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Technical Memorandum No. 1:
Webpage Prototype of Congestion Map

MAG ITS/TE On-Call Services
Contract No. 384-Q
Task Order – OP10-1
Arterial Traffic Congestion Map
System Development Project

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Version 1.1

Submitted To:

Maricopa Association of Governments

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Version	Date	Author	Comments
1.0	10 March 2010	J. Holmes	Initial draft distributed for comments.
1.1	30 March 2010	J. Holmes	Revised based on comments received from City of Peoria and MAG.

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1 Introduction

1.1 Background

In 2008, a Maricopa Association of Governments (MAG) on-call consultant project investigated the feasibility of generating a web-accessible congestion map for the arterial street networks. In this system development project, fFive intersections were included in the study area along the primary ingress/egress corridor for the Peoria Sports Complex in Peoria, AZ. Algorithms that would use traffic signal detector data, occupancy, and volume were proposed for identifying the arterial street congestion level. Initial tests of the algorithm showed positive results. A software module that would extract data from the City of Peoria's i2 Traffic Management System to estimate the congestion level was proposed. The feasibility study identified necessary modifications to the i2 system to facilitate this development. Options for using color coded maps to display the congestion level over the internet were also developed.

Travelers would be able to use this congestion information to make more educated travel decisions when attending a special event at the Peoria Sports Complex. Near real-time Web-based congestion information would allow travelers to plan alternate routes, leave earlier or later or even consider alternate modes of transportation.

The feasibility study demonstrated that the arterial congestion information could be provided to the public using traffic data extracted from existing sensors and the traffic management software environment.

1.2 Scope

The scope of this task is to develop a webpage prototype of the congestion map.

Prototype screens will be developed conforming to the Technical Requirements developed in Phase 2, Task 1 of this project (reference Technical Memorandum No. 1: System Architecture and Requirements, Version 1.1, September 2009).

1.3 Reference

The following are reference documents germane to this Technical Memo

- Final Report for MAG ITS/TE On-Call Services Contract No. 321-I,Glendale Stadium Area Congestion Map Proof of Concept Project Final Report (feasibility(October 2008)
- Technical Memorandum No. 1: System Architecture and Requirements, MAG ITS/TE On-Call Services, Contract No. 384-E, Task Order – SC09-1 Version 1.1, September 2009.
- Technical Memorandum No. 2: System Design and Deployment Plan, MAG ITS/TE On-Call Services, Contract No. 384-E, Task Order – SC09-1 Version 0.4, September 2009.

2 Webpage Prototypes

2.1 Pertinent Requirements

A subset of overall project requirements was used in developing the webpage prototypes. These requirements are repeated below.

ID	*Area*	*Requirement*
ATCM-FR-001	Display	The ATCM shall display a map with a dynamic icon (link) for each turning movement in an intersection, where available.
ATCM-FR-002		Each link icon shall display a congestion level as one of four colors plus a fifth color indicating no data is available.
ATCM-FR-004		The default link congestion level colors shall be: - Light Traffic = Green - Moderate Traffic = Yellow - Heavy Traffic = Magenta - Severe Traffic = Red - No Data = Grey
ATCM-FR-005		The user shall be able to toggle the display of a legend indicating the meaning of each congestion level color.
ATCM-FR-007		When a user moves the cursor over a link, a display shall hover over the link (“tool tip”) which displays the link ID, the congestion level text, the congestion level metric, and the timestamp indicating when the data was generated.
ATCM-FR-008		The map utilized as background for the ATCM display shall be geographically accurate.
ATCM-FR-009		The user shall be able to pan the map by dragging the map.
ATCM-FR-010		The user shall be able to pan the map through use of directional pan arrows.
ATCM-FR-011		The user shall be able to zoom in or zoom out by clicking on a zoom control. If supported by the underlying map engine and hardware, the user shall be able to use the mouse scroll wheel to zoom.
ATCM-FR-012		The user shall be able to toggle the display of the names of geographical features, including street names and city names, shall be display on the map.
ATCM-FR-013		The user shall be able to toggle the display of aerial photograph images in the background.
ATCM-FR-014		The location of the Peoria Sports Complex shall be displayed on the map.
ATCM-FR-015		The name of the Peoria Sports Complex shall be displayed at the location of these facilities.
ATCM-FR-016		The map display shall automatically add and remove detail during zooming to avoid clutter.
ATCM-FR-017		Link icons shall scale and/or relocate as the map is zoomed such that each icon remains distinct.

ID	Area	Requirement
ATCM-FR-018		The ATCM shall follow the web page style guidelines for the City of Peoria, if available.
ATCM-FR-019		The ATCM shall display a status bar with the timestamp of the last data update.
ATCM-FR-020		The ATCM shall provide access to an information page.
ATCM-FR-022		The initial ATCM information page shall include the following: Acknowledgements, FAQs (with a minimum of five likely questions), links to the Arizona 511 web site, and a user feedback form.

2.2 Prototype Screens

The Arterial Traffic Congestion Map (ATCM) will be hosted on the City of Peoria's website located at www.peoriaaz.gov .The City of Peoria employs style sheets to ensure a consistent look and feel for its collection of web pages. The ATCM will be formatted using the Google Maps API to integrate with the City's style sheets. From the www.peoriaaz.gov website home page, the ATCM is recommended to be accessible via the SERVICES → CITY SERVICES link and be identified as "Traffic Conditions" on the CITY SERVICES menu. The ATCM would also be located under the following hierarchy: Peoria Home Page > Departments > Engineering > Traffic Engineering

Screen shots of the prototype follow. Figure 1 depicts the webpage at a zoomed out level, showing color-coded intersections/links representing congestion levels in the project area on a background map. A toggle-able legend, timestamp updates, location of the Peoria Sports Complex and a link to the Information page is included.

Navigation of the ATCM is achieved through use of the included Google controls in the upper left corner of the map. The arrow buttons allow the user to pan the map north, south, east and west. The "+" button permits incremental zoom in, while the "-" button zooms the map out incrementally. Alternatively, the map can be panned by clicking the map and dragging in the desired direction.

On the upper right corner of the map are buttons that are used to toggle the background of the ACTM between map (graphic), aerial or terrain (topographic) views. A "Show Labels" check box allows the user to toggle on and off maps labels.

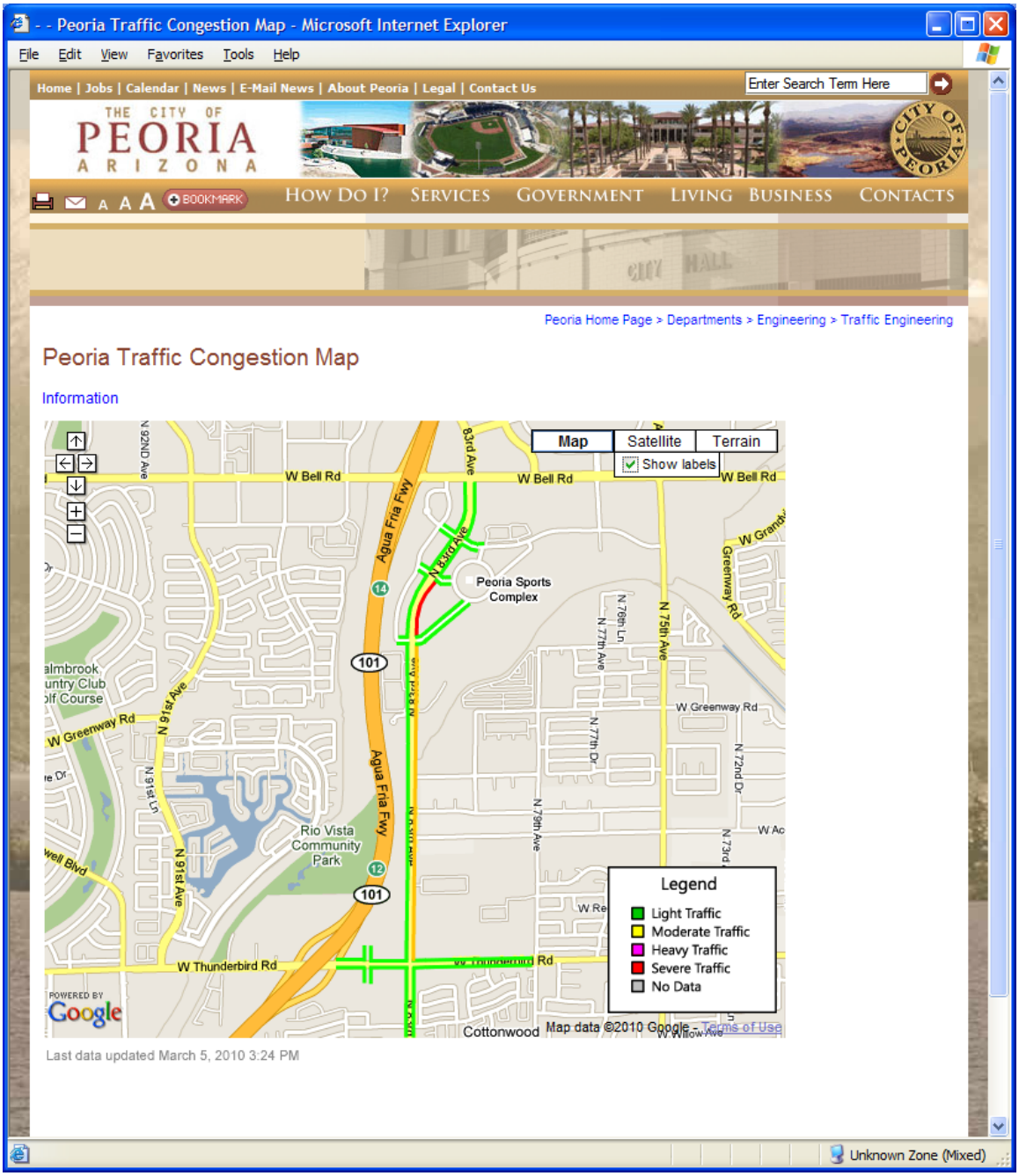

Figure 1 - Overview Map

Figure 2 contains a zoomed in view of the webpage. With the map zoomed in, congestion levels of individual movements (left, through and right) are displayed. In the case where there are multiple lanes for a given movement, the congestion algorithm aggregates individual detectors from that movement to arrive at a single congestion measure for the overall movement. As such, the zoomed in view will have at most three congestion measures per approach (left, through and right) regardless of the total number of detector equipped lanes.

Figure 2 - Zoomed In Overview Map

Figure 3 depicts similar information as Figure 2, but with a satellite image background toggled on.

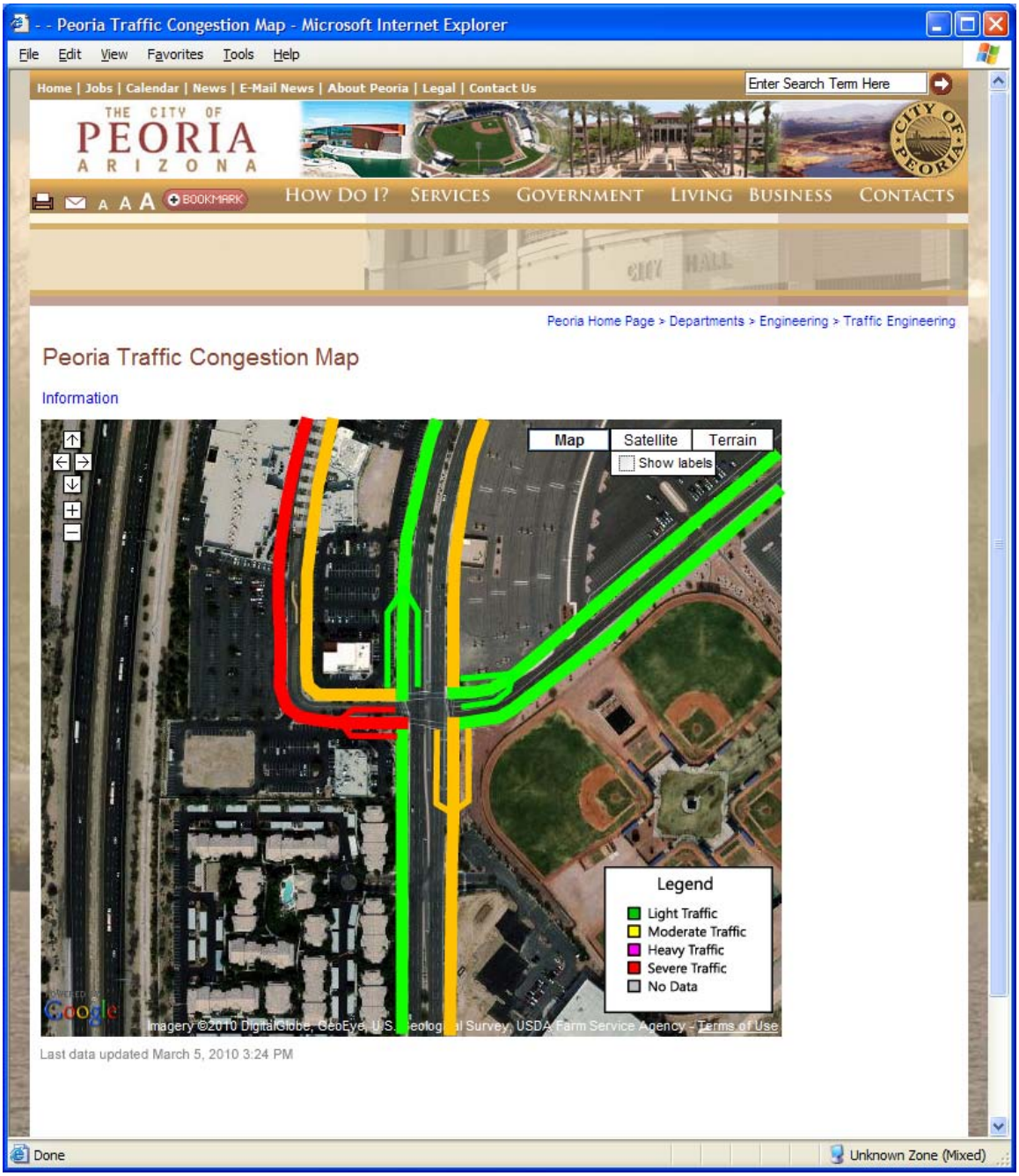

Figure 3 – Zoomed In Satellite Image

Figure 4 shows the congestion level tool tip that is displayed when a user clicks on a link on the map.

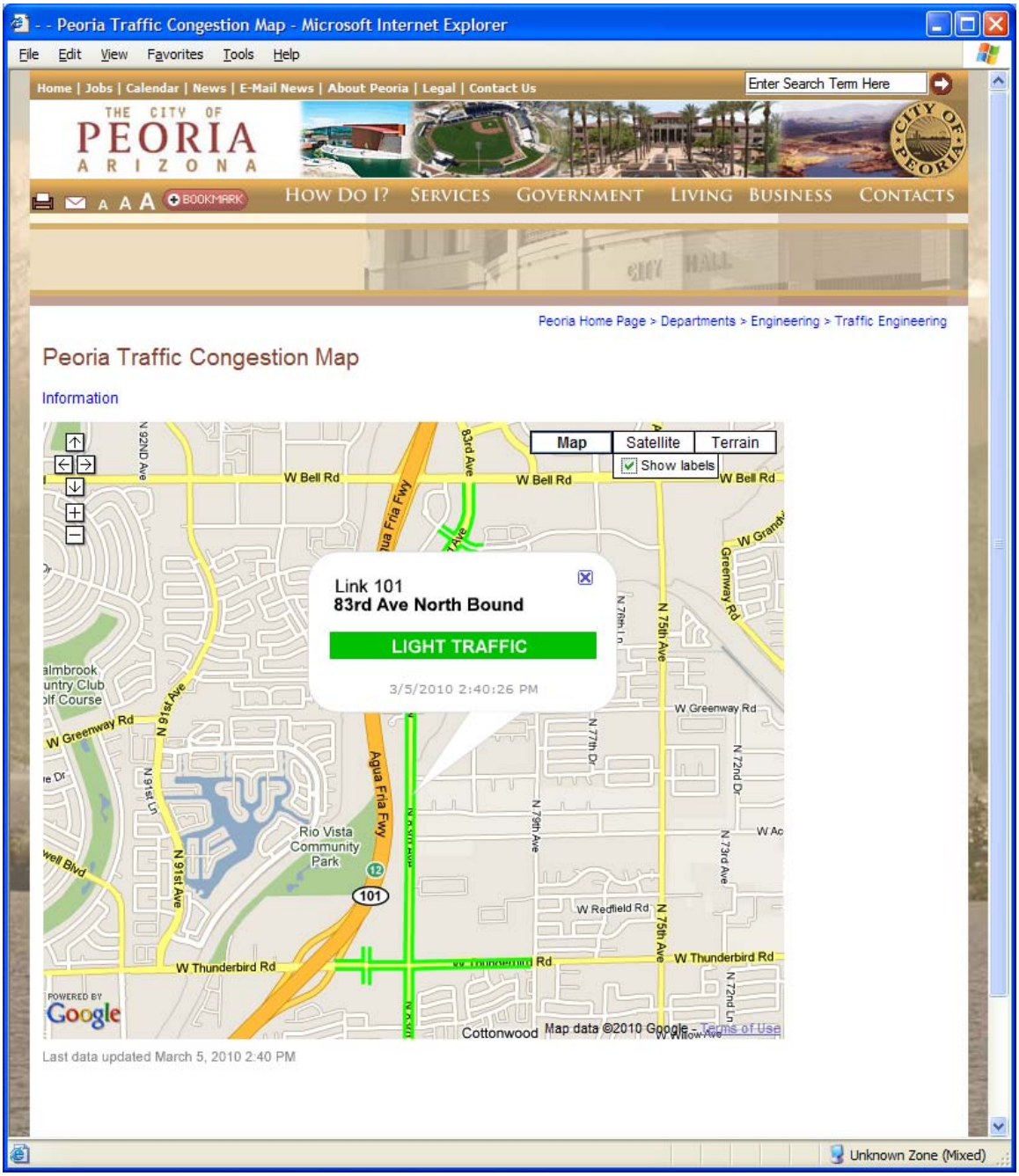

Figure 4 - Congestion Level Tool Tip

Figure 5 contains the information page displayed when the Information link is selected from the Map page.

Figure 5 - Information Page

Acknowledgements of project partners will be included on the information page along with links to other closely-related transportation websites (i.e., AZ 511).

The information page will also include a Frequently Asked Questions (FAQ) section. Typical FAQs that may be considered for the Information page include the following:

1. What is the Peoria Traffic Congestion Map?
2. What is the map telling me?
3. What do the display colors mean?
4. How did you pick the color codes displayed on the map?

5. Why do some intersections show a left turn or right turn display when zoomed in?
6. How does the map work?
7. How is the data collected and processed?
8. How often is the data gathered and updated from an intersection?
9. How often is the map updated to display the congestion level?
10. Why are some of the intersections without data?
11. Why are some of the streets not included on the real-time traffic map?
12. How accurate is the real-time traffic map information?
13. When should I consider an alternate route?
14. How does the map help engineers to manage traffic?
15. What public benefits does the map provide?
16. What additional features would you like to add to the map?
17. What other cities provide similar traffic maps?
18. Whom should I contact if I have other questions or suggestions?