LOOP 101 Mobility Project

PROJECT MANAGEMENT PLAN

Final Draft

Led by:

U.S Department of Transportation Federal Highway Administration

ADOT

Maricopa County

In Partnership with:

Department of Public Safety State Trooper Arizona

ASU

Chandler Arizona

Glendale Arizona

mesa·az

Peoria Arizona

City of Phoenix

City of Scottsdale

Tempe.

Maricopa Association of Governments

The University of Arizona.

Valley Metro

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LOOP 101 Mobility Project

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Version History

Version	Date	Author	Comments
1	12/31/2019	KH	Draft for review by PMT
2	04/27/2020	KH	Revised draft for review by PMT
3	09/17/2020	KH	Revised Final Draft for review by PMT and PAT
4	10/8/2020	KH	Final Draft for Stakeholder Review
5	11/16/2020	KH	Final Draft that addresses stakeholder comments

List of Acronyms

ADOT – Arizona Department of Transportation

ARC-IT – Architecture Reference for Cooperative and Intelligent Transportation

ASU – Arizona State University

ATCMTD – Advanced Transportation Congestion Management and Technology Demonstration

ATIS – Advanced Traveler Information System

AVL – Automatic Vehicle Location

CCTV – Closed-circuit Television Cameras

CM – Configuration Management

ConOps – Concept of Operations

DMS – Dynamic Message Signs

DPS – Department of Public Safety

DSS – Decision Support System

EGT – Executive Governance Team

FHWA – Federal Highway Administration

FSP – Freeway Service Patrol

GEC – General Engineering Consultant

ICM – Integrated Corridor Management

IRU – Incident Response Units

IT – Information Technology

ITS – Intelligent Transportation Systems

MAG – Maricopa Association of Governments

MCDOT – Maricopa County Department of Transportation

OET – Outreach and Education Team

PAT – Program Administration Team

PIO – Public Information Officer

PMP – Project Management Plan

PMT – Project Management Team

PS&E – Plans, specifications, and estimates

RADS – Regional Archived

RCN – Regional Community Network

REACT – Regional Emergency Action Coordinating Team

RFI – Request for Information

RFP – Request for Proposal

RIA – Regional ITS Architecture

SE – Systems Engineering

SEMP – Systems Engineering Management Plan

SR – State Route

SRPMIC – Salt River Pima Maricopa Indian Community

TT – Technical Team

UA – University of Arizona

1 INTRODUCTION

The Arizona Department of Transportation (ADOT) and Maricopa County Department of Transportation (MCDOT) partnered to successfully secure funding through joint leadership through the Federal Highway Administration (FHWA) Advanced Transportation Congestion Management and Technology Demonstration (ATCMTD) program in 2017 to implement Integrated Corridor Management (ICM) systems on the Loop 101 corridor in the Phoenix metropolitan area. This Loop 101 Mobility Project leverages significant investments over the years by ADOT, MCDOT, Valley Metro, the Maricopa Association of Governments (MAG) and local agencies in freeway, arterial, and transit operations and management strategies. Building on the successful ADOT Freeway Management System (FMS) and several regional/local agencies traffic operations and management systems, ICM will facilitate improved real-time freeway-arterial coordination when incidents impact Loop 101 and divert traffic onto local streets. The ICM program will increase agency awareness of incidents, develop enhanced Decision-Support System (DSS) capabilities for advanced Transportation System Management and Operations (TSMO) strategy implementation, promote cross-agency information sharing, and provide advanced warning and alerts to travelers on the corridor to promote trip decision-making. The ATCMTD application also will pilot connected vehicle applications to support incident management and transit operations for ICM.

In 2019, ADOT selected Kimley-Horn as the General Engineering Consultant (GEC) to support planning, design, implementation, and stakeholder coordination for the four-year duration of the Loop 101 Mobility Project.

The Loop 101 Mobility Project consists of multiple projects that will be planned, designed and implemented across multiple phases. This Project Management Plan (PMP) outlines the processes for managing and administering the project, including scope management, a quality control and quality management plan, a risk management strategy, schedule management and change management plans. It also includes a communications strategy for how communications will be facilitated among the multi-agency partnership as well as between PMTs and internal consultant teams. A separate Systems Engineering Management Plan (SEMP) has been developed to address systems engineering management components and technical decision-making roles and responsibilities.

1.1 PURPOSE AND OBJECTIVES

The purpose of this project is to develop a concept and requirements for the proposed ICM systems as well as complete the necessary steps to implement the concept. As part of the initial grant efforts for the Loop 101 Mobility Project, agencies have identified several preliminary concepts for technology-based projects aimed at improving overall traffic and incident management within the corridor. Key systems that were identified in the successful grant include:

- Multi-agency DSS to support ICM;
- Adaptive Ramp Metering;
- Adaptive Traffic Signal Systems for special event traffic management near the sports arena in Glendale;
- Connected Vehicle Applications for transit and incident responder communications; and
- Integrated Traveler Mobility Application.

1.2 PROJECT AREA

Loop 101 is a 61-mile urban beltway around the Phoenix metropolitan area that connects major cities, freeways and destinations in the region. Loop 101 traverses several cities and communities, including Phoenix, Scottsdale, Tempe, Mesa, Chandler, Glendale, and Peoria, as well as portions of the Salt River Pima Maricopa Indian Community (SRPMIC) and Maricopa County. Loop 101 also connects to all major freeways in the Phoenix area, including the Interstates 10 and 17, US 60, State Route (SR) 202L (Loop 202), and SR 51.

The Loop 101 corridor, shown in **Figure 1**, provides access to several dynamic downtown business districts, educational institutions (including Arizona State University and multiple community colleges), and several state-of-the-art medical facilities and hospitals, including the Mayo Clinic. There are a variety of residential communities along the corridor, including those with a large aging population towards the western portion of the corridor, each which require different amenities related to shopping, recreation and community gathering. The corridor also provides access to major event venues that are critical to the state's and region's economic development and tourism.

Figure 1 – Loop 101 Mobility Project Area

2 PROJECT PARTNERS AND STAKEHOLDERS

This section discusses the overall project organization and project communications approach of the Loop 101 Mobility Project.

The project will be co-managed by ADOT and MCDOT, with oversight by the FHWA. The FHWA is a full participant in the Loop 101 Mobility Project. FHWA will be a member of all project management committees developed for the project and will be invited to participate in operations and technical discussions to develop the key deliverables across all phases.

Project partners are those who have formal intergovernmental agreements (IGAs) in place to provide financial resources to support the Loop 101 Mobility Project. These include Valley Metro and the cities of Phoenix, Glendale, Scottsdale, Peoria, Tempe, Mesa, and Chandler. The Loop 101 Mobility Project will also involve several additional project stakeholders as part of operations discussions, concept planning, requirements development and future implementation and operations. Additional project stakeholders include the Arizona Department of Public Safety, the Maricopa Association of Governments, and the Salt River Pima Maricopa Indian Community. Arizona State University and the University of Arizona will participate in technical tasks. All project partners are considered stakeholders. The term stakeholder is used throughout this document unless there is a need to specifically differentiate partner agencies.

2.1 PROJECT GOVERNANCE STRUCTURE

A Project Governance Structure has been established for the Loop 101 Mobility Project, which is exemplified in **Figure 2** and described in more detail below.

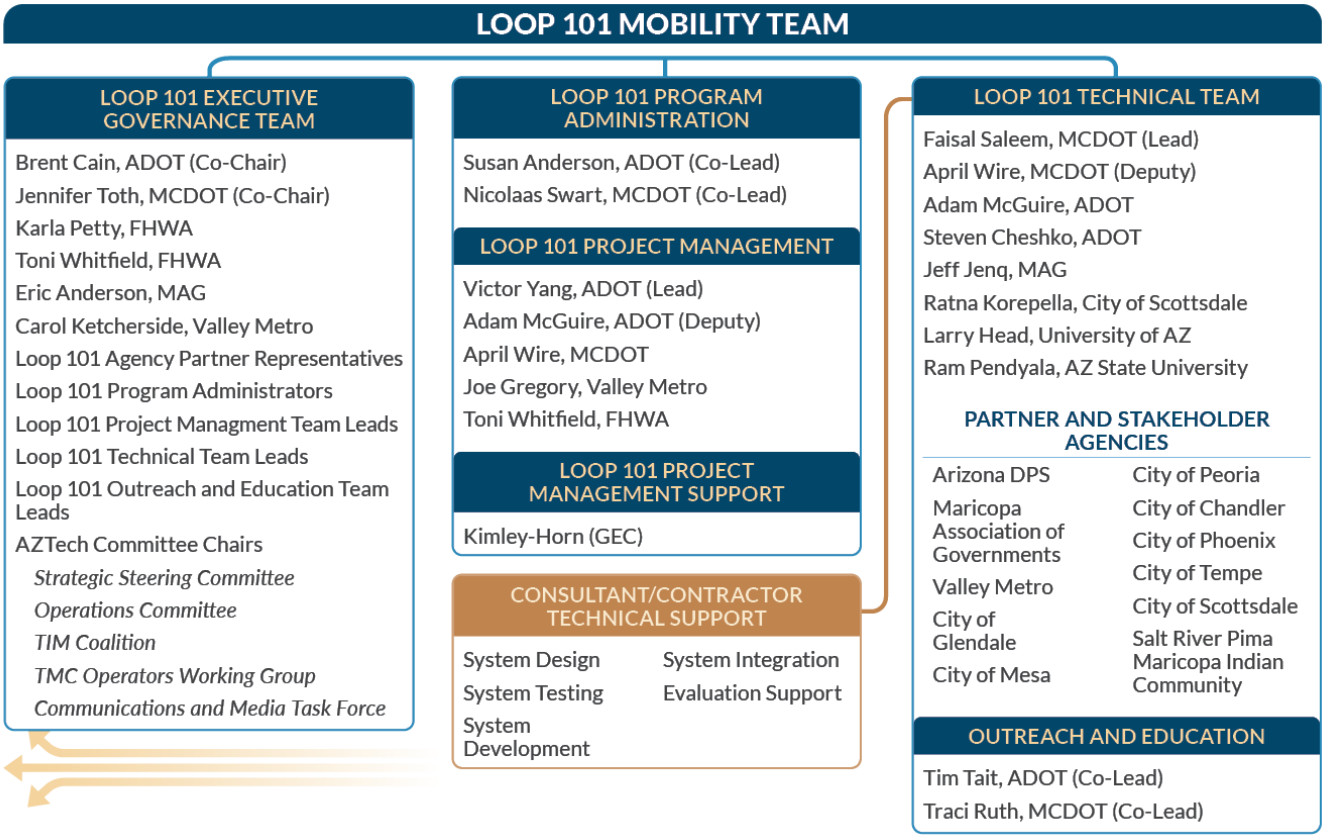

Figure 2 – Loop 101 Mobility Project Organizational Structure

2.1.1 PROJECT MANAGEMENT TEAM

The Project Management Team (PMT) has the primary role to oversee the project activities. ADOT serves as the lead of the PMT and its role in administering and coordinating activities for the Loop 101 Mobility Project, including managing scope, schedule and budget for the overall project. ADOT will coordinate Project Management tasks with MCDOT, Valley Metro, and the FHWA who also serve on the PMT. The PMT will be sent deliverables and will be responsible for distributing to stakeholders and Technical Teams as warranted for deliverable review. ADOT is responsible for tracking project task activities, managing the project scope, budget and schedule, and for submitting quarterly and annual reports to the FHWA in accordance with the FHWA/ADOT Cooperative Agreement. ADOT will coordinate with the Kimley-Horn GEC project manager (KH PM), on contracting matters, deliverable submittal, and monthly status updates and invoicing.

The Project Management Team will resolve issues brought forward from the Technical Team and this team will raise issues, as needed, to the Program Administration Team in a timely manner to ensure swift resolution.

Kimley-Horn will be the GEC for the Loop 101 Mobility Project and will provide support to the PMT and other Loop 101 Mobility teams. The KH PM will coordinate directly with ADOT on any contracting matters and invoicing and will coordinate with the entire PMT for deliverable submittal, monthly status updates, and any other matters relating to the management of the project and its components as part of a weekly and regularly

scheduled project status conference calls. The KH PM will also be the primary contact for the project sub-consultants.

Sub-consultants for the project include WSP USA, Inc., RHA, LLC, and Central Creative. The respective project managers of each sub-consultant will coordinate with the KH PM on contracting matters, their project-related activities, deliverable submittals, and monthly status updates and invoicing.

2.1.2 EXECUTIVE GOVERNANCE TEAM

The Executive Governance Team (EGT) will be led by executive staff at ADOT and MCDOT with support from FHWA, decision makers at partner and stakeholder agencies, and team leads of other Loop 101 governance and technical teams. The EGT also includes the chairs from AZTech Committees, including the AZTech Strategic Steering Committee, the AZTech Operations Committee, the Traffic Incident Management (TIM) Coalition, and the TMC Operators Working Group. The EGT team has two primary roles: to establish policy and make strategic decisions. This EGT has the responsibility to ensure project success through collaboration to support improved safety and mobility for Loop 101. The EGT team co-leads will have final responsibility for resolving issues escalated by the Program Administration Team.

2.1.3 PROGRAM ADMINISTRATION TEAM

The Program Administration Team (PAT) will consist of management staff ADOT and MCDOT and this team has the primary role of monitoring and guiding the activities of the Project Management Team, Technical Team, and support teams. The PAT has the responsibility to ensure project success through overseeing the PMT's management of scope, schedule, and budget adherence and may authorize corrective action, as necessary. The PAT is responsible for resolving conflicts brought forth from the PMT or the Technical Team. This team also has the responsibility to identify policy needs, issue resolution or strategic discussion necessary by the EGT.

2.1.4 TECHNICAL TEAM

The Technical Team will be led by MCDOT and will include representatives from all project partner and stakeholder agencies. This team has the primary role of leading technical and design activities, as well as implementation, integration, and operations of the Loop 101 systems. This team has the responsibility for system engineering, design, implementation and testing, and operations and evaluation.

Technical Task Teams will be established to support concept development, design/procurement, integration, and operation of specific technologies identified in the Loop 101 Mobility Project. The Technical Task Teams will be comprised of four to six individuals; the number of Task Team members will be based on specific project needs and will be determined during the Operations Plan and ConOps development process.

2.1.5 OUTREACH AND EDUCATION TEAM

The Outreach and Education Team will be jointly led by the ADOT and MCDOT communications staff and members of this team will include public information officers (PIOs) from DPS, Valley Metro, and local stakeholder agencies. This team has the primary role of supporting the stakeholder agency outreach and

education components of the project. There is limited public outreach necessary, but this team will support deployment of some strategies for public messaging and branding efforts in advance of project implementation and deployment. This team has the responsibility of developing and executing the Communications and Outreach Plan, with support from the GEC and sub-consultant Central Creative. They will also support the GEC in planning the Partnering Meetings that will be held at strategic points throughout the project lifecycle.

2.2 ROLES AND RESPONSIBILITIES

ADOT and MCDOT, in collaboration with other state and local agencies, jointly developed the ATCMTD grant proposal. Once selected, ADOT entered into a Cooperative Agreement with FHWA (January 5, 2018). ADOT and MCDOT agreed to co-lead the Loop 101 Mobility Partnership as established in the grant proposal and formalized in the Intergovernmental Agreement signed by both agencies on February 21, 2019. Per the Cooperative Agreement, ADOT and MCDOT will develop project management, ICM operations and system engineering management plans, and will provide oversight for the overall ATCMTD implementation. ADOT and MCDOT will jointly lead the planning, implementation and operations of the new technologies and systems proposed in the Loop 101 Mobility Project, per the IGA.

Roles and responsibilities for ADOT and MCDOT, including leadership roles and responsibilities for project management, are documented in formal agreements and have been further documented as part of subsequent discussions.

- The FHWA-ADOT Cooperative Agreement, dated January 18, 2018 and effective January 5, 2018, outlines specific responsibilities for ADOT as the Recipient of ATCMTD funds. This agreement incorporates the original ATCMTD grant proposal and includes a Work Plan/Scope of Work that identifies the roles for ADOT, MCDOT, and stakeholders. This Cooperative Agreement states that the Recipient is responsible for managing the day-to-day operations of the activities described in the proposal, and notes that the Recipient shall enter into necessary agreements to accomplish the tasks contained in the Scope of Work. ADOT has entered in to IGAs with MCDOT, the Regional Public Transportation Authority (RPTA)/Valley Metro and with the cities of Chandler, Glendale, Mesa, Peoria, Phoenix, Scottsdale and Tempe.
- The IGA between ADOT and MCDOT, dated February 21, 2019 references the FHWA-ADOT Cooperative Agreement and identifies MCDOT as the co-lead for the Loop 101 Mobility Partnership. This IGA states that through collaborative efforts with the State [ADOT], agree to jointly lead the planning, implementation and operations of new technologies and systems proposed in the Project and that MCDOT will serve as overall technical team lead.

These roles are captured in the Organization Chart, shown previously in Figure 2, and outlined in additional detail below. The following section also describes the roles and responsibilities of other project partners and stakeholders as identified in this PMP.

ADOT, as the ATCMTD Recipient and Loop 101 Mobility Project co-lead, has the following responsibilities:

- Manage the scope, schedule, and budget for the overall project with support from the GEC;
- Coordinate with the KH PM on contracting matters, deliverable submittal and monthly status updates and invoicing;

- Participate in weekly coordination teleconferences with MCDOT and the GEC to review activities, upcoming meetings and status of tasks;
- Support project Change Management functions during grant-funded project activities by providing oversight and an approval method for changes, updates, or additions to the Loop 101 systems.
- Coordinate with other ADOT Project Team staff members for deliverable review and stakeholder outreach;
- Lead the tasks for Adaptive Ramp Meters, including coordinating ramp meter implementation among multiple concurrent projects where ramp meters are being designed and installed on L101;
- Lead requirements development and procurement for the Integrated Traveler Mobility Application project;
- Lead the procurement process for equipment needed to support the DSS, Connected Vehicle project, Adaptive Traffic Signal Project in Glendale and the Integrated Traveler Mobility Application;
- Facilitate the involvement of ADOT upper management in the project development by ensuring management is involved in the review of deliverables and by arranging opportunities to present project updates to appropriate policy and decision-making committees; and
- Submit required ATCMTD grant reports to the ATCMTD mailbox and the FHWA Arizona Division contact.

MCDOT, as the ATCMTD Sub-Recipient and Loop 101 Mobility Project co-lead, has the following responsibilities:

- Participate in weekly coordination teleconferences with ADOT and the GEC to review activities, upcoming meetings and status of tasks;
- Support project Change Management functions during grant-funded project activities by providing oversight and an approval method for changes, updates, or additions to the Loop 101 systems.
- Participate on the Project Management Team with ADOT and Valley Metro;
- Lead the Technical Team to manage design, implementation, and testing activities;
- Lead design for the Glendale Adaptive Traffic Signal System project, in conjunction with the City of Glendale;
- Procure design consultant(s) and lead design activities for the DSS and for the Connected Vehicle applications;
- Coordinate with other MCDOT Project Team staff members for deliverable review and stakeholder outreach; and
- Facilitate the involvement of MCDOT upper management in the project development by ensuring management is involved in the review of deliverables and by arranging opportunities to present project updates to appropriate policy and decision-making committees.

Loop 101 partner agencies have the following responsibilities that, if met, will help to facilitate a successful project:

- Attend project meetings and workshops or provide a suitable replacement or alternate from the agency to attend the meeting;
- Coordinate the development and approval of IGAs;
- Provide constructive input from the perspective of the representative agency to make sure that the project documents and identifies the needs and requirements of the agency;
- Review all deliverables that are posted on the project website and any documents that are provided for review by electronic email;
- Provide a confirmation of deliverable review either through the provision of comments or an acknowledgement that the document was reviewed and that there were no comments;

- Participate in the development of the Operations Plan and ConOps;
- Participate in system design, installation and testing activities insofar as they require access to or acceptance by agency systems;
- Operate and maintain Loop 101 Mobility Project systems after they are installed, per responsibilities outlined in the Operations Plan or system-specific ConOps;
- Provide cost information for projects, operations and maintenance activities that were identified as matching funds; and
- Provide project updates to agency management staff and decision-makers, as necessary.

Loop 101 stakeholder agencies have similar responsibilities to partner agencies, with the exception of providing cost match information. Because there is not a formal IGA in place with stakeholders, project cost match information is not required.

The KH PM has of the following responsibilities:

- Coordinate with ADOT on contracting matters, including management of project scope, schedule, and budget;
- On the 10th of each month, submit formal monthly invoices to ADOT that include progress reports;
- Coordinate with ADOT and the PMT on deliverable submittal, monthly status updates, and other matters relating to the management of the project;
- Support ADOT in the development of required ATCMTD grant reports;
- Coordinate with the sub-consultants on contracting matters, activities, deliverable submittal and monthly status updates and invoicing;
- Monitor scope compliance as part of weekly reviews and monthly team meetings;
- Provide formal written documentation of potential scope or schedule issues and changes and communicate with ADOT and PMT;
- Participate in discussions that are elevated to the PAT for resolution;
- If updates to the schedule are approved by the PAT, update the project schedule, submit to the PMT for approval and communicate any changes to the scope or schedule to partner and stakeholder agencies;
- Forecast project effort for each month on each task and review task status to ensure tasks are on schedule and that the team is aware of critical path milestones;
- Identify a facilitator and note taker for all project-related meetings and workshops;
- Provide meeting agendas and meeting notes for all project meetings and workshops; and
- Provide project deliverables in electronic format via electronic mail.

In addition to the responsibilities of the KH PM, the Kimley-Horn Project Team has the following responsibilities:

- Participate in the development of all project deliverables including meeting agendas and notes;
- Support project Change Management functions during grant-funded project activities by supporting the process of tracking changes, updates, or additions to the Loop 101 systems.
- Track team staff time to be included in monthly invoice and monthly effort projections;
- Track in-kind staff time of Loop 101 Mobility partners using sign-in sheets and tracking of deliverable review; and
- Participate in the tracking and documentation of stakeholder review comments for project deliverables.

3 PROJECT SCOPE

3.1 APPROACH TO PROJECT PHASING

The Loop 101 Mobility Project will be developed in alignment with Systems Engineering process and principles. With multiple projects comprising the Loop 101 Mobility project, it is recognized that individual projects will be planned, designed, implemented and tested on different timeframes. Individual projects are at different levels of readiness, and due to foundational work already completed or underway, some projects will be ready for design and implementation processes sooner than others and can move forward through key processes at a faster pace. The Glendale Adaptive Traffic Signal Project and the Adaptive Ramp Meter project are two examples of projects that can move forward on an accelerated schedule. The remaining projects will be completed on timeframes that are more suitable to the complexity levels, institutional collaboration needed, and other factors, such as national policy decisions on technologies and communications.

Figure 3 shows the overall SE "Vee" Diagram and the different stages and deliverables that will guide the Loop 101 Mobility Project.

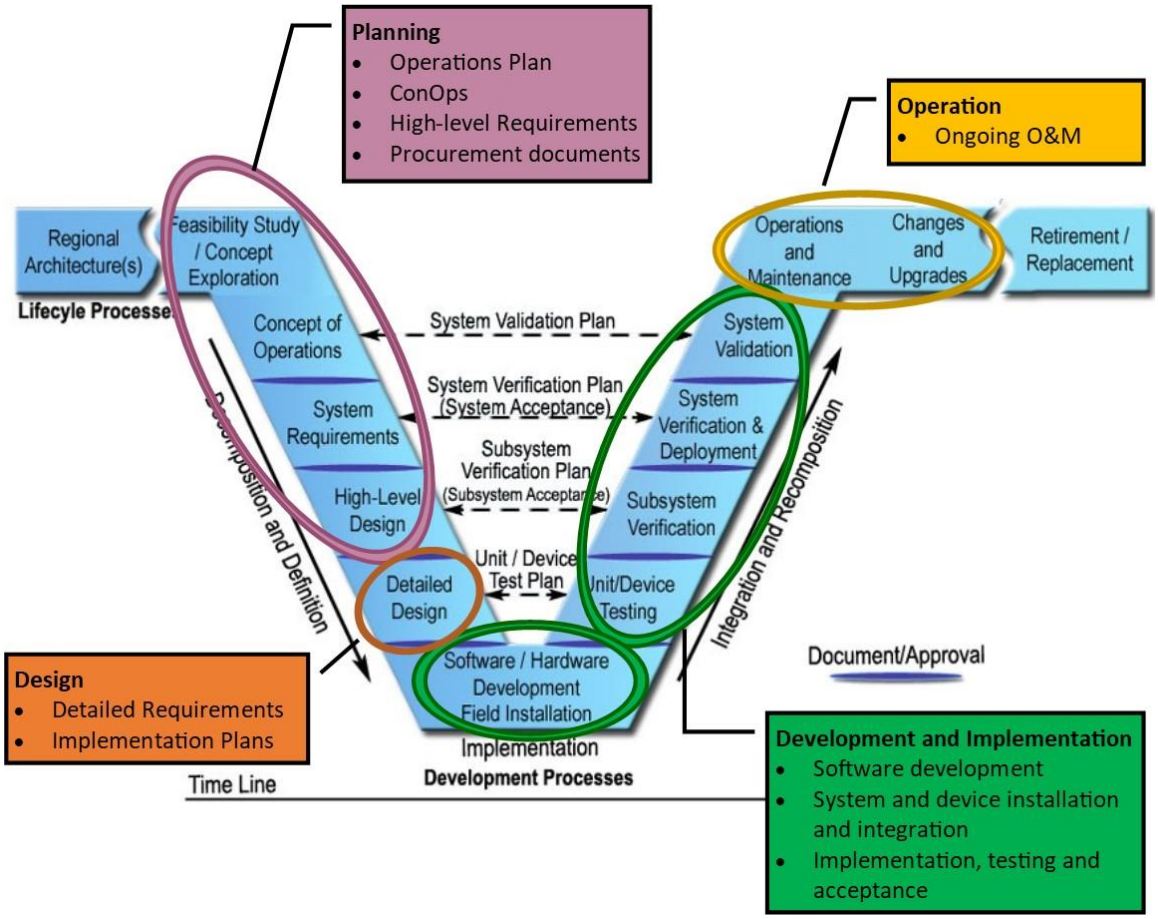

Figure 3 – Loop 101 Mobility Project Technical Phases

A technical process will be followed to satisfy the SE requirements for the planning, design, development, implementation, and operations of each of the five project components that make up the Loop 101 Mobility Project: DSS; Adaptive Ramp Metering; Adaptive Traffic Signal System; Connected Vehicle Applications; and Integrated Traveler Mobility Application.

While the final, resulting system for the Loop 101 Mobility Project will integrate all five of these components for the Loop 101 corridor, each component will be taken through the SE process individually. As a result, projects will advance through the different phases at different paces and timeframes. Ongoing tasks will include:

- Project management and coordination among PMT, Technical Team, and technical task teams, including regular interactions, documenting decisions and sharing information among teams;
- Reporting on key activities to all involved stakeholders and FHWA through stakeholder update meetings and formal reports;
- Reviewing and updating guiding documents as the Loop 101 Mobility project advances, including the PMP and SEMP documents;
- Outreach and engagement of stakeholders, including actively informing agency leadership of project activities and status and implementing strategies developed in the Communications and Outreach Plan;
- Risk monitoring and management; and
- Maintaining an information-sharing web site for project stakeholders to provide access to project documents, deliverables and status

3.2 PROJECT SCOPE

The Loop 101 Mobility Project is organized to align with the Systems Engineering process for the development of project systems for transportation purposes. It also includes tasks that support the holistic and strategic management of the project as it pertains to the successful organization and management of multiple project components and project stakeholders. Technical tasks and processes are described in more detail in the SEMP. The identified 'responsible parties' are those that have responsibility for producing, providing input, reviewing, and signing off on the task. For each task, there is also an identified 'project team lead', which indicates the team that is primarily responsible for overseeing the task's completion. There is also a description of what each scope item is anticipated to entail.

3.2.1 OVERARCHING PROJECT MANAGEMENT SCOPE ITEMS

The following project scope items and deliverables are those that will help effectively and strategically guide the overall project throughout its duration.

PMP AND PROJECT SCHEDULE (THIS DOCUMENT)

Responsible Parties: Kimley-Horn with review by the PMT (project team lead) and PAT. Additional review provided by Loop 101 stakeholder agencies.

The PMP will act as a living document and updated throughout the three phases of the project. It will include:

- An overall plan and approach for project administration and scope and deliverable management;
- Stakeholder roles and responsibilities;

- A communications plan with FHWA and project stakeholders;
- Project risks and a risk management plan;
- Schedule and plan for managing the project activities; and
- A Quality Management Plan.

SEMP

Responsible Parties: Kimley-Horn with review by the Technical Team (project team lead), PMT, PAT, and Loop 101 stakeholder agencies.

The SEMP will serve as a guiding document for how the systems engineering tasks and processes will be planned and implemented. The SEMP will help to guide technical decision-making and coordination among technical tasks. It will identify roles, responsibilities and relationships of project activities, major decision points and key milestones. It will detail stakeholder coordination and involvement in technical decision, how work products will be managed and updated, and identify the specific relationships in the process.

The SEMP will also be considered a living document and will be updated at the beginning of each phase of the project. The SEMP will:

- Guide systems engineering activities through all project phases;
- Document key project controls – system documentation, design reviews, technical decision-making and change management;
- Document the development schedule, key dependencies, and critical path system development activities;
- Document plans that will be needed at different stages of the project, including contractor testing and acceptance plans;
- Identify potential technical or development risks and risk mitigation measures;
- Will be referenced by the ADOT/MCDOT Agreement for the defined roles and responsibilities of each agency; and
- Will identify technical roles and responsibilities of partners and stakeholders

PARTNERING PLAN

Responsible Parties: Kimley-Horn and RHA with attendance and input and from the PMT (project team lead) and Loop 101 stakeholder agencies.

A series of partnering events and activities will occur throughout the duration of the project, starting with an initial Partnering Workshop. Representatives from each of the Loop 101 stakeholder agencies will be invited to participate in the initial Partnering Workshop.

- The Partnering Workshop will review project and partnership goals, review project objectives, define lines of communication, formalize the project governance structure, identify strategies for engaging agencies and leadership, and discuss how project decisions will be made, how issues will be resolved, and identify roles and responsibilities for partners and stakeholders.
- A Partnering Plan will be developed to summarize key discussion points from the meeting and will serve as a guiding document and reference for collaborative decision-making and partner and stakeholder agency involvement.

- Subsequent Partnering Check-ins to engage agency stakeholders during key decision and review points throughout the process. Design consultants (as appropriate) will be invited to participate in Partnering workshops specific to the DSS.

COMMUNICATIONS AND OUTREACH PLAN

Responsible Parties: Central Creative and Kimley-Horn in partnership with the Outreach and Education Team (project team lead) and other Loop 101 Mobility stakeholder agency PIOs.

The Communications and Outreach Plan will identify strategies to be implemented, tools to be developed, and a schedule for key updates to stakeholder agencies and the public. Strategies will include presentation opportunities for the PMT to provide updates (including MAG Committees, AZTech Committees or stakeholder agencies), social media updates, outreach tools (brochures, fact sheets), news releases, and similar strategies. Roles and responsibilities for implementing the Communications and Outreach Plan and milestones for agency and public communications will be documented. The Plan will be a living document and will be updated at key points in the project to include any additional strategies, tools or techniques identified by project stakeholders.

As part of public outreach and educational strategies, ADOT will develop and maintain a public-facing website for the Loop 101 Mobility Project on the AZdot.gov website that will include relevant project information to make available to the public for the duration of the project.

CORRIDOR INVENTORY

Responsible Parties: Kimley-Horn with input and review from the PMT (project team lead) and Loop 101 stakeholder agencies.

An inventory will be complied of Loop 101 agency assets to support ICM and the Loop 101 Mobility Project. Input from the PMT and local agencies will help create a comprehensive GIS-based dataset of existing, permanent technology infrastructure within the corridor, including assets for arterials up to two miles on either side of the Loop 101 freeway. Data to be collected and assembled include:

- Freeway ITS assets – communications, ramp meters, DMS, CCTV, detection, entrance ramp general configuration (number of lanes);
- Arterial ITS assets – traffic signals, communications infrastructure (fiber and wireless), detection (identify presence vs. VOS), arterial TMCs, DMS, CCTV;
- Transit assets – routes, schedules, devices (at bus stops, transfer centers and on-board vehicles) for Express and local routes within ICM corridors; and
- Regional systems and transportation operations data that would be potentially utilized by a DSS or other Loop 101 Mobility project components.

LONG-TERM OPERATIONS PLAN

Responsible Parties: Kimley-Horn with input from the PMT (joint project team lead), Technical Team (joint project team lead) and Loop 101 stakeholder agencies

An Operations and Management Plan will identify a plan for ongoing operations and management of the Loop 101 systems beyond the grant funded period. The Plan will identify:

- Agency roles and responsibilities;
- Future Loop 101 operations needs;
- Potential expansion opportunities;
- Performance monitoring activities and responsibilities;
- Future integration needs;
- Ongoing maintenance needs;
- Additional agency training needs;
- Agreements that need to be in place among agencies to support long-term operations; and
- Estimated cost and resource requirements for sustaining operations or any potential expansion projects as recommended by local agencies.

FINAL PROJECT REPORT

Responsible Parties: Kimley-Horn with input from the PMT (project team lead), Technical Team and Loop 101 stakeholder agencies

A Final Report will summarize each of the three phases of the project and document the Loop 101 Mobility Project process, development activities, stakeholder engagement, and implementation outcomes. Performance data will likely not be available, but preliminary performance measure activities will be documented, along with the plan for ongoing performance monitoring and reporting by agencies. The Final Report will document lessons learned that could be transferred to other corridors in the Phoenix area or to other corridors in the country. The Final Report will be submitted to the FHWA for final approval.

FEDERAL REPORTING

Responsible Parties: Kimley-Horn and ADOT

There are Federal reporting requirements of the ATCMTD grant throughout the duration of the project. ADOT is responsible for sending the following reporting documents to the ATCMTD mailbox (ATCMTD@dot.gov) and the FHWA Arizona Division contact. Reporting requirements are identified in the Cooperative Agreement Section E5 and include:

- Quarterly Project Outcomes and Monitoring Reports (calendar year quarters);
- Annual Reports to the US DOT Secretary (annually in September);
- Intermediate working papers
    - Draft Final PMP and SEMP
    - Final PMP and SEMP
    - Final Communications and Outreach Plan
    - Final Operations Plan
    - Final DSS ConOps
    - Final DSS High Level System Requirements
    - Final DSS System Procurement Document
    - Final Recommended Coordination Plan for Adaptive Ramp Meters
    - Final Adaptive Systems Procurement Document
    - Final CV Readiness Assessment
    - Final Testing and System Acceptance Reports for all applications; and

- Final Project Report.

The Kimley-Horn team, with support from ADOT, will develop these reports using FHWA's format, including documenting and summarizing status of activities and activities completed, cost tracking, and local agency cost match project status and effort tracking. Local agencies will submit relevant project cost documentation for cost-match project to ADOT for inclusion in the overall project annual reports.

3.2.2 TECHNICAL PROJECT PHASING AND SCOPE ITEMS

OPERATIONS PLAN

Responsible Parties: Kimley-Horn and WSP (for ramp meter strategies) with input and review from the Technical Team (project team lead), PMT, and Loop 101 stakeholder agencies. Pursuit of Operational Agreements will be led by ADOT and MCDOT with input and participation from Loop 101 stakeholder agencies.

An Operations Plan will describe how the Loop 101 corridor will operate in an ICM environment from an agency perspective. It will identify ICM operational strategies and include existing operational practices and how agencies will work together to implement identified operations strategies for the corridor. It will consider partnership structures, communication/notification plans, operations scenarios and plans, and roles and responsibilities. There will be formal acceptance of the Operations Plan by all partner and stakeholder agencies prior to its finalization, and it will engage the process to establish operational agreements between the Loop 101 stakeholder agencies to follow what is agreed upon in the Operations Plan. The Operations Plan will provide the foundation for the project ConOps.

CONOPS

Responsible Parties: Kimley-Horn with input and review from the Technical Team (project team lead), PMT, and Loop 101 stakeholder agencies.

The ConOps will describe how the different systems of the Loop 101 Mobility Project will function. The ConOps will describe the functionalities of a future Loop 101 Mobility system, largely focused on the DSS with inputs from other tasks, and identify necessary processes and frameworks to support its implementation and operation, including:

- Existing corridor stakeholders, networks, and operations that comprise the Loop 101 corridor;
- Existing systems, data, and data sharing to support the Loop 101 Mobility Project components
- Needs and deficiencies within the study area that can be improved by the Loop 101 Mobility Project;
- Future system elements and high level capabilities – DSS, adaptive ramp metering, adaptive traffic signal operations, connected vehicle applications, and integrated traveler information;
- Sequence of activities to be performed;
- Use cases and operational scenarios for new operations tools and strategies;
- Relationship of new concepts to national and regional ITS architectures;
- Agency roles and responsibilities, institutional frameworks and staff needs to support the Loop 101 Mobility Project implementation and ongoing O&M;
- Outputs of the modeling task and documentation of adjustments or refinements that are made based on modeling results;

- High-level discussion on long-term system operation and maintenance;
- Performance measures and targets for the Loop 101 study area that will be modeled; and
- Outputs of the modeling task and documentation of adjustments or refinements that are made based on modeling results.

HIGH-LEVEL SYSTEM REQUIREMENTS

Responsible Parties: Kimley-Horn and WSP with input from the Technical Team (project team lead), PMT, and Loop 101 stakeholder agencies.

The High-Level Requirements document will describe what the Loop 101 Mobility Project components and systems are to do (functional requirements), how well it will function (performance requirements) and under what conditions it will perform. The Requirements will be written as 'shall' statements and traceable back to specific needs in the Technical Team tasks, the ConOps as well as input from stakeholder agencies related to opportunities and constraints of the network, agency systems, and agency processes. These high-level requirements will form the basis for procurement documents and procurement contracts with potential developers, designers and vendors. There will be multiple requirements documents developed as part of this project.

SYSTEM DESIGN PROCUREMENT AND DESIGN

Responsible Parties: Design consultants with input and oversight from the Technical Team (project team lead), PMT, and Kimley-Horn, and input from the Loop 101 stakeholder agencies.

Design will be undertaken by selected design consultants, with oversight and monitoring by the Technical Team and support from PMT. Design consultants will be procured to complete design for the DSS and other Loop 101 Mobility project components, as deemed necessary by the respective ConOps and High-Level Requirements.

Design will be required for the DSS where the high-level requirements will be converted into technical content for a bid document and/or Request for Proposal. Development of detailed requirements for the Adaptive Traffic Signal System based on the approved FHWA Model Documents will constitute the design for the system. The University of Arizona will lead the software application and system communications design elements for the Connected Vehicle applications by updating the existing requirements for applications installed at the Smart Drive Testbed in Anthem. Design consultant will undertake design for the physical infrastructure elements of the connected vehicle system. Design and implementation is already underway for several adaptive ramp meters through existing ADOT projects.

The DSS designer will develop a Design Sequence Plan to outline the design process, including key steps, milestones, deliverables, and roles and responsibilities. Technical Task Team leads and the GEC will coordinate the concurrent design activities, support design and deliverable review, and coordinate with Partners/Stakeholders.

PROCUREMENT DOCUMENTS

Responsible Parties: Kimley-Horn in partnership with the PMT (joint project team lead), Technical Team (joint project team lead), and with input from Loop 101 stakeholder agencies.

Based on design outcomes and other needs identified in the ConOps and Requirements process, the PMT and Technical Team, with input from stakeholders, will identify an appropriate procurement strategy to procure consultants, developers, and/or vendors to provide hardware and software and support development, implementation, and testing the Loop 101 Mobility Project components.

- A Request for Information (RFI) will be prepared to solicit input from technology developers on potential applications for an ICM personal mobility/information application.
- Additional RFIs or technology forums may be explored to provide other avenues for obtaining information on current technologies, approaches and different vendor capabilities for different components of the Loop 101 Mobility Project. The need for industry feedback prior to a formal procurement process will be determined by the PMT and Technical Team leads.

PROCUREMENT, DEVELOPMENT, INSTALLATION, AND IMPLEMENTATION

Responsible Parties: System developers and vendors, Loop 101 stakeholder agencies, Technical team (project team lead), and PMT with support from Kimley-Horn.

System developers and/or commercial off the shelf products will be procured for the DSS, Connected Vehicle Applications, and Adaptive Traffic Signal System. Where applicable, systems will be developed and will be installed and implemented to allow for system testing and acceptance. Tasks will include:

- Coordinating installation timeframes and site access needs;
- Facilitating coordination among developers/vendors, as needed;
- Documenting any installation and implementation issues encountered; and
- Coordinating integration support and connections to local agency systems.

IMPLEMENTATION PLAN AND TESTING PROCESSES

Responsible Parties: Kimley-Horn and input from the PMT (joint project team lead), Technical Team (joint project team lead), and Loop 101 stakeholder agencies.

An Implementation Plan and Testing Process document will be developed for each relevant project component. The Plan will identify roles and responsibilities and guide activities during systems development and testing These plans will include an implementation strategy and testing plan that will:

- Identify staff that will be involved in testing;
- Identify responsibilities of vendors during testing;
- Identify testing schedules and timeframes; and
- Outline a process for how systems will be accepted and how issues will be communicated to vendors for resolution.

It will identify any site and access requirements needed during implementation, which could include field site access, vehicles and state/local agency Transportation Operations Center/Traffic Management Center access, and any site or access restrictions from local agencies. These details will be integrated with project documentation developed as part of each individual component. Vendors will be responsible for contributing some of the Implementation Plan elements related to the DSS, Adaptive Traffic Signal System, Connected Vehicle Applications, and the Integrated Traveler Mobility Application documentation.

SYSTEMS TESTING AND ACCEPTANCE

Responsible Parties: Vendors and the Technical Team (project team lead), PMT, with support from Kimley-Horn and Loop 101 stakeholder agencies.

Testing will occur prior to and following initial implementation of systems and equipment.

The GEC will develop initial testing requirements and protocols and provide to the system vendors. Detailed system test plans and protocols will be developed by the system developers and other vendors and will be submitted to the GEC, Technical Team, and the PMT for review and approval. Vendors will be required to perform initial readiness testing on systems before being submitted to the GEC and Loop 101 stakeholder agencies for further testing.

The GEC will develop a System Acceptance Report for each of the systems to be deployed and implemented. This will outline testing procedure and what constitutes a correctly operating and stable condition to be considered 'accepted'. Testing outcomes will be documented, including areas where systems passed, failed, or were unable to be tested. Based on testing results, requirements for addressing and resolving issues that failed or were not able to be tested will be identified.

From these requirements, vendors/developers will provide documentation to demonstrate changes that were made to facilitate acceptance, and the systems will be re-tested to confirm they pass. All testing outcomes will be documented and summarized in a System Acceptance Report.

Formal acceptance will be identified by the PMT, Technical Team, and impacted stakeholders in coordination with the GEC to indicate that systems successfully pass testing. Individual system acceptance processes will require agency signatures to indicate system acceptance.

3.3 SCOPE MANAGEMENT

Scope management is an ongoing process within the Systems Engineering process. The KH PM has responsibility for monitoring scope compliance as part of weekly reviews and biweekly team meetings. This review includes adherence to stated objectives within the scope, alignment of team work products (including interim products) with the scope, and identifications and corrective action for any deviations from the scope.

Scope change management is handled through a formal process of documenting potential scope issues and involves the KH PM communicating (verbally and in writing) with ADOT and the PAT when issues arise that may warrant a change in the project scope. Discussions about changes to the project scope will only occur if there is a significant event or circumstance that impacts the ability of the consultant team to produce the deliverables identified in the scope within the allotted budget. Significant changes to the project components, including scope, budget, schedule, goals, objectives, tasks, key personnel, program manager, or prime contractor, require approval from FHWA prior to enacting any formal changes. Additional scope change management details are included in Section 6.1 – Change Management, in this document.

4 PROJECT MANAGEMENT APPROACH

4.1 SCHEDULE CONTROL

The Loop 101 Mobility Project has a duration of 48 months from project authorization by ADOT. The overall, high-level schedule is provided in **Figure 4**. Individual project schedules will be developed based on actual start time, milestones, level of design needed and other factors. Individual project schedules will be developed in coordination with appropriate design and/or development consultants, vendors and contractors. The KH PM will communicate and make available to the team the work breakdown structure elements, relationship of those elements to project tasks, and project team responsibilities for achieving project objectives.

The schedule shown in Figure 4 and the 48-month schedule is based on the obligation date of August 31, 2018, and the FHWA Cooperative Agreement end date of September 30, 2022. There are many dates that correspond to the Cooperative Agreement end date, but some technical tasks that have known task activity beyond the current Cooperative Agreement are indicated. The project team intends to submit a change request to FHWA to extend the Loop 101 Mobility Project schedule to accommodate these tasks that will go beyond the current Cooperative Agreement date.

The KH PM will implement a project control system to track costs and effort and to report project progress. This will link project controls with project schedule and critical path elements. The KH PM will identify where project decisions or changes in project direction will impact schedule, scope, or budget and will promptly communicate any potential impacts to the PMT. The KH PM will submit monthly progress reports to ADOT and PMT outlining activities and tasks completed, work in progress, identify any issues with tasks or deliverables, and identify work to be completed the following month.

Any changes to schedule as a result of meeting date changes, workshop date changes, scope changes or other impacts will be coordinated with the PMT. Any updates to the project schedule will be developed and submitted to the project team.

Submittal of a schedule change request for approval by the PMT can be undertaken if the scheduling of a project workshop or meeting is delayed by at least one week due to conflicts in the schedules of the project team or agency stakeholders. If the workshop or meeting can be scheduled within a week of its identified date, then no schedule changes will be necessary.

Once the change request has been reviewed and approved, the KH PM is responsible for adjusting the schedule and communicating all changes and impacts to the project team and agency stakeholders. The KH PM must also ensure that all change requests are archived in the project records repository.

Figure 4 – High Level Loop 101 Mobility Project Schedule

Task	2020							2021											2022											2023											2024								
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Project Management and Reporting																																																
PMP and SEMP updates																																																
Quarterly Reports																																																
Annual Reports																																																
Final Report*																																																
*The current end date of the ADOT-FHWA Cooperative Agreement is September 30, 2022. The project team intends to submit a formal change request to FHWA to extend the project schedule to accommodate tasks that are currently shown to occur after the current end date.																																															
Stakeholder Engagement/Coordination																																																
Corridor Inventory																																																
Partnering Workshops																																																
Executive Governance Meetings																																																
Program Administration Team Meetings																																															
Outreach and Education Team Meetings																																																
Communications and Outreach Plan																																																
Decision Support System																																																
Operations Plan																																																
Strategy Modeling (ASU)																																																
Acceptance of Ops Plan (formal sign-off)																																																
Concept of Operations																																																
High-Level Requirements																																																
Potential RFI for Industry interest																																																
Agreements																																																
Develop Scope, Procure Designer (MCDOT)																																																
Design Acceptance Process																																																
Design (Detailed Requirements)																																																
Procure Developer (ADOT)																																																
DSS Development																																																
Implementation and Integration																																																
Testing and Acceptance																																																
Pilot Operations																																																
Long-Term Operations Plan																																															
Adaptive Ramp Meters																																																
Existing Conditions and Coordination Plan																																																
Proposed Pilot																																																
Full Loop 101 Adaptive Operations																																																
Evaluations and Performance Assessments																																																
Adaptive Traffic Signal Systems (Glendale)																																																
Concept and Requirements																																																
Verify clearances																																																
Procurement (ADOT)																																																
Deployment, Implementation and Testing																																																

Task	2020							2021											2022											2023											2024								
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Pilot Operations																																																		
Operations																																																		
Connected Vehicle Applications																																																	
Readiness Assessment and Scoping																																																	
Concept and Requirements																																																	
Verify Clearances																																																	
Procurement (ADOT)																																																
Software Development																																																
Implementation and Testing																																																	
Pilot Operations																																																	
Integrated Traveler Mobility Application																																																	
Industry Engagement and RFI																																																	
Select Mobile App Developer/Partner																																																
Development																																																
Pilot Implementation																																																	
Evaluation and Continuity Decision																																																

4.2 PROJECT MEETINGS AND WORKSHOPS

The following section identifies guidelines for conducting meetings and/or workshops associated with the Loop 101 Mobility Project. The GEC will work with the PMT to schedule all project meetings, including dates, meeting locations and attendees. The preferred option for project meeting locations and meeting rooms will be ADOT facilities, except for individual one-on-one agency meetings to be conducted at the beginning of the project, which will be held at the respective agency offices. Site reviews and equipment verifications will be conducted in the field with appropriate safety and social distancing measures. measures.

The in-person meeting restrictions imposed by COVID-19 has shifted in-person meetings to virtual meetings for the foreseeable future. The GEC will continue to facilitate meetings through teleconference and webinar until it is deemed safe and appropriate to return to in-person workshops and meetings.

- **Agendas** will be distributed at all meetings or workshops. The agenda will be sent to participants prior to the meeting. The agenda will identify the topics that will be covered during the meeting time, where the first item in the agenda will be a review of outcomes of the previous meetings and the project status.
- A **Sign in Sheet** will be available at every meeting to document the participants who attended. This will be important for computation of in-kind staff time as well as having documentation of who was involved in the decisions made in that meeting or workshop.
- **Meeting Notes** will be distributed after the completion of a meeting or workshop. The notes will be structured around the agenda and provide the status of each agenda item as well as any new items that arose during the meeting. The notes will also include decisions made, follow-up items identified, and attendees and their agency affiliation with respect to the project.
- The **Facilitator** is responsible for distributing the agenda, facilitating the meeting or workshop and distributing the notes. The facilitator will be responsible for managing the time during the meeting and making sure that all meetings start and end on time.
- A **Note Taker** is responsible for documenting the discussions and outcomes of the workshop, which will be summarized in the workshop meeting notes. The note taker will be responsible for documenting all decisions made, any follow-up items that arose and high-level summaries of the discussions during the workshop to provide context and justification for the recorded decisions. The Note Taker will provide the meeting notes to the Facilitator in electronic form for review and distribution to stakeholders.

4.3 PROJECT DELIVERABLES AND MILESTONES

Table 1 shows the anticipated project deliverables and corresponding date ranges for the Loop 101 Mobility Project. The table also identifies the inputs, resources, deliverables, and required controls or decision gates for each of the technical deliverables and processes. Decision gates take the form of reviews and approvals that will occur before classifying a task as complete.

Some milestones in Table 1 are deliverables that will be developed by contractors and vendors external to the project governance teams for the Loop 101 Mobility Project. These deliverables are indicated with a (**). These technical deliverables are important for the management of some of the specific technical tasks of the project but are important to note when considering the overall management of the Loop 101 Mobility Project.

The GEC will work with ADOT and the PMT to refine dates for of key milestones, particularly for the technical component scope items, as the project progresses. Any changes that occur will be updated in subsequent PMP document updates.

The current end date for the Cooperative Agreement between FHWA and ADOT is September 30, 2022. Project management, stakeholder engagement and meetings are shown through that current Agreement end date. The current GEC contract end date is September 30, 2022. Deliverables where the GEC is shown for tasks beyond the current GEC contract date are shown with (*). The project team intends to submit a formal change request to FHWA to extend the project schedule to accommodate activities currently schedule to occur beyond the September 2022 end date.

Table 1 – Loop 101 Mobility Project Key Milestones

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
General Project Management Deliverables					
Project Management Plan	Defines overall plan and approach for project administration, scope, and deliverable management, including a project schedule and plan for managing activities Identifies communications plan with FHWA and project stakeholders and roles and responsibilities; Identifies project risks, a risk management plan, and Quality Management Plan First updated draft occurs after procurement for all components is completed; Second updated draft occurs prior to testing of all components; Final version is updated after successful acceptance of all components.	▪ FHWA SE guidance ▪ ATCMTD grant proposal ▪ FHWA/ADOT Agreement for project ▪ Stakeholder input from kickoff meetings and Partnering Workshop ▪ PMT input	▪ Review and approval of processes and frameworks for project tasks and risk mitigation by the PMT, PAT, and FHWA ▪ Document will be updated as individual project tasks progress and warrant an update	Kimley-Horn, PMT (lead), PAT, and stakeholder agencies	Initial First Draft: October 2019 Revised First Draft: September 2020 Overall Final: September 2022
Systems Engineering Management Plan	Defines key SE management processes and tasks, relationships of project activities, decision points, key milestones, and how work products will be managed and updated Details stakeholder roles and responsibilities, coordination processes, and involvement in technical decisions First updated draft occurs after procurement for all components is completed; Second updated draft occurs prior to testing of all components; Final version is updated after successful acceptance of all components.	▪ FHWA SE guidance ▪ ATCMTD grant proposal ▪ FHWA/ADOT Agreement for project ▪ Stakeholder input from Partnering Workshop ▪ GEC scope of services	▪ Review and approval of processes and frameworks for project tasks and risk mitigation by the PMT, TT, PAT, and FHWA ▪ Document will be updated as individual project tasks progress and warrant an update	Kimley-Horn, Technical Team (lead), PMT, PAT, and stakeholder agencies	Initial First Draft: October 2019 Revised First Draft: September 2020 Overall Final: September 2022

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
Corridor Inventory	Inventory of Loop 101 agency assets to support ICM and the Loop 101 Mobility Project, including development of a GIS-based dataset of existing, permanent technology infrastructure within the corridor, including assets for arterials up to two miles on either side of the Loop 101 freeway.	▪ Stakeholder input during agency one-on-one meetings ▪ Stakeholder documentation – plans, GIS files, maps	▪ Review and approval by PMT and stakeholder agencies	Kimley-Horn, PMT (lead), and stakeholder agencies	Draft: July 2020 Final: December 2021
Partnering Workshop and Plan	First Partnering Workshop will review project and partnership goals, review project objectives, define lines of communication, formalize the project governance structure, identify strategies for engaging agencies and leadership, and discuss how project decisions will be made, how issues will be resolved, and identify roles and responsibilities for partners and stakeholders	▪ PMP, SEMP ▪ Stakeholder input during workshop	▪ Review and approval of workshop notes and resulting plan by PMT, PAT, EGC, and stakeholder agencies ▪ Review and approval of any changes to PMP and SEMP as a result of the workshop by PMT, PAT, and stakeholder agencies	RHA/Kimley-Horn, PMT (lead), Outreach and Education Team, and stakeholder agencies	Draft: June 2020 Final: September 2020
Communications and Outreach Plan	Identify strategies to be implemented, tools to be developed, and a schedule for key updates to stakeholder agencies and the public. Includes roles and responsibilities for implementing the Communications and Outreach Plan and milestones for agency and public communications will be documented.	▪ PMP, SEMP ▪ Stakeholder input during OET meetings to develop plan	▪ Review and approval of plan by OET, PMT, EGC, and stakeholder agencies	Central Creative/ Kimley-Horn, Outreach and Education Team (lead), stakeholder agency PIOs	Draft: December 2020 Final: February 2021
Long-Term Operations and Management Plan	Identify a plan for ongoing operations and management of the Loop 101 systems beyond the grant funded period, such as identifying agency roles and responsibilities; future operational needs; performance monitoring activities and responsibilities; ongoing maintenance needs; and estimated cost and resource requirements for sustaining operations.	▪ Operations Plan ▪ ConOps ▪ High-Level and Detailed Requirements ▪ Stakeholder input during workshop	▪ Review and approval of plan by PMT, TT, and stakeholder agencies	Kimley-Horn*, PMT and Technical Team (joint lead) and stakeholder agencies	Draft: January 2024 Final: March 2024

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
Project Final Report	Summarize each of the three phases of the project and document the Loop 101 Mobility Project process, development activities, stakeholder engagement, and implementation outcomes. Documents lessons learned that could be transferred to other corridors in the Phoenix area or to other corridors in the country.	▪ All project deliverables ▪ All project meeting notes ▪ All required ATCMTD grant reporting deliverables ▪ Stakeholder input	▪ Review and approval of report by PMT, TT, PAT, EGC and stakeholder agencies ▪ Review and approval by FHWA	Kimley-Horn, PMT (lead), Technical Team and stakeholder agencies	Draft: August 2022 Final: September 2022
ATCMTD Grant Reporting	Quarterly Project Outcomes and Monitoring Reports Includes annual reporting on local match contributions from partner agencies Annual Reports to the US DOT Secretary	▪ Notes from project activities, workshops, and meetings ▪ All project deliverables ▪ PMT input ▪ Local match tracking	▪ Review and approval of report by PMT and ADOT grants administrator ▪ Review and approval by FHWA	Kimley-Horn, ADOT, PMT (lead)	Quarterly Reports: January, April, July, and October of each year Annual Reports: August 31 of each year
DSS Deliverables					
Operations Plan	Describes how the Loop 101 corridor will operate in an ICM environment from an agency perspective. Includes existing and proposed operational strategies, communications/notifications plans, operations scenarios and plans, and roles and responsibilities. Identifies performance measures and targets to guide modeling activities for DSS	▪ Stakeholder input during working sessions and meetings ▪ Corridor inventory ▪ Information and lessons learned from previous ICM efforts locally and nationally ▪ Modeling report results	▪ Formal acceptance of the Operations Plan by all agency stakeholders will be required	Kimley-Horn, Technical Team (lead), PMT, and stakeholder agencies	Draft: November 2020 Final: January 2021
DSS Modeling Report	Outputs and recommendations from modeling task (completed by ASU) based on operational concepts and proposed performance measures. Provide input to final Operations Plan and draft ConOps.	▪ Operational Plan ▪ Data from MAG, RADS, ADOT and other sources (local agencies, third party) to support building and running a model	▪ Modeling results will be reviewed by TT, PMT, PAT, and technical task teams to identify any adjustments or changes that should occur prior to finalizing	Kimley-Horn, Technical Team (lead), PMT, ASU	May 2021

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
Concept of Operations	Describes the DSS, how it functions, and how it interacts with other systems. Reflects stakeholder input on needs and identifies potential functions and system alternatives to address corridor operational needs. Establish initial performance objectives for system-related functions. The ConOps is the foundation for writing high-level requirements.	▪ ATCMTD grant proposal ▪ Previous ConOps developed for similar applications ▪ Operations Plan ▪ Stakeholder input from Concept Planning Workshops ▪ Results of strategy modeling to finalize ConOps	▪ Review and approval of overall systems concepts, stakeholder roles and responsibilities and operational scenarios by TT, PMT, PAT, technical task teams and FHWA	Kimley-Horn, Technical Team (lead), PMT, and stakeholder agencies	Draft: April 2021 Final: May 2021
High Level System Requirements	Describes what the DSS will do (functional requirements), how well it will function (performance requirements) and under what conditions it will perform. Requirements will form the basis for procurement documents and procurement contracts with designers and vendors (developers).	▪ ConOps ▪ Stakeholder input from Operations Plan and Concept Planning workshops and requirement walkthrough meetings	▪ Requirements should be directly traceable back to identified needs, deficiencies, and constraints in ConOps ▪ Review and approval of identified functionality for components and supporting systems by TT, PMT, PAT, and technical task teams	Kimley-Horn; Technical Team (lead), PMT, and stakeholder agencies	Draft: June 2021 Final: July 2021
Design Procurement Document	Procurement documents to hire a design consultant for the DSS to develop detailed requirements	▪ Operations Plan ▪ ConOps ▪ DSS High Level Requirements	▪ Review and approval of RFP language by lead procurement representatives, TT, PMT, and DSS technical task team ▪ Review and approval of final procurement document by FHWA	Kimley-Horn, Technical Team (lead), PMT, and stakeholder agencies	July 2021
**DSS Design Sequence Plan (Part of DSS Design task on overall project schedule)	Outlines DSS design activities, including decision points, schedule, and key milestones. Identify roles and responsibilities of key stakeholders	▪ ConOps ▪ High Level Requirements ▪ Stakeholder input ▪ Design consultant contracts	▪ Review and approval of activities and schedule by TT, PMT, and PAT	Design consultant, Kimley-Horn, Technical Team (lead), PMT, and stakeholder agencies	Draft: October 2021 Final: November 2021

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
Design Acceptance Process	Identifies evaluation criteria and a process for obtaining consensus on preliminary acceptance of design deliverables. Criteria to demonstrate traceability back to needs and requirements, and demonstrate compliance with specific design decisions and directions provided by Loop 101 Stakeholders	▪ ConOps ▪ High Level Requirements ▪ Design consultant contracts ▪ Stakeholder input on design decisions and direction	▪ Review and approval of acceptance process by TT, PAT, and EGT ▪ Need consensus of approval for all design deliverables provided by design consultants	Kimley-Horn, Technical Team (lead), PMT, and stakeholder agencies	December 2021
**DSS Detailed Requirements	DSS design consultant will develop detailed system requirements (i.e. design) for DSS which will later guide the system developer in developing the system	▪ Operations Plan ▪ ConOps ▪ High level Requirements ▪ Stakeholder input on design decisions and direction	▪ Review and approval by TT, PMT, and GEC ▪ Approval of detailed design required before vendors can be procured for system development and implementation	Design consultant, Technical Team (lead), Kimley-Horn, PMT, and stakeholder agencies	Draft: January 2022 Final: February 2022
DSS System Procurement Document	Procurement document to hire a vendor to develop software for the DSS based on the detailed requirements	▪ Operations Plan ▪ ConOps ▪ Detailed Requirements	▪ Review and approval of procurement document language by appropriate agency procurement representatives, PAT, PMT and TT ▪ Review and approval of final procurement documents by FHWA	Kimley-Horn, PMT (lead), Technical Team, and stakeholder agencies	March 2022
**Systems Engineering Documentation for DSS Development (Part of vendor Development task on overall project schedule)	PMP, SEMP, and other documents outlining approach to management, decision-making, and project development that each consultant and vendor will use and follow Defines steps and documentation to achieve project objectives and traceability for compliance with requirements Considered living documents and are finalized at end of development process	▪ Overall Loop 101 Mobility Project PMP and SEMP ▪ ConOps and High Level Requirements ▪ Design consultant proposals and contracts	▪ Review and approval of plans and approach by TT, PMT, PAT, FHWA, and GEC	DSS software developer, Kimley-Horn*, Technical Team (lead), and PMT	Draft: August 2022 Final: July 2023

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
**Software Development and Test Plan (Part of vendor Development task on overall project schedule)	Describes how DSS developer will manage the software development process, including developer's software development approach, tools, modules, and integration approach Describes processes for requirements traceability, defect tracking, and code/document configuration management Describes a strategy and procedures for vendor and GEC to manage the iterative testing process, including schedules and timeframes. Includes unit testing, subsystem integration testing, and system verification testing showing alignment of systems and sub-systems against requirements	▪ ConOps ▪ High-level and Detailed System Requirements ▪ Software developer contract ▪ System developer tools and processes	▪ Review and approval of development approach, development tools to be used, and integration sequence and testing processes and approach by TT, PMT, and PAT ▪ Approval of Software Development and Testing Plan required prior to initiation of software development activities	DSS vendor, Kimley-Horn*, Technical Team (lead), PMT, and stakeholder agencies	Draft: September 2022 Final: October 2022
**Data Management Plan (Part of vendor Development task on overall project schedule)	Identifies data necessary for system development, testing, and integration. Describes how and which data will be controlled, methods of documentation, and responsibilities for data storage and archiving, data accessibility, data security, and data quality control.	▪ ConOps ▪ Detailed Requirements and design documentation ▪ Stakeholder input on design decisions and direction related to data	▪ Review and approval of roles and responsibilities and data security approach by PMT, Technical Team leads, and agency staff, such as IT staff	DSS vendor, Kimley-Horn*, Technical Team (Lead), PMT, and stakeholder agencies	Draft: October 2022 Final: November 2022
DSS Implementation Plan and Testing Process	Identifies staff involved in testing, responsibilities of vendors during testing, and testing schedules and timeframes. Outline a process and conditions for how system will be accepted and how issues will be communicated to vendors for resolution. This will include demonstrating traceability back to needs and requirements, as well as requiring developers to demonstrate compliance with specific design decisions and directions provided by Loop 101 agency stakeholders.	▪ Stakeholder input implementation needs and processes ▪ Vendor contracts ▪ Vendor-developed design plans/ documentation ▪ Software Development and Testing Plan	▪ Review and approval of roles and responsibilities, schedule, and acceptance conditions by PMT, TT, and impacted agencies	Kimley-Horn*, Technical Team (Lead), PMT, and stakeholder agencies	Draft: June 2023 Final: July 2023

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
**System Implementation	Initial implementation and integration of system following completion of development and in preparation for system testing.	▪ Completed DSS ▪ Software Development and Test Plan ▪ Implementation Plan	▪ Review and approval of initial implementation conditions by the TT, PMT, and impacted agencies.	DSS vendor, Technical team (lead), PMT, Kimley-Horn*, and stakeholders	September 2023
Testing and System Acceptance Report	Required system testing based on the Implementation Plan. System Acceptance Report will document testing outcomes, requirements for addressing and resolving issues, and compliance with an acceptance state. The Final System Acceptance Report will document changes that were made to facilitate acceptance	▪ System Requirements ▪ Implementation and Testing Plan ▪ Vendor-developed Software Development and Testing Plans ▪ Stakeholder input on acceptance conditions	▪ Review and approval of test results by all impacted agencies, the TT, PMT, and impacted agency staff. ▪ Test results should indicate correctly operating and stable development, test, and production hardware and software environments at identified agencies facilities and other project system nodes.	Kimley-Horn*, DSS vendor, Technical team (lead), PMT, and stakeholders	January 2024
Adaptive Ramp Meters Deliverables					
Task Kick-off Meeting	Initial meeting of ADOT and GEC team to map out task priorities	▪ ATCMTD grant proposal ▪ GEC contract	▪ Participation by relevant ADOT staff	WSP/Kimley-Horn, ADOT, TT (lead), PMT	May 2020
Ramp Metering Existing Conditions Summary	Summarizes current design projects that are implementing adaptive ramp meters and current operating approaches	▪ Documentation of current and completed ADOT ramp metering projects for the L101 ▪ Input from relevant ADOT staff	▪ Review and approval of summary document by ADOT and the PMT	WSP/Kimley-Horn, ADOT, TT (lead), PMT	Draft: July 2020 Final: September 2020
Recommended Coordination Plan for Adaptive Ramp Meters	Recommended operational practices and operational considerations for adaptive ramp meter operations	▪ Existing Conditions Summary ▪ Lessons learned and guidance from other adaptive ramp metering applications ▪ Operations Plan ▪ ConOps	▪ Review and approval of recommendations by ADOT and TT ▪ Implementation of recommendations in the field by the end of the project	WSP/Kimley-Horn, ADOT, Technical Team (lead), PMT	Draft: TBD Final: TBD *Adaptive Ramp Meter Pilot deployment date is not known based on current traffic conditions.*

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
Adaptive Traffic Signal System Deliverables					
Task Kickoff Meeting	Meeting with PMT and Technical Team Task leads to review key project tasks	▪ ATCMTD grant proposal ▪ PMT and TT input ▪ Information and lessons learned from previous Adaptive traffic signal efforts locally	▪ Approval by TT and PMT to commence meetings with City staff ▪ Approval of KO meeting notes by the TT and PMT	Kimley-Horn, Technical Team (lead), PMT	April 2020
City Kickoff Meeting	Kickoff meeting with City of Glendale staff to discuss adaptive traffic signal control concept, including key locations and desired functionalities	▪ ATCMTD grant proposal ▪ PMT and TT input ▪ Information and lessons learned from previous Adaptive traffic signal efforts locally	▪ Agreement from City of Glendale on task approach and expected outcomes ▪ Approval of City KO meeting notes	Kimley-Horn, Technical Team (lead), PMT, City of Glendale	April 2020
ConOps	Identifying user needs statements for the system, using the Concept of Operations Needs Statements from the Final FHWA Model Documents as the foundation and specifying for the Glendale Adaptive System needs.	▪ ATCMTD grant proposal ▪ FHWA model documents for Adaptive Traffic Signal Systems ▪ Example ConOps from recently completed adaptive systems involving Glendale (Bell Road and Olive Ave) ▪ Input from City of Glendale on key needs, locations, and concept	▪ Approval from City of Glendale and TT on ConOps Need Statements and format	Kimley-Horn, Technical Team (lead), City of Glendale, PMT	Draft: June 2020 Final: September 2020
High-Level Requirements	Tailored requirements document to inform procurement documents	▪ FHWA model documents for Adaptive Traffic Signal Systems ▪ Example ConOps from recently completed adaptive systems involving Glendale (Bell Road and Olive Ave) ▪ Input from City of Glendale on key needs, locations, and concept	▪ Approval from City of Glendale and TT on Requirements document and format	Kimley-Horn, Technical Team (lead), City of Glendale, PMT	Draft: June 2020 Final: September 2020

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
Adaptive System Procurement Document	Develop procurement package for adaptive system based on the requirements and advertise the project. Select and contract with a vendor.	▪ ConOps and Requirements document ▪ Input from City of Glendale on procurement needs ▪ Environmental Clearances ▪ Input from ADOT on applicable procurement processes	▪ Approval from City of Glendale, PMT, TT, and FHWA on procurement model being used ▪ Review and approval from City of Glendale, TT, and FHWA on procurement document language ▪ Review and approval from ADOT procurement on procurement package materials	Kimley-Horn, ADOT, MCDOT, Technical Team (lead), City of Glendale, PMT	November 2020
Adaptive Signals Implementation Plan and Testing Process	Identify roles of vendor and staff in testing; identify testing schedules and timeframes and outline a process and conditions for how system will be accepted and how issues will be communicated to vendors for resolution. This will include demonstrating traceability back to needs and requirements, as well as requiring developers to demonstrate compliance with specific design decisions and directions provided by the City of Glendale or other impacted agencies.	▪ City of Glendale and TT input on field site and building access needs and restrictions ▪ Vendor contract ▪ Vendor products and documentation for development and testing	▪ Review and approval of roles and responsibilities, access requirements, and schedule by City of Glendale and TT	Kimley-Horn, City of Glendale, MCDOT, Technical Team (Lead)	May 2021
**Adaptive System Implementation	City of Glendale staff and members of the technical task team will coordinate with the vendor to deploy and install hardware and software in preparation for testing and acceptance.	▪ Adaptive signal system software, hardware, and field devices ▪ Implementation Plan ▪ Environmental clearances	▪ Review and approval of initial implementation conditions by the City of Glendale and TT	System vendor, City of Glendale (lead), MCDOT, Technical Task Team, Kimley-Horn	December 2021

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
Testing and System Acceptance Report	Required system testing performed by vendor in coordination with GEC based on the Implementation Plan. System Acceptance Report will document testing outcomes, requirements for addressing and resolving issues, and compliance with an acceptance state. The Final System Acceptance Report will document changes that were made to facilitate acceptance	▪ System Requirements ▪ Implementation Plan ▪ Vendor-developed system documentation ▪ City of Glendale input on acceptance conditions	▪ Review and approval of test results by the City of Glendale TT, PMT, impacted agency staff, and GEC. ▪ Test results should indicate correctly operating and stable development, test, and production hardware and software environments at Glendale facilities or other system nodes.	System vendor, Kimley-Horn, City of Glendale (lead), MCDOT, Technical Task Team	December 2021
Connected Vehicle Applications Deliverables					
Task Kick-off Meeting	Meeting with Technical Team Task leads, including City of Scottsdale, to review key project tasks, identify key stakeholders to be involved in this task and develop overall work plan for task elements.	▪ ATCMTD grant proposal ▪ PMT and TT input ▪ Information and lessons learned from previous applications	▪ Approval by TT, City of Scottsdale, PMT, and MCDOT REACT to commence with task ▪ Approval of KO meeting notes and work plan by TT, City of Scottsdale, PMT, and MCDOT REACT	Kimley-Horn, Technical Team (lead), City of Scottsdale, PMT, MCDOT, ADOT	September 2020
CV Readiness Assessment and Scoping	Assessment of existing infrastructure, such as traffic signal controllers, to confirm hardware and software are compatible with CV hardware and software needs.	▪ Information and lessons learned from previous applications ▪ Information on field assets (traffic signal controllers) at the City of Scottsdale ▪ Input from TT, University of Arizona, City of Scottsdale,	▪ Approval of assessment (including any necessary hardware of software updates to be pursued) and proposed scope/next steps by TT, City of Scottsdale, and PMT	Kimley-Horn, Technical Team (lead), University of Arizona, City of Scottsdale, MCDOT, ADOT	Draft: December 2020 Final: January 2020

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
**CV Concept and Requirements	Updating existing documentation for CV user needs and requirements based on results of Smart Drive Test Bed in Anthem and current federal policy. Preparing preliminary design concepts and configuration for on-board and roadside infrastructure and software (mapping map messages). Development of equipment specifications	▪ Documentation (user needs, Concept, software requirements) and lessons learned from previous applications ▪ Federal guidance on CV (including 5.9 GHz spectrum) ▪ Input from TT, University of Arizona, City of Scottsdale, City of Phoenix Transit, Valley Metro, and MCDOT REACT	▪ Approval of concept, locations, systems, and roles and responsibilities, by TT, City of Scottsdale, PMT, MCDOT REACT, other implicated agencies, and FHWA to commence with procurement and installation	Kimley-Horn, University of Arizona, MCDOT, Technical Team (lead), City of Scottsdale, City of Phoenix Transit, Valley Metro, MCDOT REACT, ADOT IRU, PMT	Draft: June 2021 Final: July 2021
CV Equipment Procurement Document(s)	Develop procurement package for CV infrastructure needs (devices, hardware, others) based on the requirements and advertise the project. Select and contract with a vendor.	▪ Readiness Assessment ▪ Concept and Requirements ▪ Input from ADOT on applicable procurement processes ▪ Input on equipment specifications from University of Arizona, City of Scottsdale, MCDOT REACT, and other impacted agencies ▪ Environmental Clearances	▪ Approval from PMT, TT, and FHWA on procurement model being used ▪ Review and approval from University of Arizona, City of Scottsdale, MCDOT REACT, other impacted agencies, and FHWA on procurement document language ▪ Review and approval from ADOT procurement on procurement package materials	Kimley-Horn, ADOT, Technical Team (lead), University of Arizona, City of Scottsdale, City of Phoenix Transit, Valley Metro, MCDOT REACT, PMT	September 2021

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
**CV Software Development	Development or re-configuration of CV software and algorithm to accommodate the operational and field environment along the identified corridors in Scottsdale.	▪ CV Readiness Assessment ▪ CV Concept and Requirements ▪ Information and lessons learned from previous applications ▪ Federal guidance on CV (including 5.9 GHz spectrum)	▪ Review and approval from TT and GEC that system adheres to concept and requirements and is ready for testing	University of Arizona, Technical Team (lead)	December 2021
**CV Implementation Plan Testing Process	Identify testing roles, schedules, and timeframes and outline a process and conditions for how system will be accepted and how issues will be resolved. This will include demonstrating traceability back to needs and requirements, as well demonstrating compliance with specific design decisions and directions provided by the City of Scottsdale, MCDOT REACT or other impacted agencies.	▪ ConOps and Requirements ▪ Input from TT, University of Arizona, City of Scottsdale, MCDOT REACT, other implicated agencies on procurement needs	▪ Review and approval of roles and responsibilities, implementation and access requirements, and schedule by University of Arizona, City of Scottsdale, MCDOT REACT, other implicated agencies, and the TT	Kimley-Horn, University of Arizona, Technical Team (lead), City of Scottsdale, City of Phoenix Transit, Valley Metro, MCDOT REACT, ADOT IRU, PMT	December 2021
**CV Implementation and Configuration	Installation and configuration of software and hardware as well as deployment of field and on-board devices in preparation for testing and acceptance of the application.	▪ CV software and hardware ▪ Field devices and on-board equipment ▪ Implementation Plan ▪ Environmental clearances	▪ Review and approval of initial implementation conditions by TT, City of Scottsdale, MCDOT REACT, other implicated agencies, and GEC	University of Arizona, Technical Team (lead), City of Scottsdale, City of Phoenix Transit, Valley Metro, MCDOT REACT, ADOT IRU, PMT, Kimley-Horn	April 2022

Milestone Title	Milestone Description	Required Inputs/ Resources	Control/Decision Gate	Responsible Parties	Milestone Date (Proposed)
Testing and System Acceptance Report	Required system testing based on the Implementation Plan. System Acceptance Report will document testing outcomes, requirements for addressing and resolving issues, and compliance with an acceptance state. The Final System Acceptance Report will document changes that were made to facilitate acceptance	▪ System Requirements ▪ Implementation Plan ▪ Information and lessons learned from previous applications	▪ Review and approval of test results by all impacted agencies, the TT, PMT, FHWA, and the GEC ▪ Test results should indicate correctly operating and stable development, test, and production hardware and software environments at identified agencies facilities and other project system nodes.	University of Arizona, Technical Team (lead), Kimley-Horn City of Scottsdale, City of Phoenix Transit, Valley Metro, MCDOT REACT, ADOT IRU, PMT	April 2022
Integrated Traveler Mobility Application Concept Deliverables					
Exploration of local and industry applications for traveler information	Explore ADOT Alerts Mobile App functionality as it compares to functionalities identified in Operations Plan and DSS ConOps. Develop RFI to solicit industry input on current/emerging technologies that can address traveler information needs identified in the Operations Plan and DSS ConOps	▪ Input from ADOT staff responsible for ADOT Alerts App ▪ ATCMTD grant application ▪ Operations Plan ▪ DSS ConOps ▪ Input from stakeholders	▪ Review of RFI by TT, PMT, Outreach and Education Team, agency stakeholders, and FHWA prior to its release ▪ Review of results of exploration activities (including RFI response) and agreement on next steps by TT, Outreach and Education Team, and agency stakeholders	Kimley-Horn, Technical Team (lead), PMT, Outreach and Education Team, and stakeholders	November 2021
**Pilot of Mobility Application	Based on findings from local and industry exploration, the project team will partner with either ADOT or a third party vendor or company to implement enhanced traveler information pilot application and evaluate results and impacts of pilot.	▪ Results of traveler mobility app exploration ▪ Operations Plan ▪ DSS ConOps ▪ Input from stakeholders	▪ Review/evaluation of results of pilot by TT, PMT, Outreach and Education Team, and agency stakeholders	ADOT or third party vendor, Technical Team (lead), PMT, Outreach and Education Team, agency stakeholders, and Kimley-Horn*	August 2022 – July 2023

* Indicates deliverable dates that are beyond the current GEC contract term

**Indicates deliverables that will be developed by contractors and vendors external to the project governance teams and GEC for the Loop 101 Mobility Project

4.3.1 FORMAT FOR DELIVERABLES

Project-specific templates will be used to standardize project documentation and reporting. These templates will facilitate a consistent structure a format for all project communications, including status reports, meeting summaries, sign-in sheets, FHWA reports, project updates/fact sheets, and project deliverables. Deliverables will be provided to the PMT in electronic format. Microsoft Word will be used to prepare outlines and draft reports, and final reports will also be provided in PDF format. Graphics will be developed and inserted into documents as JPEG files. Presentations will be prepared using Microsoft PowerPoint.

Per the agreement between ADOT and FHWA dated January 2018, final report documents will also be compliant with Section 508 formatting for FHWA to publish on its website.

4.3.2 REVIEW PROCESS FOR DELIVERABLES

It will be important to get feedback from each of the Loop 101 stakeholders for every major deliverable that is produced. Feedback on the Operations Plan, ConOps and the High-level and Detailed Requirements, and design documentation are especially important, as is feedback on design consultant and vendor proposals that impact a specific agency.

Draft and final deliverables will be emailed to the PMT and, after the PMT review and GEC document updates, will be emailed to Loop 101 agency stakeholders. Deliverables will also be posted on a project-specific website hosted by Kimley-Horn. This website is where all stakeholders will be able to access and download project files, including meeting schedules and deliverables for review. Draft documents will be clearly marked as such and will be removed from the website when a final document is available. Review periods will be two weeks long for major deliverables, with one week allocated in the project schedule for comment consolidation by Kimley-Horn.

All comments received from stakeholders will be consolidated and tracked, either through a comment resolution table or through track-changes in Microsoft Word. The response or recommended action to each comment will also be documented as part of the tracking process. Any conflicting comments or those that impact other stakeholders will be resolved through further discussions during Partnering meetings or via a conference call on the specific issue being raised.

4.4 COST MANAGEMENT AND TRACKING

4.4.1 OVERALL PROJECT COST MANAGEMENT AND TRACKING

The Loop 101 Mobility Project was awarded $6 million of federal grant funds to support the project, and, per the requirements of the federal grant funding, the Loop 101 Mobility Partners are responsible for contributing at least an additional $6 million worth of local matching funds. **Table 2** shows the overall project budget, including both federal and local funds, to support the Loop 101 Mobility Project per the approved ATCMTD grant proposal and the agreement between FHWA and ADOT.

It is critical that the grant funds be managed so that all project tasks outlined in the grant can be properly executed and completed. It will also be critical to regularly track agency local match contributions to make sure

that the local match requirement for the grant is met. The PAT and PMT will be responsible for overall management of the project budget, with support from the GEC.

4.4.2 GEC COST MANAGEMENT AND TRACKING

Cost control is achieved through three independent processes that the KH PM will manage on a monthly basis, including:

- The KH PM will receive a system-generated Project Effort Report twice monthly that shows the actual level of effort expended by task for GEC team. This level of tracking will allow a continuous budget control process and the KH PM will communicate any notable items regarding the budget in the monthly project status calls.
- Once per month, the KH PM will coordinate the project invoice for the previous month, which involves a detailed review of effort on each task and its budget and of the overall project budget and schedule to completion. Invoices will include GEC subcontractors
- Each month, the KH PM will project a forecast of effort on each task for the upcoming months to be able to identify periods where increased project support may be needed as well as to manage the effort in order to meet the project schedule.

These three independent processes will be used by the KH PM to identify trends, forecast project performance and identify and proactively address challenges to eliminate major project surprises. The KH PM will communicate with the PMT any variances or concerns in the overall project budget that warrant discussion during the monthly project status calls.

The KH PM will manage and administer contracts with each of the sub-consultants that are part of the GEC consultant team. This will include developing subconsultant scopes, reviewing subconsultant invoices, incorporating subconsultant progress reports into the monthly progress reports, and coordinating work products and deliverable schedules with each subconsultant.

Kimley-Horn will support ADOT in tracking local agency in-kind (staff time, projects) and hard cost match. Kimley-Horn will coordinate with stakeholders to obtain information on a regular schedule to support cost tracking and required project reporting and will work with ADOT to integrate into the required Forms SF-425 for overall project cost tracking and reporting to the FHWA. Agencies will submit project match and agreed-to expenditures in support of the Loop 101 Mobility Project to ADOT per the terms of the individual ADOT and local agency Intergovernmental Agreements (IGA). Staff in-kind match will be tracked by the GEC based on meeting attendance and deliverable reviews. GEC invoices will be reflected in quarterly FHWA reports.

Table 2 – Loop 101 Mobility Project Summary of Expected Costs (from ATCMTD Application)

Cost Item	Year 1	Year 2	Year 3	Year 4	Total	Grant Funds	Local Funds
DSS Design, Integration and Operation	$3,250,000	$730,000	$75,000	$75,000	$4,130,000	$3,430,000	$700,000
Adaptive Traffic Signal Control Technology		$550,000			$550,000	$550,000	
Connected Vehicle Technology Deployment and Integration		$490,000			$490,000	$490,000	
Integrated Traveler Mobility Application Development, Integration and Maintenance		$350,000	$200,000	$100,000	$650,000	$650,000	
Adaptive Ramp Metering Technology				$820,600			$820,600
Additional Equipment to Support ICM		$880,000	$80,000		$960,000	$880,000	$80,000
Staff In-Kind Support	$426,250	$528,500	$453,000	$401,500	$1,809,250		$1,809,250
Agency Supporting Projects	$2,312,931	$2,673,183	$3,664,775	$726,500	$9,337,389		$9,337,389
Agency Operations and Maintenance Support	$3,974,745	$3,614,745	$3,614,745	$3,614,745	$14,818,980		$14,818,980
Total	$9,963,926	$9,816,428	$8,087,520	$5,738,345	$33,606,219	$6,000,000	$27,606,219

5 COMMUNICATIONS MANAGEMENT PLAN

This section identifies the components of the Communications Plan that includes Project Management communications, internal team communications, and external stakeholder communications. Reference to this Communications Management Plan is also included in the SEMP.

5.1 PMT COMMUNICATIONS

The KH PM will be responsible for communicating with ADOT on any contract issues. The KH PM will be responsible for communicating with the PMT on day-to-day project activities, information requests, updates and briefings. Regular communications will be via telephone as well as electronic mail. The KH PM will also submit formal monthly invoices, which include progress reports, to ADOT on behalf of the project team.

Communications with the PMT will occur on a monthly basis through formal written communications as well as weekly teleconferences regarding project status or specific deliverables and activities. The GEC will also schedule in-person project status meetings with the PMT for specific updates in addition to teleconference status reports.

5.2 INTERNAL TEAM RESOURCE COORDINATION

The GEC project team will conduct regular coordination calls to maintain clear communication and coordination on project activities. Communications tools are in place to accommodate team members (including sub-consultants) in multiple offices. The internal communications plan will include check-in calls with different team members based on current project activities and involvement of the different team members. During these calls, the respective PMs will review tasks in progress, discuss status of deliverables and reviews, and discuss cost/budget/schedule. These will be conducted via teleconference or webinar to accommodate team members in multiple offices. These calls will be facilitated by the KH PM. Discussions, outcomes and action items, as appropriate, will be distributed to each team member after the call or meeting.

5.3 AGENCY STAKEHOLDER COORDINATION

Project stakeholders include a variety of agencies with operational or management stake in the study area, including ADOT, MCDOT, Valley Metro, the cities of Phoenix, Glendale, Scottsdale, Peoria, Tempe, Mesa, Chandler, MAG, SRPMIC, AZDPS, the University of Arizona, and ASU. A schedule of stakeholder meetings and workshops can be found in Table 1 in Section 4.3 – Project Milestones, that provides an overview of the major project milestones.

Information and data will be distributed to project agency stakeholders via the following methods of communication:

- Project meetings and workshops to provide information about the project activities, gather inputs needed, and allow for discussion among stakeholder group;
- Bi-monthly summary updates of project and task activities;
- Periodic project updates and messages via electronic mail regarding document and deliverable review; and
- Upload of documents on a secure, project-specific web site (www.L101mobilityaz.com).

Kimley-Horn will develop and maintain a secure web site that will serve as a central resource for project information for Loop 101 Agency stakeholders. Secure sections of this web site will require a login and password and will not be accessible to the public. The site will serve as a central repository for project deliverables, meeting notes, work in progress, and schedule of upcoming meetings/milestones. The GEC team will be responsible for posting content to the collaborative site. All public communications will be coordinated through the Outreach and Education Team and in accordance with the Outreach and Education Plan.

The Project Management Team and Technical Team leads will provide updates at the AZTech Committee meetings and MAG ITS Committee meetings depending on the topic. General updates will be provided by the PMT, while technical updates or updates related to a project system or component may be provided by the Technical Team.

5.4 COMMUNICATIONS WITH FHWA

The KH PM will support ADOT with the Federal reporting requirements of the ATCMTD grant funds. There are Federal reporting requirements of the ATCMTD grant funds throughout the duration of the project, for which ADOT is responsible for sending to the ATCMTD mailbox (ATCMTD@dot.gov) and the FHWA Arizona Division contact (Toni Whitfield). The required documentation for federal reporting includes:

- Quarterly Project Outcomes and Monitoring Reports (calendar year quarters);
- Annual Reports to the US DOT Secretary (annually in September);
- Intermediate working papers
    - Draft Final PMP and SEMP
    - Final PMP and SEMP
    - Final Communications and Outreach Plan
    - Final Operations Plan
    - Final DSS ConOps
    - Final DSS High Level System Requirements
    - Final DSS System Procurement Document
    - Final Recommended Coordination Plan for Adaptive Ramp Meters
    - Final Adaptive Systems Procurement Document
    - Final CV Readiness Assessment
    - Final Testing and System Acceptance Reports for all applications; and
- Final Project Report.

Communications with FHWA will be coordinated through ADOT with review by others in the PMT. FHWA will be included in project meetings and activities, and will be kept apprised of technical development, task status and document reviews. FHWA will be represented as part of the EGT and in technical team activities.

6 PROJECT MONITORING AND CONTROL

6.1 CHANGE MANAGEMENT

All project changes will be reviewed and tracked so that the direction of the project does not stray from its objectives. Project changes can have a significant impact on the project's scope, budget, and schedule, and will

be reviewed by the PMT for approval prior to implementation. Significant changes to the project (scope, budget, schedule, goals, objectives, tasks, key personnel, program manager, prime contractor) requires approval from the FHWA prior to enacting any formal changes.

Changes to the project scope will be handled through a formal process of documenting potential issues and changes and will involve the KH PM communicating (verbal and written) with the PMT to discuss potential scope changes. The PMT will communicate with the KH PM about any scope changes that are identified through the course of the project. The PMT and KH PM will discuss the requested change and any associated schedule, deliverable or effort impacts; the KH PM is then responsible for communicating this request to the team members.

No changes to scope will be made without direction and approval from the PMT. If a change to scope is warranted, this change will be reviewed for impacts to schedule, deliverables and effort. The scope change will be documented in a formal written communication to the PMT along with any updates to schedule or effort.

Any changes to schedule, as a result of meeting date changes, workshop date changes, scope changes or other impacts will be coordinated with the PMT, and an updated schedule, if needed, will be developed and submitted to the project team.

Technical change management processes are addressed in the SEMP.

6.2 ISSUE RESOLUTION MANAGEMENT

If any issues do arise, they will be identified, discussed and addressed as part of formal and informal communications between the internal team or between the KH PM and the PMT, as appropriate. Part of the formal process will be documenting any issues that are identified as well as documenting all steps taken to resolve the issue.

Other issues that may arise are relevant to the input from agency stakeholders. Some project discussions will occur as part of project meetings and workshops that will include the attendance of all Agency staff. It will be the goal to settle any issues or conflicting ideas during these meetings.

One major set of activities to support issue identification and resolution management is a series of partnering workshops that will be held in coordination with key milestones or decision points throughout the project.

- The first workshop, the Partnering Meeting, will include all of the Loop 101 agency partners and stakeholders and will be conducted with the purpose of aligning the team for the successful completion of the Loop 101 Mobility Project. Partnering items to be discussed in this workshop will include understanding the communication approach and developing communications strategies and understanding the roles and responsibilities of the stakeholders in the process.
- A multi-agency partnering-focused regroup at the end of the ConOps to allow the team to come back together to discuss project activities and make any improvements to communications or coordination, and to bring any new members up to speed with the process. This workshop will also discuss the issues, needs and concerns related to transitioning to DSS design and implementation tasks.

- When a DSS developer is selected, a DSS Provider Partnering Workshop will be an opportunity to define more technical decision-making roles and processes, integrate new team members into the project and discussions, discuss project communications, and define next steps.
- A Close-out Workshop will review and document lessons learned for future Corridor Management projects, review what elements worked well, what strategies could be done differently in the future, review team integration strategies, and document outcomes for ADOT to consider as the department plans for and implements ICM on other corridors.

If issues arise as part of document review, then an in-person meeting or a teleconference may be set up to discuss and resolve any conflicting ideas. An important step that will be taken to minimize issues is to work with stakeholders at the beginning of the ConOps development to decide on a set of goals and objectives from which the ConOps will be developed. Identifying a set of agreed-upon goals from which the ConOps will be developed should help prevent many conflicts during the project development.

Any issues that cannot be resolved within a current Team structure will be elevated to the next Team for consensus. Issues are to be documented in writing and forwarded to the next team for resolution. Resolutions are also to be documented in writing. This process will be documented in the outcomes from the Partnering workshop.

As a first tier, the Technical Team and PMT will work to resolve technical issues or operational issues surrounding individual task and project planning and design activities. If issues arise affecting scope, schedule or budget, these are to be immediately escalated from the Technical Team to the PMT for discussion and resolution. To the extent possible, technical and operational project issues that arise through stakeholder feedback or conflicting feedback on operational decisions will be resolved with Loop 101 stakeholders.

As a second tier, the PMT will forward unresolved technical and policy issues to the Program Administration Team for issue resolution and to seek final consensus in writing. The Program Administration team, comprised of ADOT and MCDOT, will confer swiftly to address the issue, either through an in-person meeting or teleconference.

As a third tier, any issues that cannot be resolved by the Program Administration team are to be escalated to the EGT co-leads for discussion and resolution. It is envisioned that these issues will largely comprise policy decisions at the executive level. Operational conflicts that require a policy decision will also be escalated to the EGT co-leads, and if necessary, to the full EGT. All outcomes are to be documented in writing and shared with the Program Administration team, who will then forward to the appropriate PMT or Technical Team leads.

All issues elevated will be resolved as soon as possible as to not delay task activities.

7 PROJECT QUALITY MANAGEMENT

7.1 QUALITY CONTROL/QUALITY ASSURANCE PLAN

Quality Control (QC) involves monitoring both the project process and products to determine if the project is meeting quality standards and identifying ways to mitigate risk or eliminate unsatisfactory outcomes. Quality Assurance (QA) involves review an evaluation of the overall project performance to make sure the project is

satisfying quality standards. The GEC PM is responsible for administering the Quality Control and Quality Assurance Plan for the Loop 101 Mobility GEC team.

The objective of the QC/QA Plan is to establish controls and reviews of major project deliverables, including interim reviews and reviews of full drafts, prior to submitting to the PMT for review. As part of this quality management plan, a set of senior advisors within the GEC organization will participate during different stages of the project, based on the relevant activities and tasks occurring at that time. The senior advisor will not be directly involved in developing deliverables, but rather will be utilized to leverage their technical, industry and institutional knowledge during the development process. The project schedule includes time within the development of deliverables time periods for internal quality reviews prior to submitting documents to the PMT.

In addition to the senior advisor, the quality management plan includes reviews by technical editors who will provide quality control reviews of deliverables prior to submitting to the PMT. All final documents are to be reviewed against technical requirements and will include editorial reviews for grammar, writing style, and content. The KH PM will review all edits and suggested modifications prior to commencing with finalizing draft and final documents for submittal.

7.2 QUALITY CONTROLS

In addition to the mechanisms identified in the QC/QA Plan, a set of quality controls will be identified as part of the project schedule to ensure that quality checks are completed prior to the submittal of project deliverables. The project schedule has been developed to include internal review time prior to submitting a deliverable to the PMT, and it also includes review time from both the PMT and the agency stakeholders that will be involved throughout the project. These review periods will generally be two weeks long to provide all stakeholders adequate time to review and comment on the deliverable. All comments made during the review period will be compiled and tracked for inclusion in the deliverable through track changes in Microsoft Word and/or a comment disposition spreadsheet, as necessary. No deliverable will be finalized prior to the review and comment resolution periods.

7.3 PROJECT PERFORMANCE METRICS

Quality of the Loop 101 Mobility Project will be monitored against the performance objectives and targets shown in **Table 3**.

Table 3 – Performance Objectives and Targets for Project Development

Objective	Target
The project is completed on-time and on-schedule.	100% of deliverables are submitted on time according to the most up-to-date project schedule at that time. The project is completed by the end of the 48-month period, as identified in the PMP.
The project is completed within budget.	The cost of the project at the end of Phase 3 does not exceed the budget provided by the federal grant that was awarded.
The project engages all the stakeholders that were identified in	There is representation from each stakeholder agency at every meeting where full representation is required.

the PMP. This includes partners and stakeholders.	
The project incorporates the views and inputs of agency stakeholders.	There is, at a minimum, acknowledgement of review from at least one representative at each stakeholder agency for every deliverable.
Agency views are well-represented.	There are multiple reviewers from each agency reviewing final deliverables throughout the project.
All deliverable reviews are completed in a timely manner.	100% of agency reviewers provide review of deliverables during the review time that is designated in the project schedule.

8 RISK IDENTIFICATION AND MITIGATION

The Loop 101 Mobility Project has components that make risk management an important part of the overall project management. Monitoring and addressing risks on this project will include the following steps:

- **Risk Identification** – identify the sources of risk, potential risk events, and symptoms of risk.
- **Risk Analysis** – assess the tradeoffs between opportunities and their associated risks to understand the opportunities to pursue and those to avoid.
- **Mitigation Strategy** – develop mitigation strategies to proactively limit or address know risks.
- **Risk Monitoring and Control** – mitigation strategies or corrective action plans are developed, implemented and monitored.

The following risks have already been identified that are related to the project process and project management and strategies to manage and mitigate the risk are shown in **Table 4.** Management of technical risks are discussed in the SEMP. Risks, status and mitigation strategies will be documented and discussed in the monthly progress meetings between the KH PM and ADOT.

Table 4 – Project Risks and Mitigation Strateiges

Risk	Mitigation Strategies
There has been agency staff turnover at partner and stakeholder agencies between submission of the ATCMTD grant application and the beginning of the Loop 101 Mobility Project.	• At the onset of the project, one-on-one meetings with staff at each stakeholder agency were conducted. These meetings discussed the overall project and objectives, discuss agency roles and responsibilities, and identify any initial concerns or challenges from each agency. • Knowing any challenges or concerns early in the process will provide time to address any challenges or concerns so that they can be resolved without impacting the overall project.
If the right stakeholders from each agency are not properly engaged and involved, the project risks missing key input that could influence design and ultimate implementation of the proposed solutions(s). Delays in feedback, or significant changes that need to be implemented, could impact schedule.	• Focused outreach to all stakeholders and discussion about additional agency stakeholders that should be involved (outside of operations). • Active communication with stakeholders to keep them involved and engaged. • Multiple opportunities to provide input, feedback and review of critical deliverables. • In-person meetings in a central location to establish face-to-face communications on the project.
There is a risk of conflicting priorities among the Loop 101 stakeholder agencies in terms of how they might want to see different project components function for their network and operating environment.	• The team will build in processes to capture all feedback and identify conflicting priorities early in the assessment and objectives. • Resolution will be achieved through proactive communications through workshops and teleconferences. • Processes for issue resolution and escalation will be developed and documented through partnering strategies.

Risk	Mitigation Strategies
There is a risk of failing to obtain approval and buy-in on a final concept from the executive/management level.	• Encourage stakeholders to involve all necessary staff to make sure each agency's views are well represented. • Make sure there is a clear understanding by each agency of the commitments being made for each project concept and the types of resources that will be required. • Utilize the EGT to keep executives and management staff informed and engaged in the process. • The modeling task will model strategies identified in the ConOps. Outcomes will help determine potential safety and mobility benefits.
Barriers with agency policies regarding data sharing or ability to download external software onto agency devices.	• Engage the appropriate staff from agencies during the development of requirements so that the requirements reflect agency requirements and needs. • Document data sharing challenges and work with core team to resolve challenges or reprioritize needs to avoid challenges.
There will be multiple procurements for different components of the Loop 101 Mobility Project, and timeframe needs to factor in different schedules and constraints.	• The Operations Plan and ConOps and Requirements tasks will be undertaken to be very specific about the elements needed to be procured for different system components and what funds go to what elements. • Document specific parameters that need to be factored in procurement and implement schedules (ex: local agency project/construction seasonal fluctuations, major special events schedules, etc.). • Procurement staff from ADOT and MCDOT will be engaged early in the process to understand procurement requirements.
Since the submittal of the Loop 101 Mobility Project ATCMTD grant application, there have been changes in technologies as well as changes to national and local priorities for transportation technologies.	• The initial one-on-one meetings with agency stakeholders will be targeted to identify any changes in priorities that may impact the overall Loop 101 Mobility Project and its alignment with the initial grant submittal. • The ConOps will focus on the current needs and vision for the Loop 101 Mobility System to make sure that project concepts are in line with current industry and regional architecture and standards. The Requirements will be written based on the ConOps so that there is complete traceability. • Any proposed changes to the Loop 101 Mobility Project due to changes to regional or industry standards or technologies will be presented to the FHWA for consultation and approval.

9 PROJECT CLOSING

Project closing is as important as other processes in the PMP because it signifies that the project is complete and that the findings are accepted. The KH PM will develop a project close-out checklist to include all deliverables, meeting materials, web site materials, final FHWA reporting, and other close-out materials. Final versions of all documents will be provided to ADOT the PMT, including reports, memos, schedules, final PMP and SEMP documents, outreach materials and other documents developed during the three phases. The KH PM, in coordination with the sub-consultant PMs, will schedule a close-out meeting with the PMT. This will serve as the final transfer of electronic materials to close-out the contract.

Kimley-Horn will support ADOT in developing the Final Project Report and final project reporting to FHWA as part of ATCMTD requirements. Final project reporting is currently scheduled to occur beyond the end dates of both the ADOT-FHWA Cooperative Agreement and the GEC contract. The Loop 101 Mobility Project team intends on pursuing a formal change request to extend the project schedule to accommodate the timelines of all identified tasks for the project.

Kimley-Horn will prepare final materials that ADOT, MCDOT and stakeholders can use to promote the Loop 101 Mobility Project, including final fact sheets and a final presentation slide deck. The slide deck will serve as a master presentation that ADOT can tailor to specific audiences to share lessons learned, project outcomes and overall project approach. These slides will be suitable for national webinars, local committees and meetings, professional organizations and other venues. Kimley-Horn will prepare slide content and speaker notes and provide the final slide deck to ADOT.

Only after final invoices have been received will all contracts related to the project will be closed in the Kimley-Horn System. The project files will be archived into the Kimley-Horn system seven (7) years after the completion of the project, per Kimley-Horn file retention guidelines.