Multimodal Arterial Plan Development
Technical Advisory Committee Meeting Agenda
Thursday, April 9, 2015, 11:30 a.m.

1111 Broadway, Suite 800, Oakland, CA 94607 • 510.208.7400 • www.AlamedaCTC.org

Staff Liaisons: Tess Lengyel and Saravana Suthanthira
Technical Team Members: Alameda County Technical Advisory Committee
Consultant: Matthew Ridgeway, Fehr & Peers
Public Meeting Coordinator: Angie Ayers

		Page	A/I
1.	**Welcome and Introductions**		
2.	**February 5, 2015 Meeting Minutes** Recommendation: Approve the February 5, 2015 meeting minutes.	1	A
3.	**Work Update (Verbal)** Staff/consultants will present a project update and discuss complete and in-progress deliverables.		I
4.	**Review of Countywide Multimodal Arterial Plan Draft Roadway Typology Framework** Staff/consultants will present the draft typology framework for the Countywide Multimodal Arterial Plan.	5	I
5.	**Review of Multimodal Arterial Plan Draft Performance Objectives** Staff/consultants will present the performance objectives for the Countywide Multimodal Arterial Plan.	11	I
6.	**Next Steps/Next Meeting**		
7.	**Adjournment**		

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Multimodal Arterial Plan Technical Advisory Committee Meeting Minutes
Thursday, February 5, 2015, 11:30 a.m. 2.0

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1. **Welcome and Call to Order**
   Saravana Suthanthira called the meeting to order at 11:30 a.m. The meeting began with introductions. Saravana provided a brief overview of the desired meeting outcomes. She requested the committee provide feedback and approve the Countywide Multimodal Arterial Plan vision, goals, and performance measures. Saravana introduced Matthew Ridgway and Francisco Martin of Fehr & Peers.

2. **Work Update**
   Matthew Ridgway of Fehr & Peers, the consultant team project manager of the Countywide Multimodal Arterial Plan, reviewed the project schedule with the committee and provided a recap of work on the plan done to date.

3. **Approval of Multimodal Arterial Plan Vision, Goals, and Performance Measures**
   Matthew Ridgway informed the committee that the vision and goals in the packet are based on the feedback received from the Alameda County Technical Advisory Committee (ACTAC) and the Multimodal Arterial Plan Planning Area meetings that took place during October and November of 2014. Matthew noted that the performance measures were derived from the visions and goals. The revised performance measures and the draft performance evaluation approach were reviewed by stakeholders in January 2015.

   Questions/feedback from the committee on the vision and goals statements:
   - Change "… maintaining local contexts" to "… considering local priorities" in the vision statement.
   - The committee achieved a general consensus on the goals.

   The committee requested the following changes to the performance measures:
   - Change performance measure 4.2 "Implementation Feasibility" to "Implementation Challenges."
   - Report collisions by mode.
   - Report vehicle miles travelled and greenhouse gas emissions by planning area.

   Regarding the performance measures, the committee also discussed the following:
   - ACTAC will review the refined evaluation methodology.
   - Why are the performance measures focusing on PM peak hours for congestion? Staff said that generally the PM peak hours have more activity and congestion than the AM hours.
     - A member stated that sometimes the AM is different than the PM directionally and that can be an indicator that something unusual is going on. Francisco said that the approach was to look at one direction, which generally peaks higher in the PM. That will help to identify cross-sectional improvements that will be balanced for all directions. Saravana stated that based on Alameda CTC's monitoring efforts, the majority of congestion

occurs on the Alameda County network occurs in the PM. Since this Plan being a countywide plan and studies the countywide network, it is manageable and appropriate to look at the time period when majority of peak congestion occurs on the network.
    - A member suggested that from an informational perspective, it would be good to report the data from off-peak hours. Staff responded that Alameda CTC wants to make sure we have metrics that quantify congestion at a facility-specific level and travel reliability for all modes.
- A member stated that INRIX data is not comprehensive for the network. Will the team gather more information for arterials that do not have INRIX data? Saravana stated that Alameda CTC is looking for reliable data. We went with INRIX, because it is a huge database that covers most of the network. The data points in East County are sparse although the data sample is still much greater than what we would have received had we conducted a floating car survey. If jurisdictions have data, please provide it for use. Matthew stated that where we have INRIX data, we will use it. If jurisdictions have data with good indicators, we will use that data. If there isn't data available, we will use the congested speed out of the Countywide Travel Demand Model and make adjustments as necessary.
- A member suggested that any data collected prior to 2012 is not reliable, and using INRIX data is better. Francisco reiterated that INRIX data will be used, and if the data does not exist, data from jurisdictions will be used. Otherwise, the data from the Countywide Travel Demand Model will be used.
- A member asked regarding reliability of transit speed data and wanted clarification of what that data includes, because data is coming from both INRIX and the transit agencies for transit speed. Francisco stated that in November the original intent was to estimate transit speed based on vehicle congested speed. But since the transit agencies requested a separate performance measure for transit speed, specifically using their onboard GPS data, we will be using data provided by the transit operators.
- A member asked regarding the peak-hour vehicle performance measure in priority development areas (PDAs) versus in non-PDAs.
    - Are auto trips local or regional trips in a PDA? How many are local trips and how many are regional (also known as "through") trips?
    - How will modal priorities work in PDAs in terms of improving walking, transit, and biking as travel choices instead of driving automobiles in PDAs?

  Matthew stated that regional traffic is not a part of the automobile performance measure; however, it's part of topology. The measure for through traffic looks at what percentages of trips are greater than X-number of miles. To explain this process, we will have a series of overlays for bicycle and pedestrians in the topology.
- Will the performance measures for auto and other trips have equal weight? Saravana and Matthew stated that this needs to be defined.
- Do you have a sensitivity analysis of the tools being used for analyzing data? Francisco said that Fehr & Peers have tested these tools out previously and will use an alternative calculation method where needed.
- What would be a gap for a bicycle facility? Matthew said it could be a bike way identified in the Alameda CTC Bicycle Plan for which there is a gap. Essentially, it's a level of traffic stress perspective that changes for a wide range of users.
- How did you come up with the score for the level of traffic stress? Matthew said it's a numeric process used by Mineta Transportation Institute, as briefly shown in the memo

- There was a question whether this plan deal with turn movements. Matthew said no.
- How does the intelligent transportation system (ITS) performance measure relate to trucks? Francisco said that we are capturing the ITS structure now and will make a recommendation within the arterial study.
- For implementation feasibility one challenge is the right of way. For example, if you want to widen something, and the right of way is not received, it may delay a project. So, it is appropriate at least to acknowledge that challenge as part of the performance measurement.
- Can metrics be added for economic benefits for sales tax data as a performance indicator? Tess said that the sales tax is overall from Alameda County and the State of California Board of Equalization distributes the revenues to Alameda CTC, and therefore the incremental benefit cannot be quantified.
- What is the future property value based on transportation change? Matthew said this will come later in the process.

Aleida Andrino-Chavez (Albany) moved to approve the vision, goals, and performance measures with the changes members requested (listed on page 1). Reh Lin Chen (San Leandro) seconded the motion. The motion passed unanimously.

4. **Countywide Multimodal Arterial Plan Draft Arterial Network**
   Saravana informed the group that due to time constraints, this item will be presented at the ACTAC meeting.

5. **Next Steps/Next Meeting**
   The next meeting is scheduled for April 9, 2015 at Alameda CTC offices.

6. **Adjournment**
   The meeting adjourned at 1:25 p.m.

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DATE:	April 6, 2015
SUBJECT:	Countywide Multimodal Arterial Plan – Draft Roadway Typology Framework
RECOMMENDATION:	Provide input on Draft Roadway Typology Framework

Summary

The arterial roadways are the core of the transportation system in Alameda County, moving people and goods within the county and the region. These roadways provide regional and local mobility with multiple transportation modes, access to surrounding land uses, and connectivity between employment and activity centers that is essential for Alameda County's economy and quality of life. Alameda CTC is developing a Countywide Multimodal Arterial Plan that will provide a framework for designing, prioritizing, and implementing projects and programs on the arterial network. The Arterial Plan development is being closely coordinated with local jurisdictions, Caltrans and bus transit operators, and with two other major Alameda CTC plans: the Countywide Goods Movement Plan and the Countywide Transit Plan. In addition, Alameda is also coordinating with other stakeholders representing all modes and abilities such as representatives for bicycle, pedestrian, trucks, emergency response, seniors and disabled.

The Commission approved the vision, goals, and performance measures for the Multimodal Arterial Plan in January 2015. The project team later developed draft performance objectives, or thresholds for the approved performance measures, which is being presented separately.

A key task in the Arterial Plan development includes development of a draft roadway typology framework. A memorandum from the consultant team on the draft typology framework is provided in Attachment A. The typology framework has three main components: auto travel and access characteristics; multimodal network overlays; and land use contexts. This plan is an unprecedented effort that identifies the characteristics of major streets across a county, and use the information to evaluate their performance as multimodal complete streets. For the Arterial Plan, this step will help inform the modal priority for the streets on the Study Network, which in turn will lead to identifying multimodal improvement needs. Jurisdictions such as Alameda, Emeryville and Fremont have developed similar street typology systems unique to their General Plans or Specific Plans. Alameda CTC's

typology framework development will consider these jurisdictions' adopted typology systems, and ensure that they nest within the Multimodal Arterial Plan's street typology framework. Similarly, the typology framework is expected to inform or provide a base for any future effort to develop street typology by other local jurisdictions in Alameda County.

The draft typology framework with initial associated draft maps will be presented to the Plan TAC and ACTAC on April 9, 2015 and at each of the Planning Area meetings planned for the week of April 20, 2015. A more detailed memorandum on the proposed typology framework will be shared with the ACTAC members prior to the Planning Area meetings. A meeting with the non-agency stakeholders is also scheduled April 20, 2015. Based on comments received, the performance objectives will be finalized and presented to the Committees and the Commission for approval in May or June.

Fiscal Impact: There is no fiscal impact.

Attachments:

A. Alameda Countywide Multimodal Arterial Plan – Draft Arterial Street Typology Framework Preview

Staff Contact

Tess Lengyel, Deputy Director of Planning and Policy

Saravana Suthanthira, Senior Transportation Planner

Daniel Wu, Assistant Transportation Planner

COMMUNITY DESIGN + ARCHITECTURE

MEMORANDUM

Date: April 3, 2015

To: Saravana Suthanthira, Alameda CTC

Cc: Matthew Ridgway and Francisco Martin, Fehr & Peers

From: Phil Erickson, Bharat Singh, and Warren Logan

Re: Alameda CTC Countywide Multimodal Arterial Plan: Draft Arterial Street Typology Framework Preview

Philip Erickson, Architect, AIA
Timothy Rood, AICP, LEED AP ND

The Alameda CTC Multimodal Arterial Plan (MMAP) is developing a street typology framework. The development of a countywide typology framework is an unprecedented effort that identifies the characteristics of major streets across Alameda County. The MMAP will evaluate street performance as *multimodal complete streets*, and suggest potential improvements to streets that are lacking in serving their multimodal function within the countywide network.

Alameda CTC defines multimodal complete streets and their benefits as:

> Streets that are designed, built and maintained to be safe, convenient and inviting for all users of the roadway, including pedestrians, bicyclists, motorists, persons with disabilities, movers of commercial goods, users and operators of public transit, seniors, and children.
>
> Streets that are built for all users have multiple benefits, including increased safety, improved air quality through the reduction of auto traffic, improved health through increased physical activity, and greater cost effectiveness.[1]

Jurisdictions such as Alameda, Emeryville and Fremont have developed similar street typology systems unique to these communities' General Plans or Specific Plans. Alameda CTC's typology framework development will consider these jurisdictions' adopted typology systems, and ensure that they nest within the MMAP street typology framework. Similarly, the typology framework is expected to inform or provide a base for future efforts to develop street typology by other local jurisdictions in Alameda County as a part of their implementation of their complete streets policies.

[1] From the Alameda CTC's Complete Streets web page: http://www.alamedactc.org/app_pages/view/8563

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Definition of the MMAP Typology Framework

The typology framework consists of three components: a set of base street typologies defined by vehicular functionality, a set of multimodal emphasis overlays, and a set of land use context overlays. These three components are defined as:

- **Base Street Types –** Four street types are defined by proportion of trip lengths for vehicles that travel along the *Study Network's*[2] streets, as well as threshold vehicle volumes. Base street types provide a better understanding of the importance of mobility as opposed to access and other modes.
- **Multimodal Transportation Overlays –** All streets should be designed for all users, but some streets have a particular importance to specific modes and these are represented by multimodal transportation overlays. These overlays assure connected and continuous networks for transit, bicycle, and goods movement; and define nodes where pedestrian circulation is vital to economic development and transit access.
- **Land Use Context Overlays –** These overlays define the context of built and natural environments of the streets. The land use is characterized by Priority Development Area (PDA) place types and the land use designation used in developing the region's Sustainable Communities Strategy. In later phases of the MMAP, the land use context will inform specific cross sectional elements of the street, such as parking and loading lanes and the desired width and use of different zones of the sidewalk.

More detail about how the street types and overlays were determined and examples of streets throughout Alameda County will be provided in a separate memorandum prior to the Planning Area meetings.

How the Typology Framework will be used in the MMAP effort

The typological framework is being used in the MMAP effort in three ways:

1. The Typology Framework informs modal priorities:
    a. Base Street Types inform streets of importance to vehicles;
    b. Modal Transportation Overlays for transit, goods movement and bicycles define continuous and connected networks for each of these modes.
    c. Land Use Context Overlays and pedestrian modal transportation overlay define nodes where the pedestrian experience is important to achieving economic development and facilitating access to transit.
2. The Typology Framework informs appropriate modal improvements (to be derived in a subsequent phase of work) that address the specific modal needs of a roadway. For example, a pedestrian priority street along a commercial corridor would have a wider desired sidewalk than a pedestrian priority street in a residential corridor.
3. The street types and multimodal transportation overlays will also help identify *arterials of countywide significance*, reflecting vehicular travel, access and modal function of the streets.

[2] The *Study Network* consists of the arterials and collectors that are part of the California Road System (CRS) classification system that was sent to all Alameda County jurisdictions for review and to support data collection in December 2014.

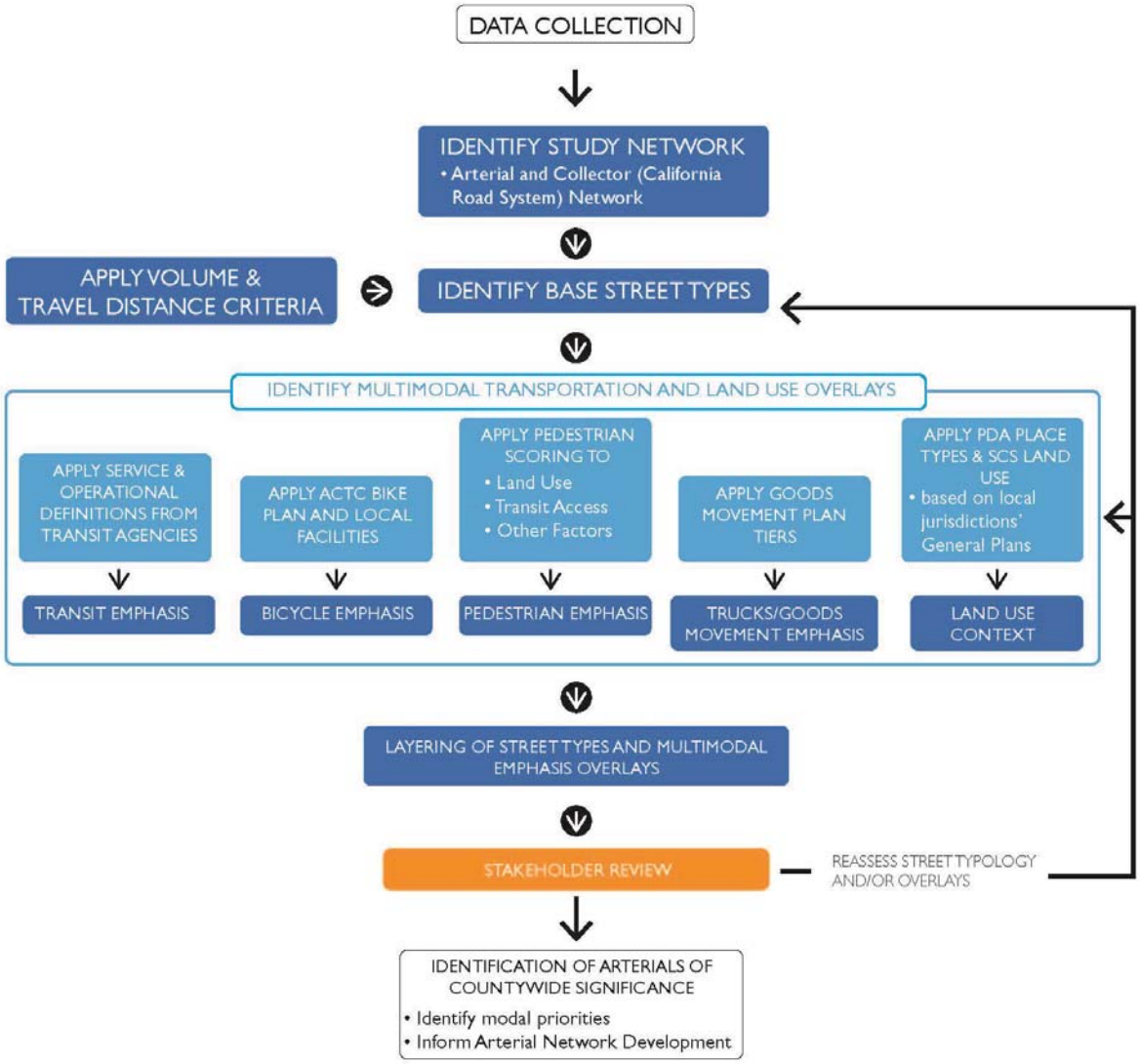
Draft *Arterial Network*[3] criteria were previously presented to stakeholders at the February 2015 ACTAC and Commission meetings; a separate white paper documenting *Arterial Network* selection criteria (updated to reflect typology work to date) and accompanying maps will be prepared and presented to jurisdictions and stakeholders.

The typology framework process is graphically illustrated in Figure 1. Data collected from local jurisdictions, the Alameda Countywide travel demand model, MTC, ABAG, transit agencies, and other sources have been used to identify base street types and to develop and apply the multimodal and land use overlays.

A series of initial maps of the street types and overlays are being prepared and will be presented at the Plan TAC and ACTAC on April 9, 2015. A description of the methodologies used in generating the initial maps will also be presented at the Plan TAC and ACTAC in April. In addition, jurisdictions will be given access to the online GIS Server maintained by Fehr & Peers to review these initial typology maps and provide comments as necessary.

[3] The *Arterial Network* is a subset of the *Study Network* consisting of those streets which satisfy the criteria for countywide significance that have been defined in a separate MMAP memorandum.

Figure 1: Multimodal Arterial Plan Typology Framework Process Diagram



DATE:	April 6, 2015
SUBJECT:	Countywide Multimodal Arterial Plan – Draft Performance Measures' Objectives
RECOMMENDATION:	Provide input on Performance Measures' Objectives.

Summary

The arterial roadways are the core of the transportation system in Alameda County, moving people and goods within the county and the region. These roadways provide regional and local mobility with multiple transportation modes, access to surrounding land uses, and connectivity between employment and activity centers that is essential for Alameda County's economy and quality of life. Alameda CTC is developing a Countywide Multimodal Arterial Plan that will provide a framework for designing, prioritizing, and implementing projects and programs on the arterial network. The plan development is being closely coordinated with local jurisdictions, the California Department of Transportation (Caltrans) and bus transit operators, and with two other major Alameda CTC plans: the Countywide Goods Movement Plan and the Countywide Transit Plan.

The Commission approved the vision, goals, and performance measures for the Multimodal Arterial Plan in January 2015. The project team developed the attached draft performance objectives, or thresholds for the approved performance measures (Attachment A). The intent is to apply the performance objectives to existing and future-year conditions to identify the transportation needs for the Arterial Plan Study Network, defined as part of the plan process as a broad countywide street network that represents all arterial and collector streets throughout Alameda County that are classified using Caltrans' California Road System (CRS). This in turn is anticipated to provide guidance to identify short-term (year 2020) and long-term (year 2040) improvements to adequately address the identified needs. Performance measures in combination with the performance objectives will ensure that the proposed short-term and long-term improvements meet the Plan's vision and goals. Attachment A summarizes the Multimodal Arterial Plan's performance measure planning framework and the approved performance measures, and presents the draft performance objectives.

The draft performance objectives will be presented to the Plan TAC and ACTAC on April 9, 2015 and at each of the Planning Area meetings planned for the week of April 20, 2015. A meeting with non-agency stakeholders is also being scheduled in April. Based on comments

from these meetings, the performance objectives will be finalized and presented to the Committees and the Commission for approval in May.

Fiscal Impact: There is no fiscal impact.

Attachments:

A. Alameda Countywide Multimodal Arterial Plan – Draft Performance Measures' Objectives

Staff Contact

Tess Lengyel, Deputy Director of Planning and Policy

Saravana Suthanthira, Senior Transportation Planner

Daniel Wu, Assistant Transportation Planner

MEMORANDUM

Date: April 1, 2015

To: Saravana Suthanthira, Alameda CTC

From: Francisco Martin and Matthew Ridgway, Fehr & Peers

Subject: Alameda Countywide Multimodal Arterial Plan – Draft Performance Measure Objectives

OK14-0023

The Alameda Countywide Multimodal Arterial Plan's performance measures are derived from the Plan's vision and goals. The performance measures will be utilized to evaluate existing and future year multimodal transportation conditions across the County for the Plan's Study Network[1], which is a broader countywide street network that represents all arterial and collector streets throughout the County using Caltrans' California Road System (CRS) classification. Performance measures were approved by the Alameda CTC Commission on February 26, 2015. The list of approved performance measures is summarized in the **Appendix A** for reference.

The draft performance objectives, or thresholds for the performance measures, were developed as a subsequent step after performance measures were approved. The performance objectives will be applied to existing and future year conditions to identify Study Network needs and provide guidance in identifying short-term (year 2020) and long-term (year 2040) improvements to adequately address those needs. Performance measures in combination with the performance objectives will ensure that the proposed short-term and long-term improvements meet the Plan's vision and goals. This memo summarizes the Multimodal Arterial Plan's performance measure planning framework and presents the draft performance objectives. The draft performance objectives will be presented to ACTAC at the April 9, 2015 meeting and at each of the Planning Area meetings planned for the week of April 20, 2015. A brief summary of the role and utility of various Plan development components is provided in **Table 1**, additional information for each of the components is also provided in the proceeding section.

[1] The Study Network consists of the arterials and collectors that are part of the California Road System classification that was sent to all Alameda County jurisdictions for review and to support data collection in December 2014.

TABLE 1
ROLE AND UTILITY OF MULTIMODAL ARTERIAL PLAN COMPONENTS

Plan Development Components	Utility	Approval Status
Vision and Goals	The vision lays out the strategic direction for the Plan; goals describe the desired outcome of the Plan.	Approved by Commission on February 26, 2015
Performance Measures	Performance measures assess the existing and future year transportation conditions of the Study Network against the identified goals. These performance measures include three types of measures: Performance Measures; Performance Indicators; and Network Connectivity Checks. • *Performance Measures* – Measures that directly assess the built environment and planning level operations at the facility-specific scale, and thus provide the direct assessment of a roadway facility on Study Network multimodal gaps and needs. • *Performance Indicators* –These are area-wide performance measures and are generally applied after preferred short- and long-term improvements are identified for the Arterial Network to evaluate and to ensure that the preferred improvements achieve the Plan's vision and goals. • *Network Connectivity Checks* - Network connectivity checks are performed as a mapping exercise that evaluates the transit infrastructure, pedestrian comfort, bicycle comfort and truck route accommodation measures for consistency across the respective modal networks.	Approved by Commission on February 26, 2015
Performance Objectives	These are thresholds identified for the performance measures that directly assess the built environment and planning level operations at the facility-specific scale. Performance objectives are applied to the performance measure assessment of existing and future year transportation conditions to determine Study Network gaps, deficiencies and needs. Performance objectives vary depending on the modal priority along a Study Network segment.	Pending Commission Approval – May/June 2015
Typologies	Typologies classify the Study Network roads based on their transportation and access functions, and land use characteristics of the roads. They help identify the modal priorities along each Study Network segment. In addition, typologies inform the Arterial Network[1] selection criteria.	Pending Commission Approval – June 2015

Notes:
1. The Arterial Network is the subset of the Study Network representing *arterials of countywide significance*.
Source: Fehr & Peers, 2015.

PERFORMANCE MEASURES AND PLANNING FRAMEWORK

Figure 1 presents a streamlined flow chart of the Multimodal Arterial Plan planning framework and illustrates how performance measures in combination with performance objectives will be used to identify short and long-term improvements. The process is also described below and distinguishes between the progress made until now and upcoming tasks.

TASKS COMPLETED OR IN PROGRESS

1. Performance Measures are derived from the Plan's goals, which are in turn derived from the Plan's vision. The Plan's vision, goals and performance measures were approved by the Commission on February 26, 2015.
2. In late 2014, the project team identified the "Study Network;" this network includes available parallel facilities of other modes (e.g. bike and truck routes). The Study Network will support data collection, assessment of existing and future conditions, and typology development.
3. In February of 2015, the ACTAC and the Commission reviewed the draft criteria to identify Arterials of Countywide Significance (Arterial Network). No changes were requested; therefore, using this set of criteria, the Arterial Network will be developed in April and presented to the ACTAC and Commission for approval in May. The Arterial Network will be used to develop the list of preferred improvements. Arterial Network selection criteria are summarized in a memo titled Alameda Countywide Multimodal Arterial Plan – Draft Criteria for Selecting Arterials of Countywide Significance (January 21, 2015).
4. Roadway typologies[2] will be developed for the Study Network. Typologies will be descriptive of a roadway's transportation function, land use context, and modal emphasis. Modal priority for transit and trucks will be coordinated with the Countywide Transit and Goods Movement Plans that are currently underway. Modal priorities will be vetted and confirmed during the Planning Area meetings in April.
5. Modal priorities will inform the performance objectives by segment/corridor as different modal priorities can potentially result in different performance objectives. Draft performance objectives are described in the following section of this memo.

[2] The roadway typology framework is described in a separate memo titled "Alameda CTC Countywide MMAP: Draft Arterial Street Typology Framework Concepts," and will also be presented to ACTAC and at the Planning Area meetings in April.

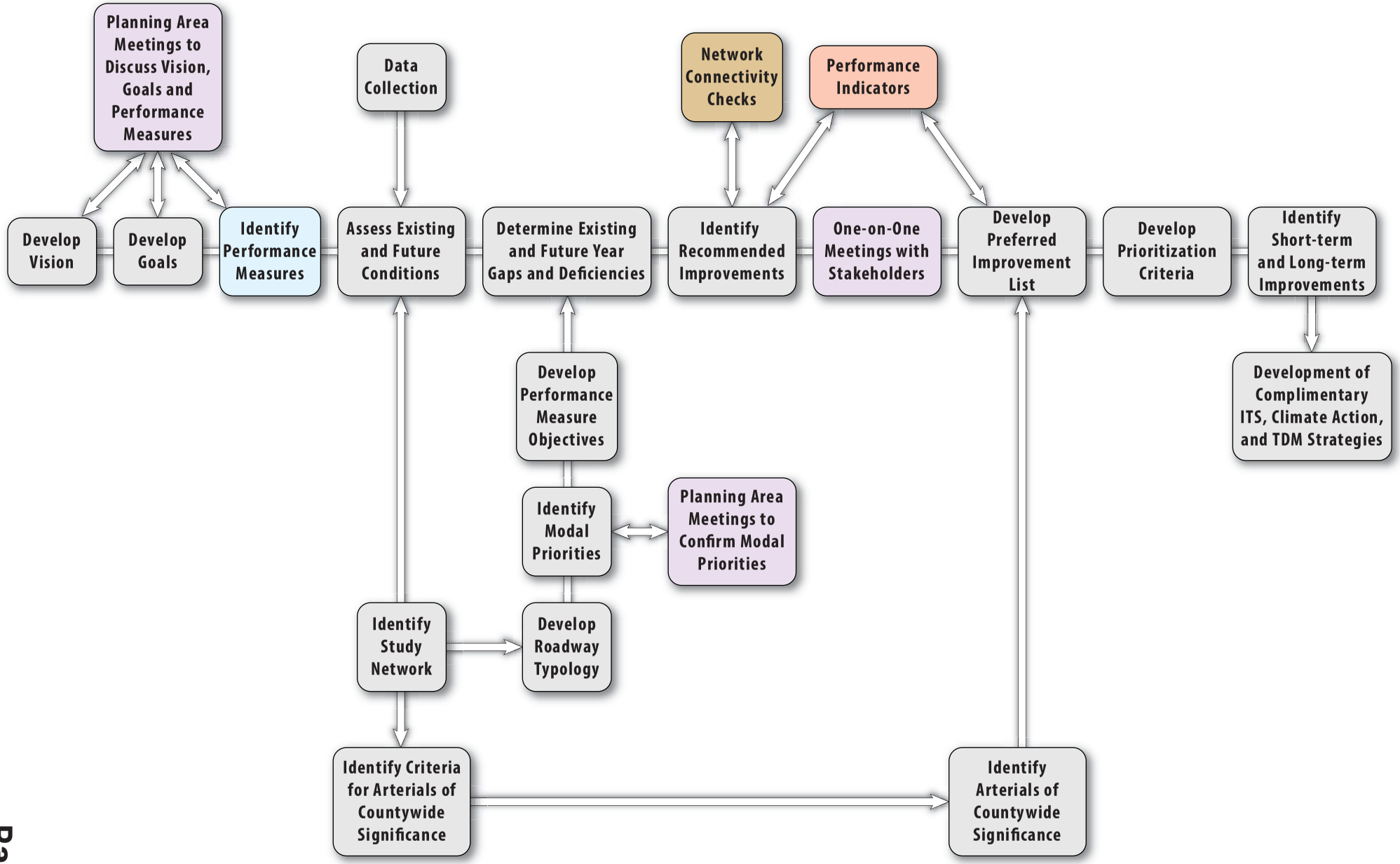


Figure 1

Alameda CTC Countywide Multimodal Arterial Plan Framework

UPCOMING TASKS

6. The performance objectives will be applied to the performance measure assessment of existing and future year transportation conditions to determine network gaps, deficiencies and needs.
7. Recommended multi-modal transportation improvements will be identified to adequately address short (2020) and long-term (2040) Study Network multimodal needs. Network connectivity checks will be conducted for each mode at this stage to ensure that identified recommended improvements provide an adequate and supportive network for all modes; connectivity checks will be performed as a mapping exercise that evaluates the transit infrastructure, pedestrian comfort, bicycle comfort and truck route accommodation measures for consistency across the respective modal networks. For Study Network segments with multiple modal priorities, preference for recommended improvements will be given to the top identified modal priority; additional improvements will be identified for other lower priority modes wherever possible.
8. The Consultant team will meet with each Alameda County jurisdiction and transit operators individually to review the recommended set of multi-modal transportation improvements; each jurisdiction will have the opportunity to review and refine the set of recommended improvements, which will lead to identifying the preferred set of improvements for the Arterials Network. Since the Arterial Network is the subset of the Study Network, the recommended improvements identified for the Arterial Network will be considered as the preferred set of improvements for the Arterial Network.
9. After preferred improvements are identified, the project team will utilize the following area-wide performance indicators to ensure that the list of identified preferred improvements achieves these various elements of the Plan's vision and goals and the results of these indicators will revise the list of preferred improvements as necessary:
    a. Equity: The benefit to Communities of Concern performance indicator ensures that recommended improvements are equitable throughout the County.
    b. Property value index: The property value index ensures that recommended improvements support a strong economy.
    c. Demand for active transportation: The demand for active transportation performance indicator will identify the potential mode shift to active transportation modes.

d. VMT per capita and GHG per capita performance indicators: The VMT and GHG per capita indicators will help ensure that recommended improvements have a positive impact on emissions throughout the County.

10. Prioritization criteria[3] will be developed in coordination with stakeholders to prioritize the list of preferred short and long-term improvements to be included in the Final Multimodal Arterial Plan.
11. The project team will develop a set of ITS, climate action, and TDM strategies that are complimentary to the list of preferred short and long-term improvements.

As shown in **Figure 1** and described above, performance measures and objectives play a critical role in developing the Plan and identifying the preferred set of short and long-term improvements.

APPROVED PERFORMANCE MEASURES

The approved performance measures to be utilized as part of the Alameda Countywide Multimodal Arterial Plan development are listed in the **Appendix A**. Performance measures will be applied to assess existing and/or future year transportation conditions. These measures also include area-wide performance indicators (non-auto mode share, benefit to Communities of Concern, demand for active transportation, VMT and GHG per capita). These indicators by themselves do not evaluate existing or future conditions to identify gaps or deficiencies, but provide an evaluation of the network or facility for a comparative assessment of the proposed improvements against the Plan's vision and goals. Therefore, these area-wide indicators will be generally applied after preferred short- and long-term improvements are identified for the Arterial Network to evaluate and to ensure that the preferred improvements achieve the Plan's vision and goals. Similarly, facility-specific performance indicators such as operating cost effectiveness, implementation challenge score and property value index will be applied after short- and long-term improvements are identified.

The performance measures table in the **Appendix A** also lists the goal that each measure or indicator addresses, if the measure is a facility-specific or area-wide application, and whether the measure or indicator applies to either existing conditions, future year conditions or both. Arterial corridor performance measure results will be derived from the study segment results along the

[3] Short and long-term improvement prioritization criteria will be developed and presented to stakeholders later in the Plan development process. All stakeholders will have an opportunity to review and provide feedback on the prioritization criteria before the criteria are finalized.

corridor; for example, automobile congested speed at the corridor level will be estimated by calculating the average (weighted by volume) congested speed from all the individual study segments that are within the corridor limits.

PROPOSED PERFORMANCE OBJECTIVES

As previously mentioned, modal priorities will inform the performance objectives as different modal priorities can potentially result in different objectives to determine if an arterial study segment is performing adequately to suit the multimodal needs. A particular objective identified for a performance measure related to a mode is the minimum threshold that needs to be met for that measure if that particular mode has the priority on that arterial segment. For example, the Bicycle Comfort Index identifies four different ratings, ranging from Level of Traffic Stress 1 (LTS1) to LTS4 (LTS1 representing "Very Good" comfort level for cyclists). If a Study Network segment is identified as having a bicycle modal priority, the performance measure objective would be to achieve an LTS1 (Very Good) or LTS2 (Good) rating. If the segment is not identified as having a bicycle modal priority, a Bicycle Comfort Index performance objective does not apply and therefore it's assumed that any rating - LTS1, LTS2, LTS3 or LTS4 - is adequate for that specific segment.

Table 2 presents the proposed performance objectives for performance measures that are facility-specific and apply to existing conditions. Performance measures for no objectives were developed are included in the next section of this memo. In order to have a comparable rating system, the scores were translated into an equivalent qualitative rating scale (e.g., very good, good, poor, etc.) for several performance measures. Performance objectives are identified for measures that directly assess the built environment and planning level operations at the facility-specific scale, and thus provide the direct assessment of a roadway facility on Study Network multimodal gaps and needs. The following are those measures, and are related to the "Multimodal" goal.

- 1.1A – Congested Speed
- 1.1B – Reliability
- 1.2A – Transit Travel Speed
- 1.2B – Transit Reliability
- 1.2C – Transit Infrastructure Index
- 1.3 – Pedestrian Comfort Index
- 1.4 – Bicycle Comfort Index
- 1.5 – Truck Route Accommodation Index
- 1.7 – Pavement Condition Index

TABLE 2
MULTIMODAL ARTERIAL PLAN PERFORMANCE OBJECTIVES

Performance Measure	Application	Modal Objectives[1]				
		Autos	Transit	Pedestrian	Bicycle	Trucks
1.1A – Congested Speed	Facility-Specific Measure, Existing and Future Conditions	Greater than 40% of Posted Speed Limit	Greater than 40% of Posted Speed Limit	*	*	Greater than 40% of Posted Speed Limit
1.1B – Reliability	Facility-Specific Measure, Existing and Future Conditions	Reliable	*	*	*	Reliable
1.2A – Transit Travel Speed	Facility-Specific Measure, Existing and Future Conditions	*	Greater than 50% of the Auto Congested Speed (Measure 1.1A)	*	*	*
1.2B – Transit Reliability	Facility-Specific Measure, Existing and Future Conditions	*	Greater than 0.4 *(PM peak hour-to-non-peak hour transit speed ratio)*	*	*	*
1.2C – Transit Infrastructure Index	Facility-Specific Measure, Existing and Future Conditions	*	Good or Very Good	*	*	*
1.3 – Pedestrian Comfort Index	Facility-Specific Measure, Existing and Future Conditions	**	Fair, Good or Very Good	Good or Very Good	*	*
1.4 – Bicycle Comfort Index	Facility-Specific Measure, Existing and Future Conditions	**	*	*	Good or Very Good	*

TABLE 2
MULTIMODAL ARTERIAL PLAN PERFORMANCE OBJECTIVES

Performance Measure	Application	Modal Objectives[1]				
		Autos	Transit	Pedestrian	Bicycle	Trucks
1.5 – Truck Route Accommodation Index	Facility-Specific Measure, Existing and Future Conditions	*	*	*	*	Very Good
1.7 – Pavement Condition Index	Facility-Specific Measure, Existing Conditions	Good or Very Good	Good or Very Good	Good or Very Good	Good or Very Good	Good or Very Good

Notes:
1. The asterisk (*) indicates that a performance objective is not applicable for that specific modal priority. Although a performance objective does not apply, it does not imply that the needs assessment will neglect recommended improvements that can better measure performance results and thus enhance the built environment for modes without applicable performance objectives.
2. The double asterisk (**) indicates that that a performance objective is not applicable for that specific modal priority. In addition, sidewalk width reduction or bicycle facility removal will not be considered along auto priority Study Network segments even to meet the set thresholds.,

Source: Fehr & Peers, 2015.

EXCEPTIONS FOR IDENTIFYING PERFORMANCE OBJECTIVES

In addition to the facility-specific performance measures, there are a number of performance indicators that, as illustrated in **Figure 1**, will be used later in the project to assure that project vision and goals are met. ***Performance indicators by themselves do not evaluate existing or future conditions to identify a gap or deficiency, but provide a measurement of the network or facility for a comparative assessment of the proposed improvements against the existing conditions.*** Therefore, identifying objectives for indicators are not applicable and therefore not proposed. Similarly, performance objectives are not identified for the network connectivity measures, coordinated technology or collision rates. Network connectivity measure will be conducted as a mapping exercise that evaluates the transit infrastructure, pedestrian comfort, bicycle comfort and truck route accommodation measures for consistency across the respective modal networks. The coordinated technology measure provides an inventory of available and proposed ITS infrastructure along the Study Network, coordinated technology results will be used to inform ITS improvements and strategies recommended as part of the Plan. Collision rates provide a facility-specific assessment of exiting conditions and the results will potentially be used to prioritize short and long-term improvements later in the Plan development process. The following are the indicators and measures for which identifying objectives is not applicable:

- 1.6 – Enhanced Mobility
- 2.1 – Benefit to Communities of Concern
- 3.1 – Transit Connectivity
- 3.2 – Pedestrian Connectivity
- 3.3 – Bicycle Connectivity
- 3.4 – Network Connectivity
- 4.1 – Operating Cost Effectiveness
- 4.2 – Implementation Challenge Score
- 4.3 - Coordinated Technology
- 4.4 – Property Value Index
- 5.1 – Collision Rates
- 5.2 – Demand for Active Transportation

All stakeholders will have an opportunity to review and refine the performance objectives, in addition to the modal priorities along the Study Network. Jurisdictions will also be given the opportunity to coordinate with neighboring jurisdictions and transit agencies on modal priorities along multi-jurisdictional routes at the second set of Planning Area meetings during the week of April 20, 2015.

BASIS FOR PERFORMANCE OBJECTIVES

Jurisdictions within Alameda County generally do not have adopted performance objectives for the approved performance measures listed in **Table 2**. As a result, the consultant team based performance objectives on previous planning projects that utilized similar measures; if reference projects were not applicable the consultant team applied relevant research to identify appropriate objectives. The basis for each performance objective is described below.

1.1A – Automobile Congested Speed

Automobile congested travel speed will be estimated for Existing and Future Year PM Peak hour conditions. The *2014 Level of Service Monitoring Report* (Alameda CTC, November 2014) applies the HCM 2000 arterial LOS methodology to assess CMP-arterial segment LOS during the PM peak hour. The methodology's LOS thresholds are shown in **Table 3**. According to the methodology, an average speed that is generally greater than 40% of the typical free flow speed corresponds to LOS D or better conditions. Based on this assessment, *the automobile congested speed performance objective is proposed to be greater than 40% of the posted speed limit*. This objective applies to auto and truck priority corridors only.

1.1B – Automobile Reliability

The automobile reliability measure is based on the PM peak hour volume-to-capacity (V/C) assessment, which corresponds to the following measure ratings:

- Reliable (V/C between 0 – 0.8)
- Less Reliable (V/C between 0.8 – 1.0)
- Unreliable (V/C greater than 1.0)

The 1994 HCM provides V/C LOS methodology for arterials; later versions of the HCM provide arterial segment LOS methodologies based on travel speed and not V/C ratio. Based on Table 7-1 in the 1994 HCM, a V/C ratio of 0.79 or lower corresponds to LOS D or better conditions along an arterial with four or more travel lanes. Based on this assessment, *the automobile reliability performance objective is proposed to be lower than a V/C ratio of 0.8, which generally corresponds to LOS D, which is identified to be of rating "Reliable"*. This objective applies to auto and truck priority corridors only.

TABLE 3
ARTERIAL LOS, HCM 2000

Arterial Class	I	II	III	IV
Range of Free Flow Speed (mph)	55 to 45	45 to 35	35 to 30	35 to 25
Typical Free Flow Speed (mph)	50	40	35	30
Level of Service	**Average Travel Speed (mph)**			
A	>42	>35	>30	>25
B	>34-42	>28-35	>24-30	>19-25
C	>27-34	>22-28	>18-24	>13-19
D	>21-27	>17-22	>14-18	>9-13
E	>16-21	>13-17	>10-14	>7-9
F	≤16	≤13	≤10	≤7

Source: Exhibit 15-2, HCM 2000.

1.2A Transit Travel Speed

Transit travel speed will be estimated for Existing and Future Year PM Peak hour conditions utilizing data provided by transit agencies. The *Transit Capacity and Quality of Service Manual* (TCQSM, TRB, 3rd Edition, 2013) was reviewed for applicable performance objectives related to transit speed. No applicable performance objective was identified in the TCQSM. According to the *2013 Public Transportation Fact Book* (APTA, 2013), the national average speed for all roadway transit modes was about 14 mph in 2011. Given that the Bay Area region is generally considered to have some of the worst traffic congestion compared to other metropolitan regions in the country, it is reasonable to assume that the Bay Area transit speed is below the national average of 14 mph. According to the *2014 Level of Service Monitoring Report* (Alameda CTC, November 2014), the average vehicle travel speed along CMP Tier 1 arterial segments was roughly 20 mph network wide, Using available sources of transit and vehicle travel speed data, *a performance objective that transit travel speed is at least 50% of the auto congested speed* (measure 1.1A) was assumed to be adequate. This objective applies to transit priority corridors only.

1.2B Transit Reliability

The transit reliability metric is estimated by comparing PM peak hour transit travel speed to non-peak hour speed based on data provided by transit agencies. The *Transit Capacity and Quality of Service Manual* (TCQSM, TRB, 3rd Edition) was reviewed for applicable performance objectives related to transit reliability, which for this plan is defined as the PM peak hour-to-non-peak hour transit speed ratio. No applicable performance objective was identified in the TCQSM. Instead, the project team proposes *a performance objective that transit reliability should be greater than a PM peak hour-to-non-peak hour transit speed ratio of 0.4*. This objective is based on the objective for measure 1.1A – auto congested speed, which has an objective of congested PM peak hour automobile speed being greater than 40% of the posted speed limit. This objective applies to transit priority corridors only.

1.2C Transit Infrastructure Index

The transit infrastructure index score is based on the following factors: bus stop amenities, bus stop location, and bus stop design. The measure applies a 10-point scoring system that corresponds to the following rating:

- 0 – 5 points = Poor
- 6 – 7 points = Good
- 8 – 10 points = Very Good

The proposed transit infrastructure index objective is based on previous planning projects that utilized a similar measure. For example, Fehr & Peers is currently part of the team developing the *Ashland-Cherryland Business District Specific Plan* in unincorporated Alameda County. Fehr & Peers applied a similar multi-modal performance measure for the specific plan development in which *the objective was to achieve a rating of "Good" or "Very Good" (at least 6 out of 10 on the scoring system)* along the E. 14th Street/Mission Boulevard transit corridor. The same performance objective is proposed for the Multimodal Arterial Plan development for the transit priority corridors.

1.3 Pedestrian Comfort Index

The pedestrian comfort index score is based on factors such as sidewalk width, presence of buffer between sidewalk and roadway, average crosswalk spacing, roadway classification, and percent heavy vehicle traffic. The measure applies a 24-point scoring system that corresponds to the following rating:

- 0 – 7 points = Poor
- 8 – 14 points = Fair
- 15 – 20 points = Good
- 21 – 24 points = Very Good

The proposed pedestrian comfort index objective is based on previous planning projects that utilized a similar measure. As previously mentioned, Fehr & Peers is currently part of the consultant team developing the *Ashland-Cherryland Business District Specific Plan* in unincorporated Alameda County. Fehr & Peers applied a similar multi-modal performance measure for the specific plan development in which *the objective was to achieve a rating of "Good" or "Very Good" (at least 15 out of 24 on the scoring system)* along roadways within the plan area. The same performance objective is proposed for the Multimodal Arterial Plan development and applied to pedestrian priority segments only. A performance objective of "Fair", "Good" or "Very Good" (at least 8 out of 24 on the scoring system) rating is also proposed for transit priority corridors to achieve a minimum pedestrian design standard for transit patrons that walk to and from bus stops.

1.4 Bicycle Comfort Index

The bicycle comfort index is based on the Level of Traffic Stress (LTS) methodology (Mineta Transportation Institute, May 2012) that examines the characteristics of streets and how various aspects can cause stress on bicyclists and affect where they are likely to ride. LTS methodology classifies roadway segments into one of four levels of traffic stress, which are termed as LTS1 through LTS4. Groups of cyclists are categorized by how much stress they will tolerate in different environments:

- LTS1: most children can tolerate and feel safe while bicycling.
- LTS2: the mainstream adult population will tolerate and feel safe while bicycling.
- LTS3: cyclists who are considered "enthused and confident" but still prefer having their own dedicated space for riding will tolerate and feel safe while bicycling.
- LTS4: a level tolerated only by those characterized as "strong and fearless", which comprises just 0.5 percent of the population. The high-stress streets that LTS4 groups will ride are those with high speed limits, multiple travel lanes, limited or non-existent bike lanes and signage, and large distances to cross at intersections.

For simplicity, the LTS results correspond to the following rating:

- LTS1 = Very Good
- LTS2 = Good
- LTS3 = Fair
- LTS4 = Poor

The proposed bicycle comfort index objective is based on previous planning projects that utilized a similar measure. As previously mentioned, Fehr & Peers is currently part of the consultant team developing the *Ashland-Cherryland Business District Specific Plan* in unincorporated Alameda County. Fehr & Peers applied a similar multi-modal performance measure for the specific plan development in which *the objective was to achieve a rating of "Good" or "Very Good"* along roadways within the plan area. The "Good" or "Very Good" rating corresponds to an LTS2 or LTS1 score, respectively. A "Good" (LTS2) rating implies that the mainstream adult population can tolerate the design of the facility and feel safe while bicycling, a "Very Good" (LTS1) rating implies that most children can tolerate the design of the facility and feel safe while bicycling. The same performance objective is proposed for the Multimodal Arterial Plan development and applied to bicycle priority segments only.

1.5 Truck Route Accommodation Index

The truck route accommodation index score is based on curb lane width; additional consideration for on-street parking will be made only in urban contexts where many businesses are expected to load from the street. The measure applies a four-point scoring system that corresponds to the following rating scores:

- 0-1 point = Poor
- 2 points = Good
- 3 - 4 points = Very Good

One point is assigned if curb lane width is 10 feet or less, two points are assigned if the curb lane width is 11 feet, three points are assigned if the curb lane width is 12 feet or greater. One point is assigned for roadways in urban areas that provide on-street parking; a negative point is assigned if on-street parking is not provided. Performance measures similar to the truck route accommodation index have not been applied in other similar planning studies throughout the County; therefore relevant performance objectives are not available.

According to *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2011), the recommended travel lane width ranges between 10 and 12 feet (not including curb, shoulder or on-street parking) for arterials in urban environments. The narrower the lane width, the higher the probability that trucks will off-track into adjacent lane or shoulder. Based on this logic, *a curb lane width of 12 feet or greater is preferred for the majority of truck routes, which corresponds to a "Very Good" rating applying the truck route accommodation index*. This objective applies to truck priority corridors only.

1.7 Pavement Condition Index

The pavement condition index (PCI) is used to describe the general condition of pavement on a 0 to 100 point scale. The Metropolitan Transportation Commission (MTC) maintains a PCI database for the Bay Area region and categorizes PCI using thresholds that were consolidated for use on the Multimodal Arterial Plan as described below:

- PCI 0 – 49 = Poor
- PCI 50 – 59 = At Risk
- PCI 60 – 79 = Good
- PCI 80 – 100 = Very Good

A PCI of 60 or higher is generally considered acceptable; therefore the *proposed performance objective is to achieve a "Good" or "Very Good" rating along all Study Network segments regardless of the modal priority*. The PCI performance objective also applies to pedestrian priority Study Network segments as the pavement condition provides a general indication of sidewalk conditions.

NEXT STEPS

The consultant team and Alameda CTC staff will present the draft performance objectives at the April 9, 2015 ACTAC meeting and at the second set of Planning Area meetings planned for the week of April 20, 2015 to seek input. Based upon comments received during this outreach, the objectives will be modified and brought to ACTAC and the Commission for approval in May 2015.

Attachments

Appendix A – Approved Multimodal Arterial Plan Performance Measures and Indicators

APPENDIX A

FEHR PEERS

APPROVED MULTIMODAL ARTERIAL PLAN PERFORMANCE MEASURES AND INDICATORS[1]

Goal	Category	Performance Measure	Evaluation Approach	Application
1. Multimodal	1.1 – Auto	1.1A – Congested Speed	Based on average PM peak hour congested speed.	Facility-Specific Measure, Existing and Future Conditions
		1.1B – Reliability	Based on PM peak hour volume-to-capacity ratio, categorized as: ▪ Reliable (V/C between 0 – 0.8) ▪ Less Reliable (V/C between 0.8 – 1.0) ▪ Unreliable (V/C greater than 1.0)	Facility-Specific Measure, Existing and Future Conditions
	1.2 – Transit	1.2A – Transit Travel Speed	Based on average PM peak hour transit travel speed provided by transit agencies that operate in the County.	Facility-Specific Measure, Existing and Future Conditions
		1.2B – Transit Reliability	Based on average PM peak hour transit travel speed to non-peak hour travel speed ratio. Measure to be provided by transit agencies that operate in the County.	Facility-Specific Measure, Existing and Future Conditions
		1.2C – Transit Infrastructure Index	Based on the following factors: ▪ Provided bus stop amenities ▪ Bus stop location ▪ Bus stop design The measure applies a 10-point scoring system that corresponds to the following rating: ▪ 0 – 5 points = Poor ▪ 6 – 7 points = Good ▪ 8 – 10 points = Very Good	Facility-Specific Measure, Existing and Future Conditions

FEHR PEERS

APPROVED MULTIMODAL ARTERIAL PLAN PERFORMANCE MEASURES AND INDICATORS[1]

Goal	Category	Performance Measure	Evaluation Approach	Application
	1.3 – Pedestrian	1.3 – Pedestrian Comfort Index	Based on the following factors: ▪ Sidewalk width ▪ Presence of buffer between sidewalk and roadway ▪ Average crosswalk spacing ▪ Roadway classification, average daily vehicle volume, number of travel lanes and speed limit ▪ Percent heavy vehicle traffic The measure applies a 24-point scoring system that corresponds to the following rating: ▪ 0 – 7 points = Poor ▪ 8 – 14 points = Fair ▪ 15 – 20 points = Good ▪ 21 – 24 points = Very Good	Facility-Specific Measure, Existing and Future Conditions
	1.4 – Bicycle	1.4 – Bicycle Comfort Index	Application of the Level of Traffic Stress (LTS) methodology, which is based on the type of bicycle facility provided and separation from vehicle travel lanes. LTS methodology classifies roadway segments into one of four levels of traffic stress, which are termed as LTS1 through LTS4. Groups of cyclists are categorized by how much stress they will tolerate in different environments. For simplicity, the LTS results correspond to the following rating: ▪ LTS4 = Poor ▪ LTS3 = Fair ▪ LTS2 = Good ▪ LTS1 = Very Good	Facility-Specific Measure, Existing and Future Conditions

FEHR PEERS

APPROVED MULTIMODAL ARTERIAL PLAN PERFORMANCE MEASURES AND INDICATORS[1]

Goal	Category	Performance Measure	Evaluation Approach	Application
	1.5 – Trucks/ Goods Movement	1.5 – Truck Route Accommodation Index	Based on curb-lane width. Additional consideration for on-street parking; on-street parking will be considered only in urban contexts where many businesses are expected to load from the street. The measure applies a four-point scoring system that corresponds to the following rating: ▪ 0-1 point = Poor ▪ 2 points = Good ▪ 3-4 points = Very Good One point is assigned if curb lane width is 10 feet or less, two points are assigned if the curb lane width is 11 feet, three points are assigned if the curb lane width is 12 feet or greater. One point is assigned for roadways in urban areas that provide on-street parking; a negative point is assigned if on-street parking is not provided.	Facility-Specific Measure, Existing and Future Conditions
	1.6 – Enhanced Mobility	1.6 – Non-Auto Transportation Mode Share	Qualitative assessment of cross-sectional improvements on likelihood of changes to transit, pedestrian, and bicycle travel (proxy for person throughput).	Area-Wide Indicator, Existing, Future Conditions
	1.7 State of Good Repair	1.7 Pavement Condition Index (PCI)	Based on the PCI data obtained from the MTC StreetSaver database. The PCI measure applies a 100-point scoring system that corresponds to the following rating: ▪ PCI 0 – 49 = Poor ▪ PCI 50 – 59 = At Risk ▪ PCI 60 – 79 = Good ▪ PCI 80 – 100 = Very Good	Facility-Specific Measure, Existing Conditions

FEHR PEERS

APPROVED MULTIMODAL ARTERIAL PLAN PERFORMANCE MEASURES AND INDICATORS[1]

Goal	Category	Performance Measure	Evaluation Approach	Application
2. Accessible and Equitable[2]	2.1 – Social Equity	2.1 – Benefit to Communities of Concern	After the preferred list of short and long-term improvements is identified, a ratio will be estimated by dividing the number of arterial miles of identified improvements within Communities of Concern (COC) by the number arterial miles of all identified improvements benefiting each jurisdiction. For Transit, number of population benefitted within COC versus overall population benefitted in the County will be used.	Area-Wide Indicator, Future Conditions
3. Connected Across the County and Region	3.1 – Transit	3.1 – Transit Connectivity	Connectivity measures will be assessed through a mapping exercise. The transit, pedestrian, bicycle and truck networks will be mapped to identify gaps or inconsistencies in the networks. The pedestrian and bicycle assessment will include consideration of relative comfort. The truck network connectivity assessment will be coordinated with the Countywide Goods Movement Plan consultant team to ensure that identified truck network gaps and deficiencies are adequately addressed.	Area-Wide Measure, Existing and Future Conditions
	3.2 – Pedestrian	3.2 – Pedestrian Connectivity		Area-Wide Measure, Existing and Future Conditions
	3.3 – Bicycle	3.3 – Bicycle Connectivity		Area-Wide Measure, Existing and Future Conditions
	3.4 – Trucks	3.4 – Network Connectivity		Area-Wide Measure, Existing and Future Conditions

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APPROVED MULTIMODAL ARTERIAL PLAN PERFORMANCE MEASURES AND INDICATORS[1]

Goal	Category	Performance Measure	Evaluation Approach	Application
4. Efficient Use of Resources	4.1 – Efficient Use of Operations Funding	4.1 – Operating Cost Effectiveness	Based on the ratio of improvement costs to existing facility costs: ▪ Develop unit operating costs for cross-sectional elements, including maintenance costs ▪ Estimate operating costs to maintain existing cross-section (O_E) ▪ Estimate operating costs to maintain preferred cross-sectional improvements (O_P) ▪ Operating Cost Effectiveness = O_P/O_E	Facility-Specific Measure, Future Conditions
	4.2 – Implementation Challenge	4.2 – Implementation Challenge Score	Based on a zero to four point scale, zero being most feasible and four being the least feasible based on the following variables: ▪ Travel lane removal required (yes = 1 pt, no = 0 pts) ▪ Parking removal required (yes = 1 pt, no = 0 pts) ▪ Multi-jurisdiction coordination required (yes = 1 pt, no = 0 pts) ▪ Curb changes required (yes = 1 pt, no = 0 pts)	Facility-Specific Indicator, Future Conditions
	4.3 ITS Infrastructure	4.3 Coordinated Technology	Four-point scale (0 – 3) based on the level of ITS investment defined by built infrastructure. Consideration for coordination with adjacent jurisdictions and/or Caltrans, as applicable: ▪ 0: no ITS infrastructure ▪ 1: basic investment ITS network ▪ 2: medium investment ITS network ▪ 3: high investment ITS network	Facility-Specific Indicator, Existing and Future Conditions
	4.4 – Economic Benefits	4.4 – Property Value Index	Based on the change in residential and commercial property values influenced by transportation infrastructure improvements within the built environment.	Facility-Specific Indicator, Future Conditions

FEHR PEERS

APPROVED MULTIMODAL ARTERIAL PLAN PERFORMANCE MEASURES AND INDICATORS[1]

Goal	Category	Performance Measure	Evaluation Approach	Application
5. Safe, Healthy and Vibrant	5.1 – Safety	5.1 – Collision Rates	Collision rates based on the SWITRS database.	Facility-Specific Measure, Existing Conditions
	5.2 – Active Transportation Mode Share	5.2 – Demand for Active Transportation	Potential for mode shift (low, medium, high) based on demand for active transportation.	Area-Wide Indicator, Future Conditions
	5.3 – VMT	VMT per Capita	Based on VMT data from the Alameda CTC Travel Demand Model.	Area-wide Indicator, Existing and Future Conditions
	5.4 – GHG	GHG per Capita	Based on VMT data from the Alameda CTC Travel Demand Model.	Area-wide Indicator, Existing and Future Conditions

Notes:

1. More information is added to the Evaluation Approach to describe the scores. Performance measures are generally applied to assess existing and/or future year transportation conditions, performance indicators will generally be evaluated after preferred short and long-term improvements are identified to ensure that preferred improvements achieve the Plan's vision and goals.
2. Accessibility is a component of the Transit Infrastructure Index, Pedestrian Comfort Index and Bicycle Comfort Index.

Source: *Alameda Countywide Multimodal Arterial Plan – Performance Measure and Evaluation Approach* Memo, Fehr & Peers, January 22, 2015.

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