

EXHIBIT A SCOPE OF WORK TRAFFIC ENGINEERING

I GENERAL REQUIREMENTS

The purpose of this contract is to provide the DEPARTMENT with professional services for conducting traffic operational/safety studies and plans preparation. The subsequent analysis and conceptual recommendations produced by the CONSULTANT may be used in the development of construction plans or incorporated into traffic operational/safety improvement projects to be included in the DEPARTMENT'S work program.

A major objective of this contract is to obtain study results as expeditiously as possible while maintaining a high degree of thoroughness and professionalism. Independent study types have been identified and work tasks for each have been specified. The CONSULTANT shall be aware that multiple Work Orders can be open concurrently.

The CONSULTANT shall ensure that all tasks and studies requiring field activities are conducted professionally and in a manner that utilizes accepted safety methods and practices. The safety of the traveling public and the CONSULTANT'S field staff shall be an essential goal of each field study activity.

For all tasks without a defined period of performance, the CONSULTANT shall return a task schedule and/or fee estimate within one (1) week from the receipt of the DEPARTMENT'S request.

Acronyms

- **AADT** Annual Average Daily Traffic
- **CADD** Computer Aided Design and Drafting
- **DTOE** District Traffic Operations Engineer
- **FDM** FDOT Design Manual
- **FDOT** Florida Department of Transportation
- **FHWA** Federal Highway Administration
- **MUTCD** Manual of Uniform Traffic Control Devices
- **MUTS** Manual of Uniform Traffic Studies
- **PM** Project Manager
- **TMC** Turning Movement Counts
- **TEM** Traffic Engineering Manual

Personnel

The CONSULTANT's work shall be performed by the key personnel agreed upon by the CONSULTANT and the DEPARTMENT at the onset of the contract. The DEPARTMENT shall be notified immediately of any changes in the CONSULTANT'S key personnel which shall be subject to review and approval by the DEPARTMENT.

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 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, conclusions and recommendations of all subcontracted work.

Issuance of Work Orders

Authorization to perform one or more of the tasks described in this scope of services shall be conveyed to the CONSULTANT through a written work order or a verbal work order (followed by an emailed written work order) issued by the DTOE or the PM. The work order shall specify the task to be conducted with a brief description; the location and project limits of each area; the desired tasks within the composite task; the date on which each task is to be completed and submitted to the DEPARTMENT; and the total price to be paid to the consultant for each task type or additive. Each work order issued by the DTOE or the PM shall serve as formal notice to proceed, effective on the date of the work order or on a subsequent date, if specified.

Preliminary Report

All tasks requiring a report shall have a preliminary report submitted to the PM prior to the submittal of the final report. The PM along with other District Traffic Operations staff shall review and comment on the preliminary report. The CONSULTANT will address and/or incorporate all the comments of the PM and the District Traffic Operations staff.

Executive Summary

All study types including a report shall contain an executive summary providing a general overview of the contents of the report including general comments about the location, purpose, findings, conclusions and recommendations.

Final Report

All final reports submitted to the PM shall be signed, sealed, and dated by a Florida Registered Professional Engineer of the CONSULTANT (including all subcontracted work). The CONSULTANT shall provide one electronically signed and sealed copy of the final report to the PM in Adobe Acrobat PDF format and any associated CADD files in DGN format. The CONSULTANT shall provide hardcopies of the final report as requested by the DEPARTMENT or if electronic sign and seal is not available.

Use of Department's Computers

The CONSULTANT will be allowed remote access to the DEPARTMENT'S Mainframe Computer for any work under this contract.

II INDEX OF STUDY TYPES

This scope of work contains eight (8) study types for which the CONSULTANT will be issued work orders. These study types and the work tasks associated with each study type are as shown below:

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III DESCRIPTION OF STUDY TASKS

STUDY TYPE I: SIGNAL WARRANT ANALYSIS

Purpose

This study is intended to provide a specific determination as to whether or not a particular intersection meets warrants for signalization and, if so, whether or not a signal should be considered for installation or removal.

Basis of Payment

The established unit price per intersection shall be considered full compensation for all work required to perform a signal warrant analysis.

Period of Performance

The normal period of performance allowed for completion of a Signal Warrant Analysis shall be 3 weeks for a single (or first) intersection, with an additional week for each additional intersection to be studied. The DTOE or the PM may allow additional time beyond the normal period for supplemental work tasks or as other conditions warrant.

Scope of Work

This section specifies the work tasks to be performed by the CONSULTANT, the responsibilities of the CONSULTANT and of the DEPARTMENT, the products and reports to be developed by the CONSULTANT and delivered to the DEPARTMENT at the completion of the Signal Warrant Analysis.

Task 1: QUALITATIVE ASSESSMENT

A Professional Engineer of the firm shall visit the intersection/interchange under study during the morning and evening peak traffic periods, as determined from the 24-hour traffic counts. This will also include any period during which a problem was indicated by the work order. The Engineer shall make qualitative assessments of intersection operation, particularly in terms of queue lengths, delays, phasing, conflicts or any operational characteristics that should be considered in recommending the need for a traffic signal or other operational improvements.

The CONSULTANT shall conduct a field inventory of each intersection under study and prepare a condition diagram on standard DEPARTMENT forms contained in the MUTS or in another format approved by the DEPARTMENT. The condition diagram shall show the intersection geometry and dimensions, including but not limited to, auxiliary turn lane lengths, lane widths, taper lengths, and turning and curb radii. The condition diagram shall show all traffic control devices and other roadway or roadside elements that contribute to the quality of intersection operation, including but not limited to driveways, sidewalks, signs, pavement markings, drainage inlets, buildings, utilities, signal poles, lighting, and other fixed objects. The condition diagram shall be a scaled drawing. If an aerial is used, it must be scaled and any features not readily apparent from the aerial shall be outlined. Any variations in current geometry from the aerial shall also be outlined. Aerials used in diagrams shall be included in the electronic file submittal.

Color photographs shall be taken of each approach. The photographs shall show the lane configuration, STOP sign/bar location and condition, traffic signals and other special beacons

or devices used to control traffic. The photographs shall be taken facing the approaching traffic. A minimum of 1 photograph shall be taken of each approach. Additional photographs shall be taken if needed to show the physical conditions. 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 or PM if any supplemental work tasks are needed prior to commencing work on such tasks.

Task Products:

- Assessment of intersection operation
- Condition Diagram
- Color photographs of intersections

Task 2: 24-HOUR TRAFFIC COUNTS (Intersection)

The CONSULTANT shall collect hourly traffic count data on each approach (up to 4 approaches) of the intersection for a minimum period of 24 hours during typical weekday traffic conditions. In conducting the counts, the CONSULTANT shall furnish automatic traffic counters which produce a written record of the traffic volumes by time of day. This record may be produced either directly or through subsequent interconnection and processing with external electronic hardware. The count data shall be presented in an acceptable tabular form showing 15-minute interval volumes and hourly summaries. Additional 24-hour counts may be authorized for additional approaches as a supplemental task.

Task Product:

- 24-hour approach volume counts

Task 3: 8-HOUR TURNING MOVEMENT COUNTS (w/Bicycles & Pedestrians)

An 8-Hour TMC shall be taken for those hours encompassing the morning, midday peak and afternoon traffic periods and/or peak periods during which warranting volumes exist and an off-peak period. Each period shall normally consist of the eight (8) consecutive 15-minute intervals (2 hours) during each period which yields the highest total volume of vehicles entering the intersection. Note that the 2-hour period could begin on any quarter hour. For example, the afternoon peak could be from 4:45 PM to 6:45 PM. Counts may be conducted manually or using video technology. The need for additional personnel or devices to count traffic may be authorized as a supplemental task.

Task Products:

- 8-Hour TMCs, all vehicles hourly summary
- 8-Hour TMCs, all vehicles 15-minute summary
- 8-Hour TMCs, trucks only 15-minute summary
- 8-Hour pedestrian volumes, all pedestrians hourly summary
- 8-Hour bicycle volumes, all bicycles hourly summary

Task 4: INTERSECTION DELAY ANALYSIS (Side Street Approach)

An intersection delay analysis of the side street approaches shall be made for a total of the 3 hours encompassing the morning, afternoon, and off-peak traffic periods as determined from the 24 hour counts. This study shall be performed in accordance with the MUTS. The study provides the average approach and stopped delay per vehicle at an intersection.

Task Product:

- Intersection delay analysis

Task 5: COLLISION ANALYSIS

The CONSULTANT shall obtain the collision reports via the DEPARTMENT'S Crash Analysis Reporting system (CARs) and any available collision database approved by the DEPARTMENT. The CONSULTANT shall prepare a collision summary and collision diagram for the intersection under study. The summary and diagram shall depict as a minimum the most recent 36 months for which data is available. Collision diagrams shall be drawn on standard DEPARTMENT forms contained in the MUTS or on other DEPARTMENT approved forms. Collision diagrams may be drawn on aerials. A collision analysis shall be performed based on the prepared collision summary and diagram.

Task Products:

- Collision summary
- Collision diagram
- Collision analysis

Task 6: WARRANT ANALYSIS AND RECOMMENDATION

The CONSULTANT shall analyze the collected data in light of the warranting conditions for all nine (9) signal warrants described in the MUTCD, the MUTS, and accepted traffic engineering practice. From this analysis, a recommendation shall be formulated as to whether or not a traffic signal should be considered for installation or removal. The recommendation and justification for it shall be documented in a summary report. Attached to this report shall be completed Departmental warrant analysis forms, 8-hour TMCs, 24-hour counts, delay analysis, color photographs, the condition diagram, the collision diagram, collision analysis, and the products of any authorized supplemental work tasks. If a signal is recommended for installation then an additional phasing analysis shall be included and the phase warrant forms attached. If other recommendations are given, they shall be included on an improvement diagram. The improvement diagram shall be a scaled drawing. Improvement diagrams shall not be drawn on aerials.

Task Product:

- Final signal warrant analysis report that is signed, sealed, and dated by a registered professional engineer.

STUDY TYPE II: INTERSECTION ANALYSIS

Purpose

This study involves the analysis of an existing or proposed intersection in order to develop a specific conceptual design recommendation that can be utilized in preparing plans for the construction of a new or modified intersection or interchange. This analysis may include geometric improvements to increase capacity and operational efficiency.

Basis of Payment

The basic unit of payment shall be for an existing intersection. The intersection may be presently signalized or un-signalized. For interchanges, each ramp terminal shall be considered a separate intersection.

Period of Performance

The normal period of performance allowed for completion of an intersection analysis shall be four (4) weeks for each location. Each additional intersection location in a work order shall add 1 week to the period of performance. The DTOE or the PM may allow additional time beyond the normal period for supplemental work tasks or as other conditions warrant.

Scope of Work

This section specifies the work tasks to be performed by the CONSULTANT, the responsibilities of the CONSULTANT and the DEPARTMENT, and the work task products to be developed by the CONSULTANT and delivered to the DEPARTMENT.

Task 1: QUALITATIVE ASSESSMENT

A Professional Engineer of the firm shall visit the intersection/interchange under study during the morning and evening peak traffic periods. This will also include any period during which a problem was indicated by the work order. The Engineer shall make qualitative assessments of intersection operation, particularly in terms of queue lengths, delays, phasing, conflicts or any operational characteristics that should be considered in recommending the need for a traffic signal or other operational improvements.

The CONSULTANT shall conduct a field inventory of each intersection under study and prepare a condition diagram on standard DEPARTMENT forms contained in the MUTS or in another format approved by the DEPARTMENT. The condition diagram shall show the intersection geometry and dimensions, including but not limited to, auxiliary turn lane lengths, lane widths, taper lengths, and turning and curb radii. The condition diagram shall show all traffic control devices and other roadway or roadside elements that contribute to the quality of intersection operation, including but not limited to driveways, sidewalks, signs, pavement markings, drainage inlets, buildings, utilities, signal poles, lighting, and other fixed objects. The condition diagram shall be a scaled drawing. If an aerial is used, it must be scaled and any features not readily apparent from the aerial shall be outlined. Any variations in current geometry from the aerial shall also be outlined. Aerials used in diagrams shall be included in the electronic file submittal.

Color photographs shall be taken of each approach. The photographs shall show the lane configuration, STOP sign/bar location and condition, traffic signals and other special beacons or devices used to control traffic. The photographs shall be taken facing the approaching traffic. A minimum of 1 photograph shall be taken of each approach. Additional photographs shall be

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taken if needed to show the physical conditions. 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 or PM if any supplemental work tasks are needed prior to commencing work on such tasks.

Task Products:

- Assessment of intersection operation
- Condition Diagram
- Color photographs of intersections
- Final recommendation for intersection improvement(s) and for supplemental work tasks
- An improvement diagram detailing intersection improvements

Task 2: COLLISION ANALYSIS

The CONSULTANT shall obtain the collision reports via the DEPARTMENT'S Crash Analysis Reporting system (CARs) and any available collision database approved by the DEPARTMENT. The CONSULTANT shall prepare a collision summary and collision diagram for the intersection under study. The summary and diagram shall depict as a minimum the most recent 36 months for which data is available. Collision diagrams shall be drawn on standard DEPARTMENT forms contained in the MUTS or on other DEPARTMENT approved forms. Collision diagrams may be drawn on aerials. A collision analysis shall be performed based on the prepared collision summary and diagram.

Task Products:

- Collision summary
- Collision diagram
- Collision analysis

Task 3: TRAFFIC VOLUME DATA

Separate work task descriptions exist for this task for an intersection analysis of either an existing or proposed intersection. The 8-hour turning movement data will include bicycle and pedestrian count data.

An 8-Hour TMC shall be taken for those hours encompassing the morning, midday peak and afternoon traffic periods and/or peak periods during which warranting volumes exist and an off-peak period. Each period shall normally consist of the eight (8) consecutive 15-minute intervals (2 hours) during each period which yields the highest total volume of vehicles entering the intersection. Note that the 2-hour period could begin on any quarter hour. For example, the afternoon peak could be from 4:45 PM to 6:45 PM. Counts may be conducted manually or using video technology. The need for additional personnel or devices to count traffic may be authorized as a supplemental task.

Task Products:

- 8-Hour TMCs, all vehicles hourly summary
- 8-Hour TMCs, all vehicles 15-minute summary
- 8-Hour TMCs, trucks only 15-minute summary

- 8-Hour pedestrian volumes, all pedestrians hourly summary
- 8-Hour bicycle volumes, all bicycles hourly summary

STUDY TYPE III: ROADWAY STUDY

Purpose

The Roadway Study involves a comprehensive, systematic review of a particular arterial or freeway from an operational efficiency and safety perspective. The required product of this study is generally a "TOPICS" type report which may be used by the DEPARTMENT as a basis for the development of an arterial or freeway improvement program. Elements of the study report are intended to provide input to the plans preparation process for the recommended improvement projects.

Basis of Payment

The basic unit of payment shall be one (1) two-way mile. The established unit price for each two-way mile studied shall be considered full compensation for all work required to perform this study.

Period of Performance

The normal period allowed for completion of a Roadway Study shall be three (3) weeks for the first two-way mile. For each additional two-way mile or fraction thereof, 1 weeks will be added to the study time. Additional intersection qualitative assessments included as part of a Roadway Study are to be conducted concurrently with the Roadway Study and no additional time shall be allotted for their completion. The DTOE or the PM may allow additional time beyond the normal period for supplemental work tasks or as other conditions warrant.

Scope of Work

This section specifies the work tasks to be performed by the CONSULTANT, the responsibilities of the CONSULTANT and those of the DEPARTMENT, along with the work task products to be developed by the CONSULTANT and delivered to the DEPARTMENT.

General

As a basic guide for the conduct of a Roadway Study, the CONSULTANT shall generally adhere to the procedures outlined in the FHWA publication, Traffic Reviews for Operational Efficiency, dated August 1982. Study activities not explicitly discussed in the FHWA publication but required in the Roadway Study are specified within the following task descriptions.

Task 1: QUALITATIVE ANALYSIS

A Professional Engineer of the firm shall visit the roadway segment under study during the morning and evening peak traffic periods. This will also include any period during which a problem was indicated by the work order. The Engineer shall make qualitative assessments of roadway operation, particularly in terms of congestion, pedestrian crossings, access management issues, conflicts or any operational characteristics that should be considered in recommending operational improvements.

The CONSULTANT shall conduct a field inventory of each segment under study and prepare a condition diagram on standard DEPARTMENT forms contained in the MUTS or in another

format approved by the DEPARTMENT. The condition diagram shall show the roadway typical section dimensions, including but not limited to, auxiliary turn lane lengths, lane widths, taper lengths, and turning and curb radii. The condition diagram shall show all traffic control devices and other roadway or roadside elements that contribute to the quality of roadway operation, including but not limited to driveways, sidewalks, signs, pavement markings, drainage inlets, buildings, utilities, signal poles, lighting, and other fixed objects. The condition diagram shall be a scaled drawing. If an aerial is used, it must be scaled and any features not readily apparent from the aerial shall be outlined. Any variations in current geometry from the aerial shall also be outlined. Aerials used in diagrams shall be included in the electronic file submittal.

Color photographs shall be taken of representative typical sections. The photographs shall show the lane configuration and any geometric features such as horizontal or vertical curves which may impact operations. The photographs shall be taken facing the approaching traffic. A minimum of 1 photograph shall be taken of each direction of travel on the mainline. Additional photographs shall be taken if needed to show the physical conditions. 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 or PM if any supplemental work tasks are needed prior to commencing work on such tasks.

Task Products:

- Assessment of roadway segment operation
- Condition Diagram
- Color photographs of typical sections
- Final recommendation for roadway improvements and for supplemental work tasks
- An improvement diagram detailing roadway improvements

Task 2: COLLISION ANALYSIS

The CONSULTANT shall obtain the collision reports via the DEPARTMENT'S Crash Analysis Reporting system (CARs) and any available collision database approved by the DEPARTMENT. The CONSULTANT shall prepare a collision summary and collision diagram for the intersection under study. The summary and diagram shall depict as a minimum the most recent 36 months for which data is available. Collision diagrams shall be drawn on standard DEPARTMENT forms contained in the MUTS or on other DEPARTMENT approved forms. Collision diagrams may be drawn on aerials. A collision analysis shall be performed based on the prepared collision summary and diagram.

Task Products:

- Collision summary
- Collision diagram
- Collision analysis

STUDY TYPE IV: COMPOSITE STUDIES

Purpose

The composite study is designed to supplement Study Types I, II, and III as needed and to enable the DTOE or the PM to utilize the services of the CONSULTANT in solving a variety of traffic problems. This study requires the DTOE or the PM and the CONSULTANT to develop the study package for a particular traffic problem by selecting appropriate tasks defined herein.

Basis of Payment

This study is designed to be flexible; therefore each task shall be priced individually. Any combination of tasks may be selected for a particular composite study or as a supplement to Study Types I, II, and III. Payment for each composite study will be the summation of the individual prices for selected tasks.

Period of Performance

The time period allowed for completion of a composite study shall be based on the types of tasks to be performed. The normal period allowed for other types of studies in this contract should be used as a general guide in determining the period of performance for a particular composite study. The PM and the CONSULTANT will determine a mutually acceptable performance period and due date.

Scope of Work

This section specifies the work tasks which may be performed by the CONSULTANT for a particular composite study; the responsibilities of the CONSULTANT and the DEPARTMENT, and the work task products to be developed by the CONSULTANT and delivered to the DEPARTMENT.

Task 1: 8-HOUR TURNING MOVEMENT COUNT (w/Bicycles & Pedestrians)

An 8-Hour TMC shall be taken for those hours encompassing the morning, midday peak and afternoon traffic periods and/or peak periods during which warranting volumes exist and an off-peak period. Each period shall normally consist of the eight (8) consecutive 15-minute intervals (2 hours) during each period which yields the highest total volume of vehicles entering the intersection. Note that the 2-hour period could begin on any quarter hour. For example, the afternoon peak could be from 4:45 PM to 6:45 PM. Counts may be conducted manually or using video technology. The need for additional personnel or devices to count traffic may be authorized as a supplemental Task.

A sketch of sufficient detail shall be made to show the approach lanes, left and right turn lanes, and whether there is a median or other type of separation. If the intersection is signalized the head arrangement and pedestrian features should be shown. The sketch should show whether the intersection is a "T" or a "Plus" type intersection, any offset, and the approximate skew if one exists. North shall be to the top of the page.

Task Products:

- 8-Hour TMCs, all vehicles hourly summary
- 8-Hour TMCs, all vehicles 15-minute summary
- 8-Hour TMCs, trucks only 15-minute summary

- 8-Hour pedestrian volumes, all pedestrians hourly summary
- 8-Hour bicycle volumes, all bicycles hourly summary
- Color photographs of intersection
- Sketch of lane configurations
- If this data is provided as a separate document, it should include a title page, location map, the data presented on standard FDOT forms or as approved by the DEPARTMENT, and any narrative necessary for the understanding or interpretation of the data

Subtask 1A: Additive – Additional Counter

One or more additional persons or devices may be authorized by the DTOE or the PM to complete a TMC on an as needed basis.

Task 2: 4-HOUR TURNING MOVEMENT COUNT (w/Bicycles & Pedestrians)

A 4-Hour TMC shall be taken for a total of 4 hours encompassing the peak traffic periods, as specified by the PM, during which warranting volumes exist. Each period shall normally consist of the eight (8) consecutive 15 minute intervals (2 hours) during each period which yields the highest total volume of vehicles entering the intersection as determined from the 24-hour traffic counts or as directed by the PM. Note that the 2-hour period could begin on any quarter hour. For example, the afternoon peak could be from 4:45 PM to 6:45 PM. Counts may be conducted manually or using video technology. The need for additional personnel or devices to count traffic may be authorized as a supplemental Task.

A sketch of sufficient detail will be made to show the approach lanes, left and right turn lanes, and whether there is a median or other type of separation. If the intersection is signalized the head arrangement and pedestrian features should be shown. The sketch should show whether the intersection is a "T" or a "Plus" type intersection, any offset, and the approximate skew if one exists. North shall be to the top of the page.

Task Products:

- 4-Hour TMCs, all vehicles hourly summary
- 4-Hour TMCs, all vehicles 15-minute summary
- 4-Hour TMCs, trucks only 15-minute summary
- 4-Hour pedestrian volumes, all pedestrians hourly summary
- 4-Hour bicycle volumes, all bicycles hourly summary
- Color photographs of intersection
- Sketch of lane configurations
- If this data is provided as a separate document, it should include a title page, location map, the data presented on standard FDOT forms or as approved by the DEPARTMENT, and any narrative necessary for the understanding or interpretation of the data

Subtask 2A: Additive - Additional Counter

One or more additional persons or devices may be authorized by the DTOE or the PM to complete a TMC on an as needed basis.

Task 3: 24-HOUR TRAFFIC COUNT (Intersection)

The CONSULTANT shall collect traffic count data of each approach to the intersection for a minimum period of 24 hours during typical weekday traffic conditions. Unless otherwise requested, the typical weekday conditions indicate days Tuesday-Thursday. In conducting the counts, the CONSULTANT shall utilize an automatic traffic counter which produces a written record of the traffic volumes and the time of day, either directly or through subsequent interconnection and processing with external electronic hardware. The count data shall be presented in an acceptable tabular form showing 15-minute interval volumes and hourly summaries.

Task Products:

- 24-hour approach volume counts
- If this data is provided as a separate document it should include a title page, location map, the data presented on standard FDOT forms or as approved by the DEPARTMENT, and any narrative necessary for the understanding or interpretation of the data

Subtask 3A: Additive - 24-Hour Traffic Count (Additional Approach)

When an intersection has more than 4 approaches or when there are adjacent legs or driveway openings that should be counted with the regular intersection the DTOE or the PM may authorize the CONSULTANT to collect hourly traffic count data on one or more additional approaches to an intersection for a minimum period of 24 hours. In conducting these supplemental counts, the CONSULTANT shall utilize an automatic traffic counter which produces a written record of the traffic volume and the time of day as defined in Task 4 above.

Task 4: 24-HOUR TRAFFIC COUNT (Roadway)

The CONSULTANT shall collect hourly traffic count data at one isolated location for a minimum period of 24 hours during typical weekday traffic conditions. Unless otherwise requested, the typical weekday conditions indicate days Tuesday-Thursday. In conducting the counts, the CONSULTANT shall utilize an automatic traffic counter which produces a written record of the traffic volumes and the time of day, either directly or through subsequent interconnection and processing with external electronic hardware. The count data shall be presented in an acceptable tabular form showing 15-minute interval volumes and hourly summaries. A pair of one-way streets is considered as one (1) location.

Task Products:

- 24-hour two-way volume count at 1 specified location.
- If this data is provided as a separate document it should include a title page, location map, the data presented on standard FDOT forms or as approved by the DEPARTMENT, and any narrative necessary for the understanding or interpretation of the data.

Subtask 4A: Additive - Additional 24-Hour Period

If the basic 24-Hour Machine Count (intersection or isolated) needs to be counted for additional days this work item may be authorized. Each unit shall be for one additional 24-hour period.

Task 5: 7-DAY CONTINUOUS TRAFFIC COUNT

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, an acceptable tabular presentation of directional traffic volumes shall be developed showing 15-minute interval volumes and hourly summaries over the 7 consecutive day period. A graphical presentation shall be developed showing hourly interval volumes over the 7 consecutive day period. The 7-day period shall not include a holiday unless otherwise directed by the DTOE or the PM. A count station is 1 location, 2 directions, or in the case of one-way pairs, 1 count for each direction.

Task Products:

- 7-day graphs and tables.
- If this data is provided as a separate document it should include a title page, location map, the data presented on standard FDOT forms or as approved by the DEPARTMENT, and any narrative necessary for the understanding or interpretation of the data.
- Subtask 5A: Additive - Additional Traffic Count
- Additional 7-Day Continuous Traffic Count requested for the same route and/or study.

Task 6: INTERSECTION DELAY ANALYSIS (Side Street Approach)

An intersection delay analysis of the critical side street approach shall be made for a total of the 3 hours encompassing the morning, afternoon and off-peak traffic periods as determined from the 24 hour counts or as directed by the DTOE or the PM. This study shall be performed in accordance with the MUTS. This study provides the average stopped and approach delay per vehicle.

Task Products:

- Intersection delay analysis for one side street approach. This may include a mainline left turn lane as the engineer determines appropriate for the intersection.
- If this data is provided as a separate document, it should include a title page, location map, the data presented on standard FDOT forms or as approved by the DEPARTMENT, and any narrative necessary for the understanding or interpretation of the data.

Subtask 6A: Additive - Additional Approach

A delay analysis for an additional approach, such as a mainline left turn lane, based on the requirements stated in Task 7 above.

Task Product:

- Delay analysis for any one designated approach.

Task 7: PEDESTRIAN AND BICYCLE VOLUME COUNT

A pedestrian and bicycle volume count shall be made for a total of 8 hours encompassing the

morning and evening peak traffic periods and/or the peak pedestrian and bicycle volume periods. A mid-block study will be counted and treated as 1 location. An intersection will be counted and treated as 1 location. (See MUTS).

Task Products:

- 8-hour pedestrian and bicycle volume count.
- If this data is provided as a separate document it should include a title page, location map, the data presented on standard FDOT forms or as approved by the DEPARTMENT, and any narrative necessary for the understanding or interpretation of the data.

Task 8: VEHICLE GAP SIZE

A vehicle gap size 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. (See MUTS).

Task Products:

- 8-hour vehicle gap size study.
- If this data is provided as a separate document it should include a title page, location map, the data presented on standard FDOT forms or as approved by the DEPARTMENT, and any narrative necessary for the understanding or interpretation of the data.

Task 9: FIELD INTERSECTION INVENTORY (Condition Diagram)

The CONSULTANT shall conduct a field inventory of each intersection under study and prepare a condition diagram on standard DEPARTMENT forms contained in the MUTS or in another format approved by the DEPARTMENT. The condition diagram shall show the intersection geometry and dimensions, including but not limited to, auxiliary turn lane lengths, lane widths, taper lengths, and turning and curb radii. The condition diagram shall show all traffic control devices and other roadway or roadside elements that contribute to the quality of intersection operation, including but not limited to driveways, sidewalks, signs, pavement markings, drainage inlets, buildings, utilities, signal poles, lighting, and other fixed objects. The condition diagram shall be a scaled drawing. If an aerial is used, it must be scaled and any features not readily apparent from the aerial shall be outlined. Any variations in current geometry from the aerial shall also be outlined. Aerials used in diagrams shall be included in the electronic file submittal.

Task Product:

- Scaled condition diagram

Task 10: COLLISION ANALYSIS

The CONSULTANT shall obtain the collision reports via the DEPARTMENT'S Crash Analysis Reporting system (CARs) and any available collision database approved by the DEPARTMENT. The CONSULTANT shall prepare a collision summary and collision diagram

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for the study location. The summary and diagram shall depict as a minimum the most recent 12 months for which data is available. Collision diagrams shall be drawn on standard DEPARTMENT forms contained in the MUTS or on other DEPARTMENT approved forms. Collision diagrams may be drawn on aerials. A collision analysis shall be performed based on the prepared collision summary and diagram.

Task Products:

- Collision summary
- Collision diagram
- Collision analysis

Subtask 10A: Additive - Additional 12 Month Analysis

When additional years of data are to be analyzed this activity may be authorized with Task 12.

Task 11: QUALITATIVE ASSESSMENT OF INTERSECTION OPERATION

A Professional Engineer of the firm shall visit the intersection/interchange under study during the morning and evening peak traffic periods. This will also include any period during which a problem was indicated by the work order. The Engineer shall make qualitative assessments of intersection operation, particularly in terms of queue lengths, delays, phasing, conflicts or any operational characteristics that should be considered in recommending the need for a traffic signal or other operational improvements.

The CONSULTANT shall conduct a field inventory of each intersection under study and prepare a condition diagram on standard DEPARTMENT forms contained in the MUTS or in another format approved by the DEPARTMENT. The condition diagram shall show the intersection geometry and dimensions, including but not limited to, auxiliary turn lane lengths, lane widths, taper lengths, and turning and curb radii. The condition diagram shall show all traffic control devices and other roadway or roadside elements that contribute to the quality of intersection operation, including but not limited to driveways, sidewalks, signs, pavement markings, drainage inlets, buildings, utilities, signal poles, lighting, and other fixed objects. The condition diagram shall be a scaled drawing. If an aerial is used, it must be scaled and any features not readily apparent from the aerial shall be outlined. Any variations in current geometry from the aerial shall also be outlined. Aerials used in diagrams shall be included in the electronic file submittal.

Color photographs shall be taken of each approach. The photographs shall show the lane configuration, STOP sign/bar location and condition, traffic signals and other special beacons or devices used to control traffic. The photographs shall be taken facing the approaching traffic. A minimum of 1 photograph shall be taken of each approach. Additional photographs shall be taken if needed to show the physical conditions. 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 or the PM the need for appropriate supplemental work tasks.

The CONSULTANT shall prepare an improvement diagram detailing the study recommendations. This diagram shall include, but not limited to proposed sign locations, design(s) of non-standard MUTCD signs, proposed pavement marking locations and proposed

turn lane locations/dimensions.

Task Products:

- Assessment of intersection operation.
- Condition Diagram
- Color photographs of intersections.
- Final recommendation for intersection improvement(s) and for supplemental work tasks.
- An improvement diagram detailing intersection improvements.

Task 12: HIGHWAY LIGHTING JUSTIFICATION

A highway lighting justification analysis shall be performed in accordance with the MUTS. Should lighting be warranted on a corridor based on the geometric and operational factors score or night-to-day collision ratio, a cost estimate and Net Present Value calculation shall be completed. The report will also include a summary of the geometric, operational, and environmental factors on the roadway which may contribute to the need for lighting.

Task Product:

- Highway lighting justification report

Task 13: DEVELOPMENT OF ALTERNATIVES AND RECOMMENDATIONS

Utilizing the products from other tasks in a composite study, the CONSULTANT shall develop and analyze feasible and appropriate alternatives, which address solutions to the defined problem(s). A minimum of 3 practical alternatives will be developed and analyzed for each composite study. If three practical alternatives do not exist, the CONSULTANT shall advise the DTOE or the PM and make a statement to this effect in the report. Based on this analysis the CONSULTANT shall recommend one of the alternatives. The CONSULTANT shall document the results and recommendations from all tasks in a Composite Study in a written report. If the proposed change(s) involve revisions to the geometrics, then a sketch should be provided for each alternative improvement concept.

Task Products:

- Development of alternatives/improvement concepts (sketches)
- Analysis of alternatives
- Recommended alternative

Task 14: NO-PASSING ZONE STUDY

The CONSULTANT shall prepare a No-Passing Zone Study report based on Section 3B-02 of the MUTCD entitled "No-Passing Zone Pavement Markings and Warrants" and of the MUTS. Payment shall be made based on one (1) two-way mile of a given roadway.

Task Product:

- No-Passing Zone study report
- The limits of the existing no-passing zone in both directions for the given roadway segment in table and diagram format

- The limits of the recommended no-passing zones required in both directions for the given roadway segment in table and diagram format

Subtask 14A: Additive – Additional Mile

Task Product:

- The limits of the recommended no-passing zones required in both directions for each additional two-way mile of the given roadway.

Task 15: SAFE CURVE SPEED STUDY

The CONSULTANT shall prepare a Safe Curve Speed Study report based on Chapter 10 of the MUTS. Payment shall be made based on one (1) two-way curve section of a given roadway.

Task Product:

- Safe Curve Speed Study report

Task 16: SPOT SPEED STUDY

The CONSULTANT shall conduct a Spot Speed Study as set forth in the MUTS. The Study shall include a minimum sample of 100 vehicles (free flow traffic unless otherwise specified) for each direction of travel. The CONSULTANT will present this data on an approved form and/or format. The data is to be obtained by a radar speed gun or other approved similar device. The CONSULTANT may also obtain spot speeds using fixed-mounted radar, pneumatic tubes placed across travel lanes, or other electromagnetic wave detection devices. When used, these devices should collect 24 hours of speed data and peak periods shall be excluded. The consultant shall also take a photo of the typical section at the spot speed location(s).

Task Products:

- Spot speed data for 1 study location
- Photograph of roadway at each site

Subtask 16A: Additive – Additional Spot Speed

Additional Spot Speeds requested for the same route and/or study.

Subtask 16B: SPEED ZONE STUDY REPORT

The CONSULTANT shall prepare a Speed Zone Study report based on the spot speed study data and the FDOT manual, SPEED ZONING FOR HIGHWAYS, ROADS AND STREETS IN FLORIDA, current version, and in accordance with the MUTS. Using these guidelines the CONSULTANT shall prepare a report with recommendations on changes to existing speed zones. Safety history and design elements shall be discussed as pertinent to any speed limit changes recommended. Existing speed zone data will be furnished by the DEPARTMENT. The inventory of existing speed limit signs will be the responsibility of the CONSULTANT.

Task Product:

- Speed zone study report

Task 17: LEFT TURN PHASE WARRANT ANALYSIS

The CONSULTANT shall conduct a left turn phase warrant analysis for two (2) approaches of

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the intersection (e.g., northbound and southbound) based on NCHRP Report 457 and Section 3.10 of the TEM. This study shall result in a recommendation for the appropriate left turn treatment including but not limited to signal head type, coordination, and phasing by time of day if appropriate. This task shall be an additive to a qualitative analysis at a signalized intersection.

Task Products:

- Critical Gap study
- Delay Analysis
- Left turn phase warrant forms
- Time-of-day phasing recommendation
- 24-hour through and left turn volume counts

Subtask 17A: Additive – Additional 2 approaches

The CONSULTANT shall conduct a left turn phase warrant analysis for the other 2 approaches of the intersection (i.e., eastbound and westbound).

Task 18: TRAFFIC SIGNAL WARRANT EVALUATION

The CONSULTANT shall conduct an evaluation of traffic signal warrants as outlined in the MUTCD and MUTS and make a recommendation based on the evaluation. This task shall be an additive to a qualitative analysis at an unsignalized intersection.

Task Products:

- Delay Analysis
- Traffic Signal Warrant Recommendation

Task 19: INTERSECTION CONTROL EVALUATION

The CONSULTANT shall conduct an evaluation of alternative intersection control configurations using the CAP-X and SPICE tools provided by the DEPARTMENT. Should more than one control strategy pass the initial screening, additional evaluation will be negotiated on a case by case basis.

Task Products:

- Recommended intersection control strategy or strategies to be advanced

Task 20: MISCELLANEOUS TASKS

This task shall involve items that are generally difficult to anticipate at the initiation of a work order. Compensation for tasks issued under this item shall be negotiated on a case by case basis.

STUDY TYPE V: ARTERIAL RETIMING

Purpose

This is intended to provide the DEPARTMENT with specialized expertise in the retiming of arterials in District 5 upon request by the DTOE or the PM.

Basis of Payment

Payment is based upon the unit price for each arterial system (assuming a minimum of three intersections in the system) plus an additive for each additional intersection within that arterial/network. The established unit price for each system will be considered full compensation for all work required to perform this study.

Period of Performance

The normal period allowed for the completion of an arterial retiming study is six (6) weeks (for a system of three intersections). For each additional signalized intersection an additional one (1) week of study time will be authorized.

Scope of Work

This section specifies the work task to be performed by the CONSULTANT and the responsibilities of the CONSULTANT and the DEPARTMENT.

General

IMSA Level II Certification required to complete tasks under this study type

Task 1: SYSTEM OPERATION REVIEW AND TRAFFIC SIGNAL EQUIPMENT INVENTORY

Review and document the type, age, condition, capability of the equipment, and existing timing plan at each intersection within the arterial, existing phasing, laneage and lane assignments, and the coordinating medium on the Department's inspection form. Report to the DTOE or the PM any deficiencies noted upon discovery.

Task Products:

- Traffic signal equipment inventory.
- Existing traffic signal timing/phasing plan
- Sketch of lane configurations.

Subtask 1A: Additive Intersection

Additional intersection for same route and/or study.

Task 2: ANALYSIS, IMPLEMENTATION AND DOCUMENTATION

Determine the optimum system timing pattern(s) for the optimum cycle length during different times of the day/week. When a system analysis is performed, the necessary settings to be developed will include but not limited to the following:

- Cycle Lengths
- Splits
- Offsets

- Time of Day Plan
- Day of Week Plan
- Force Offs
- Permissives

These parameters will be developed for the following timing plan periods:

- Day Plan: Inbound & Outbound Peak Hour(s) and Off-Peak Hour
- Week Plan: Day plan to be implemented for each day of the week

For the purpose of this task, the following definitions apply:

- A traffic control timing pattern is a set of cycle length(s), splits and offsets for a section.
- A section is a portion of a traffic control system which can be controlled by a single set of timing parameters.

An analysis shall consist of at least the following steps:

- Analyze and design isolated intersection timings for each intersection.
- Analyze and design coordinated intersection (system) timings with Synchro (or a similar design tool/software that is approved by the Department and the Maintaining Agency) with Existing Phasing.

The CONSULTANT is responsible for selecting all input values required for the analysis. The CONSULTANT must use their own computer for all analyses to be performed under this study (the software used must be approved by the DTOE or the PM). Submit electronic files of all input/output timing development runs and data files (i.e., initial and final runs); along with any link/node diagrams. The format of the timing charts will be approved by the DEPARTMENT.

All traffic count data required for the purpose of this study will either be provided by the DEPARTMENT or will be obtained by the CONSULTANT under Study Type IV. In addition to including count data with retiming report, separate PDF files (per intersection) shall be provided with initial submittal.

The CONSULTANT will obtain from the Maintaining Agency existing controller timings for before evaluations, where applicable.

The CONSULTANT shall provide the DTOE or the PM and Maintaining Agency two copies of the documentation for each of the timing patterns in an acceptable format. The report shall contain, but not limited to the following information:

- Executive Summary
- Optimum controller and coordination timing that can be implemented on existing hardware.
- Master Clock Chart (Hardwire, TBC, UTCS, CLS)
- Link/node diagrams
- Data files

- Arterial analysis and documentation

After acceptance of the initial timings and patterns by the DTOE or the PM and Maintaining Agency this task includes entering the intersection, system timings, developed by the CONSULTANT into the controller units, coordination units and master units by a IMSA - Level II signal technician. The CONSULTANT shall notify the Maintaining Agency prior to implementation and request their presence during the implementation.

Also perform fine tuning of implemented timing(s) for each arterial based on field observation of the traffic operation during the morning and evening peak hours. The traffic engineer will observe the operation of the arterial for each timing pattern. The traffic engineer shall be available to investigate and fine-tune any adjustments for a period of 30 days after the submittal of the final report.

Should an existing controller, coordination unit, or master unit be inoperative or additional hardware or cabinet modifications be required at an intersection the CONSULTANT will give verbal notification of the problem to the PM within the same day. Document in the report the nature, extent and probable solution(s) to the problem(s) within one week.

The CONSULTANT shall provide the DTOE or the PM and Maintaining Agency two copies of the final documentation for each of the timing patterns in an acceptable format. One of the reports is to remain in each controller cabinet. The report shall contain, but not limited to the following information:

- Final Implemented Timings
- Day Plans
- Week Plan

At the completion of the study, submit to the DTOE or the PM and Maintaining Agency two (2) copies of a report (in an acceptable format) containing the following information:

- Study Summary
- Equipment Inventory
- Final Intersection and System Timings
- 24-hour, 7-day counts arrayed in an acceptable format
- 8-hour turning movement count with 15 minute summary arrayed in an acceptable format

Task Product:

- Final report that is signed, sealed and dated by a registered professional engineer
- Count data in acceptable format

Subtask 2A: Additive Intersection

Additional intersection for System Timing Plan for same route and/or study. Any Composite Study Task may be used as a Supplemental Work Task for Study Type II.

Subtask 2B: Additive Plan (Weekend)

Additional System Timing Plan for same route and/or study on a weekend day (Saturday or

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Sunday).

Subtask 2C: Additive Intersection (Weekend)

Additional intersection for a Weekend System Timing Plan for same route and/or study.

Task 3: ANALYSIS AND DOCUMENTATION FOR ONE ISOLATED SIGNAL

Determine the optimum system timing settings for FREE operation of one (1) isolated traffic signal. When a signal analysis is performed, the necessary settings to be developed will include but not limited to the following:

- Max Green I/II
- Min Green
- Red/Yellow Clearance Intervals
- Passage Time
- Dual Entry
- Pedestrian Intervals

For the purpose of this task, the following definitions apply:

- Signal timing settings include minimum green, maximum I/II green, vehicle clearance intervals, pedestrian clearance intervals, gap timing and other settings needed for FREE operation of an isolated traffic signal.
- Basic signal timing parameters are the necessary settings defined in Chapter 6 of Signal Timing Manual – Second Edition, NCHRP Report 812.

An analysis must consist of at least the following steps:

- Analyze and design isolated intersection timings.
- Develop uncoordinated intersection signal timing, with existing phase sequence and geometry, and recent count data, using Synchro (or a similar design tool/software that is approved by the DEPARTMENT and the Maintaining Agency). TruTraffic analysis is not required

The CONSULTANT is responsible for selecting all input values required for the analysis. The CONSULTANT must use their own computer for all analyses to be performed under this study (the software used must be approved by the DTOE or the PM). Submit electronic files of all input/output timing development runs and data files (i.e., initial and final runs); along with any link/node diagrams. The format of the timing charts will be approved by the DEPARTMENT.

Time of Day and Day of Week plans are required only if included with a supplemental task. The CONSULTANT is responsible for identifying the need for any timing plans for recurring events.

The CONSULTANT is responsible for developing single and multiple maximum greens based on United States Department of Transportation, Federal Highway Administration (FHWA) Traffic Signal Timing Manual and/or Transportation Research Board National Cooperative

Highway Research Program (NCHRP) Signal Timing Manual.

The CONSULTANT should select the optimum signal timing settings that are needed to increase throughput, reduce traffic delays, improve travel time reliability, and reduce crashes.

All traffic count data required for the purpose of this study will either be provided by the DEPARTMENT or will be obtained by the CONSULTANT under Study Type IV. In addition to including count data with retiming report, separate PDF files shall be provided with initial submittal.

The CONSULTANT will obtain from the Maintaining Agency existing controller timings for before evaluations, where applicable.

Before acceptance of the signal timing settings, The CONSULTANT must provide the DEPARTMENT'S Project Manager and Maintaining Agency two (2) copies of the preliminary report in acceptable format. The preliminary report shall be similar in content to the final report and include optimum controller timings that can be implemented on existing hardware.

Field implementation of the signal timing settings, developed by the CONSULTANT, is required only if included by the DEPARTMENT in a supplemental task.

Should an existing controller, coordination unit, or master unit be inoperative or additional hardware or cabinet modifications be required at an intersection the CONSULTANT will give verbal notification of the problem to the PM within the same day. Document in the report the nature, extent and probable solution(s) to the problem(s) within one week.

After acceptance of the signal timing settings by the DEPARTMENT'S Project Manager and Maintaining Agency, submit to the DEPARTMENT'S Project Manager and Maintaining Agency two (2) copies of the final report (in an acceptable format) containing, but not limited to the following information:

- Executive Summary
- Signal Overview Map
- Intersection Inventory
- Signal analysis and documentation
- Final intersection signal timings and settings
- 24-hour, 7-day counts arrayed in an acceptable format if included
- 8-hour turning movement count arrayed in an acceptable format
- Appendix (Count data, field sheets, clearance calculations, Synchro reports)

Task Products:

- Preliminary Report
- Final report that is signed, sealed and dated by a Professional Engineer

Subtask 3A: Additive Timing Plan

Develop one (1) additional uncoordinated intersection signal timing plan for the intersection in task 3 to operate in a different time period as determined by the DEPARTMENT'S PM.

Subtask 3B: Isolated Intersection Implementation

Final implementation of the intersection signal timing settings, developed by the CONSULTANT.

After acceptance of the initial timings and patterns by the DTOE or the PM and Maintaining Agency this task includes entering the intersection, system timings, developed by the CONSULTANT into the controller units, coordination units and master units by a IMSA - Level II signal technician. The CONSULTANT shall notify the Maintaining Agency prior to implementation and request their presence during the implementation.

STUDY TYPE VI: PLANS DESIGN

The CONSULTANT shall produce Traffic Operations Construction Plans which illustrate recommended improvements approved by the DTOE. The plans shall be of sufficient detail to allow the DEPARTMENT to use the plans to implement and construct the recommended improvements. The plans shall indicate proposed improvements, dimensions, and other necessary information for the improvements relative to the existing conditions. Pay items and quantities shall be included. The plans shall be ready to let to contract and shall be signed, dated and sealed. The DEPARTMENT will provide a base drawing of existing conditions, copies of plans made from microfilm, the field survey to produce same or request the CONSULTANT to perform the Task for the Field Survey.

Standard Traffic Operations Design Process:

Prior to beginning the design, the CONSULTANT will meet with a DEPARTMENT representative on-site to determine the best approach for the design.

The CONSULTANT shall call-in utility locates and provide DEPARTMENT with all utility contact names, phone numbers and e-mail addresses. CONSULTANT shall verify utility contact names and phone numbers prior to DEPARTMENT submittal.

The CONSULTANT shall submit the initial plan in PDF format to the DEPARTMENT for review. DEPARTMENT staff shall review and if the design meets the scope discussed during the field meeting, the plan will be sent to the local maintenance unit and maintaining agencies for their review. If the initial design does not reflect the approach discussed during the field meeting, then a resubmittal may be required. After a two week review period, the DEPARTMENT will forward review comments to the CONSULTANT.

Subsurface Utility Engineering (SUE) (if needed) should be performed after initial plan submittal. The designer has the option to perform the SUE prior to the initial submittal if he/she desires. If comments generated by the Department, after the initial review, result in the need for additional SUE work, an additional task may not be provided. Therefore, it is recommended to coordinate with the Traffic Operations design staff prior to any SUE work. CONSULTANT designer should attend the SUE to adjust design if conflicts are encountered.

After initial review, the CONSULTANT shall schedule a utility field meeting. Attendees shall include, but not limited to, utility owners, maintaining agencies, and Traffic Operations design staff. The purpose of the meeting is to discuss design issues and identify possible utility conflicts. Utility conflict avoidance is the goal of all designs; however, if total avoidance of utilities is not possible, the simplest solution should be agreed upon. If the proposed utility involvement is minor, the parties will agree at the utility field meeting as to a plan of action, and the CONSULTANT shall document the proposed actions by utilities in meeting minutes.

The CONSULTANT shall submit the final plan (PDF via e-mail) for approval. Upon approval, the CONSULTANT shall submit the remainder of the deliverables.

Traffic Operations Construction Plans for improvements at an intersection shall be English and be prepared on a standard size reproducible plan sheet (11" x 17") on a scale of 1"=40'. Plan files are to be delivered to the DEPARTMENT electronically in a Microstation CADD format (XM or less). Typical plan detail to be shown shall include, but not be limited to the following:

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existing and proposed roadway, right-of-way lines, typical section, traffic signal poles, displays, controller cabinets, loops, loop lead-ins, pull boxes, conduit, signing, pavement markings, turn lanes, sidewalks, pre-construction notes, general notes, and utility names and contacts.

Task Products (Initial Submittal):

- Traffic Operations construction plans (PDF format) e-mailed to Project Manager
- Tabulation of quantities (PDF or Excel format) e-mailed to Project Manager

Task Products (Final Submittal):

- Reproducible Traffic Operations construction plans.
- Two copies of the Traffic Operations construction plans (S/S & dated).
- All electronic files (Microstation Files, Excel quantity list, structural analysis output, and scanned calculations, etc.).
- Hardcopy of structural calculations (if not submitted on Compact disk).
- Tabulation of quantities.
- Utility Meeting Minutes

Purpose

This design is intended to provide a plan for the construction of a Traffic Operations improvement using Traffic Operations contract.

Basis of Payment

Traffic Operations construction plans shall be authorized by the DTOE or PM on an intersection by intersection basis. The established unit price per intersection shall be considered full compensation for all work required to perform this design.

Period of Performance

The normal period of performance allowed for completion of Traffic Operations construction plans shall be four weeks for the initial plan and three weeks (upon receipt of comments from DEPARTMENT) for final plans for a single intersection, with additional time for sub tasks.

Additional Time for Sub Tasks

Sub Task 1A - One (1) Week

Sub Task 2A - One (1) Week

The normal period of performance allowed for completion of a Pushbutton Survey shall be four weeks for the first review and two weeks for completed surveys for a single intersection. The DTOE or the PM may allow additional time beyond the normal period for supplemental work tasks or as other conditions warrant.

Scope of Work

This section specifies the work tasks to be performed by the CONSULTANT, the responsibilities of the CONSULTANT and the DEPARTMENT, the products to be developed by the CONSULTANT and delivered to the DEPARTMENT at the completion of the Pushbutton Construction Plan.

Task 1: SIGNAL DESIGN

A Professional Engineer of the firm shall be in responsible charge for the design of a traffic signal at the intersection. The signal plan sheet is to include but not limited to signal operating plan, controller assembly, controller timings, loops, loop lead-ins, conduit, pole schedule, signal head details, signing and pavement marking, pole location rod readings, a rod reading for the high point of the road and a summary of pay items. The CONSULTANT is responsible for all signal pole calculations using an approved FDOT structural software. The output shall be provided to the DEPARTMENT for all signal pole designs.

Sub Task 1A: Pedestrian Features

The traffic signal design is to include pedestrian features.

Task 2: ROADWAY DESIGN

A Professional Engineer of the firm shall be in responsible charge for the design of a turn lane or median modification at the intersection. The plan sheet is to include but not limited to typical section, plan view, curb details, signing and pavement marking, and a summary of pay items. The existing and proposed cross sections are to be considered in the design. Turn lanes are to be designed per the current FDOT Design Standards.

Sub Task 2A: Additional Turn Lane

Each additional Turn Lane to be designed at the intersection.

Task 3: SURVEY FOR A SIGNAL DESIGN

The survey is to include the necessary alignment and topographic information for a base drawing for a signal design. The survey is to be submitted as a Microstation file with the aboveground utilities and the utilities' vertical heights on a separate Microstation Level from the rest of the survey.

- Intersection Survey - 400' entering direction (main street)
- 150' exiting direction (main street)
- 100' either direction (side street)

Task 4: SURVEY FOR A ROADWAY DESIGN

The survey is to include the necessary alignment and topographic information for a base drawing for turn lanes. Cross sections may be needed at critical areas. The length of the survey will be determined by the length of the turn lane that is to be constructed. In addition, should a signal survey be requested with a roadway survey, the cost of the roadway survey will include the cost of the signal survey at no additional cost to the DEPARTMENT. The survey is to be submitted as a Microstation file with the aboveground utilities and the utilities' vertical heights on a separate Microstation Level from the rest of the survey.

Task 5: STRUCTURAL ANALYSIS FOR SIGNAL IMPROVEMENTS

The analysis is to evaluate the capacity of an existing signal structure (diagonal span, box span or mast arm) to support modifications as recommended in a traffic operational study (e.g. backplates, signal head configuration, blank-out signs) using the procedures from FDM 261.7

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and FDOT Structures Manual Volume 3. This task shall include review of any available plans provided by the DEPARTMENT, as well as field review to obtain necessary additional measurements (signal head heights, pole type/lengths). Up to two (2) configurations may be evaluated (e.g. signal head changes only vs. signal heads plus backplates). Percent change in loading versus existing shall be provided if structural capacity is deemed insufficient.

Task Products:

- Ancillary Structures Report
 - Signed and sealed technical memo (summary of findings, conclusion and recommendation, etc.)
 - Appendix including existing plans, calculations, assumptions, etc.

STUDY TYPE VII: SUBSURFACE SERVICES

Upon 72 hours of verbal notification (followed by a copy of a written work order), the CONSULTANT will be available to begin subsurface services for the purpose of signal pole placement.

The CONSULTANT shall be responsible for providing subsurface services for the purpose of placing signal poles in locations so as not to conflict with the existing utilities. The CONSULTANT shall coordinate with the local utilities, municipalities, maintaining agency, and the DEPARTMENT while obtaining any necessary permits to allow the CONSULTANT to work in existing streets, roads, etc. The CONSULTANT shall call in utility locates for 400 feet from the back of the stop bars on the main line and for 100 feet from the back of stop bars on the side street. The CONSULTANT shall set up an on-site utility meeting with all involved parties prior to beginning the excavation.

The CONSULTANT shall insure that all operators have received the appropriate training for this work.

Purpose

The subsurface service is to verify the appropriate placement of signal poles prior to the design process. In this way, construction can begin immediately after the design and review.

Basis of Payment

The subsurface service shall be authorized by the DTOE or the PM on an intersection by intersection basis. The established unit price per intersection shall be considered full compensation for all work required to perform this task.

Period of Performance

The normal period of performance shall be twenty-one (21) calendar days plus three (3) days per additional pole location. All holiday days acknowledged by the DEPARTMENT shall apply to the CONSULTANT as well.

Scope of Work

This section specifies the work tasks to be performed by the CONSULTANT, the responsibilities of the CONSULTANT and the DEPARTMENT, the products to be developed by the CONSULTANT and delivered to the DEPARTMENT at the completion of the subsurface service.

Task 1: SUBSURFACE UTILITY ENGINEERING (SUE)

The CONSULTANT is to obtain and verify the location for one signal pole by excavation. The CONSULTANT is to excavate using a method enabling vertical, as well as horizontal exploration through the cut. The excavation should occur in such a manner as to prevent any damage to wrappings, coatings, or other protective coverings, such as by a vacuum excavation method, hand digging, etc. The CONSULTANT will be responsible for any damage to the utility structure during the excavation. After the excavation is complete, the CONSULTANT will backfill and compact with select material found around the utility structure.

The SUE is complete when the location for one (1) signal pole has been agreed upon by the DEPARTMENT. The design CONSULTANT shall work with the subsurface CONSULTANT (preferably on-site) to find a clear location. Slight adjustment of the proposed pole location may be required and is to be included in the original task assignment for the intersection quadrant.

Task Products:

- The location of the poles relative to existing landmarks shown on a plan sheet
- The name, number and contact information for all utility companies

Sub Task 1A: Additive – Additional Pole Location

An additional pole location is to be determined at the same intersection. This location is to be verified using the requirements established in Task 1.

Sub Task 1B: Additive – Concrete/Asphalt Removal and Restoration

In the event that it becomes necessary to remove concrete or asphalt in order to excavate, the CONSULTANT will neatly cut and remove the existing pavement by cutting an area not to exceed 225 square inches.

At the completion of the excavation, the CONSULTANT will provide complete restoration of the pavement, within the limits of the original cut at the time of backfill.

Task Product:

- Concrete or asphalt restored to original appearance

Task 2: GEOTECHNICAL SERVICES FOR MAST ARM DESIGN

The CONSULTANT shall provide geotechnical services at one location (one boring) as specified in this section at the request of the DTOE or the PM.

All work performed by the CONSULTANT shall be in accordance with DEPARTMENT standards, the Soils and Foundations Handbook, related directives, Federal Highway Administration Checklist and Guidelines for review of Geotechnical Reports and Preliminary Plans and Specifications, and Florida Department of Transportation Standard Indexes for Work Zone Traffic Controls. Prior to beginning the investigation and after the Notice to Proceed is given, the CONSULTANT shall submit an investigation plan to the PM to review the project scope and FDOT requirements. The investigation plan shall include, but not be limited to, the proposed boring locations and depths, and all existing geotechnical information from available sources to generally describe the surface and subsurface conditions of the projects site.

The CONSULTANT shall notify the PM in adequate time to schedule a representative to attend the field work.

Field Investigation

The geotechnical investigation is for one mast arm drilled shaft foundation. The investigation shall be prepared with the following guidelines:

One SPT boring (5' centers) or CPT sounding at the proposed signal foundation (average depth 30'-40').

Laboratory Testing

All laboratory testing will be performed in accordance with Soils and Foundations Handbook, Florida Sampling and Testing Methods or ASTM or by related directives. Laboratory testing will include appropriate tests as required by the needs of the project.

Structures Report

The structures report shall contain the following discussions as appropriate for the assigned project phase:

- Summary of structure background data
- Evaluation of structure foundation alternatives including the following:
 - Drilled shafts - various sizes
- Recommendation for most practical size foundation type will be given along with the basis for selection
- Provide soil parameters for use by the structural engineer or verify that default values for using the standards are acceptable
- Report of SPT boring/CPT sounding sheet, including notes addressing any specialized construction considerations
- Summary of soil test results
- Construction information addressing the following items:
 - Recommendations for shaft installation, or other site preparation soils-related construction considerations with plan sheets as necessary
- An Appendix which includes SPT boring profiles/CPT soundings, data from any specialized field tests, laboratory test data sheets, engineering analysis notes/sample calculations, a complete FHWA check list and any other pertinent information

A preliminary structures report shall be submitted to the PM for review prior to incorporation of the CONSULTANT's recommendations in the project design.

Final Analysis and Report for Geotechnical Work

The Final Geotechnical Report will incorporate the DEPARTMENT's comments and contain any additional field or laboratory test results, recommended preliminary foundation alternatives along with design parameters and special provisions for the construction plans. After review, the report will be submitted in a final form that will include the following:

- All original plan sheets
- Two sets of record prints

- All reference and support documentation used in preparation of contract plans package
- Two copies of final structures report
- Electronic copy of the final report in Adobe Acrobat PDF format and any associated CADD files in DGN format.

Task Product:

- Geotechnical services for mast arm design as described at one location (one boring)

Sub-Task 2A: ADDITIONAL GEOTECHNICAL DESIGN SERVICES

Geotechnical services are required at one (1) additional location (additional boring including appropriate laboratory testing) including soil parameters for use by the structural engineer or verification of the soil default values for use of the mast arm standards.

Sub Task 2B: CONCRETE/ASPHALT REMOVAL AND RESTORATION

In the event that it becomes necessary to remove concrete or asphalt in order to excavate, the CONSULTANT will neatly cut and remove the existing pavement by cutting an area not to exceed 225 square inches.

At the completion of the excavation, the CONSULTANT will provide complete restoration of the pavement, within the limits of the original cut at the time of backfill

Task Product:

- Concrete or asphalt restored to original appearance.

Task 3: GEOTECHNICAL SERVICES FOR STRAIN POLE DESIGN

The CONSULTANT shall provide geotechnical services at one location (one boring) as specified in this section at the request of the DTOE or the PM.

All work performed by the CONSULTANT shall be in accordance with DEPARTMENT standards, the Soils and Foundations Handbook, related directives, Federal Highway Administration Checklist and Guidelines for review of Geotechnical Reports and Preliminary Plans and Specifications, and Florida Department of Transportation Standard Indexes for Work Zone Traffic Controls. Prior to beginning the investigation and after the Notice to Proceed is given, the CONSULTANT shall submit an investigation plan to the PM to review the project scope and FDOT requirements. The investigation plan shall include, but not be limited to, the proposed boring locations and depths, and all existing geotechnical information from available sources to generally describe the surface and subsurface conditions of the projects site.

The CONSULTANT shall notify the PM in adequate time to schedule a representative to attend the field work.

Field Investigation

The geotechnical investigation is for one strain pole location. The investigation shall be prepared with the following guidelines:

One SPT boring (5' centers) or CPT sounding at the proposed pole location (average depth 25').

Laboratory Testing

All laboratory testing will be performed in accordance with Soils and Foundations Handbook, Florida Sampling and Testing Methods or ASTM or by related directives. Laboratory testing will include appropriate tests as required by the needs of the project.

Final Analysis and Report for Geotechnical Work

The Final Geotechnical Report will incorporate the DEPARTMENT's comments and contain any additional field or laboratory test results along with design parameters and special provisions for the construction plans. After review, the report will be submitted in a final form that will include the following:

- All original plan sheets
- Two sets of record prints
- All reference and support documentation used in preparation of contract plans package
- Electronic copy of the final report in Adobe Acrobat PDF format and any associated CADD files in DGN format.

Task Product:

- Geotechnical services for strain pole design as described at one location (one boring)

Sub-Task 3A: ADDITIONAL GEOTECHNICAL DESIGN SERVICES

Geotechnical services are required at one (1) additional location (additional boring including appropriate laboratory testing) including soil parameters for use by the structural engineer.

Sub Task 3B: CONCRETE/ASPHALT REMOVAL AND RESTORATION

In the event that it becomes necessary to remove concrete or asphalt in order to excavate, the CONSULTANT will neatly cut and remove the existing pavement by cutting an area not to exceed 225 square inches.

At the completion of the excavation, the CONSULTANT will provide complete restoration of the pavement, within the limits of the original cut at the time of backfill.

Task Product:

- Concrete or asphalt restored to original appearance

STUDY TYPE VIII: TRAFFIC VOLUME AND CLASSIFICATION COUNTS

Purpose

The Traffic Volume and Classification Counts are required as a portion of the FHWA data collection function and will involve performing routine traffic volume and classification counts, special traffic counts, and inspections of Traffic Monitoring Sites (TMS) in accordance with the FDOT Traffic Monitoring Handbook at specified locations as determined by the DEPARTMENT.

Basis of Payment

This study is designed to be flexible; therefore each task shall be priced individually.

Period of Performance

The normal period for the CONSULTANT to submit 48 hour traffic volume and classification

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counts to the DEPARTMENT will be two (2) weeks from completion of the count. The CONSULTANT shall complete all counts by November 15 each year.

Scope of Work

This section specifies the work tasks that may be performed by the CONSULTANT for a particular study, the responsibilities of the CONSULTANT and the DEPARTMENT, and the work task products to be developed by the CONSULTANT and delivered to the DEPARTMENT.

Certification

The CONSULTANT shall provide certification by January 1 each year, to the DEPARTMENT, that each Portable Automatic Traffic Counter to be used on this project has been tested for accuracy. Each traffic survey instrument must be capable of consistently providing data of 90% accuracy and precision at the reported level of detail. Documentation should include the method by which these machines were tested and the date tested. Testing equipment may have to be purchased by the CONSULTANT.

Identification

The CONSULTANT shall have the firm name and telephone number stenciled legibly on each Portable Automatic Traffic Counter before work commences on this project.

Task 1: ROUTINE TRAFFIC VOLUME/CLASS COUNTS (AADT)

The CONSULTANT shall collect 48-hour Traffic Volume or Class Counts between Monday 6:00 am and Friday 2:00 pm, during typical weekday traffic conditions. The CONSULTANT shall utilize an automatic traffic counter that produces an electronic record of the traffic of the day in 15-minute increments with hourly totals and day totals. The data shall be delivered to the DEPARTMENT in a text file after processing by the Survey Processing Software (SPS). The DEPARTMENT will provide a copy of the SPS and the Portable Traffic Monitoring Site (PTMS) inventory to the CONSULTANT. The CONSULTANT shall verify the description and configuration of each location, providing any errors or changes to the DEPARTMENT within two weeks of discovery.

Task Product:

- 48-hour volume and classification electronic data

Subtask 1A: Routine Traffic Classification Counts (By Tube) (AADT)

The CONSULTANT shall collect 48-hour Traffic Classification Counts (by tube) between Monday 6:00 am and Friday 2:00 pm, during typical weekday traffic conditions. This task will be performed according to the criteria of Task 1. Each location will be counted in accordance with FHWA's 13 classification categories and category 15.

Task Product:

- 48-hour volume and classification electronic data

Task 2: INSPECTION OF NEW OR REBUILT TRAFFIC COUNT OR CLASSIFICATION SITES (AADT)

The CONSULTANT shall inspect traffic count and classification stations installed or rebuilt during the course of construction projects. These inspections will include but are not limited to

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semi-final and final inspections with contractor and construction personnel. The CONSULTANT is to utilize the most current editions of (1) FDM 695-001, and (2) the Traffic Monitoring Handbook. The CONSULTANT shall ensure the count site is functioning properly as well as wired and labeled correctly.

The CONSULTANT will make recommendations as to project acceptability to the DEPARTMENT. The CONSULTANT will collect 48 hours of traffic data at the new sites. This data will be used as final verification of the proper operation of the site and will be part of the AADT data collected under this Scope of Services. The CONSULTANT shall provide GPS coordinates for the cabinet.

This task shall include one (1) reinspection to verify recommendations are properly completed and to install data collection device for operational verification.

Task Product:

- Site inspection report, including specific location description
- 48 hour count in specified format

Subtask 2A: Additive - Inspection of additional new or rebuilt traffic count or classification sites

This task is to be used when there are additional new or rebuilt sites are to be inspected, within the same area. Example: SR XX at milepost AA and milepost BB.

Task 3: INSPECTION OF EXISTING TRAFFIC COUNT OR CLASSIFICATION SITES (AADT)

Upon the request of the DEPARTMENT, the CONSULTANT shall inspect existing traffic count loop/piezo locations to determine why the site is malfunctioning.

The CONSULTANT shall inspect traffic count and classification stations that may not function properly. These inspections will include but are not limited to semi-final and final inspections with contractor and construction personnel. The CONSULTANT is to utilize the most current editions of (1) FDM 695-001, and (2) the Traffic Monitoring Handbook. The CONSULTANT shall ensure the count site is functioning properly as well as wired and labeled correctly.

Task Product:

- Inspection Report
- Recommendations for repair, if applicable

Subtask 3A: Inspection of additional existing count sites

This task is to be used when there are additional malfunctioning sites to be inspected, within the same area. Example: SR XX at milepost AA and milepost BB.

Subtask 3B: Additive – Cancelled Inspection

Traffic count sites that are not ready for inspection