Final Recommendations Report

Task 3 – Final Product

Innovative Technology Strike Team Technical Assistance - Midwestern Group of 6 Counties

Prepared for the National Center for Applied Transit Technology
by IBI Group

March 31, 2022

Document Control Page

CLIENT:	National Center for Applied Transit Technology
PROJECT NAME:	Innovative Technology Strike Team Technical Assistance – Midwestern Group of 6 Counties
REPORT TITLE:	Final Recommendations Report Task 3 – Final Product
IBI REFERENCE:	136086
VERSION:	V1.1
DIGITAL MASTER:	IBI Group and N-CATT Shared Drive
ORIGINATOR:	Hoki Tse, Brianna Jasset
REVIEWER:	N-CATT
AUTHORIZATION:	Nihit Jain, Santosh Mishra
CIRCULATION LIST:	N-CATT Staff and online
HISTORY:	V0.90 Draft submittal for external review – January 31, 2022 V0.95 Revisions requested from external review – January 31, 2022 V1.0 Final Recommendations Report – March 31, 2022 V1.1 Final Recommendations Report (Generic) – March 31, 2022

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Executive Summary

IBI Group was selected by The Community Transportation Association of America (CTAA) as the Strike Team Consultant to work with six counties and demand-response providers under A Midwestern region's Council of Governments (CoG) and the National Center for Applied Transit Technology (N-CATT) to explore improvements in their existing technologies. The Strike Team Consultant, IBI Group, has been supporting N-CATT in providing guidance on cross-county coordination and technology assistance on software utilization to increase driver productivity and move toward on-demand capabilities in rural counties.

The six counties operating demand-response services under the region's CoG have all been using a software company that specializes in demand response dispatching as their primary scheduling and dispatch software vendor since 2006. While some counties may possess additional modules provided by the vendor, all counties possess a basic package of the software's modules (scheduling, dispatching, reporting) that are intended to support day to day operations. The region's CoG and the Counties were interested in assessing how the software was being used, whether it met the various agencies' needs, whether there were additional needs that were being unmet, and how best to provide solutions for both unmet and partially met needs going forward.

Several agencies had hoped the software would improve day-to-day efficiencies and cross-county coordination. However, since the initial software implementation, Counties have struggled to use the software at any level beyond initial utilization. Many Counties have abandoned unreliable and or inefficient software modules to instead rely on resourceful employees to support day-to-day operations. All agencies find the software to be slow and struggle to connect with software representatives when issues arise. The implementation of the software in 2006 has also not improved coordination between the Counties as was originally hoped.

The goal of this project was to recommend a feasible and innovative demand-response technology solution that can expand on-demand services to get more people from rural areas, or from one county to another, to healthcare appointments, employment, and other needs.

IBI Group aimed to achieve the following project objectives with the help of the CTAA, the region's CoG, and participating agencies:

- Recommend technology solution to coordinate with other regional transit agencies to improve driver and vehicle availability and reduce "dead" time between appointments.
- Recommend technology solution to allow riders to call one number or use an app to book a ride from any county provider and schedule or pay online.
- Recommend technology solution to be able to support the "on-demand" environment many riders are expecting throughout the region and coordinates with Transportation Network Companies (TNCs).

The Strike Team Consultant has investigated the existing technology systems and services utilized under each individual agency, developed an Operating Environment Report, and recommended a list of 5 alternative approaches for moving forward and improving existing technology systems and services. The following information provides a summary of the existing conditions recorded in the Operating Environmental Report:

Regional Pain Points

The pain points below provide preliminary perspectives on potential areas of improvement as a region:

- Majority of bookings are done through call center overwhelming call center staff
- Lack the necessary resources and coordination to fulfill all in-county desired trips
- The existing software is slow, crashing, and causing issues
- Absence of shared data across counties

Urban Pain Points

The pain points below describe various challenges for urban demand-response and paratransit services provided by Urban County 1 and Urban County 2:

- Dependency on resourceful employees that are more helpful than provided software and are close to retirement has caused a concern for future support and agency efficiency
- Dispatchers can utilize existing software for scheduling however, the optimization functionality has proved itself unreliable and inefficient.
- Loss of ridership due to COVID-19
- Many riders due to an unexpected delay in medical appointments must wait until the agency is available again to service them.

Rural Pain Points

The pain points below describe various challenges specifically for rural agencies and service providers by the four rural counties:

- Customers must call to determine vehicle location and status overwhelming call center staff
- Counting passengers by hand or by manifest, leading to significant manual effort and ability to introduce errors.
- Customer information, trip information, and trip data are tracked and stored on non-integrated excel sheets or word documents, resulting in reporting challenges downstream

The purpose of this report was to identify five alternatives for improving existing demand response services and to compare each alternative based on cost, advantages, drawbacks, risks, and expected timelines. In addition, this report will elaborate upon the technical components, business impacts, policies, and next steps of the alternative preferred by the agencies. The following five alternatives were first presented and contrasted to CTAA, The region's CoG, and the six participating agencies during the Task 2 Site Visit at the region's CoG office:

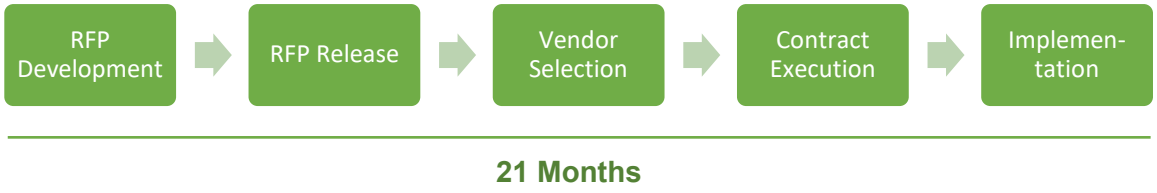
- Alternative 1: Take No Action
- Alternative 2: Upgrade Existing Software
- Alternative 3: Procure a New Software
- Alternative 4: Join a Cooperative Purchasing Agreement

- Alternative 5: Implement a One Call Center

Alternative 3 (Procure a New Software) was selected by the region's CoG and the majority of participating agencies as the preferred alternative using an anonymous polling tool. This alternative provides the best opportunity to procure and implement a software suitable for alleviating all existing technology pain points and achieving all project objectives.

The procured software shall support regional coordination and offer a common mobile application and web portal for trip planning, booking, tracking, and payment options for customers of all participating agencies. To facilitate regional coordination, The Strike Team Consultant recommends the procured system shall provide a common customer profile database and report all real-time vehicle locations for all agencies to observe, while limiting ongoing scheduling control based on well thought out configuration rules. The establishment of thoughtfully developed system requirements aimed at expanding demand response services and encouraging regional coordination has the potential to positively impact customers, agencies, and the region. Alternative 3 will allow participating agencies to standardize and centralize many policies and procedures to collaboratively provide a consistent customer experience and enhance the region's level of service.

It is recommended that all six participating agencies participate in a single procurement process estimated to last between 21 months from RFP development to implementation. System requirements developed to anticipate inevitable needs for additional functionalities and capabilities will also eliminate time spent in the future on system restructuring or the need for a new system entirely.



1 Project Background

The Community Transportation Association of America (CTAA) selected IBI Group as the Strike Team Consultant to work with six individual counties and the National Center for Applied Transit Technologies (N-CATT) to improve demand-response services under the region's council of governments (CoG). As the Strike Team Consultant, IBI Group supports N-CATT in providing demand-response technology guidance on cross-county coordination and technology assistance on software utilization to increase driver productivity and move toward on-demand capabilities in rural counties.

The six counties operating demand-response services under the region's CoG have all been using the existing demand response software vendor as their primary scheduling and dispatch software vendor since 2006. While some counties may possess additional modules provided by the existing demand response software, all counties possess a basic package of modules (scheduling, dispatching, reporting) that are intended to support day to day operations. The region's CoG and the Counties are interested in assessing how the software is being used, whether it meets the various agencies' needs, whether there are additional needs that are being unmet, and how best to provide solutions for both unmet and partially met needs going forward.

The CTAA, N-CATT, and IBI Group worked with the region's CoG to improve cross-county coordination and improve software utilization of existing and or new technologies, aiming to expand each agency's capability for rural cross-county trips and therefore increase the number of demand-response cross county rides provided for medical appointments, employment, and other needs.

1.1 Goals and Objectives

1.1.1 Project Goal

The goal of this project is to recommend a feasible and innovative demand-response technology solution that can expand on-demand services to get more people from rural areas in the region, or from one county to another, to healthcare appointments, employment, and other needs.

1.1.2 Project Objectives

- Recommend technology solution to coordinate with other regional transit agencies to improve driver and vehicle availability and reduce "dead" time between appointments.
- Recommend technology solution to allow riders to call one number or use an app to book a ride from any county provider and schedule or pay online.
- Recommend technology solution to be able to support the "on-demand" environment many riders are expecting throughout the region and coordinates with Transportation Network Companies (TNCs).

2 Pain Points Summary

Several surveys and workshops were conducted between October and December 2021 to better understand the challenges, desired functionality, and utilization level of existing technologies. The surveys and workshops indicated differences in existing technologies, operations, and challenges specifically between rural and urban transit agencies. Urban County 1 and Urban County 2 represent the two urban transit agencies within the region's CoG and both agencies maintain a higher level of technology utilization compared to their rural counterparts. A high-level summary of pain points specifically experienced regionally, by urban agencies, and by rural agencies is provided below.

2.1 Regional Pain Points

The pain points below provide preliminary perspectives on potential areas of improvement as a region:

- PP1: Majority of bookings are done through call center
- PP8: Lack the necessary resources and coordination to fulfill all in-county desired trips
- PP14: The existing software is slow, crashing, and causing issues
- PP26: Absence of shared data across counties

2.2 Urban Pain Points

The pain points below show various challenges for urban demand-response services provided by Urban County 1 and Urban County 2:

- PP2: Dependency on resourceful employees that are more helpful than provided software and are close to retirement has caused a concern for future support and agency efficiency
- PP3: Dispatchers can utilize existing software for scheduling however, the optimization functionality has proved itself unreliable and inefficient.
- PP7: Loss of ridership due to COVID-19
- PP12: Many riders, due to an unexpected and sometimes unpredictable delay in medical appointments, must then wait until the agency is available again to service them.

2.3 Rural Pain Points

The pain points below show various challenges specifically for rural agencies and service providers in the four rural counties:

- PP20: Customers must call to determine vehicle location and status
- PP24: Counting passengers by hand or by manifest
- PP25: Customer information, trip information, and trip data are tracked and stored on non-integrated excel sheets or word documents

2.4 Regional Technology Pain Points

Based on the information gathered through several workshops and surveys, 26 regionally pain points were identified, 15 of which are directly related to technology. Table 1 defines the 15 technology related pain points recognized in the Operating Environmental Report.

Table 1. Regional Technology Pain Points Summary

TOPIC	PP ID	PAIN POINT DESCRIPTION
Existing Software-Specific	PP2	Dependency on resourceful employees that are more helpful than provided software and are close to retirement has caused a concern for future support and agency efficiency
	PP3	Dispatchers can utilize existing software for scheduling however, the optimization functionality has proved itself unreliable and inefficient
	PP13	Scheduling is done manually by agency staff because the existing software's scheduling module has proved itself unreliable and or inefficient
	PP14	The existing software is slow/ crashing/ causing issues
	PP15	Struggle connecting with and getting answers from the existing software's support staff
	PP16	Lack integration of commonly used additional software with the existing software that specializes in demand response dispatching.
	PP17	Agency must change day-to-day operations to efficiently work around frequent crashing of the demand response dispatching software. The agency manually creates back up manifests in preparation of crashes or works at earlier unpopular software usage times to avoid conflicts
Real-Time Vehicle Location	PP19	Dispatchers lack access to real-time vehicle location information requiring dispatchers to contact operators to determine vehicle status
	PP20	Customers lack access to real-time vehicle location information requiring customers to call the agency to determine vehicle status
Fare	PP21	Collecting fare manually
Tablets	PP22	Do not have tablets
Passenger Counting	PP23	Occasional tablet malfunction or connectivity issue
	PP24	Counting passengers by hand or by manifest
Data	PP25	Customer and or trip information/data is tracked and stored on non-integrated excel sheets or word documents
	PP26	Absence of shared data across counties

3 Alternatives Analysis

Based on the information gathered in Task 1 activities, a deep understanding of the existing conditions, challenges (pain points), and desired functionality (wishes) of each induvial agency were obtained. Five alternatives aimed at improving existing services were selected and presented to stakeholders at the Task 2 Site Visit Workshop. The information below provides a detailed summary of each alternative:

3.1 Alternative 1: Take No Action

Alternative 1 provides the option for the region's CoG and the participating agencies to decline all recommended alternatives and continue to function under the conditions that currently exist. Under Alternative 1, The existing demand response dispatching software would continue to be utilized as each agencies' primary software vendor and the existing pain points and challenges such as frequent software crashes, abandoned purchased software modules, time consuming unintegrated data reporting procedures, and a lack of cross-county coordination would persist. All project objectives would remain unmet under Alternative 1.

While there is no upfront cost required of Alternative 1, an annual fee to utilize the existing demand response dispatching software will be required of each participating agency and the region's CoG, requiring many agencies to pay for services and modules they have deemed inefficient and or unreliable.

A MaaS company recently acquired the existing demand response dispatching software. This recent acquisition could potentially exacerbate the current unreliability of the software as the opportunity to upgrade existing modules, and/or purchase new ones, may not be possible in the future. Cost restructuring could potentially be an additional outcome of the recent acquisition. Table 2 summarizes the benefits and drawbacks of Alternative 1.

Table 2. Alternative 1 Advantages and Drawbacks

ADVANTAGES	DRAWBACKS
No Upfront Cost.	Agencies would continue to operate with existing challenges/pain points.
	The existing demand response dispatching software's current technology solution implemented at the region's CoG partners could potentially be near the end of its existence which would eliminate the opportunity to purchase upgrades in the future.
	Required annual operating fee.

3.2 Alternative 2: Upgrade Existing Software

Alternative 2 would involve working with the existing demand response dispatching software to improve existing modules, purchase new modules, and integrate additional existing software to enhance day-to-day efficiencies. Alternative 2 has the potential to quickly alleviate many existing pain points and provide additional capabilities such as the following:

- Mobile trip planning and booking options for customers
- Online trip planning and booking options for customers
- Mobile payment options for customers
- Online payment options for customers
- Trip notification functionalities
- Integration with commonly used software
- Integrated data reporting procedures

Alternative 2 provides the opportunity to implement functionalities that would benefit the region while also allowing individual agencies to purchase modules that would address agency-specific needs.

Alternative 2 possesses the shortest deployment process out of the 5 recommended alternatives that also improves existing challenges. In addition, Alternative 2 would require minimal training procedures for staff compared to other recommended alternatives allowing each agency to rapidly experience improved efficiencies. However, due to a MaaS company's recent acquisition of the existing demand response dispatching software, the status of the software's future capabilities and costs currently remains unknown. Table 3 summarizes the benefits and drawbacks of Alternative 2.

Table 3. Alternative 2 Advantages and Drawbacks

ADVANTAGES	DRAWBACKS
Opportunity to provide online/mobile booking options to customers.	Alternative does not satisfy all three project objectives.
Opportunity to provide online/mobile payment options to customers.	Reliability issues associated with the uncertainty around the future of the existing demand response dispatching software.

Figure 1 illustrates the path and estimated time needed for Alternative 2 activities from start to finish.

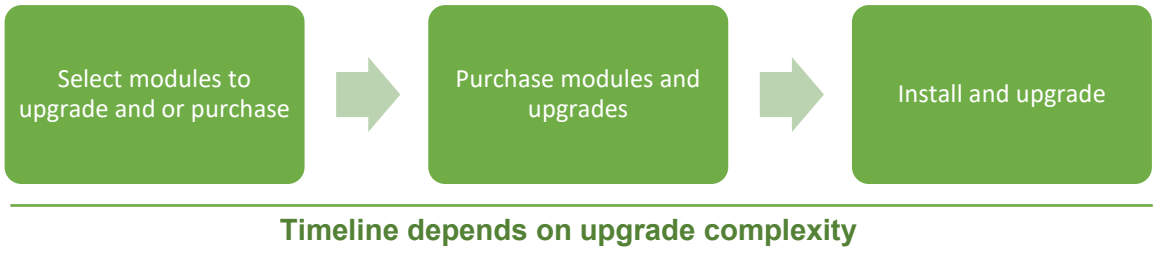


Figure 1. Alternative 2 Timeline

3.3 Alternative 3: Procure a New Software

Alternative 3 provides an opportunity to procure a software tailored to the needs identified in the Operating Environmental Report for each agency and the region. Under Alternative 3, the Operating Environmental Report would serve as a valuable resource for developing system and performance requirements to ensure the procured software operates in accordance with the expectations of the region's CoG and participating agencies. The procurement of a new software has the potential to satisfy all project objectives and wishes identified in the Operating Environmental Report.

In addition to the Operating Environmental Report, the experience with current challenges associated with vendor support and reliability will also provide an opportunity establish better vendor support contractual requirements. This will help maximize the leverage that the region's CoG has so that current challenges will not arise under a new agreement. The procurement of a new software may also involve working with a new vendor that may provide functionalities not currently offed by the existing vendor. However, working with a new vendor would require the abandonment of all purchased modules from the existing vendor.

A longer deployment process and extensive staff training will be required of Alternative 3 compared to Alternative 2. However, Alternative 3 provides the opportunity to establish training requirements to ensure staff can utilize purchased functionalities to the highest capability. Alternative 3 provides the opportunity for the region's CoG and participating agencies to examine current pain points and establish requirements that ensure the alleviation of existing challenges. Table 4 summarizes the benefits and drawbacks of Alternative 3.

Table 4. Alternative 3 Advantages and Drawbacks

ADVANTAGES	DRAWBACKS
Opportunity to develop a custom software that would satisfy all project objectives.	Working with a new vendor would require the abandonment of purchased modules with existing vendor.
Opportunity to develop a set of performance requirements to ensure all functionalities and capabilities perform as expected.	Impact on operations and staff during the transition period between vendors.
Opportunity to engage with a new vendor.	

Figure 2 illustrates the path and estimated time needed for Alternative 3 activities from start to finish.

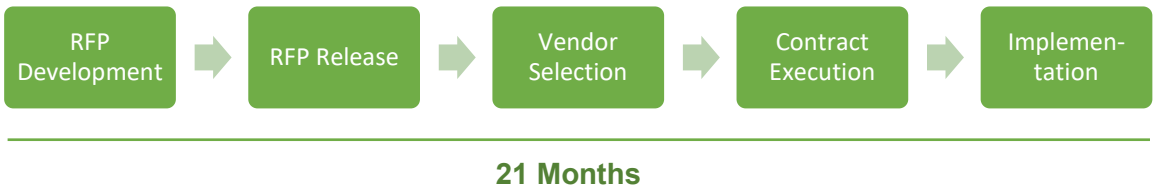


Figure 2. Alternative 3 Timeline

3.4 Alternative 4: Join a Cooperative Purchasing Agreement

Alternative 4 provides the opportunity to join or establish a Cooperative Purchasing Agreement (CPA) to provide regionally coordinated transit services to each county. By joining an established CPA, the region's CoG and the six agencies operating under the region's CoG could implement a developed software or service already utilized by other agencies. Table 5 summarizes the benefits and drawbacks of Alternative 4.

Table 5. Alternative 4 Advantages and Drawbacks

ADVANTAGES	DRAWBACKS
Peer Model 1 is a potential partner that is in the process of implementing a one call center to its members.	Establishing a new CPA would require someone to act as the leader.
Peer Model 1is also working towards establishing an integrated mobility platform aimed at improving demand response services.	Establishing a new CPA would require additional work aside from improving existing services.
CPA could bring cost savings to agencies with collective purchases as a group.	
CPA has the potential of better leverages in contract negotiations and better support during operations and maintenance.	

3.4.1 Alternative 4a: Joining an Existing CPA

For example, Peer Model 1 is a CPA that offers to its members One Call Center that aims to improve regional coordination. Alternative 4 could potentially improve all project objectives and many existing pain points without the time-consuming steps required of Alternative 3.

In addition, by joining a CPA and implementing a developed software already utilized by other agencies the expectations of the software can be apparent through conversations with agencies currently utilizing the software. Through extensive conversations with such agencies, it can be determined whether the software would provide the capabilities needed of the region's CoG and participating agencies. In addition, by joining an establish CPA, future opportunities to upgrade software or implement new services will be offered without the need to independently procure.

Figure 3 illustrates the path and estimated time needed for Alternative 4a activities from start to finish.

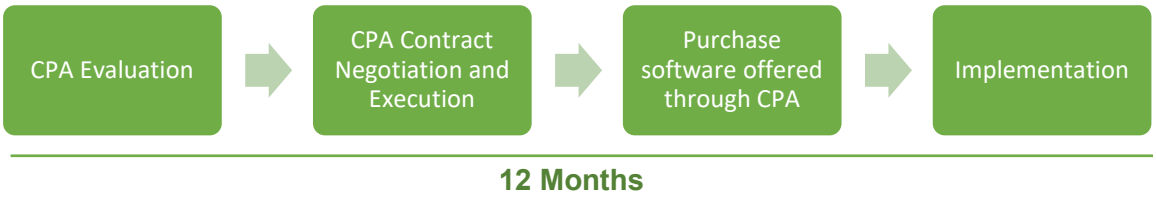


Figure 3. Alternative 4a Timeline

3.4.2 Alternative 4b: Establish a New CPA

The establishment of a new CPA would allow the region's CoG and participating agencies to procure a software specifically tailored to the needs of the region's CoG and the participating agencies. Under this option, Alternative 4 and Alternative 3 would be combined and could potentially allow for additional agencies to join the established CPA. Potential CPAs could include a metropolitan planning organization (MPO), a state DOT or Peer Model 1. In addition, the establishment of a CPA would require an acting leader. Additional time would be required of Alternative 4 compared to Alternative 3 as efforts will be dedicated to both establishing a CPA and procuring a new software.

Figure 4 illustrates the path and estimated time needed for Alternative 4b activities from start to finish.

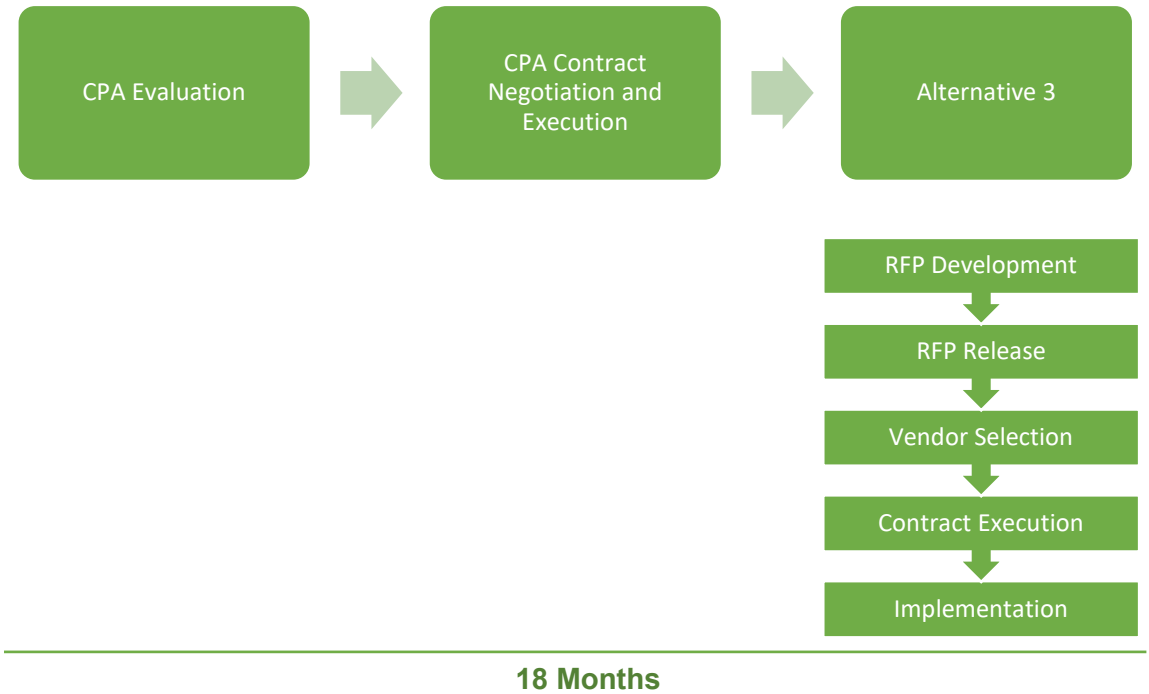


Figure 4. Alternative 4b Timeline

3.5 Alternative 5: Implement a One Call Center

Alternative 5 provides an opportunity for all agencies to pool their resources and centralize trip planning functionalities. A one call center would provide customers with a one stop access point to plan, book, and pay for trips within the six-county region. The procurement of a one call center has the potential to satisfy all project objectives allowing agencies to enhance day to day operations and customer satisfaction.

If selected as the preferred alternative, it is recommended to implement the one call center with a phased schedule in accordance with available budget. A phased implementation approach could allow for the six-county region to improve high priority pain points first and possess a plan to implement additionally desired functionality when possible. An established leader would be required if the procurement of a one call center is selected. Peer Model 1 is a potential peer to model after as their procurement followed a phased implementation approach. Detailed information on Peer Model 1 is included in Appendix A.

Table 6. Alternative 5 Advantages and Drawbacks

ADVANTAGES	DRAWBACKS
Alternative has the potential to satisfy all 3 project objectives.	Higher levels of functionality may not be reached for several years depending on available budget.
Opportunity to implement through a phased approach. Allowing high priority pain points to be addressed first in accordance to available budget.	Alternative requires someone to act as a leader.

Figure 5 illustrates the path and estimated time needed for Alternative 5 activities from start to finish.

Figure 5. Alternative 5 Timeline

4 Regional Preferences

In December 2021, a site visit was performed to collaborate with agency stakeholders on potential alternative solutions and recommendations. Participants included both mobility coordinators and transit managers. A high-level summary of the pain points gathered in the Operating Environmental Report and introduced five alternative approaches were presented to the stakeholder agencies.

Using the online anonymous polling platform, Mentimeter, a regional understanding of high priority pain points and a favored alternative was established.

Figure 6 presents the prioritization results with all pain points included. The interactive activity revealed the following pain points as a “high priority” for at least four (4) of the participating agencies.

- PP4: Agency struggles to provide all same day trip requests.
- PP14: The existing demand response dispatching software is slow, crashing, and or causing issues.
- PP15: Agencies struggle connecting with and getting answers from the existing demand response dispatching software staff.

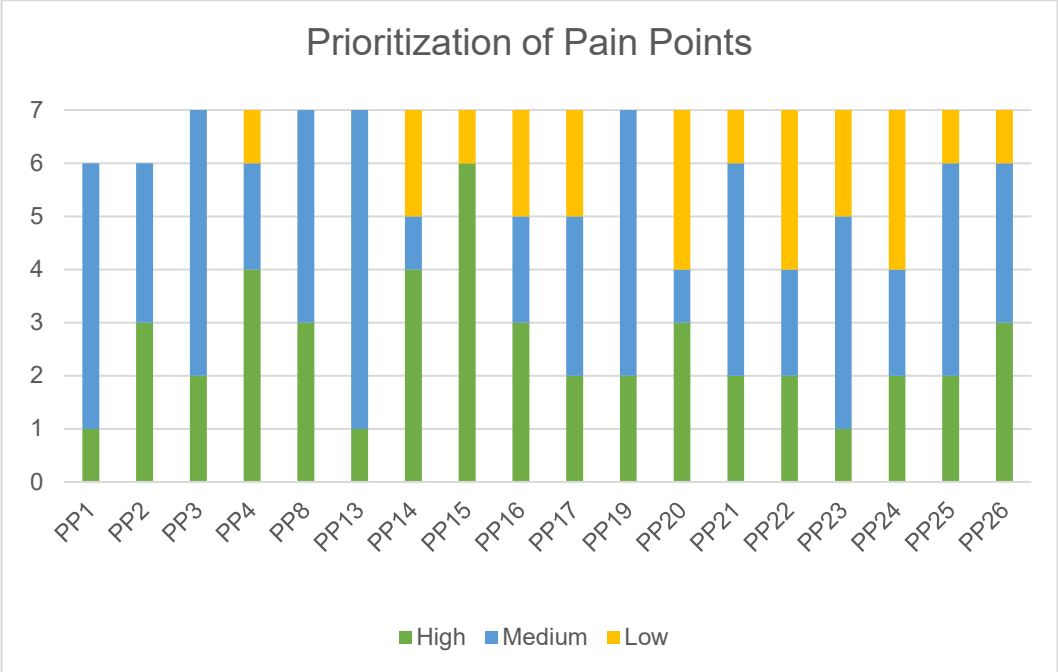


Figure 6. Pain Points Prioritization Activity Results

A high-level overview of the five alternatives was presented and compared by estimated timeframe, advantages, drawbacks, and risks. Potential peer models and existing examples of each alternative were provided when available and relevant.

Mentimeter was utilized to determine the level of interest for implementing each of the alternative approaches. The results, as shown in Figure 7, indicated Alternative 3 as the favored alternative.

Raw results from Mentimeter are included in Appendix B.

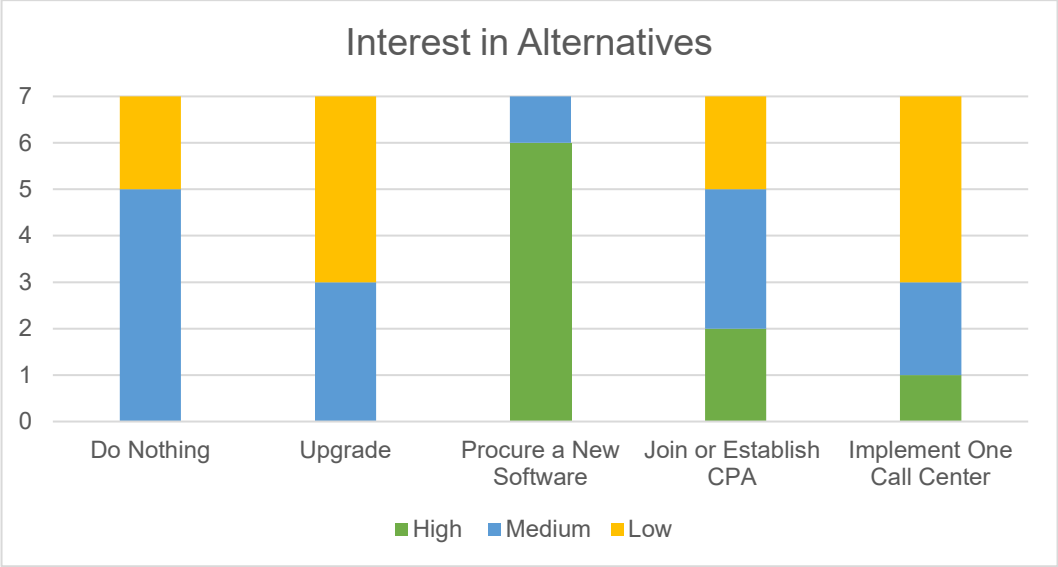


Figure 7. Alternatives Selection Activity Results

5 Alternatives Capabilities

To further compare the recommended alternatives, and highlight the capabilities of each, the potential impacts each alternative could have on existing technology pain points and project objectives were analyzed. The following table indicates whether each alternative has a high, medium, or low potential to improve the technology pain points identified in the Operating Environmental Report. In addition, Table 7 displays the probabilities of each alternative has the potential to solve a particular pain point.

Table 7. Alternatives Analysis on Likelihood of Solving Pain Points

ID	PAIN POINT	A1	A2	A3	A4	A5
PP2	Dependency on resourceful employees that are more helpful than provided software and are close to retirement has caused a concern for future support and agency efficiency	Low	Low	High	High	Medium
PP3	Dispatchers can utilize existing software for scheduling however, the optimization functionality has proved itself unreliable and inefficient.	Low	Low	High	High	Medium
PP13	Scheduling is done manually by agency staff because the existing software's scheduling module has proved itself unreliable and or inefficient.	Low	Low	High	High	Medium
PP14	The existing demand response software is slow/ crashing/causing issues.	Low	Medium	High	High	Medium
PP15	Struggle connecting with and getting answers from the existing demand response software support staff.	Low	Medium	High	High	High
PP16	Lack integration of additional commonly used software with demand response software.	Low	Low	Medium	Medium	Medium
PP17	Agency must change day-to-day operations to efficiently work around demand response software crashing. The agency manually creates back up manifests in preparation of crash or works at earlier unpopular demand response software usage times to avoid conflicts.	Low	Medium	High	High	Medium
PP19	Dispatchers lack access to real-time vehicle location information requiring dispatchers to contact operators to determine vehicle status.	Low	Medium	High	High	High
PP20	Customers lack access to real-time vehicle location information requiring customers to call the agency to determine vehicle status.	Low	Medium	High	High	High
PP21	Collecting fare manually.	Low	Low	High	Medium	Medium
PP22	Do not have tablets.	Medium	Low	High	Medium	Medium
PP23	Occasional tablet malfunction or connectivity issue.	Low	Low	High	High	Medium
PP24	Counting passengers by hand or by manifest.	Low	Low	High	High	Medium
PP25	Customer and or trip information/data is tracked and stored on non-integrated excel sheets or word documents.	Low	Low	High	Medium	Medium
PP26	Absence of shared data across counties.	Medium	Low	High	Medium	Medium

While Table 7 describes the level of likelihood each alternative has on achieving established pain points, Table 8 identifies which project objectives could potentially be met by each alternative. A summary of the level of influence each alternative could potentially have on project objectives identified during initial stages of the project will provide participating agencies with a high-level overview of the capabilities of each alternative.

Table 8. Alternatives Analysis on Likelihood of Meeting Project Objectives

PROJECT OBJECTIVE	A1	A2	A3	A4	A5
Coordinate with other regional transit agencies to improve driver and vehicle availability and reduce “dead” time between appointments.			✓	✓	✓
Allow riders to call one number or use an app to book a ride from any county provider and schedule or pay online.		✓	✓	✓	✓
Be able to support “on-demand” environment many riders are expecting throughout the region and coordinate with Transportation Network Companies (TNCs).			✓	✓	✓

6 High-Level Cost Analysis

To support the comparison of alternatives, the capital and ongoing costs for each recommended alternative were estimated. The following cost estimates have been determined from the cost information of projects in a similar scale – factoring in inflation and market adjustment.

Alternative 3 ranks among the most expensive alternative, however, it does provide the highest level of opportunity to improve day to day efficiencies by altering and or providing additional functionality/capabilities to many different daily operational functions such as scheduling, booking, customer information, tracking etc. for both internal users and customers. While Alternative 3 is only an estimate, the price was estimated with the consideration of desired functionalities identified by induvial agencies and project objectives such as an online/mobile trip planning and booking option for customers, an online/mobile payment option for customers, an advanced registration and customer database, and integrations with existing commonly used software.

The cost of Alternative 3 can also be altered depending on available funding and resources of each and all agencies. This could be accomplished procuring a software with only the most desired/necessary capabilities and functionalities included. Creating modular requirements could provide an opportunity to easily procure additional functionalities to the software in the future.

Moreover, Alternatives 4 and 5 involve non-traditional newer Software-as-a-Service (SaaS) models. Traditionally, software costs plus cost of reservation and scheduling have been priced by trips and dispatching has been by vehicle. With SaaS, vendors are beginning to move towards using fleet size as general to determine cost of software, associated equipment, and operations support.

A detailed cost analysis will be provided in the Final Recommendations Report as a Task 3 deliverable.

Table 9. High-Level Agency Cost Estimates for each Alternative

ALTERNATIVE	CAPITAL COST	ANNUAL OPERATING & MAINTENCE FEES
A1	$0	$12,000
A2	$25,000/module	$12,000
A3	$200,000	$50,000
A4 (a/b)	Varies by fleet size	
A5		

Table 10. High-Level Regional Cost Estimates for each Alternative

ALTERNATIVE	CAPITAL COST	ANNUAL OPERATING & MAINTENCE FEES
A1	$0	$72,000
A2	$25,000/module	$72,000 (4 modules)
A3	$1,2000,000	$300,000
A4 (a/b)	Varies by fleet size	
A5		

7 Recommendations

Stakeholders were presented with five recommended alternatives during the Task 2 site visit workshop in December 2021. Details of each alternative were provided and discussed. Through an anonymous Mentimeter poll, Alternative 3 was indicated as the preferred alternative by the participating transit agencies. The following sections describe various components of Alternative 3.

The preferred alternative provides an opportunity to implement a software tailored to the specific needs and desired functionalities identified in the Operating Environmental Report. The information included and pain points identified in the Operating Environmental Report provide a strong starting point for software requirements development to ensure the procured software will perform to the region's CoG and the participating transit agencies' standards and expectations.

To ensure an achievement of project objectives and enhanced day to day efficiencies, the following software features/capabilities are recommended:

- Mobile payment options/billing platform
- Automatic scheduling
- Trip Optimization
- Trip Prioritization
- Real-time vehicle tracking for customers and agency staff
- Agency access to real-time vehicle locations of all 6 agencies
- Common customer profile database
- Integrations with existing commonly used platforms

7.1 Technical components

To facilitate regional coordination and ensure a consistent user experience, it is recommended to procure a single system established through a backend. It is recommended that the system is capable of managing accounts, receiving trip requests and calls, prioritizing, scheduling, dispatching, and booking trips. System components have been divided into the following sections based on business process:

- **Customer Service**: Includes customer facing and call center components of the system
- **Data Management**: Addresses data warehousing and communications requirements
- **Scheduling**: Includes the scheduling system and links with other relevant systems
- **Service Delivery**: Includes central dispatch and onboard vehicle components
- **Regional Coordination**: Includes regional communication requirements of the system
- **Local Considerations**: Includes pain points experienced by all agencies that Alternative 3 aims to alleviate

7.1.1 Customer Service

A single system established through a backend would provide customers across the region with a consistent and convenient trip planning and account management experience. It is recommended the following components be included in the system:

- IP-based phone system with advanced call management features.
- Web portal to provide online trip booking and account management.
- Mobile app to provide mobile trip booking and account management.
- Real-time vehicle tracking and additional trip information.
- Web portal to enable organizations such as Access2Care to manage their member accounts.

7.1.2 Data Management

An integrated and centralized system will improve day to day efficiencies by eliminating the need to transfer data from one unintegrated platform to another. The following data management components are recommended.

- Central database with customer profiles and funding information.
- Integration with Access2Care, Innoprise, QuickBooks, and other commonly used platforms.
- Communication links to share information between different systems (transit agency, funding sources, third-party service providers).
- Communication links to share information between scheduling system and customer facing components.
- Communication links to share real-time vehicle utilization, capacity, and tracking information between all participating transit agencies.

7.1.3 Scheduling

A multi-agency coordinated scheduling system would enable regional vehicle and trip coordination and support the on-demand environment many riders are expecting throughout the region. The following scheduling components are recommended:

- Trip reminder, cancelation, and trip modification functionalities through the CSR, web portal, and mobile app.
- Capability to automatically schedule and allocate trips based on funding sources, trip origin, or destination, based on agreements and business policies set between agencies.
- Ability to automatically suggest ridesharing between transit agencies based on trip origin or destination in accordance to the region’s CoG and transit agency policies.
- Ability to integrate with TNCs in urban areas and third-party service providers in both urban and rural areas for allocating trips if necessary.
- System shall utilize real-time data information.
- Common trip booking and management platform.

7.1.4 Service Delivery

The following service delivery components are recommended:

- Standard electronic payment experience through web portal and mobile app.
- Standard real-time data requirements from vehicles.
- Standard reporting formats and metrics for NTD and the region's CoG.

7.1.5 Regional Coordination

The following technical requirements are recommended to improve regional coordination.

- Communication links to share real-time vehicle utilization, capacity, and tracking information between all participating transit agencies.
- Communication links that allow transit agencies to collaborate in real-time.
- Ability for each transit agency to display real-time vehicle locations of all other agencies utilizing the software.
- Communication links to allow dispatchers from different agencies to communicate with each other in real-time.

7.1.6 Local Considerations

The following pain points represent technology challenges each agency experiences under current conditions. It is recommended that the software aims to alleviate the following pain points.

- PP14: The existing demand response software is slow, crashing, and causing issues
- PP21: Collecting fare manually
- PP26: There is an absence of shared data across all counties

7.2 Benefits

Alternative 3 was chosen as the preferred alternative as it provides an opportunity to improve all existing pain points and achieve all desired functionality. For customers, Alternative 3 has the potential to provide the following benefits:

- Trip planning and booking options via web portal, mobile app, and or call center.
- Online and mobile payment options.
- Improved availability of on-demand services.
- Real-time vehicle tracking capabilities.

Alternative 3 has the potential to provide each agency with the following benefits:

- Integration between procured software and commonly used systems (QuickBooks, Innoprise, etc.).
- Reliable and efficient scheduling software.
- Reliable and efficient automatic scheduling functionality.
- Reliable and efficient dispatching software.

- Real-time vehicle tracking capabilities.

Alternative 3 has the potential to provide the region with the following benefits:

- Consistent user experience throughout the region.
- Improved level of service through regional resource sharing.
- Real-time vehicle availability, capacity, and location tracking between all participating transit agencies.
- Regional access to real-time data necessary to enable real-time coordination improving driver and vehicle availability and reducing “dead” time between appointments.

7.3 Business Impacts

Each agency currently possesses a basic demand response software package however, the level of utilization and the number of additionally purchased modules varies between each agency. Challenges and pain points stemming from the existing demand response software have caused many agencies to abandon purchased modules and operate under manual procedures such as scheduling trips by hand and or tracking passengers by trip manifest. The lack of universally utilized demand response software modules and standard procedures has restricted transit agencies from easily participating in cross county coordination and sharing data.

The procurement of a centralized software and establishment of some standard processes utilized by all agencies would provide a simple method for cross-county coordination. The establishment of thoughtfully developed system requirements aimed at expanding demand response services has the potential to meet all project objectives and alleviate all experienced technology pain points. Alternative 3 will requires significant changes in operations for all agencies. Below are some key areas of impact required by Alternative 3:

- **Common Customer Service Center:** Each transit agency currently operates and manages their own customer service center. Under Alternative 3, it is recommended that one phone number will be utilized to access all transit agencies. Once a caller has dialed the correct regional number, they will be prompted to select the agency of interest, once selected the call will direct the customer to the correct transit agency. CSRs will be required to follow regionally established standard procedures where appropriate. It is also recommended that a common web portal and mobile app are available for riders to plan, track, book, and pay for trips.
- **Customer Profiles and Eligibility:** It is recommended that the procured software consists of a common database with customer profiles. A universal customer profile database will promote cross-agency ridesharing. A common customer application portal will be required however, specific eligibility requirements may remain unique to each agency.
- **Common Scheduling and Dispatch System**: A replacement of the existing software with the procured common scheduling and dispatching system is required of Alternative 3. A common scheduling and dispatching system will provide the partnered transit agencies with a reliable and efficient method to coordinate and share data. Partnered agencies could consistently track vehicle

availability, vehicle capacity, and vehicle location across agencies to find opportunities for coordination.

- **Common Reporting and Metrics:** Common reporting metrics will improve day to day efficiencies and eliminate existing time-consuming unintegrated data related tasks. The system must support data reporting in accordance with the region's CoG and NTD standards.

7.4 Policies

The lack of standardized polices for tasks required of all agencies exacerbates the current challenge of regional coordination. A set of policies followed by all participating agencies for regularly practiced common tasks will improve the participating agencies ability to collaborate. Below are potential areas where standardized policies could improve regional coordination.

- **Hours of Operation:** It is recommended that the region's CoG and participating agencies standardize hours of operation. This would include the standardization of customer service and operating service hours. Common hours of operation between all agencies will increase available resources and simplify cross county coordination.

Table 11. Hours of Operation for Trip Scheduling and Customer Service

SCHEDULING HOURS						
	URBAN COUNTY 1	RURAL COUNTY 2	URBAN COUNTY 2	RURAL COUNTY 3	RURAL COUNTY 1	RURAL COUNTY 4
Monday–Friday	7:00AM–5:00PM	8:00AM-12:00PM & 1:00PM-4:00PM	7:00AM-12:00PM & 1:00PM-4:00PM	7:00AM-3:00PM	7:00AM-12:00PM	6:00AM-3:00PM
Saturday	Closed	Closed	8:00AM-12:00PM	Closed	Closed	Closed
Sunday	Closed	Closed	Closed	Closed	Closed	Closed

Table 12. Hours of Operation for Service Operations

SERVICE HOURS						
	URBAN COUNTY 1	RURAL COUNTY 2	URBAN COUNTY 2	RURAL COUNTY 3	RURAL COUNTY 1	RURAL COUNTY 4
Monday	6:00AM-6:40PM	7:00AM-4:30PM	7:00AM-5:00PM	6:00AM-5:00PM	7:00AM-5:00PM	6:00AM-5:00PM
Tuesday	6:00AM-6:40PM	7:00AM-4:30PM	7:00AM-5:00PM	6:00AM-5:00PM	7:00AM-5:00PM	6:00AM-5:00PM
Wednesday	6:00AM-6:40PM	7:00AM-4:30PM	7:00AM-5:00PM	6:00AM-5:00PM	7:00AM-5:00PM	6:00AM-5:00PM
Thursday	6:00AM-6:40PM	7:00AM-4:30PM	7:00AM-5:00PM	6:00AM-8:00PM	7:00AM-5:00PM	6:00AM-5:00PM
Friday	6:00AM-6:40PM	7:00AM-4:30PM	7:00AM-5:00PM	6:00AM-5:00PM	7:00AM-5:00PM	6:00AM-5:00PM
Saturday	8:00AM-5:00PM	No Service	No Service	No Service	No Service	No Service
Sunday	No Service	Meal Delivery	No Service	8:00AM-12:00PM	No Service	No Service

7.5 Customer Eligibility Assessment

A common customer profile database will require the standardization of customer applications to ensure all agencies are collecting the same information from their customers. Eligibility requirements for specific transit agencies will not need to be standardized.

7.6 Common Scheduling/Brokerage and Dispatching

A common scheduling/brokerage and dispatch system will allow agencies to easily coordinate in real-time. Policies will need to be established to ensure within the common scheduling/brokerage and dispatch system, agencies manage and maintain authority over their own resources. Additional policies will need to be established regarding how agencies can and will coordinate with each other through the system. Regulations will also need to be determined regarding collaboration with TNCs.

7.7 Staffing

A detailed document indicating the roles and responsibilities of existing staff is recommended. The detailed document should indicate centralized procedures required of all staff between all agencies as well as existing or new procedures that will be required of specific agencies. Training sessions to help staff understand the new system, its features, and functionalities is recommended.

8 Procurement Roadmap

Alternative 3 requires a complete replacement of the existing software package utilized by all agencies. The procurement of a new software will require changes in technology, policies, and standard procedures. It is recommended that Alternative 3 should be procured as a pilot program, allowing participating agencies the option to return to existing operating procedures and software.

It is recommended that the project team participates in a single procurement process. Thoughtful system requirements developed to anticipate inevitable needs for additional functionalities and capabilities will also eliminate time spent in the future on system restructuring or the need for a new system entirely. The procurement process has an estimated 21-month time frame with milestones as shown in Figure 8.

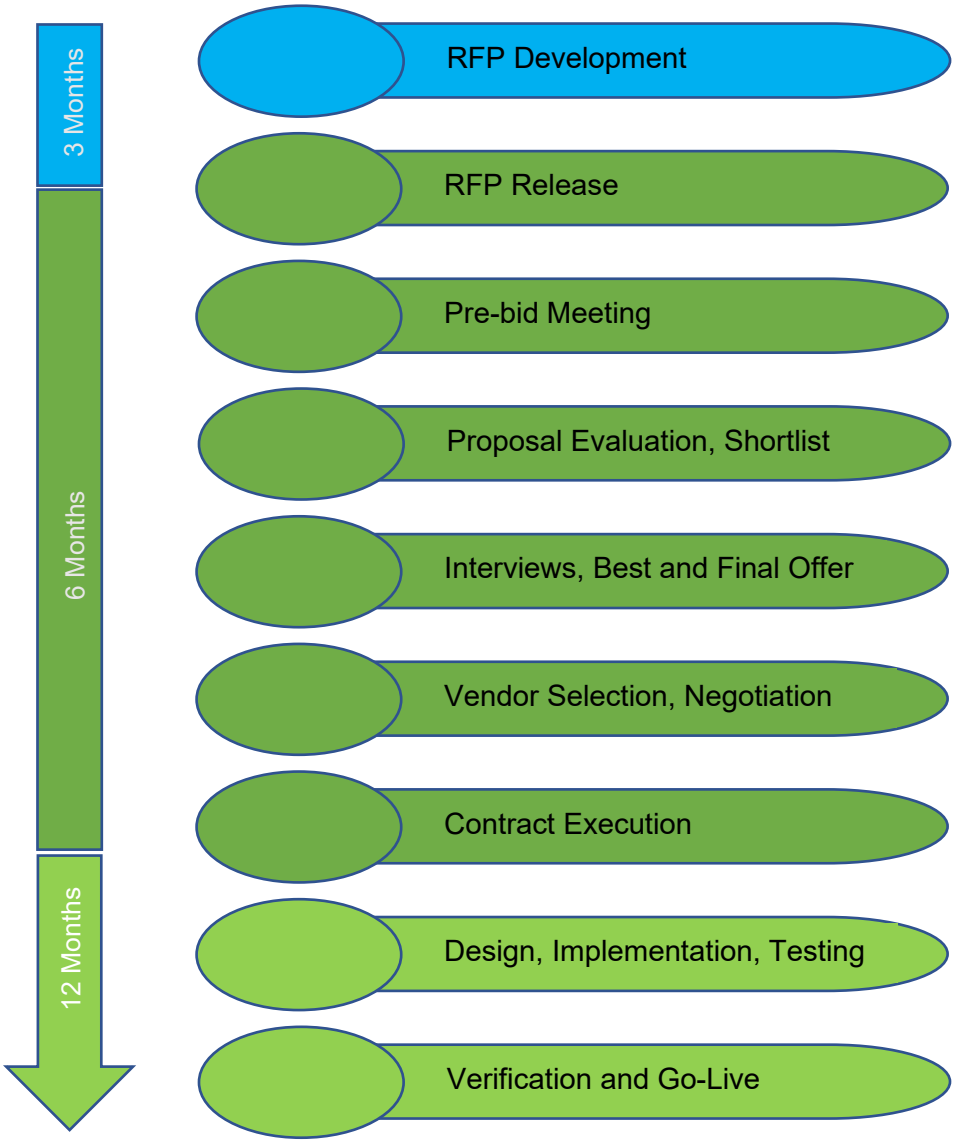


Figure 8. High-Level Procurement Roadmap

=== End of Document ===

Appendix A: Peer Model 1 Approach

In May 2021, the One-Call Mobility Center Final Report was prepared for Peer Model 1. The report summarized existing conditions and provided a needs assessment, gap analysis, alternatives analysis, final recommendation, and an implementation plan for a one-call mobility center.

Figure 9 was included within the report to identify and describe the set of alternatives a technology consultant had recommended for the organization. Each alternative, described as "levels" within the figure below, supports a different level of functionality, increasing in magnitude from Level 1 to Level 5. The list of alternatives was developed to provide Peer Model 1 with a selection of alternatives that varied in capabilities that also could be implemented with a phased approach in accordance with available budget.

Based on identified gaps, the technology consultant designed the lower levels to solve high priority pain points to ensure the organization would experience large and relevant impacts at each stage. If Alternative 5 is selected as the preferred alternative, it is recommended that the region's CoG and participating agencies implement a one-call center following a similar approach to Peer Model 1, in accordance with a phased approach alleviating high priority pain points at initial stages and implementing additionally desired functionality at later stages.

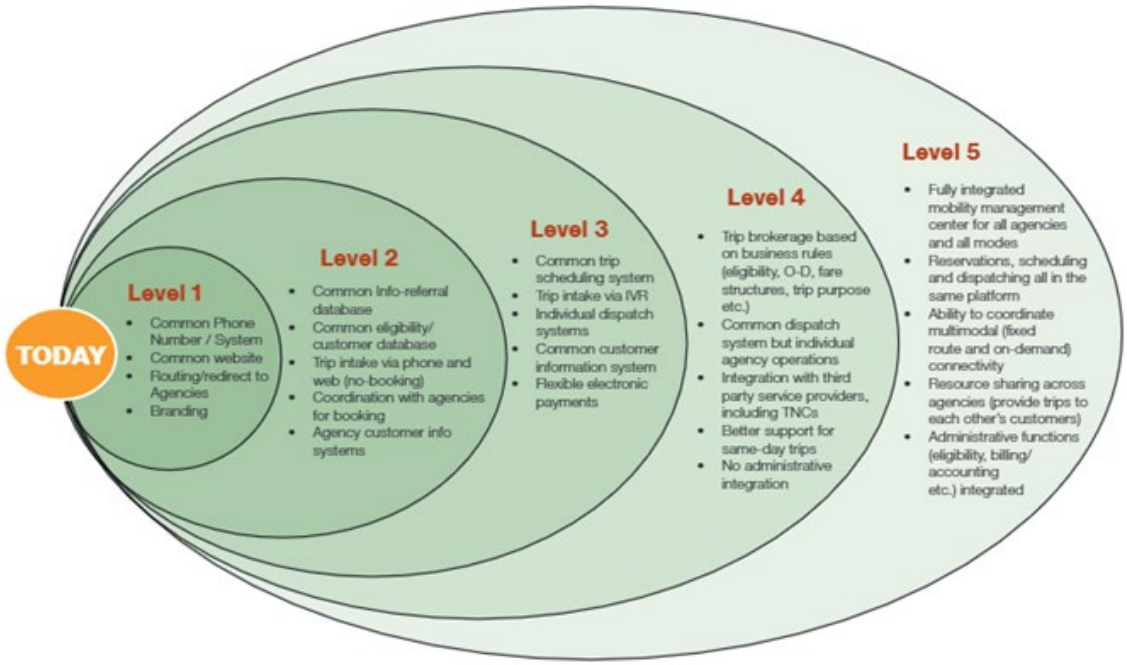


Figure 9. Peer Model 1 Implementation Levels

Appendix B: Raw Mentimeter Results

Table 13. Mentimeter Pain Points Activity Raw Results

#	QUESTION DESCRIPTION	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY
1	Please rank the level of prioritization to improve the following pain point: PP1: Majority of bookings are done through call center, necessitating that the agency devotes precious staff resources to trip booking.	1	5	0
2	Please rank the level of prioritization to improve the following pain point: PP2: Dependent on resourceful employees that are near retirement rather than purchased demand response software modules. Currently lack a reliable and efficient software solution that could be utilized upon retirement of resourceful employees.	3	3	0
3	Please rank the level of prioritization to improve the following pain point: PP3: Dispatching is done manually by agency staff as existing dispatching module has proved itself unreliable or inefficient. Dispatchers manually record and assign trips to operators as they are scheduled.	2	5	0
4	Please rank the level of prioritization to improve the following pain point: PP4: Agency struggles to provide all same day trip requests.	4	2	1
5	Please rank the level of prioritization to improve the following pain point: PP8: Agency lacks the necessary resources (drivers, vehicles, funding, etc.) and coordination to fulfil all in-county trip requests.	3	4	0
6	Please rank the level of prioritization to improve the following pain point: PP13: Scheduling is done manually by agency staff because the demand response software's scheduling module has proven itself unreliable and or inefficient.	1	6	0
7	Please rank the level of prioritization to improve the following pain point: PP14: The existing demand response software is slow, crashing, and or causing issues.	4	1	2
8	Please rank the level of prioritization to improve the following pain point: PP15: Agencies struggle connecting with and getting answers from the demand response software's support staff.	6	0	1
9	Please rank the level of prioritization to improve the following pain point: PP16: Agencies lack integration of additional commonly used software such with demand response software.	3	2	2

#	QUESTION DESCRIPTION	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY
10	Please rank the level of prioritization to improve the following pain point: PP17: Agency must change day-to-day operations to efficiently work around demand response software crashing. The agency manually creates back up manifests in preparation of crashes or works at earlier unpopular demand response software usage times to avoid conflicts.	2	3	2
11	Please rank the level of prioritization to improve the following pain point:	2	5	
12	Please rank the level of prioritization to improve the following pain point: PP19: Dispatchers lack access to real-time vehicle location information requiring dispatchers to contact operators to determine vehicle status.	3	1	3
13	Please rank the level of prioritization to improve the following pain point: PP20: Customers lack access to real-time vehicle location information requiring customers to call the agency to determine vehicle status.	2	4	1
14	Please rank the level of prioritization to improve the following pain point: PP21: Agencies are collecting fare manually.	2	2	3
15	Please rank the level of prioritization to improve the following pain point: PP22: Some agencies lack tablets.	1	4	2
16	Please rank the level of prioritization to improve the following pain point: PP23: Tablets occasionally experience malfunctions or connectivity issues	2	2	3
17	Please rank the level of prioritization to improve the following pain point: PP24: Counting passengers by hand or by manifest.	2	4	1
18	Please rank the level of prioritization to improve the following pain point: PP25: Customer and or trip information/data is tracked and stored on non-integrated excel sheets or word documents.	3	3	1
#	**QUESTION DESCRIPTION**	**RESPONSE 1**	**RESPONSE 2**	**RESPONSE 3**
19	Please describe any pain points that have not yet been mentioned that you would like to improve.	Software that can capture and compile NTD data	Cost sharing and vehicle sharing agreement within region	N/A

Table 14. Mentimeter Alternatives Activity Raw Results

#	QUESTION DESCRIPTION	HIGH LEVEL OF INTEREST	MEDIUM LEVEL OF INTEREST	LOW LEVEL OF INTEREST
1	Please rank the interest level of implementing the following alternative: Alternative 1: Do Nothing	0	5	2
2	Please rank the interest level of implementing the following alternative: Alternative 2: Upgrade existing demand response dispatching software	0	3	4
3	Please rank the interest level of implementing the following alternative: Alternative 3: Procure a new software	6	1	0
4	Please rank the interest level of implementing the following alternative: Alternative 4: Join or establish a cooperative purchasing agreement	2	3	2
5	Please rank the interest level of implementing the following alternative: Alternative 5: Implement a one call center	1	2	4
#	**QUESTION DESCRIPTION**	**RESPONSE 1**	**RESPONSE 2**	**RESPONSE 3**
6	Please describe any unmentioned alternatives that you would like to see out of this project	Statewide CPA	N/A	N/A