



DRAFT FINDINGS REPORT

CLARK COUNTY I-5/HIGHWAY 99 ALIGNMENT ALTERNATIVES

JULY 1994

Prepared for: Tri-Met

Prepared by: Parsons Brinckerhoff Quade & Douglas, Inc.

The preparation of this report was financed in part by the U.S. Department of Transportation, Federal Transit Administration and by the Washington State Department of Transportation. The opinions, findings and conclusions expressed in this report are not necessarily those of either the Federal Transit Administration or the Washington State Department of Transportation.



TABLE OF CONTENTS

Page	No.

1.0	OBJECTIVE1								
2.0	BACKGROUND1								
3.0	DESCRIPTION OF ALIGNMENT ALTERNATIVES AND DESIGN OPTIONS								
	3.1	I-5 Alignment Alternative	2						
	3.2	 Highway 99 Alignment Alternative 3.2.1 Existing Highway 99 Facility 3.2.2 Highway 99 Improvements 3.2.3 Highway 99 Alignment Alternative 	10						
4.0	COMI	PARATIVE MEASURES	.14						
	4.1	 Land Use Opportunities and Constraints 4.1.1 Existing Developed Land Uses 4.1.2 Under-Utilized Land 4.1.3 Existing and Euture Zoning 	.14						
	4.2	 4.1.5 Existing and Future Zoning Facility Design	18						
	4.3	 4.2.2 Ingrived y 55 Angrine in Anternative, Access	.19						
	4.4	 4.3.2 I-5 West Improvement Assumptions for EkT Traffic Capacity	20 21 21 22 23 26 26						
	4.5	 4.4.6 1-5 Augmment Tranc Issues Transit Operations 4.5.1 Bus Access (C-TRAN) 4.5.2 Park and Ride Lots 	27						
	4.6	Right-of-Way and Displacements	32						
	4.7	Capital Costs							

DRAFT FINDINGS REPORT CLARK COUNTY I-5/HIGHWAY 99 ALIGNMENT ALTERNATIVES

1.0 OBJECTIVE

The objective of this report is to develop data to evaluate and refine LRT alignment alternatives in the portion of the South/North Corridor just north of the NE 39th Street interchange to NE 134th Street, along the I-5 Corridor in Clark County. The purpose of this data development is to provide supporting information for comparing the alignment alternatives, I-5 versus Highway 99 in Clark County, for further analysis in the DEIS for the South/North Transit Corridor Study. As part of the project development, it provides supportive information for Metro's summary documentation concerning this corridor segment.

2.0 BACKGROUND

Clark County presents an opportunity to introduce concepts for light rail alignments and work with the community and business interests to understand the opportunities and constraints associated with these alignment alternatives and design options. The first level of decisions relating to Clark County will occur with the choice of study termini. Choices for study termini within the I-5/Highway 99 alternatives include a close-in terminus at NE 88th Street, a terminus at NE 134th Street, or as far north as NE 179th Street.

The High Capacity Transit Analysis prepared for C-TRAN (1991) studied other alignment alternatives south of the Main Street Interchange, along the east and west sides of I-5 to McLoughlin Boulevard, and heading south to the Vancouver CBD. However, these alignments have not been carried forward to this stage of the South/North Corridor Transit Project.

3.0 DESCRIPTION OF ALIGNMENT ALTERNATIVES AND DESIGN OPTIONS

For the purposes of developing cost estimates and measuring potential impacts, conceptual designs of the alignment alternatives have been developed. These conceptual designs define the baseline assumptions for the data and findings presented in this report. There are two alignment alternatives within the I-5/Highway 99 corridor north of Vancouver CBD, each with two common termini options. I-5 has two design options running north parallel to I-5; one on the east side of I-5 and the other on the west. The Highway 99 alignment alternative is located in the center median of Highway 99.

Termini Options

The alignment alternatives begin at a common point on Highway 99 at NE 39th Street. The first terminus option is at NE 88th Street. The second terminus option is at NE 134th Street. North of NE 134th Street, the three alignment alternatives would combine as one alignment on the west side of I-5 and continue north to a possible NE 179th Street terminus. The portion of the alignment segment north of NE 134th Street is not analyzed in this findings report.

Existing Interstate 5 Facility

The existing I-5 freeway varies as a four lane and six lane freeway facility throughout this alignment segment. It traverses north over varying topography either within a retained cut 15 to 20 feet below surrounding grade, or as a fill structure five feet to 20 feet above the surrounding grade. The freeway crosses two separate natural waterways: Burnt Bridge Creek at the south end of this alignment segment and Salmon Creek at the north end.

Generally, the southern half of the freeway facility is six lanes with two median shoulders, with a total right-of-way width of 88 feet. The northern half of the facility has two median shoulders and four through lanes with a total right-of-way width of 64 feet. The freeway facility within this study segment has four major interchanges, three existing, and one planned. These include: Main Street, NE 78th Street, NE 99th Street, and NE 134th Street.

WSDOT Future Expansion Plans for I-5

The Washington State Department of Transportation (WSDOT) has developed plans for improving the entire freeway facility in this study segment including: adding two to four lanes to widen the entire facility up to 110 to 120 feet of right-of-way; new interchanges with bridges and retaining walls at Main Street, NE 78th Street, NE 99th Street, and NE 134th Street; and a new overpass at NE 129th Street, new retaining walls, sound walls and overpass improvements. Construction is currently underway at the NE 99th Street interchange, NE 129th Street overpass, and NE 134th Street ramps and overpass. A more detailed description follows.

3.1 I-5 Alignment Alternative

The I-5 alignment alternative has two design options on either the east or west side of the I-5 facility. The design options would have similar station locations and park and ride locations. The two alignments would begin at a common point along the west side of Highway 99, south of the Main Street Interchange. The options would split south of the I-5 crossing with the west side LRT design option running at grade alongside the Main Street

I-5 exit ramp. The east side LRT design option would cross over I-5 on a new long span bridge structure which would touch down at grade above the Main Street I-5 entrance ramp, and head north parallel to the I-5 facility.

The LRT facilities and trackway features for the I-5 alignment alternative are assumed to be similar for both design options throughout this segment. The trackway is assumed to be tie and ballast, with the exception of at-grade crossings. Station platforms are assumed to be center platforms with canopies and other station amenities. Sound barriers and retaining walls would be required at various locations on either side of I-5.

See Figures 3.1, 3.2, and 3.3, Opportunities and Constraints map for the alignment configuration.

3.1.1 I-5 East Design Option

The east side LRT design option would cross over I-5 on a long span LRT bridge structure approximately 1,100 feet in length and touch down at grade within the I-5 right-of-way. The alignment would then head north parallel to I-5 for the remainder of this alignment segment. Retaining walls are assumed to be required along the east side of the alignment from the Main Street interchange up to NE 63rd Street in this vicinity. BPA towers located to the east of the LRT alignment and just north of the Main Street Interchange are assumed to be relocated. The alignment would pass under the east/west Burlington Northern Railroad crossing. This bridge structure is assumed to be widened to allow the alignment to pass under the structure. The alignment would continue north at grade, rising with the existing grade up to the NE 63rd Street crossing. Sound walls may be constructed adjacent to the residences at NE 59th Street.

A station is assumed to be located at the NE 63rd Street bridge crossing. The alignment would cross NE 63rd Street at grade with a signal crossing. The existing bridge structure is substandard and is assumed to need replacement with a wider structure. It is assumed that NE 63rd Street be improved and widened from Highway 99 to the east and to NE Hazel Dell Avenue to the west to enhance pedestrian access to the station.

The location of a potential park and ride lot for 300 spaces is assumed north of NE 63rd Street between the LRT alignment and Highway 99. Access to the park and ride lot is assumed to be provided from Highway 99 and NE 63rd Street.





The alignment would continue north at grade to NE 72nd Street where the next station is assumed to be located. If this design option is studied further, other locations at NE 78th Street or at NE 82nd Street could be considered as well. These alternate locations were considered difficult to access for pedestrians and costly to construct. This station is assumed to include a pedestrian bridge that crosses to the west over I-5 and touches down at NE Repass Road. It is assumed that NE 72nd Street may be improved from the station to Highway 99 to enhance pedestrian access.

The alignment would continue north at grade until it reaches a point approximately 600 feet south of NE 78th Street, where it is assumed to climb at a five percent grade on a retained structure and bridge crossing. Current plans are to convert this freeway interchange into a new urban interchange with high speed ramps, a new bridge structure, and retaining walls. Northeast 78th Street would be widened as a part of this project.

The new configuration of the interchange is assumed to require the LRT alignment to cross over NE 78th Street on a structure. Crossing at grade through this type of interchange would require a complete redesign of the I-5 facility, which is currently under construction. The redesign of the urban interchange may include extensive right-of-way impacts. The LRT crossing may include a 400 foot long retained structure both on the south and on the north of NE 78th Street and a 300 foot long aerial structure crossing over the street. The alignment may impact access to residences located between NE 82nd and Hylen Way on the east side of I-5.

The alignment would continue north to NE 88th Street, a potential terminus option. The terminus site is assumed to include a station and a 1,000 space park and ride lot. Improvements to NE 88th Street are also assumed with a bridge crossing over I-5 and connection to NE Hazel Dell Avenue to the west. This station and park and ride lot is only included in this design option if NE 88th Street is chosen as a terminus site.

The alignment would continue north at grade to a station located approximately 400 feet south of NE 99th Street. North of the station, the alignment is assumed to climb at a five percent grade on a retained structure and bridge crossing over NE 99th Street. This interchange is currently being converting it into an urban interchange with high speed ramps, a new and longer bridge, and retaining walls. Northeast 99th Street will be widened as a part of this current project.

The new configuration of the interchange is assumed to require that the LRT alignment cross over NE 99th Street on a structure similar to the interchange at NE 78th Street. The LRT structure may include a 400 foot long retained structure both south and north of NE 99th Street, and a 250 foot long aerial structure crossing over NE 99th Street. Potential sites for a 300 space park and ride lot are assumed to be located in the vicinity of the station. An alternate location for the station and park and ride lot would be north of NE 99th Street.

The alignment would continue north at grade until it reaches the ravine at NE 117th where the existing grade slopes down to the Salmon Creek recreation area at a slope greater than five percent. The LRT alignment is assumed to include an aerial structure approximately 600 feet long to reach grade at the other side of the ravine. At this point the existing grade rises at five percent, with a greater than ten percent cross slope. Developing the LRT alignment at grade through the topography would require approximately 1,200 feet of retaining wall.

The next potential terminus site would be located near the existing Salmon Creek Park and Ride Lot at NE 134th Street. The alignment would cross NE 129th Street at grade with a signalized or gated crossing. Current plans to improve the NE 129th Street bridge crossing to accommodate the widening of the freeway. The bridge and street could also be improved for pedestrian access across I-5 to Highway 99.

The terminus site is assumed to include a station and a 300 space park and ride lot.

North of NE 134th Street the alignment would cross to the west side of I-5 heading north towards NE 179th Street. Should this segment continue forward, that alignment will require further study. At this point, all three design options combine as a single alignment alternative until it reaches NE 179th Street, the third terminus site.

3.1.2 I-5 West Design Option

The west side LRT design option would split from the other I-5 alignment option at the end of the Main Street exit ramp. The alignment would then head north parallel to I-5 for the remainder of this alignment segment. Retaining walls are assumed along the west side of the alignment from the Main Street Interchange up to NE 63rd Street. Sound walls are assumed along this length of the alignment north to NE 134th Street adjacent to the residences.

The alignment would pass under the east/west Burlington Northern Railroad crossing. This bridge structure is assumed to be widened to allow the alignment to pass under the structure. The alignment would continue north at grade, and would rise with the grade up to the NE 63rd Street crossing. Sound walls may be required adjacent to the residences at NE 59th Street.

A station is assumed at the NE 63rd Street bridge crossing. The alignment would cross NE 63rd Street at grade with a signalized crossing. The existing bridge structure is substandard and is assumed to be replaced with a wider structure. To enhance pedestrian

access to the station, it is assumed that NE 63rd Street may be improved and widened from Highway 99 to the east and to NE Hazel Dell Avenue to the west.

A potential 300 space park and ride lot is assumed to be located north of NE 63rd Street, and adjacent to the east side of I-5, between I-5 and Highway 99. Access to the park and ride lot is assumed to be provided from Highway 99 and NE 63rd Street.

The alignment would continue north at grade to NE Repass Road where the next station is assumed. If this design option is studied further, other locations at NE 78th Street or at NE 82nd Street could be considered as well. These alternate locations were considered difficult to access for pedestrians and costly to construct. This station is assumed to include a pedestrian bridge crossing to the east over I-5 touching down in the vicinity of NE 72nd Street. To enhance pedestrian access, it is assumed that NE 72nd Street would be improved from the end of the pedestrian bridge to Highway 99.

The alignment would continue north at grade until it reaches a point approximately 600 feet south of NE 78th Street, where it is assumed to climb at a five percent grade on a retained structure and bridge crossing. Current plans are to convert this freeway interchange into a new urban interchange with high speed ramps, a new bridge structure, and retaining walls. Northeast 78th Street would also be widened as a part of this project.

The new configuration of the interchange is assumed to require the LRT alignment to cross over NE 78th Street on a structure. Crossing at grade through this type of interchange would require a complete redesign of the I-5 facility, which is currently under construction. The redesign of the urban interchange may include extensive right-of-way impacts. The LRT crossing may include a 400 foot long retained structure on both the south and north sides of NE 78th Street, and a 300 foot long aerial structure crossing over the street. The alignment may impact access to residences located between NE 82nd Street and Hylen Way.

The alignment would continue north to NE 88th Street, a potential terminus site. The terminus site is assumed to include a station and a 1,000 space park and ride lot. It is also assumed that NE 88 Street would be improved with a bridge crossing over I-5 and connection to NE Hazel Dell Avenue to the west and Highway 99 to the east. This station and park and ride lot is only included in this design option if NE 88th Street is chosen as a terminus site.

The alignment would continue north at grade to a station located approximately 400 feet south of NE 99th Street. North of the station, the alignment is assumed to climb at a five percent grade on a retained structure and bridge crossing over NE 99th Street. This interchange is currently being converted into an urban interchange with high speed ramps, a new and longer bridge and retaining walls. Northeast 99th Street will be widened as a part of this current project. The new configuration of the interchange is assumed to require that the LRT alignment cross over NE 99th Street on a structure similar to the interchange at NE 78th Street. The LRT structure may include a 400 foot long retained structure both south and the north of NE 99th Street and a 250 foot long aerial structure crossing over NE 99th Street. Potential sites for a 300 space park and ride lots are assumed to be located in the vicinity of the station.

The alignment would continue north at grade until it reaches the ravine at NE 117th Street, where the existing grade slopes down to the Salmon Creek recreation area at a slope greater than five percent. The LRT alignment is assumed to require an aerial structure approximately 600 feet long to reach grade at the other side of the ravine. At this point the existing grade rises at five percent, with a greater than ten percent cross slope. Developing the LRT alignment at grade through the topography would require approximately 1,200 feet of retaining wall.

The alignment would cross NE 129th Street at grade with a signalized or gated crossing. Plans to improve the NE 129th Street bridge crossing to accommodate the widening of the freeway are currently being developed. The bridge and street could also be improved for pedestrian access across I-5 to Highway 99.

Improvements to the bridge crossing and ramps at NE 134th Street are currently under construction. After crossing NE 129th Street, the alignment is assumed to be parallel to the planned entrance ramp. A potential station would be located on the south side of NE 134th Street. A potential terminus option is located in this vicinity. This terminus is assumed to include a station and a 300 space park and ride lot. North of NE 134th Street, the alignment would continue on the west side of I-5, heading towards NE 179th Street. Should this segment continue forward that alignment will require further study. At this point all three design options would combine as a single alignment until it reaches NE 179th Street, the third terminus option.

3.2 Highway 99 Alignment Alternative

3.2.1 Existing Highway 99 Facility

Highway 99 is a Clark County facility. The existing Highway 99 facility right-of-way is approximately 80 feet wide from NE Minnehaha Street to NE 134th Street. It generally includes four traffic lanes for through traffic, left turn lanes at signalized intersections, and a left turn center lane between intersections. A variety of automobile-oriented commercial uses are located on either side of the roadway. Multiple curb cuts and driveways are located along the entire length serving the parking lots of commercial establishments. Sidewalks and other pedestrian amenities are rare, located only at some intersections. FIGURE 3.3



ALIGNMENT ALTERNATIVE OPPORTUNITIES AND CONSTRAINTS



3.2.2 Highway 99 Improvements

The Highway 99 LRT alignment alternative is assumed to include street reconstruction along the entire length of this segment. The existing right-of-way is assumed to be widened to accommodate the LRT alignment. Additional left turn lanes or lengthening existing left turn pockets may be required. See Figure 3.4 for the dimensional requirements that affect the width of the right-of-way when used in various design combinations.

Construction of an LRT alignment and street improvements within the Highway 99 rightof-way is assumed to require the reconstruction of the entire facility. The improvements and design elements would require a minimum of 120 feet of right-of-way when used in the assumed configurations. Many of the adjacent properties, intersections and driveways along the entire segment of this alignment could be impacted. Vehicle crossing is assumed to be provided at signalized intersections only. This design feature would change the traffic patterns and access to businesses along the entire segment of this alignment.

The most narrow right-of-way width required in this design option for the LRT alignment would be the section between stations and Z-crossings with landscaping at 120 feet, 40 feet wider than the existing right-of-way. Stations located at intersections with left turn lanes would require 145 feet of right-of-way, thus severely impacting adjacent properties at these locations. Mitigation of these impacts and their associated costs should be investigated if this alignment design option were to be selected for further study.

3.2.3 Highway 99 Alignment Alternative

The Highway 99 design option is assumed to begin at NE 39th Street, at the common point of the I-5 options. The alignment would cross over I-5 on a 1,000 foot long aerial structure, and would touch down on the east side of I-5 at grade on the west side of Highway 99. The alignment would continue north to the Burlington Northern Railroad crossing. It is assumed that this bridge structure would be rebuilt to accommodate the LRT crossing underneath it. The alignment would continue north for approximately 200 feet where it would turn east into the median of Highway 99, crossing over the southbound lanes with a signalized or gated crossing.

The alignment would continue north in the center of Highway 99 from this point to NE 134th Street for the entire length of this design option. The trackway is assumed to be tie and ballast except at paved intersections. The stations are assumed to be farside offset platforms with crosswalks at the intersections. Z-type crossings would be located between stations. These stations and Z-type crossings would be different in design than stations assumed for the I-5 east and west design options.

Figure 3.4

The first station in this segment is assumed to be located at the intersection of Highway 99 and NE Minnehaha Street/NE 63rd Street, which is assumed to be a signalized intersection with left turn lanes. To improve pedestrian access to the station, it is assumed that NE 63rd Street would be widened from Highway 99 to NE Hazel Dell across I-5.

The next station location and signalized intersection is assumed to be located at <u>NE 72nd</u> Street. It is assumed that NE 72nd Street would be widened from Highway 99 to $\overline{1-5}$. A pedestrian bridge crossing over the freeway to NE Repass Road is assumed to be built to provide pedestrian access from NE Hazel Dell Avenue and the surrounding residential neighborhood to this station.

The next signalized intersection is assumed to be located at NE 78th Street, provided that there would be no station located at NE 72nd Street. Improvements to this street are a part of the freeway improvement project, west of the intersection.

1)

Northeast 99th Street is assumed to be the next station location and would include a signalized intersection and a 300 space park and ride lot. The station is assumed to be a farside, offset platform configuration. Again, it is assumed that crosswalks would be used to enhance pedestrian access.

Current construction of the NE 99th Street interchange at I-5 is underway and includes improvements to NE 99th Street west of Highway 99. Double left turn lanes on Highway 99 are planned along with the improvement. Possible alternate locations for a 300 space park and ride lot exist on the northwest and southwest corners of the intersection.

Locations for additional stations and signalized intersections north of NE 99th Street along Highway 99 may include NE 106th Street and NE 117th Street at Salmon Creek. These locations are not evaluated in the comparative costs analysis.

The next station location and signalized intersection is assumed to be located at NE 129th Street and would include a 300 space park and ride lot. This station location and park and ride lot is a terminus option on Highway 99. Like the other stations, it is assumed that crosswalks would be used to enhance pedestrian access. The park and ride lot site is assumed to be located on the northwest corner of the intersection. It is assumed that NE 129th Street will be widened from Highway 99 to the west across I-5, with a new bridge crossing over I-5 to provide access to the station.

This station location is one possible terminus option for a Highway 99. The alignment could continue north to the NE 179th Street terminus option on the west side of I-5. There may be alternate alignment configurations for crossing NE 134th Street, the existing park and ride lot, and I-5. These alternate alignment configurations are not included in this findings report.

4.0 COMPARATIVE MEASURES

4.1 Land Use Opportunities and Constraints

4.1.1 Existing Developed Land Uses

The I-5 corridor, from NE 39th Street to NE 134th Street is a largely sub-urbanized corridor. It contains several large vacant parcels, and a larger number of under-utilized and nonconforming parcels. "Under-utilized" refers to parcels which are largely vacant or which have low value improvements relative to the value of the land. "Nonconforming" refers to uses which are not consistent with future zoning for the proposed comprehensive plan.

Existing development ranges up to 40 years in age, with the majority of development constructed within the last 25 years. A few remnants of rural land uses and several recreational sites, dominated by the Salmon Creek watershed and wetlands, constitute the balance of land uses.

In terms of the transit orientation of existing uses, virtually all the development is auto oriented. Land uses in the corridor which could be supportive of high capacity transit consist of duplex and multi-family apartments, described in more detail below. While these apartments are built at densities which are generally considered supportive of high capacity transit, their design and street orientation suggest an opportunity for improved pedestrian connections to potential transit stations in order to maximize the walk-on patronage from these sites.

Retail and mixed use developments in the corridor are developed in configurations which focus on interior parking, or with building setbacks, allowing for parking between structures and public right-of-way. Overall densities are relatively low in part due to the extensive surface parking. Along Highway 99, particularly in the southern portion, structures in many cases are quite close to the public right-of-way with parking provided laterally from the commercial establishments, as more fully described below.

In the corridor west of I-5 and east of NE Hazel Dell Avenue, existing land uses consist predominately of medium to high density multi-family dwellings. These land uses are broadly defined by existing zoning. "Medium density" refers to densities of 17 to 34 dwelling units per gross residential acre. "High Density" refers to densities of 34 to 54 dwelling units per gross residential acre. At the intersection of NE Anderson Road, an elementary school is an example of a large institutional use. North of NE 105th Street, the land uses includes detached single-family residential near the Salmon Creek Recreational Park and an elementary school at NE 129th Street.

Between Interstate 5 and Highway 99, developed land uses are largely commercial as far north as NE 106th Street. North of NE 106th Street, a mix of residential and commercial uses occurs. A large number of these sites are under-utilized, as discussed below.

East of Highway 99, retail uses are predominant as far north as NE 110th Street. Frontage development north of NE 110th Street is a mixture of residential and commercial uses. A corridor of high density residential use exists from NE 72nd Street north to NE 106th Street, with setbacks 500 feet from the right-of-way.

I-5 Existing Land Uses

Existing development abutting I-5 is oriented away from that facility. At major arterials and interchanges, the development is oriented toward those streets; elsewhere the development is oriented toward Highway 99 or NE Hazel Dell Avenue through a series of collector streets or building setbacks and parking lots. Development at the I-5 interchanges is not clustered at the interchange; instead it is oriented in strip commercial fashion toward the intersecting arterials. A principal neighborhood retail activity serving the community west of I-5 is the J & M Plaza just north of NE 78th Street.

Thus, the existing I-5 land use patterns would probably experience minimal disruptions from the rapid movement of LRT along the design option. Retail developments, which already are oriented toward the street, may be supportive of high capacity transit with the retrofitting of more pedestrian oriented amenities and design features. For those stations located away from intersecting arterials, existing land uses are largely not transit supportive and are instead oriented toward NE Hazel Dell Avenue or Highway 99.

Highway 99 Existing Land Uses

Existing land uses oriented toward Highway 99 vary in character depending upon the segment of highway under consideration. From NE Minnehaha Street to NE 78th Street, a dense highway strip commercial development pattern dominates the frontage. Multiple curb cuts at short intervals and extensive surface parking create an environment that is difficult for pedestrians. The commercial establishments on this segment of Highway 99 are highway oriented (they depend on the large volume of through vehicular traffic for their patronage). Fast food franchises, automobile service stations and similar uses dominate. The principal community or neighborhood serving retail activities are at the intersection of NE 78th Avenue, where a market and garden center occupy the western frontage and the southwest corner of the interchange with NE 78th Street. Other neighborhood retail activities are dispersed among automobile oriented retail facilities.

From NE 78th Street to NE 99th Street, multi-family uses are set back from the highway buffered by commercial uses. Access to the multi-family uses is generally at intersecting arterials. The commercial establishments are highway oriented buildings, most of which front on Highway 99 on the east side and are setback or perpendicular to the highway on the west. The size of the structures and their lot area coverage suggests that much of this commercial development is under-utilized (see below).

From NE 99th Street to Salmon Creek, some multi-family uses continue on the east, but the predominant land use is single family residential. Commercial uses prevail on the west side of Highway 99 heading north to NE 129th Street.

In summary, existing land uses in the corridor are transit oriented to the extent that the presence of multi-family developments occur at densities which are considered supportive of high capacity transit. In other respects, such as the densities, mix of land uses, site design and amenities, the existing land uses are generally not supportive of high capacity transit in their present form.

4.1.2 Under-Utilized Land

West of I-5

Between NE Hazel Dell Avenue and I-5, there are five or more relatively large underutilized parcels. One is north of NE Anderson Street, with a mix of single family and vacant land and a high density residential zone. The second is south of NE 78th Street where relatively low value commercial development exists on a commercially zoned site. In addition, across NE Hazel Dell Avenue two opportunity sites near NE Anderson Street exist, one of which is zoned medium density residential and the other high density residential.

A second cluster of opportunity sites west of I-5 occurs between NE 88th and NE 101st Streets. Current uses include surface storage sites and other light industrial use. A zone change would be required to allow more intense uses on this site.

Between I-5 and Highway 99

Between I-5 and Highway 99, a small single-family development at NE 59th Street exists despite the presence of high density, multi-family zoning on the parcel. Between NE 88th Street and NE 95th Streets, a mixture of industrial, storage and manufacturing activities use a portion of the site which runs both on Highway 99 and I-5. North of NE 99th Street, land uses consist largely of under-utilized sites with the exception of a parcel south of NE 106th Street. Current land uses include a mixture of single family homes on parcels zoned either for medium density residential or commercial uses, a variety of light industrial and storage buildings, a lumber yard, and several parcels of vacant land.

East of Highway 99

East of Highway 99, essentially all the frontage is developed except for a small site north of the Burlington Northern railroad tracks, south of NE Minnehaha Street, and a more extensive site between Salmon Creek and NE 129th Street. The majority of this site is zoned for single family residences. The frontage on NE 129th is zoned for commercial development. However, setback 500 feet from Highway 99 on the east side are a large number of parcels zoned for multi-family residence that are currently undeveloped or under-developed.

In summary, under-developed uses dominate the central and northern portions of this corridor between I-5 and Highway 99. To the west of I-5, several large sites remain undeveloped or under-utilized. To the east of Highway 99, most of the under-utilized parcels are set back 500 to 1,000 feet from the highway, and in a number of cases the topographic barriers make the transit orientation relatively limited. While most of the corridor is developed, many of the uses have relatively low values of buildings relative to land. The quality of the structures and the nature of the occupants of the business establishments along Highway 99 suggests that existing land uses, in their current configuration, may be dependent on high volumes of auto traffic and ease of vehicle turning movements on the highway.

4.1.3 Existing and Future Zoning

The entire corridor between NE Hazel Dell Avenue and both sides of Highway 99 is subject to a proposed transit overlay district. The transit overlay district would prescribe the future land uses, and densities that encourage use and amenities supportive of high capacity transit. While specific features of the transit overlay district are still under discussion, the presence of an overlay may demonstrate the commitment of the public sector to high capacity transit in this corridor.

The transit overlay district is assumed to be superimposed upon the existing zoning designations that consist of medium to high density multi-family residential uses and certain commercial uses. Residential uses occur on (and are proposed for) the majority of land west of I-5 and east of NE Hazel Dell Avenue. East of Highway 99, they occur on approximately one third of the land set back from the highway, buffered by highway oriented commercial development.

The principal difference between existing and proposed commercial zoning is that significant parcels of current commercially zoned and develop land are proposed for "mixed use commercial" designations. Proposed zoning prohibits the construction of new, highway oriented commercial uses like the one currently built, which afford neither the amenities nor the densities of activity conductive to transit use. However, LRT is assumed to have its greatest impact on intersection delay. Further detail on these two techniques is provided in the next section.

Highway 99 Traffic Diversion

A real or perceived increase in congestion on Highway 99 due to LRT may cause traffic to divert to alternate routes. Consideration of this possibility is important in estimating future traffic conditions on Highway 99.

• <u>Access</u>

Construction of LRT in the center two-way left turn lane of Highway 99 would impact vehicular circulation and property access on this facility. The primary restrictions are assumed to be left-turns from the median to enter a property or non-signalized side street, and left turns from a side street or property to access Highway 99. The traffic analysis addresses these potential impacts.

4.4.2 Methodology and Assumptions

METRO's regional model provides projected (v/c) ratios for the primary and secondary transportation links in the region. These v/c ratios are conservative assumptions for the year 2015 and provide a broad assessment of the ability of particular roadway links to accommodate projected future travel demands. Auto link volumes are also obtained from the regional model. The ability of intersections to accommodate travel demand is measured by the average seconds of delay to a vehicle. The Highway Capacity Manual (HCM) technique was used to determine vehicle delay for this study. Existing manual counts were used to develop turning movement percentages. These turning percentages were applied to 2015 link volumes to determine 2015 turning movements. The impact of LRT on the intersections is represented by adding vehicle demand (and therefore demand for signal green time) to the north and south movements. This is done in order to simulate the effect that random signal preemptions from LRT would have on the intersection. Estimates for the amount of added vehicles is based on proposed five minute LRT headways. Also, as explained in Section 4.4.5, the presence of LRT is assumed to result in added left turns on the north and south legs of the intersections. Finally, as noted in Section 4.4.5, pedestrian volumes are anticipated to increase at station locations. Each of the three intersections analyzed in this report is assumed to have an LRT station. Therefore, pedestrian volumes were added to these intersections for the LRT scenarios.

In the Highway Capacity Manual, intersection delay and link v/c ratios are stratified to develop general level-of-service (LOS) designations. LOS is a standard description of the ability of facilities to accommodate demand. The following table defines LOS categories and corresponding delay and v/c ratio ranges. This information is applied to Highway 99 and I-5 in Sections 4.4.3 and 4.4.6 below.

Level-of-Service Conditions

Level of	Intersection Avg.	Arterial Volume to	Description
Service	Vehicle	Capacity	
	Delay (sec)	Ratio (v/c)	
LOS A	< 5.0	< 0.60	Free flow conditions
LOS B	5.1 to 15.0	0.61 to 0.70	Stable flow conditions, relatively high speeds attainable
LOS C	15.1 to 25.0	0.71 to 0.80	Stable flow conditions, lower speeds prevalent
LOS D	25.1 to 40.0	0.81 to 0.90	Approaching unstable flow conditions, traffic showing signs of restriction
LOS E	40.1 to 60.0	0.91 to 1.00	Unstable flow, traffic volumes equal or exceed roadway capacity
LOS F	> 60.0	> 1.00	Roadway failure conditions, "parking lot" conditions

4.4.3 NE Highway 99 Congestion and Levels-of-Service

Link V/C Ratios

Highway 99 is classified as a principal arterial by Clark County. Highway 99 operates as a parallel facility to I-5 and provides greater access to commercial activity and residential areas. The cross streets of NE 63rd/NE Minnehaha Street, NE 78th Street and NE 99th Street provide east/west activity to and from I-5 and Highway 99.

NE 78th and NE 99th Streets are assumed to become increasingly active in the future with the I-5 widening and installation of urban interchanges at both locations. Clark County requires that Highway 99 maintain roadway segments and intersections at LOS D or better. The following table highlights PM peak hour roadway volumes, v/c ratios and LOS on Highway 99, and I-5 and on NE Minnehaha, NE 78th and NE 99th Streets.

SCENARIO	VOLUME RANGE	V/C RATIO	LOS
Highway 99			
Base 1992	700 - 1,250	< 0.9	D or better
LRT on Hwy 99	600 - 1,290	< 0.9	D or better
LRT on I-5	600 - 1,260	< 0.9	D or better
I-5			
Base 1992	1,600 - 3,400	< 0.9	D or better
LRT on Hwy 99	2,410 - 4,940	< 0.9	D or better
LRT on I-5	2,400 - 4,920	< 0.9	D or better
NE Minnehaha St.			
Base 1992	300 - 500	< 0.9	D or better
LRT on Hwy 99	430 - 850	< 0.9	D or better
LRT on I-5	430 - 850	< 0.9	D or better
NE 78th Street *			
Base 1992	750 - 1,230	< 0.9	D or Better
LRT on Hwy 99	900 - 1,790	0.9 < v/c < 1.0	E
LRT on I-5	910 - 1,840	> 1.0	F
NE 99th Street			
Base 1992	340 - 650	< 0.9	D or better
LRT on Hwy 99	330 - 1,210	< 0.9	D or better
LRT on I-5	330 - 1,310	< 0.9	D or better

Link Volumes and V/C Ratios

* LOS for NE 78th Street is for the west leg of the NE 78th Street/Highway 99 intersection because this leg would be, by far, the most congested.

Several issues can be derived from the above table. First, maximum peak-hour roadway volumes rise significantly (40 to 75 percent) in the design year over 1992 volumes for the majority of the facilities. However, roadway volumes on Highway 99 remain about the same, or even decrease on specific segments. The main reason for this is that I-5 is assumed to be expanded to six total lanes by the design year. The model indicates that, as I-5 volumes increase, much of this increase is from trips that were originally using Highway 99. Likely, many of the trips that are diverting to the use of I-5 instead of Highway 99 will be using NE Minnehaha, NE 78th or NE 99th Streets to access I-5. Therefore, the fact that roadway volumes on Highway 99 do not grow as quickly as elsewhere does not mean that intersection congestion does not increase. Those movements from the east on NE Minnehaha, NE 78th and NE 99th Streets to I-5 will demand green time from the intersections on Highway 99 and, in turn, be delayed by LRT. Levels-of-Service at these intersections is discussed below.

Second, roadway link capacities are not, in general, going to be a limiting factor on the feasibility of light rail. In fact, according to METRO model outputs, a limited volume

reduction would be obtained on Highway 99 and I-5 with LRT. This is assumed to represent a transfer of trips from auto to LRT transit. The only link that fails to meet LOS D or better is the west leg of the Highway 99/NE 78th Street intersection. Finally, the I-5 alternative appears to attract more trips than the other scenarios to NE 78th Street, resulting in LOS F on the west leg. However, this leg is failing (LOS E or worse) with or without LRT in the 2015 design year.

It is important to note that, in the METRO model, travel time (dependent greatly on intersection delay) is the basis for the assignment of vehicles to individual facilities. The Federal Transportation Administration (FTA) requires that the travel times and delay functions be the same for all model runs. Therefore, model roadway volumes are only a general indicator of traffic constraints and do not reflect the impact that LRT may have at the intersection level and, in turn, on travel times along a facility. Intersection delay studies provide more detail to the impact of LRT.

Intersection Delay

HCM techniques were used to analyze the NE 63rd/Minnehaha Street, NE 78th Street and NE 99th Street intersections on Highway 99. The results for these intersections for base year 1992, 2015 without LRT, and 2015 with LRT are shown in the following table.

Intersection	1992 LOS	2015 LOS w/o LRT	2015 LOS w/LRT
NE 63rd/Minnehaha	С	D	D
NE 78th Street	D	D	Е
NE 99th Street	D	D	E

Intersection Level-of-Service

As previously noted, Clark County requires its facilities to operate at LOS D or better. As the previous table indicates, the intersections at NE 99th and NE 78th Streets go to LOS E with the addition of LRT. This assumes that right-of-way is acquired to maintain the same number of lanes that exist today.

HCM intersection analysis output was used to analyze the critical movements for the NE 99th and NE 78th Streets intersections to attempt to identity measures to bring the intersections back to LOS D. Several potential capacity improvements do make improvements to the average vehicle delay at the intersections. However, the methods used to represent LRT impact on traffic capacity were fairly conservative. Furthermore, it can not be determined that any mediation would, in all cases, result in LOS D at NE 78th and NE 99th Streets with LRT. It is likely that the level-of-service would remain at E. As is shown, LRT would bring the NE 78th Street and NE 99th Street intersections to LOS E in 2015. In the absence of significant transportation demand management (TDM) or transportation system management (TSM) strategies or increases, substantial additional capacity is required to bring these two intersections to County required LOS D or better. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Clean Air Act Amendments of 1990 place stringent restrictions on the addition of single-occupant-vehicle capacity expansion.

4.4.4 Highway 99 Traffic Diversion

The issues dealing with traffic diversion on Highway 99 have been developed throughout this analysis. As discussed above, the modeling process does not put a vehicle capacity restraint on Highway 99 with LRT as compared to Highway 99 without LRT. Therefore, the model output does not indicate a traffic diversion from Highway 99 to other facilities due to an addition of median LRT.

A diversion from Highway 99 to I-5 between 1992 and 2015 does occur, however, due to the expansion of I-5 to six lanes and the addition of urban interchanges on I-5 at NE 78th and NE 99th Streets. Also as noted above, this diversion from Highway 99 to I-5 may still affect the LOS at intersections on Highway 99. Many of these diverted trips would likely use NE Minnehaha, NE 78th, and NE 99th Streets to get to I-5, crossing Highway 99 in the process. As the link volume table indicated, volumes on these cross streets would increase substantially. This is especially true for NE 78th and NE 99th Streets. Thus, these trips are assumed to still interact with Highway 99 LRT and Highway 99 intersection capacity.

4.4.5 Access

An important assumption was made in the analysis of intersection delay with the addition of LRT relating to commercial access along Highway 99. Currently, there are many curb cuts and a median two-way-left-turn lane along the facility. This lane is used by many vehicles to make left-turn-in and left-turn-out movements to and from businesses. The addition of median LRT would prevent these movements. The resultant right-in, right-out access would result in U-turns and additional left turns at the signalized intersections. This assumption leads to the addition of northbound and southbound left turn volumes for the intersection LOS analysis with LRT.

Vehicular access to LRT stations is assumed to be accommodated by "vehicular drop off zones" located on the cross streets at each of the station streets. These zones would allow patrons who are dropped off by a vehicle to access a light rail station. After drop off, the pedestrians would use the signalized crosswalks to get to the station platform and board the light rail train.

4.4.6 I-5 Alignment Traffic Issues

The potential I-5 LRT alignment may be located on either the east or the west edge of the I-5 right-of-way. The LRT would be at grade with an exclusive LRT right-of-way for the complete length of this study area. The LRT alignment is assumed to be grade separated at NE 78th Street and NE 99th Street interchanges. NE 63rd Street and NE 129th Street are assumed to be at grade signalized crossings. The NE 63rd Street and NE 129th Street LRT intersections would operate at LOS B. Therefore, LRT would have little, if any, impact on traffic capacity and operations along I-5 itself or any of the east/west cross streets.

Proper design of pedestrian and vehicle access to stations and park and ride lots would help to minimize the impact of LRT on traffic operations. As noted above, LRT would not compete with vehicles for signal green time at intersections. However, the LRT stations and park-and-ride lots (section 4.5.2) would generate a certain number of vehicle trips. Much of this demand would likely be on NE 63rd/NE Minnehaha Street, NE 78th Street and NE 99th Street. Most of these trips, however, are not new trips to the network. In summary, an I-5 alignment would not have a measurable impact on vehicular congestion.

4.5 Transit Operations

4.5.1 Bus Access (C-TRAN)

Bus access to the Light Rail Transit (LRT) stations is important to support transfers to the LRT system and overall transit ridership. Several C-TRAN lines would be adjusted to connect to LRT stations under the various alignment and termini alternatives. This section discusses the I-5/Highway 99 corridor from the I-5/Highway 99/Main Street junction to NE 134th Street. Five LRT stations are assumed in this corridor:

- NE 63rd Street (Minnehaha)
- NE 72th Street
- NE 88th Street
- NE 99th Street
- NE 134th Street (Salmon Creek)

This section describes the 2015 level of bus service to each of the above stations for both the NE 134th Street (I-5 and Highway 99 alignments) and the NE 88th Street termini alternatives. The level-of-service is described for both peak-hour and off-peak-hour headways.

NE 134th Street Terminus

For both the I-5 and Highway 99 alignments, the NE 134th Street terminus alternative would include four of the stations listed above, except the NE 88th Street station. Table 1 describes the bus service to each station. Table 1 applies to both alternatives unless otherwise noted.

NE Minnehaha Station

For the NE 179th Street terminus, the NE Minnehaha Station would be served by three bus routes: lines C006 (Hazel Dell), C063 (Minnehaha) and C071 (Highway 99). Route C071 would be removed for the Highway 99 LRT alignment. The result would eight peak hour and six off-peak hour buses at the NE Minnehaha Station for the Highway 99 alignment alternative. The I-5 Alternative would have 12 peak hour and ten off-peak hour buses serving this station.

NE 72nd Street Station

The NE 72nd Street Station would be served by one C-TRAN bus route for the NE 179th Street terminus, line C078B (Vancouver Mall). This station would have a total of four peak hour and two off-peak hour buses serving it.

NE 99th Street Station

For the NE 179th Street Terminus, two bus routes would serve the NE 99th Street station, C078B (Vancouver Mall) and C099N (99th Street). The NE 99th Street station would have eight peak and four off-peak buses.

NE 134th Street Station

For the NE 134th Street terminus, five bus routes would serve the NE 134th Street (Salmon Creek) station: C006 (Hazel Dell), C008 (Ridgefield), C025E (St. Johns), C071 (Highway 99) and C139 (Alki). Route C071 would be removed from the Highway 99 alignment. The result is 14(9) buses at the 134th Street station per hour for the Highway 99 alignment alternative. An I-5 alignment would have 18 peak hour and 13 off-peak hour buses to serve the NE 134th Street station.

NE 88th Street Terminus

Within this study area, the NE 88th Street terminus includes the NE Minnehaha Station, the NE 88th Street Station. Again, refer to Table 1 for route details.

NE Minnehaha Station

Three buses serve the NE 88th Street station for the NE 88th Street terminus alternative: C006 (Hazel Dell), C063 (Minnehaha) and C071 (Highway 99). The total number of buses serving this station would be 12 peak hour and ten for the off-peak hours.

NE 88th Street Station

For the NE 88th Street Terminus, five C-TRAN routes serve the NE 88th Street Station: C008 (Ridgefield), C071 (Highway 99), C073X (Battle Ground Express), C078B (Vancouver Mall), C099N (99th Street), and C179X (179th Street Express). The NE 88th Street Station would have 22 peak hour and nine off-peak hour buses serving it.

Table 1							
Route	From	То	Via	Peak (Off-Peak) Headways	Peak (Off-Peak) Buses per Hour		
179th St.	Terminus						
Minnehaha	a Station						
C006	Minnehaha Station	WSU Campus	Hazel Dell Ave.	15 (15)	4 (4)		
C063	Central County P&R	Minnehaha Stn.	Minnehaha St.	15 (30)	4 (2)		
C071	Minnehaha Station	WSU Campus	Highway 99	15 (15)	4 (4)		
Total					12 (10)		
78th St. St	ation						
C078B	Vancouver Mall	78th Street Stn.	78th Street	15 (30)	4 (2)		
Total					4 (2)		
99th St. St	ation						
C078B	Vancouver Mall	99th Street Stn.	78th Street and Highway 99	15 (30)	4 (2)		
C099N	Central County P&R	Felida	Highway 99 and 99th St. Stn.	15 (30)	4 (2)		
Total					8 (4)		
134th St. 5	Station						
C006	Vancouver TC	WSU Campus	Hazel Dell Ave. and 134th St.	15 (15)	4 (4)		
C008	134th Street Stn.	Ridgefield	NE 10th Ave.	30 (60)	2 (1)		
C025e	Vancouver TC	134th Street Stn.	St. Johns Rd. and 119th St.	15 (30)	4 (2)		
C071	Vancouver TC	WSU Campus	Highway 99 and 134th St. Stn.	15 (15)	4 (4)		
C139	WSU Campus	Alki	134th and 139th Streets	15 (30)	4 (2)		
Total					18 (13)		
88th St. T	'erminus						
Minnehaha	a Station						
C006	Minnehaha Station	WSU Campus	Hazel Dell Ave., 88th St. Stn.	15 (15)	4 (4)		
C063	Central County P&R	88th Street Stn.	Minnehaha St. and Highway 99	15 (30)	4 (2)		
C071	Vancouver TC	WSU Campus	Highway 99	15 (15)	4 (4)		
Total					12 (10)		
88th St. St	tation						
C008	88th Street Stn.	Ridgefield	Highway 99 and NE 10th Ave.	30 (60)	2 (1)		
C071	Vancouver TC	WSU Campus	Highway 99	15 (15)	4 (4)		
C073X	Battleground	88th Street Stn.	NE 29th and I-5	30 (n/a)	2 (n/a)		
C078B	Vancouver Mall	88th Street Stn.	78th Street	15 (30)	4 (2)		
C099N	Central County P&R	88th Street Stn.	99th Street and Highway 99	15 (30)	4 (2)		
C179X	179th Street	88th Street Stn.	1-5	10 (n/a)	6 (n/a)		
Total					22 (9)		

.

4.5.2 Park and Ride Lots

Each of the alignments are assumed to have potential park and ride lots with locations at similar sites along the alignments and with similar numbers of parking spaces. Both alignment alternatives have adequate available land for locating park and ride lots.

The I-5 east design option and Highway 99 alternative are better suited to automobile traffic and access due to the greater amount of commercial land uses on this side of I-5. The west side of I-5 is predominately residential and thus would be less suited to park and ride facilities.

For either alternative the park and ride lots could be located generally at the following locations: on NE 63rd Street with 300 parking spaces, the termini site at NE 88th Street with 1,000 spaces, NE 99th Street with 300 spaces and the termini site between NE 129th Street and NE 134th Street also with 300 spaces. The park and ride lots would be located adjacent to LRT stations to facilitate pedestrian access from the station to the lots. The area assumed for a park and ride lot is based upon a 350 square foot area per parking space, landscaping, vehicle circulation area, and pedestrian walkways.

I-5 Alignment Alternative

The potential park and ride lot site at the NE 63rd Street LRT station is assumed to share the same site location for the I-5 east and west design options. Property to the west of I-5 at this location currently contains residential apartment complexes and single family homes, making this site undesirable for a park and ride lot. The property to the east contains mixed use commercial facilities currently occupied by a bowling alley and a small commercial strip shopping center. The area may be more easily redeveloped as a park and ride lot. The park and ride lot would be located between Highway 99 and the east side of I-5 on the north side of NE 63rd Street. The park and ride lot could be assumed to contain 300 parking spaces. Access to the site is assumed to be directly off NE 63rd Street.

The next park and ride lot site for the I-5 east and west design options is assumed to be at the NE 88th Street station location. A possible alignment termini with 1,000 parking spaces. Large amounts of vacant property are located on both sides of I-5 on the north side of NE 88th Street, for each alternate design option. Both sites are assumed to include the construction of a new bridge crossing and street improvements, extending NE 88th Street from Highway 99 to NE Hazel Dell Avenue to provide access to the sites. Access into each alternative park and ride site is assumed to be directly off NE 88th Street.

The next park and ride lot site for the I-5 east and west design options is assumed to be at the NE 99th Street station location. Vacant property is located adjacent the west side of the freeway on the south side of NE 99th Street. Further study would be needed to identify the best access into the site with the least impacts to adjacent residences.

The I-5 east design option has several possible site locations on the north and south sides of NE 99th Street, all of which contain commercial properties. Further study would be needed to identify the park and ride site location with the least impacts to the commercial properties and access into the sites.

Northeast 134th Street has an existing park and ride lot located to the north of NE 134th Street on the east side of I-5. The park and ride lot is currently operating at full capacity and it is assumed that additional park and ride sites would be needed for the I-5 east and west design options. Northeast 134th Street is assumed to be a possible termini for the I-5 alternate alignment options.

Vacant land located to the west of I-5 on the south side of NE 134th Street is assumed to be the site for the I-5 west design option. The property is currently used as an orchard. Further study would be needed to identify the access into the site with the least impacts to adjacent residences.

The I-5 east design option has several potential site locations between NE 129th Street and NE 134th Street west of Highway 99, all of which contain a mix of commercial facilities. The potential park and ride lot for this design option is assumed to be located on the north side of NE 129th Street. This location is assumed to provide for a terminus for the LRT, allowing for tail-track for LRT train storage to be constructed beyond the station to the north to NE 134th Street. Access into the site is assumed to be directly off of NE 129th Street.

Highway 99 Alignment Alternative

The possible park and ride lot site at the NE 63rd Street LRT station on Highway 99 is assumed to be the same site location as that identified for the I-5 design options. The park and ride lot site could be located between Highway 99 and I-5 on the north side of NE 63rd Street. The park and ride lot is assumed to contain 300 parking spaces. Access into the site is assumed to be directly of NE 63rd Street.

The next park and ride lot site for the Highway 99 alignment alternate is assumed to be at the NE 88th Street station location. It is a possible alignment terminus with 1,000 parking spaces. A large piece of vacant property is located on the north side of NE 88th Street. This site location is assumed to include the construction of a new bridge crossing over I-5 and street improvements, extending NE 88th Street from Highway 99 to NE Hazel Dell Avenue to provide access to the site.

The next park and ride lot site for the Highway 99 alignment alternative is assumed to share the same potential site locations identified for the east I-5 design option which

contain commercial properties. Further study would be needed to determine the site location with the least impacts to the commercial properties and access into the site.

The next park and ride lot site for the Highway 99 alignment alternative is assumed to be located at NE 129th Street station, the same site identified for the I-5 east design option. This location is assumed to provide for a terminus site for the Highway 99 alignment alternate. Access to the site is assumed to be directly off of NE 129th Street.

4.6 Right-of-Way and Displacements

All three alignment alternatives are assumed to involve right-of-way acquisition and displacement to businesses and residential dwelling units because of the required right-ofway width for LRT. Sidewalks, road surfaces, driveways, bridges, and intersections would be rebuilt. There would be fewer displacements required for the NE 88th Street termini options than the NE 134th termini options.

Extensive design development would be required to refine alignments and determine which properties would be impacted and which displacements would occur. However, in order to develop a quantitative comparison between the alternatives, displacements were summed for the alternatives based on standard cross sections and the existing right-of-way. For the Highway 99 design option, it was assumed that the right-of-way would be acquired on both sides with 12 foot sidewalks. Estimated displacements are summarized in the following table.

134th ESTIMATE	Terminus Option D DISPLACEMENTS
I-5 East Option	44
I-5 West Option	86
Highway 99 Alternative	106

For the I-5 east and west design options, the I-5 freeway right-of-way, adjacent collector streets, bridge crossings, and private properties are assumed to be impacted on the sides of the freeway where the LRT would be located. The east side I-5 design option would have 44 displacements based on this analysis, both residential and commercial. The BPA towers might need to be relocated for this design option. The west side I-5 design option would have 86 displacements based on this analysis, mostly residential. Both options could include reconstruction of the Burlington Northern Railroad Bridge.

The Highway 99 alignment could have significantly greater impacts to adjacent properties. This alternative would have 106 displacements based on this analysis. The majority of the properties would be commercial automobile oriented establishments.

4.7 Capital Costs

Capital costs were estimated for the two I-5 design options and for the Highway 99 alternative based on the conceptual alignments developed and discussed in this report. The methodology developed for the South/North Transit Corridor Study was used to estimate costs for the LRT elements and features. The methodology used for the right-of-way costs was prepared by the WSDOT for purposes of setting up funding amounts for individual right-of-way projects.

The following table summarizes the capital costs for the Highway 99 alternative and the I-5 design options between common points. The Main Street Interchange is the common point at the south end. Both a NE 88th Street terminus and a NE 134th Street terminus are considered as common points at the north end for cost estimating purposes.

Individual costs for right-of-way acquisition to the NE 88th terminus was not available for this draft findings report. A complete breakdown of the capital costs by category is included in the appendix of this report.

Alternative/ Option	Length (miles)	Cost w/o R-O-W	R-O-W Cost	Total Cost	Cost Per Mile
I-5 East Option	2.10	\$91			
I-5 West Option	2.10	\$86			
Highway 99 Alternative	2.09	\$129			

NE 88th Terminus Costs (\$ millions)

NE 134th Terminus Costs (\$ millions)

Alternative/ Option	Length (miles)	Cost w/o R-O-W	R-O-W Cost	Total Cost	Cost Per Mile
I-5 East Option	4.30	\$170	\$25	\$195	\$45.3
I-5 West Option	4.31	\$168	\$29	\$197	\$45.7
Highway 99 Alternative	4.32	\$257	\$30	\$287	\$66.4

NE 134th Terminus

The capital costs estimates for the two I-5 design options are similar, at only a one percent difference for the NE 134th terminus. This is because the conceptual alignments for these options would include similar construction, and are similar in length.

The I-5 design options are estimated to be over 30 percent less in cost than the Highway 99 alternative for the NE 134th terminus. Broad reasons for this lower cost estimate include:

- Highway 99 alternative could include reconstruction of the entire street right-of-way including utility relocations, new accesses, and all roadway and pedestrian surfaces.
- The I-5 design options would include additional capital costs for structures, including overpasses, retaining wall, and noise walls. However these costs do not equal the additional estimate cost of "in street" construction for the Highway 99 alternative.
- Pedestrian improvements beyond the Highway 99 right-of-way limits were not included in the Highway 99 alternative cost estimate.

Noise mitigation was not included in the estimate for the Highway 99 alternative.

NE 88th Terminus

When a right-of-way cost breakdown for the NE 88th terminus is available, a comparison of these costs will be included in a revised draft of this report. The capital costs of the Highway 99 alternative, without right-of-way included, is over 30 percent higher than either I-5 design option, without right-of-way included. The broad comparisons drawn for the NE 134th terminus will likely apply to the NE 88th terminus cost comparisons as well.

APPENDIX A

*

COST SUMMARIES BY CATEGORY

S/N LRT - Clark County 1-5 Project: Date:

υ	au	2,	

*

		·	1	1					·····	· · · · · · · · · · · · · · · · · · ·			T		······				·······	····	
iheet	DESCRIPTION	Distance	Systemwide	Right of	Utility	LAT Str.	3 LRT Grd	4 Struc-	5 Track	6 Cross-	เสา	Park &	9 Fare	Traction	Signal	12 Communi-	13 Special	SUB	Engr&	Contin	Segment
lo.		(ft.)		Way		Constr'n	Constr'n	tures	work	ings	Stations	Ride Lots	Collect'n	Power	System	cations	Conditins	TOTAL	Admin (34%)	gencies (25%)	Totals
	MAIN ST to 134TH St -	- FULL U	ENGTH OPTION				•				}		}								
I-5 W	1~5 (WESTSIDE OF) 10+00 to 121+00	11,100	-	so	\$388,500	\$2,053,250	\$6,761,340	\$6,652,050	\$3,655,420	\$232,217	\$626,312	\$0	\$337,316	\$2,952,600	\$1,387,500	\$1,043,400	\$114,966	\$26,204,871	\$8,909,656	\$6,551,218	\$41,665,745
I-5 W	I-5 (WESTSIDE OF) 121+00 to 237+75	11,675	-	so	\$408,625	\$550,000	\$6,946,020	\$10,258,837	\$3,899,410	\$0	\$626,312	\$0	\$337,316	\$3,105,550	\$1,459,375	\$1,097,450	\$674,377	\$29,363,272	\$9,983,512	\$7,340,818	\$46,687,602
1-5 W	I-5 (WESTSIDE OF) SOUNDWALLS (10') 10+00 to 237+75 (IN SE	105.000	_	• \$0	\$0	\$0	\$0	\$3,675,000	so	\$0	\$0	\$0	\$0	\$0	\$0	\$0	50	\$3 675 000	\$1,249,500	\$918 750	\$5,843,250
I-5 W	I-5 (WESTSIDE OF)	CARS)	_	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$836,700	\$0	\$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353
1–5 W	I-5 (WESTSIDE OF) PARK & RIDE @ 129TH ST (30	CARS)	-	so	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$836,700	\$0	\$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353
ROW			-	so	\$0	\$0	\$ 0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	so	\$0	\$0
SYS	LRT Vehicles (3/mi.)	-	\$32,778,634		-	-	-	-	-	_		-	-	-	-	-	-	\$32,778,634	\$11,144,736	\$8,194,659	\$52,118,028
SYS	Maintenance Yard		\$10,850,247	-	-		-		-		-	-		<u>-</u> ,	ļ - .	-		\$10,850,247	\$3,689,084	\$2,712,562	\$17,251,893
SYS	T.C.C.	-	\$1,125,030	-		-	-	-	_	-	_	-		_			-	\$1,125,030	\$382,510	\$281,258	\$1,788,798
	TOTALS	22,775	\$44,753,911	so	\$797,125	\$2,603,250	\$13,707,360	\$20,585,887	\$7,554,830	\$232,217	\$1,252,624	\$1,673,400	\$674,632	\$6,058,150	\$2,846,875	\$2,140,850	\$789,343	\$105,670,454 \$105,670,454	\$35,927,954	\$26,417,614	\$168,015,022

NOTE:

12

1

1.) Real Estate is NOT INCLUDED.
 2.) Central Business District alignment costs ARE NOT INCLUDED.
 3.) Soundwalts ARE INCLUDED

34.00% .

25.00%

\$7,377 4.31 \$38,951,684

Ì

.

Project:	S/N LRT - Clark County I-5
Date:	22-Jun-94

Sheet No.	DESCRIPTION	Distance (ft.)	Systemwide	Right of Way	1 Utility	2 LRT Str. Constr'n	3 LAT Grd Constr'n	4 Struc- tures	5 Track- work	6 Cross- ings	7 LRT Stations	8 Park & Ride Lots	9 Fare Collect'n	10 Traction Power	11 Signal System	12 Communi cations	T3 Special Conditins	SUB TOTAL	Engr& Admin (34%)	Contin- gencies (25%)	Segment Totals
	MAIN ST to 134TH St -	- ബ്വ	NGTH OPTION	}						{									2		
1–5 E	1-5 (EASTSIDE OF) 10+00 to 121+00	11,100	-	\$0	\$388,500	\$2,141,000	\$5,749,020	\$11,598,667	\$3,856,920	\$232,217	\$626,312	\$0	\$337,316	\$2,952,600	\$1,387,500	\$1,043,400	\$38,322	\$30,351,774	\$10,319,603	\$7,587,944	\$48,259,321
1-5 E	I-5 (EASTSIDE OF) 121+00 to 236+95	11,595	-	\$0	\$405,825	\$100,000	\$6,990,480	\$9,644,470	\$3,877,450	\$0	\$626,312	\$0	\$337,316	\$3,084,270	\$1,449,375	\$1,089,930	\$268,255	\$27,873,683	\$9,477,052	\$6,968,421	\$44,319,156
I−5 E	1-5 (EASTSIDE OF) SOUNDWALLS (10') 10+00 to 236+95 (IN SF)	60,000	-	\$0	\$0	\$0	\$0	\$2,100,000	\$0	\$0	\$0	\$0	 \$0	\$0	so	\$0	\$0	\$2,100,000	\$714,000	\$525,000	\$3,339,000
I-5 E	I-5 (EASTSIDE OF) PARK & RIDE @ 63RD ST (300	CARS)	-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$836,700	\$0	\$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353
1-5 E	1-5 (EASTSIDE OF) PARK & RIDE @ 129TH ST (300	CARS)	-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$836,700	\$0	\$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353
ROW			-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	so	\$0	\$0	\$0	\$0.	\$0
SYS	LRT Vehicles (3/mi.)	}	 \$32,663,495	_	-	-	-	-	-		-	-	-	-	-	-	-	\$32,663,495	\$11,105,588	\$8,165,874	\$51,934,957
sys	Maintenance Yard	-	\$10,812,134		-	-	-	-	-	-	-	-	_	-	-	-	~	\$10,812,134	\$3,676,126	\$2,703,034	\$17,191,294
SYS	T.C.C.	-	\$1,121,078	-	-	-	-		-	-		-	-	_	-	-	-	\$1,121,078	\$381,167	\$280,270	\$1,782,514
·	TOTALS	22,695	\$44,596,708	\$0	\$794,325	\$2,241,000	\$12,739,500	\$23,343,137	\$7,734,370	\$232,217	\$1,252,624	\$1,673,400	\$674,632	\$6,036,870	\$2,836,875	\$2,133,330	\$306,577	\$106,595,565 \$106,595,565	\$36,242,492	\$26,648,891	\$169,486,948

NOTE:

1.) Real Estate is NOT INCLUDED.
 2.) Central Business District alignment costs ARE NOT INCLUDED.
 (LRT, TCC & MF costs based on per mile costs)
 3.) Soundwalls ARE INCLUDED

. - -

\$7,468 4.30 \$39,431,200

34.00% 25.00%

Project: S/N LRT - Clark County HWY 99 Date: 24-Jun-94

Date:	

前前

Sheet No.	DESCRIPTION	Distance (ft.)	Systemwide	Right of Way	1 Utility	2 LRT Str. Constr'n	3 LRT Grd Constr'n	4 Struc- tures	5 Track- work	6 Cross- inys	7 LAT Stations	8 Park & Ride Lots	9 Fare Collect'n	10 Traction Power	11 Signal System	12 Communi – cations	13 Special Condit'ns	SUB TOTAL	Engr& Admin (34%)	Contin gencies (25%)	Segment Totals	
	MAIN ST to 134th St -		GTH OPTION																			
HWY 99	HWY 99 N Main St to 68th 10+00 to 120+25	11,025	_	\$0	\$3,924,900	\$31,941,560	\$1,616,133	\$7,726,833	\$3,659,390	\$1,063,064	\$1,159,940	\$0	\$337,316	\$2,932,650	\$1,378,125	\$1,036,350	\$0	\$56,796,261	\$19,310,729	\$14,199,065	\$90,306,055	
HWY 99	HWY 99 88th St to 134th S 120+25 to 238+05	t 11,780	-	\$0	\$5,607,280	\$38,353,028	\$0	\$2,610,000	\$3,645,870	\$1,197,580	\$869, 955	\$0	\$252,987	\$3,133,480	\$1,472,500	\$1,107,320	· \$0	\$58,250,000	\$19,805,000	\$14,562,500	\$92,617,500	<u> </u>
HWY 99	HWY 99 N Main St to 88th PARK & RIDE @ 63RD ST (300	CARS)	-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$836,700	· \$0	\$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353	
HWY 99	HWY 99 N 88th St to 134t PARK & RIDE @ 129TH ST (30	n) CARS)		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$836,700	\$0	so	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353	
ROW] _]	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ 0	. \$0	\$0	\$0	\$0	\$0	\$ 0	\$0	
SYS	LRT Vehicles (3/mi.)	-	\$32,821,811	-		-		-	-	-	-	-	-	-	-	_	-	\$32,821,811	\$11,159,416	\$8,205,453	\$52,186,680	
SYS	Maintenance Yard		\$10,864,540	-	-	-		-	-	-	~	-	- (-	~	_	-	\$10,864,540	\$3,693,943	\$2,716,135	\$17,274,618	Ì
SYS	T.C.C.	-	\$1,126,512	-	-	-	-	-	-	· -	-	-	-	-	~	-	-	\$1,126,512	\$383,014	\$281,628	\$1,791,154	
<u> </u>	TOTALS	22,805	\$44,812,863	\$0	\$9,532,180	\$70,294,588	\$1,616,133	\$10,336,833	\$7,305,260	\$2,280,644	\$2,029,895	\$1,673,400	\$590,303	\$6,066,130	\$2,850,625	\$2,143,670	\$0	\$161,532,524 \$161,532,524	\$54,921,058	\$40,383,131	\$256,836,713	

NOTE

1.) Real Estate is NOT INCLUDED. 2.) Central Business District alignment costs ARE NOT INCLUDED. (LRT, TCC & MF costs based on per mile costs) 3.) Sound walls are not part of the Hwy 99 option

34.00%

25.00%

\$11,262 4.32 \$59,464,935

Project:	S/N LRT Clark County I-5
Date:	22-Jun-94

υ	ate:	

Sheet No.	DESCRIPTION	Distance (ft.)	Systemwide	Right of Way	1 Utility	2 LRT Str. Constr'n	3 LRT Grd Constr'n	4 Struc- tures	5 Track work	6 Cross– ings	7 LRT Stations	8 Park & Ride Lots	9 Fare Collect'n	10 Traction Power	11 Signal System	12 Communi cations	13 Special Condit'ns	SUB TOTAL	Engr& Admin (34%)	Contin – gencies (25%)	Segment Totals
	MAIN ST to 88TH St -	TERMIN	SOPTION																		
1-5 W	1-5 (WESTSIDE OF) 10+00 to 121+00	11,100	-	\$0	\$388,500	\$2,053,250	\$6,761,340	\$6,889,550	\$3,655,420	\$232,217	\$939,468	\$0	\$505,974	\$2,952,600	\$1,387,500	\$1,043,400	\$114,966	\$26,924,185	\$9,154,223	\$6,731,046	\$42,809,454
1−5 W	I-5 (WESTSIDE OF) GENERIC BRIDGE	1	-	\$0	\$0	\$360,000	\$0	\$1,254,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,614,000	\$548,760	\$403,500	\$2,566,260
1-5 W	I-5 (WESTSIDE OF) SOUNDWALLS (10) 10+00 to 121+00 (IN SF)	50,000	-	\$0	\$0	\$0	\$0	\$1,750,000	so	50	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,750,000	\$595,000	\$437,500	\$2,782,500
1-5 W	I-5 (WESTSIDE OF) PARK & RIDE @ 63RD ST (300	CARS)	-	\$0	\$0	\$0	\$0	\$0	\$0	so	so	\$836,700	\$0	\$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353
1-5 W	I-5 (WESTSIDE OF) PARK & RIDE @ BOTH ST (300	CARS)	-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$836,700	\$0	. \$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353
ROW			_	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ 0	\$0	\$0	\$0	\$0	\$ 0
SYS	LRT Vehicles (3/mi.)	-	\$15,975,536	-	-	-	-	-	-	-		-	-	-	-	-	-	\$15,975,536	\$5,431,682	\$3,993,884	\$25,401,103
SYS	Maintenance Yard	[-]	\$5,288,156	~	_	-	_	-	-	-	-	-	-	-	~	-	-	\$5,288,156	\$1,797,973	\$1,322,039	\$8,408,167
SYS	T.C.C.	-	\$548,313	-		-		-	_	-	~	-	-	-	-	-	-	\$548,313	\$186,427	\$137,078	\$871,818
<u> </u>	TOTALS	11,100	\$21,812,005	\$0	\$388,500	\$2,413,250	\$6,761,340	\$9,893,550	\$3,655,420	\$232,217	\$939,468	\$1,673,400	\$505,974	\$2,952,600	\$1,387,500	\$1,043,400	\$114,966	\$53,773,590 \$53,773,590	\$18,283,021	\$13,443,398	\$85,500,008

NOTE:

 1.) Real Estate is NOT INCLUDED.

 2.) Central Business District alignment costs ARE NOT INCLUDED.
 (LRT, TCC & MF costs based on per mile costs)

 3.) Soundwalls ARE INCLUDED

34.00%

\$7,703 2.10 \$40,670,274

25,00%

S/N LRT - Clark County I-5 22-Jun-94 Project: Date:

ġ

Sheet No.	DESCRIPTION	Distance (ft.)	Systemwide	Right of Way	1 Utility	2 LRT Str. Constr'n	3 LRT Grd Constr'n	4 Struc tures	5 Track work	6 Cross ings	LRT Stations	8 Park & Ride Lots	9 Fare Collect'n	10 Traction Power	11 Signal System	12 Communi – cations	13 Special Condit'ns	SUB TOTAL	Engr& Admin (34%)	Contin – gencies (25%)	Segment Totals
	MAIN ST to 88TH St	TERMINU	SOPTION																		
1-5 E	I-5 (EASTSIDE OF) 10+00 to 121+00	11,100	-	\$0	\$388,500	\$2,141,000	\$5,749,020	\$11,836,167	\$3,856,920	\$232,217	\$939,468	\$0	\$505,974	\$2,952,600	\$1,387,500	\$1,043,400	\$38,322	\$31,071,088	\$10,564,170	\$7,767,772	\$49,403,030
I−5 E	I-5 (EASTSIDE OF) GENERIC BRIDGE	1	-	\$0	\$0	\$360,000	\$0	\$1,254,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1 <u>,</u> 614,000	\$548,760	\$403,500	\$2,566,260
1-5 E	I5 (EASTSIDE OF) SOUNDWALLS (10) 10+00 to 121+00 (IN SF)	26,000	-	\$0	\$0	\$0	\$0	\$910,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$910,000	\$309,400	\$227,500	\$1,446,900
1-5E	I-5 (EASTSIDE OF) PARK & RIDE @ 53RD ST (300	CARS)	-	\$0 ⁻	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$836,700	\$0	\$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353
1-5 E	I-5 (EASTSIDE OF) PARK & RIDE ⊕ 881H ST (300	CARS)	-	\$0	\$0	\$0	\$0	\$0	\$0	 \$0	\$0	\$836,700	\$0	\$0	\$0	\$0	\$0	\$836,700	\$284,478	\$209,175	\$1,330,353
ROW			-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	s 0
SYS	LRT Vehictes (3/mi.)	-	\$15,975,536		<u> </u>	-	-	-	-	-	-	-		-	_ (-	-	\$ 15,975,536	\$5,431,682	\$3,993,884	\$25,401,103
SYS	Maintenance Yard	-	\$5,288,156	-	-	~	-	-		- i	_	-	-	-	~~	-	-	\$5,288,156	\$1,797,973	\$1,322,039	\$8,408,167
sys	T.C.C.	-	\$548,313		-	-	-	-	-	-	-	-	-	~	-	~	-	\$548,313	\$186,427	\$137,078	\$871,818
	TOTALS	11,100	\$21,812,005	\$0	\$388,500	\$2,501,000	\$5,749,020	\$14,000,167	\$3,856,920	\$232,217	\$939,468	\$1,673,400	\$505,974	\$2,952,600	\$1,387,500	\$1,043,400	\$38,322	\$57,080,493 \$57,080,493	\$19,407,368	\$14,270,123	\$90,757,984

NOTE:

 1.) Real Estate is NOT INCLUDED.

 2.) Central Business District alignment costs ARE NOT INCLUDED.
 (LRT, TCC & MF costs based on per mile costs)

 3.) Soundwalls ARE INCLUDED

34.00%

25.00%

\$8,176 2.10 \$43,171,365

.

1218

Project:	S/N LRT – Clark County HWY 99
Date:	24-Jun-94

Sheet Vo.	DESCRPTION	Distance (ft.)	Systemwide	Right of Way	Utility	LRT Str. Constr'n	LRT Grd Constrin	Struc- tures	Track work	Cross ings	LRT Stations	. Park & Ride Lots	Fare Collect'n	Traction Power	Signal System	Communi- cations	Special Conditins	SUB TOTAL	Engr & Admin (34%)	Contin gencies (25%)	Segment Totals
HWY 99	MAIN St to 88th St HWY 99 N Main St to 88th 10+00 to 120+25	ERMINUS 11,025	OPTION	\$0	\$3,924,900	\$31,941,560	\$1,616,133	\$7,806,833	\$3,659,390	\$1,083,064	\$1,739,910	\$0	\$505,974	\$2,932,650	\$1,376,125	\$1,036,350	\$0	\$57,624,889	\$19,592,462	\$14,406,222	\$91,623,574
IWY 99	HWY 99 N Main St to 88th	CARSI	_	\$0.	. 50	\$0	50	\$0	50	5	50	\$836 700	\$0	\$0	\$0	\$0	\$0	\$836 700	\$984 478	\$209.175	\$1 330 353
IWY 99	HWY 99 N Main St to 88th PAFK & RIDE @ 88TH ST (300 (CARS)	-	\$0	\$0	\$0	\$0	\$0	\$0	\$0 \$0	\$0	\$836,700	\$0	\$0	\$0	\$0 \$0	\$0 \$0	\$836,700	\$284,478	\$209,175	\$1,330,353
ROW			-	\$ 0	\$0	\$ 0	so	\$ 0	\$0	\$ 0	\$0	\$0	so	so	\$0	\$0	\$0	\$0	s o	\$ 0	\$0
sys	LRT Vehicles (3/mi.)	-	\$15,867,593	-		-		-	-	-	-		-	-	-	-	-	\$15,867,593	\$5,394,982	\$3,966,898	\$25,229,474
sys	Maintenance Yard	-	\$5,252,425	-		-	-	-	-	-	-			-	-	-	-	\$5,252,425	\$1,785,824	\$1,313,106	\$8,351,356
SYS	T.C.C.	-	\$544,608	_ }		-	-	-	-	-	-	-	-	-	-	-	-	\$544,608	\$185,167	\$136,152	\$865,927
	TOTALS	11,025	\$21,664,627	\$0	\$3,924,900	\$31,941,560	\$1 ,616,133	\$7,806,833	\$3,659,390	\$1,003,064	\$1,739,910	\$1,673,400	\$505,974	\$2,932,650	\$1,378,125	\$1,036,350	\$0	\$80,962,916	\$27,527,391	\$20,240,729	\$128,731,036

 NOTE
 1.) Real Estate is NOT INCLUDED.

 2.) Central Business District alignment costs ARE NOT INCLUDED.
 (LRT, TCC & MF costs based on per mile costs)

 3.) Sound walls are not part of the Hwy 99 option
 (LRT, TCC & MF costs based on per mile costs)

m:\southnor\summary\all.wk1\sum~CC99.wk1

34.00%

25.00%

.

\$11,676 2.09 \$61,650,782

.