RESOLUTION NO. 09-102

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, APPROVING THE ATTACHED UTILITY DESIGN BY FDOT CONSULTANT AGREEMENT WITH FDOT FOR THE DESIGN OF 12" AND 24" SEWER FORCE MAINS FROM KENNEDY DRIVE TO GEORGIA STREET UNDER NORTH ROOSEVELT BLVD. IN AN AMOUNT NOT TO EXCEED $175,264.15; AUTHORIZING THE CITY MANAGER AND/OR MAYOR TO EXECUTE THE AGREEMENT; PROVIDING FOR AN EFFECTIVE DATE

NOW THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, AS FOLLOWS:

Section 1: That the attached Utility Design by FDOT Consultant Agreement between the City and FDOT is approved and the City Manager and/or Mayor are authorized to execute the document.

Section 2: That this Resolution shall go into effect immediately upon its passage and adoption and authentication by the signature of the presiding officer and the Clerk of the Commission.

Passed and adopted by the City Commission at a meeting held this 5TH day of MAY, 2009.

Authenticated by the presiding officer and Clerk of the Commission on May 6, 2009.

Filed with the Clerk May 6, 2009.

MORGAN MCPHERSON, MAYOR

ATTEST:

CHERYL SMITH, CITY CLERK

GENERAL SERVICES DEPARTMENT MEMORANDUM

EXECUTIVE SUMMARY

TO: **Jim Scholl , City Manager**

FROM: **Annalise Mannix, P.E. Manager of Engineering Services and Environmental Programs**

VIA: **David Fernandez, Assistant City Manager**
Gary Bowman, General Services Director

DATE: **April 13, 2009**

RE: **Contract/Agreement for Design Services for Sewer System improvements during North Roosevelt Blvd. Reconstruction**

ACTION STATEMENT

A resolution approving a Utility Design By FDOT Consultant Agreement for the design of 12" and 24" sewer force mains under the North Roosevelt Blvd. corridor in the amount of $175,264.15, Authorizing execution of the Man-hours Estimate Proposal for $175,264.15 with APCT Engineers.

STRATEGIC PLAN INITIATIVES

The maintenance of our public infrastructure in a cost effective manner to serve the needs of our citizens and visitors is one of our seven priorities outlined in the Strategic Plan. This project attempts to improve our sidewalk and the State's roadway.

Another strategic initiative is to provide transportation and land use for all people with an efficient and pleasurable choice for arriving at one's destination. This project will make driving on the blvd by bike or car or bus more pleasurable.

BACKGROUND

The State of Florida Department of Transportation (FDOT) programmed funding to reconstruct US1 in Key West from Jose Marti Drive to, approximately, the west end of the Beachside Resort. The City is required to upgrade any utilities to ensure the utilities will not fail or need to be improved for many years. The City has sewer lines that are required to be upgraded from Kennedy Drive to Georgia Street (see attached CH2M Hill report) and so the City must make the improvements either *before* the state reconstructs the road or while the state reconstructs the road.

The State plans and all utility improvements that will be performed at the time of road reconstruction are required to be 90% complete in May 2009 and will be 100% shortly thereafter. The construction of the road is scheduled for June, 2011.

The City actually owns and is responsible for the sidewalk and seawall along North Roosevelt Blvd., the state owns the 50 foot road curb to curb. However, the state is willing to remove and reconstruct the sidewalk and seawall since they need a few feet of the sidewalk to fit the reconstructed road using 2005 roadway standards.

PURPOSE & JUSTIFICATION

City staff has determined it is in the citizen's best interest to have the state design the improvements during the road design phase (now) and build the improvements during the reconstruction project. If the City performed the design separately, poor coordination of newly designed underground pipes may occur. If sewer construction is performed ahead of the reconstruction the Citizens will have to pay for additional mobilization, maintenance of traffic costs, and concrete and asphalt repair costs that will be absorbed by the entire project if performed during the road reconstruction.

In order to have the state perform the design work the city must enter into a contract with the state (see attached) for the design work, and provide the funding for the design to the state prior to the start of the design. The total cost of the design is $175,264.15 (see the attached "Man-hours Estimate Proposal by APCT Engineers.)

At a later date the City will enter into a contract to have the state actually construct the 1.65 million dollar work. The state FDOT has agreed to take over the maintenance of the road and sidewalks and seawall after construction occurs. Currently, the City is responsible for the seawall and sidewalk maintenance.

OPTIONS

There are three options for this request. The City has the option to task the State with the design and the design will be performed by the same firm performing all the underground design on the boulevard; or task a separate firm to design it, coordinate it and place it in the state plans. A third option would be to design the project and construct it prior to the road reconstruction project.

Staff has determined that the best option for the city is to task the state with the design and construction of the project. This provides for the best coordination, with the least impact on the citizens, and the cost will be commiserate with or less than the cost to perform it otherwise.

FINANCIAL IMPACT

The total design cost for the design project will be $175,264.15. The future cost of construction is estimated to be $1,640,000. The project is currently budgeted in the 2009 Sewer budget in account 401-3503-535-65 with a $75,000 line item and $100,000 of a $200,000 line item for miscellaneous required/unexpected work.

RECOMMENDATION

Authorize execution of both agreements and the budget modifications required.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Form No. 710-010-56
UTILITIES
10/04

UTILITY DESIGN BY FDOT CONSULTANT AGREEMENT
(AT UTILITY EXPENSE)

Financial Project ID: 250548-3-56-01	**Federal Project ID:**
County: Monroe	**State Road No.: SR-5**
District Document No:	
Utility Agency/Owner (UAO): City of Key West	

THIS AGREEMENT, entered into this _____ day of_____, year of_____, by and between the **STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**, hereinafter referred to as the "**FDOT**," and _____, hereinafter referred to as the "**UAO**";

WITNESSETH:

WHEREAS, the **FDOT**, is constructing, reconstructing, or otherwise changing a portion of a public road or publicly owned rail corridor, said project being identified as Design of 12 and 24 inch sewer force from Kennedy Drive to Georgia Street, State Road No.: SR-5, hereinafter referred to as the "Project"; and

WHEREAS, the **UAO** owns or desires to install certain utility facilities which are located within the limits of the Project hereinafter referred to as the "Facilities" (said term shall be deemed to include utility facilities as the same may be relocated, adjusted, installed, or placed out of service pursuant to this Agreement); and

WHEREAS, the Project requires the location (vertically and/or horizontally), protection, relocation, installation, adjustment or removal of the Facilities, or some combination thereof, hereinafter referred to as "Utility Work"; and

WHEREAS, the **DEPARTMENT** and the UTILITY have determined that it would be to the best interest of the general public and to the economic advantage of both parties to enter into an agreement providing for the design of the Utility Work by the engineer designing the Project for the **FDOT**, hereinafter referred to as the "**FDOT Consultant**," which design of the Utility Work shall hereinafter be referred to as the "Utility Design"; and

WHEREAS, the **UAO**, pursuant to the terms and conditions hereof, will bear certain costs associated with the Utility Design;

NOW, THEREFORE, in consideration of the premises and the mutual covenants contained herein, the **FDOT** and the **UAO** hereby agree as follows:

1. Design of Utility Work

a. **FDOT Consultant** shall prepare, at the **UAO's** sole cost and expense, final engineering design, plans, other necessary related design documents, and cost estimate for the Utility Work (hereinafter referred to as the "Plans Package") more specifically described in the **FDOT's** Supplemental Agreement # _____ to Consultant _____ Design Services Contract.

b. The Plans Package shall be in the same format as the **FDOT's** contract documents for the Project.

c. The Plans Package shall include any and all activities and work effort required to perform the Utility Work, including but not limited to, all clearing and grubbing, survey work and shall include a traffic control plan.

d. The Plans Package shall be prepared in compliance with the **FDOT's** Utility Accommodation Manual and the **FDOT's** Plans Preparation Manual in effect at the time the Plans Package is prepared, and the **FDOT's** contract documents for the Project. If the **FDOT's** Plans Preparation Manual is updated and conflicts with the **FDOT's** Utility Accommodation Manual, the Utility Accommodation Manual shall apply where such conflicts exist.

e. The technical special provisions which are a part of the Plans Package shall be prepared in

accordance with the **FDOT's** guidelines on preparation of technical special provisions.

f. The **FDOT Consultant** shall provide a copy of the proposed Plans Package to the **UAO,** for review at the following stages: 10%, 50%, 90%. The **UAO** shall review the Plans Package to see that it complies with the requirements of this Agreement.

g. In the event the **UAO** finds any deficiencies in the Plans Package during the reviews performed pursuant to Subparagraph f. above, the **UAO** will notify the **FDOT** in writing of the deficiencies within the time specified in the plans review transmittal.

h. The **UAO** shall furnish the **FDOT** such information from the **UAO** files as requested by the **FDOT**.

I. The Facilities and the Utility Design will include all utility facilities of the **UAO** which are located within the limits of the Project, except as generally summarized as follows: sanitary sewer. These exceptions shall be handled by separate arrangement.

2. Cost of Design

a. The **UAO** shall be responsible for all costs of the Utility Design.

b. The **UAO** agrees that it will, at least Thirty (30) days prior to the **FDOT** issuing the Supplemental Agreement referred to in Paragraph 1 hereof, furnish the **FDOT** an advance deposit of $175,264.70 for the payment of said Utility Design. It is understood that the **FDOT's Consultant** shall not begin any Utility Design until the **FDOT** has received the above payment and that if such payment is not received on or before 6/7/09 this Agreement shall be null and void. The **FDOT** shall utilize this deposit for the payment of Utility Design. Both parties further agree that in the event the final billing pursuant to the terms of Subparagraph 2. d. below is less than the advance deposit, a refund of any excess will be made by the **FDOT** to the **UAO**. No work in excess of the advance deposit shall be done. In the event that it is subsequently determined that work in addition to that described in the Supplemental Agreement described in Paragraph 1 hereof is necessary in order to properly complete the Utility Design, the **UAO** shall make an additional deposit in the amount necessary to issue a subsequent Supplemental Agreement to the **FDOT Consultant** for the additional work.

c. The payment of funds under this Agreement will be made (choose one):

☒ directly to the **FDOT** for deposit into the State Transportation Trust Fund.

☐ as provided in the attached Memorandum of Agreement between the **UAO**, the **FDOT** and the State of Florida, Department of Financial Services, Division of Treasury. Deposits of less than $100,000.00 must be pre-approved by the Department of Financial Services and the **FDOT** Comptroller's Office prior to execution of this agreement.

d. Upon final payment to the **FDOT Consultant**, the **FDOT** intends to have its final and complete accounting of all costs incurred in connection with the Utility Design within three hundred sixty (360) days. All project cost records and accounts shall be subject to audit by a representative of the **UAO** for a period of three (3) years after final close out of the project. The **UAO** will be notified of the final cost. Both parties agree that in the event the final accounting of total project costs pursuant to the terms of this agreement is less than the total deposits to date, a refund of the excess will be made by the **FDOT** to the **UAO** in accordance with Section 215.422, Florida Statutes.

3. Default

a. In the event the **UAO** breaches any provision of this Agreement, then in addition to any other remedies which are otherwise provided for in this Agreement, the **FDOT** may exercise one or more of the following options, provided that at no time shall the **FDOT** be entitled to receive double recovery of damages:

(1) Terminate this Agreement if the breach is material and has not been cured within 60 days from written notice thereof from the **FDOT.**

(2) Pursue a claim for damages suffered by the **FDOT**.

(3) Suspend the issuance of further permits to the **UAO** for the placement of Facilities on **FDOT** property if the breach is material and has not been cured within 60 days from written notice thereof from the **FDOT** until such time as the breach is cured.

(4) Pursue any other remedies legally available.

(5) Perform any work with its own forces or through contractors and seek repayment for the cost thereof under Section 337.403(3), Florida Statutes.

b. In the event the **FDOT** breaches any provision of this Agreement, then in addition to any other remedies which are otherwise provided for in the Agreement, the **UAO** may exercise one or more of the following options:

(1) Terminate this Agreement if the breach is material and has not been cured within 60 days from written notice thereof from the **UAO**.

(2) Pursue any other remedies legally available.

c. Termination of this Agreement shall not relieve either party from any obligations it has pursuant to other agreements between the parties or from any statutory obligations that either party may have with regard to the subject matter hereof.

4. Indemnification

FOR GOVERNMENT-OWNED UTILITIES,

To the extent provided by law, the **UAO** shall indemnify, defend, and hold harmless the **FDOT** and all of its officers, agents, and employees from any claim, loss, damage, cost, charge, or expense arising out of any acts, action, error, neglect, or omission by the **UAO**, its agents, employees, or contractors during the performance of the Agreement, whether direct or indirect, and whether to any person or property to which **FDOT** or said parties may be subject, except that neither the **UAO**, its agents, employees, or contractors will be liable under this section for damages arising out of the injury or damage to persons or property directly caused by or resulting from the negligence of the **FDOT** or any of its officers, agents, or employees during the performance of this Agreement.

When the **FDOT** receives a notice of claim for damages that may have been caused by the **UAO** in the performance of services required under this Agreement, the **FDOT** will immediately forward the claim to the **UAO**. The **UAO** and the **FDOT** will evaluate the claim and report their findings to each other within fourteen (14) working days and will jointly discuss options in defending the claim. After reviewing the claim, the **FDOT** will determine whether to require the participation of the **UAO** in the defense of the claim or to require the **UAO** to defend the **FDOT** in such claim as described in this section. The **FDOT's** failure to notify the **UAO** of a claim shall not release the **UAO** from any of the requirements of this section. The **FDOT** and the **UAO** will pay their own costs for the evaluation, settlement negotiations, and trial, if any. However, if only one party participates in the defense of the claim at trial, that party is responsible for all costs.

FOR NON-GOVERNMENT-OWNED UTILITIES,

The **UAO** shall indemnify, defend, and hold harmless the **FDOT** and all of its officers, agents, and employees from any claim, loss, damage, cost, charge, or expense arising out of any acts, action, error, neglect, or omission by the **UAO**, its agents, employees, or contractors during the performance of the Agreement,

whether direct or indirect, and whether to any person or property to which **FDOT** or said parties may be subject, except that neither the **UAO**, its agents, employees, or contractors will be liable under this section for damages arising out of the injury or damage to persons or property directly caused by or resulting from the negligence of the **FDOT** or any of its officers, agents, or employees during the performance of this Agreement.

The **UAO's** obligation to indemnify, defend, and pay for the defense or at the **FDOT's** option, to participate and associate with the **FDOT** in the defense and trial of any damage claim or suit and any related settlement negotiations, shall arise within fourteen (14) days of receipt by the **UAO** of the **FDOT's** notice of claim for indemnification to the **UAO**. The notice of claim for indemnification shall be served by certified mail. The **UAO's** obligation to defend and indemnify within fourteen (14) days of such notice shall not be excused because of the **UAO's** inability to evaluate liability or because the **UAO** evaluates liability and determines the **UAO** is not liable or determines the **FDOT** is solely negligent. Only a final adjudication or judgment finding the **FDOT** solely negligent shall excuse performance of this provision by the **UAO**. The **UAO** shall pay all costs and fees related to this obligation and its enforcement by the **FDOT**. The **FDOT's** delay in notifying the **UAO** of a claim shall not release **UAO** of the above duty to defend.

5. Force Majeure

Neither the **UAO** nor the **FDOT** shall be liable to the other for any failure to perform under this Agreement to the extent such performance is prevented by an act of God, war, riots, natural catastrophe, or other event beyond the control of the non-performing party and which could not have been avoided or overcome by the exercise of due diligence; provided that the party claiming the excuse from performance has (a) promptly notified the other party of the occurrence and its estimated duration, (b) promptly remedied or mitigated the effect of the occurrence to the extent possible, and (c) resumed performance as soon as possible.

6. Miscellaneous

a. Time is of the essence in the performance of all obligations under this Agreement.

b. The **FDOT** may unilaterally cancel this Agreement for refusal by the **UAO** to allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119, Florida Statutes, and made or received by the **UAO** in conjunction with this Agreement.

c. This Agreement constitutes the complete and final expression of the parties with respect to the subject matter hereof and supersedes all prior agreements, understandings, or negotiations with respect thereto, except that the parties understand and agree that the **FDOT** has manuals and written policies and procedures which may be applicable at the time of the Project and the relocation of the Facilities.

d. This Agreement shall be governed by the laws of the State of Florida. Any provision hereof found to be unlawful or unenforceable shall be severable and shall not affect the validity of the remaining portions hereof.

e. All notices required pursuant to the terms hereof may be sent by first class United States Mail, facsimile transmission, hand delivery, or express mail and shall be deemed to have been received by the end of five business days from the proper sending thereof unless proof of prior actual receipt is provided. The **UAO** shall have a continuing obligation to notify each District of the **FDOT** of the appropriate persons for notices to be sent pursuant to this Agreement. Unless otherwise notified in writing, notices shall be sent to the following addresses:

UTILITY DESIGN BY FDOT CONSULTANT AGREEMENT
(AT UTILITY EXPENSE)

If to the **UAO**:
Gary Bowman, General Sertvices Director
PO Box 1409
Key West, FL 33041-1409

If to the **FDOT**:
Ali Togihini
1000 NW 111 Ave
Miami, FL 33172

7. Certification

This document is a printout of an **FDOT** form maintained in an electronic format and all revisions thereto by the **UAO** in the form of additions, deletions, or substitutions are reflected only in an Appendix entitled "Changes to Form Document" and no change is made in the text of the document itself. Hand notations on affected portions of this document may refer to changes reflected in the above-named Appendix but are for reference purposes only and do not change the terms of the document. By signing this document, the **UAO** hereby represents that no change has been made to the text of this document except through the terms of the appendix entitled "Changes to Form Document."

You MUST signify by selecting or checking which of the following applies:

☒ No changes have been made to this Form Document and no Appendix entitled "Changes to Form Document" is attached.
☐ No changes have been made to this Form Document, but changes are included on the attached Appendix entitled "Changes to Form Document."

IN WITNESS WHEREOF, the parties hereto have executed this Agreement effective the day and year first written.

UTILITY: City of Key West

BY: (Signature) _____ **DATE:** 5/5/09

(Typed Name: Morgan Mc Pherson)

(Typed Title: Mayor)

Recommend Approval by the District Utility Office

BY: (Signature) _____ **DATE:** _____

FDOT Legal review

BY: (Signature) _____ **DATE:** _____

District Counsel

UTILITY DESIGN BY FDOT CONSULTANT AGREEMENT
(AT UTILITY EXPENSE)

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

BY: (Signature) _____ **DATE:** _____

(Typed Name: _____)

(Typed Title: _____)

FEDERAL HIGHWAY ADMINISTRATION (if applicable)

BY: _____ **DATE:** _____

(Typed Name: _____)

(Typed Title: _____)

How to execute a Joint Project Agreement (JPA) between The Florida Department of Transportation (FDOT) and a Utility Agency/Owner (UAO) to design and build a utility work:

1- Utility Agency/Owner (UAO) sends a letter to FDOT (Antonio Soto, P.E. District Utility Engineer) requesting to enter into a JPA for a utility work.

2- FDOT prepare the "Utility Design by FDOT Consultant Agreement" and send it to the Utility Agency/Owner (UAO).

3- APCTE send a man-hour estimate for the design of the utility work to the Utility Agency/Owner (UAO) for their approval.

4- Utility Agency/Owner (UAO) signs the "Utility Design by FDOT Consultant Agreement" and send it to FDOT.

5- Utility Agency/Owner (UAO) issue a check to FDOT for the amount agreed with APCTE for the design of the utility work.

6- FDOT issues a Letter of Authorization (LOA) to APCTE to begin the design of the utility work. APCTE will submit sets of plans to FDOT and the Utility Agency/Owner (UAO) at 60%, 90% and 100% for their review. APCTE will submit Final Plans in hard copy and electronic format.

7- At 100% APCTE submits a construction cost estimate of the utility work to FDOT and the Utility Agency/Owner (UAO) for their review and to start the Construction JPA process.

8- FDOT prepares the "Utility Work by Highway Contractor Agreement" and send it to the Utility Agency / Owner (UAO).

9- Utility Agency/Owner (UAO) signs the "Utility Work by Highway Contractor Agreement" and pays FDOT the estimated cost for the utility work.

10-FDOT advertises the roadway project that includes the utility work and selects the Contractor to execute the work.

11-FDOT will manage the roadway construction, including the utility work. The Utility Agency/Owner (UAO) should inspect the utility work being done by the FDOT Contractor.

12-After the project is completed FDOT Final Estimate will check the actual cost of the utility work and reconcile the differences with the Utility Agency/Owner (UAO).

Submitted to:

CITY OF KEY WEST

MAN-HOURS ESTIMATE PROPOSAL

FOR

Proposed Force Mains along N. Roosevelt Blvd. Key West, Monroe County, Florida

FDOT FINANCIAL PROJECT ID NUMBER: 250548-3-56-01

SUBMITTED BY:

APCT ENGINEERS

04 / 09 / 2009

CITY OF KEY WEST
TECHNICAL SUPPORT CONSULTANTS
F.M. No.: 250548-3-56-01
TASK ORDER REQUEST
Proposed 12"& 24" Force Mains on N. Roosevelt Blvd.
04/09/2009

1 SCOPE OF WORK

The purpose of this scope of services is to provide consulting engineering services to the City of Key West for design, permits, preparation of technical special provisions and post design services activities related with the installation of a 12" and 24" Force Mains along N. Roosevelt Blvd., from Georgia St. to Kennedy Dr. The project description considered under this scope of services is defined in Exhibit A.

2 SCHEDULE

Design services are to be completed on or before June 15, 2010.

3 ESTIMATE OF MANHOURS

Details attached Exhibit B

4 PRELIMINARY CONSTRUCTION COSTS

Detailed attached Exhibit C.

5 DELIVERABLES

Plans, Construction Costs and Technical Special Provisions for the installation of the above mentioned force mains.

6 EXCLUSIONS

Permit Fees

7 METHOD OF COMPENSATION

The services identified shall be compensated in the form of a **LUMP SUM** of **$ 175,264.15** Should additional work become necessary in excess of the amount authorized, justification shall be provided and a separate letter of authorization will be required. Compensation will be based on progress submittals of construction documents.

8 OTHER

N/A

9 TASK MANAGERS ACCEPTANCE

PREPARED FOR A&P CONSULTING TRANSPORTATION ENGINEERS BY:

Arnelio Alfonso Jr., P.E.
Name (typed or printed)

Project Manager
Title

Signature

04/09/09
Date

REVIEWED FOR A&P CONSULTING TRANSPORTATION ENGINEERS BY:

Carlos M. Gil-Mera, P.E.
Name (typed or printed)

Principal
Title

Signature

04/09/09
Date

10 SUBMITTAL/APPROVAL

APPROVED FOR CITY OF KEY WEST BY:

Name (typed or printed)

Title

Signature

Date

EXHIBIT A

SCOPE OF SERVICES

A&P CONSULTING TRANSPORTATION ENGINEERS
10305 NW 41st Street - Suite 115 - Miami, FL 33178
(305)592-7283 / Fax(305)593-1594
www.apcte.com

Scope of Services

Proposed 12" and 24" Force Mains along SR-5 (N. Roosevelt Blvd.)
From Georgia St to Kennedy Dr.
Monroe County, Florida
FDOT FPID No.: 250548-3-56-01

Project Description:

The purpose of this project is to develop construction documents for proposed 12" and 24" force mains along N. Roosevelt Blvd. from Georgia St to Kennedy Dr.

The project includes:

- Installation of approximately 630 LF of 12" Force Main from north of MacMillan Dr. To Seventh Street. This line will replace an existing 6" Force Main

- Installation of approximately 8450 LF of 24" C-905 Force Main from Georgia St. to Kennedy Dr. This line will replace an existing 16" Force Main. Stub-outs at:
  Georgia St, with connection to the existing 16" PVC force main,
  7th St, with a 90 or a Tee
  Kennedy Dr, For future connection of Pump Station F.

- Replacing the existing 16" force main crossing Salt Run Canal by a 24" steel pipe attached to the existing bridge.

- Perform full survey along Truman Ave., from Georgia St. To Eisenhower Dr.

- Perform 3 core boring to obtain geotechnical information along Truman Ave., from from Georgia St. To Eisenhower Dr.

The project will include reconnecting all existing force mains that are currently discharging into the lines being replaced.

10305 NW 41st Street - Suite 115 - Miami, FL 33178
(305)592-7283 / Fax(305)593-1594
www.apcte.com

Services to be performed:

1- Coordination with the City of Key West in order to design the above referenced Force Mains.

2- Design Analysis, which includes preliminary pipe alignment, computation book, summary of pay items, coordination with roadway design firm and construction costs estimates.

3- Construction Plans, this task will include:

- Key Sheet
- General Notes
- Tabulation of Quantities
- Pay Item Notes
- Project Layout
- Force Main Plans and Profiles
- General Details
- Traffic Control Notes

4- Develop the Technical Special Provisions (TSP) required for the relocation of the above mentioned water mains.

5- Permits, which includes support calculations, permit applications and any other activity required to obtain permits for the above referenced water mains relocation.

6- Assisting in the preparation of JPA for design and construction to be executed between the City of Key West and FDOT.

7- Post Design Services, including Shop Drawing Review and Field visits during construction.

EXHIBIT B

SUMMARY OF FEES

ENGINEERS

ESTIMATE OF WORK EFFORT FOR SELECTION
FORCE MAIN PLANS

CONSULTANT NAME: A&P Consulting Transportation Engineers

WPI No.: N/A

FDOT Job No.: 250548-3-56-01

FAP No.: N/A

PROJECT NAME: SR 5 / North Roosevelt Blvd.

From Georgia St.

To Kennedy Dr.

DATE: 4/9/2009

ACTIVITY DESCRIPTION	SUB-ACTIVITY	STAFF HOURS		CADD* HOURS		REMARKS
		FROM	TO	FROM	TO	
A. FORCE MAIN PLANS PACKAGE	1. Design Analysis	529				
	2. Construction Plans	680				
	3. Utilities	192				
	4. Permits	64				
	5. Post Design Services	96				
TOTAL		1,561				

STAFF DISTRIBUTION	(%)	REMARKS
CHIEF ENGINEER	5	
PROJECT MANAGER	20	
PROJECT ENGINEER	20	
ENGINEER	20	
ENGINEER TECHNICIAN	30	
CLERICAL	5	
TOTAL	100	

FINANCIAL PROJECT No.: 250548-3-56-01

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ESTIMATE OF WORK EFFORT AND FEE

CONSULTANT: A&P CONSULTING TRANSPORTATION ENGINEERS CORP.

WPI NO.: N/A DESCRIPTION: SR 5 / North Roosevelt Blvd.

CONST. YR.: 2009-2010 COUNTY: MIAMI-DADE From Georgia St. To Kennedy Dr.

		MANHOURS										
CLASSIFICATION:	WORK %	WATER MAIN PLANS	ELEMENTS							TOTAL WORK EFFORT	AVERAGE HOURLY RATE	ESIMATED COST
CHIEF ENGINEER	5	78								78	$64.87	$5,059.86
PROJECT MANAGER	20	312								312	$54.13	$16,888.56
PROJECT ENGINEER	20	312								312	$45.68	$14,252.16
ENGINEER	20	312								312	$29.90	$9,328.80
ENGINEER TECHNICIAN	30	468								468	$25.99	$12,163.32
CLERICAL	5	78								78	$20.00	$1,560.00
TOTALS	100	1,561								1,560	$37.98	$59,252.70

TASK TOTALS FROM TASK LIST SHEETS

DATE OF ESTIMATE:
4/9/09

If revised estimate, give reasins for revisions:

ESTIMATOR & TITLE:
Arnelio Alfonso, P.E., Senior Project Manager

TOTAL CONTRACT FEE COMPUTATIONS

(a)	**Total Unloaded Salary**	$59,252.70
(b)	162.13 % Total Overhead [1]	$96,066.40
(c)	27.0 % Operating Margin [2]	$15,998.23
(d)	0.131 % FCCM [3]	$77.62
(e)	6.53 % Direct Expenses [4]	$3,869.20
	TOTAL CONTRACT AMOUNT (LUMP SUM)	**$175,264.15**

Notes:

(1) Total Overhead (General) = % * Unloaded Salary

(2) Operating Margin = % * Unloaded Salary

(3) Facilities Capital Cost of Money (FCC) = % * Unloaded Salary

(4) Direct Reimbursables (Out-of-Pocket) = % of Unloaded Salary

SR 5 / North Roosevelt Blvd.
FINANCIAL PROJECT No.: 250548-3-56-01
Force Main Plans

ACTIVITY: **A. (WATER MAIN PLANS)**

SUBACTIVITY: **1. (Design Analysis)**

SUBACTIVITY	BASIS OF ESTIMATE	NO. OF UNITS	HOURS/ UNIT	NO. OF SHEETS	TOTAL HOURS	CADD HOURS	REMARKS
1. Pipe Line Alignment	L.S.	1	40		40		
2. Structural Analysis	L.S.	1	32		32		
3. Canal Crossing	L.S.	1	32		32		
4. Field Survey & Service Location	L.S.	1	40		40		
5. Contract File (set-up and maintenance)	L.S.	1	12		12		
6. Computation Book and Quantities	L.S.	1	24		24		
7. C.E.S. / Summary of Pay Items	L.S.	1	24		24		
8. Special Provisions / Specifications	L.S.	1	32		32		
9. Prepare Construction Cost Estimate	L.S.	1	32		32		
10. Traffic Control Analysis	L.S.	1	72		72		
11. Design Coordination Meetings	L.S.	1	24		24		
12. Survey of Truman Ave.	L.S.	1	80		80		From Georgia St to Eisenhower Dr
13. Geotechnical Study	L.S.	1	60		60		Based on 3 core borings
SUBACTIVITY SUBTOTAL					504		
12. Quality Assurance / Quality Control	5%				25		
13. Attend FDOT Field Reviews Meeting	EA	1					
SUBACTIVITY TOTAL					**529**		

SR 5 / North Roosevelt Blvd.
FINANCIAL PROJECT No.: 250548-3-56-01
Force Main Plans

ACTIVITY: **A. (WATER MAIN PLANS)**

SUBACTIVITY: **2. (Construction Plans)**

SUBACTIVITY	BASIS OF ESTIMATE	NO. OF UNITS	HOURS/ UNIT	NO. OF SHEETS	TOTAL HOURS	CADD HOURS	REMARKS
1. Key Sheet	Sheet	1	8	1	8		
2. Summary of Pay Items	Sheet	1	8	1	8		
3. General Notes	Sheet	1	8	1	8		
4. Tabulation of Quantities and Pay Item Notes	Sheet	2	12	2	24		
5. Proposed General Plan of Force Main	Sheet	2	8	2	16		
6. Proposed Plan/Profile Sheets	Sheet	18	18	18	324		
7. Laterals Plan/Profile Sheets	Sheets	4	12	8	48		
8. Canal Crosing Details	Sheet	2	12	2	24		
9. Structural Plans and Details	Sheet	3	12	3	36		
10. Structural Details	Sheet						
11. Notes & Details	Sheet	1	8	1	8		
12. Pavement and Base Restoration/ General Notes and Details	Sheet	1	4	1	4		
13. Core Boring Reports	Sheet	4	4	4	16		
14. Traffic Control Notes	Sheet	1	4	1	4		
15. Traffic Control Plan	Sheet	8	12	8	96		Based on 2 phases
16. Phase Review Meetings	LS	3	8		24		
SUBACTIVITY SUBTOTAL					648		
17. Quality Assurance / Quality Control	5%				32		
SUBACTIVITY TOTAL				53	**680**		

SR 5 / North Roosevelt Blvd.
FINANCIAL PROJECT No.: 250548-3-56-01
Force Main Plans

ACTIVITY: **A. (WATER MAIN PLANS)**

SUBACTIVITY: **3. (Utilities)**

SUBACTIVITY	BASIS OF ESTIMATE	NO. OF UNITS	HOURS/ UNIT	NO. OF SHEETS	TOTAL HOURS	CADD HOURS	REMARKS
1. Initial Contact	L.S.	8	1		8		
2. Transfer Existing Utilities to Plan/ Profile	EA	8	12		96		
3. Coordination with Utility Companies	L.S.	8	2		16		
4. Soft Digs	L.S.	1	48		48		
SUBACTIVITY SUBTOTAL					168		
5. Quality Control	5%				8		
6. Utility Meetings	EA	8	2		16		
SUBACTIVITY TOTAL					**192**		

SR 5 / North Roosevelt Blvd.
FINANCIAL PROJECT No.: 250548-3-56-01
Force Main Plans

ACTIVITY: **A. (WATER MAIN PLANS)**

SUBACTIVITY: **4. (Permits & JPA Documents)**

SUBACTIVITY	BASIS OF ESTIMATE	NO. OF UNITS	HOURS/ UNIT	NO. OF SHEETS	TOTAL HOURS	CADD HOURS	REMARKS
1. Prepare Permit Applications	L.S.	1	24		24		
2. Coordination and RFI with Permitting Agencies	L.S.	1	24		24		
3. Permit Fees	L.S.						Not included in this contract
4. JPA Documents for Design and Construction	L.S.	1	16		16		
SUBACTIVITY TOTAL					64		

SR 5 / North Roosevelt Blvd.
FINANCIAL PROJECT No.: 250548-3-56-01
Force Main Plans

ACTIVITY: **A. (WATER MAIN PLANS)**

SUBACTIVITY: **5. (Post Design Services)**

SUBACTIVITY	BASIS OF ESTIMATE	NO. OF UNITS	HOURS/ UNIT	NO. OF SHEETS	TOTAL HOURS	CADD HOURS	REMARKS
1. Pre Bid Conference	EA	1	8		8		
2. Shop Drawings Review	L.S.	1	32		32		
3. Construction Site Visits	L.S.	4	8		32		
4. Response for Information	EA	12	2		24		
SUBACTIVITY TOTAL					96		

EXHIBIT C

PRELIMINARY CONSTRUCTION COSTS

A&P CONSULTING TRANSPORTATION ENGINEERS
10305 NW 41ST STREET - SUITE 115 - MIAMI, FL 33178
(305)592-7283 / FAX(305)593-1594
www.apcte.com

4/9/2009

PRELIMINARY CONSTRUCTION COST ESTIMATE

Proposed 12 and 24 inches Force Mains along SR 5 (N. Roosevelt Blvd.), From Georgia St. to Kennedy Dr.
Financial Project No. 250548-3-56-01
City of Key West

ITEM	DESCRIPTION	UNIT	UNIT PRICE	QUANTITY	TOTAL
1	Install 24" PVC Pipe and Fittings.	LF	$68.00	8,448.00	$574,464.00
2	Furnish 24" PVC Pipe and Fittings.	LF	$42.00	8,448.00	$354,816.00
3	Install 12" PVC Pipe, Fittings and Valves.	LF	$70.00	630.00	$44,100.00
4	Furnish 12" PVC Pipe, Fittings and Valves.	LF	$35.00	630.00	$22,050.00
5	Install 24" Plug Valves complete, w/rise pipe and valve box.	EA	$4,200.00	4.00	$16,800.00
6	Furnish 24" Plug Valves complete, w/rise pipe and valve box.	EA	$4,500.00	4.00	$18,000.00
7	Install 24" Steel Pipe on Bridge over Salt Run Canal	LF	$450.00	200.00	$90,000.00
8	Make connection to exist. F.M. at Several Locations	EA	$4,500.00	6.00	$27,000.00
9	Furnish & Install Air Release Valve assembly complete.	EA	$2,500.00	10.00	$25,000.00
10	Install M.J. Tapping Sleeves and Tapping Valves (Several Diameters)	EA	$6,500.00	4.00	$26,000.00
11	Furnish M.J. Tapping Sleeves and Tapping Valves (Several Diameters)	EA	$4,500.00	4.00	$18,000.00
12	Remove Valve Boxes and riser pipe on mains to be placed out of service to 2' below finish grade.	EA	$300.00	15.00	$4,500.00
	Total				**$1,220,730.00**
13	Maintenance of Traffic [M.O.T.] (10%)	LS	$122,073.00	1	$122,073.00
14	Mobilization (10%)	LS	$122,073.00	1	$122,073.00
	Total Estimated Construction Cost				**$1,464,876.00**
15	Contingency Fund (10%)	LS	$146,487.60	1	$146,487.60
16	Const. Engineering Administration [C.E.A.] (2%)				$29,297.52
	UTILITY WORK GRAND TOTAL				**$1,640,661.12**

TECHNICAL MEMORANDUM **CH2MHILL**

Sigsbee Force Main Upgrade Evaluation

PREPARED FOR:	David Fernandez/City of Key West
PREPARED BY:	CH2M HILL
COPIES:	Gary Bowman/City Key West
DATE:	March 30, 2009
PROJECT NUMBER:	386838.AA.01

The memo is organized as follows:

- Introduction
- Method of Evaluation
- Pumping Scenarios
- Design Criteria and Assumptions
- Model Results
- Cost Estimate
- Summary and Recommendations

Introduction

The Florida Department of Transportation (FDOT) is planning road improvements to North Roosevelt Boulevard as part of their 5 year capital improvement plan. FDOT has requested that all local agencies provide information on their utilities under the existing road.

The City of Key West (CITY) is planning on utilizing this opportunity to potentially increase conveyance capacity to the Richard A. Heyman Environmental Protection Facility (WWTP). The goal is to have pump stations pump more directly to the treatment plant and eliminate the present operation in which some pump stations lift the sewer flow to gravity systems that ultimately go to Pump Station D.

The purpose of this technical memorandum (TM) is to evaluate the different options for increasing the existing Sigsbee force main to increase flow to the WWTP. Three alternatives were considered. These options are as follows:

1. Increasing the Sigsbee force main to 24-inch pipe from the intersection of Roosevelt and Kennedy to the intersection of Fleming and White.
2. Diverting flow from Pump Station "F" to Sigsbee and increasing the Sigsbee force main size.
3. Diverting flow from Pump Station "D" and "DA" to the abandoned 30-inch Primary Effluent outfall pipeline (PE), increasing the Sigsbee force main size, and diverting flow from Pump Station "F" to Sigsbee.

Currently, the Sigsbee force main consists of segments of 12-inch ductile iron pipe (DIP) and 16-inch C905 polyvinyl chloride (PVC) pipe, and 16-inch steel pipe along the Salt Run Bridge. The Sigsbee force main currently receives sanitary sewerage from the Sigsbee pump station and Pump Stations S and Q which is conveyed to the existing 30-inch raw sewage force main (RS). In addition to the Sigsbee force main, the existing 30-inch RS line receives sanitary sewerage from Pump Stations A, B, C, D and DA where all flows discharge at the Richard A. Heyman Wastewater Treatment Plant.

Pump Station "F" currently pumps into a manhole which flows by gravity into Pump Station "E", where it flows by gravity to Pump Station "D" which pumps the sanitary sewer to the 30-inch RS. An overall schematic map showing the locations of the pump stations that tie to the 30-inch RS is shown in Exhibit 1.

Methods of Evaluation

Hydraulic modeling was performed using the AFT Fathom version 7.0. The hydraulic model was prepared using available drawings and pump information. Flows by gravity to individual manholes were not modeled. The modeled sewer system consists of the following pump stations: A, B, C, D, DA, S, Sigsbee, and Q. Pump Station F currently pumps into the gravity system for Pump Station E, which pumps into the gravity system for Pump Station D. However, Pump Station F was included in some of the model simulations because it is required in some of the upgrade alternatives.

Data for all pump stations including, wetwell elevations, on/off pumping elevations and actual discharge piping sizes were used to model the respective pumping stations. Wet well dimensions and pump curves were not available for Pump Station "Q". It was assumed that the elevations were comparable in depth to Pump Station S. A pump curve was assumed for Pump Station "Q" and was based on the information from the completed hydraulic analysis (See technical memorandum, Preliminary Engineering to Resolve Pump Station D Peak Flow Issues, dated December 20, 2006). Where Pump Station "F" was used in the model, a fixed flow rate of 2750 gpm was used because the existing pumps are not capable of handling the new design pressures. For these alternatives the pumps would need to be replaced.

An elevation of 20.85 feet centerline was used as a local high point, representing the bridge to Fleming Key, to which the 30-inch force main is attached. The force main distances and pipe sizes for the Sigsbee force main were determined from the Contract Drawings for the City of Key West Wastewater Improvements titled "Sigsbee Force Main Navy Points of Connection, Pump Station B Force Main, and Patterson Avenue Street and Drainage Improvements".

Pumping Scenarios

Three options were evaluated to increase flow to the WWTP by upsizing the existing Sigsbee force main. The three options are as follows:

Option 1 - This option entails the replacement of the existing Sigsbee force main with 24-inch C905 PVC pipe. Any replacement of the pipe on the bridge will be steel pipe. This option has three alternatives:

a. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Roosevelt and 7th
b. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Truman and Georgia, abandoning the existing 16-inch section of the existing Sigsbee force main.
c. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Fleming and White, abandoning the existing 16-inch section of the existing Sigsbee force main. (Connect to existing 30-inch RS to plant)

Option 2 - This option diverts flow directly from Pump Station "F" to the Sigsbee force main and also incorporates the improvements in Option 1. The three improvements alternatives for this option are:

a. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Roosevelt and 7th with Pump Station "F" diverted to Sigsbee.
b. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Truman and Georgia with Pump Station "F" diverted to Sigsbee.
c. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Fleming and White (Connect to existing 30-inch RS to plant) with Pump Station "F" diverted to Sigsbee.

To tie Pump Station "F" into the Sigsbee force main, the discharge pipe from Pump Station "F" would be routed along Kennedy Drive and would tie in to the new 24-inch Sigsbee force main at the intersection of Kennedy Drive and North Roosevelt Blvd.

Option 3 - This option removes flow from the existing 30-inch RS by taking the flows from Pump Station "D" and "DA" to the abandoned 30-inch PE pipeline. This option also includes the improvements made in Options 1 and 2, where the Sigsbee force main is replaced with 24-inch pipe and Pump Station F is diverted to the Sigsbee force main. The different improvement alternatives for this are:

a. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Roosevelt and 7th with Pump Station F diverted to Sigsbee with Pump Station "D" and "DA" to 30-inch outfall.
b. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Truman and Georgia with Pump Station F diverted to Sigsbee with Pump Station "D" and "DA" to 30-inch outfall.
c. Replace Sigsbee with 24-inch from Roosevelt and Kennedy to Fleming and White (Connect to existing 30-inch RS to plant) with Pump Station F diverted to Sigsbee with Pump Station "D" and "DA" to 30-inch PE.

Current Configuration - A simulation was run for the existing sewer system configuration.

A map showing the locations of the three upgrade options is provided as Exhibit 2.

Simulations were also run for Option 2c and 3c with fixed flow rates for Pump Stations S, Sigsbee, and Q. The design flow rates used are listed below. The flows for Pump Stations F, S, and Sigsbee are based on the original design flow rates as provided on existing pump curves. The design flow rate for Pump Station "Q" was assumed.

Pump Station "S" 120 gpm

Pump Station "Q" 120 gpm

Pump Station Sigsbee 900 gpm

Pumping simulations were run for each of the options provided above. Additionally, each of the options was run for two different pumping scenarios:

- All spare pumps off at each pump station
- All pumps on at each pump station

Design Criteria and Assumptions

The minimum and maximum surface elevations for all pump stations and the WWTP headworks are provided in Table 1. Surface water elevations at the pump wetwells were obtained from existing drawings and various tables. The surface elevations at the headworks were obtained from the existing hydraulic profile for the WWTP as provided in the Contract Drawings for the City of Key West Wastewater Treatment Plant, May 1986. The maximum and minimum surface water elevation at the headworks is based on a maximum month average flow of 10 mgd and an average day flow of 7.20 mgd, respectively. With the increase in flow to the plant the surface water elevations at the headworks may change.

Table 1 Pump Stations Surface Water Elevations

Location	Minimum Elevation (ft)	Maximum Elevation (ft)
Pump Station A"	-15.4	-6.00
Pump Station "B"	-13.0	-7.0
Pump Station "C"	-17.5	-11.5
Pump Station "D"	-14.60	-6.85
Pump Station "DA"	-14.50	-11.90
Pump Station F	-12.82	-7.32
Pump Station S	-7.0	-5.1
Pump Station Sigsbee	-4.17	-0.75

Pump Station Q[1]	-7.0	
Headworks	23.88	24.67

1) The values obtained for this pump stations were assumed and was obtained from the completed hydraulic analysis (See technical memorandum, Preliminary Engineering to Resolve Pump Station D Peak Flow Issues, dated December 20, 2006). No data is available for the maximum surface elevations at this station.

The following assumptions were made:

- The 30-inch line from Pump Station "A" to the WWTP is High Density Polyethylene (HDPE) pipe. HDPE pipe is modeled as HDPE, Class SDR 11 (160 pounds per square inches (psi)) (Iron Pipe Size).
- All ductile iron pipes were model as Class 53.
- Steel pipe was model as schedule 40.
- Models were run with all pump station wetwell elevations at the maximum water surface elevation with exception of Pump Stations F, S, and Sigsbee. Maximum surface water elevation is at the high water alarm. Pump Stations F, S, and Sigsbee were modeled with wetwell level at minimum water surface elevation which occurs when all pumps are off.
- The flow from businesses located along Roosevelt that currently discharge in to the Sigsbee force main is negligible.

Model Results

Tables 2 and 3 present the results of the simulations run for the three upgrade options and their alternatives. The flows from each of the pump stations are summarized and the total flow to the WWTP is calculated. Table 2 shows the flows when the spare pump at each pump station is off. For duplex pump stations, one pump is in operation, and for triplex stations, two pumps are in operation.

Table 3 shows the flows when all pumps at each pump station are in operation. By modeling all pumps in the system running, it determines the full capacity of each station. However, the spare pumps at these stations do not normally run.

Current Network Configuration

For this simulation Pump Stations A, B, C, D, DA, S, Sigsbee, and Q are all pumping into the 30-inch RS. Pump Station F is pumping into the gravity system. From the modeling results shown in Table 2, the total flow to the WWTP is 12,353 gpm (17.8 million gallons per day (mgd)) when all spare pumps are off. When all pumps are on at all pump stations the total flow to the WWTP is approximately 14,892 gpm (21.4 mgd). The current configurations show that flows at Pump Stations S and Q are higher than the design flow rates when the spare pumps are off. However, when all

pumps are on the flow rates from each of these pumps are significantly below the design flow rates.

The results of this model run shows that Pump Station "Q" cannot operate under the current condition.

Option 1:

This scenario replaces sections of the Sigsbee force main with 24-inch pipe. Tables 2 and 3 show that the total flow to the WWTP for Options 1a, 1b, and 1c does not change significantly from the total flow in the current configuration. The increase in flow is less than 100 gpm. For Options 1b and 1c the total flow to the WWTP is approximately the same for when all spare pumps are off or when all pumps are on.

This option was also run leaving the existing 16-inch steel section of pipe over the Salt Run Bridge. The change in flow for each model run is negligible.

Pump Station "Q" does not operate under any of these conditions.

Option 2:

This scenario diverts flow from Pump Station "F" to the Sigsbee force main as well as replaces sections of the Sigsbee force main with 24-inch pipe. Tables 2 and 3 show that replacing the Sigsbee force main while diverting flow from Pump Station "F" produces a significant increase of flow to the WWTP. The flow increases as more segments of the Sigsbee force main are increased in size. The total flow to the plant for Option 2c is approximately 13,319 gpm (19.2 mgd) when all spare pumps are off. This increases the flow by approximately 1,562 gpm (2.3 mgd). When all pumps are on at the pump stations the flow increases by approximately 4,400 gpm (6.3 mgd).

For Option 2a, Pump Station "S" does not operate when all spare pumps are off. This is due to the increased pressure in the Sigsbee force main as a result of the diverted flow from Pump Station "F". In addition, flows from the Sigsbee Pump Station are highly reduced. The pump is very close to the shut off head. When the Sigsbee force main is completely replaced (Option 2c), Pump Stations "S" and Sigsbee are capable of handling the flows and pressures.

When all pumps are on, Pump Stations "S" and Sigsbee cannot operate for all options. Although Table 3 shows flows at Pump Station Sigsbee for Options 2b and 2c, the flows are very low and are near the shut off of the pump.

Based on the results of this scenario, the pumps at Pump Station "S" and Sigsbee would need to be replaced by larger head pumps if all pumps are to be operated at the same time and if some portions of the Sigsbee force main are not increased.

Option 2c was also run leaving the existing 16-inch steel section of pipe over the Salt Run Bridge. The change in flow for this model run is negligible.

Pump Station "Q" also does not operate under any of Option 2 conditions.

Option 3:

For this scenario, improvements in Option 1 and 2 are incorporated, and flow from Pump Stations "D" and "DA" are diverted to the 30-inch PE. The results from Tables 2 and 3 show that the total flow to the WWTP is much smaller, however approximately 7,400 gpm (10 mgd) is being conveyed to the WWTP via the 30-inch PE from Pump Stations "D" and "DA" when all spare pumps are off and approximately 8,600 gpm (12.4 mgd) when all pumps are on. For Option 3c, the total flow being conveyed to the plant is therefore, approximately 16,709 gpm (24.1 mgd) with spare pumps off and 21,738 gpm (31.3 mgd) when all pumps in both systems are on.

For Option 3a, Pump Station "S" pumps 15 gpm when all spare pumps are off which is approximately at the shut of the pump. Pump Station 'S" does not operate for Options 3a when all pumps are on. For Option 3b, Pump Station Sigsbee operates near the shut off of the pumps.

When all upgrades are incorporated the pumps are capable of handling the flows, therefore the existing pumps at the Sigsbee Pump Station and Pump Station "S" do not have to be replaced.

Option 3c was also run leaving the existing 16-inch steel section of pipe over the Salt Run Bridge. The change in flow for this model run is negligible.

Pump Station "Q" does not operate under these conditions.

Table 2
SPARE PUMPS OFF AT EACH PUMP STATIONS (gpm)

	CURRENT NETWORK CONFIGURATION	OPTION 1			OPTION 2			OPTION 3		
		a	b	c	a	b	c	a	b	c
P/S "A"	0	X	X	X	X	X	X	X	X	X
P/S "A"	1991	1,970	1,968	1,967	1,917	1,901	1,894	2,095	2,077	2,071
P/S "B"	0	0	0	0	0	0	0	0	0	0
P/S "B"	955	903	897	895	771	732	715	1,198	1,156	1,142
P/S "C"	1667	1,527	1,516	1,512	1,251	1,169	1,133	2,135	2,054	2,026
P/S "C"	0	X	X	X	X	X	X	X	X	X
P/S "D"	0	X	X	X	X	X	X	X	X	X
P/S "D" No. 2	2669	2,533	2,529	2,527	2,407	2,371	2,355	0	0	0
P/S "D" No. 3	2659	2,524	2,520	2,519	2,399	2,363	2,347	0	0	0
P/S "DA"	0	X	X	X	X	X	X	X	X	X
P/S "DA"	1238	1,170	1,170	1,169	1,145	1,137	1,134	0	0	0
P/S "Q"*	0	X	X	X	X	X	X	X	X	X
P/S "Q"*	0	0	0	0	0	0	0	0	0	0
P/S "S"	0	X	X	X	X	X	X	X	X	X
P/S "S"	206	194	219	227	0	95	159	0	184	248
P/S F	-	-	-	-	0	0	0	0	0	0
P/S F	-	-	-	-	2,750	2,750	2,750	2,750	2,750	2,750
P/S Sigsbee	0	X	X	X	X	X	X	X	X	X
P/S Sigsbee	969	951	1,011	1,030	245	671	832	443	897	1,046
Total (gpm)	12,353	11,772	11,829	11,846	12,885	13,189	13,319	8,620	9,118	9,283
Total (MGD)	17.8	17.0	17.0	17.1	18.6	19.0	19.2	12.4	13.1	13.4

X - Spare pump is off
- Pump not included in simulation
gpm - gallons per minute
** Flow and pump station information is assumed.*

Table 3
ALL PUMPS ON AT EACH PUMP STATION

	CURRENT NETWORK CONFIGURATION	OPTION 1			OPTION 2			OPTION 3		
		a	b	c	a	b	c	a	b	c
P/S "A"	1,823	1,797	1,793	1,792	1,694	1,694	1,680	1,865	1,855	1,835
P/S "A"	1,825	1,799	1,795	1,794	1,696	1,696	1,682	1,867	1,857	1,838
P/S "B"	566	514	506	503	275	274	240	660	639	597
P/S "B"	566	514	506	503	275	274	240	660	639	597
P/S "C"	821	712	697	691	217	216	131	996	959	884
P/S "C"	818	710	695	689	217	216	131	991	955	881
P/S "D"	1,816	1,705	1,699	1,696	1,515	1,515	1,489	0	0	0
P/S "D" No. 2	1,816	1,705	1,698	1,696	1,515	1,515	1,489	0	0	0
P/S "D" No. 3	1,861	1,746	1,739	1,736	1,547	1,547	1,520	0	0	0
P/S "DA"	816	759	758	758	734	733	730	0	0	0
P/S "DA"	813	756	755	755	731	731	728	0	0	0
P/S "Q"*	0	0	0	0	0	0	0	0	0	0
P/S "Q"*	0	0	0	0	0	0	0	0	0	0
P/S "S"	88	80	101	108	0	0	0	0	0	64
P/S "S"	89	80	102	109	0	0	0	0	0	65
P/S F[1]	-	-	-	-	2,750	2,750	2,750	2,750	2,750	2,750
P/S F[1]	-	-	-	-	2,750	2,750	2,750	2,750	2,750	2,750
P/S Sigsbee	599	587	645	666	0	4	301	0	176	461
P/S Sigsbee	576	564	618	637	0	4	295	0	174	448
Total (gpm)	14,892	14,027	14,107	14,132	15,915	15,921	16,155	12,538	12,754	13,169
Total (MGD)	21.4	20.2	20.3	20.3	22.9	22.9	23.3	18.1	18.4	19.0

- Pump not included in simulation
gpm - gallons per minute
**Flow and pump station information is assumed.*
1 Total flow will be lower when pump curves are incorporated. Actual flows will be determined when pumps are selected.

Cost Estimate

Order of magnitude cost estimates for Option 1a-c are being provided to allow coordination with the proposed North Roosevelt Blvd road improvements. This cost estimate includes the following assumptions;

- The Sigsbee force main increases to 24" at the intersection of Kennedy and N Roosevelt Blvd.
- 24"x 12" Tee at Kennedy and Roosevelt will be utilized to connect the existing Sigsbee force main.
- Up to seven tapping sleeves and valves for individual connections along Roosevelt,
- The new 24" pipe will be mounted on Salt Run bridge same as the current 16" pipe,
- All pipe will be PVC C905, Salt Run Bridge crossing to be Ductile Iron pipe.
- No costs are included for pumps and force main for PS "F"
- No costs are included for potential increases or decreases to other system pump station.

The order of magnitude capital construction costs are based on (+50%/-30%) estimates and includes 10% for Engineering and 8% for Services During Construction and are shown in Table 4 below.

Table 4
Capital Cost Estimates

	+50%	avg	-30%
Option 1a	$1,209,000	$806,000	$564,000
Option 1b	$1,928,000	$1,285,000	$900,000
Option 1c	$2,736,000	$1,824,000	$1,277,000

Detailed capital cost estimate information is included as an attachment to this Technical memo.

Summary and Recommendations

Options 1a, b and c will provide the City with minimal increase in flow to the WWTP, however the increase in pipe size is required if the City plans on implementing options 2 or 3.

Options 2a, b and c provide additional flow to the WWTP by connecting flow from PS F (2750 gpm) directly to the 30" RS line. However, by connecting PS F to the system, other pump stations in the system will experience reductions in flow. Because of this we do not feel this option is in the best interest of the City.

Options 3a, b and c provide the City with increased flow to the WWTP and have minimal impacts to the existing pump stations. In all options existing pump stations A, B, C flows increase. Additionally pump stations D and DA flows will increase due to being placed on a separate pipeline (30" PE). Pump stations S and Sigsbee experience significant reductions of flow in 3a and minor reductions in flow in option 3b. Option 3c provides the most flow to the WWTP and allows all existing pump stations to operate at or above the current flow conditions. Pump station Q does not operate under any option.

In addition to system flows, the other consideration that needs to be addressed is velocity. For wastewater systems, the pipeline velocity should be between 2 ft/s and 6 ft/s. Minimum of 2ft/s is for scouring, which would not allow settling of solids in the pipeline and maximum of 6 ft/s for lower headloss as well as to eliminate erosion of the pipe.

Our recommendation is based on sending the most flow to the WWTP in the most cost efficient manner. We believe that option 3b would match this goal.

The velocity in the existing 16" pipeline between Georgia Street and connection to the 30"RS will be 6.2 ft/s when spare pumps are off. This is acceptable. As with all options, when all pumps are on the velocities in the pipe are as high as 9 to 10 ft/s. However, for this option the pumps at Pump Station "F" will have to be replaced with larger pumps and the discharge piping replaced as well. Based on the new calculated total discharge head, the pumps could have motors of approximately 100 to 160 hp and a 16" force main would need to be installed. Flows from the Sigsbee Pump Station and Pump Station "S" meet or are a little higher than the design flows required. Therefore the pumps at these pump stations do not have to be increased.

Table 5 shows the new total dynamic heads required if the current design flows at Pump Stations "Q", "S", F, and Sigsbee are to be maintained for Option 3b when all spare pumps are off. Information for Pump Station "Q" will need to be obtained and compared against the assumptions based in the model.

It should be noted that the surface water elevations at the wetwells for Pump Stations "S" and Sigsbee were modeled at the minimum elevation. This means that the flows produced by these pumps may be higher which may result in the pumps running off their curves. If too high flows are obtained cavitation may also be a problem. This should be further investigated. Pumps with lower heads may be required.

Table 5
New Total Discharge Heads

	Vol. Flow (gal/min)	Existing dH (feet)	New dH (feet)
P/S "S"	120	90	65.3
P/S F	2,750	26	90.2
P/S Sigsbee	900	91	79.4
P/S "Q"*	120		53.9

* Assumed

Table 6 summarizes the results of the modeled options showing the total and increased flows to the WWTP as compared to the existing flow to the plant.

Prior to final design, it is strongly recommended that the model be calibrated against the current actual operating conditions to verify that the flows simulated and assumptions made are comparable to that which occurs in the field.

Table 6 Summary of Total Flow to WWTP and Increase in Flows

	CURRENT NETWORK CONFIGURATION	OPTION 1			OPTION 2			OPTION 3		
		a	b	c	a	b	c	a	b	c
Spare Pumps Off										
Total Flow to WWTP via RS (gpm)	11,755	11,772	11,829	11,846	12,885	13,189	13,319	8,620	9,118	9,283
Total Flow to WWTP via PE (gpm)[1]	0	0	0	0	0	0	0	7,426	7,426	7,426
Total Flow to WWTP (gpm)[1]	11,755	11,772	11,829	11,846	12,885	13,189	13,319	16,046	16,544	16,709
Total Flow to WWTP (mgd)[1]	16.9	17.0	17.0	17.1	18.6	19.0	19.2	23.1	23.8	24.1
Additional Flow to WWTP (gpm)		16	74	91	1,130	1,434	1,564	4,291	4,789	4,953
Additional Flow to WWTP (mgd)		0.0	0.1	0.1	1.6	2.1	2.3	6.2	6.9	7.1
All Pumps On										
Total Flow to WWTP via RS (gpm)	14,002	14,027	14,107	14,132	15,915	15,921	16,155	12,538	12,754	13,169
Total Flow to WWTP via PE (gpm)	0	0	0	0	0	0	0	8568.5	8568.5	8568.5
Total Flow to WWTP (gpm)[1]	14,002	14,027	14,107	14,132	15,915	15,921	16,155	21,106	21,323	21,738
Total Flow to WWTP (mgd)[1]	20.2	20.2	20.3	20.3	22.9	22.9	23.3	30.4	30.7	31.3
Additional Flow to WWTP (gpm)		2,272	2,352	2,377	4,160	4,166	4,400	9,351	9,568	9,983
Additional Flow to WWTP (mgd)		3.3	3.4	3.4	6.0	6.0	6.3	13.5	13.8	14.4

1. Flow to 30-inch PE

1. Flows will be a little lower when the curves are incorporated into the model.

EXHIBITS

DETAILED CAPITAL COST ESTIMATE

Sigsbee Force Main Replacement
Opinion of Probable Cost +50%/-30%

25-Mar-09

OPTIONS	Subtotal	Contingency 20%	Subtotal	Escalation 8%	Key West Factor 20%	Subtotal	Engineering 10% *	SDC 8%	Total	Total (-30%)	Total (+50%)
Option 1 A	$ 439,000	$ 87,800	$526,800	$42,144	$113,789	**$682,733**	$68,273	$54,619	**$806,000**	**$564,000**	**$1,209,000**
Option 1 B	$ 700,000	$ 140,000	$840,000	$67,200	$181,440	**$1,088,640**	$108,864	$87,091	**$1,285,000**	**$900,000**	**$1,928,000**
Option 1 C	$ 994,000	$ 198,800	$1,192,800	$95,424	$257,645	**$1,545,869**	$154,587	$123,670	**$1,824,000**	**$1,277,000**	**$2,736,000**

Estimate includes

Option 1A: $30,000 Conflict Resolution Allowance
$50,000 Bypass Pumping at Bridge

Option 1B: $30,000 additional Conflict Resolution Allowance
800 LF x12' asphalt @ $25/SY

Option 1C: $50,000 additional Conflict Resolution Allowance
2625 LFx12' asphalt additional
connection to 30" outfall

* Engineering estimates do not include Surveying, Geotech, easements or permitting services

Facility	Proc/Systm	Description	Takeoff Quantity	Total Unit Price	Total Amount	Grand Total
W993		Option 1 A				
	16" Connection	16" Connection	2.00 EA	146.49 /EA	293	377
	4" Lateral	4" Lateral	105.00 LF	175.53 /LF	18,430	23,376
	Bridge Crossing	Bridge Crossing	874.00 LF	164.77 /LF	144,006	184,883
	Bypass Pumping Allow	Bypass Pumping Allowance	1.00 LS	50,000.00 /LS	50,000	62,277
	Conflict Resolution	Conflict Resolution Allowance	1.00 LS	30,000.00 /LS	30,000	37,366
	Pipe C905	Pipe C905 PVC	2,067.00 LF	49.21 /LF	101,720	130,955
		W993 Option 1 A	2,067.00 LF	166.64 /LF	344,449	439,235

Estimate Totals

Description	Amount	Totals	Rate
Construction Total	439,236	439,236	

Facility	Proc/Systm	Description	Takeoff Quantity	Total Unit Price	Total Amount
W993		Option 1 A			
	16" Connection	16" Connection			
		PVC C-905 45 bend 24	4.00 ea	60.46 /ea	242
		PVC C-900 Reducer 24 x 16	2.00 ea	67.65 /ea	135
		16" Connection 16" Connection	**2.00 EA**	**188.57 /EA**	**377**
	4" Lateral	4" Lateral			
		Install tapping valve, iron body, MJ, Nut, 4"	7.00 ea	156.11 /ea	1,093
		Purchase tapping valve, iron body, MJ, Nut, 4"	7.00 ea	245.91 /ea	1,721
		Install tapping sleeve, 24" x 4"	7.00 ea	1,587.93 /ea	11,116
		Purchase tapping sleeve, carbon steel, 24" x 4"	7.00 ea	882.01 /ea	6,174
		Exc Trnch W/hoe Med Hard	26.83 cuyd	15.01 /cuyd	403
		Backfill Native Med Hard	105.00 cuyd	15.06 /cuyd	1,581
		Bobtail (Truck/trailer) 24cy (1 - 3 Mile)	105.00 cuyd	2.39 /cuyd	251
		Trench Box 8' Deep	105.00 lf	0.38 /lf	39
		Pipe Bedding - Crushed Rock	5.35 cy	52.55 /cy	281
		Pipe Zone - Crushed Rock	5.35 cy	52.55 /cy	281
		PVC SDR 35 4	105.00 lf	4.16 /lf	436
		4" Lateral 4" Lateral	**105.00 LF**	**222.63 /LF**	**23,376**
	Bridge Crossing	Bridge Crossing			
		Purchase 24" DI flange under the Bridge	874.00 lf	130.28 /lf	113,865
		Install 24" DI, flanged, spool > 10'	88.00 ea	705.28 /ea	62,064
		24" PVC to CLDI Adapter	2.00 ea	1,362.99 /ea	2,726
		Pipe Support Allowance	1.00 ls	6,227.68 /ls	6,228
		Bridge Crossing Bridge Crossing	**874.00 LF**	**211.54 /LF**	**184,883**
	Bypass Pumping Allow	Bypass Pumping Allowance			
		Bypass Pumping Allowance	1.00 LS	62,276.79 /LS	62,277
		Bypass Pumping Allow Bypass Pumping Allowance	**1.00 LS**	**62,276.79 /LS**	**62,277**
	Conflict Resolution	Conflict Resolution Allowance			
		Conflict Resolution Allowance	1.00 LS	37,366.08 /LS	37,366
		Conflict Resolution Conflict Resolution Allowance	**1.00 LS**	**37,366.08 /LS**	**37,366**
	Pipe C905	Pipe C905 PVC			
		Install plug valve, MJ, 24"	3.00 ea	816.65 /ea	2,450
		Ecc plug valve, iron body, MJ, 250#, NO, 24"	3.00 ea	13,655.90 /ea	40,968
		Trench Excav & Lay Pipe 4- 6'	2,067.00 lf	16.89 /lf	34,905
		Pipe Bedding - Sand	80.05 cy	19.03 /cy	1,524
		Pipe Zone - Sand	615.94 cy	19.03 /cy	11,723
		Spoils to Waste	695.99 cy	1.86 /cy	1,295
		PVC C-905 Pipe 24	2,067.00 lf	18.43 /lf	38,091
		Pipe C905 Pipe C905 PVC	**2,067.00 LF**	**63.36 /LF**	**130,955**
		W993 Option 1 A	**2,067.00 LF**	**212.50 /LF**	**439,235**

Estimate Totals

Description	Amount	Totals	Rate
Construction Total	**439,236**	**439,236**	

Facility	Proc/Systm	Description	Takeoff Quantity	Total Unit Price	Total Amount	Grand Total
W994		Option 1 B				
	16" Connection	16" Connection	2.00 EA	146.49 /EA	293	377
	4" Lateral	4" Lateral	105.00 LF	175.53 /LF	18,430	23,357
	Bridge Crossing	Bridge Crossing	874.00 LF	164.77 /LF	144,006	184,735
	Conflict Resolution	Conflict Resolution Allowance	1.00 LS	60,000.00 /LS	60,000	74,670
	Paving	Paving	1,066.67 SY	18.71 /SY	19,955	25,445
	Pipe C905	Pipe C905 PVC	7,541.00 LF	40.46 /LF	305,141	391,410
		W994 Option 1 B	7,541.00 LF	72.65 /LF	547,825	699,994

Estimate Totals

Description	Amount	Totals	Rate
Construction Total	699,994	699,994	

Facility	Proc/System	Description	Takeoff Quantity	Total Unit Price	Total Amount
W994		**Option 1 B**			
	16" Connection	**16" Connection**			
		PVC C-905 45 bend 24	4.00 ea	60.41 /ea	242
		PVC C-900 Reducer 24 x 16	2.00 ea	67.60 /ea	135
		16" Connection 16" Connection	**2.00 EA**	**188.42 /EA**	**377**
	4" Lateral	**4" Lateral**			
		Install tapping valve, iron body, MJ, Nut, 4"	7.00 ea	155.98 /ea	1,092
		Purchase tapping valve, iron body, MJ, Nut, 4"	7.00 ea	245.72 /ea	1,720
		Install tapping sleeve, 24" x 4"	7.00 ea	1,586.62 /ea	11,106
		Purchase tapping sleeve, carbon steel, 24" x 4"	7.00 ea	881.31 /ea	6,169
		Exc Trnch W/hoe Med Hard	26.83 cuyd	14.99 /cuyd	402
		Backfill Native Med Hard	105.00 cuyd	15.05 /cuyd	1,580
		Bobtail (Truck/trailer) 24cy (1 - 3 Mile)	105.00 cuyd	2.39 /cuyd	251
		Trench Box 8' Deep	105.00 lf	0.38 /lf	39
		Pipe Bedding - Crushed Rock	5.35 cy	52.51 /cy	281
		Pipe Zone - Crushed Rock	5.35 cy	52.50 /cy	281
		PVC SDR 35 4	105.00 lf	4.15 /lf	436
		4" Lateral 4" Lateral	**105.00 LF**	**222.45 /LF**	**23,357**
	Bridge Crossing	**Bridge Crossing**			
		Purchase 24" DI flange under the Bridge	874.00 lf	130.18 /lf	113,775
		Install 24" DI, flanged, spool > 10'	88.00 ea	704.69 /ea	62,013
		24" PVC to CLDI Adapter	2.00 ea	1,361.89 /ea	2,724
		Pipe Support Allowance	1.00 ls	6,222.53 /ls	6,223
		Bridge Crossing Bridge Crossing	**874.00 LF**	**211.37 /LF**	**184,735**
	Conflict Resolution	**Conflict Resolution Allowance**			
		Conflict Resolution Allowance	1.00 LS	74,670.35 /LS	74,670
		Conflict Resolution Conflict Resolution Allowance	**1.00 LS**	**74,670.35 /LS**	**74,670**
	Paving	**Paving**			
		Prepare & Roll roadway/parking base, large areas over 2500 sy	1,066.67 sy	0.85 /sy	903
		12" Type B Stabilized Base	1,066.67 sy	1.32 /sy	1,407
		12" Limerock	355.56 cy	38.00 /cy	13,511
		Asphalt Base Course 4"	1,066.67 sy	9.02 /sy	9,624
		Paving Paving	**1,066.67 SY**	**23.85 /SY**	**25,445**
	Pipe C905	**Pipe C905 PVC**			
		Install plug valve, MJ, 24"	5.00 ea	815.97 /ea	4,080
		Ecc plug valve, iron body, MJ, 250#, NO, 24"	5.00 ea	13,645.14 /ea	68,226
		Trench Excav & Lay Pipe 4- 6'	7,541.00 lf	16.87 /lf	127,238
		Pipe Bedding - Sand	292.04 cy	19.02 /cy	5,554
		Pipe Zone - Sand	2,247.12 cy	19.02 /cy	42,736
		Spoils to Waste	2,539.16 cy	1.86 /cy	4,722
		PVC C-905 Pipe 24	7,541.00 lf	18.41 /lf	138,856
		Pipe C905 Pipe C905 PVC	**7,541.00 LF**	**51.90 /LF**	**391,410**
		W994 Option 1 B	**7,541.00 LF**	**92.83 /LF**	**699,994**

Estimate Totals

Description	Amount	Totals	Rate
Construction Total	**699,994**	**699,994**	

Facility	Proc/Systm	Description	Takeoff Quantity	Total Unit Price	Total Amount	Grand Total
W995		Option 1 C				
	16" Connection	16" Connection	2.00 EA	73.25 /EA	146	188
	30" Connection	30" Connection	1.00 EA	13,803.23 /EA	13,803	17,982
	4" Lateral	4" Lateral	105.00 LF	175.53 /LF	18,430	23,333
	Bridge Crossing	Bridge Crossing	874.00 LF	164.77 /LF	144,006	184,548
	Conflict Resolution	Conflict Resolution Allowance	1.00 LS	100,000.00 /LS	100,000	124,321
	Paving	Paving	4,566.67 SY	18.71 /SY	85,430	108,824
	Pipe C905	Pipe C905 PVC	10,166.00 LF	41.08 /LF	417,564	535,175
		W995 Option 1 C	10,166.00 LF	76.67 /LF	779,379	994,371

Estimate Totals

Description	Amount	Totals	Rate
Construction Total	994,371	994,371	

Facility	Proc/Systm	Description	Takeoff Quantity	Total Unit Price	Total Amount
W995		**Option 1 C**			
	16" Connection	**16" Connection**			
		PVC C-905 45 bend 24	2.00 ea	60.35 /ea	121
		PVC C-900 Reducer 24 x 16	1.00 ea	67.53 /ea	68
		16" Connection 16" Connection	**2.00 EA**	**94.12 /EA**	**188**
	30" Connection	**30" Connection**			
		Install plug valve, Flgd, DIP, 24"	1.00 ea	582.72 /ea	583
		Ecc plug valve, iron body, Flgd, 250#, HWO, 24"	1.00 ea	13,631.60 /ea	13,632
		SS Tapping Tee 30 x 24	1.00 ea	3,767.22 /ea	3,767
		30" Connection 30" Connection	**1.00 EA**	**17,981.54 /EA**	**17,982**
	4" Lateral	**4" Lateral**			
		Install tapping valve, iron body, MJ, Nut, 4"	7.00 ea	155.81 /ea	1,091
		Purchase tapping valve, iron body, MJ, Nut, 4"	7.00 ea	245.47 /ea	1,718
		Install tapping sleeve, 24" x 4"	7.00 ea	1,584.96 /ea	11,095
		Purchase tapping sleeve, carbon steel, 24" x 4"	7.00 ea	880.44 /ea	6,163
		Exc Trnch W/hoe Med Hard	26.83 cuyd	14.98 /cuyd	402
		Backfill Native Med Hard	105.00 cuyd	15.03 /cuyd	1,578
		Bobtail (Truck/trailer) 24cy (1 - 3 Mile)	105.00 cuyd	2.39 /cuyd	251
		Trench Box 8' Deep	105.00 lf	0.38 /lf	39
		Pipe Bedding - Crushed Rock	5.35 cy	52.45 /cy	280
		Pipe Zone - Crushed Rock	5.35 cy	52.45 /cy	280
		PVC SDR 35 4	105.00 lf	4.15 /lf	436
		4" Lateral 4" Lateral	**105.00 LF**	**222.22 /LF**	**23,333**
	Bridge Crossing	**Bridge Crossing**			
		Purchase 24" DI flange under the Bridge	874.00 lf	130.05 /lf	113,662
		Install 24" DI, flanged, spool > 10'	88.00 ea	703.96 /ea	61,948
		24" PVC to CLDI Adapter	2.00 ea	1,360.52 /ea	2,721
		Pipe Support Allowance	1.00 ls	6,216.04 /ls	6,216
		Bridge Crossing Bridge Crossing	**874.00 LF**	**211.15 /LF**	**184,548**
	Conflict Resolution	**Conflict Resolution Allowance**			
		Conflict Resolution Allowance	1.00 LS	124,320.84 /LS	124,321
		Conflict Resolution Conflict Resolution Allowance	**1.00 LS**	**124,320.84 /LS**	**124,321**
	Paving	**Paving**			
		Prepare & Roll roadway/parking base, large areas over 2500 sy	4,566.67 sy	0.85 /sy	3,861
		12" Type B Stabilized Base	4,566.67 sy	1.32 /sy	6,018
		12" Limerock	1,522.22 cy	37.96 /cy	57,785
		Asphalt Base Course 4"	4,566.67 sy	9.01 /sy	41,161
		Paving Paving	**4,566.67 SY**	**23.83 /SY**	**108,824**
	Pipe C905	**Pipe C905 PVC**			
		Install plug valve, MJ, 24"	7.00 ea	815.12 /ea	5,706
		Ecc plug valve, iron body, MJ, 250#, NO, 24"	7.00 ea	13,631.60 /ea	95,421
		Trench Excav & Lay Pipe 4- 6'	10,166.00 lf	16.86 /lf	171,350
		Pipe Bedding - Sand	393.70 cy	19.00 /cy	7,480
		Pipe Zone - Sand	3,029.33 cy	19.00 /cy	57,554
		Spoils to Waste	3,423.03 cy	1.86 /cy	6,359
		PVC C-905 Pipe 24	10,166.00 lf	18.40 /lf	187,004

Facility	Proc/System	Description	Takeoff Quantity		Total Unit Price		Total Amount
	Pipe C905	**Pipe C905 PVC**					
		PVC C-905 Pipe 24 under the Bridge	200.00	lf	18.40	/lf	3,679
		Pipe Support Allowance	1.00	ls	621.60	/ls	622
		Pipe C905 Pipe C905 PVC	**10,166.00**	**LF**	**52.64**	**/LF**	**535,175**
		W995 Option 1 C	**10,166.00**	**LF**	**97.81**	**/LF**	**994,371**

Estimate Totals

Description	Amount	Totals	Rate
Construction Total	**994,371**	**994,371**	