

Space Coast Transportation Planning Organization
Wickham Road Operational Analysis
Work Order 17-20K
Scope of Services
12/27/2016

A. INTRODUCTION

The Wickham Road Operational Analysis will attempt to address the observed congestion and safety issues while also incorporating multi-modal solutions to facilitate pedestrian/bicycle/transit movement along the corridor. Wickham Road is a key north/south arterial in Brevard County, starting at US 192 in the south and ending west of I-95 to the north. The Wickham Road Operational Analysis will focus on identifying improvements for the section of Wickham Road from Eau Gallie Boulevard to Lake Washington Road in the City of Melbourne. **Figure 1** displays the location of the study corridor.

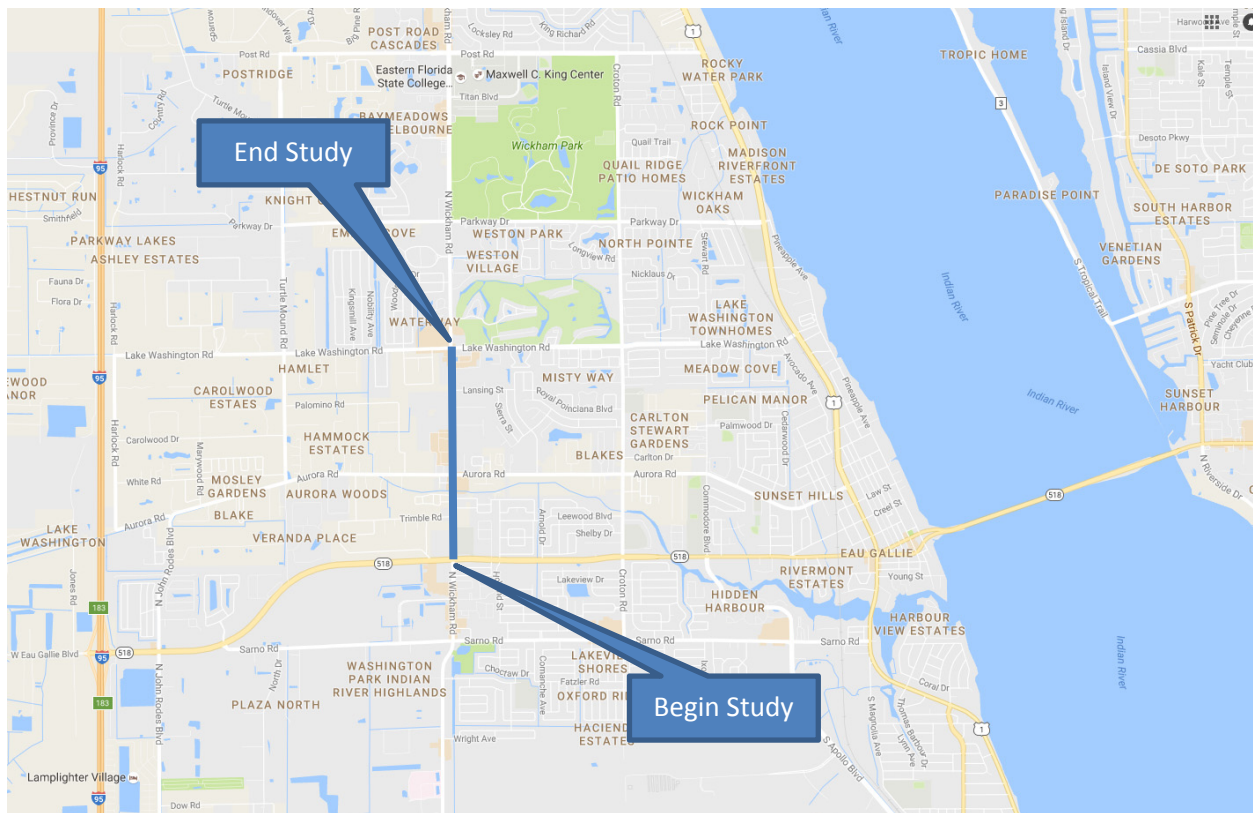


Figure 1 – Wickham Road Study Corridor

Wickham Road within the study corridor is currently classified as an Urban Principal Arterial – Other and consists of a five lane cross section (four travel lanes, two in each direction, with a two-way left-turn lane). Wickham Road has an urban, closed drainage system along most of the length of the study corridor.

Existing traffic volumes along the study corridor range from 34,200 to 43,100 vehicles per day. Wickham Road from Eau Gallie Boulevard to Lake Washington Road has experienced volume-to-capacity ratios greater than 1.00 in nine of the past 10 years based on the Space Coast Transportation Planning Organizations (TPO) annual State of the System Report. In the 2015 State of the System Report, the intersection of Wickham Road and Eau Gallie Boulevard was ranked sixth out of the top twenty busiest intersections. The study corridor has experienced on average 75 crashes per year over the past 5 years, with four per year involving pedestrians or bicyclists.

Sabal Elementary School is located just north of Eau Gallie Boulevard on the east side of Wickham Road. Commercial/retail land uses are directly adjacent to the corridor while single family subdivisions surround those commercial/retail parcels.

A road safety audit of Wickham Road was completed by the TPO in June 2016. As part of this audit, crash data was reviewed and safety improvements for Wickham Road between Sarno Road and Parkway Drive were suggested. It is anticipated that feasible suggestions from this report will be included in the recommended alternative, as discussed in **Task 3.1**.

B. DESCRIPTION OF SERVICES

Kittelson & Associates, Inc. (CONSULTANT) will assist the TPO in performing the Wickham Road Operational Analysis. The goals of the Operational Analysis are as follows:

- Assess capacity improvements at the signalized intersections along the study corridor and recommend a feasible preferred alternative at each intersection targeting congestion reduction.
- Assess alternatives to provide improved pedestrian/bicycle/transit facilities along the length of the corridor with an emphasis at signalized intersections and recommend a feasible preferred alternative targeting multi-modal mobility.
- Assess cross section changes, such as constructing raised medians, to reduce vehicular conflicts and improve safety along the corridor.
- Solicit input from the public and a Project Advisory Team throughout the course of the project. This team will provide guidance to the CONSULTANT when recommending the preferred alternative.

C. MAJOR TASKS

The CONSULTANT will assist the TPO with the following major tasks:

- Prepare for and lead two (2) public meetings and four (4) Project Advisory Team meetings.
- Perform general data collection activities including:
 - A right-of-way review;
 - A field review to observe existing operational conditions and corridor characteristics; and
 - A utility verification for existing utilities along the study corridor.
- Perform an existing conditions analysis which includes:

- Historical safety review;
- Existing corridor and intersection operational analysis; and
- Issues and opportunities identification.
- Perform a future conditions assessment including the following tasks:
 - Determine future growth rates;
 - Forecast traffic volumes; and
 - Perform future no-build operational analysis.
- Develop and analyze alternatives involving:
 - Development of cross sections and roadway alternatives;
 - Drainage, impacted utilities, and right-of-way assessments;
 - Development of preliminary cost estimates; and
 - Analyze operational measures of effectiveness and select a preferred alternative.

As documented in **Part D** of this scope, the CONSULTANT will develop a schedule during the project's first month and keep the schedule current throughout the project's duration. The following subsections describe each task to be performed.

TASK 1: PUBLIC AND PROJECT ADVISORY TEAM MEETINGS

As part of the Wickham Road Operational Analysis, the CONSULTANT will prepare for and lead four Project Advisory Team meetings and two public meetings. The following work activities are anticipated in preparation for the Project Advisory Team and public meetings:

- Project Advisory Team –
 - Identification of Project Advisory Team: It is anticipated the CONSULTANT will work with the TPO to identify appropriate members of the Project Advisory Team. Members of the Project Advisory Team are anticipated to represent local agencies along the corridor, such as Brevard County, the City of Melbourne, Sabal Elementary School, and local law enforcement.
 - Project Advisory Team Meetings (4): The Project Advisory Team will be engaged in the review of products and at key decision points during the operational analysis process.
- Public Meetings –
 - Public Involvement Kick-Off Meeting: Following the existing conditions assessment, a public meeting will be held during the needs identification process to solicit input from interested parties that wish to actively engage in the planning process. The format of the meeting will include a brief presentation to review the operational analysis process, review existing conditions and key project issues, and to highlight samples of similar projects and/or planning techniques being considered as part of this operational analysis. The public will be presented with key project contacts and ways that the community can get involved.
 - Alternatives Development Public Meeting: Following the development of alternatives, the CONSULTANT will lead a public meeting presenting the alternative(s) for Wickham

Road to the public. The workshop will include a brief presentation to review the study process, review the future conditions, and to highlight alternatives being considered.

- For each of the two public meetings, the CONSULTANT will prepare the following:
 - Project Summary/Overview Handout for distribution at the meetings.
 - Multi-media presentation and equipment; meeting equipment set-up and tear-down.
 - Meeting notifications: The CONSULTANT will work with TPO staff to generate a mailing list for meeting notifications. This includes letters to elected and appointed officials, legal advertisements, post card mailings to property owners and other interested parties, and e-mail notifications to the Project Advisory Team. The CONSULTANT will pay the cost of publications and first class postage as applicable (up to \$1,500 per meeting).
 - News releases for use 14 days prior to meeting. The CONSULTANT will pay for the cost of publishing the press release in one local newspaper.
 - Summary notes of meetings to be provided to the TPO no later than 10 business days after the meeting.

With input from the TPO, the CONSULTANT will secure a site to host the public meetings. The CONSULTANT will attend the meetings with an appropriate number of personnel to assist TPO Staff.

Material for TPO Website: If the TPO anticipates posting study-related information on the web, the CONSULTANT will provide project information, graphics, and other materials generated for major deliverables, public, and Project Advisory Team coordination meetings in a suitable format for posting as requested.

Task 1 Deliverables

- *Meeting materials such as presentations, notifications, and meeting boards will be made available to the TPO for review prior to the meetings.*
- *Meeting notes from each of the meetings will be prepared and distributed amongst the Project Advisory Team.*

TASK 2: DATA COLLECTION

2.1 Traffic Data Collection

The TPO will collect turning movement count data at signalized intersections and key unsignalized intersections during the AM and PM peak hours. The CONSULTANT will review the counts collected for reasonableness and consistency along the study corridor. It is anticipated the CONSULTANT will obtain daily segment volumes from the TPO's State of the System (SOS) traffic count data set.

2.2 Field Review

The CONSULTANT will perform two field reviews over the course of the project:

1. During the Existing Conditions Analysis task to observe operational characteristics in the AM and PM peak hours. This field review will also consist of verifying intersection/cross sectional geometrics along with the existing pedestrian, bicycle, and transit facilities. This review will also include a night review to observe lighting levels along the corridor.
2. During the Alternatives Analysis task to verify specific roadway characteristics that may impact concept development features. This may include the location of driveways, curb returns, drainage inlets, open swales, or review of locations where potential conflicts between the roadway elements and proposed concepts may exist.

2.3 Right-of-Way Review

The CONSULTANT will coordinate with Brevard County and the City of Melbourne to review ROW information within the limits of the study corridor. The ROW maps will be compared to the GIS parcel lines and utilized during Alternatives Analysis.

2.4 Utility Verification

The CONSULTANT will verify utilities along the corridor via a Sunshine One Call and readily available plans obtained from Brevard County and/or the City of Melbourne. The Sunshine One Call will provide a list of potential utility providers in the area and a field inspection will be completed to provide visual confirmation of the utilities. Local cities will be contacted to obtain any GIS utility information that is available and these utilities will be mapped in GIS/CADD for use during the Alternatives Analysis.

2.5 General Data Collection

The following smaller tasks are anticipated to be completed as part of the data collection effort:

- Signal timing/phasing information for the study intersections.
- Existing transit data in the corridor including route information, schedules, ridership, transit facilities, and future transit plans.
- Planned and programmed roadway projects in the area. This will also include a request for any approved but unbuilt access permits on the corridor.
- Recently completed projects in the area.
- Existing and future land use plans.
- GIS data illustrating available information within the study area. This data generally consists of wetland, floodplains, threatened/endangered species and habitat, contamination, and cultural/historic sites used to identify fatal flaws with potential alternatives.

Task 2 Deliverables

- *A data collection summary will be included in the Existing Conditions Report as defined in **Task 3**.*

TASK 3: EXISTING CONDITIONS ANALYSIS

3.1 Historical Safety Review

The TPO completed a road safety audit for Wickham Road in June 2016. As part of this audit, six years of crash data (2009 to 2014) were reviewed and summarized for Wickham Road between Sarno Road and Parkway Drive. It is anticipated the CONSULTANT will review this report and summarize the crash data pertinent to the Eau Gallie Boulevard to Lake Washington Road study corridor between 2011 and 2014. The CONSULTANT will obtain and summarize 2015 crash data from the 2015 State of the System report to provide a complete five-year data set.

As part of this task, the CONSULTANT will summarize the near and long term safety and pedestrian/bicycle/transit improvements suggested within the Road Safety Audit report. These suggestions will be reviewed for feasibility and may be included in the preferred alternative for the corridor.

3.2 Existing Corridor Operational Analysis

Using the travel characteristics data collected for the study corridor, the CONSULTANT will perform a Level of Service (LOS) evaluation per Highway Capacity Manual (HCM) procedures as they apply to roadway intersections and segments for the AM and PM peak hours. The existing conditions analysis will be performed for four signalized intersections and four unsignalized intersections within the study corridor. A HCM based segment analysis will be performed for the three segments between the signalized intersections.

3.3 Issues and Opportunities Identification

Based on the existing conditions analysis, the CONSULTANT will review the data collected to identify the preliminary issues and opportunities along the corridor. This will include issues and opportunities based on safety, traffic congestion, and pedestrian/bicycle/transit mobility obtained through review of previous studies, field reviews, coordination with agencies, previous public workshops/meetings, operational analysis, and other publically-available data sources such as agency GIS resources and the TPO databases.

Task 3 Deliverables

- *The results of the existing conditions analysis will be summarized within the Existing Conditions Report. It is anticipated the TPO will review the report and the CONSULTANT will incorporate comments/edits before finalizing.*
- *Two (2) hard copies of the Existing Conditions Report will be prepared for the TPO once the report is finalized.*

TASK 4: FUTURE CONDITIONS ASSESSMENT

4.1 Determination of Future Growth Rate

Utilizing the latest version of the Central Florida Regional Planning Model (CFRPM), the CONSULTANT will run an “off the shelf” model to evaluate projected traffic growth in the area. Programmed and planned roadway improvements will be verified, documented, and included into the transportation model and the CONSULTANT will prepare a year 2040 baseline future model for the study corridor (no interim year models will be developed). It is anticipated that a subarea model will not be created for this project. The future traffic growth forecast by the model will be reviewed for growth rate applicability.

In addition to the model growth rates, historical traffic growth rates and future Florida Bureau of Economic and Business Research population growth rates will be reviewed for applicability. Based on the three growth rate sources discussed, the CONSULTANT will propose a growth rate to the Project Advisory Team to be utilized for the future traffic projections along the study corridor.

4.2 Traffic Volume Projections

The existing AM and PM peak-hour turning movement volumes for the study corridor will be forecast to the opening year (specific year to be determined by the Project Advisory Team) utilizing the growth rate discussed in **Task 4.1**. These projected volumes will be used for the future intersection LOS analysis and determination of potential intersection improvements.

The growth rate will also be applied to AM and PM peak-hour segment volumes to determine capacity needs on a segment level.

4.3 Future No-Build Operational Analysis

Using the future traffic volumes projected for the opening year of the study corridor, the CONSULTANT will perform a Level of Service (LOS) evaluation per Highway Capacity Manual (HCM) procedures as they apply to roadway segments and intersections. The future conditions analysis will be performed for the same four signalized intersections and four unsignalized intersections as in the existing conditions analysis. A HCM based segment analysis will be performed for the same three segments as defined in the existing conditions analysis.

The CONSULTANT will summarize the AM and PM LOS, delay, v/c, and 95th-percentile queues for each movement at each of the study intersections. This information will help the CONSULTANT identify possible turn lane improvements to be analyzed during the Alternatives Analysis discussed in **Task 5**.

Task 4 Deliverables

- *The results of the future conditions analysis will be summarized within the Future Conditions Report. It is anticipated the TPO will review the report and the CONSULTANT will incorporate comments/edits before finalizing.*
- *Two (2) hard copies of the Future Conditions Report will be prepared for the TPO once the report is finalized.*

TASK 5: ALTERNATIVES ANALYSIS

5.1 Development of Roadway Alternatives and Cross Sections

The CONSULTANT will develop a preliminary set of conceptual plans and exhibits for up to three roadway alternatives. The conceptual plans will be provided to the Project Advisory Team on roll plots with an aerial background to help facilitate thought and feedback. It is anticipated these three roadway alternatives could be a combination of intersection turn lane improvements and segment cross sectional changes.

Cross sections will also be generated for up to three segments and up to eight signalized intersection approaches along the Wickham Road mainline for up to three roadway alternatives. These cross sections will identify impacts to utilities and help in the selection of the preferred alternative.

5.2 Drainage Assessment

The CONSULTANT will perform a drainage analysis for up to three alternatives developed as part of this task. Drainage assessment items include:

- Delineate existing drainage basins, patterns and outfalls;
- Perform existing condition drainage calculations to determine max pre development flow rates;
- Perform proposed condition drainage calculations to determine post development flow rates as well as water quality requirements;
- Analyze existing storm water management facilities for possible accommodation of proposed conditions;
- If needed, determine suitable pond sites to accommodate proposed drainage requirements; and
- Summarize design considerations for pond if a new pond is proposed.

As part of this task, one meeting will be held with Brevard County and City of Melbourne to review details about the drainage impacts for each of the three alternatives developed.

5.3 Impacted Utilities Assessment

The CONSULTANT will review the utility conflicts for up to three alternatives and provide preliminary cost estimates for the impacted utilities, if necessary.

5.4 Preliminary Construction Cost Estimates

The CONSULTANT will prepare a construction cost estimate for up to three alternatives using the conceptual roadway layouts. Utility relocations and drainage ponds, if needed, will be included in the construction cost estimates.

5.5 Right-of-Way Cost Estimates

If necessary, the CONSULTANT will coordinate with Brevard County and the City of Melbourne to obtain right-of-way cost estimates for up to three alternatives developed along the study corridor. The cost estimates for these alternatives will be utilized for the benefit/cost matrix as described in **Task 5.6**. It is

noted that survey (not included in this scope) will be needed in the design phase to verify parcel lines and update the right-of-way cost estimates as needed.

5.6 Operational MOEs and Benefit/Cost Matrix

An operational analysis will be performed utilizing future volumes on up to three alternatives developed as part of this task. This operational analysis will be used to compare the measures of effectiveness between the various alternatives. The analysis, performed using Synchro utilizing *HCM* methodologies, will provide a LOS and delay by approach and movement. The alternatives can be compared to identify the concept with the most benefit from a LOS and delay perspective. Benefits will be defined in terms of annualized cost savings in delay and fuel consumption derived from the identified intersection improvements. Monetary benefits will be defined for each scenario by converting the differences in delay and fuel consumption (compared to the no-build condition) to annualized costs over the service life of the improvements. Monetary rates for delay and fuel consumption will be defined using industry-accepted publications or current market conditions. Construction cost estimates of implementing the identified improvements (i.e., engineering, right-of-way, construction), as described in **Task 5.4**, will be converted to an annualized cost over the service life of the improvements.

The annualized costs associated with the defined benefits (estimated savings in delay and fuel consumption) as well as the annualized construction cost estimate will be used to determine the benefit/cost ratios for each alternative developed. The operational MOEs and benefit/cost analysis will be summarized into a matrix comparing the various costs of the three alternatives to the anticipated operational benefit. This matrix will help identify the alternative to move forward to the design preparation phase.

5.7 Select Preferred Alternative

Based on the results of the Alternatives Analysis, the Project Advisory Team will select a preferred alternative. The preferred alternative may be one of the three alternatives considered or some combination of those alternatives. The preferred alternative will be documented in the Corridor Alternatives and Strategies Report (the **Task 5** deliverable).

Task 5 Deliverables

- *The results of the Alternatives Analysis will be summarized within the Corridor Alternatives and Strategies Report. It is anticipated the TPO will review the report and the CONSULTANT will incorporate comments/edits before finalizing.*
- *Two (2) hard copies of the Corridor Alternatives and Strategies Report will be prepared for the TPO once the report is finalized.*

D. PROJECT MEETINGS AND PRESENTATIONS

Kick-Off Meeting: The CONSULTANT will attend a kick-off meeting with TPO staff and the Project Advisory Team to discuss the goals and anticipated outcomes of the project.

Project Status Meetings: Up to two (2) members of the CONSULTANT team will attend up to four (4) additional meetings with TPO staff to discuss project progress and receive input on tasks completed. The purpose of these meetings is to maintain clear communication between the TPO and the CONSULTANT team. The CONSULTANT will prepare a meeting agenda and prepare/distribute meeting notes following each of these meetings.

Project Presentations: It is anticipated the CONSULTANT will make two (2) presentations at the conclusion of the project: 1. Presentation to the Space Coast TPO Technical Advisory Committee (TAC) and Citizens Advisory Committee (CAC); and 2. Presentation to the TPO Board. The CONSULTANT will be responsible for preparing the PowerPoint presentation but will coordinate with the TPO on what will be included in the presentation. It is anticipated the project presentations will occur during the December 2017 meeting schedule.

Project Meetings and Presentations Deliverables

- Meeting notes will be prepared and distributed amongst the Project Advisory Team.

E. PROJECT ADMINISTRATION

Quality Assurance/Quality Control: The CONSULTANT team will designate appropriate senior staff to conduct Quality Assurance/Quality Control (QA/QC) reviews of work products.

Project Schedule: The CONSULTANT will prepare and submit a detailed project schedule identifying major tasks, their durations, and tasks relationships. The CONSULTANT is responsible for keeping the schedule up to date. The beginning date of the services will be the date of authorization for this work order. Any changes to the schedule necessitated by circumstances outside the CONSULTANT’s control will be coordinated with TPO staff. It is anticipated the project will be complete by March 31, 2018.

Invoices: Invoices will be prepared in the format prescribed by the TPO. A detailed invoice including a narrative description of the work performed by the CONSULTANT during the period covered by the invoice for each item in the scope will be submitted. The final invoice will be labeled “Final” and project close out procedures will be followed.

Budget: This work will be completed as a lump sum task order. **Table 1** displays the budget breakdown for Kittelson & Associates, Inc. (KAI) and Infrastructure Engineers, Inc. (IEI). A detailed summary budget table for both KAI and IEI is attached.

Project Administration Deliverables

- Project Schedule (initial and updates when necessary)
- Monthly Progress Reports
- Project Administration

Table 1 – Wickham Road Operational Analysis Budget

Firm	Fee
Kittelson & Associates, Inc.	\$ 199,482.00
Infrastructure Engineers, Inc.	\$ 29,491.00
Sum	\$228,973.00

STANDARD FEE SUMMARY SHEET

Prime Consultant Information
 Kittelson & Associates, Inc.
 Karl Passetti, P.E.
 P: 407-540-0555
 F: 407-540-0550

Task Work Order Consultant Information
 Kittelson & Associates, Inc.
 Travis Hills, P.E.
 P: 407-540-0555
 F: 407-540-0550

Task: Wickham Road Operational Analysis

Name of Firm: Kittelson & Associates, Inc.

ACTIVITY	Senior Principal RATE: \$ 225.00	Principal RATE: \$ 205.00	Senior Engineer/Planner RATE: \$ 160.00	Engineer/Planner RATE: \$ 145.00	Engineer Intern RATE: \$ 128.00	Senior Technician RATE: \$ 133.00	Secretary/Clerical RATE: \$ 68.00	TOTAL HOURS	COST BY ACTIVITY
Task 1: Public and Project Team Meetings	38 \$ 8,550.00	0 \$ -	0 \$ -	84 \$12,180.00	74 \$ 9,472.00	24 \$ 3,192.00	24 \$ 1,632.00	244	\$ 35,026.00
Task 2: Data Collection	0 \$ -	0 \$ -	4 \$ 640.00	44 \$ 6,380.00	64 \$ 8,192.00	0 \$ -	0 \$ -	112	\$ 15,212.00
Task 3: Existing Conditions Analysis	0 \$ -	10 \$ 2,050.00	12 \$ 1,920.00	36 \$ 5,220.00	96 \$ 12,288.00	0 \$ -	0 \$ -	154	\$ 21,478.00
Task 4: Future Conditions Assessment	0 \$ -	12 \$ 2,460.00	12 \$ 1,920.00	48 \$ 6,960.00	112 \$ 14,336.00	0 \$ -	0 \$ -	184	\$ 25,676.00
Task 5: Alternatives Analysis	0 \$ -	32 \$ 6,560.00	36 \$ 5,760.00	124 \$17,980.00	288 \$ 36,864.00	0 \$ -	0 \$ -	480	\$ 67,164.00
Project Meetings and Presentations	35 \$ 7,875.00	0 \$ -	0 \$ -	51 \$ 7,395.00	30 \$ 3,840.00	0 \$ -	10 \$ 680.00	126	\$ 19,790.00
Project Administration	40 \$ 9,000.00	0 \$ -	0 \$ -	16 \$ 2,320.00	0 \$ -	0 \$ -	12 \$ 816.00	68	\$ 12,136.00
TOTAL PROJECT	113 \$ 25,425.00	54 \$11,070.00	64 \$ 10,240.00	403 \$58,435.00	664 \$ 84,992.00	24 \$ 3,192.00	46 \$ 3,128.00	1368	\$ 196,482.00
Public Meeting Expenses \$									3,000.00

KAI TOTAL \$ 199,482.00

STANDARD FEE SUMMARY SHEET

Prime Consultant Information

Kittelson & Associates, Inc.
 Karl Passetti, P.E.
 P: 407-540-0555
 F: 407-540-0550

Task Work Order Consultant Information

Infrastructure Engineers, Inc.
 Frank Hickson, P.E.
 P: 407-957-1660
 F: 407-957-8744
 IEI Job No. 09009FL00.00

Task: Wickham Road Operational Analysis

Name of Firm: Infrastructure Engineers, Inc.

ACTIVITY	Project Principal		Senior Engineer/Planner		Engineer/Planner		Engineer Intern		Tech/CADD		Secretary/Clerical		TOTAL HOURS	COST BY ACTIVITY
	RATE:	\$	RATE:	\$	RATE:	\$	RATE:	\$	RATE:	\$	RATE:	\$		
Task 1: Public and Project Team Meetings	0	\$ -	35	\$ 6,335.00	0	\$ -	35	\$ 3,220.00	0	\$ -	0	\$ -	70	\$ 9,555.00
Task 2: Data Collection	0	\$ -	10	\$ 1,810.00	0	\$ -	48	\$ 4,416.00	0	\$ -	0	\$ -	58	\$ 6,226.00
Task 3: Existing Conditions Analysis	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -
Task 4: Future Conditions Assessment	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -
Task 5: Alternatives Analysis	0	\$ -	30	\$ 5,430.00	0	\$ -	90	\$ 8,280.00	0	\$ -	0	\$ -	120	\$ 13,710.00
TOTAL PROJECT	0	\$ -	75	\$ 13,575.00	0	\$ -	173	\$ 15,916.00	0	\$ -	0	\$ -	248	\$ 29,491.00

IEI TOTAL \$ 29,491.00