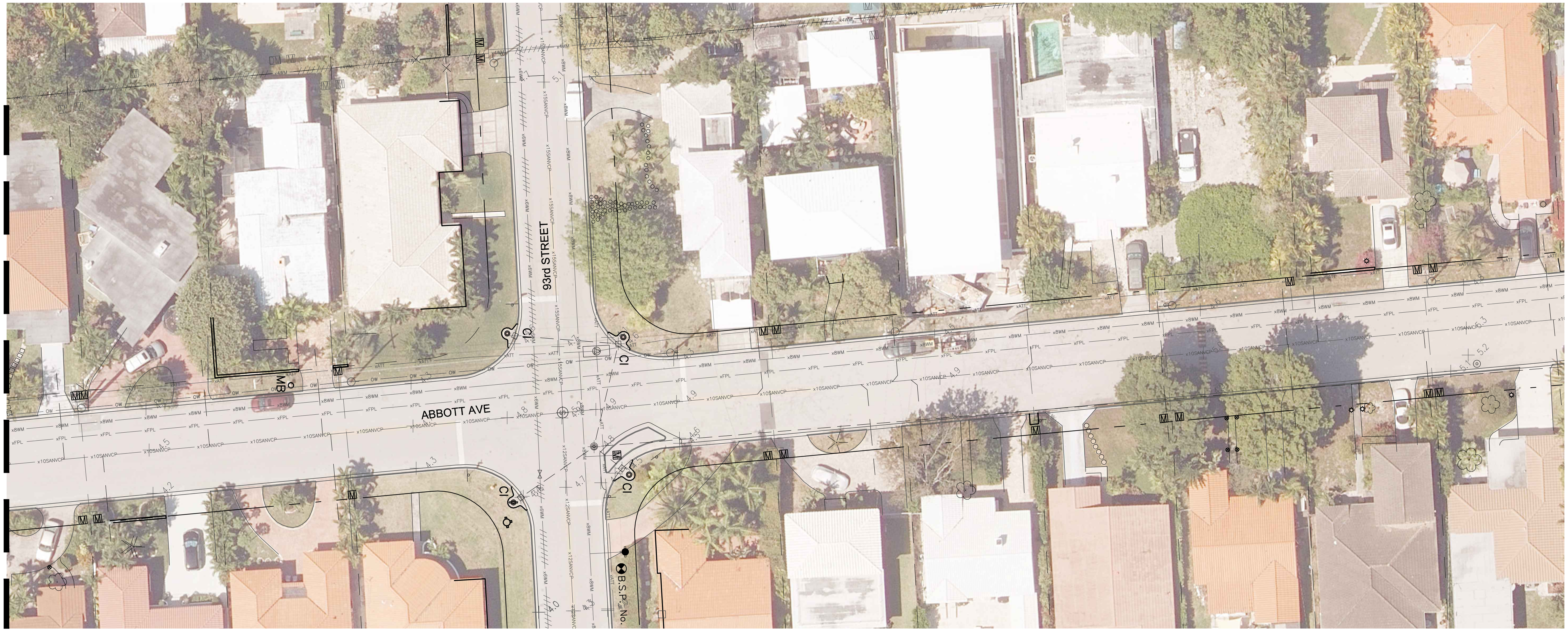
GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

SEE SHEET C6 - OPTION 2

MATCH LINE E



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

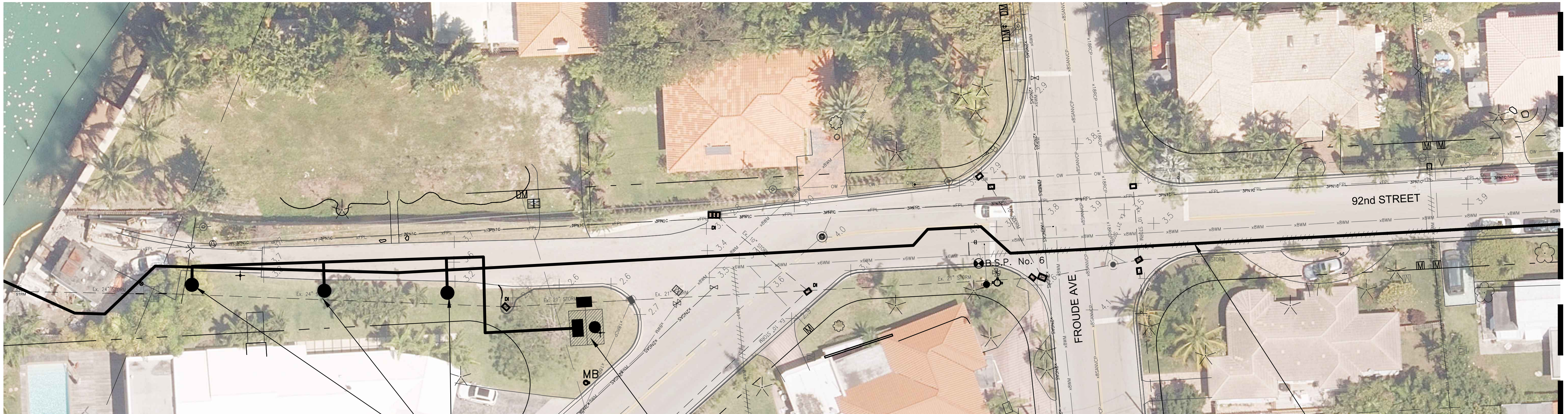
DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C7

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1" = 40'



PROPOSED DRAINAGE WELLS

PROPOSED LIFT STATION

PROPOSED 12" HDPE DRAINAGE FORCE MAIN

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C1

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:06:39 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

SEE SHEET C1-OPTION 3

MATCH LINE A

SEE SHEET C3-OPTION 3

MATCH LINE C

PROPOSED 12" HDPE
DRAINAGE FORCE MAIN

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE
AS SHOWN

PROJECT No
181160

SHEET:
C2

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg — (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:07:07 PM)

GRAPHIC SCALE

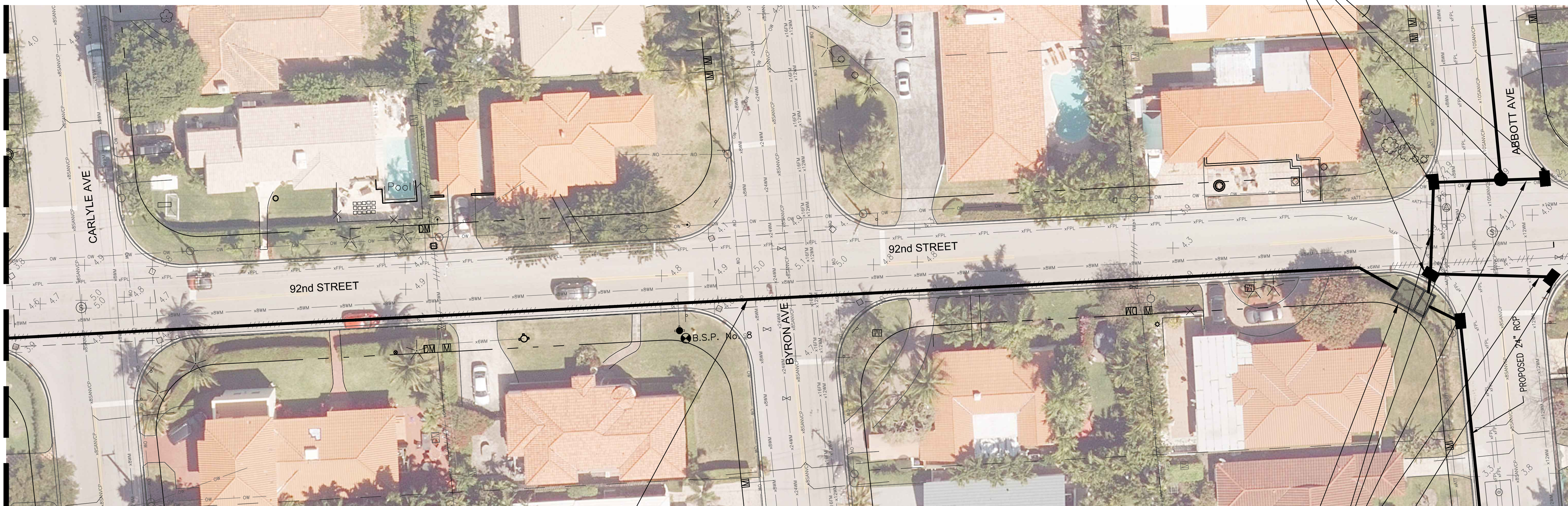
0 10 20 40

(IN FEET)
1" = 40'

EXISTING DRAINAGE
STRUCTURES TO BE
RECONSTRUCTED

SEE SHEET C2-OPTION 3

MATCH LINE B



PROPOSED
LIFT STATION

PROPOSED 12" HDPE
DRAINAGE FORCE MAIN

PROPOSED
18" PIPE

EXISTING DRAINAGE
STRUCTURES TO BE
RECONSTRUCTED

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: **C3**

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:07:33 PM)

GRAPHIC SCALE

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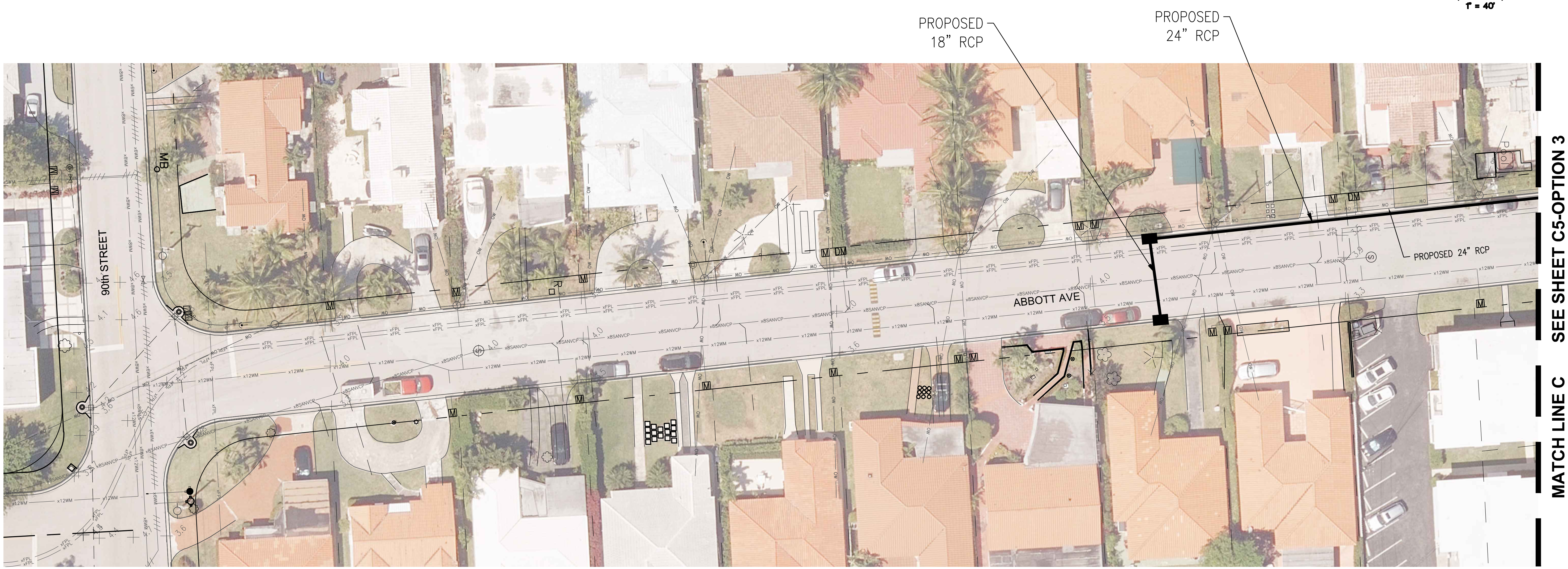
(IN FEET)
1" = 40'



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C4

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg — (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:07:57 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C5

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:08:23 PM)

GRAPHIC SCALE

0 10 20 40

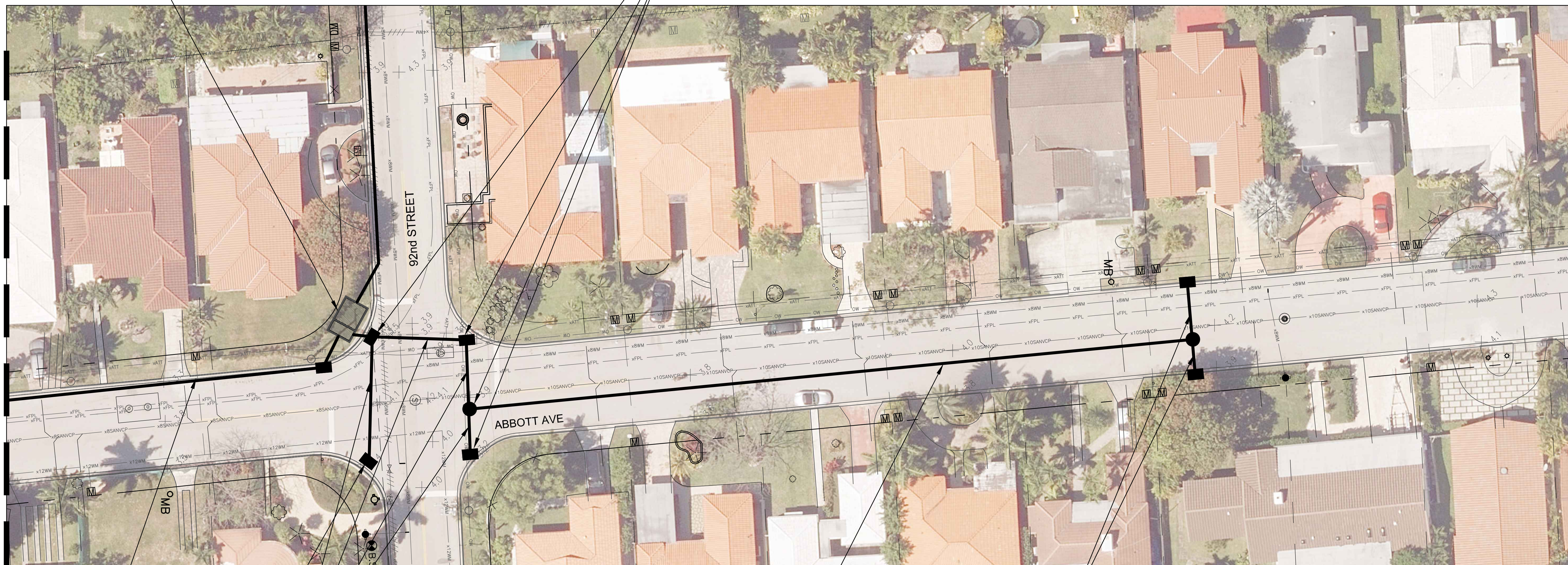
(IN FEET)
1" = 40'

PROPOSED LIFT STATION

EXISTING DRAINAGE STRUCTURES TO BE RECONSTRUCTED

SEE SHEET C5-OPTION 3

MATCH LINE EC



SEE SHEET C7-OPTION 3

MATCH LINE E

PROPOSED 24" RCP

EXISTING DRAINAGE STRUCTURES TO BE RECONSTRUCTED

PROPOSED 18" PIPE

PROPOSED 24" RCP

PROPOSED 18" RCP

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SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No 181160

SHEET: C6

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:08:48 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

MATCH LINE E SEE SHEET C6-OPTION 3

KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG

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NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

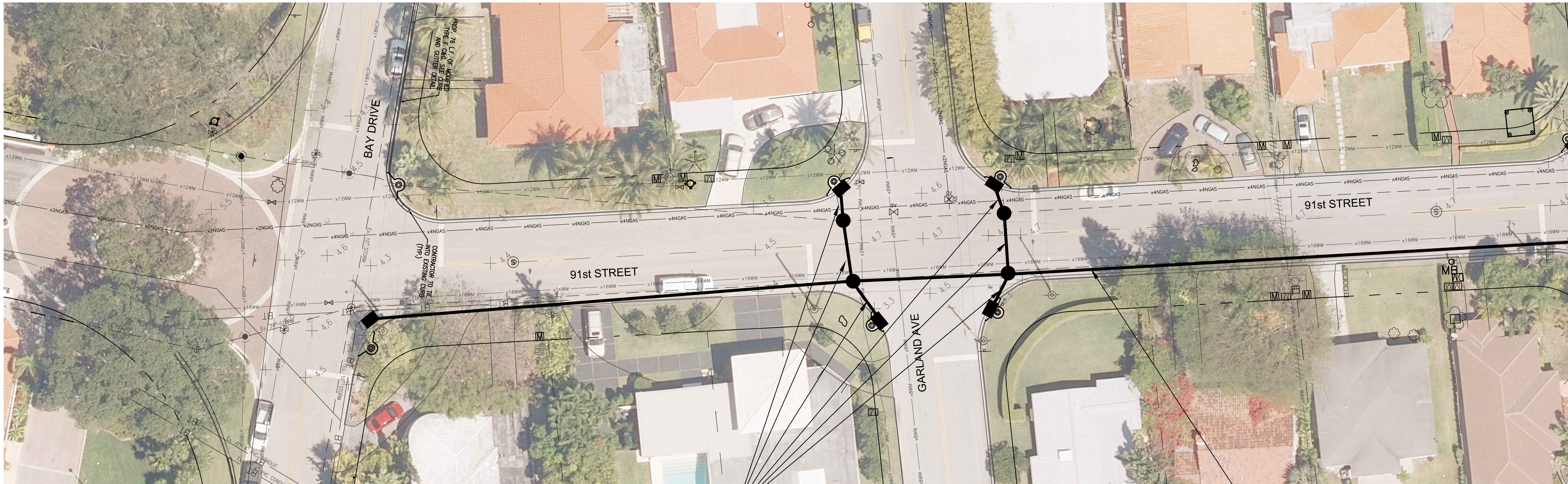
SHEET: C7

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:09:13 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'



MATCH LINE F SEE SHEET ##

PROPOSED 18" RCP

PROPOSED 48" RCP

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

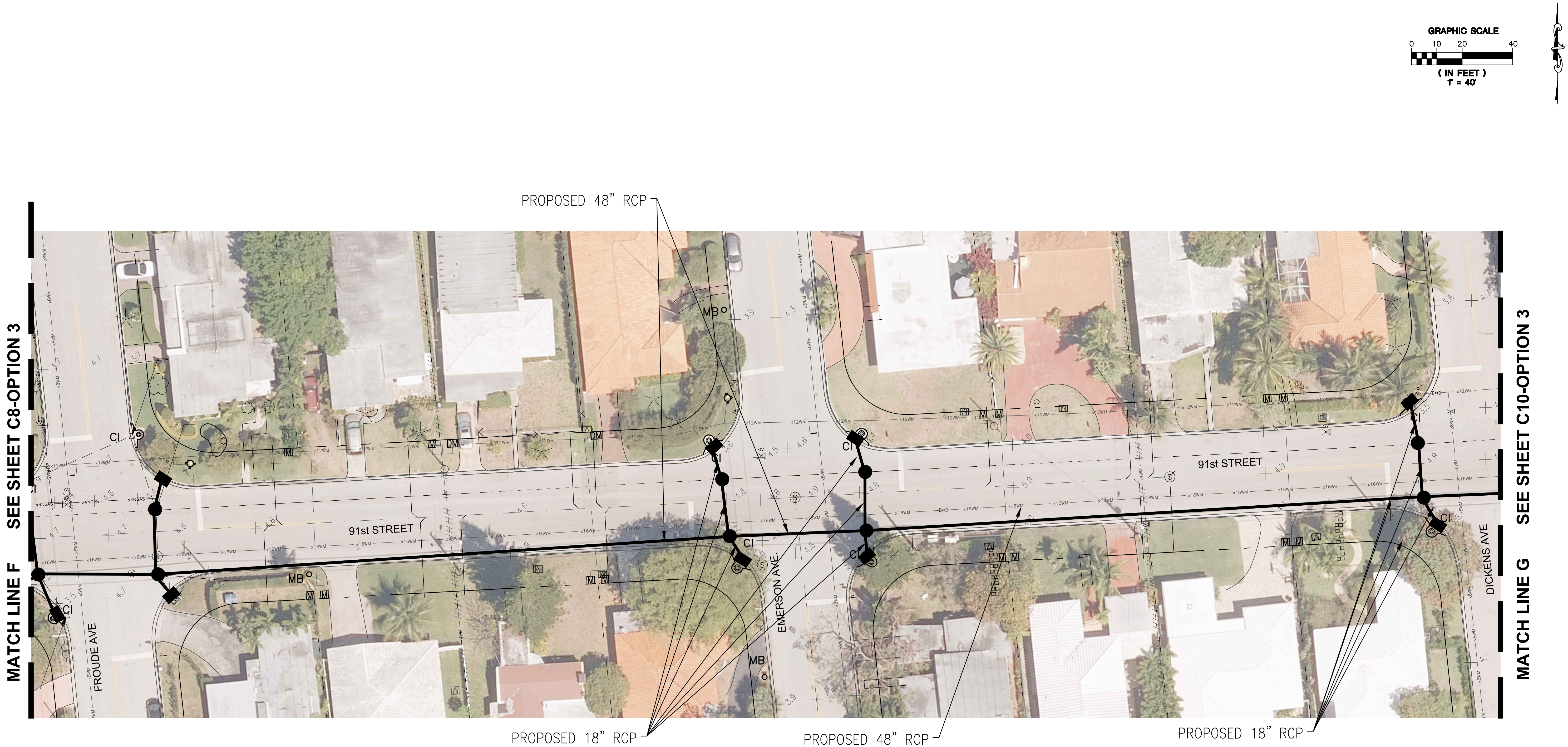
DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: **C8**

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:09:38 PM)



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NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

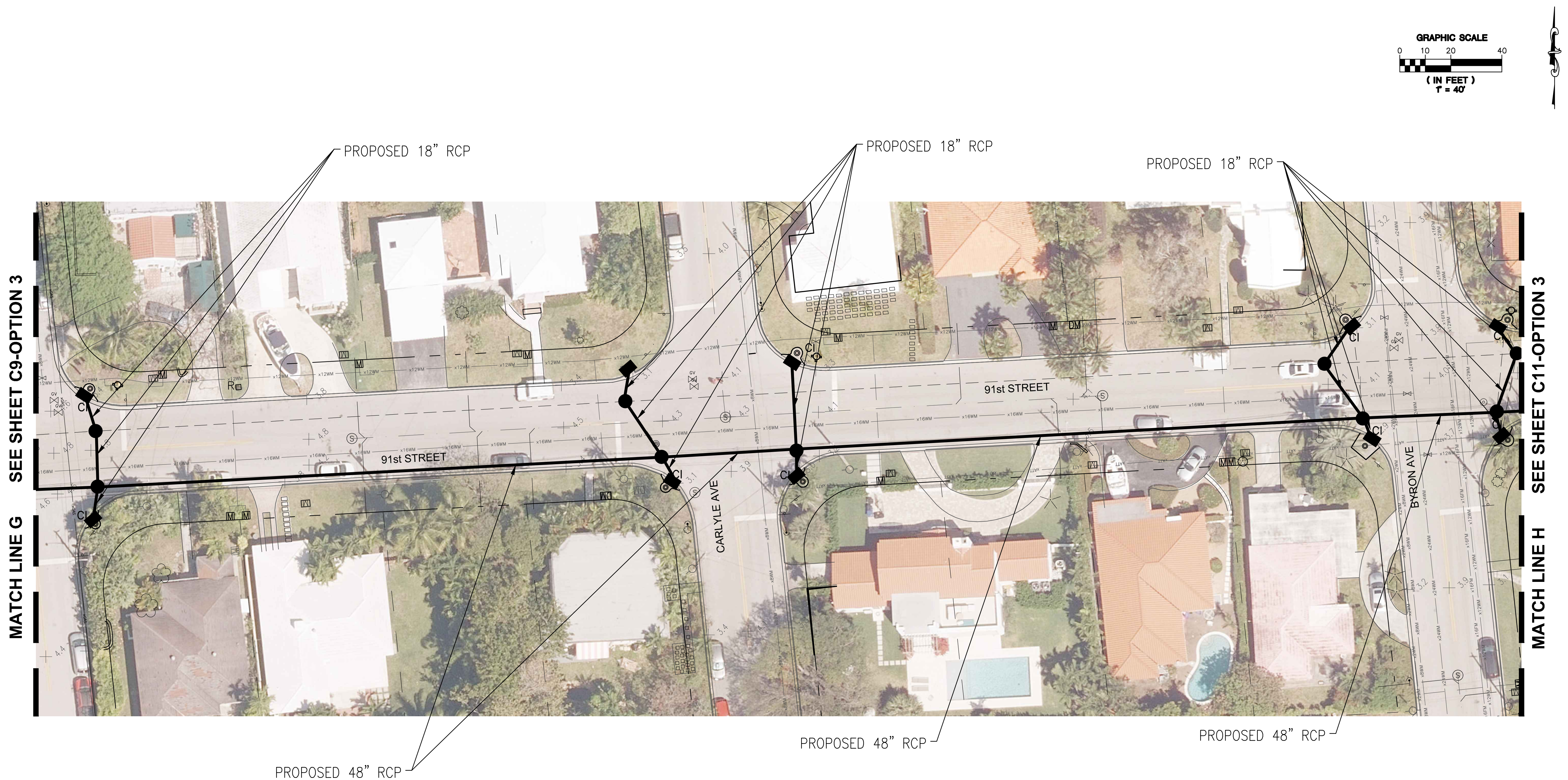
DATE: 7/20/18

SCALE
AS SHOWN

PROJECT No
181160

SHEET:
C9

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:10:02 PM)



NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C10

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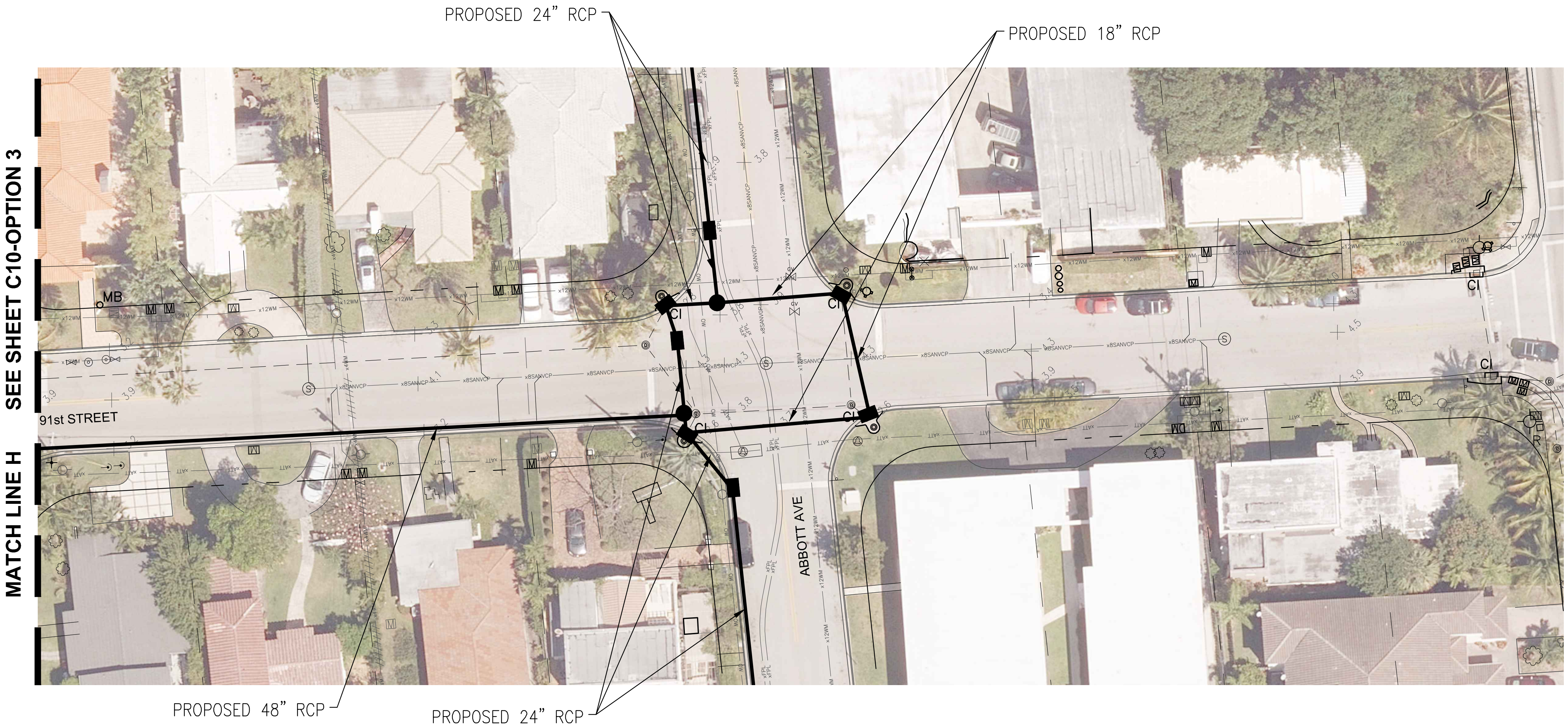
File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:10:27 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'



KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG

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NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: **C11**

EXHIBIT 10

PROPOSED DRAINAGE IMPROVEMENTS

COST ESTIMATES

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS™
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(phone) 954.921.7781 · (fax) 954.266.6487
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ENGINEER'S OPINION
OF PROBABLE COST
WORKSHEET

DATE
12/3/2018

PROJECT TITLE	**CG&A PROJECT NO.**
Abbott Avenue Drainage Improvements-OPTION 1	18-1160
Order of Magnitude Cost Estimate	

LOCATION
Surfside, FL

ESTIMATED BY MS | **CHECKED BY MS** | **APPROVED BY MS**

ITEM NO.	DESCRIPTION	QTY.	UNIT	UNIT PRICE MAT. & LAB	ESTIMATED AMOUNT
1	Mobilization	1	LS	5%	$26,905.00
2	Maintenance of Traffic	1	LS	$10,000.00	$10,000.00
3	Pavement Marking & Signage	1	LS	$5,000.00	$5,000.00
4	Landscape and Irrigation	1	LS	$10,000.00	$10,000.00
5	Clearing & Grubbing	1	LS	$20,000.00	$20,000.00
6	Erosion Control	1	LS	$5,000.00	$5,000.00
7	Storm Inlets	17	EA	$4,000.00	$68,000.00
8	Storm Manholes	5	EA	$4,000.00	$20,000.00
9	15"/18" RCP w/ Trench Restoration	400	LF	$62.00	$24,800.00
10	24" RCP w/ Trench Restoration	900	LF	$73.00	$65,700.00
11	48" RCP w/ Trench Restoration	0	LF	$150.00	$0.00
12	Milling & Resurface	1	LS	$20,000.00	$20,000.00
13	Drainage Pump Station	1	LS	$100,000.00	$100,000.00
14	12" HDPE Drainage FM	2,000	LF	$85.00	$170,000.00
15	Modified Curb & Gutter	900	LF	$19.00	$17,100.00
16	Swale / SOD restoration	1,000	SY	$2.50	$2,500.00
17	Utiity Adjustment/Relocation	1	LS	$100,000.00	$100,000.00
				SUBTOTAL	**$665,005.00**
				TOTAL	**$665,005.00**
				20% Contingency =	**$133,001.00**
				Design/Permitting Services(13%)=	**$103,740.78**
				Construction Engineering & Inspection Services (10%)=	**$79,800.60**
				Cost Total	**$981,547.38**

MOHAMMED SHARIFUZZAMAN, P.E.
State of Florida Professional Engineer
Florida Registration No. 67640

PAY ITEM NOTES:

1. Pay Item for Clearing and Grubbing includes, but not limited to, removal of asphaltic concrete, sidewalks, curbs, curb and gutter
2. Pay Item for Pipe/culvert includes, but not limited to, construction dewatering, concrete jacket, concrete collar, connection to exist. pipes
3. Pay Item for Erosion Control includes, but not limited to, Silt fence, Floating Turbidity Barrier, Inlet Protection Systems, NPDES permitting
4. Pay Item for Pavement Marking and Signage includes, but not limited to, removal of signs, relocation of signs, installation of signs, restoration of pavement markings and RPMs
5. Pay Item for Landscape and Irrigation includes, but not limited to, Root Pruning, Tree Removal, Tree Relocation, Storage and Disposal, Coordination w/ Town of Surfside, Permitting for Tree removal/relocation, Removal/Relocation/Reconstruction of Irrigation facilities

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ENGINEER'S OPINION
OF PROBABLE COST
WORKSHEET

DATE
12/3/2018

PROJECT TITLE
Abbott Avenue Drainage Improvements-OPTION 2
Order of Magnitude Cost Estimate

CG&A PROJECT NO.
18-1160

LOCATION
Surfside, FL

ESTIMATED BY MS | **CHECKED BY MS** | **APPROVED BY MS**

ITEM NO.	DESCRIPTION	QTY.	UNIT	UNIT PRICE MAT. & LAB	ESTIMATED AMOUNT
1	Mobilization	1	LS	5%	$26,905.00
2	Maintenance of Traffic	1	LS	$10,000.00	$10,000.00
3	Pavement Marking & Signage	1	LS	$5,000.00	$5,000.00
4	Landscape and Irrigation	1	LS	$10,000.00	$10,000.00
5	Clearing & Grubbing	1	LS	$20,000.00	$20,000.00
6	Erosion Control	1	LS	$5,000.00	$5,000.00
7	Storm Inlets	17	EA	$4,000.00	$68,000.00
8	Storm Manholes	5	EA	$4,000.00	$20,000.00
9	15"/18" RCP w/ Trench Restoration	400	LF	$62.00	$24,800.00
10	24" RCP w/ Trench Restoration	900	LF	$73.00	$65,700.00
11	48" RCP w/ Trench Restoration	0	LF	$150.00	$0.00
12	Milling & Resurface	1	LS	$20,000.00	$20,000.00
13	Drainage Pump Station	1	LS	$100,000.00	$100,000.00
14	12" HDPE Drainage FM	2,000	LF	$85.00	$170,000.00
15	Modified Curb & Gutter	900	LF	$19.00	$17,100.00
16	Swale / SOD restoration	1,000	SY	$2.50	$2,500.00
17	Utiity Adjustment/Relocation	1	LS	$100,000.00	$100,000.00
18	3- 24" dia drainage wells and pump station system	1	LS	$500,000.00	$500,000.00
				SUBTOTAL	**$1,165,005.00**
				TOTAL	**$1,165,005.00**
				20% Contingency =	**$233,001.00**
				Design/Permitting Services(13%)=	**$181,740.78**
				Construction Engineering & Inspection Services(10%)=	**$139,800.60**
				Cost Total	**$1,719,547.38**

MOHAMMED SHARIFUZZAMAN, P.E.
State of Florida Professional Engineer
Florida Registration No. 67640

PAY ITEM NOTES:

1. Pay Item for Clearing and Grubbing includes, but not limited to, removal of asphaltic concrete, sidewalks, curbs, curb and gutter
2. Pay Item for Pipe/culvert includes, but not limited to, construction dewatering, concrete jacket, concrete collar, connection to exist. pipes
3. Pay Item for Erosion Control includes, but not limited to, Silt fence, Floating Turbidity Barrier, Inlet Protection Systems, NPDES permitting
4. Pay Item for Pavement Marking and Signage includes, but not limited to, removal of signs, relocation of signs, installation of signs, restoration of pavement markings and RPMs
5. Pay Item for Landscape and Irrigation includes, but not limited to, Root Pruning, Tree Removal, Tree Relocation, Storage and Disposal, Coordination w/ Town of Surfside, Permitting for Tree removal/relocation, Removal/Relocation/Reconstruction of Irrigation facilities

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ENGINEER'S OPINION
OF PROBABLE COST
WORKSHEET

DATE
12/3/2018

PROJECT TITLE	**CG&A PROJECT NO.**
Abbott Avenue Drainage Improvements-OPTION 3	18-1160
Order of Magnitude Cost Estimate	
LOCATION	
Surfside, FL	
ESTIMATED BY MS / **CHECKED BY MS**	**APPROVED BY MS**

ITEM NO.	**DESCRIPTION**	**QTY.**	**UNIT**	**UNIT PRICE MAT. & LAB**	**ESTIMATED AMOUNT**
1	Mobilization	1	LS	5%	$53,122.10
2	Maintenance of Traffic	1	LS	$50,000.00	$50,000.00
3	Pavement Marking & Signage	1	LS	$20,000.00	$20,000.00
4	Landscape and Irrigation	1	LS	$30,000.00	$30,000.00
5	Clearing & Grubbing, Demolition	1	LS	$200,000.00	$200,000.00
6	Erosion Control	1	LS	$20,000.00	$20,000.00
7	Storm Inlets	12	EA	$4,000.00	$48,000.00
8	Storm Manholes	2	EA	$4,000.00	$8,000.00
9	15"/18" RCP w/ Trench Restoration	216	LF	$62.00	$13,392.00
10	24" RCP w/ Trench Restoration	900	LF	$73.00	$65,700.00
11	48" RCP w/ Trench Restoration	2,000	LF	$150.00	$300,000.00
12	Milling & Resurface	1	LS	$20,000.00	$20,000.00
13	Drainage Pump Station	1	LS	$100,000.00	$100,000.00
14	12" HDPE Drainage FM	2,000	LF	$85.00	$170,000.00
15	Modified Curb & Gutter	900	LF	$19.00	$17,100.00
16	Swale / SOD restoration	100	SY	$2.50	$250.00
17	Utiity Adjustment/Relocation	1	LS	$100,000.00	$100,000.00
18	3- 24" dia drainage wells and pump station system	1	LS	$300,000.00	$300,000.00
19	Additional Drainage Structures	44	EA	$8,000.00	$352,000.00
20	Additional Roadway Restoration	1	LS	$500,000.00	$500,000.00
21	Additional Utility Relocation/Adjustment	1	LS	$1,000,000.00	$1,000,000.00
				SUBTOTAL	**$3,367,564.10**
				TOTAL	**$3,367,564.10**
				20% Contingency =	**$673,512.82**
				Design/Permitting Services(13%)=	**$525,340.00**
				Construction Engineering & Inspection Services(10%)=	**$404,107.69**
				Cost Total	**$4,970,524.61**

MOHAMMED SHARIFUZZAMAN, P.E.
State of Florida Professional Engineer
Florida Registration No. 67640

PAY ITEM NOTES:

1. Pay Item for Clearing and Grubbing includes, but not limited to, removal of asphaltic concrete, sidewalks, curbs, curb and gutter
2. Pay Item for Pipe/culvert includes, but not limited to, construction dewatering, concrete jacket, concrete collar, connection to exist. pipes
3. Pay Item for Erosion Control includes, but not limited to, Silt fence, Floating Turbidity Barrier, Inlet Protection Systems, NPDES permitting
4. Pay Item for Pavement Marking and Signage includes, but not limited to, removal of signs, relocation of signs, installation of signs, restoration of pavement markings and RPMs
5. Pay Item for Landscape and Irrigation includes, but not limited to, Root Pruning, Tree Removal, Tree Relocation, Storage and Disposal, Coordination w/ Town of Surfside, Permitting for Tree removal/relocation, Removal/Relocation/Reconstruction of Irrigation facilities

EXHIBIT 11

FIELD PICTURES

ABBOTT AVE CLOSURE AT 94^{TH} STREET

ABBOTT AVE AND 92^{ND} STREET INTERSECTION, PROPOSED PUMP STATION LOCATION (OPTION-2)

ABBOTT AVE AT 92ND STREET (LOOKING SOUTH)

ABBOTT AVENUE AT 92ND STREET (LOOKING NORTH)

EXISTING GAS MAIN, WATER MAIN, FPL AND AT&T DUCT BANKS ALONG ABBOTT AVE

ABBOTT AVENUE AT 91ST STREET (LOOKING NORTH)

FPL POLES BEHIND BACK OF CURB, ABBOTT AVENUE AT 91st STREET

TYPICAL HOUSES ALONG ABBOTT AVENUE, FFE MAINTAINED BY STEPS

92ND STREET AT BAY DRIVE, PROPOSED NEW PUMP STATION AND DRAINAGE WELLS LOCATION (OPTION-3)

EXISTING PUMP STATION AT 92ND STREET, CURRENTLY NOT IN SERVICE

EXHIBIT 12

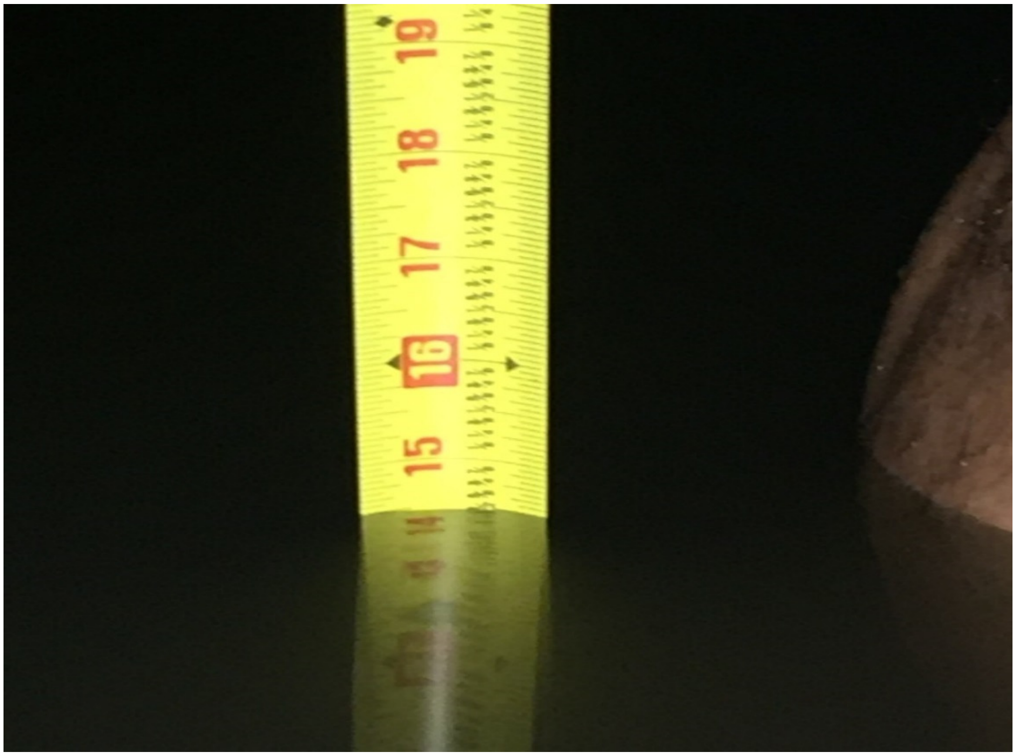
FLOOD PICTURES

ABBOTT AVE, SEPTEMBER 26, 2016
(ESTIMATED 1.0 INCH OF RAIN PER SFWMD RAINFALL DATA)

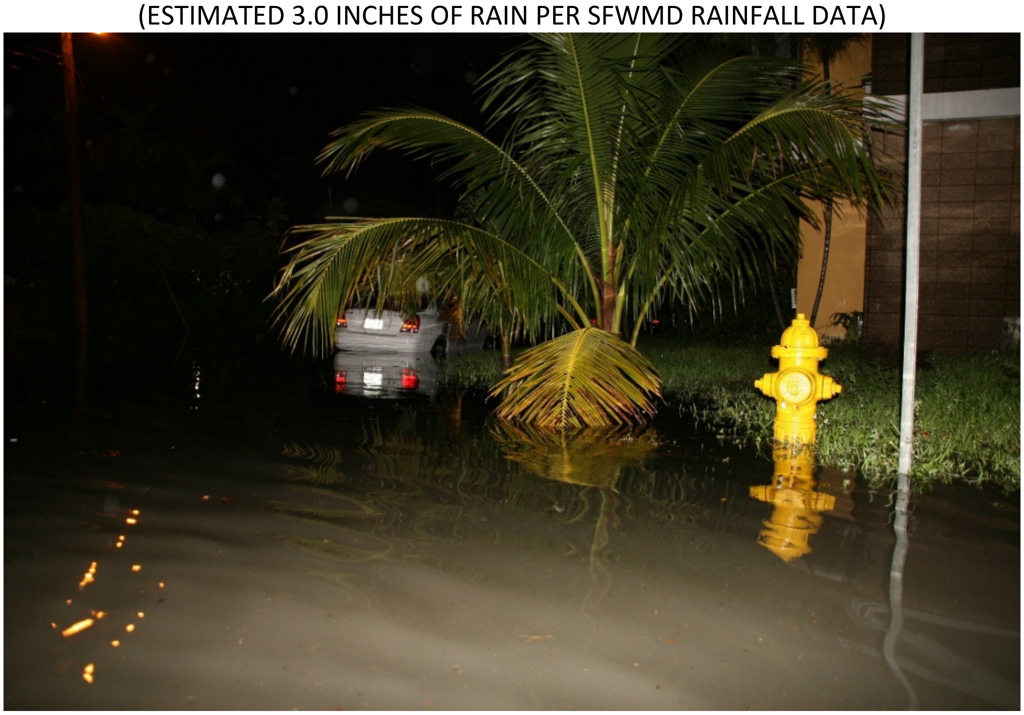
ABBOTT AVE, OCTOBER 15, 2016
(ESTIMATED 3.0 INCHES OF RAIN PER SFWMD RAINFALL DATA)

92ND STREET AT ABBOTT AVE INTERSECTION, JULY 24, 2016
(ESTIMATED 1.50 INCHES OF RAIN PER SFWMD RAINFALL DATA)

ABBOTT AVE, SEPTEMBER 5, 2016
(ESTIMATED 1.0 INCH OF RAIN PER SFWMD RAINFALL DATA)



91ST STREET AT ABBOTT AVE INTERSECTION, OCTOBER 3, 2016
(ESTIMATED 3.0 INCHES OF RAIN PER SFWMD RAINFALL DATA)



ABBOTT AVE AT 91ST STREET, OCTOBER 3, 2016
(ESTIMATED 3.0 INCHES OF RAIN PER SFWMD RAINFALL DATA)

ABBOTT AVE, JULY 23, 2018
(ESTIMATED 1.0 INCHES OF RAIN PER SFWMD RAINFALL DATA)

ABBOTT AVE, JUNE 7, 2017
(ESTIMATED 1.5 INCHES OF RAIN PER SFWMD RAINFALL DATA)

APPENDIX A

ROADWAY SPREAD CALCULATIONS

Name of The Project: ABBOTT AVE DRAINAGE STUDY (TYPICAL EXISTING SPREAD CONDITIONS)

Q (cfs) = (0.56/n)*S_x^(1.67)*S^(0.5)*T^(2.67)

$Q_i = Q[R_f E_0 + R_s(1-E_0)]$, (Equation 11, Chapter 7, Hec-12, March 1984) for Inlets on Grade.

$R_f = 1-0.09(V-V_0)$,

$E_0 = 1-(1-W/T)^{2.67}$,

$R_s = 1/[1+0.15V^{1.8}/S_x L^{2.3}]$

In Sag $Q_i = C_W(L+1.8W)d^{1.5}$ Hec-12 Eq. 19

$C_W = 2.3$

n= 0.016

Impervious, C = 0.95 Pervious C = 0.25 Single Residential Family, C = 0.60 Comm. Development, C = 0.80

From Station	To Station	Str Sta	Side LT/RT	Str. No.	Imp. Width (ft)	Perv. Width (ft)	SRF Width (ft)	Comm. Development (ft)	Flow Length (ft)	Wt. Coef. Of Runoff	Area (acres)	I Intensity (in/hr)	Q in/hr (cfs)	Q_i in/hr (cfs)	Inlet Bypass (cfs)	S_x Cross Slope (ft/ft)	S Long. Slope (ft/ft)	T_{calc} Spread (ft)	$T_{allowable}$ Spread (ft)	Comments
P-6 Inlets																				
0	330	300+00	LT	S-1	18	7	112	0	330	0.63	1.04	4.00	2.68			3.00%	0.20%	10.95	9.25	P-6 in Sag
330	605	300+00	LT	S-1	18	7	112	0	275	0.63	0.86	4.00	2.24	9.85	0.00	3.00%	0.20%	10.24	9.25	P-6 in Sag

Name of The Project: ABBOTT AVE DRAINAGE STUDY (TYPICAL PROPOSED SPREAD CONDITIONS)

Q (cfs) = (0.56/n)*S_x^(1.67)*S^(0.5)*T^(2.67)

$Q_i = Q[R_f E_0 + R_s(1-E_0)]$, (Equation 11, Chapter 7, Hec-12, March 1984) for Inlets on Grade.

$R_f = 1-0.09(V-V_0)$,

$E_0 = 1-(1-W/T)^{2.67}$,

$R_s = 1/[1+0.15V^{1.8}/S_x L^{2.3}]$

In Sag $Q_i = C_W(L+1.8W)d^{1.5}$ Hec-12 Eq. 19

$C_W = 2.3$

n= 0.016

Impervious, C = 0.95 Pervious C = 0.25 Single Residential Family, C = 0.60 Comm. Development, C = 0.80

From Station	To Station	Str Sta	Side LT/RT	Str. No.	Imp. Width (ft)	Perv. Width (ft)	SRF Width (ft)	Comm. Development (ft)	Flow Length (ft)	Wt. Coef. Of Runoff	Area (acres)	I Intensity (in/hr)	Q in/hr (cfs)	Q_i in/hr (cfs)	Inlet Bypass (cfs)	S_x Cross Slope (ft/ft)	S Long. Slope (ft/ft)	T_{calc} Spread (ft)	$T_{allowable}$ Spread (ft)	Comments
P-6 Inlets																				
0	165	300+00	LT	S-1	18	7	112	0	165	0.63	0.52	4.00	1.37			3.00%	0.20%	8.52	9.25	P-6 in Sag
165	330	300+00	LT	S-1	18	7	112	0	165	0.63	0.52	4.00	1.37	9.85	0.00	3.00%	0.20%	8.52	9.25	P-6 in Sag

APPENDIX B

STORM DRAIN SYSTEM CALCULATIONS

10/12/2018

STORM SEWER HYDRAULICS

System: **1**

PROJECT			
Number:	TOWN OF SURFSIDE	Organization:	CALVIN, GIORDANO and ASSOCIATI
Description:	Drainage Study	Designed by:	MS
County:	MIAMI-DADE	Checked by:	MS

CONDITIONS		Storm Event - IDF Curve		Runoff Coeff. (default)		
		Zone	Frequency	Area 1	Area 2	Area 3
Outfall Tailwater El:	1.60					
Exit Loss at Outfall:	0.00					
Storm Sewer Control El	1.60	10	3	0.90	0.20	0.00

HGL method: Do NOT jump to pipe crown.

FROM		TO	Drainage Areas				Tc	Travel	Inten.	Total	Flow (cfs)		Inlet Elevations		Pipe Elevations		Fall	Pipe	HGL	Flow	Velocity	Capacity	Mann'g
Station		Offset	Area	Runoff	C*A	Lcl CA		Time		CA	Qb	Sum(Qb)	Inlet	HGL	HGL			Height	(%)	Type	Actual		'N'
Type	Brls	Len		Coeff		UpStrm						CIA		Min HGL	Crown Line			Width	FL		Physical		
			(A)	(C)	(CA)	Tot CA	(min)	(min)	(in/hr)	(ac)		TOTAL	Clear.	Jnc Loss	Flow Line		(ft)	(in)	(%)		(fps)	(cfs)	
S-1		**S-2**	2.93	0.90	2.63	2.91					0.00	0.00	2.80	3.58	3.58	3.56	0.018	48.00	0.0066	Full	1.01		
		0.00	1.38	0.20	0.27	0.00	30.00	2.25	4.35	2.91		12.66		0.00	0.00	0.00						0.00	0.0120
P-6	1	270.00	0.00	0.00	0.00	2.91						**12.66**	-0.78	0.00	-4.00	-4.00	0.000	48.00	0.0000		0.00		
S-2		**S-3**	2.93	0.90	2.63	2.91					0.00	0.00	4.00	3.56	3.56	3.50	0.067	48.00	0.0246	Full	1.94		
		0.00	1.38	0.20	0.27	2.91	32.25	2.25	4.19	5.82		24.42		0.00	0.00	0.00						0.00	0.0120
P-6	1	270.00	0.00	0.00	0.00	5.82						**24.42**	0.44	0.00	-4.00	-4.00	0.000	48.00	0.0000		0.00		
S-3		**S-4**	2.93	0.90	2.63	2.91					0.00	0.00	3.90	3.50	3.50	3.36	0.140	48.00	0.0517	Full	2.82		
		0.00	1.38	0.20	0.27	5.82	34.50	1.60	4.05	8.73		35.39		0.00	0.00	0.00						0.00	0.0120
P-6	1	270.00	0.00	0.00	0.00	8.73						**35.39**	0.40	0.00	-4.00	-4.00	0.000	48.00	0.0000		0.00		
S-4		**S-5**	2.93	0.90	2.63	2.91					0.00	0.00	3.70	3.36	3.36	3.12	0.237	48.00	0.0877	Full	3.67		
		0.00	1.38	0.20	0.27	8.73	36.10	1.23	3.96	11.65		46.09		0.00	0.00	0.00						0.00	0.0120
P-6	1	270.00	0.00	0.00	0.00	11.65						**46.09**	0.34	0.00	-4.00	-4.00	0.000	48.00	0.0000		0.00		
S-5		**S-6**	2.93	0.90	2.63	2.91					0.00	0.00	3.50	3.12	3.12	2.76	0.357	48.00	0.1323	Full	4.50		
		0.00	1.38	0.20	0.27	11.65	37.32	1.00	3.89	14.56		56.60		0.00	0.00	0.00						0.00	0.0120
P-6	1	270.00	0.00	0.00	0.00	14.56						**56.60**	0.38	0.00	-4.00	-4.00	0.000	48.00	0.0000		0.00		
S-6		**S-7**	2.93	0.90	2.63	2.91					0.00	0.00	2.80	2.76	2.76	2.26	0.500	48.00	0.1852	Full	5.33		
		0.00	1.38	0.20	0.27	14.56	38.32	0.84	3.83	17.47		66.97		0.00	0.00	0.00						0.00	0.0120
P-6	1	270.00	0.00	0.00	0.00	17.47						**66.97**	0.04	0.00	-4.00	-4.00	0.000	48.00	0.0000		0.00		
S-7		**S-8**	2.93	0.90	2.63	2.91					0.00	0.00	4.00	2.26	2.26	1.60	0.665	48.00	0.2462	Full	6.14		
		0.00	1.38	0.20	0.27	17.47	39.17	0.00	3.79	20.39		77.21		0.00	0.00	0.00						0.00	0.0120
P-6	1	270.00	0.00	0.00	0.00	20.39						**77.21**	1.74	0.00	-4.00	-4.00	0.000	48.00	0.0000		0.00		

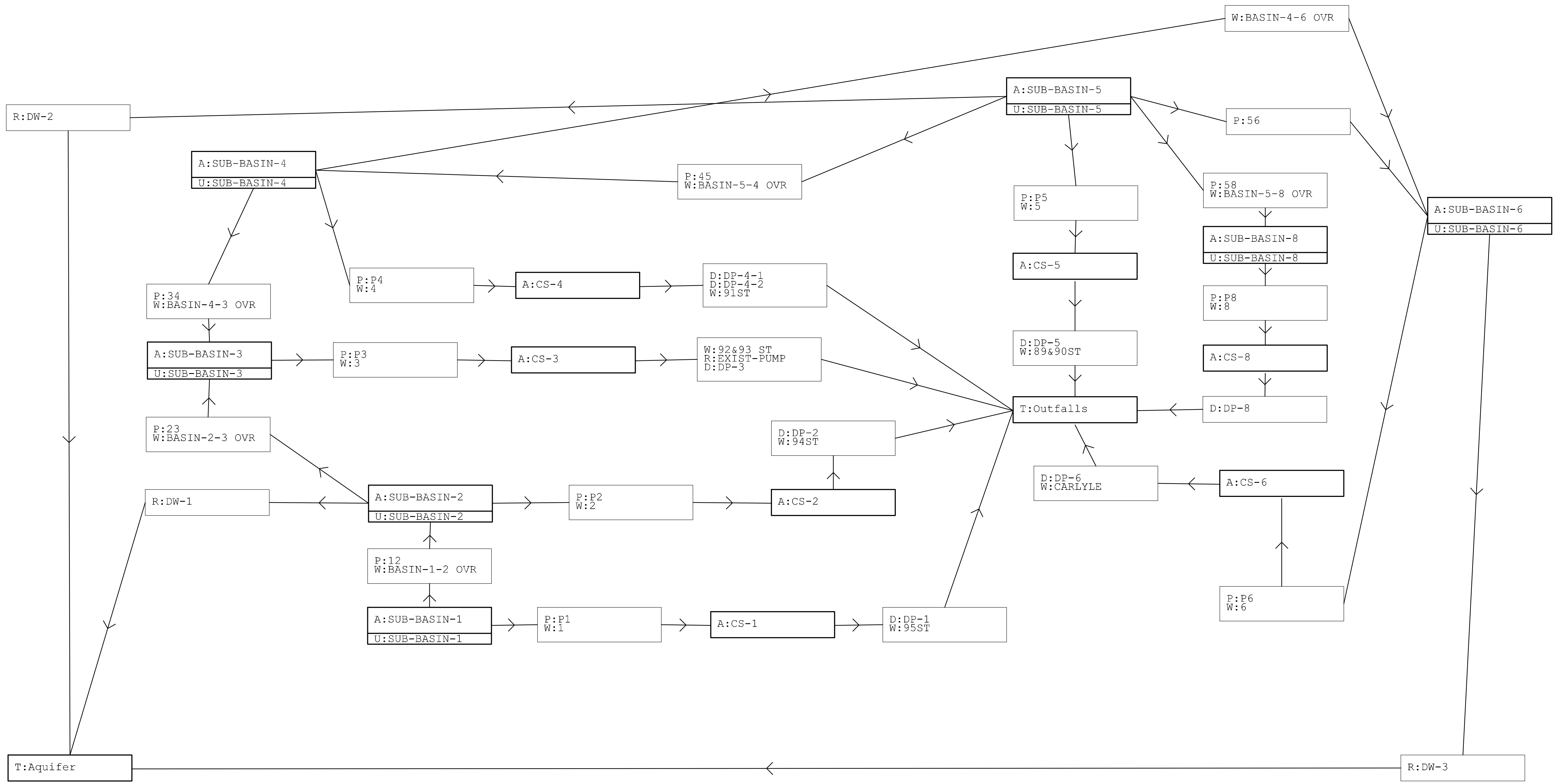
Units: ENGLISH

T60v11.RPT 10/14/2003

APPENDIX C

ICPR MODEL FOR EXISTING CONDITIONS

Node-Reach Diagram
ICPR Input Data
Node Maximum Report
Link Maximum Report



NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS™
1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

ICPR MODEL - EXISTING CONDITIONS NODE REACH DIAGRAM

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: ----

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

        Name: SUB-BASIN-1             Node: SUB-BASIN-1           Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

     Unit Hydrograph: Uh256                     Peaking Factor: 256.0
       Rainfall File:                      Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
            Area(ac): 27.810                   Time Shift(hrs): 0.00
        Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
        Name: SUB-BASIN-2             Node: SUB-BASIN-2           Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

     Unit Hydrograph: Uh256                     Peaking Factor: 256.0
       Rainfall File:                      Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
            Area(ac): 30.400                   Time Shift(hrs): 0.00
        Curve Number: 85.00               Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
        Name: SUB-BASIN-3             Node: SUB-BASIN-3           Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

     Unit Hydrograph: Uh256                     Peaking Factor: 256.0
       Rainfall File:                      Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
            Area(ac): 41.040                   Time Shift(hrs): 0.00
        Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
        Name: SUB-BASIN-4             Node: SUB-BASIN-4           Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

     Unit Hydrograph: Uh256                     Peaking Factor: 256.0
       Rainfall File:                      Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
            Area(ac): 32.390                   Time Shift(hrs): 0.00
        Curve Number: 85.00               Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
        Name: SUB-BASIN-5             Node: SUB-BASIN-5           Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

     Unit Hydrograph: Uh256                     Peaking Factor: 256.0
       Rainfall File:                      Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
            Area(ac): 32.600                   Time Shift(hrs): 0.00
        Curve Number: 85.00               Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
        Name: SUB-BASIN-6             Node: SUB-BASIN-6           Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

     Unit Hydrograph: Uh256                     Peaking Factor: 256.0
       Rainfall File:                      Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
            Area(ac): 54.600                   Time Shift(hrs): 0.00
        Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
        Name: SUB-BASIN-8             Node: SUB-BASIN-8           Status: Onsite
```

```
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                 Peaking Factor: 256.0
          Rainfall File:                   Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000               Time of Conc(min): 30.00
               Area(ac): 7.240                 Time Shift(hrs): 0.00
           Curve Number: 84.00            Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name: Aquifer            Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 1.600
      Type: Time/Stage


      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         -60.000
       99999.00         -60.000

------------------------------------------------------------------------------------------
      Name: CS-1               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001

------------------------------------------------------------------------------------------
      Name: CS-2               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001

------------------------------------------------------------------------------------------
      Name: CS-3               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001

------------------------------------------------------------------------------------------
      Name: CS-4               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001

------------------------------------------------------------------------------------------
      Name: CS-5               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
```

8.000	0.0001

Name: CS-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: CS-8 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: Outfalls Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 1.600
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	1.600
99999.00	1.600

Name: SUB-BASIN-1 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.090	0.0000
8.000	19.3100

Name: SUB-BASIN-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 2.800
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.690	0.0000
8.000	21.1000

Name: SUB-BASIN-3 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 2.800
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.690	0.0000
8.000	28.0000

Name: SUB-BASIN-4 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.120	0.0000
8.000	23.0000

Name: SUB-BASIN-5 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.110	0.0000
8.000	19.5000

Name: SUB-BASIN-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.060	0.0000
8.000	32.7500

Name: SUB-BASIN-8 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.330	0.0000
8.000	4.8400

==== Cross Sections ====

Name: SECTION 1 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	3.250	0.016000
18.000	3.800	0.016000
36.000	3.250	0.016000

==== Operating Tables ====

Name: DRAINAGE WELLS Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

DRAINAGE WELL CAPACITY: 500 GPM/FT. OF AVAILABLE HEAD

US Stage(ft)	Discharge(cfs)
1.900	7.70
8.000	7.70

Name: EXIST-PUMP Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

US Stage(ft)	Discharge(cfs)

```
--------------- ---------------
          2.000           14.20
          8.000           14.20

==========================================================================================
==== Pipes ===============================================================================
==========================================================================================

         Name: 12                 From Node: Sub-Basin-1        Length(ft): 650.00
        Group: BASE                 To Node: Sub-Basin-2             Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: 23                 From Node: Sub-Basin-2        Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-3             Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: 34                 From Node: Sub-Basin-4        Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-3             Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: 45                 From Node: Sub-Basin-5        Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-4             Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
```

```
   Invert(ft): -1.500         -1.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: 56                 From Node: Sub-Basin-5       Length(ft): 250.00
        Group: BASE                 To Node: Sub-Basin-6            Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: 58                 From Node: Sub-Basin-5       Length(ft): 550.00
        Group: BASE                 To Node: Sub-Basin-8            Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 18.00          18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                          Exit Loss Coef: 1.00
   Invert(ft): -4.320         -1.120                         Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P1                 From Node: Sub-Basin-1       Length(ft): 600.00
        Group: BASE                 To Node: CS-1                   Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                 Flow: Both
     Span(in): 15.00          15.00                      Entrance Loss Coef: 0.00
     Rise(in): 15.00          15.00                          Exit Loss Coef: 1.00
   Invert(ft): -0.820         -1.830                         Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P2                 From Node: Sub-Basin-2       Length(ft): 600.00
        Group: BASE                 To Node: CS-2                  Count: 1
                                                       Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                   Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                       Exit Loss Coef: 1.00
   Invert(ft): -0.210         -2.740                      Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P3                 From Node: Sub-Basin-3       Length(ft): 600.00
        Group: BASE                 To Node: CS-3                  Count: 1
                                                       Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                   Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                       Exit Loss Coef: 1.00
   Invert(ft): -0.630         -2.330                      Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P4                 From Node: Sub-Basin-4       Length(ft): 600.00
        Group: BASE                 To Node: CS-4                  Count: 2
                                                       Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 24.00          24.00                   Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                       Exit Loss Coef: 1.00
   Invert(ft): -0.630         -2.330                      Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P5                 From Node: Sub-Basin-5       Length(ft): 250.00
        Group: BASE                 To Node: CS-5                  Count: 1
                                                       Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular       Circular                              Flow: Both
     Span(in): 12.00          12.00                   Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                       Exit Loss Coef: 1.00
   Invert(ft): 0.420          -4.320                      Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                    Stabilizer Option: None
```

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
         Name: P6                 From Node: Sub-Basin-6        Length(ft): 600.00
        Group: BASE                 To Node: CS-6                    Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular      Circular                                 Flow: Both
     Span(in): 36.00         36.00                      Entrance Loss Coef: 0.00
     Rise(in): 36.00         36.00                          Exit Loss Coef: 1.00
   Invert(ft): 0.880         -1.730                         Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
         Name: P8                 From Node: Sub-Basin-8        Length(ft): 250.00
        Group: BASE                 To Node: CS-8                    Count: 2
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular      Circular                                 Flow: Both
     Span(in): 12.00         12.00                      Entrance Loss Coef: 0.00
     Rise(in): 12.00         12.00                          Exit Loss Coef: 1.00
   Invert(ft): -1.200        -1.580                         Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

         Name: DP-1               From Node: CS-1               Length(ft): 100.00
        Group: BASE                 To Node: Outfalls                Count: 1

              UPSTREAM       DOWNSTREAM                  Friction Equation: Automatic
     Geometry: Circular      Circular                   Solution Algorithm: Automatic
     Span(in): 15.00         15.00                                    Flow: Positive
     Rise(in): 15.00         15.00                      Entrance Loss Coef: 0.000
   Invert(ft): -1.410        -1.830                         Exit Loss Coef: 1.000
  Manning's N: 0.020000      0.020000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                           Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-1 ***
                                                                                 TABLE
                  Count: 7                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Positive                Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600
```

```
              Span(in): 48.00                      Invert(ft): 2.000
              Rise(in): 9.00                 Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-2               From Node: CS-2             Length(ft): 100.00
        Group: BASE                 To Node: Outfalls              Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Automatic
     Span(in): 30.00          30.00                                   Flow: Positive
     Rise(in): 30.00          30.00                     Entrance Loss Coef: 0.000
   Invert(ft): -2.740         -3.070                        Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-2 ***
                                                                                    TABLE
                 Count: 1                        Bottom Clip(in): 0.000
                  Type: Vertical: Mavis             Top Clip(in): 0.000
                  Flow: Positive                 Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 48.00                      Invert(ft): 2.000
              Rise(in): 9.00                 Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-3               From Node: CS-3             Length(ft): 100.00
        Group: BASE                 To Node: Outfalls              Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Automatic
     Span(in): 24.00          24.00                                   Flow: Positive
     Rise(in): 24.00          24.00                     Entrance Loss Coef: 0.000
   Invert(ft): -1.500         -1.500                        Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-3 ***
                                                                                    TABLE
                 Count: 1                        Bottom Clip(in): 0.000
                  Type: Vertical: Mavis             Top Clip(in): 0.000
                  Flow: Positive                 Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 48.00                      Invert(ft): 2.100
              Rise(in): 9.00                 Control Elev(ft): 2.100


----------------------------------------------------------------------------------------------------
         Name: DP-4-1             From Node: CS-4             Length(ft): 100.00
        Group: BASE                 To Node: Outfalls              Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Automatic
     Span(in): 24.00          24.00                                   Flow: Positive
     Rise(in): 24.00          24.00                     Entrance Loss Coef: 0.000
   Invert(ft): -4.060         -2.300                        Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



*** Weir 1 of 1 for Drop Structure DP-4-1 ***
                                                                                  TABLE
                Count: 1                        Bottom Clip(in): 0.000
                 Type: Vertical: Mavis             Top Clip(in): 0.000
                 Flow: Positive                  Weir Disc Coef: 3.200
             Geometry: Rectangular            Orifice Disc Coef: 0.600

             Span(in): 48.00                        Invert(ft): 2.000
             Rise(in): 9.00                   Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
        Name: DP-4-2              From Node: CS-4              Length(ft): 100.00
       Group: BASE                  To Node: Outfalls               Count: 1

             UPSTREAM       DOWNSTREAM                  Friction Equation: Automatic
    Geometry: Circular      Circular                   Solution Algorithm: Automatic
    Span(in): 30.00         30.00                                    Flow: Positive
    Rise(in): 30.00         30.00                      Entrance Loss Coef: 0.000
  Invert(ft): -1.070        -1.820                         Exit Loss Coef: 1.000
 Manning's N: 0.020000      0.020000                    Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000         0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



*** Weir 1 of 1 for Drop Structure DP-4-2 ***
                                                                                  TABLE
                Count: 1                        Bottom Clip(in): 0.000
                 Type: Vertical: Mavis             Top Clip(in): 0.000
                 Flow: Positive                  Weir Disc Coef: 3.200
             Geometry: Rectangular            Orifice Disc Coef: 0.600

             Span(in): 48.00                        Invert(ft): 2.000
             Rise(in): 9.00                   Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
        Name: DP-5                From Node: CS-5              Length(ft): 100.00
       Group: BASE                  To Node: Outfalls               Count: 1

             UPSTREAM       DOWNSTREAM                  Friction Equation: Automatic
    Geometry: Circular      Circular                   Solution Algorithm: Automatic
    Span(in): 24.00         24.00                                    Flow: Positive
    Rise(in): 24.00         24.00                      Entrance Loss Coef: 0.000
  Invert(ft): -4.320        -2.470                         Exit Loss Coef: 1.000
 Manning's N: 0.020000      0.020000                    Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000         0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



*** Weir 1 of 1 for Drop Structure DP-5 ***
                                                                                  TABLE
                Count: 1                        Bottom Clip(in): 0.000
                 Type: Vertical: Mavis             Top Clip(in): 0.000
                 Flow: Positive                  Weir Disc Coef: 3.200
             Geometry: Rectangular            Orifice Disc Coef: 0.600

             Span(in): 48.00                        Invert(ft): 2.000
             Rise(in): 9.00                   Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
        Name: DP-6                From Node: CS-6              Length(ft): 100.00
       Group: BASE                  To Node: Outfalls               Count: 1
```

```
             UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular              Solution Algorithm: Automatic
     Span(in): 36.00          36.00                               Flow: Positive
     Rise(in): 36.00          36.00                 Entrance Loss Coef: 0.000
   Invert(ft): -1.730         -3.610                    Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                    Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Solution Incs: 10
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
*** Weir 1 of 1 for Drop Structure DP-6 ***
                                                                             TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Positive                Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 48.00                       Invert(ft): 2.000
             Rise(in): 9.00                  Control Elev(ft): 2.000
```

```
----------------------------------------------------------------------------------------------------
         Name: DP-8                From Node: CS-8              Length(ft): 100.00
        Group: BASE                  To Node: Outfalls               Count: 2

             UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular              Solution Algorithm: Automatic
     Span(in): 15.00          15.00                               Flow: Positive
     Rise(in): 15.00          15.00                 Entrance Loss Coef: 0.000
   Invert(ft): -1.580         -1.580                    Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                    Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Solution Incs: 10
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
*** Weir 1 of 1 for Drop Structure DP-8 ***
                                                                             TABLE
                 Count: 2                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Positive                Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

             Span(in): 48.00                       Invert(ft): 2.000
             Rise(in): 9.00                  Control Elev(ft): 2.000
```

```
==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name: 1                   From Node: Sub-Basin-1
        Group: BASE                  To Node: CS-1
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 5.000
       Control Elevation(ft): 5.000
                                                  TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

----------------------------------------------------------------------------------------------------
         Name: 2                   From Node: Sub-Basin-2
```

```
       Group: BASE                 To Node: CS-2
        Flow: Both                   Count: 1
        Type: Vertical: Paved     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 4.800
     Control Elevation(ft): 4.800
                                           TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600

----------------------------------------------------------------------------------------------------
        Name: 3                  From Node: Sub-Basin-3
       Group: BASE                 To Node: CS-3
        Flow: Both                   Count: 1
        Type: Vertical: Paved     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 4.200
     Control Elevation(ft): 4.200
                                           TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600

----------------------------------------------------------------------------------------------------
        Name: 4                  From Node: Sub-Basin-4
       Group: BASE                 To Node: CS-4
        Flow: Both                   Count: 1
        Type: Vertical: Paved     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 4.800
     Control Elevation(ft): 4.800
                                           TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600

----------------------------------------------------------------------------------------------------
        Name: 5                  From Node: Sub-Basin-5
       Group: BASE                 To Node: CS-5
        Flow: Both                   Count: 1
        Type: Vertical: Paved     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 4.700
     Control Elevation(ft): 4.700
                                           TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600

----------------------------------------------------------------------------------------------------
        Name: 6                  From Node: Sub-Basin-6
       Group: BASE                 To Node: CS-6
        Flow: Both                   Count: 1
        Type: Vertical: Paved     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 5.200
     Control Elevation(ft): 5.200
                                           TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
```

```
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 8                   From Node: Sub-Basin-8
        Group: BASE                  To Node: CS-8
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 89&90ST             From Node: CS-5
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.900
       Control Elevation(ft): 4.900
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 91ST                From Node: CS-4
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 5.000
       Control Elevation(ft): 5.000
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 92&93 ST            From Node: CS-3
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 2
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 180.00
                    Rise(in): 999999.00
                  Invert(ft): 3.800
       Control Elevation(ft): 3.800
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 94ST                From Node: CS-2
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
```

```
            Invert(ft): 4.600
  Control Elevation(ft): 4.600
                                            TABLE
        Bottom Clip(in): 0.000
           Top Clip(in): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 95ST               From Node: CS-1
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 1
         Type: Vertical: Paved     Geometry: Rectangular

              Span(in): 240.00
              Rise(in): 999999.00
            Invert(ft): 4.550
  Control Elevation(ft): 4.550
                                            TABLE
        Bottom Clip(in): 0.000
           Top Clip(in): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-1-2 OVR      From Node: SUB-BASIN-1
        Group: BASE                 To Node: SUB-BASIN-2
         Flow: Both                   Count: 1
         Type: Vertical: Paved     Geometry: Rectangular

              Span(in): 420.00
              Rise(in): 9999.00
            Invert(ft): 4.100
  Control Elevation(ft): 4.100
                                            TABLE
        Bottom Clip(in): 0.000
           Top Clip(in): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600

Bay Drive Roadway Overflow

----------------------------------------------------------------------------------------------------
         Name: BASIN-2-3 OVR      From Node: SUB-BASIN-2
        Group: BASE                 To Node: SUB-BASIN-3
         Flow: Both                   Count: 1
         Type: Vertical: Paved     Geometry: Rectangular

              Span(in): 420.00
              Rise(in): 999.00
            Invert(ft): 4.500
  Control Elevation(ft): 4.500
                                            TABLE
        Bottom Clip(in): 0.000
           Top Clip(in): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-4-3 OVR      From Node: SUB-BASIN-4
        Group: BASE                 To Node: SUB-BASIN-3
         Flow: Both                   Count: 1
         Type: Vertical: Paved     Geometry: Irregular

                  XSec: SECTION 1
            Invert(ft): 3.250
  Control Elevation(ft): 3.250
  Struct Opening Dim(ft): 9999.00
                                            TABLE
        Bottom Clip(ft): 0.000
           Top Clip(ft): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-4-6 OVR      From Node: SUB-BASIN-4
```

```
        Group: BASE                  To Node: SUB-BASIN-6
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.000
       Control Elevation(ft): 4.000
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-5-4 OVR       From Node: SUB-BASIN-5
        Group: BASE                  To Node: SUB-BASIN-4
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-5-8 OVR       From Node: SUB-BASIN-5
        Group: BASE                  To Node: SUB-BASIN-8
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 3.500
       Control Elevation(ft): 3.500
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: CARLYLE             From Node: CS-6
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.600
       Control Elevation(ft): 4.600
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==========================================================================================
==== Rating Curves =======================================================================
==========================================================================================

         Name: DW-1                From Node: Sub-Basin-2            Count: 3
        Group: BASE                  To Node: Aquifer                 Flow: Positive

               TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: Drainage Wells  2.000           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000
```

```
----------------------------------------------------------------------------------------------------
         Name: DW-2                From Node: Sub-Basin-5            Count: 3
        Group: BASE                  To Node: Aquifer                 Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: Drainage Wells  2.000           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
         Name: DW-3                From Node: Sub-Basin-6            Count: 3
        Group: BASE                  To Node: Aquifer                 Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: Drainage Wells  2.000           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
         Name: EXIST-PUMP          From Node: CS-3                   Count: 1
        Group: BASE                  To Node: Outfalls                Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: EXIST-PUMP      2.100           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: 005Y001H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\005Y001H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Fdot-1
    Rainfall Amount(in): 3.20

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 005Y024H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\005Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: SFWMD-24HR
    Rainfall Amount(in): 6.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 010Y024H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\010Y024H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: SFWMD-24HR
    Rainfall Amount(in): 7.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 025Y072H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\025Y072H.R32

      Override Defaults: Yes
```

```
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 11.00

Time(hrs)       Print Inc(min)
--------------- ---------------
96.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 100Y072H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\100Y072H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 15.00

Time(hrs)       Print Inc(min)
--------------- ---------------
96.000          5.00

----------------------------------------------------------------------------------------------------
         Name: QUALITY
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\QUALITY.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.63
          Rainfall File: Scsiii
    Rainfall Amount(in): 1.58

Time(hrs)       Print Inc(min)
--------------- ---------------
12.000          1.00
24.000          15.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: 005Y001H           Hydrology Sim: 005Y001H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\005Y001H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 6.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         1.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 005Y024H           Hydrology Sim: 005Y024H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\005Y024H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 48.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.000
48.000          15.000

Group           Run
--------------- -----
```

```
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 010Y024H            Hydrology Sim: 010Y024H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\010Y024H.I32

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 48.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.000
48.000          15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 025Y072H            Hydrology Sim: 025Y072H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\025Y072H.I32

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 120.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          30.000
50.000          5.000
72.000          5.000
120.000         30.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 100Y072H            Hydrology Sim: 100Y072H
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\100Y072H.I32

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 120.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          30.000
50.000          5.000
72.000          5.000
120.000         30.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: QUALITY             Hydrology Sim: QUALITY
```

Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\EXIST\QUALITY.I32

Execute: No   Restart: No   Patch: No
Alternative: No

Max Delta Z(ft): 1.00   Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000   End Time(hrs): 24.00
Min Calc Time(sec): 0.5000   Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
24.000	5.000

Group	Run
BASE	Yes

ABBOTT AVENUE DRAINAGE STUDY
ICPR MODEL FOR EXISTING CONDITIONS
NODE MAXIMUM REPORT

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Aquifer	BASE	005Y001H	0.00	-60.00	1.60	-61.6000	0	0.45	69.30	0.00	0.00
Aquifer	BASE	005Y024H	0.00	-60.00	1.60	-61.6000	0	7.72	69.30	0.00	0.00
Aquifer	BASE	010Y024H	0.00	-60.00	1.60	-61.6000	0	6.94	69.30	0.00	0.00
Aquifer	BASE	025Y072H	0.00	-60.00	1.60	-61.6000	0	17.04	69.30	0.00	0.00
Aquifer	BASE	100Y072H	0.00	-60.00	1.60	-61.6000	0	12.90	69.30	0.00	0.00
Aquifer	BASE	QUALITY	0.00	-60.00	1.60	-61.6000	0	0.98	69.30	0.00	0.00
CS-1	BASE	005Y001H	2.72	2.09	8.00	0.0026	132	2.72	2.39	2.72	2.39
CS-1	BASE	005Y024H	14.87	2.11	8.00	0.0023	132	14.86	2.61	14.87	2.61
CS-1	BASE	010Y024H	14.66	2.12	8.00	0.0022	132	14.65	2.70	14.66	2.70
CS-1	BASE	025Y072H	62.31	2.14	8.00	0.0022	132	62.30	2.76	62.31	2.76
CS-1	BASE	100Y072H	62.81	2.76	8.00	0.0022	132	62.79	4.13	62.81	4.13
CS-1	BASE	QUALITY	1.82	2.07	8.00	0.0024	132	1.82	1.75	1.82	1.75
CS-2	BASE	005Y001H	1.56	2.21	8.00	0.0023	128	1.56	1.20	1.56	1.20
CS-2	BASE	005Y024H	14.86	2.23	8.00	-0.0027	128	14.86	1.41	14.86	1.41
CS-2	BASE	010Y024H	14.65	2.24	8.00	-0.0027	128	14.65	1.46	14.65	1.46
CS-2	BASE	025Y072H	62.30	2.25	8.00	-0.0026	128	62.30	1.63	62.30	1.63
CS-2	BASE	100Y072H	62.80	2.95	8.00	-0.0026	128	62.80	10.92	62.80	10.92
CS-2	BASE	QUALITY	6.97	2.00	8.00	-0.0023	128	1.89	0.45	0.00	0.00
CS-3	BASE	005Y001H	2.52	2.10	8.00	-0.0549	128	2.48	1.39	2.52	14.20
CS-3	BASE	005Y024H	14.52	2.10	8.00	-0.0549	128	14.52	2.03	14.52	14.20
CS-3	BASE	010Y024H	15.13	2.11	8.00	-0.0550	128	14.91	7.11	15.13	14.22
CS-3	BASE	025Y072H	63.11	2.76	8.00	-0.0551	128	63.11	21.00	63.11	21.00
CS-3	BASE	100Y072H	62.80	4.20	8.00	-0.0550	128	62.80	53.60	62.80	53.60
CS-3	BASE	QUALITY	2.31	2.10	8.00	-0.0551	128	2.23	1.09	2.31	14.20
CS-4	BASE	005Y001H	2.49	2.78	8.00	-0.0038	173	2.49	17.42	2.49	17.42
CS-4	BASE	005Y024H	14.55	2.88	8.00	0.0033	173	14.55	20.21	14.55	20.21
CS-4	BASE	010Y024H	14.93	2.91	8.00	0.0033	173	14.93	21.12	14.93	21.12
CS-4	BASE	025Y072H	63.11	2.98	8.00	0.0033	173	63.11	22.41	63.11	22.41
CS-4	BASE	100Y072H	62.80	3.66	8.00	-0.0039	173	62.80	30.05	62.80	30.05
CS-4	BASE	QUALITY	1.67	2.42	8.00	-0.0040	173	1.67	7.10	1.67	7.06
CS-5	BASE	005Y001H	1.71	2.25	8.00	-0.0036	119	1.71	1.59	1.71	1.59
CS-5	BASE	005Y024H	14.63	2.28	8.00	-0.0037	119	14.63	1.89	14.63	1.89
CS-5	BASE	010Y024H	15.00	2.30	8.00	-0.0037	119	15.00	2.06	15.00	2.06
CS-5	BASE	025Y072H	63.11	2.31	8.00	-0.0037	119	63.11	2.18	63.11	2.18
CS-5	BASE	100Y072H	62.81	4.40	8.00	-0.0037	119	62.79	15.95	62.81	15.95
CS-5	BASE	QUALITY	6.59	2.00	8.00	-0.0037	119	1.63	0.68	0.00	0.00
CS-6	BASE	005Y001H	1.75	3.06	8.00	0.0057	292	1.74	11.92	1.75	11.92
CS-6	BASE	005Y024H	14.88	3.38	8.00	-0.0104	158	14.87	14.49	14.88	14.49
CS-6	BASE	010Y024H	14.93	3.54	8.00	-0.0108	158	14.93	15.58	14.93	15.58
CS-6	BASE	025Y072H	63.11	3.69	8.00	-0.0109	158	63.11	16.56	63.11	16.56
CS-6	BASE	100Y072H	62.80	3.94	8.00	-0.0108	158	62.79	18.05	62.80	18.05
CS-6	BASE	QUALITY	6.42	2.00	8.00	-0.0050	364	1.73	3.13	0.00	0.00
CS-8	BASE	005Y001H	1.99	2.25	8.00	-0.0044	126	1.99	3.14	1.99	3.14
CS-8	BASE	005Y024H	14.63	2.28	8.00	-0.0040	126	14.63	3.78	14.63	3.78
CS-8	BASE	010Y024H	15.01	3.88	8.00	-0.0036	126	14.99	11.21	15.01	11.21
CS-8	BASE	025Y072H	63.11	4.64	8.00	0.0068	126	62.91	16.41	63.11	12.96
CS-8	BASE	100Y072H	62.80	5.08	8.00	0.0944	126	62.02	52.60	62.80	13.85
CS-8	BASE	QUALITY	1.25	2.08	8.00	-0.0027	126	1.21	0.66	1.25	0.59
Outfalls	BASE	005Y001H	0.00	1.60	1.60	0.0000	0	1.87	51.32	0.00	0.00

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Outfalls	BASE	005Y024H	0.00	1.60	1.60	0.0000	0	14.69	58.58	0.00	0.00
Outfalls	BASE	010Y024H	0.00	1.60	1.60	0.0000	0	14.97	68.34	0.00	0.00
Outfalls	BASE	025Y072H	0.00	1.60	1.60	0.0000	0	63.10	79.36	0.00	0.00
Outfalls	BASE	100Y072H	0.00	1.60	1.60	0.0000	0	62.80	146.56	0.00	0.00
Outfalls	BASE	QUALITY	0.00	1.60	1.60	0.0000	0	1.66	23.15	0.00	0.00
SUB-BASIN-1	BASE	005Y001H	2.72	4.09	8.00	-0.0056	172212	1.25	26.15	2.76	8.64
SUB-BASIN-1	BASE	005Y024H	14.86	4.50	8.00	-0.0131	241537	12.50	35.60	16.61	15.10
SUB-BASIN-1	BASE	010Y024H	14.65	4.67	8.00	-0.0156	270744	12.50	42.75	14.97	17.64
SUB-BASIN-1	BASE	025Y072H	62.30	4.82	8.00	-0.0159	296193	60.50	52.14	62.46	23.43
SUB-BASIN-1	BASE	100Y072H	62.80	5.08	8.00	-0.0181	341634	60.50	72.81	61.72	38.19
SUB-BASIN-1	BASE	QUALITY	1.82	3.14	8.00	-0.0066	8872	1.67	6.58	1.89	6.67
SUB-BASIN-2	BASE	005Y001H	1.56	3.84	2.80	0.0624	32476	1.25	28.73	1.10	26.64
SUB-BASIN-2	BASE	005Y024H	14.86	4.50	2.80	0.0616	172321	13.03	39.45	12.15	26.62
SUB-BASIN-2	BASE	010Y024H	14.65	4.67	2.80	0.0615	208630	12.80	47.47	14.64	34.16
SUB-BASIN-2	BASE	025Y072H	62.30	4.82	2.80	0.0626	240198	60.62	57.38	62.27	46.22
SUB-BASIN-2	BASE	100Y072H	62.80	5.08	2.80	0.0626	296793	61.05	87.98	61.70	77.65
SUB-BASIN-2	BASE	QUALITY	1.89	2.02	2.80	-0.0616	182	1.66	12.73	5.71	23.59
SUB-BASIN-3	BASE	005Y001H	2.51	3.79	2.80	-0.0032	253213	1.25	44.25	2.48	1.39
SUB-BASIN-3	BASE	005Y024H	14.55	4.24	2.80	-0.0127	355973	12.46	60.52	14.52	2.03
SUB-BASIN-3	BASE	010Y024H	14.93	4.40	2.80	-0.0141	391868	12.37	69.27	14.91	7.11
SUB-BASIN-3	BASE	025Y072H	63.11	4.66	2.80	-0.0156	451683	60.42	75.99	63.11	21.00
SUB-BASIN-3	BASE	100Y072H	62.80	5.08	2.80	-0.0164	548763	60.83	102.14	62.80	53.60
SUB-BASIN-3	BASE	QUALITY	2.19	2.94	2.80	-0.0082	56423	1.59	4.53	2.23	1.09
SUB-BASIN-4	BASE	005Y001H	2.49	3.79	8.00	-0.0152	137587	1.25	30.53	1.39	20.45
SUB-BASIN-4	BASE	005Y024H	14.55	4.24	8.00	-0.0154	229345	12.50	41.45	12.45	22.62
SUB-BASIN-4	BASE	010Y024H	14.93	4.39	8.00	-0.0147	261414	12.50	49.80	12.35	23.38
SUB-BASIN-4	BASE	025Y072H	63.11	4.65	8.00	-0.0145	315008	60.50	60.01	60.25	16.62
SUB-BASIN-4	BASE	100Y072H	62.80	5.08	8.00	-0.0187	402183	60.37	79.12	60.36	19.00
SUB-BASIN-4	BASE	QUALITY	1.67	2.59	8.00	0.0037	233	1.63	5.61	1.67	5.22
SUB-BASIN-5	BASE	005Y001H	1.71	3.50	8.00	0.0621	67567	1.25	31.99	4.86	24.94
SUB-BASIN-5	BASE	005Y024H	14.63	4.04	8.00	0.0636	161066	12.50	42.66	12.61	29.40
SUB-BASIN-5	BASE	010Y024H	15.00	4.38	8.00	0.0623	219890	12.50	51.05	12.43	29.47
SUB-BASIN-5	BASE	025Y072H	63.11	4.65	8.00	-0.0628	267832	60.50	61.55	60.25	27.00
SUB-BASIN-5	BASE	100Y072H	62.80	5.08	8.00	-0.0627	341649	60.50	85.72	62.58	32.41
SUB-BASIN-5	BASE	QUALITY	1.42	2.01	8.00	-0.0621	179	1.67	8.40	2.53	26.15
SUB-BASIN-6	BASE	005Y001H	1.75	3.52	8.00	0.0166	134686	1.25	50.74	1.74	35.02
SUB-BASIN-6	BASE	005Y024H	14.88	4.12	8.00	-0.0197	305791	12.50	69.26	14.87	37.59
SUB-BASIN-6	BASE	010Y024H	14.93	4.39	8.00	-0.0208	384501	12.50	83.10	14.93	38.68
SUB-BASIN-6	BASE	025Y072H	63.11	4.65	8.00	-0.0208	460080	60.83	103.99	63.11	39.66
SUB-BASIN-6	BASE	100Y072H	62.80	5.08	8.00	-0.0205	583284	60.58	163.61	62.79	41.15
SUB-BASIN-6	BASE	QUALITY	1.61	2.00	8.00	-0.0149	787	1.65	16.68	1.73	26.23
SUB-BASIN-8	BASE	005Y001H	1.99	3.46	8.00	-0.0123	41881	0.95	13.55	1.99	3.14
SUB-BASIN-8	BASE	005Y024H	14.63	4.04	8.00	-0.0128	63491	12.61	17.10	14.63	3.78
SUB-BASIN-8	BASE	010Y024H	15.00	4.37	8.00	-0.0126	76052	12.43	20.75	14.99	11.21
SUB-BASIN-8	BASE	025Y072H	63.11	4.65	8.00	-0.0113	86313	60.25	24.21	62.91	16.41
SUB-BASIN-8	BASE	100Y072H	62.80	5.08	8.00	-0.0129	102120	60.70	33.55	62.02	52.60
SUB-BASIN-8	BASE	QUALITY	1.21	2.13	8.00	-0.0070	146	1.93	2.34	1.21	0.66

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
1	BASE	005Y001H	0.00	0.00	0.000	2.72	4.09	2.72	2.09
1	BASE	005Y024H	0.00	0.00	0.000	14.86	4.50	14.87	2.11
1	BASE	010Y024H	0.00	0.00	0.000	14.65	4.67	14.66	2.12
1	BASE	025Y072H	0.00	0.00	0.000	62.30	4.82	62.31	2.14
1	BASE	100Y072H	62.80	1.56	0.000	62.80	5.08	62.81	2.76
1	BASE	QUALITY	0.00	0.00	0.000	1.82	3.14	1.82	2.07
12	BASE	005Y001H	2.80	6.25	1.221	2.72	4.09	1.56	3.84
12	BASE	005Y024H	18.11	6.39	1.265	14.86	4.50	14.86	4.50
12	BASE	010Y024H	19.18	6.38	1.370	14.65	4.67	14.65	4.67
12	BASE	025Y072H	67.91	6.38	1.349	62.30	4.82	62.30	4.82
12	BASE	100Y072H	70.00	6.38	1.330	62.80	5.08	62.80	5.08
12	BASE	QUALITY	1.89	4.92	1.257	1.82	3.14	1.89	2.02
2	BASE	005Y001H	0.00	0.00	0.000	1.56	3.84	1.56	2.21
2	BASE	005Y024H	0.00	0.00	0.000	14.86	4.50	14.86	2.23
2	BASE	010Y024H	0.00	0.00	0.000	14.65	4.67	14.65	2.24
2	BASE	025Y072H	62.30	0.13	0.000	62.30	4.82	62.30	2.25
2	BASE	100Y072H	62.80	9.55	0.005	62.80	5.08	62.80	2.95
2	BASE	QUALITY	0.00	0.00	0.000	1.89	2.02	6.97	2.00
23	BASE	005Y001H	1.10	2.40	-1.036	1.56	3.84	2.51	3.79
23	BASE	005Y024H	12.14	2.38	-1.177	14.86	4.50	14.55	4.24
23	BASE	010Y024H	12.06	2.34	-1.173	14.65	4.67	14.93	4.40
23	BASE	025Y072H	60.32	2.01	-1.190	62.30	4.82	63.11	4.66
23	BASE	100Y072H	60.69	1.95	-1.200	62.80	5.08	62.80	5.08
23	BASE	QUALITY	6.62	0.42	-1.155	1.89	2.02	2.19	2.94
3	BASE	005Y001H	0.00	0.00	0.000	2.51	3.79	2.52	2.10
3	BASE	005Y024H	14.55	0.50	0.000	14.55	4.24	14.52	2.10
3	BASE	010Y024H	14.93	5.54	0.001	14.93	4.40	15.13	2.11
3	BASE	025Y072H	63.11	19.72	0.006	63.11	4.66	63.11	2.76
3	BASE	100Y072H	62.80	52.72	0.022	62.80	5.08	62.80	4.20
3	BASE	QUALITY	0.00	0.00	0.000	2.19	2.94	2.31	2.10
34	BASE	005Y001H	0.84	1.57	0.306	2.49	3.79	2.51	3.79
34	BASE	005Y024H	12.02	1.23	0.319	14.55	4.24	14.55	4.24
34	BASE	010Y024H	12.00	1.03	-0.317	14.93	4.39	14.93	4.40
34	BASE	025Y072H	77.17	0.81	0.334	63.11	4.65	63.11	4.66
34	BASE	100Y072H	77.32	0.81	0.335	62.80	5.08	62.80	5.08
34	BASE	QUALITY	7.13	0.81	0.317	1.67	2.59	2.19	2.94
4	BASE	005Y001H	0.00	0.00	0.000	2.49	3.79	2.49	2.78
4	BASE	005Y024H	0.00	0.00	0.000	14.55	4.24	14.55	2.88
4	BASE	010Y024H	0.00	0.00	0.000	14.93	4.39	14.93	2.91
4	BASE	025Y072H	0.00	0.00	0.000	63.11	4.65	63.11	2.98
4	BASE	100Y072H	62.80	9.40	0.002	62.80	5.08	62.80	3.66
4	BASE	QUALITY	0.00	0.00	0.000	1.67	2.59	1.67	2.42
45	BASE	005Y001H	0.41	0.16	-1.020	1.71	3.50	2.49	3.79
45	BASE	005Y024H	29.13	0.48	-1.120	14.63	4.04	14.55	4.24
45	BASE	010Y024H	29.11	0.47	-1.126	15.00	4.38	14.93	4.39
45	BASE	025Y072H	77.04	0.47	-1.125	63.11	4.65	63.11	4.65
45	BASE	100Y072H	77.33	0.48	-1.140	62.80	5.08	62.80	5.08
45	BASE	QUALITY	7.13	0.48	-1.066	1.42	2.01	1.67	2.59
5	BASE	005Y001H	0.00	0.00	0.000	1.71	3.50	1.71	2.25

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
5	BASE	005Y024H	0.00	0.00	0.000	14.63	4.04	14.63	2.28
5	BASE	010Y024H	0.00	0.00	0.000	15.00	4.38	15.00	2.30
5	BASE	025Y072H	0.00	0.00	0.000	63.11	4.65	63.11	2.31
5	BASE	100Y072H	62.80	14.78	0.003	62.80	5.08	62.81	4.40
5	BASE	QUALITY	0.00	0.00	0.000	1.42	2.01	6.59	2.00
56	BASE	005Y001H	2.93	3.85	2.126	1.71	3.50	1.75	3.52
56	BASE	005Y024H	11.76	3.85	-2.102	14.63	4.04	14.88	4.12
56	BASE	010Y024H	11.27	3.84	-2.103	15.00	4.38	14.93	4.39
56	BASE	025Y072H	58.71	3.87	2.115	63.11	4.65	63.11	4.65
56	BASE	100Y072H	57.74	3.85	2.121	62.80	5.08	62.80	5.08
56	BASE	QUALITY	2.13	3.84	-2.112	1.42	2.01	1.61	2.00
58	BASE	005Y001H	3.64	1.88	-1.496	1.71	3.50	1.99	3.46
58	BASE	005Y024H	12.03	2.04	-1.520	14.63	4.04	14.63	4.04
58	BASE	010Y024H	11.96	2.08	-1.516	15.00	4.38	15.00	4.37
58	BASE	025Y072H	59.85	2.14	-1.523	63.11	4.65	63.11	4.65
58	BASE	100Y072H	59.67	2.01	-1.529	62.80	5.08	62.80	5.08
58	BASE	QUALITY	2.88	1.29	-1.492	1.42	2.01	1.21	2.13
6	BASE	005Y001H	0.00	0.00	0.000	1.75	3.52	1.75	3.06
6	BASE	005Y024H	0.00	0.00	0.000	14.88	4.12	14.88	3.38
6	BASE	010Y024H	0.00	0.00	0.000	14.93	4.39	14.93	3.54
6	BASE	025Y072H	0.00	0.00	0.000	63.11	4.65	63.11	3.69
6	BASE	100Y072H	0.00	0.00	0.000	62.80	5.08	62.80	3.94
6	BASE	QUALITY	0.00	0.00	0.000	1.61	2.00	6.42	2.00
8	BASE	005Y001H	0.00	0.00	0.000	1.99	3.46	1.99	2.25
8	BASE	005Y024H	0.00	0.00	0.000	14.63	4.04	14.63	2.28
8	BASE	010Y024H	15.00	9.20	0.001	15.00	4.37	15.01	3.88
8	BASE	025Y072H	62.91	16.10	-3.127	63.11	4.65	63.11	4.64
8	BASE	100Y072H	62.02	51.79	-82.213	62.80	5.08	62.80	5.08
8	BASE	QUALITY	0.00	0.00	0.000	1.21	2.13	1.25	2.08
89&90ST	BASE	005Y001H	0.00	0.00	0.000	1.71	2.25	0.00	1.60
89&90ST	BASE	005Y024H	0.00	0.00	0.000	14.63	2.28	0.00	1.60
89&90ST	BASE	010Y024H	0.00	0.00	0.000	15.00	2.30	0.00	1.60
89&90ST	BASE	025Y072H	0.00	0.00	0.000	63.11	2.31	0.00	1.60
89&90ST	BASE	100Y072H	0.00	0.00	0.000	62.81	4.40	0.00	1.60
89&90ST	BASE	QUALITY	0.00	0.00	0.000	6.59	2.00	0.00	1.60
91ST	BASE	005Y001H	0.00	0.00	0.000	2.49	2.78	0.00	1.60
91ST	BASE	005Y024H	0.00	0.00	0.000	14.55	2.88	0.00	1.60
91ST	BASE	010Y024H	0.00	0.00	0.000	14.93	2.91	0.00	1.60
91ST	BASE	025Y072H	0.00	0.00	0.000	63.11	2.98	0.00	1.60
91ST	BASE	100Y072H	0.00	0.00	0.000	62.80	3.66	0.00	1.60
91ST	BASE	QUALITY	0.00	0.00	0.000	1.67	2.42	0.00	1.60
92&93 ST	BASE	005Y001H	0.00	0.00	0.000	2.52	2.10	0.00	1.60
92&93 ST	BASE	005Y024H	0.00	0.00	0.000	14.52	2.10	0.00	1.60
92&93 ST	BASE	010Y024H	0.00	0.00	0.000	15.13	2.11	0.00	1.60
92&93 ST	BASE	025Y072H	0.00	0.00	0.000	63.11	2.76	0.00	1.60
92&93 ST	BASE	100Y072H	62.80	24.04	0.015	62.80	4.20	0.00	1.60
92&93 ST	BASE	QUALITY	0.00	0.00	0.000	2.31	2.10	0.00	1.60
94ST	BASE	005Y001H	0.00	0.00	0.000	1.56	2.21	0.00	1.60
94ST	BASE	005Y024H	0.00	0.00	0.000	14.86	2.23	0.00	1.60

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
94ST	BASE	010Y024H	0.00	0.00	0.000	14.65	2.24	0.00	1.60
94ST	BASE	025Y072H	0.00	0.00	0.000	62.30	2.25	0.00	1.60
94ST	BASE	100Y072H	0.00	0.00	0.000	62.80	2.95	0.00	1.60
94ST	BASE	QUALITY	0.00	0.00	0.000	6.97	2.00	0.00	1.60
95ST	BASE	005Y001H	0.00	0.00	0.000	2.72	2.09	0.00	1.60
95ST	BASE	005Y024H	0.00	0.00	0.000	14.87	2.11	0.00	1.60
95ST	BASE	010Y024H	0.00	0.00	0.000	14.66	2.12	0.00	1.60
95ST	BASE	025Y072H	0.00	0.00	0.000	62.31	2.14	0.00	1.60
95ST	BASE	100Y072H	0.00	0.00	0.000	62.81	2.76	0.00	1.60
95ST	BASE	QUALITY	0.00	0.00	0.000	1.82	2.07	0.00	1.60
BASIN-1-2 OVR	BASE	005Y001H	0.00	0.00	0.000	2.72	4.09	1.56	3.84
BASIN-1-2 OVR	BASE	005Y024H	16.61	12.17	0.080	14.86	4.50	14.86	4.50
BASIN-1-2 OVR	BASE	010Y024H	14.97	14.76	0.143	14.65	4.67	14.65	4.67
BASIN-1-2 OVR	BASE	025Y072H	62.46	20.46	0.134	62.30	4.82	62.30	4.82
BASIN-1-2 OVR	BASE	100Y072H	61.72	34.48	-0.099	62.80	5.08	62.80	5.08
BASIN-1-2 OVR	BASE	QUALITY	0.00	0.00	0.000	1.82	3.14	1.89	2.02
BASIN-2-3 OVR	BASE	005Y001H	0.00	0.00	0.000	1.56	3.84	2.51	3.79
BASIN-2-3 OVR	BASE	005Y024H	0.00	0.00	0.000	14.86	4.50	14.55	4.24
BASIN-2-3 OVR	BASE	010Y024H	14.65	7.71	0.001	14.65	4.67	14.93	4.40
BASIN-2-3 OVR	BASE	025Y072H	62.30	19.90	0.005	62.30	4.82	63.11	4.66
BASIN-2-3 OVR	BASE	100Y072H	61.66	44.35	0.030	62.80	5.08	62.80	5.08
BASIN-2-3 OVR	BASE	QUALITY	0.00	0.00	0.000	1.89	2.02	2.19	2.94
BASIN-4-3 OVR	BASE	005Y001H	1.40	4.07	-0.064	2.49	3.79	2.51	3.79
BASIN-4-3 OVR	BASE	005Y024H	12.45	5.89	-0.055	14.55	4.24	14.55	4.24
BASIN-4-3 OVR	BASE	010Y024H	12.35	6.53	-0.047	14.93	4.39	14.93	4.40
BASIN-4-3 OVR	BASE	025Y072H	0.00	0.00	0.034	63.11	4.65	63.11	4.66
BASIN-4-3 OVR	BASE	100Y072H	0.00	0.00	0.061	62.80	5.08	62.80	5.08
BASIN-4-3 OVR	BASE	QUALITY	0.00	0.00	0.000	1.67	2.59	2.19	2.94
BASIN-4-6 OVR	BASE	005Y001H	0.00	0.00	0.000	2.49	3.79	1.75	3.52
BASIN-4-6 OVR	BASE	005Y024H	14.55	12.88	0.002	14.55	4.24	14.88	4.12
BASIN-4-6 OVR	BASE	010Y024H	13.51	15.09	-0.012	14.93	4.39	14.93	4.39
BASIN-4-6 OVR	BASE	025Y072H	60.96	15.58	-0.069	63.11	4.65	63.11	4.65
BASIN-4-6 OVR	BASE	100Y072H	60.60	22.92	-0.201	62.80	5.08	62.80	5.08
BASIN-4-6 OVR	BASE	QUALITY	0.00	0.00	0.000	1.67	2.59	1.61	2.00
BASIN-5-4 OVR	BASE	005Y001H	0.00	0.00	0.000	1.71	3.50	2.49	3.79
BASIN-5-4 OVR	BASE	005Y024H	0.00	0.00	-0.001	14.63	4.04	14.55	4.24
BASIN-5-4 OVR	BASE	010Y024H	0.00	0.00	-0.002	15.00	4.38	14.93	4.39
BASIN-5-4 OVR	BASE	025Y072H	0.00	0.00	0.006	63.11	4.65	63.11	4.65
BASIN-5-4 OVR	BASE	100Y072H	0.00	0.00	0.061	62.80	5.08	62.80	5.08
BASIN-5-4 OVR	BASE	QUALITY	0.00	0.00	0.000	1.42	2.01	1.67	2.59
BASIN-5-8 OVR	BASE	005Y001H	0.00	0.00	0.000	1.71	3.50	1.99	3.46
BASIN-5-8 OVR	BASE	005Y024H	12.62	6.10	-0.062	14.63	4.04	14.63	4.04
BASIN-5-8 OVR	BASE	010Y024H	14.68	9.28	-0.060	15.00	4.38	15.00	4.37
BASIN-5-8 OVR	BASE	025Y072H	61.38	12.57	0.098	63.11	4.65	63.11	4.65
BASIN-5-8 OVR	BASE	100Y072H	60.75	14.60	1.326	62.80	5.08	62.80	5.08
BASIN-5-8 OVR	BASE	QUALITY	0.00	0.00	0.000	1.42	2.01	1.21	2.13
CARLYLE	BASE	005Y001H	0.00	0.00	0.000	1.75	3.06	0.00	1.60
CARLYLE	BASE	005Y024H	0.00	0.00	0.000	14.88	3.38	0.00	1.60
CARLYLE	BASE	010Y024H	0.00	0.00	0.000	14.93	3.54	0.00	1.60

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
CARLYLE	BASE	025Y072H	0.00	0.00	0.000	63.11	3.69	0.00	1.60
CARLYLE	BASE	100Y072H	0.00	0.00	0.000	62.80	3.94	0.00	1.60
CARLYLE	BASE	QUALITY	0.00	0.00	0.000	6.42	2.00	0.00	1.60
DP-1	BASE	005Y001H	2.72	2.39	0.008	2.72	2.09	0.00	1.60
DP-1	BASE	005Y024H	14.87	2.61	-0.011	14.87	2.11	0.00	1.60
DP-1	BASE	010Y024H	14.66	2.70	-0.015	14.66	2.12	0.00	1.60
DP-1	BASE	025Y072H	62.31	2.76	-0.026	62.31	2.14	0.00	1.60
DP-1	BASE	100Y072H	62.81	4.13	-0.026	62.81	2.76	0.00	1.60
DP-1	BASE	QUALITY	1.82	1.75	-0.011	1.82	2.07	0.00	1.60
DP-2	BASE	005Y001H	1.56	1.20	0.005	1.56	2.21	0.00	1.60
DP-2	BASE	005Y024H	14.86	1.41	-0.017	14.86	2.23	0.00	1.60
DP-2	BASE	010Y024H	14.65	1.46	-0.017	14.65	2.24	0.00	1.60
DP-2	BASE	025Y072H	62.30	1.63	-0.017	62.30	2.25	0.00	1.60
DP-2	BASE	100Y072H	62.80	10.92	-0.017	62.80	2.95	0.00	1.60
DP-2	BASE	QUALITY	0.00	0.00	0.000	6.97	2.00	0.00	1.60
DP-3	BASE	005Y001H	2.52	0.00	0.001	2.52	2.10	0.00	1.60
DP-3	BASE	005Y024H	14.52	0.00	0.003	14.52	2.10	0.00	1.60
DP-3	BASE	010Y024H	15.13	0.02	0.019	15.13	2.11	0.00	1.60
DP-3	BASE	025Y072H	63.11	6.80	0.053	63.11	2.76	0.00	1.60
DP-3	BASE	100Y072H	62.80	15.35	0.050	62.80	4.20	0.00	1.60
DP-3	BASE	QUALITY	2.31	0.00	0.001	2.31	2.10	0.00	1.60
DP-4-1	BASE	005Y001H	2.49	8.67	-0.046	2.49	2.78	0.00	1.60
DP-4-1	BASE	005Y024H	14.55	10.06	-0.047	14.55	2.88	0.00	1.60
DP-4-1	BASE	010Y024H	14.93	10.56	-0.048	14.93	2.91	0.00	1.60
DP-4-1	BASE	025Y072H	63.11	11.14	-0.047	63.11	2.98	0.00	1.60
DP-4-1	BASE	100Y072H	62.80	13.68	-0.057	62.80	3.66	0.00	1.60
DP-4-1	BASE	QUALITY	1.67	3.53	-0.011	1.67	2.42	0.00	1.60
DP-4-2	BASE	005Y001H	2.49	8.75	-0.046	2.49	2.78	0.00	1.60
DP-4-2	BASE	005Y024H	14.55	10.15	-0.047	14.55	2.88	0.00	1.60
DP-4-2	BASE	010Y024H	14.93	10.56	-0.048	14.93	2.91	0.00	1.60
DP-4-2	BASE	025Y072H	63.11	11.27	-0.047	63.11	2.98	0.00	1.60
DP-4-2	BASE	100Y072H	62.80	16.37	-0.057	62.80	3.66	0.00	1.60
DP-4-2	BASE	QUALITY	1.67	3.53	-0.011	1.67	2.42	0.00	1.60
DP-5	BASE	005Y001H	1.71	1.59	-0.009	1.71	2.25	0.00	1.60
DP-5	BASE	005Y024H	14.63	1.89	-0.013	14.63	2.28	0.00	1.60
DP-5	BASE	010Y024H	15.00	2.06	-0.021	15.00	2.30	0.00	1.60
DP-5	BASE	025Y072H	63.11	2.18	-0.023	63.11	2.31	0.00	1.60
DP-5	BASE	100Y072H	62.81	15.95	-0.022	62.81	4.40	0.00	1.60
DP-5	BASE	QUALITY	0.00	0.00	0.000	6.59	2.00	0.00	1.60
DP-6	BASE	005Y001H	1.75	11.92	-0.076	1.75	3.06	0.00	1.60
DP-6	BASE	005Y024H	14.88	14.49	-0.163	14.88	3.38	0.00	1.60
DP-6	BASE	010Y024H	14.93	15.58	-0.170	14.93	3.54	0.00	1.60
DP-6	BASE	025Y072H	63.11	16.56	-0.172	63.11	3.69	0.00	1.60
DP-6	BASE	100Y072H	62.80	18.05	-0.170	62.80	3.94	0.00	1.60
DP-6	BASE	QUALITY	0.00	0.00	0.000	6.42	2.00	0.00	1.60
DP-8	BASE	005Y001H	1.99	3.14	-0.054	1.99	2.25	0.00	1.60
DP-8	BASE	005Y024H	14.63	3.78	-0.047	14.63	2.28	0.00	1.60
DP-8	BASE	010Y024H	15.01	11.21	0.126	15.01	3.88	0.00	1.60
DP-8	BASE	025Y072H	63.11	12.96	0.127	63.11	4.64	0.00	1.60

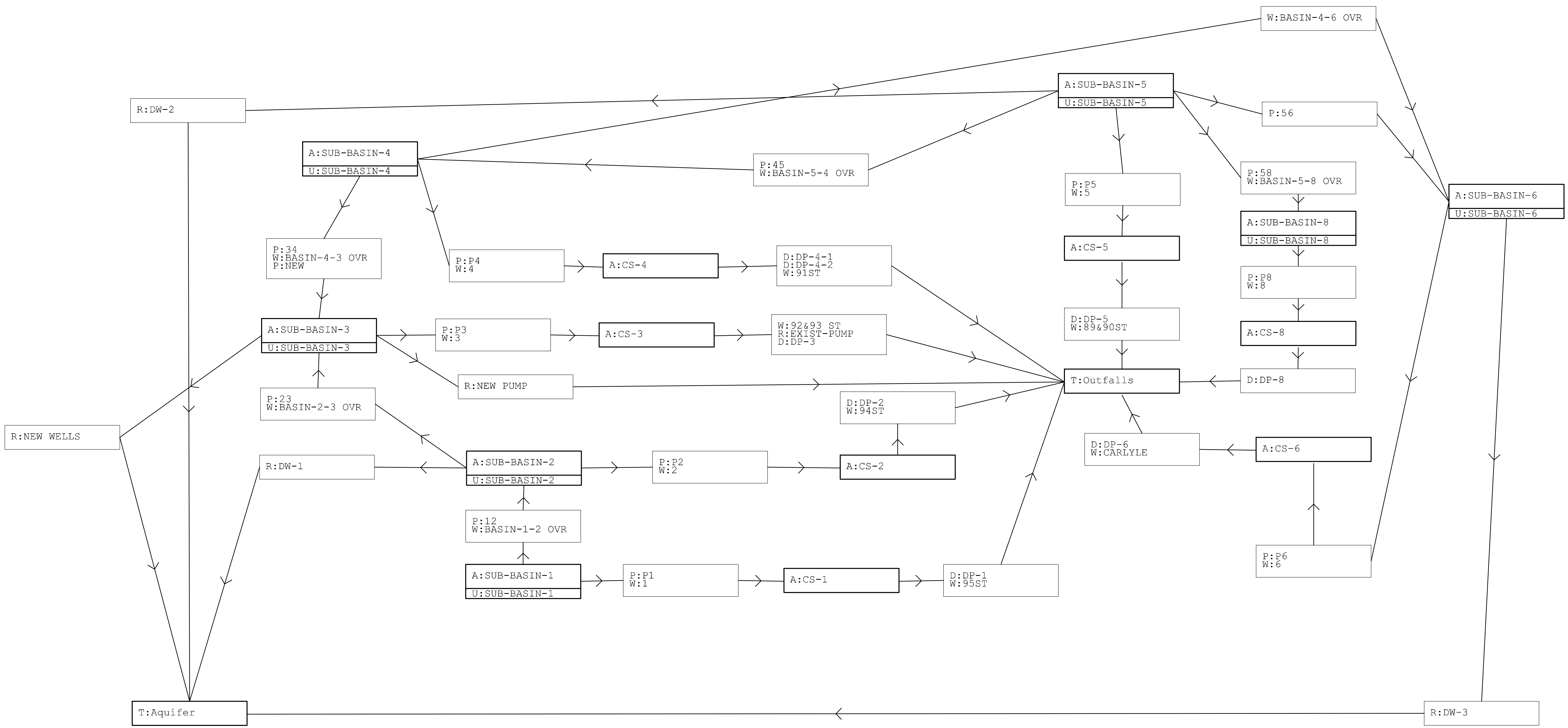
Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
DP-8	BASE	100Y072H	62.80	13.85	0.189	62.80	5.08	0.00	1.60
DP-8	BASE	QUALITY	1.25	0.59	-0.010	1.25	2.08	0.00	1.60
DW-1	BASE	005Y001H	0.40	23.10	23.100	1.56	3.84	0.00	-60.00
DW-1	BASE	005Y024H	5.91	23.10	23.100	14.86	4.50	0.00	-60.00
DW-1	BASE	010Y024H	5.43	23.10	23.100	14.65	4.67	0.00	-60.00
DW-1	BASE	025Y072H	9.58	23.10	23.100	62.30	4.82	0.00	-60.00
DW-1	BASE	100Y072H	7.22	23.10	23.100	62.80	5.08	0.00	-60.00
DW-1	BASE	QUALITY	0.89	23.10	23.100	1.89	2.02	0.00	-60.00
DW-2	BASE	005Y001H	0.41	23.10	23.100	1.71	3.50	0.00	-60.00
DW-2	BASE	005Y024H	5.93	23.10	23.100	14.63	4.04	0.00	-60.00
DW-2	BASE	010Y024H	5.46	23.10	23.100	15.00	4.38	0.00	-60.00
DW-2	BASE	025Y072H	9.90	23.10	23.100	63.11	4.65	0.00	-60.00
DW-2	BASE	100Y072H	7.30	23.10	23.100	62.80	5.08	0.00	-60.00
DW-2	BASE	QUALITY	0.89	23.10	23.100	1.42	2.01	0.00	-60.00
DW-3	BASE	005Y001H	0.45	23.10	23.100	1.75	3.52	0.00	-60.00
DW-3	BASE	005Y024H	6.15	23.10	23.100	14.88	4.12	0.00	-60.00
DW-3	BASE	010Y024H	5.66	23.10	23.100	14.93	4.39	0.00	-60.00
DW-3	BASE	025Y072H	10.87	23.10	23.100	63.11	4.65	0.00	-60.00
DW-3	BASE	100Y072H	8.16	23.10	23.100	62.80	5.08	0.00	-60.00
DW-3	BASE	QUALITY	0.98	23.10	23.100	1.61	2.00	0.00	-60.00
EXIST-PUMP	BASE	005Y001H	0.49	14.20	14.200	2.52	2.10	0.00	1.60
EXIST-PUMP	BASE	005Y024H	8.70	14.20	14.200	14.52	2.10	0.00	1.60
EXIST-PUMP	BASE	010Y024H	7.98	14.20	14.200	15.13	2.11	0.00	1.60
EXIST-PUMP	BASE	025Y072H	38.84	14.20	14.200	63.11	2.76	0.00	1.60
EXIST-PUMP	BASE	100Y072H	25.31	14.20	14.200	62.80	4.20	0.00	1.60
EXIST-PUMP	BASE	QUALITY	1.04	14.20	14.200	2.31	2.10	0.00	1.60
P1	BASE	005Y001H	2.72	2.39	-0.179	2.72	4.09	2.72	2.09
P1	BASE	005Y024H	14.86	2.61	-0.185	14.86	4.50	14.87	2.11
P1	BASE	010Y024H	14.65	2.70	-0.185	14.65	4.67	14.66	2.12
P1	BASE	025Y072H	62.30	2.76	-0.185	62.30	4.82	62.31	2.14
P1	BASE	100Y072H	61.31	2.84	-0.196	62.80	5.08	62.81	2.76
P1	BASE	QUALITY	1.82	1.75	-0.181	1.82	3.14	1.82	2.07
P2	BASE	005Y001H	1.56	1.20	0.326	1.56	3.84	1.56	2.21
P2	BASE	005Y024H	14.86	1.41	-0.327	14.86	4.50	14.86	2.23
P2	BASE	010Y024H	14.65	1.46	-0.327	14.65	4.67	14.65	2.24
P2	BASE	025Y072H	62.02	1.50	-0.327	62.30	4.82	62.30	2.25
P2	BASE	100Y072H	60.81	1.50	0.331	62.80	5.08	62.80	2.95
P2	BASE	QUALITY	1.89	0.45	-0.327	1.89	2.02	6.97	2.00
P3	BASE	005Y001H	2.48	1.39	0.137	2.51	3.79	2.52	2.10
P3	BASE	005Y024H	14.59	1.53	0.137	14.55	4.24	14.52	2.10
P3	BASE	010Y024H	15.03	1.57	0.158	14.93	4.40	15.13	2.11
P3	BASE	025Y072H	61.73	1.60	0.189	63.11	4.66	63.11	2.76
P3	BASE	100Y072H	60.81	1.60	0.162	62.80	5.08	62.80	4.20
P3	BASE	QUALITY	2.23	1.09	0.179	2.19	2.94	2.31	2.10
P4	BASE	005Y001H	2.49	17.42	1.308	2.49	3.79	2.49	2.78
P4	BASE	005Y024H	14.55	20.21	1.561	14.55	4.24	14.55	2.88
P4	BASE	010Y024H	14.93	21.12	1.562	14.93	4.39	14.93	2.91
P4	BASE	025Y072H	63.11	22.41	1.652	63.11	4.65	63.11	2.98
P4	BASE	100Y072H	61.31	23.11	1.647	62.80	5.08	62.80	3.66

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P4	BASE	QUALITY	1.67	7.10	-1.567	1.67	2.59	1.67	2.42
P5	BASE	005Y001H	1.71	1.59	0.497	1.71	3.50	1.71	2.25
P5	BASE	005Y024H	14.63	1.89	-0.499	14.63	4.04	14.63	2.28
P5	BASE	010Y024H	15.00	2.06	-0.499	15.00	4.38	15.00	2.30
P5	BASE	025Y072H	63.11	2.18	-0.502	63.11	4.65	63.11	2.31
P5	BASE	100Y072H	61.10	2.21	0.506	62.80	5.08	62.81	4.40
P5	BASE	QUALITY	1.63	0.68	-0.498	1.42	2.01	6.59	2.00
P6	BASE	005Y001H	1.74	11.92	-1.419	1.75	3.52	1.75	3.06
P6	BASE	005Y024H	14.87	14.49	-1.450	14.88	4.12	14.88	3.38
P6	BASE	010Y024H	14.93	15.58	-1.450	14.93	4.39	14.93	3.54
P6	BASE	025Y072H	63.11	16.56	-1.461	63.11	4.65	63.11	3.69
P6	BASE	100Y072H	62.79	18.05	-1.455	62.80	5.08	62.80	3.94
P6	BASE	QUALITY	1.73	3.13	-1.452	1.61	2.00	6.42	2.00
P8	BASE	005Y001H	1.99	3.14	-0.338	1.99	3.46	1.99	2.25
P8	BASE	005Y024H	14.63	3.78	-0.324	14.63	4.04	14.63	2.28
P8	BASE	010Y024H	13.38	3.86	-0.329	15.00	4.37	15.01	3.88
P8	BASE	025Y072H	60.85	3.86	-0.329	63.11	4.65	63.11	4.64
P8	BASE	100Y072H	60.46	3.86	-1.143	62.80	5.08	62.80	5.08
P8	BASE	QUALITY	1.21	0.66	-0.327	1.21	2.13	1.25	2.08

APPENDIX D

ICPR MODEL FOR PROPOSED IMPROVEMENTS – OPTION 1

Node-Reach Diagram
ICPR Input Data
Node Maximum Report
Link Maximum Report



NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS™
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Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

ICPR MODEL - OPTION 1
NODE REACH DIAGRAM

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No 181160

SHEET: ----

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: SUB-BASIN-1              Node: SUB-BASIN-1           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 27.810                  Time Shift(hrs): 0.00
          Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-2              Node: SUB-BASIN-2           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 30.400                  Time Shift(hrs): 0.00
          Curve Number: 85.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-3              Node: SUB-BASIN-3           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 41.040                  Time Shift(hrs): 0.00
          Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-4              Node: SUB-BASIN-4           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 32.390                  Time Shift(hrs): 0.00
          Curve Number: 85.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-5              Node: SUB-BASIN-5           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 32.600                  Time Shift(hrs): 0.00
          Curve Number: 85.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-6              Node: SUB-BASIN-6           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 54.600                  Time Shift(hrs): 0.00
          Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-8              Node: SUB-BASIN-8           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN
```

```
       Unit Hydrograph: Uh256                 Peaking Factor: 256.0
         Rainfall File:                   Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 30.00
              Area(ac): 7.240                 Time Shift(hrs): 0.00
          Curve Number: 84.00            Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name: Aquifer             Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                               Warn Stage(ft): 1.600
      Type: Time/Stage


      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         -60.000
       99999.00         -60.000

------------------------------------------------------------------------------------------
      Name: CS-1                Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                               Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001

------------------------------------------------------------------------------------------
      Name: CS-2                Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                               Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001

------------------------------------------------------------------------------------------
      Name: CS-3                Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                               Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001

------------------------------------------------------------------------------------------
      Name: CS-4                Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                               Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001

------------------------------------------------------------------------------------------
      Name: CS-5                Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                               Warn Stage(ft): 8.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          1.600          0.0000
          8.000          0.0001
```

Name: CS-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: CS-8 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: Outfalls Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 1.600
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	1.600
99999.00	1.600

Name: SUB-BASIN-1 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.090	0.0000
8.000	19.3100

Name: SUB-BASIN-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 2.800
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.690	0.0000
8.000	21.1000

Name: SUB-BASIN-3 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 2.800
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.690	0.0000
8.000	28.0000

Name: SUB-BASIN-4 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000

3.120	0.0000
8.000	23.0000

Name: SUB-BASIN-5 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.110	0.0000
8.000	19.5000

Name: SUB-BASIN-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.060	0.0000
8.000	32.7500

Name: SUB-BASIN-8 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.330	0.0000
8.000	4.8400

==== Cross Sections ====

Name: SECTION 1 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	3.250	0.016000
18.000	3.800	0.016000
36.000	3.250	0.016000

==== Operating Tables ====

Name: DRAINAGE WELLS Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

DRAINAGE WELL CAPACITY: 500 GPM/FT. OF AVAILABLE HEAD

US Stage(ft)	Discharge(cfs)
1.900	7.70
8.000	7.70

Name: EXIST-PUMP Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

US Stage(ft)	Discharge(cfs)
2.000	14.20
8.000	14.20

```
-------------------------------------------------------------------------------------------
      Name: NEW PUMP            Group: BASE
      Type: Rating Curve
  Function: US Stage vs. Discharge



   US Stage(ft)  Discharge(cfs)
--------------- ---------------
          1.900            5.00
          8.000            5.00

===========================================================================================
==== Pipes ================================================================================
===========================================================================================

         Name: 12                 From Node: Sub-Basin-1       Length(ft): 650.00
        Group: BASE                 To Node: Sub-Basin-2            Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular      Circular                                 Flow: Both
     Span(in): 18.00         18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                          Exit Loss Coef: 1.00
   Invert(ft): -1.500        -1.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
         Name: 23                 From Node: Sub-Basin-2       Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-3            Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular      Circular                                 Flow: Both
     Span(in): 18.00         18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                          Exit Loss Coef: 1.00
   Invert(ft): -1.500        -1.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
         Name: 34                 From Node: Sub-Basin-4       Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-3            Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular      Circular                                 Flow: Both
     Span(in): 18.00         18.00                      Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                          Exit Loss Coef: 1.00
   Invert(ft): -1.500        -1.500                         Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                     Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-----------------------------------------------------------------------------------------------------
```

```
         Name: 45                 From Node: Sub-Basin-5       Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-4            Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: 56                 From Node: Sub-Basin-5       Length(ft): 250.00
        Group: BASE                 To Node: Sub-Basin-6            Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: 58                 From Node: Sub-Basin-5       Length(ft): 550.00
        Group: BASE                 To Node: Sub-Basin-8            Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                         Exit Loss Coef: 1.00
   Invert(ft): -4.320         -1.120                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: NEW                From Node: SUB-BASIN-4       Length(ft): 600.00
        Group: BASE                 To Node: SUB-BASIN-3            Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 24.00          24.00                     Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                         Exit Loss Coef: 1.00
   Invert(ft): -3.000         -3.000                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P1                From Node: Sub-Basin-1       Length(ft): 600.00
        Group: BASE                To Node: CS-1                   Count: 1
                                                       Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                               Flow: Both
     Span(in): 15.00         15.00                    Entrance Loss Coef: 0.00
     Rise(in): 15.00         15.00                        Exit Loss Coef: 1.00
   Invert(ft): -0.820        -1.830                       Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P2                From Node: Sub-Basin-2       Length(ft): 600.00
        Group: BASE                To Node: CS-2                   Count: 1
                                                       Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                               Flow: Both
     Span(in): 12.00         12.00                    Entrance Loss Coef: 0.00
     Rise(in): 12.00         12.00                        Exit Loss Coef: 1.00
   Invert(ft): -0.210        -2.740                       Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P3                From Node: Sub-Basin-3       Length(ft): 600.00
        Group: BASE                To Node: CS-3                   Count: 1
                                                       Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                               Flow: Both
     Span(in): 12.00         12.00                    Entrance Loss Coef: 0.00
     Rise(in): 12.00         12.00                        Exit Loss Coef: 1.00
   Invert(ft): -0.630        -2.330                       Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P4                From Node: Sub-Basin-4       Length(ft): 600.00
        Group: BASE                To Node: CS-4                   Count: 2
                                                       Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                               Flow: Both
     Span(in): 24.00         24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00         24.00                        Exit Loss Coef: 1.00
   Invert(ft): -0.630        -2.330                       Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                   Outlet Ctrl Spec: Use dc or tw
```

```
 Top Clip(in): 0.000          0.000                          Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                        Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P5                From Node: Sub-Basin-5        Length(ft): 250.00
        Group: BASE                To Node: CS-5                    Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                               Flow: Both
     Span(in): 12.00          12.00                    Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                        Exit Loss Coef: 1.00
   Invert(ft): 0.420          -4.320                       Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P6                From Node: Sub-Basin-6        Length(ft): 600.00
        Group: BASE                To Node: CS-6                    Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                               Flow: Both
     Span(in): 36.00          36.00                    Entrance Loss Coef: 0.00
     Rise(in): 36.00          36.00                        Exit Loss Coef: 1.00
   Invert(ft): 0.880          -1.730                       Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P8                From Node: Sub-Basin-8        Length(ft): 250.00
        Group: BASE                To Node: CS-8                    Count: 2
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                               Flow: Both
     Span(in): 12.00          12.00                    Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                        Exit Loss Coef: 1.00
   Invert(ft): -1.200         -1.580                       Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================
```

```
        Name: DP-1              From Node: CS-1           Length(ft): 100.00
       Group: BASE                To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Automatic
    Span(in): 15.00          15.00                                  Flow: Positive
    Rise(in): 15.00          15.00                    Entrance Loss Coef: 0.000
  Invert(ft): -1.410         -1.830                       Exit Loss Coef: 1.000
 Manning's N: 0.020000       0.020000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-1 ***
                                                                              TABLE
                 Count: 7                     Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Positive               Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                      Invert(ft): 2.000
              Rise(in): 9.00                 Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
        Name: DP-2              From Node: CS-2           Length(ft): 100.00
       Group: BASE                To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Automatic
    Span(in): 30.00          30.00                                  Flow: Positive
    Rise(in): 30.00          30.00                    Entrance Loss Coef: 0.000
  Invert(ft): -2.740         -3.070                       Exit Loss Coef: 1.000
 Manning's N: 0.020000       0.020000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-2 ***
                                                                              TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Positive               Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                      Invert(ft): 2.000
              Rise(in): 9.00                 Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
        Name: DP-3              From Node: CS-3           Length(ft): 100.00
       Group: BASE                To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                 Solution Algorithm: Automatic
    Span(in): 24.00          24.00                                  Flow: Positive
    Rise(in): 24.00          24.00                    Entrance Loss Coef: 0.000
  Invert(ft): -1.500         -1.500                       Exit Loss Coef: 1.000
 Manning's N: 0.020000       0.020000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                      Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
*** Weir 1 of 1 for Drop Structure DP-3 ***
                                                                                   TABLE
                Count: 1                        Bottom Clip(in): 0.000
                 Type: Vertical: Mavis             Top Clip(in): 0.000
                 Flow: Positive                  Weir Disc Coef: 3.200
             Geometry: Rectangular            Orifice Disc Coef: 0.600

             Span(in): 48.00                         Invert(ft): 2.100
             Rise(in): 9.00                    Control Elev(ft): 2.100


----------------------------------------------------------------------------------------------------
         Name: DP-4-1              From Node: CS-4             Length(ft): 100.00
        Group: BASE                  To Node: Outfalls              Count: 1

             UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular     Circular                 Solution Algorithm: Automatic
     Span(in): 24.00        24.00                                  Flow: Positive
     Rise(in): 24.00        24.00                    Entrance Loss Coef: 0.000
   Invert(ft): -4.060       -2.300                       Exit Loss Coef: 1.000
  Manning's N: 0.020000     0.020000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000        0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000        0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-4-1 ***
                                                                                   TABLE
                Count: 1                        Bottom Clip(in): 0.000
                 Type: Vertical: Mavis             Top Clip(in): 0.000
                 Flow: Positive                  Weir Disc Coef: 3.200
             Geometry: Rectangular            Orifice Disc Coef: 0.600

             Span(in): 48.00                         Invert(ft): 2.000
             Rise(in): 9.00                    Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-4-2              From Node: CS-4             Length(ft): 100.00
        Group: BASE                  To Node: Outfalls              Count: 1

             UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular     Circular                 Solution Algorithm: Automatic
     Span(in): 30.00        30.00                                  Flow: Positive
     Rise(in): 30.00        30.00                    Entrance Loss Coef: 0.000
   Invert(ft): -1.070       -1.820                       Exit Loss Coef: 1.000
  Manning's N: 0.020000     0.020000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000        0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000        0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-4-2 ***
                                                                                   TABLE
                Count: 1                        Bottom Clip(in): 0.000
                 Type: Vertical: Mavis             Top Clip(in): 0.000
                 Flow: Positive                  Weir Disc Coef: 3.200
             Geometry: Rectangular            Orifice Disc Coef: 0.600

             Span(in): 48.00                         Invert(ft): 2.000
             Rise(in): 9.00                    Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-5                From Node: CS-5             Length(ft): 100.00
        Group: BASE                  To Node: Outfalls              Count: 1

             UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular     Circular                 Solution Algorithm: Automatic
     Span(in): 24.00        24.00                                  Flow: Positive
     Rise(in): 24.00        24.00                    Entrance Loss Coef: 0.000
   Invert(ft): -4.320       -2.470                       Exit Loss Coef: 1.000
  Manning's N: 0.020000     0.020000                  Outlet Ctrl Spec: Use dc or tw
```

```
 Top Clip(in): 0.000         0.000                    Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                      Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-5 ***
                                                                                 TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Positive               Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                     Invert(ft): 2.000
              Rise(in): 9.00                Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-6              From Node: CS-6            Length(ft): 100.00
        Group: BASE                To Node: Outfalls             Count: 1

              UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular      Circular                Solution Algorithm: Automatic
     Span(in): 36.00         36.00                                 Flow: Positive
     Rise(in): 36.00         36.00                   Entrance Loss Coef: 0.000
   Invert(ft): -1.730        -3.610                      Exit Loss Coef: 1.000
  Manning's N: 0.020000      0.020000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-6 ***
                                                                                 TABLE
                 Count: 1                     Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Positive               Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                     Invert(ft): 2.000
              Rise(in): 9.00                Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-8              From Node: CS-8            Length(ft): 100.00
        Group: BASE                To Node: Outfalls             Count: 2

              UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular      Circular                Solution Algorithm: Automatic
     Span(in): 15.00         15.00                                 Flow: Positive
     Rise(in): 15.00         15.00                   Entrance Loss Coef: 0.000
   Invert(ft): -1.580        -1.580                      Exit Loss Coef: 1.000
  Manning's N: 0.020000      0.020000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                        Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-8 ***
                                                                                 TABLE
                 Count: 2                     Bottom Clip(in): 0.000
                  Type: Vertical: Mavis          Top Clip(in): 0.000
                  Flow: Positive               Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                     Invert(ft): 2.000
              Rise(in): 9.00                Control Elev(ft): 2.000
```

```
==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name: 1                   From Node: Sub-Basin-1
        Group: BASE                  To Node: CS-1
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 5.000
       Control Elevation(ft): 5.000
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: 2                   From Node: Sub-Basin-2
        Group: BASE                  To Node: CS-2
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.800
       Control Elevation(ft): 4.800
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: 3                   From Node: Sub-Basin-3
        Group: BASE                  To Node: CS-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.200
       Control Elevation(ft): 4.200
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: 4                   From Node: Sub-Basin-4
        Group: BASE                  To Node: CS-4
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.800
       Control Elevation(ft): 4.800
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: 5                   From Node: Sub-Basin-5
        Group: BASE                  To Node: CS-5
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.700
```

```
       Control Elevation(ft): 4.700
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 6                  From Node: Sub-Basin-6
        Group: BASE                 To Node: CS-6
         Flow: Both                   Count: 1
         Type: Vertical: Paved     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 5.200
       Control Elevation(ft): 5.200
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 8                  From Node: Sub-Basin-8
        Group: BASE                 To Node: CS-8
         Flow: Both                   Count: 1
         Type: Vertical: Paved     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 89&90ST            From Node: CS-5
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 2
         Type: Vertical: Paved     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 999999.00
                 Invert(ft): 4.900
       Control Elevation(ft): 4.900
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 91ST               From Node: CS-4
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 1
         Type: Vertical: Gravel    Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 5.000
       Control Elevation(ft): 5.000
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 92&93 ST           From Node: CS-3
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 2
```

```
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 180.00
                    Rise(in): 999999.00
                  Invert(ft): 3.800
       Control Elevation(ft): 3.800
                                              TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 94ST                From Node: CS-2
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.600
       Control Elevation(ft): 4.600
                                              TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 95ST                From Node: CS-1
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.550
       Control Elevation(ft): 4.550
                                              TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-1-2 OVR       From Node: SUB-BASIN-1
        Group: BASE                  To Node: SUB-BASIN-2
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 9999.00
                  Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                              TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

Bay Drive Roadway Overflow

----------------------------------------------------------------------------------------------------
         Name: BASIN-2-3 OVR       From Node: SUB-BASIN-2
        Group: BASE                  To Node: SUB-BASIN-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.500
       Control Elevation(ft): 4.500
                                              TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600
```

```
----------------------------------------------------------------------------------------------------
         Name: BASIN-4-3 OVR       From Node: SUB-BASIN-4
        Group: BASE                  To Node: SUB-BASIN-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Irregular

                        XSec: SECTION 1
                  Invert(ft): 3.250
       Control Elevation(ft): 3.250
      Struct Opening Dim(ft): 9999.00
                                             TABLE
             Bottom Clip(ft): 0.000
                Top Clip(ft): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: BASIN-4-6 OVR       From Node: SUB-BASIN-4
        Group: BASE                  To Node: SUB-BASIN-6
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.000
       Control Elevation(ft): 4.000
                                             TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: BASIN-5-4 OVR       From Node: SUB-BASIN-5
        Group: BASE                  To Node: SUB-BASIN-4
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                             TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: BASIN-5-8 OVR       From Node: SUB-BASIN-5
        Group: BASE                  To Node: SUB-BASIN-8
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 3.500
       Control Elevation(ft): 3.500
                                             TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: CARLYLE             From Node: CS-6
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.600
       Control Elevation(ft): 4.600
                                             TABLE
             Bottom Clip(in): 0.000
```

```
            Top Clip(in): 0.000
      Weir Discharge Coef: 3.200
   Orifice Discharge Coef: 0.600


===========================================================================================
==== Rating Curves ========================================================================
===========================================================================================

        Name: DW-1                From Node: Sub-Basin-2            Count: 3
       Group: BASE                  To Node: Aquifer                 Flow: Positive

             TABLE           ELEV ON(ft)     ELEV OFF(ft)
         #1: Drainage Wells  2.000           1.600
         #2:                 0.000           0.000
         #3:                 0.000           0.000
         #4:                 0.000           0.000

----------------------------------------------------------------------------------------------------
        Name: DW-2                From Node: Sub-Basin-5            Count: 3
       Group: BASE                  To Node: Aquifer                 Flow: Positive

             TABLE           ELEV ON(ft)     ELEV OFF(ft)
         #1: Drainage Wells  2.000           1.600
         #2:                 0.000           0.000
         #3:                 0.000           0.000
         #4:                 0.000           0.000

----------------------------------------------------------------------------------------------------
        Name: DW-3                From Node: Sub-Basin-6            Count: 3
       Group: BASE                  To Node: Aquifer                 Flow: Positive

             TABLE           ELEV ON(ft)     ELEV OFF(ft)
         #1: Drainage Wells  2.000           1.600
         #2:                 0.000           0.000
         #3:                 0.000           0.000
         #4:                 0.000           0.000

----------------------------------------------------------------------------------------------------
        Name: EXIST-PUMP          From Node: CS-3                   Count: 1
       Group: BASE                  To Node: Outfalls                Flow: Both

             TABLE           ELEV ON(ft)     ELEV OFF(ft)
         #1: EXIST-PUMP      2.100           1.600
         #2:                 0.000           0.000
         #3:                 0.000           0.000
         #4:                 0.000           0.000

----------------------------------------------------------------------------------------------------
        Name: NEW PUMP            From Node: SUB-BASIN-3            Count: 1
       Group: BASE                  To Node: Outfalls                Flow: Both

             TABLE           ELEV ON(ft)     ELEV OFF(ft)
         #1: NEW PUMP        2.000           1.600
         #2:                 0.000           0.000
         #3:                 0.000           0.000
         #4:                 0.000           0.000

----------------------------------------------------------------------------------------------------
        Name: NEW WELLS           From Node: SUB-BASIN-3            Count: 3
       Group: BASE                  To Node: Aquifer                 Flow: None

             TABLE           ELEV ON(ft)     ELEV OFF(ft)
         #1: DRAINAGE WELLS  2.000           1.600
         #2:                 0.000           0.000
         #3:                 0.000           0.000
         #4:                 0.000           0.000


===========================================================================================
==== Hydrology Simulations ================================================================
===========================================================================================
```

```
        Name: 005YR001HR
    Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\005YR001HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
         Rainfall File: Fdot-1
    Rainfall Amount(in): 3.20

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
        Name: 005YR024HR
    Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\005YR024HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: SFWMD-24HR
    Rainfall Amount(in): 6.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
        Name: 010YR024HR
    Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\010YR024HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: SFWMD-24HR
    Rainfall Amount(in): 7.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
        Name: 025YR072HR
    Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\025YR072HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
         Rainfall File: Sfwmd72
    Rainfall Amount(in): 11.00

Time(hrs)       Print Inc(min)
--------------- ---------------
96.000          5.00

----------------------------------------------------------------------------------------------------
        Name: 100YR072HR
    Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\100YR072HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
         Rainfall File: Sfwmd72
    Rainfall Amount(in): 15.00

Time(hrs)       Print Inc(min)
--------------- ---------------
96.000          5.00

----------------------------------------------------------------------------------------------------
        Name: QUALITY
    Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\QUALITY.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.63
         Rainfall File: Scsiii
    Rainfall Amount(in): 1.58

Time(hrs)       Print Inc(min)
--------------- ---------------
12.000          1.00
24.000          15.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

        Name: 005YR001HR         Hydrology Sim: 005YR001HR
    Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\005YR001HR.I32
```

```
      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 6.00
     Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         1.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 005YR024HR          Hydrology Sim: 005YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\005YR024HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 48.00
     Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.000
48.000          15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 010YR024HR          Hydrology Sim: 010YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\010YR024HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 48.00
     Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.000
48.000          15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 025YR072HR          Hydrology Sim: 025YR072HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\025YR072HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 120.00
     Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:
```

Time(hrs)	Print Inc(min)
30.000	30.000
50.000	5.000
72.000	5.000
120.000	30.000

Group	Run
BASE	Yes

```
          Name: 100YR072HR          Hydrology Sim: 100YR072HR
      Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\100YR072HR.I32

       Execute: Yes         Restart: No            Patch: No
   Alternative: No

         Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
         Start Time(hrs): 0.000                     End Time(hrs): 120.00
      Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
         Boundary Stages:                          Boundary Flows:
```

Time(hrs)	Print Inc(min)
30.000	30.000
50.000	5.000
72.000	5.000
120.000	30.000

Group	Run
BASE	Yes

```
          Name: QUALITY             Hydrology Sim: QUALITY
      Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 1\QUALITY.I32

       Execute: Yes         Restart: No            Patch: No
   Alternative: No

         Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
         Start Time(hrs): 0.000                     End Time(hrs): 24.00
      Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
         Boundary Stages:                          Boundary Flows:
```

Time(hrs)	Print Inc(min)
24.000	5.000

Group	Run
BASE	Yes

ABBOTT AVE DRAINAGE STUDY
ICPR MODEL FOR PROPOSED CONDITIONS-OPTION 1
NODE MAXMUM REPORT

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Aquifer	BASE	005YR001HR	0.00	-60.00	1.60	-61.6000	0	0.53	69.30	0.00	0.00
Aquifer	BASE	005YR024HR	0.00	-60.00	1.60	-61.6000	0	8.66	69.30	0.00	0.00
Aquifer	BASE	010YR024HR	0.00	-60.00	1.60	-61.6000	0	7.91	69.30	0.00	0.00
Aquifer	BASE	025YR072HR	0.00	-60.00	1.60	-61.6000	0	38.33	69.30	0.00	0.00
Aquifer	BASE	100YR072HR	0.00	-60.00	1.60	-61.6000	0	25.06	69.30	0.00	0.00
Aquifer	BASE	QUALITY	0.00	-60.00	1.60	-61.6000	0	1.03	69.30	0.00	0.00
CS-1	BASE	005YR001HR	2.72	2.09	8.00	0.0025	132	2.72	2.39	2.72	2.39
CS-1	BASE	005YR024HR	14.86	2.11	8.00	0.0026	132	14.85	2.61	14.86	2.61
CS-1	BASE	010YR024HR	14.66	2.12	8.00	0.0026	132	14.65	2.69	14.66	2.69
CS-1	BASE	025YR072HR	62.31	2.14	8.00	0.0028	132	62.30	2.76	62.31	2.76
CS-1	BASE	100YR072HR	62.81	2.49	8.00	0.0028	132	62.80	3.61	62.81	3.61
CS-1	BASE	QUALITY	1.82	2.07	8.00	0.0024	132	1.82	1.75	1.82	1.75
CS-2	BASE	005YR001HR	1.55	2.21	8.00	0.0023	128	1.55	1.19	1.55	1.19
CS-2	BASE	005YR024HR	14.85	2.23	8.00	-0.0027	128	14.85	1.41	14.85	1.41
CS-2	BASE	010YR024HR	14.65	2.23	8.00	-0.0027	128	14.65	1.46	14.65	1.46
CS-2	BASE	025YR072HR	62.30	2.25	8.00	-0.0026	128	62.30	1.60	62.30	1.60
CS-2	BASE	100YR072HR	62.80	2.84	8.00	0.0028	128	62.80	9.66	62.80	9.66
CS-2	BASE	QUALITY	6.37	2.00	8.00	-0.0023	128	1.89	0.44	0.00	0.00
CS-3	BASE	005YR001HR	2.85	2.10	8.00	-0.0548	128	2.34	1.36	2.85	14.20
CS-3	BASE	005YR024HR	14.32	2.10	8.00	-0.0549	128	14.55	1.51	14.32	14.20
CS-3	BASE	010YR024HR	14.98	2.11	8.00	-0.0547	128	14.86	5.62	14.98	14.21
CS-3	BASE	025YR072HR	63.07	2.56	8.00	-0.0551	128	63.06	18.24	63.07	18.24
CS-3	BASE	100YR072HR	62.82	4.17	8.00	-0.0549	128	62.82	51.20	62.82	51.20
CS-3	BASE	QUALITY	1.68	2.10	8.00	-0.0549	128	1.66	0.91	1.68	14.20
CS-4	BASE	005YR001HR	2.33	2.76	8.00	-0.0063	173	2.33	16.93	2.33	16.93
CS-4	BASE	005YR024HR	14.64	2.87	8.00	-0.0051	173	14.64	19.97	14.64	19.97
CS-4	BASE	010YR024HR	14.87	2.90	8.00	0.0048	173	14.87	20.93	14.87	20.93
CS-4	BASE	025YR072HR	63.07	2.97	8.00	0.0050	173	63.07	22.20	63.07	22.20
CS-4	BASE	100YR072HR	62.82	3.57	8.00	-0.0075	173	62.82	29.17	62.82	29.17
CS-4	BASE	QUALITY	1.66	2.39	8.00	-0.0049	173	1.66	6.30	1.66	6.24
CS-5	BASE	005YR001HR	1.71	2.25	8.00	-0.0036	119	1.70	1.59	1.71	1.59
CS-5	BASE	005YR024HR	14.34	2.28	8.00	-0.0037	119	14.33	1.87	14.34	1.87
CS-5	BASE	010YR024HR	14.96	2.29	8.00	-0.0037	119	14.95	2.04	14.96	2.04
CS-5	BASE	025YR072HR	63.07	2.31	8.00	-0.0037	119	63.07	2.16	63.07	2.16
CS-5	BASE	100YR072HR	62.83	3.98	8.00	-0.0037	119	62.82	14.71	62.83	14.71
CS-5	BASE	QUALITY	6.09	2.00	8.00	-0.0037	119	1.64	0.68	0.00	0.00
CS-6	BASE	005YR001HR	1.75	3.06	8.00	0.0053	292	1.74	11.91	1.75	11.91
CS-6	BASE	005YR024HR	14.62	3.35	8.00	-0.0100	158	14.61	14.25	14.62	14.25
CS-6	BASE	010YR024HR	14.87	3.52	8.00	-0.0108	158	14.86	15.44	14.87	15.44
CS-6	BASE	025YR072HR	63.07	3.67	8.00	-0.0107	158	63.06	16.40	63.07	16.40
CS-6	BASE	100YR072HR	62.82	3.92	8.00	-0.0108	158	62.82	17.96	62.82	17.96
CS-6	BASE	QUALITY	5.97	2.00	8.00	-0.0050	364	1.71	3.15	0.00	0.00
CS-8	BASE	005YR001HR	1.98	2.25	8.00	-0.0041	126	1.98	3.13	1.98	3.13
CS-8	BASE	005YR024HR	14.34	2.28	8.00	-0.0038	126	14.33	3.74	14.34	3.74
CS-8	BASE	010YR024HR	14.96	3.41	8.00	-0.0035	126	14.95	10.00	14.96	10.00
CS-8	BASE	025YR072HR	63.07	4.60	8.00	0.0063	126	63.44	15.78	63.07	12.86
CS-8	BASE	100YR072HR	62.27	5.05	8.00	0.0942	126	62.82	52.63	62.27	13.79
CS-8	BASE	QUALITY	1.25	2.08	8.00	-0.0027	126	1.13	0.68	1.25	0.60
Outfalls	BASE	005YR001HR	0.00	1.60	1.60	0.0000	0	1.83	55.92	0.00	0.00
Outfalls	BASE	005YR024HR	0.00	1.60	1.60	0.0000	0	14.60	63.04	0.00	0.00

ABBOTT AVE DRAINAGE STUDY
ICPR MODEL FOR PROPOSED CONDITIONS-OPTION 1
NODE MAXMUM REPORT

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Outfalls	BASE	010YR024HR	0.00	1.60	1.60	0.0000	0	14.98	71.76	0.00	0.00
Outfalls	BASE	025YR072HR	0.00	1.60	1.60	0.0000	0	63.06	81.11	0.00	0.00
Outfalls	BASE	100YR072HR	0.00	1.60	1.60	0.0000	0	62.82	144.96	0.00	0.00
Outfalls	BASE	QUALITY	0.00	1.60	1.60	0.0000	0	1.63	27.33	0.00	0.00
SUB-BASIN-1	BASE	005YR001HR	2.72	4.09	8.00	-0.0055	171854	1.25	26.15	2.79	8.64
SUB-BASIN-1	BASE	005YR024HR	14.85	4.50	8.00	-0.0137	240849	12.50	35.60	16.56	15.13
SUB-BASIN-1	BASE	010YR024HR	14.65	4.67	8.00	-0.0144	270414	12.50	42.75	14.97	17.63
SUB-BASIN-1	BASE	025YR072HR	62.30	4.82	8.00	-0.0172	295809	60.50	52.14	62.47	23.40
SUB-BASIN-1	BASE	100YR072HR	62.80	5.06	8.00	-0.0177	337238	60.50	72.81	61.81	38.76
SUB-BASIN-1	BASE	QUALITY	1.82	3.14	8.00	-0.0063	8897	1.67	6.58	1.86	6.67
SUB-BASIN-2	BASE	005YR001HR	1.55	3.84	2.80	0.0623	31499	1.25	28.75	1.10	26.73
SUB-BASIN-2	BASE	005YR024HR	14.85	4.49	2.80	-0.0622	171461	13.03	39.52	12.15	26.79
SUB-BASIN-2	BASE	010YR024HR	14.65	4.67	2.80	-0.0624	208220	12.80	47.56	14.64	34.14
SUB-BASIN-2	BASE	025YR072HR	62.30	4.81	2.80	0.0626	239721	60.62	57.49	62.28	46.13
SUB-BASIN-2	BASE	100YR072HR	62.80	5.06	2.80	0.0626	291301	61.06	87.78	61.75	78.50
SUB-BASIN-2	BASE	QUALITY	1.72	2.02	2.80	-0.0623	182	1.67	12.71	0.98	24.92
SUB-BASIN-3	BASE	005YR001HR	2.34	3.72	2.80	-0.0286	236193	1.25	45.80	2.34	6.36
SUB-BASIN-3	BASE	005YR024HR	14.65	4.20	2.80	-0.0249	346650	12.50	62.69	14.55	6.51
SUB-BASIN-3	BASE	010YR024HR	14.87	4.36	2.80	-0.0247	383477	12.44	74.40	14.86	10.62
SUB-BASIN-3	BASE	025YR072HR	63.06	4.61	2.80	-0.0236	441511	60.32	81.90	63.06	23.24
SUB-BASIN-3	BASE	100YR072HR	62.82	5.05	2.80	-0.0313	542621	60.55	111.69	62.82	56.20
SUB-BASIN-3	BASE	QUALITY	1.68	2.53	2.80	0.0112	218	1.16	6.62	1.66	5.91
SUB-BASIN-4	BASE	005YR001HR	2.33	3.72	8.00	-0.0103	122511	1.25	30.77	1.38	20.57
SUB-BASIN-4	BASE	005YR024HR	14.64	4.20	8.00	-0.0091	221158	12.50	41.72	12.49	24.09
SUB-BASIN-4	BASE	010YR024HR	14.87	4.36	8.00	-0.0091	253986	12.50	50.29	12.43	26.42
SUB-BASIN-4	BASE	025YR072HR	63.07	4.61	8.00	-0.0089	305953	60.50	60.83	60.28	25.57
SUB-BASIN-4	BASE	100YR072HR	62.82	5.05	8.00	-0.0108	396720	60.50	86.21	60.44	21.73
SUB-BASIN-4	BASE	QUALITY	1.66	2.52	8.00	-0.0052	263	1.67	5.79	1.61	5.74
SUB-BASIN-5	BASE	005YR001HR	1.70	3.49	8.00	0.0625	66584	1.25	31.99	0.54	25.72
SUB-BASIN-5	BASE	005YR024HR	14.33	3.99	8.00	-0.0619	153475	12.50	42.66	12.61	29.52
SUB-BASIN-5	BASE	010YR024HR	14.95	4.34	8.00	-0.0617	212862	12.50	51.05	12.43	29.66
SUB-BASIN-5	BASE	025YR072HR	63.07	4.61	8.00	-0.0625	260141	60.50	61.55	60.25	27.18
SUB-BASIN-5	BASE	100YR072HR	62.82	5.05	8.00	-0.0624	337016	60.50	85.72	62.71	30.93
SUB-BASIN-5	BASE	QUALITY	1.53	2.01	8.00	-0.0620	179	1.67	8.40	2.54	26.76
SUB-BASIN-6	BASE	005YR001HR	1.74	3.52	8.00	0.0154	134203	1.25	50.65	1.74	35.01
SUB-BASIN-6	BASE	005YR024HR	14.61	4.06	8.00	-0.0188	289378	12.50	69.20	14.61	37.35
SUB-BASIN-6	BASE	010YR024HR	14.87	4.35	8.00	-0.0205	374028	12.50	83.05	14.86	38.54
SUB-BASIN-6	BASE	025YR072HR	63.07	4.61	8.00	-0.0203	447320	60.50	101.71	63.06	39.50
SUB-BASIN-6	BASE	100YR072HR	62.82	5.05	8.00	-0.0205	575552	60.48	147.93	62.82	41.06
SUB-BASIN-6	BASE	QUALITY	1.74	2.00	8.00	-0.0148	787	1.65	16.68	1.71	26.25
SUB-BASIN-8	BASE	005YR001HR	1.98	3.45	8.00	-0.0135	41729	0.95	13.54	1.98	3.13
SUB-BASIN-8	BASE	005YR024HR	14.33	3.99	8.00	-0.0119	61870	12.61	16.93	14.33	3.74
SUB-BASIN-8	BASE	010YR024HR	14.96	4.33	8.00	-0.0123	74552	12.43	20.60	14.95	10.00
SUB-BASIN-8	BASE	025YR072HR	63.07	4.61	8.00	-0.0138	84666	60.25	23.85	63.44	15.78
SUB-BASIN-8	BASE	100YR072HR	62.82	5.05	8.00	-0.0127	101132	60.75	30.68	62.82	52.63
SUB-BASIN-8	BASE	QUALITY	1.25	2.13	8.00	-0.0070	146	2.00	2.29	1.13	0.68

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
1	BASE	005YR001HR	0.00	0.00	0.000	2.72	4.09	2.72	2.09
1	BASE	005YR024HR	0.00	0.00	0.000	14.85	4.50	14.86	2.11
1	BASE	010YR024HR	0.00	0.00	0.000	14.65	4.67	14.66	2.12
1	BASE	025YR072HR	0.00	0.00	0.000	62.30	4.82	62.31	2.14
1	BASE	100YR072HR	62.80	0.90	0.000	62.80	5.06	62.81	2.49
1	BASE	QUALITY	0.00	0.00	0.000	1.82	3.14	1.82	2.07
12	BASE	005YR001HR	2.79	6.25	0.987	2.72	4.09	1.55	3.84
12	BASE	005YR024HR	18.04	6.39	1.049	14.85	4.50	14.85	4.49
12	BASE	010YR024HR	19.13	6.39	1.048	14.65	4.67	14.65	4.67
12	BASE	025YR072HR	67.83	6.39	1.079	62.30	4.82	62.30	4.81
12	BASE	100YR072HR	69.83	6.38	1.084	62.80	5.06	62.80	5.06
12	BASE	QUALITY	1.86	4.93	0.955	1.82	3.14	1.72	2.02
2	BASE	005YR001HR	0.00	0.00	0.000	1.55	3.84	1.55	2.21
2	BASE	005YR024HR	0.00	0.00	0.000	14.85	4.49	14.85	2.23
2	BASE	010YR024HR	0.00	0.00	0.000	14.65	4.67	14.65	2.23
2	BASE	025YR072HR	62.30	0.10	0.000	62.30	4.81	62.30	2.25
2	BASE	100YR072HR	62.80	8.27	0.006	62.80	5.06	62.80	2.84
2	BASE	QUALITY	0.00	0.00	0.000	1.72	2.02	6.37	2.00
23	BASE	005YR001HR	1.10	2.48	-1.189	1.55	3.84	2.34	3.72
23	BASE	005YR024HR	12.14	2.55	-1.221	14.85	4.49	14.65	4.20
23	BASE	010YR024HR	12.05	2.58	-1.213	14.65	4.67	14.87	4.36
23	BASE	025YR072HR	60.01	2.42	-1.226	62.30	4.81	63.06	4.61
23	BASE	100YR072HR	60.19	2.24	-1.209	62.80	5.06	62.82	5.05
23	BASE	QUALITY	5.11	1.74	-1.202	1.72	2.02	1.68	2.53
3	BASE	005YR001HR	0.00	0.00	0.000	2.34	3.72	2.85	2.10
3	BASE	005YR024HR	0.00	0.00	0.000	14.65	4.20	14.32	2.10
3	BASE	010YR024HR	14.87	4.06	0.001	14.87	4.36	14.98	2.11
3	BASE	025YR072HR	63.06	16.91	0.005	63.06	4.61	63.07	2.56
3	BASE	100YR072HR	62.82	50.32	0.021	62.82	5.05	62.82	4.17
3	BASE	QUALITY	0.00	0.00	0.000	1.68	2.53	1.68	2.10
34	BASE	005YR001HR	0.88	1.58	0.390	2.33	3.72	2.34	3.72
34	BASE	005YR024HR	11.96	1.45	0.607	14.64	4.20	14.65	4.20
34	BASE	010YR024HR	11.88	1.40	0.548	14.87	4.36	14.87	4.36
34	BASE	025YR072HR	15.20	1.11	0.565	63.07	4.61	63.06	4.61
34	BASE	100YR072HR	10.63	1.11	0.565	62.82	5.05	62.82	5.05
34	BASE	QUALITY	0.91	1.01	0.564	1.66	2.52	1.68	2.53
4	BASE	005YR001HR	0.00	0.00	0.000	2.33	3.72	2.33	2.76
4	BASE	005YR024HR	0.00	0.00	0.000	14.64	4.20	14.64	2.87
4	BASE	010YR024HR	0.00	0.00	0.000	14.87	4.36	14.87	2.90
4	BASE	025YR072HR	0.00	0.00	0.000	63.07	4.61	63.07	2.97
4	BASE	100YR072HR	62.82	8.08	0.001	62.82	5.05	62.82	3.57
4	BASE	QUALITY	0.00	0.00	0.000	1.66	2.52	1.66	2.39
45	BASE	005YR001HR	5.90	1.82	-1.232	1.70	3.49	2.33	3.72
45	BASE	005YR024HR	26.59	1.87	-1.251	14.33	3.99	14.64	4.20
45	BASE	010YR024HR	6.73	1.89	-1.255	14.95	4.34	14.87	4.36
45	BASE	025YR072HR	22.54	2.01	-1.252	63.07	4.61	63.07	4.61
45	BASE	100YR072HR	11.64	1.95	-1.264	62.82	5.05	62.82	5.05
45	BASE	QUALITY	6.22	1.83	-1.232	1.53	2.01	1.66	2.52
5	BASE	005YR001HR	0.00	0.00	0.000	1.70	3.49	1.71	2.25
5	BASE	005YR024HR	0.00	0.00	0.000	14.33	3.99	14.34	2.28

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
5	BASE	010YR024HR	0.00	0.00	0.000	14.95	4.34	14.96	2.29
5	BASE	025YR072HR	0.00	0.00	0.000	63.07	4.61	63.07	2.31
5	BASE	100YR072HR	62.82	13.24	0.002	62.82	5.05	62.83	3.98
5	BASE	QUALITY	0.00	0.00	0.000	1.53	2.01	6.09	2.00
56	BASE	005YR001HR	3.62	3.84	2.120	1.70	3.49	1.74	3.52
56	BASE	005YR024HR	11.50	3.84	-2.107	14.33	3.99	14.61	4.06
56	BASE	010YR024HR	19.92	3.83	-2.111	14.95	4.34	14.87	4.35
56	BASE	025YR072HR	57.79	3.84	2.125	63.07	4.61	63.07	4.61
56	BASE	100YR072HR	57.49	3.86	-2.112	62.82	5.05	62.82	5.05
56	BASE	QUALITY	2.16	3.82	-2.074	1.53	2.01	1.74	2.00
58	BASE	005YR001HR	3.76	1.85	-1.500	1.70	3.49	1.98	3.45
58	BASE	005YR024HR	12.04	2.02	-1.500	14.33	3.99	14.33	3.99
58	BASE	010YR024HR	11.96	2.07	-1.509	14.95	4.34	14.96	4.33
58	BASE	025YR072HR	59.85	2.11	-1.507	63.07	4.61	63.07	4.61
58	BASE	100YR072HR	59.68	2.00	-1.508	62.82	5.05	62.82	5.05
58	BASE	QUALITY	2.62	1.18	-1.521	1.53	2.01	1.25	2.13
6	BASE	005YR001HR	0.00	0.00	0.000	1.74	3.52	1.75	3.06
6	BASE	005YR024HR	0.00	0.00	0.000	14.61	4.06	14.62	3.35
6	BASE	010YR024HR	0.00	0.00	0.000	14.87	4.35	14.87	3.52
6	BASE	025YR072HR	0.00	0.00	0.000	63.07	4.61	63.07	3.67
6	BASE	100YR072HR	0.00	0.00	0.000	62.82	5.05	62.82	3.92
6	BASE	QUALITY	0.00	0.00	0.000	1.74	2.00	5.97	2.00
8	BASE	005YR001HR	0.00	0.00	0.000	1.98	3.45	1.98	2.25
8	BASE	005YR024HR	0.00	0.00	0.000	14.33	3.99	14.34	2.28
8	BASE	010YR024HR	14.96	7.25	0.001	14.96	4.33	14.96	3.41
8	BASE	025YR072HR	63.44	15.44	-2.839	63.07	4.61	63.07	4.60
8	BASE	100YR072HR	62.82	51.87	-82.055	62.82	5.05	62.27	5.05
8	BASE	QUALITY	0.00	0.00	0.000	1.25	2.13	1.25	2.08
89&90ST	BASE	005YR001HR	0.00	0.00	0.000	1.71	2.25	0.00	1.60
89&90ST	BASE	005YR024HR	0.00	0.00	0.000	14.34	2.28	0.00	1.60
89&90ST	BASE	010YR024HR	0.00	0.00	0.000	14.96	2.29	0.00	1.60
89&90ST	BASE	025YR072HR	0.00	0.00	0.000	63.07	2.31	0.00	1.60
89&90ST	BASE	100YR072HR	0.00	0.00	0.000	62.83	3.98	0.00	1.60
89&90ST	BASE	QUALITY	0.00	0.00	0.000	6.09	2.00	0.00	1.60
91ST	BASE	005YR001HR	0.00	0.00	0.000	2.33	2.76	0.00	1.60
91ST	BASE	005YR024HR	0.00	0.00	0.000	14.64	2.87	0.00	1.60
91ST	BASE	010YR024HR	0.00	0.00	0.000	14.87	2.90	0.00	1.60
91ST	BASE	025YR072HR	0.00	0.00	0.000	63.07	2.97	0.00	1.60
91ST	BASE	100YR072HR	0.00	0.00	0.000	62.82	3.57	0.00	1.60
91ST	BASE	QUALITY	0.00	0.00	0.000	1.66	2.39	0.00	1.60
92&93 ST	BASE	005YR001HR	0.00	0.00	0.000	2.85	2.10	0.00	1.60
92&93 ST	BASE	005YR024HR	0.00	0.00	0.000	14.32	2.10	0.00	1.60
92&93 ST	BASE	010YR024HR	0.00	0.00	0.000	14.98	2.11	0.00	1.60
92&93 ST	BASE	025YR072HR	0.00	0.00	0.000	63.07	2.56	0.00	1.60
92&93 ST	BASE	100YR072HR	62.82	21.72	0.013	62.82	4.17	0.00	1.60
92&93 ST	BASE	QUALITY	0.00	0.00	0.000	1.68	2.10	0.00	1.60
94ST	BASE	005YR001HR	0.00	0.00	0.000	1.55	2.21	0.00	1.60
94ST	BASE	005YR024HR	0.00	0.00	0.000	14.85	2.23	0.00	1.60
94ST	BASE	010YR024HR	0.00	0.00	0.000	14.65	2.23	0.00	1.60
94ST	BASE	025YR072HR	0.00	0.00	0.000	62.30	2.25	0.00	1.60

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
94ST	BASE	100YR072HR	0.00	0.00	0.000	62.80	2.84	0.00	1.60
94ST	BASE	QUALITY	0.00	0.00	0.000	6.37	2.00	0.00	1.60
95ST	BASE	005YR001HR	0.00	0.00	0.000	2.72	2.09	0.00	1.60
95ST	BASE	005YR024HR	0.00	0.00	0.000	14.86	2.11	0.00	1.60
95ST	BASE	010YR024HR	0.00	0.00	0.000	14.66	2.12	0.00	1.60
95ST	BASE	025YR072HR	0.00	0.00	0.000	62.31	2.14	0.00	1.60
95ST	BASE	100YR072HR	0.00	0.00	0.000	62.81	2.49	0.00	1.60
95ST	BASE	QUALITY	0.00	0.00	0.000	1.82	2.07	0.00	1.60
BASIN-1-2 OVR	BASE	005YR001HR	0.00	0.00	0.000	2.72	4.09	1.55	3.84
BASIN-1-2 OVR	BASE	005YR024HR	16.56	12.21	0.076	14.85	4.50	14.85	4.49
BASIN-1-2 OVR	BASE	010YR024HR	14.98	14.76	0.141	14.65	4.67	14.65	4.67
BASIN-1-2 OVR	BASE	025YR072HR	62.47	20.43	0.129	62.30	4.82	62.30	4.81
BASIN-1-2 OVR	BASE	100YR072HR	61.79	35.04	-0.104	62.80	5.06	62.80	5.06
BASIN-1-2 OVR	BASE	QUALITY	0.00	0.00	0.000	1.82	3.14	1.72	2.02
BASIN-2-3 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.55	3.84	2.34	3.72
BASIN-2-3 OVR	BASE	005YR024HR	0.00	0.00	0.000	14.85	4.49	14.65	4.20
BASIN-2-3 OVR	BASE	010YR024HR	14.65	7.58	0.001	14.65	4.67	14.87	4.36
BASIN-2-3 OVR	BASE	025YR072HR	62.30	19.69	-0.004	62.30	4.81	63.06	4.61
BASIN-2-3 OVR	BASE	100YR072HR	61.75	45.06	0.028	62.80	5.06	62.82	5.05
BASIN-2-3 OVR	BASE	QUALITY	0.00	0.00	0.000	1.72	2.02	1.68	2.53
BASIN-4-3 OVR	BASE	005YR001HR	1.42	3.06	-0.033	2.33	3.72	2.34	3.72
BASIN-4-3 OVR	BASE	005YR024HR	12.52	6.06	-0.038	14.64	4.20	14.65	4.20
BASIN-4-3 OVR	BASE	010YR024HR	12.44	8.06	-0.044	14.87	4.36	14.87	4.36
BASIN-4-3 OVR	BASE	025YR072HR	60.29	7.50	-0.030	63.07	4.61	63.06	4.61
BASIN-4-3 OVR	BASE	100YR072HR	60.13	2.88	0.017	62.82	5.05	62.82	5.05
BASIN-4-3 OVR	BASE	QUALITY	0.00	0.00	0.000	1.66	2.52	1.68	2.53
BASIN-4-6 OVR	BASE	005YR001HR	0.00	0.00	0.000	2.33	3.72	1.74	3.52
BASIN-4-6 OVR	BASE	005YR024HR	14.64	9.76	0.002	14.64	4.20	14.61	4.06
BASIN-4-6 OVR	BASE	010YR024HR	13.51	10.14	-0.005	14.87	4.36	14.87	4.35
BASIN-4-6 OVR	BASE	025YR072HR	66.14	9.86	0.016	63.07	4.61	63.07	4.61
BASIN-4-6 OVR	BASE	100YR072HR	68.54	9.72	-0.068	62.82	5.05	62.82	5.05
BASIN-4-6 OVR	BASE	QUALITY	0.00	0.00	0.000	1.66	2.52	1.74	2.00
BASIN-5-4 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.70	3.49	2.33	3.72
BASIN-5-4 OVR	BASE	005YR024HR	0.00	0.00	-0.001	14.33	3.99	14.64	4.20
BASIN-5-4 OVR	BASE	010YR024HR	0.00	0.00	-0.002	14.95	4.34	14.87	4.36
BASIN-5-4 OVR	BASE	025YR072HR	0.00	0.00	-0.004	63.07	4.61	63.07	4.61
BASIN-5-4 OVR	BASE	100YR072HR	60.50	0.99	0.021	62.82	5.05	62.82	5.05
BASIN-5-4 OVR	BASE	QUALITY	0.00	0.00	0.000	1.53	2.01	1.66	2.52
BASIN-5-8 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.70	3.49	1.98	3.45
BASIN-5-8 OVR	BASE	005YR024HR	12.62	5.94	-0.061	14.33	3.99	14.33	3.99
BASIN-5-8 OVR	BASE	010YR024HR	14.69	7.98	-0.065	14.95	4.34	14.96	4.33
BASIN-5-8 OVR	BASE	025YR072HR	61.49	11.51	0.090	63.07	4.61	63.07	4.61
BASIN-5-8 OVR	BASE	100YR072HR	61.01	13.36	1.324	62.82	5.05	62.82	5.05
BASIN-5-8 OVR	BASE	QUALITY	0.00	0.00	0.000	1.53	2.01	1.25	2.13
CARLYLE	BASE	005YR001HR	0.00	0.00	0.000	1.75	3.06	0.00	1.60
CARLYLE	BASE	005YR024HR	0.00	0.00	0.000	14.62	3.35	0.00	1.60
CARLYLE	BASE	010YR024HR	0.00	0.00	0.000	14.87	3.52	0.00	1.60
CARLYLE	BASE	025YR072HR	0.00	0.00	0.000	63.07	3.67	0.00	1.60
CARLYLE	BASE	100YR072HR	0.00	0.00	0.000	62.82	3.92	0.00	1.60
CARLYLE	BASE	QUALITY	0.00	0.00	0.000	5.97	2.00	0.00	1.60

ABBOTT AVE DRAINAGE STUDY
ICPR MODEL FOR PROPOSED CONDITIONS-OPTION 1
LINK MAXMUM REPORT

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
DP-1	BASE	005YR001HR	2.72	2.39	-0.013	2.72	2.09	0.00	1.60
DP-1	BASE	005YR024HR	14.86	2.61	-0.018	14.86	2.11	0.00	1.60
DP-1	BASE	010YR024HR	14.66	2.69	-0.018	14.66	2.12	0.00	1.60
DP-1	BASE	025YR072HR	62.31	2.76	-0.018	62.31	2.14	0.00	1.60
DP-1	BASE	100YR072HR	62.81	3.61	-0.025	62.81	2.49	0.00	1.60
DP-1	BASE	QUALITY	1.82	1.75	-0.018	1.82	2.07	0.00	1.60
DP-2	BASE	005YR001HR	1.55	1.19	0.004	1.55	2.21	0.00	1.60
DP-2	BASE	005YR024HR	14.85	1.41	-0.017	14.85	2.23	0.00	1.60
DP-2	BASE	010YR024HR	14.65	1.46	-0.017	14.65	2.23	0.00	1.60
DP-2	BASE	025YR072HR	62.30	1.60	-0.017	62.30	2.25	0.00	1.60
DP-2	BASE	100YR072HR	62.80	9.66	-0.016	62.80	2.84	0.00	1.60
DP-2	BASE	QUALITY	0.00	0.00	0.000	6.37	2.00	0.00	1.60
DP-3	BASE	005YR001HR	2.85	0.00	0.001	2.85	2.10	0.00	1.60
DP-3	BASE	005YR024HR	14.32	0.00	0.002	14.32	2.10	0.00	1.60
DP-3	BASE	010YR024HR	14.98	0.01	0.013	14.98	2.11	0.00	1.60
DP-3	BASE	025YR072HR	63.07	4.04	0.041	63.07	2.56	0.00	1.60
DP-3	BASE	100YR072HR	62.82	15.28	0.034	62.82	4.17	0.00	1.60
DP-3	BASE	QUALITY	1.68	0.00	0.000	1.68	2.10	0.00	1.60
DP-4-1	BASE	005YR001HR	2.33	8.43	-0.065	2.33	2.76	0.00	1.60
DP-4-1	BASE	005YR024HR	14.64	9.93	-0.051	14.64	2.87	0.00	1.60
DP-4-1	BASE	010YR024HR	14.87	10.46	-0.048	14.87	2.90	0.00	1.60
DP-4-1	BASE	025YR072HR	63.07	11.06	-0.051	63.07	2.97	0.00	1.60
DP-4-1	BASE	100YR072HR	62.82	13.38	-0.075	62.82	3.57	0.00	1.60
DP-4-1	BASE	QUALITY	1.66	3.12	-0.007	1.66	2.39	0.00	1.60
DP-4-2	BASE	005YR001HR	2.33	8.50	-0.065	2.33	2.76	0.00	1.60
DP-4-2	BASE	005YR024HR	14.64	10.04	-0.051	14.64	2.87	0.00	1.60
DP-4-2	BASE	010YR024HR	14.87	10.46	-0.048	14.87	2.90	0.00	1.60
DP-4-2	BASE	025YR072HR	63.07	11.14	-0.051	63.07	2.97	0.00	1.60
DP-4-2	BASE	100YR072HR	62.82	15.79	-0.075	62.82	3.57	0.00	1.60
DP-4-2	BASE	QUALITY	1.66	3.12	-0.007	1.66	2.39	0.00	1.60
DP-5	BASE	005YR001HR	1.71	1.59	-0.009	1.71	2.25	0.00	1.60
DP-5	BASE	005YR024HR	14.34	1.87	-0.010	14.34	2.28	0.00	1.60
DP-5	BASE	010YR024HR	14.96	2.04	-0.021	14.96	2.29	0.00	1.60
DP-5	BASE	025YR072HR	63.07	2.16	-0.022	63.07	2.31	0.00	1.60
DP-5	BASE	100YR072HR	62.83	14.71	-0.022	62.83	3.98	0.00	1.60
DP-5	BASE	QUALITY	0.00	0.00	0.000	6.09	2.00	0.00	1.60
DP-6	BASE	005YR001HR	1.75	11.91	-0.076	1.75	3.06	0.00	1.60
DP-6	BASE	005YR024HR	14.62	14.25	-0.155	14.62	3.35	0.00	1.60
DP-6	BASE	010YR024HR	14.87	15.44	-0.169	14.87	3.52	0.00	1.60
DP-6	BASE	025YR072HR	63.07	16.40	-0.168	63.07	3.67	0.00	1.60
DP-6	BASE	100YR072HR	62.82	17.96	-0.169	62.82	3.92	0.00	1.60
DP-6	BASE	QUALITY	0.00	0.00	0.000	5.97	2.00	0.00	1.60
DP-8	BASE	005YR001HR	1.98	3.13	-0.051	1.98	2.25	0.00	1.60
DP-8	BASE	005YR024HR	14.34	3.74	-0.047	14.34	2.28	0.00	1.60
DP-8	BASE	010YR024HR	14.96	10.00	0.126	14.96	3.41	0.00	1.60
DP-8	BASE	025YR072HR	63.07	12.86	0.127	63.07	4.60	0.00	1.60
DP-8	BASE	100YR072HR	62.27	13.79	0.189	62.27	5.05	0.00	1.60
DP-8	BASE	QUALITY	1.25	0.60	-0.014	1.25	2.08	0.00	1.60
DW-1	BASE	005YR001HR	0.40	23.10	23.100	1.55	3.84	0.00	-60.00

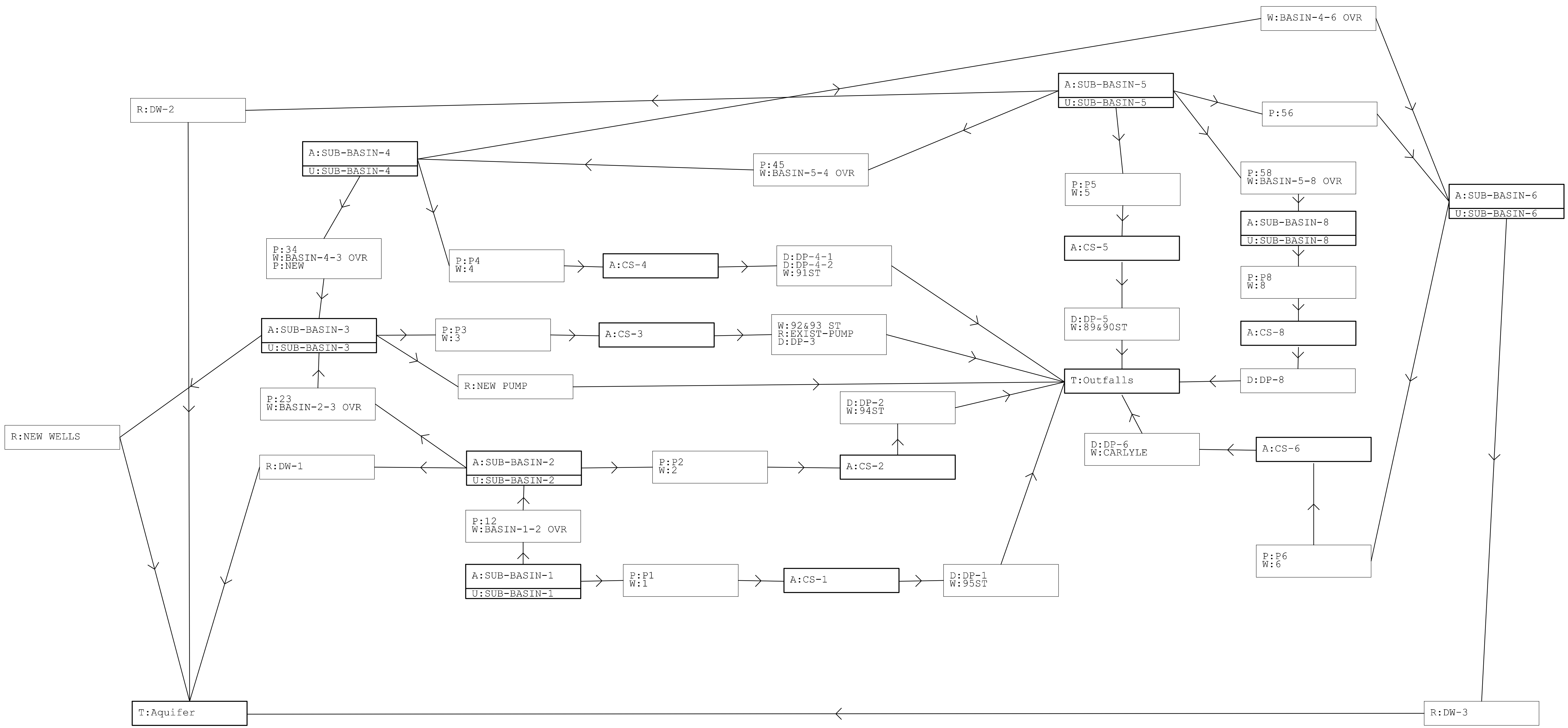
Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
DW-1	BASE	005YR024HR	5.92	23.10	23.100	14.85	4.49	0.00	-60.00
DW-1	BASE	010YR024HR	5.44	23.10	23.100	14.65	4.67	0.00	-60.00
DW-1	BASE	025YR072HR	9.60	23.10	23.100	62.30	4.81	0.00	-60.00
DW-1	BASE	100YR072HR	7.23	23.10	23.100	62.80	5.06	0.00	-60.00
DW-1	BASE	QUALITY	0.89	23.10	23.100	1.72	2.02	0.00	-60.00
DW-2	BASE	005YR001HR	0.41	23.10	23.100	1.70	3.49	0.00	-60.00
DW-2	BASE	005YR024HR	5.94	23.10	23.100	14.33	3.99	0.00	-60.00
DW-2	BASE	010YR024HR	5.46	23.10	23.100	14.95	4.34	0.00	-60.00
DW-2	BASE	025YR072HR	10.51	23.10	23.100	63.07	4.61	0.00	-60.00
DW-2	BASE	100YR072HR	7.77	23.10	23.100	62.82	5.05	0.00	-60.00
DW-2	BASE	QUALITY	0.90	23.10	23.100	1.53	2.01	0.00	-60.00
DW-3	BASE	005YR001HR	0.43	23.10	23.100	1.74	3.52	0.00	-60.00
DW-3	BASE	005YR024HR	6.28	23.10	23.100	14.61	4.06	0.00	-60.00
DW-3	BASE	010YR024HR	5.80	23.10	23.100	14.87	4.35	0.00	-60.00
DW-3	BASE	025YR072HR	11.85	23.10	23.100	63.07	4.61	0.00	-60.00
DW-3	BASE	100YR072HR	8.43	23.10	23.100	62.82	5.05	0.00	-60.00
DW-3	BASE	QUALITY	0.91	23.10	23.100	1.74	2.00	0.00	-60.00
EXIST-PUMP	BASE	005YR001HR	0.59	14.20	14.200	2.85	2.10	0.00	1.60
EXIST-PUMP	BASE	005YR024HR	10.67	14.20	14.200	14.32	2.10	0.00	1.60
EXIST-PUMP	BASE	010YR024HR	9.98	14.20	14.200	14.98	2.11	0.00	1.60
EXIST-PUMP	BASE	025YR072HR	54.51	14.20	14.200	63.07	2.56	0.00	1.60
EXIST-PUMP	BASE	100YR072HR	52.70	14.20	14.200	62.82	4.17	0.00	1.60
EXIST-PUMP	BASE	QUALITY	1.22	14.20	14.200	1.68	2.10	0.00	1.60
NEW	BASE	005YR001HR	0.88	3.81	0.941	2.33	3.72	2.34	3.72
NEW	BASE	005YR024HR	11.96	3.49	1.464	14.64	4.20	14.65	4.20
NEW	BASE	010YR024HR	11.88	3.37	1.323	14.87	4.36	14.87	4.36
NEW	BASE	025YR072HR	15.20	2.68	1.363	63.07	4.61	63.06	4.61
NEW	BASE	100YR072HR	10.63	2.67	1.363	62.82	5.05	62.82	5.05
NEW	BASE	QUALITY	0.91	2.43	1.362	1.66	2.52	1.68	2.53
NEW PUMP	BASE	005YR001HR	0.42	5.00	5.000	2.34	3.72	0.00	1.60
NEW PUMP	BASE	005YR024HR	6.15	5.00	5.000	14.65	4.20	0.00	1.60
NEW PUMP	BASE	010YR024HR	5.67	5.00	5.000	14.87	4.36	0.00	1.60
NEW PUMP	BASE	025YR072HR	9.65	5.00	5.000	63.06	4.61	0.00	1.60
NEW PUMP	BASE	100YR072HR	7.27	5.00	5.000	62.82	5.05	0.00	1.60
NEW PUMP	BASE	QUALITY	0.91	5.00	5.000	1.68	2.53	0.00	1.60
NEW WELLS	BASE	005YR001HR	0.00	0.00	0.000	0.00	0.00	0.00	0.00
NEW WELLS	BASE	005YR024HR	0.00	0.00	0.000	0.00	0.00	0.00	0.00
NEW WELLS	BASE	010YR024HR	0.00	0.00	0.000	0.00	0.00	0.00	0.00
NEW WELLS	BASE	025YR072HR	0.00	0.00	0.000	0.00	0.00	0.00	0.00
NEW WELLS	BASE	100YR072HR	0.00	0.00	0.000	0.00	0.00	0.00	0.00
NEW WELLS	BASE	QUALITY	0.00	0.00	0.000	0.00	0.00	0.00	0.00
P1	BASE	005YR001HR	2.72	2.39	-0.176	2.72	4.09	2.72	2.09
P1	BASE	005YR024HR	14.85	2.61	-0.177	14.85	4.50	14.86	2.11
P1	BASE	010YR024HR	14.65	2.69	-0.168	14.65	4.67	14.66	2.12
P1	BASE	025YR072HR	62.30	2.76	-0.182	62.30	4.82	62.31	2.14
P1	BASE	100YR072HR	61.32	2.84	-0.185	62.80	5.06	62.81	2.49
P1	BASE	QUALITY	1.82	1.75	-0.176	1.82	3.14	1.82	2.07
P2	BASE	005YR001HR	1.55	1.19	-0.324	1.55	3.84	1.55	2.21
P2	BASE	005YR024HR	14.85	1.41	-0.330	14.85	4.49	14.85	2.23
P2	BASE	010YR024HR	14.65	1.46	-0.330	14.65	4.67	14.65	2.23

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P2	BASE	025YR072HR	62.07	1.50	-0.330	62.30	4.81	62.30	2.25
P2	BASE	100YR072HR	60.82	1.50	-0.330	62.80	5.06	62.80	2.84
P2	BASE	QUALITY	1.89	0.44	-0.330	1.72	2.02	6.37	2.00
P3	BASE	005YR001HR	2.34	1.36	0.136	2.34	3.72	2.85	2.10
P3	BASE	005YR024HR	14.55	1.51	-0.137	14.65	4.20	14.32	2.10
P3	BASE	010YR024HR	14.86	1.56	-0.136	14.87	4.36	14.98	2.11
P3	BASE	025YR072HR	64.44	1.60	0.207	63.06	4.61	63.07	2.56
P3	BASE	100YR072HR	67.07	1.60	0.142	62.82	5.05	62.82	4.17
P3	BASE	QUALITY	1.66	0.91	0.147	1.68	2.53	1.68	2.10
P4	BASE	005YR001HR	2.33	16.93	-1.567	2.33	3.72	2.33	2.76
P4	BASE	005YR024HR	14.64	19.97	-1.670	14.64	4.20	14.64	2.87
P4	BASE	010YR024HR	14.87	20.93	-1.677	14.87	4.36	14.87	2.90
P4	BASE	025YR072HR	63.07	22.20	-1.868	63.07	4.61	63.07	2.97
P4	BASE	100YR072HR	61.41	23.11	-1.784	62.82	5.05	62.82	3.57
P4	BASE	QUALITY	1.66	6.30	-1.588	1.66	2.52	1.66	2.39
P5	BASE	005YR001HR	1.70	1.59	-0.502	1.70	3.49	1.71	2.25
P5	BASE	005YR024HR	14.33	1.87	-0.499	14.33	3.99	14.34	2.28
P5	BASE	010YR024HR	14.95	2.04	-0.500	14.95	4.34	14.96	2.29
P5	BASE	025YR072HR	63.07	2.16	-0.501	63.07	4.61	63.07	2.31
P5	BASE	100YR072HR	61.18	2.21	0.505	62.82	5.05	62.83	3.98
P5	BASE	QUALITY	1.64	0.68	-0.500	1.53	2.01	6.09	2.00
P6	BASE	005YR001HR	1.74	11.91	-1.416	1.74	3.52	1.75	3.06
P6	BASE	005YR024HR	14.61	14.25	-1.432	14.61	4.06	14.62	3.35
P6	BASE	010YR024HR	14.86	15.44	-1.437	14.87	4.35	14.87	3.52
P6	BASE	025YR072HR	63.06	16.40	-1.432	63.07	4.61	63.07	3.67
P6	BASE	100YR072HR	62.82	17.96	-1.445	62.82	5.05	62.82	3.92
P6	BASE	QUALITY	1.71	3.15	-1.418	1.74	2.00	5.97	2.00
P8	BASE	005YR001HR	1.98	3.13	-0.347	1.98	3.45	1.98	2.25
P8	BASE	005YR024HR	14.33	3.74	0.326	14.33	3.99	14.34	2.28
P8	BASE	010YR024HR	13.43	3.86	0.323	14.96	4.33	14.96	3.41
P8	BASE	025YR072HR	60.87	3.86	0.325	63.07	4.61	63.07	4.60
P8	BASE	100YR072HR	60.47	3.86	-1.141	62.82	5.05	62.27	5.05
P8	BASE	QUALITY	1.13	0.68	0.321	1.25	2.13	1.25	2.08

APPENDIX E

ICPR MODEL FOR PROPOSED IMPROVEMENTS – OPTION 2

Node-Reach Diagram
ICPR Input Data
Node Maximum Report
Link Maximum Report



NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
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Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

ICPR MODEL - OPTION 2
NODE REACH DIAGRAM

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: ----

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\option 2.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 2:17:05 PM)

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: SUB-BASIN-1              Node: SUB-BASIN-1           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 27.810                  Time Shift(hrs): 0.00
          Curve Number: 84.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-2              Node: SUB-BASIN-2           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 30.400                  Time Shift(hrs): 0.00
          Curve Number: 85.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-3              Node: SUB-BASIN-3           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 41.040                  Time Shift(hrs): 0.00
          Curve Number: 84.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-4              Node: SUB-BASIN-4           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 32.390                  Time Shift(hrs): 0.00
          Curve Number: 85.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-5              Node: SUB-BASIN-5           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 32.600                  Time Shift(hrs): 0.00
          Curve Number: 85.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-6              Node: SUB-BASIN-6           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                    Peaking Factor: 256.0
          Rainfall File:                     Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 60.00
               Area(ac): 54.600                  Time Shift(hrs): 0.00
          Curve Number: 84.00              Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-8              Node: SUB-BASIN-8           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN
```

```
       Unit Hydrograph: Uh256                 Peaking Factor: 256.0
         Rainfall File:                  Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000              Time of Conc(min): 30.00
              Area(ac): 7.240                Time Shift(hrs): 0.00
          Curve Number: 84.00          Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00
```

```
==========================================================================================
==== Nodes ===============================================================================
==========================================================================================
```

```
      Name: Aquifer            Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 1.600
      Type: Time/Stage
```

Time(hrs)	Stage(ft)
0.00	-60.000
99999.00	-60.000

```
      Name: CS-1               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area
```

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

```
      Name: CS-2               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area
```

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

```
      Name: CS-3               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area
```

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

```
      Name: CS-4               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area
```

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

```
      Name: CS-5               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
     Group: BASE                                              Warn Stage(ft): 8.000
      Type: Stage/Area
```

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: CS-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: CS-8 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: Outfalls Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 1.600
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	1.600
99999.00	1.600

Name: SUB-BASIN-1 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.090	0.0000
8.000	19.3100

Name: SUB-BASIN-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 2.800
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.690	0.0000
8.000	21.1000

Name: SUB-BASIN-3 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 2.800
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.690	0.0000
8.000	28.0000

Name: SUB-BASIN-4 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000

3.120	0.0000
8.000	23.0000

Name: SUB-BASIN-5 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.110	0.0000
8.000	19.5000

Name: SUB-BASIN-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.060	0.0000
8.000	32.7500

Name: SUB-BASIN-8 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.330	0.0000
8.000	4.8400

==== Cross Sections ====

Name: SECTION 1 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	3.250	0.016000
18.000	3.800	0.016000
36.000	3.250	0.016000

==== Operating Tables ====

Name: DRAINAGE WELLS Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

DRAINAGE WELL CAPACITY: 500 GPM/FT. OF AVAILABLE HEAD

US Stage(ft)	Discharge(cfs)
1.900	7.70
8.000	7.70

Name: EXIST-PUMP Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

US Stage(ft)	Discharge(cfs)
2.000	14.20
8.000	14.20

```
---------------------------------------------------------------------------------------------
      Name: NEW PUMP            Group: BASE
      Type: Rating Curve
  Function: US Stage vs. Discharge



   US Stage(ft)  Discharge(cfs)
--------------- ---------------
          1.900            5.00
          8.000            5.00

=============================================================================================
==== Pipes ==================================================================================
=============================================================================================

         Name: 12                 From Node: Sub-Basin-1       Length(ft): 650.00
        Group: BASE                 To Node: Sub-Basin-2            Count: 1
                                                        Friction Equation: Automatic
               UPSTREAM      DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 18.00         18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500        -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------------------------
         Name: 23                 From Node: Sub-Basin-2       Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-3            Count: 1
                                                        Friction Equation: Automatic
               UPSTREAM      DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 18.00         18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500        -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------------------------
         Name: 34                 From Node: Sub-Basin-4       Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-3            Count: 1
                                                        Friction Equation: Automatic
               UPSTREAM      DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 18.00         18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500        -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------------------------
```

```
         Name: 45                From Node: Sub-Basin-5       Length(ft): 800.00
        Group: BASE                To Node: Sub-Basin-4            Count: 1
                                                        Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular       Circular                               Flow: Both
     Span(in): 18.00          18.00                    Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                        Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: 56                From Node: Sub-Basin-5       Length(ft): 250.00
        Group: BASE                To Node: Sub-Basin-6            Count: 1
                                                        Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular       Circular                               Flow: Both
     Span(in): 18.00          18.00                    Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                        Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: 58                From Node: Sub-Basin-5       Length(ft): 550.00
        Group: BASE                To Node: Sub-Basin-8            Count: 1
                                                        Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular       Circular                               Flow: Both
     Span(in): 18.00          18.00                    Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                        Exit Loss Coef: 1.00
   Invert(ft): -4.320         -1.120                       Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: NEW               From Node: SUB-BASIN-4       Length(ft): 600.00
        Group: BASE                To Node: SUB-BASIN-3            Count: 1
                                                        Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM               Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                               Flow: Both
     Span(in): 24.00          24.00                    Entrance Loss Coef: 0.00
     Rise(in): 24.00          24.00                        Exit Loss Coef: 1.00
   Invert(ft): -3.000         -3.000                       Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                     Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P1                 From Node: Sub-Basin-1       Length(ft): 600.00
        Group: BASE                 To Node: CS-1                   Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 15.00         15.00                     Entrance Loss Coef: 0.00
     Rise(in): 15.00         15.00                         Exit Loss Coef: 1.00
   Invert(ft): -0.820        -1.830                        Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P2                 From Node: Sub-Basin-2       Length(ft): 600.00
        Group: BASE                 To Node: CS-2                   Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 12.00         12.00                     Entrance Loss Coef: 0.00
     Rise(in): 12.00         12.00                         Exit Loss Coef: 1.00
   Invert(ft): -0.210        -2.740                        Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P3                 From Node: Sub-Basin-3       Length(ft): 600.00
        Group: BASE                 To Node: CS-3                   Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 12.00         12.00                     Entrance Loss Coef: 0.00
     Rise(in): 12.00         12.00                         Exit Loss Coef: 1.00
   Invert(ft): -0.630        -2.330                        Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
----------------------------------------------------------------------------------------------------
         Name: P4                 From Node: Sub-Basin-4       Length(ft): 600.00
        Group: BASE                 To Node: CS-4                   Count: 2
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 24.00         24.00                     Entrance Loss Coef: 0.00
     Rise(in): 24.00         24.00                         Exit Loss Coef: 1.00
   Invert(ft): -0.630        -2.330                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                    Outlet Ctrl Spec: Use dc or tw
```

```
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P5                From Node: Sub-Basin-5       Length(ft): 250.00
        Group: BASE                To Node: CS-5                   Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                         Exit Loss Coef: 1.00
   Invert(ft): 0.420          -4.320                        Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P6                From Node: Sub-Basin-6       Length(ft): 600.00
        Group: BASE                To Node: CS-6                   Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 36.00          36.00                     Entrance Loss Coef: 0.00
     Rise(in): 36.00          36.00                         Exit Loss Coef: 1.00
   Invert(ft): 0.880          -1.730                        Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P8                From Node: Sub-Basin-8       Length(ft): 250.00
        Group: BASE                To Node: CS-8                   Count: 2
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.200         -1.580                        Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================
```

```
         Name: DP-1               From Node: CS-1           Length(ft): 100.00
        Group: BASE                 To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular               Solution Algorithm: Automatic
     Span(in): 15.00          15.00                                Flow: Positive
     Rise(in): 15.00          15.00                  Entrance Loss Coef: 0.000
   Invert(ft): -1.410         -1.830                      Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-1 ***
                                                                               TABLE
                Count: 7                    Bottom Clip(in): 0.000
                 Type: Vertical: Mavis         Top Clip(in): 0.000
                 Flow: Positive              Weir Disc Coef: 3.200
             Geometry: Rectangular         Orifice Disc Coef: 0.600

             Span(in): 48.00                     Invert(ft): 2.000
             Rise(in): 9.00                Control Elev(ft): 2.000

----------------------------------------------------------------------------------------------------
         Name: DP-2               From Node: CS-2           Length(ft): 100.00
        Group: BASE                 To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular               Solution Algorithm: Automatic
     Span(in): 30.00          30.00                                Flow: Positive
     Rise(in): 30.00          30.00                  Entrance Loss Coef: 0.000
   Invert(ft): -2.740         -3.070                      Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-2 ***
                                                                               TABLE
                Count: 1                    Bottom Clip(in): 0.000
                 Type: Vertical: Mavis         Top Clip(in): 0.000
                 Flow: Positive              Weir Disc Coef: 3.200
             Geometry: Rectangular         Orifice Disc Coef: 0.600

             Span(in): 48.00                     Invert(ft): 2.000
             Rise(in): 9.00                Control Elev(ft): 2.000

----------------------------------------------------------------------------------------------------
         Name: DP-3               From Node: CS-3           Length(ft): 100.00
        Group: BASE                 To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular               Solution Algorithm: Automatic
     Span(in): 24.00          24.00                                Flow: Positive
     Rise(in): 24.00          24.00                  Entrance Loss Coef: 0.000
   Invert(ft): -1.500         -1.500                      Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
*** Weir 1 of 1 for Drop Structure DP-3 ***
                                                                                   TABLE
                  Count: 1                        Bottom Clip(in): 0.000
                   Type: Vertical: Mavis             Top Clip(in): 0.000
                   Flow: Positive                  Weir Disc Coef: 3.200
               Geometry: Rectangular            Orifice Disc Coef: 0.600

               Span(in): 48.00                        Invert(ft): 2.100
               Rise(in): 9.00                   Control Elev(ft): 2.100


----------------------------------------------------------------------------------------------------
         Name: DP-4-1             From Node: CS-4            Length(ft): 100.00
        Group: BASE                 To Node: Outfalls             Count: 1

               UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Automatic
     Span(in): 24.00          24.00                                 Flow: Positive
     Rise(in): 24.00          24.00                   Entrance Loss Coef: 0.000
   Invert(ft): -4.060         -2.300                      Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-4-1 ***
                                                                                   TABLE
                  Count: 1                        Bottom Clip(in): 0.000
                   Type: Vertical: Mavis             Top Clip(in): 0.000
                   Flow: Positive                  Weir Disc Coef: 3.200
               Geometry: Rectangular            Orifice Disc Coef: 0.600

               Span(in): 48.00                        Invert(ft): 2.000
               Rise(in): 9.00                   Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-4-2             From Node: CS-4            Length(ft): 100.00
        Group: BASE                 To Node: Outfalls             Count: 1

               UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Automatic
     Span(in): 30.00          30.00                                 Flow: Positive
     Rise(in): 30.00          30.00                   Entrance Loss Coef: 0.000
   Invert(ft): -1.070         -1.820                      Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-4-2 ***
                                                                                   TABLE
                  Count: 1                        Bottom Clip(in): 0.000
                   Type: Vertical: Mavis             Top Clip(in): 0.000
                   Flow: Positive                  Weir Disc Coef: 3.200
               Geometry: Rectangular            Orifice Disc Coef: 0.600

               Span(in): 48.00                        Invert(ft): 2.000
               Rise(in): 9.00                   Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-5               From Node: CS-5            Length(ft): 100.00
        Group: BASE                 To Node: Outfalls             Count: 1

               UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Automatic
     Span(in): 24.00          24.00                                 Flow: Positive
     Rise(in): 24.00          24.00                   Entrance Loss Coef: 0.000
   Invert(ft): -4.320         -2.470                      Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
```

```
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-5 ***
                                                                                  TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Positive                Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                      Invert(ft): 2.000
              Rise(in): 9.00                 Control Elev(ft): 2.000

----------------------------------------------------------------------------------------------------
         Name: DP-6                From Node: CS-6             Length(ft): 100.00
        Group: BASE                  To Node: Outfalls              Count: 1

              UPSTREAM        DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Automatic
     Span(in): 36.00          36.00                                   Flow: Positive
     Rise(in): 36.00          36.00                     Entrance Loss Coef: 0.000
   Invert(ft): -1.730         -3.610                        Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-6 ***
                                                                                  TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Positive                Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                      Invert(ft): 2.000
              Rise(in): 9.00                 Control Elev(ft): 2.000

----------------------------------------------------------------------------------------------------
         Name: DP-8                From Node: CS-8             Length(ft): 100.00
        Group: BASE                  To Node: Outfalls              Count: 2

              UPSTREAM        DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Automatic
     Span(in): 15.00          15.00                                   Flow: Positive
     Rise(in): 15.00          15.00                     Entrance Loss Coef: 0.000
   Invert(ft): -1.580         -1.580                        Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-8 ***
                                                                                  TABLE
                 Count: 2                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Positive                Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                      Invert(ft): 2.000
              Rise(in): 9.00                 Control Elev(ft): 2.000
```

```
=========================================================================================
==== Weirs ==============================================================================
=========================================================================================

         Name: 1                   From Node: Sub-Basin-1
        Group: BASE                  To Node: CS-1
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 5.000
       Control Elevation(ft): 5.000
                                                 TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



---------------------------------------------------------------------------------------------------
         Name: 2                   From Node: Sub-Basin-2
        Group: BASE                  To Node: CS-2
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.800
       Control Elevation(ft): 4.800
                                                 TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



---------------------------------------------------------------------------------------------------
         Name: 3                   From Node: Sub-Basin-3
        Group: BASE                  To Node: CS-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.200
       Control Elevation(ft): 4.200
                                                 TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



---------------------------------------------------------------------------------------------------
         Name: 4                   From Node: Sub-Basin-4
        Group: BASE                  To Node: CS-4
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.800
       Control Elevation(ft): 4.800
                                                 TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



---------------------------------------------------------------------------------------------------
         Name: 5                   From Node: Sub-Basin-5
        Group: BASE                  To Node: CS-5
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.700
```

```
       Control Elevation(ft): 4.700
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

---------------------------------------------------------------------------------------------------
         Name: 6                  From Node: Sub-Basin-6
        Group: BASE                 To Node: CS-6
         Flow: Both                   Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 5.200
       Control Elevation(ft): 5.200
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

---------------------------------------------------------------------------------------------------
         Name: 8                  From Node: Sub-Basin-8
        Group: BASE                 To Node: CS-8
         Flow: Both                   Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

---------------------------------------------------------------------------------------------------
         Name: 89&90ST            From Node: CS-5
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 2
         Type: Vertical: Paved      Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 999999.00
                 Invert(ft): 4.900
       Control Elevation(ft): 4.900
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

---------------------------------------------------------------------------------------------------
         Name: 91ST               From Node: CS-4
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 1
         Type: Vertical: Gravel     Geometry: Rectangular

                   Span(in): 240.00
                   Rise(in): 99999.00
                 Invert(ft): 5.000
       Control Elevation(ft): 5.000
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

---------------------------------------------------------------------------------------------------
         Name: 92&93 ST           From Node: CS-3
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 2
```

```
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 180.00
                    Rise(in): 999999.00
                  Invert(ft): 3.800
       Control Elevation(ft): 3.800
                                               TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

----------------------------------------------------------------------------------------------------
         Name: 94ST                From Node: CS-2
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.600
       Control Elevation(ft): 4.600
                                               TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

----------------------------------------------------------------------------------------------------
         Name: 95ST                From Node: CS-1
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.550
       Control Elevation(ft): 4.550
                                               TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

----------------------------------------------------------------------------------------------------
         Name: BASIN-1-2 OVR       From Node: SUB-BASIN-1
        Group: BASE                  To Node: SUB-BASIN-2
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 9999.00
                  Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                               TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

Bay Drive Roadway Overflow

----------------------------------------------------------------------------------------------------
         Name: BASIN-2-3 OVR       From Node: SUB-BASIN-2
        Group: BASE                  To Node: SUB-BASIN-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.500
       Control Elevation(ft): 4.500
                                               TABLE
              Bottom Clip(in): 0.000
                 Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600
```

```
----------------------------------------------------------------------------------------------------
         Name: BASIN-4-3 OVR       From Node: SUB-BASIN-4
        Group: BASE                  To Node: SUB-BASIN-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Irregular

                        XSec: SECTION 1
                  Invert(ft): 3.250
       Control Elevation(ft): 3.250
      Struct Opening Dim(ft): 9999.00
                                                 TABLE
             Bottom Clip(ft): 0.000
                Top Clip(ft): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-4-6 OVR       From Node: SUB-BASIN-4
        Group: BASE                  To Node: SUB-BASIN-6
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.000
       Control Elevation(ft): 4.000
                                                 TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-5-4 OVR       From Node: SUB-BASIN-5
        Group: BASE                  To Node: SUB-BASIN-4
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                                 TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: BASIN-5-8 OVR       From Node: SUB-BASIN-5
        Group: BASE                  To Node: SUB-BASIN-8
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 3.500
       Control Elevation(ft): 3.500
                                                 TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: CARLYLE             From Node: CS-6
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.600
       Control Elevation(ft): 4.600
                                                 TABLE
             Bottom Clip(in): 0.000
```

```
           Top Clip(in): 0.000
     Weir Discharge Coef: 3.200
  Orifice Discharge Coef: 0.600


==========================================================================================
==== Rating Curves =======================================================================
==========================================================================================

        Name: DW-1                From Node: Sub-Basin-2            Count: 3
       Group: BASE                  To Node: Aquifer                 Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
          #1: Drainage Wells  2.000           1.600
          #2:                 0.000           0.000
          #3:                 0.000           0.000
          #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
        Name: DW-2                From Node: Sub-Basin-5            Count: 3
       Group: BASE                  To Node: Aquifer                 Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
          #1: Drainage Wells  2.000           1.600
          #2:                 0.000           0.000
          #3:                 0.000           0.000
          #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
        Name: DW-3                From Node: Sub-Basin-6            Count: 3
       Group: BASE                  To Node: Aquifer                 Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
          #1: Drainage Wells  2.000           1.600
          #2:                 0.000           0.000
          #3:                 0.000           0.000
          #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
        Name: EXIST-PUMP          From Node: CS-3                   Count: 1
       Group: BASE                  To Node: Outfalls                Flow: Both

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
          #1: EXIST-PUMP      2.100           1.600
          #2:                 0.000           0.000
          #3:                 0.000           0.000
          #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
        Name: NEW PUMP            From Node: SUB-BASIN-3            Count: 1
       Group: BASE                  To Node: Outfalls                Flow: Both

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
          #1: NEW PUMP        2.000           1.600
          #2:                 0.000           0.000
          #3:                 0.000           0.000
          #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
        Name: NEW WELLS           From Node: SUB-BASIN-3            Count: 3
       Group: BASE                  To Node: Aquifer                 Flow: Both

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
          #1: DRAINAGE WELLS  2.000           1.600
          #2:                 0.000           0.000
          #3:                 0.000           0.000
          #4:                 0.000           0.000


==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================
```

```
         Name: 005YR001HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\005YR001HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Fdot-1
    Rainfall Amount(in): 3.20

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 005YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\005YR024HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: SFWMD-24HR
    Rainfall Amount(in): 6.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 010YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\010YR024HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: SFWMD-24HR
    Rainfall Amount(in): 7.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 025YR072HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\025YR072HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 11.00

Time(hrs)       Print Inc(min)
--------------- ---------------
96.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 100YR072HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\100YR072HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 15.00

Time(hrs)       Print Inc(min)
--------------- ---------------
96.000          5.00

----------------------------------------------------------------------------------------------------
         Name: QUALITY
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\QUALITY.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.63
          Rainfall File: Scsiii
    Rainfall Amount(in): 1.58

Time(hrs)       Print Inc(min)
--------------- ---------------
12.000          1.00
24.000          15.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: 005YR001HR          Hydrology Sim: 005YR001HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\005YR001HR.I32
```

```
      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 6.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         1.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 005YR024HR         Hydrology Sim: 005YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\005YR024HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 48.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.000
48.000          15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 010YR024HR         Hydrology Sim: 010YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\010YR024HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 48.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.000
48.000          15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 025YR072HR         Hydrology Sim: 025YR072HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\025YR072HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 120.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:
```

Time(hrs)	Print Inc(min)
30.000	30.000
50.000	5.000
72.000	5.000
120.000	30.000

Group	Run
BASE	Yes

Name: 100YR072HR   Hydrology Sim: 100YR072HR
Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\100YR072HR.I32

Execute: Yes   Restart: No   Patch: No
Alternative: No

Max Delta Z(ft): 1.00   Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000   End Time(hrs): 120.00
Min Calc Time(sec): 0.5000   Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
30.000	30.000
50.000	5.000
72.000	5.000
120.000	30.000

Group	Run
BASE	Yes

Name: QUALITY   Hydrology Sim: QUALITY
Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 2\QUALITY.I32

Execute: Yes   Restart: No   Patch: No
Alternative: No

Max Delta Z(ft): 1.00   Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000   End Time(hrs): 24.00
Min Calc Time(sec): 0.5000   Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
24.000	5.000

Group	Run
BASE	Yes

ABBOTT AVE DRAINAGE STUDY
ICPR MODEL FOR PROPOSED IMPROVEMENTS - OPTION 2
NODE MAXIMUM REPORT

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Aquifer	BASE	005YR001HR	0.00	-60.00	1.60	-61.6000	0	0.57	92.40	0.00	0.00
Aquifer	BASE	005YR024HR	0.00	-60.00	1.60	-61.6000	0	9.65	92.40	0.00	0.00
Aquifer	BASE	010YR024HR	0.00	-60.00	1.60	-61.6000	0	8.76	92.40	0.00	0.00
Aquifer	BASE	025YR072HR	0.00	-60.00	1.60	-61.6000	0	36.96	92.40	0.00	0.00
Aquifer	BASE	100YR072HR	0.00	-60.00	1.60	-61.6000	0	25.09	92.40	0.00	0.00
Aquifer	BASE	QUALITY	0.00	-60.00	1.60	-61.6000	0	1.18	92.40	0.00	0.00
CS-1	BASE	005YR001HR	2.72	2.09	8.00	0.0025	132	2.72	2.38	2.72	2.38
CS-1	BASE	005YR024HR	14.78	2.11	8.00	0.0021	132	14.77	2.60	14.78	2.60
CS-1	BASE	010YR024HR	14.66	2.12	8.00	0.0021	132	14.65	2.69	14.66	2.69
CS-1	BASE	025YR072HR	62.31	2.14	8.00	0.0022	132	62.30	2.76	62.31	2.76
CS-1	BASE	100YR072HR	61.91	2.40	8.00	0.0024	132	61.89	3.42	61.91	3.41
CS-1	BASE	QUALITY	1.83	2.07	8.00	0.0023	132	1.83	1.75	1.83	1.75
CS-2	BASE	005YR001HR	1.51	2.20	8.00	0.0023	128	1.51	1.19	1.51	1.19
CS-2	BASE	005YR024HR	14.76	2.23	8.00	-0.0028	128	14.76	1.40	14.76	1.40
CS-2	BASE	010YR024HR	14.66	2.23	8.00	-0.0028	128	14.65	1.46	14.66	1.46
CS-2	BASE	025YR072HR	62.31	2.25	8.00	0.0026	128	62.30	1.55	62.31	1.55
CS-2	BASE	100YR072HR	61.89	2.80	8.00	0.0048	128	61.89	9.09	61.89	9.09
CS-2	BASE	QUALITY	6.78	2.00	8.00	-0.0023	128	1.76	0.44	0.00	0.00
CS-3	BASE	005YR001HR	2.00	2.10	8.00	-0.0537	128	1.86	1.23	2.00	14.20
CS-3	BASE	005YR024HR	14.41	2.10	8.00	-0.0540	128	14.26	1.42	14.41	14.20
CS-3	BASE	010YR024HR	15.12	2.10	8.00	-0.0540	128	14.57	1.51	15.12	14.20
CS-3	BASE	025YR072HR	62.97	2.12	8.00	-0.0541	128	62.75	10.19	62.97	14.23
CS-3	BASE	100YR072HR	62.88	4.08	8.00	-0.0546	128	62.88	43.54	62.88	43.54
CS-3	BASE	QUALITY	7.26	2.00	8.00	-0.0023	128	1.73	0.43	0.00	0.00
CS-4	BASE	005YR001HR	1.67	2.71	8.00	-0.0084	173	1.66	15.42	1.67	15.42
CS-4	BASE	005YR024HR	14.30	2.81	8.00	-0.0116	173	14.30	18.11	14.30	18.11
CS-4	BASE	010YR024HR	14.60	2.87	8.00	-0.0117	173	14.60	19.93	14.60	19.93
CS-4	BASE	025YR072HR	62.77	2.93	8.00	-0.0124	173	62.77	21.47	62.77	21.47
CS-4	BASE	100YR072HR	62.89	3.32	8.00	-0.0115	173	62.89	26.48	62.89	26.48
CS-4	BASE	QUALITY	1.59	2.08	8.00	-0.0089	173	1.25	2.33	1.59	0.54
CS-5	BASE	005YR001HR	1.68	2.25	8.00	-0.0037	119	1.67	1.58	1.68	1.58
CS-5	BASE	005YR024HR	13.89	2.27	8.00	-0.0037	119	13.89	1.84	13.89	1.84
CS-5	BASE	010YR024HR	14.39	2.29	8.00	-0.0037	119	14.39	1.96	14.39	1.96
CS-5	BASE	025YR072HR	62.77	2.30	8.00	-0.0037	119	62.77	2.10	62.77	2.10
CS-5	BASE	100YR072HR	62.90	2.91	8.00	-0.0037	119	62.90	10.60	62.90	10.60
CS-5	BASE	QUALITY	6.33	2.00	8.00	-0.0037	119	1.70	0.66	0.00	0.00
CS-6	BASE	005YR001HR	1.74	3.05	8.00	0.0054	293	1.73	11.90	1.74	11.90
CS-6	BASE	005YR024HR	13.93	3.31	8.00	-0.0079	158	13.93	13.95	13.93	13.95
CS-6	BASE	010YR024HR	14.59	3.42	8.00	-0.0103	158	14.59	14.78	14.59	14.78
CS-6	BASE	025YR072HR	62.77	3.58	8.00	-0.0106	158	62.76	15.85	62.77	15.85
CS-6	BASE	100YR072HR	62.90	3.87	8.00	-0.0106	158	62.89	17.66	62.90	17.66
CS-6	BASE	QUALITY	5.85	2.00	8.00	-0.0050	364	1.66	3.17	5.85	0.00
CS-8	BASE	005YR001HR	1.94	2.25	8.00	-0.0040	126	1.93	3.12	1.94	3.12
CS-8	BASE	005YR024HR	13.89	2.27	8.00	-0.0033	126	13.89	3.67	13.89	3.67
CS-8	BASE	010YR024HR	14.39	2.34	8.00	-0.0037	126	14.39	5.06	14.39	5.06
CS-8	BASE	025YR072HR	62.77	4.43	8.00	-0.0033	126	62.75	12.49	62.77	12.49
CS-8	BASE	100YR072HR	62.90	4.98	8.00	0.0860	126	62.89	46.86	62.90	13.65
CS-8	BASE	QUALITY	1.22	2.08	8.00	-0.0027	126	1.21	0.70	1.22	0.62
Outfalls	BASE	005YR001HR	0.00	1.60	1.60	0.0000	0	1.71	54.67	0.00	0.00
Outfalls	BASE	005YR024HR	0.00	1.60	1.60	0.0000	0	14.13	60.71	0.00	0.00

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Outfalls	BASE	010YR024HR	0.00	1.60	1.60	0.0000	0	14.45	65.06	0.00	0.00
Outfalls	BASE	025YR072HR	0.00	1.60	1.60	0.0000	0	62.73	75.39	0.00	0.00
Outfalls	BASE	100YR072HR	0.00	1.60	1.60	0.0000	0	62.78	126.64	0.00	0.00
Outfalls	BASE	QUALITY	0.00	1.60	1.60	0.0000	0	1.59	7.52	0.00	0.00
SUB-BASIN-1	BASE	005YR001HR	2.72	4.08	8.00	-0.0053	169849	1.25	26.15	2.88	8.62
SUB-BASIN-1	BASE	005YR024HR	14.77	4.48	8.00	-0.0130	237916	12.50	35.60	16.23	15.53
SUB-BASIN-1	BASE	010YR024HR	14.65	4.66	8.00	-0.0147	269229	12.50	42.75	15.00	17.65
SUB-BASIN-1	BASE	025YR072HR	62.31	4.81	8.00	-0.0171	295023	60.50	52.14	62.50	23.38
SUB-BASIN-1	BASE	100YR072HR	61.89	5.05	8.00	-0.0177	335412	60.50	72.81	61.98	39.17
SUB-BASIN-1	BASE	QUALITY	1.83	3.14	8.00	-0.0064	8894	1.67	6.58	1.81	6.68
SUB-BASIN-2	BASE	005YR001HR	1.51	3.81	2.80	0.0622	25931	1.25	28.83	1.13	27.25
SUB-BASIN-2	BASE	005YR024HR	14.76	4.48	2.80	-0.0624	167640	13.07	39.90	17.50	27.72
SUB-BASIN-2	BASE	010YR024HR	14.65	4.66	2.80	-0.0626	206741	12.80	47.85	14.65	34.12
SUB-BASIN-2	BASE	025YR072HR	62.30	4.81	2.80	-0.0631	238741	60.61	57.75	62.29	46.07
SUB-BASIN-2	BASE	100YR072HR	61.89	5.04	2.80	-0.0631	288724	61.06	87.45	61.87	78.59
SUB-BASIN-2	BASE	QUALITY	1.55	2.02	2.80	-0.0626	182	1.67	12.74	3.18	25.65
SUB-BASIN-3	BASE	005YR001HR	1.88	3.33	2.80	-0.0617	148054	1.25	49.08	1.86	29.33
SUB-BASIN-3	BASE	005YR024HR	14.30	3.90	2.80	-0.0673	277289	12.67	68.19	14.26	29.52
SUB-BASIN-3	BASE	010YR024HR	14.60	4.19	2.80	-0.0684	344908	12.67	83.91	14.57	29.61
SUB-BASIN-3	BASE	025YR072HR	62.76	4.46	2.80	-0.0697	407243	60.59	104.12	62.75	38.29
SUB-BASIN-3	BASE	100YR072HR	62.88	4.96	2.80	-0.0685	522213	60.84	149.91	62.88	71.64
SUB-BASIN-3	BASE	QUALITY	1.58	2.01	2.80	-0.0621	218	1.68	18.86	1.73	28.53
SUB-BASIN-4	BASE	005YR001HR	1.66	3.50	8.00	-0.0121	78926	1.25	31.05	1.56	23.78
SUB-BASIN-4	BASE	005YR024HR	14.30	3.90	8.00	-0.0165	159689	12.54	42.53	12.93	32.95
SUB-BASIN-4	BASE	010YR024HR	14.60	4.19	8.00	-0.0157	219895	12.53	51.25	12.78	38.40
SUB-BASIN-4	BASE	025YR072HR	62.77	4.46	8.00	-0.0157	275528	60.50	62.18	60.63	43.54
SUB-BASIN-4	BASE	100YR072HR	62.89	4.96	8.00	-0.0166	378549	60.81	97.39	60.41	48.85
SUB-BASIN-4	BASE	QUALITY	1.59	2.08	8.00	-0.0113	263	1.62	7.53	1.61	8.50
SUB-BASIN-5	BASE	005YR001HR	1.67	3.48	8.00	0.0631	64705	1.25	31.99	3.45	28.84
SUB-BASIN-5	BASE	005YR024HR	13.89	3.93	8.00	0.0627	142512	12.50	42.66	12.61	30.11
SUB-BASIN-5	BASE	010YR024HR	14.39	4.17	8.00	0.0623	184344	12.50	51.05	12.43	30.15
SUB-BASIN-5	BASE	025YR072HR	62.77	4.46	8.00	0.0628	234187	60.50	61.55	61.30	35.29
SUB-BASIN-5	BASE	100YR072HR	62.90	4.96	8.00	0.0632	321694	60.50	85.72	60.83	49.44
SUB-BASIN-5	BASE	QUALITY	1.45	2.01	8.00	-0.0617	179	1.67	8.40	2.30	28.28
SUB-BASIN-6	BASE	005YR001HR	1.74	3.52	8.00	0.0149	133639	1.25	50.58	1.73	35.00
SUB-BASIN-6	BASE	005YR024HR	13.93	3.99	8.00	-0.0153	268780	12.50	69.11	13.93	37.05
SUB-BASIN-6	BASE	010YR024HR	14.59	4.19	8.00	-0.0195	326199	12.50	82.96	14.59	37.88
SUB-BASIN-6	BASE	025YR072HR	62.77	4.46	8.00	-0.0201	404695	60.50	101.54	62.76	38.95
SUB-BASIN-6	BASE	100YR072HR	62.89	4.96	8.00	-0.0200	549974	60.42	139.46	62.89	40.76
SUB-BASIN-6	BASE	QUALITY	1.57	2.00	8.00	-0.0147	787	1.65	16.61	1.66	26.27
SUB-BASIN-8	BASE	005YR001HR	1.93	3.44	8.00	-0.0133	41474	0.95	13.53	1.93	3.12
SUB-BASIN-8	BASE	005YR024HR	13.89	3.93	8.00	-0.0103	59530	12.61	16.57	13.89	3.67
SUB-BASIN-8	BASE	010YR024HR	14.39	4.17	8.00	-0.0131	68474	12.43	20.32	14.39	5.06
SUB-BASIN-8	BASE	025YR072HR	62.77	4.46	8.00	-0.0127	79111	60.25	23.66	62.75	12.49
SUB-BASIN-8	BASE	100YR072HR	62.89	4.96	8.00	-0.0103	97852	60.96	28.39	62.89	46.86
SUB-BASIN-8	BASE	QUALITY	1.21	2.14	8.00	-0.0070	146	1.92	2.23	1.21	0.70

ABBOTT AVE DRAINAGE STUDY
ICPR MODEL FOR PROPOSED IMPROVEMENTS - OPTION 2
LINK MAXIMUM REPORT

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
1	BASE	005YR001HR	0.00	0.00	0.000	2.72	4.08	2.72	2.09
1	BASE	005YR024HR	0.00	0.00	0.000	14.77	4.48	14.78	2.11
1	BASE	010YR024HR	0.00	0.00	0.000	14.65	4.66	14.66	2.12
1	BASE	025YR072HR	0.00	0.00	0.000	62.31	4.81	62.31	2.14
1	BASE	100YR072HR	61.89	0.67	0.001	61.89	5.05	61.91	2.40
1	BASE	QUALITY	0.00	0.00	0.000	1.83	3.14	1.83	2.07
12	BASE	005YR001HR	2.95	6.24	0.987	2.72	4.08	1.51	3.81
12	BASE	005YR024HR	17.71	6.40	1.150	14.77	4.48	14.76	4.48
12	BASE	010YR024HR	18.89	6.40	1.133	14.65	4.66	14.65	4.66
12	BASE	025YR072HR	67.59	6.40	1.113	62.31	4.81	62.30	4.81
12	BASE	100YR072HR	69.20	6.39	1.115	61.89	5.05	61.89	5.04
12	BASE	QUALITY	1.88	4.93	1.093	1.83	3.14	1.55	2.02
2	BASE	005YR001HR	0.00	0.00	0.000	1.51	3.81	1.51	2.20
2	BASE	005YR024HR	0.00	0.00	0.000	14.76	4.48	14.76	2.23
2	BASE	010YR024HR	0.00	0.00	0.000	14.65	4.66	14.66	2.23
2	BASE	025YR072HR	62.30	0.06	0.000	62.30	4.81	62.31	2.25
2	BASE	100YR072HR	61.89	7.69	0.007	61.89	5.04	61.89	2.80
2	BASE	QUALITY	0.00	0.00	0.000	1.55	2.02	6.78	2.00
23	BASE	005YR001HR	1.12	3.01	1.427	1.51	3.81	1.88	3.33
23	BASE	005YR024HR	17.61	3.40	1.459	14.76	4.48	14.30	3.90
23	BASE	010YR024HR	12.06	3.13	1.430	14.65	4.66	14.60	4.19
23	BASE	025YR072HR	59.95	3.14	1.444	62.30	4.81	62.76	4.46
23	BASE	100YR072HR	59.77	3.15	1.428	61.89	5.04	62.88	4.96
23	BASE	QUALITY	1.04	2.28	-1.372	1.55	2.02	1.58	2.01
3	BASE	005YR001HR	0.00	0.00	0.000	1.88	3.33	2.00	2.10
3	BASE	005YR024HR	0.00	0.00	0.000	14.30	3.90	14.41	2.10
3	BASE	010YR024HR	0.00	0.00	0.000	14.60	4.19	15.12	2.10
3	BASE	025YR072HR	62.76	8.61	0.002	62.76	4.46	62.97	2.12
3	BASE	100YR072HR	62.88	42.66	0.018	62.88	4.96	62.88	4.08
3	BASE	QUALITY	0.00	0.00	0.000	1.58	2.01	7.26	2.00
34	BASE	005YR001HR	2.85	2.87	1.200	1.66	3.50	1.88	3.33
34	BASE	005YR024HR	17.71	2.84	1.206	14.30	3.90	14.30	3.90
34	BASE	010YR024HR	19.10	2.81	1.212	14.60	4.19	14.60	4.19
34	BASE	025YR072HR	68.18	2.81	1.221	62.77	4.46	62.76	4.46
34	BASE	100YR072HR	70.41	2.82	1.223	62.89	4.96	62.88	4.96
34	BASE	QUALITY	1.68	2.47	1.207	1.59	2.08	1.58	2.01
4	BASE	005YR001HR	0.00	0.00	0.000	1.66	3.50	1.67	2.71
4	BASE	005YR024HR	0.00	0.00	0.000	14.30	3.90	14.30	2.81
4	BASE	010YR024HR	0.00	0.00	0.000	14.60	4.19	14.60	2.87
4	BASE	025YR072HR	0.00	0.00	0.000	62.77	4.46	62.77	2.93
4	BASE	100YR072HR	62.89	4.22	0.001	62.89	4.96	62.89	3.32
4	BASE	QUALITY	0.00	0.00	0.000	1.59	2.08	1.59	2.08
45	BASE	005YR001HR	5.79	1.12	-1.276	1.67	3.48	1.66	3.50
45	BASE	005YR024HR	6.85	1.21	-1.294	13.89	3.93	14.30	3.90
45	BASE	010YR024HR	12.95	1.31	-1.295	14.39	4.17	14.60	4.19
45	BASE	025YR072HR	60.76	1.42	-1.304	62.77	4.46	62.77	4.46
45	BASE	100YR072HR	60.52	1.54	-1.291	62.90	4.96	62.89	4.96
45	BASE	QUALITY	5.85	1.20	-1.282	1.45	2.01	1.59	2.08
5	BASE	005YR001HR	0.00	0.00	0.000	1.67	3.48	1.68	2.25
5	BASE	005YR024HR	0.00	0.00	0.000	13.89	3.93	13.89	2.27

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
5	BASE	010YR024HR	0.00	0.00	0.000	14.39	4.17	14.39	2.29
5	BASE	025YR072HR	0.00	0.00	0.000	62.77	4.46	62.77	2.30
5	BASE	100YR072HR	62.90	8.56	0.002	62.90	4.96	62.90	2.91
5	BASE	QUALITY	0.00	0.00	0.000	1.45	2.01	6.33	2.00
56	BASE	005YR001HR	2.61	3.84	-2.132	1.67	3.48	1.74	3.52
56	BASE	005YR024HR	17.62	3.83	-2.108	13.89	3.93	13.93	3.99
56	BASE	010YR024HR	11.67	3.87	-2.110	14.39	4.17	14.59	4.19
56	BASE	025YR072HR	58.04	3.84	-2.116	62.77	4.46	62.77	4.46
56	BASE	100YR072HR	57.61	3.85	-2.125	62.90	4.96	62.89	4.96
56	BASE	QUALITY	1.98	3.81	-2.104	1.45	2.01	1.57	2.00
58	BASE	005YR001HR	0.96	1.81	-1.486	1.67	3.48	1.93	3.44
58	BASE	005YR024HR	12.04	2.02	-1.508	13.89	3.93	13.89	3.93
58	BASE	010YR024HR	11.96	2.07	-1.505	14.39	4.17	14.39	4.17
58	BASE	025YR072HR	59.86	2.12	-1.503	62.77	4.46	62.77	4.46
58	BASE	100YR072HR	59.69	2.04	-1.510	62.90	4.96	62.89	4.96
58	BASE	QUALITY	2.37	1.02	-1.489	1.45	2.01	1.21	2.14
6	BASE	005YR001HR	0.00	0.00	0.000	1.74	3.52	1.74	3.05
6	BASE	005YR024HR	0.00	0.00	0.000	13.93	3.99	13.93	3.31
6	BASE	010YR024HR	0.00	0.00	0.000	14.59	4.19	14.59	3.42
6	BASE	025YR072HR	0.00	0.00	0.000	62.77	4.46	62.77	3.58
6	BASE	100YR072HR	0.00	0.00	0.000	62.89	4.96	62.90	3.87
6	BASE	QUALITY	0.00	0.00	0.000	1.57	2.00	5.85	2.00
8	BASE	005YR001HR	0.00	0.00	0.000	1.93	3.44	1.94	2.25
8	BASE	005YR024HR	0.00	0.00	0.000	13.89	3.93	13.89	2.27
8	BASE	010YR024HR	14.39	1.20	0.000	14.39	4.17	14.39	2.34
8	BASE	025YR072HR	62.76	12.02	0.002	62.77	4.46	62.77	4.43
8	BASE	100YR072HR	62.89	46.08	-73.954	62.89	4.96	62.90	4.98
8	BASE	QUALITY	0.00	0.00	0.000	1.21	2.14	1.22	2.08
89&90ST	BASE	005YR001HR	0.00	0.00	0.000	1.68	2.25	0.00	1.60
89&90ST	BASE	005YR024HR	0.00	0.00	0.000	13.89	2.27	0.00	1.60
89&90ST	BASE	010YR024HR	0.00	0.00	0.000	14.39	2.29	0.00	1.60
89&90ST	BASE	025YR072HR	0.00	0.00	0.000	62.77	2.30	0.00	1.60
89&90ST	BASE	100YR072HR	0.00	0.00	0.000	62.90	2.91	0.00	1.60
89&90ST	BASE	QUALITY	0.00	0.00	0.000	6.33	2.00	0.00	1.60
91ST	BASE	005YR001HR	0.00	0.00	0.000	1.67	2.71	0.00	1.60
91ST	BASE	005YR024HR	0.00	0.00	0.000	14.30	2.81	0.00	1.60
91ST	BASE	010YR024HR	0.00	0.00	0.000	14.60	2.87	0.00	1.60
91ST	BASE	025YR072HR	0.00	0.00	0.000	62.77	2.93	0.00	1.60
91ST	BASE	100YR072HR	0.00	0.00	0.000	62.89	3.32	0.00	1.60
91ST	BASE	QUALITY	0.00	0.00	0.000	1.59	2.08	0.00	1.60
92&93 ST	BASE	005YR001HR	0.00	0.00	0.000	2.00	2.10	0.00	1.60
92&93 ST	BASE	005YR024HR	0.00	0.00	0.000	14.41	2.10	0.00	1.60
92&93 ST	BASE	010YR024HR	0.00	0.00	0.000	15.12	2.10	0.00	1.60
92&93 ST	BASE	025YR072HR	0.00	0.00	0.000	62.97	2.12	0.00	1.60
92&93 ST	BASE	100YR072HR	62.88	14.33	0.009	62.88	4.08	0.00	1.60
92&93 ST	BASE	QUALITY	0.00	0.00	0.000	7.26	2.00	0.00	1.60
94ST	BASE	005YR001HR	0.00	0.00	0.000	1.51	2.20	0.00	1.60
94ST	BASE	005YR024HR	0.00	0.00	0.000	14.76	2.23	0.00	1.60
94ST	BASE	010YR024HR	0.00	0.00	0.000	14.66	2.23	0.00	1.60
94ST	BASE	025YR072HR	0.00	0.00	0.000	62.31	2.25	0.00	1.60

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
94ST	BASE	100YR072HR	0.00	0.00	0.000	61.89	2.80	0.00	1.60
94ST	BASE	QUALITY	0.00	0.00	0.000	6.78	2.00	0.00	1.60
95ST	BASE	005YR001HR	0.00	0.00	0.000	2.72	2.09	0.00	1.60
95ST	BASE	005YR024HR	0.00	0.00	0.000	14.78	2.11	0.00	1.60
95ST	BASE	010YR024HR	0.00	0.00	0.000	14.66	2.12	0.00	1.60
95ST	BASE	025YR072HR	0.00	0.00	0.000	62.31	2.14	0.00	1.60
95ST	BASE	100YR072HR	0.00	0.00	0.000	61.91	2.40	0.00	1.60
95ST	BASE	QUALITY	0.00	0.00	0.000	1.83	2.07	0.00	1.60
BASIN-1-2 OVR	BASE	005YR001HR	0.00	0.00	0.000	2.72	4.08	1.51	3.81
BASIN-1-2 OVR	BASE	005YR024HR	16.23	12.60	0.058	14.77	4.48	14.76	4.48
BASIN-1-2 OVR	BASE	010YR024HR	15.00	14.77	0.139	14.65	4.66	14.65	4.66
BASIN-1-2 OVR	BASE	025YR072HR	62.50	20.42	0.127	62.31	4.81	62.30	4.81
BASIN-1-2 OVR	BASE	100YR072HR	62.00	35.52	-0.102	61.89	5.05	61.89	5.04
BASIN-1-2 OVR	BASE	QUALITY	0.00	0.00	0.000	1.83	3.14	1.55	2.02
BASIN-2-3 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.51	3.81	1.88	3.33
BASIN-2-3 OVR	BASE	005YR024HR	0.00	0.00	0.000	14.76	4.48	14.30	3.90
BASIN-2-3 OVR	BASE	010YR024HR	14.65	7.11	0.001	14.65	4.66	14.60	4.19
BASIN-2-3 OVR	BASE	025YR072HR	62.30	19.26	0.003	62.30	4.81	62.76	4.46
BASIN-2-3 OVR	BASE	100YR072HR	61.89	44.89	0.022	61.89	5.04	62.88	4.96
BASIN-2-3 OVR	BASE	QUALITY	0.00	0.00	0.000	1.55	2.02	1.58	2.01
BASIN-4-3 OVR	BASE	005YR001HR	1.66	2.70	0.001	1.66	3.50	1.88	3.33
BASIN-4-3 OVR	BASE	005YR024HR	13.00	12.90	-0.012	14.30	3.90	14.30	3.90
BASIN-4-3 OVR	BASE	010YR024HR	12.82	18.00	-0.027	14.60	4.19	14.60	4.19
BASIN-4-3 OVR	BASE	025YR072HR	60.65	22.82	-0.052	62.77	4.46	62.76	4.46
BASIN-4-3 OVR	BASE	100YR072HR	60.46	30.86	-0.099	62.89	4.96	62.88	4.96
BASIN-4-3 OVR	BASE	QUALITY	0.00	0.00	0.000	1.59	2.08	1.58	2.01
BASIN-4-6 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.66	3.50	1.74	3.52
BASIN-4-6 OVR	BASE	005YR024HR	0.00	0.00	0.000	14.30	3.90	13.93	3.99
BASIN-4-6 OVR	BASE	010YR024HR	15.45	4.75	0.051	14.60	4.19	14.59	4.19
BASIN-4-6 OVR	BASE	025YR072HR	65.08	4.34	0.072	62.77	4.46	62.77	4.46
BASIN-4-6 OVR	BASE	100YR072HR	67.54	3.93	0.115	62.89	4.96	62.89	4.96
BASIN-4-6 OVR	BASE	QUALITY	0.00	0.00	0.000	1.59	2.08	1.57	2.00
BASIN-5-4 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.67	3.48	1.66	3.50
BASIN-5-4 OVR	BASE	005YR024HR	0.00	0.00	0.000	13.89	3.93	14.30	3.90
BASIN-5-4 OVR	BASE	010YR024HR	13.94	1.67	-0.046	14.39	4.17	14.60	4.19
BASIN-5-4 OVR	BASE	025YR072HR	61.30	7.81	-0.141	62.77	4.46	62.77	4.46
BASIN-5-4 OVR	BASE	100YR072HR	60.83	19.10	-0.284	62.90	4.96	62.89	4.96
BASIN-5-4 OVR	BASE	QUALITY	0.00	0.00	0.000	1.45	2.01	1.59	2.08
BASIN-5-8 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.67	3.48	1.93	3.44
BASIN-5-8 OVR	BASE	005YR024HR	12.62	5.59	-0.069	13.89	3.93	13.89	3.93
BASIN-5-8 OVR	BASE	010YR024HR	12.44	5.38	-0.065	14.39	4.17	14.39	4.17
BASIN-5-8 OVR	BASE	025YR072HR	62.12	9.87	-0.093	62.77	4.46	62.77	4.46
BASIN-5-8 OVR	BASE	100YR072HR	61.00	13.59	1.214	62.90	4.96	62.89	4.96
BASIN-5-8 OVR	BASE	QUALITY	0.00	0.00	0.000	1.45	2.01	1.21	2.14
CARLYLE	BASE	005YR001HR	0.00	0.00	0.000	1.74	3.05	0.00	1.60
CARLYLE	BASE	005YR024HR	0.00	0.00	0.000	13.93	3.31	0.00	1.60
CARLYLE	BASE	010YR024HR	0.00	0.00	0.000	14.59	3.42	0.00	1.60
CARLYLE	BASE	025YR072HR	0.00	0.00	0.000	62.77	3.58	0.00	1.60
CARLYLE	BASE	100YR072HR	0.00	0.00	0.000	62.90	3.87	0.00	1.60
CARLYLE	BASE	QUALITY	0.00	0.00	0.000	5.85	2.00	0.00	1.60

LINK MAXIMUM REPORT

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
DP-1	BASE	005YR001HR	2.72	2.38	-0.011	2.72	2.09	0.00	1.60
DP-1	BASE	005YR024HR	14.78	2.60	-0.016	14.78	2.11	0.00	1.60
DP-1	BASE	010YR024HR	14.66	2.69	-0.016	14.66	2.12	0.00	1.60
DP-1	BASE	025YR072HR	62.31	2.76	-0.028	62.31	2.14	0.00	1.60
DP-1	BASE	100YR072HR	61.91	3.41	-0.017	61.91	2.40	0.00	1.60
DP-1	BASE	QUALITY	1.83	1.75	-0.015	1.83	2.07	0.00	1.60
DP-2	BASE	005YR001HR	1.51	1.19	0.006	1.51	2.20	0.00	1.60
DP-2	BASE	005YR024HR	14.76	1.40	-0.019	14.76	2.23	0.00	1.60
DP-2	BASE	010YR024HR	14.66	1.46	-0.018	14.66	2.23	0.00	1.60
DP-2	BASE	025YR072HR	62.31	1.55	-0.017	62.31	2.25	0.00	1.60
DP-2	BASE	100YR072HR	61.89	9.09	-0.015	61.89	2.80	0.00	1.60
DP-2	BASE	QUALITY	0.00	0.00	0.000	6.78	2.00	0.00	1.60
DP-3	BASE	005YR001HR	2.00	0.00	0.001	2.00	2.10	0.00	1.60
DP-3	BASE	005YR024HR	14.41	0.00	0.001	14.41	2.10	0.00	1.60
DP-3	BASE	010YR024HR	15.12	0.00	0.002	15.12	2.10	0.00	1.60
DP-3	BASE	025YR072HR	62.97	0.03	0.034	62.97	2.12	0.00	1.60
DP-3	BASE	100YR072HR	62.88	15.01	0.041	62.88	4.08	0.00	1.60
DP-3	BASE	QUALITY	0.00	0.00	0.000	7.26	2.00	0.00	1.60
DP-4-1	BASE	005YR001HR	1.67	7.71	-0.078	1.67	2.71	0.00	1.60
DP-4-1	BASE	005YR024HR	14.30	8.99	-0.120	14.30	2.81	0.00	1.60
DP-4-1	BASE	010YR024HR	14.60	9.91	-0.119	14.60	2.87	0.00	1.60
DP-4-1	BASE	025YR072HR	62.77	10.74	-0.128	62.77	2.93	0.00	1.60
DP-4-1	BASE	100YR072HR	62.89	12.48	-0.119	62.89	3.32	0.00	1.60
DP-4-1	BASE	QUALITY	1.59	0.27	0.018	1.59	2.08	0.00	1.60
DP-4-2	BASE	005YR001HR	1.67	7.71	-0.078	1.67	2.71	0.00	1.60
DP-4-2	BASE	005YR024HR	14.30	9.12	-0.120	14.30	2.81	0.00	1.60
DP-4-2	BASE	010YR024HR	14.60	10.02	-0.119	14.60	2.87	0.00	1.60
DP-4-2	BASE	025YR072HR	62.77	10.74	-0.128	62.77	2.93	0.00	1.60
DP-4-2	BASE	100YR072HR	62.89	14.00	-0.119	62.89	3.32	0.00	1.60
DP-4-2	BASE	QUALITY	1.59	0.27	0.018	1.59	2.08	0.00	1.60
DP-5	BASE	005YR001HR	1.68	1.58	0.009	1.68	2.25	0.00	1.60
DP-5	BASE	005YR024HR	13.89	1.84	-0.008	13.89	2.27	0.00	1.60
DP-5	BASE	010YR024HR	14.39	1.96	-0.018	14.39	2.29	0.00	1.60
DP-5	BASE	025YR072HR	62.77	2.10	-0.021	62.77	2.30	0.00	1.60
DP-5	BASE	100YR072HR	62.90	10.60	-0.021	62.90	2.91	0.00	1.60
DP-5	BASE	QUALITY	0.00	0.00	0.000	6.33	2.00	0.00	1.60
DP-6	BASE	005YR001HR	1.74	11.90	-0.076	1.74	3.05	0.00	1.60
DP-6	BASE	005YR024HR	13.93	13.95	-0.115	13.93	3.31	0.00	1.60
DP-6	BASE	010YR024HR	14.59	14.78	-0.161	14.59	3.42	0.00	1.60
DP-6	BASE	025YR072HR	62.77	15.85	-0.165	62.77	3.58	0.00	1.60
DP-6	BASE	100YR072HR	62.90	17.66	-0.165	62.90	3.87	0.00	1.60
DP-6	BASE	QUALITY	5.85	0.00	0.000	5.85	2.00	0.00	1.60
DP-8	BASE	005YR001HR	1.94	3.12	-0.050	1.94	2.25	0.00	1.60
DP-8	BASE	005YR024HR	13.89	3.67	-0.039	13.89	2.27	0.00	1.60
DP-8	BASE	010YR024HR	14.39	5.06	-0.044	14.39	2.34	0.00	1.60
DP-8	BASE	025YR072HR	62.77	12.49	-0.126	62.77	4.43	0.00	1.60
DP-8	BASE	100YR072HR	62.90	13.65	0.174	62.90	4.98	0.00	1.60
DP-8	BASE	QUALITY	1.22	0.62	-0.012	1.22	2.08	0.00	1.60
DW-1	BASE	005YR001HR	0.40	23.10	23.100	1.51	3.81	0.00	-60.00

ABBOTT AVE DRAINAGE STUDY
ICPR MODEL FOR PROPOSED IMPROVEMENTS - OPTION 2
LINK MAXIMUM REPORT

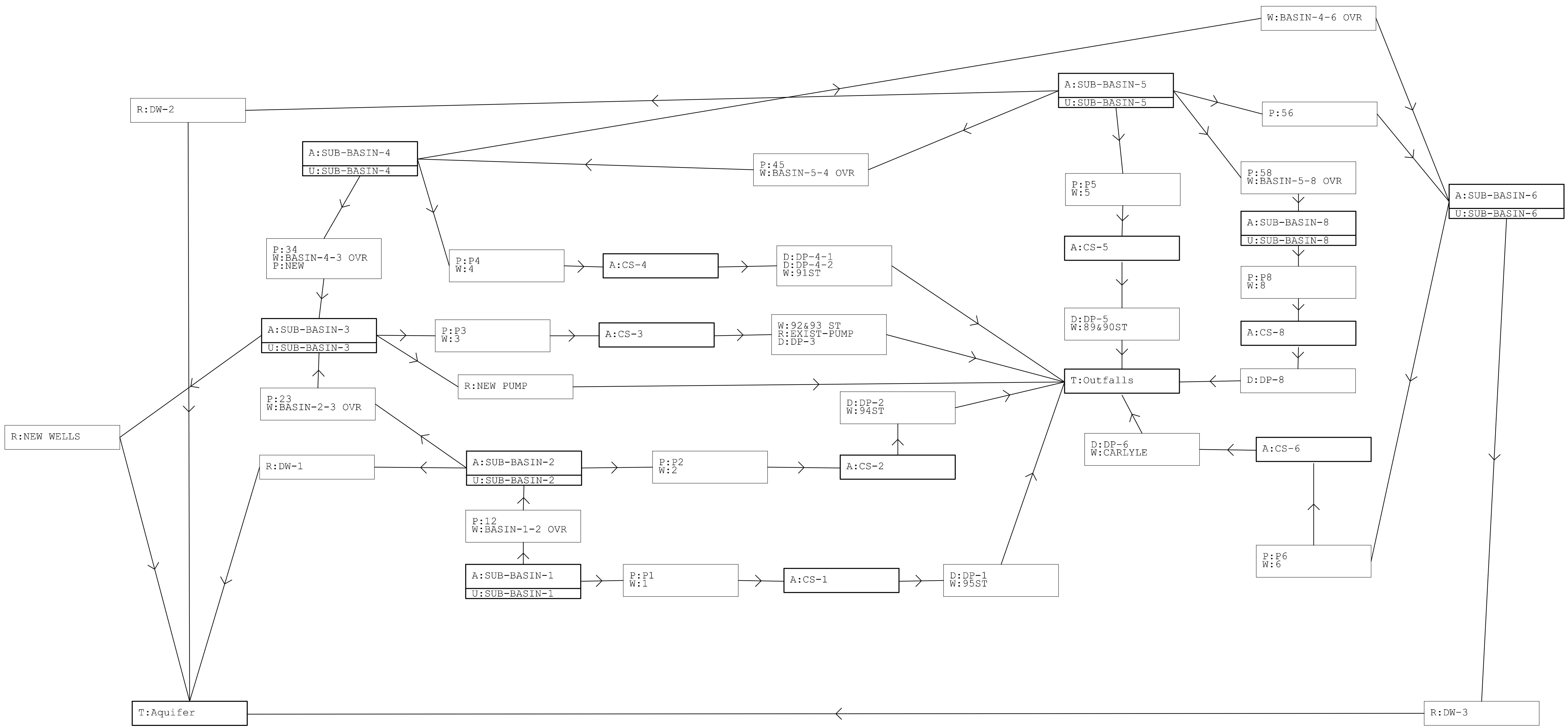
Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
DW-1	BASE	005YR024HR	5.92	23.10	23.100	14.76	4.48	0.00	-60.00
DW-1	BASE	010YR024HR	5.44	23.10	23.100	14.65	4.66	0.00	-60.00
DW-1	BASE	025YR072HR	9.60	23.10	23.100	62.30	4.81	0.00	-60.00
DW-1	BASE	100YR072HR	7.23	23.10	23.100	61.89	5.04	0.00	-60.00
DW-1	BASE	QUALITY	0.89	23.10	23.100	1.55	2.02	0.00	-60.00
DW-2	BASE	005YR001HR	0.41	23.10	23.100	1.67	3.48	0.00	-60.00
DW-2	BASE	005YR024HR	5.94	23.10	23.100	13.89	3.93	0.00	-60.00
DW-2	BASE	010YR024HR	5.46	23.10	23.100	14.39	4.17	0.00	-60.00
DW-2	BASE	025YR072HR	10.37	23.10	23.100	62.77	4.46	0.00	-60.00
DW-2	BASE	100YR072HR	7.59	23.10	23.100	62.90	4.96	0.00	-60.00
DW-2	BASE	QUALITY	0.90	23.10	23.100	1.45	2.01	0.00	-60.00
DW-3	BASE	005YR001HR	0.42	23.10	23.100	1.74	3.52	0.00	-60.00
DW-3	BASE	005YR024HR	6.20	23.10	23.100	13.93	3.99	0.00	-60.00
DW-3	BASE	010YR024HR	5.71	23.10	23.100	14.59	4.19	0.00	-60.00
DW-3	BASE	025YR072HR	11.67	23.10	23.100	62.77	4.46	0.00	-60.00
DW-3	BASE	100YR072HR	8.28	23.10	23.100	62.89	4.96	0.00	-60.00
DW-3	BASE	QUALITY	0.91	23.10	23.100	1.57	2.00	0.00	-60.00
EXIST-PUMP	BASE	005YR001HR	0.86	14.20	14.200	2.00	2.10	0.00	1.60
EXIST-PUMP	BASE	005YR024HR	11.94	14.20	14.200	14.41	2.10	0.00	1.60
EXIST-PUMP	BASE	010YR024HR	11.86	14.20	14.200	15.12	2.10	0.00	1.60
EXIST-PUMP	BASE	025YR072HR	59.72	14.20	14.200	62.97	2.12	0.00	1.60
EXIST-PUMP	BASE	100YR072HR	59.37	14.20	14.200	62.88	4.08	0.00	1.60
EXIST-PUMP	BASE	QUALITY	0.00	0.00	0.000	7.26	2.00	0.00	1.60
NEW	BASE	005YR001HR	2.85	6.92	2.896	1.66	3.50	1.88	3.33
NEW	BASE	005YR024HR	17.71	6.85	2.911	14.30	3.90	14.30	3.90
NEW	BASE	010YR024HR	19.10	6.78	2.926	14.60	4.19	14.60	4.19
NEW	BASE	025YR072HR	68.18	6.79	2.948	62.77	4.46	62.76	4.46
NEW	BASE	100YR072HR	70.41	6.81	2.952	62.89	4.96	62.88	4.96
NEW	BASE	QUALITY	1.68	5.95	2.913	1.59	2.08	1.58	2.01
NEW PUMP	BASE	005YR001HR	0.42	5.00	5.000	1.88	3.33	0.00	1.60
NEW PUMP	BASE	005YR024HR	6.15	5.00	5.000	14.30	3.90	0.00	1.60
NEW PUMP	BASE	010YR024HR	5.67	5.00	5.000	14.60	4.19	0.00	1.60
NEW PUMP	BASE	025YR072HR	9.65	5.00	5.000	62.76	4.46	0.00	1.60
NEW PUMP	BASE	100YR072HR	7.27	5.00	5.000	62.88	4.96	0.00	1.60
NEW PUMP	BASE	QUALITY	0.91	5.00	5.000	1.58	2.01	0.00	1.60
NEW WELLS	BASE	005YR001HR	0.42	23.10	23.100	1.88	3.33	0.00	-60.00
NEW WELLS	BASE	005YR024HR	6.15	23.10	23.100	14.30	3.90	0.00	-60.00
NEW WELLS	BASE	010YR024HR	5.67	23.10	23.100	14.60	4.19	0.00	-60.00
NEW WELLS	BASE	025YR072HR	9.65	23.10	23.100	62.76	4.46	0.00	-60.00
NEW WELLS	BASE	100YR072HR	7.27	23.10	23.100	62.88	4.96	0.00	-60.00
NEW WELLS	BASE	QUALITY	0.91	23.10	23.100	1.58	2.01	0.00	-60.00
P1	BASE	005YR001HR	2.72	2.38	-0.174	2.72	4.08	2.72	2.09
P1	BASE	005YR024HR	14.77	2.60	-0.184	14.77	4.48	14.78	2.11
P1	BASE	010YR024HR	14.65	2.69	-0.179	14.65	4.66	14.66	2.12
P1	BASE	025YR072HR	62.30	2.76	-0.185	62.31	4.81	62.31	2.14
P1	BASE	100YR072HR	61.34	2.84	-0.182	61.89	5.05	61.91	2.40
P1	BASE	QUALITY	1.83	1.75	-0.176	1.83	3.14	1.83	2.07
P2	BASE	005YR001HR	1.51	1.19	0.322	1.51	3.81	1.51	2.20
P2	BASE	005YR024HR	14.76	1.40	-0.327	14.76	4.48	14.76	2.23
P2	BASE	010YR024HR	14.65	1.46	-0.326	14.65	4.66	14.66	2.23

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P2	BASE	025YR072HR	62.23	1.50	-0.333	62.30	4.81	62.31	2.25
P2	BASE	100YR072HR	60.83	1.50	-0.332	61.89	5.04	61.89	2.80
P2	BASE	QUALITY	1.76	0.44	-0.326	1.55	2.02	6.78	2.00
P3	BASE	005YR001HR	1.86	1.23	-0.328	1.88	3.33	2.00	2.10
P3	BASE	005YR024HR	14.26	1.42	-0.327	14.30	3.90	14.41	2.10
P3	BASE	010YR024HR	14.57	1.51	-0.329	14.60	4.19	15.12	2.10
P3	BASE	025YR072HR	62.71	1.58	-0.330	62.76	4.46	62.97	2.12
P3	BASE	100YR072HR	66.20	1.60	-0.330	62.88	4.96	62.88	4.08
P3	BASE	QUALITY	1.73	0.43	-0.328	1.58	2.01	7.26	2.00
P4	BASE	005YR001HR	1.66	15.42	-1.796	1.66	3.50	1.67	2.71
P4	BASE	005YR024HR	14.30	18.11	-1.892	14.30	3.90	14.30	2.81
P4	BASE	010YR024HR	14.60	19.93	-1.894	14.60	4.19	14.60	2.87
P4	BASE	025YR072HR	62.77	21.47	-1.925	62.77	4.46	62.77	2.93
P4	BASE	100YR072HR	61.70	23.10	-1.946	62.89	4.96	62.89	3.32
P4	BASE	QUALITY	1.25	2.33	-1.867	1.59	2.08	1.59	2.08
P5	BASE	005YR001HR	1.67	1.58	-0.498	1.67	3.48	1.68	2.25
P5	BASE	005YR024HR	13.89	1.84	-0.503	13.89	3.93	13.89	2.27
P5	BASE	010YR024HR	14.39	1.96	-0.503	14.39	4.17	14.39	2.29
P5	BASE	025YR072HR	62.77	2.10	-0.503	62.77	4.46	62.77	2.30
P5	BASE	100YR072HR	61.40	2.21	0.508	62.90	4.96	62.90	2.91
P5	BASE	QUALITY	1.70	0.66	-0.500	1.45	2.01	6.33	2.00
P6	BASE	005YR001HR	1.73	11.90	-1.434	1.74	3.52	1.74	3.05
P6	BASE	005YR024HR	13.93	13.95	-1.451	13.93	3.99	13.93	3.31
P6	BASE	010YR024HR	14.59	14.78	-1.453	14.59	4.19	14.59	3.42
P6	BASE	025YR072HR	62.76	15.85	-1.464	62.77	4.46	62.77	3.58
P6	BASE	100YR072HR	62.89	17.66	-1.461	62.89	4.96	62.90	3.87
P6	BASE	QUALITY	1.66	3.17	-1.441	1.57	2.00	5.85	2.00
P8	BASE	005YR001HR	1.93	3.12	-0.338	1.93	3.44	1.94	2.25
P8	BASE	005YR024HR	13.89	3.67	0.321	13.89	3.93	13.89	2.27
P8	BASE	010YR024HR	13.71	3.86	0.324	14.39	4.17	14.39	2.34
P8	BASE	025YR072HR	60.90	3.86	0.304	62.77	4.46	62.77	4.43
P8	BASE	100YR072HR	60.48	3.86	-1.091	62.89	4.96	62.90	4.98
P8	BASE	QUALITY	1.21	0.70	0.311	1.21	2.14	1.22	2.08

APPENDIX F

ICPR MODEL FOR PROPOSED IMPROVEMENTS – OPTION 3

Node-Reach Diagram
ICPR Input Data
Node Maximum Report
Link Maximum Report



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

ICPR MODEL - OPTION 3
NODE REACH DIAGRAM

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: ----

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\option 3.dwg -- (Plotted by: Katharine Kupsky on Friday, October 12, 2018 2:17:35 PM)

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: SUB-BASIN-1              Node: SUB-BASIN-1           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
               Area(ac): 27.810                 Time Shift(hrs): 0.00
           Curve Number: 84.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-2              Node: SUB-BASIN-2           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
               Area(ac): 30.400                 Time Shift(hrs): 0.00
           Curve Number: 83.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-3              Node: SUB-BASIN-3           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
               Area(ac): 41.040                 Time Shift(hrs): 0.00
           Curve Number: 83.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-4              Node: SUB-BASIN-4           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
               Area(ac): 32.390                 Time Shift(hrs): 0.00
           Curve Number: 83.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-5              Node: SUB-BASIN-5           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
               Area(ac): 32.600                 Time Shift(hrs): 0.00
           Curve Number: 83.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-6              Node: SUB-BASIN-6           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File:                    Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                Time of Conc(min): 60.00
               Area(ac): 54.600                 Time Shift(hrs): 0.00
           Curve Number: 83.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

----------------------------------------------------------------------------------------------------
         Name: SUB-BASIN-8              Node: SUB-BASIN-8           Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN
```

```
       Unit Hydrograph: Uh256                  Peaking Factor: 256.0
         Rainfall File:                    Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                Time of Conc(min): 30.00
              Area(ac): 7.240                  Time Shift(hrs): 0.00
          Curve Number: 84.00              Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

     Name: Aquifer            Base Flow(cfs): 0.000          Init Stage(ft): 1.600
    Group: BASE                                              Warn Stage(ft): 1.600
     Type: Time/Stage



     Time(hrs)       Stage(ft)
--------------- ---------------
          0.00         -60.000
      99999.00         -60.000

------------------------------------------------------------------------------------------
     Name: CS-1               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
    Group: BASE                                              Warn Stage(ft): 8.000
     Type: Stage/Area



     Stage(ft)        Area(ac)
--------------- ---------------
         1.600          0.0000
         8.000          0.0001

------------------------------------------------------------------------------------------
     Name: CS-2               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
    Group: BASE                                              Warn Stage(ft): 8.000
     Type: Stage/Area



     Stage(ft)        Area(ac)
--------------- ---------------
         1.600          0.0000
         8.000          0.0001

------------------------------------------------------------------------------------------
     Name: CS-3               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
    Group: BASE                                              Warn Stage(ft): 8.000
     Type: Stage/Area



     Stage(ft)        Area(ac)
--------------- ---------------
         1.600          0.0000
         8.000          0.0001

------------------------------------------------------------------------------------------
     Name: CS-4               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
    Group: BASE                                              Warn Stage(ft): 8.000
     Type: Stage/Area



     Stage(ft)        Area(ac)
--------------- ---------------
         1.600          0.0000
         8.000          0.0001

------------------------------------------------------------------------------------------
     Name: CS-5               Base Flow(cfs): 0.000          Init Stage(ft): 1.600
    Group: BASE                                              Warn Stage(ft): 8.000
     Type: Stage/Area



     Stage(ft)        Area(ac)
--------------- ---------------
         1.600          0.0000
         8.000          0.0001
```

Name: CS-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: CS-8 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
8.000	0.0001

Name: Outfalls Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 1.600
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	1.600
99999.00	1.600

Name: SUB-BASIN-1 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.090	0.0000
8.000	19.3100

Name: SUB-BASIN-2 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 2.800
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.690	0.0000
8.000	21.1000

Name: SUB-BASIN-3 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 2.800
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.690	0.0000
8.000	28.0000

Name: SUB-BASIN-4 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000

3.120	0.0000
8.000	23.0000

Name: SUB-BASIN-5 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.110	0.0000
8.000	19.5000

Name: SUB-BASIN-6 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
3.060	0.0000
8.000	32.7500

Name: SUB-BASIN-8 Base Flow(cfs): 0.000 Init Stage(ft): 1.600
Group: BASE Warn Stage(ft): 8.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.600	0.0000
2.330	0.0000
8.000	4.8400

==== Cross Sections ====

Name: SECTION 1 Group: BASE
Encroachment: No

Station(ft)	Elevation(ft)	Manning's N
0.000	3.250	0.016000
18.000	3.800	0.016000
36.000	3.250	0.016000

==== Operating Tables ====

Name: DRAINAGE WELLS Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

DRAINAGE WELL CAPACITY: 500 GPM/FT. OF AVAILABLE HEAD

US Stage(ft)	Discharge(cfs)
1.900	7.70
8.000	7.70

Name: EXIST-PUMP Group: BASE
Type: Rating Curve
Function: US Stage vs. Discharge

US Stage(ft)	Discharge(cfs)
2.000	14.20
8.000	14.20

```
------------------------------------------------------------------------------------------
      Name: NEW PUMP            Group: BASE
      Type: Rating Curve
  Function: US Stage vs. Discharge



   US Stage(ft)  Discharge(cfs)
--------------- ---------------
          1.900            5.00
          8.000            5.00

==========================================================================================
==== Pipes ===============================================================================
==========================================================================================

         Name: 12                 From Node: Sub-Basin-1       Length(ft): 650.00
        Group: BASE                 To Node: Sub-Basin-2            Count: 1
                                                         Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
         Name: 23                 From Node: Sub-Basin-2       Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-3            Count: 1
                                                         Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
         Name: 34                 From Node: Sub-Basin-4       Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-3            Count: 1
                                                         Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 18.00          18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00          18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500         -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
```

```
         Name: 45                 From Node: Sub-Basin-5       Length(ft): 800.00
        Group: BASE                 To Node: Sub-Basin-4            Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 18.00         18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500        -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: 56                 From Node: Sub-Basin-5       Length(ft): 250.00
        Group: BASE                 To Node: Sub-Basin-6            Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 18.00         18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.500        -1.500                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: 58                 From Node: Sub-Basin-5       Length(ft): 550.00
        Group: BASE                 To Node: Sub-Basin-8            Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 18.00         18.00                     Entrance Loss Coef: 0.00
     Rise(in): 18.00         18.00                         Exit Loss Coef: 1.00
   Invert(ft): -4.320        -1.120                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: NEW                From Node: SUB-BASIN-4       Length(ft): 600.00
        Group: BASE                 To Node: SUB-BASIN-3            Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Most Restrictive
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 24.00         24.00                     Entrance Loss Coef: 0.00
     Rise(in): 24.00         24.00                         Exit Loss Coef: 1.00
   Invert(ft): -3.000        -3.000                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
         Name: P1                 From Node: Sub-Basin-1       Length(ft): 600.00
        Group: BASE                 To Node: CS-1                   Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 15.00         15.00                     Entrance Loss Coef: 0.00
     Rise(in): 15.00         15.00                         Exit Loss Coef: 1.00
   Invert(ft): -0.820        -1.830                        Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
         Name: P2                 From Node: Sub-Basin-2       Length(ft): 600.00
        Group: BASE                 To Node: CS-2                   Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 12.00         12.00                     Entrance Loss Coef: 0.00
     Rise(in): 12.00         12.00                         Exit Loss Coef: 1.00
   Invert(ft): -0.210        -2.740                        Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
         Name: P3                 From Node: Sub-Basin-3       Length(ft): 600.00
        Group: BASE                 To Node: CS-3                   Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 12.00         12.00                     Entrance Loss Coef: 0.00
     Rise(in): 12.00         12.00                         Exit Loss Coef: 1.00
   Invert(ft): -2.330        -2.330                        Bend Loss Coef: 0.00
  Manning's N: 0.020000      0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                       Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



----------------------------------------------------------------------------------------------------
         Name: P4                 From Node: Sub-Basin-4       Length(ft): 600.00
        Group: BASE                 To Node: CS-4                   Count: 1
                                                        Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 48.00         48.00                     Entrance Loss Coef: 0.00
     Rise(in): 48.00         48.00                         Exit Loss Coef: 1.00
   Invert(ft): -2.330        -2.330                        Bend Loss Coef: 0.00
  Manning's N: 0.013000      0.013000                    Outlet Ctrl Spec: Use dc or tw
```

```
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P5                From Node: Sub-Basin-5       Length(ft): 250.00
        Group: BASE                To Node: CS-5                   Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                         Exit Loss Coef: 1.00
   Invert(ft): 0.420          -4.320                        Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P6                From Node: Sub-Basin-6       Length(ft): 600.00
        Group: BASE                To Node: CS-6                   Count: 1
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 36.00          36.00                     Entrance Loss Coef: 0.00
     Rise(in): 36.00          36.00                         Exit Loss Coef: 1.00
   Invert(ft): 0.880          -1.730                        Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


----------------------------------------------------------------------------------------------------
         Name: P8                From Node: Sub-Basin-8       Length(ft): 250.00
        Group: BASE                To Node: CS-8                   Count: 2
                                                         Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular       Circular                                Flow: Both
     Span(in): 12.00          12.00                     Entrance Loss Coef: 0.00
     Rise(in): 12.00          12.00                         Exit Loss Coef: 1.00
   Invert(ft): -1.200         -1.580                        Bend Loss Coef: 0.00
  Manning's N: 0.020000       0.020000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================
```

```
        Name: DP-1               From Node: CS-1           Length(ft): 100.00
       Group: BASE                 To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
    Geometry: Circular       Circular                Solution Algorithm: Automatic
    Span(in): 15.00          15.00                                 Flow: Positive
    Rise(in): 15.00          15.00                   Entrance Loss Coef: 0.000
  Invert(ft): -1.410         -1.830                      Exit Loss Coef: 1.000
 Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                      Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-1 ***
                                                                                  TABLE
                 Count: 7                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Positive                Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                       Invert(ft): 2.000
              Rise(in): 9.00                  Control Elev(ft): 2.000

----------------------------------------------------------------------------------------------------
        Name: DP-2               From Node: CS-2           Length(ft): 100.00
       Group: BASE                 To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
    Geometry: Circular       Circular                Solution Algorithm: Automatic
    Span(in): 30.00          30.00                                 Flow: Positive
    Rise(in): 30.00          30.00                   Entrance Loss Coef: 0.000
  Invert(ft): -2.740         -3.070                      Exit Loss Coef: 1.000
 Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                      Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-2 ***
                                                                                  TABLE
                 Count: 1                      Bottom Clip(in): 0.000
                  Type: Vertical: Mavis           Top Clip(in): 0.000
                  Flow: Positive                Weir Disc Coef: 3.200
              Geometry: Rectangular          Orifice Disc Coef: 0.600

              Span(in): 48.00                       Invert(ft): 2.000
              Rise(in): 9.00                  Control Elev(ft): 2.000

----------------------------------------------------------------------------------------------------
        Name: DP-3               From Node: CS-3           Length(ft): 100.00
       Group: BASE                 To Node: Outfalls            Count: 1

              UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
    Geometry: Circular       Circular                Solution Algorithm: Automatic
    Span(in): 24.00          24.00                                 Flow: Positive
    Rise(in): 24.00          24.00                   Entrance Loss Coef: 0.000
  Invert(ft): -1.500         -1.500                      Exit Loss Coef: 1.000
 Manning's N: 0.020000       0.020000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                      Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall
```

```
*** Weir 1 of 1 for Drop Structure DP-3 ***
                                                                            TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Positive                Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600

               Span(in): 48.00                      Invert(ft): 2.100
               Rise(in): 9.00                 Control Elev(ft): 2.100


----------------------------------------------------------------------------------------------------
         Name: DP-4-1             From Node: CS-4             Length(ft): 100.00
        Group: BASE                 To Node: Outfalls              Count: 1

               UPSTREAM       DOWNSTREAM              Friction Equation: Automatic
     Geometry: Circular       Circular               Solution Algorithm: Automatic
     Span(in): 24.00          24.00                                Flow: Positive
     Rise(in): 24.00          24.00                  Entrance Loss Coef: 0.000
   Invert(ft): -4.060         -2.300                     Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                    Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-4-1 ***
                                                                            TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Positive                Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600

               Span(in): 48.00                      Invert(ft): 2.000
               Rise(in): 9.00                 Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-4-2             From Node: CS-4             Length(ft): 100.00
        Group: BASE                 To Node: Outfalls              Count: 1

               UPSTREAM       DOWNSTREAM              Friction Equation: Automatic
     Geometry: Circular       Circular               Solution Algorithm: Automatic
     Span(in): 30.00          30.00                                Flow: Positive
     Rise(in): 30.00          30.00                  Entrance Loss Coef: 0.000
   Invert(ft): -1.070         -1.820                     Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                    Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                      Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-4-2 ***
                                                                            TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Positive                Weir Disc Coef: 3.200
               Geometry: Rectangular          Orifice Disc Coef: 0.600

               Span(in): 48.00                      Invert(ft): 2.000
               Rise(in): 9.00                 Control Elev(ft): 2.000


----------------------------------------------------------------------------------------------------
         Name: DP-5               From Node: CS-5             Length(ft): 100.00
        Group: BASE                 To Node: Outfalls              Count: 1

               UPSTREAM       DOWNSTREAM              Friction Equation: Automatic
     Geometry: Circular       Circular               Solution Algorithm: Automatic
     Span(in): 24.00          24.00                                Flow: Positive
     Rise(in): 24.00          24.00                  Entrance Loss Coef: 0.000
   Invert(ft): -4.320         -2.470                     Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                Outlet Ctrl Spec: Use dc or tw
```

```
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-5 ***
                                                                                    TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Positive                Weir Disc Coef: 3.200
               Geometry: Rectangular           Orifice Disc Coef: 0.600

               Span(in): 48.00                       Invert(ft): 2.000
               Rise(in): 9.00                  Control Elev(ft): 2.000

----------------------------------------------------------------------------------------------------
         Name: DP-6               From Node: CS-6            Length(ft): 100.00
        Group: BASE                 To Node: Outfalls             Count: 1

               UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Automatic
     Span(in): 36.00          36.00                                 Flow: Positive
     Rise(in): 36.00          36.00                   Entrance Loss Coef: 0.000
   Invert(ft): -1.730         -3.610                      Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-6 ***
                                                                                    TABLE
                  Count: 1                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Positive                Weir Disc Coef: 3.200
               Geometry: Rectangular           Orifice Disc Coef: 0.600

               Span(in): 48.00                       Invert(ft): 2.000
               Rise(in): 9.00                  Control Elev(ft): 2.000

----------------------------------------------------------------------------------------------------
         Name: DP-8               From Node: CS-8            Length(ft): 100.00
        Group: BASE                 To Node: Outfalls             Count: 2

               UPSTREAM       DOWNSTREAM               Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Automatic
     Span(in): 15.00          15.00                                 Flow: Positive
     Rise(in): 15.00          15.00                   Entrance Loss Coef: 0.000
   Invert(ft): -1.580         -1.580                      Exit Loss Coef: 1.000
  Manning's N: 0.020000       0.020000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 1 for Drop Structure DP-8 ***
                                                                                    TABLE
                  Count: 2                      Bottom Clip(in): 0.000
                   Type: Vertical: Mavis           Top Clip(in): 0.000
                   Flow: Positive                Weir Disc Coef: 3.200
               Geometry: Rectangular           Orifice Disc Coef: 0.600

               Span(in): 48.00                       Invert(ft): 2.000
               Rise(in): 9.00                  Control Elev(ft): 2.000
```

```
==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name: 1                  From Node: Sub-Basin-1
        Group: BASE                 To Node: CS-1
         Flow: Both                   Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 5.000
       Control Elevation(ft): 5.000
                                            TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 2                  From Node: Sub-Basin-2
        Group: BASE                 To Node: CS-2
         Flow: Both                   Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.800
       Control Elevation(ft): 4.800
                                            TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 3                  From Node: Sub-Basin-3
        Group: BASE                 To Node: CS-3
         Flow: Both                   Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.200
       Control Elevation(ft): 4.200
                                            TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 4                  From Node: Sub-Basin-4
        Group: BASE                 To Node: CS-4
         Flow: Both                   Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.800
       Control Elevation(ft): 4.800
                                            TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



----------------------------------------------------------------------------------------------------
         Name: 5                  From Node: Sub-Basin-5
        Group: BASE                 To Node: CS-5
         Flow: Both                   Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.700
```

```
       Control Elevation(ft): 4.700
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



--------------------------------------------------------------------------------------------------
         Name: 6                  From Node: Sub-Basin-6
        Group: BASE                 To Node: CS-6
         Flow: Both                   Count: 1
         Type: Vertical: Paved     Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 5.200
       Control Elevation(ft): 5.200
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



--------------------------------------------------------------------------------------------------
         Name: 8                  From Node: Sub-Basin-8
        Group: BASE                 To Node: CS-8
         Flow: Both                   Count: 1
         Type: Vertical: Paved     Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



--------------------------------------------------------------------------------------------------
         Name: 89&90ST            From Node: CS-5
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 2
         Type: Vertical: Paved     Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.900
       Control Elevation(ft): 4.900
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



--------------------------------------------------------------------------------------------------
         Name: 91ST               From Node: CS-4
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 1
         Type: Vertical: Gravel    Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 99999.00
                  Invert(ft): 5.000
       Control Elevation(ft): 5.000
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



--------------------------------------------------------------------------------------------------
         Name: 92&93 ST           From Node: CS-3
        Group: BASE                 To Node: Outfalls
         Flow: Both                   Count: 2
```

```
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 180.00
                    Rise(in): 999999.00
                  Invert(ft): 3.800
       Control Elevation(ft): 3.800
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: 94ST                From Node: CS-2
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.600
       Control Elevation(ft): 4.600
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: 95ST                From Node: CS-1
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.550
       Control Elevation(ft): 4.550
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: BASIN-1-2 OVR       From Node: SUB-BASIN-1
        Group: BASE                  To Node: SUB-BASIN-2
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 9999.00
                  Invert(ft): 4.100
       Control Elevation(ft): 4.100
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600

Bay Drive Roadway Overflow

----------------------------------------------------------------------------------------------------
         Name: BASIN-2-3 OVR       From Node: SUB-BASIN-2
        Group: BASE                  To Node: SUB-BASIN-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.500
       Control Elevation(ft): 4.500
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600
```

```
----------------------------------------------------------------------------------------------------
         Name: BASIN-4-3 OVR       From Node: SUB-BASIN-4
        Group: BASE                  To Node: SUB-BASIN-3
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Irregular

                        XSec: SECTION 1
                  Invert(ft): 3.250
        Control Elevation(ft): 3.250
      Struct Opening Dim(ft): 9999.00
                                              TABLE
             Bottom Clip(ft): 0.000
                Top Clip(ft): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: BASIN-4-6 OVR       From Node: SUB-BASIN-4
        Group: BASE                  To Node: SUB-BASIN-6
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.000
        Control Elevation(ft): 4.000
                                              TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: BASIN-5-4 OVR       From Node: SUB-BASIN-5
        Group: BASE                  To Node: SUB-BASIN-4
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 4.100
        Control Elevation(ft): 4.100
                                              TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: BASIN-5-8 OVR       From Node: SUB-BASIN-5
        Group: BASE                  To Node: SUB-BASIN-8
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                    Span(in): 420.00
                    Rise(in): 999.00
                  Invert(ft): 3.500
        Control Elevation(ft): 3.500
                                              TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


----------------------------------------------------------------------------------------------------
         Name: CARLYLE             From Node: CS-6
        Group: BASE                  To Node: Outfalls
         Flow: Both                    Count: 1
         Type: Vertical: Gravel     Geometry: Rectangular

                    Span(in): 240.00
                    Rise(in): 999999.00
                  Invert(ft): 4.600
        Control Elevation(ft): 4.600
                                              TABLE
             Bottom Clip(in): 0.000
```

```
           Top Clip(in): 0.000
    Weir Discharge Coef: 3.200
 Orifice Discharge Coef: 0.600


==========================================================================================
==== Rating Curves =======================================================================
==========================================================================================

         Name: DW-1                From Node: Sub-Basin-2            Count: 3
        Group: BASE                  To Node: Aquifer                 Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: Drainage Wells  2.000           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
         Name: DW-2                From Node: Sub-Basin-5            Count: 3
        Group: BASE                  To Node: Aquifer                 Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: Drainage Wells  2.000           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
         Name: DW-3                From Node: Sub-Basin-6            Count: 3
        Group: BASE                  To Node: Aquifer                 Flow: Positive

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: Drainage Wells  2.000           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
         Name: EXIST-PUMP          From Node: CS-3                   Count: 1
        Group: BASE                  To Node: Outfalls                Flow: Both

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: EXIST-PUMP      2.100           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
         Name: NEW PUMP            From Node: SUB-BASIN-3            Count: 1
        Group: BASE                  To Node: Outfalls                Flow: Both

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: NEW PUMP        2.000           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


----------------------------------------------------------------------------------------------------
         Name: NEW WELLS           From Node: SUB-BASIN-3            Count: 3
        Group: BASE                  To Node: Aquifer                 Flow: Both

              TABLE           ELEV ON(ft)     ELEV OFF(ft)
           #1: DRAINAGE WELLS  2.000           1.600
           #2:                 0.000           0.000
           #3:                 0.000           0.000
           #4:                 0.000           0.000


==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================
```

```
         Name: 005YR001HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\005YR001HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.00
          Rainfall File: Fdot-1
    Rainfall Amount(in): 3.20

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 005YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\005YR024HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: SFWMD-24HR
    Rainfall Amount(in): 6.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 010YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\010YR024HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: SFWMD-24HR
    Rainfall Amount(in): 7.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 025YR072HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\025YR072HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 11.00

Time(hrs)       Print Inc(min)
--------------- ---------------
96.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 100YR072HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\100YR072HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 15.00

Time(hrs)       Print Inc(min)
--------------- ---------------
96.000          5.00

----------------------------------------------------------------------------------------------------
         Name: QUALITY
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\QUALITY.R32

      Override Defaults: Yes
    Storm Duration(hrs): 1.63
          Rainfall File: Scsiii
    Rainfall Amount(in): 1.58

Time(hrs)       Print Inc(min)
--------------- ---------------
12.000          1.00
24.000          15.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: 005YR001HR          Hydrology Sim: 005YR001HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\005YR001HR.I32
```

```
      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 6.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         1.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 005YR024HR          Hydrology Sim: 005YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\005YR024HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 48.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.000
48.000          15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 010YR024HR          Hydrology Sim: 010YR024HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\010YR024HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 48.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.000
48.000          15.000

Group           Run
--------------- -----
BASE            Yes


----------------------------------------------------------------------------------------------------
         Name: 025YR072HR          Hydrology Sim: 025YR072HR
     Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\025YR072HR.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 120.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:
```

Time(hrs)	Print Inc(min)
30.000	30.000
50.000	5.000
72.000	5.000
120.000	30.000

Group	Run
BASE	Yes

Name: 100YR072HR Hydrology Sim: 100YR072HR
Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\100YR072HR.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 120.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
30.000	30.000
50.000	5.000
72.000	5.000
120.000	30.000

Group	Run
BASE	Yes

Name: QUALITY Hydrology Sim: QUALITY
Filename: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\Engineering\Calculations\ICPR\OPTION 3\QUALITY.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
24.000	5.000

Group	Run
BASE	Yes

NODE MAXIMUM REPORT

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Aquifer	BASE	005YR001HR	0.00	-60.00	1.60	-61.6000	0	0.57	92.40	0.00	0.00
Aquifer	BASE	005YR024HR	0.00	-60.00	1.60	-61.6000	0	8.06	92.40	0.00	0.00
Aquifer	BASE	010YR024HR	0.00	-60.00	1.60	-61.6000	0	7.44	92.40	0.00	0.00
Aquifer	BASE	025YR072HR	0.00	-60.00	1.60	-61.6000	0	41.80	92.40	0.00	0.00
Aquifer	BASE	100YR072HR	0.00	-60.00	1.60	-61.6000	0	17.18	92.40	0.00	0.00
Aquifer	BASE	QUALITY	0.00	-60.00	1.60	-61.6000	0	1.25	92.40	0.00	0.00
CS-1	BASE	005YR001HR	2.74	2.09	8.00	-0.0013	132	2.74	2.37	2.74	2.37
CS-1	BASE	005YR024HR	14.68	2.10	8.00	-0.0019	132	14.68	2.58	14.68	2.58
CS-1	BASE	010YR024HR	14.68	2.12	8.00	-0.0019	132	14.68	2.68	14.68	2.68
CS-1	BASE	025YR072HR	62.32	2.14	8.00	-0.0019	132	62.31	2.76	62.32	2.76
CS-1	BASE	100YR072HR	61.91	2.37	8.00	-0.0019	132	61.89	3.35	61.91	3.35
CS-1	BASE	QUALITY	1.83	2.07	8.00	-0.0019	132	1.83	1.75	1.83	1.75
CS-2	BASE	005YR001HR	1.39	2.20	8.00	0.0023	128	1.38	1.15	1.39	1.15
CS-2	BASE	005YR024HR	14.67	2.23	8.00	-0.0034	128	14.66	1.39	14.67	1.39
CS-2	BASE	010YR024HR	14.68	2.23	8.00	-0.0037	128	14.67	1.45	14.68	1.45
CS-2	BASE	025YR072HR	62.32	2.24	8.00	-0.0037	128	62.31	1.51	62.32	1.51
CS-2	BASE	100YR072HR	61.90	2.79	8.00	0.0029	128	61.90	8.93	61.90	8.93
CS-2	BASE	QUALITY	7.02	2.00	8.00	-0.0023	128	1.54	0.43	0.00	0.00
CS-3	BASE	005YR001HR	1.46	2.10	8.00	-0.0539	128	1.68	1.19	1.46	14.20
CS-3	BASE	005YR024HR	13.48	2.10	8.00	-0.0541	128	13.88	1.36	13.48	14.20
CS-3	BASE	010YR024HR	14.35	2.10	8.00	-0.0541	128	14.67	1.46	14.35	14.20
CS-3	BASE	025YR072HR	62.77	2.11	8.00	-0.0542	128	62.58	6.59	62.77	14.22
CS-3	BASE	100YR072HR	62.91	4.02	8.00	-0.0546	128	62.91	39.10	62.91	39.10
CS-3	BASE	QUALITY	7.02	2.00	8.00	-0.0023	128	1.80	0.43	0.00	0.00
CS-4	BASE	005YR001HR	1.49	3.05	8.00	-0.0096	173	1.48	23.28	1.49	23.28
CS-4	BASE	005YR024HR	13.87	3.40	8.00	-0.0104	173	13.86	27.44	13.87	27.44
CS-4	BASE	010YR024HR	14.64	3.66	8.00	-0.0104	173	14.63	30.08	14.64	30.08
CS-4	BASE	025YR072HR	62.61	3.96	8.00	-0.0110	173	62.60	32.80	62.61	32.80
CS-4	BASE	100YR072HR	62.92	4.45	8.00	-0.0132	173	62.91	36.43	62.92	36.43
CS-4	BASE	QUALITY	1.66	2.03	8.00	-0.0097	173	2.23	4.23	1.66	0.16
CS-5	BASE	005YR001HR	1.58	2.24	8.00	-0.0037	119	1.58	1.51	1.58	1.51
CS-5	BASE	005YR024HR	13.80	2.27	8.00	-0.0037	119	13.80	1.80	13.80	1.80
CS-5	BASE	010YR024HR	14.06	2.28	8.00	-0.0037	119	14.06	1.93	14.06	1.93
CS-5	BASE	025YR072HR	62.60	2.30	8.00	-0.0037	119	62.60	2.06	62.60	2.06
CS-5	BASE	100YR072HR	62.92	2.74	8.00	-0.0037	119	62.92	8.13	62.92	8.13
CS-5	BASE	QUALITY	6.54	2.00	8.00	-0.0037	119	1.70	0.64	0.00	0.00
CS-6	BASE	005YR001HR	1.69	3.02	8.00	0.0055	303	1.68	11.57	1.69	11.57
CS-6	BASE	005YR024HR	13.89	3.29	8.00	-0.0071	158	13.88	13.79	13.89	13.79
CS-6	BASE	010YR024HR	13.90	3.40	8.00	-0.0094	158	13.90	14.65	13.90	14.65
CS-6	BASE	025YR072HR	62.61	3.53	8.00	-0.0105	158	62.60	15.55	62.61	15.55
CS-6	BASE	100YR072HR	62.92	3.84	8.00	-0.0104	158	62.91	17.47	62.92	17.47
CS-6	BASE	QUALITY	6.39	2.00	8.00	-0.0050	364	1.68	2.98	0.00	0.00
CS-8	BASE	005YR001HR	1.74	2.24	8.00	-0.0041	126	1.74	3.03	1.74	3.03
CS-8	BASE	005YR024HR	13.80	2.27	8.00	-0.0028	126	13.80	3.60	13.80	3.60
CS-8	BASE	010YR024HR	14.06	2.29	8.00	-0.0029	126	14.06	4.07	14.06	4.07
CS-8	BASE	025YR072HR	62.61	3.91	8.00	-0.0033	126	62.59	11.29	62.61	11.29
CS-8	BASE	100YR072HR	62.92	4.92	8.00	0.0742	126	62.92	41.90	62.92	13.52
CS-8	BASE	QUALITY	1.21	2.09	8.00	-0.0027	126	1.21	0.76	1.21	0.67
Outfalls	BASE	005YR001HR	0.00	1.60	1.60	0.0000	0	1.54	61.77	0.00	0.00
Outfalls	BASE	005YR024HR	0.00	1.60	1.60	0.0000	0	13.90	69.78	0.00	0.00

ABBOTT AVE DRAINAGE STUDY
ICPR MODEL FOR PROPOSED CONDITIONS - OPTION 3
NODE MAXIMUM REPORT

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Outfalls	BASE	010YR024HR	0.00	1.60	1.60	0.0000	0	14.22	73.85	0.00	0.00
Outfalls	BASE	025YR072HR	0.00	1.60	1.60	0.0000	0	62.63	85.16	0.00	0.00
Outfalls	BASE	100YR072HR	0.00	1.60	1.60	0.0000	0	62.73	129.00	0.00	0.00
Outfalls	BASE	QUALITY	0.00	1.60	1.60	0.0000	0	1.49	7.15	0.00	0.00
SUB-BASIN-1	BASE	005YR001HR	2.74	4.05	8.00	-0.0051	164630	1.25	26.15	2.77	8.57
SUB-BASIN-1	BASE	005YR024HR	14.68	4.45	8.00	-0.0132	232464	12.50	35.60	16.03	15.71
SUB-BASIN-1	BASE	010YR024HR	14.68	4.64	8.00	-0.0145	266157	12.50	42.75	15.01	17.49
SUB-BASIN-1	BASE	025YR072HR	62.31	4.81	8.00	-0.0165	293908	60.50	52.14	62.51	23.30
SUB-BASIN-1	BASE	100YR072HR	61.90	5.04	8.00	-0.0174	334800	60.50	72.81	61.99	39.09
SUB-BASIN-1	BASE	QUALITY	1.83	3.14	8.00	-0.0067	8959	1.67	6.58	1.86	6.68
SUB-BASIN-2	BASE	005YR001HR	1.38	3.72	2.80	0.0616	6523	1.32	27.44	1.27	27.12
SUB-BASIN-2	BASE	005YR024HR	14.66	4.44	2.80	-0.0638	160512	13.21	39.55	16.57	30.29
SUB-BASIN-2	BASE	010YR024HR	14.67	4.64	2.80	-0.0638	202913	12.82	47.15	14.68	33.33
SUB-BASIN-2	BASE	025YR072HR	62.31	4.80	2.80	-0.0637	237353	60.61	57.43	62.30	45.60
SUB-BASIN-2	BASE	100YR072HR	61.90	5.04	2.80	-0.0636	287961	61.06	86.91	61.87	78.17
SUB-BASIN-2	BASE	QUALITY	1.70	2.01	2.80	-0.0635	182	1.67	11.50	3.34	25.64
SUB-BASIN-3	BASE	005YR001HR	1.69	3.19	2.80	0.0618	116001	1.25	44.96	1.68	29.29
SUB-BASIN-3	BASE	005YR024HR	13.87	3.70	2.80	-0.0636	231557	12.58	60.75	13.88	29.46
SUB-BASIN-3	BASE	010YR024HR	14.64	4.02	2.80	-0.0635	304878	12.58	74.52	14.67	29.56
SUB-BASIN-3	BASE	025YR072HR	62.60	4.38	2.80	-0.0637	389083	60.58	94.60	62.58	34.69
SUB-BASIN-3	BASE	100YR072HR	62.91	4.91	2.80	-0.0718	509824	60.93	144.28	62.91	67.20
SUB-BASIN-3	BASE	QUALITY	1.64	2.01	2.80	-0.0637	218	1.68	17.64	1.80	28.53
SUB-BASIN-4	BASE	005YR001HR	1.48	3.26	8.00	-0.0097	28346	1.25	30.08	1.25	27.93
SUB-BASIN-4	BASE	005YR024HR	13.87	3.70	8.00	-0.0106	118576	12.50	41.61	12.84	33.55
SUB-BASIN-4	BASE	010YR024HR	14.64	4.02	8.00	-0.0199	184134	12.50	50.02	12.76	38.43
SUB-BASIN-4	BASE	025YR072HR	62.60	4.38	8.00	-0.0216	259161	60.50	61.71	60.59	43.89
SUB-BASIN-4	BASE	100YR072HR	62.91	4.91	8.00	-0.0226	367319	60.84	96.33	60.40	50.23
SUB-BASIN-4	BASE	QUALITY	1.59	2.03	8.00	-0.0098	263	1.70	7.12	1.94	10.26
SUB-BASIN-5	BASE	005YR001HR	1.58	3.36	8.00	0.0626	43494	1.25	29.36	3.17	28.53
SUB-BASIN-5	BASE	005YR024HR	13.80	3.87	8.00	0.0628	131527	12.50	40.78	12.64	28.69
SUB-BASIN-5	BASE	010YR024HR	14.06	4.12	8.00	0.0628	175830	12.50	49.15	12.44	28.56
SUB-BASIN-5	BASE	025YR072HR	62.60	4.38	8.00	-0.0621	220314	60.50	60.67	61.52	35.57
SUB-BASIN-5	BASE	100YR072HR	62.92	4.91	8.00	0.0630	312227	60.50	84.96	60.93	51.23
SUB-BASIN-5	BASE	QUALITY	1.46	2.01	8.00	-0.0626	179	1.67	7.07	2.11	28.03
SUB-BASIN-6	BASE	005YR001HR	1.69	3.46	8.00	0.0155	116710	1.25	47.67	1.68	34.67
SUB-BASIN-6	BASE	005YR024HR	13.88	3.95	8.00	-0.0150	257866	12.50	67.07	13.88	36.89
SUB-BASIN-6	BASE	010YR024HR	13.90	4.16	8.00	-0.0177	316693	12.50	81.10	13.90	37.75
SUB-BASIN-6	BASE	025YR072HR	62.60	4.38	8.00	-0.0200	381786	60.50	100.59	62.60	38.65
SUB-BASIN-6	BASE	100YR072HR	62.92	4.91	8.00	-0.0195	534174	60.42	138.54	62.91	40.57
SUB-BASIN-6	BASE	QUALITY	1.86	2.00	8.00	-0.0151	787	1.68	15.56	1.72	26.08
SUB-BASIN-8	BASE	005YR001HR	1.74	3.37	8.00	-0.0132	38595	1.00	12.62	1.74	3.03
SUB-BASIN-8	BASE	005YR024HR	13.80	3.87	8.00	-0.0106	57181	12.17	15.79	13.80	3.60
SUB-BASIN-8	BASE	010YR024HR	14.06	4.12	8.00	-0.0104	66661	12.17	18.36	14.06	4.07
SUB-BASIN-8	BASE	025YR072HR	62.60	4.38	8.00	-0.0113	76146	60.24	22.13	62.59	11.29
SUB-BASIN-8	BASE	100YR072HR	62.92	4.91	8.00	-0.0116	95824	61.05	27.12	62.92	41.90
SUB-BASIN-8	BASE	QUALITY	1.21	2.16	8.00	-0.0070	146	2.00	2.05	1.21	0.76

ABBOTT AVE DRAINAGE STUDY
ICPR MODEL FOR PROPOSED CONDITIONS - OPTION 3
LINK MAXIMUM REPORT

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
1	BASE	005YR001HR	0.00	0.00	0.000	2.74	4.05	2.74	2.09
1	BASE	005YR024HR	0.00	0.00	0.000	14.68	4.45	14.68	2.10
1	BASE	010YR024HR	0.00	0.00	0.000	14.68	4.64	14.68	2.12
1	BASE	025YR072HR	0.00	0.00	0.000	62.31	4.81	62.32	2.14
1	BASE	100YR072HR	61.90	0.59	0.000	61.90	5.04	61.91	2.37
1	BASE	QUALITY	0.00	0.00	0.000	1.83	3.14	1.83	2.07
12	BASE	005YR001HR	2.87	6.21	0.874	2.74	4.05	1.38	3.72
12	BASE	005YR024HR	17.29	6.43	1.046	14.68	4.45	14.66	4.44
12	BASE	010YR024HR	18.63	6.42	1.042	14.68	4.64	14.67	4.64
12	BASE	025YR072HR	67.45	6.41	1.072	62.31	4.81	62.31	4.80
12	BASE	100YR072HR	68.97	6.40	1.052	61.90	5.04	61.90	5.04
12	BASE	QUALITY	1.86	4.93	1.029	1.83	3.14	1.70	2.01
2	BASE	005YR001HR	0.00	0.00	0.000	1.38	3.72	1.39	2.20
2	BASE	005YR024HR	0.00	0.00	0.000	14.66	4.44	14.67	2.23
2	BASE	010YR024HR	0.00	0.00	0.000	14.67	4.64	14.68	2.23
2	BASE	025YR072HR	62.31	0.01	0.000	62.31	4.80	62.32	2.24
2	BASE	100YR072HR	61.90	7.53	0.006	61.90	5.04	61.90	2.79
2	BASE	QUALITY	0.00	0.00	0.000	1.70	2.01	7.02	2.00
23	BASE	005YR001HR	1.27	2.88	1.410	1.38	3.72	1.69	3.19
23	BASE	005YR024HR	16.57	5.86	1.500	14.66	4.44	13.87	3.70
23	BASE	010YR024HR	18.03	5.86	1.513	14.67	4.64	14.64	4.02
23	BASE	025YR072HR	67.40	5.38	1.430	62.31	4.80	62.60	4.38
23	BASE	100YR072HR	59.78	3.21	1.437	61.90	5.04	62.91	4.91
23	BASE	QUALITY	3.85	2.29	-1.391	1.70	2.01	1.64	2.01
3	BASE	005YR001HR	0.00	0.00	0.000	1.69	3.19	1.46	2.10
3	BASE	005YR024HR	0.00	0.00	0.000	13.87	3.70	13.48	2.10
3	BASE	010YR024HR	0.00	0.00	0.000	14.64	4.02	14.35	2.10
3	BASE	025YR072HR	62.60	5.03	0.001	62.60	4.38	62.77	2.11
3	BASE	100YR072HR	62.91	38.22	0.017	62.91	4.91	62.91	4.02
3	BASE	QUALITY	0.00	0.00	0.000	1.64	2.01	7.02	2.00
34	BASE	005YR001HR	2.33	2.89	1.233	1.48	3.26	1.69	3.19
34	BASE	005YR024HR	11.83	2.75	1.224	13.87	3.70	13.87	3.70
34	BASE	010YR024HR	11.76	2.75	1.228	14.64	4.02	14.64	4.02
34	BASE	025YR072HR	59.54	2.75	1.232	62.60	4.38	62.60	4.38
34	BASE	100YR072HR	69.56	2.82	1.228	62.91	4.91	62.91	4.91
34	BASE	QUALITY	1.68	2.35	1.223	1.59	2.03	1.64	2.01
4	BASE	005YR001HR	0.00	0.00	0.000	1.48	3.26	1.49	3.05
4	BASE	005YR024HR	0.00	0.00	0.000	13.87	3.70	13.87	3.40
4	BASE	010YR024HR	0.00	0.00	0.000	14.64	4.02	14.64	3.66
4	BASE	025YR072HR	0.00	0.00	0.000	62.60	4.38	62.61	3.96
4	BASE	100YR072HR	62.91	2.28	0.000	62.91	4.91	62.92	4.45
4	BASE	QUALITY	0.00	0.00	0.000	1.59	2.03	1.66	2.03
45	BASE	005YR001HR	1.92	1.48	-1.289	1.58	3.36	1.48	3.26
45	BASE	005YR024HR	15.91	1.80	-1.290	13.80	3.87	13.87	3.70
45	BASE	010YR024HR	12.89	1.61	-1.306	14.06	4.12	14.64	4.02
45	BASE	025YR072HR	60.71	1.68	-1.300	62.60	4.38	62.60	4.38
45	BASE	100YR072HR	60.50	1.78	-1.296	62.92	4.91	62.91	4.91
45	BASE	QUALITY	6.82	1.25	-1.306	1.46	2.01	1.59	2.03
5	BASE	005YR001HR	0.00	0.00	0.000	1.58	3.36	1.58	2.24
5	BASE	005YR024HR	0.00	0.00	0.000	13.80	3.87	13.80	2.27

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
5	BASE	010YR024HR	0.00	0.00	0.000	14.06	4.12	14.06	2.28
5	BASE	025YR072HR	0.00	0.00	0.000	62.60	4.38	62.60	2.30
5	BASE	100YR072HR	62.92	6.03	0.002	62.92	4.91	62.92	2.74
5	BASE	QUALITY	0.00	0.00	0.000	1.46	2.01	6.54	2.00
56	BASE	005YR001HR	2.53	3.88	-2.125	1.58	3.36	1.69	3.46
56	BASE	005YR024HR	11.00	3.81	-2.105	13.80	3.87	13.88	3.95
56	BASE	010YR024HR	11.04	3.81	-2.102	14.06	4.12	13.90	4.16
56	BASE	025YR072HR	58.40	3.84	-2.117	62.60	4.38	62.60	4.38
56	BASE	100YR072HR	57.69	3.85	-2.125	62.92	4.91	62.92	4.91
56	BASE	QUALITY	1.42	3.80	-2.111	1.46	2.01	1.86	2.00
58	BASE	005YR001HR	3.42	1.47	-1.492	1.58	3.36	1.74	3.37
58	BASE	005YR024HR	12.08	1.72	-1.506	13.80	3.87	13.80	3.87
58	BASE	010YR024HR	12.00	1.81	-1.494	14.06	4.12	14.06	4.12
58	BASE	025YR072HR	59.89	1.92	-1.504	62.60	4.38	62.60	4.38
58	BASE	100YR072HR	59.73	1.90	-1.495	62.92	4.91	62.92	4.91
58	BASE	QUALITY	2.65	0.93	-1.486	1.46	2.01	1.21	2.16
6	BASE	005YR001HR	0.00	0.00	0.000	1.69	3.46	1.69	3.02
6	BASE	005YR024HR	0.00	0.00	0.000	13.88	3.95	13.89	3.29
6	BASE	010YR024HR	0.00	0.00	0.000	13.90	4.16	13.90	3.40
6	BASE	025YR072HR	0.00	0.00	0.000	62.60	4.38	62.61	3.53
6	BASE	100YR072HR	0.00	0.00	0.000	62.92	4.91	62.92	3.84
6	BASE	QUALITY	0.00	0.00	0.000	1.86	2.00	6.39	2.00
8	BASE	005YR001HR	0.00	0.00	0.000	1.74	3.37	1.74	2.24
8	BASE	005YR024HR	0.00	0.00	0.000	13.80	3.87	13.80	2.27
8	BASE	010YR024HR	14.06	0.21	0.000	14.06	4.12	14.06	2.29
8	BASE	025YR072HR	62.60	9.33	0.001	62.60	4.38	62.61	3.91
8	BASE	100YR072HR	62.92	41.17	-64.636	62.92	4.91	62.92	4.92
8	BASE	QUALITY	0.00	0.00	0.000	1.21	2.16	1.21	2.09
89&90ST	BASE	005YR001HR	0.00	0.00	0.000	1.58	2.24	0.00	1.60
89&90ST	BASE	005YR024HR	0.00	0.00	0.000	13.80	2.27	0.00	1.60
89&90ST	BASE	010YR024HR	0.00	0.00	0.000	14.06	2.28	0.00	1.60
89&90ST	BASE	025YR072HR	0.00	0.00	0.000	62.60	2.30	0.00	1.60
89&90ST	BASE	100YR072HR	0.00	0.00	0.000	62.92	2.74	0.00	1.60
89&90ST	BASE	QUALITY	0.00	0.00	0.000	6.54	2.00	0.00	1.60
91ST	BASE	005YR001HR	0.00	0.00	0.000	1.49	3.05	0.00	1.60
91ST	BASE	005YR024HR	0.00	0.00	0.000	13.87	3.40	0.00	1.60
91ST	BASE	010YR024HR	0.00	0.00	0.000	14.64	3.66	0.00	1.60
91ST	BASE	025YR072HR	0.00	0.00	0.000	62.61	3.96	0.00	1.60
91ST	BASE	100YR072HR	0.00	0.00	0.000	62.92	4.45	0.00	1.60
91ST	BASE	QUALITY	0.00	0.00	0.000	1.66	2.03	0.00	1.60
92&93 ST	BASE	005YR001HR	0.00	0.00	0.000	1.46	2.10	0.00	1.60
92&93 ST	BASE	005YR024HR	0.00	0.00	0.000	13.48	2.10	0.00	1.60
92&93 ST	BASE	010YR024HR	0.00	0.00	0.000	14.35	2.10	0.00	1.60
92&93 ST	BASE	025YR072HR	0.00	0.00	0.000	62.77	2.11	0.00	1.60
92&93 ST	BASE	100YR072HR	62.91	10.07	0.007	62.91	4.02	0.00	1.60
92&93 ST	BASE	QUALITY	0.00	0.00	0.000	7.02	2.00	0.00	1.60
94ST	BASE	005YR001HR	0.00	0.00	0.000	1.39	2.20	0.00	1.60
94ST	BASE	005YR024HR	0.00	0.00	0.000	14.67	2.23	0.00	1.60
94ST	BASE	010YR024HR	0.00	0.00	0.000	14.68	2.23	0.00	1.60
94ST	BASE	025YR072HR	0.00	0.00	0.000	62.32	2.24	0.00	1.60

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
94ST	BASE	100YR072HR	0.00	0.00	0.000	61.90	2.79	0.00	1.60
94ST	BASE	QUALITY	0.00	0.00	0.000	7.02	2.00	0.00	1.60
95ST	BASE	005YR001HR	0.00	0.00	0.000	2.74	2.09	0.00	1.60
95ST	BASE	005YR024HR	0.00	0.00	0.000	14.68	2.10	0.00	1.60
95ST	BASE	010YR024HR	0.00	0.00	0.000	14.68	2.12	0.00	1.60
95ST	BASE	025YR072HR	0.00	0.00	0.000	62.32	2.14	0.00	1.60
95ST	BASE	100YR072HR	0.00	0.00	0.000	61.91	2.37	0.00	1.60
95ST	BASE	QUALITY	0.00	0.00	0.000	1.83	2.07	0.00	1.60
BASIN-1-2 OVR	BASE	005YR001HR	0.00	0.00	0.000	2.74	4.05	1.38	3.72
BASIN-1-2 OVR	BASE	005YR024HR	15.76	12.74	0.003	14.68	4.45	14.66	4.44
BASIN-1-2 OVR	BASE	010YR024HR	15.01	14.63	0.116	14.68	4.64	14.67	4.64
BASIN-1-2 OVR	BASE	025YR072HR	62.51	20.34	0.119	62.31	4.81	62.31	4.80
BASIN-1-2 OVR	BASE	100YR072HR	62.00	35.50	-0.105	61.90	5.04	61.90	5.04
BASIN-1-2 OVR	BASE	QUALITY	0.00	0.00	0.000	1.83	3.14	1.70	2.01
BASIN-2-3 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.38	3.72	1.69	3.19
BASIN-2-3 OVR	BASE	005YR024HR	0.00	0.00	0.000	14.66	4.44	13.87	3.70
BASIN-2-3 OVR	BASE	010YR024HR	14.67	5.94	0.001	14.67	4.64	14.64	4.02
BASIN-2-3 OVR	BASE	025YR072HR	62.31	18.65	0.003	62.31	4.80	62.60	4.38
BASIN-2-3 OVR	BASE	100YR072HR	61.90	44.44	0.019	61.90	5.04	62.91	4.91
BASIN-2-3 OVR	BASE	QUALITY	0.00	0.00	0.000	1.70	2.01	1.64	2.01
BASIN-4-3 OVR	BASE	005YR001HR	1.48	0.00	0.000	1.48	3.26	1.69	3.19
BASIN-4-3 OVR	BASE	005YR024HR	12.92	4.78	-0.018	13.87	3.70	13.87	3.70
BASIN-4-3 OVR	BASE	010YR024HR	12.78	8.85	-0.034	14.64	4.02	14.64	4.02
BASIN-4-3 OVR	BASE	025YR072HR	60.61	13.59	-0.048	62.60	4.38	62.60	4.38
BASIN-4-3 OVR	BASE	100YR072HR	60.93	24.37	-0.098	62.91	4.91	62.91	4.91
BASIN-4-3 OVR	BASE	QUALITY	0.00	0.00	0.000	1.59	2.03	1.64	2.01
BASIN-4-6 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.48	3.26	1.69	3.46
BASIN-4-6 OVR	BASE	005YR024HR	0.00	0.00	0.000	13.87	3.70	13.88	3.95
BASIN-4-6 OVR	BASE	010YR024HR	0.00	0.00	-0.002	14.64	4.02	13.90	4.16
BASIN-4-6 OVR	BASE	025YR072HR	64.87	1.85	0.054	62.60	4.38	62.60	4.38
BASIN-4-6 OVR	BASE	100YR072HR	67.40	1.07	0.277	62.91	4.91	62.92	4.91
BASIN-4-6 OVR	BASE	QUALITY	0.00	0.00	0.000	1.59	2.03	1.86	2.00
BASIN-5-4 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.58	3.36	1.48	3.26
BASIN-5-4 OVR	BASE	005YR024HR	0.00	0.00	0.000	13.80	3.87	13.87	3.70
BASIN-5-4 OVR	BASE	010YR024HR	14.06	0.36	0.000	14.06	4.12	14.64	4.02
BASIN-5-4 OVR	BASE	025YR072HR	61.52	8.54	-0.129	62.60	4.38	62.60	4.38
BASIN-5-4 OVR	BASE	100YR072HR	60.93	21.54	-0.293	62.92	4.91	62.91	4.91
BASIN-5-4 OVR	BASE	QUALITY	0.00	0.00	0.000	1.46	2.01	1.59	2.03
BASIN-5-8 OVR	BASE	005YR001HR	0.00	0.00	0.000	1.58	3.36	1.74	3.37
BASIN-5-8 OVR	BASE	005YR024HR	12.64	3.72	-0.048	13.80	3.87	13.80	3.87
BASIN-5-8 OVR	BASE	010YR024HR	12.45	3.48	-0.041	14.06	4.12	14.06	4.12
BASIN-5-8 OVR	BASE	025YR072HR	62.58	8.20	-0.062	62.60	4.38	62.60	4.38
BASIN-5-8 OVR	BASE	100YR072HR	61.09	13.35	1.047	62.92	4.91	62.92	4.91
BASIN-5-8 OVR	BASE	QUALITY	0.00	0.00	0.000	1.46	2.01	1.21	2.16
CARLYLE	BASE	005YR001HR	0.00	0.00	0.000	1.69	3.02	0.00	1.60
CARLYLE	BASE	005YR024HR	0.00	0.00	0.000	13.89	3.29	0.00	1.60
CARLYLE	BASE	010YR024HR	0.00	0.00	0.000	13.90	3.40	0.00	1.60
CARLYLE	BASE	025YR072HR	0.00	0.00	0.000	62.61	3.53	0.00	1.60
CARLYLE	BASE	100YR072HR	0.00	0.00	0.000	62.92	3.84	0.00	1.60
CARLYLE	BASE	QUALITY	0.00	0.00	0.000	6.39	2.00	0.00	1.60

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
DP-1	BASE	005YR001HR	2.74	2.37	-0.014	2.74	2.09	0.00	1.60
DP-1	BASE	005YR024HR	14.68	2.58	-0.017	14.68	2.10	0.00	1.60
DP-1	BASE	010YR024HR	14.68	2.68	-0.017	14.68	2.12	0.00	1.60
DP-1	BASE	025YR072HR	62.32	2.76	-0.026	62.32	2.14	0.00	1.60
DP-1	BASE	100YR072HR	61.91	3.35	-0.031	61.91	2.37	0.00	1.60
DP-1	BASE	QUALITY	1.83	1.75	-0.016	1.83	2.07	0.00	1.60
DP-2	BASE	005YR001HR	1.39	1.15	0.006	1.39	2.20	0.00	1.60
DP-2	BASE	005YR024HR	14.67	1.39	-0.024	14.67	2.23	0.00	1.60
DP-2	BASE	010YR024HR	14.68	1.45	-0.026	14.68	2.23	0.00	1.60
DP-2	BASE	025YR072HR	62.32	1.51	-0.026	62.32	2.24	0.00	1.60
DP-2	BASE	100YR072HR	61.90	8.93	-0.015	61.90	2.79	0.00	1.60
DP-2	BASE	QUALITY	0.00	0.00	0.000	7.02	2.00	0.00	1.60
DP-3	BASE	005YR001HR	1.46	0.00	0.001	1.46	2.10	0.00	1.60
DP-3	BASE	005YR024HR	13.48	0.00	0.001	13.48	2.10	0.00	1.60
DP-3	BASE	010YR024HR	14.35	0.00	0.002	14.35	2.10	0.00	1.60
DP-3	BASE	025YR072HR	62.77	0.02	0.017	62.77	2.11	0.00	1.60
DP-3	BASE	100YR072HR	62.91	14.83	0.038	62.91	4.02	0.00	1.60
DP-3	BASE	QUALITY	0.00	0.00	0.000	7.02	2.00	0.00	1.60
DP-4-1	BASE	005YR001HR	1.49	11.46	-0.087	1.49	3.05	0.00	1.60
DP-4-1	BASE	005YR024HR	13.87	12.80	-0.107	13.87	3.40	0.00	1.60
DP-4-1	BASE	010YR024HR	14.64	13.69	-0.169	14.64	3.66	0.00	1.60
DP-4-1	BASE	025YR072HR	62.61	14.65	-0.193	62.61	3.96	0.00	1.60
DP-4-1	BASE	100YR072HR	62.92	16.11	-0.198	62.92	4.45	0.00	1.60
DP-4-1	BASE	QUALITY	1.66	0.08	0.018	1.66	2.03	0.00	1.60
DP-4-2	BASE	005YR001HR	1.49	11.83	-0.087	1.49	3.05	0.00	1.60
DP-4-2	BASE	005YR024HR	13.87	14.64	-0.107	13.87	3.40	0.00	1.60
DP-4-2	BASE	010YR024HR	14.64	16.39	-0.130	14.64	3.66	0.00	1.60
DP-4-2	BASE	025YR072HR	62.61	18.15	-0.151	62.61	3.96	0.00	1.60
DP-4-2	BASE	100YR072HR	62.92	20.33	-0.154	62.92	4.45	0.00	1.60
DP-4-2	BASE	QUALITY	1.66	0.08	0.018	1.66	2.03	0.00	1.60
DP-5	BASE	005YR001HR	1.58	1.51	0.008	1.58	2.24	0.00	1.60
DP-5	BASE	005YR024HR	13.80	1.80	0.007	13.80	2.27	0.00	1.60
DP-5	BASE	010YR024HR	14.06	1.93	-0.011	14.06	2.28	0.00	1.60
DP-5	BASE	025YR072HR	62.60	2.06	-0.022	62.60	2.30	0.00	1.60
DP-5	BASE	100YR072HR	62.92	8.13	-0.021	62.92	2.74	0.00	1.60
DP-5	BASE	QUALITY	0.00	0.00	0.000	6.54	2.00	0.00	1.60
DP-6	BASE	005YR001HR	1.69	11.57	-0.069	1.69	3.02	0.00	1.60
DP-6	BASE	005YR024HR	13.89	13.79	-0.100	13.89	3.29	0.00	1.60
DP-6	BASE	010YR024HR	13.90	14.65	-0.145	13.90	3.40	0.00	1.60
DP-6	BASE	025YR072HR	62.61	15.55	-0.164	62.61	3.53	0.00	1.60
DP-6	BASE	100YR072HR	62.92	17.47	-0.162	62.92	3.84	0.00	1.60
DP-6	BASE	QUALITY	0.00	0.00	0.000	6.39	2.00	0.00	1.60
DP-8	BASE	005YR001HR	1.74	3.03	-0.050	1.74	2.24	0.00	1.60
DP-8	BASE	005YR024HR	13.80	3.60	-0.030	13.80	2.27	0.00	1.60
DP-8	BASE	010YR024HR	14.06	4.07	-0.030	14.06	2.29	0.00	1.60
DP-8	BASE	025YR072HR	62.61	11.29	0.126	62.61	3.91	0.00	1.60
DP-8	BASE	100YR072HR	62.92	13.52	0.151	62.92	4.92	0.00	1.60
DP-8	BASE	QUALITY	1.21	0.67	-0.015	1.21	2.09	0.00	1.60
DW-1	BASE	005YR001HR	0.41	23.10	23.100	1.38	3.72	0.00	-60.00

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
DW-1	BASE	005YR024HR	6.21	23.10	23.100	14.66	4.44	0.00	-60.00
DW-1	BASE	010YR024HR	5.72	23.10	23.100	14.67	4.64	0.00	-60.00
DW-1	BASE	025YR072HR	10.41	23.10	23.100	62.31	4.80	0.00	-60.00
DW-1	BASE	100YR072HR	7.83	23.10	23.100	61.90	5.04	0.00	-60.00
DW-1	BASE	QUALITY	0.90	23.10	23.100	1.70	2.01	0.00	-60.00
DW-2	BASE	005YR001HR	0.42	23.10	23.100	1.58	3.36	0.00	-60.00
DW-2	BASE	005YR024HR	6.23	23.10	23.100	13.80	3.87	0.00	-60.00
DW-2	BASE	010YR024HR	5.75	23.10	23.100	14.06	4.12	0.00	-60.00
DW-2	BASE	025YR072HR	11.54	23.10	23.100	62.60	4.38	0.00	-60.00
DW-2	BASE	100YR072HR	8.38	23.10	23.100	62.92	4.91	0.00	-60.00
DW-2	BASE	QUALITY	0.91	23.10	23.100	1.46	2.01	0.00	-60.00
DW-3	BASE	005YR001HR	0.44	23.10	23.100	1.69	3.46	0.00	-60.00
DW-3	BASE	005YR024HR	6.34	23.10	23.100	13.88	3.95	0.00	-60.00
DW-3	BASE	010YR024HR	5.75	23.10	23.100	13.90	4.16	0.00	-60.00
DW-3	BASE	025YR072HR	11.95	23.10	23.100	62.60	4.38	0.00	-60.00
DW-3	BASE	100YR072HR	8.66	23.10	23.100	62.92	4.91	0.00	-60.00
DW-3	BASE	QUALITY	0.92	23.10	23.100	1.86	2.00	0.00	-60.00
EXIST-PUMP	BASE	005YR001HR	0.89	14.20	14.200	1.46	2.10	0.00	1.60
EXIST-PUMP	BASE	005YR024HR	11.96	14.20	14.200	13.48	2.10	0.00	1.60
EXIST-PUMP	BASE	010YR024HR	11.88	14.20	14.200	14.35	2.10	0.00	1.60
EXIST-PUMP	BASE	025YR072HR	59.73	14.20	14.200	62.77	2.11	0.00	1.60
EXIST-PUMP	BASE	100YR072HR	59.42	14.20	14.200	62.91	4.02	0.00	1.60
EXIST-PUMP	BASE	QUALITY	0.00	0.00	0.000	7.02	2.00	0.00	1.60
NEW	BASE	005YR001HR	2.33	6.97	2.976	1.48	3.26	1.69	3.19
NEW	BASE	005YR024HR	11.83	6.64	2.954	13.87	3.70	13.87	3.70
NEW	BASE	010YR024HR	11.76	6.65	2.963	14.64	4.02	14.64	4.02
NEW	BASE	025YR072HR	59.54	6.64	2.973	62.60	4.38	62.60	4.38
NEW	BASE	100YR072HR	69.56	6.80	2.965	62.91	4.91	62.91	4.91
NEW	BASE	QUALITY	1.68	5.66	2.953	1.59	2.03	1.64	2.01
NEW PUMP	BASE	005YR001HR	0.43	5.00	5.000	1.69	3.19	0.00	1.60
NEW PUMP	BASE	005YR024HR	6.28	5.00	5.000	13.87	3.70	0.00	1.60
NEW PUMP	BASE	010YR024HR	5.98	5.00	5.000	14.64	4.02	0.00	1.60
NEW PUMP	BASE	025YR072HR	10.41	5.00	5.000	62.60	4.38	0.00	1.60
NEW PUMP	BASE	100YR072HR	7.83	5.00	5.000	62.91	4.91	0.00	1.60
NEW PUMP	BASE	QUALITY	0.92	5.00	5.000	1.64	2.01	0.00	1.60
NEW WELLS	BASE	005YR001HR	0.43	23.10	23.100	1.69	3.19	0.00	-60.00
NEW WELLS	BASE	005YR024HR	6.28	23.10	23.100	13.87	3.70	0.00	-60.00
NEW WELLS	BASE	010YR024HR	5.98	23.10	23.100	14.64	4.02	0.00	-60.00
NEW WELLS	BASE	025YR072HR	10.41	23.10	23.100	62.60	4.38	0.00	-60.00
NEW WELLS	BASE	100YR072HR	7.83	23.10	23.100	62.91	4.91	0.00	-60.00
NEW WELLS	BASE	QUALITY	0.92	23.10	23.100	1.64	2.01	0.00	-60.00
P1	BASE	005YR001HR	2.74	2.37	-0.174	2.74	4.05	2.74	2.09
P1	BASE	005YR024HR	14.68	2.58	-0.179	14.68	4.45	14.68	2.10
P1	BASE	010YR024HR	14.68	2.68	-0.181	14.68	4.64	14.68	2.12
P1	BASE	025YR072HR	62.31	2.76	-0.181	62.31	4.81	62.32	2.14
P1	BASE	100YR072HR	61.37	2.84	-0.180	61.90	5.04	61.91	2.37
P1	BASE	QUALITY	1.83	1.75	-0.176	1.83	3.14	1.83	2.07
P2	BASE	005YR001HR	1.38	1.15	0.329	1.38	3.72	1.39	2.20
P2	BASE	005YR024HR	14.66	1.39	-0.327	14.66	4.44	14.67	2.23
P2	BASE	010YR024HR	14.67	1.45	-0.327	14.67	4.64	14.68	2.23

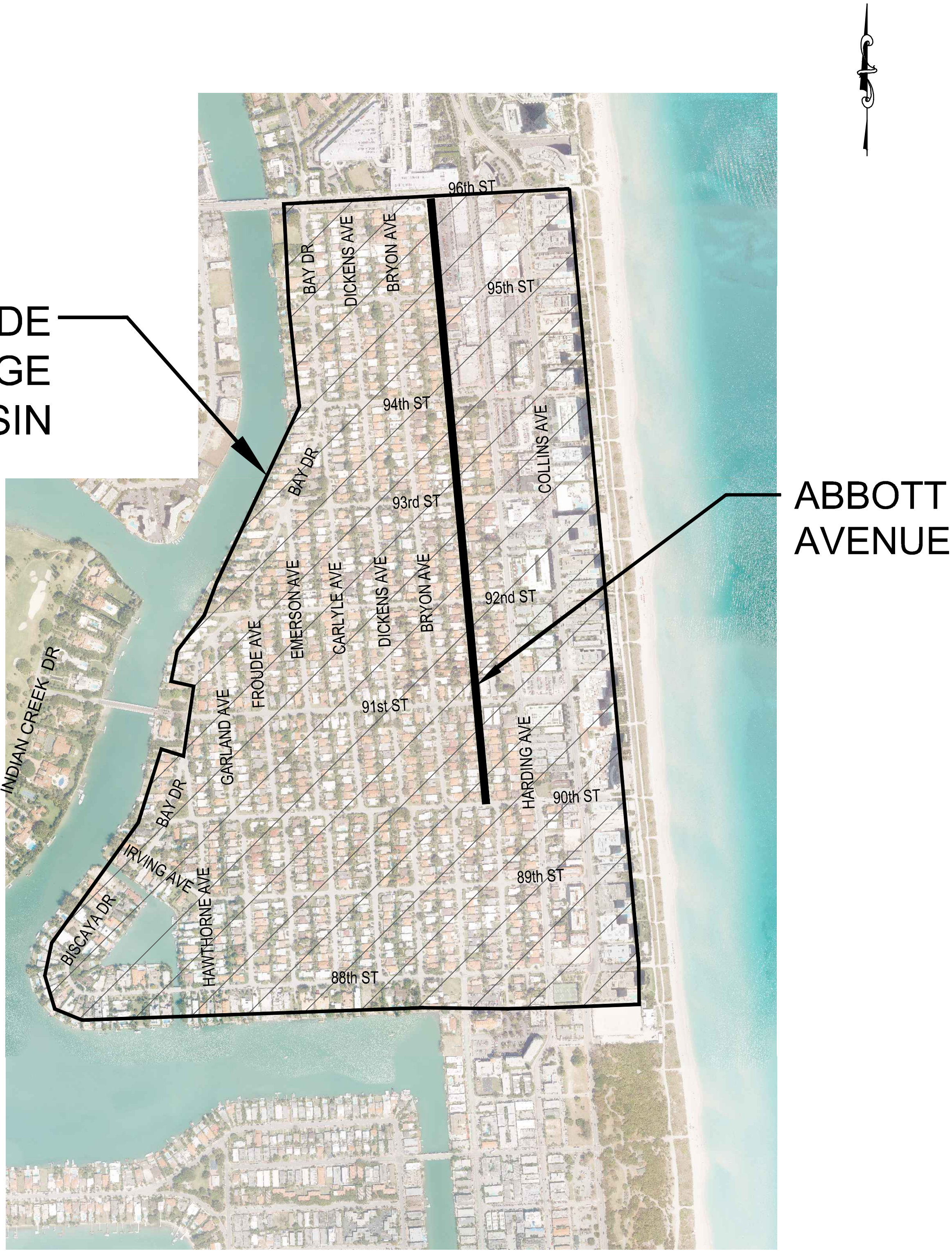
Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
P2	BASE	025YR072HR	62.31	1.50	-0.334	62.31	4.80	62.32	2.24
P2	BASE	100YR072HR	60.84	1.50	-0.334	61.90	5.04	61.90	2.79
P2	BASE	QUALITY	1.54	0.43	-0.327	1.70	2.01	7.02	2.00
P3	BASE	005YR001HR	1.68	1.19	-0.326	1.69	3.19	1.46	2.10
P3	BASE	005YR024HR	13.88	1.36	-0.329	13.87	3.70	13.48	2.10
P3	BASE	010YR024HR	14.67	1.46	-0.329	14.64	4.02	14.35	2.10
P3	BASE	025YR072HR	62.58	1.56	-0.329	62.60	4.38	62.77	2.11
P3	BASE	100YR072HR	61.10	1.60	0.331	62.91	4.91	62.91	4.02
P3	BASE	QUALITY	1.80	0.43	-0.329	1.64	2.01	7.02	2.00
P4	BASE	005YR001HR	1.48	23.28	-5.468	1.48	3.26	1.49	3.05
P4	BASE	005YR024HR	13.86	27.44	-5.721	13.87	3.70	13.87	3.40
P4	BASE	010YR024HR	14.63	30.08	-5.701	14.64	4.02	14.64	3.66
P4	BASE	025YR072HR	62.60	32.80	-5.894	62.60	4.38	62.61	3.96
P4	BASE	100YR072HR	61.84	35.46	-5.887	62.91	4.91	62.92	4.45
P4	BASE	QUALITY	2.23	4.23	-5.763	1.59	2.03	1.66	2.03
P5	BASE	005YR001HR	1.58	1.51	-0.499	1.58	3.36	1.58	2.24
P5	BASE	005YR024HR	13.80	1.80	-0.504	13.80	3.87	13.80	2.27
P5	BASE	010YR024HR	14.06	1.93	-0.503	14.06	4.12	14.06	2.28
P5	BASE	025YR072HR	62.60	2.06	-0.505	62.60	4.38	62.60	2.30
P5	BASE	100YR072HR	61.52	2.21	0.507	62.92	4.91	62.92	2.74
P5	BASE	QUALITY	1.70	0.64	-0.499	1.46	2.01	6.54	2.00
P6	BASE	005YR001HR	1.68	11.57	-1.446	1.69	3.46	1.69	3.02
P6	BASE	005YR024HR	13.88	13.79	-1.464	13.88	3.95	13.89	3.29
P6	BASE	010YR024HR	13.90	14.65	-1.450	13.90	4.16	13.90	3.40
P6	BASE	025YR072HR	62.60	15.55	-1.463	62.60	4.38	62.61	3.53
P6	BASE	100YR072HR	62.91	17.47	-1.468	62.92	4.91	62.92	3.84
P6	BASE	QUALITY	1.68	2.98	-1.448	1.86	2.00	6.39	2.00
P8	BASE	005YR001HR	1.74	3.03	-0.337	1.74	3.37	1.74	2.24
P8	BASE	005YR024HR	13.80	3.60	0.314	13.80	3.87	13.80	2.27
P8	BASE	010YR024HR	14.05	3.86	0.304	14.06	4.12	14.06	2.29
P8	BASE	025YR072HR	60.94	3.86	0.301	62.60	4.38	62.61	3.91
P8	BASE	100YR072HR	60.50	3.86	-1.003	62.92	4.91	62.92	4.92
P8	BASE	QUALITY	1.21	0.76	0.302	1.21	2.16	1.21	2.09

EXHIBITS

- Exhibit 1 Location Map
- Exhibit 2 Aerial Map
- Exhibit 3 USDA Soil Survey Map
- Exhibit 4 FEMA Flood Insurance Rate Map
- Exhibit 5 Miami-Dade County Average October Ground Water Map
- Exhibit 6 Abbott Avenue Typical Section
- Exhibit 7 Existing Drainage Basin Map
- Exhibit 8 Proposed Drainage Improvements Maps
- Exhibit 9 Proposed Drainage Improvements Details
- Exhibit 10 Proposed Drainage Improvements Cost Estimates
- Exhibit 11 Field Pictures
- Exhibit 12 Flood Pictures

EXHIBIT 1

LOCATION MAP

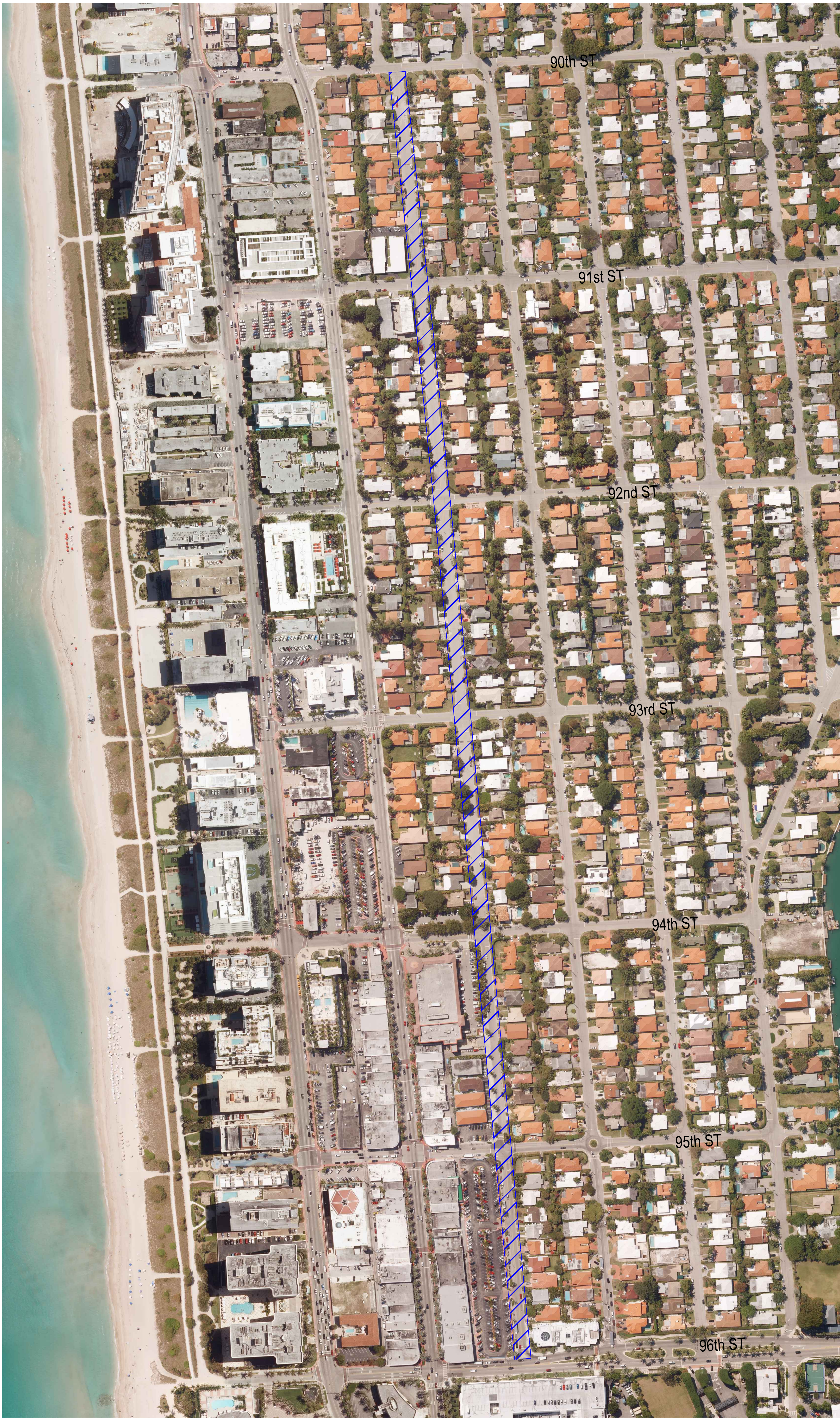


Calvin, Giordano & Associates, Inc. EXCEPTIONAL SOLUTIONS™	**SURFSIDE ABBOTT AVE. DRAINAGE STUDY** SURFSIDE, FLORIDA	**LOCATION MAP**	SHEET **EXH1**

EXHIBIT 2

AERIAL MAP

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\CADD Files\Drawings\C-EXH 2.dwg — (Plotted by: Katharine Kupsky on Friday, August 31, 2018 10:35:22 AM)



LEGEND

ABBOTT AVENUE STUDY LIMITS

GRAPHIC SCALE

0 75 150 300

(IN FEET)
1" = 300'

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

AERIAL MAP

SHEET:

EXH2

EXHIBIT 3

USDA SOIL SURVEY MAP

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Miami-Dade County Area, Florida

TOWN OF SURFSIDE

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features

Public Land Survey
- Township and Range
- Section

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Miami-Dade County Area, Florida
Survey Area Data: Version 1, Jan 22, 2007

Date(s) aerial images were photographed: 2/28/1999; 12/25/1999

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Miami-Dade County Area, Florida (FL686)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
15	Urban land	321.9	95.8%
39	Beaches	3.9	1.1%
99	Water	10.4	3.1%
Totals for Area of Interest (AOI)		336.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Miami-Dade County Area, Florida Version date:1/22/2007 11:40:42 AM

15—Urban land

Map Unit Setting

Mean annual precipitation: 53 to 70 inches
Mean annual air temperature: 69 to 83 degrees F
Frost-free period: 358 to 365 days

Map Unit Composition

Urban land: 98 percent
Minor components: 2 percent

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Minor Components

Udorthents

Percent of map unit: 2 percent
Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

39—Beaches

Map Unit Setting

Elevation: 0 to 20 feet
Mean annual precipitation: 53 to 70 inches
Mean annual air temperature: 69 to 83 degrees F
Frost-free period: 358 to 365 days

Map Unit Composition

Beaches: 95 percent
Minor components: 5 percent

Description of Beaches

Setting

Landform: Beaches on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear

Properties and qualities

Slope: 0 to 2 percent

Drainage class: Poorly drained
Depth to water table: About 0 to 72 inches
Frequency of flooding: Very frequent

Interpretive groups

Land capability (nonirrigated): 8w

Minor Components

Canaveral

Percent of map unit: 5 percent
Landform: Ridges on marine terraces, dunes on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

99—Water

Map Unit Setting

Mean annual precipitation: 62 to 70 inches
Mean annual air temperature: 73 to 81 degrees F
Frost-free period: 358 to 365 days

Map Unit Composition

Water: 100 percent

References

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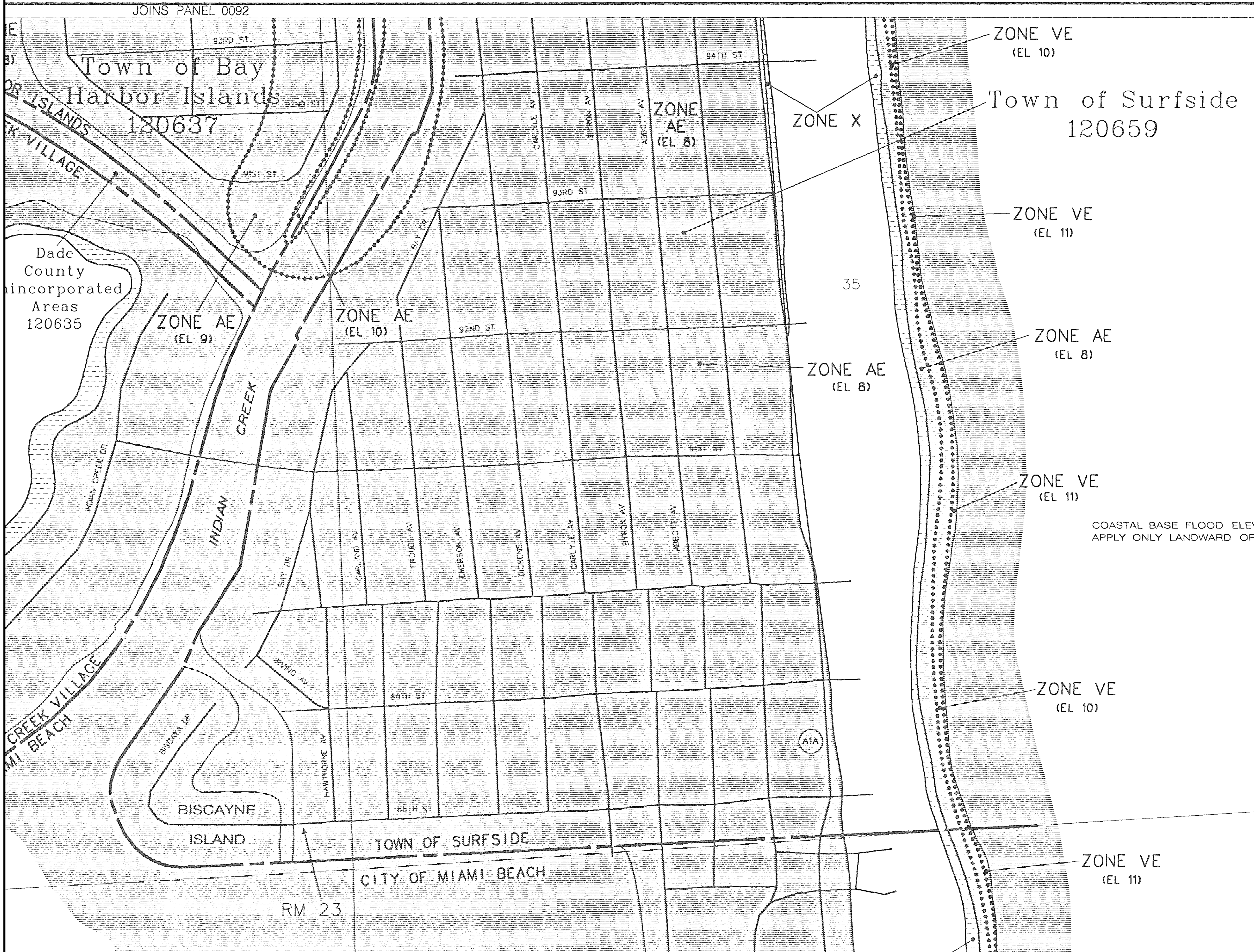
EXHIBIT 4

FEMA FLOOD INSURANCE RATE MAP



APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

DADE COUNTY,
FLORIDA
AND INCORPORATED AREAS

PANEL 94 OF 625

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BAY HARBOR ISLANDS, TOWN OF	120637	0094	J
INDIAN CREEK VILLAGE, VILLAGE OF	120646	0094	J
MIAMI BEACH, CITY OF	120651	0094	J
MIAMI SHORES, VILLAGE OF	120652	0094	J
NORTH BAY VILLAGE, CITY OF	120654	0094	J
NORTH MIAMI, CITY OF	120655	0094	J
SURFSIDE, TOWN OF	120659	0094	J
UNINCORPORATED AREAS	120635	0094	J

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
12025C0094 J

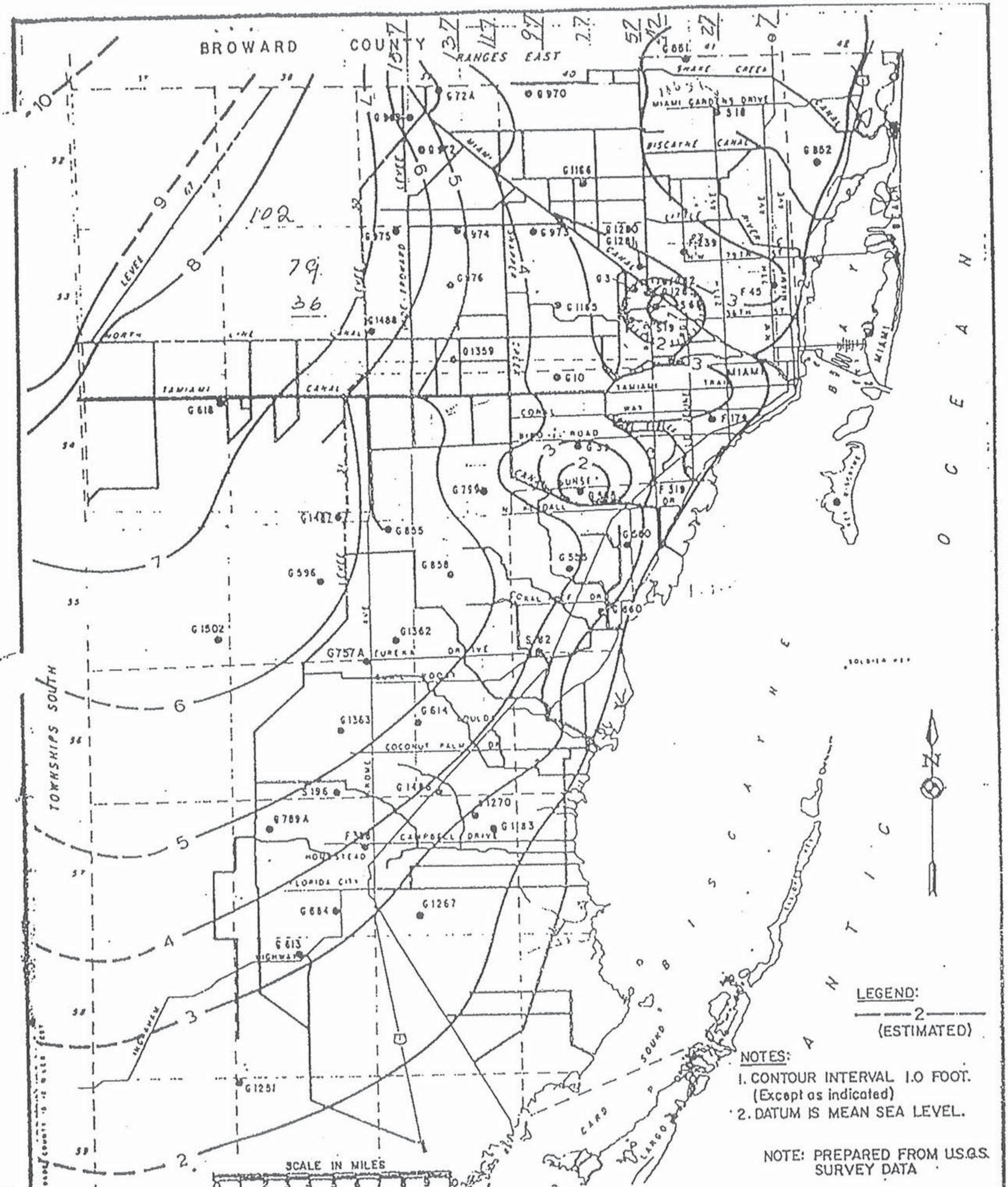
MAP REVISED:
MARCH 2, 1994

BEST AVAILABLE COPY
AT THIS TIME

Federal Emergency Management Agency

EXHIBIT 5

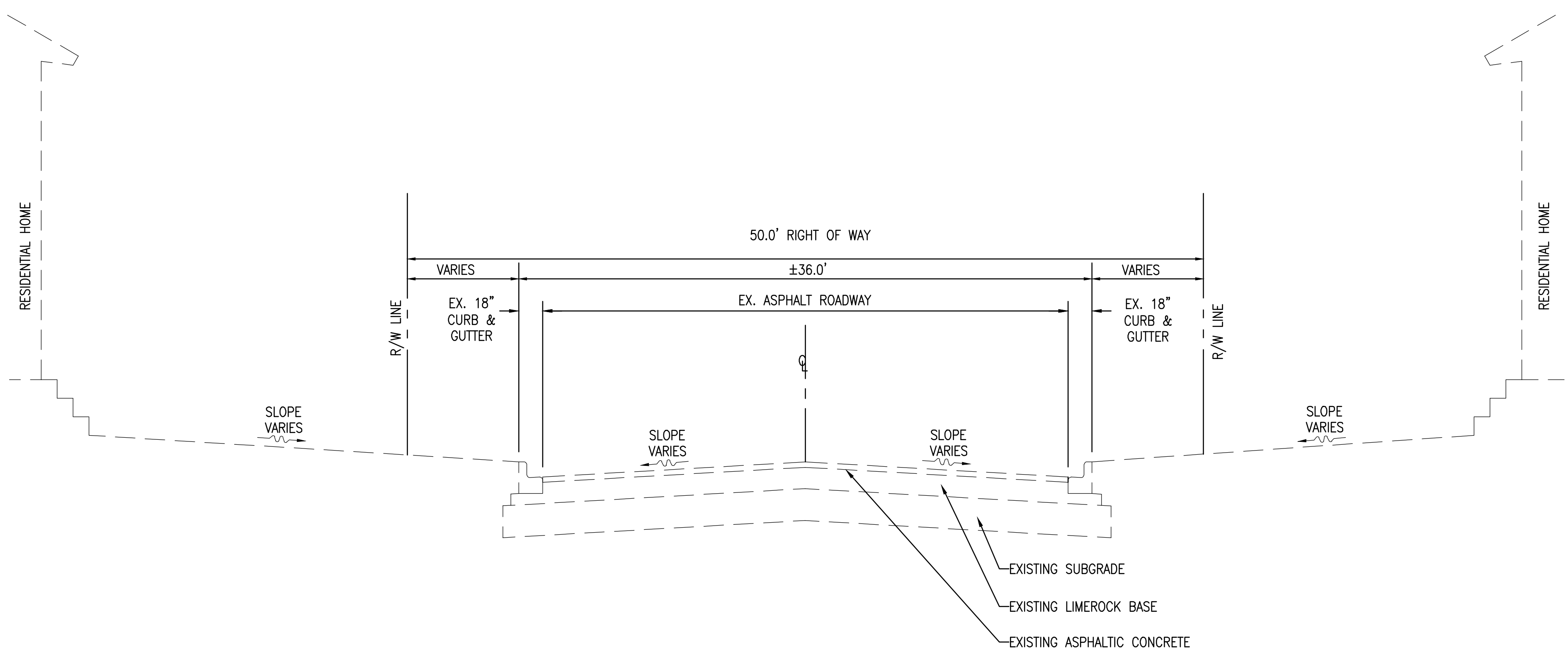
MIAMI-DADE COUNTY AVERAGE OCTOBER GROUND WATER MAP



METROPOLITAN DADE COUNTY — PUBLIC WORKS DEPARTMENT	APPROVED 4/5/72	REVISED 2/19/75, 4/14/77	DESIGN STANDARDS — AVERAGE OCTOBER GROUND WATER LEVEL 1960–75	W.C. 2.2 SHEET 1 OF 1

EXHIBIT 6

ABBOTT AVENUE TYPICAL SECTION



Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS™

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

TYPICAL SECTION

SHEET

EXH6

EXHIBIT 7

EXISTING DRAINAGE BASIN MAP

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS
1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

EXISTING DRAINAGE BASIN MAP

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: NTS

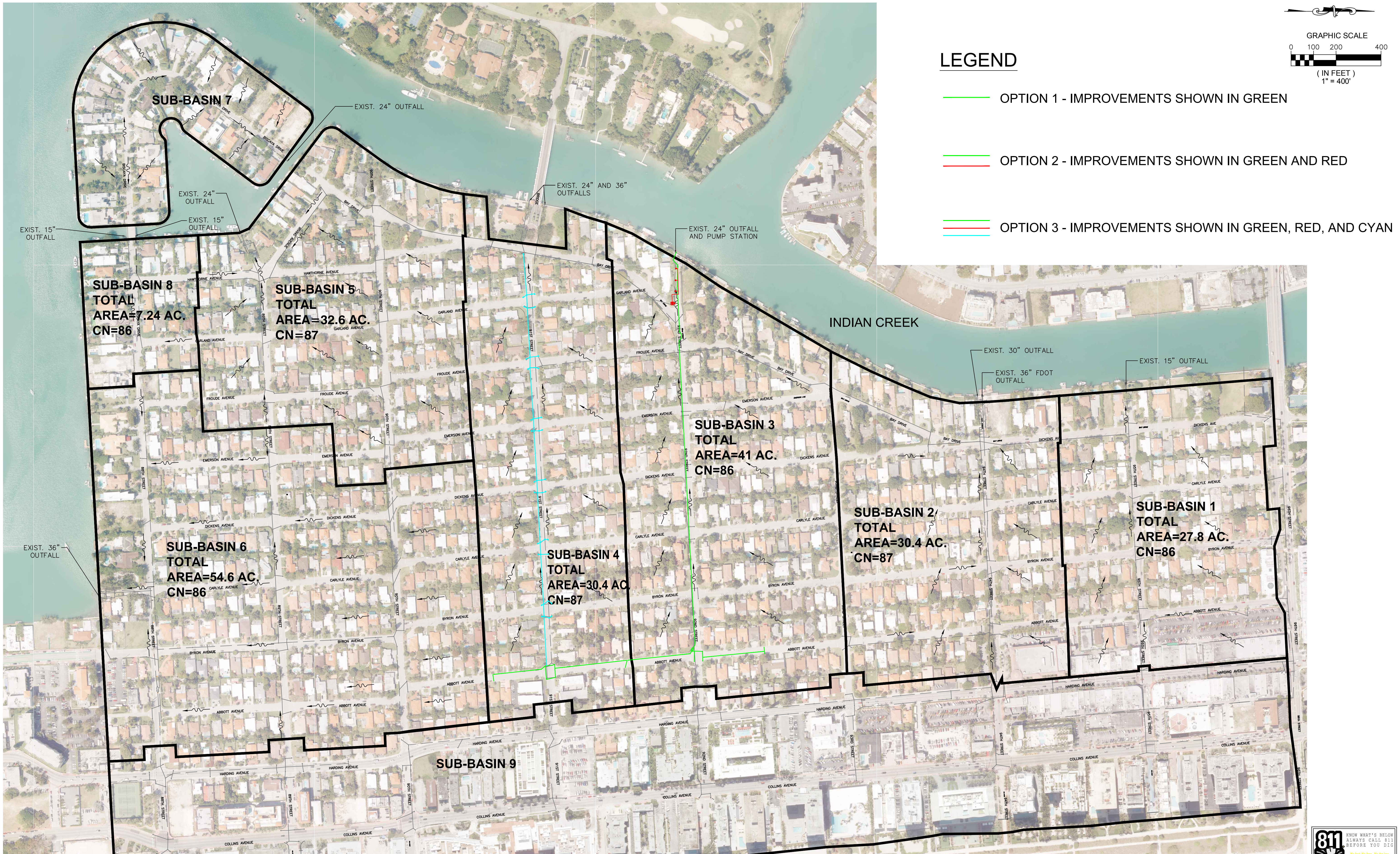
PROJECT No: 181160

SHEET: EXH7

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\C-XX-DRAINAGE MAP.dwg – (Plotted by: Katharine Kupsky on Wednesday, October 17, 2018 4:17:15 PM)

EXHIBIT 8

PROPOSED DRAINAGE IMPROVEMENTS MAPS



NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
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1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

PROPOSED DRAINAGE BASIN MAP

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: NTS
PROJECT No: 181160
SHEET: EXH8

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\C-XX-DRAINAGE MAP.dwg - (Plotted by: Katharine Kupsky on Wednesday, October 17, 2018 4:15:55 PM)

EXHIBIT 9

PROPOSED DRAINAGE IMPROVEMENTS

DETAILS

KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG
It's fast. It's free. It's the law.
www.callsunshine.com

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
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1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

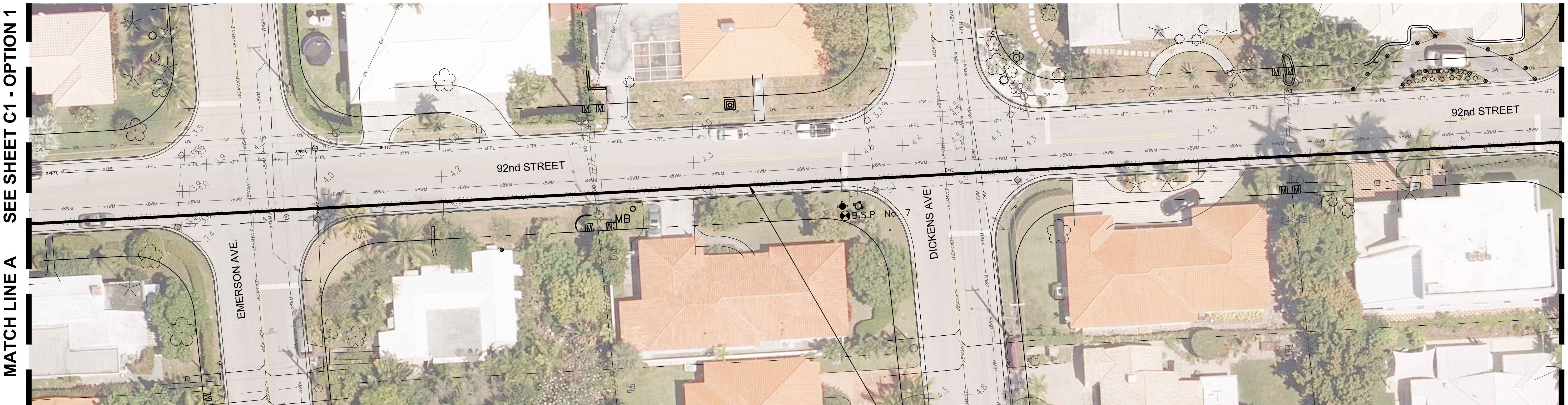
MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C1

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:54:32 PM)

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1" = 40'



PROPOSED 12" HDPE DRAINAGE FORCE MAIN

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

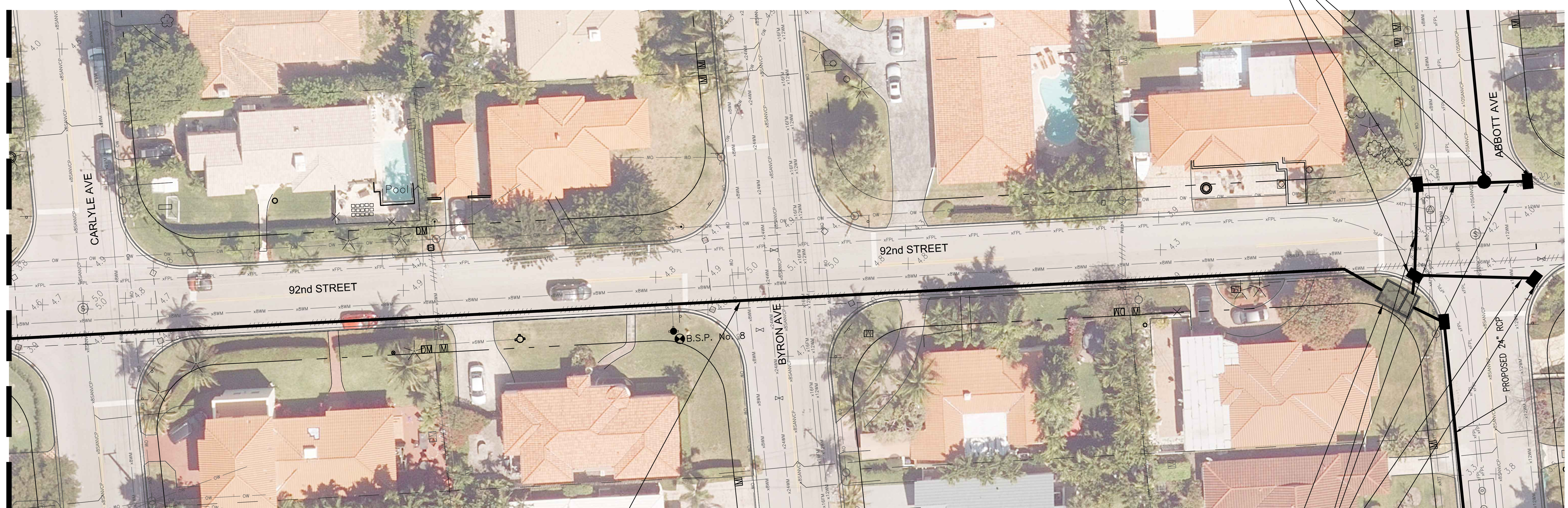
OPTION 1
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C2

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:54:59 PM)



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C3

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg - (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:55:25 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C4

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File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg - (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:55:50 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

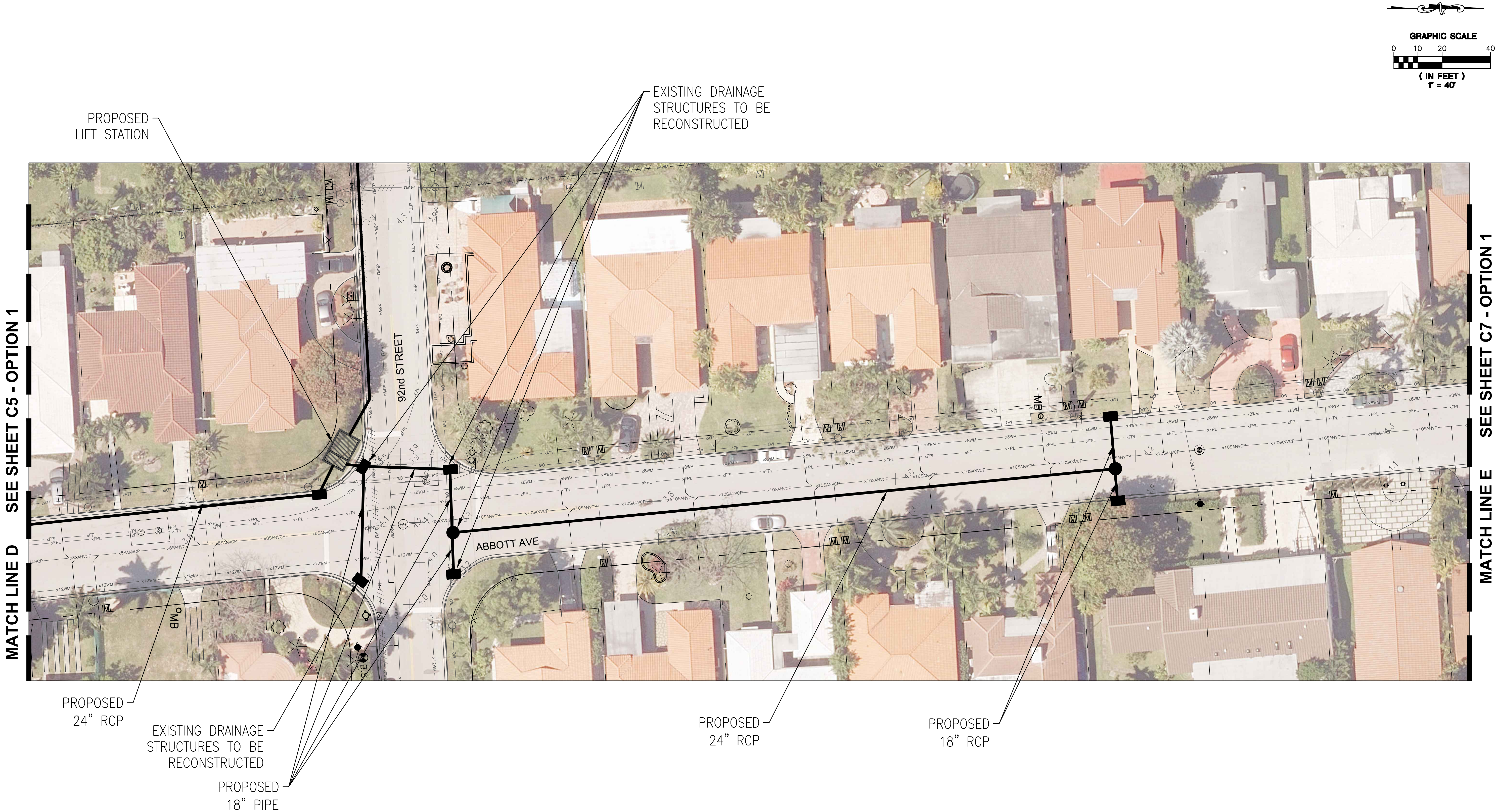
SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C5

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:56:15 PM)



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C6

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:56:39 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

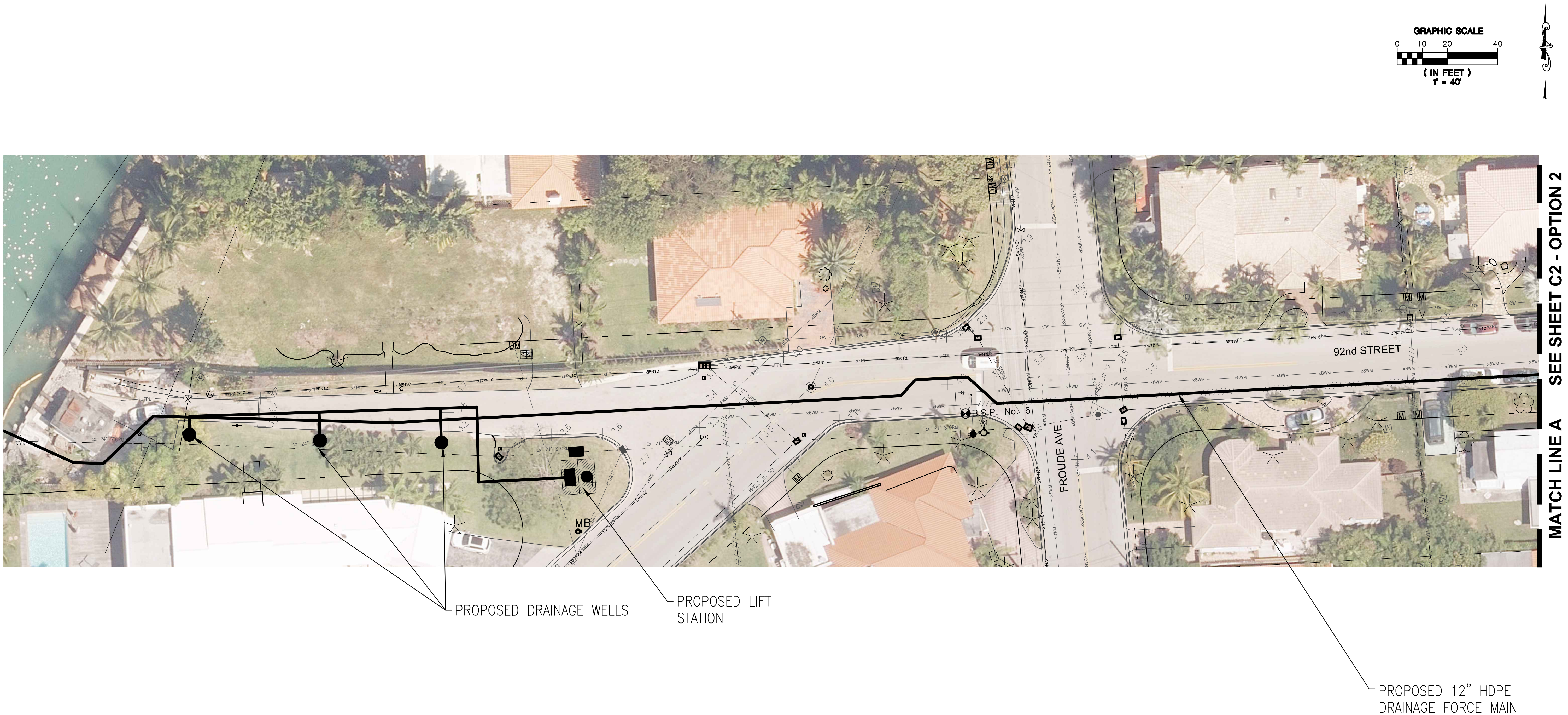
OPTION 1
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C7

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt1.dwg - (Plotted by: Katharine Kupsky on Friday, October 12, 2018 4:57:05 PM)



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

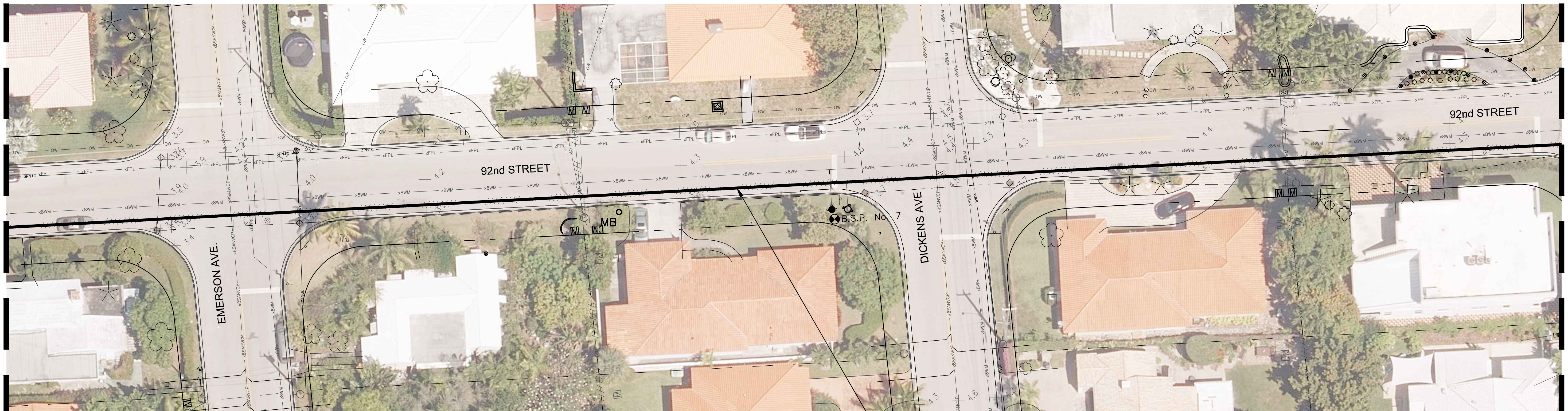
SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C1

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:02:31 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'



PROPOSED 12" HDPE
DRAINAGE FORCE MAIN

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

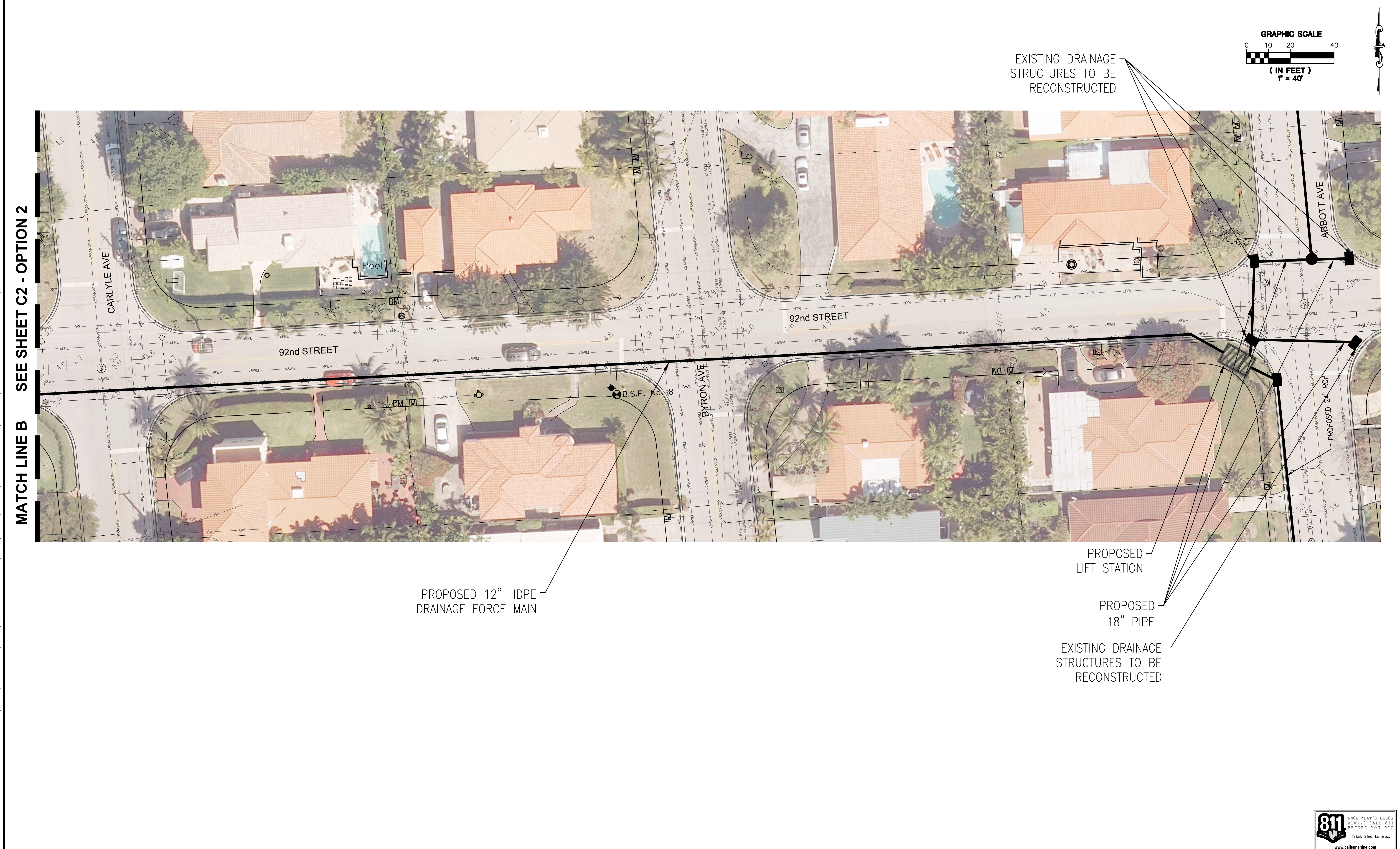
DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: **C2**

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:02:57 PM)



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C3

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg - (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:03:22 PM)

GRAPHIC SCALE

0 10 20 40

(IN FEET)
1" = 40'

PROPOSED
18" RCP

PROPOSED
24" RCP

MATCH LINE C SEE SHEET C5 - OPTION 2

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C4

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:03:47 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C5

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:04:13 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C6

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:04:37 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

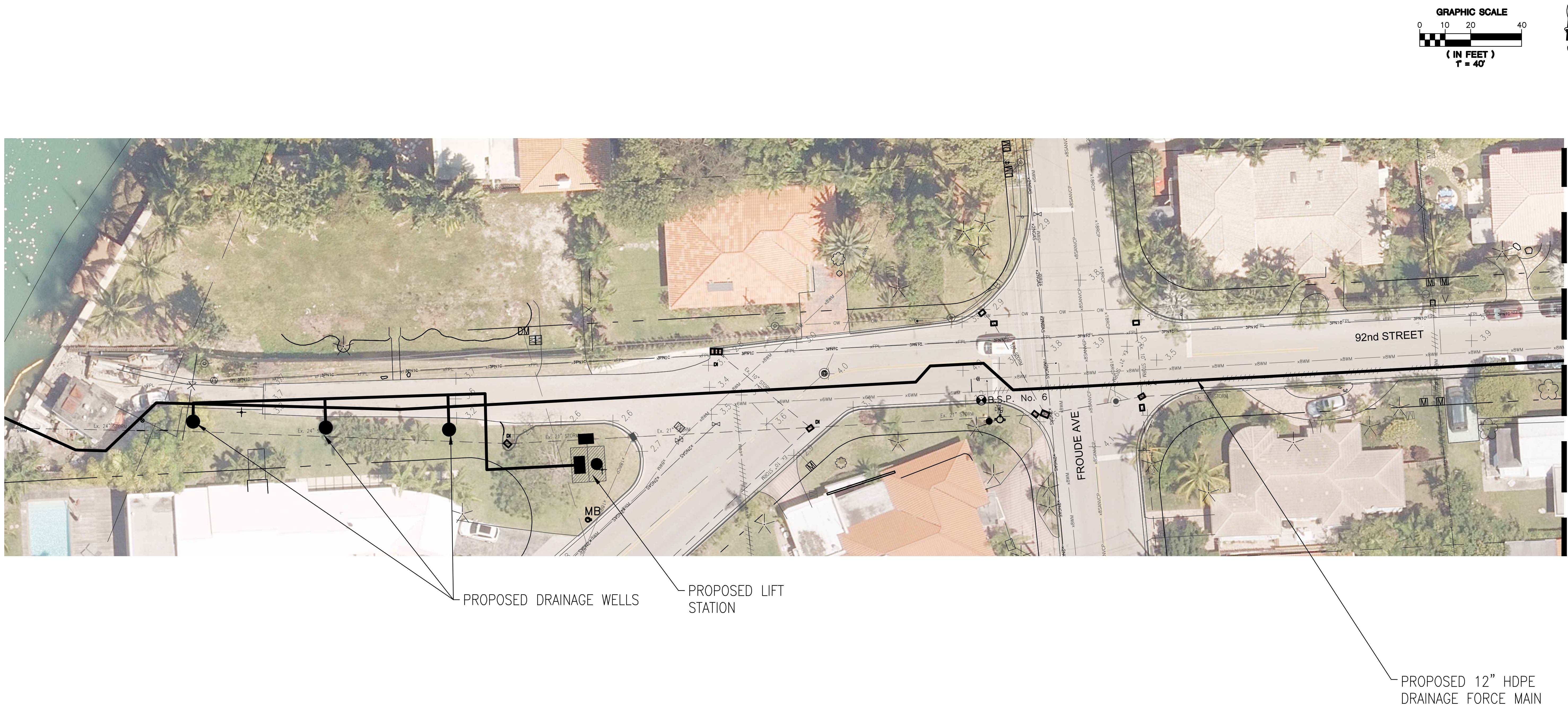
SURFSIDE, FLORIDA

OPTION 2
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C7

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt2.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:05:02 PM)



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE
IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C1

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File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:06:39 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C2

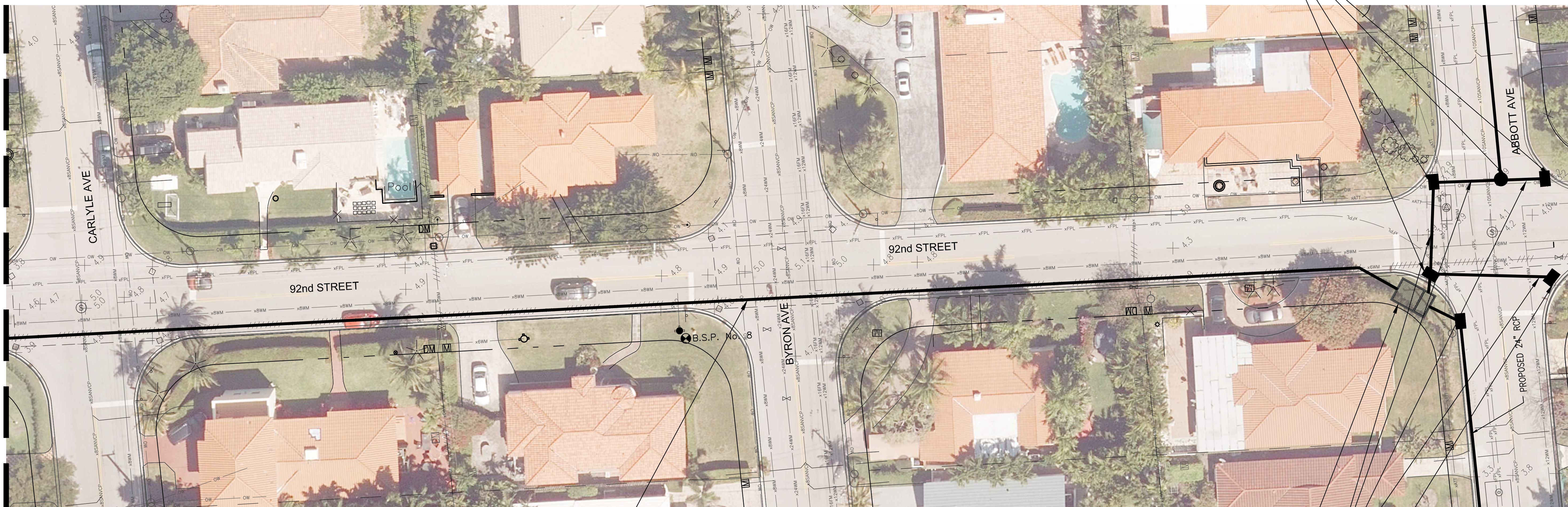
File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:07:07 PM)

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1" = 40'

EXISTING DRAINAGE STRUCTURES TO BE RECONSTRUCTED

SEE SHEET C2-OPTION 3

MATCH LINE B



PROPOSED 12" HDPE DRAINAGE FORCE MAIN

PROPOSED LIFT STATION

PROPOSED 18" PIPE

EXISTING DRAINAGE STRUCTURES TO BE RECONSTRUCTED

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C3

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:07:33 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C4

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:07:57 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

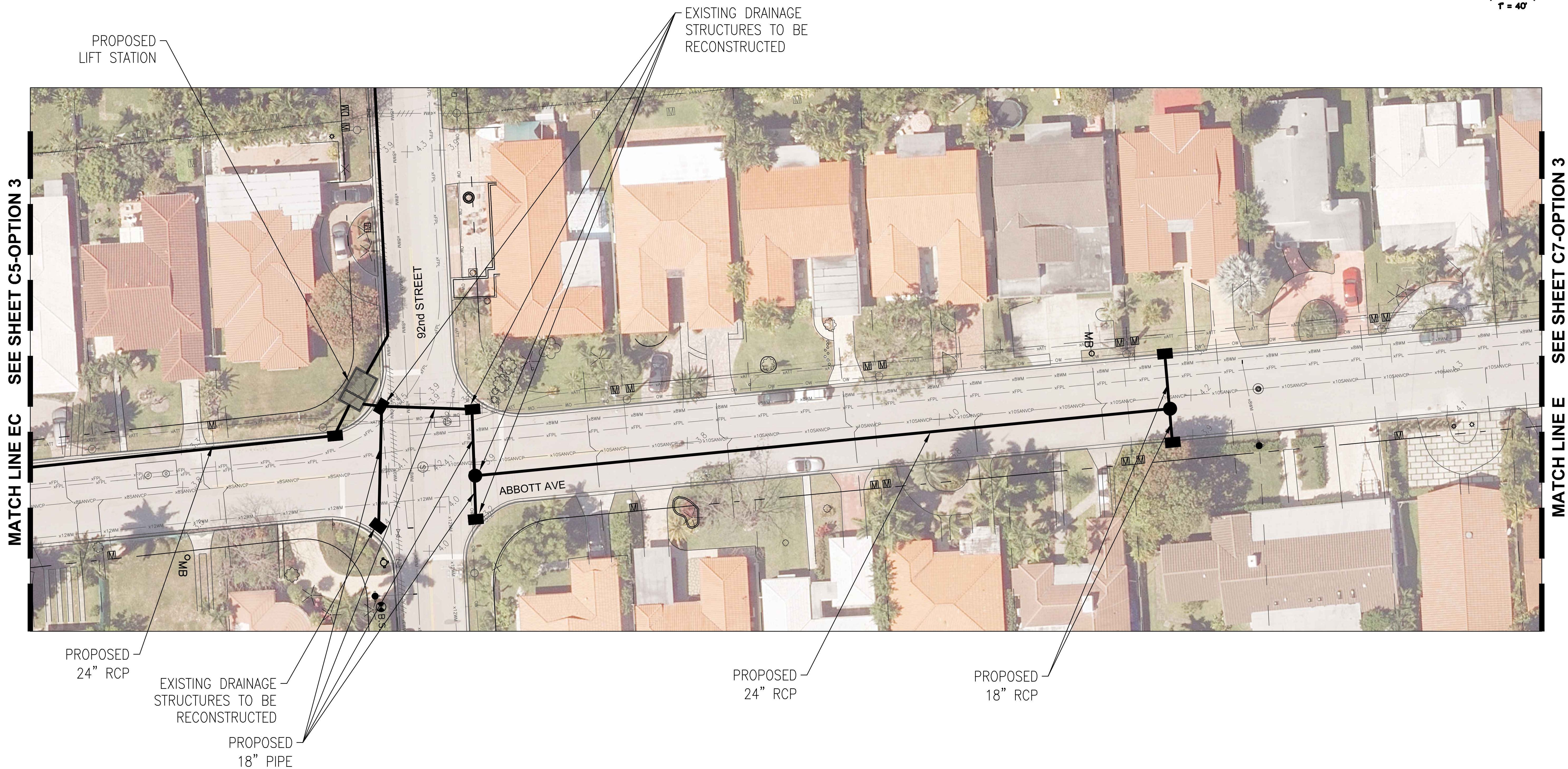
OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C5

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:08:23 PM)



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SURFSIDE, FLORIDA

OPTION 3
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MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C6

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:08:48 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
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MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

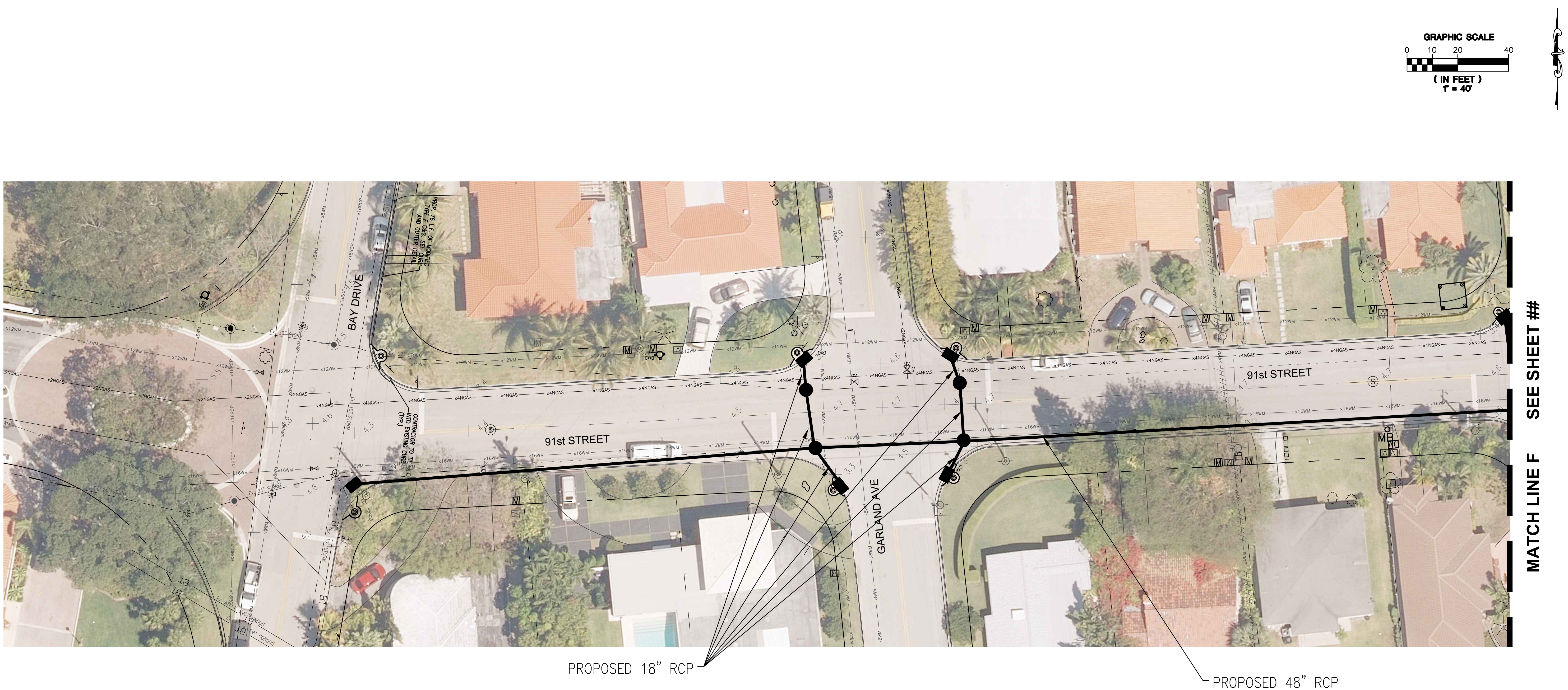
DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C7

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg - (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:09:13 PM)



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C8

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg - (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:09:38 PM)

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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

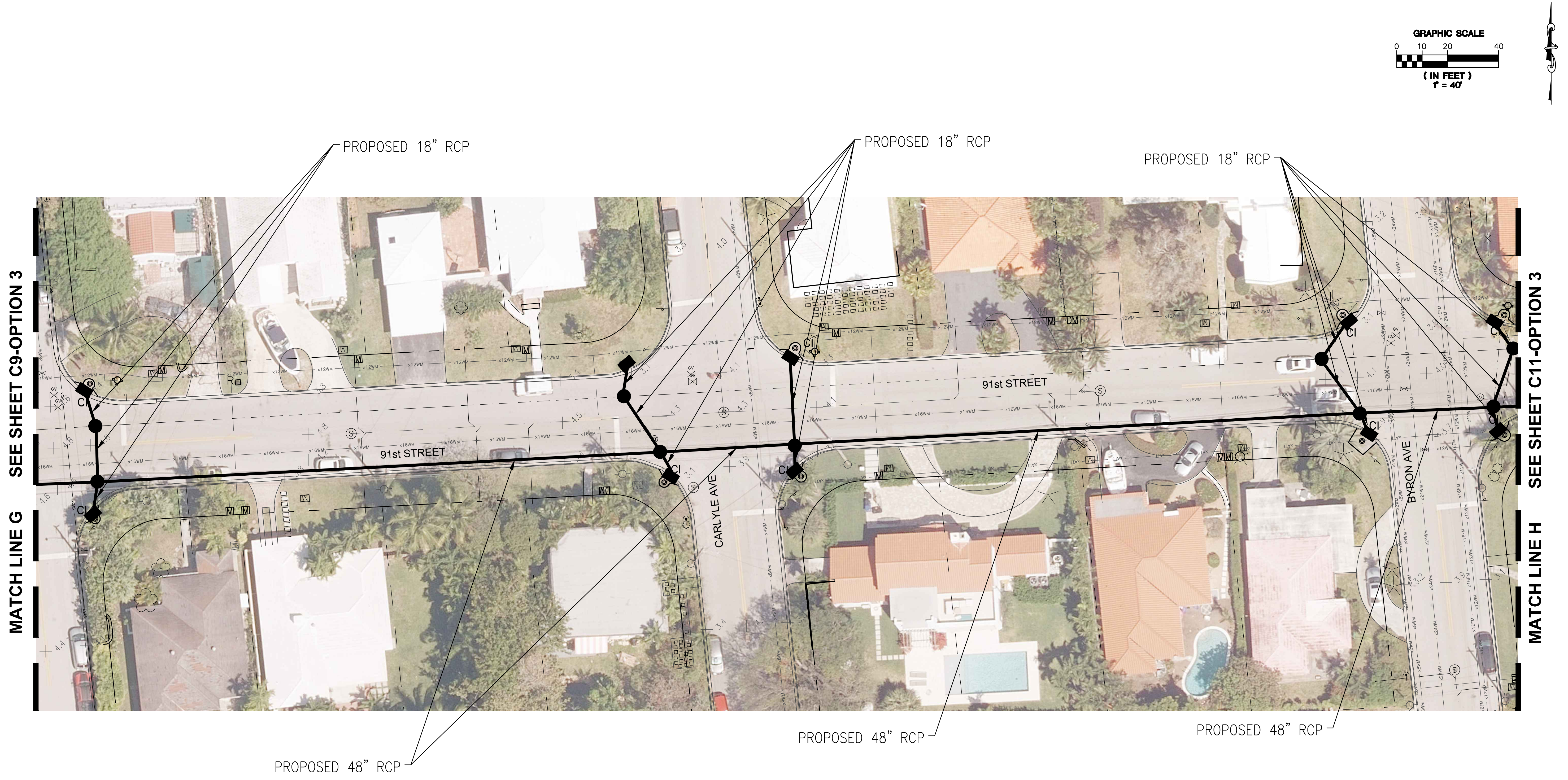
SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640
DATE: 7/20/18

SCALE: AS SHOWN
PROJECT No: 181160
SHEET: C9

File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:10:02 PM)



NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS™
1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
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DATE: 7/20/18

SCALE: AS SHOWN

PROJECT No: 181160

SHEET: C10

811 KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG
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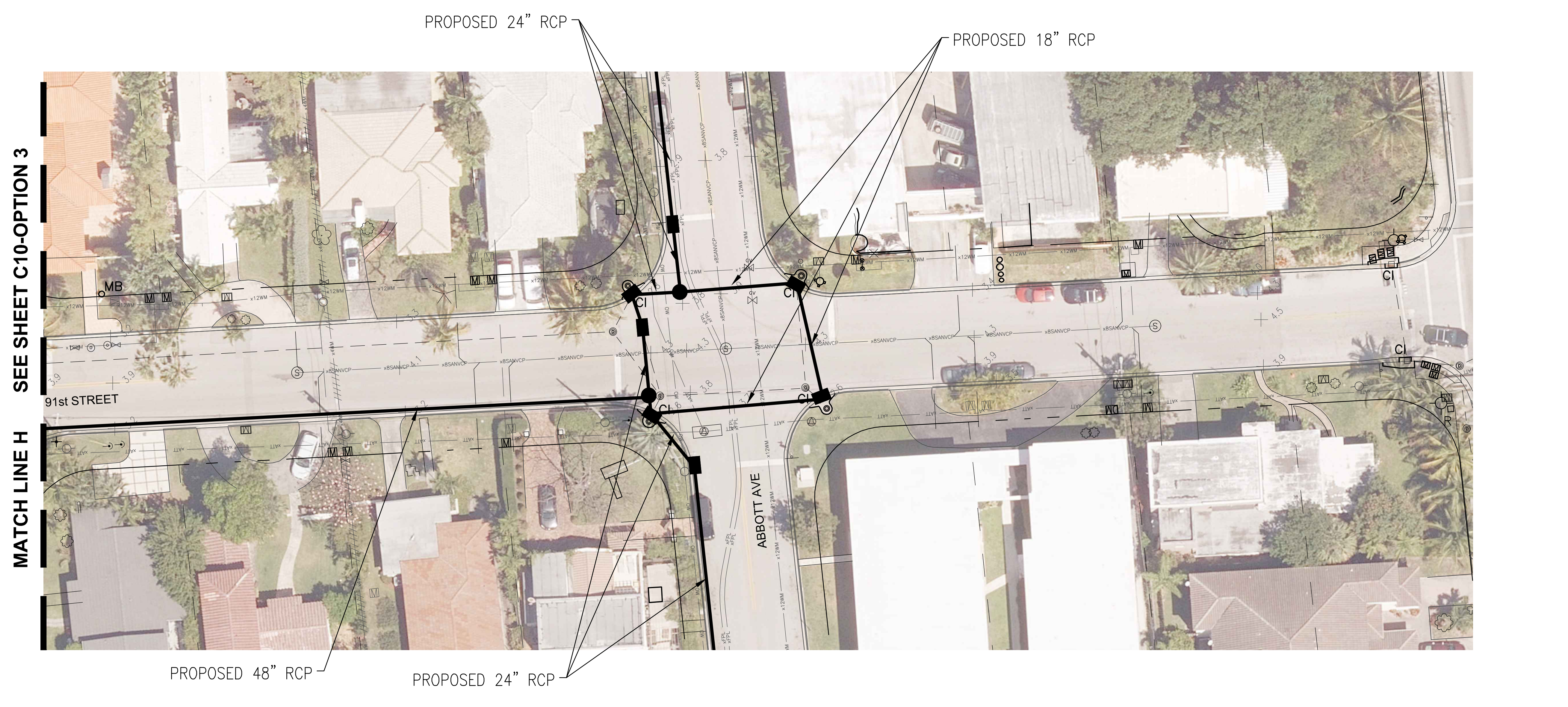
File Name: P:\Projects\2018\181160 Surfside Abbott Ave. Drainage Study\cadd Files\Drawings\181160_C-STRM-opt3.dwg – (Plotted by: Katharine Kupsky on Friday, October 12, 2018 5:10:27 PM)



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SURFSIDE ABBOTT AVE. DRAINAGE STUDY

SURFSIDE, FLORIDA

OPTION 3
PROPOSED DRAINAGE IMPROVEMENTS DETAILS

MOHAMMED SHARIFUZZAMAN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 67640

DATE: 7/20/18

SCALE: AS SHOWN

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EXHIBIT 10

PROPOSED DRAINAGE IMPROVEMENTS

COST ESTIMATES

Calvin, Giordano & Associates, Inc.
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ENGINEER'S OPINION
OF PROBABLE COST
WORKSHEET

DATE
12/3/2018

PROJECT TITLE				**CG&A PROJECT NO.**	
Abbott Avenue Drainage Improvements-OPTION 1				18-1160	
Order of Magnitude Cost Estimate					
LOCATION					
Surfside, FL					
ESTIMATED BY MS		**CHECKED BY MS**		**APPROVED BY MS**	
ITEM NO.	**DESCRIPTION**	**QTY.**	**UNIT**	**UNIT PRICE MAT. & LAB**	**ESTIMATED AMOUNT**
1	Mobilization	1	LS	5%	$26,905.00
2	Maintenance of Traffic	1	LS	$10,000.00	$10,000.00
3	Pavement Marking & Signage	1	LS	$5,000.00	$5,000.00
4	Landscape and Irrigation	1	LS	$10,000.00	$10,000.00
5	Clearing & Grubbing	1	LS	$20,000.00	$20,000.00
6	Erosion Control	1	LS	$5,000.00	$5,000.00
7	Storm Inlets	17	EA	$4,000.00	$68,000.00
8	Storm Manholes	5	EA	$4,000.00	$20,000.00
9	15"/18" RCP w/ Trench Restoration	400	LF	$62.00	$24,800.00
10	24" RCP w/ Trench Restoration	900	LF	$73.00	$65,700.00
11	48" RCP w/ Trench Restoration	0	LF	$150.00	$0.00
12	Milling & Resurface	1	LS	$20,000.00	$20,000.00
13	Drainage Pump Station	1	LS	$100,000.00	$100,000.00
14	12" HDPE Drainage FM	2,000	LF	$85.00	$170,000.00
15	Modified Curb & Gutter	900	LF	$19.00	$17,100.00
16	Swale / SOD restoration	1,000	SY	$2.50	$2,500.00
17	Utiity Adjustment/Relocation	1	LS	$100,000.00	$100,000.00
				SUBTOTAL	**$665,005.00**
				TOTAL	**$665,005.00**
				20% Contingency =	**$133,001.00**
				Design/Permitting Services(13%)=	**$103,740.78**
				Construction Engineering & Inspection Services (10%)=	**$79,800.60**
				Cost Total	**$981,547.38**

MOHAMMED SHARIFUZZAMAN, P.E.
State of Florida Professional Engineer
Florida Registration No. 67640

PAY ITEM NOTES:

1. Pay Item for Clearing and Grubbing includes, but not limited to, removal of asphaltic concrete, sidewalks, curbs, curb and gutter
2. Pay Item for Pipe/culvert includes, but not limited to, construction dewatering, concrete jacket, concrete collar, connection to exist. pipes
3. Pay Item for Erosion Control includes, but not limited to, Silt fence, Floating Turbidity Barrier, Inlet Protection Systems, NPDES permitting
4. Pay Item for Pavement Marking and Signage includes, but not limited to, removal of signs, relocation of signs, installation of signs, restoration of pavement markings and RPMs
5. Pay Item for Landscape and Irrigation includes, but not limited to, Root Pruning, Tree Removal, Tree Relocation, Storage and Disposal, Coordination w/ Town of Surfside, Permitting for Tree removal/relocation, Removal/Relocation/Reconstruction of Irrigation facilities

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ENGINEER'S OPINION
OF PROBABLE COST
WORKSHEET

DATE
12/3/2018

PROJECT TITLE				**CG&A PROJECT NO.**	
Abbott Avenue Drainage Improvements-OPTION 2				18-1160	
Order of Magnitude Cost Estimate					
LOCATION					
Surfside, FL					
ESTIMATED BY MS		**CHECKED BY MS**		**APPROVED BY MS**	

ITEM NO.	**DESCRIPTION**	**QTY.**	**UNIT**	**UNIT PRICE MAT. & LAB**	**ESTIMATED AMOUNT**
1	Mobilization	1	LS	5%	$26,905.00
2	Maintenance of Traffic	1	LS	$10,000.00	$10,000.00
3	Pavement Marking & Signage	1	LS	$5,000.00	$5,000.00
4	Landscape and Irrigation	1	LS	$10,000.00	$10,000.00
5	Clearing & Grubbing	1	LS	$20,000.00	$20,000.00
6	Erosion Control	1	LS	$5,000.00	$5,000.00
7	Storm Inlets	17	EA	$4,000.00	$68,000.00
8	Storm Manholes	5	EA	$4,000.00	$20,000.00
9	15"/18" RCP w/ Trench Restoration	400	LF	$62.00	$24,800.00
10	24" RCP w/ Trench Restoration	900	LF	$73.00	$65,700.00
11	48" RCP w/ Trench Restoration	0	LF	$150.00	$0.00
12	Milling & Resurface	1	LS	$20,000.00	$20,000.00
13	Drainage Pump Station	1	LS	$100,000.00	$100,000.00
14	12" HDPE Drainage FM	2,000	LF	$85.00	$170,000.00
15	Modified Curb & Gutter	900	LF	$19.00	$17,100.00
16	Swale / SOD restoration	1,000	SY	$2.50	$2,500.00
17	Utiity Adjustment/Relocation	1	LS	$100,000.00	$100,000.00
18	3- 24" dia drainage wells and pump station system	1	LS	$500,000.00	$500,000.00
				SUBTOTAL	**$1,165,005.00**
				TOTAL	**$1,165,005.00**
				20% Contingency =	**$233,001.00**
				Design/Permitting Services(13%)=	**$181,740.78**
				Construction Engineering & Inspection Services(10%)=	**$139,800.60**
				Cost Total	**$1,719,547.38**

MOHAMMED SHARIFUZZAMAN, P.E.
State of Florida Professional Engineer
Florida Registration No. 67640

PAY ITEM NOTES:

1. Pay Item for Clearing and Grubbing includes, but not limited to, removal of asphaltic concrete, sidewalks, curbs, curb and gutter
2. Pay Item for Pipe/culvert includes, but not limited to, construction dewatering, concrete jacket, concrete collar, connection to exist. pipes
3. Pay Item for Erosion Control includes, but not limited to, Silt fence, Floating Turbidity Barrier, Inlet Protection Systems, NPDES permitting
4. Pay Item for Pavement Marking and Signage includes, but not limited to, removal of signs, relocation of signs, installation of signs, restoration of pavement markings and RPMs
5. Pay Item for Landscape and Irrigation includes, but not limited to, Root Pruning, Tree Removal, Tree Relocation, Storage and Disposal, Coordination w/ Town of Surfside, Permitting for Tree removal/relocation, Removal/Relocation/Reconstruction of Irrigation facilities

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ENGINEER'S OPINION
OF PROBABLE COST
WORKSHEET

DATE
12/3/2018

PROJECT TITLE			**CG&A PROJECT NO.**	
Abbott Avenue Drainage Improvements-OPTION 3			18-1160	
Order of Magnitude Cost Estimate				
LOCATION				
Surfside, FL				
ESTIMATED BY MS	**CHECKED BY MS**		**APPROVED BY MS**	

ITEM NO.	**DESCRIPTION**	**QTY.**	**UNIT**	**UNIT PRICE MAT. & LAB**	**ESTIMATED AMOUNT**
1	Mobilization	1	LS	5%	$53,122.10
2	Maintenance of Traffic	1	LS	$50,000.00	$50,000.00
3	Pavement Marking & Signage	1	LS	$20,000.00	$20,000.00
4	Landscape and Irrigation	1	LS	$30,000.00	$30,000.00
5	Clearing & Grubbing, Demolition	1	LS	$200,000.00	$200,000.00
6	Erosion Control	1	LS	$20,000.00	$20,000.00
7	Storm Inlets	12	EA	$4,000.00	$48,000.00
8	Storm Manholes	2	EA	$4,000.00	$8,000.00
9	15"/18" RCP w/ Trench Restoration	216	LF	$62.00	$13,392.00
10	24" RCP w/ Trench Restoration	900	LF	$73.00	$65,700.00
11	48" RCP w/ Trench Restoration	2,000	LF	$150.00	$300,000.00
12	Milling & Resurface	1	LS	$20,000.00	$20,000.00
13	Drainage Pump Station	1	LS	$100,000.00	$100,000.00
14	12" HDPE Drainage FM	2,000	LF	$85.00	$170,000.00
15	Modified Curb & Gutter	900	LF	$19.00	$17,100.00
16	Swale / SOD restoration	100	SY	$2.50	$250.00
17	Utiity Adjustment/Relocation	1	LS	$100,000.00	$100,000.00
18	3- 24" dia drainage wells and pump station system	1	LS	$300,000.00	$300,000.00
19	Additional Drainage Structures	44	EA	$8,000.00	$352,000.00
20	Additional Roadway Restoration	1	LS	$500,000.00	$500,000.00
21	Additional Utility Relocation/Adjustment	1	LS	$1,000,000.00	$1,000,000.00
				SUBTOTAL	**$3,367,564.10**
				TOTAL	**$3,367,564.10**
				20% Contingency =	**$673,512.82**
				Design/Permitting Services(13%)=	**$525,340.00**
				Construction Engineering & Inspection Services(10%)=	**$404,107.69**
				Cost Total	**$4,970,524.61**

MOHAMMED SHARIFUZZAMAN, P.E.
State of Florida Professional Engineer
Florida Registration No. 67640

PAY ITEM NOTES:

1. Pay Item for Clearing and Grubbing includes, but not limited to, removal of asphaltic concrete, sidewalks, curbs, curb and gutter
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