

**THE POSSIBILITIES OF TRANSPORTATION CONCURRENCY
PROPOSAL AND EVALUATION OF MEASUREMENT ALTERNATIVES**

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EXECUTIVE SUMMARY

STUDY PURPOSE

The cities of Bellevue, Kirkland, Issaquah, and Redmond, commenced a two-year cooperative study in fall 2001 to

- describe and assess the four cities' existing approaches to transportation concurrency
- develop and analyze alternative approaches that are more multi-modal in nature
- evaluate alternative approaches with a focus on assisting the four cities in reaching the objectives of the Growth Management Act and the region's Vision 2020 plan
- recommend changes, if necessary, to state and local laws to improve the effectiveness of transportation concurrency.

This report was prepared by an interdisciplinary University of Washington team led by the Washington State Transportation Center with the Evans School of Public Affairs, the School of Urban Design and Planning, and the consulting firm Kittleson and Associates. The report's findings and recommendations are not those of city elected officials or staff and have not been endorsed by them.

TRANSPORTATION CONCURRENCY

Washington State's Growth Management Act (GMA) requires that jurisdictions' infrastructure keep pace with development. This *concurrency* requirement applies to all aspects of a local government's infrastructure, including roadways, sewers, and water. However, the Act only requires jurisdictions to adopt ordinances that establish a concurrency *measurement* system for transportation. As a result, the ability of the transportation system to support new development has become the primary test for whether development and infrastructure are "concurrent."

The GMA directs jurisdictions to establish level of service (LOS) standards for their transportation systems. The transportation LOS standards serve as a baseline for determining whether current transportation facilities can accommodate new development. If the new development will cause the transportation system to exceed the pre-determined LOS standards, the jurisdiction *must deny the development* unless transportation improvements and strategies are made to accommodate the development within six years, a process known as *concurrency mitigation*.

Jurisdictions have great flexibility in designing concurrency mitigation efforts. "Transportation improvements and strategies" are broadly defined in the statute to include, among other things, "public transportation service, ride sharing programs, demand management, and other transportation systems management strategies."

THE EXISTING TRANSPORTATION CONCURRENCY SYSTEM

All four Eastside cities measure level of service (and thus concurrency) on the basis of a comparison of vehicle use to roadway capacity. This comparison is usually referred to as the “volume/capacity” ratio (v/c). The “volume” side of the ratio is determined by the number of vehicles that use the roadway during the busiest hour(s) of the day. The “capacity” portion of the ratio is determined by “roadway geometry,” essentially the number of lanes, their design, and the roadway’s operational strategy (e.g., signal timing). A v/c ratio below 1.0 means that the roadway’s use is lower than its calculated capacity. A ratio of 1.0 suggests the roadway is at capacity. A ratio that is greater than 1.0 indicates significant congestion.

Each city’s comprehensive plan uses the v/c ratio to determine LOS standards, although the computational methods used to calculate v/c and the actual LOS standards selected in each Eastside city vary. The standards establish the highest v/c ratio that will be permitted for a given roadway, intersection, or set of roadway locations at the times of day when congestion is most likely. Bellevue, Redmond, and Kirkland’s LOS standards vary by geographic location, requiring better LOS in some zones (usually residential areas) and permitting more congestion in other zones (generally commercial areas). Issaquah’s LOS standards vary by arterial street classification rather than by zone.

The cities regularly measure roadway LOS to determine whether performance standards are being maintained. As of the last LOS report, Issaquah is out of compliance with concurrency requirements. In Redmond, two of seven zones are out of compliance. Bellevue is in compliance, but further development likely will raise compliance issues. Kirkland is in compliance and does not face any immediate compliance problems. The current economic downturn has eased Redmond and Bellevue’s concurrency pressures, but these pressures are likely to increase once the economy picks up.

LIMITATIONS AND CONSTRAINTS

Limitations of the existing transportation concurrency approaches can hinder the cities in realizing the futures articulated in their comprehensive plans. These limitations include the following:

- Current v/c measurement methods are auto-focused and do not encourage alternative transportation use or capacity. This leads to concurrency mitigation that is limited to road widening and new road construction, alternatives that are both costly and disruptive to existing neighborhoods.
- Focus on LOS measurement disguises the fact that, at its core, transportation concurrency is an interaction between land-use goals and transportation expectations. In many cases, the statistics chosen for defining LOS in a city’s concurrency system do not adequately reflect the actual transportation system desired and/or required to serve the desired land-use plan, particularly when that plan depends on modes other than the single occupant car to provide mobility.

- Frequently, current LOS standards are based more on an expression of people's congestion preferences than on coordination of cities' long-term (20- to 30-year) land-use and transportation goals. In some cases, levels of congestion in certain areas or corridors may foster desired land-use futures by making other transportation choices (transit, non-motorized, or use of other corridors) more attractive.
- Most jurisdictions' LOS standards are not designed to evolve over time and, therefore, do not reflect changing land-use and transportation values.
- Regional traffic presents a significant challenge to cities' ability to manage local transportation concurrency. A city's conscientious efforts at setting LOS standards and balancing land-use and transportation investments can be offset by traffic that begins and ends in other places but passes through and clogs up roadways and intersections in the process. The emphasis on local impacts and the exclusion of regional effects ignore the facts that transportation networks must be managed as a system and that transportation systems cross various jurisdictional boundaries.

ALTERNATIVE APPROACHES FOR DETERMINING CONCURRENCY

Despite existing limitations, transportation concurrency presents an opportunity for local jurisdictions to improve the connection between their land-use goals and transportation expectations. The GMA gives jurisdictions broad discretion in the design of their level of service (LOS) standards and concurrency measurement process. Jurisdictions can do more to capitalize on the available discretion, designing a measurement process that advances their transportation and land-use goals. This report presents three different approaches to measuring transportation concurrency. Each is premised on the assumption that, by employing robust measures of transportation system performance, local jurisdictions can assure more efficient and intensive use of existing roadways. The three approaches are as follows:

1. Enhanced Volume/Capacity

Enhanced v/c allows jurisdictions to incorporate transit and other alternative transportation capacity when setting and implementing the LOS standard. This method also can incorporate a more robust process of developer negotiation in the mitigation process. The measured v/c ratio of cars to roadway capacity *does not change* because of increased alternative transportation choices. Rather, jurisdictions make a *policy choice* to permit a higher v/c ratio and a higher level of congestion where certain levels of transit service or other transportation choices, such as walking, exist.

A negotiated concurrency process (rather than an “all or nothing” process) can allow jurisdictions and developers to worry less about the precise number of trips estimated for a given development, and more about the overall impacts of the development on the transportation system. Moreover, it can provide jurisdictions with an opportunity to encourage development designs and other TDM programs that promote the use of alternative modes of travel.

The negotiation process is recommended because it can allow far more flexibility in designing an outcome that is mutually acceptable to both the developer and the city. The City of Redmond negotiates with developers when proposed developments are calculated to exceed concurrency standards. Negotiated agreements fund additional capital improvements, as well as ongoing programs to limit single occupancy trips; in some cases this has included requiring participation in a Transportation Management Association. Such agreements assure the city that active travel demand management will take place for the life of the development, and they assure the developer that those funds will be spent on TDM efforts relevant to that specific development.

2. Travel Time

Rather than measuring the amount of roadway congestion, an alternative LOS measure is to measure the length of time it takes to travel from point A to point B. For example, “the desirable amount of time to travel from the city center to the city limit should not exceed 30 minutes.”

Measuring travel time to and from key places in a city or along main corridors has a particular advantage over the traditional v/c approach: it is easily explained and understood by the general public. Most people speak about transportation performance in terms of travel time, whereas only transportation professionals use v/c ratios. LOS standards will likely carry more credibility with the public and government officials if they are easily understood and translated into everyday experience. However, clarity may be a double-edged sword. For example, whereas an increase of the v/c from 0.9 to 0.95 is not easily translated into driver experience, a driver immediately understands, and may not accept, the ramifications of a LOS change that increases travel time for a 10-mile trip from 15 to 20 minutes.

3: Regional Mode-Split

Adopting a regional system of concurrency would likely require changes in state law, but nonetheless a regional mode-split alternative is one model that warrants further investigation because it recognizes and attempts to deal with the regional nature of transportation systems.

The previous two measurement approaches—enhanced v/c and travel time—base their definition of “transportation concurrency” on measurement of the performance of specific facilities. The regional approach replaces a facility performance calculation with a measure of how well a region (or sub-region) achieves a transportation policy target of reducing vehicle miles traveled (VMT). For example, one regional LOS target might be to increase the share of non-single occupancy vehicle (SOV) trips by 2 percent within five years. Therefore, if the region’s current PM peak-period mode-split was 10 percent non-SOV trips, the region would remain concurrent if non-SOV mode-split was 12 percent within five years. After five years, a new LOS goal would be set.

After setting a regional LOS goal, a regional coordinating entity would distribute mode shift requirements to the region’s jurisdictions. All jurisdictions could initially be assigned the same targets, but they could negotiate with one another to adjust the distributions on the basis of local realities. That is, one city could agree to help fund a neighboring city’s transit facility

improvements in return for “credit” toward mode shifts that would occur as a result of those facilities. Because not all trips would be as easily shifted from SOV to non-SOV modes, it would make financial sense for cities to work together to fund those projects that would have the greatest mode shift effect.

COMPARING ALTERNATIVES

The alternative approaches developed during this study are to varying degrees a departure from existing concurrency practice. But to what extent will they enable the Eastside cities to practice transportation concurrency better, to change land use and transportation patterns, or realize their comprehensive plan visions more completely? To try and answer these questions, each alternative was subjected to ten tests or questions.

1. Is the alternative multi-modal?
2. Does the alternative enhance the link between land use and transportation?
3. Does the alternative address regional traffic and inter-jurisdictional transportation issues?
4. Is the alternative less resource-intensive than current practice?
5. Is the alternative easy to understand and credible?
6. Can the alternative adapt to land use and transportation changes?
7. Are the concurrency results of the alternative predictable for developers?
8. Will concurrency violations be the exception, not rule, if this approach is adopted?
9. Does the alternative provide ways to fund non-roadway transportation improvements?
10. Can the alternative be adapted to support the widely varying goals of the four cities?

The approaches scored differently on the basis of these criteria, and no single approach emerged as the ‘winner.’ Rather, the results of this assessment can be used by each jurisdiction to tailor transportation concurrency to the policies it wants to achieve.

BEYOND LOS: CONCEPTUALIZING FUTURE DIRECTIONS

There are many dimensions to transportation concurrency, ranging from the technical to the more conceptual and policy-oriented. The report outlines several directions that local and regional stakeholders can pursue to advance the goal of accommodating new growth and development while improving quality of life and transportation service. These directions include using roads less, funding transit more, and acting inter-jurisdictionally. Each of these broad directions would mean changes in individual attitudes and behaviors, as well as institutional frameworks and financing. They represent parts of a roadmap for discussion and debate now, hoping for action in the short- to mid-term future. A summary list of these ideas includes the following:

Using Roads Less

- Offer monetary rewards for residents who reduce SOV usage.
- Introduce variable roadway pricing based on time of day congestion.

Funding Transit More

- Use developer agreements to fund Transportation Management Associations and transit service.
- Concentrate new development in transit-friendly nodes and corridors, thereby building ridership which in turn leads to increased frequency of transit service.
- Underwrite transit service with Flexpass and other tools until routes important to each city reach *core* status and attain a higher level of permanence.

Acting Inter-jurisdictionally

- Expand developer agreements to include transportation systems and services across city boundaries.
- Tackle subregional transportation concurrency through formation of a multi-city Transportation Benefit District that rationalizes varying LOS standards and sets subregional performance targets and rewards.
- Create a region-wide transportation concurrency authority to establish and manage regional VMT reduction and mode-split credits.

CHANGES TO STATE AND LOCAL LAWS

The four Eastside cities have sufficient flexibility under current law to develop, implement, and fund a variety of multi-modal concurrency approaches, both within their own jurisdictions and among one or more of their neighbors. A regional approach to transportation could be coordinated under the existing authority of the Puget Sound Regional Council, requiring a change in state enabling legislation only if a form of metropolitan government were desired. Consequently, the project team does not recommend significant changes to current state and local concurrency legislation at this time.

CHAPTER 1: TRANSPORTATION CONCURRENCY – CURRENT PRACTICES, PITFALLS, AND POSSIBILITIES

The 1990 Washington State Legislature passed the Growth Management Act (GMA), a comprehensive framework for urban growth in the state. The GMA came out of a growing realization that current urban policies and unplanned growth were encouraging sprawl, threatening environmental quality, and straining local government infrastructures. Specific to transportation, growth patterns were creating car-dependant, low-density communities with a tendency to experience road congestion. The GMA established a broad mandate for comprehensive planning, calling on local jurisdictions to balance their land-use goals with appropriate provisions for infrastructure and services.¹ Included in the GMA is the requirement that housing and commercial development be concurrent with the development of infrastructure, including water, sewer, and transportation. This concurrency requirement is one tool that the GMA provides to local governments to help them achieve a land-use/infrastructure balance and effectively manage their growth. Concurrency is not an end unto itself; instead it is a requirement that local jurisdictions think carefully about the interaction between land-use goals, transportation infrastructure and service expectations. This chapter overviews the transportation concurrency requirement; explains existing practices within the four Eastside cities of Bellevue, Kirkland, Issaquah and Redmond; and discusses some of the constraints of the existing concurrency framework. It provides the foundation for the report’s in-depth discussions of alternative concurrency measurement systems and policies.

THE TRANSPORTATION CONCURRENCY REQUIREMENT

The GMA requirement known as “concurrency” mandates that a jurisdiction’s infrastructure must keep pace with development.² The concurrency requirement applies to all aspects of a local government’s infrastructure, including roadways, sewers, and water.³ However, the Act only explicitly requires jurisdictions to adopt ordinances that establish a concurrency measurement system for their transportation infrastructure.⁴ As a result, the ability of the transportation system to support new development has become the primary test for whether development and infrastructure are “concurrent.”

The GMA directs jurisdictions to establish level of service (LOS) standards for their transportation systems.⁵ The transportation LOS standards serve as a baseline for determining whether current transportation facilities can accommodate new development. If the new

¹ RCW 36.70A.010 & 36.70A.020.

² RCW 36.70A.070(6)(b).

³ *See Taxpayers for Responsible Government v. City of Oak Harbor*, WWGMHB No. 96-2-0002, Final Decision and Order (July 16, 1996).

⁴ RCW 36.70A.070(6)(b).

⁵ RCW 36.70A.070(a)(iii)(B).

development will cause the transportation system to exceed the pre-determined LOS standards, the jurisdiction *must deny the development* unless transportation improvements and strategies are made to accommodate the development within six years.⁶

SETTING LOS STANDARDS

Jurisdictions must adopt ordinances that set LOS standards for all locally owned arterials and transit routes, but they have considerable discretion in selecting the measurement system and the performance standards. The GMA concurrency requirement provides no parameters for acceptable measurement methods or LOS standards. The statute only requires that the LOS standards be “regionally coordinated,” a determination made by the Puget Sound Regional Council (PSRC) when it reviews the jurisdictions’ comprehensive plans.⁷ In addition, Washington State Department of Transportation regulations endorse a wide range of LOS standards, including “speed and travel time, freedom of maneuver, traffic interruptions, comfort, convenience, geographic accessibility, and safety.”⁸ The lack of specificity in both the statute and its accompanying regulations has led at least two growth management hearing boards to conclude that local governments have “virtually limitless discretion” when setting LOS standards.⁹ Moreover, the Central Puget Sound Growth Management Hearing Board has held that concurrency only requires jurisdictions to establish gauges of transportation performance; it does not dictate what is “too congested.”¹⁰ Thus, local governments have considerable flexibility in designing concurrency measurement methods and LOS standards, including making a policy choice to accept roadway congestion rather than limit development. However, once jurisdictions have set their LOS standards, they must deny any development that would cause the affected transportation facilities to exceed their standards unless they pursue mitigation to accommodate the impacts of development.

⁶ RCW 36.70A.070(6)(b).

⁷ RCW 36.70A.070(a)(iii)(B).

⁸ WAC 365-15-210.

⁹ Richard Settle, “Revisiting the Growth Management Act: Washington’s Growth Management Revolution Goes to Court,” 23 Seattle Univ. L. Rev. 5, 19 (1999). The Western Washington Growth Management Hearing Board concluded that the statute permitted Clark County to adopt a “failing road” LOS standard. See Achen v. Clark County, No. 95-2-0067 WWGMHB, Final Decision and Order (September 20, 1995). Similarly, the Central Puget Sound Growth Management Board upheld Seattle’s LOS standards that permitted considerable road congestion. See West Seattle Defense Fund v. City of Seattle, No. 94-3-0016 CPSGMHB, Final Decision and Order (April 4, 1995).

¹⁰ See West Seattle Defense Fund v. City of Seattle, No. 94-3-0016 CPSGMHB, Final Decision and Order (April 4, 1995).

MITIGATING CONCURRENCY FAILURES

Although jurisdictions are required to deny development that will cause the transportation system to exceed the LOS standards, jurisdictions may nonetheless permit development if “transportation strategies and improvements to accommodate the impacts of development are made concurrent with the development.”¹¹ Generally, this provision is referred to as “concurrency mitigation.” Mitigation allows jurisdictions (and developers) to avoid the harsh result of LOS failure by implementing system improvements that would eliminate the effects of the development on the transportation system—or at least eliminate the effects of the development that are projected to cause LOS failure. Jurisdictions that use the mitigation provision generally require the developer to either scale back the development or fund projects to improve the transportation system near the development site. For example, Snohomish County’s municipal code establishes mitigation measures linked to “trip reduction” credits that developers can implement in order to avoid concurrency problems.

Jurisdictions have considerable flexibility in designing concurrency mitigation efforts. “Transportation improvements and strategies” are broadly defined in the statute to include, among other things, “public transportation service, ride sharing programs, demand management, and other transportation systems management strategies.”¹² The text of the mitigation provision does not directly link the mitigation efforts to lowering the LOS measure below the pre-determined standard. Instead, the statute requires mitigation efforts to “accommodate the impacts of the development” within six years. Jurisdictions are free to work with developers to design any combination of transportation services or system improvements that will accommodate the development. The end goal in concurrency mitigation is a decrease in the LOS measure below the pre-determined standard. The mitigation measures need not remove the particular development’s traffic from the roadway, but they must remove enough traffic—whatever the source—so that the development can be accommodated without causing LOS failure. Standards of “nexus” and “proportionality” established by the U.S. Supreme Court in *Dolan v. Tigard* will almost always be met when dealing with concurrency mitigation because there is a direct gauge of the development’s impacts (the decline in the LOS measure beyond the standard), and mitigation is required only to offset those impacts.¹³

¹¹ RCW 36.70A.070(6)(b).

¹² RCW 36.70A.070(6)(b).

¹³ The “nexus” requirement was established in *Nollan v. California Coastal Commission*, 483 U.S. 825 (1987). In *Nollan*, the United States Supreme Court held that permit conditions must be sufficiently related to the government’s regulatory interests. The Court added the “proportionality” requirement in *Dolan v. City of Tigard*, 512 U.S. 374 (1994). In *Dolan*, the Court held that when governments impose permit conditions, there must be “rough proportionality” between the condition’s requirements and the impacts of the development. Whenever local jurisdictions impose conditions on land use permits, they must be aware of constitutional limits, particularly the “nexus” and “proportionality” requirements of the Fifth Amendment’s takings clause. According to the U.S. Supreme Court, while local governments can place conditions on land use permits, the Constitution requires a “nexus” between the permit conditions and a legitimate regulatory interest. A “nexus” exists where the permit conditions are connected to and further the regulatory interest. Even if there is a “nexus” between the conditions and the regulatory interest, the Constitution also requires that the permit conditions be “roughly proportional” to the projected impacts of the land use development. “Proportionality” does not require a precise mathematical calculation, but jurisdictions “must make some sort of individualized determination that the required [condition] is related both in nature and

It is important to distinguish concurrency mitigation from other tools cities use to accommodate the effects of development, most importantly impact fees. Impact fees are collected from all developers and must only be used for capital improvements. By contrast, concurrency mitigation arises only if a development fails its LOS analysis, and mitigation efforts are not limited to capital improvements. While all four Eastside jurisdictions use impact fees, they use concurrency mitigation to varying degrees. Chapters 2, 4, and 5 explore the possibilities of concurrency mitigation more fully and suggest some ways that jurisdictions could use concurrency mitigation to increase alternative transportation choices.

EXISTING CONCURRENCY STANDARDS AND MEASUREMENT IN THE FOUR EASTSIDE CITIES

All four cities—Bellevue, Issaquah, Kirkland, and Redmond—measure level of service (and thus concurrency) by comparing vehicle use to roadway capacity. This comparison is usually referred to as the “volume/capacity” ratio (v/c). The “volume” side of the ratio is determined by the number of vehicles that use the roadway during the busiest hours of the day.¹⁴ The “capacity” portion of the ratio is determined by “roadway geometry,” essentially the number of lanes, their design, and the roadway’s operational strategy (e.g., signal timing). A v/c ratio below 1.0 means that the roadway’s use is lower than its theoretical capacity. A ratio of 1.0 suggests that the roadway is at capacity. A ratio of greater than 1.0 indicates significant congestion. Each city’s comprehensive plan uses the v/c ratio to determine LOS standards, although the computational methods used to compute v/c and the actual LOS standards selected in each Eastside city vary. The standards establish the highest v/c ratio that will be permitted for a given roadway, intersection, or set of roadway locations at the times of day when congestion is most likely. Bellevue, Redmond and Kirkland’s LOS standards vary by geographic location, requiring better LOS in some zones (usually residential areas) and permitting more congestion in other zones (generally commercial areas). Issaquah’s LOS standards vary by arterial street classification rather than by zone.

The cities regularly measure roadway LOS to determine whether performance standards are being maintained. As of its last LOS report, Issaquah is out of compliance with concurrency requirements. In Redmond, two of seven zones are out of compliance. Bellevue is in compliance, but further development will likely raise compliance issues. Kirkland is in compliance and does not face any immediate compliance problems. The current economic downturn has eased Redmond and Bellevue’s concurrency pressures, but these pressures are likely to increase once the economy picks up.

extent to the impact of the proposed development.” A more complete introduction to proportionality and nexus as it applies to concurrency is given in Append A of this report.

¹⁴ Roadways are busiest generally from 4:00-6:00 p.m., Monday-Friday. This time is frequently known as the “PM peak period.” All four Eastside jurisdictions have set their LOS standards to reflect maximum peak-period use. In determining compliance with LOS standards, Redmond, Kirkland, and Issaquah all measure average vehicle use during 1 hour of the peak period. Bellevue measures LOS compliance by averaging vehicle use during the entire 2-hour peak period.

In addition to general concurrency checks, all four cities conduct an individual concurrency analysis for each development proposal. The cities use a combination of nationally recognized trip generation rates and four-step transportation modeling to project the number of trips that the new development will add to the transportation system and the facilities those trips will use. The cities then add new trips to the volume side of the v/c ratio for each of their LOS measurement locations. If those trips cause the ratio to exceed the pre-determined LOS standard, the development is not concurrent and must be denied, absent mitigation measures.

While the basic methods of concurrency measurement are similar across the Eastside, each city has tailored its LOS standards and its overall concurrency approach to the unique circumstances of the jurisdiction. Kirkland has embraced the GMA's lack of definition regarding LOS standards, has recognized that some congestion will necessarily come with new development, and has set its standards high enough (well above 1.0) so that concurrency laws will not hinder its ability to implement its land-use vision. Issaquah, on the other hand, is currently experiencing considerable growth pressure and significant congestion. Therefore, the city has set its LOS standards so that they prevent new development from exacerbating existing traffic congestion, even if it means limiting development. Redmond and Bellevue have pursued essentially the same approach. The cities began with the assumption that LOS standards should vary throughout the city according to land use, acknowledging the fact that more dense areas of the cities will have higher levels of congestion. However, at the same time, the city officials based their LOS standards on the amount of traffic congestion they believe residents will tolerate. Therefore, the amount and nature of permitted development is influenced as much by the level of congestion city residents are willing to accept as it is by the land-use vision articulated in the city's comprehensive plan. The four cities' different approaches have led to noticeably different results on the ground. For example, in Kirkland, concurrency has been essentially a "non-issue" in implementing the comprehensive plan's development objectives, whereas in Issaquah concurrency has been "the issue" and serves as a significant obstacle to implementation of the comprehensive plan's land-use vision.

THE EXISTING TRANSPORTATION CONCURRENCY SYSTEM: LIMITATIONS AND CONSTRAINTS

Frustrated that Eastside concurrency procedures were hindering the implementation of their comprehensive plans, the four cities undertook this study to identify the major shortcomings of current concurrency practice and to find alternative procedures that could advance the cities' land-use and transportation goals. The issues below are some of the major shortcomings of the current procedures. The proposed alternatives are presented in Chapter 2.

Current measurement methods are auto-focused and don't encourage development of alternative transportation capacity. The volume/capacity ratio approach used by all four Eastside cities (as well as the majority of Puget Sound jurisdictions) considers only the transportation system's capacity to support vehicle traffic. On the volume side, each vehicle is given equal weight regardless of the number of people it carries. Mode-split (the fraction of people accessing the development by each mode of travel) is not an issue, other than the effect it has on the number of car trips generated by a given development. On the capacity side, the number of

lanes, geometric design, and signal timing are considered, but non-automobile aspects of the transportation system, such as the level of transit service, the existence and performance of ride-sharing programs, sidewalk coverage, or bike lanes, are usually not directly considered. In short, when it comes to concurrency in these four Eastside cities, the measure of a transportation system's success is based exclusively on the ability to travel in a single occupancy vehicle. This focus on car travel in concurrency measurement leads to a corresponding focus on vehicle capacity when the transportation effects of development are mitigated. In other words, besides shrinking the size of the development, developers respond by mitigating their traffic volume increases by increasing the capacity side of the ratio. Because capacity is calculated only in terms of auto-carrying capacity, the solutions to the concurrency failure inevitably are car-focused. The fact that the four cities do not have authority to plan or operate public transit routes exacerbates this situation (see a more detailed discussion in Chapter 5). Without a comprehensive picture of the entire capacity of a transportation system—including all modes—concurrency will continue to require development denial or increases in auto-capacity, often through unpopular road-widening projects.

Focus on LOS measurement disguises the fact that, at its core, concurrency is an interaction between land-use goals and transportation expectations. In the GMA, concurrency is discussed in terms of measurement. Cities set LOS standards and then if development will cause the transportation system to exceed the LOS standards, it must be denied. On its face, concurrency seems like an easy measurement problem. As long as cities have LOS standards, concurrency can be determined by a few calculations. However, the focus on LOS measurement obscures the fact that concurrency is really a requirement that cities coordinate their land-use goals and transportation expectations. Ultimately, the LOS standards should be the expression of this coordination, but many jurisdictions have developed their LOS standards without explicitly considering how they will affect their land-use and transportation plans. Generally, cities do not determine when congestion may be useful to implement the land-use plan, given the existing and planned transportation system (e.g., number of lanes of roadway and expected transit service now and over the next twenty years). Consequently, LOS standards are an expression of people's congestion preferences rather than a coordinated relationship between land-use and transportation goals. "Concurrency," therefore, is often the place where land-use plans and congestion preferences collide. And under existing concurrency rules, congestion preferences must win because LOS standards can stop land-use development. A number of concurrency critics have argued that the existing concurrency process is contrary to the goals of the GMA because it forces cities to deny development that is called for in cities' comprehensive plans. However, concurrency does not necessarily require this result. Rather, if LOS standards were established through careful discussion of land-use goals and transportation expectations, concurrency determinations would likely represent an expression of each city's vision.

Most jurisdictions' LOS standards do not evolve over time and therefore do not reflect changing land-use and transportation values. Although some jurisdictions have provided for regular review and revision of their LOS standards, most have chosen LOS standards that remain constant over time. These standards represent, in essence, a negotiated agreement between residents and city officials at a given point in time, with a given set of land-use and transportation values. However, a city's land-use and transportation landscape, as well as its vision and values, do not remain static. Jurisdictions face increasing growth pressure that may

require re-opening the conversation about the LOS standard. By law, each city must accept its share of the region's growth, which from time to time may require a renewed discussion of acceptable LOS standards. Under existing LOS standards (adopted when growth pressures and transportation values were different) a city's acceptance of legally required growth would likely lead to wider roads, something most neighborhood residents strongly resist. However, if cities revisited their LOS standards periodically, in light of changing legal requirements and values, and engaged residents in a discussion of the balance between the land-use vision and transportation expectations, residents might more readily agree to change the LOS standard to avoid wider roads. On the other hand, if the discussion were not tied to changing requirements and values, residents might view revised LOS standards as a sign that the city had broken a compact regarding growth management in their neighborhood.

Regional traffic presents a significant challenge to cities' ability to sustain local concurrency. When analyzing whether new development will be concurrent with transportation facilities, each city generally considers only the effects of that development's traffic on nearby roadways. This local focus neglects the fact that a considerable amount of traffic generated by new development comes from—or goes to—distant destinations, often passing through several jurisdictions on the way. When developing their combined land-use/transportation plans, cities frequently did not account for growth in pass-through traffic. As a consequence, growth in regional pass-through traffic has emerged as one of the most significant challenges to jurisdictions' ability to maintain compliance with their concurrency standards while still permitting land uses called for in their comprehensive plans. In some cases, cities have had to restrict development because regional traffic is overburdening the local system. (Bellevue's experience with development in the Lake Hills community provides one such example.) Exacerbating regional traffic's effect on concurrency is the fact that jurisdictions have few options for reducing the congestion effects of regional pass-through traffic. Cities experiencing the effects of pass-through traffic do not have the power to pursue mitigation from remote developments, and a regional structure of transportation concurrency does not exist. Ideally, regional transportation systems would be managed as a true system, but this would require a higher level of jurisdictional cooperation (in both land use and transportation) than currently occurs. Therefore, cities must rely on inter-local agreements that can be negotiated with neighboring jurisdictions. To date, inter-jurisdictional agreements have been focused on development near jurisdiction borders where obvious traffic effects bleed over onto the nearby streets of another city or county. (BROTS and the Issaquah-King County's impact fee sharing agreement are good examples of these agreements.) The agreements have not tackled a development's effects on traffic a considerable distance from the development site.

SUMMARY

Despite existing problems, transportation concurrency presents an opportunity for local jurisdictions to improve the connection between their land-use goals and transportation expectations. Our investigation of current measurement practices reveals that they are one-dimensional and could be expanded to include other aspects of the transportation system, including services. Expanded LOS measures are entirely consistent with the GMA concurrency framework and would provide cities with an opportunity to accommodate future growth while at

the same time enhancing quality of life. The following chapters present the bulk of our work for the Eastside Transportation Concurrency Project. They include an exploration of alternative measurement systems and transportation policies that would provide the Eastside with an enriched measure of transportation capacity and that could be used to target growth along corridors (or in specific geographic locations) that receive more or better transportation services rather than wider roads.

Chapter 2 of this report describes three LOS measurement alternatives to the v/c measurement system currently used: 1) Enhanced V/C ratio (which includes consideration of transit capacity and other alternative modes of travel), 2) Travel Time corridors, and 3) Regional Mode-Split targets. Chapter 3 describes two ways to implement concurrency analysis to limit the cost and resources required to make concurrency determinations, increase precision of concurrency tests, and make concurrency more predictable and understandable. Chapter 4 discusses the strengths and weaknesses of these proposed measurement alternatives. Chapter 5 explores other factors that affect concurrency—including local control over transit service, funding sources, and regional traffic—and suggests some long-term options that merit further investigation.

CHAPTER 2: ALTERNATIVE APPROACHES FOR DETERMINING CONCURRENCY

The Growth Management Act (GMA) requires that local jurisdictions ensure that new development is concurrent with adequate transportation services and facilities, but the GMA gives jurisdictions nearly limitless discretion to design their level of service (LOS) standards and concurrency measurement process. Jurisdictions should capitalize on the available discretion, designing a measurement process that advances their transportation and land-use goals. If the LOS standards and measurement process are not coordinated with the land-use and transportation objectives of the jurisdiction, concurrency may well become an impediment to the achievement of those objectives.

This chapter describes three intrinsically different approaches to measuring transportation concurrency. They are premised on the assumption that, by employing robust measures of transportation system performance, local jurisdictions can use existing roadways more efficiently and intensively. The three approaches are

1. Enhanced Volume/Capacity
2. Travel Time
3. Regional Mode-Split

Enhanced Volume/Capacity (V/C) adjusts LOS standards upwards if alternative transportation capacity exists, permitting more development where transportation choices are available. Travel Time measures concurrency on the basis of traffic's ability to move along corridors, permitting LOS standards to be set for multiple modes. Regional Mode-Split presents an "outside the box" alternative that focuses on the achievement of regional transportation goals rather than the attainment of localized, facility-based LOS standards.

Like most measurement systems, the proposed alternatives all can be adapted to emphasize different land-use, transportation, and concurrency goals. In fact, in many respects selecting the alternative to meet the city's comprehensive plan goals is the most important part of the concurrency process. The authors often struggled with which adaptation of the alternative to present as the "example case," since each alternative could be used in vastly different ways. For the most part, we chose land-use, transportation, and concurrency goals designed to encourage transportation choice, including placing a premium on transit service and transit-friendly development. However, these goals may not be the ones desired by each Eastside jurisdiction, and they are definitely not required by the proposed alternatives. These same basic techniques could be used to encourage land-use and transportation systems that are pedestrian-friendly, multi-modal, or car-oriented.

Each alternative is explored in a separate section below. Each section includes discussions on 1) setting LOS standards, 2) the measurement process, and 3) concurrency analysis, with various subsections providing additional detail. The focus of these discussions is on implementation—not evaluation—of the three alternatives. Chapter 4 compares the three

alternatives using the criteria provided by the project’s Technical Advisory and Executive Steering committees.

OPTION 1: ENHANCED VOLUME/CAPACITY RATIO

The Enhanced Volume/Capacity (V/C) Ratio, while using the traditional v/c measurement process, provides tiered LOS standards based on whether or not roadways are equipped with alternative transportation modes, such as transit. By using the Enhanced V/C method, jurisdictions make a policy determination to tolerate a higher LOS standard (thus, allowing more vehicle congestion) on roadways where a certain level of transit service is present. This section provides a detailed discussion of the Enhanced V/C alternative, including LOS standards, measurement processes, and specific applications.

LOS Standards Using Enhanced V/C

The biggest change from present concurrency practice proposed under Enhanced V/C is the adjustment of the LOS standards. The measurement process remains essentially the same, but Enhanced V/C allows jurisdictions to recognize transit and other alternative transportation capacity while setting the LOS standard. It is important to note that the measured v/c ratio of cars to roadway capacity *does not change* because of increased alternative transportation choices. Rather, jurisdictions make a policy choice to permit a higher v/c ratio where certain levels of transit service or other transportation choices are present. Therefore, the most important step when implementing the Enhanced V/C concurrency measurement alternative is setting the LOS standard, and in particular, setting the standard so that it encourages the specific transportation system and services desired by the city.

Example LOS Standards

Enhanced V/C provides tiered LOS standards for roadways based on their levels of transportation choices. Using the simplest form of Enhanced V/C, roadways would receive an LOS standard “enhancement” on the basis of the extent of transit service. Those roadways where transit service was below a pre-determined threshold (say, five buses per hour during peak periods) would have a lower LOS standard than roadways where transit service exceeded that threshold. For example:

Standard LOS	LOS if Transit Service (5 buses/hour)
0.90	1.00 (+0.1)

While the above standards incorporate transit into the concurrency decision, the frequency of bus service, by itself, might be an incomplete measure of “adequate” transit service. Therefore, the city might consider other measures of transit quality of service to determine whether adequate transit service existed to increase a roadway’s person-carrying capacity, even if accompanied by an increase in roadway congestion. These measures might include the following:

- HOV lanes or queue jumps on the congested roadway
- Transit signal priority (TSP) on both the buses and the signals of intersections affected by roadway congestion
- Park & ride lots along the transit corridor
- Availability of seats on buses combined with a high frequency of service (e.g., a passenger/seat ratio of below 0.8 and more than five buses per hour) during peak periods.

Including HOV lanes and TSP in the LOS standard would ensure that transit vehicles were not unduly delayed by the vehicle congestion permitted by the increased LOS standard. Moreover, decreased transit delay would increase the attractiveness of transit service, making it an acceptable alternative to the SOV. Park & ride lots along the transit route would concentrate riders and provide an incentive for SOV drivers to consider transit. Seat availability would also increase transit’s appeal, ensuring that riders could find a seat. Including other considerations of transit service quality, the Enhanced V/C LOS structure might look like this:

Standard LOS	Enhanced LOS if Transit Service (5 buses/hour and seat availability)	Enhanced LOS if Transit Priority Equipped (5 buses/hour <i>and</i> a combination of TSP, HOV lanes, park & ride lots)
0.90	0.95 (+0.05)	1.05 (+0.15)

The above three-tiered LOS standard would allow jurisdictions to increase the transit credit where there were additional guarantees of transit effectiveness. But, jurisdictions could also expand the LOS structure to recognize other alternative transportation choices, such as HOV lanes (for carpooling incentives), sidewalks, and bike lanes. For example:

Standard LOS	Enhanced LOS if Transit Equipped (5 buses/hour <i>and</i> a combination of TSP, HOV lanes, park & ride lots)	Enhanced LOS if Transit Plus (Transit equipped <i>and</i> a parallel bike facility exists)
0.90	1.0 (+0.10)	1.05 (+0.15)

The above LOS structures are merely examples of what is possible using the Enhanced V/C alternative. Jurisdictions could (and should) mix and match the measures to create an LOS structure that fits the various land uses throughout the city. For example, a dense area like downtown Bellevue might use a different LOS standard continuum than an area that is primarily residential. The key would be to select measures that accurately described the types of alternative transportation services desired *in each particular location*, and to make sure that the measure selected accurately described the transportation system required to serve the land-use plan adopted in the city’s comprehensive plan.

Enhanced V/C LOS Standards Are Set by Policy Not by Measurement

At heart, Enhanced V/C LOS standards trade increased alternative transportation choices for increased single-occupancy vehicle (SOV) congestion. The Enhanced V/C alternative does not make a technical determination of the amount of additional capacity alternative modes provide to a given roadway. Rather, it involves a policy determination that the alternative modes do provide additional capacity but recognizes that the capacity cannot be measured in a way that fits within the traditional v/c metric. Because the “adjustments” are set by *policy*, not as the result of a specific engineering relationship, each city would have the ability to define the following:

- *What* non-roadway based transportation system facilities and services should be allowed as a trade-off against increased vehicle congestion.
- *Where* those alternative transportation facilities and services should be used to allow additional growth despite vehicle congestion.
- *How much* additional congestion should be tolerated as a result of those facilities and services.

In addition, because the LOS enhancements given for additional transportation choices are a statement of policy, the LOS standards should be carefully set to reflect the transportation alternatives each jurisdiction hopes to encourage. Careful consideration of what types of alternative transportation choices are worthy of higher LOS standards is particularly important, given that mitigation from concurrency failures can provide cities with a way to fund those choices. Because failure of the LOS standard means development must be denied, developers have a significant incentive to mitigate development impacts by providing those services/facilities that would make the roadways eligible for the enhanced LOS standards.

Avoiding False Precision: A Tiered Approach to LOS Standards

Current LOS standards based on v/c ratios create an “all or nothing” system of concurrency in which developments are concurrent on the basis of the estimated numbers of new trips they will generate. Developments that generate fewer trips than the LOS standard permits are concurrent. Developments that generate more trips than the LOS standard permits—even just one more trip—are not concurrent. This system relies heavily on the accuracy of trip generation estimates—estimates that in reality are only informed guesses of the number of new trips a development will generate during the peak periods. Trip estimates for the concurrency analysis are at best a reasonable snapshot of one likely trip generation scenario. However, because roadway volumes vary greatly from day to day, as do the number of trips generated by each development, these “reasonable estimates” should not be viewed as exact or precise. Moreover, the lack of precision should not be translated into unwanted development denials because of the “all or nothing” nature of the concurrency test.

The following example illustrates the problem of “all or nothing” LOS standards. Assume that a roadway has an existing volume to capacity ratio of 1700/1800 or 0.94. Assume also that the LOS standard for this roadway is a v/c ratio of 1.0. If a proposed development is estimated to generate 100 trips on this road, it will remain within the defined standard and will be concurrent. If that proposed development is estimated to generate 101 trips, it will cause the roadway to exceed the standard, and the development will be denied (unless that trip can somehow be “eliminated”). But the reality is that the difference between the trip estimates (100 versus 101 trips) is within the forecasting model’s margin of error. It is simply not possible to state with any certainty that the proposed development will generate 100 or 101 trips, and yet this determination controls whether the proposed development will be permitted.

A developer whose initial trip generation estimate produces an estimate of 101 trips will immediately begin to manipulate the development and/or the trip generation process to eliminate that single “extra” trip. But the focus on eliminating a specific number of trips from modeling estimates loses sight of concurrency’s overall purpose: to make sure transportation facilities can support development. Concurrency analysis should step away from whether development generates 100 or 101 trips, instead focusing on where the development falls within a range of LOS standards.

Tiered LOS standards provide one solution to the current over-reliance on imprecise trip estimates in concurrency determinations. Below a certain point, the roadway’s LOS is clearly acceptable and the development will be considered concurrent without further efforts. Above that point, the tiered structure provides a gradually increasing system of mitigation measures designed to alleviate the effects of the development. Only when roadways affected by the new development are on the high end of acceptable LOS will the “all or nothing concurrency” process be applied. (See Table 1.)

Table 1: Example of Tiered LOS Standards

V/C Ratio	
> 0.7	Development is concurrent
0.7 > 0.8	Development is concurrent if TMA membership
0.8 > 0.9	Development is concurrent if TMA membership and TDM programs
0.9 > 1.0	Development is concurrent if TMA membership, TDM programs, and negotiated development-specific transportation improvements
1.0 >	Development is <u>not</u> concurrent <i>unless</i> developer undertakes specific concurrency mitigation (determined through negotiated agreement with the city) to lower v/c ratio below 1.0.

Perhaps the most important tier for reducing concurrency’s focus on eliminating specific numbers of trips from modeling estimates is the v/c range just below the cut-off point. Developments that fall within this range would have to enter negotiations with the city to mitigate the effects of the development. Developments that barely exceeded 0.9 would be required to perform relatively modest mitigation tasks. But developments that approached 1.0 would be required to perform substantial mitigation to remain concurrent. The goal at this stage of congestion is partly to limit the generation of new vehicle traffic, but perhaps more importantly it is to make sure all developments being constructed in this “partly congested” area are putting in place the programs and/or attributes which will allow successful reductions in traffic volumes later in time as those reductions become more necessary due to continued development.

Consequently, mitigation measures at this “middle” stage of development would be designed through negotiation to limit the travel impacts of development, but would not be focused on removing a specific number of trips from the system. (For example, developments and their tenants might be required to join a TMA or adopt various TDM measures, but would not be required to remove a specific number of trips.) In our example, only when developments exceeded 1.0 would the mitigation measures be directly linked to reduction in trip estimates.

A negotiated concurrency process (rather than an “all or nothing” process) would allow jurisdictions and developers to worry less about the precise number of trips estimated for a given development, focusing instead on the overall impacts of the development on the transportation system. Moreover, it would provide jurisdictions with an opportunity to encourage development designs and other TDM programs that promoted the use of alternative modes of travel.

The negotiation process is recommended because it would allow far more flexibility in designing an outcome that was mutually acceptable to both the developer and the city. The City of Redmond uses a negotiated approach with developers whose projects would exceed

concurrency standards. Negotiated agreements fund capital improvements, ongoing transportation programs, and/or participation in a Traffic Management Association with the purpose of reducing development impacts and maintaining LOS at predevelopment levels. The agreements assure the city that active travel demand management will take place for the life of the development, and they assure the developers that those funds will be spent on TDM efforts relevant to specific development.

Measurement Process

The procedures required to compute and apply the Enhanced V/C alternative are almost identical to those currently used for the existing v/c concurrency process. That is, jurisdictions would use volume counts to measure baseline conditions and use the four-step modeling system to forecast the effects of proposed development. Thus, the Enhanced V/C alternative would change the LOS standards and the concurrency analysis but would not substantially change the v/c measurement and prediction process.

Concurrency Analysis Using Enhanced V/C

There are various ways to test concurrency using the Enhanced V/C alternative, but this report examines just three: 1) zonal, 2) intersection, and 3) location-constrained.¹⁵ These three methods of concurrency analysis are described below. Each description includes an application of the approach to Bellevue's Zone 9 and assumes that the "enhancement" to the v/c-based LOS standard would be based on the frequency of transit service.

1. Zonal LOS Approach

Under the zonal approach, the LOS adjustment would be made for the entire zone rather than for an individual intersection or location. The approach involves setting one "enhanced" LOS standard for the entire zone, dependent on whether a certain number of corridors or intersections are eligible for the transit LOS adjustment. For example, the city could determine that any zone with five or more "transit" intersections would have a higher LOS standard than those zones with less transit service. The v/c calculations would still be made at individual locations, but the entire zone would receive the transit LOS adjustment, rather than just the specific locations where transit service was present.

Example Application

To illustrate how the zonal approach would work, Bellevue's Zone 9 is used as an example. The v/c ratios are one-hour, PM peak hour values taken from the report "Concurrency Update, LOS Snapshot as of May 31, 2001."

¹⁵ Currently, most Eastside jurisdictions test concurrency by using an intersection of v/c ratios combined with a number of allowable "failures" at specific locations.

Example Zonal LOS Standard

Baseline LOS	Enhanced LOS if Transit Service (5 buses per hour headed in a single direction five or more intersections in the zone)
0.90	1.00 (+0.1)

Zone 9 is eligible for the transit LOS standard because bus routes with frequencies of at least five buses per hour transect five intersections. Therefore, the entire zone has a 1.00 LOS standard. (See Figure 1, which shows Zone 9 and the intersections served by transit, as well as the intersections included in the LOS standard.) The enhanced LOS standard increases development capacity in Zone 9. Table 2 compares the zonal approach to the current concurrency process in Bellevue’s Zone 9.

Table 2: Performance Using Zonal Approach

Zone Number	Existing LOS Standard	Transit LOS Standard	Zonal Average V/C
9	0.90	1.0	0.858

As Table 2 demonstrates, the zonal approach increases the development possibilities throughout Zone 9 considerably because it moves the zone from being near the LOS standard to being well below the standard. Under the zonal approach, development in the entire zone is credited for the transit service available at specific locations in the zone. While this approach is the simplest application of Enhanced V/C, it may permit increased congestion in places in the zone where transit service is not present. The second application—intersection LOS—targets the transit credit to the specific intersections that have transit service.

2. Intersection Approach¹⁶

The intersection approach applies the enhanced LOS standard to those intersections that have transit service. In this case, the zone’s LOS standard is based not on the average of intersection v/c ratios but on the individual ratios themselves. The standard is normally stated such that “no more than X locations in a zone can exceed a given LOS.” With Enhanced V/C, the

¹⁶ This approach works for mid-block v/c computations as well as for intersection v/c computations.

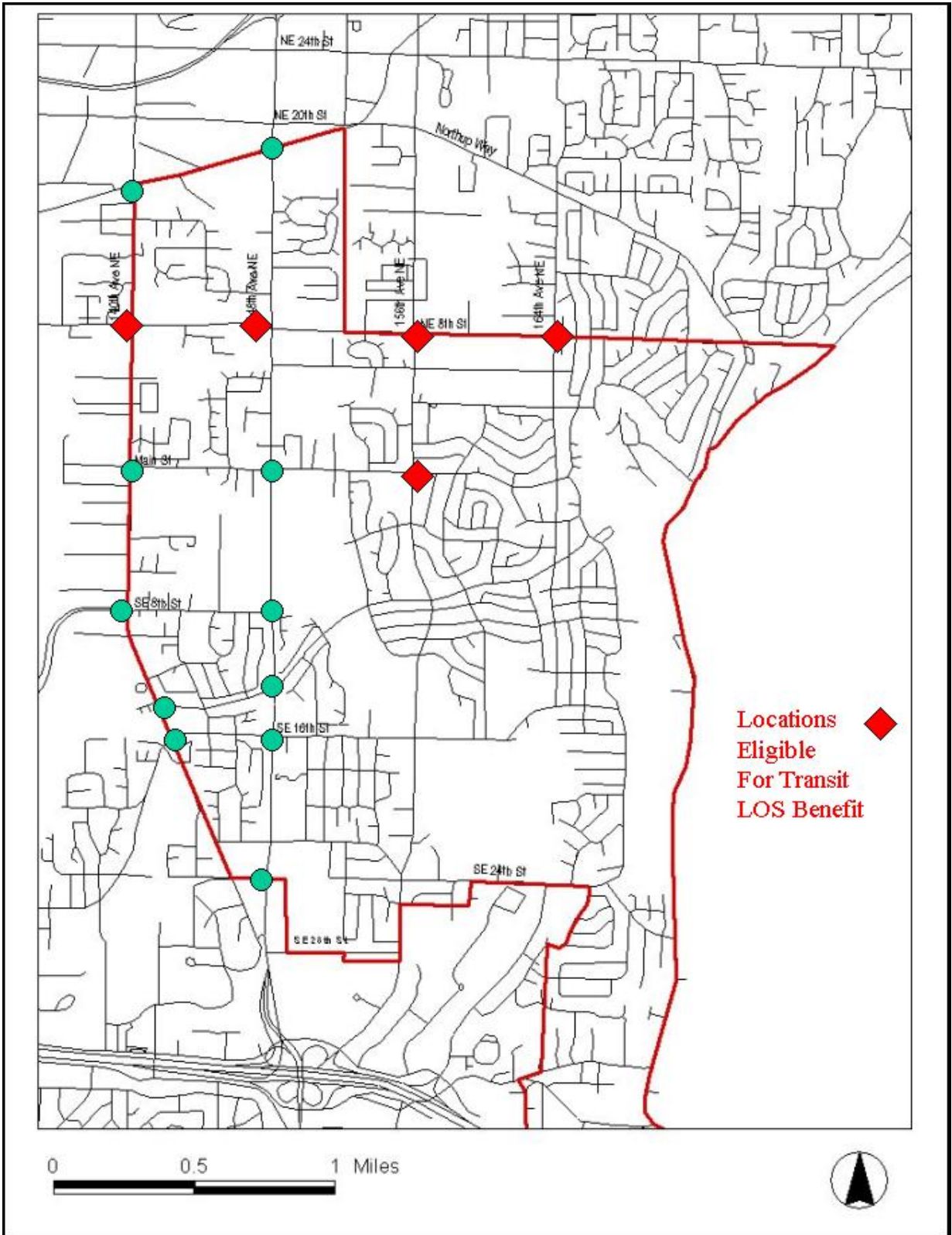


Figure 1: Zone 9 Intersections Meeting Transit Service Frequency Requirement

ratio at each intersection that meets the stated policy criterion is allowed to increase before being considered “over the LOS standard.” Thus, continuing with the transit-based approach used in the previous example, the allowable v/c ratio for any location (intersection) might be set at 0.9, *unless* that location was served by five or more buses per hour, in which case a v/c of 1.0 would be allowed.

Example Application

Again using Bellevue’s Zone 9, the following tables, figures, and discussion demonstrate how the Intersection LOS approach to concurrency analysis would work. As with the previous example, the v/c ratios are one-hour, PM peak values taken from the report “Concurrency Update, LOS Snapshot as of May 31, 2001.”

Example Intersection LOS Standards

Baseline Intersection LOS standard	Transit Intersection LOS standard (5 buses per hour headed in a single direction)
0.90	1.00 (+0.1)

Adjusting Intersection LOS: A transit adjustment of 0.1 is made at each intersection where five or more buses per hour (in a single direction) pass through a given roadway segment or intersection leg. Figure 1 above shows where these intersections are located. Figure 2 shows the v/c values computed by Bellevue for Zone 9 using the TRB Circular 212/1-hour method. The current PM peak period transit usage in the area is used to compute the frequency of bus service. The concurrency requirement is assumed as no more than five intersections in Zone 9 exceeding the LOS standard. Table 3 shows how this would be applied given the five “enhancement eligible” intersections in this example.

Table 3: Performance Using Intersection Approach

	LOS Standard	Number of Intersections	Number of Intersections Exceeding the Standard
Current Approach	0.90	16	5
Enhanced V/C Approach	0.90 1.0	11 5	4 1 (Total = 5)

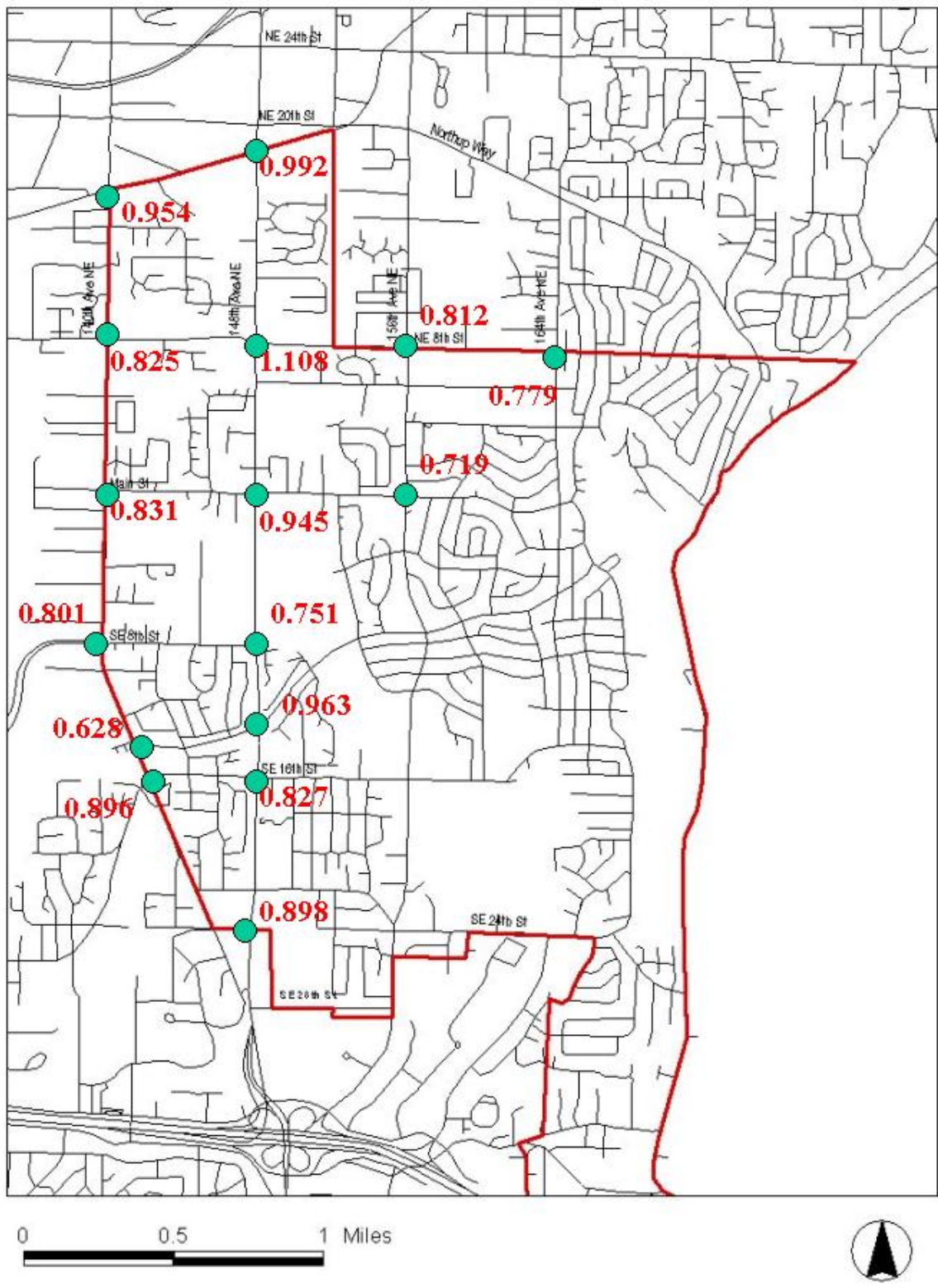


Figure 2: Circular 212 Volume/Capacity Ratios in Bellevue's Zone 9

Interestingly, Table 3 shows that, in this case, relatively little new development potential is gained from this approach to the v/c adjustment. At current levels of transit service, this zone is on the edge of failing the concurrency test, even with the transit LOS adjustment. Only five intersections benefit from the selected adjustment, and four of those intersections are already well below the Enhanced V/C standard. The fifth (NE 8th St and 148th Ave NE) is so far above the standard that the v/c adjustment does not make that intersection compliant. Without increasing transit capacity at additional intersections in this zone, the City of Bellevue would need to concentrate its development in the area of Crossroads and on NE 8th between Crossroads and I-405.

However, even in Zone 9, this method of Enhanced V/C analysis could provide additional benefits by encouraging a developer to help support additional transit service. Mitigation is required where developments fail the concurrency analysis. Under the current v/c approach, developers can only mitigate the impacts of their development by 1) funding roadway projects (such as road widening) or 2) scaling back the development. In contrast, the Enhanced V/C approach provides a third option: developers can fund transit capacity so that more intersections are eligible for the transit adjustment. For example, if a developer (or collection of developers) funded increased bus service along 148th, three additional intersections would become compliant. (See Figure 2 above and Table 4 below.)

Table 4: Performance Using Intersection Approach with Increased Transit Capacity on 148th

	LOS Standard	Number of Intersections	Number of Intersections Exceeding the Standard
Current Approach	0.90	16	5
Enhanced V/C Approach	0.90	8	1
	1.0	8	1 (Total = 2)

3. Location-Constrained Approach

The Zonal and Intersection approaches to concurrency analysis are relatively easy to perform, requiring only modest amounts of staff time. But they provide all new developments within the zone the benefit of the transit LOS standard, regardless of whether the development is near or far from the transit service and regardless of whether the development is likely to generate transit users. By contrast, the Location-Constrained approach applies the enhanced LOS standard only to those developments that are located close enough to the transit service so that at least some of the development’s trips are likely to use transit service.

Eligibility requirements of the enhanced LOS standard could incorporate a number of factors, including the following:

- The development must be within walking distance of a transit corridor (perhaps ¼ mile)
- The development must be within a defined “urban center” where there is a concentration of transit services
- The development must be within walking distance *and* have a “transit-friendly design” (i.e. sidewalks, small setbacks, limited surface parking, etc.).

Geographic proximity alone is likely to increase the chances that the development will produce transit riders, but adding “transit-friendly” design elements to the LOS eligibility requirements provides even more rider incentive. In zones where v/c ratios are bumping up against current LOS standards, the geographic proximity requirement would concentrate new development along transit corridors or in transit-served centers, increasing land-use densities and thus enhancing the viability of transit. And “transit-friendly” design requirements would provide developers with incentives to design non-auto oriented developments, which would further encourage transit ridership and would encourage development consistent with the comprehensive plan. Transit-friendly considerations may include the following:

- If the development is residential or commercial office space, does the site design allow easy access to transit?
- If the development is pure retail, is it likely to serve transit-oriented or pedestrian patrons?

The Location-Constrained approach to the Enhanced V/C alternative would not, by itself, prohibit certain kinds of development. Rather, it would ensure that where roadways were nearing baseline LOS standards, the enhanced LOS standards would be available only to those developments that were likely to take advantage of the jurisdiction’s transit capacity. In essence, cities could use the enhanced LOS eligibility requirements to encourage transit-friendly development concentrated around transit services.¹⁷ At the same time, all other developments, although not prohibited outright, would be held to an LOS standard that assumed that they were auto-oriented.

The Location-Constrained approach would provide developers with powerful incentives to fit their developments within the eligibility requirements in order to increase the size and

¹⁷ The Location-Constrained approach could also be used with LOS standards that address alternative modes of travel. However, care would have to be taken in the design of the incentive system. Modes such as walking are very sensitive to scale, the presence of amenities (sidewalks, weather protection), and the specific mix of land uses present at a location. For example, a city might want to apply a v/c adjustment for walking only within a limited geographic area that corresponded to a specific mixed-use set of developments. The State of Florida has explicitly defined these areas as “Multi-modal Transportation Districts” (MMTDs). To be designated as an MMTD, these districts must be of specific size, contain specific, compatible land uses, and have transportation networks that are compatible with the alternative modes under consideration. This scale might be expanded to reflect an entire mixed-use area (such as an urban center) such as Bellevue’s or Kirkland’s downtown. In such a case, a v/c adjustment within that core area might be adopted and applied *only to intersections within that core area, and only for developments within that core area* that were compatible with the existing mix of land uses.

(likely) the profitability of their development projects. It would also create a concurrency process that reinforced the linkage between the comprehensive plan’s transportation and land-use elements, by providing incentives for developments that met both land-use and transportation goals.¹⁸

If a city adopted location and land use eligibility requirements, the Location-Constrained approach would likely produce situations in which a transit-friendly design would be permitted for a given parcel of land, while a traditional development of equal size would not be permitted. Similarly, a transit-friendly design built within the “designated walking limits” of the transit corridor would be permitted, while the same, transit-friendly development built on a parcel of land outside of the “designated walking limits” would be denied. In this latter case, the “permitted” development would receive permission to build because it would be located on a parcel to which transit service was (or would be) available, thus providing a reasonable alternative to travelers. The “denied” development would be rejected because its location would engender little confidence that modes other than the car would be used to access it. Therefore, it 1) would contribute substantially to a congested situation that already exceeded limits, and 2) would not contribute to the jurisdiction’s transportation choices policy goals.

Example Application

Bellevue’s Zone 9 is again used to illustrate how the Location-Constrained approach would work. As before, the v/c ratios are taken from the report “Concurrency Update, LOS Snapshot as of May 31, 2001.” This example combines geographic location and land-use design requirements with the Transit LOS eligibility requirements.

Example LOS Standard

Baseline LOS Standard	Transit Service LOS Standard (5 buses/hour)	Transit-Equipped LOS Standard (5 buses/hour <i>and</i> TSP or HOV lanes)
No more than 5 intersections can exceed the LOS standard of 0.90	No more than 5 intersections can exceed the LOS standard that is 0.90 if limited transit service, or 1.0 if 5+ buses are present	No more than 5 intersections can exceed the LOS standard that is 0.90 if limited transit service, or 1.0 if 5+ buses are present, or 1.2 if 5+ buses <i>and</i> TSP or HOV lanes

¹⁸ An excellent side benefit of increased land-use/transportation coordination should be increased transit patronage along the corridor, which would in turn provide support for additional transit service, resulting in further increases in transit mode split. This would result in reduced vehicle traffic and congestion on the neighboring arterials and on other arterials in the city. (For example, other travelers already using the corridor would be likely to switch from their car to transit because the added transit frequency supported by the new development would make transit a more attractive travel choice.) The increased transit services would also provide additional mobility to residents and patrons of the transit-friendly developments located near those services.

Transit Service/Transit-Equipped LOS Eligibility: The requirements for transit service LOS eligibility are as follows:

1. Walking Distance: development must be within ¼ mile of a transit corridor
2. Transit-Friendly Design: sidewalks, maximum setbacks, limited surface parking

If the development meets *both* of the above requirements, its concurrency analysis would use the Transit Service or Transit-Equipped LOS standard, depending on intersection classification. The concurrency analysis for all other developments would use the baseline LOS standard.

Figure 3 provides the PM peak, one-hour, v/c ratios for Bellevue's Zone 9 as of May 2001. Figure 3 also shows the number of vehicles per hour that can be added to each intersection before the computed v/c ratio hits the Baseline LOS standard.

Figure 4 shows the transit corridors within Zone 9 that meet the five bus per hour threshold and indicates the hypothetical "transit-equipped" improvements (such as TSP and HOV lanes), making the corridor eligible for the enhanced LOS standards. The gray band around the transit corridor shows the area of Zone 9 within which developments would be eligible for the enhanced LOS standards if the developments also contained "transit-friendly design."

Figure 5 shows the number of vehicles that can be added to each intersection with both the "transit-equipped" enhanced LOS standard and the baseline LOS standards.

A Hypothetical Development: Assume that a developer proposes to build a multi-family residential development that will generate 200 trips in the peak hour at Location A within the enhanced LOS of Zone 9 (see Figure 6). The development qualifies as a "transit-friendly" development, making it eligible for the enhanced LOS standards. The development's trips will be distributed across the roadway network, as shown in Figure 7. Figure 8 shows the new v/c ratios that result from adding these trips to the existing roadway volume and the "new" remaining volume that can be added while remaining below each standard, given that the development falls within the "transit benefit district boundaries." Table 5 shows the effect on the total concurrency determination process.

As shown in Figure 8, the intersection closest to exceeding the enhanced v/c standard is at NE 8th St and 148th Ave NE. Thanks to both significant transit service and a designated HOV lane, this intersection has an adjustment of 0.3 added to its allowable v/c ratio. The result is that despite the addition of 145 vehicle trips because of the new development at Location A, another 95 vehicle trips can still be accommodated while this location remains within the new level of service rule. (Note that if an HOV lane or TSP installation were not present at NE 8th Street and 148th Avenue NE, this intersection would not be eligible for the enhanced LOS standard of 1.2, and thus the development would not be concurrent. However, to attain a positive concurrency status, the developer could help fund one of those efforts as part of concurrency mitigation.)

While the development at Location A is concurrent, if this exact same "transit-friendly" development was proposed for Location B instead of Location A, the development would not be allowable under this concurrency process because the development would be located too far

away from frequent bus service for the city to anticipate that the development would support significant transit use. (See Figure 9.) Consequently, the development at Location B would not be eligible for the transit benefit LOS standards, and the existing v/c ratios would exceed Baseline LOS even before the traffic generated by the development was added to the roadway network

Table 5: Zone V/C Ratios For East Bellevue Including TSP and HOV Lanes

Development Location	LOS Standard	Intersections Failing Standard	Comparison Against Standard
A	0.9 (baseline) 1.0 (Transit Service LOS) 1.2 (Transit Equipped LOS)	5 (of 11) 0 (of 1) 0 (of 4)	(5 failures of 5 allowed) Pass
B	0.9 (baseline) 1.0 (Transit Service LOS) 1.2 (Transit Equipped LOS)	6 (of 16) 0 (of 0) 0 (of 0)	(6 failures of 5 allowed) Fail

As can be seen in this simple set of examples, combining v/c adjustments selected to promote the use of specific alternative transportation modes (in this case transit) with geographic constraints tailored to restrict their use to locations with reasonable access to those modal facilities can allow a city to use transportation concurrency calculations to encourage specific types of developments and development locations.

The particular set of LOS standards, transit benefit policy statements, and existing roadway levels of congestion in the above example would result in a transportation concurrency situation in which the only development permitted in this zone would be in areas designated as “transit benefit districts” (the shaded area in Figure 4). This would be an excellent outcome if the city wished to promote such development in these locations. It would be a poor outcome if the city did not wish to concentrate most development in dense, transit-friendly locations.

This result highlights the need to start with a clear vision of the land uses and transportation systems desired as an outcome. Without this clear vision, it is difficult to design the appropriate performance statistics, policy statements, and level of service standards. Poor selection of any of these is likely to result in incentives provided to developers that encourage land uses that are not desired, or transportation system performance that is sub-optimum.

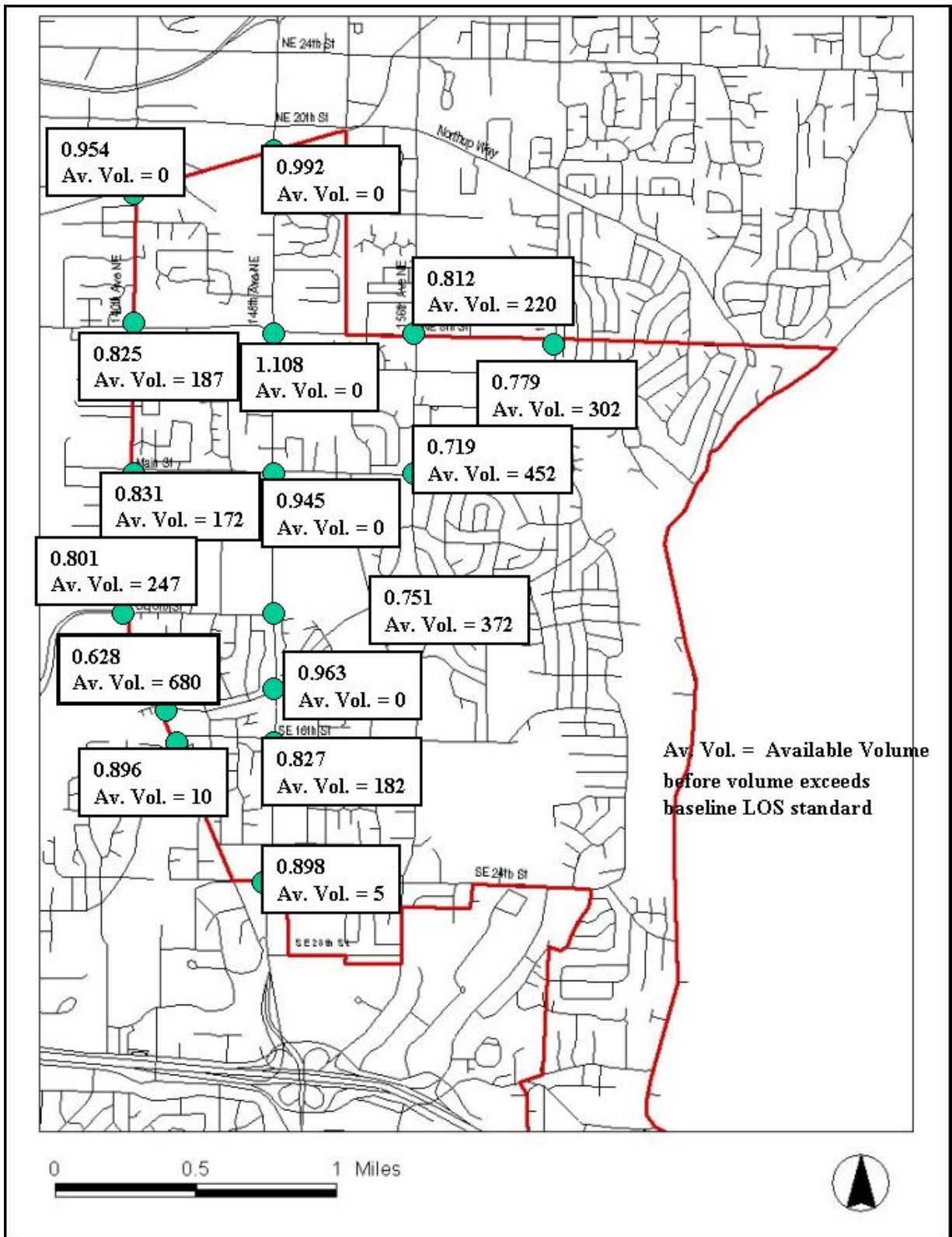


Figure 3: Illustration of Volume/Capacity Ratios and Allowable Volume Growth

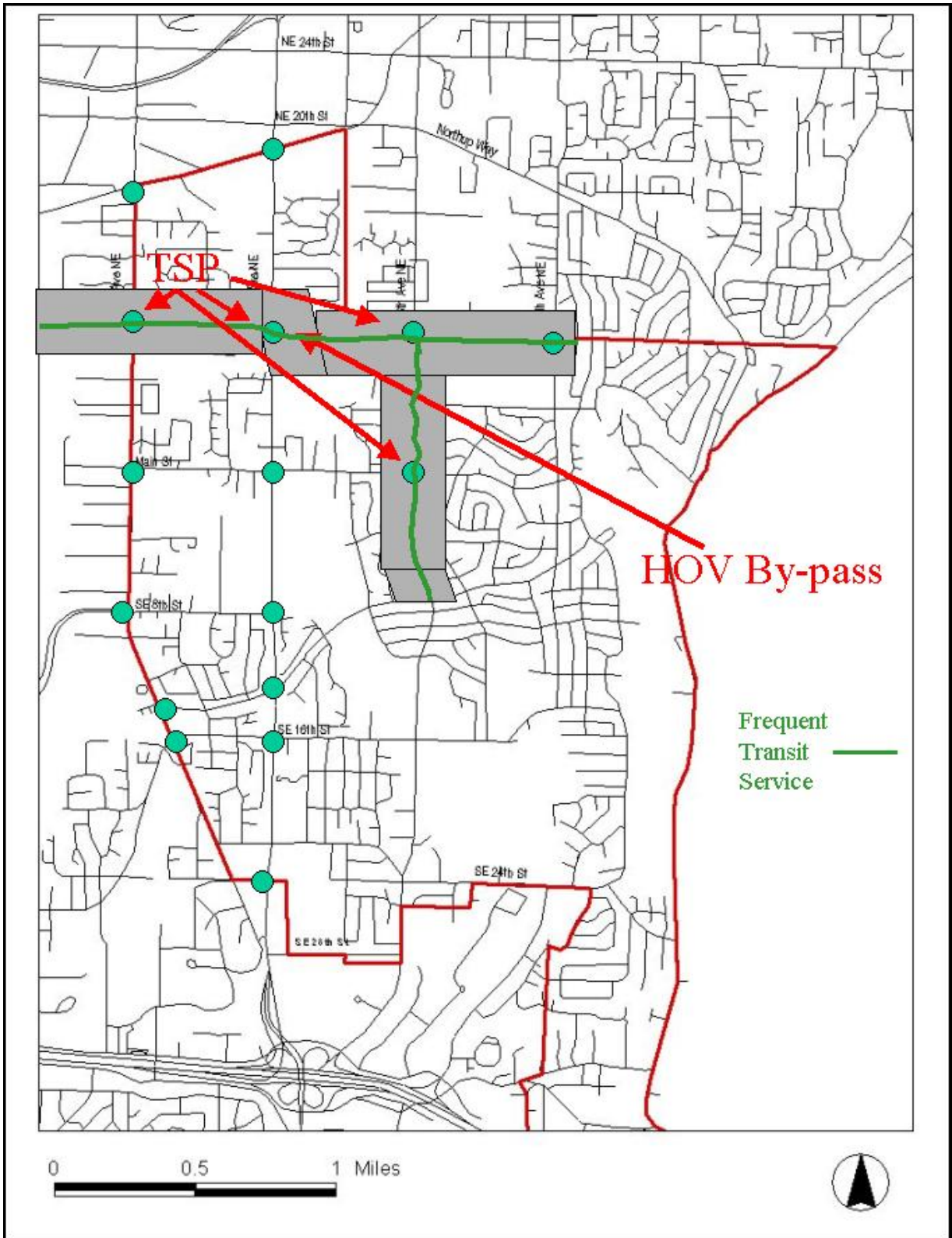


Figure 4: Transit Improvements Included in Enhanced V/C Computation

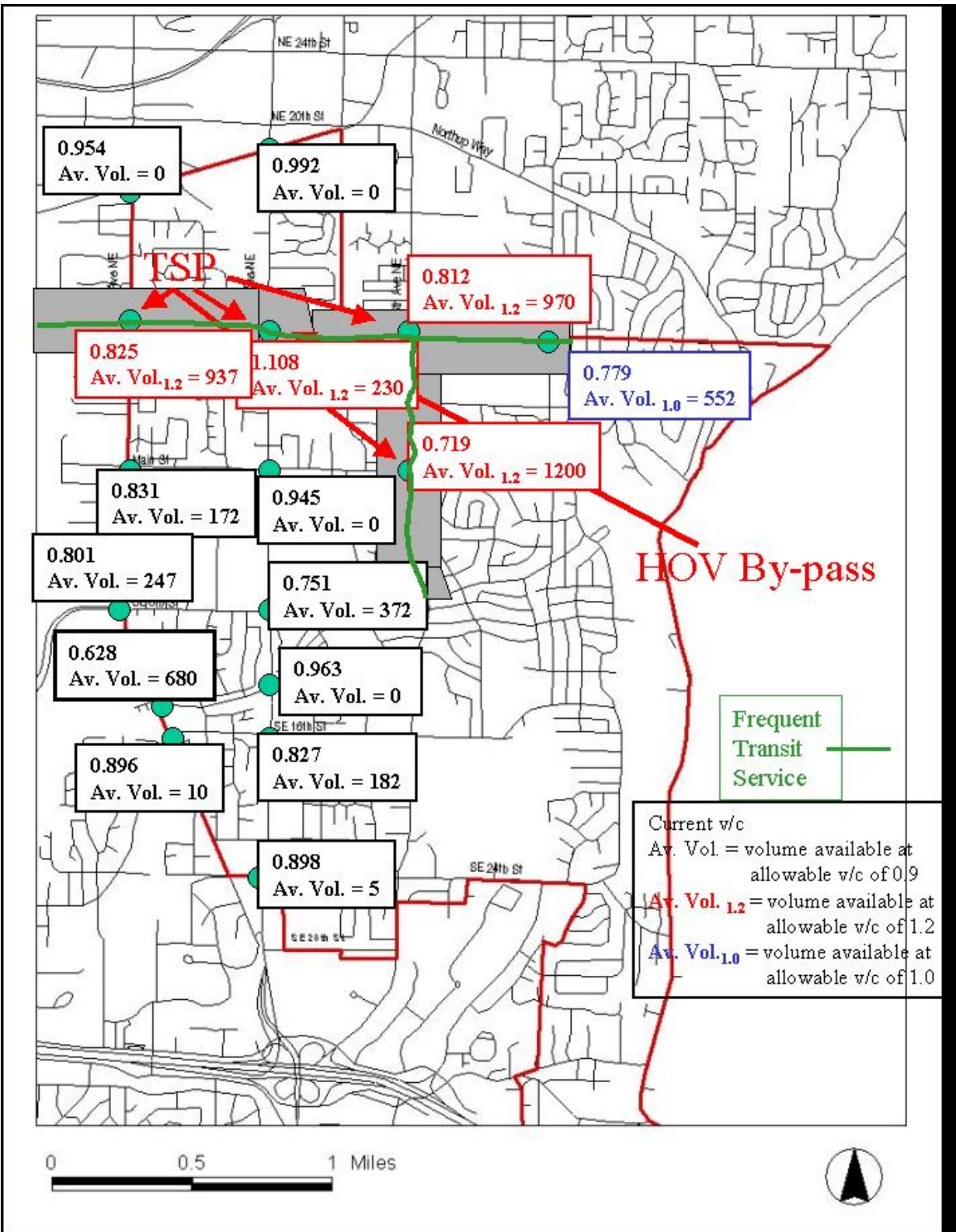


Figure 5: Changes in V/C and Allowable Volume Increases Based on Availability of Transit Improvements

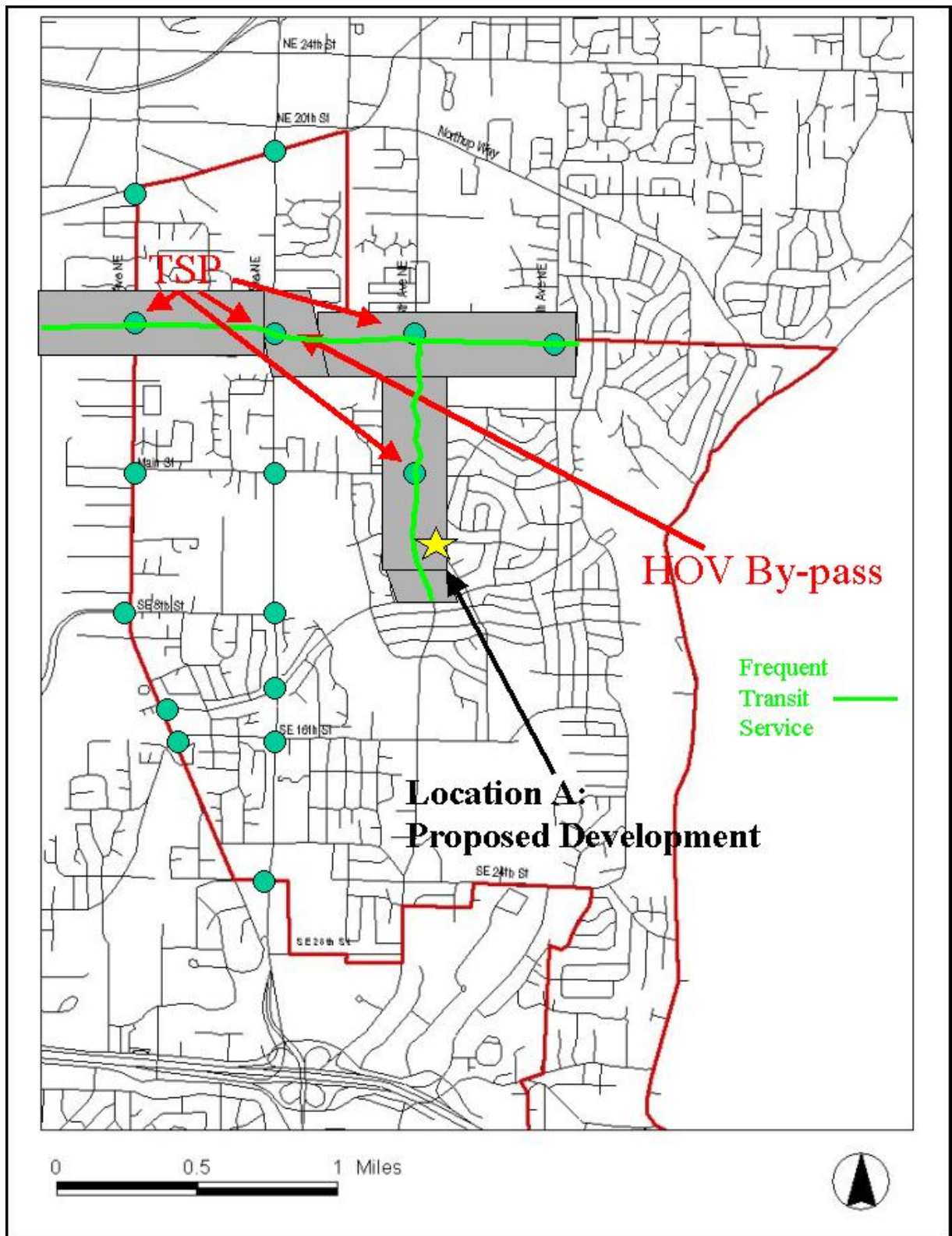


Figure 6: Location of Example Development

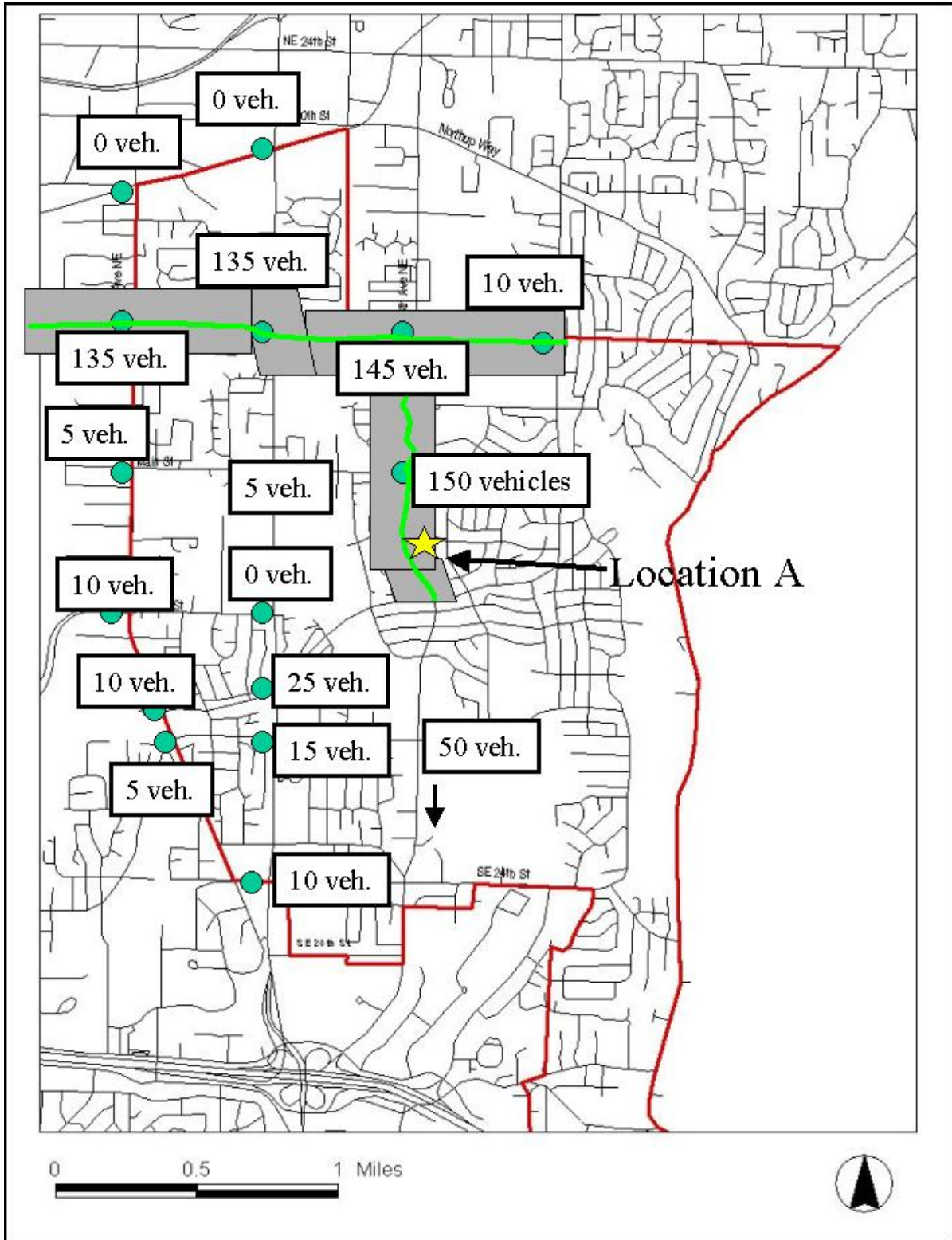


Figure 7: Distribution of Vehicle Trips Generated by Proposed Development

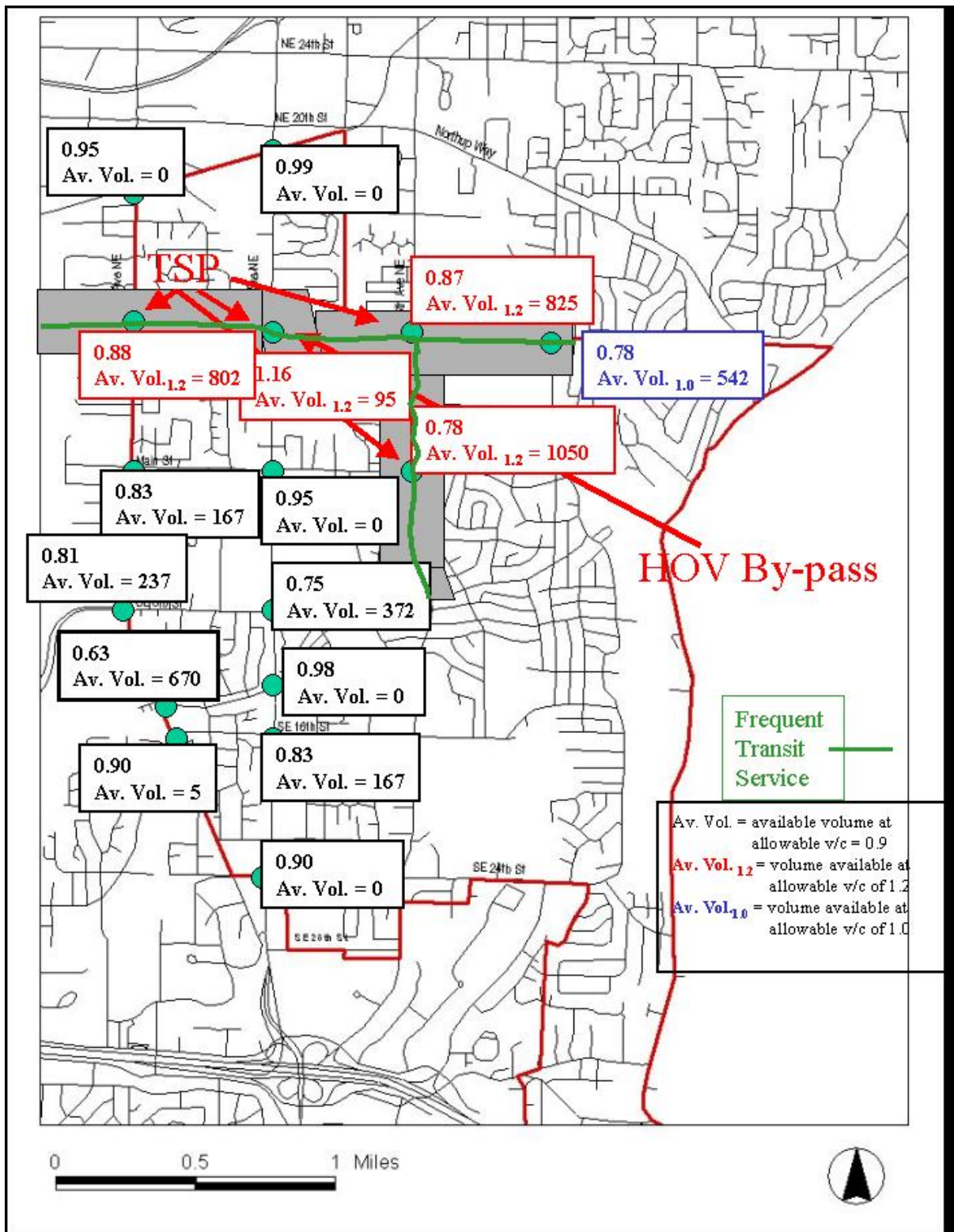


Figure 8: Actual and Adjusted V/C Ratios and Available Vehicle Volumes After Addition of New Development Generated Trips

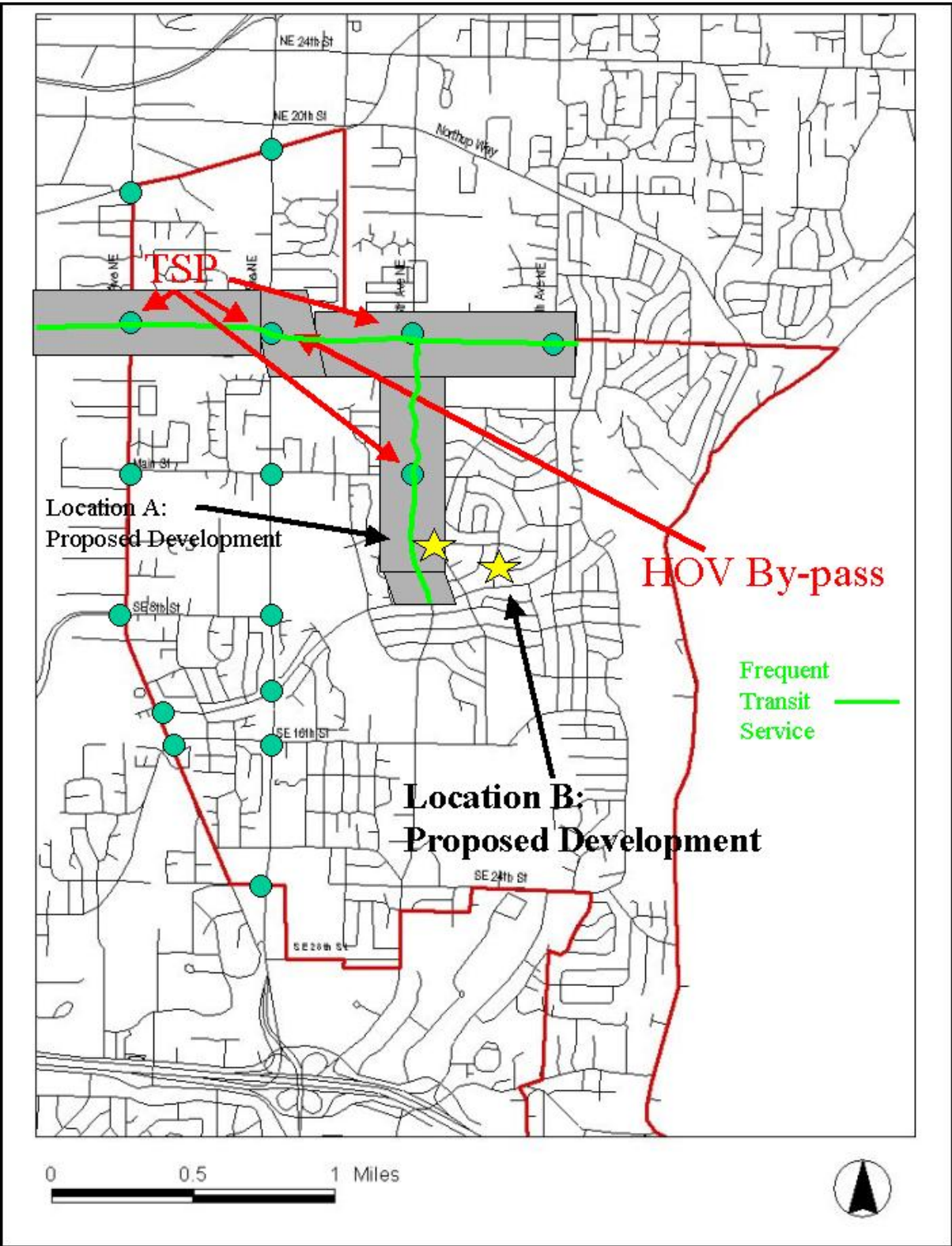


Figure 9: Alternative Location of Proposed Development (Now Outside of Transit Benefit District)

OPTION 2: TRAVEL TIME

The Enhanced V/C alternative builds on concurrency methods already used by the Eastside cities. This section explores travel time as an alternative concurrency measurement method and represents a significant departure from traditional v/c calculations. Travel time is an obvious choice for measuring transportation level of service because it reflects many Americans' perception of transportation. When asked "How far is it from here to my destination?" many Americans will answer with a measure of time. "Ten minutes from here to there."

Travel time as the measure of currency has a number of advantages over the traditional v/c approach, but it also has limitations. For instance, travel time is advantageous because it is easily explained and understood by the general public; only transportation officials speak about transportation performance in terms of v/c ratios. LOS standards will likely carry more credibility with the public and government officials if they are easily understood and translated into everyday experience. However, clarity may be a double-edged sword. While residents may be willing to sacrifice some transportation performance to permit development without road-widening, once a travel time is associated with that sacrifice, the public may be more resistant to decreased LOS standards. For example, an increase of the v/c from 0.9 to 0.95 is not easily translated into driver experience. But a driver immediately understands the ramifications of an LOS change from 10 miles in 20 minutes to 7 miles in 20 minutes.

Travel Time also counters another drawback to the traditional v/c ratio. Concurrency measurement using the v/c ratio is confined to a specific site, usually an intersection, and does not capture the "flow" of the roadway network. Consequently, a few trouble spots can show heavy congestion even though the vast majority of roadway network is functioning smoothly. By contrast, Travel Time measures movement over a larger geographic area. That is, Travel Time covers vehicle movement along a corridor instead of vehicle volumes at a specific intersection. Measuring movement along a corridor, Travel Time balances the performance of a series of roadway segments and intersections.

Traditional v/c measurements are also inherently car-based. While the Enhanced V/C alternative would provide one way to adjust LOS standards where alternative transportation capacity exists, it would do so through policy adjustments, not measurement solutions. Alternative modes of travel, on the other hand, can be built directly into the Travel Time statistic. Separate Travel Time LOS standards can be set for the various modes, or the modes can be combined into one travel LOS standard through the use of weighted averages. But while car-based v/c ratios are relatively straightforward predictions of car traffic, transportation model limitations make accurate travel time estimates, especially across modes, much more difficult to predict. (Measurement accuracy is discussed further below.)

Travel time can be used as a concurrency measure in two different ways. The first approach, called "Key Center," bases LOS standards based on the time it takes to travel out of the city from a central point. Under the Key Center approach, the concurrency determination is based on the development's effect on travel to and from a pre-determined key point. This approach is currently used by the City of Renton. The second approach, called "Corridor," defines LOS standards for a variety of important corridors throughout the jurisdiction. Using the

Corridor approach, the concurrency determination is based on a development's effects on either the corridors near the development site or the corridors accepting the majority of the development's trips.

The following sections discuss setting Travel Time LOS standards, creating a measurement process, and applying the Key Center and Corridor approaches.

Setting LOS Standards Using Travel Time

As with any approach to transportation concurrency, the first step in designing the measurement program is establishing LOS standards to measure performance. For Travel Time, this means:

1. Selecting the end points of the trip, usually along a corridor, that will be used to calculate travel time
2. Defining which travel modes will be included in the LOS standard
3. If multiple modes are included, determining how the travel times of the various travel modes will be combined into one measure or a single decision point
4. Selecting what travel time for each corridor represents the limit of "acceptable" performance.

While all four steps require careful attention by jurisdictions considering Travel Time, steps two and three are perhaps the most challenging aspects of setting Travel Time LOS standards. All four Eastside cities have expressed a desire to measure more than car traffic when determining concurrency. Therefore, determining whether (and how) to combine multiple modes into a single performance measure is a particularly crucial step and one that is filled with a number of uncertainties.

A variety of multi-modal, Travel Time LOS standards are possible. Travel Time LOS standards could be determined for each mode, for example, providing an auto LOS standard of 2 miles in 5 minutes and a transit LOS of 2 miles in 10 minutes. Or LOS standards could be set by a simple average of the multiple modes. Using the above example, the LOS standard would be 2 miles in 7.5 minutes. The simple average, however, would produce LOS Travel Time standards that were significantly longer than current car performance because buses generally travel more slowly than cars as they stop to pick up and drop off passengers. To reduce the transit bias, a multi-modal Travel Time LOS standard could also be calculated by multiplying travel times by mode-split. For instance, again using the above example and assuming that the car/transit mode-split was 90/10, the LOS standard would be 2 miles in 5.5 minutes ($5 \text{ min} * 0.9 + 10 \text{ min.} * 0.1$). This would provide only a slightly longer LOS standard to account for transit.

The four steps outlined above are explored in detail using the Key Center and Corridor approaches in the Concurrency Analysis section below.

Measurement Process

Once jurisdictions have developed their LOS standards, the next step is to measure existing travel time performance to establish a baseline against which the effects of new developments will be judged. Travel time baselines can be developed in two ways: 1) measurement or 2) estimation. Transportation engineers measure actual travel times along corridors by actually driving them (or, to measure transit, by riding the bus). Transportation engineers estimate auto travel times using transportation system models, relying on many of the same processes that develop v/c estimates. These same procedures are used to predict future travel times given changes in demand and transportation system features. The most accurate concurrency baselines are developed through a combination of both methods, as direct measurement is used to calibrate and verify the accuracy of the estimation procedures being used to predict future performance. Cities adopting Travel Time LOS standards should annually or biennially undertake travel time measurement as a check on the accuracy of the model's estimates.

Baselines developed from estimates also fall into two groups. The most common tool for estimating auto travel time is the standard four-step planning model. However, the accuracy of four-step modeling estimates is limited because the network models used do not contain the roadway details necessary to be highly precise. Among the inputs generally missing from the models are

- actual traffic signal timing plans (cycle length, phasing, offsets)
- geometric roadway details (the presence and length of left turn bays, or the presence and effects on capacity of two-way left turn lanes)
- the size and frequency of mid-block turning movements (e.g., movements into and out of shopping centers).

There are two ways that jurisdictions can deal with the limitations of the four-step modeling process. First, jurisdictions can simply accept the limitations, relying on frequent field measurements to adjust for inaccuracies in the estimates. Second, jurisdictions can use more sophisticated engineering tools to examine all of the roadway factors that affect travel time. The details missing from standard four-step models are present in more sophisticated traffic engineering analytical packages.¹⁹ These detailed packages can be used to predict baseline travel times with a much higher level of accuracy and precision, but they are more expensive to maintain and operate and require a significant investment of staff time to calibrate and use. Simply put, advanced transportation models are an excellent—but costly—way to estimate travel time.

¹⁹ These packages can include simulation models such as NETSIM and PARAMICS, or signal timing programs such as PASSER and TRANSYT, as well as a variety of other traffic engineering models.

Concurrency Analysis Using Travel Time

In many respects, the most difficult aspect of the Travel Time alternative is determining what effect new development will have on travel times. Two concurrency analysis approaches are possible. First, jurisdictions can use trip estimation models to make a one-time determination of the total number of trips that can be added to the geographic areas surrounding the Travel Time corridor before actual travel times reach the LOS standard. This type of concurrency analysis is considered the “new trips allowed” approach. Trips from new developments are then subtracted from the pool of available trips until the standard is met (or until the baseline condition is recalibrated with new estimates or measurements). Second, jurisdictions can use four-step modeling (and any subsequent traffic engineering techniques) to generate new travel time estimates for each new development, comparing those estimates with the LOS standards. This type of concurrency analysis is considered the “development-by-development” approach. These two approaches are explored in the specific applications of the Key Center and Corridor methods of concurrency review.

Example Applications

1. Key Center Approach

The Key Center approach measures concurrency on the basis of travel times along specific corridors radiating outward in all directions from one point in the jurisdiction, usually the central business district. The City of Renton uses the Key Center approach to measure concurrency. Renton sets a citywide LOS standard based on how far (in miles) a person can travel out of downtown within 30 minutes along three different corridors. The LOS standard is a weighted average of miles traveled by three different modes (SOV, HOV, and transit). Renton’s current LOS standard is 19 miles in 30 minutes along each of the three corridors. Renton uses the following formula to calculate its baseline:

$$\frac{(\text{Sum of SOV} + \text{Sum of HOV} + 2(\text{Sum of Transit}))^{20}}{3 \text{ (number of corridors tested)}}$$

After determining the baseline, Renton uses the “new trips allowed” approach to conduct its concurrency analysis. It calculates the number of additional trips that can be accommodated within the city limits before the LOS standard is exceeded. As new developments are proposed, trips are subtracted from the “allowable trips” pool until the pool is empty or the LOS standard is

²⁰ where: **Sum of SOV** equals the total distance traveled by a single occupancy vehicle in 30 minutes on three corridors radiating out from downtown;

Sum of HOV equals the total distance traveled by a carpool in 30 minutes on three corridors radiating out from downtown;

Sum of Transit equals the total distance traveled by a bus in 30 minutes on three corridors radiating out from downtown.

reset. If an insufficient number of allowable trips are available to cover a new development, the development is not concurrent unless mitigation efforts reduce the number of trips or provide for transportation system improvements that decrease travel times. In practice, however, Renton regularly adjusts its LOS standards to keep available trips in the pool to accommodate additional growth.

The Key Center approach used in Renton is most appropriate when a city wants to increase or protect the vibrancy of a specific portion of the city. A city adopting such an approach must identify the key corridors used for accessing a geographic area that will be the basis of the LOS standard and select the travel modes that will be included in the standard.

Setting the Key Center LOS Standard. The LOS standard can be set using a number of different statistics:

- Distance traveled along a corridor in 30 minutes (Renton’s standard)
- Average speed along a corridor
- Travel time from one point to another along a corridor.

No matter what the statistic, the Key Center LOS standard is a combined measure of performance on a number of corridors radiating out from a central point. Assuming the jurisdiction chose travel time as its measurement statistic, the LOS standard would be set by examining current and predicted travel times (given expected levels of development and transportation improvements) and comparing those outcomes with publicly acceptable levels of transportation system performance. Like all other approaches to concurrency, the LOS standard is a negotiated agreement of development and transportation preferences between concerned citizens, their elected officials, and city staff. What emerges from the Key Center approach is a single LOS standard that is applied *citywide*. The concurrency of each development is based on the number of trips it adds to the key center corridors included in the LOS standard.

Concurrency Analysis Using Key Center Approach. Both the “new trips allowed” approach and the “development-by-development” approach can be used to perform the Key Center concurrency analysis. This section further explores the “new trips allowed” approach, while the Corridor section explores the development-by-development approach. However, either method of concurrency analysis can be applied to both Travel Time LOS approaches.

As described above, the “new trips allowed” method of concurrency analysis creates an “available trips” pool. As each development is proposed, trips are subtracted from the pool until it is empty. A crucial component of the “new trips allowed” method is regular (perhaps annual or biennial) updating of the travel time baseline and allowable trip pool. Updating includes refinement of model inputs and recalibration of the modeling system, and it also should include additional field measurement.

Revision of the number of “available trips” is based on how many trips can be added to the model network while maintaining acceptable travel times. This estimate is significantly affected by the assumed location of the new developments, the direction of travel of trips

generated by the predicted developments, and the trips' mode of travel. Predicted vehicle trip volumes are then added to the existing transportation system usage patterns and performance (in travel time) is calculated. Regular model refinement and recalibration ensures that the available trip pool reflects

- changes in the transportation system
- differences between previously assumed development sizes and locations and actual development sizes and locations
- changes in land use in neighboring jurisdictions
- changes in trip making behavior
- any changes in allowable travel time performance.

The recalibration process ensures that the accuracy of the general trip forecasting procedure is maintained.

Drawbacks of Key Center Approach. Because the Key Center approach focuses entirely on movement to and from one part of the city, its concurrency analysis ignores congestion created by new development in areas of the city that are not included in the Key Center LOS standard. By focusing only on a key center, the approach does not necessarily examine a development's most significant transportation impacts. In a small city where traffic patterns are closely tied to the key center, the travel times associated with that key center can be an excellent surrogate for mobility within the city as a whole. But in a larger city, a development that is built far from the key center may have relatively little impact on the defined corridors leading to/from the key center but may create considerable congestion near the development site. If so, the impacts of new development are badly underestimated by a concurrency analysis focused on the development's effect on a key center.

2. Corridor Approach

For larger cities, and especially for cities with multiple centers, the Corridor approach is a more effective Travel Time concurrency tool than the Key Center approach. In fact, the Corridor approach likely is a more appropriate concurrency method for the four Eastside cities. The Corridor approach measures a development's impacts throughout the city on the basis of changes in travel times along major corridors.

The Corridor approach first requires identification of those corridors that will define the LOS standard. At the most comprehensive level, LOS standards can be developed for all major travel corridors within the city. Or LOS standards can be developed for the five or six corridors that are particularly sensitive to development changes. A recent transportation study looked at the possibility of the Corridor approach in Redmond. The study recommended 10 corridors (see Figure 10) on the basis of factors including

- traffic volumes
- travel patterns

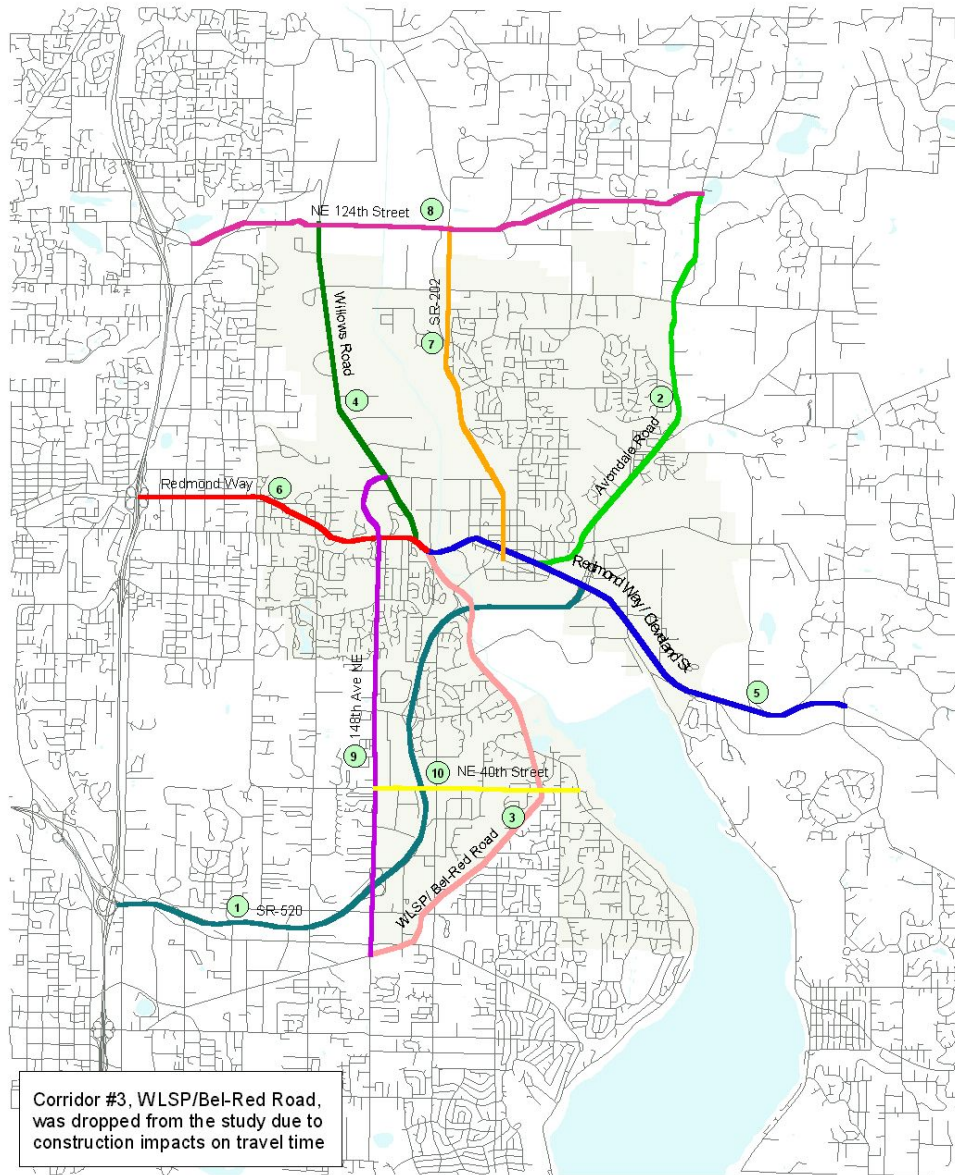


Figure 2
Travel Time Study Corridors
 Redmond Travel Time Study



Figure 10: Potential Travel Time Corridors for Monitoring Transportation Concurrency Using Travel Time in Redmond²¹

²¹ Redmond Travel Time Study, City of Redmond Phase 2 – Forecasting Travel Speeds, May 2002, The Transpo Group, Inc., page 8

- roadway function
- type of adjacent land use
- access management
- traffic operations.

Setting Corridor LOS Standards. Like the Key Center approach, the Corridor LOS standard can use a variety of performance statistics, including

- Distance traveled along a corridor in 30 minutes (Renton’s standard)
- Average speed along a corridor
- Travel time from one point to another along a corridor.

The Corridor LOS standard can also include a variety of travel modes. While the performance statistic should be consistent across corridors, each corridor LOS can incorporate different modes to accurately reflect the transportation service available along that corridor. For example, the ten Redmond corridors shown in Figure 10 have varying degrees of multi-modal capabilities. Transit service is not provided along corridors 7 and 8, but corridors 1, 2, and 9 currently have transit service that could be expanded. No corridors have HOV lanes, but they might be added in the future to expand transportation alternatives. Each Corridor LOS could be adopted to reflect existing capacity or desired capacity. Assuming that Redmond adopted an average speed performance statistic, LOS standards for Corridor 7 (SOV dominant) and Corridor 2 (multi-modal) could be as follows:

	Auto-Only LOS	Multi-modal LOS – Option 1	Multi-modal LOS – Option 2
Corridor 7	PM peak-hour SOV speed must be at least 20 mph		
Corridor 2		PM peak-hour speed based on weighted average must be at least 20 mph Weighted Average: $\frac{(\text{car speed} + 1.5(\text{bus speed}))}{2}$	PM peak-hour speed based on combination of speed and mode-split must be at least 20 mph Mode-split Average: $(\text{average car speed} * \text{mode-split}) + (1.5 * \text{average bus speed} * \text{mode-split for buses})$

On the other hand, jurisdictions can select a common multi-modal LOS for all corridors to encourage the development of alternative modes of transportation on those corridors.

While the above examples use the same performance standard (at least 20 mph), the city could assign a different standard to each corridor on the basis of factors such as

- the acceptable level of congestion within different parts of the city
- the design of the street itself (closely spaced signals tend to result in lower speeds)
- the speed limits of the facility.

Concurrency Analysis Using Corridor Approach. Whereas the Key Center LOS standard is applied to developments citywide, each corridor's LOS should be applied only to those developments that will affect that corridor. Therefore, jurisdictions must assign geographic areas of impact to each corridor. This can be done in one of two ways. In the simplest approach, all corridors within a defined distance of a development (e.g., within 2 miles of a development) are assumed to be affected by that development. In the second approach, four-step planning models are used to determine which geographic areas are likely to generate trips that use each specific corridor. Using technical capabilities available with four-step models, it is possible to determine traffic analysis zones (TAZs) that include the majority of trips along each corridor.²² Using either approach, a proposed development at a single geographic location will likely affect more than one corridor. So, for example, a development in Location A of Figure 6 might affect the corridors of NE 8th Street, 148th Avenue, and possibly 156th Avenue.

After the corridor's geographic area of impact has been identified, the concurrency analysis would be conducted using either the "new trips allowed" or "development-by-development" approach. A development's concurrency would be tested for each corridor affected by that development, and the development would have to pass the concurrency test on each corridor to move forward.

The "new trips allowed" method holds a lot of promise for the Corridor approach and was described in detail in the Key Center section. "Allowable trips" would be computed for each corridor and would be applicable to the groups of TAZs associated with that corridor. This approach would require a substantial up-front planning effort but would greatly simplify the development review process. It would also provide an easy measure of allowable development within defined geographic zones that could be used to improve the predictability of the concurrency process for prospective developers.

The "development-by-development" approach, on the other hand, provides a detailed engineering analysis of the impacts of a specific development. This approach resembles existing concurrency practice that determines the change in v/c ratios for each proposed development. Using the "development-by-development" approach, jurisdictions would calculate the predicted LOS for each new development rather than just subtracting trips from the available pool. Such

²² This is called a selected link analysis.

an analysis would be considerably better at estimating the effects a development would have on travel times along a specific corridor because it would directly account for the specific location and trip making characteristics of that development, but it would also be far more resource-intensive and costly than the “new trips allowed” approach.

OPTION 3: REGIONAL MODE-SPLIT

The last measurement alternative provides a regional approach to concurrency. A regional system of concurrency would likely require changes in state law, but the Regional Mode-Split alternative is one model that warrants further investigation because it recognizes the inherent regional nature of transportation systems. Regional concurrency is still in an exploratory phase. Therefore, this section paints the Regional Mode-Split alternative with a broad brush, suggesting possibilities without getting mired in technical detail. Further investigations of the legal, political, and technical considerations are necessary before specific applications of the Regional Mode-Split alternative can be fleshed out.

The previous two measurement approaches—Enhanced V/C and Travel Time—base their definition of “transportation concurrency” on the performance of specific facilities. The regional approach replaces a facility performance calculation with a measure of how well a region (or sub-region) is achieving a selected transportation policy mandate.

The shift away from a facility-based system would remove concurrency’s current focus on localized trouble spots. While the public may react negatively to such an approach (“How can you permit development when my road is so congested?”), the regional focus could actually be a helpful change because many “local” problems are the result of regional traffic patterns that cannot be “fixed” at an individual jurisdiction level. Nonetheless, regional concurrency might lead to significant localized congestion problems because new developments would no longer be judged on the basis of their impact on local transportation facilities. Before adopting regional concurrency, jurisdictions would have to carefully consider residents’ willingness to give up a focus on local congestion to get a better-functioning regional system.

A regional system of concurrency could be pursued at a variety of jurisdictional levels, including a multi-county region, a single county region, or a sub-region (perhaps the Eastside) within a single county. In general, the larger the region, the more likely that the concurrency system would capture the effects of regional pass-through traffic. For example, if the Eastside alone pursued a regional concurrency system, it would likely be hindered by the inability to account for new trips coming from South King County.

Setting LOS Standards (Goals) Using Regional Mode-Split

Regional concurrency would require a regional decision-making body, such as the Puget Sound Regional Council (PSRC), to establish LOS standards based on joint transportation policy objectives. Unlike current LOS standards that establish the ceiling for allowable growth, regional LOS standards would set a transportation goal, requiring new developments to take steps to meet

that goal. To emphasize the aspirational nature of regional concurrency, this section refers to a “LOS goal” rather than an “LOS standard.”

This section recommends an LOS goal to reduce per capita vehicle miles traveled (VMT) through mode shift. For example, one regional LOS goal might be to increase the share of peak period, non-SOV trips by 2 percent within five years. Therefore, if the region’s current PM peak-period mode-split was 10 percent non-SOV trips, the region would remain concurrent if non-SOV mode-split was 12 percent within five years. After five years, a new LOS goal would be set by the region.

After setting a regional LOS goal, a regional coordinating entity would distribute mode shift requirements to the region’s jurisdictions. All jurisdictions could initially be assigned the same targets, but they could negotiate with one another to adjust the distributions on the basis of local realities. That is, one city could agree to help fund a neighboring city’s transit facility improvements in return for “credit” toward mode shifts that would occur as a result of those facilities. Because not all trips would be as easily shifted from SOV to non-SOV modes, it would make financial sense for cities to work together to fund the projects that would produce the greatest mode shifts.

Measurement Process

Local jurisdictions and the regional coordinating entity would need to periodically measure both the effects of specific developments on mode-split and the degree to which the region was meeting its overall LOS goal. The PSRC, or a similar agency, would be the most likely agency to monitor achievement of overall regional transportation goals. Funding for such an activity does not currently exist and would need to be earmarked from existing or new transportation funding sources. Monitoring of specific development performance would most likely be conducted by local jurisdictions. Developers and employers would be responsible for certifying the trip-making behavior for their developments and companies, and the jurisdictions would enforce an audit or compliance review process to ensure the accuracy of that certification process. Local and regional mode-split monitoring would likely require legislation to provide funding and regulatory authority.

Concurrency Analysis Using Regional Mode-Split

Although the LOS goal would be set regionally, each jurisdiction would adopt specific concurrency rules to ensure that it achieved its share of the mode-split goal. For example, a city might adopt a concurrency ordinance requiring that all new development must have a peak-period mode-split of at least 12 percent. Any new development that could not meet the mode-split would either be denied or would require supplemental mitigation.

As indicated above, an SOV-oriented development could still meet regional concurrency requirements if it mitigated its new SOV trips by funding projects that enabled the necessary mode shift elsewhere. The cost of that mitigation would be whatever was necessary to ensure the additional required mode shift took place somewhere in the region. For example, if the new development generated ten non-SOV trips and 90 SOV trips (10 percent) in the PM peak,

supplemental mitigation would be required to shift at least two more SOV trips to non-SOV modes to meet the Regional Mode-Split requirement. Importantly, because the level of analysis would be regional, the mode shift required for mitigation would not have to be located at the new development but instead could occur in some other location—even in some other jurisdiction.

For example, a developer might choose to fund a park-and-ride lot on the fringe of the metropolitan area that generated a significant mode shift to build single family residential housing in a location that could not be effectively served by transit. Thus, concurrency based on regional mode-split could provide jurisdictions with the ability to approve single family development (where called for in the comprehensive plan), yet it would also provide them with the ability to fund transit where transit was most likely to be used.

By allowing the developer to fund mode shift projects elsewhere in the region, developers could target their investments to the projects that were most cost effective and that would produce the largest number of non-SOV trips. It would also provide excellent financial incentives to build transit-friendly developments, as other builders might actually subsidize their construction as mitigation for SOV-oriented development. In fact, a Regional Mode-Split approach might create a “market” for transportation improvements and land-use designs that would encourage mode shift. A concurrency market for projects that would encourage mode shift would give private developers a vested interest in seeing that the region achieved its LOS goal.

Concurrency analysis using the Regional Mode-Split alternative would not be without its measurement challenges. A rough estimate of a proposed development’s mode-split could be created using four-step planning models. But there would be no guarantee that the estimates would be accurate. Therefore, the regional concurrency approach should include a monitoring requirement in the development permits. That is, developers would be responsible for demonstrating that their developments had indeed achieved the stated mode-split. Developments that did not meet their predicted mode-split would be charged some form of additional mitigation fee. Mode-split monitoring would be particularly important given the economic incentives built into this approach.

In addition to monitoring challenges, concurrency based on mode-shift would require significant research on the amount of “mode shift” credit to give developers for off-site mitigation projects. A transportation study could define the “worth” (in mode shift terms) of new facilities designed to increase transportation choices. Jurisdictions might also need to develop design parameters for the transportation facilities or programs that were eligible for mitigation credit. (For example, mitigation funding would have to go toward a multi-modal project that was already on a jurisdiction’s transportation improvement plan.) Or mitigation projects proposed by developers might be subject to a monitoring program to ensure that they achieved their stated objective, with additional mitigation fees due if the monitoring program showed that the desired mode shift did not occur.

CHAPTER 3: TIMING AND SCALE OF CONCURRENCY DETERMINATIONS

No matter what measurement alternative they select, jurisdictions must separately consider the timing of performance review and the geographic scale of concurrency analysis. Combined, these two factors can have a dramatic effect on the concurrency process. First, they affect the cost of the concurrency determination process. Second, they affect the role concurrency plays in implementing the land-use and transportation goals of the jurisdiction. Third, they affect the precision of the analytical results of the concurrency test (and the resulting sensitivity of the concurrency process as it nears key LOS boundary conditions). Fourth, they affect the ability to measure and understand the regional and inter-jurisdictional impacts of new development. Timing and scale considerations were discussed briefly in Chapter 2, but this chapter treats the options more completely.

TIMING OF TRANSPORTATION SYSTEM PERFORMANCE REVIEWS

To perform a concurrency review for new development, jurisdictions must have a baseline measurement of current roadway performance. These baselines are developed either by measuring actual roadway conditions or by using four-step modeling estimates that have been calibrated against previously collected data on actual roadway performance. Jurisdictions vary in the frequency with which they calculate the baseline. Our review of the available literature found two basic approaches. Some jurisdictions establish baseline levels of service only periodically (often annually), using the baseline to develop an “allowable trip pool” from which they make their concurrency determination. Alternatively, some jurisdictions estimate or measure the baseline in response to each development proposal, making a specific determination about the effect of that proposal on the roadway level of service. Both approaches can be applied to either the Enhanced V/C or Travel Time alternative, and they are described below.

Periodic Measurement of Roadway Performance and “New Trips Allowed” Concurrency Analysis

The “New Trips Allowed” approach to concurrency measurement requires jurisdictions to measure roadway performance on a periodic—yet regular—basis. From the results of that measurement, jurisdictions determine the number of new trips that can be added to the roadway before the LOS standards are exceeded. New development trips are subtracted from the available trips pool. Nationally, Maryland’s implementation of the Adequate Public Facilities Ordinance (APFO) is probably the best example of how periodic performance reviews provide a framework for ongoing development decisions. In Washington State, Renton is a good example of how the “New Trips Allowed” approach can be applied to concurrency analysis. While Renton uses the Travel Time alternative, the New Trips Allowed approach can easily be applied to traditional or Enhanced V/C processes.

The New Trips Allowed approach has a number of advantages over current practice. Perhaps the biggest advantage of this approach is that it significantly reduces the time and resources required to conduct each new development concurrency determination. Moreover, it allows cities to provide concurrency determinations quickly because they require only a brief comparison of the development's trip estimates with the available trip pools rather than a detailed four-step modeling analysis. The quick turnaround is likely to be welcomed by developers, as is the ability of developers to use available trip estimates as an early sizing guide for their development plans. In addition, the reduction in the resources required to perform concurrency analysis allows those resources to be re-allocated to other priority efforts within the jurisdiction.

An important step in the New Trips Allowed approach is the periodic reassessment of the existing level of service, comparing it with adopted LOS standards and recalibrating "available" trip estimates. The reassessment process accomplishes several functions simultaneously:

- It recalibrates the allowable development cap to reflect actual transportation system performance; this includes both correcting for performance differences that result from differences between where expected and actual development has taken place, and adjusting for changes in travel patterns that result from shifting demographic and economic trends.
- It allows the analysis tools used in the planning process (and the outcomes from that process) to reflect changes in planned transportation system infrastructure improvements.
- It allows the jurisdiction to consider whether LOS standards are set at the appropriate level or should be adjusted to reflect changing transportation expectations.

As noted above, the New Trips Allowed approach can be applied to Enhanced V/C or Travel Time LOS standards. Each alternative is discussed below.

Using Enhanced V/C LOS standards, the New Trips Allowed approach would involve the following steps:

1. Assessment of existing roadway level of service, either through field measurement or modeling estimates. The frequency of this determination would depend on how often the jurisdiction wanted to check trip estimates against actual performance, but annual measurement should be sufficient to develop and update trip pools.
2. Identification of "allowable trips" by comparing existing v/c conditions with LOS standards using four-step modeling analysis. Allowable trip determinations should be made for each intersection.
3. Development of a concurrency map that showed the number of trips available at each intersection.
4. Comparison of a new development's trip estimates with the available trips pool. If enough trips were available, the development would be "concurrent" and the trips would

be subtracted from the pool (provided the development met other requirements and was permitted). If insufficient trips were available, the development would be denied unless the city pursued concurrency mitigation or revision of LOS standards.

Step 4 would be repeated for each proposed development. Steps 1 through 3 would be repeated as determined by city policy (for example, annually, as in the case of Maryland's APFO).

There are no significant drawbacks to using New Trips Allowed concurrency analysis with Enhanced V/C measurement. In fact, the process would essentially mirror what takes place under the current development-by-development approach, but by saving and publishing the results of steps 1 through 3, it would reduce the resources required to perform the concurrency analysis.

Applying the New Trips Allowed approach to Travel Time LOS standards would involve essentially the same steps as the Enhanced V/C alternative. However, the available trips would be assigned to corridors rather than intersections. In addition, concurrency reviews made through subtraction of available corridor trips might be less accurate than development-by-development review because of inherent limitations in the four-step modeling process. Specifically, the model would be unable to predict beforehand precisely where along the corridor the new development would take place and, therefore, could not say where traffic would enter the corridor. Consequently, the model would be unable to predict with a high degree of accuracy the new development's actual effect on corridor travel times. As a result, available trip estimates might get out of sync with existing conditions, resulting in unexpected transportation performance. The uncertainty of trip estimates could be limited through more frequent reassessment of existing roadway level of service and recalibration of trip estimate models.

Development-by-Development Measurement and Concurrency Analysis

All four Eastside cities currently perform a detailed transportation impact study for each proposed development, using the study to judge the development's impacts against adopted LOS standards. Development-by-development LOS review and concurrency analysis determinations allow cities to start from current estimates of transportation system performance and forecast only those changes directly related to the proposed development. This approach can lead to excellent, site-specific predictions of transportation performance. It also allows the concurrency analyst to test a wide variety of "minor adjustments" to the transportation system to determine whether those adjustments would allow an otherwise "non-compliant" development to become "compliant." (For example, the analyst can test the effect on the predicted LOS of new signal timing plans or the addition of minor geometric improvements changes in lane striping.)

As a result of this added analytical capability, however, the Development-by-Development approach is more resource-intensive than the New Trips Allowed approach. The detailed analysis required for each proposal slows the process of development review and increases costs. In addition, from a developer's perspective, this approach is less predictable than the New Trips Allowed approach. Often it is only possible to estimate whether a development will be concurrent after considerable trip analysis. By contrast, the New Trips Allowed approach

would allow developers to make pre-application determinations of concurrency on the basis of available trip estimates.

The key benefit of the Development-by-Development approach is that it provides a more precise evaluation of the impacts of each specific development. The estimates are more precise because, unlike estimates from the New Trips Allowed approach, the jurisdiction knows the exact location and access characteristics of the new development. This is particularly important for improving the accuracy of travel time computations.

Summary

Periodically setting development limits in units of “allowable new trips” can reduce the cost of the concurrency review to the local jurisdiction. This savings comes at the cost of some loss in the precision of the estimates used to make the concurrency determination. But when making this trade-off, it is important to realize that all forecasts of travel behavior are at best “reasonable guesses” of transportation impacts, no matter what technique is used. Moreover, travel performance varies significantly from day –to day and over time because of factors that are not incorporated into modeling programs. Therefore, no technique can provide an “exact” prediction of transportation system performance as a result of a new development’s approval. In addition, both approaches use the same basic data sets and analytical procedures. Consequently, choosing between these two techniques is a matter of degree. The New Trips Allowed approach should require fewer resources but produce a somewhat less precise result than the Development-by-Development approach. Neither approach is “inexpensive.” And neither approach is “exact.”

GEOGRAPHIC SCALE OF ANALYSIS

A second consideration to be incorporated into the design of a city’s concurrency approach is the geographic scale of the analysis. There are several aspects of geographic scale that significantly affect the application of concurrency. In general, the smaller the geographic scale selected for analysis, the more detail that can be provided in the analysis and, in many respects, the more accurate the analysis. The larger the geographic framework selected for review, the more effectively the concurrency analysis can deal with issues such as regional traffic impacts and the effects of development across jurisdictional borders.

The problem is that the more detail that is provided and the wider the geographic scope of the analysis, the more expensive and time consuming the analysis, if for no other reason than that the required volume of data and number of mathematical calculations increase. In addition, larger geographic land areas are, by their nature, diverse in their land-use and transportation attributes. Therefore, it is far easier to design and apply LOS standards for more homogeneous geographic areas. Finally, most cities do not consider regional impacts in their review of development impacts and therefore are not interested in spending resources to gain insight into those impacts. Consequently, when a jurisdiction designs concurrency procedures, it needs to understand what it is trying to accomplish through concurrency and structure the analysis accordingly, setting the geographic scale used in the analysis to effectively meet those needs.

Currently, Bellevue, Kirkland, and Redmond divide concurrency analysis into zones, assigning different LOS standards on the basis of the land use of the zone. (Issaquah assigns LOS standards on the basis of the type of arterial.) These approaches work well for the current v/c-based approaches. However, as alternative modes of transportation are dealt with more directly, additional levels of geographic scale may need to be added to the analysis because non-automobile modes of travel are significantly more sensitive to geographic scale than are cars.

For example, if walking is to be considered as part of the transportation system, then a geographic scale compatible with pedestrian trips must be used within the concurrency analysis. This normally means the use of a much more detailed transportation network within a much smaller geographic zone system, since pedestrian trips are very sensitive to the distance that must be walked and take advantage of a variety of pathways. This level of detail is often more than is present in most four-step planning models. Yet without such detail, the effects of walking on mobility cannot be accurately estimated.

One alternative to using smaller zones is to apply geographic limitations within the LOS standard itself. The Location-Constrained approach to Enhanced V/C is an example of a geographically limited concurrency process. One figure used to describe the Location-Constrained approach is presented again as Figure 11. In this approach, proposed development projects would be eligible for the v/c level-of-service “enhancement benefit” only if they were within walking distance of the transit service for which that “benefit” was being given. As a result, the concurrency process would work at two levels: the zonal LOS standard, and “walking distance” to high quality transit service.

Similar geographic constraints exist for most non-auto modes. In general, to analyze the effectiveness of many alternative modes of travel, the concurrency analysis must look at smaller geographic areas and high levels of network detail. Unfortunately, these smaller zones and greater levels of network detail require more data and more complex analysis, and therefore, they tend to be more time consuming and expensive to undertake.

In general, simplification can be successfully achieved by creating small geographic zones that contain specific transportation system and land-use attributes (e.g., a mixed use, multi-modal center), and then selecting transportation system performance criteria tailored specifically to the land-use/transportation goals of that geographic area. This can be done through the policy process and is already done to a certain extent by three of the four cities participating in this study.

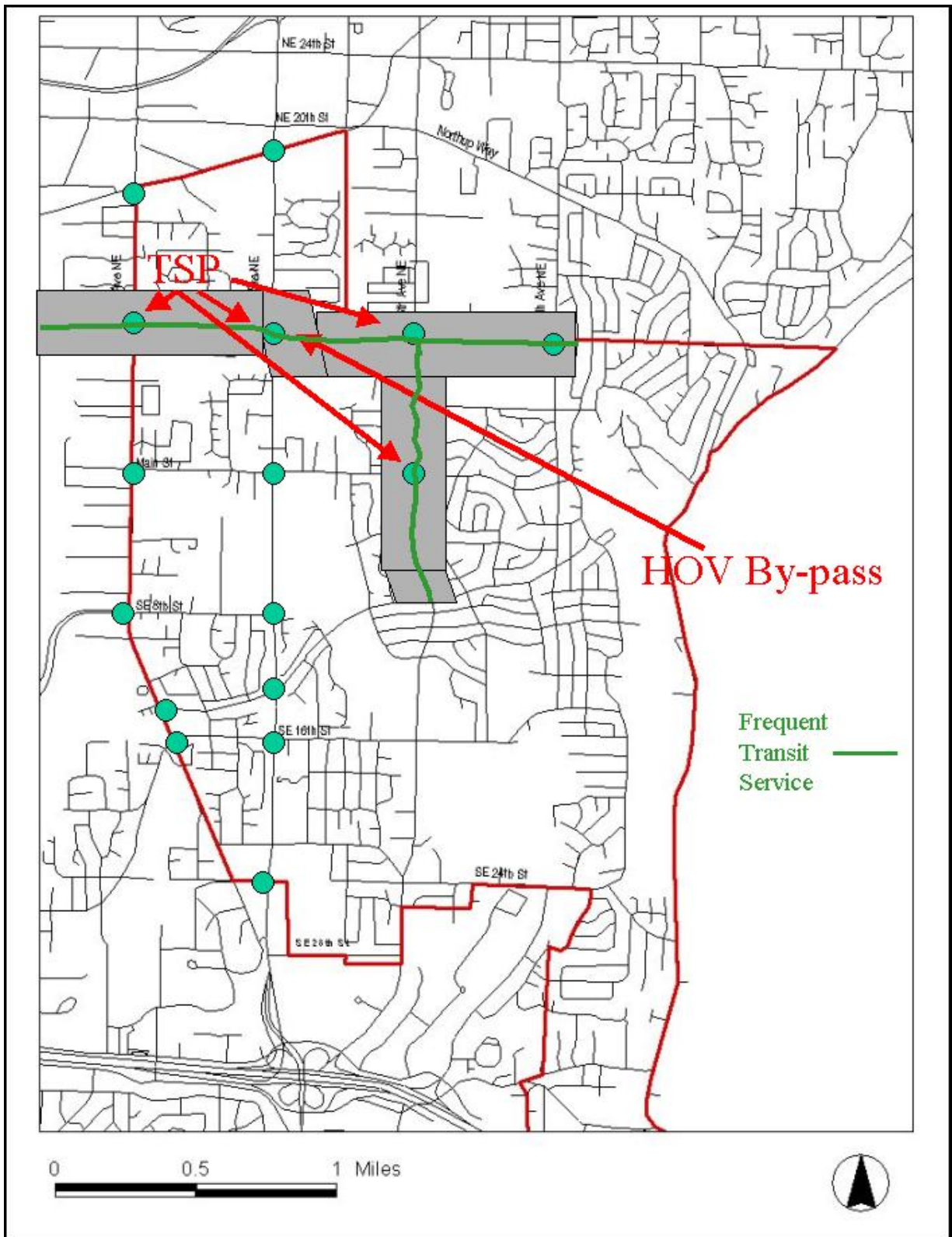


Figure 11: Geographic Area Served by High Quality Transit Service

Where alternative modes are not essential to mobility within a geographic area, smaller zones are not necessary. Consequently, to reduce the cost of collecting and maintaining the data needed to perform the concurrency analysis, geographic areas outside of these specific “multi-modal transportation districts”²³ should be analyzed as part of larger geographic zones, where concurrency performance standards are defined much more simply, usually in terms of roadway congestion. This combination of different geographic scales within the concurrency process would create a more complex process (some small complex zones and some large more simple zones, each using different level of service standards), but it would allow a more cost-effective approach to concurrency without sacrificing a city’s ability to use concurrency as a tool for promoting alternative transportation modes in the locations where they made sense.

As with selecting the appropriate performance statistics and level of service standards, correctly selecting the appropriate geographic scale (or scales) is dependent upon having a clear vision of the land-use/transportation outcome the concurrency process is intended to support.

²³ A “Multi-modal Transportation District” is Florida DOT’s term for small geographic areas where local jurisdictions want to emphasize, and obtain credit for, the mobility provided by the combination of effectively integrated land use and non-automobile transportation systems.

CHAPTER 4: COMPARISON OF ALTERNATIVE MEASUREMENT OPTIONS

The alternative approaches proposed in Chapter 2 are to varying degrees a departure from existing concurrency practice. This chapter explores whether the proposed alternatives would advance the participating cities' objectives. In particular, this chapter compares and contrasts the proposed alternatives with current practice, answering eight questions posed by the project's Executive Steering Committee and Technical Advisory Committee. The eight questions used for evaluation are as follows:

1. Is the alternative multi-modal?
2. Does the alternative enhance the link between land use and transportation?
3. Does the alternative address regional traffic and inter-jurisdictional transportation issues?
4. Is the alternative less resource-intensive than current practice?
5. Is the alternative easy to understand and credible?
6. Can the alternative adapt to land-use and transportation changes?
7. Are the concurrency results of the alternative predictable for developers?
8. Will concurrency violations be the exception, not rule, if this approach is adopted?

In addition to the above questions, this chapter considers two additional questions that have frequently surfaced during the project. Additional questions are as follows:

9. Does the alternative provide ways to fund non-roadway transportation improvements?
10. Can the alternative be adapted to support the widely varying goals of the four cities?

The following sections discuss the three alternative approaches (and their various implementation options) with regard to the above questions and provide a framework for jurisdictions considering revision of their transportation concurrency process. The first five questions are answered with individual evaluations of the three approaches. The last five questions are answered without addressing each approach individually because the Project Team discovered that the answer to the questions lay more with the design of the LOS standards than with the selection of a measurement approach. In addition to the written analysis, Table 6 is a matrix for evaluating the three alternatives and comparing them with one another.

Table 6: Criteria For Evaluating Alternative Approaches To Concurrency

	Multi-modal?	Enhance link between land use and transportation?	Address regional and inter-jurisdictional issues?	Less Resource intensive?	Easier to understand and more credible?²⁴	Adaptive to land use changes?	Predictable for developers?²⁵	Concurrency violations are the exception?²⁶
Enhanced V/C: Zonal and Intersection	3	3	1	1.5	2	2	2-4	N/A
Enhanced V/C: Location-Constrained	5	5	1	1	3	3	2-4	N/A
Travel Time: Key Center	1-3	3	1	1	3	2	2-4	N/A
Travel Time: Corridors	1-4	4	1	1	4	3	2-4	N/A
Regional Mode-Split	5	4	4	1	3	3	1-5	N/A
Current Procedures	1	3	1	2	2	2	2-4	N/A

Rated 1 to 5, where 1 = very poor and 5 = very good

²⁴ Defined as how easily the public can understand and respect the measure, as well as how well the public can understand and respect why a specific development decision was made.

²⁵ This depends in large part on exactly how the city sets up the entire concurrency process, not simply on the measurement system selected

²⁶ Whether concurrency violations occur is a function of the standards selected, not the measurement statistic used. Thus any one of these techniques could result in a system in which concurrency violations occurred frequently or infrequently. Whether they do or don't is simply a function of the levels of service each city allows to occur.

Table 6 (continued): Criteria for Evaluating Alternative Approaches to Concurrency

	Provide funding for non-roadway improvements?	Adaptable to the varying city goals?
Enhanced V/C: Zonal and Intersection	4	3
Enhanced V/C: Location-Constrained	4	4
Travel Time: Key Center	2-3	3
Travel Time: Corridors	2-3	3
Regional Mode-Split	5	3
Current Procedures	1	3

A word of caution is necessary, however. It is difficult to provide comprehensive evaluation of the proposed alternatives because each approach can be implemented in multiple ways and concurrency outcomes may change dramatically depending on how cities set their LOS standards. Moreover, the Project Team necessarily brings with it a certain set of assumptions (for example, that travel time easier for the public to understand than v/c) that may be not be shared by elected officials, city staff, and residents. The Project Team views this chapter as a beginning point for comparison, recognizing that the evaluation is by no means definitive. Each Eastside jurisdiction, guided by unique goals and values, will likely have a somewhat different perspective than the Project Team.

As the above example demonstrates, much of the concurrency challenge lies in setting LOS standards that will enable cities to pursue the land use and transportation visions laid out in their comprehensive plans. For example, though using essentially the same concurrency process, Kirkland never encounters concurrency failures whereas Issaquah frequently does. The key difference between Kirkland and Issaquah is not their measurement process but their LOS standards. Although each of the proposed alternatives has some advantages over current practice, those advantages may not prove helpful if LOS standards are not designed to advance the comprehensive plan. This chapter, therefore, is at times definitive and at time suggestive of how this study’s proposed alternatives would measure up against the ten questions. Where possible, this chapter addresses how changes to LOS standards would alter the effects of the alternative approaches.

IS THE ALTERNATIVE MULTI-MODAL?

All three alternative approaches incorporate multiple modes into the performance standard used for concurrency determinations, but two of the three alternatives incorporate multiple modes through policy rather than measurement decisions. Nonetheless, by incorporating multiple modes into the concurrency LOS standard, all three alternatives allow jurisdictions to include development of alternative transportation capacity (bus routes, shelters, TSP, walkways, and bike lanes) into concurrency mitigation packages.

Alternative 1: Enhanced V/C Ratio

The Enhanced V/C alternative increases LOS standards where alternative transportation choices are present. In its simplest form, the alternative provides for higher LOS standards on roadways with a certain threshold of transit service, but the alternative can also provide credit for other transportation options, such as HOV lanes, bike paths, and sidewalks. The LOS standards are based on a policy determination that transportation choices are part of a transportation system's capacity, even though they are not captured in the traditional v/c metric. In addition, the standards should be based on those services and facilities called for in the city's transportation plan and viewed as necessary for meeting the needs of the adopted land-use plan.

The Zonal, Intersection, and Location-Specific approaches to implementing the Enhanced V/C alternative all rely on policy-based LOS standards that account for non-SOV transportation choices. However, the Location-Specific approach provides additional multi-modal benefits by creating incentives to develop in locations where transportation choices exist. The Location-Specific approach restricts application of the higher LOS standard to locations that are near the multi-modal corridor and to projects that incorporate transit-friendly design. Thus, in areas where actual LOS was nearing baseline LOS standard, developers would have significant incentive to fit their development into the parameters of the higher LOS standard.

Alternative 2: Travel Time

The Travel Time alternative can be designed to be more or less multi-modal, depending on the number of modes incorporated into the LOS standard. For example, Renton uses a multi-modal LOS standard by calculating a weighted average of car, HOV, and transit travel times. Jurisdictions can alter the importance of multiple modes in setting Travel Time standards by changing the equation. Care should be taken when combining transit and automobile travel times because buses are inherently slower than cars. Thus, a straight average of the two modes' travel times will describe corridor performance as being slower than that experienced by motorists. A weighted average attempts to correct for the transit delay in Travel Time standards by adjusting for the inherent biases caused by transit stopping to pick up and drop off passengers. A Travel Time standard based on mode split accurately describes the "average" travel time experienced, but performance will appear to slow down if transit use increases relative to automobile use, even if actual travel times in the corridor have not changed.

Alternative 3: Regional Mode-Split

The Regional Mode-Split alternative measures concurrency on the basis of progress toward a defined, regional transportation goal. This report suggests a regional goal of reducing per capita vehicle miles traveled through transportation mode shift (from SOV to transit, carpool, bike, or feet).

Using this approach, a development's concurrency hinges on its ability to meet or exceed the Regional Mode-Split targets, either at the development site or through off-site mitigation.

DOES THE ALTERNATIVE ENHANCE THE LINK BETWEEN LAND USE AND TRANSPORTATION?

At heart, concurrency measures the coordination between a jurisdiction's land-use plan and its transportation system. A number of today's unwanted concurrency failures are the result of land use plans that call for levels of development far above what the transportation plan promises to provide. These unwanted concurrency failures²⁷ can be avoided, at least in part, if the LOS standards are designed as an explicit compromise between land-use and transportation goals. The extent to which each alternative provides opportunities for land-use and transportation coordination is explored below. However, beyond changes to LOS standards, increased coordination of land-use and transportation goals through changes to the measurement process would be modest for Enhanced V/C and Travel Time because each alternative essentially relies on the same analytical techniques that are currently used to measure transportation impacts. Regional Mode-Split, on the other hand, results in a more indirect linkage between land use and transportation. This system uses market forces to encourage land-use decisions that strengthen the opportunity to use alternative modes but does not necessarily create strong links at the local level.

Alternative 1: Enhanced V/C Ratio

The Enhanced V/C alternative provides jurisdictions with a way to incorporate land-use and transportation goals into the concurrency process by adding considerations other than roadway capacity into the LOS standard. In addition, because the elements that are included in Enhanced V/C LOS standards are set through policy, city leaders have the ability to design LOS standards that will advance their land-use and transportation plans. For example, if a city's comprehensive plan called for greater residential and mixed-use densities and increased transit service, the Enhanced V/C standard would encourage both by removing the concurrency barrier to development and providing incentives for investment in transit service.

²⁷ At times jurisdictions may want concurrency failures as a way to slow growth. For example, it seems that Issaquah is using concurrency failures, in part, to control growth until its land-use and transportation plans are in sync.

In addition, while Enhance V/C standards permit higher densities if transportation choices are present, the Location-Specific approach is designed to use concurrency to channel those densities and transportation choices to explicit geographic areas identified in the comprehensive plan. The approach is designed to identify, on the basis of available transportation system capacity, those land uses (and locations) that should be encouraged, as well as to highlight where development can and cannot be supported by the existing transportation system.

Alternative 2: Travel Time

Like Enhanced V/C, the ability for the Travel Time alternative to enhance coordination between land use and transportation lies in the design of the LOS standard. Depending on the land-use/transportation vision of the city, both the Key Center and Corridor approaches can be designed to advance the comprehensive plan. For example, Renton has chosen the Key Center approach because its comprehensive plan targets development and transportation improvements in the downtown. While the Key Center approach works for Renton, the Corridors approach may be more appropriate for other jurisdictions that wish to coordinate land use and transportation citywide. The Corridors approach would allow a city to use its planning models to carefully define which geographic areas would affect specific corridors. This would allow the concurrency review to focus on the land-use/transportation interactions of most significance and to base LOS standards on the development expectations of that area.

Alternative 3: Regional Mode-Split

The Regional Mode-Split concept approaches the transportation/land-use link very differently. Rather than tying transportation facility impacts directly to a given development, it encourages cities and developers to identify the land-use and transportation developments that will most effectively achieve the regional mode-split targets set by policy. If the alternative transportation incentives work as intended, the outcome should be reduction in SOV vehicle miles traveled and reinforcement of the land uses that support multi-modal transportation systems, but the directive comes from regional goals rather than local plans.

DOES THE ALTERNATIVE ADDRESS REGIONAL TRAFFIC AND INTER-JURISDICTIONAL ISSUES?

Regional pass-through traffic is a consistent impediment to concurrency. The GMA designed the concurrency requirement to focus on local land-use decisions and local transportation systems, yet the transportation system does not serve only local traffic. Every Eastside jurisdiction has felt the effects of regional traffic, though Issaquah and Bellevue may have experienced those effects most acutely. The existing, locally focused concurrency process is not designed to address regional pass-through traffic. Jurisdictions can exclude regional trips from their LOS calculations or raise the LOS standard high enough so that regional trips are effectively excluded from concurrency determinations, but this doesn't fix regional traffic problems; it just permits development at the expense of crowded roads.

Local concurrency measurement may not be the best place to try to fix regional traffic problems. Instead, the Eastside could work together through inter-jurisdictional agreements to fund transportation projects (e.g., a park & ride facility) that would remove trips from the regional network. Cities can also pursue inter-jurisdictional agreements such as BROTS and the Issaquah/King County Impact Fee-Sharing agreement to address traffic effects that affect nearby neighbors. Perhaps the most comprehensive approach would be an inter-jurisdictional effort to coordinate the land use and transportation visions of all jurisdictions on the Eastside and a commitment by each jurisdiction to achieve that regional vision.

Alternative 1: Enhanced V/C ratio

Inherently local, the Enhanced V/C ratio will not ameliorate the actual effects of regional traffic on Eastside roads, but by permitting higher LOS standards where transportation choices are present and encouraging development of alternative transportation choices, it may reduce regional traffic's contribution to concurrency failures. Also, if the Enhanced V/C alternative is successful in increasing transit capacity, regional car trips may shift to other modes, but this shift will likely require neighboring jurisdictions to coordinate their transit systems.

Alternative 2: Travel Time

The Travel Time alternative suffers from the same limitations as the Enhanced V/C approach. While neither alternative prohibits the expansion of concurrency analysis to more than one jurisdiction, they do not directly incorporate any specific inter-jurisdictional attributes. Expansion of the Travel Time approach to any corridor beyond an immediate neighboring jurisdiction is likely to result in a process that is both unwieldy analytically and very resource intensive.

Alternative 3: Regional Mode-Split

The Regional Mode-Split approach is designed to provide a mechanism to limit the effects of regional traffic and to encourage inter-jurisdictional cooperation. The approach steps back, looking at the transportation system regionally rather than as separate systems affected by regional traffic. Focusing on one system, the alternative would not work without a great deal of inter-jurisdictional cooperation. Cities would have to work together to determine where improvements should be made and how to best target resources to achieve regional goals.

IS THE ALTERNATIVE LESS RESOURCE-INTENSIVE THAN CURRENT PRACTICE?

All things being equal, the three alternatives would require an equal or greater level of effort and resources than the current process. However, all things need not be equal. As Chapter 3 described, jurisdictions can vary the timing, scope, and geographic scale of analysis to increase or decrease the level of detail and resources required for each alternative. In fact, by adopting any of the more multi-modal alternatives discussed in this report and by also changing to a yearly

analysis of “New Trips Allowed” rather than a “Development-by-Development” determination of concurrency, jurisdictions can increase the sophistication of their concurrency assessment while still seeing a net decrease in time and money required to comply with concurrency requirements. (See Chapter 3 for a complete discussion of options for the timing and scope of concurrency analysis.)

Alternative 1: Enhanced V/C Ratio

The Enhanced V/C concurrency analysis uses the same four-step model used in current concurrency practice, so aside from the additional effort required to design the new LOS standards, “Development-by-Development” concurrency analysis should require the same amount of effort as current practice. However, a change to “New Trips Allowed” analysis would significantly decrease the ongoing resources required for concurrency analysis. In most cases, the effort required to obtain and apply the “enhancements” would be marginal.

Alternative 2: Travel Time

Travel Time concurrency analysis also uses the same four-step model as current concurrency practice. As a result, it is possible to obtain estimates of travel time for corridors directly from these models at little or no addition cost above that for the current concurrency process. However, these travel time estimates are not terribly precise, and their accuracy suffers from the lack of network detail present in four-step traffic assignment models. “Better” travel time estimates can be obtain by using more detailed traffic models, but these models require more data inputs, as well as more staff and computing resources than are needed for the current v/c analysis efforts. However, even with the more detailed analysis, the resources required can be limited if cities adopt the “New Trips Allowed” approach.

Alternative 3: Regional Mode-Split

It is not clear, without considerable further study, whether the Regional Mode-Split approach would require an increase or decrease in resources. Because the approach does not study the ramifications of development on specific facilities, it is possible that a transportation concurrency review might require fewer resources. However, this approach would also require considerable inter-jurisdictional cooperation, which might demand more staff resources. In addition, technical work would be needed to define the “size” of mode shifts that would be achieved by proposed developer actions. Estimating the cost of that effort is beyond the scope of this project.

IS THE ALTERNATIVE EASY TO UNDERSTAND AND CREDIBLE?

Concurrency processes that are understandable and generally credible go hand in hand, which stems from the public’s ability to relate the LOS standards to their own experience. However, the three alternatives also provide numerous opportunities for cities to use visuals and other communication tools to increase the transparency of the concurrency process.

Alternative 1: Enhanced V/C Ratio

As an indicator of transportation performance, the v/c ratio is not easily equated to resident travel experience and doesn't represent a significant improvement over current practice. LOS standards aside, however, we believe that the concurrency process could be made easier to understand and more credible if jurisdictions used the "New Trips Allowed" approach to concurrency analysis. By using more effective visuals along with this approach, it would be possible to clearly indicate the size and location of allowable traffic volume growth in terms that were easily understood by the public. For example, the visuals would show where and how much new development could be absorbed before concurrency concerns were raised. The visual representation of concurrency could change public discussion from the use of engineering terms such as "v/c ratios" to "how many more cars the intersection can accommodate" and "whether sufficient transit service is present."

Alternative 2: Travel Time

LOS standards based on travel time rather than v/c ratios are easier for the public to understand because travel time is a performance measure that can easily be related to the public's transportation experience. In addition, the Corridor approach promotes LOS standards that explicitly link performance on a given corridor with the development that will take place near that corridor. Credibility is likely to flow from the Travel Time standard's clarity, particularly if the Travel Time standards are accompanied by concurrency maps that project the development that could take place while keeping within LOS standards.

Alternative 3: Regional Mode-Split

LOS standards aimed at mode shift, unlike travel time, are not immediately translatable into residents' travel experience, but residents will understand the policy goal: getting more people out of their cars. The concurrency determination, too, is relatively easy to understand, allowing development that meets mode-split targets through site design or mitigation.

The Regional Mode-Split alternative's credibility may suffer because of doubts about whether regional improvements and policy goals can really improve local traffic. This regional approach may actually suffer from exactly the opposite problem of the current procedures. That is, because it focuses on regional issues, problems occurring locally (and ignored by the regional process) may create an impression that the concurrency system "does not work." For example, it might be a hard to convince East Bellevue residents that additional housing should be permitted in their neighborhood because the developer built a park-and-ride in Issaquah, even though the park-and-ride might succeed not only in reducing total SOV mode-split but also in reducing regional traffic passing through east Bellevue.

IS THE ALTERNATIVE ADAPTABLE TO CHANGING LAND-USE AND TRANSPORTATION CONDITIONS?

For the most part, the answer to this question does not depend on which alternative a jurisdiction selects. Instead, it depends almost entirely on the flexibility of the jurisdiction's LOS standard or the jurisdiction's willingness to change the LOS standard on the basis of new conditions. In all likelihood, no matter what the measurement system, the LOS standard will need to be revisited on occasion to accommodate changing conditions and comprehensive plan goals.

Where LOS standards enhance the link between land use and transportation, revision of the concurrency process will likely be needed less often. But regional traffic (unless it's accounted for in the LOS standard) always has the potential to create concurrency problems and to affect the system's ability to enhance the land-use and transportation connection. In addition, the Regional Mode-Split alternative is less likely to adapt to changing local conditions, though it does account for regional traffic.

ARE THE CONCURRENCY RESULTS PREDICTABLE FOR DEVELOPERS?

Like the above question, the predictability of each alternative rests more with the system of implementation than with the measurement approach itself. Therefore, all of the proposed alternatives could be developed in ways that were predictable or unpredictable.

For example, the "New Trips Allowed" approach (whether using Enhanced V/C or Travel Time LOS) would be highly predictable because developers could quickly determine the development capability of various areas throughout the jurisdiction. By contrast, a system of negotiated concurrency would be less predictable for developers (though it might have benefits for jurisdictions) because concurrency would depend less on "black and white" standards than on how transportation impacts could be mitigated. However, developers might be willing to accept increased uncertainty in exchange for less likelihood of concurrency failure. In addition, if the city worked to carefully describe the types of concurrency mitigation desired and the conditions under which mitigation would be required, developers would gain considerable insight into the eventual costs of the required mitigation, even though the final "mitigation plan" (and thus the cost to the developer) would be subject to negotiation. While developer predictability is a laudable goal, the objectives of concurrency may be best achieved through a process that is more flexible and, thus contains a little unpredictability.

ARE CONCURRENCY VIOLATIONS THE EXCEPTION AND NOT THE RULE?

Once again, the answer to this question lies in the design of the LOS standards, not in the measurement process. This fact is readily apparent by looking at the frequently cited differences between Kirkland's and Issaquah's existing concurrency systems. Kirkland has set LOS standards to effectively eliminate all concurrency violations, whereas Issaquah has set LOS standards that have resulted in what amounts to a building moratorium.

No matter what the measure, concurrency failures are hard to avoid where adopted land-use goals require LOS standards that are higher (thus allowing more congestion) than local residents are willing to accept, especially when those same residents resist the expansion of transportation facilities. Of the proposed alternatives, only the Regional Mode-Split alternative divorces the LOS standards from local congestion preferences. But the alternative's trade-off of local benefits for regional benefits may decrease its credibility as a realistic check on growth.

DOES THE ALTERNATIVE PROVIDE WAYS TO FUND NON-ROADWAY IMPROVEMENTS?

The GMA concurrency requirements permit mitigation to avoid concurrency failure, but that mitigation must lower the existing level of service below the LOS standard. Therefore, although the concurrency legislation permits a wide range of mitigation efforts, jurisdictions can only require mitigation measures that will reduce impacts from the development that are measured in the LOS standard. The typical v/c LOS standard measures vehicle use and roadway capacity. Thus, mitigation efforts are restricted to measures that reduce vehicle use or increase roadway capacity.

All of the proposed alternatives incorporate more than vehicles into the LOS standard, including measures of transit and other transportation choices. In so doing, each alternative opens the door to mitigation measures that are not roadway-based. For example, using the Enhanced V/C alternative, developers could become eligible for a higher LOS standard if they increased transit service along a specific corridor or provided bus shelters (assuming that the availability of bus shelters was written into the "enhanced LOS"). Using the Travel Time alternative, developers could provide TSP facilities along a corridor to increase transit travel times, thereby lowering the corridor's multi-modal average travel time. Using the Regional Mode-Split alternative, developers could offer on-site TDM programs to decrease the SOV mode-split, or they could contribute to a park-and-ride lot that would capture SOV drivers from the region's fringe. These non-roadway mitigation efforts could also be enhanced by implementing the system of negotiated concurrency described in Chapter 2.

CAN THE ALTERNATIVE BE ADAPTED TO SUPPORT THE WIDELY VARYING GOALS OF THE FOUR EASTSIDE CITIES?

Like most measurement systems, the proposed alternatives can all be adapted to emphasize the land-use, transportation, and concurrency goals of each jurisdiction. In fact, in many respects adapting the alternatives to meet the cities' comprehensive plan goals is the most important part of the concurrency process. We struggled with which adaptation of the alternatives to use as the "example cases," knowing that each alternative could be used in vastly different ways. For the most part, we chose land-use, transportation, and concurrency goals designed to encourage transportation choice, including placing a premium on transit service and transit-friendly development. We then adopted example LOS standards that

- encourage development only in places where good transit service already exists

- allow development only when that development is “transit-friendly”
- allow development only when either the design or mitigation incorporated into the development proposal ensures that mode shift will occur.

However, these goals may not be the ones desired by each Eastside jurisdiction, and they are definitely not required by the proposed alternatives. These same basic techniques could be used to encourage land-use and transportation systems that were pedestrian-friendly, multi-modal, or car-oriented.

In fact, in large cities, different measurement statistics can be applied to each “zone” of the city, depending on nature of the transportation system that is needed to serve that zone. Currently, LOS standards change from zone to zone, but they all rely on the same measurement statistic. However, most cities have varying land-use and transportation goals throughout the city, and those goals may be best served by varying measurement statistics. For example, an appropriate concurrency standard in a downtown core area (Bellevue, Kirkland, or Redmond) might include three different modal attributes (cars, transit, and pedestrians) because all three modes were important for mobility within such an area. On the other hand, a concurrency standard in a zone that contained primarily single-family residential units might include statistics for only one or two modes (e.g., cars, or cars and bikes.)

All of the alternative approaches discussed in this report will allow this flexibility. The real key to selecting any one of them, as well as the actual measurement statistics and LOS standards, is *understanding what transportation system is needed to support a specific land-use vision*. With this understanding, jurisdictions should design concurrency programs that enable them to incrementally develop the necessary transportation system.

CHAPTER 5: FUNDING AND REGIONAL CONSIDERATIONS

There are many dimensions to transportation concurrency, ranging from the technical to the more conceptual and policy-oriented. In this chapter we focus on the latter, outlining several directions that local and regional stakeholders could pursue to advance the goal of accommodating new growth and development while improving quality of life and transportation service. These directions include using roads less, funding transit more, and acting inter-jurisdictionally. Each of these broad directions would mean changes in individual attitudes and behaviors, as well as institutional frameworks and financing. None by themselves will change travel behavior or urban form, but Anthony Downs' admonition in *Stuck in Traffic* applies: it takes a thousand chops of the woodsman's axe to fell the tree. Therefore, we present them as a roadmap for discussion and debate now, hoping for action in the short- to mid-term future.

USING ROADS LESS

The most significant variable in analyzing the transportation concurrency equation is roadway capacity. As this report has demonstrated, the options are very simple: *increase* road capacity, *maximize existing* road capacity, or *use less* of it. In our discussion and illustrations of Enhanced V/C we explored increasing the use of existing road capacity by promoting ways to increase the number of people in each vehicle. Here we use similar ideas to explore using roads less. The person throughput of a given roadway not only increases with more HOV traffic, congestion is reduced if fewer SOVs are on the road. Experience over the past few years offers proof of this. Traffic counts on Puget Sound freeways peaked during the economic boom of the late 1990s and have declined along with the economy over the last two years, resulting in less traffic. Recessions are certainly not the best way to reduce traffic congestion in order to remain within concurrency LOS limits. Rewards and pricing could work better.

Rewards

At present there are no rewards for reducing SOV driving and no targets for helping residents know when they are doing a good job of solving either the congestion problem or the halt of new development because of LOS caps. On the contrary, when we build auto-oriented development and front-load the cost of driving by charging up-front for the car, licensing, and insurance but not for ongoing road use, it is only rational that drivers choose to drive more miles in order to maximize their investment, as each additional mile traveled costs less. However, each city, county, or collection of counties through PSRC could establish a vehicle miles traveled (VMT) reduction target for individual car drivers to meet. As an example, let's say that each car driver is asked to reduce annual VMT by 10 percent. Actual miles traveled would be documented during annual vehicle inspections. Drivers reducing VMTs by 10 percent from the previous year would be entered in a lottery drawing with a chance to win prizes from \$1000 to \$10,000 or more. These funds would come from a variety of sources, including developer agreement contributions and related supplemental mitigation funds at the local jurisdiction level, and MPO-controlled funds at the regional level.

Would such a monetary incentive work? What would the size of the award need to be? Would it be politically acceptable to divert funds that could go to road improvements or transit services to individual motorists? Would overall VMT reduction translate into lower v/c readings during peak hour periods? A demonstration program would need to carefully address these kinds of questions during project design and subsequently during its monitoring phase. A local reward/VMT reduction program could be popular with developers if it proved successful because it could reduce expensive requirements to construct road lanes, overpasses, and intersections.²⁸

Pricing

The Puget Sound region currently has a transportation pricing system; it is based on congestion, paid in time through hours spent waiting in peak hour traffic. More explicit pricing regimes are in place in Norway and England and closer to home in New York and California, where motorists make decisions about road use on the basis of a monetary price. The PSRC is conducting a transportation pricing prototype project that is now under design. Charging motorists variable prices to enter cordoned areas or congested roadway segments is technologically feasible and, from an economic perspective, desirable. Politically, it is a difficult sell in a western state with a pension for 'free' roads. Yet variably priced tollways in conjunction with un-tolled alternative roads have proven successful in southern California. Transportation pricing offers a tangible way to not exceed established LOS through an adjustment of rates to keep congestion at the desired level.

FUNDING TRANSIT MORE

An obvious addition to existing concurrency measurement methods is the consideration of alternative transportation choices in the calculation of transportation system capacity. One of the principle benefits of such an approach is that jurisdictions can increase the performance of their transportation system by adding transit capacity (or other alternative transportation choices) rather than an additional lane. However, under current law, county and regional transit authorities, not local governments, control transit service. Specific to the Eastside, Metro and Sound Transit are responsible for planning, routing, and operating transit service. Local governments have little certainty, absent an interagency agreement, that the transit service they might rely on now to approve the development will exist in three, five, or ten years. The likelihood of dramatic decreases in transit service is unknown, but nonetheless, establishing LOS standards that incorporate transit service into the jurisdiction's transportation capacity reduces that jurisdiction's ability to predict capacity over the long term. As a result, cities often find it easier to fund roadway expansion projects rather than transportation services. While the preference for certainty is understandable, this section explores ways cities can increase permanence of transit service by funding it.

²⁸ This approach is adapted from a municipal recycling program. The challenge was how to enforce residential garbage recycling. The answer was to have a single city employee randomly check homeowners' curbside waste stream. If trash was properly separated, the 'enforcement officer' gave the homeowner a check for hundreds of dollars.

The arguments against bus transit are that it is expensive to operate, few people ride it, cities do not control routes and operations, and (because neither its route nor funding is fixed) it is not permanent. The arguments for bus transit are that it enables large numbers of people to get in and out of compactly developed centers efficiently and with minimal environmental impacts, it can keep congestion below LOS standards, and it offers an alternative to costly and politically divisive new road building.

Paying for Transit

Transportation concurrency developer agreements can pay for transit service. Cities can underwrite existing or new Metro routes or contract with third parties such as transportation management associations (TMA) to operate HOV service. Metro bus service is expensive—approximately \$75 per hour, and fare box recovery is only 20percent—but cities and employers can work jointly with Metro to share the cost of new route development and use Flexpasses to add new classes of riders. Cities can impose parking charges on SOVs that can be used to fund new transit alternatives. Redmond dedicates a per employee tax to transportation demand management (TDM) and HOV measures, funding TMAs and Metro Transit bus services. Major employers such as Microsoft and Weyerhaeuser have worked with Metro Transit Development to underwrite new bus and HOV service for its employees. At least one residential development, Overlake Village in Redmond, offers Flexpasses to its tenants.

Each of these examples illustrates existing mechanisms in use that pay for transit service. Developer agreements can be negotiated to define specific amounts of funding (per employee/resident) to be contributed to a local TMA. The TMA can use funds for an array of TDM measures ranging from education campaigns, to vanpool provision, to transit service contributions. TMA funds are not subject to six-year expenditure requirements that cities must meet. Developer agreements, which can include implementation schemes like the TMA examples described above, are an excellent way to generate and manage funds to help support alternative transportation services, while at the same time providing land owners and tenants with incentives to fund effective TDM actions.

Transit-Friendly Land Use

Cities control their land uses, densities, and to some extent, the location of future development. The application of Smart Growth principles of compact, transit-friendly development makes the use of existing and the provision of new transit routes more viable, as it results in increased transit ridership. Continuing low density, land intensive development patterns makes transit less viable. Coordinating land development decisions with transit agency service plans can result in ensured levels of transit service for geographic areas with transit-friendly development zones and can be the most cost effective means of increasing ridership for transit agencies. Bellevue and Metro Transit negotiated an agreement approximately 20 years ago regarding the development of its downtown. As the downtown achieved its density goals, Metro would add transit service. Today the downtown Bellevue Transit Center is one of the county's key hubs, with service every 15 minutes to downtown Seattle, the University District, and Eastside locations. Transit ridership and mode-split are now higher to downtown Bellevue

than any other Eastside location. As Kirkland seeks regional center designation for Totem Lake, similar land-use decisions could link compact, mixed-use development with new bus routes.

Route Permanence

Rail transit offers long-term certainty about station location. Bus transit is flexible, and routes can be changed, thereby reducing the certainty that bus routes can be counted on to mitigate the traffic congestion impacts of new development. While this is undeniably the case in principle, a closer look in practice may shift views on the likelihood and progression of bus route permanence. Metro Transit's current six-year service plan adds 40 percent of new service hours to the east and south county and only 20 percent to the city of Seattle. The six-year plan also identifies a *core network* of routes, which are essentially permanent routes. City land-use decisions that direct development to transit-friendly locations will use the new service hours and reinforce the strength of bus routes that are currently, or that could become, core routes. An analysis of basic routes in urbanized areas shows little change in routing over generations. Therefore, the period of vulnerability is when new routes start. If developments are delayed, poorly designed to support transit, or not associated with other transit-friendly land uses, and if ridership projections are unmet, Metro will drop routes without ongoing subsidies from local jurisdictions.

Effectively designed and integrated, transit-friendly land uses and direct financial support can be used to influence and control the placement of transit service. Yet there are limits to the amount of additional transit service that will be added in the foreseeable future. Therefore, the Eastside cities must be strategic about the number of new bus route corridors they initiate, bring to scale, and underwrite and partner with private developers and Metro or Sound Transit. It is also clear that the combination of well designed land use and local financial assistance provides a win/win situation for both local jurisdictions and transit agencies when it comes to route selection and service provision. Transit agencies therefore have significant incentive to cooperate with local plans that are designed to support transit, as the transit agencies will obtain greater ridership at lower per passenger costs by providing transit service in corridors or urban centers. The use of concurrency in such a strategic fashion could actually provide local jurisdictions with a large measure of control over transit route selection and levels of service. The period of subsidy could be many years but could still amount to less expense than road-widening or denying development. This could make the bus transit option more popular for developers and neighbors alike.

ACTING INTER-JURISDICTIONALLY

We have already discussed at least one form of cooperation amongst jurisdictions—the routing and funding of bus transit service between a city and the county. But there are additional possibilities that could bring advantage to the four Eastside cities. Before going further, it is important to acknowledge that working together sounds easy, but is often very difficult, consuming much time and goodwill. There is nothing inherently beneficial about inter-jurisdictional cooperation except when it is in the mutual self-interest of all the parties. In its wisdom the GMA left each city and county to establish its own transportation concurrency LOS,

but after ten years of living under the act we can see that some activities, such as regional pass-through traffic, are beyond the control of any one jurisdiction. State law enables inter-jurisdictional cooperation. Redmond and Bellevue have developed the BROTS agreement dealing with land use in Overlake, an area that straddles city boundaries, and Issaquah and King County have an agreement to share impact fees at their boundaries. This kind of cooperation can offer advantages at the sub-regional and regional levels in implementing the land-use/transportation balance intended by transportation concurrency.

Developer Agreements

Developer agreements, as previously noted, have the advantages of solidifying commitments for ongoing transportation programs and proactively heading off concurrency failures. Rather than reacting to only those developments that fail concurrency, developer agreements build transportation services along the way, decreasing the likelihood of concurrency failures.

Redmond uses negotiated agreements with developers most intensively of the four cities. Presently, developers are asked to contribute to transportation improvements on a citywide list, although development impacts in any of the four cities could be sub-regional in nature. The existing system of negotiation stops at improvements within the city boundary, yet transit service, roadway, or non-motorized activity could just as well take place in neighboring cities. By more explicit inter-city coordination, developer agreements could mitigate transportation impacts that a given development might induce in more than one city or corridor.

Sub-regional Traffic

Presently, each city can look at the others as the generator of car traffic that tips local LOS over its limits. Each city has a different LOS standard. The four cities could create a *Transportation Benefit District* that would deal with issues of sub-regional significance. For example, the District could set standards and fund improvements to arterials of regional significance such as 148th Ave, a busy street carrying trips between various Microsoft campuses and three cities. Such a four-city compact could pool developer agreements or mitigation funds to underwrite bus transit routes that serve multiple cities over time. It could also be the initiator of a parking tax applied across all four cities, equalizing the political pain (and benefits).

Regional Traffic and VMT

As productive as four-city efforts are, they cannot deal with the scope of the population and traffic of the four-county Puget Sound region. Major interstate and state highways transect Kirkland, Redmond, Bellevue and Issaquah, and people travel from all over the region to visit families, shop at Bellevue Square, or work at Microsoft's campus. A metropolitan region-wide governance entity could set VMT reduction standards or mode-split targets and implement the kinds of mode-split credits or VMT reduction incentives described in this report. The PSRC, the four-county voluntary council and metropolitan planning organization, is an existing organization whose governing board could be encouraged by its members to assume this kind of

regional responsibility for developing and implementing regional approaches to transportation concurrency. The four Eastside cities could initiate the development of a regional VMT reduction program as a working agenda item within the PSRC. PSRC staff are not authorized to take the lead on such an initiative, but they would respond to the will of the membership and its policy board.

An alternative, perhaps longer-term, approach is the formulation of a metro regional government modeled after Portland Metro or the Twin Cities Metro Council. Both have taxing powers and authority to implement development and programs at the metropolitan region level.

APPENDIX A

A Brief Discussion of Nexus and Proportionality as It Relates to Concurrency

The “nexus” requirement was established in Nollan v. California Coastal Commission, 483 U.S. 825 (1987). In Nollan, the United States Supreme Court held that permit conditions must be sufficiently related to the government’s regulatory interests. The Court added the “proportionality” requirement in Dolan v. City of Tigard, 512 U.S. 374 (1994). In Dolan, the Court held that when governments impose permit conditions, there must be “rough proportionality” between the condition’s requirements and the impacts of the development.

Whenever local jurisdictions impose conditions on land use permits, they must be aware of constitutional limits, particularly the “nexus” and “proportionality” requirements of the Fifth Amendment’s takings clause. According to the U.S. Supreme Court, while local governments can place conditions on land use permits, the Constitution requires a “nexus” between the permit conditions and a legitimate regulatory interest. A “nexus” exists where the permit conditions are connected to and further the regulatory interest. Even if there is a “nexus” between the conditions and the regulatory interest, the Constitution also requires that the permit conditions be “roughly proportional” to the projected impacts of the land use development. “Proportionality” does not require a precise mathematical calculation, but jurisdictions “must make some sort of individualized determination that the required [condition] is related both in nature and extent to the impact of the proposed development.”

Concurrency mitigation requirements are conditions imposed on development permits to comply with the transportation concurrency requirements of the GMA, and thus “nexus” and “proportionality” considerations apply. To satisfy the nexus requirement, the conditions must further a legitimate regulatory interest. The U.S. Supreme Court in Dolan v. City of Tigard recognized that jurisdictions have a legitimate regulatory interest in mitigating traffic impacts and in providing adequate transportation facilities and services.¹ Therefore, conditions imposed through concurrency mitigation satisfy the “nexus” requirement if they directly further the jurisdiction’s legitimate transportation interests.

Once a “nexus” is established, jurisdictions must also consider whether there is “proportionality” between the permit conditions and the development impacts. The U.S. Supreme Court’s opinion in Dolan is helpful for concurrency mitigation because it provides a clear framework for meeting the proportionality requirement in the transportation context: Jurisdictions must demonstrate how the permit conditions will offset the traffic impacts of the new development.¹ The Court in Dolan does not appear to require that the *expense* (or burden) of the condition be proportional to the impacts of the development. Rather, it appears to require that the *improvements* gained through the condition be proportional to the impacts of the development.

Under current law, concurrency mitigation fits nicely within the proportionality framework set out in Dolan because the law requires that developers mitigate *only* those impacts that exceed the LOS standard.¹ In other words, concurrency mitigation cannot be used to obtain improvements below the LOS standard. Moreover, LOS standards provide a measure of the development’s impacts that are above the concurrency requirement. Therefore, there is a direct gauge between the required improvements and the impacts of the development. For example, if a proposed development exceeds the LOS standard by 15 trips, jurisdictions using concurrency mitigation could require a developer to fund ride-share vans that would remove 15 trips from the system. Provided that the jurisdiction could make some showing that the ride-share vans would actually remove trips from the transportation system—and thus offset the impacts of the proposed development—the conditions appear to satisfy Dolan’s “roughly proportional” requirement.

As constitutional requirements of land use regulation, the U.S. Supreme Court’s “nexus” and “proportionality” tests apply to all permit decisions, and Eastside jurisdictions should be aware of their requirements whenever they use mitigation to meet the GMA’s concurrency law. However, the Project Team believes that if concurrency mitigation requirements are imposed as provided in the GMA, the “nexus” and “proportionality” tests will almost always be met. Therefore, while they should always be a consideration, we conclude that “nexus” and “proportionality” are not serious concerns for jurisdictions wanting to pursue concurrency mitigation as provided for in the GMA.

APPENDIX B

Technical Memo 6: Concurrency Measurement Systems Recommended for Further Study

Completed: February 2003

PURPOSE

This memo suggests several transportation concurrency measurement approaches that we recommend for case study trial this spring. It also suggests criteria for selecting the geographic areas of the case studies. The suggestions outline below will be the topic of discussion at the upcoming ESC meeting on February 19, 2003. At that meeting, we hope to receive guidance on which concurrency alternatives and geographic areas to test.

BACKGROUND

In November 2002, the Project Team began the second phase of work on the Eastside Transportation Concurrency Project. We shifted our attention from the four Eastside cities' existing concurrency practices to possible alternatives that could be tested in case studies. We began identifying alternative programs and practices that might better align Growth Management Act transportation concurrency requirements with each city's goals for growth and transportation service. Specifically, we focused on level of service measures and transportation demand management (TDM) programs that could

- shift the focus of concurrency from road capacity to mobility,
- improve roadway performance, and
- increase access to transportation choices.

In the last three months we have looked at more than a dozen alternative concurrency approaches, including practices from nearby Puget Sound neighbors like Renton and recognized national leaders in growth management such as Maryland and Florida. To narrow the list of possibilities, we met with many of you in January asking once again what each city wants its transportation and land use futures to be and how it plans to get there. Our research and discussions with the ESC and TAC members has led us to recommend several measurement approaches and applications for case study consideration.

MEMO OUTLINE

This memo is divided into two parts. Part I provides a general overview of our suggestions and their potential applications. Part II explains each measure in more detail and suggests several variations for each approach. We expect to work with the TAC and

other city staff during the case studies to tailor these measures to the needs of each jurisdiction.

PART I

This section presents three transportation concurrency measurement approaches:

- enriched v/c measures (traditional v/c ratios adjusted for the availability of alternative modes of transportation);
- travel time measures (a combination of travel times and transit availability);
- vehicle miles traveled (VMT) reduction measures (a combination of coordination between land use and development plans and a VMT reduction target).

It also discusses several ways the three measures could be applied most effectively, through project-by-project analysis (enriched v/c measures) or area-wide or region-wide analysis (travel time and VMT reduction). Finally, the section suggests geographic, land use, and transportation system characteristics we believe should be represented in the case study areas.

Measurement Approaches

Almost all transportation in the eastside cities is roadway-based, and therefore the measurements must be focused on roadway travel. However, the goal of our suggested approaches is to create measures that encourage jurisdictions to use existing roadways more effectively. We believe these approaches link the land use and transportation elements of your comprehensive plans, in a way that makes it easier for developers and city staff to determine what types of development are permitted (even encouraged), where those developments are permitted to occur, and what transportation characteristics they should entail. We suggest three approaches:

- **Enriched Volume/Capacity (v/c):** Currently, all four jurisdictions use the facility-based measure of v/c, but none incorporate the availability of alternative transportation choices in their performance measurement system. By enriching the traditional v/c metric with information about transportation alternatives to SOV travel, this approach enables cities to make a policy decision to tolerate higher v/c ratios (and thus allow additional development) where significant transportation choices exist. For example, road segments where transit service exceeds a certain threshold (say 5 buses an hour during peak periods) would be eligible for a pre-determined LOS adjustment based on their ability to move more people through the roadway segment. In addition, roadways that have transit service plus other transportation choices or improvements (say Transit Signal Priority, HOV lanes, bike lanes, under-used Park & Ride lots, etc.) could receive additional LOS credit. The availability of a LOS adjustment for transportation choices would provide an incentive for developers to locate projects in areas where transportation choices exist or to develop transportation choices in areas

currently ineligible for the adjustment as part of a concurrency mitigation package.

- **Travel Time:** Travel time is a performance measure as opposed to a capacity measure. In addition, travel time is a measure that is easier to relate to the travel experience of city residents than the current v/c measure. By setting LOS standards based on travel time, city staff and residents could ground LOS discussions in the experience of residents, and could have more frank discussions about desired levels of mobility. Under this approach, each city would set travel time standards for all transportation modes (SOV, HOV, transit, and possibly others) for key corridors, zones, and/or trips. Travel times would be measured periodically and the standard attained/maintained by a combination of project improvements, increased HOV use, or decreased new development. This approach could also combine travel time measures with transit availability, permitting more development where transportation choices exist. A combination of travel time and transit availability would build into the concurrency system incentives for developers to locate along transit corridors and to develop alternative transportation options.
- **VMT Reduction:** As traffic counts during this period of economic downturn demonstrate, if people drive marginally less, road congestion lessens. This approach has two parts. First, cities would identify areas of their jurisdictions that could develop without dramatically increasing peak-period VMT, and would target development to those areas. For example, the city would target development to areas that are not heavily SOV dependant. Second, the cities would set peak-period VMT reduction targets (at either the city, sub-region, or regional level) by which cities would judge concurrency. For example, the four cities may work together to maintain VMT at 2002 levels or commit to a 1% reduction in VMT each year. This approach moves the concurrency's focus away from local projects toward a recognition of the regional aspects of travel. It encourages a region-wide agreement on a target to reduce peak-period SOV travel, and allows cities to channel development into the areas where their comprehensive plans call for expanded transportation choices. Each jurisdiction would employ a variety of TDM, transit, non-motorized, or parking fee measures to attain the VMT reduction target. Periodic calculation of VMT levels would be used to determine if additional traffic control measures were needed or if development needed to be curtailed.

Applications

The three measurement approaches can be applied at varying geographic scales—intersections, corridors, zone, city, sub-region, or region. And, the concurrency decisions based on these approaches can be made at various times—during development approval, during yearly assessment of LOS standards, or during the creation of a concurrency plan. Each of the proposed measures can be modified to fit any scale and time, but we suspect the approaches fit most naturally with a particular scale and time. For example, enriched v/c likely works best if applied to intersections, corridors or zones, and judged on a

project-by-project basis. Travel time likely works best if applied to corridors or zones, and judged on a yearly basis. And, VMT reduction likely works best applied to sub-regions or regions, and judged on a yearly basis. Though we think these approaches work best at a particular scale and time, we recommend experimenting with approaches, scales, and times during the case studies to find the best fit for each approach.

These measures, especially travel time and VMT reduction, would be most effective if implemented through the creation of *transportation concurrency maps*. These maps combine information from the land use, transportation, and capital improvement elements of each city's comprehensive plan with concurrency measurement data (travel times, transit availability, etc.). Once compiled, these maps would visually display where development is encouraged by the comprehensive plan and allowed by concurrency. Drawing on examples in Maryland and New Jersey, the transportation concurrency map would show areas in green where development is encouraged and supported by adequate transportation options, areas in red where development is not permitted due to transportation constraints, and areas in yellow where development would need to be mitigated through developer agreements and adjustments to the available transportation options. The transportation concurrency map could be updated annually, to reflect the effects of transportation facility and service improvements.

Case Study Area Selection

We propose that the participating cities test one or more of the approaches in a range of different case study areas. The case studies should represent the following:

- Centers where uses are mixed, and density, infill, and transit are greater
- Peripheral development where lower density residential development prevails and collector/arterial dependence is greatest
- Corridors that link centers in different cities
- Areas of joint influence like Overlake where cities have to cooperate
- Areas of primarily office uses and areas of primarily retail activities

We would like each city and members of the TAC and ESC to recommend corridors, neighborhoods, centers, and zones that have these characteristics.

What We Hope to Learn from the Case Studies

- Do the approaches work with data that is readily available to city staff?
 - Do approaches work in at various geographic scales and with a variety of land uses?
 - Are they easily understood by professional staff, residents, developers?

- Will they require more or less staff time to implement?
- How do they balance future development with transportation options?

PART II

This section provides a more detailed description of the measurement approaches and highlights some possible variations under each approach. We plan to work with the TAC and other city staff to design approaches that will work best in each jurisdiction.

Measurement Approaches

1. Enriched V/C

This approach adjusts v/c LOS standards based on the availability of transportation choices. A frustration of existing enriched v/c measures, such as those used in Florida, is that it is difficult to predict the amount of capacity transportation choices add to a roadway. Our suggested approach avoids that problem by having cities make a policy decision (rather than a capacity decision) to tolerate more congestion if significant transportation choices exist. The concurrency requirement of the GMA allows such policy decisions in setting LOS standards, requiring only that cities determine the level of transportation service they need to support development. There are several variations on this simple approach.

Variation A: If concurrency zone has a specified level of transit (say 5 buses per hour on designated transit corridors), adjust the average v/c ratio permitted within that zone upward by some designated amount. For example:

Existing Permitted Zone LOS	LOS Permitted if transit-equipped	LOS if transit, plus HOV lanes, TSP, bike lanes etc.
0.95	1.05 (+0.1)	1.15 (+0.2)

Variation B: Instead of adjusting the entire zone v/c ratio upward, make the adjustments at the intersection level. Intersection adjustments allow cities to target their congestion tolerance to those specific areas that have transit options. The intersection adjustment would involve discounting a set amount from the actual intersection v/c to account for transit capacity. For example:

Actual intersection v/c	v/c if transit-equipped	v/c if transit equipped, plus HOV lanes, TSP, bike lanes, etc.
1.1	1.0 (-0.1)	0.9 (-0.2)

Under this option, the permissible zone LOS would remain the same, but specific intersections, if transit-equipped, would be allowed to exceed the “non-transit equipped”

LOS standard. (Again the size of the numerical benefit to v/c would be set by a policy decision, and only for those improvements that are part of the transportation plan, and that serve the needs of the desired levels of development.)

Variation C: This option would allow application of alternative B only to those developments that were near designated transit-equipped facilities. For example, the adjustment could be given to commercial developments within ¼ mile of a transit corridor and to residential developments within ¼ mile of a transit corridor or 1 mile from Park & Ride facility able to serve the development's residents. The benefit of this alternative is that it would provide an incentive for developers to build along transit corridors or to fund transit service so that a corridor fit the "transit-equipped" definition.

Variation D: This option would apply alternative B only to those developments where the four-step model projects that have a high percentage of the new trips generated (say 60%) will use the transit-equipped corridor. The benefit of this alternative is that it would provide an incentive for developers to build in areas with easy access to transit corridors or to fund transit service so that a corridor fit the "transit-equipped" definition.

2. Travel Time

This measurement approach would base the concurrency calculation on a combination of corridor travel times and transit availability. LOS standards would be set for each zone and would most likely be measured on a yearly basis. LOS standards would be determined by a two-step analysis:

Step One: Set Travel Times. Establish travel time standards for critical arterials in each zone, setting standards for different modes of travel including SOV, HOV and transit. Measure current travel times and project number of trips that could be added before travel time standards are exceeded. Based on analysis assign geographic areas a color designation based on compliance with the travel time standards:

- Green – meets travel time standards and projected development will not jeopardize compliance;
- Yellow – meets travel time standard but additional development will put compliance in jeopardy; or
- Red – does not meet travel time standards.

Step Two: Calculate Transportation Choices. Identify arterials where significant transportation choices exist, or will exist. The determination of a transit corridor should be based on the planned densities along the corridor and the planned amount of future transit service, rather than simply the existing amount of service. (This avoids a chicken-or-the-egg situation where transit providers are reluctant to provide extra service where demand does not yet exist but development isn't allowed because the transit service is not in place.) For example, transportation choice could be coded on the following basis:

- Basic Arterial – arterials that are SOV-oriented and do not provide many transportation choices.
- Transit-Equipped Arterial – arterials that have transit service of some set minimum level (for example, at least 5 buses an hour during peak periods.)
- Transit-Plus Arterial – arterials that have significant transit service as well as other alternative transportation capacity (such as TSP, HOV, bike lanes, Park & Ride facilities.)

Using this two-step framework, there are several variations on the travel time measurement approach. The variations are described below.

Variation A: Using a zone approach, jurisdictions would overlay a map of transit-coded arterials on a map of the travel time zones. Concurrency determinations and mitigation requirements would be based on the following criteria:

- *Green Zone, plus transit arterials:* Priority area for density development. Development may proceed.
- *Green Zone without transit arterials:* Development may proceed.
- *Yellow Zone, plus transit arterials:* Development may proceed if development agrees to X, Y, and Z pre-determined TDM requirements
- *Yellow Zone without transit arterials:* Development may proceed only if developer agrees pre-determined TDM requirements and to build transit capacity in the area. (They could choose from a list of available transit projects, such as installation of TSP or bus shelters.)
- *Red Zone, plus transit arterials:* Development may proceed only if developer agrees to build transit capacity or other roadway improvements.
- *Red Zone without transit arterials:* Development may not proceed.

Variation B: This variation expands the analysis done in Step Two. Instead of merely identifying transit corridors, Step Two would involve an analysis of the development location, concurrency goals, and transportation choices. The specific combination of these factors for a particular development, added to the color-coded travel time standards, would determine whether a development is concurrent, whether concurrency mitigation is required, or whether development may not proceed. (See Appendix A for a graphical demonstration of how Step Two of this variation would work.)

Under any option that predetermines mitigation requirements, the approach will need to address how to match the level of mitigation projects to the development size, so that a large office building is required to do more than an espresso cart and (somewhat

related) how to define the extent of a development's impact (e.g., what happens if a development is located at an intersection where two corridors cross).

Variation C: This variation uses the two-step analysis as first describe but takes a corridor approach. It targets the benefits of the transit arterial to the land immediately surrounding the arterial. Areas within ¼ mile of a transit-equipped or transit-plus arterial would bump up color zones, creating ½ mile development corridors surrounding transit capacity. Therefore, if a travel time zone were red, the transit corridors through that zone would be upgraded to yellow. Similarly, if the zone were yellow, the transit corridors through that zone would be upgraded to green.

3. VMT Reduction

This approach achieves concurrency by targeting development in areas that have transportation choices and by setting VMT reduction targets. This approach, like travel time, involves a two-step analysis. First, cities would identify areas in their jurisdictions that could develop without dramatically increasing peak-period VMT and target development to those areas. This involved combining the land use, transportation, and capital improvement elements of the comprehensive plan to create a picture of where development can happen in the city. Development areas could be expressed graphically through a green/yellow/red map similar to the one described under the travel time approach.

Second, the cities would set single occupancy vehicle VMT reduction targets for a geographic area. Targets, such as a 1% reduction of VMT each year, could be set for the city, sub-region or region. (In many respects, given the regional nature of traffic, a regional reduction target makes the most sense.) VMT for single occupancy vehicles would be measured through model outputs, although those outputs could be compared against ground count VMT estimates for current conditions. The basic concept is to set policy goals relating to acceptable levels of VMT. VMT targets recognize the regional realities of travel and attempt to implement programs to reduce VMT over a large area, rather than at a specific intersection. Targets also encourages a region-wide agreement to reduce peak period SOV travel, and allows cities to channel development into the areas predicted in their comprehensive plans to have transportation choices. Each jurisdiction would employ a variety of TDM, transit, non-motorized, or parking fee measures to attain the VMT reduction target. Periodic calculation of VMT levels would be used to determine if additional traffic control measures were needed or if development needed to be curtailed.

APPENDIX C

Technical Memo #5: Transportation Concurrency Literature Review¹

Completed: November 2002

1. LEVEL OF SERVICE DEFINITIONS AND MEASURES

Below is literature that addresses transportation Level of Service (LOS) and efforts to incorporate multiple modes of travel in calculating LOS.

- Draft Technical Memorandum for the Bellevue, Redmond, Kirkland and Issaquah Concurrency Study, Task 4c Literature Review, by Haliburton, Peter, and Paul Ryus of Kittleson & Associates, Inc.

This document reviews state-of-the-art methodologies being used or considered in Florida and elsewhere for including alternative travel modes — including transit, bicycle, and pedestrian travel — in the transportation concurrency process. The report also summarizes other ongoing work in Florida to implement transit concurrency, and descriptions of existing methodologies for analyzing alternative modes.

http://depts.washington.edu/trac/concurrency/pdf/lit_review.pdf

- Land Developer Participation in Providing for Bus Transit Facilities and Operations, by Hendricks, Sara J., and Cecilia Dyhouse of the Center for Urban Transportation Research, University of South Florida. March 2002.

This report overviews various non-regulatory and regulatory approaches for gaining private sector land developer contributions toward the provision of public bus transit capital facilities and the cost of operations. This report focuses on involvement by land developers in cases of new land development or redevelopment in which funding or other contributions was provided to public bus capital facilities or operations, under circumstances applicable to Florida localities.

<http://depts.washington.edu/trac/concurrency/pdf/hendricks.pdf>

- Transportation Service Standards – As if People Matter, by Ewing, R., Transportation Research Record 1400: 10-17.

This paper argues for a paradigm shift in performance measurements away from speed to personal mobility, accessibility, livability and sustainability, and it identifies and assesses alternative performance measures used around the United States.

¹ For complete report and links to article summaries, visit
http://depts.washington.edu/trac/concurrency/lit_review/lit_review.html

- Roadway Level of Service in an Era of Growth Management, by Ewing, R., Transportation Research Record 1364: 63-70.

This paper calls for fresh thinking about the ways roadway level of service is calculated and recommends the following innovations in the calculation: a) a simple regression method for estimating average travel speeds and, from them, arterial level of service; b) average levels of service to determine adequacy of facilities within travel corridors; and c) the 100th rather than 30th highest hourly traffic volumes as the basis for determining roadway level of service.

- Performance Standards for Growth Management, by Porter, D.R., PAS Report 461. APA Planning Press: Chicago, IL., ed. 1996.

The first five chapters of this report discuss the various performance measures, including those for transportation, that communities throughout the country have employed. The sixth chapter argues for moving beyond volume- and speed-based measures for transportation, and the last chapter discusses some of the key legal issues in performance standards and zoning.

- Assessing Level of Service Equally Across Modes, by Winters, P.L., C. Francis, E. Mierzejewski, and Lisa, T. White Paper. Prepared for Florida Department of Transportation by Center for Urban Transportation Research, College of Engineering, University of South Florida. December 2001.

The primary aim of this paper is to assess the need for developing an LOS system that can be assessed equally for motor vehicle, bicycle, pedestrian, and transit modes. This paper is motivated by the knowledge that current LOS classification schemes make total transportation system performance and multimodal tradeoff decisions difficult to evaluate. Hence there is a need to find a method for assessing level of service across modes in a way that is consistent, as well as easily interpretable.

<http://www11.myflorida.com/planning/systems/sm/los/pdfs/AssessingLOSFinal.pdf>

2. LAND USE – TRANSPORTATION CONNECTION

Below are described a couple of reviews of studies that deal with the connection between land use and transportation.

- Travel and the Built Environment: A Synthesis, by Ewing, R., and R. Cervero. Transportation Research Record, 1780: 87-114. 2001.

The authors review the literature to explore the effects of the built environment on key transportation outcome variables: trip frequency, trip length, mode choice, and composite measures of travel, vehicle miles traveled, and vehicle hours traveled.

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- Walk and Ride: Factors Influencing Pedestrian Access to Transit, by Cervero, R. Journal of Public Transportation, 3(4): 1-23. 2001.

By analyzing a) aggregate data from the San Francisco Bay Area and b) access trips to Washington Monorail services by residents of Montgomery County, Maryland, the author shows that urban design, particularly sidewalk provisions and street dimensions, significantly influences whether or not someone reaches a rail stop by foot. The article advocates conversion of park-and-ride lots into transit-oriented developments as a means of promoting walk-and-ride transit usage.

<http://www.cutr.eng.usf.edu/pubs/jpt3-4.htm>

3. INTER-JURISDICTIONAL COOPERATION

Both reports examining cooperation among local governments (counties, municipalities, and special districts) and inter-local agreements were reviewed. The emphasis here is not solely on transportation but on cooperation in general.

- Linking transportation and land use by fostering inter- jurisdictional cooperation: Enabling legislation in eight states, by Carlson, D., and S. King. Institute of Public Policy and Management, Graduate School of Public Affairs, University of Washington. 1998.

This reports highlights the lack of institutional mechanisms available for coordinating transportation and land-use authority at the local, regional, and state levels. It calls for practical multi-jurisdictional efforts at the regional and sub-regional levels to fill the void.

- King County and City of Seattle Transfer of Development Credit (TDC) program

Through an inter-local agreement between King County and the City of Seattle, this program allows property owners to sell the development potential from a site in rural King County and transfer the development credits to a site in the Denny Triangle Neighborhood in downtown Seattle. This program is one of the many that the county has developed with cities to promote denser urban development and preservation of rural land and open space.

Source: Turning Regional Visions into Real Results. Carlson, D., and E.L. Schroer. Project Report. Daniel J. Evans School of Public Affairs, University of Washington, Seattle. 2001.

<http://depts.washington.edu/visions>

- Mile High Compact, Denver Region, Colorado (Voluntary Coordination of Local Plans)

The Mile High Compact is a binding, inter-local agreement among 31 municipal and

county governments in the Denver region. It is a voluntary pact designed to implement Metro Vision 2020, the regional comprehensive plan. Signatory governments agree to explicitly link their comprehensive/master plans to Metro Vision 2020, which includes open space buffers between cities and a multi-modal transportation system.

Source: Turning Regional Visions into Real Results. Carlson, D., and E.L. Schroer. Project Report. Daniel J. Evans School of Public Affairs, University of Washington, Seattle. 2001.

<http://depts.washington.edu/visions>

More information about Mile High Compact is available at:

<http://www.metromayors.org/MHCompact.html>

- Transportation Capital Transition Agreement between City of Vancouver and Clark County

Under this inter-local agreement, responsibility for managing the county's Transportation Improvement Program (TIP) moves from the county to the city of Vancouver as areas are annexed. The city adopts and intends to implement the county's TIP. The city reserves the right to modify, create, and define design standards and parameters for projects or portions of projects with a local share provided by the city. Revenues for local match, public shares that were collected into the county's Road Fund, will now flow into the city's General Fund. The city assumes responsibility for the local share of all projects in the annexed areas after the date of annexation.

The city is to manage the Traffic Impact Fee (TIF) districts that are wholly or partially included within the annexing area. The county transfers to the city all fund balances in these TIF districts. For districts falling under both jurisdictions, a joint decision making process for project selection and prioritization is established. Existing road improvements and financing agreements entered into by the county will be assigned to the city, which will participate in and be signatory to any such agreements for projects falling within both jurisdictions.

The Inter-local Agreement can be reviewed at
<http://www.mrsc.org/Subjects/Planning/growth.aspx>

- Revenue Sharing Agreement Between Grant County and the City of Moses Lake (September 20, 1999)

Grant County and the city of Moses Lake reached a mediated agreement to provide for timely annexations by Moses Lake while protecting the financial viability of the Grant County Road fund. The agreement contains reimbursement formulas to help the county adjust to reduced road revenues. The city will reimburse the county at a decreasing rate over a six-year period, corresponding with the time frame of the county's capital improvement program. Separate formulas are established for resource-based and non-resource based property annexations. The agreement also addresses city-county cost sharing for maintenance costs on a specific road. The city will also reimburse the county for the locally funded portion of any capital investments made by the county within the unincorporated urban growth area at the time of annexation.

A copy of the complete agreement is available at <http://www.mrsc.org/govdocs/G76-revshare.aspx>

Source: http://www.mrsc.org/Site_Map.aspx

- Urban Growth Area Agreement: A component of the City of Walla Walla and Walla Walla County Comprehensive Plan Implementation Program

Walla Walla County and the city of Walla Walla have signed an agreement that establishes a framework to address fiscal impacts of the annexation of significant developed commercial and industrial properties. In the agreement, the city and county have established a formula that will compensate the county for lost revenue resulting from annexation and compensate the city for expenditures for services to the annexed area.

To view the complete agreement go to <http://www.mrsc.org/govdocs/W33-ugama.pdf>

- Snohomish County's Inter-local Agreements

The county enters into many inter-local agreements with local jurisdictions such as cities, special purpose districts, and state or federal departments. These agreements essentially list the details of responsibility and actions. They are reviewed by the County Council and executed by the County Executive. Specific agreements briefly described include Master Annexation Inter-local Agreements and Annexation-specific Inter-local Agreements

Source: <http://www.co.snohomish.wa.us/PDS/900-Planning/interlocals/default.asp>

4. CONCURRENCY AND ADEQUATE FACILITIES

Below are reports on Florida's concurrency program, Maryland's Adequate Facilities Provision Ordinance (AFPO), and the salient features of a model AFPO. (Note that there is some overlap in the material included in this section and Section 1, "Level of Service Definitions and Measures.")

- Florida's Transportation Concurrency: Are the current tools adequate to meet the need for coordinated land use and transportation planning?, by Steiner, R. University of Florida Journal of Law and Public Policy, 2001(Spring): 269-297.

This paper first reviews the history of Florida's transportation concurrency requirements, then discusses the process of implementing transportation concurrency. Finally, recommendations are made for improving the current system.

- Growth management and smart growth in Florida, by Nicholas, J.C., and R.L. Steiner. Wake Forest Law Review, 35(3): 645-670. 2000.

This article reviews Florida's growth management history from 1972 to the present

and also its transportation concurrency program. The review and recommendations about the transportation concurrency program are similar to those in the above article. In sum, the article argues for tying local comprehensive planning to budgeting because lack of funding has been suggested as a major factor in the failure of Florida's transportation concurrency system.

Article available through Lexis-Nexis

- Adequate Public Facilities Ordinances and Transportation Management, by White, S.M. PAS Report 465. APA Planning Press: Chicago, IL. 1996.

This report outlines the various aspects of Adequate Public Facility Ordinances (AFPO), including their history, the legal issues involved, and issues to be considered while designing such an ordinance. The report also outlines the AFPO of Montgomery County, Maryland; the concurrency system of Florida; and concurrency management regulations of Washington State.

- TDM Evaluation Model from FHWA

The TDM Evaluation Model is a software program that analyzes the vehicle-trip reduction effects of a wide range of travel demand management strategies. The TDM model has been widely applied throughout the U.S. to analyze transportation control measures or other TDM programs. The model can address the following TDM strategies:

- improved transit
- HOV lanes
- carpooling and vanpooling promotion
- telecommute and work hour strategies
- pricing and subsidies

http://www.fhwa.dot.gov/environment/cmaqeat/descriptions_tdm_evaluation_model

5. FUNDING MECHANISMS

Below are reviews of various innovative or regional funding mechanisms.

Also included are documents that look conceptually at some of the regional funding mechanisms and regional coordination models that might be relevant for the East Side Concurrency Study.

- Cases on External Funding Sources: Dedicated Local Taxes. Chapter IV (1) in Funding Strategies for Public Transportation (Part B). Transit Cooperative Research Program (TCRP) Report 31 Volume 2, pg: 29-54. National Academy Press: Washington D.C., 1998.

This chapter looks at the way local taxation has been used by Atlanta, Georgia, and Pullman, Washington, to fund their transit services.

- Transit Impact Development Fee: San Francisco Municipal Railway, San Francisco, California. Chapter IV (2) in Funding Strategies for Public Transportation (Part B). Transit Cooperative Research Program (TCRP) Report 31 Volume 2, pg: 55-66. National Academy Press: Washington D.C., 1998.

This chapter reviews the key feature of the ordinance authorizing San Francisco to collect a Transit Impact Development Fee (TIDF). The fee was designed to recover the operating subsidy and capital expansion costs of the San Francisco Municipal Railway (MUNI).

- Real Estate Transfer Taxes

Real estate transfer taxes rely on real estate transactions. Unlike impact fees that are generally based only on the value of new improvements, real estate transfer taxes are based on sales price, reflecting the value of both the land and the infrastructure improvements. Because real estate transfer taxes are not dependent on new development but rather on an active real estate market, revenues from real estate transfer taxes are more predictable than revenues from other financing schemes such as impact fees.

Source: <http://www.vapreservation.org/growth/pf.htm>

- San Jose, California: Real Estate Transfer Tax to Fund Facility Development

In 1972, San Jose adopted a real estate conveyance tax that assesses a value-added tax on every sale or transfer of real property in the city. Revenues from the tax are earmarked for the acquisition and development of parks, libraries, fire stations, and emergency services. Under the current allocation formula, a minimum of 48 percent of tax revenues must be spent on parks within the district, up to 16 percent may be expended on parks outside the district, and a maximum of 36 percent can be spent for specified non-park uses. The majority of San Jose's real estate transfer tax revenues are from developed property rather than from new development.

Source: <http://www.vapreservation.org/growth/sjcr1.htm>

- Boston, Massachusetts: Real Estate Transfer Taxes Linked to Public Facility Management

Boston instituted its affordable housing linkage policy in December 1983 with an amendment to its zoning code. Under Boston's housing linkage law, developers of large commercial projects are required either to build affordable housing or to contribute money to build such housing. The charge assessed to developers is calculated at \$5 for every square foot they develop over 100,000 square feet. By 1990, developers had committed to pay over \$76 million in housing linkage fees, with over \$28 million in linkage fees already committed to create over 2,900 housing units,

80 percent of which were targeted for low- and moderate-income residents.

Source: <http://www.vapreservation.org/growth/bmlr1.htm>

- Minneapolis-St. Paul, Minnesota: Regional Tax Base Sharing Used to Fund Public Facilities

The regional property tax sharing program within the seven-county Minneapolis-St. Paul metropolitan area was established by the Fiscal Disparities Act of 1971, and the state legislature implemented it in 1975. Under the Act's requirements, a local jurisdiction compares its commercial and industrial property values with its 1971 assessment for those properties. Forty percent of the increase over the 1971 assessment is put in a metropolitan pool, which is then redistributed according to each community's population and overall tax base. When the program began, Minneapolis and St. Paul were the major beneficiaries. Minneapolis is now a net contributor because of the successful redevelopment of its downtown, and St. Paul's redevelopment efforts have reduced its dominance of the recipient pool. Small communities are now the major beneficiaries of the program.

Source: <http://www.vapreservation.org/growth/mspm1.htm>

- Hackensack Meadowlands, New Jersey: Another Innovative Example of Regional Tax Base Sharing

In New Jersey's Hackensack Meadowlands, a regional commission controls development and apportions property tax revenue among fourteen municipalities. The tax-base sharing program is aimed at ensuring that those communities that contain valuable tidal wetlands do not suffer financially because wetlands can not be developed for business or industrial development. The 1972 Hackensack Meadowlands Development Commission and Redevelopment Act provides the legal basis for the tax-base sharing program. Each town's tax base as of 1970 is unaffected by the arrangement, and all the revenues from that tax base continue to go to the individual towns. Forty percent of the increase in the tax base over the 1970 valuation is subject to the tax-sharing program. Redistribution is based on the number of school children and the proportion of property the town has in the Meadowlands District. All new tax revenues are distributed among the fourteen towns, with no diversion of tax revenue to the regional commission.

Source: <http://www.vapreservation.org/growth/hmnj1.htm>

- Nelson Symposium on Florida's Growth Management Legislation, University of Florida Journal of Law and Public Policy. 2001 (Spring), Issue 2.

The eight articles and one commentary articles can be reached through Lexis-Nexis are as follows:

- The Ups and Downs of Growth Management in Florida, Nicholas, James C.

- Integrating Water Management and Land Use Planning: Uncovering the Missing Link in the Protection of Florida's Water Resources?. Angelo, Mary Jane
- Concurrency, Concurrency Alternatives, Infrastructure, Planning and Regional Solution Issues. Weaver, Ronald L.
- Florida's Transportation Concurrency: Are the Current Tools Adequate to Meet the Need for Coordinated Land Use and Transportation Planning?. Steiner, Ruth L, Ph.D.
- Restructuring Florida's Growth Management System: Alternative Approaches to Plan Implementation and Concurrency. Pelham, Thomas G.
- A Role for State Planning: Intergenerational Equity and Adaptive Management. Bosselman, Fred.
- Reforming Growth Management in the 21st Century: The Metropolitan Imperative. Porter, Douglas R.
- A Call to Revitalize the Heart of NEPA: The Alternatives Analysis. Wittorff, Kelly.
- CASE COMMENT: Commercial Speech: Mandatory Disclaimers in the Regulation of Misleading Attorney Advertising, Mason v. Florida Bar, 208 F.3d 952 (11th Cir. 2000). Borisov, Stacy.

APPENDIX D

Technical Memos #2 and #4 – The Concurrency Calculation Process: Current Procedures and Potential

Completed: November 2002

This report serves three functions. First, it meets the requirement for Technical Memorandum #2, a report on state, regional, and local concurrency systems and practices. Second, it fulfills the requirement for Technical Memorandum #4 on issues identification. Last, it presents an initial review of alternative approaches to changing or refining the concurrency practices currently used by some of the participating cities.

The first section of this report briefly describes how concurrency is calculated. The second section describes the limitations of those procedures and highlights important issues raised by project stakeholders that should be addressed in changes to the current system. The third section presents a preliminary review of alternatives that are being considered in the near term to replace or refine the current process. This specific list of alternatives was included in the original scope of work by the four cities. They are briefly analyzed for implementation in the near term. It is the project team's opinion that none of these solutions resolve the larger issues identified in the second section of this report. As a result, additional approaches to concurrency need to be considered by the four cities if they wish to resolve these issues. The fourth and final section of this report briefly identifies the primary subject areas that need further investigation if the project team is to develop functional alternatives to the current concurrency process that address the limitations identified in the second section of this report.

CURRENT CONCURRENCY PROCESS

This section describes how each city has implemented concurrency and how they approach its application. It summarizes their technical procedures, the standards they have adopted, and where concurrency fits into their planning process.

The four cities participating in this project use concurrency determination procedures that are similar in style and structure but that differ in technical execution. All four cities currently use a technical process that is driven by roadway level-of-service and that focuses primarily within local jurisdictional boundaries. (However, these boundaries can extend to neighboring jurisdictions when the development is located close to a border or causes obvious vehicle volume increases on roads in a neighboring jurisdiction.) Table 1 summarizes the concurrency procedures used by the four cities.

In all four cities, roadway level-of-service is computed as a function of roadway use (vehicle volume) and capacity. In addition, the level-of-service that is acceptable without violating the concurrency standard changes with geographic location within each city. Three of the four cities has adopted LOS standards that vary by geographic zone, with better levels-of-service required in some zones (usually residential areas) and more

congestion allowed in other zones (usually those that are heavily commercial). Issaquah's LOS standards vary by arterial street classification, rather than by zone.

All four cities use two different basic sets of procedures for computing roadway level-of-service for determining transportation concurrency. One method is based on classic four-step modeling, while the second is based on physical vehicle volume counts and predicted trip generation for given developments. In both cases, vehicle volumes (estimated or measured) are input into algorithms that essentially predict level-of-service.

These equations are taken from various editions of the Highway Capacity Manual and result in volume to capacity ratios (v/c) that are compared against standards adopted by the respective jurisdictions.

A brief description of these two types of procedures is presented below.

Four-Step Modeling

For longer term forecasts each of the four cities uses its four-step planning model to forecast traffic conditions. Inputs to the four-step model are current land uses (primarily households and employment); the current transportation system; forecast changes in households, employment, and transportation system improvements; and the fraction of trips made during the peak period. The modeling process computes trips generated (by mode), the approximate origins and destinations of those trips, and the transportation facilities they use. From this process, the model computes roadway link-specific vehicle volumes, which can be compared with roadway capacity to estimate roadway level of service. (Cities may also further manipulate these outputs (Bellevue is one) to better reflect specific turning movements, and to account for limitations in the road network detail maintained in the four step planning model roadway assignment.)

For predicting future conditions, the four-step model is calibrated against current conditions and then used to forecast changes in v/c ratios at roadway sections / intersections of interest. Model calibration is usually updated annually. Calibration is adjusted by refining model coefficients so that predicted roadway volumes match measured volumes for major facilities within the city. Three of the cities use the same basic four-step model (the BKR model), and jointly participate in the previously described annual update process, while Issaquah uses a slightly different model.

All four cities use forecast control totals and system level inputs that are provided and/or agreed to at the regional level through the Puget Sound Regional Council (PSRC). PSRC also provides each city with a common set of regional transportation system improvements for specific forecast years. Each city notifies PSRC of transportation system improvements occurring within its boundaries so that these improvements can be passed along to other jurisdictions. PSRC also participates as a technical peer reviewer in critiquing the BKR model during the annual update process.

It is important to realize that the modeling process is not sensitive to a wide variety of factors that affect mode choice or vehicle volumes. For example, because the fraction of trips

Table 1: Summary of Concurrency Procedures

City	Citywide Approach	Model Used	Project-Specific Approach	LOS Standard is Based On	Roadway Facility Type Used	Methodology	Time Period Used	Zonal v/c Standards Used?	Zonal v/c Ratios Accepted	Specific Facility Exemptions Allowed?	v/c Intersection Exceptions Allowed?	Multi-Modal?	Other
Redmond	Four-step model	BRK	ITE Trip Generation + Current Conditions	Roadway v/c	Intersection	Circ. 212	1 hour	Yes	0.85 – 0.95	Yes	Yes	Partly	$\frac{\text{Sum } v}{\text{Sum } c}$ not average of individual v/c
Kirkland	Four-step model	BRK	ITE Trip Generation + Current Conditions	Roadway v/c	Intersection	Cir. 212	1 hour	Yes	0.98 – 1.116	Yes	Yes	Partly	No intersection can exceed a v/c of 1.4
Issaquah	Four-step model	T-Model	ITE Trip Generation + Current Conditions	Roadway v/c	Mid-block screenlines	(segments)	1 hour	Yes	0.85 – 3.18 (no zonal standard, only segment specific)	Yes	Yes	Partly	Additional check for intersections exceeding baseline by more than 0.3 More direct incorporation of missing roadway features in computation of “c”
Bellevue	Four-step model	BRK	ITE Trip Generation + Current Conditions	Roadway v/c	Intersection	HCM	2 hour	Yes	0.80 – 0.95	Yes	Yes	Partly	No. of intersections allowed to exceed standard changes from zone to zone

taken during any given period is an input to the modeling effort, shifts in the time of day during which trips take place that are caused by congestion are not accounted for directly.

In addition, the BKR mode split model used by three of the jurisdictions applies traffic analysis zone-specific transit fares. This means that the effects of building or development-specific travel demand management actions, such as subsidizing transit passes for employees or differential SOV parking costs, can not be directly modeled.

To account for these types of model limitations, the cities rely on their annual model validation and the resulting adjustments to the model calibration.

Direct Measurement Plus Generated Trips

For concurrency calculations estimated in response to specific development proposals, each city directly measures current vehicle volumes and then adds vehicle volumes predicted for the proposed development to those conditions. “Predicted vehicle volumes” for a given development are usually computed with the ITE Trip Generation rates. ITE rates are often modified to reflect promised travel demand management efforts or other mitigating circumstances.

As a result, the exact size and timing of the vehicle volumes generated by a new development are often the subject of negotiation between city staff and the developer, as relatively little standardized guidance is available on the effect of the different travel demand management options available to a developer. For example, a company constructing a new building might state that its staff will be working four 10-hour shifts a week, rather than five 8-hour shifts, with shifts starting at 7:30 AM and ending at 6:00 PM. This would be grounds for reducing the number of “peak hour” trips generated by this development, since many of the work trips would occur before the morning peak hour and after the evening peak hour. Exactly how significant a reduction in “peak hour” trips such a proposal might be worth would be the subject of negotiation.

Differences in Concurrency Procedures

While all four cities use the basic analysis process described above, there are a number of technical, procedural, and conceptual differences in their respective concurrency procedures. These differences reflect the four cities’ different roadway conditions, their different levels of development, the roadway attributes they are trying to encourage, and the professional choices made by different staff charged with developing their respective concurrency systems.

All four sets of concurrency procedures are acceptable reflections of city-specific interpretations of how concurrency is meant to be used to help meet the development goals of each city.

Differences observed in the four approaches to level of service calculation include the following:

- the duration of the “peak period” examined
- the mechanism used to compute “capacity” on roadways

- the specific roadway attributes examined
- the specific mathematical equations/algorithms used to compute level of service
- the mechanism used to combine specific location level-of-service into a figure representative of the entire zone
- the v/c or LOS standards actually adopted
- exceptions allowed by the different cities to their basic v/c standards.

Peak Period Examined

Three of the four jurisdictions measure or predict vehicle volumes for a single PM peak hour to compute concurrency. At one time, Bellevue also used a 1-hour time period, but in 1998 it switched to using a 2-hour period. Use of a 2-hour period is appropriate where “rush hour” volumes are affected by significant peak spreading that results from capacity constrained regional roadways. Use of a 1-hour peak is generally a better assumption on facilities not subject to significant, extended peak period traffic volumes. (Where peak spreading is not significant, a 2-hour peak period is likely to result in a lower v/c ratio. This may or may not be an acceptable outcome of the analytical process. For example, the 2-hour period can be used to reflect a city council decision that considers short duration peak period traffic congestion an acceptable cost of development and considers congestion significant enough to limit development only when it persists for well over an hour.)

Calculation of Volume to Capacity Ratio

The actual calculation of the volume to capacity ratio also differs from city to city, in part because of the wide variety of factors that can be included in the determination of the capacity and volume estimates provided by both model output and measured ground counts. Basically, each city has selected a slightly different set of procedures to trade off simplicity (and thus smaller resource requirements) against the precision and accuracy of the results.

Among the factors that can affect the calculation of v/c ratios are

- the type of roadway segment selected for analysis
- the specific aspects of roadway geometry that are included in or excluded from the capacity calculation
- the duration of the period used in the calculation (1 hour or 2 hours)
- the expected variations in traffic volume during the time period being analyzed.

The four cities are all using professionally acceptable methods of measuring v/c, which itself is a well accepted mechanism for estimating roadway level-of-service. No one method of computing v/c is especially “better” than the others, particularly since all of the methods used are based on the same concept: that level of service can be predicted by the metric vehicle volume divided by roadway capacity.

Issaquah’s approach to concurrency differs somewhat from the other three jurisdictions in that it does not restrict itself to intersection locations for computing level-of-service. Instead, the city staff have identified a set of “critical links” (mid-block) for computing concurrency. This approach is certainly acceptable from a technical perspective and makes considerable sense, given the different characteristics of much of the roadway system and current land use in

Issaquah in comparison to the other three cities. A consequence of choosing mid-block locations for calculation is that Issaquah uses a different methodology for computing v/c than the other three cities.

In addition, during the project team's review of procedures, Issaquah was the only city that specifically discussed incorporating the presence or absence of minor geometric features (for example, sidewalks) in the calculation of facility capacity used in the concurrency process. (However, the procedures adopted by Bellevue also provide for inclusion of roadway features.)

By directly incorporating roadway features into its capacity calculations, Issaquah has created a mechanism to fund these types of desired improvements. The intent was that in some cases a developer could bring a facility (or zone) into compliance with concurrency standards by funding these minor roadway improvements, thereby increasing roadway capacity and lowering the v/c ratio for that segment to an acceptable level. This approach is a perfect example of how the concurrency calculation process has been tailored to fit specific jurisdictional needs and conditions.

In reality, all v/c-based estimations of LOS are reasonably similar. All are based on work published in the Highway Capacity Manual (HCM.) For intersection-based computations, an extra step is required to determine the "critical" traffic volumes from the data submitted for each of the intersection approach legs. ("Critical" is basically defined as "the largest among competing movements.") These critical approach volumes are then compared with available capacity, and the resulting v/c ratio is used to estimate level of service.

The more "common" of these approaches is based on TRB Circular 212, published in 1980. This approach simplifies the capacity calculation by removing much of the detail involved in that computation. (The "detail" includes elements such as signal timing information and geometric details such as lane width, or the presence of on-street parking.) This lack of detail reduces the time and data needed to calculate LOS, but it results in some loss of precision in the v/c calculation. These results, however, are still a reasonable measure of level of service if the input volumes are accurately estimated. This level of accuracy is particularly acceptable for forecast conditions where many intersection details (such as signal timing or precise turning movement volumes) are not known.

If a more precise estimate is desired, procedures published in the 1994 Highway Capacity Manual² can be used. These procedures allow the inclusion of considerably more detail in the calculation of both volume and capacity. The result is a more realistic estimation of v/c, but one that requires both more data and more effort to perform. (Note that the results from this procedure are only more "accurate" than the Circular 212 computations when the more complex inputs are accurately tracked by the city and used within the process.) Perhaps more important than whether the 1994 HCM procedures are more accurate than the Circular 212 procedures is the fact that use of the 1994 HCM allows a city to incorporate the effects of specific geometric features into its capacity calculations and thus account for these types of improvements in its v/c computations.

² Note that the HCM procedures used for mid-block computations by Issaquah will not be the same HCM computations used for intersections by Bellevue. Furthermore, these mid-block computations have no direct counterpart in Circular 212.

However, these minor computational additions are not a cause of significant differences in how concurrency is applied from one city to the next. In fact, in all probability, the differences measured by comparing the computational outcomes are small relative to the error inherent in measuring or predicting vehicle volumes at that location. For example, if vehicle volume data are collected at two significantly different times of the year (e.g., mid-summer or early December) in a commercial district, and those data are used to compute v/c, the differences in computed v/c for the different data collection efforts are likely to be greater than the differences between results obtained from using the Circular 212 versus the 1994 HCM.

Similarly, different assumptions that are used when inputs to both procedures are computed can have more significant effects on the v/c computation than the differences in the procedures themselves. For instance, in general, the 2-hour approach Bellevue currently uses tends to produce slightly lower v/c ratios than the 1-hour approach it previously used. (This is because 2-hour peak period volumes tend to be slightly lower relative to capacity than 1-hour peak period volumes.) However, also important in the 2-hour to 1-hour comparison is Bellevue's choice to select a peak hour factor of 1.0 instead of the 0.95 used earlier. The change in peak hour factor most likely changes estimates of traffic volumes as significantly as the shift from a 1- to 2-hour period.

Level-of-Service Standards

Despite the effect of various assumptions used in developing concurrency calculation inputs, the biggest difference in how the four cities determine concurrency is in the specific "standards" each has adopted. As with the v/c calculations themselves, there are both similarities and differences in how each city has established concurrency standards.

Three of the four cities approach concurrency zonally. That is, they allow different levels of congestion in different geographic regions within their city. The level-of-service standards are all expressed as v/c ratios and vary from geographic sub-area to geographic sub-area within each jurisdiction. Issaquah's LOS standards vary by arterial street classification, rather than by zone. However, in all four cities, more congestion is accepted in predominately commercial areas, and less congestion is accepted in primarily residential areas.

In addition, each city has created a list of "exemptions" or "exceptions" for specific types of developments that are permitted regardless of the calculated level of service. These exemptions involve facilities viewed as providing far more "public good" than any resulting loss that might result from an increase in traffic congestion caused by the new facility. A good example of such a facility would be a new fire station.

While the same basic process is followed for setting standards, there are differences among the four cities. The most significant difference is in the allowable average v/c ratio within a zone. Kirkland allows average v/c to reach 1.16 in one zone, while Bellevue's highest allowable v/c is 0.95. The next differential is the specific list of exempt facilities accepted by each city.

In addition to exempting specific types of developments, each city allows a specific number of locations to exceed the adopted v/c standards as long as the zone average itself does

not exceed standards. The number of these permissible “exceedances” varies from zone to zone, as well as from city to city. Issaquah allows five exceedances citywide. Kirkland allows between two and seven for different zones within the city; Bellevue allows between two and ten; and Redmond allows any number of exceedances, so long as the average v/c for the zone remains below the adopted standard for that zone.

The UW project team’s general opinion is that the differences in both the mechanisms used to compute concurrency and the standards against which the results of those computations are compared are a direct result of political processes and the specific objectives that each jurisdiction is trying to accomplish. While it might be possible to “force” the adoption of a single process and/or standard, this would meet considerable political resistance, primarily because it would limit the ability of the individual jurisdictions to accomplish their local objectives.

City-Specific Approaches to and Uses of Concurrency

Technical variations in how concurrency is computed and the selection of standards against which those results are compared are not the only concurrency process differences between the four cities. In many respects, how the four cities apply their concurrency system also differs. Each city attempts to use concurrency to address their local concerns, and since those concerns vary (as do the local land use / transportation circumstances), the outcomes from the concurrency process also vary from city to city.

Many of these differences in “outcome” from the concurrency process stem from the political climate within each city, from that city’s geographic location relative to regional transportation movements, and from the existing level of urban development and transportation infrastructure development within each city. (Also note that the geographic location and current level of transportation and land use development directly impact the political climate.) These differing background conditions result in very different local attitudes towards growth, the acceptability of traffic congestion, and the acceptance of widening roadways in response to traffic congestion. These differences are reflected both in the differing standards (described above) that have been adopted by the four cities, and the ability or willingness of the cities to use their concurrency regulations to require additional developer mitigation as a precursor to permitting those developments.

Of the four cities participating in this study, the two most “extreme” cases of differences in application of concurrency are Kirkland and Issaquah. Kirkland is a “more established” city, has relatively little undeveloped land, a well defined land use pattern, and (with the exception of I-405) moderate pass through regional traffic. Issaquah has considerable undeveloped land, in many ways is still establishing its land use patterns and expected levels of density (in part because of the amount of undeveloped land still available), and considerable pass through regional traffic especially from the north and south (in addition to I-90.)

These differences are reflected in how the two cities approach concurrency. Kirkland uses its land use plan (for which there appears to be broad public acceptance) to determine demand, compares that to the transportation system it is willing to provide (which has basically already been established), factors in some expected pass through traffic, and sets its concurrency

standards as being equal to the expected LOS that results from these assumptions. They also have explicitly considered the effects of regional traffic, both incorporating language in their comprehensive plan that it exists, and is beyond their control, and in selecting the number of LOS standards exceptions they allow per zone. (That is, the number of allowable LOS exceedances appears highly correlated to the number of intersections where regional pass through traffic could become an issue.) Only development that departs from these accepted/expected conditions “runs afoul” of concurrency.

Issaquah entered into concurrency with a residential population that was not at all happy with the state of the local transportation system relative to the existing land use, let alone the prospective transportation system performance that would occur given expected growth. There is considerable debate amongst various factions in the area about the amount, location, and style of development that should be permitted, as well as the location, size, and design of transportation system improvements.

Consequently, the Issaquah concurrency plan is not based on “implementing the agreed upon development plan.” Instead, the concurrency standards appear to have been developed and adopted specifically in response to the concurrency requirements of the Growth Management Act.

The land use assumptions in the Issaquah comprehensive plan do not appear to directly drive their transportation system plan, and do not appear to have been a major factor in the selection of their concurrency standards. Land uses are not mentioned in the transportation vision and values section of the comprehensive plan.

The concurrency standards adopted by the City are an excellent compromise between those advocating growth and those protesting against the negative effects of that growth. They accurately reflect the political desire to allow growth, but to mitigate the effects of that growth on traffic congestion. The standards themselves can be summarized as “new development won’t make the transportation situation worse than it already is.” Issaquah staff characterize their approach to concurrency not as a constraint on achieving the comprehensive plan itself, but as a constraint on the *timing* of when those planned improvements occur.

The problem Issaquah has is not with this approach to concurrency, but with the fact that Issaquah lacks the ability to apply the same standards to regional trip making, and/or to obtain the mitigation necessary to compensate for the significant growth in regional trips that pass through the City. The growth in regional traffic has caused a number of concurrency exceedances, and consequently limited the City’s ability to permit local land use development. This situation is exacerbated by public resistance to significant increases in roadway lanes in key areas, as well as the cost (financial and otherwise) of those capacity increases. As a result, the concurrency check “we won’t let growth make things worse” frequently prevents even desirable growth (for example development that reinforces the traditional “main street” town center) from occurring in the City.

Bellevue and Redmond have approaches to concurrency that fall between the extremes of Kirkland and Issaquah. In many respects, Bellevue and Redmond are more diverse cities. This

diversity tends to make both the public attitude and city decisions more like Kirkland in some areas and more like Issaquah in others.

Both cities have adopted approaches to concurrency that start with determining their constituents “acceptable levels of transportation system performance” rather than letting adopted land uses and transportation systems plans from the comprehensive planning process drive the LOS standards determination, or by adopting a standard aimed at preventing degradation of the current conditions.

In addition both cities appear to have focused their concurrency process on ensuring the connection between local land use and local roadway level of service. Neither city appears to have adequately anticipated the effects of (or their lack of control over) regional traffic as directly as Kirkland. As a result, both now share a significant concern about losing control of local land use decision making and permitting because continued increases in regional pass through traffic on city streets are resulting in roadway level of service measurements approaching or exceeding adopted standards. This results in conflicts between two desired goals, adopted and desired growth and adopted and desired roadway system performance.

As in Issaquah, concurrency problems in both Bellevue and Redmond are primarily a function of regional traffic growth. Where desired development is permitted by the adopted standards, “concurrency works.” Where land use intensity permitted in the comprehensive plan causes traffic to exceed adopted standards the “concurrency system needs to be fixed.”

Where both cities differ most strongly from Issaquah is in how closely tied to their comprehensive plans they have made concurrency. In both cities the comprehensive plans demonstrate considerable linkage between accepted land use, the planned transportation system, and the adopted concurrency standards. Increases in the intensity of adopted land uses correlates strongly with an increase in allowable traffic congestion. In addition, both cities were able to adopt LOS standards that allowed for both growth, and some degradation in traffic congestion. However, unlike Kirkland, the plans for these cities do not appear to acknowledge the full effects of regional traffic on the cities’ ability to meet both land use growth and transportation level of service goals, although in Bellevue’s case, language has been added to the comprehensive plan that specifically discusses the need for increase state route capacity to provide for regional growth.

It is unclear from our review where the disconnect between acceptable land use, acceptable traffic congestion, and the reality of regional traffic is occurring. It may be because regional trip making is not adequately incorporated in the planning process. It may be that the adoption of LOS standards is sufficiently independent from the adoption of land use plans that the public does not realize the mutually exclusive nature of some of their adopted plans and standards. It may also be simply that regional trip making is growing more quickly than anticipated.

In general, citywide, Redmond’s standards allow more growth than Bellevue’s. Redmond’s approach to LOS standards also facilitates their decision to use concurrency as a mechanism to help generate funds for transportation system improvements to mitigate the negative impacts of development. However, as opportunities to add capacity begin to run into

local opposition (for example, in Redmond's Grasslawn neighborhood) Redmond is likely to begin to have more concurrency related problems such as those faced continually by Issaquah.

Cooperation Between Cities

While the focus of all four cities' concurrency programs is on the roadway conditions within each respective city, each has recognized the fact that concurrency's problems and solutions stretch across jurisdiction boundaries and thus require multi-agency cooperation. Within the four cities, there are two notable efforts at managing growth impacts across jurisdictional boundaries: the Bellevue Redmond Overlake Transportation Study (BROTS), and the Issaquah/King County reciprocal inter-local agreement. Both of these efforts deal with what might be called the "near local" impacts of growth across jurisdictional boundaries.

With BROTS, Bellevue and Redmond have worked jointly to plan and fund roadway and other mobility improvements in the Overlake area and on the major arterials that serve Overlake development. In this case, most of the development is occurring within Redmond, but significant impacts are occurring on arterials in Bellevue. Through the BROTS agreement the two cities have worked together to adopt growth targets in the Overlake area and to fund the transportation improvements (in both jurisdictions) needed to accommodate that growth. Thus, developer fees generated in Redmond are used for mitigation in Bellevue, and the two cities work together to identify and plan those improvements.

Similarly, Issaquah and King County have signed an inter-local agreement that allows each jurisdiction to collect two sets of impact fees for developments whose impacts cross jurisdiction boundaries. Issaquah collects the King County fees needed for mitigation for development occurring in Issaquah (as well as fees for Issaquah), and King County does the same in reverse. These fees are then transferred to the appropriate jurisdiction to help fund the needed transportation improvements.

In addition to these development impact efforts, the Bellevue Kirkland Redmond four-step planning model (the BKR model) is a good example of the cross-jurisdictional effort that is required to address the more regional problems associated with concurrency. While the BKR model does not lead directly to better multi-agency growth management within the concurrency legislation framework, it is an important step in the planning process needed to support such an effort. It incorporates many of the necessary data elements, as well as requiring considerable coordinated planning effort from the three cities. The BKR modeling effort also provides both a forum for growth planning (i.e., a review of where growth is occurring and what transportation improvements are planned) and a means for analyzing the multi-jurisdictional effects of those land-use and transportation system changes. Lastly, the use of a common modeling system also provides a large degree of consistency in the analytical methods that serve as input to the concurrency calculations.

ISSUE IDENTIFICATION

This section discusses problems identified with the current concurrency process. It identifies areas that the project team believes need to be addressed if changes are made to the current process. Issues identified include technical, political, institutional, and financial

shortcomings that either cause inaccurate output from, or are not addressed well within, the current concurrency process. These issues were raised by participating city staff, interested stakeholders, or the project team through the project interview process and the literature review. Table 2 provides a summary list of these issues.

In general, these issues define limitations of the current concurrency procedures. Addressing these limiting factors so that cities can more effectively manage new development and transportation system improvements will require exploration of other “issues” that are not discussed in the following section. Issues for further analysis are introduced in the final section of this paper.

Computed v/c Ratios May Not Be Accurate (Technical Issue)

The project team heard or identified several concerns about the accuracy of level-of-service computations used by the four cities. Three sub-issues are reflected in those concerns about accuracy. The first issue is that the public’s perception of traffic congestion is worse than the reported v/c ratios. The second is some transportation professionals’ concern that the current process undervalues non-automobile travel and thus does not accurately reflect the current transportation system. The third is the concern that different cities use different computational procedures, resulting in the public perception that some cities are “cooking the books” in favor of specific, pre-determined outcomes.

V/C Ratios (Technical Issue)

The first of these issues stems in part from problems with using v/c to compute level-of-service and in part from the inability of the volume estimation process to accurately reflect the “true” peak period traffic volumes. This is because on a congested street, measured traffic volumes are often lower than those associated with roadway “capacity.” This is because heavy congestion causes vehicles to slow down, resulting in throughput below maximum levels. A traffic count taken during this condition reports a volume that significantly under-represents actual traffic demand for that street. When such a “low” volume statistic is used to compute v/c, the resulting ratio predicts a better level-of-service than actually exists.

While four-step planning models have capacity constraints built into their highway assignment algorithms, they do allow predicted traffic volumes to exceed “capacity” as an indicator that roadway demand exceeds capacity. When this occurs, the predicted v/c ratios are greater than 1.0, which indicates the occurrence of significant congestion. (Note that an actual traffic count taken at such a location, under those conditions, will show low volumes and significant congestion.) The ability of the forecasting process to predict v/c ratios above 1.0 is used by the cities to predict LOS failures as part of the concurrency review process.

Thus, four-step model output does not necessarily suffer from the limitation of “congestion caused” volume reductions and their effect on v/c computation. However, because four-step model volume outputs are compared with actual ground counts as part of the calibration and validation process, they are subject to being biased by the calibration process to under-estimate traffic volumes on congested roads. This is particularly true with models for

Table 2: Problems and Issues Identified with the Current Process

Issue	Technical	Political	Institutional	Financial
Computed v/c Ratios May Not Be Accurate - V/C Ratios	X			
Computed v/c Ratios May Not Be Accurate - Undervalued Non-automobile Travel	X			
Computed v/c Ratios May Not Be Accurate - Different Computational Procedures	X			
Adopted Concurrency Standards Are Limiting Desired Local Growth in Some Places	X	X		
Regional Traffic Growth Is Limiting the Effectiveness of Concurrency	X	X		
Non-automobile Travel Is Not Truly Considered	X	X		
There Is No Agreement on How to Estimate the Effect of TDM	X			
Each City Views the Objectives of Concurrency Differently and Thus Uses Concurrency Differently		X		
Some Cities Do Not Have a Clear Vision of How They Should Develop		X		
The Public Does Not Understand the Growth Choices Available		X		
Too Much Uncertainty Is Associated with the Concurrency Process		X		
No Guarantees Exist That Transit Service Will Remain as Planned			X	
Current Funding Sources Are Insufficient and Are Heavily Skewed toward Capital Projects				X
There Is No Way to Fund New Ongoing Operations Costs through Concurrency Fees		X		X
Too Many Resources Are Used for Concurrency Calculations				X

which re-calibration efforts are undertaken to account for the effects of travel demand management strategies that are not effectively tracked in the mode split model.

Consequently, any vehicle volume-based approach to level-of-service computation will suffer from this same problem, regardless of whether it computes v/c directly or uses the basic v/c ratio to compute a related statistic (e.g., total delay) or level-of-service value.

A second problem that effects the “accuracy” of v/c based level-of-service computations when they are compared to the general public perception of congestion stems from the timing of traffic volume counts. The concurrency process assumes that “peak” conditions occur in the PM peak period (evening rush hour). In many locations, this time period is not when peak traffic demand occurs. Instead, peak traffic demand can occur on weekends (when shopping trips are highest), on Friday evenings (because of recreational movements), earlier in the day (because of traffic movements to/from schools), or during peak seasonal events (such as Christmas shopping periods). Because the public experiences and remembers these “actual peak” conditions, they are skeptical of level-of-service conditions being reported that do not reflect these same extreme levels of congestion.

Unfortunately, current traffic planning and forecasting procedures do a poor job of estimating non-commute trip travel patterns. Adding to this problem is the fact that “peak” conditions in one part of a zone may easily occur at different times of the day and/or year, which makes it especially difficult to compute an “accurate zonal average” v/c ratio for all intersections or roadway segments in a zone. In many cases, cities even lack the data needed to accurately describe the size, timing, and duration of these “unusual” peak conditions, because permanent data collection capabilities are needed over wide geographic areas to accurately measure and record these events, and the cities can not afford these data collection efforts. The result is an inability to accurately measure and model many of the peak conditions experienced by the public.

Undervalued Non-automobile Travel (Technical Issue)

The second major “accuracy” concern is that the v/c-based computational process does not accurately reflect all travel in a zone. This basic concern appears to be quite true. In zones where few alternatives to the car exist, the basic v/c process works reasonably well (subject to the limitations discussed above and elsewhere in this report). However, where transit service or other non-automobile modes serve a significant portion of current or planned trips, the current v/c-based procedures undervalue the mobility provided by these modes of travel and thus tend to present a view of transportation system concurrency that is inappropriately skewed toward roadway performance. The incorporation of non-automobile travel within the concurrency process is covered in more detail in another subsection below.

Different Computational Procedures (Technical Issue)

The last issue relates to the accuracy of the alternative procedures used by the four cities. The project team is confident that the differences in equations and algorithms used by the four cities are not a major source of inaccuracy. Instead, each city is using a reasonable,

professionally accepted approach to the computation of v/c. As noted earlier in this report, the observed differences simply reflect the local choices made by the cities as they attempt to use the concurrency process to meet their specific needs and interests. Any “inaccuracy” is caused not by the differences in technique used but in the assumptions required to develop vehicle volumes input into those procedures.

Adopted Concurrency Standards Are Limiting Desired Local Growth in Some Places (Technical and Political Issue)

In almost all cases where concurrency is limiting development desired by the local jurisdiction, the “concurrency failure” is in large part caused by increases in pass-through traffic, both generated in and bound for areas outside of the local jurisdiction. These non-local traffic volume increases use road capacity that then becomes unavailable for serving local land use development. In some areas, regional traffic growth has caused roadway congestion to increase beyond concurrency standards initially adopted by the city.

At the same time, increases in roadway capacity on these routes would result in publicly unacceptable decreases in quality of life within the local area.

The root cause of these difficulties is discussed in the following subsection.

Regional Traffic Growth Is Limiting the Effectiveness of Concurrency (Technical and Political Issue)

Concurrency is intended to provide local control over the interaction of land use and transportation. However, by focusing exclusively on the local transportation impacts of land use and excluding the regional impacts, the current process has inadvertently created a system that causes loss of local development control for areas with roads that carry significant regional traffic volumes. This “local only” focus has also skewed land-use development decisions to favor those developments that can minimize local transportation impacts and maximize regional impacts.

By law, concurrency is defined by local conditions, and any fees generated for traffic mitigation must be spent on impacts directly attributable to the development. Thus, real but “less direct” regional impacts occur without mitigation. For example, a development in Kent increases the number of people driving up I-405 and on SR 520 to Redmond’s Microsoft campus. This increase in traffic increases congestion on these routes and shifts commuters traveling from Issaquah to Redmond away from I-405 and onto 148th Ave. Concurrency does not recognize these real impacts on 148th Ave, nor does it provide funds to mitigate them. Yet this increase in traffic on 148th Ave can prevent further development contemplated in Bellevue’s comprehensive plan because the “extra” traffic now using this street cause a failure of the v/c based concurrency standard. Adding to the problems this regional pass-through traffic creates is the fact that no funds exist to mitigate the “Kent caused” traffic increase, and Bellevue residents object to the road expansion plans that would be necessary to lower the v/c ratio for that street.

The above example illustrates how the “local only” focus of concurrency can easily result in a loss of actual local control over both facility performance and local development.- State routes are specifically exempted from concurrency calculations, yet congestion on state routes

causes travelers to divert onto “local” roads. These “extra” pass-through vehicle trips often create “local” concurrency failures that can not be mitigated with transportation strategies acceptable to local residents and businesses. In large part no local transportation changes other than roadway expansion can affect these trips, since the trips themselves start and end outside of the local area. They are thus not affected by local land-use actions or local TDM measures. Instead, they simply use up “local” roadway capacity and limit local development.

For developers, this “local only” review of concurrency results in a large incentive to build sprawl style developments in undeveloped, uncongested areas and considerable disincentive to develop in existing urban centers. This is precisely opposite to the intent of Washington’s Growth Management Act which is to encourage development in urban areas and reduce the inappropriate conversion of undeveloped land into sprawling, low-density development (RCW 36.70A.020), and is inadvertently being caused by the exclusive application of roadway LOS standards which favor development in less dense areas away from centers and closer to the edge of the Urban Growth Area. Costs imposed to help roads meet concurrency standards mean that developments must internalize the cost of mitigation required to meet local concurrency failures, but current regulations externalize the cost of regional concurrency failures and other regional trip impacts. This provides a strong economic incentive to build in low density areas that have less chance of “tripping” local concurrency levels. These development locations are not easily or effectively served by non-auto modes, and thus the vast majority of trips they generate require single occupant automobile travel. Since regional impacts are ignored, no incentive exists for the developer to mitigate the impacts of those trips. For example, in the 148th Ave illustration above, no incentive exists for the Kent developer to fund the regional transit facilities (e.g., park and ride lots, expanded transit service) necessary for making transit a viable travel option to Redmond, in order to reduce SOV trips on I-405.

Thus, because the current concurrency process ignores “concurrency failures” that are not geographically close to the development or that occur on state routes, it encourages development that exacerbates those problems. These problems in turn create congestion in communities that contain regional transportation facilities, and that congestion effectively eliminates that community’s ability to control its land-use decisions relative to its traffic congestion levels.

Non-automobile Travel Is Not Truly Considered (Technical and Political Issue)

When asked by PSRC, all four cities indicated that they use a “multi-modal” approach to level-of-service computation. At first glance, this seemed a somewhat surprising response to the project team since the concurrency determination is based exclusively on roadway v/c.

Cities answered “multi-modal” to PSRC’s questionnaire because in both the “project specific” and “four-step modeling” procedures, a mode split estimation is performed, and “non-driver” trips are removed from the vehicle volume estimates. Thus, the effects of transit usage, walking, biking, and other forms of transportation to and from new developments are removed from the v/c calculations used to compute level-of-service. Consequently, the current processes are indeed “multi-modal.”

This definition of “multi-modal” has an interesting effect. In theory, for all four jurisdictions, if the roads serving a geographic area were “congested,” no development would be

permitted in that area, even if it were served by a rail transit line where “extra” capacity existed and 95 percent of new peak period trips were served by that rail line (unless the developer was somehow able to build additional roadway “capacity”). This is because all four cities currently incorporate only roadway congestion in the “definition” of concurrency. Thus, the process may be considered “multi-modal” technically speaking, but functionally the determination of concurrency is based strictly on roadway conditions.

There Is No Agreement on How to Estimate the Effect of TDM (Technical Issue)

Many key travel demand management actions (carpool formation programs, building-based transit pass subsidization programs, guaranteed ride home programs, the provision of bike lockers and showers) are not directly accounted for in the mode split models used to forecast future transportation system mode split and performance. This is both because no nationally accepted guide similar to ITE’s *Trip Generation* book exists for these programs, and because the mode split models used in the BKR and Issaquah four-step modeling efforts do not include these items as input variables. In addition, the four-step planning mode-split models use zonal average input variables, and thus development specific TDM programs are not even potential model inputs (assuming the mode split model could be redesigned and calibrated to include them).

While each city uses the best available information to determine the effects of specific proposed TDM improvements for each development review, the lack of a common national standard makes effects of TDM actions subject to “second guessing” by groups participating in the concurrency review process. This in turn slows down the process, makes its outcome less predictable, and leads to considerable disagreement about its accuracy.

Each City Views the Objectives of Concurrency Differently and Thus Uses Concurrency Differently (Political Issue)

While all cities agree on the basic goal of concurrency (keeping transportation improvements in step with development), the more practical objectives of each city differ, depending on their individual needs, pressures, and situations. These differences lead to different approaches to calculating concurrency. These differences generally result in concurrency outcomes that address specific local objectives. Thus, a single “consistent” approach to concurrency is unlikely to be acceptable across all four cities.

Some Cities Do Not Have a Clear Vision of How They Should Develop (Political Issue)

Many jurisdictions and most of the general public do not have a clear vision of how land use is expected to change in the future (either short- or long-term) and how the transportation system needs to change to meet that growth. Without an agreed upon vision, review of individual development projects is very difficult, and the determination of required mitigation fees is haphazard. If a clear vision can be expressed and agreed upon for both land use and transportation system changes, it will be much easier to compute the cost of required improvements and to assign those costs appropriately.

Having a clear vision also eases the task of communicating what that vision is and how a given development project or transportation improvement will fit into that vision.

Ideally, each city's vision includes both a concept of its own transportation/land-use system and how that system both contributes to and fits within the regional transportation/land-use vision.

The Public Does Not Understand the Growth Choices Available (Political Issue)

Broad public support exists for each of the following four statements: 1) "I want to drive my car." 2) "I don't want the impacts from roads hurting my neighborhood's quality of life." 3) "I want to develop my property to maximize its value." and 4) "I want to pay lower taxes." Large segments of the public do not understand that these choices are mutually exclusive, in that increasing car use requires increasing roadway space (or increasing congestion), and that space invariably comes at the expense of some existing neighborhood's quality of life. The public does not actually have the choice of "development or no development," as state law requires each jurisdiction planning under GMA to accept its share of projected growth. The real choice is, "Where and how do we develop?" Public officials and city residents might find the concurrency dialogue easier with the understanding that pushing growth elsewhere often does not relieve the local area of growth impacts, just the possible benefits from local growth. (See the effects of pass-through traffic above.)

The existing concurrency process does not help explain these choices and does not make the broad consequences of specific development decisions clear.

Too Much Uncertainty Is Associated with the Concurrency Process (Political Issue)

Members of the development community interviewed by the project team were uniform in their frustration with the current process, both in terms of the delays it caused in the development process and in terms of the uncertainty associated with the costs imposed on their developments.

For cities where developers can "buy their way out" of concurrency failures (usually by funding projects or programs that allow roadways to operate within the concurrency standards adopted by the city) developers complained about the variability of these costs, and the delays in determining just what those costs would be. In general, when considering development of a parcel, developers would like to have a better, and earlier, understanding of what size of development will fit within existing concurrency standards, what transportation improvements could be made to keep a larger development within concurrency standards, and what the costs associated with those improvements would be. This information is needed early in the development process in order to make informed business decisions.

Even without the presence of added "concurrency related fees" that allow developments to stay within concurrency standards, developers were unhappy with the time required to learn whether their proposals were permissible within existing standards, and to negotiate changes (smaller size, adoption of specific TDM programs) that allowed their proposals to remain within standards.

No Guarantees Exist That Transit Service Will Remain as Planned (Institutional Issue)

In this region, transit service is a county or regional agency function, but concurrency is a local jurisdiction function. Cities have relatively little control over the amount of transit service provided and the routing of that transit service. Because cities have relatively little control over the transit service provided to a given development, there is concern that reliance on transit as a long-term travel mitigation measure is impermanent and therefore risky.

Current Funding Sources Are Insufficient and Are Heavily Skewed toward Capital Projects (Financial Issue)

The PSRC Phase 1 Concurrency report³ noted that over 70 percent of responding jurisdictions indicated that developer fees pay less than 10 percent of the costs of needed transportation improvements. When added to the reduced transportation funding available from state and federal sources, the result is that the cities face a significant deficit when comparing transportation needs with available revenue. Because it does not pay for all associated costs, new development further exacerbates the revenue problem, and the “regional” trip problem noted above makes the situation even worse.

As a result, the concurrency process frequently becomes one more way to generate transportation improvement funds, rather than a “go/no go” development switch. In areas already “non-concurrent” this results in a bias toward large developments that are more likely to be able afford the mitigation fees required to permit increases in travel activity.

Another drawback of the current approach to concurrency is that it further exacerbates the emphasis on capital projects to the detriment of operational improvements. This occurs because concurrency funds are spent on capital projects, and they must be matched with local funds, since concurrency fees can only be proportional to the impact of the development. Thus concurrency becomes a drain on existing local funds that might be used for operational improvements.

There Is No Way to Fund New Ongoing Operations Costs through Concurrency Fees (Financial and Political Issue)

By law, traffic impact fees must be spent on mitigation of direct impacts. Similarly, concurrency related “fees” must be spent in a way that allows impacted streets to lower their v/c ratios to the point where the proposed development does not violate the existing v/c standards. This has traditionally meant capital improvements (particularly given the use of v/c as the measurement criterion). The project team has found no mechanism to date that allows a city to collect and spend mitigation funds (either impact fees or concurrency specific fees) slowly over time to provide ongoing operational improvements—such as new bus service, periodic signal retiming, or general TDM program funding—that would add the necessary additional transportation system capacity in place of increasing roadway capacity. (Note that Redmond has developed a mechanism that allows it to negotiate an agreement with a developer where the developer funds the on-going TDM program, rather than providing the money to the city, which

³ Implementing Destination 2030, Assessing the Effectiveness of Concurrency: Phase 1 Report, Survey Results, January 2002, PSRC

can then fund the TDM effort. This agreement then becomes legally binding on future property owners.)

In locations where roadway expansion is not acceptable, operational improvements are the only available mechanism for increasing person and vehicle throughput. If funds are not available to maintain those operational improvements, either congestion will increase or desired development will be prevented.

One potential way to begin to approach this problem is in use in Redmond. Redmond allows developers to propose long term TDM activities as part of their traffic mitigation plan. A key here is that funding and operation of the TDM program remains in the control of the property owner (and with subsequent property owners), and that the development must continue to generate traffic levels at or below agreed upon rates. These agreements become a legal requirement tied to site approval and remain as covenants with the property.

The primary limitation with this approach is that control of funds remains with the property owner. This may hamper a city's ability to combine these funds to provide a more effective TDM program or fund operational improvements (such as new bus service) that might have a greater impact on transportation system performance.

Too Many Resources Are Used for Concurrency Calculations (Financial Issue)

Each of the cities interviewed indicated a desire to reduce the staff time and resources needed to perform concurrency reviews. Their concerns mirrored the developers' concerns in that too much time was required to determine the concurrency standing for specific developments and then determine the required/acceptable mitigation required from developments.

NEAR-TERM CHANGES

This section discusses the project team's initial review of how a series of short-term changes to the concurrency process would affect that process. Review of this specific set of changes was requested as part of the scope of work for this project. Each suggested alternative is briefly described, along with the project team's opinion of how adoption of that change would affect the outcome of the concurrency process. Recommendation to adopt the change is then discussed. A recommendation for the change is based on whether the suggested change provides significant advantages over existing procedures, given the costs of adopting the change (for example, the cost of new data collection, if it were needed). If a reviewed alternative would provide advantages and can be adopted with minimal additional staff time and effort (meaning no new data collection or technical resources would be required), it is recommended for near-term adoption. If the project team review concludes that significant benefits could be gained, but additional study would be needed to determine the details of the approach, additional city resources would be needed to perform it, or significant changes in procedures would be required (meaning a significant staff training effort or public debate would be required before adoption of the procedure), the approach is recommended for further study in the remainder of the project. These issues can then be clarified and presented to the Executive Steering Committee for the project.

Switch to a Persons Per Hour Rather Than Vehicles Per Hour Approach to Capacity

This change is intended to measure the capacity to move people (or the actual efficiency of moving those people) by a combination of means, including non-motorized modes, buses, carpools, and vanpools, as well as automobile travel.

There are two basic ways to use person volumes in the concurrency process. The first is to actually use person throughput relative to available transportation facilities as a measure of facility performance. The second approach is to use person throughput as a way of weighing the relative importance of the performance of different transportation facilities. That is, the current LOS calculation process would be followed, but rather than computing simple average v/c ratios for all intersections (or screenlines) within a city analysis “zone,” the performance of each intersection/screenline would be weighted according to the person throughput associated with that location.

These two approaches are discussed separately below.

Use of Persons per Hour as a Measure of Facility Adequacy or Performance

Used by itself, person throughput is an inadequate measure of facility performance; it is only a measure of facility use. Consequently, it does not describe whether the transportation facilities being examined are adequate for the current or proposed development.

To be converted into a measure of performance, person volumes must be related to the person carrying capacity of the current (or proposed) facility. Person carrying capacity for a facility is mode specific. Thus, to use person volume as a measure of facility performance or adequacy requires a mode specific, multi-modal analysis. Adopting such a process would not be a minor change to the current process of any of the four cities.

Consequently, use of the statistic persons per hour is not a reasonable near-term alternative concurrency measure.

However, adoption of a true comparison of person throughput versus person carrying capacity by mode would resolve several of the major limitations of the current process. Thus, use of person throughput within the concurrency process will be considered as one of the alternatives for long-term revision to the concurrency calculation process.

There is one significant caveat to this approach, however, and that is that the person carrying capacity of an automobile is essentially undefined. In theory, the person carrying capacity of automobiles on roads is roughly four times the vehicular capacity of that road. However, it is unrealistic to expect a mode shift that might “fill” each car. Determining a rational “capacity” for cars is therefore problematic.

For the long-term approach, the project team proposes that car capacity be treated as being equal to vehicle capacity, and that transit capacity be independently compared with actual transit ridership. This will allow a direct evaluation of whether “spare capacity (transit or automobile) exists within a defined area.

Use of Persons per Hour for Weighting the Importance of Different Locations

This approach can be adopted easily within the current procedures of all four cities. To adopt it, each city would either need to conduct vehicle occupancy counts or assume vehicle occupancy rates. The first of these would require a considerable increase in resources spent on facility performance monitoring; the second would be far less expensive but would make the system insensitive to the effects of changes in carpool and transit usage.

Use of person throughput for weighting v/c ratios within a given analysis zone would mean that large intersections would play a more important role in the computation of the “average” v/c ratio within a given analysis zone. This would mean that the performance of larger intersections would be more important to “zonal performance” than smaller intersections (where “large” is defined in terms of person movement, so an intersection heavily used by transit would likely be a “large” intersection within a zone).

The effect of such a change would be entirely dependent on the relative condition of large and small intersections within the zone. If the larger intersections operated better, or were more easily expanded, such an approach would have the effect of allowing more development to occur. If larger intersections were more difficult to expand (they might already have been expanded as much as possible to meet the larger demands placed on them), this might result in less ability to accept growth.

When viewed in the larger context of concurrency, emphasizing larger facilities would be likely to have only a modest effect on overall concurrency calculations. It would basically provide a modest “tweak” to the current system that could be used in some cases to influence the results produced. From a theoretical perspective, it would shift the emphasis within an analysis zone toward movements that served the most people.

It would not improve the analysis of specific facilities, nor would it provide particularly useful insight into a city’s facility performance.

This approach is not recommended for further study. It would further complicate the concurrency process without providing a significantly better outcome than is currently available. It would not resolve any of the limitations in the current concurrency process.

Switch to a Travel Time Approach

The v/c approach to estimating level-of-service has a number of limitations. Among these limitations are that v/c is at best a mediocre surrogate for level-of-service as perceived by the traveling public and that under congested conditions use of actually measured volumes underestimates the “true” level of service. (Not included in this list are those larger limitations of the current concurrency process noted elsewhere in this report.)

As a result of the limitations in the v/c process, there is a growing sense among transportation professionals that the best statistic for gauging facility performance is travel time. This measure is easy for the public to understand, relates directly to the traveling experience, and can be compared transparently across modes.

The first disadvantage to the use of travel time is the fact that no data collection procedure currently exists to collect and report actual travel times. (Although the four-step modeling program can predict travel times with no changes to the current process.) Thus, a new data collection program would be needed if actual travel times were to be used for model validation, or for project development review. In addition, travel times are route and trip dependent, which means that specific “trips” would need to be defined for data collection and review. (This step would be similar to the designation of “critical intersections” or “screenlines” in the current process.)

A second disadvantage is that the analytical requirements for converting specific project improvements into travel time are not well defined, and those parts that are defined require more effort than the current v/c process. While the four-step modeling process allows for direct calculation of route-specific travel times, application of a four-step model would require more work than simply estimating trips to be generated and adding those trips to existing measured volumes at nearby intersections.

The next disadvantage of using travel times as the primary concurrency review statistic is that its adoption would require revision to the entire concurrency standards process. (This would be a significant, but certainly not overwhelming, effort.) As mentioned above, within each zone a city would need to adopt specific routes/segments for which travel times would be collected/estimated. Standards would then have to be adopted for each of these routes, just as v/c standards had to be adopted for intersections.

The good news is that such a process would allow a public review of expected transportation system performance. This would allow a city such as Issaquah to select new performance standards that might permit development where development was not currently allowed.

For any city, the selection of a new performance standard is not without significant risk of increasing public distrust in the planning and public decision making process. Consequently, it is important when selecting a new performance measure, such as travel times, to be able to clearly describe to the public why a new measure is better than the existing measure, how the measure serves the public good, and why it gives a more accurate reflection of the presence or absence of “adequate transportation facilities.” (Bellevue has already experienced the communication difficulties loss of public trust entails as a result of changing from a one hour standard to a two hour standard.)

If a travel time approach is adopted, it must be remembered that simply shifting from a v/c approach to a travel time approach would not fix the structural problems the project team has found with the current concurrency process. The most significant of these problems include the inability to accurately account for non-automobile based travel modes, the insensitivity of the current forecasting process to adopted TDM measures, and the lack of measurement of the effects of regional impacts. (Note that while the use of travel time measurements would allow direct comparison of transit to SOV performance, no process or standards exist to direct how this comparison would take place. That is, since transit travel times are typically slower than SOV travel times, a shift to transit use could conceivably make average person travel times increase, thus making concurrency less likely. Thus, even though use of travel time would make multi-

modal comparisons possible, considerable work would be needed to make this technique operational.)

This proposal merits consideration of further review, but at first glance it does not appear that it would, by itself, resolve many of the primary issues identified earlier in this report.

Remove Selected Intersections⁴ from the LOS Calculation if Capacity Increases Result in Negative Neighborhood Impacts

This proposal addresses limitations in the concurrency process where current (or forecast) levels of traffic volume are not acceptable, but increases in roadway capacity are unwanted by the local community. This combination of events prohibits further development in the area not because capacity improvements are not possible, but because political constraints prevent any undertaking of those improvements. (Note that these political constraints might not be “bad,” that is, the city may agree with local residents and property owners that capacity improvements are not appropriate for that facility.) Removing intersections that fell under these constraints from the concurrency process would allow development to proceed. It would allow a development to proceed when “adequate” facilities did not exist to serve it, removing the constraint on development to under-served areas that concurrency is designed to provide. With no constraint on facility performance remaining, development that significantly exceeded “acceptable” levels could not be restrained.

Simply removing the intersection from the concurrency analysis eliminates the congestion check which concurrency was intended to provide. Thus, this approach appears counter to the goals of concurrency, and will not be further analyzed in this study.

The key in this situation would be not to “remove” the facility from concurrency calculations but to either restate the allowable congestion (i.e., raise the allowable amount of congestion to one that was acceptable), or raise the standard when specific pre-conditions had been met.

Kirkland has already adopted this type of arrangement in its approach to zonal LOS standards. Specific intersections can exceed the adopted LOS standard, as long as they are not TOO FAR above that standard, but only if the zonal average remains acceptable. In fact, all four city’s have also adopted an “exemption” process, where a limited number of intersections (or roadway segments) are allowed to exceed the v/c standard without “tripping” the concurrency standard. Simply increasing the number of allowable exemptions by one intersection would have the same positive (pro development) effect as removing the intersection from the analysis. Unlike removing the intersection, however, this approach still acknowledges that congestion is being allowed to grow, which is an important public disclosure, given the intent of concurrency.

A different twist to this same basic concept would be to allow an intersection to exceed the base LOS standard as long as transit service (or transit use) exceeded some set level. Such an

⁴ Note that “roadway segment” can be used interchangeably with “intersection” in this discussion, in that “congested roadway segments” could also be removed from the concurrency process if widening those roadways resulted in unacceptable, negative, neighborhood impacts.

approach would mean allowing additional development to occur where sufficient transit service (or use) existed to serve that development, and the availability of a “high” level of transit service would provide sufficient transportation access despite the congested roadway conditions. These more detailed, multi-modal approaches are not short-term improvements to the current concurrency process and are therefore included in the longer term solutions that will be studied in more depth as this project continues.

Lower LOS Standards (Allow More Congestion) for Motor Vehicles

This approach would simply allow development to occur without requiring the widening and upgrading of congested intersections and roadway segments. Where such an approach is politically acceptable, this would be reasonable. It would be inexpensive and easy, as long as the political will existed to do it.

No changes in the current concurrency process would be required to implement this alternative.

There are two primary drawbacks to this approach. The first is that such an approach might not be politically acceptable. Certainly in cities such as Issaquah and parts of Redmond and Bellevue, adjusting LOS standards to allow more congestion would not be accepted mildly by vocal segments of the population. The reason that concurrency was adopted at all was that transportation infrastructure was not being expanded quickly enough to serve new development, and the public resented the failure of the transportation system to move cars more freely. The project team’s opinion is that, in many cases, the currently adopted standards would be difficult to lower without mitigation.

The second drawback to this approach is that it would eliminate the ability to use concurrency as a way of generating additional funds for transportation system improvements. While concurrency is, in theory, not about fund generation, it often does serve that purpose in heavily congested areas (because not enough other sources of transportation improvement funds are available). However, if development with no transportation system expansion were politically preferable to no development, then this approach would be acceptable.

Expand the Definition of “State Route” to Include Intersections Feeding State Routes That Are Not Controlled by the Local Jurisdiction

Because the state specifically removed state routes from the concurrency process, congestion on those facilities may not be factored into development concurrency decisions. The net effect is that approved development tends to create unmitigated increases in volume on state routes. This in turn creates congestion on routes that intersect (or parallel) those facilities. One particularly difficult location, from a concurrency standpoint, is where a city arterial connects to a congested freeway. When the local jurisdiction does not control these intersections, there is little opportunity to provide congestion relief to the arterial. The arterial congestion then causes a concurrency failure that limits the city’s ability to permit additional development even in localities specified in its comp plan vision.

This proposal would essentially extend the current practice of removing state facilities from the concurrency process to include these specific intersections, even though they are not technically part of a state route.

The primary advantage of this idea is that it would further diminish the impacts of regional facility congestion on a local jurisdiction's ability to control its own development. The suggested change follows the basic line of thinking at the legislative level that resulted in removal of the state routes from the concurrency process. This line of reasoning can be summarized by the following example, "We shouldn't deny growth in Bellevue because I-405 is congested." This line of reasoning makes sense at the legislative level because the "fixes" for many of these concurrency failures are very expensive and thus significantly limit development under the concurrency legislation.

Extending "state route" designation to non-state route arterial intersections would allow increases in development without providing for "congestion" control related to that growth. This would be a good idea if the goal of the change were simply to permit additional development, regardless of congestion. It would be a bad idea if the city wished to uphold the intent of the concurrency process. Simply removing this class of transportation facilities from the concurrency calculation would not help "solve" the problem of inadequate transportation facilities for a given level of development. It would give a city more flexibility in "getting around" the concurrency legislation.

While exempting routes of state significance from concurrency requirements has been problematic, removing more arterials and intersections from concurrency requirements will not advance the balance of development and mobility intended by state policy and law.

This approach would certainly be one way of "surmounting" a specific type of problem, but it would not provide the cities with a tool that was very useful for managing their development patterns, given the existing, planned, and desired transportation system.

Remove Arterial Roadways that Serve Primarily Regional Trips from the Concurrency Determination

As noted above, state routes were specifically exempted from concurrency determination, and congestion related to a lack of capacity on those routes is a major problem in applying concurrency at the local level. The problem is that travelers divert from congested state routes onto locally controlled arterials that serve as alternative routes for these regional trips. Increases in these regional trips, with trip ends outside of the local jurisdiction, cause increases in local congestion without generating the funds needed to mitigate the volume increases. A roadway that primarily serves these types of trips becomes a "drag" on local concurrency and local control because it will continue to degrade in level-of-service, and the cost of improvements (which must be done to meet concurrency requirements) must be met by the local jurisdiction and/or local development.

Removing arterials that primarily serve regional trips from concurrency calculations would "solve" this dilemma, at least in the same manner that the current state route exemption "solves" the problem. The disadvantage of such an approach is that it essentially would allow

development without regard to the availability of adequate transportation infrastructure. Thus, while “solving” one specific problem, it would likely generate or exacerbate several others. (For example, increased congestion on local roads caused by worsening conditions on regional by-pass routes would result in other concurrency failures as traffic attempted to by-pass the by-pass facilities.)

The project team does not recommend adoption of this idea. Such an approach would simply eliminate the concept of concurrency, without replacing it with a more functional system. In addition, given the fact that standards have already been adopted that include these roadways, it is likely to be viewed as a “give away to developers” by significant segments of the population, and is likely to generate considerable distrust towards future city actions.

This approach would simply treat a symptom, not address the issues that concurrency was meant to address, nor would it provide a mechanism to help fund the transportation system improvements that non-concurrent development requires.

Change the Duration of the Concurrency Standard

The City of Bellevue changed from a 1-hour volume standard to a 2-hour volume standard in 1998. Bellevue also adopted a peak hour factor of 1.00, instead of the 0.95 that was previously used.

This peak period duration (and/or peak hour factor), or an even longer standard, could be applied by all jurisdictions. In most locations, computing an “average hourly volume” over a 2-hour peak period would result in a lower traffic volume than if such a volume were measured for only 1 hour. The lower volume would result in a lower v/c ratio and would consequently result in a “better” computed level-of-service. Similarly, using a peak hour factor of 1.0 instead of 0.95 would lower the computed v/c.

Combined, these adjustments would “artificially” reduce the v/c ratio computed for a given intersection (assuming that the current v/c ratio using 1-hour volumes and a 0.95 PHF are considered to be “truth”). In reality, neither of these adjustments would change the performance of the intersection; they would simply change how that performance was reported.

The lower value reported with a 2-hour period and 1.0 PHF simply reflects the “average” condition at that intersection over the entire 2-hour period, rather than the condition found during the highest volume 15-minute period during the highest volume hour of the day. The 2-hour approach is essentially a measure of “average peak period,” while the 1-hour approach is a “worst case” condition during the peak period. Both conditions occur. The question is simply which one is the better measure of intersection performance for use in managing infrastructure investment?

Answering this question requires stepping back to how level-of-service standards are set. If LOS standards are adopted as if they represent the “worst” condition of the day but are then computed with an average peak period volume, the analysis results will produce an artificially low measure of congestion. On the other hand, if the standards are adopted with the understanding that the “average 2-hour condition” is being measured (and that at the worst of

times during that 2-hour period conditions are likely to be worse than reported), then increasing the duration of the time period measured is certainly acceptable.

In a congested metropolitan area, it makes considerable sense to use a longer period and set standards based on the “peak period.” This acknowledges the reality of urban congestion, particularly in zones with heavy employment, and accepts the facts that congestion does exist, that peak spreading is acceptable, and that roadway geometry should not be altered to meet the highest level of peak demand. However, while this may be “correct” from an “urbanist” point of view, it may not be politically acceptable or appropriate for zones that are primarily residential. The “correct” answer to this question is political, not technical.

At the same time, many local anti-growth activists will see such a change as simply a mechanism to permit unmitigated growth. This has the effect of creating distrust of the city’s motives. This group of citizens is likely to view these types of changes as simply a “way around” previously adopted standards.

No technical improvement would result from this suggestion. It would not resolve any of the limitations noted earlier in this paper. It would simply allow more development, given the current transportation infrastructure. This same result could be obtained by adopting a different level-of-service standard

Switch to an Average Total Delay Approach

The current Highway Capacity Manual includes procedures for estimating approach delay at intersections on the basis of input volumes, geometric intersection detail, and intersection timing information. Total intersection delay can then be used to look up the resulting level of service for the intersection. This technique could be used in place of the current v/c procedures for estimating level of service.

The advantage of such an approach is that it would describe intersection performance in terms of a traveler’s time, rather than in terms of roadway characteristics. In theory, this would allow the comparison of travel improvements across modes and allow more effective consideration of non-automobile based travel. The description of intersection performance in terms of “time delayed” would probably also be easier for the public to understand than the more abstract v/c ratio.

Additionally, it would be possible to compute delay for the “less important” movements at each intersection and to incorporate this delay into the reporting process. (The current process ignores all “non-critical” movements.) This would allow improvements to these “non-critical” movements to be reflected in the concurrency computations. However, inclusion of data on those movements would decrease the importance of the most congested movements.

On the downside, as with adopting travel time in place of v/c, simply changing the statistic used to compute concurrency would not result in a significantly better concurrency process. To address the issues identified earlier would require a more structural change to the concurrency process, such as collection and use of transit ridership and transit performance information. However, inclusion of transit trips and performance in the level-of-service

computation is not possible in the near term for the majority of the cities in this study. Without these additional capabilities, no significant change in the concurrency process outcome will occur. That is, all of the significant limitations noted above will remain, and therefore, this approach is not worth pursuing. Addition of non-automobile modal performance is considered a “longer term” change and is therefore addressed in the following section.

Finally, delay is only accurately measured when the effects of signal timing are accurately reflected. Signal timing is not incorporated into the four-step modeling process and is often not tracked well by the planning sections of most cities. Consequently, it is likely that delay computations output from the four-step planning process will be “rational” at best and most likely no better than the current v/c computations.

This approach is not recommended. It would provide few real benefits and would increase the time and resources required to perform the analysis.

POTENTIAL LONG-TERM SOLUTIONS

As a result of the work done to date on this effort, the project team believes that “fixing⁵” the concurrency process followed by the four cities in order to address the issues identified in the second section of this report requires some substantial changes to

- what types of measures are included in the concurrency standards,
- how the cities work together (and with other agencies in the region),
- how funds are generated, controlled, and spent for regional transportation improvements, and
- the types of transportation system improvements cities (and their residents) are willing to accept as a consequence of continued growth.

Not all of these types of changes must be adopted. However to fulfill the intent of this study, the project team believes that we need to explore this typology of changes in order to adequately describe their potential application to the participating cities, as well as to understand the advantages each might convey and the costs each implies.

The project team recommends pursuing the following six areas of study in order to adequately define and describe realistic proposals for addressing the major limitations in the current process.

- **A System of Regional Concurrency.** Our study and PSRC’s concurrency assessment project confirm that local concurrency powers cannot and do not manage regionally generated traffic. Could a regional concurrency system be employed? What would it look like and how might it work? Who would manage it? Would loss of local control and complexity cause more problems than would be solved? How would you provide accountability? Measure success?
- **Results-based Concurrency Measures.** Presently, the four eastside cities use one LOS metric, the volume of automobiles at key points in roadways relative to estimated

⁵ Note that not all participants in this project feel that the current system needs to be “fixed.”

roadway capacity. But PSRC's survey identifies two examples where local governments have set different outcome-based measures for future transportation. Can the kinds of performance standards for reducing VMT in Snohomish County and increasing the transit share of trips in Renton make concurrency work better in the eastside cities? Could adoption of a program similar to the University of Washington's U-Pass (which limits vehicle trips bound to/from a defined geographic zone) within a defined geographic area function successfully when multiple land owners and hundreds of tenants and residents fall within that zone?

- **Investing in TDM, HOV, and Non Motorized Modes.** Auto capacity LOS measures invariably result in road widening solutions. The GMA legislation itself also leans towards immediate capital improvements because it uses the term “adequate public facilities” and imposes a six year time frame for implementing improvements paid for by impact fees on new development. What measures could induce more multi-modal and non-structural approaches to concurrency investments, consistent with the intent of federal TEA-21 transportation policy?
- **Incorporation of Other Modal Performance Measures Within the Concurrency Standards.** Where the desired increase in transportation system capacity needed to serve desired growth is not roadway based, how can the four cities' define those system improvements in such a way that they can be incorporated into the transportation concurrency standards? How can performance against those standards be cost effectively monitored, and how can the effects of proposed development on the use of those non-roadway facilities be accurately predicted?
- **A Long Term TDM/Transit Fund.** There are two arguments against using impact fees (and other publicly controlled transportation funds generated from new development) for anything other than adding lanes or widening intersections. The first is that impact fees must be spent within six years, hence on-going car trip reduction methods would be impossible to sustain. The second is that transit operations are not permanent and would disappear after a six year period as well. We plan to examine the efficacy of creating *transit and TDM operating accounts*, a type of perpetuating fund which could yield an annuity for transit service and/or TDM efforts. If this kind of mechanism appears promising, we would want to understand if it is enabled under current state law, and if not, what changes would be necessary.
- **Local/Regional Transit Cooperation.** As we have seen, a strength and limitation of transportation concurrency is that it is locally defined and administered. Should an eastside city decide locally to enhance transit service to achieve concurrency in a given corridor, it would remain powerless to implement such service, because transit operating authority falls within King County's jurisdiction. What legal, structural, or inter-jurisdictional arrangements would remedy the existing disconnect between concurrency at the city level and transit planning and operations at the county level?

APPENDIX E

Technical Memo #2: Stakeholder Involvement Plan

Completed: March 2002

INTRODUCTION

This memo offers an outline of who the Eastside Concurrency Study stakeholders are and how they will interact with, influence and learn from this study over the next year and a half.

The study's purpose is three-fold:

- To understand how the cities of Bellevue, Issaquah, Redmond, and Kirkland employ transportation concurrency
- To examine alternative methods of measuring and implementing concurrency practices and propose changes which can incorporate multi-modal measures and can improve implementation and public understanding, and
- To foster inter-jurisdictional cooperation in addressing what are simultaneously local as well as regional and sub-regional growth management issues.

THE STAKEHOLDERS

The most directly involved parties will be the professional staffs responsible for implementing the four jurisdictions' land use and transportation policies as embodied in their comprehensive plans. These plans, adopted in 1995, carry out the statewide mandate of Washington's Growth Management Act. Stakeholders include individuals and organizations at the local level and at the state and regional levels. At the local level, stakeholders most involved on a regular basis will include:

Technical staff from each city's planning and transportation departments. This multi-jurisdiction group comprises the study Technical Advisory Committee (TAC) which will provide information to the consulting team and review the team's work.

Directors of the planning and public works departments of each municipality comprising an Executive Steering Committee (ESC) will provide oversight and guidance to the TAC and consultant team.

Stakeholders which will be regularly informed on the project's progress and involved from time to time include:

Elected officials from each city

Appointed members of Planning and Transportation Commissions

Civic and Neighborhood Associations

At the state and regional level, stakeholders include:

State Office of Community Development/Growth Management Division

Puget Sound Regional Council/Growth and Transportation Policy Committees and the Concurrency project

Suburban Mayor's Association

State Legislature

Environmental/Transportation Interest Groups

Chambers of Commerce

Business Associations

Master Builders Association

King County

Growth Management Hearings Board

Washington State Department of Transportation

ROLES

The ESC and TAC roles are to provide information to the consultant team, review its work, and provide overall guidance to keep the project focused, and on track. The ESC/TAC will provide technical input to the project. In particular they will be relied on to comment on the practicality and functionality of recommendations and suggestions developed by the project team. Elected and appointed officials are responsible to the electorate, directly or through their representatives, to formulate the policies governing concurrency. They will both inform this study and act upon some of its findings. Many local officials have become experts on issues of traffic, development and growth and their recommendations regarding implementation alternatives will enrich the study. Their understanding of the political terrain and their buy-in will make the study results more useful in the world of implementation.

The same is true for civic and neighborhood groups which are protective of their neighborhoods and quality of life and may be wary about the actions of city officials regarding growth, growth management and concurrency. Whereas the elected officials from the four jurisdictions are on record supporting this study, some neighborhood groups may not wish to constructively join with the study. Hence, neighborhood group level of involvement will be less direct than elected and appointed officials'.

At the state level, the Office of Community Development is responsible for assisting jurisdictions in implementing the GMA. Concurrency best practice is an obvious area of interest. The State Legislature is the project funder and is interested to know how to most effectively implement its 1991 landmark legislation. PSRC is undertaking an inventory and analysis of how concurrency is being applied in its four county service area. Statewide and metro area organizations, 1000 Friends of WA and organizations like the Washington Master Builders Association advocate for the application of growth management, often in very different ways. Their views can also inform the study.

Core Involvement: The ESC and TAC

The ESC and TAC with the addition of selected representatives from city councils and appointed commissions will meet approximately eight times during the course of the study in conjunction with development of draft products. The purpose of these meetings is to provide regular input and scrutiny for the consultant team's work. They are proposed for Friday mornings from 9:30 to 12:30pm two weeks after draft deliverables are due to enable participants to review and comment on materials and maximize productive meeting time. (See the attached timeline for proposed dates 3/28, 4/26, 6/21, 9/20, 11/22/02, 1/24, 2/21, 5/23, 9/5, 11/15/03) We are also reserving time for an ESC/TAC meeting before or after the Chartering Session should such an additional meeting be advantageous.

The meetings will offer a time to hear presentations about consultant team findings, and to invite outside speakers and experts to present best practices or new approaches from a practitioner and/or academic perspective. These meetings serve both a technical review/project management function as well as an enrichment and exploration function for the local ESC/TAC/Elected/Appointed Officials stakeholders. Meetings of approximately three hours in length will be held at roughly ten-week intervals at eastside locations as well as at the University of Washington. In the latter cases, we might combine sessions with speakers or presentations on topics such as:

- Other states' concurrency tools and experiences
- Inter-jurisdictional cooperation/ models and experiences (Joint Exercise of Powers Agreements i.e. Alameda Corridor Authority)
- New tools and techniques (Urban Sym transportation modeling)

Intermittent Involvement: An Advisory Council

The consultant team will also seek the advice and counsel of stakeholder individuals and organizations with a statewide and regional perspective in the form of an Advisory Council. This advisory council comprised of representatives from PSRC, OCD, 1000 Friends of WA, neighborhood groups, and others, will be consulted from time to time to test ideas and options. We anticipate that some of advisors may be asked to attend ESC/TAC meetings on a selective basis when their involvement will add value to the topics under discussion.

Presentations to City Councils and Commissions

Although we expect some elected and appointed officials to participate in ESC/TAC meetings, staff and consultants will be regularly updating city councils and planning and/or transportation commissions on the progress of this study. City staff will take the lead in briefing their elected and appointed officials, but the consultant team is prepared to make up to eight presentations to city councils during the course of the study. The exact timing of these presentations will be determined as the study proceeds and in consultation with the ESC/TAC. However, the draft report is scheduled for review by city staffs in August 2003 with a final report and executive summary ready for approval by the Bellevue, Redmond, Issaquah and Kirkland city councils in October 2003.

Accessing Study Information via the Web

The study team will develop a project Web site, which will host materials and links useful to the Eastside Concurrency Project and its stakeholders. ESC/TAC members and other stakeholders will receive e-mail notification of new postings. The intent is to make information available and accessible to a broad array of individuals and organizations interested in the issues of transportation concurrency. However, certain sections of the web site can be password restricted should this be necessary. Our plan is to establish the site initially at <http://depts.washington.edu/trac/concurrency/index.html>.

Chartering Session

The Chartering session is the Eastside Concurrency Study's formal kickoff event, tentatively scheduled in this Stakeholder Involvement Plan for late April 2002. Its purpose is to bring the array of stakeholders together to:

- share the history of GMA and concurrency
- hear the purpose of the study from the funder and cities' perspectives
- meet the consultant team
- set a standard of inclusiveness and openness for the study
- build a foundation for cooperation and mutual learning.

There will be an opportunity for the mayors and other elected officials from the four Eastside cities to welcome attendees. It will be an opportunity for appointed officials, professional staff, and organizations interested in concurrency to do the following:

- hear from State Representative Fred Jarrett sponsor of the legislation funding the effort
- share a common history from the Growth Strategies Commission (Dick Ford and/or Mary McCumber) and
- hear from an outside expert on the reasons for building GMA around the 3Cs—comprehensiveness, consistency, and concurrency (possibly people such as John DeGrove, Reid Ewing, Doug Porter, or Henry Richmond).
- meet the UW/TRAC study team.

Invitees will represent the broader list of stakeholders. The Chartering Session will introduce the study process and points of public involvement.

Closing Session

The closing session will be the other bookend to the chartering session. It will also involve a broad array of stakeholders and embody a public presentation of the findings and recommendations of the study. Both the Chartering and Closing Sessions will be held in locations that are welcoming (not public hearing-like in nature, places such as Issaquah's Mansion, UW's Parrington Hall Commons).

