



## REPORT TO CITY COUNCIL

Approved by:

Kingsley, Department Director

Arnoldo Rodriguez, City Manager

Council Meeting of: September 21, 2022

Agenda Number: D-3

### SUBJECT:

Madera Metro Transit Plan and Service Design Guidelines

### RECOMMENDATION:

Adopt a Resolution Approving the Final Report of the Madera Metro Transit Plan (MTP) and the City's Transit System Service Design Guidelines

### SUMMARY:

On April 21, 2021 the City retained WSP USA, Inc (WSP), a leader in public transit planning. While the City initially planned on developing a new transit plan in a single phase, as the project evolved, it was determined that a two-phase approach was more appropriate. This item is for Phase I only, while Phase II will be presented to Council at a future date.

### BACKGROUND:

Council may recall that WSP was originally retained to complete Phase I of the study; however, as the plan evolved, staff recommended that a second phase (Phase II) be added to implement the recommendations found in Phase I in an effort to make the transit system more robust. A resolution to approve the agreement with WSP for Phase II was presented and adopted by Council on July 20, 2022. While staff is recommending that the Council adopt Phase I of the MTP, it is noted that the MTP is expected to be treated as a fluid document and modifications are expected as passenger and/or land use patterns change; however, the MTP outlines key principles. Moreover, while Phase I included a public outreach component, additional outreach is called for as part of Phase II.

As Council may be aware, the existing transit system evolved as the City developed based on passenger demand. In certain situations, stops appear logical, whereas in others they may have been added based on a passengers preferred location (i.e., at the intersection near their home).

Unfortunately, in some situations, it appears that some stops may no longer be conducive to high ridership. Moreover, as the City grows and new destinations are introduced, passenger behavior should be analyzed to ensure that preferred destinations are added, while those that have less riders are eliminated resulting in an efficient system. As a result, staff recommended to reevaluate the system employing a holistic approach, thus the need for the preparation of the MTP.

## **DEFINING PHASE I AND PHASE II**

Phase I of the MTP focused on assessing the network and redesigning the fixed-route bus system, including identifying ideal stops. This included updating route schedules, reducing headways, and assessing destinations by marrying land use patterns with public transit needs, or ensuring that routes led to desired destinations. The following provides a synopsis of Phase I.

- Phase I was conducted from July 2021 – July 2022 and included the following elements:
  - Analysis of existing system
  - Research of peer agencies and industry best practices
  - Development of preliminary route realignment recommendations
  - Development of the MTP

It should be noted that in an effort to gain insight as part of Phase I, WSP consulted the following stakeholders:

- The City's Transit Advisory Board
- Community members
- Community stakeholders, and
- City staff

While Phase I identified new routes, additional consideration should be given to ensure that the routes reflect the desires of the community. To do so, the team plans on the following for Phase II:

- Phase II is scheduled to be conducted from August 2022 – April 2023 and will include the following elements:
  - Robust public outreach of route proposals
  - Refining of route proposals
  - Development of the service implementation plan/schedule
  - Finalization of routes and implementation of new service in April 2023

## **GOALS OF THE MTP**

The intent of the MTP is to:

- Evaluate the City's transit system and devise operational and policy changes.
- Improve connectivity with other modes of transportation.
- Improve systems to advance multi-modal transportation within the region.

- Evaluate the changes that should be implemented or enhanced, in order to improve the efficiencies and the connectivity with current planned transportation systems.

As part of the MTP, the Madera Metro Service Design Standards (Guidelines) establishes policies and procedures to follow when seeking transit improvements and/or route alterations to ensure the Madera Metro fixed-route network can grow and improve. Specifically, the Guidelines aim to bring clarity and consistency to the decision-making process with regards to making changes and/or additions to the network.

The service design guidelines apply to the following items:

- Bus Route and Stop Design
- Bus Stop Development and Changes
- Fixed-Route Scheduling
- Performance Measurements

#### **DISCUSSION:**

According to the 2014 Transportation Plan and Sustainable Communities Strategy, the forecast for traffic generated by the projected population, housing and employment shows that total vehicle trips in the County will increase by approximately 93 percent between 2010 and 2040. Furthermore, vehicle miles of travel in 2040 are forecasted to increase by approximately 44 percent from 2010 due to longer trips and commute trips to and from Fresno. The 2014 Regional Transportation Plan (RTP) also focuses on creating a more balanced, multi-modal transportation system while increasing accessibility to land use patterns that support social equity.

On June 30, 2020 the City was awarded the Sustainable Transportation Planning Grant in the amount of \$100,000 from the California Department of Transportation (Caltrans), Division of Transportation Planning. The purpose of this grant is to develop a Madera Transit Plan focused on evaluating the City's transit system, devising operational and policy changes, improving connectivity with other modes of transportation, improving systems to advance multi-modal transportation within the region, and evaluating changes that should be implemented or enhanced in an attempt to improve efficiency and connectivity with the current transportation systems.

In April 2021, Council approved the agreement with WSP for transit consulting services for the development of the MTP. The Project objective included:

- Facilitation of community forums, Committee meetings, and Public Hearings.
- Development and implementation of a survey to assess the public concerns surrounding the City's transit system.
- Aggregation of survey data to inform Project Committee, City staff and other stakeholders as identified.

- Cataloging, mapping, and inspecting all fixed route bus stops including bike path/lane accessibility and determining if stop is essential or deemed obsolete.
- Confirming current headways on all routes during peak time of day and non-peak time of day and documenting fixed issues such as school dismissal traffic and/or speed limits.
- Researching and developing policy recommendations on best practices for new and/or retiring stops, improving headways and schedules, developing efficient route, enhancing safety, and fueling timetables.
- Evaluating the current fixed route efficiencies and proposing new routes deemed necessary based on assessment criteria.

The project will contribute to the implementation of the RTP goals and objectives, including the regional 2017 Active Transportation Plan (ATP), which will serve as a guide in developing the project. This comprehensive transit study will serve as a tool for the City towards effectively planning and investing capital dollars in amenities at proper locations to support transit goals and meet the needs of the community.

**FINANCIAL IMPACT:**

Transit services and personnel time is expended through Local Transportation Funds (LTF) and other Transit related budgets which are grant funded. This project required a 11.47% (\$12,956) Local Share Match which was fulfilled through LTF.

**CONSISTENCY WITH THE VISION MADERA 2025 PLAN:**

The updated Transit Asset Management (TAM) Plan supports the Vision Madera 2025 Plan as follows:

- Strategy 121
  - Multi-modal transportation: Develop a city-wide multi-modal transportation plan to ensure safe, affordable and convenient transportation modes for residents and businesses within Madera.

**ALTERNATIVES:**

Potential Council alternatives include:

- Request the inclusion of additional items into the Service Design Guidelines and postpone adopting the resolution. Note: this would result in extending the timeline of the project and consequently the agreement with WSP.

**ATTACHMENTS:**

1. Attachment A – Resolution
2. Attachment B – Madera Transit Plan Draft Final
  - Exhibit A – Madera Transit Plan Timeline
3. Attachment C – Madera Service Design Guidelines

**RESOLUTION NO. 22-\_\_\_\_**

**RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MADERA, CALIFORNIA  
ADOPTING THE CITY OF MADERA TRANSIT PLAN AND THE MADERA TRANSIT  
SYSTEM SERVICE DESIGN GUIDELINES**

**WHEREAS**, the City of Madera operates the Madera Metro Fixed Route and Dial-A-Ride Transit System; and

**WHEREAS**, the Madera Transit Plan is a network assessment and proposed redesign of the existing transit system; and

**WHEREAS**, the primary objective of the Madera Transit Plan is to analyze the current system to develop recommendations for revising routes, updating route schedules, and improving headway times; and

**WHEREAS**, the purpose of the Madera Metro Service Design Guidelines is to establish criteria and standards to ensure the City's Transit system can consistently grow and improve; and

**WHEREAS**, the guidelines aim to bring clarity and consistency to the decision-making process when considering changes and/or additions to the network; and

**WHEREAS**, establishing these guidelines ensures the network continues to evolve to respond to customer needs while confirming Madera Metro resources are used in an efficient manner; and

**NOW THEREFORE**, the City Council of the City of Madera hereby finds, orders and resolves as follows:

1. The above recitals are true and correct.
2. The Council hereby adopts the City of Madera Transit Plan and the Madera Metro Service Design Guidelines.
3. This resolution is effective immediately upon adoption.

\*\*\*

MADERA METRO

# DRAFT MADERA TRANSIT PLAN

DRAFT REPORT

AUGUST 2022



wsp





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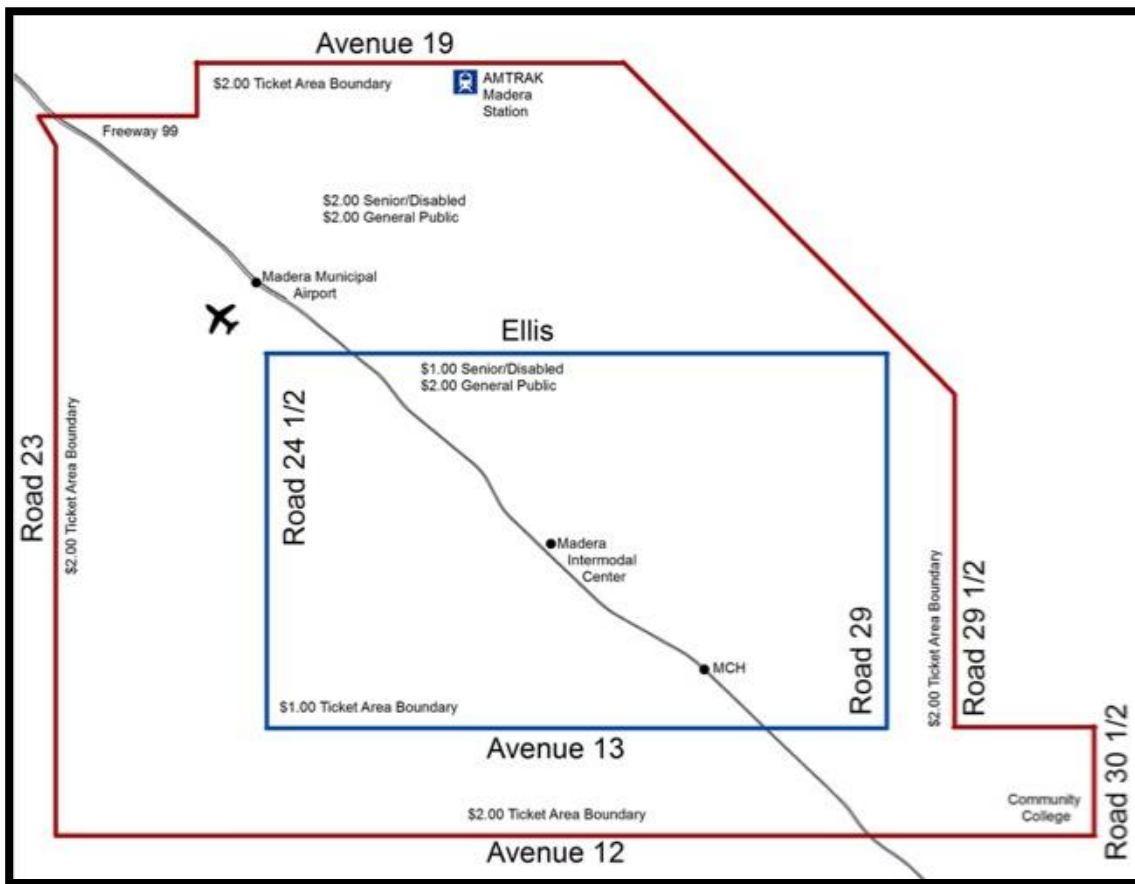
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# 1 INTRODUCTION

Located in the Central Valley of California, the City of Madera encompasses approximately 14 square miles and is separated by State Route (SR) 99 and SR 145 (also known as East Yosemite Avenue). Transit service in the city is provided by Madera Metro, a system comprising of three fixed-routes, Dial-a-Ride, and Americans with Disabilities Act (ADA)/Paratransit service. The service area (shown in Figure 1) is bounded by Avenue 19 to the north, Road 23 to the west, Avenue 12 to the south, and Road 29 ½/Road 30 ½ to the east. Service is provided by a third-party operator, MV Transportation, and the system serves approximately 110,000 customers per year (pre-COVID). As of 2021, annual ridership has dipped to 55,000 customers due to the pandemic.

The City of Madera has recently made commitments to improving the system through utilizing local and State funds to improve bus shelters and other customer amenities, developing a new logo, expanding the fleet, constructing a new Transit Center, and beginning work on a new bus stop sign design.

**Figure 1 Madera Metro Service Area**



## WHAT IS THE MADERA TRANSIT PLAN (MTP)?

The MTP is a network assessment and proposed redesign of the existing Madera Metro fixed-route system. The MTP includes developing revised route alignments and new or updated bus stop locations. The primary objectives of the MTP are to analyze the current system to develop recommendations for revising routes, update route schedules, and improve headways to provide a better transit service to the Madera community.

The MTP is divided into two phases: Phase I and Phase II. Figure 2 describes the division of Phase I and Phase II project elements.

**Figure 2 MTP Phases**



The MTP utilizes a holistic approach to develop recommendations to the Madera Metro fixed-route system. The MTP's route recommendations are based on analyzing the existing system, applying industry best practices and common transit planning concepts, and incorporating feedback from stakeholders and the public. Phase II will include finalized route alignments, bus stop locations, and schedules to be implemented in April 2023. More information on next steps is provided in Section 5.

## WHY DEVELOP THE MTP?

The current Madera Metro fixed-route system consists of three routes. These routes have organically grown over time to respond to passenger demand, calls to City Hall, and the annual Madera County Transit Commission's Unmet Transit Needs hearing process. This has created a system of routes that covers the city but in an inefficient and duplicative way. Additionally, bus stops have been implemented with little regard to the impact on the overall route, and this has led to several issues that negatively impact route performance and potentially ridership:

- 1) Uneven distances between stops that make it difficult for customers to use the system, reduce route reliability, and worsen travel times
- 2) Locating bus stops in low activity areas where passengers may feel unprotected while waiting for the bus
- 3) Locating bus stops with little or no ADA access to and from the bus stop

The MTP catalogs all the system's bus stops and provides an inventory of each with recommendations of changes for Madera Metro to implement.

The MTP recommends new route alignments and bus stop locations to make the system more efficient and effective. The main strategies for achieving this are through streamlining routes to eliminate unnecessary turns and shortening routes in areas that aren't conducive to high ridership. Figure 3 summarizes the primary goals of the MTP, and the strategies used to achieve them.

**Figure 3 MTP Goals**

**Higher Ridership**



Eliminating unnecessary turns and right sizing bus stop spacing will allow for more frequent service that can boost ridership

**Improved Reliability**



Buses are more likely to show up at their scheduled time if route paths are as straight and short as possible

**Increased Productivity**



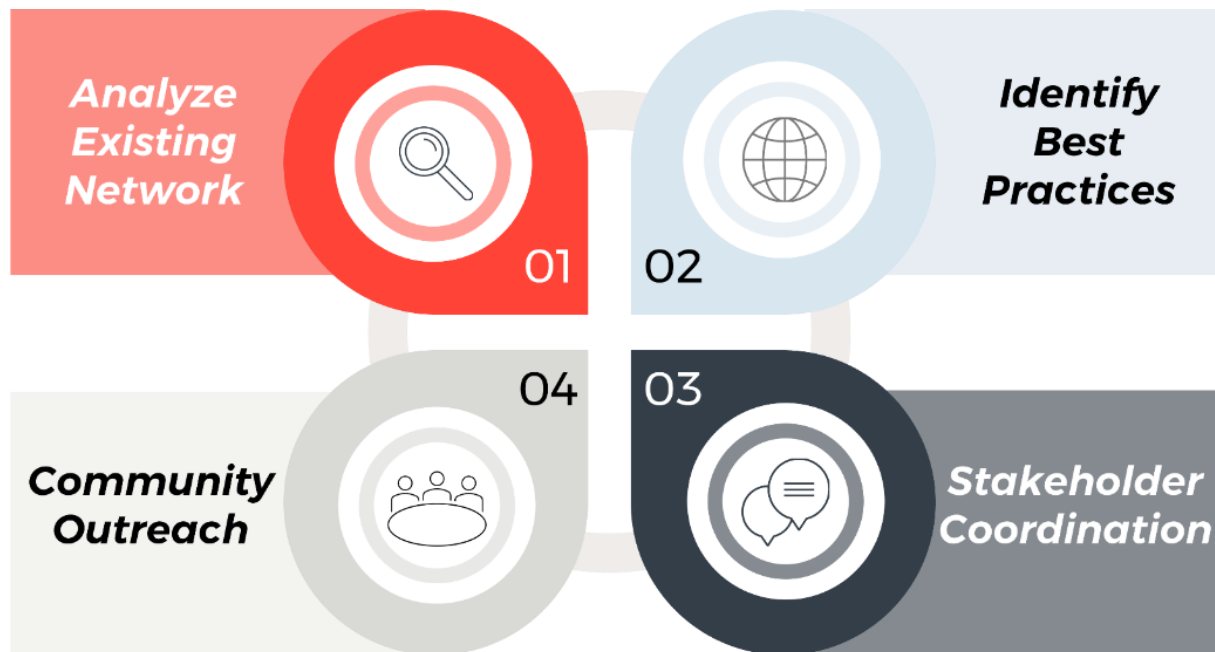
Reducing route redundancy and providing straight, direct route paths ensures resources are used as efficiently as possible

## 2 DEVELOPMENT PROCESS

Figure 4 shows the four major tasks that were completed to recommend new route alignments and bus stop locations as part of the MTP. This process included a combination of data analysis, field visits to examine existing conditions, and soliciting feedback from stakeholders and the public. To that end, these steps ensured that the development of the new system was informed by both qualitative and quantitative data.

The route development process will continue in Phase II with a robust public outreach plan to solicit further comments from the public and stakeholders to ensure the finalized network responds to customer needs and improves the bus riding experience. Further explanation of the MTP development process is described in the following sections.

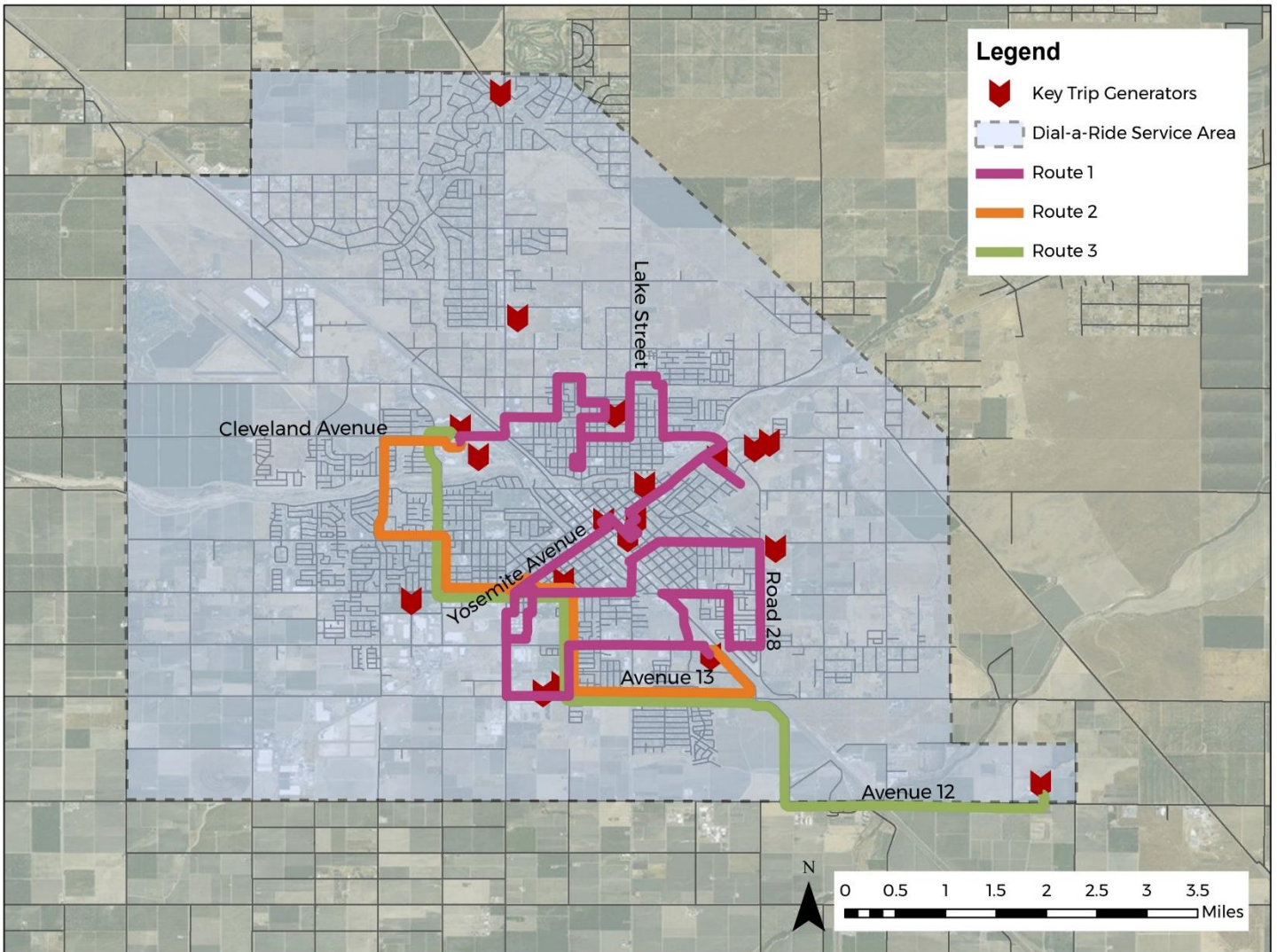
**Figure 4 MTP Development Process**



## 2.1 ANALYZE EXISTING SYSTEM

Figure 5 shows the existing Madera Metro fixed-route system. Each route was analyzed to determine their frequencies, length, number of turns, average distance between stops, and ability to serve key destinations among numerous other factors. These findings were then used to determine changes to each route to remove unnecessary turns and ensure portions of the city were not overserved. Table 1 includes a high-level summary of these findings.

**Figure 5 Madera Metro Existing System**



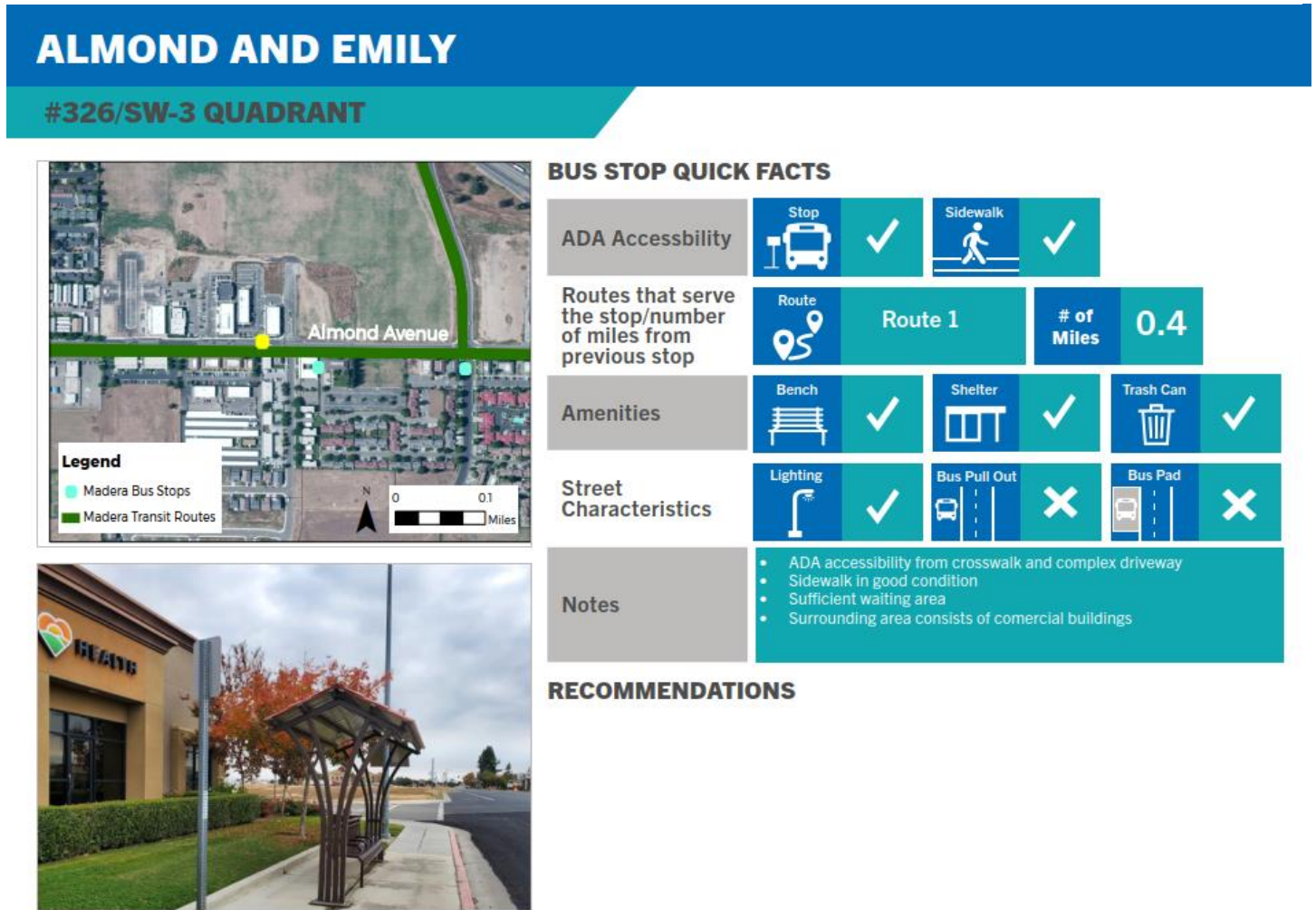
**Table 1 Existing Route Analysis**

Route	Strengths	Weaknesses
Route 1	<ul style="list-style-type: none"> <li>+ Serves large portion of the city</li> <li>+ Serves several key destinations (downtown, Madera Hospital, Walmart)</li> <li>+ Most frequent route in the system</li> <li>+ “Workhorse” of the system</li> </ul>	<ul style="list-style-type: none"> <li>– Route is circuitous which impacts travel times/reliability and is confusing for customers</li> <li>– Stops are unevenly spaced</li> <li>– Few opportunities to transfer to the other two routes</li> <li>– Schedule is confusing for customers</li> </ul>
Route 2	<ul style="list-style-type: none"> <li>+ Covers NW and SW quadrants of city well</li> <li>+ Serves Walmart and Madera Hospital</li> </ul>	<ul style="list-style-type: none"> <li>– Route is infrequent</li> <li>– Stops are unevenly spaced</li> <li>– Few opportunities to transfer to other two routes</li> </ul>
Route 3	<ul style="list-style-type: none"> <li>+ Covers NW and SW quadrants of city well</li> <li>+ Serves Walmart and Madera Community College</li> </ul>	<ul style="list-style-type: none"> <li>– Route is infrequent</li> <li>– Few opportunities to transfer to other two routes</li> </ul>



Additionally, each bus stop in the Madera Metro system was visited to document and analyze existing conditions. Information collected during these site visits included ADA accessibility of the stop, availability of route information, and stop amenities including the presence of benches, shelters, trash cans, and lighting. These findings were then summarized in bus stop fact sheets and used to determine whether each stop should be retained, removed, or relocated. An example of a bus stop fact sheet is shown in Figure 6.

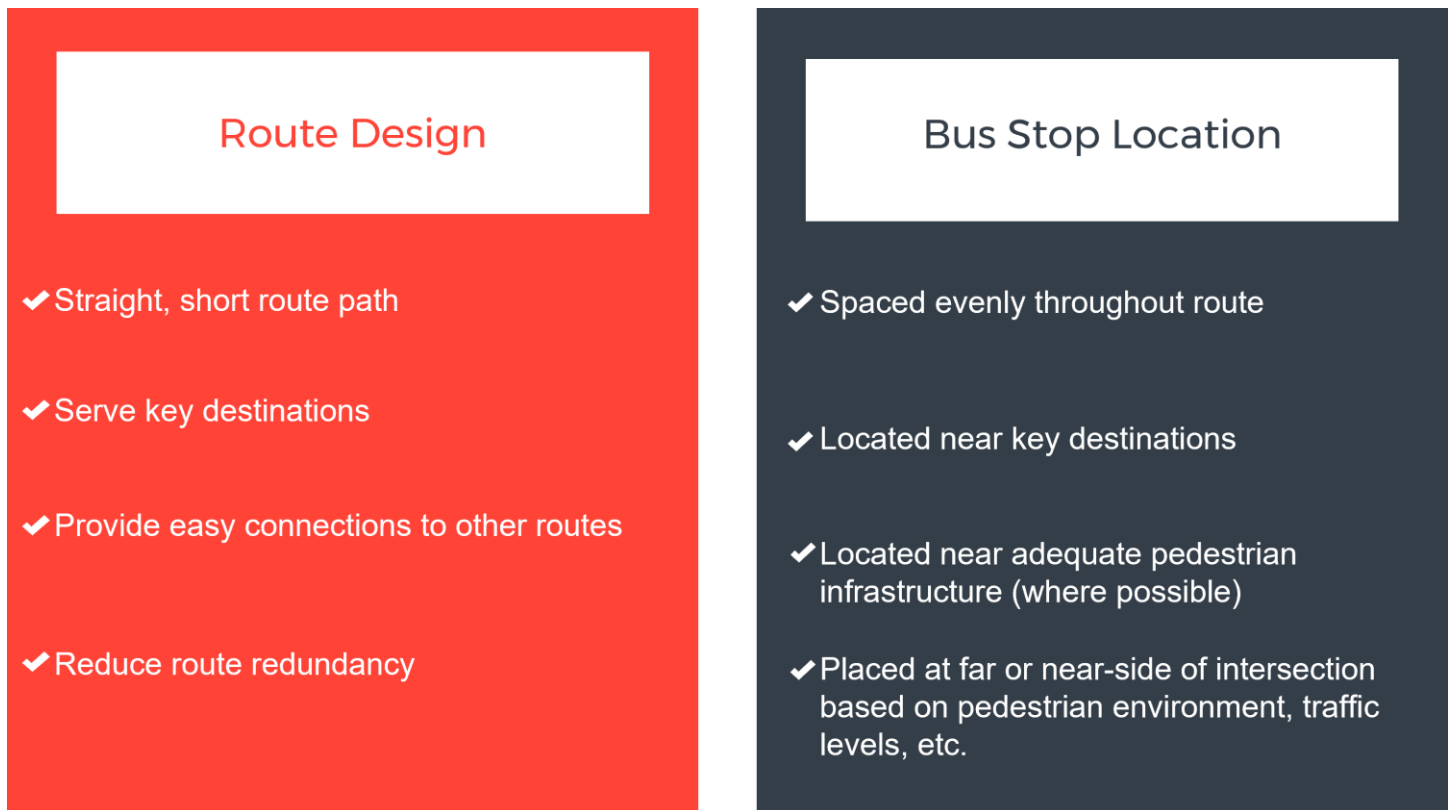
**Figure 6 Sample Bus Stop Fact Sheet**



## 2.2 IDENTIFY BEST PRACTICES

Industry best practices concerning common route design concepts were reviewed for applicability to Madera Metro and incorporated into the route redesign recommendations. Known as Service Design Guidelines (SDG), the SDG are an overarching framework for assisting with the design and operation of transit service. A separate report, titled “Madera Metro Service Design Guidelines” documents those recommendations. The operating SDG concepts were identified through an analysis of industry best practices from peer transit agencies. Figure 7 lists some of these concepts that were used to redesign the routes and determine bus stop locations.

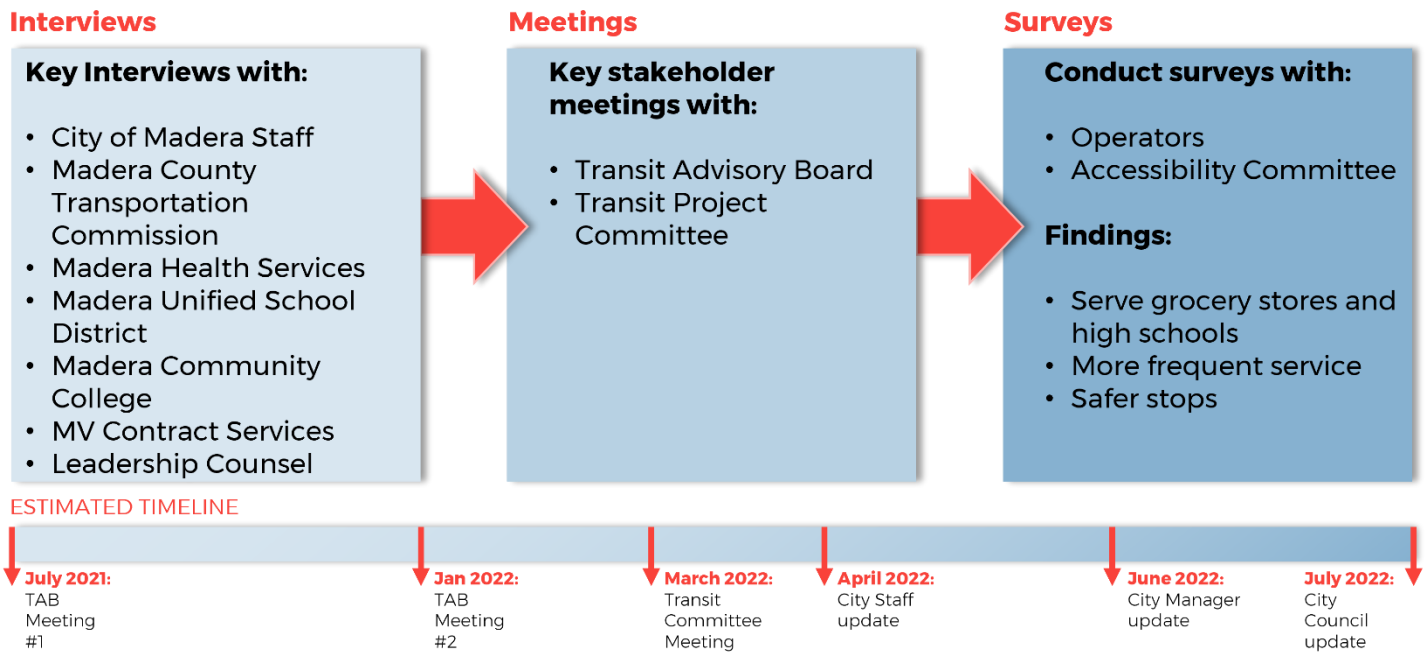
**Figure 7 Route and Bus Stop Standards**



## 2.3 STAKEHOLDER COORDINATION

Throughout Phase I of the MTP, the project team met with various stakeholders to promote collaboration, solicit feedback on the existing Madera Metro system, and build consensus among various parties on potential improvements to the system. A summary of the various stakeholder coordination activities completed are shown in Figure 8.

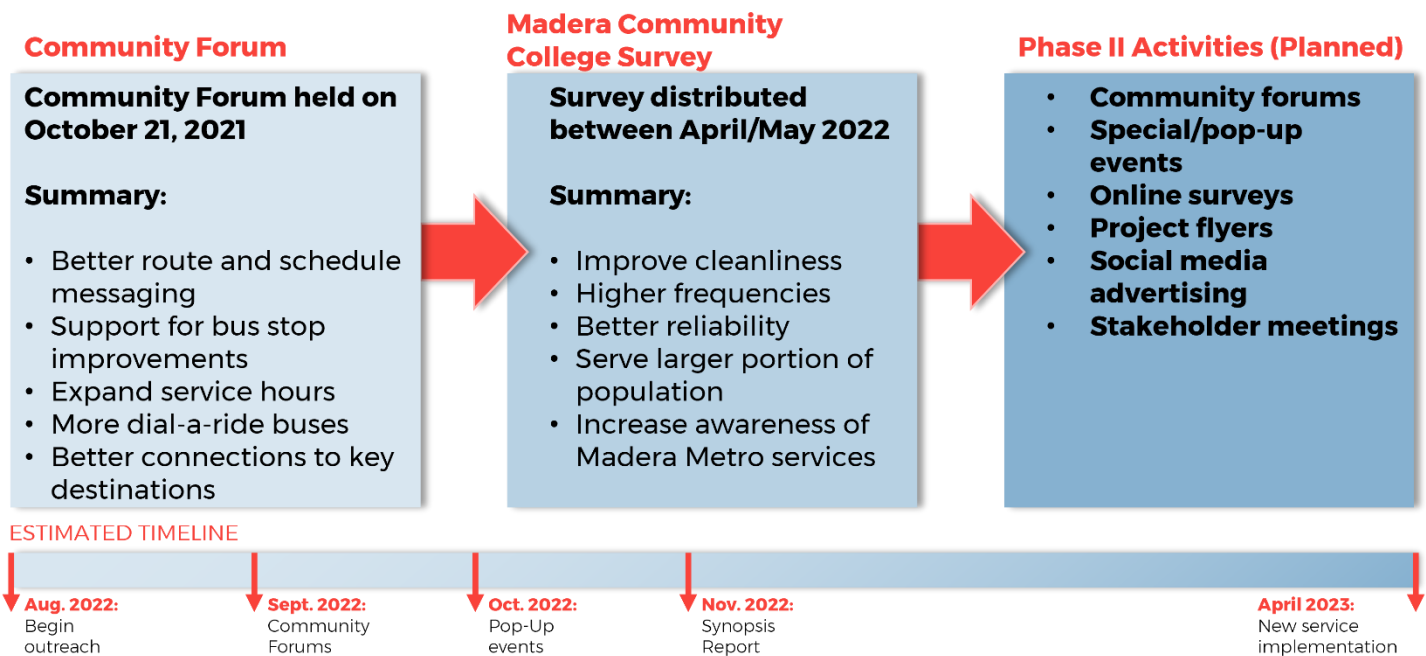
**Figure 8 Stakeholder Coordination Summary**



## 2.4 COMMUNITY OUTREACH

In addition to meeting with various stakeholders, the project team held a community forum in October of 2021 and distributed a survey to Madera Community College students throughout April and May of 2022. A summary of the community outreach activities conducted, including frequent comments heard that were incorporated into the design of the proposed system, are shown in Figure 9.

**Figure 9 Community Outreach Summary**



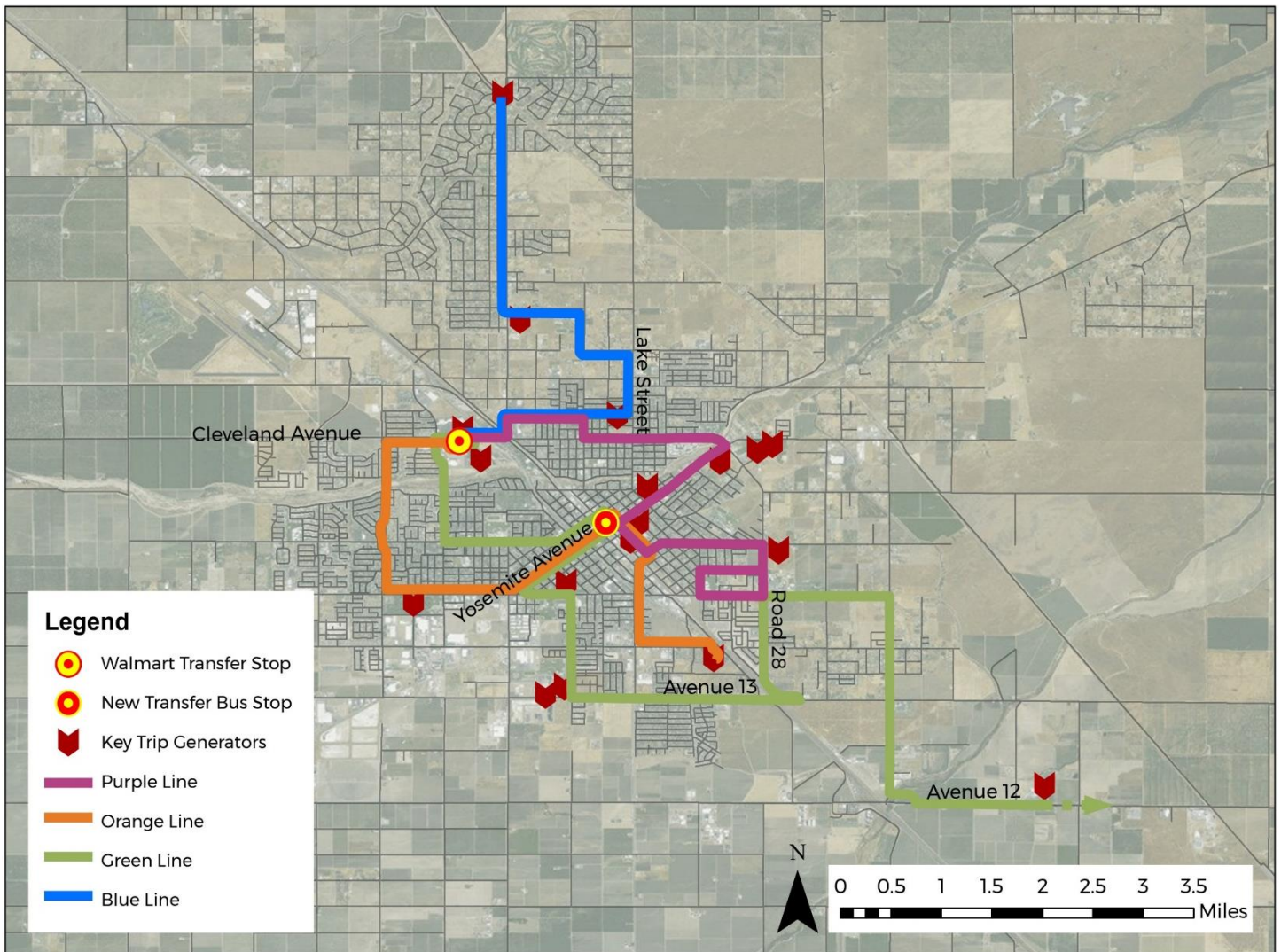
# 3 PROPOSED ROUTES

In addition to proposing changes to route alignments, the MTP recommends changing the route names and colors to reflect the new routes. The following routes make up the proposed Madera Metro system:

- Purple Line
- Orange Line
- Green Line
- Blue Line

As the proposed system map shows in Figure 10, a new transfer point for the Purple/Orange/Green lines will be located at the Madera Intermodal Station at the intersection of North E Street and East Yosemite Avenue. There will also be a transfer point located at Walmart where all four routes will meet. These transfer points will provide an easy and convenient opportunity for customers to transfer between routes to access more of the city. Further details on each new route are described in the following sections.

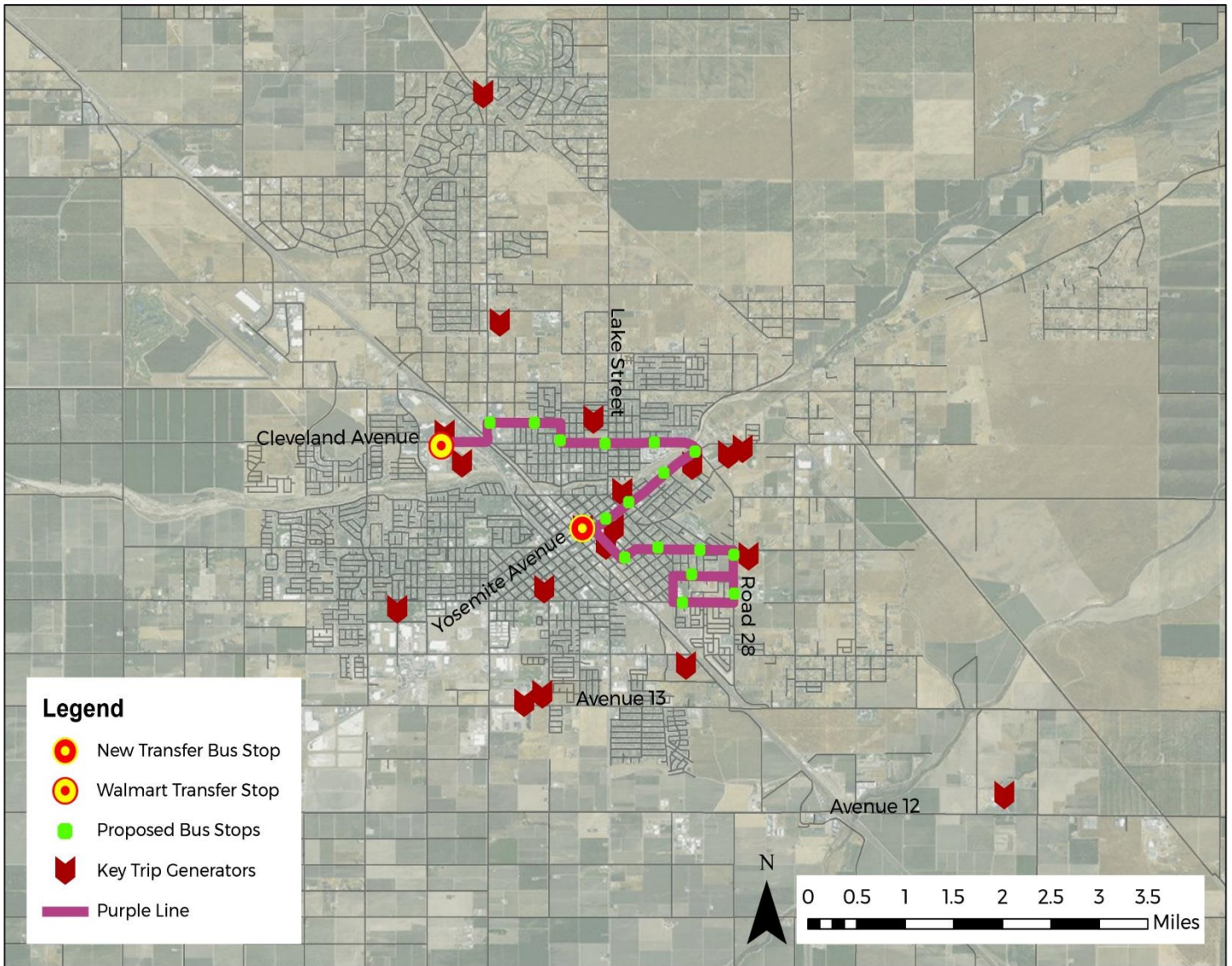
**Figure 10 Proposed Madera Metro Fixed-Route System**



### 3.1 PROPOSED PURPLE LINE

The proposed Purple Line is designed to focus on providing service to the area of the city east of SR 99. This allows for a shorter and more direct travel path compared to the original Route 1 that will improve route reliability and provide an opportunity to reinvest resources into improving frequencies and/or expanding spans for the system. The route will serve several key destinations including multiple grocery stores, the Madera Intermodal Station, and Walmart. Figure 11<sup>1</sup> shows the proposed route alignment. Table 2 provides a summary of the proposed route stats.

**Figure 11 Proposed Purple Line Alignment**



<sup>1</sup> Stops with multiple directions (e.g. NB and SB) are shown as one stop for presentation purposes.

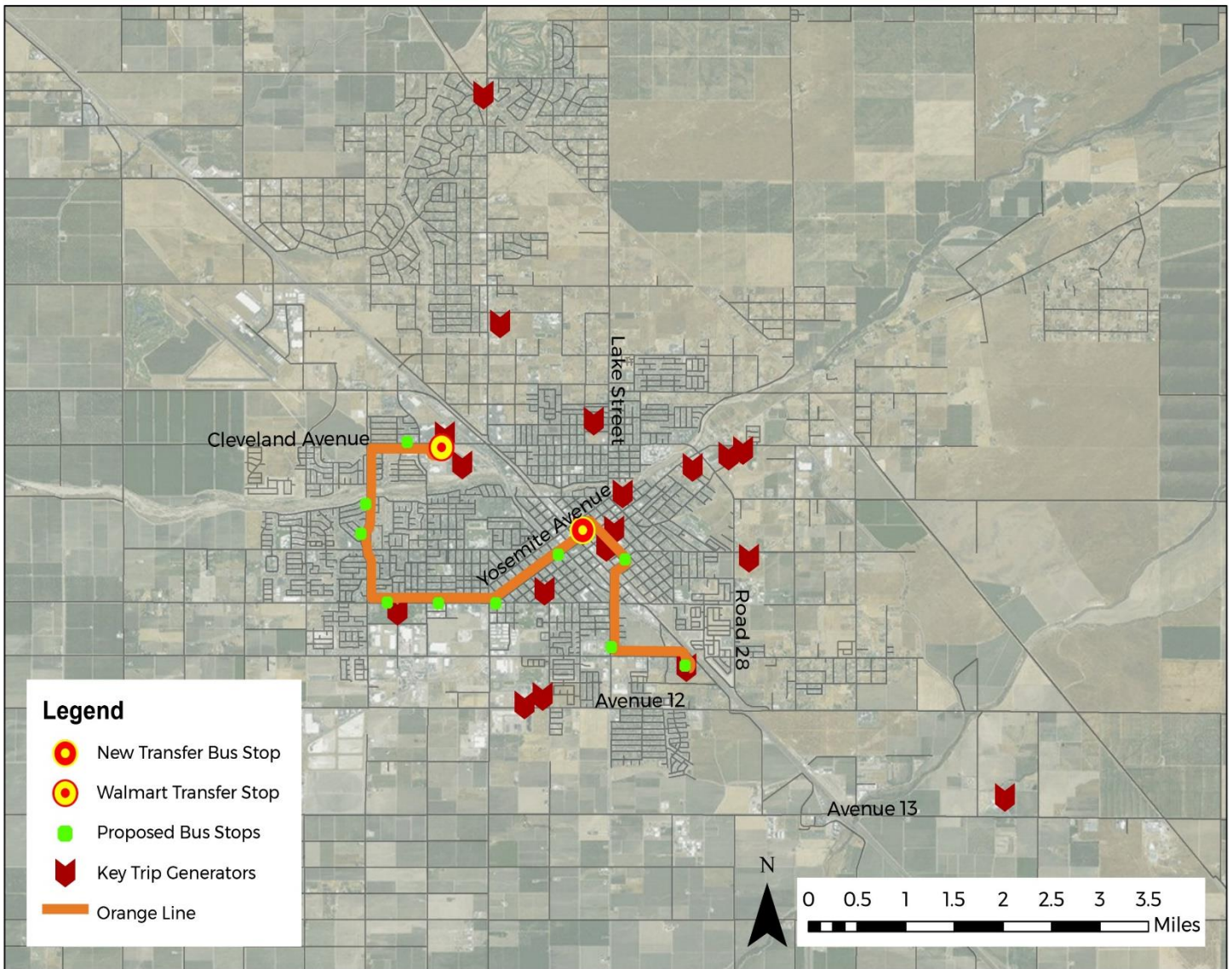
**Table 2 Proposed Purple Line Stats**

<b>First Stop</b>	<b>NB:</b> Road 28 at County Complex	<b>SB:</b> Walgreens at Cleveland Avenue
<b>Last Stop</b>	<b>NB:</b> Walgreens at Cleveland Avenue	<b>SB:</b> Road 28 at County Complex
<b>Key Destinations Served</b>	Walmart, Madera Intermodal Station, Multiple Grocery Stores	
<b>Route Length</b>	13 Miles	

## 3.2 PROPOSED ORANGE LINE

The proposed Orange Line is designed to focus on serving the area of the city west of SR 99. This route path provides access to the Madera Intermodal Station for transfer opportunities to the Purple and Green Lines. This route also connects multiple key destinations in the city including Walmart, Madera High School, and Madera Hospital. Figure 12<sup>2</sup> shows the proposed route alignment. Table 3 provides a summary of the proposed route stats.

**Figure 12 Proposed Orange Line Alignment**



<sup>2</sup> Stops with multiple directions (e.g. NB and SB) are shown as one stop for presentation purposes.

**Table 3 Proposed Orange Line Stats**

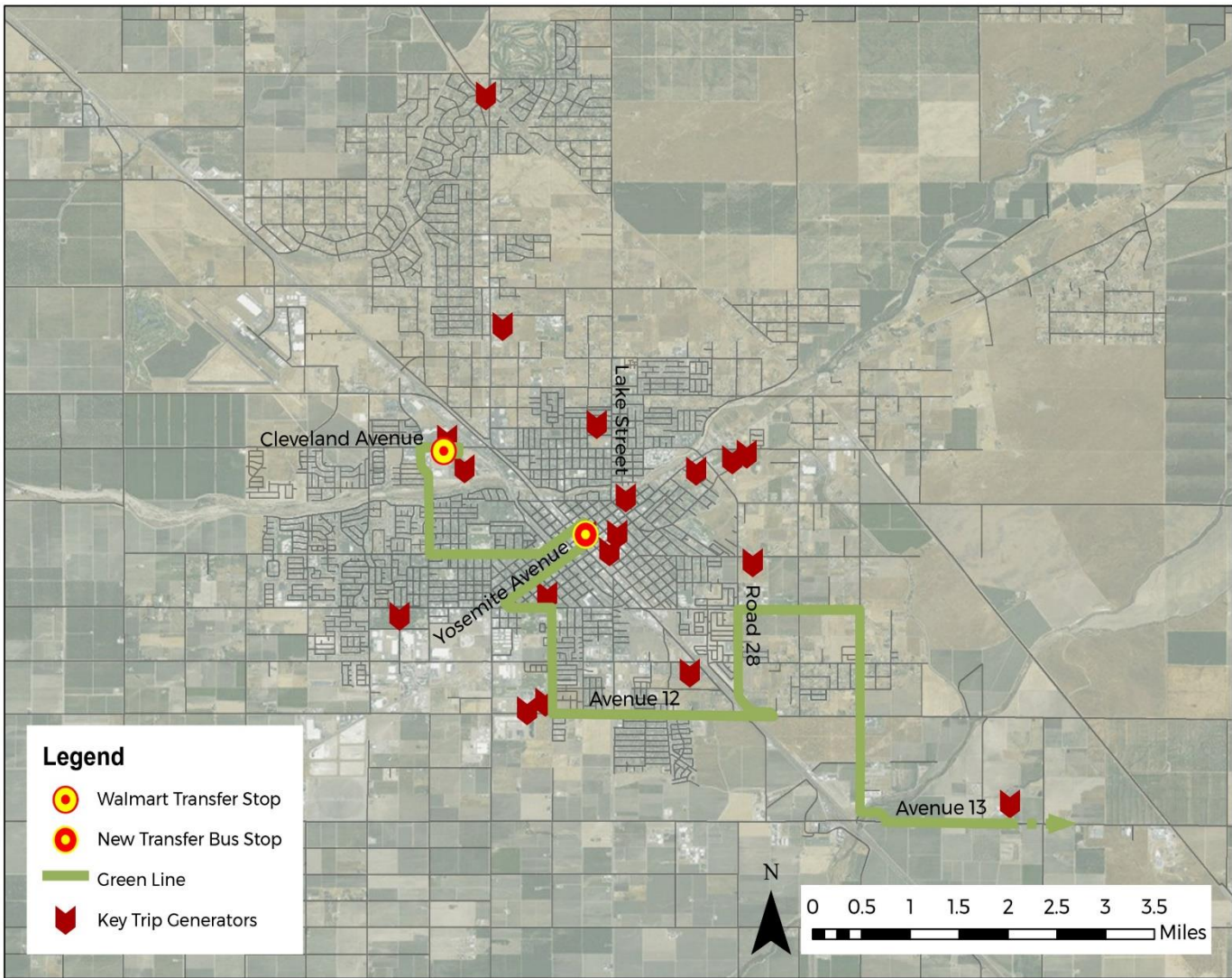
<b>First Stop</b>	<b>NB:</b> Madera Hospital	<b>SB:</b> Walgreens at Cleveland Avenue
<b>Last Stop</b>	<b>NB:</b> Walgreens at Cleveland Avenue	<b>SB:</b> Madera Hospital
<b>Key Destinations Served</b>	Walmart, Madera Intermodal Station, Madera Hospital	
<b>Route Length</b>	13 Miles	



### 3.3 PROPOSED GREEN LINE

The proposed Green Line is designed to serve the area of the city west of SR 99 and southeast along Avenue 12. The route will maintain existing service to Madera Community College for residents west of SR 99 and will provide a new connection to the area for residents along Road 28, Avenue 14, and Road 29. The route will also serve Walmart as well as the Madera Intermodal Station for convenient transfers to the Purple and Orange Lines. Figure 13<sup>3</sup> shows the proposed route alignment. Table 4 provides a summary of the proposed route stats.

**Figure 13 Proposed Green Line Alignment**



<sup>3</sup> Stops with multiple directions (e.g. NB and SB) are shown as one stop for presentation purposes.

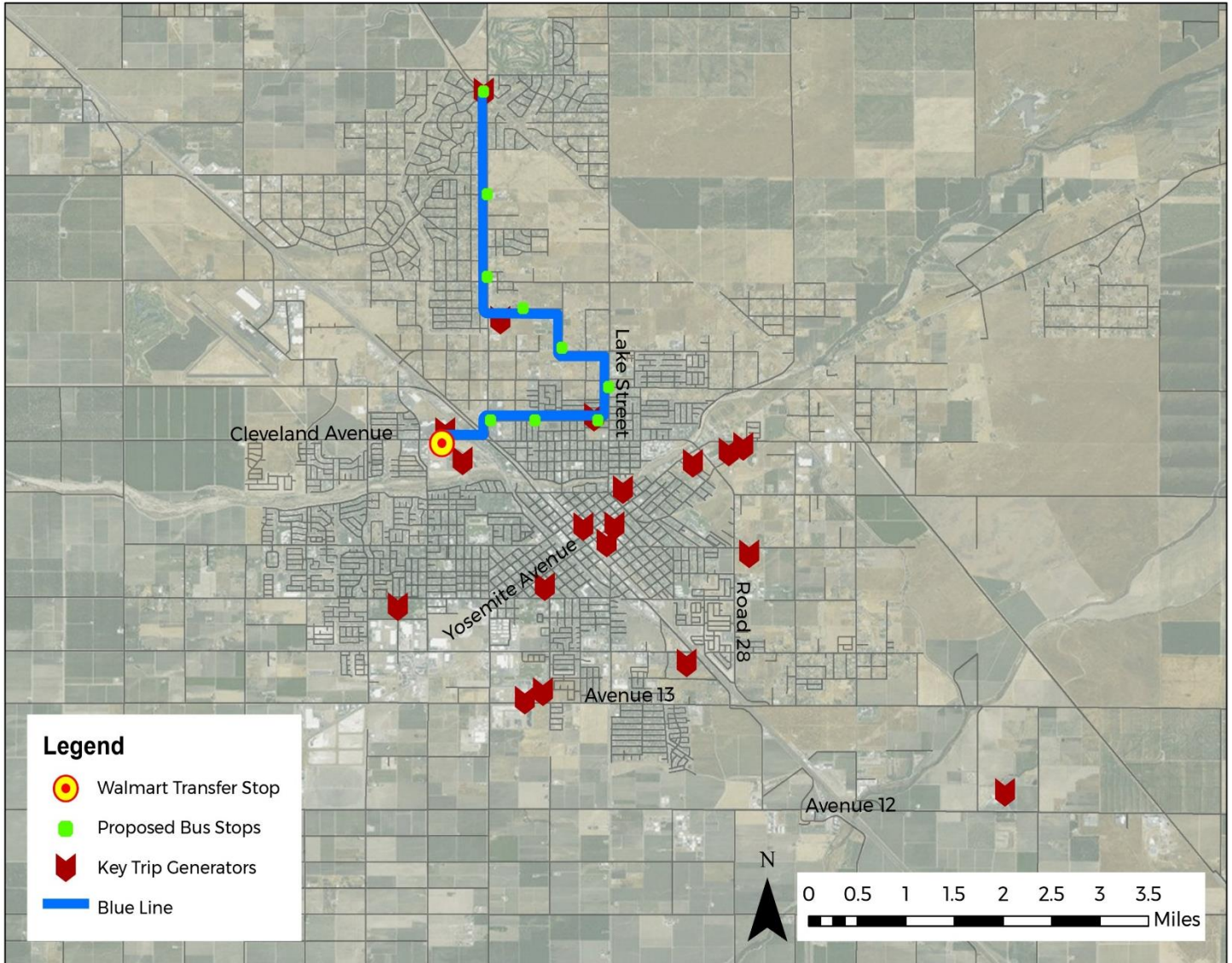
**Table 4 Proposed Green Line Stats**

<b>First Stop</b>	<b>NB:</b> Community College Center	<b>SB:</b> Walgreens at Cleveland Avenue
<b>Last Stop</b>	<b>NB:</b> Walgreens at Cleveland Avenue	<b>SB:</b> Community College Center
<b>Key Destinations Served</b>	Walmart, Madera Intermodal Station, Community College	
<b>Route Length</b>	25 Miles	

### 3.4 PROPOSED BLUE LINE

The proposed Blue Line provides service to the area of the city north of West Cleveland Avenue that is not currently served by the Madera Metro fixed-route system. The route will provide access to Walmart, Pan-American Park, Matilda Torres High School, and the existing Amtrak Station. Figure 14<sup>4</sup> shows the proposed route alignment. Table 5 provides a summary of the proposed route stats.

**Figure 14 Proposed Blue Line Alignment**



<sup>4</sup> Stops with multiple directions (e.g. NB and SB) are shown as one stop for presentation purposes.

**Table 5 Proposed Blue Line Stats**

<b>First Stop</b>	<b>NB:</b> Walgreens at Cleveland Avenue	<b>SB:</b> Amtrak Station
<b>Last Stop</b>	<b>NB:</b> Amtrak Station	<b>SB:</b> Walgreens at Cleveland Avenue
<b>Key Destinations Served</b>	Walmart, Pan-American Park, Existing Amtrak Station	
<b>Route Length</b>	11 Miles	

## 4 NEXT STEPS

The redesigned network presented in this plan serves as a foundation for a more efficient bus system for the residents of Madera and will be finalized through a collaborative engagement process. Phase II will continue the work from Phase I by presenting the proposed redesigned routes to the community through a robust public outreach effort. Through a wide range of activities, the team hopes to solicit feedback to include in the refinement process before the proposed routes are finalized for implementation. Specific public outreach activities will include:

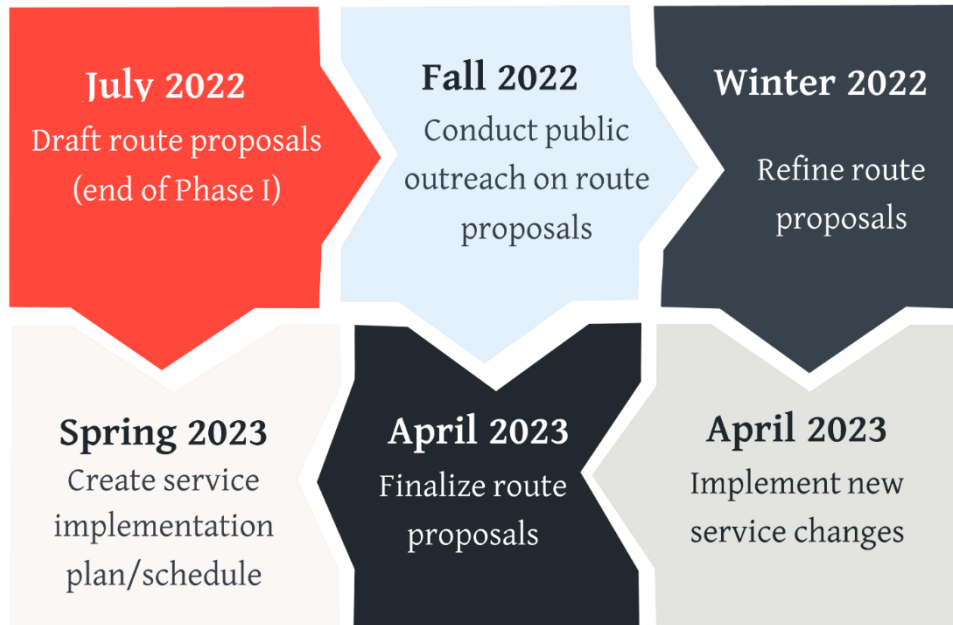
- Online survey
- Project flyer
- Social media advertisements
- Community forums
- Pop-up events

In addition to meeting with the public, stakeholder engagement will continue with presentations to the following groups:

- Transit Advisory Board
- Madera City Council
- Madera County Transportation Commission
- Madera Unified School District
- City of Madera ADA Advisory Council
- Madera County Social Services Department

Following these public outreach efforts, the proposed routes will be revised and finalized. An implementation plan will outline any schedule or frequency changes, including identifying different cost considerations. The anticipated implementation of new service is April 2023. Figure 15 shows a preview of Phase II activities.

**Figure 15 Phase II Timeline**



Task	2021								2022										2023			
	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23
<b>Task 2: TAB Project Committee Coordination</b>																						
2.1: Advertise Community Forum and TAB Committee																						
2.2: Coordinate with City on TAB Committee																						
2.3: Facilitate Community Forums						●																
2.4: Develop and Distribute Survey																						
2.5: Appoint Citizens to Project Committee																						
2.6: Compile Results and Inform Project Committee						◆																
2.7: TAB Project Committee Meetings	●	●	●	●	●	●	●	●	●	●	●	●										
2.8: Discuss and Devise Outreach Implementation																						
2.9: Committee's Final Report/Recommendations																						
<b>Task 3: Service Study &amp; Operational and Policy Recommendations</b>																						
3.1: City Staff, Caltrans, and TAB approve RFP																						
3.2: Advertise and Conduct a Procurement Process																						
3.3: Select a Consultant and Execute Agreement																						
3.4: Catalog, Map, and Inspect Bus Stops and Bike Path/Lane accessibility																						
3.5: Confirm Headways in Varying Conditions																						
3.6: Compile and/or Formulate Policy Recommendations									◆													
<b>Task 4: Madera Transit Plan</b>																						
4.1: Workshop on Findings											◆											
4.2: Draft Madera Transit Service Design Standards and Efficient Performance Plan											◆	◆										
4.3: Circulate the Revised Draft Plan/Matrix														◆								
4.4: Prepare Final Grant Report																						
4.5: Present Final Transit Plan																						
4.6: City Adopting Final Plan																						◆

- Project Committee Meeting
- ◆ Deliverable
- Work Performed by Non-WSP Team Staff
- Work Performed by WSP Team Staff

MADERA METRO

# SERVICE DESIGN GUIDELINES

AUGUST 2022





wsp



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# 1 INTRODUCTION

## WHAT ARE THE SERVICE DESIGN GUIDELINES?

The Madera Metro Service Design Guidelines establish criteria and standards to ensure the Madera Metro fixed-route network can grow and improve following standard guidelines that delivers consistent service to its customers and supports the mission of the department as shown in Figure 1. Specifically, these guidelines aim to bring clarity and consistency to the decision-making process when Madera Metro staff consider changes and/or additions to the network. Establishing these guidelines ensures the network continues to evolve to respond to customer needs while confirming Madera Metro resources are used in an efficient manner. The guidelines apply to the following topics:

- **Bus Route and Stop Design**
- **Bus Stop Development and Changes**
- **Fixed-Route Scheduling**
- **Performance Measurements**

**Figure 1 Madera Metro Mission**

The City of Madera Transit Division seeks to provide transit customers in the City's transit service area with public transportation to specified destinations in a professional, courteous, and timely manner with equipment that is accessible, affordable, and comfortable.

## HOW WERE THE SERVICE DESIGN GUIDELINES DEVELOPED?

The Service Design Guidelines were developed utilizing common transit planning concepts and a robust review of relevant industry white papers and peer case studies. These high-level concepts and strategies were then tailored to account for available Madera Metro resources along with the city's land use, street network including the pedestrian environment, customers' travel patterns, and key trip generators in the city. Table 1 provides a summary of the documents reviewed and how they were incorporated into the Service Design Guidelines.

**Table 1 Peer Case Studies and Industry Best Practices Summary**

Document	Date Published	Description	Document Reference
<a href="#">TCRP Synthesis 139: Transit Service Evaluation Standards</a>	2019	Provides an overview of the purpose, use, and application of performance measures, service evaluation standards, and data collection methods at North American transit agencies.	<a href="#">Section 5 – Performance Measures:</a> Provided list of possible measurements/metrics to use and definitions of various transit planning concepts.
<a href="#">TransLink Transit Service Guidelines</a>	June 2018	Provides a framework for TransLink to meet its objectives of planning, managing, and delivering an integrated transit network and provide access and mobility for people across the Vancouver, B.C. region.	<a href="#">Section 2 – Bus Route and Stop Design:</a> Provided route design standards and definitions of various transit planning concepts.
<a href="#">Santa Clara Valley Transportation Authority (VTA) Service Guidelines</a>	April 2018	Guides VTA’s service planning efforts by establishing a framework to monitor and evaluate VTA’s transit services, process to develop service design recommendations for the VTA Board of Directors to consider, and measures to guide service planning decisions that are equitable, systematic, timely, and move VTA toward achieving the goal of providing Faster Frequent Reliable Transit from the VTA Strategic Plan.	<a href="#">Section 2 – Bus Route and Stop Design:</a> Provided route design standards.
<a href="#">Regional Transportation District (RTD) Transit Service Policies &amp; Standards</a>	July 2016	Establishes a set of service standards maintained by RTD to ensure consistent evaluation of service proposals and that service being provided represents the most cost-effective use of the District’s resources.	<a href="#">Section 2 – Bus Route and Stop Design:</a> Provided stop spacing standards.
<a href="#">National Association of City Transportation Officials (NACTO) Transit Street Design Guide</a>	April 2016	Provides design guidance for the development of transit facilities on city streets, and for the design and engineering of city streets to prioritize transit, improve transit service quality, and support other goals related to transit.	<a href="#">Section 2 – Bus Route and Stop Design:</a> Provided various route and bus stop design standards, graphics, and definitions of various transit planning concepts.
<a href="#">OmniTrans Transit Design Guidelines</a>	March 2013	Provides design criteria guidelines that should be considered when designing and placing safe and secure transit facilities.	<a href="#">Section 2 – Bus Route and Stop Design:</a>

Document	Date Published	Description	Document Reference
			<p>Provided graphics and concepts for bus stop placement.</p> <p><a href="#">Section 3 – Bus Stop Change and Development Policy:</a></p> <p>Provided potential steps to include in the bus stop change process.</p>
<a href="#">TCRP Report 165: Transit Capacity and Quality of Service Manual</a>	2013	Provides current research-based guidance on evaluating quality of transit service, measuring transit capacity, speed, and reliability, sizing elements of transit stops and stations, and guidance on ways to positively influence all the above.	<p><a href="#">Section 2 – Bus Route and Stop Design:</a></p> <p>Provided stop spacing standards.</p>
<a href="#">USF Best Practices in Transit Service Planning</a>	March 2009	Defines operating standards and philosophies, provides a framework for transit service planning, and formulizes a decision process to make transit service changes.	<p><a href="#">Section 4 – Fixed Route Scheduling:</a></p> <p>Provided metrics and standards to use when deciding on potential headways.</p>

## USING THE SERVICE DESIGN GUIDELINES

The Service Design Guidelines should be used by Madera Metro staff to support and guide decision making related to adding, adjusting, or eliminating various elements of transit service. These guidelines should be consulted whenever Madera Metro staff receive a request from the public either as a standalone comment or through the Madera County Transportation Commission’s (MCTC) Unmet Transit Needs process. Typical applications for each section of the Service Design Guidelines can be found below:

- **[Bus Route and Stop Design:](#)** This section should be consulted when Madera Metro staff are choosing to amend or add a new route or bus stop.
- **[Bus Stop Development and Change Policy:](#)** This section includes a process Madera Metro staff should follow whenever they receive a request to add, remove, or change a bus stop’s location.
- **[Fixed-Route Scheduling:](#)** This section should be consulted when Madera Metro staff are determining schedules and headways for new or amended routes.
- **[Performance Measures:](#)** This section should be used to establish a performance measurement process to determine the performance of the network and develop potential necessary changes for improvement.

## 2 BUS ROUTE AND STOP DESIGN

### 2.1 OVERVIEW

The following section outlines recommended standards for the design of Madera Metro's routes and bus stop elements. This section was developed utilizing common transit planning concepts along with findings from the relevant industry white papers and peer case studies listed in Section 1. These high-level concepts and strategies were then tailored to account for available Madera Metro resources along with the city's land use, population and demographics, street network including the pedestrian environment, and key trip generators in the city.

Route design refers to the length and directness of a route. Section 2.2 establishes standards for how routes should be designed to optimize travel times, reliability, and ease of use for the customer. At a minimum, routes should be designed to be as direct (limited number of turns) and short as possible while still serving key trip generators. Bus stop design, addressed in Section 2.3, refers to where a stop should be located in relation to an intersection, how far apart stops should be spaced, and possible amenities to be provided at each stop.

### 2.2 ROUTE DESIGN

Madera Metro's routes should have a simple and consistent design and alignment that is easy for customers to use and understand. This will assist with easing a customer's understanding of how to complete a trip using Madera Metro. Ensuring that routes operate on the same street in each direction where possible can assist with this. However, in cases where this design is not possible due to one-way streets, the alignment of the route in the opposite direction should be as close as possible.<sup>1</sup>

To prevent duplicative service, routes should be spaced approximately ½ mile from each other where the street network and land use allows. This will ensure access to the network is provided without overserving areas. Routes should also be located on streets that are conducive to high-quality transit service including those that serve key destinations and areas with more intense/mixed-use development, and provide safe pedestrian environments (sidewalks, marked crosswalks, etc.). Establishing "anchors" (key trip generators) at each end of the route also provides an opportunity to serve a potential high ridership area and provide them access to destinations throughout the route path.

As stated in Section 2.1, routes should have a minimal number of turns (specifically left-turns) and short travel paths to improve travel times and ensure reliability. Short and direct travel paths ensure that resources spent serving low transit-demand areas can be redistributed to providing high-frequency service to potential high ridership areas. Although a large amount of turns for a route typically causes an increase in travel time, there are some cases where a more circuitous route alignment can be considered. Specifically, adding turns to a route should be considered if it will increase the route's overall productivity, serve a greater number of customers, and will not interfere with its own service frequencies.

Typical key route design concepts are shown in Figure 2.<sup>2</sup>

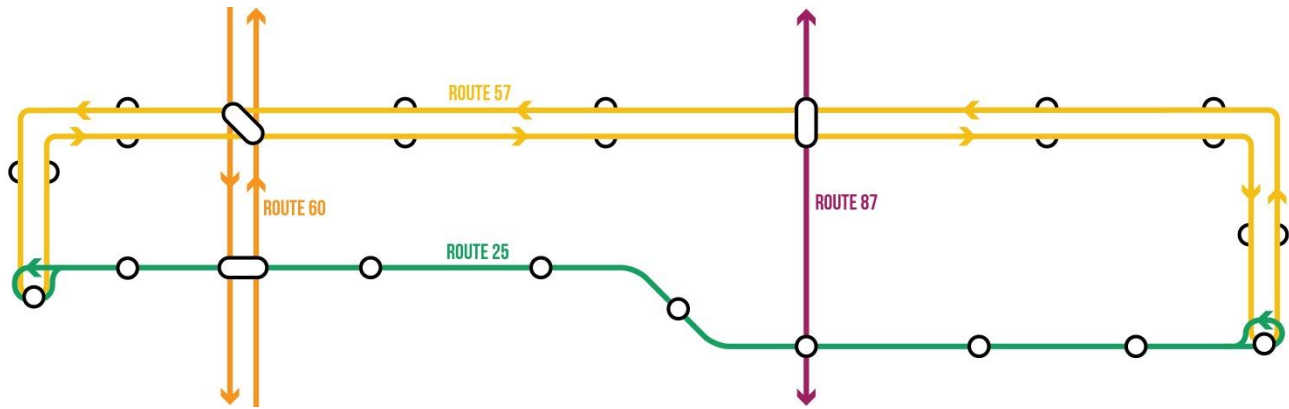
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<sup>1</sup> [Santa Clara VTA Transit Service Guidelines](#)

<sup>2</sup> [NACTO Transit Street Design Guide](#)



**Figure 2 Route Design Concepts**



1 Routes are as straight as possible while ensuring key destinations are served.

2 Routes are aligned to facilitate transfers between various lines.

3 Where possible, routes operate on the same street in each direction. For one-way streets, routes are aligned as closely as possible in each direction.

4 Where possible, routes are spaced approximately  $\frac{1}{2}$  mile from each other to ensure network accessibility without overserving an area.

## 2.3 BUS STOP DESIGN

### SPACING

The distance between stops should be carefully considered when implementing a new bus stop or removing/adjusting an existing bus stop. Establishing stop spacing standards is critical as greater distances between stops will cause longer walking distances for customers but allow for faster travel times. Conversely, stops spaced closer together will reduce customer walking distances but lead to slower and more unreliable travel times.

It can be expected that customers will typically walk up to 5 minutes, or  $\frac{1}{4}$  mile (1,320 feet), to access a stop.<sup>3</sup> Therefore, it is recommended that bus stops be spaced no further than  $\frac{1}{4}$  mile from each other. However, the placement of each bus stop should be considered on a case-by-case basis and the  $\frac{1}{4}$  mile-standard can be amended as necessary based on a wide variety of factors, including, but not limited to, the following:

- **Bus schedule adherence:** Stops spaced too closely together can cause delays and bus bunching for the next trip(s).
- **Pedestrian environment:** The desired average stop distance can be adjusted to ensure stops are located near crosswalks.
- **Key trip generators:** The desired average stop distance can be adjusted based on the presence of key trip generators.

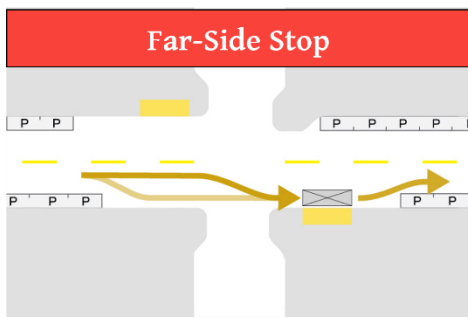
<sup>3</sup> [TCRP Report 165: Transit Capacity and Quality of Service Manual](#)

- **Surrounding land use:** Stops can be located further apart than ¼ mile if the route travels through areas with sparse development.

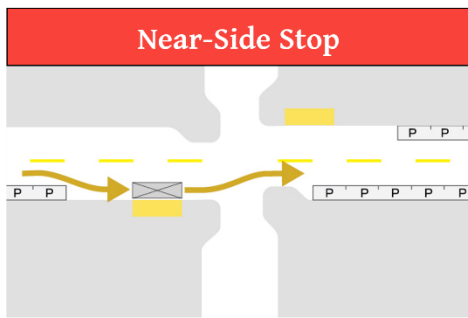
**PLACEMENT**

Whether it be along the far-side of the intersection, near-side of the intersection, or mid-block, stop placements should be carefully considered as it can affect traffic and pedestrian safety. A far-side stop is a stop that is located immediately after an intersection. A near-side stop is a stop that is located immediately before an intersection. Lastly, a mid-block stop is a stop located 200 feet or more beyond or before an intersection. Additionally, if a stop exists in one direction, a stop in the opposite direction should be provided as well (creating a “bus stop pair”) to allow the customer to easily return to their original location. Figure 3 provides examples of the three types of stops<sup>4</sup> and when to implement them.<sup>5</sup>

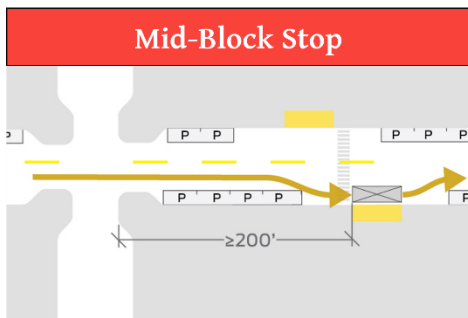
**Figure 3 Bus Stop Examples**



- When to Implement:
- Traffic volumes are higher at near-side of intersection
  - Route requires a left or right turn (near-side stops increase difficulty of accessing left-turn lanes especially)
  - Intersection has heavy turn volumes
  - Far-side of intersection has safer pedestrian environment (including signalized street crossing) and dedicated area for customers getting on and off the bus



- When to Implement:
- Traffic volumes are higher at far-side of intersection
  - Near-side of intersection has safer pedestrian environment (including signalized street crossing) and dedicated area for customers getting on and off the bus
  - Bus route continues straight through intersection



- When to Implement:
- Safe, well-marked crossing or signalized crossing is located adjacent to the stop
  - Block is long (>300 feet) and locating the stop close to the intersection is not feasible

<sup>4</sup> [NACTO Transit Street Design Guide](#)

<sup>5</sup> [OmniTrans Transit Design Guidelines](#)

## AMERICANS WITH DISABILITIES ACT (ADA) CONSIDERATIONS

Bus stop locations should meet ADA requirements.<sup>6</sup> This includes providing an accessible boarding area at least 96 inches long and 60 inches wide and connected to streets, sidewalks, or pedestrian paths by an accessible route. The boarding area should be at least five feet wide for a wheelchair waiting area, plus additional width to deploy a wheelchair ramp to serve the waiting area (typically three feet).<sup>7</sup> Regardless of location in relation to the intersection, bus stops should be placed in areas where wheelchair lifts or ramps can be deployed on a firm, stable surface. Where possible, stops should also be located near crosswalks for added pedestrian safety.

## AMENITIES

Bus stop amenities can improve the customer experience and promote increased ridership. To help customers use the network, all stops should have signs that identify the bus stop's location, route information (route name, headways, spans, etc.), and display Madera Metro's telephone number and website. If possible, adding real-time arrival information at bus stops will greatly improve the customer experience. The following amenities should also be implemented at bus stop locations where possible:

- **Benches:** Benches provide a comfortable option for customers to use while waiting for their bus to arrive. Comfortable seating at bus stops dramatically improves the customer experience. Providing seating options at bus stops is also a way to foster a sense of place by incorporating an attractive and recognizable design. Benches should be prioritized at frequently used stops (ex: stops that serve 10 or more customers per day) or when the route has a long headway (ex: routes that provide service every 60 minutes or worse).
- **Shelters:** Locating shelters at bus stops can also add to the customer experience. Shelters can provide refuge from inclement weather as well as seating options and information on available transit services at the stop. This can significantly improve the perception of wait time and customer satisfaction. Shelters should be prioritized at transfer points, frequently used stops, and in areas that serve higher senior populations and residents with disabilities. Shelters should not be placed directly on the wheelchair landing area, sidewalk, or in front of store windows. The shelter should also be designed in a way that provides wheelchair accessibility and seating for at least four people.
- **Lighting:** When feasible, a bus stop should be placed where there is already an existing streetlight. However, when this is not feasible, ornamental streetlights should be used at the bus stop. Adequate lighting at bus stops increases safety for customers and promotes use of the network at different times of the day and night.
- **Trash receptacles:** Bus stops should also be equipped with trash receptacles. This will ensure cleanliness of the stop itself and the surrounding area. Customers will feel more comfortable using the stop and the overall customer experience will be improved as a result. Location of trash receptacles should also prevent any conflicts with wheelchair accessibility and be placed outside the curb clear zone or landing area.

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<sup>6</sup> [Americans with Disabilities Act](#)

<sup>7</sup> [NACTO Transit Street Design Guide](#)

The photo on the left in Figure 4 shows an example of the elements listed above that should be located at a minimum at each stop. The photo on the right shows a typical shelter that should be implemented where possible based on available resources and level of ridership at a particular stop.

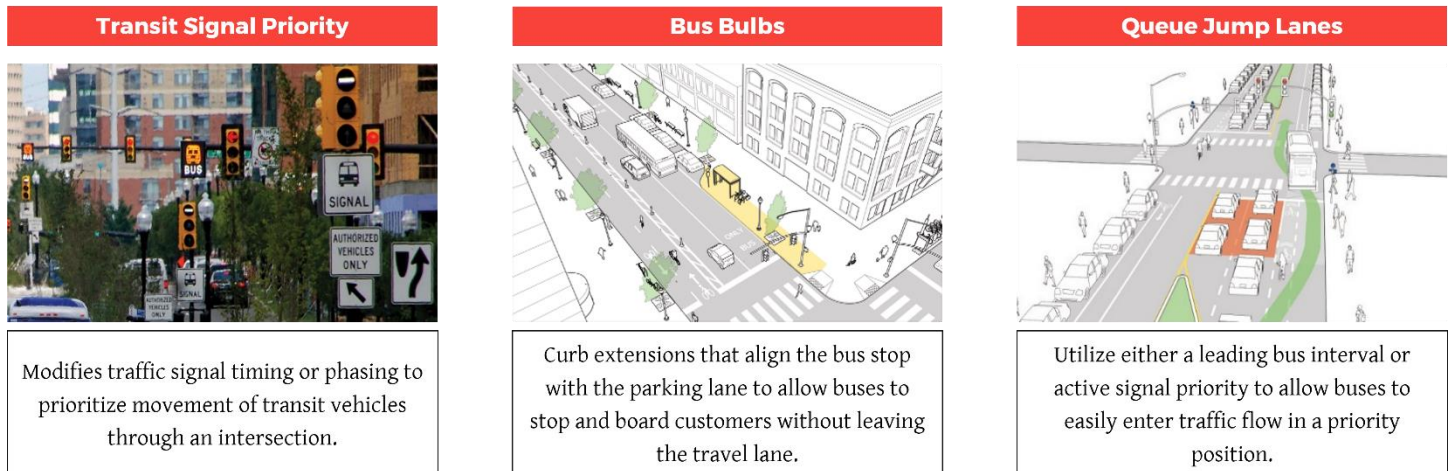
**Figure 4 Madera Metro Bus Stop Sign and Shelter**



## 2.4 TRANSIT PRIORITY TREATMENTS

Figure 5 shows potential transit priority treatments that can be implemented in the future as Madera Metro ridership increases and more funding becomes available.<sup>8</sup> These treatments are not intended to be prescriptive, but rather provide examples of infrastructure investments that can improve Madera Metro service and increase ridership as a result. These treatments can help alleviate reliability issues transit services may experience on surface streets and are context-sensitive to unique street conditions. Deploying these strategies should be considered on a case-by-case basis.

**Figure 5 Transit Priority Treatments**



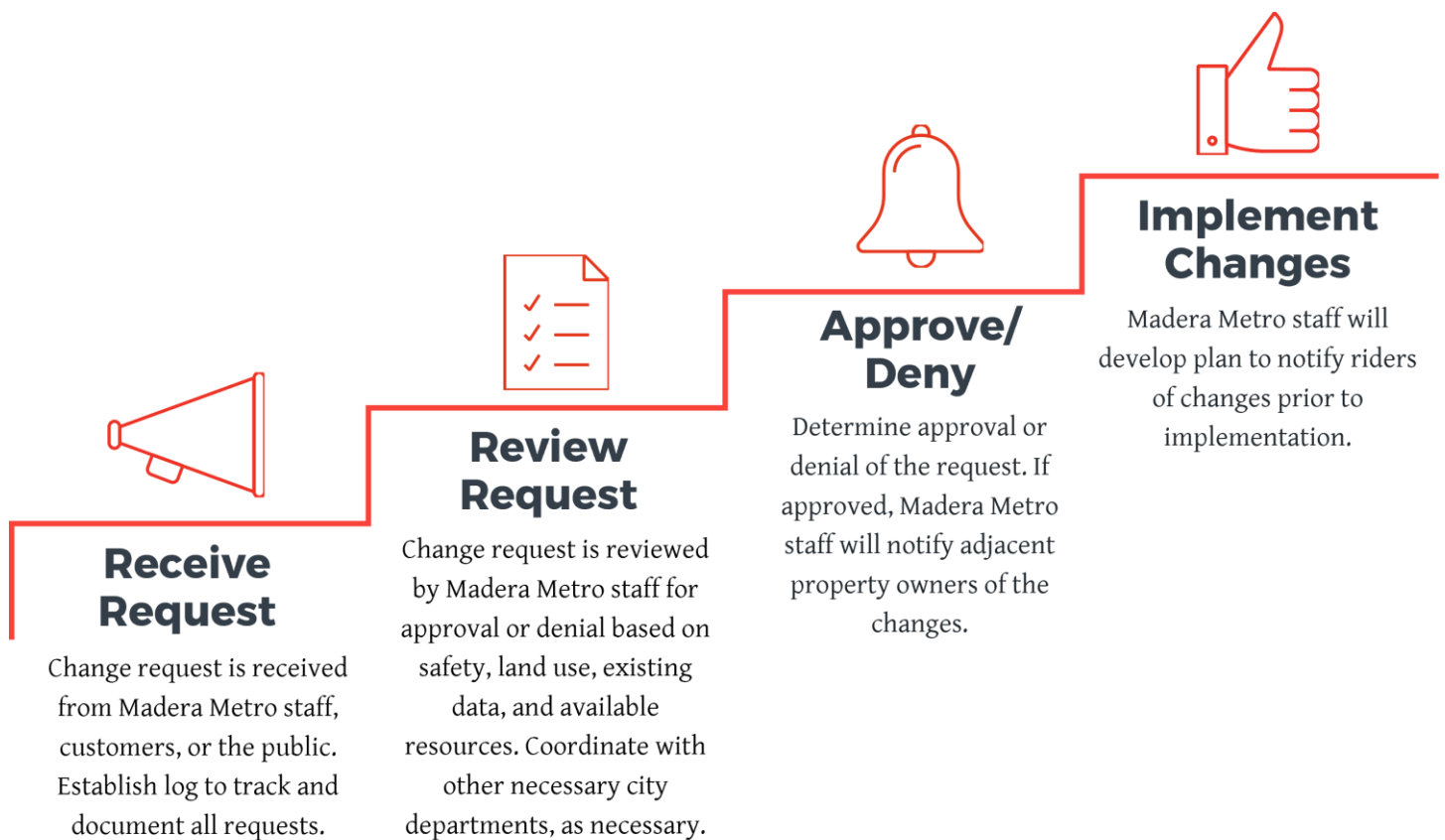
<sup>8</sup> [NACTO Transit Street Design Guide](#)

# 3 BUS STOP DEVELOPMENT AND CHANGE POLICY

A policy should be developed and implemented to evaluate requests for adding, removing, or making changes to any bus stop. These requests can be received through passenger demand, calls to Madera Metro, and the annual Unmet Transit Needs process.

The proposed process below ensures any request to change bus stop locations do not adversely affect existing routes and are placed in areas that are safe for customers to access and serve key destinations. The standards described in Section 2.2 should be used as the basis for approving or denying bus stop requests during reviews. Once a request is received, the proposed process shown in Figure 6 should be followed.

**Figure 6 Proposed Bus Stop Change Policy**



## 4 FIXED-ROUTE SCHEDULING

### 4.1 OVERVIEW

Bus route scheduling determines when a bus will arrive at a given stop. The time intervals between the arrival times of buses at a bus stop is called a headway. Headways are often set at 15-minute intervals and can be set based on the clock face or schedule. Determining headways are based on several factors, such as ridership demand, resource availability (operating budget), operator availability, route length (time to complete round trip) and vehicle availability. 15, 30, and 60-minute windows are common headways that reflect the operator's ability to deliver the service based on the above factors. Establishing consistent headways ensures buses show up on time consistently.

Frequency of service is the number of vehicles that arrive at the bus stop in one hour. Headway based schedules are typically easier for the public to understand compared to frequency of service, which may not have even intervals for buses arriving at the bus stop.

Span of service is the timeframe in which transit service is provided (ex: 6:00 AM to 8:00 PM). Madera Metro route spans should be developed in a way that works for the city. Shorter spans require fewer resources; however, longer spans can provide more access to services for a larger portion of the population. Spans and frequencies should balance meeting ridership demand and available financial resources.

In addition to regular fixed route trips that have the same origin and destination for each trip, Madera Metro should consider offering trips during typical school arrival and departure time periods that specifically serve school locations in the city. These trips would deviate from their typical travel path during these specific time periods to provide direct service for school students.

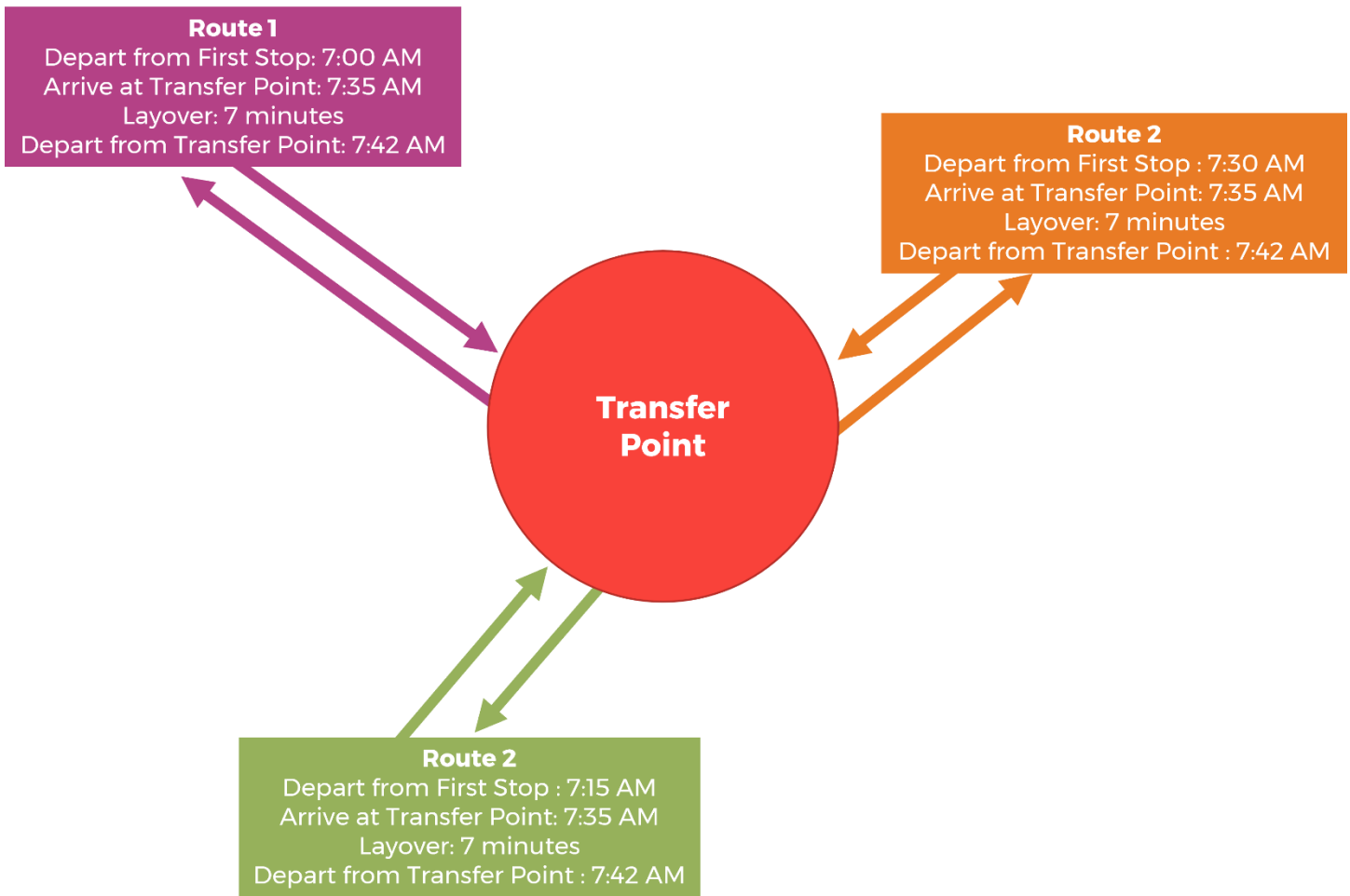
### 4.2 SCHEDULING CONSIDERATIONS

#### **TIMED TRANSFERS**

Timed transfers are a scheduling strategy where vehicles from different routes are routed and scheduled to meet simultaneously at common stops to reduce the time needed to transfer to different routes. Timed transfers are typically deployed for routes with longer headways where transit demand may be lower. Two potential locations to implement timed transfers include the existing Walmart stop on Cleveland Avenue and the Madera Intermodal Station on North E Street. Madera Metro staff should examine the feasibility of timed transfers to improve connectivity of the network and ease the process of transferring to another route.

An example of a timed transfer scenario can be found in Figure 7. Note that the routes are scheduled to arrive at the transfer point at 7:35 AM and each route is also scheduled to have a seven-minute layover before departing to give customers sufficient time to make their connection.

**Figure 7 Timed Transfer Scenario**



### **SERVICE LEVEL ALLOCATION**

Working within a constrained budget requires making tough decisions in terms of providing transit service. It's important for Madera Metro to establish their priorities and realize span of service and headways may be in competition with each other for scarce resources.

To help match service levels with ridership demand, transit systems typically provide different levels of service for different periods of the day (peak vs. off-peak) and days of the week (weekdays vs. weekends). Peak periods are times in the day (typically in the morning and late afternoon) where ridership demand is highest.

Table 2 shows an example of three routes with different spans and levels of service. While the Purple Line has the highest level of service and longest span, there is a trade-off between the Orange Line and Green Line where one has a shorter span but shorter headways in the peaks, while the other offers longer headways but also a longer span. These time windows and headways can be adjusted as necessary based on factors including, but not limited to, ridership demand, available resources, and areas that are being served.



**Table 2 Potential Service Levels Allocation**

Route	Span	Headways					
		Overnight 12:00 AM – 6:00 AM	AM Peak 6:00 AM – 9:00 AM	Midday 9:00 AM – 4:00 PM	PM Peak 4:00 PM – 7:00 PM	Early Evening 7:00 PM – 9:00 PM	Late Evening 9:00 PM – 12:00 AM
Purple	24 hours	60 min	15 min	30 min	15 min	30 min	60 min
Orange	4:00 AM – 10:00 PM	60 min	30 min	60 min	30 min	60 min	60 min
Green	6:00 AM – 8:00 PM	N/A	15 min	30 min	15 min	30 min	N/A

# 5 PERFORMANCE MEASURES




## 5.1 MONITORING AND REPORTING PROCESS




Performance measurements provide a set of standards and strategies to measure the effectiveness of a transit network in many different areas. These measurements can be either quantitative based on available data from the operator, or qualitative based on surveying customers’ travel behavior and feelings towards the services provided. These measurements should be reported on a regular basis (monthly, quarterly, or annually depending on staff resources) to both internal stakeholders and the public. Analyzing the results of these measurements can guide future decision making on changes to the network to improve any low-performing routes.

## 5.2 METRICS

The metrics shown in Table 3 provide both qualitative and quantitative measures to analyze the Madera Metro network and propose changes to meet customers’ needs and improve route performance and productivity.

**Table 3 Performance Measures**

Category	Performance Measure	Description	Target Standard
<b>Ridership</b> 	Annual Average Ridership	Total number of unlinked one-way trips	> 100,000
	Customers Per Revenue Hour	Number of customers that board the system divided by the amount of revenue hours over the same period	> 8
	Customers Per Revenue Mile	Number of customers that board the system divided by the amount of revenue miles over the same period	> 1
<b>Performance</b> 	On-Time Performance	The percentage of trips that are picked up on-time (within an established time period)	> 80%
<b>Productivity</b> 	Operating Cost Per Revenue Hour	Cost to operate service divided by revenue hours	< \$82.00
	Operating Cost Per Revenue Mile	Cost to operate service divided by amount of revenue miles	< \$6.00
	Farebox Recovery	Amount of fare received per the cost to operate service	> 15%
	Cost Per Passenger	Total operating expenses required to deliver service divided by total number of boardings	< \$23.00

Category	Performance Measure	Description	Target Standard
	Subsidy Per Passenger	Total operating cost of providing service minus any fare (and other revenue) per the number of customers	< \$23.00
	Average Fare Per Passenger	Total fare received divided by number of customers that board the system	TBD
<b>Customer Satisfaction</b> 	On-Board Ridership Survey	Survey should be conducted regularly to gauge customer satisfaction with the network	<b>Complete twice per year</b>
<b>Access</b> 	Population Within ¼ Mile of a Bus Stop	Measure of percentage of residents within walking distance (¼ mile) of a bus stop	> 85%
<b>Safety</b> 	Accidents Per 100,000 Vehicle Miles Traveled	Identifies how often preventable accidents occur over time	<2 accidents

### 5.3 EQUITY

In addition to the performance measures listed above, Madera Metro should make consistent efforts to ensure their services are adequately serving areas of the city with higher percentages of households with low income, people of color, seniors, people with disabilities, and other traditionally underserved populations. This includes identifying populations that rely on transit service the most and developing strategies to improve transit service in those areas. As updates are made to the network and services are expanded and/or adjusted, it is imperative that these changes are not made at the expense of those that use the network the most.

Future changes to the network should be made in consultation with the findings of the equity analysis conducted as part of the MCTC’s 2022 Regional Transportation Plan & Sustainable Communities Strategy.<sup>9</sup> Specifically, the plan states, “Residents who rely on public transit most, should subsequently receive the largest share of transit investment.”

The plan also defines five Target Areas in the Madera Region listed below. It should be noted that Target Area III, which includes the City of Madera, has the largest proportion of minority and low-income residents.

- **Target Area I:** Town of La Vina, located in the southwest corner of Madera County
- **Target Area II:** City of Chowchilla and surrounding block groups.
- **Target Area III:** City of Madera and surrounding block groups.

<sup>9</sup> [MCTC 2022 Regional Transportation Plan & Sustainable Communities Strategy](#)

- **Target Area IV:** Madera Ranchos area near Avenue 12 between Highway 41 and Road 34.
- **Target Area V:** Mountain communities within Madera County, north of the Madera Canal.

## 6 GLOSSARY

**Americans with Disabilities Act (ADA):** Civil rights law passed by Congress in 1990 which makes it illegal to discriminate against people with disabilities in employment, services provided by state and local governments, public and private transportation, public accommodations, and telecommunications.

**Fixed Route:** Service provided on a repetitive, fixed-schedule basis along a specific route with vehicles stopping to pick up and deliver passengers to specific locations.

**Frequency:** The number of vehicles that arrive at the bus stop in one hour.

**Headway:** Time interval between vehicles moving in the same direction on a particular route.

**Layover:** Time built into a schedule between arrival at the end of a route and the departure for the return trip.

**MCTC:** Madera County Transit Commission

**Peak Period:** Time periods when transit ridership is highest.

**Span of Service:** The time that service starts and ends.

**Transfer:** When passengers interchange from one route or vehicle to another.