City of Bellevue

Transportation Commission Study Session

DATE: January 8, 2016

TO: Chair Lampe and Members of the Transportation Commission

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SUBJECT: Multimodal Level-of-Service – Toward a Multimodal Approach to Mobility

DIRECTION REQUESTED

___ Action
X Discussion
___ Information

On August 3, 2015, the City Council adopted Ordinance 6251, to update the 2004 Comprehensive Plan. The following excerpt from the staff report to Council broadly summarizes a shifting policy emphasis in the Transportation Element of the Plan:

> **Multimodal transportation** – Strong support for non-motorized transportation came early in the process during the "Best Ideas" campaign in 2013 and recently from the online open house for the draft plan review. The update continues to support a comprehensive transportation system that addresses the mobility needs of all people. The update places an increased emphasis on addressing all modes of travel, whether by car, bus, train, bicycle or walking.

Embedded in the updated Transportation Element are policies, recommended by the Transportation Commission, to broaden the metrics and standards used to measure and track mobility in Bellevue – a multimodal level-of-service (MMLOS) approach to mobility. Adopted policies are not prescriptive as to the types of metrics and standards the city should consider. Instead they provide direction to develop such metrics and standards through subsequent analysis.

At the January 14, 2016 meeting, staff will review existing level-of-service policy and practice, and describe the work plan through which the Commission will prepare recommendations for new LOS metrics and standards.

BACKGROUND

In preparing policy recommendations to update the Transportation Element, the Transportation Commission reviewed nationwide best practices for a multimodal approach to level-of-service and reviewed the programs of several local jurisdictions, including Redmond and Bellingham.

Commission study sessions in December 2013, January 2014, March, 2014 and April 2014 included discussions, deliberations and approval of recommendations regarding the policy approach Bellevue should take to revise the metrics and standards used to determine level-of-service for both concurrency and for long-range planning.

The Final Report of that work documents the range of approaches to MMLOS the Commission considered, and it provides a take-off point for the current MMLOS assignment.

With this study session on January 14, the Commission begins the process of developing mobility metrics and standards for Council consideration.

INFORMATION

Transportation Element policy addresses level-of-service and provides direction to achieve a multimodal approach to mobility. New level-of-service metrics and standards will depart from the decades-old approach of measuring the volume-to-capacity ratio of vehicles traveling through an intersection at the PM peak hour.

Current Approach to Level-of-Service

For Concurrency purposes, Bellevue uses a level of service (LOS) standard based on the ratio of **volume-to-capacity** ratio for vehicles at "system" intersections, and includes an area-wide standard for Mobility Management Areas (MMAs). For long range transportation planning, the City uses travel demand and traffic operational modeling to forecast intersection and area-wide LOS based on the **delay** of vehicles at intersections. Both methods consider only vehicles and provide a quantitative analysis of a single mode of travel. Throughout the city, in existing mixed-use urban neighborhoods such as Downtown, Crossroads and Factoria, and in evolving neighborhoods such as BelRed and Wilburton, mobility is increasingly characterized by people riding transit, walking and riding bicycles, yet the quantitative metrics that inform transportation planning decisions and investments are focused on vehicle capacity and delay.

Recommended Approach to Level-of-Service

In the updated Transportation Element, the Council adopted policies that set a direction for mobility that would provide mobility options for all users, better document metrics relative to

each mode of mobility, and establish standards that reflect geographic context and mode priorities.

Listed below are the Transportation Element policies that refer to mobility metrics and standards, highlighting policies TR-29.2 and TR-30 that provide the specific policy direction for the MMLOS work the Commission is about to undertake:

TRANSPORTATION ELEMENT GOAL
To maintain and enhance a comprehensive multimodal transportation system to serve all members of the community.

Mobility Management - *Policies that address how the city will provide a variety of mobility options for residents, employees and visitors.*

TR-29. Observe the following policy guidance in revising level-of-service standards by Mobility Management Area:

Reflect the availability of mobility options;

1. Consider community goals that may be as important as managing vehicular congestion, such as goals for land use, neighborhood protection from wider streets and cut-through traffic, livability, or economic vitality. For example, a higher level of vehicular congestion is allowed in some areas of the city under the following conditions:

a. In return for stronger emphasis on transit, walking, bicycling and other mobility options, and

b. Where the impacts of wider streets or intersections are judged to be worse than the congestion they are designed to solve.

2. Establish multimodal level-of-service standards adequate to ensure a functional transportation system.

TR-30. Establish multimodal level-of-service and concurrency standards and other mobility measures and targets for transportation corridors and in each area of the city in consideration of planned development patterns and mobility options.

TR-31. Define Mobility Management Areas that reflect street patterns and connectivity, available mobility options, topography, development patterns, and land use objectives.

TR-32. Utilize level-of-service standards for transportation corridors that reflect the range of available and intended mobility options.

TR-33. Utilize concurrency standards that consider the available and intended mobility options for transportation corridors, Mobility Management Areas and implementation and management priorities.

TR-34. Monitor the level-of-service for all modes and adjust programs and resources as necessary to achieve mobility targets and objectives.

TR-35. Review transportation system impacts of proposed developments and require appropriate mitigation as necessary. Prohibit development approval if the development will cause the area level of service in one or more Mobility Management Areas to fall

below the adopted standard, unless demand management or other system improvements are provided to mitigate the transportation impacts.

TR-36. Require transportation system mitigation to offset the adverse impacts of development with regard to level-of-service, safety, access and neighborhoods.

Transportation Finance - *Policies that address the priorities and methods to finance transportation projects, as coordinated with the Capital Facilities Element.*

TR-132. Balance funding to achieve scheduled progress on mobility targets/level-of-service standards for all modes within the Mobility Management Areas, by using results from monitoring the targets/level-of-service to prioritize transportation facility and service investments.

TR-133. Provide adequate transportation funding to ensure that adopted level-of-service standards are met.

RECOMMENDATION

Bellevue has entered into a contract with the firm, Fehr & Peers to work with the Commission and staff toward recommendations for amendments to integrate MMLOS metrics and standards into applicable city policies and codes.

Ultimately, the Commission will prepare policy recommendations for the City Council that may include policies for the Transportation Element, and amended code language for the Traffic Standards Code (Chapter 14.10).

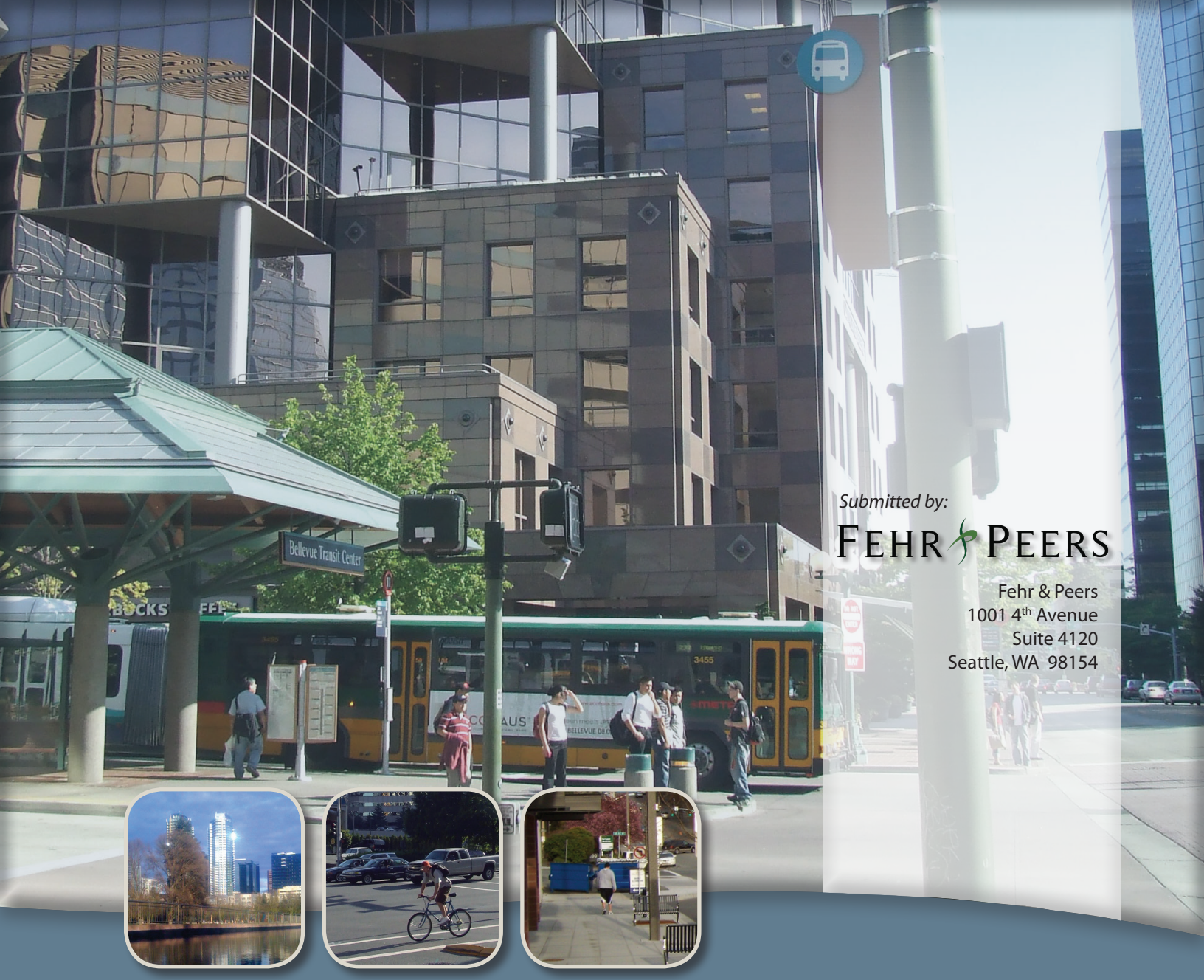
NEXT STEPS

In the consultant's scope of work is an anticipated timeline for the MMLOS work. A specific public involvement strategy is forthcoming, and it will include 6 to 8 meetings with the Transportation Commission. The table below outlines the process and highlights the times when staff anticipates holding study sessions with the Commission:

	MMLOS WORK PROGRAM SCHEDULE IN 2016											
TASK	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1.	Existing Conditions and Issues Documentation											
2.	Refining Multimodal Level-of-Service Approaches for Concurrency and Long-Range Planning											
3.	Public Involvement – Potential Transportation Commission Meetings ★											
	★		★	★		★			★		★	★
4.	Environmental Analysis and Documentation											
5.	Final Report and Transportation Commission Recommendation											

ATTACHMENTS

1. MMLOS Final Report, April 2014
2. MMLOS Consultant Scope of Work



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CITY OF BELLEVUE WASHINGTON

Multimodal Policy Options *for* Long Range Planning and Transportation Concurrency

April 2014

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EXECUTIVE SUMMARY

As Bellevue has transitioned from a suburban bedroom community to a major mixed-use center, expectations about how residents and visitors travel have changed as well. With major portions of the City featuring mixed-use development, robust transit service, high pedestrian activity, and bicycle amenities, the City's sole reliance on auto level of service (LOS) as a means to plan for future transportation investment is outdated.

This report documents best practices in applying multimodal LOS for long-range transportation planning and transportation concurrency management in Washington State and nationally. Based on this research, City staff, the Transportation Commission, and Fehr & Peers recommend the following policy options be evaluated for future adoption in City codes and policies:

- Adopt a multimodal LOS policy that evaluates transportation corridors. Corridors would be defined on which modes of travel are the priority. The LOS standards of the corridors could change as they pass through different zones in the City, similar to the existing Mobility Management Areas.
- Adopt a multimodal programmatic transportation concurrency program that uses "mobility units" to measure transportation supply and demand consumed by new growth.
- Monitor progress on transportation planning overall using performance targets.

The Commission unanimously approved a motion to include the concept of multimodal LOS in the Transportation Element through the 2014 Comprehensive Plan Update. The Commission also endorsed a proposal that, with Council approval, would provide the policy direction to develop a work plan and budget to integrate multimodal metrics into the Transportation Element and the Traffic Standards Code (BCC 14.10.060).

INTRODUCTION

As a typical post-war suburban community, much of Bellevue developed in an era where the car was viewed as the primary form of transportation and a major goal of early community planners and engineers was to ensure smooth flow of traffic. Reducing traffic congestion was equated with increased safety, better mobility, and enhanced economic development. Concurrent with the rapid growth of Bellevue were advances in transportation planning and engineering. The concept of level of service, or LOS, became synonymous with reducing traffic congestion. Like almost every city across the state and country, Bellevue adopted auto-oriented LOS standards that focus on delay at intersections as the primary measure of how to plan the transportation network and manage the mobility needs of new development.

Flash forward to 2014. Bellevue has emerged as the largest city on the eastside of Lake Washington and has some of the region's largest employment centers. Downtown Bellevue is the city's fastest-growing residential neighborhood. While much of the city retains a suburban character, major portions of Bellevue feature mixed-use development, robust transit service, high pedestrian activity, and bicycle amenities. Other areas of the city are along key transit routes or major bicycle corridors that feature high numbers of non-auto users. Despite this evolution in mobility and urban form, Bellevue's method for long-range planning and transportation concurrency have remained solidly anchored to auto LOS.

This report documents best practices in applying multimodal LOS for long-range transportation planning and transportation concurrency management in Washington State and nationally. Policy options for Bellevue are also presented, along with feedback received from the Bellevue Transportation Commission about the Commission's intent to prepare and implement a multimodal level of service methodology. Lastly, policy recommendations and next steps are presented.

BACKGROUND

The concept of level of service (LOS) dates back to the 1950s when the original Highway Capacity Manual (HCM) was published by the Transportation Research Board. In simple terms, LOS is intended to describe the quality of the transportation system from a user's perspective. Thus, LOS is a qualitative description of mobility. The original LOS definition was focused on auto travel and is based on the idea that traffic congestion leads to driver delay and frustration. A completely empty road is assigned a LOS of "A" (the LOS system was set to mimic school grades), since there is nothing getting in the way of a driver and they can travel as they please. Stop-and-go traffic is assigned a LOS of "F."

In the 1960's, LOS was introduced for other modes of travel, including walking, bicycling, and transit. Initially, the LOS methods for the non-auto modes were similar to auto LOS where congestion and delay defined the LOS scores. However, outside of very dense areas, a pedestrian or bicyclist rarely feels uncomfortably crowded on a sidewalk or bike lane. Transit LOS never caught on since transit agencies tended to rely on separate measures of performance for transit planning. Given the lack of applicability in practical use, non-auto LOS methods were largely ignored for the next 50 years.

Amid recent spikes in energy prices, demographic shifts, concerns over climate change, and technological advances, both the public and the planning/engineering community have realized that providing adequate infrastructure for non-auto modes is important for a balanced community. As a result, there has been more attention focused on multimodal LOS. Recent research has provided new insight into people's travel behavior and how to meaningfully measure LOS for different modes. With this background in mind, City of Bellevue planners recognized the benefits of exploring how multimodal LOS could benefit transportation planning and concurrency management.

LEVEL OF SERVICE IN WASHINGTON STATE

The Washington State Legislature passed the Growth Management Act (GMA) in 1990. The GMA defines transportation as one of the mandatory elements of a jurisdiction's Comprehensive Plan. Further, the Legislature defined that the transportation element must include an inventory of facilities and a LOS standard for "all locally owned arterials and transit routes to judge

performance of the system." A pedestrian and bicycle component is also required in the transportation element, however, no LOS standard is required for those modes. As an integral part of the transportation element, the Legislature included the concept of transportation concurrency, as stated below (RCW 36.70A.070):

> *After adoption of the comprehensive plan by jurisdictions required to plan or who choose to plan under RCW 36.70A.040, local jurisdictions must adopt and enforce ordinances which prohibit development approval if the development causes the level of service on a locally owned transportation facility to decline below the standards adopted in the transportation element of the comprehensive plan, unless transportation improvements or strategies to accommodate the impacts of development are made concurrent with the development.*

In essence, the transportation element and concurrency provision are intended to have jurisdictions identify a long-range transportation system plan that accommodates the future land use and devise a system to ensure that the transportation system is implemented to meet community defined LOS targets. The bullets below provide more complete definitions:

- **Long-range planning** defines the transportation goals, policies, and desired outcomes for the transportation system given the population and employment growth forecasted in the Comprehensive Plan. Auto LOS is often used to plan the auto transportation system by establishing an auto LOS goal/standard, and determining the list of projects needed to meet that standard over time. Multimodal LOS could be used to facilitate planning for other modes.
- **Regulatory concurrency** is the process that jurisdictions implement to determine if a specific development would cause any transportation facilities to fall below the LOS thresholds adopted in the Comprehensive Plan.

While nearly all Washington State communities have defined a multimodal long-range transportation system, very few communities have used a systematic multimodal LOS method to define what this system looks like. Only two communities use multimodal LOS to manage transportation concurrency.

WASHINGTON STATE – STATE OF THE PRACTICE

This section describes how long-range planning and regulatory concurrency is typically performed in Washington State communities. Most of the focus on this section is on regulatory concurrency since there tends to be more documentation on how communities develop and monitor regulatory concurrency programs. Following this section is a discussion of best practices in Washington State, and examples of both long-range planning and regulatory concurrency programs are highlighted.

LONG-RANGE PLANNING

There is no "cookbook" with a recipe to develop a transportation element for a Comprehensive Plan. These plans tend to be unique for each community. However, given the requirements set forth in the GMA, the example below is typical of the steps a community would take to develop a long-range transportation plan:

1. Identify the future land use growth in the community
2. Define goals and policies related to issues such as traffic congestion, transit service, and bicycle and pedestrian mobility
3. Quantify a LOS standard for autos
4. Determine how much auto demand there will be based on the future land use
5. Identify capital projects needed to provide the roadway capacity to meet the auto LOS standard
6. Identify a network for bicycle, pedestrian, and transit travel based on community input, and planning-judgment
7. Identify a set of non-auto capital projects to implement the plans for the other modes; often, auto improvements are prioritized since the auto LOS goal must be met. Occasionally, very few non-auto projects are developed due to limited funding and an auto-oriented LOS policy.

In the absence of a LOS-based planning approach for non-auto modes, some cities develop bicycle, pedestrian, and transit networks and project lists using a qualitative approach. In this case, lines are drawn on a map to connect important destinations, or policies are defined, such as the need to build a sidewalk on at least one side of every street and to ensure that all arterials have

bike lanes. This approach is typically iterative and involves substantial public input to identify destinations, travel desire lines, and policies. While this approach can be quite effective at long-term planning, it can run into difficulty as the plans are implemented, particularly when interests question the need for expanding non-auto infrastructure in absence of a clear LOS policy and standards.

REGULATORY CONCURRENCY

As described above, the GMA requires multimodal transportation elements, but because LOS is only required to be defined for "locally owned arterials and transit routes," the law does not explicitly require concurrency planning for other modes. In practice, most jurisdictions within Washington State set concurrency standards only for autos—for example, this is currently the case for the Cities of Kent, Spokane, and Tacoma[1].

The City of Seattle sets LOS standards for autos (using volume-to-capacity across large screenlines)[2], but also includes mode share goals which serve to quantify the City's vision of the future transportation system. Both the screenline LOS and mode share goals vary across the city, reflecting a higher tolerance for congestion and a higher goal for non-SOV mode share in denser areas of the city.

While mode share goals are identified in the Seattle Comprehensive Plan, these goals are not explicitly tied to the assessment of concurrency. In essence, Seattle has quantified its vision for the transportation system, but has not developed a means to achieve it via the concurrency regulations.

King County has a concurrency evaluation method that considers auto LOS within various "travel sheds" using average travel speeds on state routes and arterials. LOS standards vary depending on whether the travel shed is a rural area, a rural neighborhood commercial center, an urban growth area or a rural mobility area. Rural area LOS standards are skewed to higher speeds than are urban areas. In each area, 85 percent of the state routes and arterials must meet the adopted

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[1] While there is transit in these cities, the transit is not owned or operated by the city and is therefore no transit LOS standard is defined.

[2] Seattle also defines LOS standards for transit, but they are the same as autos noting that buses travel on the same right-of-way as cars and are equally affected by congestion. Many cities use a similar justification to avoid developing a separate transit LOS standard.

LOS standard. King County does not test individual developments; rather they assume a development proposal meets concurrency if it is located in a travel shed that meets the LOS standards cited above. This type of concurrency assessment is known as *Plan Based Concurrency*.

By measuring concurrency based only on auto LOS, jurisdictions tend to focus on auto improvements, potentially at the expense of other modes including pedestrians, bicycles, and transit. As the thinking of transportation planners and the expectations of the community have evolved to consider a more holistic approach to the transportation system, applying concurrency in a multimodal fashion has emerged as a challenge. The remainder of this memorandum surveys the best practices for assessing concurrency and long-range planning both in Washington State and beyond.

City of Bellevue

The City of Bellevue's approach to long-range planning generally follows the process outlined above, although the City does maintain advanced travel models and GIS databases to streamline the identification and prioritization of future projects. Documents such as the Comprehensive Plan transportation element and Pedestrian and Bicycle Transportation Plan define specifically the City's long-range planning process; key features are summarized below.

- The City has a long-range auto LOS standard to facilitate planning of the auto network.
- The Pedestrian and Bicycle Transportation Plan was developed through the efforts of planning staff and an extensive community outreach process. The final project list was prioritized using sophisticated GIS and field data analysis techniques.
- There are no LOS standards for non-auto modes.

Bellevue is currently updating its Transit Master Plan, which outlines the City's vision for transit service and facilities. With King County Metro focusing on well-defined performance metrics to guide future service provision, the City's new Transit Master Plan has a decidedly quantitative approach. Some of the elements of the Transit Master Plan could serve as the basis of a transit LOS that can be applied for future long-range planning and potentially regulatory concurrency.

Bellevue currently has a "project-based" regulatory concurrency system that evaluates how a new development project may impact auto LOS in 14 "mobility management areas" (MMA). The MMAs allow for different LOS standards to be defined in areas of the city in consideration of land use and urban form characteristics. Auto LOS is defined using a two-hour peak period volume-to-

capacity (v/c) ratio at "system" intersections. Maximum v/c ratios are defined for each MMA and, similar to King County, a certain number of intersections within each MMA are allowed to exceed the v/c ratio. In general, dense areas have both a higher v/c standard and a greater number of intersections that can exceed the v/c threshold.

Recognizing the limitations of its auto-based concurrency system, the City of Bellevue participated in a multimodal concurrency pilot project with the PSRC in 2009. That document outlined the following three steps for a multimodal concurrency management program:

> *Step 1) Evaluate multimodal concurrency in a future year. In this step, forecasted travel demand is compared with the planned capacity of the transportation system. If the analysis concludes that the transportation system is adequate, a positive concurrency finding, then the proposed development can be constructed and no further work is required.*
>
> *Step 2) If step one finds that concurrency has not been met, the analysis must determine the gap between the originally proposed future transportation system and a scenario that would meet concurrency. The gap is then translated unto units such as person trips, which allows scenario testing to be conducted.*
>
> *Step 3) Finally, strategies are designed and tested to close the gap and meet concurrency requirements.*

This report also suggests various metrics for each mode. Staff from PSRC, King County Metro, and the City of Bellevue collaborated to test this approach in Downtown Bellevue. They tested a long-term planning scenario rather than applying it as a development review case. Although it was determined that Downtown Bellevue would meet concurrency in the horizon year of 2020, the project team assumed that this was not the case so that a sample gap analysis could be completed. The team used person trips to quantify the gap and tested a variety of transit, pedestrian, bicycle, and TDM measures to close the gap.

BEST PRACTICES IN WASHINGTON STATE

Two Washington State jurisdictions have implemented multimodal concurrency programs: Bellingham and Redmond. These programs go beyond auto-centric measures so that the cities have a means to achieve their multimodal visions. The approaches used by Burien and Renton for long-range planning are also uncommon so they are summarized in this section.

City of Bellingham

The City of Bellingham implemented a multimodal transportation concurrency program in 2008. The fundamental concept underlying the program is quantifying the number of person trips available (PTA) for each mode. Metrics for each mode are shown in **Figure 1**.

Motorized	**Measurement**
Automobiles	Arterial volume-to-capacity measured during weekday p.m. peak hour based on data collected at designated concurrency measurement points in concurrency service areas
Public Transit	Seated capacity based on bus size and route frequency and ridership based on annual transit surveys measured during weekday p.m. peak hour based on data collected at designated concurrency measurement points for each concurrency service area
Non-motorized	**Measurement**
Bicycle	Credit person trips according to degree of bicycle network completeness for designated system facilities/routes for each concurrency service area
Pedestrian	Credit person trips according to degree of pedestrian network completeness for designated system facilities/routes for each concurrency service area
Trail Use	Credit person trips according to degree of trail network completeness, where trails serve a clear transportation function for a concurrency service area
Source: Bellingham Municipal Code 13.70 Multimodal Transportation Concurrency (2008)	

Figure 1. Multimodal Transportation Concurrency Measurements by Mode
Source: "Moving Beyond the Automobile: Multi-modal Transportation Planning in Bellingham, Washington, "Chris Comeau, AICP, Practicing Planner, Vol. 7, No. 3, September 2009.

Multimodal LOS in Bellingham's Comprehensive Plan

The Comprehensive Plan was revised to include LOS standards based on the PTA platform, as follows:

- Arterial Streets: LOS E which corresponds to no more than a 1.0 volume-to-capacity ratio.
- Transit: LOS F which corresponds to 1.0-1.25 riders per seat (e.g. up to 50 riders on a 40-seat bus).
- No separate LOS thresholds are identified for pedestrians, bicycles, or trails; however, they are considered in the overall PTA measure.

Based on the existing and planned transportation facilities, the City can estimate the total PTA in the planning horizon year. Land use forecasts can then be tested against this transportation system to determine if the land use plans and transportation system are in line with one another. Other than determining whether future roadway and transit infrastructure meet the LOS standards, there are no explicit quantitative metrics guiding the long-range planning for the other modes. The bicycle and pedestrian plans were developed using traditional planning approaches.

Regulatory Concurrency

The PTA concept can also be applied in a regulatory setting. Bellingham is divided into 15 "concurrency service areas," to account for the varying land use and urban form characteristics of each area. These areas are categorized into three types. Type 1 areas are urban villages with adopted master plans and generally have the highest level of pedestrian, bicycle, and transit service. Type 3 areas are less dense with few pedestrian, bicycle, and transit options and high dependence on auto travel, while the Type 2 designation is used for those transition areas that fall in the middle of the spectrum. Different weights—called "policy dials"—are applied to each mode as shown in **Figure 2**, to help direct development into the areas that the City has identified as being most appropriate for growth.

	Transportation Concurrency Service Areas		
Mode	**Type 1[1]**	**Type 2[2]**	**Type 3[3]**
Motorized			
Auto			
Mode weight factor[4]	0.70	0.80	0.90
Transit			
Mode weight factor[5]	1.00	1.00	0.80
Non-Motorized			
Pedestrian			
Percent threshold for minimum system complete[8]	50%	50%	50%
Person trip credit for 1% greater than minimum threshold[9]	20	20	20
Mode weight factor[6]	0.60	0.60	0.60
Bicycle			
Percent threshold for minimum system complete[8]	50%	50%	50%
Percent credit for 1% greater than threshold[9]	20	20	20
Mode weight factor[7]	0.40	0.40	0.40

1. Type 1 = Urban Village areas with adopted master plans, high-density mixed use zoning, or an active master plan process.
2. Type 2 = Medium density areas adjacent to and influenced by Urban Villages.
3. Type 3 = Lower density and auto-oriented areas near edges of City.
4. Auto mode weight factor considers the importance of roadways to a service area, relative to the availability of other mode alternatives.
5. Transit mode weight factor considers the availability/viability of the transit mode to a service area.
6. Pedestrian mode weight factor considers the importance of pedestrian facilities to a service area, relative to land use and travel patterns.
7. Bicycle mode weight factor considers the importance of bicycle facilities to a service area, relative to land use and travel patterns.
8. This is the minimum level of the planned system completed for it to be considered a viable mode alternative.
9. Person trips credited to service area based on the amount of the system completed minus the minimum threshold.

Source: Bellingham Municipal Code, Section 13.70, Table 1 (2008).

Figure 2. Multimodal Policy Dials
Source: "Moving Beyond the Automobile: Multi-modal Transportation Planning in Bellingham, Washington," Chris Comeau, AICP, *Practicing Planner*, Vol. 7, No. 3, September 2009.

The following examples illustrate how PTA are calculated by mode:

- A roadway with a 1,400 vehicle hourly capacity and a volume of 1,000 vehicles would have 600 PTA assuming an average occupancy rate of 1.5 people per vehicle.
- A location with four 40-seat buses per peak hour (160 person trip total capacity) and 100 riders would have 60 PTA.

- An area with 90% of its sidewalk or bicycle network complete would be credited with 800 PTA. An area with 40% of its sidewalk or bicycle network complete would not be credited with any PTA. To gain PTA via sidewalk or bicycle improvements, a minimum of 50% of the area's sidewalk and bicycle network must be completed.

Each year, the City of Bellingham calculates the PTA for each concurrency service area, taking into account projects with approved permits. Each new development application draws upon the PTA in the relevant area. If the development would generate more person trips than are available, the developer must contribute sufficient PTA through construction of new multimodal facilities or implement transportation demand management strategies to allow the project to go forward (these strategies reduce the PTA demanded by the development).

The pool of PTA can be increased by improving any modal facility, thereby offering flexibility to the City and developers. Another benefit of this approach is that it is based on recent observed data, providing a reliable check of current conditions. However, this also means the approach is somewhat data-intensive. In addition, there is no direct link to SEPA standards, which generally rely on traditional auto LOS thresholds to make determinations of significance.

City of Redmond

The City of Redmond implemented a multimodal transportation concurrency program in 2009. The system defines LOS based on citywide person miles traveled, which are called "mobility units" by the City. The City uses supply and demand language to describe the program: completed infrastructure projects create mobility units of supply and new developments create mobility units of demand.

The City uses this concept for both long-range planning and regulatory concurrency. The City developed a Transportation Master Plan (TMP) that lists multimodal capital projects intended to achieve the envisioned land use/transportation balance. The fundamental assumption underlying the concurrency system is that the list of projects to be constructed by the TMP's horizon year is expected to meet the demand of new development. In other words, the number of mobility units supplied by the TMP is equal to the number of mobility units that would be consumed by the planned development.

Long-Range Planning

The Redmond Comprehensive Plan includes the following policy which serves as the LOS standards for long-range planning as well as concurrency:

> *Support planned land use through the use of a citywide person-mile-of-travel-based transportation level of service standard. Redmond's transportation level of service standard is established to mean that so long as the growth of the city and the development of the city's transportation system are proportionate, work in parallel, and are consistent with the Comprehensive Plan, all concurrency management requirements are considered met.*

Concurrency is quantified as the ratio between the mobility units of supply and the mobility units of demand so a ratio of more than 1.0 indicates that the City is achieving its envisioned transportation/land use balance.

Mobility units are calculated using the City's travel demand model. First, land use growth is determined, then ITE trip-generation rates are applied to estimate vehicle trips which are subsequently converted to person trips. (Person trips for pedestrians, bicycles, and transit were estimated using the travel demand model.) Lastly, the travel demand model is used to estimate trip length which is applied to the total person trips to arrive at the person miles of travel. The resulting number of person miles traveled—or mobility units—is then allocated proportionately to each capital project in the TMP based on cost. Balance between the supply and demand of mobility units can be tracked by summing the mobility units that are supplied by completed projects and comparing that to the total mobility units that are consumed by new development.

While Redmond ultimately translates its TMP into mobility units, these units are not the basis for developing the plan itself. In terms of long-range planning, Redmond recently completed an update of the TMP with the projects in the multimodal plan being selected on the basis of how well they help to advance nine "dashboard" measures. These measures are summarized in **Figure 3** on the following page.

Redmond Dashboard Measures	
Measure	**Description**
Connectivity	Percentage of Downtown and Overlake Village development square footage with connectivity levels of "medium" or better. Connectivity is measured using route directness—the ratio of the actual pedestrian travel distance to the straight line distance between set points on the transportation network. 2030 targets are 81% of development in Downtown and 31% of development in Overlake Village
Network Completion	Proportion of the multimodal transportation system that is complete to the city's defined ultimate buildout plan. Tracked separately for auto, bicycle, pedestrian, transit, and truck networks. 2030 targets are 68% auto, 51% bicycle, 53% pedestrian, 100% transit, 76% truck.
Mode Share	Non-SOV mode share. 2030 target is 53%.
Vehicular Congestion	Average PM peak hour vehicle delay per mile on principal arterials. 2030 target is 46 seconds per mile.
Transit Ridership	Average boardings per weekday citywide. 2030 target 26,700 (based on mode share target).
Concurrency	Ratio of mobility units of supply to mobility units of demand. 2030 target is 1.0.
Safety	Number of injuries per 1,000 persons (based on daytime population). 2030 target is 1.3 injuries per 1,000 persons or less. Note that future performance for this target cannot be forecasted. The city uses this target to prioritize short-term safety projects.
Air and Water Quality	Air quality measure based on federal "attainment" status for PM 2.5. Water quality measure is based on the proportion of right of way that is equipped "basic" treatment infrastructure. 2030 air quality target is for attainment status and 2030 water quality target is for 36% of right of way to feature basic water quality treatment.
Street Preservation	Pavement condition index. 2030 target is 73.

Figure 3. Redmond Transportation Master Dashboard Performance Measures
Source: "Transportation Master Plan, pages 40-56" City of Redmond, August 2013.

Regulatory Concurrency

The regulatory concurrency process requires that the City determine the number of mobility units that would be available in the six-year timeframe that the GMA requires for transportation infrastructure to be implemented following development. To measure the available mobility units, the City employs the system completion dashboard measure in conjunction with the funding status of each project in the TMP. The City has specific guidelines to help determine which projects should be assumed to be completed within six years. For example, a fully funded project included in the CIP or the annual expenditure for a programmatic project would be included.

Each development application is evaluated to estimate the number of mobility units that would be generated using a spreadsheet tool that mirrors the more involved travel demand modeling process used for long-term planning. Redmond uses a look-up table that provides the mobility unit rates for each type of land use development, similar to an impact fee table. This demand is then compared to the level of six-year mobility unit supply to determine if the development is permissible. If insufficient mobility units are available, the development would be rejected or the developer could pay to implement a project that would supply the required amount of mobility units to maintain concurrency. The mobility unit calculation and allocation methodology is currently being updated to ensure that projects which generate higher rates of pedestrian or bicycle travel (which have lower person miles of travel than auto trips) would use proportionately fewer mobility units and since mobility units also for the basis for Redmond's transportation impact fee program, would pay lower impact fees.

As with Bellingham, this approach provides flexibility to build a project that addresses any mode. Redmond's method requires that the total mobility units be recalculated when the Comprehensive Plan is being updated rather than every year (although the six-year projection must be done more frequently). One potential problem with this approach is that more expensive projects tend to be implemented since they provide substantial mobility units; in turn, smaller projects are sometimes ignored. Also, there is no correlation to mode split goals or SEPA standards.

City of Burien

The City of Burien uses a multimodal LOS methodology in its 2012 Transportation Master Plan (TMP) to help define the projects in the City's CIP and prioritize the projects in the Transportation Improvement Plan (TIP). This approach has not yet been translated to the regulatory concurrency

process. Burien continues to employ traditional auto LOS standards for regulatory concurrency review.

For transit, pedestrians, and bicycles, the City uses a three-tier LOS system with green denoting the highest level of service, yellow denoting an intermediate level of service, and red denoting a poor level of service. As described below, the three LOS tiers vary based on the type of transportation facility and the neighborhood context. In conjunction with the LOS system, Burien defined a "layered network," which is a system that identifies the "priority" modes on a given facility. For example, Ambaum Boulevard, which is a major north-south arterial, is defined as both a transit priority and an auto priority corridor. Ambaum is not defined as a bikeway, recognizing that cycling will not be practical for much of the public on this busy street. 4th Avenue, a parallel street located just east of Ambaum is identified as one of the City's main north/south bicycle corridors.

Burien identified corridors with high transit demand and/or high service frequency. These corridors were evaluated using the criteria shown in **Figure 4**. The TMP recognizes that the City can improve the infrastructure on which transit operates, although it has no direct control over transit service. Therefore, City investments would include projects such as bus stop amenities, crosswalks, sidewalks, intersection improvements, and transit signal priority. The City aims to achieve a green LOS for all roadways designated as transit priority corridors.

LOS	Transit Stop Amenities	Transit Travel Speeds	Pedestrian Access	Frequency of Service
	High level	Minimal Roadway Delay	Sidewalks and marked crosswalks serving stops	All day service. Peak service 15 minutes or less, midday 30 minutes or less.
	Some amenities	Moderate Roadway Delay	Sidewalks and marked crosswalks service some stops	All day service. Peak services 30o minutes or less, midday service 60 minutes or less.
	Little or no amenities	Congested Roadway	General lack of sidewalks and marked crosswalks	Low level of service.

Figure 4. Transit Corridor LOS
Source: Burien Transportation Master Plan, 2012.

Burien's criteria for the pedestrian network are shown in **Figure 5**. The City designates areas as being either pedestrian priority areas or pedestrian non-priority areas. This system recognizes that investment should first be focused in areas such as downtown or near schools, rather than outlying residential areas.

LOS	Along Transit Priority Corridors	Pedestrian Activity Centers	Downtown Burien
	Sidewalk and buffer	Arterial/Collector – Sidewalk on Both Sides	Meets Downtown Standards
	Sidewalk	Wide Shoulder	Sub-standard Sidewalk
	No Sidewalk	Congested Roadway	No Sidewalk

Pedestrian Non-Priority Area LOS – Sidewalk Requirements

LOS	Other Roadway Segments
	Arterial – Sidewalk on Both Sides
	Arterial – Sidewalk on One Side
	Arterial – No Sidewalk

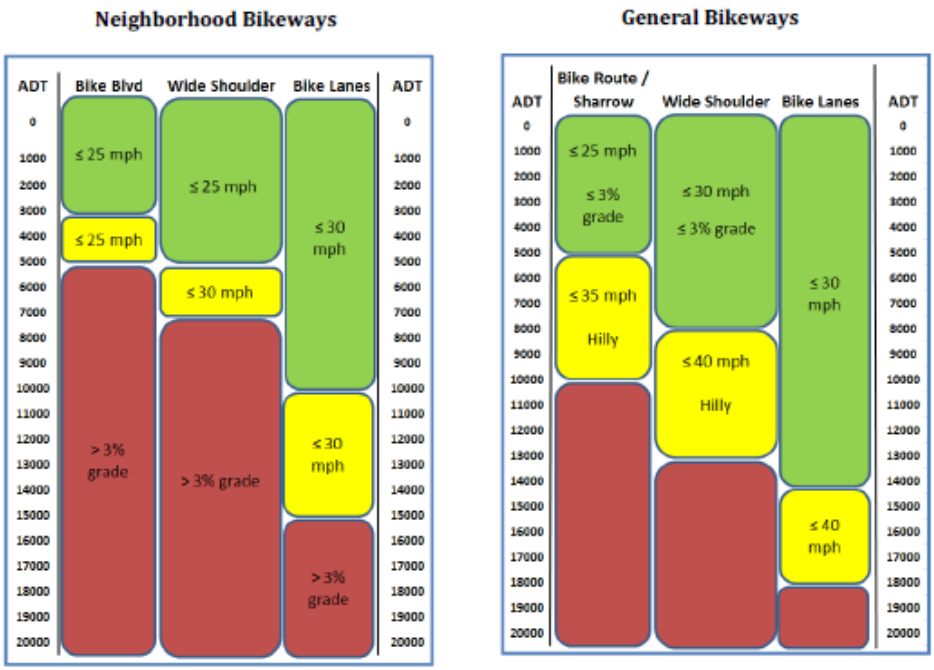
Crossing Requirements

LOS	Pedestrian Priority Areas	Other Areas
	Appropriately designed crossing every 300 feet in pedestrian activity area(s) or downtown	Appropriately designed crossings at existing marked crosswalks
	Crosswalks present every 600 feet	Crosswalks present
	No crosswalks present	No crossings within 600 feet

Figure 5. Pedestrian LOS
Source: Burien Transportation Master Plan, 2012.

Bicycle facilities are also categorized into two tiers: neighborhood bikeways, which are designed to accommodate bicyclists of all abilities on low volume, low speed residential streets, and general bikeways which are designed for more confident riders who are comfortable using

roadways with higher volumes and speeds. **Figure 6** summarizes the bicycle LOS from the Burien plan.



Crossing Requirements

LOS	Unsignalized Intersections	Stop Frequency (Neighborhood Bikeways Only)
	Adequate crossing of arterial or collectors along bikeways.	< One stop per 1/4 mile
	Marked but insufficient crossing of arterial or collector along bikeway	Stops spaced at 1/8 to 1/4 mile
	No marked/controlled crossings of arterial or collector along bikeway	> One stop per 1/8 mile

Figure 6. Bicycle LOS
Source: Burien Transportation Master Plan, 2012.

Burien uses traditional (Highway Capacity Manual (HCM) intersection LOS for autos. Again, roadways are categorized differently to account for their desired character. For example, downtown Burien has a lower LOS threshold than other areas because the City wants to maintain the walkability of the area – this eliminates projects such as roadway widening from consideration.

Burien's Comprehensive Plan includes the following language:

> *The City adopts the following Level-of-Service standards for vehicles: LOS standard D for designated vehicle priority roadways; LOS standard E for downtown Burien streets; and LOS C for all other roadway facilities and services.*
>
> *The City will pursue the following actions along designated transit priority roadways: provide high level of transit stop amenities, maintain adequate vehicle LOS, provide sidewalks and marked crosswalks at all major transit stops, and encourage transit agencies to provide all day service with minimum 15-minute peak/30-minute midday bus frequencies.*
>
> *The City will pursue the following actions within designated pedestrian priority areas: provide sidewalks and/or wide shoulders on both sides of all arterial and collector routes and provide adequate street crossings within 300 feet of identified activity areas. For other areas of the city, provide sidewalks and/or wide shoulders on all arterial routes and adequate crossings at existing or planned marked crosswalks.*
>
> *The City will pursue the following actions for designated bicycle priority streets: provide high-level bicycle treatments on roadway segments considering traffic volumes and speeds, adequate intersection treatments, and undertake actions to minimize stop frequency for bicycles along these routes. For other streets with bikeways, provide appropriate bicycle treatments considering traffic volumes and speeds on designated streets, and adequate intersection treatments.*

This approach requires minimal data collection and uses simple analysis with context sensitive LOS definitions. However, there is no regulatory concurrency component, there is potential for modal conflict, and some of the measures are subjective.

City of Renton

The City of Renton uses an uncommon measure for their regulatory concurrency evaluation. Using the Renton travel demand model, the City estimates the distance that can be traveled in 30 minutes from the center of the City. This is done for a single occupant vehicle, a high occupancy vehicle, and a transit vehicle. Then, an index is determined by calculating the sum of the HOV and SOV distances and twice the transit distance. This analysis is updated periodically to set the standard for future evaluation. For instance, the 2002 index was determined to be 42 (16.6 miles for SOV plus 18.7 miles for HOV plus 2 x 3.4 miles for transit), which then serves as the standard for the 2022 horizon year.

This citywide standard is applied as part of a plan-based concurrency program to determine whether future development may impact mobility in Renton. This approach is inherently multimodal since projects that generate fewer auto trips will have less of an impact on the travel distance index. One downside compared to Redmond or Bellingham's concurrency program is that non-auto improvements do not directly improve the index. However, transit speed improvements are given more weight than auto improvements, providing incentive to increase the mobility of transit, with particularly high value to transit operating in dedicated right-of-way.

While Renton uses this travel distance methodology for regulatory concurrency, it is unclear if the City uses this measure to inform the long-range transportation plan.

NATIONAL BEST PRACTICES

This chapter summarizes the best multimodal planning practices from around the country.

Florida Department of Transportation

Florida and Washington are the only states with a concurrency requirement. The Florida Department of Transportation (FDOT) has developed a detailed handbook for determining level of service. In addition to auto LOS, the handbook addresses transit, pedestrian, and bicycle LOS. FDOT has also developed a software program to streamline the LOS calculation.

Pedestrian and bicycle LOS are calculated using a regression model. Pedestrian LOS is based on four variables: existence of a sidewalk, lateral separation of pedestrians from motorized vehicles, motorized vehicle volumes, and motorized vehicle speeds. Bicycle LOS is based on the following five variables: average effective width of the outside through lane, motorized vehicle volumes, motorized vehicle speeds, heavy vehicle volumes, and pavement condition. Note that while the bicycle LOS is not applicable to off-street facilities, the pedestrian model may be applied to shared use paths within 100 feet of the roadway.

These models were originally designed for operational purposes, but FDOT has made some assumptions to simplify the methodology for planning level evaluation by giving a discrete number of choices with default values for some variables. For example, the software includes three choices for outside lane width (wide, typical, or narrow) with default values. For pedestrian and bicycle analysis, FDOT weights segments based on their length and the severity of their scores, which significantly penalizes poorly operating segments.

For transit, FDOT relies on the concept that frequency of service is the most relevant performance measure. FDOT uses the service

Service Frequency LOS Thresholds

Level of Service	Adjusted Service Frequency (Vehicles/hour)	Headway (minutes)	Comments
A	>6.0	<10	Passengers don't need schedules
B	4.01 to 6.0	10 to 14	Frequent service, passengers consult schedules
C	3.0 to 4.0	15 to 20	Maximum desirable time to wait if transit vehicle missed
D	2.0 to 2.99	21 to 30	Service unattractive to choice riders
E	1.0 to 1.99	31 to 60	Service available during hour
F	<1.0	>60	Service unattractive to all riders

Figure 7. FDOT Transit LOS
Source: Quality/Level of Service Handbook, FDOT, 2009.

frequency standards cited in the Transportation Research Board's Transit Capacity and Quality of Service Manual, as shown in **Figure 7** on the prior page. FDOT also created "Generalized Tables" that may be used for generalized planning of facilities, rather than focusing on the segment level.

City of Destin

The City of Destin uses FDOT's ARTPLAN software to evaluate multimodal LOS within a designated Multimodal Transportation District (MMTD). In 2006, Destin was the first jurisdiction in Florida to adopt a MMTD and several other cities have since followed suit. Destin codified both short-term and long-term multimodal LOS standards within their Comprehensive Plan. **Figure 8** below summarizes the ARTPLAN LOS standards for major collector roads.

	BICYCLE	PED	BUS
Adopted (2006)	C	E	F
Adopted (2011)	B	C	E
Adopted (2020)	B	B	C

Figure 8. Destin LOS Targets by Year
Source: Quality/Level of Service Handbook, FDOT, 2009.

Within the MMTD, the City requires proposed developments to meet two conditions to be considered in compliance with the concurrency standard. First, the development must follow certain urban form and multimodal facility design standards. Second, the development must offset its traffic impact through multimodal improvements. The traffic impact of a project is determined by entering project vehicle trip generation into a spreadsheet. Multimodal improvements to offset the impact can be selected from a checklist. The number of impact mitigation points must equal or exceed the calculated impact. Mitigation projects include on-site, frontage improvements, and off-site improvements. Examples include development of pedestrian oriented buildings (adjacent to the sidewalk), constructing on-site sidewalks to connect uses, constructing off-site sidewalks/bicycle facilities, or providing less than the maximum allowed parking.

San Francisco, California

The State of California has no concurrency requirement. Therefore, jurisdictions have been moving toward using other means to achieve the goals of a concurrency program, namely, the

California Environmental Quality Act (CEQA) impact disclosure requirements and impact fee programs.

The San Francisco Department of Public Health (SFDPH) developed a Bicycle Environmental Quality Index (BEQI) and a Pedestrian Environmental Quality Index (PEQI). These indices consider a wide variety of facility characteristics and quantify how well the facility is serving pedestrians or bicycles. These scores can help jurisdictions to prioritize capital investments.

The PEQI and BEQI were developed using a survey of available research on how different roadway environments affect pedestrians and bicyclists. Both the PEQI and the BEQI use a field observation in conjunction with other data to determine an overall score for the facility. The PEQI has a total of 30 variables while the BEQI has 22, as shown in **Figures 9** and **10** below.

INTERSECTION	*STREET SEGMENT*			
Intersection Safety	**Traffic**	**Street Design**	**Land Use**	**Perceived Safety**
Crosswalk	Number of lanes	Sidewalk width	Storefronts/retail use	Illegal graffiti
Ladder crosswalk	Two-way traffic	Sidewalk impediments	Public art/historical sites	Litter
Pedestrian signal	Vehicle speed limit	Sidewalk obstructions		Pedestrian scale lighting
Traffic signal	Traffic volume	Presence of curb		Construction sites
Crossing speed	Traffic calming features	Driveway cuts		Abandoned buildings
Crosswalk scramble		Trees		
No turn on red signs		Planters/gardens		
Traffic calming features		Public seating		
Additional signs for pedestrians		Presence of buffer		

Figure 9. PEQI Scoring Elements
Source: Pedestrian Environmental Quality Index (PEQI) Draft Methods Report v 1.1, 2008.

INTERSECTION	STREET SEGMENT			
Intersection Safety	**Vehicle Traffic**	**Street Design**	**Safety**	**Land Use**
Left Turn Bicycle Lane	Number of Vehicle Lanes	Presence of a Marked Area for Bicycle Traffic	Bicycle/Pedestrian Scale Lighting	Line of Sight
Dashed Intersection Bicycle Lane	Vehicle Speed	Width of Bike Lane	Presence of Bicycle Lane Signs	Bicycle Parking
No Turn on Red Sign(s)	Traffic Calming Features	Bicycle Lane Markings		Retail Use
	Parallel Parking Adjacent to Bicycle Lane/Route	Trees		
	Traffic Volume	Connectivity of Bicycle Lanes		
	Percentage of Heavy Vehicle	Pavement Type/Condition		
		Driveway Cuts		
		Street Slope		

Figure 10. BEQI Scoring Elements
Source: Bicycle Environmental Quality Index (BEQI) Draft Report, 2009.

Most of the data is collected by observation at an intersection or street segment, using a two-page survey with simple questions. Other data is also required, including traffic volumes, grade, and heavy vehicle percentage. SFDPH created a Microsoft Access database that takes the data from the field and other sources to calculate the overall score using varying weights for each indicator. The final score ranges from zero to 100, with 100 denoting the highest quality facilities.

San Francisco has also tried to use the concept of Auto Trips Generated (ATG) in development review. This method assumes that each new auto trip is an incremental impact to the network. The concept is aimed at balancing objectives to consider the public right-of-way as a space for all modes rather than strictly as a vehicle facility. However, the City ran into challenges demonstrating the nexus to the mitigation it proposed and is now reconsidering if there is another way to achieve the goal.

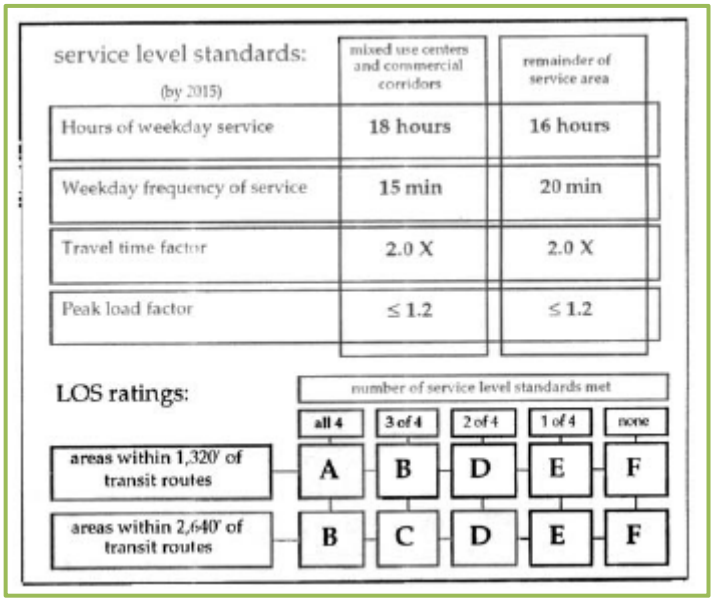
Fort Collins, Colorado

The City of Fort Collins has developed a multimodal LOS system that essentially functions as a concurrency management system.. These standards are used for long-term planning as well as part of the development review process (which is similar to regulatory concurrency).

Transit LOS is based on four factors: hours of weekday service, weekday frequency of service, travel time factor (the ratio of transit travel time to auto travel time), and peak load factor (the ratio of passengers to seats). The City establishes two sets of thresholds depending on the area in question. Mixed use centers and commercial corridors have more stringent thresholds (e.g., more hours of weekday service and higher frequency.) than outlying areas. The number of conditions met and the distance to the transit route determine which LOS grade is achieved as shown in **Figure 11**.

Fort Collins sets thresholds for five distinct typologies for pedestrian LOS. Each measure has a different standard, rather than aggregating the measures into a single standard. Pedestrian LOS is based on five standards as described below and summarized in **Figure 12**:

- Directness – defined as the ratio of actual walking distance via sidewalks or pathways to minimum walking district as measured on the street grid. Continuous sidewalks along the grid system represents the ideal condition; LOS A is defined as having a ratio less than 1.2 while LOS F is defined as having a ratio greater than 2.



service level standards: (by 2015)	mixed use centers and commercial corridors	remainder of service area
Hours of weekday service	18 hours	16 hours
Weekday frequency of service	15 min	20 min
Travel time factor	2.0 X	2.0 X
Peak load factor	≤ 1.2	≤ 1.2

LOS ratings:	number of service level standards met				
	all 4	3 of 4	2 of 4	1 of 4	none
areas within 1,320' of transit routes	A	B	D	E	F
areas within 2,640' of transit routes	B	C	D	E	F

Figure 11. Ft. Collins Transit LOS
Source: Fort Collins Multimodal Transportation Level of Service Manual, 2002

- Continuity – qualitative measure. For example, LOS C is defined as "continuous stretches of sidewalks which may have variable widths, with and without landscaped parkways."
- Street crossings – Four types of crossings are defined (signals, unsignalized crossing the major street, unsignalized crossing the minor street, and mid-block major street crossing), each with a defined LOS threshold. For example, LOS A on a signalized crossing is defined as "three or fewer lanes to cross; signal has clear vehicular and pedestrian indications; well-marked crosswalks; good lighting levels; standard curb ramps; automatic pedestrian signal phase; amenities, signing, sidewalk, and roadway character strongly suggest the presence of a pedestrian crossing; and drivers and pedestrians have unobstructed views of each other."
- Visual Interest and Amenity – qualitative measure. For example, LOS B is defined as "generous sidewalks, visual clarity, some street furniture and landscaping, and no blank street walls."
- Security – qualitative measure. For example, LOS A is defined as "sense of security enhanced by presence of other people using sidewalks and overlooking them from adjacent buildings. Good lighting and clear sight lines."

Pedestrian Level of Service by Location Area Type

factors / area type	directness	continuity	street crossings	visual interest & amenities	security
pedestrian district	A	A	B	A	A
activity center/corridor	B	B	B	B	B
transit corridor	B	B	B	C	B
school walk area	B	B	B	C	B
other	C	C	C	C	C

Figure 12. Ft. Collins Pedestrian LOS
Source: Fort Collins Multimodal Transportation Level of Service Manual, 2002.

Bicycle LOS is based on the concept of connectivity to bike facilities, as shown in **Figure 13**. Again, areas have different LOS standards based on their character.

connectivity required for levels of service:

A	directly connected to both North-South and East-West on-street lanes
B	directly connected to both North-South and East-West corridors at least one of which is a set of on-street lanes
C	directly connected to either a North-South or an East-West corridor which is a set of on-street lanes
D	directly connected to either a North-South or an East-West corridor which is an off-street path
E	indirectly connected via an on-street unstriped route along a low volume local street to one or more of the above within 1/4 mile
F	no direct or indirect connections to either North-South or East-West corridors

minimum LOS

base city-wide minimum level:	C
public school sites:	A
recreation sites:	B
community/neighborhood commercial centers:	B

Figure 13. Ft. Collins Bicycle LOS
Source: Fort Collins Multimodal Transportation Level of Service Manual, 2002

Auto LOS is defined using volume-to-capacity ratios with standards varying based on the functional classification of the roadway and the type of neighborhood. **Figure 14** summarizes the auto LOS methodology.

roadway functional classification	land use (from structure plan)			
		Other Corridors Within:		
	Commercial Corridors	Mixed Use Districts	Low Density Mixed Residential	All Other Areas
Major Arterial	E	E*	D	D
Arterial	E	E*	D	D
Minor Arterial	E	E*	C	D
Collector	D	D*	C	D
Connector		C*	B	C

* Corridors within mixed use districts may fall below the LOS level indicated. In such cases, the City will provide for mitigation of congestion through alternatives to motor vehicle travel.

Figure 14. Ft. Collins Auto LOS
Source: Fort Collins Multimodal Transportation Level of Service Manual, 2002.

Fullerton, California

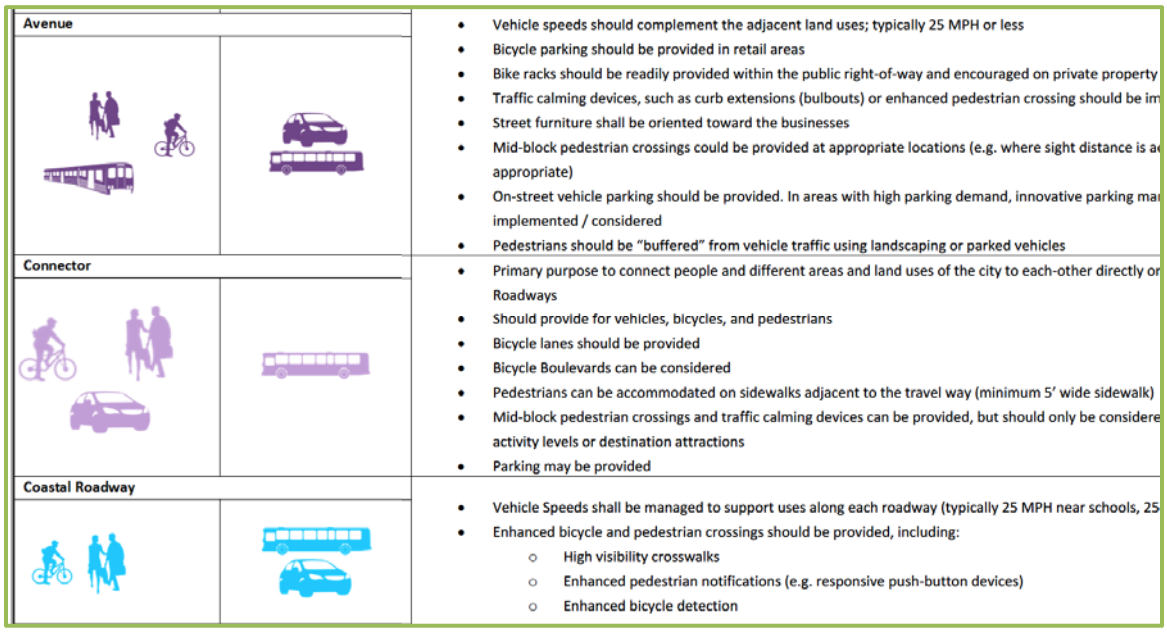
The City of Fullerton, California recently completed an update to their General Plan (currently pending approval by the City Council) that includes a multimodal LOS requirement to evaluate project impacts during the California Environmental Quality Act (CEQA) process. The City is using the Fort Collins methodology for pedestrians, bicycles, and transit and the traditional HCM intersection delay methodology for autos. The City identifies a single threshold, but the standard is applied to whichever mode has been designated as the prioritized mode on a given corridor. This modal prioritization is based on a layered network that was developed as part of the City's General Plan update. A significant impact would be identified if the project would:

> *Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit as defined below:*
>
> - *Degrades levels of service for prioritized modes from an acceptable LOS D or better to LOS E, or F; or*
> - *Increases use of a facility operating at an unacceptable LOS.*
>
> *For non-prioritized modes within the City, LOS F shall be considered an acceptable operating level. For Caltrans' facilities or facilities outside the City of Fullerton, the respective guidelines and thresholds shall apply of the operator of the study facility, if available. If not available, the City of Fullerton methodology shall apply.*

Fullerton's approach is similar to the project-based regulatory concurrency program in Washington State. In Fullerton, all projects or actions that would require a discretionary action by the City Council would trigger the CEQA review. If a project impacts multimodal LOS, the project must mitigate the impact to a less-than-significant level, which could require the construction of multimodal improvements. One potential drawback to this method is that it can be difficult to demonstrate that a project increases the use of a facility operating at an unacceptable LOS, particularly for walking and cycling on facilities located away from the immediate vicinity of the project. Proportionally allocating costs (which is a requirement of any mitigation program) may also be difficult in the absence of a travel model that can predict the pedestrian and bicycle usage of a facility.

Carlsbad

The City of Carlsbad, California has developed a multimodal LOS methodology to guide development of their long-range transportation plan. Carlsbad has intentions to adapt the multimodal LOS method into a multimodal transportation impact fee program in the near future to streamline development review. As with other communities that have adopted multimodal LOS, Carlsbad has identified a layered network with priorities assigned to different modes. Below is a figure highlighting some of the transportation network typologies.



Avenue	• Vehicle speeds should complement the adjacent land uses; typically 25 MPH or less • Bicycle parking should be provided in retail areas • Bike racks should be readily provided within the public right-of-way and encouraged on private property • Traffic calming devices, such as curb extensions (bulbouts) or enhanced pedestrian crossing should be im • Street furniture shall be oriented toward the businesses • Mid-block pedestrian crossings could be provided at appropriate locations (e.g. where sight distance is a appropriate) • On-street vehicle parking should be provided. In areas with high parking demand, innovative parking ma implemented / considered • Pedestrians should be "buffered" from vehicle traffic using landscaping or parked vehicles
Connector	• Primary purpose to connect people and different areas and land uses of the city to each-other directly or Roadways • Should provide for vehicles, bicycles, and pedestrians • Bicycle lanes should be provided • Bicycle Boulevards can be considered • Pedestrians can be accommodated on sidewalks adjacent to the travel way (minimum 5' wide sidewalk) • Mid-block pedestrian crossings and traffic calming devices can be provided, but should only be considere activity levels or destination attractions • Parking may be provided

Coastal Roadway	• Vehicle Speeds shall be managed to support uses along each roadway (typically 25 MPH near schools, 25
	• Enhanced bicycle and pedestrian crossings should be provided, including:
	  ○ High visibility crosswalks
	  ○ Enhanced pedestrian notifications (e.g. responsive push-button devices)
	  ○ Enhanced bicycle detection

Figure 15. Carlsbad Livable Streets-Modal Priorities
Source: Carlsbad General Plan Update, City of Carlsbad 2013.

As shown in **Figure 15**, different street typologies have different modal priorities. The symbols in the left column represent the prioritized modes, while the symbols in the right column represent modes that are accommodated, but not prioritized. Note that Coastal Roadways, which are right-of-way constrained streets along the coast, prioritize pedestrian and bicycle travel, while accommodating cars and transit. Carlsbad's General Plan identifies a LOS standard of D for all prioritized modes and some minimum design criteria are also specified. The ultimate transportation network in the General Plan was developed to meet the LOS D standard for the prioritized modes and potential project impacts are assessed against the multimodal LOS thresholds.

Auto LOS is analyzed using traditional HCM intersection methods.

The pedestrian, bicycle, and transit LOS methodology is similar to ARTPLAN from FDOT or the 2010 HCM methods in that LOS is based on a points system for each facility. The total points, which will range from 0 to 10, correspond to traditional LOS letter grades, as shown in **Figure 16**, below. However, unlike ARTPLAN or the 2010 HCM, the points system is highly customized to Carlsbad and issues such as high traffic speeds or volumes do not degrade pedestrian or bicycle LOS[3].

MMLOS Point System and LOS Rating	
Point Score	**LOS**
9.0-10	A
8.0-8.99	B
7.0-7.99	C
6.0-6.99	D
5.0-5.99	E
0-4.99	F

Figure 16. Carlsbad MMLOS Scoring Thresholds
Source: Carlsbad General Plan Update, City of Carlsbad 2013.

The pedestrian level of service criteria and point system for a pedestrian prioritized street are outlined below:

- Number of lanes (including travel lanes and turn lanes) at a pedestrian crossing
    - 4 points for roads with two lanes or fewer; or
    - 3 points for roads with three lanes; or
    - 2 points for roads with four lanes; or
    - 1 point for roads with five lanes; or
    - 0 points for roads with more than five lanes
- Crossing Quality
    - 0.5 points for presence of a pedestrian refuge

[3] A major criticism of ARTPLAN or the 2010 HCM multimodal LOS method is that pedestrian and bicycle LOS is heavily influenced by traffic conditions on the adjacent road. While traffic speeds and volumes are important considerations, for major roads, traffic volumes can dominate the calculation, making it impossible to improve pedestrian or bicycle LOS. A road like NE 8th Street or Bellevue Way, even with wide tree-lined sidewalks and good adjacent urban form would end up scoring poorly with this method.

- 0.5 points for well-marked crossways and mid-block crossings at safe and convenient locations
- 0.5 points signing, striping, sidewalks, and other elements that suggest the presence of a pedestrian crossing
- 0.5 points for Rectangular Rapid Flashing Beacons at an uncontrolled crossing
- 0.5 points for drivers and pedestrian having unobstructed views of each other
- 0.5 points for posted speeds of 25 miles per hour or less
- 0.25 points for posted speeds of 30 miles per hour or less

- Other Elements
  - 1 point for active building frontages
  - 0.5 for pedestrian lighting at night
  - 0.5 points for street trees and/or quality street furniture facing the land uses
  - 0.5 points for twinkle lights in trees along the corridor
  - 0.5 points for sidewalks that are at least ten feet adjacent to retail, at least six feet adjacent to residential uses, or at least eight feet everywhere else
  - 0.5 points for a sense of security by the presence of other people and clear sight lines
  - 0.5 points for on-street parking and/or landscaping as a "buffer" from vehicle traffic and pedestrian walkway.

The bicycle level of service criteria and point system for bicycle oriented streets are outlined below:

- Type of bicycle facility
  - 6 points for multiple bicycle facilities (e.g. a bike path and bike lanes or something similar) along the corridor; or
  - 5 points for a Class I facility (off-street path) or a Class II facility (on-street bicycle lanes) with a bicycle buffer (e.g. striped median buffering the bicycles from the vehicles either on the right side or left side of the bike lane depending on if parallel parking exists); or
  - 4 points for a Class II facility that incorporates a painted lane that is at least 6 feet wide and signage or a Class III facility (bike route designated by signage only) that incorporates sharrows; or
  - 3 points for Class II bike lanes that are under 6 feet wide or a Class III facility
- Connectivity – 0.5 points if it is directly connected to bicycle facilities in all four directions

at intersections

- Amenities
    - 0.5 points if bicycle racks are provided along roadway segment corridor
    - 0.5 points if signage is provided
    - 0.5 points for bike-friendly intersections (e.g. bicycles are not trapped by right-turn lanes, there is space for bicycles to bypass the vehicle queue, etc.)
    - 0.5 points for enhanced bicycle detection or video detection at an intersection
- Other Elements
    - 0.5 points for posted speed limits of 25 miles per hour or less
    - 0.25 points for posted speed limits of 30 miles per hour or less

  0.5 points for good pavement conditions
- Adjacent Vehicle Parking
    - 1.5 points for no parking along the street; or
- 1 point for backed-in angled parking; or 0.5 points for parallel parking

The transit level of service criteria and point system for a transit prioritized street are outlined below:

- Right of Way
    - 0.5 points for dedicated right of way for transit only
- Service
    - 1.5 points for at least 15 minute headways during the peak hours
    - 1 point for at least 30 minute headways during the peak hours
    - 0.5 for at least 60 minute headways during the peak hours
    - 1.5 points for good on-time performance
    - 1.5 points if the route provides for a single transfer to reach of the Coaster stations
- Visual Interest, adjacent land use and Amenity
    - 0.5 points for covered bus stops
    - 0.5 points for a bench
    - 0.5 points for a well-lit stop that provides a sense of security
- Other Elements
    - 0.5 points for a corridor that has transit preemption to reduce delays
    - 0.5 points for routes that have available seats on the bus
    - 0.5 points for the availability to directly access multiple routes (e.g. the stop

serves more than one bus route)

- 1 point for bike parking availability at the bus stop
- 1 point for buses that provide on-board bike racks

Carlsbad's system combines standard and well-understood auto LOS methods with customized LOS methods for the other modes. The key for this system is the layered network and prioritized mode concept, which addresses potential issues where improving the LOS of one mode compromises the LOS of another. While this framework has proven useful for long-range planning, it is relatively untested for development review. Translating this type of program into a Washington-style regulatory concurrency program would also require some additional thought; but systems like Redmond's and Bellingham's could work with this general framework.

MULTIMODAL LOS POLICY OPTIONS FOR BELLEVUE

As discussed in the prior chapter, there are a variety of multimodal LOS applications both in Washington and nationally. However, based on the research conducted for this project and reaction from Bellevue Transportation Commission members, there are no "turnkey" approaches that can be directly implemented in the City. Any multimodal LOS application in Bellevue would require further refinement to account for the unique characteristics of the city and to integrate into existing city tools like the travel demand forecasting model. This chapter presents a variety of customized policy options the City of Bellevue could consider for long-range planning and transportation concurrency management.

REVISE THE MOBILITY MANAGEMENT AREA STRUCTURE

Bellevue established the Traffic Standards Code in 1989, in response to citizen concerns about rapid growth and increasing traffic congestion. In 1993, Mobility Management Areas (MMAs) were established in recognition that different areas of the City had different land use contexts, different transportation options, and different traffic congestion expectations. The original MMA boundaries were set to generally align with the impact fee boundaries at the time. With some minor revisions, the Traffic Standards Code and the MMAs have remained intact, while many parts of the City have experienced dramatic land use and transportation network transformations.

This policy option would revise and simplify the MMA boundaries to separate traditional suburban areas from mixed-use/transit-oriented areas. Within the traditional suburban areas, which are generally built-out, the current auto-oriented intersection-based LOS standard could remain; however, aspirational LOS targets for other modes (transit, walk, bike) could be incorporated to track progress on building out infrastructure for these other modes. Within the mixed-use/transit-oriented areas, alternative LOS methods, including area-wide measures or corridor-based measures, may be appropriate. For example, in downtown Bellevue/Wilburton, an overall level of traffic delay could be established (as opposed to the current intersection-based approach). Similarly, a target for transit throughput or level of system completion for pedestrian infrastructure (sidewalk/trail/midblock crossings) could be established to ensure "abundant access" for travelers. **Figure 17** on the following page presents an example of what a revised MMA structure could look like.

Implications:

- Similar structure to current system
- Could function well for both long-range planning and concurrency management
- Recognizes that autos are the dominant form of travel in the suburban areas of the city
- Larger MMAs allow for more continuity along important travel corridors for both autos and transit
- Explicitly accounts for non-auto infrastructure investments, focusing on completing the system for other modes of travel
- More transparency for multimodal investments, particularly in mixed-use/transit-oriented areas of the city
- Additional work would be needed to precisely define the multimodal LOS methodology
- The City would need to modify the BKR model to calculate the new multimodal LOS results

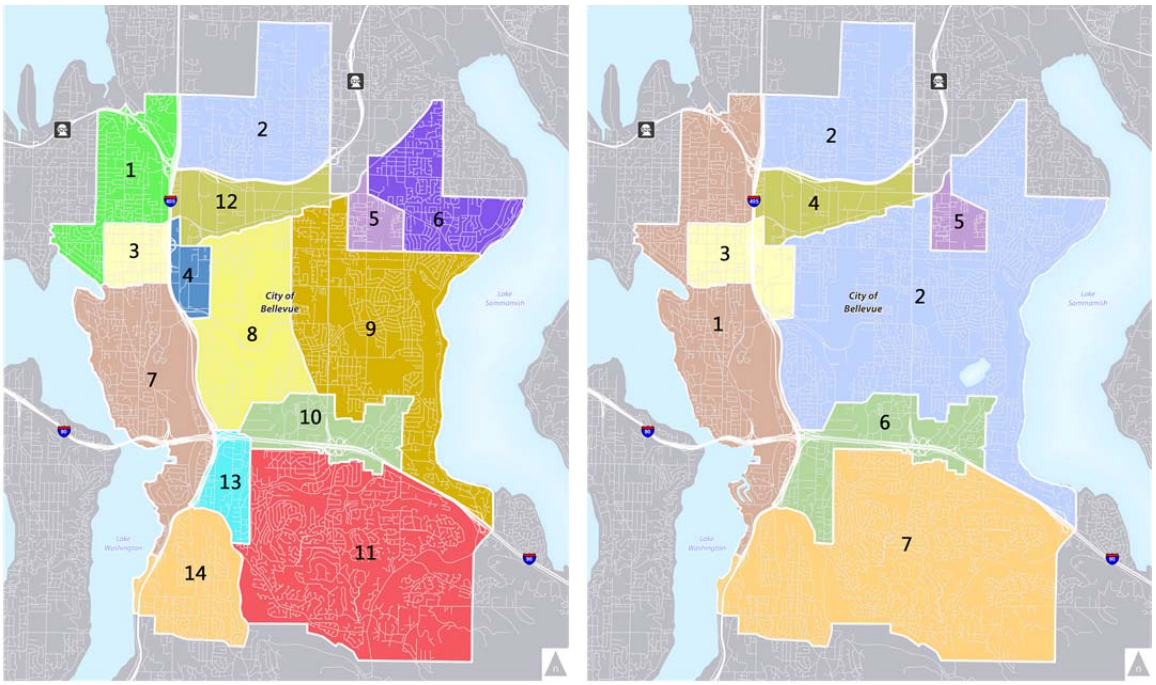


Figure 17. Current MMAs (left); Potential Revised MMAs (right)
Source: Fehr & Peers, 2014

CORRIDOR APPROACH

In the corridor approach, the primary function of the roadway/transportation corridor is the basis for establishing and monitoring level of service standards, as opposed to the MMA which relates mobility to a geographic area. A layered network (each layer representing a mode) would be defined based on plans like the Downtown Transportation Plan and the city's modal plans. For each facility type, a multimodal LOS method and standard would be defined. This standard would incorporate both design features and operational characteristics.

For instance, along a transit priority corridor, design standards could include the provision of transit signal priority, queue jumps at major intersections, and high quality pedestrian facilities to access the transit stops. From an operations perspective, transit LOS-focused metrics could include transit speed and reliability and/or person throughput. Similarly, along a corridor with a primary function of moving vehicles, design features could include right-turn pockets or dual-left turns at intersections, median access control, and sidewalks. Operations could be evaluated using volume/capacity or corridor travel time methods.

For each corridor, the LOS would also measure the functional adequacy of the relevant non-primary modes. For example, on an auto-oriented corridor, the LOS would measure traffic delay, but could also incorporate the need to provide adequate sidewalks, bike lanes and crossing opportunities. Multiple modes could be considered for a corridor—for example bikes and transit on 108th Ave NE in downtown or transit and autos on NE 8th Street.

The concept of an "ultimate facility" also fits well within this framework. When a street is built out to the maximum extent identified in the standards, it could be defined as an ultimate facility with no additional right-of-way used to improve the LOS. In this case, only operational strategies, such as signal coordination, transit signal priority, rechannelization, and other means would be used to optimize performance. Ultimate facilities recognize limitations with right-of-way and impacts to other modes once a facility reaches a given size.

MMAs would not be included in this approach, although it is possible to combine elements of a corridor and a zone-based approach. For example, various corridors could be defined throughout the city, while downtown Bellevue could be retained as a network of streets. **Figure 18** provides examples of a layered network of transportation corridors in a portion of Bellevue.

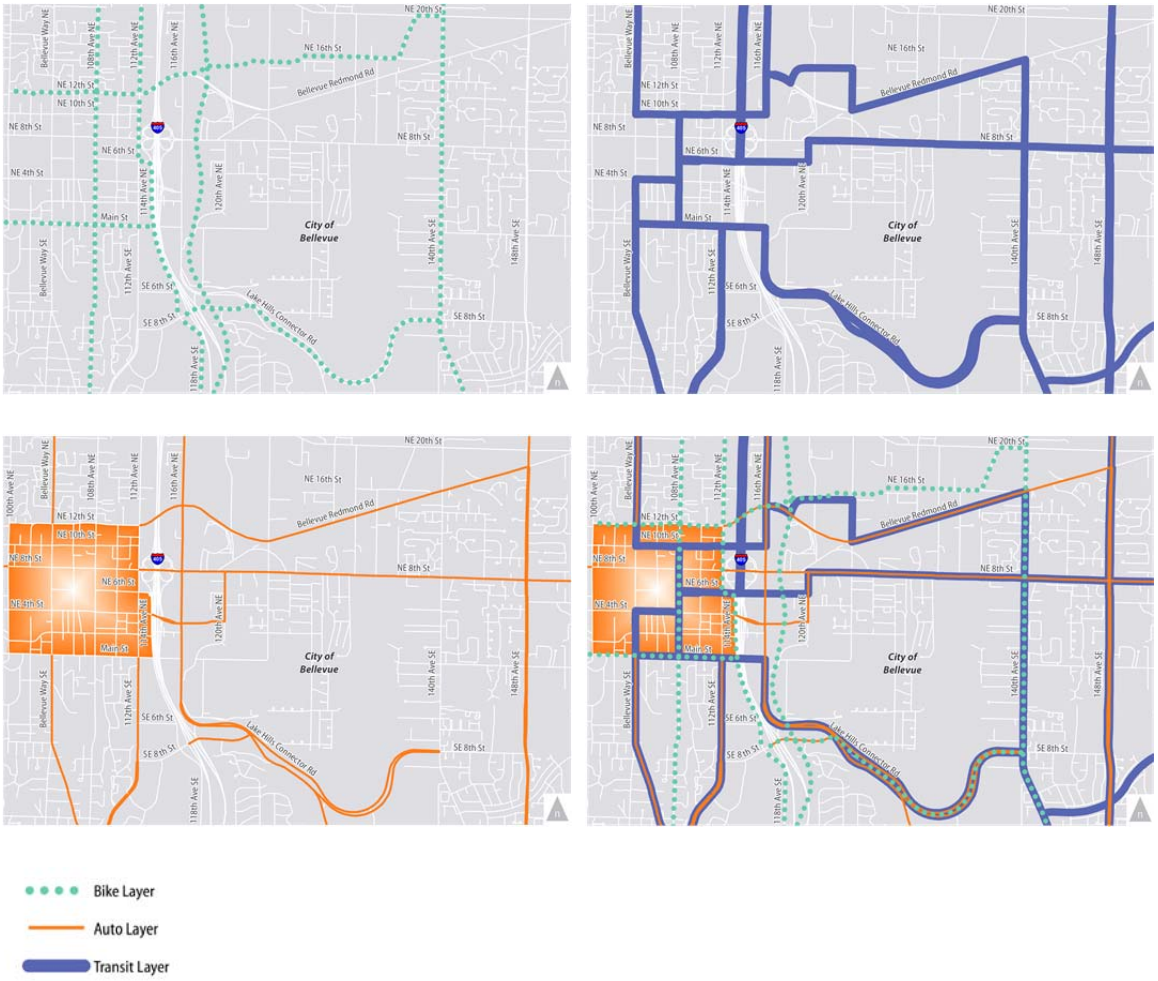


Figure 18. From Top Left to Right: Bike, Transit, Auto, and Combined Corridor Network
Source: Fehr & Peers, 2014

Implications:

- Significant departure from current system
- Could function well for both long-range planning and concurrency management
- Defines the functional design of every transportation facility that is included in the system
- Explicitly recognizes non-auto modes for design and operational consideration
- Includes flexibility to vary the LOS standard in different parts of the City
- Corridor focus works well for transit and key auto routes
- Would require the establishment of design standards for roadways, intersections, and pedestrian/bikeways across the entire city
- Would require some enhancements to the BKR travel model to implement

- Would require that all modal, neighborhood, and other transportation plans be overlaid to identify synergies or conflicts
- May require additional policy direction or research to rectify conflicts between modes in areas with limited right-of-way

MOBILITY UNITS

This approach is based on existing multimodal concurrency programs in Redmond and Bellingham, and could be a good option for concurrency management. In this approach, LOS is "simplified" into a single numerical value defined by "mobility units." A mobility unit measures the amount of access transportation infrastructure provides within an area.

While mobility units can be defined for an entire city, in Bellevue they might best be defined for different areas. This approach would require that the "value" of mobility units be established in different areas of the city. For example, given the dense mix and diverse land uses in downtown Bellevue, pedestrian infrastructure would have more value than it would in East Bellevue, where auto and potentially bicycle infrastructure would have higher values. Additionally, analysis would be needed to determine the transportation infrastructure projects that would contribute mobility units. For example, a sidewalk in Bel-Red or downtown may be contribute mobility units to the system since they substantially aid access for businesses, services, transit and residents; however, a neighborhood sidewalk, while important for local access, may not contribute any mobility units to the system. The types of transportation infrastructure projects that contribute mobility units could vary across the City.

The mobility unit LOS standards would be defined by the amount of infrastructure that is programmed to be built at a certain time horizon, based upon the City's modal plans. This method would increase accountability, since the City would identify when it plans to complete certain infrastructure projects for the various modes. Since the mobility unit concept is geared toward concurrency management, it could be paired with one of the other methods in this memo for long-term planning.

Implications:

- Significant departure from current system
- This system is very well suited for a concurrency management system but not as a stand-alone planning tool. It could be combined with one of the other options in this memo for long-range planning

- Would require research to determine how mobility units are calculated for different parts of the City
- This method may require substantial work on the BKR model for evaluation since pedestrian and bicycle travel are important components
- A concurrency system based on mobility units would be much simpler and less costly to administer than the current system (once the initial setup has been completed)
- This system provides substantial flexibility for City staff and commission/council members to identify potential projects that would improve LOS
- This system dovetails with the other approaches in the document when they are used for long-range planning
- This system recognizes that different parts of the city have different mobility needs

TARGET-BASED

This is an "outcome" oriented approach where reasonable mobility targets are identified and projects are matched to meet the targets. In this sense, the targets are similar to LOS standards.

As an example, targets could be set for mode share, greenhouse gas (GHG) emissions, or the number of jobs within a 20 minute transit commute. This option has the advantage of being closely tied to overall Comprehensive Plan transportation goals, but this would require substantial coordination with other elements of the Comprehensive Plan.

Depending on the targets that are set, the definition of and prioritization of projects can be less straightforward than other options identified earlier. For example, mode share goals could be reached through a variety of projects and programs. Examples include capital projects like more pedestrian infrastructure or transit speed and reliability investments. Programs and policies could be equally effective at meeting the targets—examples include revised parking codes, mandatory participation in commute trip reduction programs, or a requirement to de-couple parking costs from rent. The target-based approach is used by other jurisdictions to monitor progress on a Comprehensive Plan, but it is rare for the targets to remain fixed (often, if a target is not being met, it is simply 'kicked down the road'). For concurrency purposes, this option would likely need to be combined with either a traditional LOS evaluation, or one of the options defined earlier since these targets may not adequately meet the concurrency requirement of demonstrating how additional transportation capacity is being added to meet demand for travel from new growth.

Implications:

- Significant departure from current system
- Would require substantial coordination with other Comprehensive Plan elements (e.g. land use, capital facilities) and other plans/policies to ensure consistency and commitment to reach shared goals
- Very transparent link to long-term visions and goals for the city
- Flexibility to set different targets for different portions of the city
- High degree of accountability; straightforward to monitor progress
- May require substantial research and policy direction to establish targets
- Well suited for long-term planning, but would likely need a complementary concurrency methodology (e.g., one of the other approaches mentioned in this memo)
- May require substantial investments in BKR travel model to forecast outcomes
- Project prioritization may be less clear than other methods
- Could be used as a monitoring framework coupled to alternative long-range planning and concurrency methodologies

SUMMARY OF HOW POLICY OPTIONS CAN BE USED FOR LONG-RANGE PLANNING AND CONCURRENCY MANAGEMENT

As described earlier in this document, multimodal LOS for long-range planning and concurrency management are distinctly different and need not use the same methodology. Below is a table summarizing how the policy options are suited for use in long-range planning and concurrency:

Application	***Refine MMAs***	***Corridor Approach***	***Mobility Units***	***Target-Based***
Long-Range Planning	Very Well suited	Very Well suited	Not recommended; combine with another approach	Well suited
Concurrency Management	Well suited	Well suited	Very Well suited	Not recommended; combine with another approach

As noted above, the options to refine MMAs and the corridor approach are well suited for both long-range planning and concurrency management. The mobility unit approach is not as well suited for long-range planning and the target-based approach is not a good fit for concurrency management.

Any of these approaches could be mixed and applied for different purposes. For example, the refined MMAs could be used for long-range planning along with the mobility unit approach for concurrency management. The target-based option could be used to monitor performance and inform whether the long-range planning or concurrency standards need to be adjusted.

TRANSPORTATION COMMISSION DISCUSSION

The Bellevue Transportation Commission has been actively engaged in the discussion of how multimodal LOS could be integrated into future transportation planning in the City. This chapter summarizes the Commission's views and recommendations for future steps.

Meeting #1: December 12, 2013

At the initial meeting with City staff and consultants, the Commissioners discussed whether there was any need to update the City's LOS policies. Commissioners observed that the City is moving toward multimodal metrics, but not in a comprehensive or transparent manner. The consultants explained that Bellevue's existing practice of defining different auto LOS standards for each of the City's mobility management areas implicitly accounts for mobility options and the density/diversity of land uses by specifying different auto LOS standards for each MMA. While the current system reflects some land use context, it does not clearly account for all modes of travel.

In long-range planning and project prioritization for the CIP, several Commissioners noted that clear metrics for all modes would be helpful, as long as the system remained relatively simple. Several Commissioners noted that through the adoption of multimodal transportation plans, it is only natural to develop multimodal LOS methods to support long-range planning, project prioritization, and transportation concurrency. Others stressed that community expectations for traffic congestion should be related to the type of neighborhood—commercial area versus residential neighborhood—and that retaining a vehicular LOS measure is appropriate for many arterial roadways in the city

In a unanimous vote following a robust discussion, the Commission endorsed the development of a multimodal policy framework and a methodology for measuring LOS and calculating concurrency.

Meeting #2: January 9, 2013

In a second meeting with the Commissioners, City staff and the consultants presented the LOS policy options discussed in this report. Most of the discussion focused on the first two options, the revised MMA and corridor-based LOS approaches.

Among the major comments were the following:

- *The City's modal plans align well with the corridor approach, particularly for transit service.*
- *The refined MMA approach allows flexible LOS standards, which could also be applied to corridors.*
- *It might be difficult to prioritize the investments in the modal plans and establish LOS standards in the absence of a coordinated transportation master plan for all modes*
- *The refined MMA approach provides a visible link between land use and LOS*

Following the discussion, the chair of the Commission asked City staff and the consultants for recommendations. After some discussion, there was growing support for the corridor LOS approach combined with some elements from the revised MMA approach for use in long-range planning. The mobility unit approach was recommended for transportation concurrency management and targets were suggested as a way to track progress.

The Commission unanimously approved a motion to include the concept of multimodal LOS in the Transportation Element through the 2014 Comprehensive Plan Update. The Commission also endorsed a proposal that, with Council approval, would provide the policy direction to develop a work plan and budget to integrate multimodal metrics into the Transportation Element and the Traffic Standards Code (BCC 14.10.060).

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Attachment A-2

Request for Qualifications, RFP #15121

Level-of-Service in Bellevue – Toward a Multimodal Approach to Mobility

Scope of Work

October 20, 2015

Consultant Tasks and Deliverables

Task 1: Existing Conditions and Issues Documentation

Transportation Level-of-Service (LOS) in Bellevue is defined on a policy level in the Transportation Element of the Comprehensive Plan and is codified in the Traffic Standards Code (BCC 14.10). Existing LOS standards for concurrency management are based on a metric that quantifies vehicle mobility through specified intersections (called "system" intersections) in terms volume-to-capacity (v/c) ratio in the PM peak hour. System intersections are aggregated in Mobility Management Areas (MMAs) for which an area mobility standard (level-of-service) is established. Standards for long-range transportation planning are not established in policy or by code, but the common practice in Bellevue is to use a forecast average vehicle delay at intersections in the PM peak hour.

In this Task, the consultant will document how the existing system functions for concurrency and long-range transportation planning, and how it influences land use and transportation decisions, including the funding, prioritization, design, and operation of roadway capacity projects and other mobility infrastructure. The consultant will identify the mobility options and livability factors that are potentially forgone or compromised through the implementation of this vehicular approach to level-of-service. This analysis will contribute to defining and describing the issue(s) to be addressed in subsequent tasks. Consider for context purposes, adopted modal plans - the Pedestrian and Bicycle Transportation Plan and the Transit Master Plan, for example - plus the Downtown Transportation Plan and the Downtown Livability Initiative.

Deliverable:

A documentation of the existing methodology used in Bellevue for concurrency and long-range transportation planning level-of-service calculation, forecasts, and reporting. Identify the capital investment implications and the observed or potential multimodal mobility and livability issues related to the existing approach. Data and map(s) may be included as needed to document the existing and forecast transportation system, level-of-service and land use conditions. This documentation report will establish a baseline upon which multimodal mobility issues to be addressed would be based.

Task 2: Multimodal Level-of-Service Approaches for Concurrency and Long-Range Planning

The Transportation Commission studied several approaches to defining and managing level-of-service and establishing standards that consider and incorporate all modes of travel. As documented in the MMLOS Final Report, April 2014, the Commission supported a corridor approach combined with some elements from a revised MMA structure to provide context for use in long-range transportation planning. The Commission recommended a "mobility unit" approach for transportation concurrency management purposes and suggested that targets be established as a way to track progress. In this Task, the consultant will work with the Transportation Commission and staff to refine and detail the preferred approaches to develop multimodal level-of service metrics and standards that will inform concurrency and long-range transportation planning.

In this task the consultant will develop and recommend metrics, standards and monitoring methods for the following modes in the urban environment(s) of Bellevue:

- Vehicular level-of-service. Consider vehicle delay at intersections and the volume/capacity ratio at intersections.
- Transit level-of-service. Consider metrics from the transit passenger perspective; such as service frequency, hours of service, passenger load (passenger to seating ratio), service speed and reliability, plus access to transit stops and passenger amenities.
- Bicycle level-of-service. Consider metrics from the bicycle rider perspective; including on-street and off-street facilities, and wayfinding. Provide recommendations on metrics and standards that could be established for linear corridors or spot locations (intersections, for example) or some combination of each.
- Pedestrian level-of-service. Consider metrics from the pedestrian perspective; including intersection design and operation, crossing times, sidewalk factors such as width and landscaping, and mid-block crossings. Provide recommendations on metrics and standards that could be established for linear corridors or spot locations (intersections, for example) or some combination of each.

Another important factor in developing mobility recommendations for metrics and standards for level-of-service is the expectations of residents, employees and visitors for safety, comfort and overall urban livability. Along roadway corridors through various types of neighborhoods, the expectations for level-of-service for each mode may vary. The context is important and the level-of-service metrics and standards developed in this task should reflect the variability of the urban environment and the expectations for mobility and quality of life.

<u>Deliverable</u>

In this Task the consultant will prepare options for MMLOS metrics and standards and will

review/discuss those options with the Transportation Commission – anticipate consultant participating in 6 to 8 study sessions to work with the Commission toward a recommendation.

Task 3: Public Engagement

Bellevue staff will lead the public engagement task. Consultant will support staff in the undertaking of various ways to engage the community stakeholders in the outcome. Support will generally consist of preparing electronic and print materials and attending and participating in public meetings as requested by staff. The Bellevue Transportation Commission will serve as the advisory body for this project, and a number of study sessions are anticipated that would require consultant attendance and participation, as discussed in Task 2. Additional public engagement activities are likely to include briefings with community stakeholders; community open house(s); briefings to Bellevue boards, commissions and City Council; and outreach and information through electronic and social media.

Deliverable:

Support city staff in public information and community engagement activities by assisting as requested to prepare content for newsletter articles and meeting/event fliers, creating materials and presentations for community meetings and stakeholder group discussions, developing visual simulations and displays, creating electronic materials for social media and web site postings, and other related tasks. Consultant attendance at public and stakeholder meetings will be kept to a minimum, with the appropriate level of support for each meeting to be determined jointly by the City and consultant. In this Task the consultant will support staff, prepare materials and participate in meetings with the Transportation Commission as noted in Task 2, and with the City Council (anticipate 2 to 3 meetings).

Task 4. Environmental Analysis and Documentation

Supplement the SEPA documentation prepared for the 2015 Comprehensive Plan Update to disclose and document potential changes to the environment that may result from adopting and implementing new multimodal level-of-service standards.

Deliverable:

SEPA documentation report, including community process, alternatives considered, potential impacts to the environment, and final recommendations.

Task 5: Final Report

The consultant will prepare a Final Report to document the Transportation Commission discussions and recommendations for the **Level-of-Service in Bellevue – Toward a Multimodal**

Approach to Mobility project. This report will include an executive summary and will be organized in chapters that roughly correspond to Tasks 1 through 4 identified in this Scope of Work. The final report will contain text, graphics, plans and figures, and case studies as needed to document the recommendations, with technical details and public meeting minutes/notes included in appendices. The final report will summarize all of the public involvement activities.

Deliverable:

Electronic copy of the final report, prepared in a source format compatible with available City of Bellevue software, and a .pdf version. The final report will document the information presented and discussed at the study sessions with the Transportation Commission. The final report will describe the approaches to level-of-service considered – including case studies - and the preferred approach recommended by the Commission to establish and monitor multimodal level-of-service metrics and standards to inform concurrency and long-range transportation planning.

Task 6: Project Management

The Consultant will manage the contract tasks and budget in general accordance with the timeline and the allocation of resources schedule provided in the final Scope of Work and budget. Proposed reallocation of budget resources among budgeted tasks, or changes to the timeline may be approved with concurrence of the city project manager.

Deliverables:

i. *Consultant project manager and city project manager will develop an agenda for and participate in a project kick-off meeting with staff in Bellevue City Hall at a mutually agreed-upon time subsequent to receiving a notice to proceed.*

ii. *Consultant project manager will prepare invoices and progress reports on a monthly basis, and submit these to the city project manager. Progress reports will document the specific work accomplished and the completion status for each task identified in this Scope of Work, plus the budget status for each task. Identify and document emerging issues related to task, budget or timeline.*

iii. *Consultant project manager and city project manager will periodically review progress, plan for meetings with community stakeholders, the Transportation Commission and the City Council, and will review emerging issues related to the scope, timeline and budget.*

City of Bellevue Project Manager
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