EXHIBIT “A”

SCOPE OF SERVICES

FOR

DISTRICT-WIDE TRAFFIC OPERATIONAL STUDIES

FOR

INNOVATIVE INTERSECTION AND INTERCHANGE TREATMENTS

Financial Project No.: 436382 1 32 02
EXHIBIT “A”

SCOPE OF SERVICES
FOR
DISTRICT-WIDE TRAFFIC OPERATIONAL STUDIES
FOR
INNOVATIVE INTERSECTION AND INTERCHANGE TREATMENTS

Financial Project No.: 436382 1 32 02

INDEX

1.0 PURPOSE A-1
2.0 TASK TYPES A-1
3.0 DESCRIPTION OF SERVICES A-2
 Task 1 24 Hour Traffic Count A-2
 Task 2 8 Hour Turning Movement Count A-3
 Task 3 8 Hour Turning Movement Count with Video A-3
 Task 4 7 Day Continuous Traffic Count A-3
 Task 5 6 Hour Observation Video A-4
 Task 6 Intersection Inventory A-4
 Task 7 Obtain Traffic Crash Records A-4
 Task 8 Crash Analysis A-4
 Task 9 Qualitative Assessment of Intersection Operation A-5
 Task 10 Design Traffic Data A-5
 Task 11 Traffic Conflict Study A-6
 Task 12 Intersection Delay Analysis A-6
 Task 13 Intersection Operational Analysis A-6
 Task 14 Signal, Roundabout and Innovative Intersection/Interchange Operational Analysis A-6
 Task 15 VISSIM Operational Analysis & Simulation Runs A-7
 Task 16 Obtain Utility Locations A-7
 Task 17 Constructability and Feasibility Review A-7
 Task 18 Aerial Photography A-7
 Task 19 Development of Alternatives Recommendations A-8
 Task 20 Preparation and Submission of Report A-8
 Task 21 Conceptual Plan A-8
 Task 22 Cost Estimates A-8
 Task 23 Meetings A-9
 Task 24 Engineering Assistance A-9
 Task 25 Survey for Existing Right of Way Lines A-9
 Task 26 Highway Safety Manual and Intersection Controlling Evaluation Project Analysis A-12

4.0 PROVISIONS FOR WORK A-12
EXHIBIT “A”

SCOPE OF SERVICES

FOR

DISTRICT-WIDE TRAFFIC OPERATIONAL STUDIES

FOR

INNOVATIVE INTERSECTION AND INTERCHANGE TREATMENTS

Financial Project No.: 436382 1 32 02

1.0 PURPOSE

The purpose of this contract is to provide the Florida Department of Transportation (FDOT) with professional services for conducting traffic operational studies and concepts for innovative intersection and interchange treatments. The analysis and conceptual recommendations produced by the Consultant will provide valuable input into the development of traffic operational and safety improvement projects.

The major objective of this project is to provide District-Wide Services for this contract to obtain study results as expeditiously as possible while maintaining a high degree of thoroughness and professionalism. Independent tasks have been identified and specified in Section 2.0, Task Types.

2.0 TASK TYPES

This Scope of Services contains 26 task types for which the Consultant will be issued Task Work Orders. These tasks as follows:

- Task 1  24 Hour Traffic Count
- Task 2  8 Hour Turning Movement Count
- Task 3  8 Hour Turning Movement Count with Video
- Task 4  7 Day Continuous Traffic Count
- Task 5  6 Hour Observation Video
- Task 6  Intersection Inventory
- Task 7  Obtain Traffic Crash Records
- Task 8  Crash Analysis
- Task 9  Qualitative Assessment of Intersection Operation
Task 10  Design Traffic Data
Task 11  Traffic Conflict Study
Task 12  Intersection Delay Analysis
Task 13  Intersection Operational Analysis
Task 14  Signal, Roundabout & Innovative Intersection/Interchange Operational Analysis
Task 15  VISSIM Operational Analysis & Simulation Runs
Task 16  Obtain Utility Locations
Task 17  Constructability and Feasibility Review
Task 18  Aerial Photography
Task 19  Development of Alternatives Recommendations
Task 20  Preparation and Submission of Report
Task 21  Conceptual Plan
Task 22  Cost Estimates
Task 23  Meetings
Task 24  Engineering Assistance
Task 25  Survey for Existing Right of Way Lines
Task 26  Highway Safety Manual and Intersection Controlling Evaluations Project Analysis

3.0 DESCRIPTION OF SERVICES

For each task type included in this scope, this section describes the work required and the task product(s). Additionally, the units of payment for each work task are defined for the purpose of payment, and the period of performance typically expressed as a function of the number of units to be studied by the Consultant.

Task 1  24 Hour Traffic Count

The Consultant shall collect traffic count data on an approach to the intersection for a minimum period of 24 hours, at 15-minute intervals. The count data shall be collected on a Tuesday, Wednesday or Thursday, during typical traffic conditions or as directed by the FDOT Project Manager. Count data shall be recorded by automatic devices furnished by the Consultant.

Task Product
24-hour approach volume counts, recorded in 15-minute intervals with hourly totals.
Count data shall be submitted electronically along with 2 paper copies if desired by the FDOT project manager.

Task 2 8 Hour Turning Movement Count

The Consultant shall collect turning movement volumes, bicycle and pedestrian volumes for 8 hours, recorded in 15-minute intervals with hourly totals. The 8 hours shall be those in which the side street volumes are greatest as determined from a 24-hour traffic count or as determined by the FDOT project manager. All vehicles entering the intersection shall be counted and totaled by movement for each approach. The count shall be made on a Tuesday, Wednesday or Thursday with typical traffic conditions or as directed by the FDOT Project Manager.

Task Product
8-Hour Turning Movement Volumes, recorded in 15-minute intervals with hourly totals.
8-Hour Bicycle Volumes.
8-Hour Pedestrian Volumes.

Count data shall be submitted electronically along with 2 paper copies if desired by the FDOT.

Task 3 8 Hour Turning Movement Count with Video

The Consultant shall collect turning movement volumes, bicycle and pedestrian volumes for 8 hours, recorded in 15-minute intervals with hourly totals. The 8 hours shall be those in which the side street volumes are greatest as determined from a 24-hour traffic count or as determined by the FDOT project manager. All vehicles entering the intersection shall be counted and totaled by movement for each approach. The count shall be made on a Tuesday, Wednesday or Thursday with typical traffic conditions or as directed by the FDOT Project Manager.

Task Product
8-Hour Turning Movement Volumes, recorded in 15-minute intervals with hourly totals.
8-Hour Bicycle Volumes, table
8-Hour Pedestrian Volumes, table
Video disk

Count data shall be submitted electronically along with 2 paper copies if desired by the FDOT project manager.

Task 4 7 Day Continuous Traffic Count

The Consultant shall collect 15-minute traffic count data on each of two approaches to an intersection or bi-directional, midblock locations for a minimum period of seven days.

In conducting the counts, the Consultant shall utilize an automatic traffic counter, which produces a written record of the traffic volume and the time of day, either directly or through subsequent interconnection and processing with external electronic hardware. From the count data, three graphical and tabular presentations of directional traffic volumes shall be developed. These are (1) 24 hours of 15-minute interval volumes with hourly totals for the average weekday; (2) two consecutive days of 15-minute interval volumes with hourly totals for the
weekend; and (3) seven consecutive days of 15-minute interval volumes with hourly totals.

**Task Product**
Average weekday graph and table.
Weekend graph and table.
Seven-day graph and table.

Count data shall be submitted electronically along with 2 paper copies if desired by the project manager.

**Task 5  6 Hour Observation Video**

Six consecutive hours of video, in fifteen-minute increments. Each 15-minute increment shall be in a separate chapter for quick, simple access to any time period. The video shall be able to cover at least a 9000 square foot area. The time period shall be specified by the project manager. Video information shall be provided on a disk that can be viewed on a standard Microsoft computer.

**Subtask 6.1 Extended Video**
A Subtask 6.1 will be assigned for each additional hour needed in a camera that is already set up.

**Task Product**
Disk of video with 15-minute chapters

**Task 6  Intersection Inventory**

The Consultant shall conduct a field inventory of the intersection under study and prepare a condition diagram on standard Department forms contained in the MUTS or in another format approved by the Department. Condition diagrams shall include intersection geometry, all traffic control devices, and other roadway or roadside elements that contribute to the quality of intersection operation.

**Task Product**
Condition Diagram submitted electronically along with 2 paper copies if desired by the project manager.

**Task 7  Obtain Traffic Crash Records**

The Consultant shall obtain copies of traffic crash reports for the most recent 36 months. This data shall be obtained from the Florida Highway Patrol (FHP) and local agencies.

**Subtask 7.1 Additional intersections**
A Subtask 7.1 will be assigned for crash data obtained from the same agency for each additional intersection

**Task Product**
36-Month Crash Data
**Task 8  Crash Analysis**

The Consultant shall obtain traffic crash data from the Department and shall prepare collision diagram for each intersection under study. The diagram(s) shall depict the most recent 36 months if data is available. The crash diagram shall be based on a review of hard copies of the crash reports. Collision diagrams shall be drawn per year on standard Department forms contained in the MUTS or on another Department approved form. A crash analysis shall be performed. The crash rate shall be included on the collision diagram and shall be calculated using the total intersection ADT.

**Department Responsibility**

When crash reports are available in the Department, the District Traffic Operations Engineer (DTOE) will furnish the Consultant with copies of intersection crash reports. If crash reports are not available electronically and the responsible agency requires an individual to physically search the crash records, an additional work task for obtaining traffic crash records from the appropriate county/state agencies may be authorized.

**Task Product**

Crash Analysis  
Collision Diagram

**Task 9  Qualitative Assessment of Intersection Operation**

A qualified Engineer shall visit the intersection under study during peak traffic periods (usually both morning and evening peaks) in order to make qualitative assessments of intersection operation, particularly in terms of queue lengths, delays, conflicts or any other operational characteristics that should be considered in evaluating the need for a traffic signal, roundabout or other innovative treatments. Photographs shall be taken of any geometric, traffic, or traffic control aspects about which the DTOE should be aware. The Consultant shall recommend to the DTOE the need for supplemental work tasks.

**Task Products**

Assessment of Intersection Operation  
Color Photographs  
Recommendation for Additional Work Tasks

**Task 10  Design Traffic Data**

The Consultant will obtain the initial traffic data, including current corridor traffic counts, 20 year design corridor system traffic with K, D & T Factors, volume of trucks (medium and heavy), and buses for existing, opening, interim years and design year.

The Consultant will analyze the initial traffic projections, and report to the Project Manager concerning apparent inconsistencies. The Consultant will provide the Project Manager with support and advice in procuring acceptable revised Traffic Projections.

The Consultant will develop design year traffic projections for the project area, including weekdays for 3 peak hour periods, weekends for 2 peak hour periods, and future AADT traffic conditions.
Task 11  Traffic Conflict Study

The Consultant shall conduct a Traffic Conflicts Study as defined in FHWA “Traffic Conflict Technologies for Safety and Operations” report. Four hours of data shall be collected for an approach. This should include at least one hour during morning peak and afternoon peak periods. The Consultant will then analyze the data for statistical significance as outlined in the FHWA report. Payment will be per intersection.

Task Product
Traffic Conflict Data
Statistical Analysis

Task 12  Intersection Delay Analysis

An intersection delay analysis shall be made for the heaviest two hours, either the morning or evening peak hour, as determined by the Consultant and approved by the Project Manager. This study shall be performed in accordance with the MUTS. The study will provide some basic measures of delays, such as the average vehicle delay, presently existing at an intersection. Payment will be per approach.

Task Product
Intersection delay study field sheets

Task 13  Intersection Operational Analysis

The Consultant shall perform operational and capacity analysis using the using the latest version of Synchro (or a similar software package agreed upon by the FDOT project manager and consultant project manager). This task includes the coding of the network, including distances between intersections, geometrics, volumes, timings and any other necessary data for three time periods for an existing and up to two proposed conditions. Payment will be per intersection.

Additional conditions

Department Responsibility
The Department shall furnish turning movement counts.

Task Product
Synchro (or agreed upon software) Files (latest version)
Intersection, approach, and movement LOS, delays and queue lengths

Task 14  Signal, Roundabout and Innovative Intersection/Interchange Operational Analysis

The Consultant shall perform operational and capacity analysis using the latest version of SIDRA (or a similar software package agreed upon by the FDOT project manager and consultant project manager). This task includes the coding of the network, including distances
between intersections, geometrics, volumes, timings and any other necessary data for three time periods for an existing and up to two proposed conditions. Payment will be per intersection.

**Department Responsibility**
The Department shall furnish turning movement counts.

**Task Product**
SIDRA (or agreed upon software) Files (latest version)
Intersection, approach, and movement LOS, delays and queue lengths

**Task 15  VISSIM Operational Analysis and Simulation Runs**

The Consultant shall perform operational and capacity analysis and simulation runs using the VISSIM software package (or a similar software package agreed upon by the FDOT PM and consultant PM). This task includes the coding of the network, including distances between intersections, geometrics, volumes, timings and any other necessary data for three time periods for an existing and up to two proposed conditions. Payment will be per intersection.

**Department Responsibility**
The Department shall furnish turning movement counts.

**Task Product**
VISSIM (or agreed upon software) Files (latest version)
Intersection, approach, and movement LOS, delays and queue lengths

**Task 16  Obtain Utility Locations**

The Consultant shall be responsible for identifying all utilities in the vicinity of the proposed project. This task may be used in lieu of the Department providing the utility locations. The Consultant shall furnish copies of preliminary design plans to all utilities located in the vicinity of a project. The utility companies will furnish marked-up plans showing the location of their facilities. The Consultant shall plot the locations onto the design plans. Payment will be per intersection.

**Task Product**
Plotted locations on design plans

**Task 17  Constructability and Feasibility Review**

The Consultant will perform constructability reviews for proposed improvements. The Consultant will estimate and document the anticipated impacts of the proposed project for right-of-way, utilities, drainage, environmental, railroad, maintenance of traffic, pedestrian and bicycle facilities, structures, roadway features, multi-modal transportation, and any other applicable facilities.

**Task Product**
Anticipated project impacts

**Task 18  Aerial Photography**

The Consultant will use aerial photography as a basis for plotting various data necessary for
both engineering and environmental analysis, design studies, and the development of conceptual plans.

The Consultant shall furnish an aerial photograph of a location as specified by the Department. The photographic image shall be transferred to a standard size reproducible plan sheet or sheets in a standard scale as specified by the Department. The specified location may be an individual intersection or a roadway segment.

Established units will be based on:
- Aerial photo and 1 plan sheet
- Additional plan sheets from same photo.

**Task Product**
- 3 copies of aerial photograph
- Reproducible plan sheet(s)
- Compact Disk with aerial photograph in digital format

**Task 19  Development of Alternatives Recommendations**

Utilizing the products from other tasks in a composite study, the Consultant will develop and analyze feasible and appropriate alternatives, which address solutions to the defined problem(s). A minimum of three alternatives will be developed and analyzed for each study. Based on this analysis the Consultant shall recommend one of the alternatives.

**Task Product**
- Development of Alternatives
- Analysis of Alternatives
- Recommended Alternative

**Task 20  Preparation and Submission of Report**

The Consultant shall document the results and recommendations from all tasks in the study into a bound, written report.

**Task Product**
- One copy of draft report and three copies of final report

**Task 21  Conceptual Plan**

The Consultant will develop conceptual plans for proposed improvements. Using aerial photography as a base, the Consultant will develop plans that can be used to develop 60% design plans.

**Task Product**
- Three copies of the conceptual plan

**Task 22  Cost Estimates**

The Consultant will develop construction cost estimates and updates for proposed improvements. The cost estimates are to be developed using the FDOT’s latest statewide
average costs or other contractual costs provided by the Department.

Task Product
Construction cost estimate

**Task 23 Meetings**

The consultant shall attend special meetings to assist the Department in responding to traffic engineering issues. One senior level engineer having traffic engineering experience shall attend the meeting. The consultant shall discuss and/or present the results of their traffic engineering studies. Payment will be per hour.

Task Product
Attendance at meeting

**Task 24 Engineering Assistance**

The Consultant shall provide assistance to the Department in responding to miscellaneous traffic engineering issues. The work may include computer analysis (Synchro, SIDRA, HCS, etc.), prepare crash studies, evaluate signal phasing/timing changes and requests for signalization, conduct intersection analysis, documented in letter or memorandum and prepare presentations for local agencies and the public. The Consultant may be based in the District Office. Payment will be per hour day.

Task Product
Assignment to FDOT for one hour

**Task 25 Survey for Existing Right of Way Lines**

Determine and document the location of the existing Department Right-of-Way lines for intersection improvements. The limits are up to 750 feet on each approach to an intersection. Payment shall be per intersection.

Incorporate Right-of-Way information for project in final delivery as shown on Department Right-of-Way Maps (if such maps exist), platted, dedicated, or maintained Right-of-Way that meets the roadway design CADD standards.

Task Product
A Microstation (DGN) file showing Right-of-Way lines

Subtask 25.1 Horizontal Project Control (HPC)

Establish or recover HPC, for the purpose of establishing horizontal control on the Florida State Plane Coordinate System or datum approved by the District Surveyor (DS) or District Location Surveyor (DLS); may include primary or secondary control points. Includes analysis and processing of all field collected data, and preparation of forms.

Establish/Recover Horizontal Project Control (HPC) on NAD 83 adjustment of 2007 for the purpose of establishing the alignment of the project on the Florida State Plane Coordinate System and assure an error free or closed alignment. A Horizontal Control
Survey Data Form will be submitted in both hard copy and a Microstation (DGN) File on all old and new control monuments used and submitted with the field books.

Subtask 25.2 Vertical Project Control (VCP)

Establish or recover VCP, for the purpose of establishing vertical control or datum approved by the District Surveyor (DS) or District Location Surveyor (DLS); may include primary or secondary vertical control points. Includes analysis and processing of all field collected data, and preparation of forms.

Establish VPC (a bench line) on N.A.V.D. 1988. A bench mark description form will be submitted in both hard copy and a Microstation (DGN) File on all old and new Bench Marks used or set along with the field books (bench marks set are to be a concrete monument with brass disk; the CONSULTANT will provide the disks and concrete monuments). Bench marks are to be set at 1000 feet intervals and outside of the proposed R/W line. If any existing FDOT bench mark disks are found in head walls, wing walls, bridges, etc., incorporate these disks in the bench line and submit both a hard copy and a Microstation (DGN) File.

Subtask 25.3 Reference Points

Reference HPNC points, project alignment, vertical control points, section, ¼ section, center of section corners and G.L.O. corners as required.

Reference all survey line control points. References shall be at every PC, PI (if possible) and PT, POT or POC and set outside the Right of Way. The references shall be at intervals not greater than 1000' along the alignment. These references shall be staked in the field and recorded in field books.

Subtask 25.4 Topography/DTM (3D)

Locate all above ground features and improvements for the limits of the project by collecting the required data for the purpose of creating a DTM with sufficient density. Shoot all break lines; high and low points. Effort includes field edits, analysis and processing of all field collected data, existing maps, and/or reports.

Field Edit: It is preferred that a field survey party perform field checks such as a curb type, utility type, and void area densification.

Provide DTM as needed in obscured areas. Make a complete topographic survey as needed by collecting the required data for the purpose of a D.T.M. Survey with sufficient density of shots. Shoot all break lines, high and low points. Note: The survey will include the side street intersections only as far as the line 10' beyond the main line right of way. Incorporate Right-of-Way information for entire project in final topography delivery as shown on Department Right-of-Way Maps (if such maps exist) that meets the roadway design CADD standards. Incorporate Right-of-Way information for the entire project in final topography delivery as shown on department Right-of-Way Maps (if such maps exist) that meets the roadway design CADD standards.
Subtask 25.5 Planimetric (2D)

Locate all above ground features, utilities, and improvements. Deliver in appropriate electronic format. Effort includes field edits, analysis and processing of all field-collected data, existing maps, and/or reports.

Subtask 25.6 Underground Utilities

Designation includes two-dimensional collection of existing utilities and selected three-dimensional verification as needed for designation. Location includes non-destructive excavation to determine size, type and location of existing utility, as necessary for final three-dimensional verification. Survey includes collection of data on points as needed for designates and locates. Includes analysis and processing of all field-collected data, and delivery of all appropriate electronic files.

Subtask 25.7 Geotechnical Support

Perform three-dimensional (X, Y, Z) field location, or stakeout, of boring sites established by the geotechnical engineer. Includes field edits, analysis and processing of all field collected data and/or reports.

Subtask 25.8 Document Research

Perform research of documentation to support field and office efforts involving surveying and mapping.

Acquire a last deed of record for each property adjoining the project limits and research any additional rights of way that may have been acquired by a local governmental agency (i.e. city or county). All existing Right-of-Way will be plotted on the Control Survey with ties by station/offset to the survey line at all breaks in the right of way. Utilize existing documentation, if apparent. All deeds and/or any documentation acquired from local governmental agencies must be delivered to the Department upon completion of the Control Survey.

Subtask 25.9 Field Review

Perform verification of the field conditions as related to the collected survey data.

Subtask 25.10 Technical Meetings

Attend meetings as requested by the Department.

Provisions for Survey Work

The Consultant shall perform survey tasks in accordance with all applicable statutes, manuals, guidelines, standards, handbooks, procedures, and current design memoranda.

The Consultant shall submit all survey notes and computations to document the surveys. All field survey work shall be recorded in approved media and submitted to the Department. Field books submitted to the Department must be of an approved type. The field books shall be
certified by the surveyor in responsible charge being performed before the final product is submitted.

The survey notes shall include documentation of decisions reached from meetings, telephone conversations or site visits. All like work (such as bench lines, reference points, etc.) shall be recorded contiguously. The Department may not accept field survey radial locations of section corners, platted subdivision lot and block corners, alignment control points, alignment control reference points and certified section corner references. The Department may instead require that these points be surveyed by true line, traverse or parallel offset.

A Microstation (DGN) File showing topography and an acceptable ASCII or GEOPAK input file showing cross section information will be provided to the Department, if reference files are attached include on the disk.

(1) If electronically collected, a field book with setup documentation along with the "raw" data files will also be provided to the Department.

(2) If conventionally collected, the field books will also be provided to the Department

When final determination of section lines, quarter section lines, and subdivision boundaries are achieved, the final product will be recorded in field books. These drawings in the field books must show the relationship between the aforementioned boundaries and the survey line. This relationship can be shown with angles and distances or bearings and distances. This final product will be the basis for and agree with the right-of-way control survey map. All corners shall be found or set in the field with corners properly identified with size and type and recorded in the field book.

(Note: The final Survey Line, final Section Ties and final Subdivision Ties will be recorded in the same field book. This will be the only thing in this field book. All Right-of-Way Survey Data will be recorded in field books furnished by the Consultant. Field books will be 6-1/2" by 8-3/4" cross section book with 10 by 10 grid on both sides of opening. No Right-of-Way Survey Data will be collected in E.F.B. without written approval by the District Location Surveyor.)

Task 26  Highway Safety Manual and Intersection Controlling Evaluations Project Analysis

The Consultant shall be familiar with the Highway Safety Manual (HSM) and Intersection Controlling Evaluations (ICE). The Consultant shall conduct a HSM or ICE program briefing for transportation executives and professionals in engineering, planning, environmental assessment, field operations, enforcement and education. The Consultant shall also be able to use HSM or ICE approach to analyze suitable projects and deliver the recommendations.

Task Product:
HSM or ICE project analysis and recommendations
Conduct briefing

4.0 PROVISIONS FOR WORK

Sealing of Reports
All final reports and copies submitted to the Department shall be signed and sealed by a Florida registered Professional Engineer.

**Beginning and Length of Service**

The services to be rendered by the Consultant may commence upon execution of this Consultant Agreement. Individual projects shall be assigned for a period of sixty (60) months from the date of this Agreement, or until a total accumulated fee of $1,500,000 is reached. The time of completion for each assigned project may be stated in the Scope of Services for that particular project.

**Issuance of Work Orders**

The Department shall furnish a Task Work Order to the Consultant for the assignment of the individual projects. The Task Work Order shall identify the assigned project, specify the services to be performed, and state the compensation for the services. The Department’s Procurement Services Manager shall sign the Task Work Order. No work will be commenced by the Consultant until a Task Work Order has been issued.

**Procedure for Payment**

The Consultant shall submit invoices to the Department using the Consultant Invoice Transmittal System (CITS). Invoices may be submitted in accordance with the Invoicing Procedure in Exhibit “B”, Method of Compensation. The Consultant will notify the Department Project Manager via email prior to the submittal of any CITS invoicing. The email notification shall include the updated status of the tasks. The Department Project Manager will review and process accordingly.