Welcome & Introductions

1. Approval of July 24 Committee Minutes* (page 3)

2. VOTE: Vice-Chair Election*

3. Two Minute Agency Updates

4. Proposed 2018 Meetings (page 7)

5. 2018 OGL Work Plan (page 8)

6. Potential Initiatives and 2018 Call for Projects (page 10)
   - Ideas to advance the state of arterial operations and/or traffic flow in the region. Desire is to have “shovel-ready” projects

7. Incident Diversion Planning (page 17)

8. IT Security Audit

9. TransSuite Feature Update (page 18)
   - SEPAC 4.57 controller integration
   - Automated Signal Performance Measures (ATSPM)
   - Presentation from Overland Park ATSPM experiences

10. STP 2017-2018 Local Funds Agreements and Invoice Status

11. Regional OGL CMAQ Project Update (CCTV, Fiber, Blue Springs and Grandview)

12. Regional Traffic Signal On-Line Map Progress (page 19)

13. Video Recording

Getting to MARC: Information on transportation options to the MARC offices, including directions, parking, transit, carpooling, and bicycling, can be found online. If driving, visitors and guests should enter the Rivergate Center parking lot from Broadway and park on the upper level of the garage. An entrance directly into the conference area is available from this level.

Parking: Free parking is available when visiting MARC. Visitors and guests should park on the upper level of the garage. To enter this level from Broadway, turn west into the Rivergate Center parking lot. Please use any of the available spaces on the upper level at the top of the ramp.

Special Accommodations: Please notify MARC at (816) 474-4240 at least 48 hours in advance if you require special accommodations to attend this meeting (i.e., qualified interpreter, large print, reader, hearing assistance). MARC programs are non-discriminatory as stated by Title VI of the Civil Rights Act of 1964. For more information or to obtain a Title VI Complaint Form, call 816-474-4240 or visit our webpage.
Getting to MARC: Information on transportation options to the MARC offices, including directions, parking, transit, carpooling, and bicycling, can be found online. If driving, visitors and guests should enter the Rivergate Center parking lot from Broadway and park on the upper level of the garage. An entrance directly into the conference area is available from this level.

Parking: Free parking is available when visiting MARC. Visitors and guests should park on the upper level of the garage. To enter this level from Broadway, turn west into the Rivergate Center parking lot. Please use any of the available spaces on the upper level at the top of the ramp.

Special Accommodations: Please notify MARC at (816) 474-4240 at least 48 hours in advance if you require special accommodations to attend this meeting (i.e., qualified interpreter, large print, reader, hearing assistance). MARC programs are non-discriminatory as stated by Title VI of the Civil Rights Act of 1964. For more information or to obtain a Title VI Complaint Form, call 816-474-4240 or visit our webpage.
Welcome & Introductions
Meeting started at 1:30. Steve welcomed all and conducted introductions

1. Approval of April 24 Committee Minutes* (page 3)
The chair asked for approval of the minutes, the committee voted unanimously. The motion carried.

2. Two Minute Agency Updates
   - Derek noted that MoDOT will be doing bridge work on I-470 from the Triangle to I-70 that will require lane closures starting Monday July 31st.
   - Donna noted that at Lees Summit road, OGL has developed a study for retiming work. Recently at Lee’s Summit Road and 42nd St. a crash damaged equipment and the traffic signal is currently in flash operation.
   - Lideana noted a crash occurred recently at K7 and Parallel Parkway. KCK is looking to make improvements at this intersection with safety funds.
   - David N. noted that KDOT’s traffic engineering unit is working on publishing the Johnson County Road Safety Audit. OGL and other agencies assisted with providing clearance timings for vehicular and pedestrian movements for on-system traffic signals.
   - David N. asked if there were any recommendations that OGL staff or members might wish to offer regarding a study that KDOT will be conducting to evaluate the possibility of signalizing the intersection of US-56 (Shawnee Mission Parkway) and 55th Street.
   - David L. reported that the Senate Report 114-243 (accompanying the FY 2017 Department of Transportation Appropriations Act) dated May 5, 2017, contained requirements for a new Federal Highway Administration report to Congress regarding dynamic highway message signs. FHWA requested that states fill out a survey on State DOT use of DMS to support safety activities per the above provisions. The brief survey requested on a per corridor basis information on the number of DMS, Maximum ADT, number of DMS used to display safety messages, and the average annual number of
days such messages are displayed. This information will be valuable to the FHWA in preparing a report to Congress on such usage. He thanked KDOT for the timely submission of their survey.

- Chris L. reported that KCMO has hired a traffic engineer, Sulaiman Moinuddin and goes by Sol

3. **ITS Regional Architecture Presentation**
   Marc Hansen provided the update on the status of this work. MARC has contracted with Iteris with subs of Vireo, GBAsi and Gannett Fleming to do a comprehensive update to the ITS Regional Architecture. Work will begin soon that will involve the region and many on the OGL Steering Committee in this effort. 2001 was the first work on the architecture. The regional plan was adopted 2004 and the last update was in 2012. Stakeholder outreach will begin soon since NTP was given last week.

4. **Incident / Diversion Signal Timing**
   Todd Fredericksen provided the update to the status of the diversion planning efforts in a presentation. History of this work and the basis for it was discussed. Work continues to develop the I-35 and I-70 / I-435 corridor mapping which includes infrastructure. The command list details are also being created.

5. **Regional Traffic Signal Map Proposal** (page 6)
   Barry demonstrated a start of a new OGL traffic signal map to replace the current coverage map on the MARC website. Currently the PDF map is very time consuming to update and cumbersome to view. The MARC GIS staff has created this new map from the OGL database. Given the enhanced map functionality, OGL staff would like to pursue making it even more useful by including all regional traffic signals, not just OGL intersections, and adding contact information for public with concerns.

   The committee decided to proceed to develop the map to include all traffic signals and a contact number for each intersection. OGL signals may include a contact number for MARC. It was asked if the cameras could be added to the site. Barry replied that live camera views and live signal status from TransSuite would be more appropriate as part of a possible future website that could be incorporated with KC Scout, but that would be a much larger effort requiring discussion from all parties involved.

6. **Signal Phasing and Timing (SPaT) Challenge Presentation** (page 7)
   From the April meeting, OGL was asked to propose a corridor. Staff recommend the Southwest Trafficway & Shawnee Mission Pkwy corridor from 27th St to Mission Rd which includes four agencies, two states, a good number of intersections, has BRT, an advance ped interval intersection, detection variety, mixed use, heavy volumes and occasional freeway incident diversion traffic. Costs for a DSRC radio is around $5000 per intersection and a few intersections will need a new controller. A rough estimate is around $120,000 for the corridor. Some concerns include the payoff for doing this as it is unclear what direct benefit there is other than the advancement of technology in the Kansas City area of which has some smart city efforts currently underway.

   This topic had a good variety of discussion. In the end, this was not an endeavor the committee took any action to pursue. It should be noted that of the four agencies on the SWT/SMP corridor, only KCMO was in attendance. Also it is unclear if OGL funds could be used but likely local funds should be able to be used. Procurement would have to be worked out.

7. **Automated Signal Performance Measures Update** (page 9)
   A video presentation of the FHWA every day counts initiative of ATSPM was shown. The April 2016 document was updated from when it was given in April 2016
   https://www.youtube.com/watch?v=iFNvw_ZdVyk

   Details of this effort is provided in the handout. What is recently new is the capability of TransCore to provide a working performance measure system for Peek, Econolite, and Intelight controllers. This
capability exists now and can be installed soon. There are impacts to the system storage due to the high amount of data being collected. It was noted that some capabilities are available with presence vehicle detection but more advanced performance measure will come from having advanced detection. Another concern with the system is that every activity of the controllers being logged puts MARC and the agencies in a position of being required to provide the data for litigation purposes and sunshine requests. Committee members who spoke were not concerned with this fact, but some may want to discuss with their legal departments.

8. **Video Recording Proposal / Discussion** (page 17)
   Many agencies record their traffic video and OGL staff also have found the recordings to be useful on several instances where we could access recordings of another agency through federation. Currently the OGL-maintained Security Center system, which manages cameras for several agencies in the region, is not recording. KCK would like their cameras to be recorded. MODOT will not allow recording their cameras. Usually the city’s police department is involved in distribution of the video to outside parties particularly where crashes are involved. OGL needs to consult applicable agencies and determine a policy that will satisfy all.

9. **Marketing and Communications Proposal** (page 18)
   Todd Fredericksen presented the communication plan, a draft of which is included in the meeting packet for this meeting. This is an effort that came out of the Strategic Plan created for OGL, i.e. the need for more communication of the activities and benefits of the OGL program to its various customers. Target audiences include partner agencies’ staff, MARC staff and the public. The team has identified several key messages as seen in the document. MARC and OA staff would like to meet with city staff and their public relations staff to flesh out detailed communications.

10. **STP 2017-2018 Federal and Local Funds and Agreements Update**
    KS Attorney General (AG) – the KS interlocal agreement was rejected. Olathe and MARC were questioned by the AG as to the signature authority. Apparently actions need to be taken by council/board to give authority to the signers and this documentation then provided to the AG. Also there are issues on the language in section 8 and 15 as to when the agreement is effective and should have language in which the agreements are filed with the register of deeds office in each county. Resubmittal will be late August following MARC board of director’s action and Olathe Council action. AG then has another 90 days to review. It is unclear whether or not all agencies will need to re-sign prior to AG review again. If approved, MARC could then invoice cities in December. MARC needs to meet with a few key city attorneys and map out timeline and communicate that to agencies.

    MO Agreements – There are two cities that have their agreements yet to sign. Agreements received to date are KCMO, MoDOT, Independence, Lees Summit, Gladstone and North KC. KCMO requested to be invoiced and has paid for both 2017 and 2018. NKC has made payment for 2017. Agreements not received to date, Belton (due to possible additions), Liberty and Raymore

11. **2017 CMAQ MO Construction Project Update**
    Project consists of 35 CCTVs in KCMO and some fiber on the plaza, the addition of Blue Springs (5 signals) and Grandview (5 signals), and System Engineering of ATMS software functional requirements. TREKK had fallen off the MoDOT prequalified list. They are now on the list again but waiting for overhead rate verification.

12. **Quarterly Operations Update** (page 22)
    Chris highlighted a few things from the written report including the following. Two Ceragon links were upgraded and last week the final link needing it was also upgraded. FCC licenses are being finalized. Our Genetec system was upgraded in April and TransSuite in June. Raymore tower was vacated for painting
and subsequently re-installed and upgraded. OGL staff assisted with signal changes to accommodate closures of Shawnee Mission Pkwy at I-35 the past two weekends. Holiday schedules discussed previously were completed as planned, new timing plans were installed on Little Blue Pkwy and US-40 in Independence. Several training sessions were conducted and another is planned for this Friday, July 28.

13. Quarterly Budget Report (Handout)
We have expended the 2015-2016 STP funds. 2017-2018 started in April so we are 12.5% into the new 2-year budget. There were some changes to combine categories and a corresponding correction to the budgeted amounts. Biggest note is the ~1 Million balance in local funds that result partly due to spending local funds on an 80% federal and 20% local match while collecting at 50%. Next budget cycle we may request less funds to spend this balance down. Other endeavors are also being explored, recognizing some limitations on what kinds of things the funds may be spent on.

Other Business
- Missouri's 2017 Highway Safety & Traffic Blueprint Conference September 27-29, Columbia
- MoVITE Fall Meeting, October 4-6
- TSMO Webinars July 27th, 12-1. See ITS Heartland for future training.
- KAUTC – next meeting to be held October 10th, Manhattan Public Library

It was noted that in October, the committee will have a leadership change where a KS vice Chair will be elected. The current vice chair will become the Chair and both will assume their duties for the January 2018 meeting.

Next Regularly Scheduled Meetings: Monday, October 23, 2017, January 22, 2018
Adjournment, meeting ended at 3:42

*Action Items

<table>
<thead>
<tr>
<th>When</th>
<th>Who</th>
<th>What</th>
</tr>
</thead>
<tbody>
<tr>
<td>By end of August</td>
<td>All agencies</td>
<td>Meet with you PIO staff regarding the OGL Communications plan. Ray and Todd offered assistance to be part of your meeting</td>
</tr>
<tr>
<td>By end of August</td>
<td>All agencies</td>
<td>Provide Barry with a list of your agencies traffic signals. The format should be, in order of preference, (1) GIS (2) a table with GPS (3) a simple table/list or (4) CAD files</td>
</tr>
<tr>
<td>By October</td>
<td>KS Agencies</td>
<td>A KS Agency wishing to serve the committee as the KS vice chair for 2018 should contact Ray</td>
</tr>
<tr>
<td>Before October</td>
<td>OGL</td>
<td>Continue to develop the video recording policy and seek which agencies are interested recording.</td>
</tr>
<tr>
<td>When able</td>
<td>OGL</td>
<td>Pursue ATSPM</td>
</tr>
</tbody>
</table>
2018 OGL Steering Committee Meetings

January 22
MARC Board Room 1:30

April 23
MARC Board Room 1:30
*ITS Heartland starts April 23, Lincoln, NE*

July 23
MARC Board Room 1:30

October 22
MARC Board Room 1:30
OGL WORK PLAN - 2018

Operation Green Light Program

Program Objectives
- Manage traffic signal operations on the arterial corridors included in Operation Green Light in cooperation with partner agencies.
- Support regional traffic incident management initiatives by managing traffic signal timing plans on the arterial corridors included in Operation Green Light.
- Maintain the regional shared wireless communication network in good working order.
- Collect Traffic Signal traffic data in support of the signal timing efforts
- Support the Regional Traffic Signal Software

Background/Previous Work
Operation Green Light is a regional effort to improve traffic flow and reduce vehicle emissions. Operation Green Light works with federal, state and local agencies to operate and coordinate traffic signal operations and communication between traffic signal equipment across jurisdictional boundaries on nearly 700 traffic signals. Coordinating traffic signal systems can significantly reduce travel delay, reduce ozone precursor emissions and provide a powerful tool to help manage incident-related congestion.

Program Activities and Products
1. **ACTIVITY: Program management.** Activities included in this work include project management, stakeholder engagement, training, and all other work necessary to ensure the active prioritization of objectives to efficiently manage traffic signal infrastructure and control devices (ongoing)
2. **ACTIVITY: Signal Timing and Synchronization.** Activities include traffic data collection and analysis, field observation, controller programming and deployment, signal timing troubleshooting and reporting, traffic modeling and deployment, updating signal timing based on changes in traffic patterns, citizen concerns, special events, incidents or roadwork. (ongoing)
3. **ACTIVITY: Regional network communications.** Activities include, database management, repair tracking, field investigation, equipment procurement, server and software administration, contractor oversight and other activities associated with the system network (ongoing)
4. **ACTIVITY: Strategic plan update.** Update of the existing strategic plan
5. **ACTIVITY: Communications Network Upgrades.** Continue technology plan upgrades of aging communication network equipment
7. **ACTIVITY: Missouri 2017 CMAQ funds.** Manage the funds and project that will add cities, communication infrastructure, and systems engineering analysis of the regional traffic signal control system.
8. **ACTIVITY: IT security audit.** Manage the work that will review the OGL network security.

Funding
Operations 2018

<table>
<thead>
<tr>
<th>Type</th>
<th>Amount</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>$385,000</td>
<td>FHWA-STP-MO</td>
</tr>
<tr>
<td>Federal</td>
<td>$225,000</td>
<td>FHWA-STP-KS</td>
</tr>
<tr>
<td>Non-Federal</td>
<td>$610,000</td>
<td>Local funds</td>
</tr>
<tr>
<td><strong>Task Total</strong></td>
<td><strong>$1,220,000</strong></td>
<td></td>
</tr>
</tbody>
</table>
## 2018 OGL SIGNAL TIMING PLAN

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Signals</th>
<th>Jurisdiction</th>
<th>Plans</th>
<th>Last timed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-32</td>
<td>6</td>
<td>UG</td>
<td>All</td>
<td>N/A</td>
<td>Plans have been submitted to UG for approval</td>
</tr>
<tr>
<td>Lees Summit Rd</td>
<td>6</td>
<td>Independence, MODOT</td>
<td>All</td>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>95th St Lenexa/OP</td>
<td>8</td>
<td>Lenexa, OP</td>
<td>All</td>
<td>2007</td>
<td></td>
</tr>
<tr>
<td>Douglas</td>
<td>7</td>
<td>Lees Summit, MODOT</td>
<td>All</td>
<td>2011</td>
<td></td>
</tr>
<tr>
<td>Barry Rd</td>
<td>7</td>
<td>KCMO, MODOT</td>
<td>All</td>
<td>2013</td>
<td>Special attention to weekends and holidays</td>
</tr>
<tr>
<td>Metropolitan &amp; 635</td>
<td>2</td>
<td>UG</td>
<td>All</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Shawnee &amp; 635</td>
<td>2</td>
<td>UG</td>
<td>All</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>75th Lamar to Mission</td>
<td>5</td>
<td>OP, PV</td>
<td>All</td>
<td>2011</td>
<td></td>
</tr>
<tr>
<td>Bannister Rd</td>
<td>8</td>
<td>KCMO, MODOT</td>
<td>All</td>
<td>2015</td>
<td>Cerner</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>51</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special Plans</th>
<th>Signals</th>
<th>Jurisdiction</th>
<th>Plans</th>
<th>Last timed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident Mgt for I-35, I-70</td>
<td>50+</td>
<td>Incident</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Wide Holiday</td>
<td>100+</td>
<td>holiday / weekend</td>
<td></td>
<td>N/A</td>
<td>Identify additional corridors and strategies</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>150+</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Benefits</td>
<td>Challenges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open Traffic Signal Data</td>
<td>• Define a regional standard for open data (traffic signal system related)</td>
<td>• Provides regional leadership</td>
<td>• Institutional agreement</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Addresses an imminent issue before it’s a bigger issue</td>
<td>• May encompass bigger and legal issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increases the probability of regional uniformity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sets region up for other bigger smart city type initiatives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAT Challenge</td>
<td>• Pursue the deployment of V2I equipment along a selected OGL corridor</td>
<td>• Provides regional leadership</td>
<td>• Institutional agreement</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sets up region for connected vehicle testing and applications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel Times</td>
<td>• Collect travel time data for operational use (not public distribution)</td>
<td>• Improve system monitoring capability</td>
<td>• Deciding on the best technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Could be derived from: Bluetooth, Wi-Fi, LPR, Probe, Google/Waze, INRIX, HERE</td>
<td>• Optimize efficiency and cost-effectiveness of timing efforts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal Performance Measures</td>
<td>• Establish means for collecting and processing performance measures for the traffic signal system</td>
<td>• Improve system monitoring capability</td>
<td>• Institutional agreement</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Could include Utah SPM, TransSuite (recently implemented some Purdue PMs), MioVision, other technologies</td>
<td>• Optimize efficiency and cost-effectiveness of timing efforts</td>
<td>• Upcoming central system advertisement may cover this</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Adaptive</td>
<td>• Implement adaptive signal control as part of OGL</td>
<td>• Satisfies some local “demands” (KCMO)</td>
<td>• Some agencies have deployed on their own (and some have turned it off)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Possible improved operations on select corridors</td>
<td>• Requires excellent detection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Responsive</td>
<td>• Use the existing TransSuite traffic responsive tools</td>
<td>• Possible improve operations on select corridors</td>
<td>• Learning-curve for implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Answers long-standing questions on the effectiveness of TR operations</td>
<td>• May require improved detection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field System Upgrades or Expansion</td>
<td>• Upgrade or add field equipment:</td>
<td>• Improved monitoring, data collection, and communications</td>
<td>• May be higher cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Detection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Signal Controllers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o CCTV Cameras</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Description
Research the implications of making real-time traffic signal data “open”, develop a regional policy to govern its distribution and use, and implement the functionality to share it.

Background
OGL has been approached by multiple companies to provide a data feed of real-time traffic signal status and the demand for this seems to be increasing. Companies and individuals are using this data in an attempt to add value to their product by incorporating real-time signal operations data.

Many agencies have embraced the concept of open data in government in order to foster innovation and promote transparency in government. Others are reluctant to release such data because they are unclear about the implications for security, liability, safety, cost, or potential for additional revenue.

The current traffic signal control system (TransSuite) already has one or more such data feeds that could be made available once authorized.

Benefits
The concept of open data for government continues to evolve, and it is anticipated that pressure to provide this type of data will increase. Addressing the institutional issues now will allow area agencies to be prepared to respond to such requests, and facilitate the work of the many Kansas City region innovators. It would also contribute to positioning the region for greater advancements in transportation innovation, smart cities initiatives, economic development in the technology sector, and could benefit travelers through enhanced third-party services.

The benefits to having OGL facilitate this effort are that it could lead to regional uniformity in the data format and distribution throughout the region, and that it could serve as a single point of distribution for the area.

Challenges
The primary challenge for the effort lies in evaluating the implications and coming to agreement on a common policy among all of the agencies, each of which will have varying concerns, desires, and existing policies.

Tasks
1. Research the implications and best practices of sharing real-time traffic signal data, and present this to the OGL Steering Committee.
2. If determined to be beneficial, work with agencies to establish a common policy for sharing real-time traffic signal data from the OGL system.
3. Once a policy is in place, add the required system hardware and capability to make this data available.

Budgetary Estimate
$40,000-$65,000
Initiative: SPaT Challenge
10/12/17

Description
Select a corridor within the Kansas City region for participation in the national signal phase and timing (SPaT) challenge. Pursue deployment of V2I equipment along the selected OGL corridor.

Background
AASHTO has challenged state and local public-sector transportation infrastructure owners and operators (IO&Os) to deploy at least 20 dedicated short-range communication devices (DSCR) 5.9 GHz broadcast radio infrastructure to broadcast SPaT in one or more coordinated corridors or networks in each state by January 2020.

MARC staff have been asked to pursue investigation of a proposed corridor for participation in the program. MARC has already performed a preliminary assessment of, and recommended the Southwest Trafficway / Ward Parkway / Shawnee Mission Parkway corridor, and has collected some information on the program. This corridor involves the cities of Mission, Fairway, Westwood and Kansas City, Mo.

Benefits
The transportation industry, including automakers, is quickly moving toward vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) applications. While these applications have benefits to drivers in terms of safety features and mobility enhancements, IO&Os can also benefit from the use of V2I. By participating in this challenge, the region will have the opportunity to evaluate potential technology, develop specifications for equipment, learn how to best use the technology and data produced, and develop methodologies for managing data prior to V2I being ‘on the road’. Additionally, regional deployment will enable and encourage local initiatives to advance this technology.

The benefits to having OGL facilitate this effort are that OGL currently manages several large multi-jurisdictional candidate corridors across two states. Additionally, participation could lead to regional uniformity in the equipment, standards, and data management. OGL could act as a ‘manager’ of data, specifically for corridors that cross jurisdictional boundaries.

Challenges
Selection of a corridor may be a challenge dependent upon interest of individual agencies to participate. Signal equipment (cabinet and/or controller) upgrades may be necessary to support the initiative.

Tasks
1. Evaluate and recommend corridors for participation in the program. The evaluation process should include determination of equipment upgrades necessary to support the project as well as interest by owning agency(ies) in participation of the program.
2. Evaluate the various DSRC radio alternatives, and understand how they operate with each of the controller/firmware types currently used in the OGL system.
3. Selection and deployment of equipment along selected corridor.

Budgetary Estimate
$150,000
Description
Research the benefits, disadvantages, and implications of various alternatives for the automatic collection of arterial travel times for traffic signal operations. If approved, implement the selected solution.

Background
Travel time is a primary measure of the effectiveness (MOE) of traffic signal coordination. The standard way to collect this data is by using the floating car method, which requires an individual to drive each corridor multiple times. This can be costly and time consuming.

There are many new technologies and services that can be used to collect this data automatically. These include on-street devices such as Bluetooth, Wi-Fi sensors, License Plate Recognition (LPR) sensors, commercial sources such as INRIX, HERE or Waze that use probe data, and navigation systems on smartphones such as Google Maps or Waze. Each of these sources have pros and cons in relation to accuracy, saturation, and cost among others.

Some of the commercial sources may be available to some or all of the OGL partners through existing agreements (including an existing agreement between MoDOT and HERE), or by other types of agreements (e.g. Google or Waze).

Benefits
The automatic collection of travel time data would provide a comprehensive view of the current state of the arterial transportation system. This will enable OGL and local staff to quickly identify and respond to sudden changes, long-term trends, prioritize retiming efforts, and identify coordination issues at specific intersections.

Challenges
Given the rapid evolution of these technologies, most agencies are not clear on the pros, cons, and costs of each option.

Tasks
1. Evaluate various automatic travel time technologies.

Budgetary Estimate
Evaluation: $15,000-$20,000
Implementation: $0 - $500,000 depending on the technology type and deployment scale
Description
Evaluate and implement Adaptive Signal Control Technology (ASCT) as a part of the OGL system.

Background
ASCT is a method of traffic system management that uses traffic demand to initiate traffic signal timing changes in real-time. Several companies have developed ASCT systems. Some local agencies have deployed these systems with varying responses to the operation of the system. OGL staff would like to investigate the use of this technology as a region by evaluating the benefits and costs of adaptive compared to the current optimized timings.

Benefits
Local member agencies are being approached by system developers to deploy ASCT. By facilitating this effort, OGL can provide an evaluation of systems from a regional/cross-jurisdictional perspective. ASCT is another potential tool that OGL could use in the management of the appropriate traffic signal corridors and could result in improved operations.

Challenges
ASCT has been deployed by some member agencies with varying degrees of effectiveness; this prior experience may influence perspectives on the future use of these systems.

Most ASCT systems require vehicle detectors in a specific configuration, and some only work with specific controller/firmware types. The expense associated with these upgrades often exceeds the anticipated benefit for most areas. Additional research, a synthesis of local experience, and other efforts may help agencies understand the most appropriate applications for this technology.

Tasks
1. Research local and national experience and best practices for the use of ASCT.
2. Document the benefits and limitations of existing ASCT.
3. Recommend an approach to the deployment of ASCT, along with potential deployment corridors. If agreed upon by the steering committee, this may include following the systems engineering process defined in the 2012 FHWA guidance document, *Model Systems Engineering Documents for Adaptive Signal Control Technology (ASCT) Systems*

Budgetary Estimate
Evaluation: $35,000
Implementation: Costs depend on the ASCT and scope and scale of required enhancements.
Description
Evaluate and implement traffic responsive signal operation within the OGL system.

Background
Traffic responsive signal operation uses detector volume thresholds to automatically command a signal or group of signals to use a predetermined plan. TransSuite currently has built-in traffic responsive operation tools available to be used.

OGL staff have been asked to investigate the possibility of implementing traffic responsive signal control along a corridor in the system.

Benefits
It is possible to improve operations on some corridors through the use of traffic responsive signal control. By facilitating this effort, OGL can provide an evaluation of the approach, techniques for effective configuration, and recommendations on signals or corridors where it may be most effective.

Challenges
Configuring and adjusting the necessary thresholds is a cumbersome process and requires some expertise. Equipment upgrades, such as improved detection along a corridor, may be necessary to support traffic responsive as the application requires appropriate, accurate and reliable vehicle detection methods to be effective.

Tasks
1. Research the TransSuite traffic responsive control system tools. Determine what will be required to implement a traffic responsive system along an OGL corridor.
2. Select a corridor and recommend to the OGL Steering Committee.
3. Conduct equipment upgrades (if necessary) and implement traffic responsive traffic signal control.

Budgetary Estimate
Research and Evaluation: $20,000
Implementation: Costs will depend on the scope and scale of required enhancements.
Description
Identify potential projects and funding opportunities to upgrade or add field equipment such as vehicle and pedestrian detection, signal controllers, CCTV cameras or communications to enhance the current OGL network. Prepare identified projects to be ‘shovel-ready.’

Background
The OGL network has been expanding since the initial deployment of equipment in the early 2000’s. Over the course of that time new technologies and equipment enhancements have been identified that would benefit the system. The addition of CCTV cameras increases the ability to monitor and adjust to field related incidents, citizen concerns and signal timing real-time observation. CCTV’s reduce time to resolve problems by reducing the need for trips to the field. Expansion of the OGL system has and may continue to occur through the addition of new corridors and agencies to OGL, requiring new communications equipment. Through our operations of the system there are still several signalized locations without pedestrian detection that require longer side street green times which reduces vehicle delay and increases overall delay and emissions. In addition, there are locations with a lack of or failed vehicle detection that needs to be added or replaced.

There have been instances when funding opportunities have been presented for projects that are ‘shovel-ready’. Identifying these projects, whether equipment enhancements or system expansion, will prepare OGL to take advantage of these opportunities.

Benefits
Enhancements will provide improved monitoring, data collection, communication and operations of the system. There may also be opportunities for system expansion, whether by adding intersections to an existing corridor or adding a new corridor to the system.

Challenges
Equipment upgrades can be expensive and are not always improvements visible to the public. Expansion of the system into jurisdictions that are not currently members of OGL may require additional planning and not be ready in time to take advantage of short-turnaround funding opportunities.

Tasks
1. Identify and prioritize potential projects.
2. Prepare documentation as appropriate for each identified project to be ‘shovel-ready.’
3. Deploy equipment upgrades or expansion as funding becomes available.

Budgetary Estimate
Evaluation: $15,000
Documentation / deployment: Costs will depend on the scope and scale of each project.
OGL Diversion Route Timings
Steering Committee Update 10/23/2017

Previous Tasks: Determination of Segments and Diversion Routes
Corridors along I-35 north of 87th Street in Kansas and portions of I-70 and I-435 in Missouri were selected and possible diversion routes were identified. Many segments contain multiple diversion routes.

Recent Tasks: Completion of Diversion Route Timings
Diversion signal timings for all I-35 diversion routes have been completed. Signal timings were adjusted to provide additional time to diverted route movements. In many cases cycle lengths were and splits, for the diverted route movements, were increased.

Next Steps:
The diversion route timings for I-35 will be submitted and reviewed by local agencies. Once finalized and timings input into TransSuite, walk-throughs will be completed with the appropriate agencies. This includes a review of the notification process for incidents as well as the corresponding process for implementing diversion plans.

Work will begin developing timing plans for the identified diversion routes along I-70 and I-435 in Missouri.
Automated Signal Performance Measures Update – 10/23/2017

On January 26‐27, 2016 in Salt Lake City Utah, approximately 170 Traffic signal professionals gathered to learn about the efforts of the Pooled Fund Study (TPF‐5(258)) that included Indiana DOT and Purdue University for High Resolution Traffic Signal controller data and UDOT’s work to develop and provide source code for software to acquire and utilize the data.

The OGL team provided a plan to move toward how to incorporate ATSPM’s in its environment on April 25, 2016. Background has been provided on several occasions including two formal presentations of which the dates and links to the info are noted here: July 24, 2017; April 25, 2016

The Regional TransSuite ATMS (MARC server) now has the ability provide this performance data. Below is a recent screenshot of data from the intersection of US 71 and 59th St. The data has been set up on the intersections of US 71 at Gregory and 55th as well. Note that this data is limited due to the availability of lane by lane and advanced detection. 59th provides interesting data as shown below as well as below that the XPL diagram of the intersection. 59th street has presence detection but the advance detection covers all three thru lanes with one detector.
**Operation Green Light Signal System Map Update** (first proposed July 24, 2017)

**New public-facing OGL Map(s)**

OGL currently has its traffic signal locations on a PDF map on MARC’S website. The map provides good details of the locations showing a dot at an intersection and is well labelled. The map is capable of scaled to allow for moving between the areas and to be able to zoom to an area as well as the ability to print and stitch together it desired. Currently, while the map is only updated occasionally, it’s a tedious process as well as the fact there are better methods to display the data. It is also does not show any details of the intersection or what agencies owns the signal.

MARC has yet to receive data from a few agencies. MARC will soon reach out to agencies beyond the OGL group once the core OGL agencies are in place.
Table of Contents

List of Figures ...................................................................................................................... iii
Introduction .......................................................................................................................... 1
Operations Summary ........................................................................................................... 1
  Notes on Operations Summary ...................................................................................... 2
  System Hardware/Software Activities/Issues................................................................. 2
  Interagency Coordination ............................................................................................... 3
Additional Statistics .............................................................................................................. 6
  OGL Network Pod Diagram ............................................................................................ 6
  Repair Tickets by Network Pod ....................................................................................... 7
  Repair Tickets by Equipment Type .................................................................................. 8
  Repair Ticket Statistics by Severity Level ....................................................................... 9
Summary of Critical Events ................................................................................................ 10
  Preventative Maintenance .............................................................................................. 10
  CCTV Operations .......................................................................................................... 10
Traffic Signal Event Tracking ............................................................................................. 11
List of Figures

Quarterly Repair Ticket Statistics by Month................................................................. 4
Figure 1 – Quarterly Repair Ticket Statistics by Month............................................... 4
Additional Repair Ticket Details..................................................................................... 4
Figure 2 – Monthly Repair Ticket Statistics / Prior 15 months...................................... 4
Figure 3 – OGL Network Pod Diagram.......................................................................... 6
Figure 4 – Repair Tickets by Network Pod ................................................................. 7
Figure 5 – Repair Tickets by Network Pod / Year – to – date........................................ 7
Figure 6 – Repair Tickets by Equipment Type.............................................................. 8
Figure 7 – Repair Tickets by Equipment Type / Year – to – Date................................. 8
Figure 8 – Repair Ticket Statistics by Severity Level................................................... 9
Figure 9 – Repair Ticket Statistics by Severity Type / Prior 15 months......................... 9
Introduction

Operation Green Light (OGL) is a bi-state regional effort to improve traffic flow and reduce vehicle emissions. Managed by the Mid-America Regional Council (MARC), Operation Green Light works with federal, state and local agencies to operate a system that coordinates traffic signal timing and communication between intersections across jurisdictional boundaries.

This report details the work performed on the Operation Green Light communications network during the 3rd Quarter (July, August, and September) of 2017 and highlights of signal timing and agency coordination. OGL currently monitors/operates 699 signals and manages over 1200 network devices. These devices include intersection controllers, wireless radios, switches, cameras, routers, serial-to-IP converters and servers. For more information on the program, visit http://www.marc.org/Transportation/Commuting.

Operations Summary

A summary of the operational results and activities of the OGL program staff during the reporting period is presented below.

Repair tickets
- OGL staff actively responded to 129 repair tickets, representing about an 800% increase compared to last quarter. The increase is attributed to doing a significant amount of wireless radio upgrades throughout the region. OGL uses the repair tracking database to manage work orders and billing for the contractor, but currently don’t differentiate between normal repair work and radio upgrades.

Corridor Timing Efforts
- N-Brighton
- SMP & I-35 bridge closure detours
- Colbern Rd I-470 bridge closure detours
- Various timing changes in response to Solar Eclipse traffic

Training Sessions/ Panels/ Events
- 7/13 – Ray Webb attended the July KCITE Meeting
- 7/27 – OGL staff participated in TSMO to Improve Safety – Laying a Foundation webinar
- 7/27 – Barry Viss attended an MPR Cyber Security Summit
- 7/28 – Barry Viss conducted TransSuite training for member agencies
- 8/24 – OGL staff participated in TSMO to Improve Reliability – Laying a Foundation webinar
- 9/15 – Ray Webb attended the September KCITE Meeting
- 9/21 & 9/22 – Ray Webb attended the Regional TSM&O Summit in NKC

Additional Information
- OGL staff set up and scheduled the Miovision equipment to conduct 37 counts. Most of these were 13-hour turning movement counts and the remaining were 24-hour ADT counts.
Notes on Operations Summary

1. Repair ticket levels used by OGL staff are defined in Exhibit I Scope of Services as follows:
   - Minor – investigate and resolve communication problem within 5 business days, weather permitting
   - Major – investigate and resolve communication problem within 2 business days, weather permitting
   - Critical – investigate and resolve communication problem within 24 hours, weather permitting

System Hardware/Software Activities/Issues

The following list represents major software or hardware activities performed during the 3rd Quarter of 2017:

- Pod6 intersections on Barry Rd were upgraded from Alvarion to Radwin radios
- Pod2 intersections in Raytown and Kansas City were upgraded to Radwin radios
- Pod6A intersections in Liberty and Kansas City were upgraded to Radwin radios
- M350 intersections fiber switches were upgraded to new Transition switches
- 7/19 – Ceragon radio link was upgraded between Pod7 Bennington and Pod1B Woods Chapel
- FCC licensing was updated and renewed for links from Pod 1B Woods Chapel to Pod7 Bennington and from Pod5 KCMO City Hall to Pod6 Barry Rd.
- 7/5 – 7 MARC-owned controllers were upgraded to ASC/3s
- 9/26 – TransSuite TCS was upgraded to version 17.4.1
Interagency Coordination

During the 3rd Quarter, OGL staff participated in the following interagency activities:

- 7/6, 7/24, 7/31 - Barry Viss worked at the KCMO TOC
- 7/12, 7/26 – OGL and Olsson staff held bi-weekly signal timing conference call
- 7/14 – OGL and Belton staff held conference call to discuss new signal construction
- 7/20 – OGL staff participated in monthly OGL Regional TransSuite Status meeting
- 7/24 – OGL staff participated in the OGL Steering Committee meeting
- 7/27 – Ray Webb participated in NOCoE MPO/Regional TSM&O Peer Exchange discussion
- 8/4, 8/18, 8/29 – Ray Webb participated in a Regional TSM&O Summit planning discussion
- 8/7, 8/14, 8/21, 8/28 - Barry Viss worked at the KCMO TOC
- 8/7 – OGL staff participated in TransSuite web demo
- 8/7 – Ray Webb attended an ITS Architecture Coordination meeting
- 8/9, 8/23 – OGL and Olsson staff held bi-weekly signal timing conference call
- 8/9 – OGL staff participated in the FHWA Virtual Data Access Final Project webinar
- 8/15 – OGL staff met with Belton to discuss M58 & Y Hwy
- 8/15 – Chris Jenkins and Ray Webb participated in a call to discuss tower access for KDOT tower at K7 & I-70
- 8/17 – OGL staff participated in monthly OGL Regional TransSuite Status meeting
- 8/17 – OGL and Prairie Village staff had conference call to discuss ability to view camera at 75th & Mission
- 8/22 – OGL staff met with a Platte County Commissioner to discuss OGL operations
- 8/25 – OGL staff held initial meeting with TREKK for OGL CMAQ project
- 8/25 – Ray Webb attended an update meeting regarding the Lewis & Clark Viaduct project
- 9/5, 9/11, 9/18, 9/25 - Barry Viss worked at the KCMO TOC
- 9/5 – Ray Webb attended ITS Architecture Update Steering meeting
- 9/6, 9/20 – OGL and Olsson staff held bi-weekly signal timing conference call
- 9/6 – OGL staff met with TREKK and KCMO staff to discuss OGL CMAQ project
- 9/7 – Ray Webb and Chris Jenkins met with Leawood staff to discuss network connections to integrate signals and video
- 9/7, 9/15 – Ray Webb participated in a Regional TSM&O Summit planning discussion
- 9/14 – OGL staff met with OP and Leawood staff for site review of the Sheraton radio room
- 9/15 – OGL, Olsson, and Lees Summit staff met to discuss corridor signal timing on Douglas St
- 9/15 – Ray Webb attended Autonomous Vehicle Advisory Task Force meeting
- 9/18 – OGL, TREKK, and Blue Springs staff to discuss OGL CMAQ project
- 9/21 – OGL staff participated in monthly OGL Regional TransSuite Status meeting
- 9/26 – Ray Webb participated in NOCoE MPO/Regional TSM&O Peer Exchange discussion
Quarterly Repair Ticket Statistics by Month
In the 3rd Quarter of 2017, OGL staff created and responded to **129** repair tickets in the Kansas City area. This number represents an increase of about **210%** compared to the 3rd Quarter of 2016 and a **800%** increase compared to the 2nd Quarter of 2017. All repair tickets are shown by month in Figure 1.

Figure 1 – Quarterly Repair Ticket Statistics by Month

![Pie chart showing repair tickets by month: 46 in July, 59 in August, and 24 in September.](image)

Additional Repair Ticket Details:

Figure 2 – Monthly Repair Ticket Statistics / Prior 15 months

Figure 2 shows the number of repair tickets that OGL staff responded to for the last 15 months. It is intended to show long-term trends in incidents that are occurring on the OGL network.
Additional Statistics

OGL Network Pod Diagram

Figure 3 shows the overall design of the OGL Network and Pod Locations. It is noted that the different color of lines between the Pods are representing the different type of network connections. A black line represents a FCC licensed link, an orange line represents a fiber optic connection, and a light blue line represents an unlicensed radio link. The OGL network now has 2 wireless rings as seen in the diagram.

Figure 3 – OGL Network Pod Diagram
Repair Tickets by Network Pod

OGL staff is continually working on improving the reliability of the OGL network. Therefore, staff monitors and tracks which network pods continually have incidents. Figure 4 shows the number of repair tickets for each Pod and Figure 5 shows the number of repair tickets year-to-date for each Pod.

Figure 4 – Repair Tickets by Network Pod

Figure 5 – Repair Tickets by Network Pod / Year – to – date
Repair Tickets by Equipment Type

Figure 6 – Repair Tickets by Equipment Type

Figure 6 shows the number and percentage of incidents that occur for each equipment type for the quarter.

![Pie chart showing equipment types and their percentages.]

- Alvarion SU: 59%
- Alvarion AU: 28%
- Backhaul: 1%
- Switches: 12%
- Comtrol: 0%

Figure 7 – Repair Tickets by Equipment Type / Year – to – Date

Figure 7 shows the percentage of repair tickets year – to – date for each equipment type.

![Pie chart showing equipment types and their percentages.]

- SU: 61%
- AU: 27%
- Switches: 11%
- Backhaul: 1%
- Comtrols: 0%
Repair Ticket Statistics by Severity Level

**Figure 8 – Repair Ticket Statistics by Severity Level**

Figure 8 shows the number and percentage of incidents by severity level for the quarter.

**Figure 9 – Repair Ticket Statistics by Severity Type / Prior 15 months**

Figure 9 shows the number of incidents by severity type that OGL staff has managed in the last 15 months.
Summary of Critical Events
The OGL staff responded to 3 critical events during the 3rd Quarter of 2017.

During some major storms, there were 3 locations that experienced some lightning damage. Pods 3, 3A, and 7 all had some sort of equipment failure. Pods 3 and 3A had some ports go bad on their router. Pod 7 needed new lightning suppression for the Radwin radio that connects to Pod 3. All equipment was brought back online and has been working properly since.

Preventative Maintenance
Each year at the Pod locations for the OGL network, preventative maintenance is performed according to Exhibit I Scope of Services.

Preventative maintenance was completed and no major issues were found.

CCTV Operations
As part of the MO American Recovery and Reinvestment Act project in 2010 and the 2015 OGL CCTV and Network Enhancement project, 118 CCTV cameras were constructed at critical locations throughout the region. Since final installation, these cameras have routinely proven valuable to manage traffic and signal timing. During times of timing plan implementation, construction and detours, OGL staff, operations staff and signal electricians have routinely used these cameras to observe traffic and signal operations. Through the use of CCTV combined with TransSuite, malfunctions can be investigated remotely for a variety of issues including detection problems and timing concerns saving time investigating the issue in the field.

A bridge rehab project started in Merriam that installed 3 CCTV locations as part of the project to help oversee operations. They were installed in order to observe traffic during bridge construction. These continue to be heavily used to respond to incidents or timing changes in the construction zone. During this project, SMP was closed in both directions at various times and these cameras played an integral part in signal operations and timings adjustments that were needed. Additional cameras throughout the area in Shawnee and Merriam were utilized to help with the detours.

A bridge rehab project was started by MoDOT in Lees Summit in an area that has existing CCTV coverage. These cameras have been used to respond to incidents or timing changes in the construction zone. At different times during construction, I-470 and M291 were closed for new bridge decks to be poured. This and surrounding cameras proved extremely useful to monitor traffic conditions and signal operations.
### Traffic Signal Event Tracking

<table>
<thead>
<tr>
<th>Issue</th>
<th>Jurisdiction</th>
<th>Count</th>
<th>Issue</th>
<th>Jurisdiction</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Directions Dark</td>
<td>MODOT</td>
<td>1</td>
<td>Opticom Not Working</td>
<td>Merriam</td>
<td>1</td>
</tr>
<tr>
<td>All Directions Flashing</td>
<td>Bonner Springs</td>
<td>1</td>
<td>Other</td>
<td>Independence</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Lansing</td>
<td>1</td>
<td></td>
<td>Liberty</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Leawood</td>
<td>3</td>
<td></td>
<td>MODOT</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Lenexa</td>
<td>4</td>
<td></td>
<td>Shawnee</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>UGOVT</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Merriam</td>
<td>2</td>
<td>Ped Recalling</td>
<td>Belton</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Mission</td>
<td>1</td>
<td></td>
<td>Gladstone</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>MODOT</td>
<td>22</td>
<td></td>
<td>Lees Summit</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Prairie Village</td>
<td>1</td>
<td></td>
<td>Liberty</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Raymore</td>
<td>1</td>
<td></td>
<td>Merriam</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Shawnee</td>
<td>1</td>
<td>MODOT</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UGOVT</td>
<td>10</td>
<td>Shawnee</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Westwood</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Conflict With Opposing Phase</td>
<td>Belton</td>
<td>1</td>
<td>Phase Actuating W/No Vehicle</td>
<td>Independence</td>
<td>1</td>
</tr>
<tr>
<td>Cycling Improperly</td>
<td>Fairway</td>
<td>1</td>
<td></td>
<td>Lenexa</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Independence</td>
<td>1</td>
<td></td>
<td>Merriam</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Leawood</td>
<td>1</td>
<td></td>
<td>MODOT</td>
<td>36</td>
</tr>
<tr>
<td>Detection Not Working Correctly</td>
<td>Belton</td>
<td>1</td>
<td>Phase Backing Up</td>
<td>Bonner Springs</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Independence</td>
<td>3</td>
<td></td>
<td>UGOVT</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Merriam</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MODOT</td>
<td>10</td>
<td>Phase Maxing Out</td>
<td>Belton</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Shawnee</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UGOVT</td>
<td>6</td>
<td>Phase Skipped</td>
<td>Fairway</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Liberty</td>
<td>3</td>
<td></td>
<td>Merriam</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Lenexa</td>
<td>7</td>
<td>Poor Progression</td>
<td>UGOVT</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MODOT</td>
<td>2</td>
</tr>
<tr>
<td>Green Time too short</td>
<td>Leawood</td>
<td>1</td>
<td>Program Replacement Controller</td>
<td>MODOT</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MODOT</td>
<td>6</td>
<td></td>
<td>UGOVT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Shawnee</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intersection Not running Correct Plan</td>
<td>MODOT</td>
<td>3</td>
<td>Stuck Ped Button</td>
<td>UGOVT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>UGOVT</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liberty</td>
<td>1</td>
<td>TransSuite Database Comparison Diff</td>
<td>Independence</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Lenexa</td>
<td>1</td>
<td></td>
<td>Liberty</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Gladstone</td>
<td>1</td>
<td></td>
<td>Lenexa</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Merriam</td>
<td>2</td>
</tr>
<tr>
<td>Long Wait For Green Time</td>
<td>MODOT</td>
<td>6</td>
<td></td>
<td>MODOT</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Fairway</td>
<td>1</td>
<td></td>
<td>Shawnee</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UGOVT</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>294</td>
</tr>
</tbody>
</table>
MARC’s OGL program operates from STP Federal revenues on a reimbursement basis from MoDOT and KDOT who manage the funds. The local match according to agreements being executed for the years 2017-2018 is collected annually. Local funds are combined with federal STP funds to comprise the operations budget. The current federal funds to local target funding split is 50/50. Reimbursement of federal funds from MoDOT and KDOT are at an 80/20 rate. Currently, local agreements are in progress. In Kansas, all agreements are in the form of a single combined agreement for the 15 agencies and have been delayed due to the thought that the Kansas Attorney General would require approval however that has changed due to recent law revision. Of the nine Missouri partners, five agreements remain to be processed. Funds from KCMO have been paid for both 2017 and 2018 and from North Kansas City and Lees Summit for 2017.

Items to note from the below budget summary:
- This quarter begins into the 2017 funds as of April 2017.
- The budget is developed to show a two year budget.
- The % variance column can be used to compare variance to a 25% (6 of 24 months) progress.
- Since October 2016 OGL Steering Committee budget approval, the two year budget has been modified as noted:
  1. Consultant / Contractor Services was increased $50,000
  2. Travel was reduced
  3. Rent was lowered as reflected by MARC’s smaller office footprint
  4. Equipment / supplies budget was increased $30,000
  5. Telephone category is now combined to be telephone/maintenance (telephone, internet, modem, conference phone). Revised from $5000 to $48,000 due to combined categories

Funds collected for the current period minus the applied match results in $1,023,709 remaining funds.
### Expenses

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Two-Year Program Budget</th>
<th>Cumulative To Date</th>
<th>Balance</th>
<th>% Variance (Cumulative / Budget)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries, Fringe Benefits, Indirect Costs</td>
<td>$1,099,716</td>
<td>$275,382.52</td>
<td>$824,333.48</td>
<td>25.0%</td>
</tr>
<tr>
<td>Consultants/Contracted Services</td>
<td>$865,636</td>
<td>$301,019.48</td>
<td>$564,616.52</td>
<td>34.8%</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$10,000</td>
<td>$4,544.92</td>
<td>$5,455.08</td>
<td>45.4%</td>
</tr>
<tr>
<td>Meeting/Travel (In/Out of Region &amp; Registration)</td>
<td>$16,200</td>
<td>$1,172.48</td>
<td>$15,027.52</td>
<td>7.2%</td>
</tr>
<tr>
<td>Rent</td>
<td>$15,248</td>
<td>$3,735.49</td>
<td>$11,512.51</td>
<td>24.5%</td>
</tr>
<tr>
<td>Telephone/Maint. (Internet, mobile, ConferSave, USB modem)</td>
<td>$48,000</td>
<td>$9,258.37</td>
<td>$38,741.63</td>
<td>19.3%</td>
</tr>
<tr>
<td>Insurance</td>
<td>$8,000</td>
<td>$1,839.00</td>
<td>$6,161.00</td>
<td>23.0%</td>
</tr>
<tr>
<td>Postage</td>
<td>$200</td>
<td>$31.72</td>
<td>$168.28</td>
<td>15.9%</td>
</tr>
<tr>
<td>Equipment/Computer/Supplies</td>
<td>$249,000</td>
<td>$67,589.07</td>
<td>$181,410.93</td>
<td>27.1%</td>
</tr>
<tr>
<td>Service Agreements</td>
<td>$2,000</td>
<td>$314.60</td>
<td>$1,685.40</td>
<td>15.7%</td>
</tr>
<tr>
<td>Automobile Gas/Maintenance</td>
<td>$16,000</td>
<td>$3,242.64</td>
<td>$12,757.36</td>
<td>20.3%</td>
</tr>
<tr>
<td>Professional Memberships</td>
<td>$1,000</td>
<td>-$</td>
<td>$1,000.00</td>
<td>0.0%</td>
</tr>
<tr>
<td>Training</td>
<td>$3,000</td>
<td>-$</td>
<td>$3,000.00</td>
<td>0.0%</td>
</tr>
<tr>
<td>Utilities</td>
<td>$10,000</td>
<td>$2,641.86</td>
<td>$7,358.14</td>
<td>26.4%</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>$2,344,000.00</td>
<td>$670,772.15</td>
<td>$1,673,227.85</td>
<td>28.6%</td>
</tr>
</tbody>
</table>

### Revenues

<table>
<thead>
<tr>
<th>Revenues</th>
<th>Two-Year Program Budget</th>
<th>Cumulative To Date</th>
<th>Balance</th>
<th>% Variance (Cumulative / Budget)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STP Funding, KDOT</td>
<td>$450,000.00</td>
<td>$197,932.79</td>
<td>$252,067.21</td>
<td>44.0%</td>
</tr>
<tr>
<td>STP-Funding, MoDOT</td>
<td>$770,000.00</td>
<td>$338,684.93</td>
<td>$431,315.07</td>
<td>44.0%</td>
</tr>
<tr>
<td>Local Gov't Revenue - Required Match</td>
<td>$305,000.00</td>
<td>$134,154.43</td>
<td>$170,845.57</td>
<td>44.0%</td>
</tr>
<tr>
<td><strong>Total Revenues for Federal Grant</strong></td>
<td>$1,525,000.00</td>
<td>$670,772.15</td>
<td>$854,227.85</td>
<td>44.0%</td>
</tr>
</tbody>
</table>

Local Gov't Revenue - Designated to supplement Federal operations funds for program support

### Combined Revenues

| Combined Revenues                             | $2,344,000.00           | $670,772.15        | $1,673,227.85           | 28.6%                            |

### Net

| Net                                           | -$                       | -                  | -$                      | -                                |

### Local Government Balances:

| Excess local funds from previous budget periods | $793,463.44 | Grants 40-65375 and 40-65200 |
| Funds collected for current budget period      | $364,400.00  |
| Total available                                | $1,157,863.44 |
| Amount applied for current budget period (see above) | $(134,154.43) |
| **Ending Balance September 30, 2017**          | $1,023,709.01       |
| Reserve/Emergency (local funds)                | $300,000.00        |