CENTRAL FLORIDA EXPRESSWAY AUTHORITY

MEMORANDUM

TO: CFX Board Members

FROM: Aneth Williams
Director of Procurement

DATE: August 23, 2016

SUBJECT: Authorization for Approval of Supplemental Agreement No. 1
S.R. 408 Eastern Extension PD&E Study
Project 408-254, Contract No. 001064

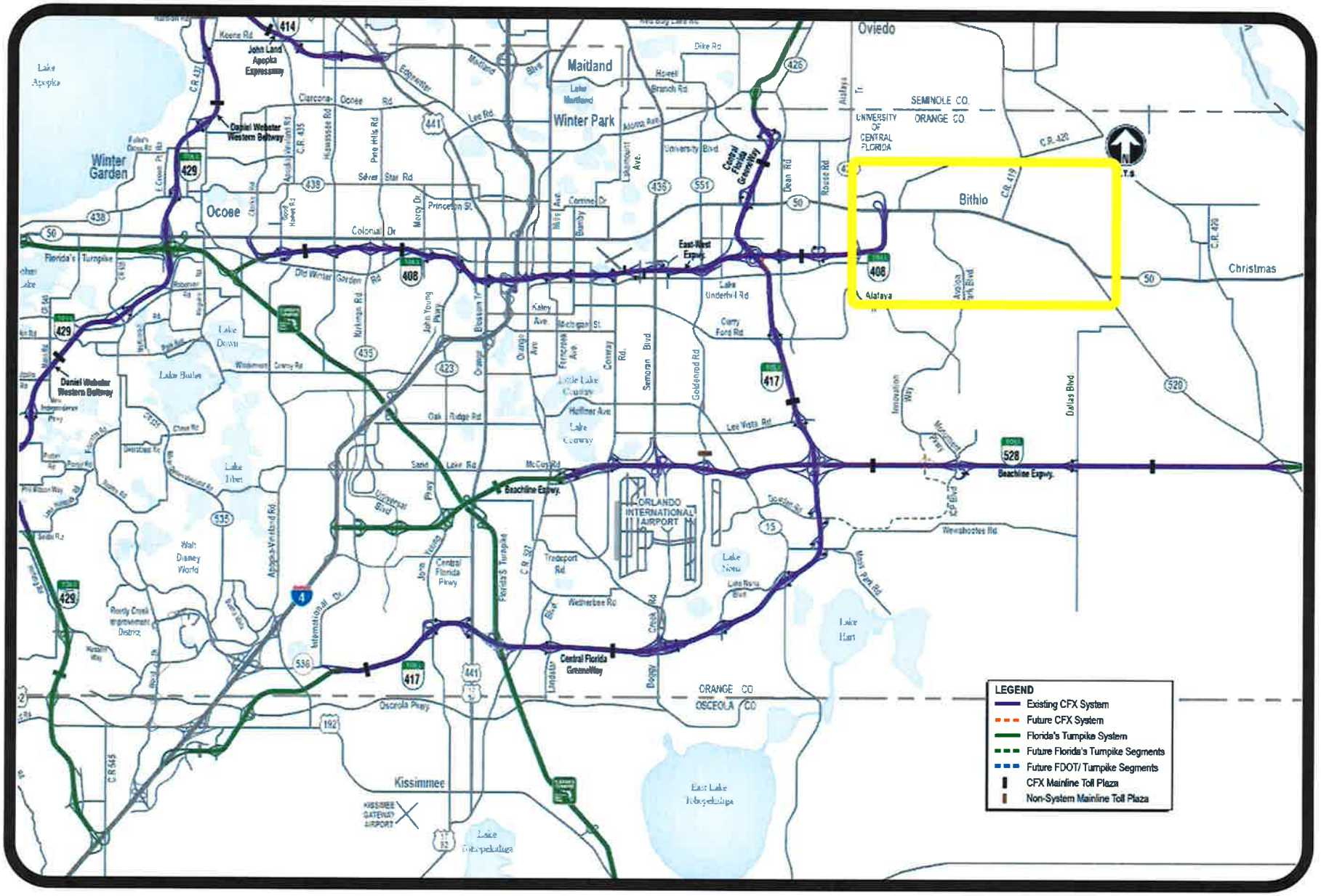
Board approval is requested for Supplemental Agreement No. 1 with Metric Engineering, Inc. in the not-to-exceed amount of $1,000,000.00 for additional services related to the S.R. 408 Eastern Extension Project Development and Environment (PD&E) Study, Project 408-254.

Services will include development and analysis of additional corridors and alignments outside of the existing S.R. 50 right-of-way, additional public meetings, Project Advisory Group (PAG) meetings and Environmental Advisory Group (EAG) meetings. Services will also include presentation of the Recommended Alternative at a Public Hearing and preparation of all final PD&E documents and reports. It is anticipated that this Supplemental Agreement will result in a 12 month extension to the duration of the PD&E Study.

This Supplemental Agreement will be a continuation of an agreement previously approved. (Original Agreement dated March 12, 2015)

Original Contract Amount	$2,200,000.00
Amount of Supplemental Agreement No. 1	$1,000,000.00
Total Revised Contract Amount	$3,200,000.00

Reviewed by:
Glenn Pressimone, PE
Director of Engineering



Project Location Map for
S.R. 408 Eastern Extension PD&E Study (408-254)

EXHIBIT A

Central Florida Expressway Authority (CFX)

SCOPE OF SERVICES

SR 408 Eastern Extension
PROJECT DEVELOPMENT AND ENVIRONMENT (PD&E) STUDY

Supplemental Amendment #1

Project Description and Limits:

SR 408 Eastern Extension from the current terminus at SR 50 to the vicinity of the SR 50 / SR 520 intersection in east Orange County.

August 16, 2016

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DESCRIPTION

In 2008 the CFX completed the Concept Development and Evaluation Report, SR 408 Eastern Extension (Concept Study). The results of the Concept Study indicated that there is / will be a transportation need for a limited access toll road (with a possible directional split) within the SR 50 corridor that could be served by the extension of the SR 408. After initiating the PD&E Study and selecting a recommended alternative within the FDOT SR 50 Right-of-Way, the FDOT advised CFX that the Right-of-Way along SR 50 was not available for the development of a CFX tolled expressway. As a result, the PD&E study is being reinitiated concurrently with a full corridor study to determine the best suitable location for the extension of the SR 408 outside of FDOT Right-of-Way. This limits of the corridor study will encompass an area 1 mile wide (.5 miles North and South of SR50 from the current eastern terminus of SR 408 to SR 520 in Orange County, a distance of approximately 8 miles). The State Road 408 Eastern Extension Project Development and Environment (PD&E) Study will build on the results of the Concept Study and the 2015 SR 408 Expressway Extension PD&E Study to determine if a reasonable improvement option exists that will meet the current and projected transportation needs of the area.

PURPOSE

The purpose of this Exhibit is to describe the scope of work and the responsibilities of the CONSULTANT, CFX, the CFX's general engineering consultant, Atkins North America (GEC) and the CFX's traffic and revenue consultant, CDM Smith (T&R).

The Project Development Process shall follow the Florida Department of Transportation's (FDOT) publication titled "Project Development and Environment Manual", published 07/01/88 and all subsequent revisions. The publication will be referred to as the PD&E Manual. All tasks identified in this scope of work will be done in accordance with the PD&E Manual, State Environmental Impact Report (SEIR) unless otherwise stated. In the event of a contradiction between the provision of the SEIR requirements and this exhibit, the provisions of the SEIR will apply.

The study will investigate various new corridors for the development of the planned improvements. The work will include study and preparation of environmental reports and documents which evaluate the physical, natural, social, cultural, air and noise quality, economic and human impacts of the alternatives. Preliminary engineering plans and studies which address the economic and engineering feasibility, traffic capacity and levels of service, geometrics, soils, structures, interchange and intersection requirements shall be performed. Public involvement and interagency coordination will be an integral part of the assessment process.

The GEC will provide contract administration, project management services and technical reviews of all work associated with the development and preparation of the engineering / environmental study reports required for this project. The GEC is authorized by the CFX to provide the management and technical direction for this Agreement on behalf of the CFX. The CONSULTANT shall comply with all of the GEC's directions that are within the purview of this Agreement.

STUDY OBJECTIVE

The general objective of this study is to provide documented information necessary for the CFX to reach a decision on the type, design, and location of the potential eastern extension of SR 408. All factors related

to the design and location of the facility must be considered including transportation needs, social impacts, economic factors, environmental impacts, engineering analysis, and right-of-way requirements.

The specific objective of the study is to prepare a series of reports documenting the preliminary engineering and design concept, including existing and predicted conditions, typical sections, right-of-way requirements, potential new interchange locations and design concepts, environmental impacts, and costs of the improvement and its alternatives.

The documentation shall be developed to and in compliance with all applicable state regulations and all applicable state issuances governing the content and development of this study type. The resultant engineering and environmental reports prepared during the study shall satisfy the level of documentation required for a state-funded transportation improvement when a SEIR is prepared. Formal adoption by the CFX of the study documentation, including the identification of a preferred alignment alternative, will constitute Location and Design Concept Acceptance of the proposed action as a SEIR.

STUDY REQUIREMENTS AND PROVISIONS FOR WORK

Governing Regulations

The services performed by the CONSULTANT shall be in compliance with all applicable CFX and FDOT Manuals and Guidelines. The FDOT's Manuals and Guidelines incorporate by requirement or reference all applicable State and Federal regulations. The current edition, including updates, of the following FDOT Manuals and Guidelines shall be used in the performance of this work. It is understood that AASHTO criteria shall apply as incipient policy. Some standards may not apply to the project, but are listed for reference.

- Florida Statutes
- Florida Administrative Codes
- Applicable federal regulations and technical advisories.
- Project Development and Environment Manual
- Plans Preparation Manual
- Roadway Traffic and Design Standards
- Highway Capacity Manual
- Manual of Uniform Traffic Control Devices(MUTCD)
- Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways
- Bicycle Facilities Planning and Design Manual
- Right-of-Way Mapping Handbook
- Location Survey Manual
- EFB User Guide
- Drainage Manual
- Outline Specifications - Aerial Surveys/Photogrammetry
- Soils and Foundations Manual
- Structures Design Guidelines
- CADD Manual (No. 625-050-001)
- CADD Production Criteria Handbook
- Florida's Level of Service Standards and Guidelines Manual for Planning (No. 525-000-005)
- Equivalent Single Axle Load Guidelines (No. 525-030-121)

- Design Traffic Procedure (No. 525-030-120)
- K-Factor Estimation Process
- Project Traffic Forecasting Guidelines
- Florida Highway Landscape Guide
- Basis of Estimates Manual

Notice to Proceed Meeting/Scoping Meeting

The CONSULTANT shall meet with appropriate CFX, GEC and T&R personnel immediately following receipt of the Notice to Proceed. As a minimum, the CONSULTANT's Project Manager and senior project personnel shall attend. At the Notice to Proceed Meeting, the CFX will:

a. Render all relevant information in its possession;
b. Establish any ground rules upon which the study process will be conducted;
c. Bring to the attention of the CONSULTANT any special or controversial issues to be considered in the study; and
d. Explain the financial administration of the contract.

Key Personnel

The CONSULTANT'S work shall be performed and directed by the key personnel identified by the CONSULTANT and approved by the CFX. Any changes in the indicated personnel shall be subject to review and approval by the CFX.

Correspondence

Copies of all written correspondence between the CONSULTANT and any party pertaining specifically to this study shall be provided to the CFX and GEC for their records within one (1) week of the receipt of said correspondence.

Submittals

The CONSULTANT shall provide (Draft and Final) copies of the required documents as listed below. These are the anticipated printing requirements for the project. This tabulation will be used for estimating purposes, and the Project Manager will determine the number of copies required prior to each submittal. Electronic submittals shall accompany all hard copy submittals.

Engineering Items:	Copies:
Alternative Corridor Evaluation Report (Draft and Final)	2
Design Traffic Technical Memorandum	2
First Draft Preliminary Engineering Report	2
Final Preliminary Engineering Report (Signed and Sealed)	4
Location Hydraulics Report	2
Pond Siting Report	2
Conceptual Design Roadway Plan Set	2
Right of Way Plans	2
Geotechnical Report	2
Utility Assessment Package	2

Environmental Items:	Copies:
Advance Notification Package	2
Public Involvement Plan	2
State Environmental Impact Report	4
Noise Study Report	2
Air Quality Report	2
Contamination Screening Evaluation Report	2
ROW Impacts Technical Memorandum	2
Public Hearing Transcript	2
Wetlands Evaluation Report	2
Biological Assessment Report	2
Cultural Resource Assessment Survey	2
Water Quality Impact Evaluation Report	2

Upon completion of the study, the CONSULTANT shall deliver to the CFX, in an organized manner, all project files, maps, sketches, worksheets, and other materials used or generated during the study process.

Coordination with other Entities

The CONSULTANT shall coordinate with all federal, state and local agencies and citizen groups that would have an influence upon the study and preparation of the preliminary engineering and environmental documents.

The CONSULTANT will be required to coordinate with and assist the CFX in securing necessary agency approvals.

Project Schedule

The PD&E Study is expected to be extended by 12 months. Within twenty (20) calendar days after receipt of the Notice-to-Proceed, the CONSULTANT shall provide a schedule of calendar deadlines to the GEC for review. The CONSULTANT shall update the project schedule on a monthly basis and inform the CFX of any substantial potential schedule modifications.

Quality Control

The CONSULTANT shall be responsible for ensuring that all work products conform to CFX standards and criteria. This shall be accomplished through an internal Quality Control (QC) process performed by the CONSULTANT. This QC process shall ensure that quality is achieved through checking, reviewing, and surveillance of work activities by objective and qualified individuals who were not directly responsible for performing the initial work.

The CONSULTANT shall submit a Quality Assurance/Quality Control (QA/QC) Plan to the GEC for their review and approval within twenty (20) working days following the Notice to Proceed Meeting.

Project Management, Meetings and Coordination

The CONSULTANT shall meet with the CFX as needed throughout the life of the project. The CONSULTANT should be prepared to meet with the CFX and /or GEC on a bi-monthly basis for progress meetings; therefore, 24 meetings should be anticipated. The actual frequency of the meetings will vary depending on the project stage and pending activities.

Progress reports shall be delivered to the CFX in a format as prescribed by the GEC and no less than 10 days prior to submission of the corresponding invoice. Judgment on whether work of sufficient quality and quantity has been accomplished will be made by the GEC Project Manager by comparing the reported percent complete against actual work accomplished.

1.0 PUBLIC INVOLVEMENT

Public involvement includes communicating to and receiving information from all interested persons, groups, and government organizations on topics related to the PD&E Study. The CONSULTANT shall coordinate and perform the appropriate level of public involvement for this project as outlined in the PD&E Manual and the following sections.

All public involvement tasks and activities will be coordinated with the CFX's Public Affairs and Communications Department.

1.1 Public Involvement Plan

The CONSULTANT will update the Public Involvement Plan (PIP) and submit to the GEC within twenty (20) calendar days following the Notice to Proceed meeting.

The purpose of the PIP is to establish and maintain a strategy for early, meaningful, and continuous public and stakeholder involvement throughout the PD&E process. Obtaining stakeholder public consensus throughout the PD&E phase is the desired outcome of the PIP.

1.2 Mailing List

The CONSULANT shall be responsible for developing, maintaining, and updating a project mailing list which will include:

a. Public officials and their staffs
b. Affected residents, business tenants and property owners within the project area.
c. Interested parties, including:
    1. Residents/property owners within 300 feet of the alternative alignments.
    2. Other informed parties who notify the CONSULTANT that they desire to be added to the mailing list.
d. Special interest groups

The CONSULTANT will maintain the mailing list in a computer file which is acceptable to the CFX. For each mailing, the CONSULTANT will provide the CFX a computer file of the mailing list and a hard copy printout, certified by the CONSULTANT as true and correct. Additional groups and/or individuals may be included on the mailing list as requested.

1.3 Notice of Intent (N/A)

1.4 Advance Notification

At the beginning of the project, the CONSULTANT shall prepare the Advance Notification and transmittal letter in accordance with the PD&E Manual for the CFX's Executive Director or his designee to submit to the State Clearing House. The CONSULTANT shall distribute the Advance Notification package to all appropriate agencies within thirty (30) calendar days of the Notice to Proceed meeting.

1.5 Scheduled Public Meetings

The CFX has determined that multiple public meetings will be required to provide adequate opportunities for the public to participate in the PD&E Study. The CONSULTANT shall provide all support necessary for the CFX to hold or participate in three public meetings, as listed below:

A. Corridor Public Workshop (Viable Corridors, evaluation, impacts, etc.)
B. Alternatives Public Workshop (Viable alternatives, evaluation, impacts, etc.)
(Public Hearing included as part of the original contract)

For each meeting, the CONSULTANT shall prepare and/or provide:

a. Scripts or agenda for presentation.
b. Handouts.
c. Graphics for presentation.
d. Meeting equipment set-up and tear-down.
e. Legal and/or display advertisements (The CONSULTANT will pay the cost of publishing)
f. Letters for notification of elected and appointed officials, affected property owners and other interested parties. (The CONSULTANT will pay the cost of first class postage.) Affected property owners includes those parcels that lie a minimum of 300 feet from the roadway right-of-way and any additional parcels that lie outside of the 300 foot buffer that may be impacted by potential median modifications.
g. News releases.
h. The Alternatives Public Workshop will also include a running PowerPoint presentation with audio, in lieu of a live speaker. The CONSULTANT will prepare the script, CFX will provide the audio.
i. For the Public Hearing, the CONSULTANT will procure a verbatim transcript of the Public Hearing. The CONSULTANT will combine the transcript with any letters received by the CFX as part of the public hearing record, and affidavits of publication of legal ads, and will provide copies of the transcript for CFX use. The CONSULTANT will also prepare a Public Hearing Summary.(Part of original contract)

The CONSULTANT will investigate potential meeting sites to advise the CFX on their suitability. The CONSULTANT will pay all costs for meeting site rents and insurance.

The CONSULTANT will attend the meetings with an appropriate number of personnel to assist the CFX staff.

Drafts of all notification advertisements and letters shall be submitted to the CFX for its approval at least one week prior to mailing. Mailings, legal notices and/or newspaper display advertisements shall be the responsibility of the CONSULTANT. Actual copies of the notices shall be retained in the project files.

Within three (3) weeks after each public meeting, the CONSULTANT will prepare a public involvement package of the following materials:

a. Advertisements and legal notices
b. Letter notices to affected property owners
c. Mailing list for letter notices sent to affected property owners
d. Newsletters
e. Minutes of information sessions

f. Sign-in sheets
g. Comment sheets
h. Draft responses to comments, inquiries or statements of record

1.5.1 Project Advisory Committees

The CONSULTANT shall update and confirm the PD&E Project Advisory Group (PAG), and the Environmental Advisory Group (EAG), which will include staff from the FDOT, Orange County, permitting agencies, environmental organizations, special interest groups and other entities as approved by the CFX. The CONSULTANT will be available to meet with the PAG and EAG up to three (3) times each during the PD&E Study to present information regarding the project, receive input from the PAG and EAG members and respond to questions.

The CONSULTANT will coordinate with the CFX and the GEC to update the initial PAG and EAG members list. The CONSULTANT will be responsible for contacting the PAG and EAG members and maintaining coordination with them throughout the study.

1.6 Unscheduled Public Meetings

In addition to scheduled public meetings, the CONSULTANT may be required to participate in unscheduled meetings with the public, elected officials, or public agencies (METROPLAN ORLANDO, Space Coast TPO, Orange County, neighborhood groups, etc.). The CONSULTANT shall be available with no more than a five (5) working days notice, to attend these meetings or make presentations at the request of the CFX. Such meetings and presentations may be held at any hour between 7:00 a.m. and 12:00 midnight on any day of the week. The CONSULTANT may be called upon to provide maps, draft news releases, audio-visual displays, and similar material for such meetings. The CONSULTANT shall be prepared to attend up to 20 such unscheduled meetings. This includes to arrange for, prepare and present a project kick-off presentation to the Orange County commission, METROPLAN ORLANDO board (and technical committees as required) at their regularly scheduled meetings.

Additionally, the CONSULTANT will be prepared to present to the CFX's Board and the Metropolitan Orlando (MPO) Board prior to the 3 milestone meetings.

1.7 Public Hearing

The CONSULTANT shall provide all support necessary for the CFX to hold or participate inthree public meetings, as described in section 1.5 of this document.

1.8 Location and Design Concept Acceptance Notice/Notification of Approved Environmental Document from FHWA (N/A)

1.9 Special Public Involvement Requirements

1.9.1 General Public Correspondence

The CONSULTANT shall make available knowledgeable staff which interested parties may call with questions concerning the project. The CONSULTANT will be available to answer questions and respond to comments during regular business hours.

1.9.2 Project Newsletters

The CONSULTANT shall prepare and distribute two additional project (2) newsletters which will be designed to inform interested parties as to the status of the project. Newsletters shall have the quality of desk-top publishing and be comparable to the previous work efforts of the CFX. Distribution of the five newsletters will coincide with key project milestones as follows:

a. Corridor Meeting Newsletter
b. Pre-Alternatives Public Workshop Newsletter

Pre-Public Hearing Newsletter (Part of original contract) Post-Public Hearing Newsletter (Part of original contract)

The CONSULTANT will distribute Newsletters to all interested parties, public officials, property owners, special interest groups, etc. as identified above with meeting invitations and at the public meetings.

Interested parties include those contained on the CONSULTANT's mailing list and other informed parties who request to be added to the mailing list.

The Introductory Newsletter may contain language to alert affected property owners and tenants of the possibility that certain environmental and/or engineering personnel may require access to their property. Prior to any actual property access, the CONSULTANT shall contact the owner or tenant to coordinate an agreeable time and date for such access.

1.9.3 Project Webpage

The CONSULTANT shall provide information about the study to the CFX for inclusion in their Webpage. After initial posting of the project information, the CONSULTANT shall provide updated information to the CFX four times during the study. These times will coincide with the newsletter mailings.

1.9.4 Rendering

The CONSULTANT shall prepare 3D visual renderings for display at the Public Hearing. They will be accurately modeled and textured to show proposed design and include roadway, striping, curb and gutter, grass, bridges, traffic signals, and more. Aerial photography and/or online satellite imagery will be used to create the ground plane for the surrounding area. A limited number of surrounding structures or landmarks may be modeled if needed to help illustrate key points of the proposed design.

Cars and trucks will be shown to indicate traffic flow and pedestrians will be included to show sidewalk or cross-walk functionality.

2.0 ENGINEERING ANALYSIS AND REPORTS

2.1 Data Collection

Immediately following the Notice to Proceed, the CONSULTANT shall begin data collection. The information collected should include all data necessary to adequately identify and evaluate the location and design of the facility. All data collection efforts should be performed in accordance with the PD&E Manual.

The CONSULTANT shall make maximum use of existing information available from state, regional and local agencies such as the Florida Geographic Data Library (FGDL), or other appropriate databases that include existing features. This data base information shall be compatible for use on base maps used for public presentations, corridor maps, and alternative plans.

2.2 Field Review

The CONSULTANT shall conduct all anticipated field trips needed to collect engineering data

2.3 Survey Coordination

Use previously obtained Aerial Photography as a basis for plotting various data necessary for both engineering and environmental analysis, alternative corridor and design studies, and the development of the preliminary plans of conceptual design. Copies of aerial photography are the prime source of information used to convey project considerations to the public at public meetings. The CONSULTANT shall be responsible for coordinating with CFX regarding project requirements, and scheduling.

2.4 Geotechnical

The CONSULTANT will obtain information to describe the soil composition within the project study area using previous geotechnical reports and investigations, county and city soil survey maps, and other information from the Soil Conservation Service and detailed soil surveys as needed to determine the impacts of the project.

This task is for the CONSULTANT to coordinate with the geotechnical staff regarding project requirements, review of geotechnical data, and scheduling.

2.5 Traffic

2.6 Traffic Data (N/A)

2.7 Traffic Analysis

CFX will provide the CONSULTANT with the Design Traffic Technical Memorandum. The CONSULTANT will review the information provided and coordinate any updates required.

2.8 Safety (N/A)

2.9 Utilities and Railroads

The CONSULTANT shall collect data on the location of all existing utilities within the study area. The CONSULTANT shall obtain data and information and meet with utility owners concerning proposed utility improvements, some of which may influence location/design considerations. Utility data to be collected will address the following:

a. Overhead Transmission lines, microwave towers, etc.
b. Underground Water, gas, sanitary sewer, force mains, power and telephone cables, etc.
c. Bridge attachments.

Based on the coordination with the utility companies along the project, the CONSULTANT shall prepare a Utility Assessment Package as described in Part 2, Chapter 10 of the PD&E Manual. The CONSULTANT will also address impacts to existing and proposed railroads, if applicable.

2.10 Needs

2.11 Transportation Plans

The CONSULTANT shall revisit and summarize at a minimum:

a. METROPLAN ORLANDO Long Range Transportation Plan
b. Orange County Comprehensive Plan
d. LYNX
e. Non-motorized modes, including bikeways and pedestrian walkways
f. Other applicable transportation plans

2.12 Analysis of Existing Conditions

The CONSULTANT will analyze the existing facility and conditions for deficiencies.

2.13 Purpose and Need

The CONSULTANT will prepare the purpose and need statement and project description. The CFX and GEC will review and approve the Purpose and Need statement.

2.14 Corridor Analysis

Conduct new corridor generation and evaluation of new potential corridor options. This includes coordination with Environmental Technical Advisory Team (ETAT) members and other key public and private stakeholders. Identify corridors (assuming 5, approximately 8 miles long), these are used as a starting point for the alternative corridor evaluation (ACE) process (there is also the possibility that as stakeholders [such as the Environmental Technical Advisory Team (ETAT) become involved, additional corridors could be identified. The ability to meet the purpose and need must serve as a baseline to identify and delineate corridors). Develop a Methodology Memorandum (MM), The MM includes:

2.14.1 Background

2.14.2 The evaluation criteria

2.14.3 Specific Data Tools [i.e., EST, Land Suitability Mapping (LSM)] and timelines that will be applied with the evaluation criteria

Perform analysis and populate evaluation matrices, Corridors are refined using the evaluation criteria developed in the MM. The results of this step are documented in an Alternative Corridor Evaluation Report (ACER). This report summarizes the refinements made in consideration of ETAT and/or stakeholder assessments, project purpose and need, public involvement commentary, analytical methodology, and evaluation criteria. It also identifies the alternatives that should move forward for SEIR

analysis, and provides supporting justifications for eliminating alternatives. The alternatives section of the SEIR should summarize the results of the corridor analysis. This summary should describe the rationale for determining the reasonableness of the alternatives evaluated. The ACER should be included in the project file as part of the supporting documentation of a PD&E Study and should be summarized in the "Alternatives Development" sub-section of the Environmental Document (SEIR). The corridor analysis shall be performed in accordance with the PD&E Manual and shall be documented in the ACER.

2.15 Roadway

2.16 Existing Roadway Characteristics

The CONSULTANT shall document the existing roadway characteristics within the project limits. The CONSULTANT will review and document available plans, pavement reports, existing rights-of-way, tax and maintenance maps and other readily available data. The CONSULTANT shall develop a CADD database, supported by computer spreadsheets, that includes all existing highway characteristics noted above, as appropriate. CADD database information shall be compatible for use on aerial photography used for Public Hearing displays, the Corridor Base Map(s), and Conceptual Design Plans.

2.17 Typical Section Analysis

After confirmation of a viable corridor, the CONSULTANT shall develop and analyze alternate conceptual design alternatives. Utilizing the data collected as part of this scope of work (and the design criteria provided in Section 6 of this Scope of Services), the CONSULTANT shall perform the engineering analysis necessary to complete the project development process. The task of engineering analysis will be ongoing throughout the duration of the project and will be performed with consideration to the results of the environmental impacts analysis.

The CONSULTANT shall develop and evaluate all viable alternatives in order to address the project needs. The CONSULTANT shall obtain feedback from the EAG and PAG as well as concurrence for those conceptual improvements / alternatives from the CFX and their GEC.

The CONSULTANT shall develop all appropriate typical section alternatives for the project. These will include two typical sections per alternative (two alternatives) that result in minimizing right of way. In general, the initial expressway extension conceptual alternatives shall reflect a 300-foot wide right of way width with alignment geometrics meeting the appropriate criteria. These initial conceptual alternatives will be presented on the base map at a scale appropriate for review and comparison. The CONSULTANT will convene a work session during a regularly scheduled progress meeting, during which the initial conceptual alternatives will be reviewed and discussed. The CONSULTANT will prepare a generalized comparative assessment of the initial conceptual alternatives that will include items such as construction costs, right of way requirements, estimated relocations, wetland impacts and other appropriate evaluation measures.

The CONSULTANT will recommend to CFX specific refinements or modifications to the initial conceptual alternatives based on the review and assessment. CFX will provide direction to the CONSULTANT on proceeding with the refined conceptual alternatives.

2.18 Roadway Design Alternatives

Based on CFX direction, the CONSULTANT will then prepare the Refined Conceptual Alternatives at an increased level of detail on a base map at a comparable scale. Schematic interchanges and working profiles will be developed for the refined alternatives.

The Refined Alternatives will be presented to the PAG and the EAG for review and input. Based on responses received from the PAG and the EAG, the CONSULANT will recommend which refined alternatives should be carried forward and developed as Viable Alternative(s).

The CONSULTANT will abstain from indicating preference between any proposed alternative prior to the public hearing unless specifically requested to do so by the CFX.

The entire Conceptual Alternatives Development and Evaluation process shall be documented by the CONSULTANT in a technical memorandum.

The CONSULTANT will further refine the two Conceptual Alternatives, thereby creating the Viable Alternatives. The Viable Alternatives will be prepared on the base maps at an appropriate scale for review and evaluation. Working profiles will be developed for each Viable Alternative along with interchange concepts and other preliminary design features including property access treatments, stormwater facilities and toll plaza envelopes. The two alternatives include the following:

1) North alignment within selected corridor (at-grade)

3.) South alignment within selected corridor (at-grade)

The CONSULTANT will make the most efficient use of existing roadways and right-of-way in developing typical and special sections. The CONSULTANT will develop, evaluate and document alternative sections such as, but not limited to, cantilever overhangs, retained earth walls, slope stabilization, and innovative drainage systems. Business and residential development, drainage requirements, environmental impacts and maintenance-of-traffic will be considered, evaluated and documented during this project phase.

The Viable Alternatives will be developed to a point at which the following can be determined:

a. Horizontal and vertical alignment
b. Typical cross section
c. Preliminary right of way needs and impacts
d. Preliminary drainage needs (showing required outfalls)
e. Existing and proposed utility locations
f. General soils information
g. Local roadway improvement needs
h. Structure locations, sizes, spans, etc.
i. Potential stormwater pond sites, sizes, locations, etc.
j. Retaining walls
k. Sound walls
l. Other features as directed by the CFX and GEC

2.19 Access Management

The CONSULTANT will ensure the appropriate access management standards are reflected within any alternative the effects the local roadway network

2.20 Identify Construction Segments (N/A)

2.21 Structures

2.22 Existing Structure Characteristics (N/A)

2.23 Structures Typical Section Analysis

The CONSULTANT shall develop all appropriate structural typical section alternatives as well as structure depth and span length that will be depicted on plan and profile sheets for the following alternatives:

- Four (4) interchange concepts (2 per alternative alignment)
- Bridges over other key crossings and/or sensitive environmental lands
- Bridge over the Econlockhatchee River

2.24 Structures Design Alternatives

The CONSULTANT shall prepare a Bridge Analysis Report reflecting structural considerations for each structure developed including a brief description of the proposed conditions and reasons for recommendations.

2.25 Drainage

The CONSULTANT shall collect hydraulic data as needed to assess constraints for the viable alternatives. This effort will be coordinated with the Orange County and SJRWMD to identify any historic maintenance problems involving drainage or flooding which may affect the viability of the concept design and influence the evaluation results. The history and past hydraulic performance will be noted on all structures.

The CONSULTANT will collect any stormwater management or master drainage plans prepared for the area to determine the hydrologic basin characteristics, both existing and future, of bridges and culverts, such as size, topography, and land use. The CONSULTANT will inventory the immediate upstream and downstream structures and inventory existing storm drain system; noting their type, size, hydraulic basin they serve and discharge points.

The CONSULTANT will determine and quantify the base floodplain involvement for the viable alternatives. Additionally, the CONSULANT will obtain all data necessary to analyze any encroachments

The CONSULTANT shall perform preliminary drainage design in order to determine potential outfall locations and preliminary sizes (volume and area) of required detention and/or retention facilities for stormwater treatment or attenuation. The location and size of potential detention/retention areas will be determined for the four viable alternates. There are 15 Basins, 2 alternative ponds per each basin will be evaluated. Selected Pond Sites will be modeled for recovery utilizing geotechnical boring or existing permit info. The Pond Siting Report (PSR) will evaluate 2 alternatives pond sites. The CONSULTANT will perform floodplain impact analysis at the Econlockhatchee river bridge crossing and its tributaries.

Perform pond sites analysis and floodplain impact compensation analysis in the proposed ponds. Cost estimate analysis for alternative pond sites. Provide summary of recommended pond sites. Perform Seasonal High Water Analysis using the soil borings report. Comparison of alternatives and identification of a preferred alternative.

The CONSULTANT shall prepare a Location Hydraulics Report. Identify and list all existing cross drains for it size, length and flow lines information. Perform proposed cross drain analysis based on recommended typical sections, using HY8 software. Perform preliminary analysis for proposed bridge improvements. The analysis includes 50 year, 100 year and 500 year stages in the river and flood stage increment compare to existing condition for each cross drain. Provide recommendation summary table for proposed cross drain size and length based on the analysis.

2.26 Concept Plans

2.27 Prepare Base Map for Conceptual Plans

The CONSULTANT will review the aerial base maps used for the corridor analysis and update or provide any additional information as required for the development and evaluation of the Conceptual Design Plans. Information to be checked and updated will include:

a. Existing features: plot existing roadway right-of-way, intersections, bicycle/pedestrian walkways, and drainage easements.
b. Street names: label street names and highway numbers in immediate project area.
c. Surface features: label all pertinent cultural and natural features and land use information.
d. North Arrow: locate north arrow at upper-mid portion of sheet. Show scale and aerial flight date with north arrow.
e. Plot property lines.
f. Plot new data as it becomes available to keep base maps up to date.

The base will be prepared using aerial photography at a scale of 1" = 200" within the corridor area.

2.28 Alternative Concept Plan

The CONSULTANT will prepare alternative concept plans for two alternatives. At a minimum, the concept plans should include defined right of way required and horizontal geometry. The CONSULTANT will overlay concept plans on the base maps. The concept plans will be prepared at a scale of 1"= 200'. In addition, the CONSULTANT will draw an overall location plan of the project alternative at a ratio of 1" = 400'. The concept plans will be drawn on standard size 11" x 17" reproducible sheets with standard title boxes. The drawings shall be provided of suitable size and scale for public display at meeting and hearings.

2.29 Preferred Alternative Concept Plans

Upon approval by the CFX of the preferred alternative, the CONSULANT will develop the preferred Alternative on the base maps at a scale of 1" = 100" that include refinements from the public hearing.

2.30 Typical Section Package

The CONSULTANT will prepare the Typical Section Package in accordance with the Department's Plans Preparation Manual.

2.31 Design Exception and Variation (N/A)

2.32 Multi-Modal Accommodations (N/A)

2.33 Park and Ride Lots (N/A)

2.34 Maintenance of Traffic

The CONSULTANT will analyze the recommended alternative for constructability, and the ability to maintain traffic. If the constructability analysis indicates that there will be a substantial cost to maintain traffic, the cost estimate will be included in the cost estimate for that alternative. This analysis involves the existing terminus of SR 408 along with the connection to SR520.

2.35 Comparative Analysis and Evaluation

The CONSULTANT will prepare a numerical descriptive evaluation matrix for the SR 50 interchange, the SR 520 interchange and for options along the 8 mile corridor, which will include of each Viable Alternatives being considered. The No-Build Alternative will also be included in the matrix.

The evaluation matrix will at a minimum include the following features:

a. Construction Costs
b. Right of way impacts
c. Engineering costs
d. Utility impact costs
e. Environmental impacts
f. Socio-Economic impacts
g. Maintenance of traffic impacts
h. Relocation potential
i. Drainage impacts / costs
j. Hazardous material impacts

The CONSULTANT shall be prepared to present the viable alternatives and the evaluation at the Alternatives Public Workshop.

The CONSULTANT will complete an evaluation and comparison of the Viable Alternatives. This will include engineering, environmental and public input.

2.36 Selection of Preferred Alternatives

Upon completion of the evaluation and comparison, the CONSULANT will recommend a single Preferred Alternative to the CFX.

2.37 Value Engineering (N/A)

2.38 Risk Management (N/A)

2.39 Construction Cost Estimate

The CONSULTANT shall prepare a construction cost estimate for both viable alternatives utilizing CFX per mile estimates.

2.40 Right of Way Cost Estimate

The CONSULTANT will provide the CFX with pertinent R/W information (existing/proposed) for each viable alternative shown on aerials. CFX staff will prepare preliminary R/W costs.

2.41 Preliminary Engineering Report (PER)

The CONSULTANT will prepare the Preliminary Engineering Report (PER) and all required supporting engineering reports in accordance with the PD&E Manual for review and comment by the CFX and GEC. Following review by CFX, the CONSULTANT will make this report available to the public prior to the Public Hearing. The Final PER will be finalized after the Public Hearing.

2.42 Other Engineering Services

The CONSULTANT shall coordinate the assessment and development of Intelligent Transportation Systems (ITS) proposals with CFX. The CONSULTANT shall provide thorough assessments and recommendations for future ITS infrastructure improvements as necessary.

2.43 Quality Assurance/Quality Control

Establish and implement a QA/QC plan. Also includes sub consultant review, response to comments and any resolution meetings if required, preparation of submittals for review. The CONSULTANT shall be responsible for insuring that all work products conform to CFX standards and criteria. This shall be accomplished through an internal Quality Control (QC) process performed by the CONSULTANT. This QC process shall insure that quality is achieved through checking, reviewing, and supervision of work activities by objective and qualified individuals who were not directly responsible for performing the initial

3.0 ENVIRONMENTAL ANALYSIS AND REPORTS

The CONSULTANT shall perform the appropriate level of environmental analysis of each community, cultural, natural or physical feature of the project and prepare the required corresponding documentation as outlined in the PD&E Manual.

The Environmental Documents prepared by the CONSULTANT will comply with the procedures listed in the PD&E Manual, Part 1, and will also follow the format and include content described in Part 2 of the PD&E Manual. The task of documentation includes the preparation of draft and interim reports prepared by the CONSULTANT for review and comment by the CFX prior to producing final reports and documents.

3.1 Land Use Changes

The CONSULTANT shall review existing and future land uses and analyze the compatibility of the project with the identified land use in accordance with Part 2, Chapter 9, of the PD&E Manual.

3.2 Socioeconomic Characteristics

The CONSULTANT will conduct an overview of the study area to explore the socioeconomic issues, features, and activities that will influence the development of the extension alternatives. Socioeconomic features to be catalogued will include, but not be limited to:

a. Schools
b. Churches
c. Community centers and parks
d. Other public facilities
e. Neighborhoods
f. Specialized housing

The CONSULANT will perform and document a community impact assessment in accordance with Part 2, Chapter 9 of the PD&E Manual.

3.3 Economic

The CONSULTANT shall prepare a Community Characteristics Inventory that documents key community amenities and features within the study area. The CONSULTANT shall also document how public comments, ideas and concerns have been addressed as part of the project. The alternatives proposing new roadway alignments and new traffic patterns can greatly alter access/ease of access to local businesses

3.4 Mobility

Local mobility may be greatly altered, considering the ability for local traffic and pedestrians to cross a new expressway facility, in order to access local businesses, parks and places of worship.

3.5 Aesthetics

The CONSULTANT shall evaluate the potential visual and aesthetic impacts to the community associated with the project in accordance with Part 2, Chapter 15 of the PD&E Manual.

3.6 Relocation Potential

The CONSTULTANT will prepare a ROW Impacts Technical Memorandum that includes information about potential impacts. The GEC will provide ROW cost information.

3.7 Archaeological and Historical Resources

The CONSULTANT will provide a cultural resource assessment for the project, which shall include coordination with FDOT and SHPO. A complete Cultural Resource Assessment Survey will be performed in accordance with the PD&E Manual. he CONSULTANT shall completely analyze the impacts to all

cultural and historic resources and prepare a Cultural Resource Assessment Request Package as described in Part 2, Chapter 12, of the PD&E Manual.

3.8 Recreational/ Section 4(f) (N/A)

3.9 Wetlands and Essential Fish Habitat

The CONSULTANT will collect all available information on wetlands located within the study area. The CONSULTANT will evaluate and document all potential impacts to the study area wetlands in accordance with Part 2, Chapter 18 of the PD&E Manual.

3.10 Water Quality

The CONSULTANT will obtain information on the existing water quality of potential receiving water bodies and evaluate the project's potential for enhancing or degrading their water quality. A Water Quality Impact Evaluation checklist and supporting documentation will be prepared pursuant to the PD&E Manual.

3.11 Special Designation

The Econlockhatchee River System is identified as an Outstanding Florida Water. The CONSULTANT shall collect all data necessary to perform and assessment of Outstanding Florida Waters in accordance with the PD&E Manual. The CONSULTANT will confirm there are no Wild and Scenic River designations within the study area. The CONSULTANT will confirm no aquatic preserves or Wild and Scenic Rivers are impacted by the project and provide the appropriate level of documentation in accordance with Part 2, Chapters 19 and 23 of the PD&E Manual.

3.12 Wildlife and Habitat

The CONSULTANT will generally describe the project area and more specifically describe the area within the proposed right-of-way limits including common names and Latin binomials for dominant and/or representative species. The CONSULTANT will further quantify areas that will be impacted both directly (within the right-of-way limits) and indirectly (ecotone encroachment, etc.) by the alternative improvements.

The CONSULTANT will record all fauna observed and outline what species might be expected to be found based on flora. Any state or Federal "critical habitat" must be identified.

The CONSULTANT will obtain all biological information needed to prepare a Biological Assessment Report of the project where endangered or threatened species are identified. The CONSULTANT will prepare a Biological Assessment for the project in accordance with Part 2, Chapter 27 of the PD&E Manual.

3.13 Identify Permit Conditions

The CONSULTANT will obtain permit related information about sites that may require dredge and fill permits, water quality permits or stormwater discharge permits. This task includes the identification of all permitting agencies. The CONSULTANT shall identify permit conditions, and type of permits required.

3.14 Farmlands

The CONSULTANT will confirm and document that there are no farmland impacts associated with this project in accordance with Part 2, Chapter 28 of the PD&E Manual.

3.15 Noise

The CONSULTANT shall collect all data necessary to perform the noise impact analysis in accordance with the PD&E Manual. The noise analysis will be conducted in accordance with Chapter 17 of Part 2 of the FDOT PD&E Manual. This task will include a qualitative corridor analysis will be conducted to provide a comparative assessment of noise impacts for up to three corridor alternatives. Develop Traffic Noise Model input data and evaluate the existing conditions, No-Build Alternative and one recommended Build Alternative. Conduct detailed traffic noise barrier analyses for Noise Sensitive Areas (NSAs) within 300 feet of the project corridor between the SR 408/SR 50 interchange and the SR 50/SR 520 interchange. Identified Residential NSAs include the following: Six (6) first and second-row single-family home (SFH) communities; three (3) mobile-home parks and six (6) individual SFHs. Identified Non-Residential NSAs include two (2) hotels and three (33) restaurants w/outdoor eating areas. Prepare traffic data from project's DTTM for noise analysis. The CONSULTANT shall prepare first and final drafts of the Noise Study Report.

3.16 Air Quality

The CONSULTANT shall collect all data necessary to perform the air quality screening test in accordance with the PD&E Manual. The air quality study will be performed in accordance with Part 2, Chapter 16 of the PD&E Manual. It is anticipated that the project will pass the Air Quality Screening model and no detailed air quality analysis will be required. The air quality analysis will be documented in a brief Technical Memorandum.

3.17 Construction Impact Analysis

The CONSUTLTANT will address potential construction impacts associated with this project in accordance with Part 2, Chapter 30 of the PD&E Manual.

3.18 Contamination

The CONSULTANT shall collect all data necessary to perform the Contamination Screening Evaluation in accordance with Part 2, Chapter 22, of the PD&E Manual.

3.19 Class of Action Determination (N/A)

3.20 CatEx Type II (N/A)

3.21 SEIR

The CONSULTANT will prepare the State Environmental Impact Report (SEIR) in accordance with the PD&E Manual for review and comment by the CFX and GEC. Following review by the AUTHORITY, the CONSULTANT will prepare this report after all other reports have been finalized and will make this report available to the public prior to the Public Hearing. The Final SEIR will be finalized after the Public Hearing.

3.22 Environmental Assessment (N/A)

3.23 FONSI (N/A)

3.24 Draft EIS (N/A)

3.25 Final EIS (N/A)

3.26 Quality Assurance/ Quality Control

Establish and implement a QA/QC plan. Also includes sub consultant review, response to comments and any resolution meetings if required, preparation of submittals for review within three (3) months.

4.0 MISCELLANEOUS

4.1 Contract and Project Files

Project Management efforts for complete setup and maintenance, developing monthly progress reports, schedule updates, work effort to develop and execute sub-consultant agreements etc. Progress reports shall be delivered to the CFX in a format as prescribed by CFX and no less than 10 days prior to submission of the corresponding invoice. The Project Manager will make judgment on whether work of sufficient quality and quantity has been accomplished by comparing the reported percent complete against actual work accomplished.

Within ten (10) days after the Notice to Proceed, the CONSULTANT shall provide a schedule of calendar deadlines accompanied by an anticipated payout curve. Said schedule and anticipated payout curve shall be prepared in a format prescribed by CFX.

4.2 Project Management Meetings and Coordination

The CONSULTANT shall meet with CFX as needed throughout the life of the project. It is anticipated 24 progress meetings will be needed. These meetings will include progress and miscellaneous review and other coordination activities with CFX.

4.3 Additional Services

27 **SURVEY (Optional Service as authorized by CFX)**

The CONSULTANT shall perform survey tasks in accordance with all applicable statutes, manuals, guidelines, standards, handbooks, procedures, and current design memoranda. Includes the following tasks. See attachment for details.

- Horizontal Project Control (HPC). set 34 control points (17 pairs at half□mile intervals with a minimum distance of 500 feet between control pair points) for Project Control. This control datum will be based on FDOT Primary Control Network 51301 and 7500R.
- Vertical PC / Bench Line. 3 wire bench run thru points set in 27.1. This control datum will be NAVD 88 based on FDOT vertical control network for projects in this area.
- Roadway Cross Sections/Profiles. 75 cross sections in areas as determined by drainage engineer
- Geotechnical Support. Stake and locate 75 soil borings as directed by Geotechnical consultant
- Work Zone Safety. MOT as appropriate to maintain safe work zone to traveling public and field survey crew.
- Supplemental survey (as authorized by CFX)
- Field Reviews. 2 field reviews (at 4 Hours per)
- Technical Meetings. Meetings with Metric and CFX for mapping requirements. 2 meetings, 2 at 4 hrs per meeting
- QA/QC
- Supervision
- Coordination

5.0 AERIAL PHOTOGRAPHY (OBTAINED AS PART OF ORIGINAL CONTRACT)

Aerial Photography shall be used as the basis for plotting various data necessary for both engineering and environmental analysis. The CONSULTANT shall use controlled digital aerial photography as the basis for corridor and alternative analysis and to convey project information to the public at public presentations / meetings. The digital aerial photography will be raster files compatible with Microstation.

Generally, controlled aerial mapping at a scale of 1" =400' will be used as the basis for plotting various data necessary to conduct detailed engineering and environmental analysis, alternative corridors and conceptual design studies, and to convey preliminary engineering concepts to the public at public meetings. The preferred alternative will be plotted at 1" =100' scale with vertical data identified using 2' contour aerials. Following is a summary of expected uses at the noted scales:

1. Overall Project Location Map	1" = 400'
2. Corridor Analysis	1" = 400'
3. Drainage Plan	1" = 400'
4. Conceptual Design Alternatives	1" = 100'
5. Preliminary Engineering	1" = 100'

6.0 GEOTECHNICAL

The CONSULTANT shall review the United States Department of Agriculture Geological Survey, Natural Resource Conservation Service (formerly Soil Conservation Service) Maps/GIS data and summarize the findings. This information will be summarized in a memo. The CONSULTANT shall, for each project, be responsible for a complete

geotechnical investigation. All work performed by the CONSULTANT shall be in accordance with CFX standards, or as otherwise directed by the District Geotechnical Engineer. The District Geotechnical Engineer will make interpretations and changes regarding geotechnical standards, policies and procedures and provide guidance to the CONSULTANT.

6.1 Selection of Foundation Alternatives (BDR) – N/A

6.2 Detailed Analysis of Selected Foundation Alternate(s) – N/A

6.3 Bridge Construction and Testing Recommendations

Provide construction and testing recommendations including potential constructability problems.

6.4 Lateral Load Analysis (Optional) – N/A

6.5 Walls – N/A

6.6 Sheet Pile Wall Analysis (Optional) – N/A

6.7 Design Soil Parameters for Signs, Signals, High Mast Lights, and Strain Poles and Geotechnical Recommendations – N/A

6.8 Box Culvert Analysis – N/A

6.9 Preliminary Report – BDR – N/A

6.10 Final Report - Bridge and Associated Walls – N/A

6.11 Final Reports - Signs, Signals, Box Culvert, Walls, and High Mast Lights – N/A

6.12 Other Geotechnical – N/A

6.13 Technical Special Provisions – N/A

6.14 Field Reviews

Identify and note surface soil and rock conditions, surface water conditions and locations, and preliminary utility conflicts. Observe and note nearby structures and foundation types.

6.15 Technical Meetings – N/A

6.16 Quality Assurance/Quality Control

6.17 Supervision

6.18 Coordination

6.19 Optional Preliminary Contamination Assessment – N/A

7.0 DESIGN CRITERIA

The CONSULTANT shall coordinate and perform the appropriate level of engineering analysis for this project as outlined in Part 1, Chapter 9 of the PD&E Manual and the following sections.

Development of this project will be guided by the basic design criteria listed below.

Design Element	Design Standard	Source
Design Year	2045	- Scope of Services
Design Vehicle	WB-62FL/WB-67	- AASHTO 2004, Pg. 18 - FDOT PPM Vol. I, p 1-19
Design Speed Rural Freeway Urban Freeway Urban Arterial Rural Arterial Other Frontage Road Service Road Access Road Ramp Directional Loop	 70 mph 60 mph 45 mph[1] 55 mph 45 mph 50 mph As appropriate 50 mph 30 mph	- FDOT PPM Vol. I, Tbl. 1.9.1, 1.9.2
Lane Widths Freeway Ramp 1-lane 2-lane Turning Roadway Arterial Collector/Service Road Bicycle Rural/Urban	 12-ft 15-ft 24-ft Case dependent 12-ft 12-ft 5-ft/4-ft (designated or undesignated)	- FDOT PPM Vol. I, Tbl. 2.1.1, 2.1.2, 2.1.3 & 2.14.1

Design Element	Design Standard				Source
Cross Slope (lanes 1-way)					- FDOT PPM Vol. I, Fig. 2.1.1
Roadway					
2-lane (2)	-0.02 ft/ft (2)				
3-lane (3)	-0.02 ft/ft (2), -0.03 ft/ft (1)				
4-lane (4) 2	+0.02 ft/ft (1), -0.02 ft/ft (2), –0.03 (2)				
Bridge Section	–0.02 (typical, uniform, no slope break)				- PPM Vol. I, Sect. 2.1.5
Max. Lane "Roll-over"	4.0%				- FDOT PPM Vol. I, Fig. 2.1.1
DS 35 mph	5.0% (between though lane & aux. lane)				- PPM Vol. I, Table 2.1.4
DS 35 mph	6.0% (between though lane & aux. lane)				
Median Width					- FDOT PPM Vol. I, Tbl. 2.2.1
Freeway					
DS 60 mph	60 to (64-ft*)				
DS 60 mph	40-ft				
All	26-ft (with barrier)				
Arterial & Collector					
DS 45 mph	22-ft				
DS 45 mph	40-ft				
Offset Left Turn Lanes					- FDOT PPM Vol. I, Sect. 2.13.3 & Fig. 2.13.2
Median width 30-ft	Parallel offset lane				- AASHTO Exh. 9-98
Median width 30-ft	Taper offset lane				
	Total (ft)		Paved (ft)		- FDOT PPM Vol. I, Tbl. 2.3.1 to 2.3.4, Fig. 2.3.1 - Design Standards Index No. 510
Shoulder Width (lanes 1-way)	Outside	Left	Outside	Left	
Freeway					
3-lane or more	12	12	10	10	
2-lane	12	8	10	4	
Ramp					
1-lane	6	6	4	2	
2-lane	10	8	8	4	
Aux. Lane	12	N/A	10	N/A	
Arterial & Collector (Norm. volume)					
2-lane divided	10	8	5	0	
1-lane undivided	10	N/A	5	N/A	
Service Road, 2-Lane, 2-Way, Undivided	10	10	5	5	
Shoulder Cross Slope	0.06	0.05	-	-	
Max. Shoulder "Roll-over"	7.0%	7.0%	-	-	
Bridge section (lanes 1-way)					
2-lane	10	6	-	-	- FDOT PPM Vol. I, Fig. 2.0.1, 2.0.2, 2.0.4
3-lane or more	10	10	-	-	
1-lane ramp	6	6	-	-	
2-lane ramp	10	6	-	-	
Service Road, 2-Lane, 2-Way, Undivided	10	10	-	-	
Border Width					- FDOT PPM Vol. I, Tbl. 2.5.1, 2.5.2
Freeway	94-ft, *(94-ft desirable)*				- *(OOCEA Policy)*3
Ramp	94-ft, *(L.O.C. plus 10-ft as minimum)*				
Arterial/Collector					
DS 45 mph	40-ft				
DS 45 mph	33-ft				
Arterial/Collector (Curb & Gutter)					
DS = 45 mph	14-ft (12-ft with bike lane)				
DS 40 mph	12-ft (10-ft with bike lane)				

Design Element	Design Standard		Source
	Fill Height (ft)	Rate	
Roadside Slopes			- FDOT PPM Vol. I, Tbl. 2.4.1
Front slope	0.0-5	1:6	
	5-10	1:6 to CZ & 1:4	
	10-20	1:6 to CZ & 1:3	
	□□20	1:2 with guardrail *(Use 10-ft bench at half the height of fill)*	- *(OOCEA Policy)*[3] *Use 1:3 slopes, avoid 1:2 slopes except where as necessary*
Front slope (curb & gutter)	All	1:2 not flatter than 1:6	
Back slope	All	1:4 or 1:3 w/ standard width trap. ditch & 1:6 front slope	
Back slope (curb & gutter)	All	1:2 not flatter than 1:6	
	Max. Grade		
Max. Grade / Max. Change in Grade			- FDOT PPM Vol. I, Tbl. 2.6.1, 2.6.2
Freeway (Rural / Urban)	3.0%	0.20% / 0.40%	
Ramp			
Directional	5.0%	0.60%	
Loop	7.0%	1.00%	
Arterial			
Rural	3.5%	0.50%	
Urban	6.0%	0.70%	
Collector	6.5% to 9.0%	-	
Frontage Road/Service Road	8.0%	0.70%	
Min. Grade Curb & Gutter	0.3%	-	- FDOT PPM Vol. I, Tbl. 2.6.4
	Dsgn. Speed (mph)	Distance (ft)	
Minimum Stopping Sight Distance (Grades 2.0%)	70	730	- FDOT PPM Vol. I, Tbl. 2.7.1
	60	570	
	55	495	
	50	425	
	45	360	
	30	200	
	Dsgn. Speed (mph)	Distance (ft)	
Decision Sight Distance (Per avoidance maneuver)	70	780-1445	- AASHTO Exh. 3-3
	60	610-1280	
	55	535-1135	
	50	465-1030	
	45	395-930	
	30	220-620	
Horizontal Curve Length	V = Design Speed		- FDOT PPM Vol. I, Tbl. 2.8.2a
Freeway	30V (15V min.)		
Others	15V (400-ft min.)		
Max. Curvature (Degree of Curve)			- FDOT PPM Vol. I, Tbl. 2.8.3
Freeway			
DS = 70 mph Rural	3 30' 00"		
DS = 60 mph Urban	5 15' 00"		
Arterial			
DS = 55 mph Rural	6 30' 00"		
DS = 45 mph Urban	8 15' 00"		
Collector			
DS = 45 mph Frontage Road	8 15' 00"		
DS = 50 mph Service Road	8 15' 00"		
Ramp			
DS = 50 mph Directional	8 15' 00"		
DS = 30 mph Loop	24 45' 00"		

Design Element	Design Standard			Source
Superelevation Transition				-FDOT PPM Vol. I, Sect. 2.9
Tangent	80% (50% min.)			
Curve	20% (50% min.)			
Spirals	*(Curves □□1□□30' 00" do not use spirals)*[4]			*- (OOCEA Policy)*[3]
Superelevation Rates	e_{max}	SE Trans. Rate		- FDOT PPM Vol. I, Tbl. 2.9.1, 2.9.2, 2.9.3, 2.9.4
Freeway				- Design Standards Ind. No. 510, 511
DS = 70 mph Rural	0.10	1:200[5]		- AASHTO Exh. 3-28
DS = 60 mph Urban	0.10	1:225		
Arterial				
DS = 55 mph Rural	0.10	1:225		
DS = 45 mph Urban	0.05	1:150		
Collector				
DS = 45 mph Frontage Road	0.05	1:150		
DS = 50 mph Service Road	0.10	1:200		
Ramp				
DS = 50 mph Directional	0.10	1:200		
DS = 30 mph Loop	0.10	1:150		
Vertical Curves	Dsgn. Speed (mph)	K-value		- FDOT PPM Vol. I, Tbl. 2.8.5, 2.8.6
		Crest	Sag	- AASHTO Exh. 3-72 (crest), 3-75 (sag)
Length , L = KA	70	401	181	
	60	245	136	
	55	185	115	
	50	136	96	
	45	98	79	*- OOCEA Policy*[3]
	30	31	37	*Note: FDOT K-values for "ALL OTHER FACILITIES" are desirable*
Minimum Lengths	Crest	Sag		
Freeway				
DS = 70 mph Rural	500-ft	400-ft		
DS = 60 mph Urban	400-ft	300-ft		
Arterial				
DS = 55 mph Rural	350-ft	250-ft		
DS = 45 mph Urban	135-ft	135-ft		
Collector				
DS = 45 mph Frontage Road	135-ft	135-ft		
DS = 50 mph Service Road	300-ft	200-ft		
Ramp				
DS = 50 mph Directional	300-ft	200-ft		
DS = 30 mph Loop	90-ft	90-ft		
Ramps	Entrance	Exit		- Design Standards Ind. No. 525
Ramp Terminals	"Parallel-Type"	"Taper-Type"		- AASHTO Pg. 850-856
Length	900 to 1200-ft	550-ft		
Taper	300-ft (25:1)	(2□□to 5□, 4□□desirable)		
Minimum Spacing				- AASHTO Exh. 10-68, Pg. 844
Entrance to Exit[6]	1,600 to 2,000-ft			
Exit to Entrance	500-ft			
Entrance to Entrance	1,000-ft			
Exit to Exit	1,000-ft			
Turning Roadways	600 to 800-ft			

Design Element	Design Standard	Source
Lane Drop Taper	L = WS (DS □□45 mph) L = $WS^2/60$ (DS □□45 mph) 50:1 min, 70:1 desirable (freeways)	- Design Standards Ind. No. 525, 526 - AASHTO Pg. 818
Clear Zone Freeway DS = 70 mph Rural DS = 60 mph Urban Arterial DS = 55 mph Rural DS = 45 mph Urban Collector DS = 45 mph Frontage Road DS = 50 mph Service Road Ramp DS = 50 mph Directional 1 to 2-lane DS = 30 mph Loop 1 to 2-lane	 36-ft 36-ft 30-ft 4-ft (Curb & Gutter) As appropriate 4-ft (Curb & Gutter) 24-ft 14-ft to 24-ft 10-ft to 18-ft	- FDOT PPM Vol. I, Tbl. 2.11.11
Vertical Clearance Over Roadway Over Railroad Sign over Roadway Over Water	 16'-6" 23'-6" 17'-6" 12'-0" min.	- FDOT PPM Vol. I, Tbl. 2.10.1 to 2.10.4, Sect. 2.10.1
Limited Access Limits Rural Urban Crossroad overpass/no interchange	 300-ft min. 100-ft min 200-ft	- FDOT PPM Vol. I, Sect. 2.14.1
Limited Access Spacing Rural Urbanized	 6 Miles 1 Mile	- Access Management Rule 14-97 Table 1, Sect. 14-97.003

Ramp Operations

a. Two thousand (2,000) ft. between entrance and exit terminals - full freeways

b. Six hundred (600) ft. between exit and entrance terminals

c. Entrance Ramp Taper of 900 ft. (1° - convergence)

d. Exit Ramp Taper of 550 ft. (3° - divergence)

Right-of-way

a. Ten (10) ft. from back of walls or limit of construction.

b. Two (2) ft. from back of sidewalk on frontage roads.

c. Drainage and construction easements as required.

d. Ninety-four (94) ft. from ramp or mainline traveled way desirable for limited access ROW.

e. Limited access right-of-way limits per Index 450.