Connected Corridors
Face-to-Face Meeting

Tuesday, Nov 14th, 2017 – 1:30 – 3:30 pm
Arcadia
Agenda

- 1:30-2:00 - Summary of program
- 2:00-2:10 - Approval of charter - Joe
- 2:10-2:30 - Update on communications – Kali, Jesus, Erlan
- 2:30-3:00 - Call for projects requirements - Parsons
- 3:00-3:20 - Sign requirements - Erlan
- 3:20-3:30 - Closing: Next meeting location in Monrovia or Duarte
Systems Engineering Next Steps

- **Design Documents** – How will the requirements be met
- **Hardware and Software** – Building the system
Schedule

Launch Dec 15th 2018

Start 10/1/13

1. Project Management
10/1/13 - 6/30/20

2. Outreach & Communications
10/1/13 - 6/30/20

3. Concept Exploration / User Needs
11/1/13 - 12/26/14

4. Corridor Preparation
12/2/13 - 9/28/18

5a. AMS - Phase 1
1/6/14 - 5/29/15

5b. AMS - Phase 2
6/1/15 - 9/28/18

5c. AMS - Phase 3
10/1/18 - 6/30/20

5d. SEMP
1/1/15 - 6/30/15

5e. SEMP Updates
6/30/15 - 6/30/18

6. ConOps
9/12/14 - 5/20/15

7. System Requirements
4/23/15 - 7/29/16

8a. Validation & Verification Plans
8/1/16 - 8/31/17

8b. System Integration
1/1/18 - 9/28/18

9. Institutional Design
1/2/17 - 9/28/18

10. Component Development
8/15/16 - 6/30/18

11. System Integration
1/1/18 - 9/28/18

12. System Deployment
2/2/18 - 4/1/19

13a. Institutional Design
1/1/18 - 9/28/18

13b. Institutional Operations
10/1/18 - 6/30/20

14. System Integration
1/1/18 - 9/28/18

15. Training
11/1/18 - 12/31/19

16. System Operations
1/1/19 - 6/30/20

17. System Operations
1/1/19 - 6/30/20

18a. Pre Evaluation
6/1/18 - 12/31/18

18b. Post-Deployment Evaluation
4/1/19 - 6/30/20

19. Migration to Production
3/1/19 - 6/30/20

19. Lessons Learned
1/1/20 - 6/30/20
Risks

- **Short Term Risks**
  - Dynamic Message Sign Design and Purchasing
  - Other Call for Projects ITS Design and Purchasing
  - Contracting items

- **Launch Risks**
  - Data being available for testing
  - Integration at a rapid pace
  - Shortage of resources
  - COTS Integration
  - Contracting
6 Summary
Outreach

- New format for face to face
- Next two face to face meetings in Monrovia and Duarte
- Next Connected Newsletter under review
- Mort and Farid onboarding
  - Mort, Farid, Steve, Ed and Joe met with Pasadena, Arcadia and LA County. Meetings went well.
  - Are setting up similar meetings with Monrovia and Duarte (Will the week of Nov 27th work?)
- Charter – To be discussed later
- Presentations
  - Francois to present on the Data Hub at TRB – Title is UC Berkeley’s and Caltrans’ new cloud based data hub
  - Joe presented to AASHTO Center for Excellence on Workforce Management for TSM&O
  - Joe to present at ITS Southern Ca Luncheon on Big Data at Berkeley
MOU

- Mort is working on it
- Tentative Schedule
  - Assigned to Mort October 23, 2017;
  - Draft Outline due January 10, 2018;
  - Draft MOU due April 20, 2018;
  - Draft MOU Circulation for Review April 27, 2018;
  - All comments Due back by May 30, 2018;
  - Final draft MOU Due July 11, 2018;
  - Submit for Signature July 25, 2018;
  - Final Signed MOU September 22, 2018
Caltrans D7 provided prioritization comments on additional sections of the Roles and Responsibilities document.

Tarek met with San Diego Association of Governments (SANDAG)
- Will await his report to share results
- Alex Estrella indicated he would like to be more involved with the I-210 effort

Tarek met with Caltrans District 11 – San Diego
- Will await his report to share details

Tarek setting up meeting with Caltrans District 4 – Bay Area
Systems Engineering

- **Released on CC Website yesterday**
  - Draft data hub core system design document
  - Detailed design architecture picture (large and detailed).
  - Continual updates to System Interface Doc/Data Dictionary

- **Under development**
  - Core system validation document
  - Kali and Jesus building communication design document
TMDD Interfaces

- **External NTCIP/TMDD Interfaces**
  - Kimley Horn
    - Caltrans working on contract
  - TransCore
    - Have started development. Will check in with them next week.
  - McCain
    - Caltrans working on contract

- **ATMS – Caltrans (CMS Signs, Loops, Ramps)**
  - Provided comments on the design document.
  - Overall it looked pretty good.
COTS (Purple Box)

- **Companies who are participating:**
  - Kapsch
  - Parsons
  - Telegra

- **Update**
  - Good meeting with Telegra. Everyone seems reasonably comfortable with the process.
  - Meeting with Parson’s next week
  - Folks want to make sure that the official procurement will be completed by first half of 2020
Design and Construction

- **210 TMS Upgrade**
  - Heading for on time completion at end of year

- **Network Communication**
  - To be discussed in detail later

- **Call for Projects (ITS Elements) – Allen**
  - To be discussed in detail later

- **Call for Projects – Signs and Sign Software**
  - To be discussed in detail later
Data Quality

- **Freeway - Data Quality Meeting**
  - I-210 PM 25 - 52.44
    - Eastbound 79.4% (6-month average: 82%)
    - Westbound 84.2% (6-month average: 84%)
  - I-10 PM 19.4 - 29.65
    - Eastbound 98.3% (6-month average: 93%)
    - Westbound 97.4% (6-month average: 91%)
  - I-605 PM 22.93 - 28
    - Northbound 87.6% (6-month average: 79%)
    - Southbound 88.4% (6-month average: 80%)

- **IEN Data**
  - IEN has been up and down this month so difficult to report on data quality for County, Monrovia and Duarte

- **Pasadena Data**
  - Received one week of Pasadena data
  - Will be processing this week. Yes!

- **Arcadia**
  - Rising to 79%.
Estimation of Corridor Traffic State

- **Freeway**
  - Hope to have working by end of year
  - Improving data quality is enabling this

- **Arterial**
  - Integrating Pasadena data
  - Continuing migration of Matlab code to Java
  - Hope to have first corridor wide arterial estimation running by end of year

- **Estimation is needed for**
  - Display of current state
  - Possible information for rules
  - Seeding of prediction simulations
Incident simulation and response planning

- Matching traffic patterns during historical incidents
- Comparing available freeway and arterial data to confirm simulation veracity
- Adjusting flush plans and ramp meter plans to improve traffic outcomes
- Greg met with TMC staff to review response planning process
- Dec 5th – Next response plan and modeling review (Actual incident and response)
Data Hub and DSS Software

- Cloud networking address space identified
- Command and control - Improved simple and complex workflow implementations
- Data Hub hardening (reliability improvements)
- Beginning design of response plan management in DSS
- Integration meetings with COTS vendors
Data and DSS Detailed Design (Draft)
Other Items

- **511**
  - 511 Integration – We reviewed the interface definitions and will now setup a meeting with Kali to discuss initial implementations.
  - Began reviewing the “REGIONAL INTEGRATION OF ITS MODERNIZATION TRANSPORTATION STANDARDS SYSTEM DESIGN”

- **Arterial Lane Closure – Arterials**
  - I think we have agreed to use the Caltrans arterial lane closure system.
  - Do people want more time to review it?

- **PEMS**
  - Expecting proposal in near future
2. THE CORE STAKEHOLDERS NOW DESIRE TO AMEND THE PROJECT CHARTER AS FOLLOWS:
   A. The following Primary Contact Persons shall be updated as follows:
      i. Caltrans District 7 – Mort Fahrtash, Rafael Molina

F. Core Stakeholders will now include LA SAFE (the Los Angeles County Service Authority for Freeway Emergencies) and RIITS (the Regional Integration of Intelligent Transportation Systems program).
   i. LA SAFE includes the Metro Freeway Service Patrol (FSP), SoCal 511 Traveler Information System, and the Kenneth Hahn Call Box Program System, and is managed by LA Metro’s Congestion Reduction department Business Unit.
   ii. LA Metro administers the RIITS network with information provided from government agencies in Southern California and other sources of transportation data available through RIITS, by Caltrans, the City of Los Angeles Department of Transportation, the California Highway Patrol, Long Beach Transit, and Foothill Transit.
   iii. Additional Core Stakeholders may be added without amendment to the Project Charter with verbal approval of Caltrans, LA Metro, PATH, LA SAFE, LA County and the cities (Pasadena, Arcadia, Monrovia, and Duarte).
3. The following will be added to the table of contacts and roles/responsibilities starting on Page 4:

<table>
<thead>
<tr>
<th>Core Stakeholder</th>
<th>Primary Contact Person</th>
<th>Primary Roles and Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIITS</td>
<td>Kali Fogel</td>
<td>Real-time information exchange network between LA County, freeway and arterial data, traffic, transit and emergency services agencies. Provide equipment, hardware, maintenance, and/or management for interfaces and video, as agreed.</td>
</tr>
<tr>
<td>LA SAFE</td>
<td>Iain Fairweather, Kenneth Coleman</td>
<td>Develop the software, accept and display data, disseminate incident information, integrate with existing programs such as Freeway Service Patrol</td>
</tr>
</tbody>
</table>

All other terms and conditions contained in the June 25, 2015 Project Charter are unaffected by this Amendment No. 1 and shall remain in full force and effect.

IN WITNESS WHEREOF, the Core Stakeholders have executed this Amendment. The latest signature date is the date of the Amendment.
Communication
Status Update

- **Finalizing Phase 2 network design**
  - Network capable of splitting a single fiber optic into multiple channels each with dedicated bandwidth
  - IP address and protocol independent
  - Provides a medium for organizations to transport data
  - Network components do not include switches, routers, or firewalls

- **Generated draft Bill of Materials using MRV as an example but have not selected a vendor**

- **Require fiber distances, fiber power and loss budget to finalize design**
IP Address and Protocol Independent

- Fiber network provides physical connectivity between the agencies
- RIITS will provide and manage the physical demarcation where Caltrans and agencies connect
- Logical part of the network such as routing and IP address numbering will not be managed by RIITS
- Routing and IP address schemes required for logical connectivity needs to be defined
Phase 2 Overview
# Phase 2 Components

<table>
<thead>
<tr>
<th></th>
<th>OD-48-HD</th>
<th>OD-32</th>
<th>OD-16</th>
<th>OD-12</th>
<th>OD-6</th>
<th>OD-4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rack Space</strong></td>
<td>10 RU</td>
<td>9 RU</td>
<td>3 RU</td>
<td>3 RU</td>
<td>2 RU</td>
<td>1 RU</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>18 lbs</td>
<td>37 lbs</td>
<td>28.5 lbs</td>
<td>28.5 lbs</td>
<td>12.5 lbs</td>
<td>1.6 lbs</td>
</tr>
<tr>
<td><strong>App Slot</strong></td>
<td>46</td>
<td>30</td>
<td>15</td>
<td>11</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Mgr Slot</strong></td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Hub Sites**

**Field Sites**
# Phase 2 Components

<table>
<thead>
<tr>
<th>Modules</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>OADM</td>
<td>Separate physical fiber into multiple data channels</td>
</tr>
<tr>
<td></td>
<td>Protocol and topology independent</td>
</tr>
<tr>
<td>Network Management</td>
<td>Provide management control for self-healing switch</td>
</tr>
<tr>
<td>Optical Self Healing</td>
<td>Provide full path protection</td>
</tr>
<tr>
<td>Switch</td>
<td>Capable of switching between a primary and secondary (backup) link</td>
</tr>
<tr>
<td>Amplifier</td>
<td>Extended optical link</td>
</tr>
<tr>
<td></td>
<td>Use only when needed</td>
</tr>
<tr>
<td>Transciever</td>
<td>Enables agencies to connect into the optical network</td>
</tr>
</tbody>
</table>
Phase 2 Sample Connectivity – 1 service
Phase 2 Sample Connectivity – 3 services
### Design Option 1: Channel per Agency

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated bandwidth for each agency</td>
<td>Reduce scalability for the region due to finite number of channels</td>
</tr>
<tr>
<td>Dedicated bandwidth for data and video</td>
<td>Increases fiber and switch port requirement for agencies</td>
</tr>
<tr>
<td>Protocol independent</td>
<td>Most expensive solution</td>
</tr>
<tr>
<td>Minimize concerns with IP address conflicts between agencies</td>
<td></td>
</tr>
<tr>
<td>Security based on physical separation</td>
<td></td>
</tr>
</tbody>
</table>
Design Option 2: Channel per Function

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated bandwidth for data and video</td>
<td>Shared bandwidth between agencies</td>
</tr>
<tr>
<td>Increase channel scalability for the region</td>
<td>Agencies need to agree on protocol and IP address scheme</td>
</tr>
<tr>
<td>Security based logical separation (VLANs and firewall)</td>
<td></td>
</tr>
</tbody>
</table>
# Design Option 3: Single Channel for ICM

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase channel scalability for the region</td>
<td>Shared bandwidth between agencies and function (data/video)</td>
</tr>
<tr>
<td>Reduce fiber and switch port requirement for agencies</td>
<td>Agencies need to agree on protocol and IP address scheme</td>
</tr>
<tr>
<td>Least expensive solution</td>
<td>Security based logical separation (VLANs and firewall)</td>
</tr>
</tbody>
</table>
## Design Comparisons

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Option 1: Separate channels/agency</th>
<th>Option 2: Separate channels/function</th>
<th>Option 3: Single channel for ICM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability (Most)</td>
<td>★★★★★</td>
<td>★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Agency Impact (Least)</td>
<td>★</td>
<td>★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Capacity (Most)</td>
<td>★★★★★</td>
<td>★★★★★</td>
<td>★★</td>
</tr>
<tr>
<td>Cost (Least)</td>
<td>★</td>
<td>★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Logical Config (Least)</td>
<td>★★★★★</td>
<td>★★★★★</td>
<td>★★</td>
</tr>
<tr>
<td>Scalability (Most)</td>
<td>★</td>
<td>★★★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Security (Most)</td>
<td>★★★★★</td>
<td>★★★★★</td>
<td>★★★★★</td>
</tr>
</tbody>
</table>

- **Good**
- **Better**
- **Best**
Next Steps

- Identify connectivity points between Caltrans and agencies
- Issue Statement of Work to complete fiber connectivity
- Obtain fiber distances and estimates on fiber power/loss budgets
- Finalize number of channels need per location
- Issue procurement for network components
Communication – Other Items

- **Assignment of IP Ranges for CC**
  - Caltrans HQ has assigned 10.X subnet to ICM efforts in the districts. Excellent. Provides sufficient addresses for production, test, dev and research.
  - PATH divided the network up as needed and results were provided to Caltrans and RIITS

- **Erlan working on Caltrans fiber to city fiber connections**

- **Call for Projects Communication Under Bridge at Huntington and Encino**
  - Allen, Kali and Joe discussed. Kali will move forward with a design that meets Jane’s requirements
## CC IP Ranges

<table>
<thead>
<tr>
<th>IP Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.207.0.xxx</td>
<td>ROOT of PROD stack</td>
</tr>
<tr>
<td>10.207.0.xxx</td>
<td>PROD Datahub ROOT &gt;&gt; PROD Datahub Public (*)</td>
</tr>
<tr>
<td>10.207.1.xxx</td>
<td>&gt;&gt; PROD Datahub Shared</td>
</tr>
<tr>
<td>10.207.2.xxx</td>
<td>&gt;&gt; PROD Datahub Private</td>
</tr>
<tr>
<td>10.207.3.xxx</td>
<td>PROD CMS ROOT &gt;&gt; PROD CMS Public (#)</td>
</tr>
<tr>
<td>10.207.4.xxx</td>
<td>&gt;&gt; PROD CMS Shared</td>
</tr>
<tr>
<td>10.207.5.xxx</td>
<td>&gt;&gt; PROD CMS Private</td>
</tr>
<tr>
<td>10.207.6.xxx</td>
<td>PROD AWS RDS subnet in second Availability Zone</td>
</tr>
<tr>
<td>10.207.7.xxx</td>
<td>&gt;&gt; SPARE &lt;&lt;</td>
</tr>
<tr>
<td>10.207.8.xxx</td>
<td>PROD DSS1 ROOT &gt;&gt; PROD DSS1 Modeling Shared</td>
</tr>
<tr>
<td>10.207.9.xxx</td>
<td>&gt;&gt; PROD DSS1 Modeling Private</td>
</tr>
<tr>
<td>10.207.10.xxx</td>
<td>&gt;&gt; PROD DSS1 RPM Shared</td>
</tr>
<tr>
<td>10.207.11.xxx</td>
<td>&gt;&gt; PROD DSS1 RPM Private</td>
</tr>
<tr>
<td>10.207.12.xxx</td>
<td>PROD DSS2 ROOT</td>
</tr>
<tr>
<td>10.207.16.xxx</td>
<td>PROD DSS3 ROOT</td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
<tr>
<td>10.207.60.xxx</td>
<td>PROD DSS14 ROOT</td>
</tr>
</tbody>
</table>
Next Step: Select Transport IP Addresses

1. Internal IP range

2. Transport IP Range

3. 10.207.0.0/16
Call for Projects

Parsons to Discuss
Caltrans D7 I-210 Connected Corridors
Procurement Support

Dan Lukasik
Vice President
Timeline

- Met Face-to-Face with Stakeholders  
  August 2 – 21
- Distributed Updated Equipment List  
  September 1
- Distributed Procurement Packages to Stakeholders  
  September 7
- Integrated updates / comments  
  Sept 21 – Oct 31
- Provided Caltrans with Engineering Cost Estimate  
  October 10
- Distributed Updated Procurement Packages  
  November 2
- Provided Updated Engineering Cost Estimates  
  November 8

- **Finalize Procurement Packages (within Budget)**  
  November 22
Status

Well Defined Procurement Packages with scope reviewed by Stakeholders

Procurement Summary – 7 Procurement Packages

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget</td>
<td>$ 1,629,800</td>
</tr>
<tr>
<td>Requested</td>
<td>$ 2,150,643</td>
</tr>
</tbody>
</table>

Requested Quantities Exceeded Budget by over 30% (or $ 521,000)

To Meet Project Funding - Forced to Reduce Quantities to original budget totals
Reductions have been spread across all packages / jurisdictions

Each Jurisdiction must provide Updated LOCATIONS (reflecting reduced quantities)
### Procurement List & Quantity

| Package | Location | Pasadena | Arcadia | Monrovia | Durate | LA County | Total | Original | Requested | In Budget | Reduction |
|---------|----------|----------|---------|----------|--------|-----------|-------|----------|-----------|-----------|-----------|----------|
| **Package 1 - Bluetooth (Velocity)** |          |          |         |          |        |           |       |          |           |           |           |          |
| Original | -        | 5        | -       | -        | -      | 5         |      | $15,200   | $18,024   | $15,124   |           |          |
| Requested | -       | 4        | -       | -        | -      | 4         |      |           |           |           |           |          |
| In Budget | -       | 4        | -       | -        | -      | 4         |      |           |           |           |           |          |
| Reduction | -       | -        | -       | -        | -      | -         |      |           |           |           |           |          |
| **Package 2 - Bluetooth (BlueToad)** |          |          |         |          |        |           |       |          |           |           |           |          |
| Original | 12       | 0        | 6       | 3        | 5      | 26        |      | $122,000  | $208,708  | $115,620  |           |          |
| Requested | 11      | 0        | 4       | 2        | 5      | 22        |      |           |           |           |           |          |
| In Budget | 6       | 0        | 2       | 1        | 3      | 12        |      |           |           |           |           |          |
| Reduction | -5      | -        | -2      | -1       | -2     | -10       |      |           |           |           |           |          |
| **Package 3 - New Cabinets** |          |          |         |          |        |           |       |          |           |           |           |          |
| Original | 7        | 1        | -       | -        | -      | 8         |      | $222,500  | $271,897  | $206,689  |           |          |
| Requested | 7       | 1        | -       | -        | -      | 8         |      |           |           |           |           |          |
| In Budget | 5       | 1        | -       | -        | -      | 6         |      |           |           |           |           |          |
| Reduction | -2      | -        | -       | -        | -      | -2        |      |           |           |           |           |          |
| **Package 4 - Communication Upgrade** |          |          |         |          |        |           |       |          |           |           |           |          |
| Original | -        | 0        | 15      | 5        | 2      | 22        |      | $302,500  | $417,038  | $301,058  |           |          |
| Requested | -       | 2        | 27      | 11       | 5      | 45        |      |           |           |           |           |          |
| In Budget | -       | 2        | 16      | 8        | 3      | 29        |      |           |           |           |           |          |
| Reduction | -       | -        | -11     | -3       | -2     | -16       |      |           |           |           |           |          |
## Procurement List & Quantity

<table>
<thead>
<tr>
<th>Package 5 - Controllers</th>
<th>Pasadena</th>
<th>Arcadia</th>
<th>Monrovia</th>
<th>Durate</th>
<th>LA County</th>
<th>Total</th>
<th>Original</th>
<th>Requested</th>
<th>In Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>17</td>
<td>$105,600</td>
<td>$114,063</td>
<td>$110,263</td>
</tr>
<tr>
<td>Requested</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Budget</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>11</td>
<td></td>
<td>$110,263</td>
<td></td>
</tr>
<tr>
<td>Reduction</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Package 6 - Video Detection System</th>
<th>Pasadena</th>
<th>Arcadia</th>
<th>Monrovia</th>
<th>Durate</th>
<th>LA County</th>
<th>Total</th>
<th>Original</th>
<th>Requested</th>
<th>In Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>22</td>
<td>$730,000</td>
<td>$924,416</td>
<td>$712,363</td>
</tr>
<tr>
<td>Requested</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Budget</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>17</td>
<td></td>
<td>$712,363</td>
<td></td>
</tr>
<tr>
<td>Reduction</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Package 7 - Data Comm Module / VDS SW Upgrades</th>
<th>Pasadena</th>
<th>Arcadia</th>
<th>Monrovia</th>
<th>Durate</th>
<th>LA County</th>
<th>Total</th>
<th>Original</th>
<th>Requested</th>
<th>In Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>11</td>
<td>13</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>31</td>
<td>$128,000</td>
<td>$196,497</td>
<td>$127,771</td>
</tr>
<tr>
<td>Requested</td>
<td>8</td>
<td>15</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Budget</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction</td>
<td>-1</td>
<td>-8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$1,629,800 $2,150,643 $1,588,889

$520,843
Over Budget
ALTERNATE ROUTE UPDATE
Equipment Update (CMS)

Sign: Full Matrix LED (3’ x 4’)
Equipment Update (Pole)

- **Pole: Modified Pole from San Mateo Project**
DMS Sign Location Update

- **15 Locations, 17 Signs in Pasadena**
  - 3 locations are at Caltrans-owned signals

- **6 Locations, 8 Signs in Arcadia**
  - Includes Huntington at Santa Anita (low priority)

- **4 Locations, 6 Signs in Monrovia**
  - 2 locations are at Caltrans-owned signals

- **3 Locations, 3 Signs in Unincorporated County Land**
  - 3 locations on Rosemead owned by LACO

- **1 Location, 2 Signs in Duarte**

- **TOTAL = 36 signs**
Static Sign Location Update

- **Four locations will have static painted signs**
  - Three in Caltrans ROW
  - One in Pasadena
Conduit Capacity

- Performed conduit fill calculations based on the MUTCD
  - 25% fill for new runs
  - 35% for existing runs
Field Review Results

- **Feasible**
  - Any location where there is sufficient conduit capacity between the controller cabinet and the proposed sign location

- **Not Feasible**
  - Any location that does not have sufficient capacity and will require some or all of the following:
    - Wireless Communication
    - Solar Power
    - New Conduit

- **Existing**
  - Locations where a sign is already in place
Bid Estimate

- **Hardware**
  - Signs, Poles, Pull Boxes, Wireless Equipment, Extenders, Power & Comm Cables, Static Sign

- **Software**
  - Three F2C Licenses, C2C Software

- **5% for Traffic Control**

- **5% for Mobilization**

- **20% Contingency**

- ~$1.1 million
Bid Specifications

- **A shorter scope-of-work**
  - Procuring & installing equipment
    - Comm and Power
  - F2C Sofw
  - C2C
  - Static Sign

- 2 Drafts
  - With and without details
What we are trying to avoid
Next Steps

- Josh and Erlan will visit all proposed sign locations to measure distance between proposed sign and corresponding Intersection.

- Meet with Pasadena and Arcadia to discuss possible service access points.

- Examine Caltran’s cabinet locations, conduits and pull boxes.

- Include information gathered from the tasks above onto the Bid Specifications.
Thank You
and
Next Meeting
(Suggest Jan 16th in Duarte)