SIEMENS

TECHNICAL MEMORANUM #4

Implementation Scope of Work, Schedule and Budget

MAG ITS/TE On-Call Services

Contract No. 321-I

Glendale Stadium Area Congestion Map

Proof of Concept Project

September 12, 2008

Version 1.0

Submitted To:

Maricopa Association of Governments

Submitted By:

Siemens

1 INTRODUCTION

Siemens has been contracted by the Maricopa Association of Governments (MAG) to explore the feasibility of generating a web-accessible congestion map for the arterial street network surrounding the University of Phoenix Stadium and Jobbing.com Arena in Glendale, Arizona. The initial concept is of a congestion map to be developed based on volume and occupancy data from vehicle detectors located at five signalized intersections on the east side of the stadium area. Volume and occupancy values would be extracted from the City of Glendale's i2 Traffic Management System. Algorithms would be developed to correlate volume and occupancy values to congestion levels. Varying levels of congestion would be depicted by colored links on a map. The map would be available to the public via the Internet.

The first task of the project was to perform a field survey of the five signalized intersections around the Glendale stadium to determine what vehicle detectors and raw data are available. Results of the survey are documented in Technical Memorandum #1. The second task was to define algorithms and software interface needs for gathering and processing those data to determine the current level of congestion for each intersection approach or traffic movement. A proposed algorithmic approach and corresponding modifications needed to the i2 central traffic signal system software were reported in Technical Memorandum #2.

Technical Memorandum #3 recommended an approach for displaying the congestion information to the public.

This document, Technical Memorandum #4, lays out a scope of work, schedule and cost estimate for Siemens to implement the congestion map described and defined in Technical Memorandums #1 -3 .

2 WORK TO BE PERFORMED BY SIEMENS

Task 1 – System Architecture and Requirements

Based on Technical Memorandum #2 and #3, identify and document the data exchange network architecture and functionality (functional requirements) needed for the conceptualized operations. Describe at a high level the hardware, software, and communications links needed. Describe the data flows involved. Describe the functional requirements for modifications needed to each involved system. Also identify alternatives evaluation criteria to assist in deciding between design options.

Prepare a draft System Architecture and Requirements document, and after review by MAG and the City of Glendale, prepare a final version that addresses comments received.

Task 2 – System Design and Deployment Plan

Design the software and identify hardware modifications or additions needed to meet the system requirements. In a Design document, identify the modifications or additions needed to i2, and further middleware or translation software needed for the web interface. Prepare mock-ups of any new or modified user interfaces. Identify new or changed communications links, their capacity, and their security measures. Identify any off-the-shelf software needed,

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including operating systems and database engines. Identify any temporary facilities needed for component or system testing.

Describe the logistics of system development, deployment, and acceptance testing including:

- Definition of components that can be developed and unit-tested independently, including new or modified communications links to be arranged by the involved agencies or third parties.
- A deployment plan including the order of installation of components and any sub-system (subset of all system components) testing prior to full system testing.
- Procedures for conducting system acceptance testing. Acceptance testing will confirm that the implemented system meets all system requirements.
- The system documentation required and the content and format for each document or database.
- The user training needed and a plan for providing that training.
- A refined time schedule for all activities, including documentation of dependencies between activities.

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Prepare a draft System Design and Deployment Plan document, and after review by MAG and the City of Glendale, prepare a final version that addresses comments received. It is assumed that one face-to-face meeting will be needed during this task.

Preliminarily, it is assumed that new communication links will be via the City of Glendale WAN, and that the City will arrange for and provide these links, either by use of existing WAN services or by provision of new or enhanced Internet services.

Task 3 – System Development

Develop the software modifications and additions identified in the System Design. Purchase a server to be used as a host for the web-based map interface. Arrange installation or modification of needed communication links – assumed to be performed by agency personnel. Perform unit testing and sub-system testing that is feasible prior to on-site installation. Demonstrate components to MAG and the City of Glendale.

Task 4 –Deployment and Acceptance Testing

Install system components on site at the City of Glendale TMC. Configure all system components as needed. Conduct acceptance testing. Demonstrate to the involved agencies successful operation and passing of all acceptance tests. Provide a written acceptance test report.

Work with the City of Glendale to configure system detectors at the initial target intersections.

Task 5 – Documentation and Training

Prepare system documentation and conduct user training as identified in the System Design and Deployment Plan.

Submit a draft of each document, and after review by MAG and the City of Glendale, prepare a final version that addresses comments received.

Preliminarily, it is assumed that one training session will be needed, and that documentation will include the following:

- Users Manual, including administration and maintenance for the congestion module.
- Specification of data interfaces involved.
- System configuration, including documentation of all system hardware and software components and their initial configuration.
- Documentation provided by the manufacturer of hardware and off-the-shelf software.

3 TIME SCHEDULE

The following table shows the preliminary work schedule. The schedule will be refined during the System Design and Deployment Plan task.

Task	Begin	End
1. System Architecture & Requirements	January 2009	February 2009
2. System Design & Deployment Plan	February 2009	March 2009
3. System Development	March 2009	September 2009
4. Deployment and Acceptance Testing	October 2009	November 2009
5. Documentation and Training	October 2009	November 2009

4 LEVEL OF EFFORT

Person hours by task are shown in the following table.

	Task 1 System Architecture & Requirements	Task 2 System Design & Deployment Plan	Task 3 System Development	Task 4 Deployment & Acceptance Testing	Task 5 Documentation & Training
Warren Tighe	8	8	4	4	8
Arti Gupta	0	0	4	0	8
Glenn Massarano	8	16	16	8	8
Michael Clance	8	8	32	8	8
Nagendra Tripathi	16	24	80	16	24
Jun Wang	0	0	16	0	0
Luke Nelson	0	8	32	8	8
Michael Jara	0	0	40	0	0
Brandon Johnson	16	24	80	32	24
Jim Holmes	8	8	16	20	8

5 SUMMARY COST SHEET

See Attached.