# EXHIBIT "A"

# SCOPE OF SERVICES

# FOR

# FINANCIAL PROJECT ID
# 211185-1-32-15

# TRAFFIC OPERATIONS STUDIES CONTRACT
# GENERAL CONSULTANT SERVICES

# DISTRICT TWO

**February 8, 2023**

# 1. GENERAL REQUIREMENTS

The purpose of this contract is to provide the DEPARTMENT with professional services of a CONSULTANT for traffic operational studies, data collection and analysis, design services (both conceptual and final), and preparation of roadway construction plans for proposed miscellaneous improvements. The objective of traffic operational studies is to maximize the efficiency of transportation systems by focusing on reducing crashes through the implementation of engineering countermeasures. A typical study's goal is to develop traffic operational strategies to enhance safety, while minimizing impact, if any, on traffic flow. The CONSULTANT will be expected to provide services requested by the DEPARTMENT as-needed. The DEPARTMENT, at its own discretion, may elect to have any of the services set forth herein, performed by other CONSULTANTS or DEPARTMENT staff.

The CONSULTANT shall be qualified by the DEPARTMENT to perform the following Work Types:

- 3.1 Minor Highway Design
- 6.1 Traffic Engineering Studies
- 6.2 Traffic Signal Timing
- 7.1 Signing, Pavement Marking, and Channelization
- 7.3 Signalization

**1.1. Issuance of Task Work Order Authorizations:** Authorization to perform work described in this Scope of Services shall be conveyed to the CONSULTANT through a written Task Work Order (TWO) issued by the DEPARTMENT's Project Manager (DPM). Each TWO shall specify the work to be performed, the products and services to be provided, the assigned staffing, and the TWO cost broken down to individual tasks and estimated man hours. The CONSULTANT shall not begin any work prior to receiving a fully executed TWO. The TWO shall serve as a Notice to Proceed effective on the date specified in the TWO. Due to the nature of the work to be assigned under this contract, CONSULTANT staff may be required to work at either or both of the FDOT Traffic Operations offices (Jacksonville Urban Office and/or Lake City District Office). Location requirements shall be specified in the TWO.

**1.2. Subcontracting:** Should the CONSULTANT require the services of a specialist, the CONSULTANT is authorized to subcontract these services under the provisions of paragraph 7.00 of the standard CONSULTANT agreement. Firms selected for subcontracts must be approved in writing and qualified by the DEPARTMENT prior to the CONSULTANT authorizing any such work. The CONSULTANT shall be fully responsible for the satisfactory performance of all subcontracted work.

**1.3. Beginning and Length of Services:** Services to be provided by the CONSULTANT under this agreement will be initiated by issuance of Task Work Orders (TWO) that describe the work to be done for each assignment. Each TWO shall include individual tasks as described in Section 3 (SERVICES), Section 4 (In House Support Services), Section 5 (Traffic Engineering Reviews), and Section 6 (Plans Preparation) of this contract, and/or staff-hours required for

various personnel as described in Section 2 (PERSONNEL). This is a district-wide contract of duration up to 5 years.

**1.4. Basis of Payment:** Each Task Work Order (TWO) shall be priced individually and paid for as such. Payment shall be based on pre-determined costs for individual tasks as described in Section 3 (SERVICES), Section 4 (In House Support Services), Section 5 (Traffic Engineering Reviews), and Section 6 (Plans Preparation) of this contract, and/or expected staff-hour effort for various personnel as described in Section 2 (PERSONNEL) for individual tasks without pre-determined cost. The CONSULTANT shall submit a schedule of pre-determined costs along with staff-hour estimates for each TWO proposed by the DEPARTMENT within two working days of notice by the DPM.

**1.5. Sealing of Final Documents:** All final study reports and memorandums submitted to the DPM, unless otherwise notified in writing by the DPM, shall be signed, sealed, and dated by the Florida Registered Professional Engineer in responsible charge of the work being performed.

## 2. PERSONNEL

The CONSULTANT's work shall be performed and/or directed by the key personnel identified in the CONSULTANT's Letter of interest. Any changes in the indicated personnel of the CONSULTANT's office in charge of the work as identified in the CONSULTANT's proposal shall be subject to review and approval by the DEPARTMENT.

Each member of the Team shall be identified as one of the following:

**2.1. Consultant Project Manager**: The project manager shall be a registered Professional Engineer (PE) in the State of Florida. The Consultant Project Manager shall have no less than 7 years of traffic engineering experience. The Consultant Project Manager shall have a demonstrated ability to perform Quality Control / Quality Assurance checks on a variety of traffic studies/reports and technical memorandums.

**2.2. Senior Engineer**: Each senior engineer shall be a registered Professional Engineer (PE) in the State of Florida in good standing. A senior engineer shall have a minimum of 10 years traffic engineering experience as registered Professional Engineer.

**2.3. Engineer**: Each engineer shall be a registered Professional Engineer (PE) in the State of Florida in good standing. An Engineer shall have a minimum of 4 years of traffic engineering experience as a registered Professional Engineer.

**2.4. Engineer Intern**: Each Engineer Intern shall hold a valid EI certificate and be eligible for registration as a Florida Professional Engineer within four years.

**2.5. Office Technician**: Each office technician shall be:

- Proficient in the use of Microstation
- Proficient in the use of Microsoft-Office (word, excel, access)
- Proficient in the use of GIS based applications (ArcGIS)
- Able to learn and become proficient in the use of:
    - FDOT's section number, node list, and mile point systems.
    - FDOT's CARS database
    - Signal Four Analytics

**2.6. Data Collection Technician**: Each data collection technician shall have at least 1 year of experience in data collection. The CONSULTANT must ensure that the Data collection technicians are knowledgeable in the use, maintenance and calibration of the equipment they use.

**2.7. Administrative Assistant**: Each Administrative Assistant shall be proficient in the use of the latest editions of MS-Office (MS-Word, Excel, and PowerPoint). At least one Administrative Assistant shall have access to and be proficient in the FDOT Consultant Invoice Transmittal System (CITS).

## 3. SERVICES

The services assigned under the terms of this contract will generally relate to the following:

**3.1. Traffic Volume Collection:** The CONSULTANT shall collect one or more of the following as directed by the DPM. Counts shall be taken in conformance to Chapter 4 (Intersection and Turning Movement Counts) of the latest version of the Manual on Uniform Traffic Studies, Topic No. 750-020-007, published by the FDOT and available on the FDOT website. The count data shall be presented in an acceptable tabular form showing 15 minute interval volumes and hourly summaries. The counts shall be signed, sealed, and dated by the Florida Registered Professional Engineer in responsible charge of the work being performed.

**3.1.1. Twenty four (24) Hour Machine Counts:** The CONSULTANT shall collect hourly traffic count data on each approach to the intersection for a minimum period of 24 hours during typical weekday traffic conditions determined by the CONSULTANT and approved by the DPM.

**3.1.2. Seven (7) Day Traffic Counts:** The CONSULTANT shall collect hourly traffic count data on each approach to the intersection for a minimum period of 7 days to be determined by the CONSULTANT and approved by the DPM.

**3.1.3. Eight (8) Hour Turning Movement / Pedestrian Count:** Turning movement volumes shall be taken in fifteen-minute intervals for a total of eight hours encompassing the highest total volume of vehicles entering the intersection as determined from the 24 hour traffic counts or as otherwise directed by the DPM. Collection dates and times shall be approved by the DPM prior to collection. Final product delivered to DEPARTMENT shall include:

- TMCs, all vehicles hourly summary
- TMCs, all vehicles 15-minute summary
- TMCs, trucks only 15-minute summary
- Pedestrian volumes, all pedestrians 15-minute summary
- Bicycle volumes, all bicycles 15-minute summary

**3.1.4. Ten (10) Hour Turning Movement / Pedestrian Count:** Same as 3.1.3 but shall be taken for ten (10) hours.

**3.1.5. Twelve (12) Hour Turning Movement / Pedestrian Count:** Same as 3.1.3 but shall be taken for twelve (12) hours.

**3.1.6. Four (4) Hour Turning Movement / Pedestrian Count:** Same as 3.1.3 but shall be taken for four (4) hours.

**3.2. Intersection Delay Analysis:** An intersection delay analysis of the side street approaches and left turns off the main street shall be made for a total of the three hours encompassing the morning, mid-day and evening as determined from the turning movement counts. Delay

Studies shall be prepared as outlined in Chapter 7 (Intersection Delay Study) of the latest version of the Manual on Uniform Traffic Studies, Topic No. 750-020-007, published by the FDOT and available on the FDOT website. The study provides several parameters including the average stopped delay per approach vehicle, presently existing at an intersection. If the average stopped delay per approach vehicle on a side-street approach is greater than 60 seconds for any 15 minute period, then the form for Warrant I Condition B, Interruption of Continuous Traffic, shall be completed. The delay study shall be signed, sealed, and dated by the Florida Registered Professional Engineer in responsible charge of the work being performed.

**3.3. Travel Time and Delay Study:** The purpose of a Travel Time and Delay Study is to evaluate the quality of traffic movement along a route and determine the locations, types, and extent of traffic delays by using a test vehicle, vehicle observation, or probe vehicle. This study can be used to compare and evaluate operational conditions before and after roadway or intersection improvements have been made. It can also be used as a tool to assist in prioritizing projects by comparing the magnitude of the operational deficiencies (e.g., delays and stops) for each project under consideration. Travel Time and Delay Studies shall be prepared as outlined in Chapter 13 (Travel Time and Delay Study) of the latest version of the Manual on Uniform Traffic Studies, Topic No. 750-020-007, published by the FDOT and available on the FDOT website. Other techniques considered for use must receive prior approval by the FDOT Project Manager. The Travel Time and Delay Study shall be signed, sealed, and dated by the Florida Registered Professional Engineer in responsible charge of the work being performed.

Travel time and delay studies shall be conducted in each direction of travel during the morning and afternoon peak traffic periods as determined from 24 hour traffic counts, and also during a daytime off-peak period. Six runs shall be done in each direction of travel for each of the three sample time periods. A "Basic" study consists of Three (3) 2-Hour study periods encompassing six (6) signalized intersections with additional compensation at the rate of 10% of the basic rate for each two additional signalized intersections.

**3.4. Pedestrian Group Size Study:** A pedestrian group size study shall be made for a total of eight hours encompassing the morning and evening peak traffic periods and/or the peak pedestrian volume periods. A mid-block study will be counted as one location. An intersection will be counted and treated as one location. The counts shall be signed and sealed by the Florida Registered Professional Engineer in responsible charge of the work being performed.

**3.5. Vehicle Gap Size Study:** A vehicle gap size study shall be made for a total of eight hours encompassing the morning and evening peak traffic periods. A mid-block study will be counted as one location. An intersection will be counted and treated as one location. If there is a median of sufficient width to store a vehicle the gap size should be determined for both directions. Gap Studies shall be prepared as outlined in Chapter 8 (Gap Study) of the latest version of the Manual on Uniform Traffic Studies, Topic No. 750-020-007, published by the FDOT and available on the FDOT website. The counts shall be signed and sealed by the Florida Registered Professional Engineer in responsible charge of the work being performed.

**3.6. Eight (8) Hour Bicycle Count:** Bicycle volumes shall be collected for a total of 8 hours which includes the morning, noon day and evening peak bicycle periods or during time periods

specified by the FDOT Project Manager. The CONSULTANT will present this data on an approved form or format. The counts shall be signed and sealed by the Florida Registered Professional Engineer in responsible charge of the work being performed.

**3.7. Field Intersection Inventory (Condition Diagram):** The purpose of a condition diagram is to show the intersection and the conditions within the surrounding area as it exists. It provides the engineer with details of field conditions and helps investigate the need for changes to the existing traffic control devices. Condition diagrams shall be prepared as outlined in Chapter 6 (Condition Diagram) of the latest version of the Manual on Uniform Traffic Studies, Topic No. 750-020-007, published by the FDOT and available on the FDOT website. Condition Diagrams shall be drawn on the most recent Aerial Photograph available.

Colored photographs shall be taken of each approach. The photographs shall show the lane configuration and stop bar and shall be taken facing the approaching traffic. A minimum of one photograph shall be taken of each approach. More photos shall be taken if needed to show the physical conditions. Additional photographs shall be taken of any geometric, traffic, or traffic control aspects about which the FDOT Project Manager should be aware.

**3.8. Crash Analysis:** As part of this task the CONSULTANT shall collect and review all available crash data for a minimum of the most recent 36 month period of available crash data (or other time period as requested by the DPM). Crash data shall be collected from FDOT CARS and Signal4 Analytics as a minimum, and may require additional collection from local law enforcement agencies. The review shall include preparation of crash summary tables, collision diagrams (both in formats approved by the DPM), along with a memo or brief report identifying any significant crash patterns with recommendations for countermeasures to enhance motorist safety and traffic flow.

**3.9. No-passing zone study:** The CONSULTANT shall conduct a no-passing zone study in accordance with Chapter 12 of the Manual of Uniform Traffic Studies (MUTS Manual). In addition, the CONSULTANT shall conduct a no-passing zone warrant analysis when applicable. The CONSULTANT shall prepare a table or straight line diagram showing existing passing / no passing zones and recommended alterations of same.

**3.10. Lighting:** The goal of this type of assignment is to cost-effectively develop lighting projects that help reduce the potential for nighttime crashes involving vehicles and vulnerable users.

As part of this task, the CONSULTANT will investigate the adequacy, from a safety standpoint, of the existing lighting system(s) and determine the need for installation of a new lighting system, additions or modifications to the existing system, or upgrade of luminaries of the existing lighting system.

As part of this task the CONSULTANT shall perform night time field reviews and take spot luminance measurements at specific locations approved in advance by the DPM. The CONSULTANT will choose a lighting study technique (such as AASHTO criteria, NCHRP Report: Warrant for Highway Lighting, NCHRP Guidelines for Roadway Lighting Based on Safety Benefits and Costs, light meter, etc.) and shall obtain the DPM approval of the study

method before conducting the study. The CONSULTANT shall document the field review and the results.

The CONSULTANT shall develop a Highway Lighting Justification Report to analyze and justify the need for a roadway lighting system. The Study shall be developed according to the guidelines provided in the Manual of Uniform Traffic Studies.

**3.11.** Spot speed study: As part of this study task, the CONSULTANT shall conduct a spot speed study in accordance with the procedure outlined in the Manual of Uniform Traffic Studies, Chapter 12. The CONSULTANT shall obtain the speed data by means of a laser gun, a directional relay device, or other method as approved by the DPM. The study shall include a minimum sample of 100 vehicles for each direction of travel.
The CONSULTANT shall prepare and provide the Vehicle Spot Speed Study form in accordance with the DEPARTMENT's Manual on Uniform Traffic Studies.

**3.12. Speed Study Report**: The CONSULTANT shall prepare a signed and sealed engineering report that includes, at minimum, (a) a Spot Speed Study, (b) a high level crash summary table, (c) recommendations. If changes to existing speed zones are recommended, existing speed zones and recommended speed zones shall be shown graphically on a copy of the DEPARTMENT's Straight Line Diagram.

**3.11. Safe curve speed study:** As part of this task, the CONSULTANT shall conduct a safe curve speed study in accordance with the Manual of Uniform Traffic Studies (MUTS Manual), Chapter 10. The purpose of this study is to determine the maximum speed to safely negotiate a given curve and the need for installing maximum speed advisory signs. The CONSULTANT shall record and summarize the data in a form, or format approved by the DPM. The CONSULTANT shall submit to the DEPARTMENT a signed and sealed report summarizing findings and the recommended advisory speed for the curve, including all field data worksheets.

**3.12. Conflict analysis:** This study is to be conducted in accordance with the Federal Highway Administration (USDOT) Course "Traffic conflict technique for safety and operations" (publication FHWA-HI-90-023, NHI Course 38059). As part of this study, the CONSULTANT shall observe and record all conflicts and their frequencies in the field. Field observations are to include any erratic maneuvers, near misses, converging/diverging conflict patterns, etc. The analysis shall be both quantitative and qualitative. Due to the subjective nature of this type of analysis, the CONSULTANT shall make efforts to ensure the use of highly qualified traffic engineers with practical/operational experience for all conflict observations. Based on the conflict analysis, the CONSULTANT shall prepare a signed and sealed report making recommendations for engineering improvements, and shall include as a minimum a summary of the conflict analysis study and all field data worksheets.

**3.13. Fixed object inventory:** The purpose of this task is to inventory locations on State Highway System where fixed objects exist within the roadway clear zone. Typical fixed objects are utility poles, signals poles, sign posts, etc. The CONSULTANT will identify the fixed object

locations and make recommendations for mitigating the same so that the hazard can be removed, relocated, delineated or made crash-worthy. In addition, the CONSULTANT will make determination of the need for guardrail to protect the motorists against hazards such as steep embankment on the side of the median, body of water adjacent to the roadway, etc. While the guardrail may be required at a location, other alternatives, if appropriate, should be investigated and evaluated. Based on the fixed object inventory and analysis, the CONSULTANT shall prepare a signed and sealed report making recommendations for engineering improvements, and shall include as a minimum an inventory of fixed objects and recommended action, and evaluation of the need for guardrail or alternative devices.

**3.14. Railroad crossing preemption study:** The purpose of this study is to investigate the need and make recommendation for signal pre-emption features for intersections located within a certain distance (ex. 200 -500 feet) from a railroad/highway crossing. The CONSULTANT shall, at a minimum, verify if vehicle queues extend up to or beyond the tracks, estimate queue lengths utilizing adequate simulation software(s), and verify the results by making observations in the field. The study should be conducted in accordance with the MUTCD and the DEPARTMENT's guidelines outlined in FDOT Procedure Topic No. 750-020-010-a. Based on the fixed object inventory and analysis, the CONSULTANT shall prepare a signed and sealed Railroad/highway crossing pre-emption study report.

**3.15. Sight distance study**: Under this task, the CONSULTANT shall determine the required sight distance at a given location and evaluate the adequacy of the existing sight distance. Furthermore, the CONSULTANT shall make recommendations for improving the sight distance at such a location, as appropriate. This study should be conducted in accordance with the MUTCD and AASHTO's Green Book (A policy of Geometric Design of Highways and Streets). The study results shall be in compliance with the latest edition of the State of Florida Roadway and Traffic Design Standards. Based on the sight distance study, the CONSULTANT shall prepare a signed and sealed report to include, as a minimum, determination of required sight distance, documentation of existing sight distance, and recommendation for improving sight distance.

**3.16. Signal Warrant Analysis:** The CONSULTANT shall perform the following tasks:

- 3.1.1 Twenty four (24) Hour Machine Counts
- 3.1.3. Eight (8) Hour Turning Movement / Pedestrian Count
- 3.2. Intersection Delay Analysis
- 3.7. Field Intersection Inventory (Condition Diagram)
- 3.8. Crash Analysis

The CONSULTANT shall analyze the collected data in light of the warranting conditions for the eight (8) warrants described in the MUTCD.

The CONSULTANT must be aware that engineering judgment must be exercised in making the final recommendation to install or not a traffic signal. Engineering judgment must be exercised to taken into account factors such as the spacing of adjacent signals, the impact of the new signal on arterial operation, availability of acceptable gaps in the mainline traffic, etc.

Alternatives to signal installation must also be considered.

After preliminary presentation of data and analysis to the DPM, the CONSULTANT shall prepare a final signed and sealed engineering report that will include all data collected, all analysis worksheets, all alternatives considered, and operational analysis of the existing and proposed conditions.

If the report recommendation includes a new signal, a Florida DEPARTMENT of Transportation Step 1- Roundabout Screening check list, pursuant to task 3.19.1. shall be completed and included in the final report.

**3.17. Roundabout Justification**

**3.17.1. Step 1- Roundabout Screening**: Completion of the Step 1- Roundabout Screening check list pursuant to the Florida Intersection Design Guide, Section 7.3.1 Step 1- Roundabout Screening.

**3.17.2. Step 2- Roundabout b/c Evaluation:** Step 2 evaluation consists of a benefit to cost (b/c) analysis comparing a roundabout with a traditional intersection (stop controlled or signal controlled). The b/c analysis considers safety benefits associated with a reduced frequency and severity of crashes as well as life cycle costs including right-of-way, utilities, construction, operation, and maintenance. Road user costs can also be included in the analysis if information on driver delay is available. The Step 2- Roundabout b/c Evaluation spreadsheet and supporting documentation can be found in the Florida Intersection Design Guide, Section 7.3.2 Step 2- Roundabout b/c Evaluation.

**3.17.3. Step 3- Geometric and Operational Analysis:** The Step 3- Geometric and Operational Analysis will include a preliminary design that establishes the roundabout alignment, geometry, and lane requirements. Step 3- Geometric and Operational Analysis requirements and format shall adhere to the Florida Intersection Design Guide, Section 7.3.3 Step 3- Geometric and Operational Analysis.

**3.18. Parking study:** The purpose of this study is to investigate the safety impact of on-street parking and make recommendations for altering/removing parking on a given segment of roadway. As part of this study, the CONSULTANT will examine parking-related crashes, investigate sight-restrictions, parking occupancy rates and available alternative parking in the area.

The CONSULTANT shall prepare a signed and sealed engineering report that includes all data collected, crash reports (if applicable), and recommendations for changes. Existing no parking zones and proposed no parking zones shall be shown graphically on a copy of the DEPARTMENT's Straight Line Diagram.

**3.19. Operational analysis for intersections:** The CONSULTANT shall conduct an operational

analysis for an intersection (or group of intersections) using methodology and software approved by the DPM. The operational analysis shall be consistent with methodologies contained in the 2010 Highway Capacity Manual (or newer version if available). Analyses should be conducted for the existing conditions (existing traffic, geometry and signal timing/phasing); and proposed conditions (forecasted traffic, proposed geometry, signal timings/phasing). The CONSULTANT shall conduct a field review to verify the results of the existing operational conditions and calibrate the model appropriately. The output shall be presented in tabular format comparing level of service (LOS), delay, V/C ratio, and queue length for existing and proposed conditions. If deemed necessary, the CONSULTANT will conduct a left turn phasing analysis based upon current District 2 Traffic Operations left turn phase warrant guidelines.

The CONSULTANT shall prepare a signed and sealed engineering report that includes (a) Operational analysis worksheets for existing and proposed conditions, (b) Summary of operational analysis results, and (c) Left turn phasing analysis as applicable.

**3.20. Operational analysis for arterials and networks:** The CONSULTANT shall determine the existing and proposed LOS utilizing the methodology outlined for arterials in the Latest Edition of the Highway Capacity Manual. The analysis shall also indicate LOS analysis for the individual intersections within the segments under study. The CONSULTANT shall utilize a methodology and software approved by the DPM (SYNCHRO, CORSIM, and HCS.) The output of the analysis shall be presented in a tabular format comparing LOS, delays, V/C ratios and queue lengths for existing and proposed conditions.

The CONSULTANT shall prepare a signed and sealed engineering report that includes (a) Operational analysis worksheets for existing and proposed conditions, (b) Summary of operational analysis results and recommendations.

**3.21. Concept Design / Scope Package:** Under this task the CONSULTANT shall prepare complete concept designs for the studies that may become projects under this agreement, completed using D2 Traffic Operations scope package format. Scope packages shall include (as required) Conceptual Plans for intersections and highway improvements, potential utility relocations, potential R/W requirements, conceptual drainage, roadway lighting, signing, signalization, pavement markings and incidental items. All conceptual plans shall be in accordance with AASHTO standards, current FDOT standards and specifications, and the instructions provided by the DEPARTMENT to the CONSULTANT.

**3.22. Structural Analysis of Mast Arms, Strain Poles and Sign Structures:** If back plates are to be added to existing signals heads, signal heads are to be added or relocated upon an existing structure, or signs are to be modified or added to an existing structure, structural analysis shall be performed to verify that the structure can meet current design code requirements. Results shall be in memo form with all calculations attached.

**3.23. Intersection Design - Lane Configuration:** The CONSULTANT shall analyze the number

and configuration of traffic lanes required for an intersection to function properly when signalized. Analysis shall include two (2) approaches as determined by the DPM, and shall be carried out in accordance with the FDOT Plans Preparation Manual, Volume 1, Section 7.4.7 Intersection Design – Lane Configuration. This task will include:

- 3.1.1 Twenty four (24) Hour Machine Counts
- 3.1.3. Eight (8) Hour Turning Movement / Pedestrian Count
- 3.7. Field Intersection Inventory (Condition Diagram)
- 3.8. Crash Analysis

Payment shall be based on the unit cost for each of the four tasks plus a unit cost for task 3.25. Intersection Design – Lane Configuration.

**3.24. Left Turn Treatments:** The CONSULTANT shall determine the best phasing for left turn treatments. Analysis shall include two (2) approaches as determined by the DPM, and shall be carried out in accordance with FDOT Plans Preparation Manual, Volume 1, Section 7.4.5 Left Turn Treatments. This task may include any or all of the following as determined by the DPM:

- 3.1.1 Twenty four (24) Hour Machine Counts
- 3.1.3. Eight (8) Hr Turning Movement -OR- 3.1.6. Four (4) Hr Turning Movement
- 3.8. Crash Analysis
- 3.24. Structural Analysis of Mast Arms and Strain Poles

Payment shall be based on the unit cost for each of the tasks specified in the TWO plus a unit cost for task 3.26. Left Turn Treatment.

**3.25. Roadway Signing Inventory:** The CONSULTANT shall conduct a field inventory of each roadway listing all existing signs and locations set forth in the TWO. This will usually be (but not limited to) a roadway corridor, interchange, or intersection, and may be limited or non-limited access facilities." Inventory shall include, but not be limited to, the following information:

- Type of sign (R-1, W-11, etc.)
- Size of sign Panel
- Size of Letters
- Distance to nearest intersection or exit (in the case of Interstate).
- Color of sign background and color of letters.
- Horizontal clearance from the edge of the nearest travel lane to the nearest support.
- Vertical clearance from bottom of the sign panel to the ground at its closest point.
- Milepost where sign is located.

**3.26. Benefit Cost Analysis:** A Benefit-Cost Analysis shall be performed in accordance with the Highway Safety Improvement Program Guideline, section 2.1.5 in conjunction with Florida Crash Reduction rates and the current cost per crash tables on Form 511-09 from the "HSIPG".

**3.27. Studies Research:** The CONSULTANT shall provide one staff person (engineering intern) to work under the direct management and supervision of the DEPARTMENT's Project Manager (DPM). The staff person shall be familiar with traffic engineering principles and practices and be approved by the DPM. The CONSULTANT staff shall assist with routine assignments such as researching DEPARTMENT files and databases for safety data, reviewing data, analyzing data (under supervision of the DPM), etc. These assignments will be generated from safety concerns from DEPARTMENT high crash listings, management, citizen complaints, or Community Traffic Safety Teams.

**3.28. Miscellaneous Services:** Any items or tasks that are not outlined in the above study types would be considered additional services and would be provided as requested and authorized by the DEPARTMENT. The fee for any of these services will be negotiated separately, but will be at the hourly wages agreed to in the contract.

Additional services may include but are not limited to the following items: Obtain aerial photography, Conduct public information meeting, Review plans for roadway projects, Produce 3D renderings of proposed roadway improvements, Any study which does not fit the above predefined study types. 1.1.

## 4. <u>In House Support Services:</u>

At the DEPARTMENT's request, the CONSULTANT shall make available the services of any of the positions identified in the "personnel" section of the scope of services as requested by the DPM. The

in-house support employee may be of a position above that requested, but reimbursement shall be for the position requested. The CONSULTANT will be compensated for actual hours on-the-job by the in house support employee.

**4.1.** Related in-house support costs: The DEPARTMENT expects that the employee provided by the CONSULTANT for in-house support services will need the continued support from the home-office. For instance, the CONSULTANT's home office is expected to make periodical reviews of the employee's performance and job satisfaction, provide training opportunities, and assist him/her with other administrative tasks (ex., preparation of timesheet, expense reimbursement documents, etc.). Thus, the DEPARTMENT will allow the CONSULTANT to bill 3 project manager hours and 3 clerical hours for every 21 work days labored by each employee providing in-house support services. Whenever in-house support services are provided for a period briefer than 21 days, project management and clerical hours shall be prorated to the nearest half hour.

**4.2.** Work load limits for in-house support employees: Whenever an employee is assigned to provide full time (i.e., 40 hours per week) in-house support services for the DEPARTMENT, the CONSULTANT Project Manager shall limit the employee's work load to the 40 hours he/she is working for the DEPARTMENT, unless approved in writing by the DEPARTMENT's project manager. Overtime requests are to be submitted in advance and must be approved by the DEPARTMENT.

**4.3.** Billing for in-house support services: The CONSULTANT shall invoice the DEPARTMENT on a monthly basis for in-house support services, unless otherwise approved by the DPM

## 5. Traffic Engineering Reviews

This task is intended to provide the DEPARTMENT with professional traffic engineering peer review services. The peer reviews will be needed on select projects that are submitted to and/or generated by

the District Traffic Operations Office. These include, but are not limited to, permit packages (e.g., subdivisions, site plans, etc.), routine design plan submittals, and special permits. The main peer reviewer for the project shall be a Professional Engineer registered in the State of Florida with a minimum of 5 years of experience in traffic engineering or other related fields. The reviewer will be required to perform a thorough traffic engineering analysis of all assigned design plans, permits, applications, etc. These written reviews shall be submitted in a professional report to the District Traffic Operations Office. The reports shall provide a thorough traffic engineering analysis and include review comments, recommendations, and a summary. Tasks required for the various traffic engineering reviews will be detailed for each individual project and compensation terms shall be negotiated on a "per Work Order" basis. These tasks will vary depending on the size, complexity, location, and review timeline associated with the projects. Traffic engineering elements to be reviewed may include, but are not limited to, the following:

**5.1.** Traffic Operational Study/Safety Study Reviews – this may include also conducting a site visit to verify existing conditions as well as gain an understanding of the subject site's traffic operations, posted speeds, travel speeds, geometry, pedestrian and vehicle movements, curb cuts, sight lines, land uses and any other pertinent data.

**5.2.** Traffic Impact Studies

**5.3.** Traffic Signal Warrant Analysis

**5.4.** Access Management and Development of Regional Impact (DRI) Reviews

**5.5.** Intersection Traffic Control Studies (e.g., traffic signal warrant analysis, all-way Stop analysis, roundabout, etc.)

**5.6.** Highway Capacity Analyses (for intersections, segments, weaving situations, etc.)

**5.7.** Traffic Signal/Intelligent Transportation Systems/Advanced Traffic Management System Design

**5.8.** Roadway Lighting Design

**5.9.** Signing and Pavement Marking Plan Design

**5.10.** Maintenance of Traffic / Work Zone Plan Design

**5.11.** Review traffic counts, spot speed studies, and crash data analysis.

**5.12.** Review sight distance measurements for conformance with DEPARTMENT and Federal standards. This may include Stopping Sight Distance and Intersection Sight Distance. Review of Passing Sight Distance may also be needed in certain instances.

**5.13.** Various Permit Submittals (may also include participation in DEPARTMENT Pre-Application meetings)

**5.14.** Review of development permit packages (site plans, special exceptions, temporary uses, etc.), and associated traffic impact studies for compliance with DEPARTMENT Standards, Specifications, and other governing documents.

**5.15.** Review trip generation rates and distribution assumptions. The latest edition of the ITE manual shall be a key reference in determining these rates.

**5.16.** Coordination with developer's engineer/CONSULTANT and the District Traffic Operations Office to resolve issues relating to the interpretation and implementation of the applicable standards.

**5.17.** Review of impacts of the development's traffic on existing State road networks with additional analysis of surrounding streets and neighborhoods.

**5.18.** Review of proposed roadway improvement recommendations for compliance with established design criteria and to ensure that all traffic impacts caused by proposed development have been properly addressed.

**5.19.** Review of development's internal design geometry and circulation including but not limited to the following areas:

- Ingress/egress; number, location and geometry
- Access layout and geometric design
- Traffic control devices
- Number and layout of parking stall/aisles
- Vehicular storage at ingress/egress locations
- Loading Zones
- Sight lines
- On/off street parking impacts
- Pedestrian/vehicular conflicts
- Turn lanes
- Roadway lighting
- Review of existing or proposed conditions as they affect traffic conditions along State roadways and making recommendations relative to changes or improvements. Examples include speed limits, traffic counts, intersection improvements, on-street parking, etc.
- Review of design drawings, specifications, estimate of quantities and cost estimates for completeness, accuracy, conformance with DEPARTMENT standards, ease of construction, construction phasing, construction scheduling, project safety, conflicts with existing utilities, effect of construction on adjacent properties, maintenance of traffic and ease of future maintenance and operations.

## 6. Plans Preparation

The DEPARTMENT desires to obtain assistance from the CONSULTANT for performance of

miscellaneous engineering services of a minor nature including, but not limited to: revision and/or updating of previously completed construction plans; minor roadway designs of minor highway improvements, minor structures, signalization, highway lighting, signing including overhead signing, pavement markings and drainage where applicable; and right-of-way maps.

**6.1. Services:** The CONSULTANT will provide any one or more of the following engineering services or elements contained therein, as required by the DEPARTMENT:

**6.1.1.** Provide all necessary engineering and drafting services required for revising and updating previously prepared construction plans and specifications to conform to current FDOT, AASHTO Standards and Specifications and the desires of the DEPARTMENT has made known to the CONSULTANT.

**6.1.2.** Prepare complete construction plans and draft all special provisions for all phases of construction for each minor design project assigned under this agreement. Plans shall include, as appropriate, minor roadway design, intersections and highway improvements, maintenance of traffic, utility relocation, minor structures, sign support structures and details, drainage facilities, roadway lighting, signing signalization, pavement markings and incidental items.

**6.1.3.** Prepare preliminary estimates of construction cost based on unit prices furnished by the DEPARTMENT. The estimates will be submitted as required by the DEPARTMENT'S Project Engineer on coding sheets furnished by the DEPARTMENT.

**6.1.4.** Provide Record Quantity computation books in a format comparable to examples furnished by the DEPARTMENT, lighting and signalization justification reports, signalization analysis and other studies as required by the DEPARTMENT.

**6.1.5.** Submit to the DEPARTMENT a Design Documentation Booklet with design notes, reports, calculations and other related information required to document the design conclusions reached during the development of the construction plans.

**6.1.6.** Prepare complete and accurate right-of-way maps, including legal descriptions, satisfying the requirements of the DEPARTMENT, as set forth in DEPARTMENT policies and procedures and furnish same to the DEPARTMENT in reproducible form. Right-of-way maps will contain sufficient information thereon to enable the DEPARTMENT to complete instruments of conveyance according to DEPARTMENT procedures for transfer of title for required right-of-way.

**6.1.7.** Prepare permit application(s) as required for submittal to other agencies by the DEPARTMENT including forms, sketches, and hydraulic calculations.

**6.1.8.** Furnish a complete design field survey to include topography, cross sections, drainage outfalls, utilities, right-of-way and other surveys including field investigations. All work will be in accordance with the criteria established by the DEPARTMENT'S Highway Field Survey Specifications, and will be coordinated with and subject to review by the

District Location Engineer.

**6.1.9.** Make such reviews, attend such meeting and make such contacts as are necessary for proper preparation of plans and special provisions for these minor projects.

**6.1.10.** Serve as an expert witness in the legal proceedings related to these minor projects if required by the DEPARTMENT. The fee for these services shall be established if and when they are needed.

**6.1.11.** Provide traffic studies, including traffic counts with turning movements and pedestrian activity.

**6.1.11.1.** Prepare a draft of special provisions required for the construction of the roadway, minor structures, and traffic operations portion of this project

**6.1.11.2.** Notify the DEPARTMENT of any utility conflicts and coordinate with the DEPARTMENT in all relocation efforts.

**6.2. General:** The CONSULTANT shall be required to use a CADD System for plans production. All CADD produced plans must conform to the DEPARTMENT'S CADD Roadway Standards and Guidelines Manual and maintain the National Map Accuracy Standards. Any electronic submittal made to the DEPARTMENT shall be in the Microstation (.DGN) design file format (not a print file) on a media approved by the District CADD Manager. If the CONSULTANT'S system is not Microstation (.DGN), the CONSULTANT must demonstrate prior to final acceptance, the capability to translate their system to Microstation (.DGN) format files Design File format. The CONSULTANT must identify the graphic system they intend to use, and the system must be compatible with a Microstation Interactive Graphics System with Software. All plans are to be in accordance with AASHTO Standards, FDOT Standards and Specifications and the desires of the DEPARTMENT. Plans shall be accurate, legible, complete in design, and drawn to scales acceptable to the DEPARTMENT. The completed plans shall be furnished on reproducible materials and in a format acceptable to the DEPARTMENT and shall be suitable for bidding purposes. For recommendations concerning the plans preparation, the CONSULTANT shall refer to the DOT Plans Preparation Manual latest edition. (English). The CONSULTANT shall furnish preliminary computer plotted plan sheets (11" x 17") as required by the DEPARTMENT to adequately control, coordinate, and approve the design and to negotiate with utility companies, railroads, and others. The DEPARTMENT must approve a sample of all original plan sheet material. The DEPARTMENT reserves the rights to reject plans prepared on material that it deems unsatisfactory.

**6.3. Subcontracting:** Should the CONSULTANT require the services of a specialist for specialty work, the CONSULTANT is authorized to subcontract these services under the provisions of Paragraph 7.00 of the Standard CONSULTANT agreement. Firms selected for subcontracts must be approved and qualified by the DEPARTMENT prior to the CONSULTANT authorizing any such work. The CONSULTANT shall be fully responsible for the satisfactory performance of all subcontracted work.

**6.4. Items to be Furnished by the DEPARTMENT:** The DEPARTMENT will furnish any or all of the following items as appropriate, for performance of the required services:

- All previously completed field surveys as required.
- All available subsoil data and tests for roadway and structure foundations.
- All available roadway plans, bridge plans, right-of-way maps, studies and other available information pertinent to the project.
- All available traffic information.
- Right-of-way maps and legal descriptions that are not part of the CONSULTANT'S work effort, when required.
- Utility and railroad contacts and agreements.
- Numbered standard survey books for survey data, when survey services are required.
- Pavement Design where necessary.
- Coordination and processing of all permit applications.