2. Assumptions

Introduction

The CTIP builds upon an explicit set of planning, financing, and technical assumptions. The assumptions fall into the following categories:

- Planning assumptions
- Financing assumptions
- System performance measures and benchmarks

Planning Assumptions

Existing Plans

The CTIP builds upon previous plans and studies, with particular attention to the following plans:

- The Northgate goals and policies in the Seattle Comprehensive Plan (2004)
- The Northgate Open Space and Pedestrian Connections Plan (2004)
- The 5th Avenue NE Streetscape Final Design Report (2002)

In addition, known or anticipated new developments were evaluated as “pipeline projects.”

Assumptions

1. CTIP recommendations will be consistent with existing plans for the Northgate area.
2. Anticipated new development and land uses will be included as part of CTIP traffic forecasts.

Study Area

The CTIP uses the same study area boundaries as the 1993 NACP study (see **Figure 1-2**).

Assumptions

1. The study area of the CTIP will be consistent with the NACP (see **Figure 2-1**). The study area boundaries, as designated in the NACP EIS, are defined by Ashworth Avenue N on the west, N/NE 130th Street on the north, N/NE 85th Street on the south, and the west side of Lake City Way NE on the east, excluding Lake City Way.

2. The analysis will include traffic that may travel through the study area from access points on Lake City Way.

Study Area Growth Assumptions

The CTIP assumes the City's land use growth forecasts for the study area. The future growth assumptions used the Seattle Transportation Demand Forecasting Model (Seattle Model) for the following three areas: 1) Northgate CTIP study area; 2) the entire City of Seattle area; and 3) the four-county Puget Sound Regional Council planning area outside the City (King, Kitsap, Pierce, and Snohomish counties).

Assumptions

1. The CTIP will review the Seattle Model's assumptions for existing land use, and 2010 and 2030 growth projections.
2. The CTIP will refine land use projections for 2010 and 2030 based on the anticipated development proposals.

Interstate 5

While the City does not have land use or transportation planning responsibility within the State right-of-way, State facilities significantly affect the operation of the City's transportation system. WSDOT's planning activities for I-5 may provide a vehicle by which to implement recommendations.

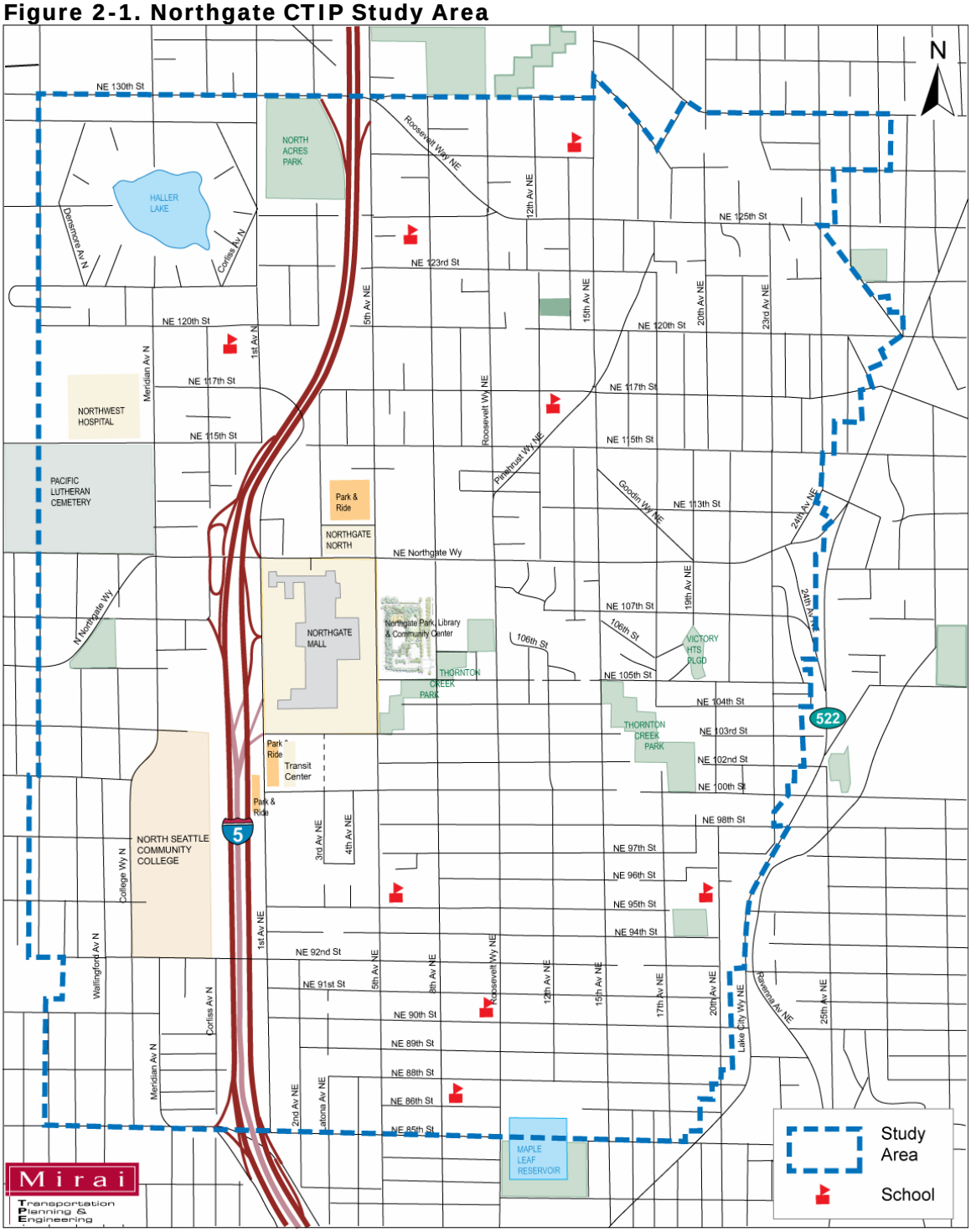
Assumptions

1. The CTIP will develop and evaluate concepts to improve east-west pedestrian circulation across I-5.
2. The CTIP will evaluate intersection operations on City arterials at existing I-5 ramps.
3. The CTIP will coordinate with WSDOT on the I-5 Pavement Reconstruction and Bottleneck Improvement Projects. (WSDOT is planning to replace 16 miles of concrete on I-5 from Tukwila through downtown Seattle to Northgate.)

Sound Transit

The Sound Transit Board affirmed its plan to build a light rail system from Downtown Seattle to Northgate, but full funding and project timing remained uncertain during the CTIP study. At the time of this report, Sound Transit had initiated planning for Sound Move Phase 2, including extension of light rail from Northgate into Snohomish County.

Figure 2-1. Northgate CTIP Study Area



The elevated Northgate light rail station is proposed for east of 1st Avenue NE, spanning NE 103rd Street, with a station entrance on the Northgate mall property north of NE 103rd Street and an entrance south of NE 103rd Street near the Metro Transit Center. This station would provide a connection to the regional and local transit systems with access to Northgate Mall, allow for bus transfers at the Northgate Transit Center, and serve adjacent park-and ride facilities. Pedestrian and transit circulation throughout the station area would be well integrated. Light rail service would offer an alternative to the region's congested roadways, with significant travel time savings over existing bus travel times between Northgate and downtown Seattle.

While Sound Transit has identified Northgate as a temporary terminus for the light rail line, a decision to extend light rail beyond Northgate has not been made. When that decision is made, Sound Transit will prepare environmental documents and analyze impacts of such action to the Northgate communities. Therefore, the following assumptions were used for the CTIP.

Assumptions

1. Link Light Rail will be extended to the University District by 2020.
2. Link Light Rail will serve Northgate by 2030.

Financing Sources

The CTIP balances new, innovative ideas with financial constraint. The list of full transportation needs nevertheless outstrips the City's available funding. Potential revenue sources include the following:

- Local Improvement District financing;
- Transportation Benefit District financing;
- employee tax for transportation improvements;
- additional general fund allocation to transportation;
- grants and loans;
- partnership opportunities involving the use of street rights-of-way, including street vacations;
- partnership opportunities via neighborhood grant allocations;
- development mitigation under SEPA; and
- the City's Transportation Mitigation Payment Program.

The CTIP's financing plan estimated possible revenue sources from the City; agencies such as King County Metro, Sound Transit, and WSDOT; and private development.

Assumptions

1. The City's current financial capability will be described early in the CTIP planning process.
2. The City's current financial capability will define the initial investment level for CTIP recommendations.
3. The CTIP will identify other potential funding sources and steps.

System Performance Measures

Recommended Performance Measures and Benchmarks

System performance measures, indicators, and benchmarks make explicit the assumptions about what constitutes an effective and efficient transportation system. Using the performance measures, indicators, and benchmarks defined below, the CTIP identified system deficiencies and corresponding improvements for each transportation mode, as well as for residential and arterial roadways.

Performance measures provide measurement or evaluation of how a system is performing to meet its goals and objectives.

Performance indicators comprise the components and/or characteristics of a system. Generally, a performance measure consists of several indicators.

Benchmarks establish acceptable conditions for each transportation system.

Note: the City's adopted level-of-service standards in the Seattle Comprehensive Plan Transportation Element direct the City's concurrency management system under the Growth Management Act. However, the CTIP uses a more detailed set of performance measures and benchmarks to evaluate the benefits of potential CTIP improvements at a subarea level.

The following key components of Northgate's transportation system were evaluated using the recommended measures and benchmarks:

- Mode share
- Transportation system for pedestrians
- Transportation system for bicyclists
- Transit system
- Transportation system for vehicles

Mode Share Performance Measures

Travel mode share for single-occupant vehicle (SOV), transit, carpool, pedestrian, and bicycle trips indicates how efficiently the transportation system is used. The Transportation Element of the Seattle Comprehensive Plan recommends travel mode choice goals for 2010 and 2020.

The Northgate Overlay District in the Land Use Code (SMC 23.71) includes the maximum PM peak hour SOV mode use for commercial and residential trips generated by development projects above a certain trip generation threshold. After year 2000, the maximum SOV use goal is set at 55% for both commercial and residential trips. However, the mode share goals recommended in the Seattle Comprehensive Plan Transportation Element (see **Table 2-1**) appeared more useful for the CTIP's analysis, insofar as they are based on information available from the 2000 Census survey data.

Table 2-1. Mode Share Performance Measures

Indicator	Benchmark
Work trips by workers within the Urban Center	2010: 70% or less drive alone
	2020: 60% or less drive alone
All trips by residents within the Urban Center	2010: 45% or less drive alone
	2020: 40% or less drive alone

Pedestrian System Performance Measures

The CTIP's performance measures for the Northgate area pedestrian system describe conditions at arterial crossings, as well as the presence and quality of connections between major destinations, connections between neighborhoods and the Northgate Urban Center, and connections within neighborhoods to local schools, parks, the Civic Center, the transit center, and neighborhood commercial districts. The Open Space and Pedestrian Connections Plan identified a number of important pedestrian linkages in the study area.

The study team documented existing conditions through field observations, public comment, and feedback from the Northgate Stakeholders.

Measurement of key indicators at intersections and mid-block crossings (**Table 2-2**) included the following locations:

- Northgate Way Corridor
  - I-5 southbound ramps
  - 1st Avenue NE
  - 3rd Avenue NE
  - 5th Avenue NE
  - 8th Avenue NE
  - Roosevelt Way
- 5th Avenue NE Corridor
  - Northgate Way
  - NE 106th Street (Civic Center)
  - NE 105th Street
  - NE 103rd Street
  - NE 100th Street
  - NE 92nd Street
  - NE 85th Street
- 8th Avenue NE Corridor
  - North of Northgate Way NE to Post Office
- Roosevelt Way Corridor
  - Street sections between NE 112th Street and Northgate Way
  - Street sections between NE 88th Street and NE 92nd Street
- 15th Avenue NE Corridor
  - North of NE 94th Street
  - Access to Sacajawea Elementary School
  - Access to NW Puppet Center
  - NE 117th Street —NE 125th Street
- 3rd Avenue NE Corridor between NE 100th Street and NE 103rd Street (new 3rd Avenue NE extension)
  - NE 100th Street
  - NE 103rd Street
- College Way/Meridian Avenue N Corridor between N 92nd Street and N 122nd Street

Table 2-2. Pedestrian System Performance Measures for Intersections and Mid-Block Crossings

Indicator	Benchmark
Pedestrian Crashes Crossing Width Conflicting Turning Volumes Refuge Space Average Speed Activated Pedestrian Signals ADA-Compliant Ramps Streetlights	Quantitative and qualitative analysis to determine adequacy

Table 2-3 identifies key indicators for areas within the Urban Center, from neighborhoods to the Urban Center, and within neighborhoods.

Table 2-3. Pedestrian System Performance Measures for Areas within the Urban Center, Neighborhoods to the Urban Center and within Neighborhoods

Connections within the Urban Center	
Between North Seattle Community College and Northgate Transit Center Between the new Civic Center and Transit Center Between Northgate Mall and Northgate Transit Center Between Northgate Mall and the future Link Light Rail station Between Northgate Mall and Northgate Civic Center Between Northgate Mall and Northgate North Center Between the office center south of NE 100th Street and Northgate Mall Pedestrian Access to QFC at Roosevelt Way and NE 112th Street 8th Avenue NE between Northgate Way to NE 92nd Street	
Indicator	**Benchmark**
Connectivity (pedestrian facilities that may include sidewalks, trails, etc.)	Acceptable when equals 90% of total arterial linear distance times two (2)*
Quality of pedestrian connection	Qualitative assessment of pedestrian facilities to determine adequacy

Neighborhoods to Urban Center (arterials including trail segments through public open space)	
Indicator	**Benchmark**
Connectivity (sidewalks) and characteristics of pedestrian facilities such as street lights, sidewalk space, pavement conditions (such as tree grate displacement, lack of maintenance, need, etc)	Acceptable when equals 90% of total linear arterial distance times two (2)*, and qualitative assessment of pedestrian facilities to determine adequacy

Neighborhoods to Parks, Schools, Local Businesses and Transit Center (arterials and local streets)	
Indicator	**Benchmark**
Obstacles (minimum space necessary for two persons to walk continuously)	None within ½ mile radius of parks, Civic Center, and neighborhood commercial districts
Connectivity (sidewalks) and quality of sidewalks	90% of total arterial linear distance times two (2)* and qualitative assessment of pedestrian facilities to determine adequacy
School walk routes	90% have sidewalks on one side within each school walk zone

** Sidewalks to be assessed on both sides of a street*

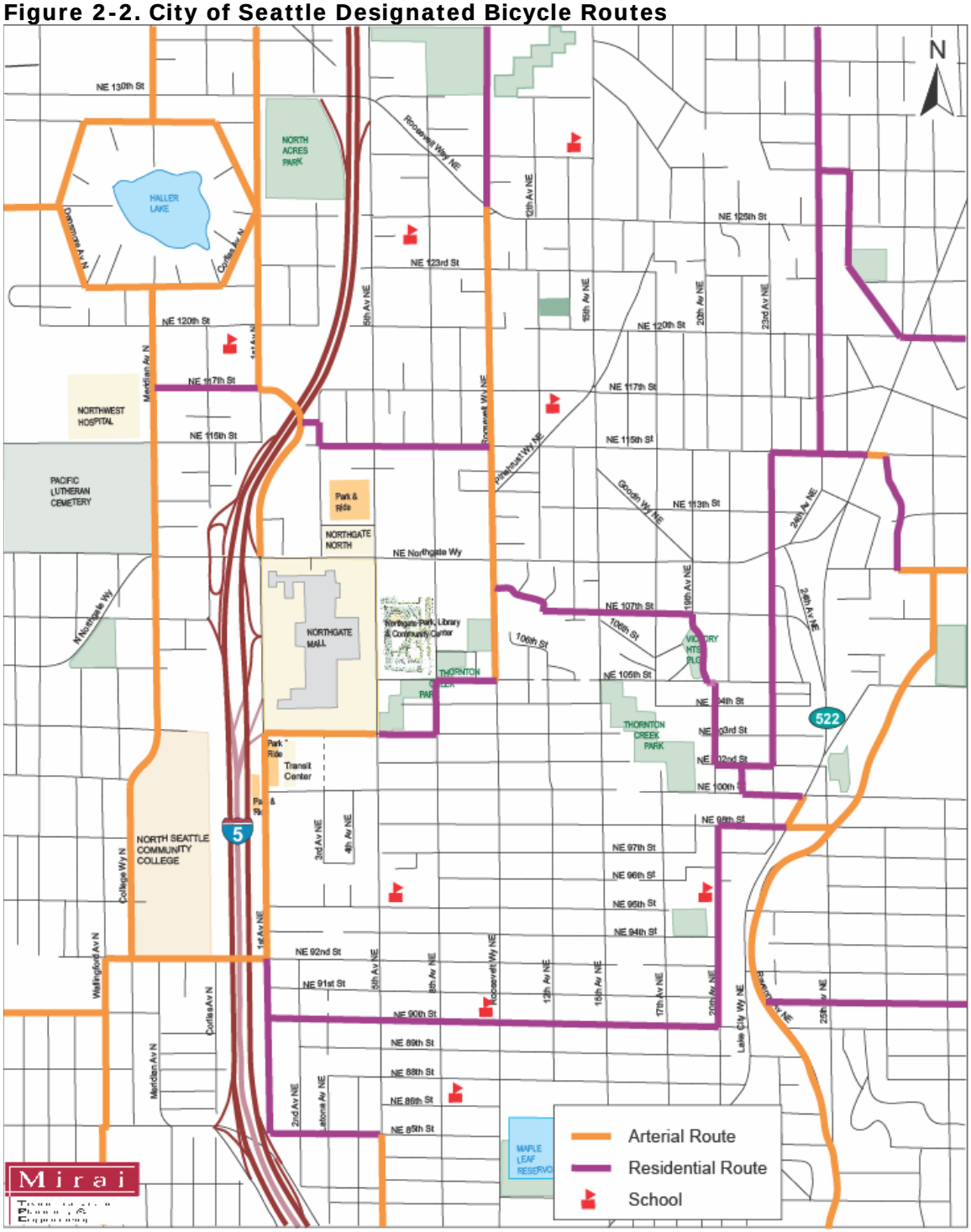
Bicycle System Performance Measures

The CTIP rated the designed bicycle routes and other arterials in the study area against a bicycle performance index (BPI) benchmark that indicates bicyclist comfort in terms of specific roadway design and traffic conditions (see **Figure 2-2** for the City's designated bike routes). **Table 2-4** lists the specific performance indicators, each of which was weighted and added together according to a mathematical equation to arrive at a given score. The resulting scores equate to a BPI that ranges from an "A" through "F," with "A" being the best conditions. The target BPI along arterials in the study area was set at "C"; it was set at "B" for residential routes. In addition, routes within ½ mile of a recreational facility or school were assigned a target BPI of "B."

Table 2-4. Bicycle System Performance Measures

Indicator	Benchmark
Traffic conditions (average daily trips, percent of heavy vehicles)	Bike routes within ½ mile of a recreational facility or schools: BPI **B**
Roadway design (number of lanes, speed limit, width of outside lane)	Bike routes along non-arterials: BPI **B**
Roadway surface conditions	Bike routes along arterials: BPI **C**
(FHWA's Bicycle Compatibility Index and Updates)	

Figure 2-2. City of Seattle Designated Bicycle Routes



Transit System Performance Measures

The CTIP defined transit performance indicators within three major service categories: the Urban Village Transit Network (UVTN), senior households, and other households served by the Secondary Transit Network (see Chapter 1 for transit network descriptions and **Table 2-5** for performance measures). Benchmarks for UVTN service match those in the adopted Seattle Transit Plan; others include service frequencies and coverage. The bus routes were grouped based on Northgate residents' travel destinations. For example, one set of the routes served local/neighborhood facilities such as the Northgate Mall, Civic Center, Northgate Community College, etc., and others served major destinations such as downtown Seattle and the University of Washington.

Table 2-5. Transit System Performance Measures

Urban Village Transit Network	
Indicator	**Benchmark**
Frequency (per UVTN Report)	7–15 minutes
Span of service (per UVTN Report)	16–18 hours
Loading	< 100% capacity
Reliability (per UVTN Report)	> 60% services running < 1 minute late
Transit vehicle speed	> 30% of the speed limits

Senior Households (residents in multi-family senior facilities)	
Indicator	**Benchmark**
Transit service for 90% of senior households within 1/8 mile of routes serving these destinations:	
Downtown Seattle and University District	< 15 minute peak and midday
Other Urban Centers	< 30 minute peak and midday
Local destinations	< 30 minute peak and midday

Households (Secondary Transit Network)	
Indicator	**Benchmark**
Transit service for 60% of all other households within ¼ mile of routes serving these destinations:	
Downtown Seattle and University District	< 15 minute peak and midday
Other Urban Centers and nearby urban villages	< 15 minute peak and 30 minute midday
Transit service for 70% of all other households within ¼ mile of routes serving local destinations	< 30 minute peak and midday

Roadway System Performance Measures

Performance of the transportation system for vehicles was evaluated according to traffic safety, non-arterial/residential streets, arterial corridor level of service, and arterial signalized intersection level of service.

Traffic Safety

The CTIP measured traffic safety in terms of the number of crashes and traffic crash rates within the study area. The rates were defined by average annual accidents per million vehicles at intersections, and mid-block locations were derived from the last five years of traffic crash records maintained by the City (see **Table 2-6**).

Table 2-6. Traffic Safety Performance Measures

Indicator	Benchmark
Average number of crashes for signalized intersections	10 per year
Average number of crashes for unsignalized intersections and mid-block locations	5 per year
Crash rates for signalized intersections	Intersections within the top one-quarter (ranked highest to lowest rates)
Crash rates for unsignalized intersections	Intersections within the top one-quarter (ranked highest to lowest rates)
Crash rates for mid-block locations	Mid-block locations within the top one-quarter (ranked highest to lowest rates)

Non-Arterial/Residential Streets

The Seattle Comprehensive Plan calls for protecting neighborhood streets from through traffic (policy T-G7). The NACP identified the following streets as appropriate for reducing traffic, speeds, and pedestrian vehicular conflicts:

- Ashworth Avenue N
- NE 115th Street between Lake City Way and 5th Avenue NE
- NE 107th Street between 15th Avenue NE and 23rd Avenue NE
- 23rd Avenue NE
- Pinehurst Way between NE 120th Street and NE 125th Street
- Maple Leaf local access streets
- NE 98th Street between Lake City Way and 15th Avenue NE

This study also evaluated streets identified as school walk routes for elementary schools in the study area.

The CTIP evaluated non-arterial/residential streets in terms of the following indicators: traffic volumes, vehicle speeds, crash history, school walkway designations, pedestrian routes identified in the

Open Space and Pedestrian Connections Report (2004) and elsewhere, bicycle routes, presence of sidewalks/walkways, and street characteristics such as street width, sight distance, and on-street parking (see **Table 2-7**).

Table 2-7. Non-Arterial/Residential Performance Measures

Indicator	Benchmark
Traffic volume, traffic speed, crash history, school walkway, pedestrian facilities, bicycle routes, and street characteristics	Points will be assigned to each indicator. Individual residential streets will be ranked by total score. This ranking of streets will be used at the initial stage of identifying deficiencies.

Key residential streets received points for each performance indicator and were then ranked by total points given to each street (see **Table 2-8**).

Table 2-8. Non-Arterial/Residential Indicator Scoring

Indicator	Maximum Points
Vehicle volume (1 point per 100 vehicles per day)	20
Vehicle speed (1 point per each mph above an 85th % speed of 20 mph)	20
Pedestrian facilities	20
Crash history	10
School walk route	10
Primary pedestrian route	10
Bicycle route	5
Street characteristics	5

Arterial Corridor Level of Service

Arterial corridor level of service (LOS) was measured by average speed on a minimum 1-mile segment during the PM peak period. As shown in **Table 2-9**, the target levels of service were set at LOS D for transit streets and LOS E for other arterials. LOS D is defined as average speed in a range of 14 to 18 miles per hour, and LOS E average speed ranges from 10 to 14 miles per hour during the PM peak hour. The following arterials were analyzed using the methodology in the Highway Capacity Manual 2000:

- NE 130th Street/NE 125th Street between Ashworth Ave and 25th Ave NE
- Northgate Way between Meridian Avenue and Lake City Way
- Meridian Avenue N/College Way/Wallingford Avenue N between NE 122nd Street and NE 85th Street
- 1st Avenue NE between Northgate Way and NE 92nd Street, and between Northgate Way and NE 130th Street
- 5th Avenue NE between NE 130th Street and Northgate Way, and between Northgate Way and NE 85th Street

- Roosevelt Way NE/Pinehurst Way NW between NE 117th Street (15th Avenue) and NE 85th Street
- 15th Avenue NE between NE 125th Street and Northgate Way and between Northgate Way and NE 85th Street

Table 2-9. Arterial Corridor Level of Service Performance Measures

Indicator	Benchmark
Travel speed	Level of service E Level of service D along transit corridors (principal and major transit streets shown in Figure 3-15)

Arterial Signalized Intersection Level of Service

The level of service at a signalized intersection is the average of the vehicle wait times at each leg of the intersection. Following the HCM 2000 methodology, this study calculated average vehicle delay at each arterial intersection during the PM peak hour using Synchro 6 traffic simulation software.[1] The intersection level of service for an arterial corridor averages the delay at each intersection along that corridor, with a CTIP target benchmark of LOS E, representing an average of 55 to 80 seconds of delay per intersection (see **Table 2-10**).

Table 2-10. Arterial Signalized Intersection Level of Service Performance Measures

Indicator	Benchmark
Intersection delay at each intersection	Level of service at each arterial intersection will be reported. (Specific benchmark will not be established because it is more meaningful to evaluate the performance of the aggregated intersections than the performance of individual intersections for an Urban Center area).
Average delay among intersections	LOS E within a key arterial corridor

[1] "Delay" is a measure of free-flow traffic speed minus the actual time waiting to get through the intersection(s).