CITY OF RICHMOND

REPORT TO COMMITTEE

TO PWT - JUNE 20, 2001

TO: Public Works and Transportation Committee **DATE:** June 4, 2001

FROM: Victor Wei, P. Eng.
A/Manager, Transportation **FILE:** 6500-01

RE: **RICHMOND SUB-AREA TRANSPORTATION STUDY – RECOMMENDED ROAD IMPROVEMENTS**

STAFF RECOMMENDATION

1. That the following road improvements recommended in Phase 1 of the *Richmond Sub-Area Transportation Study*, a joint study by the City of Richmond, British Columbia Transportation Financing Authority, Ministry of Transportation, and TransLink, as presented in the attached report, be endorsed to be carried forward to the next phase of the study for the preparation of functional design and detailed assessment of cost and property requirements:

   (a) widening of Steveston Highway between No. 5 Road and Palmberg Road, including the overpass at the Highway 99 interchange;

   (b) new full interchange at Blundell Road and Highway 99;

   (c) widening of Blundell Road to four lanes between No. 4 Road and the new Blundell interchange; and

   (d) extension of Blundell Road from No. 6 Road to Nelson Road as a two- or four-lane road.

2. That staff be directed to work with British Columbia Transportation Financing Authority, Ministry of Transportation and TransLink to complete the above tasks and to report back on an implementation strategy for the recommended road improvements in the south Richmond area.

Victor Wei, P. Eng.
A/Manager, Transportation

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STAFF REPORT

ORIGIN

On November 22, 1999, Council endorsed the Terms of Reference for the *South Richmond Sub-Area Transportation Study*, a joint study by the City of Richmond, BC Transportation Financing Authority (BCTFA), Ministry of Transportation (MoT) and TransLink. The study is a comprehensive review of the Steveston Interchange and surrounding road network to identify the short-term and long-term transportation improvements required to address road and traffic deficiencies in the area, as well as to develop a phased implementation strategy for any recommended improvements.

The *South Richmond Sub-Area Transportation Study* is comprised of two phases:

- *Phase 1 – Transportation Planning*: identification of current transportation deficiencies in the study area and evaluation of different options for improvements; and
- *Phase 2 – Functional Design*: cost-benefit analysis, preparation of preliminary functional design for recommended improvements and development of implementation strategy.

The analysis for Phase 1 of the study has now been completed. This staff report summarizes the Phase 1 findings and presents a set of recommended road improvements for Council's consideration.

ANALYSIS

1. Transportation Deficiencies

To identify the presence of problem areas due to recurring traffic delays, existing traffic data for key intersections within the study area was analyzed to ascertain the current levels of service. All signalized intersections were evaluated and assigned a level of service rating based on the average delay experienced by motorists during three different time frames: weekday AM and PM peak periods and Saturday PM peak period. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Level of service ratings range from good (delay of less than 25 seconds per vehicle), fair (delay of 25 to 60 seconds) to poor (delay in excess of 60 seconds). Table 1 below summarizes the key intersections examined and the traffic level of service at each intersection.

Table 1
Transportation Deficiencies at Key Intersections

Intersection	Level of Service (LOS)
• Shell Road / Westminster Highway • No. 5 Road / Westminster Highway • **Hwy 99 Northbound Off-Ramp / Westminster Hwy** • No. 5 Road / Blundell Road • No. 5 Road / Williams Road • Coppersmith Way / Steveston Highway	• Good LOS during all three time periods. • Hwy 99 Northbound Off-Ramp / Westminster Hwy intersection experiences heavy left turn traffic from Hwy 99 during the weekday AM peak period.
• Jacombs Road / Westminster Highway	• Poor LOS during the weekday AM and PM peak periods due to heavy left turns eastbound from Westminster Hwy and southbound from Jacombs Road. • Acceptable during the Saturday PM peak period.
• Knight Street / Westminster Highway	• Fair LOS during the weekday PM peak period due to heavy southbound traffic from Vancouver. • Good LOS during the weekday AM peak and Saturday PM peak periods.

Intersection	Level of Service (LOS)
• No. 6 Road / Westminster Highway	• Poor LOS during the weekday AM and PM peak periods due to heavy left turn eastbound from Westminster Hwy to No. 6 Road. • Good LOS during the Saturday PM peak period.
• Shell Road / Steveston Highway • **Hwy 99 Southbound Off-Ramp / Steveston Hwy** • **Hwy 99 Northbound Off-Ramp / Steveston Hwy** • No. 5 Road / Steveston Highway	• Poor LOS when southbound approach to Massey Tunnel is congested and traffic spills back onto the surrounding arterial network. • Good LOS during all three time periods when no congestion present at Massey Tunnel.

Intersections operating at fair to poor levels of service indicate capacity constraints given the volume of traffic arriving during the time periods analyzed. In turn, capacity constraints can create unsafe traffic conditions and the potential for serious incidents and crashes, especially at highway on- and off-ramps. Therefore, while a number of intersections were found to be congested, this study focussed on the specific problems along the Highway 99 corridor.

2. Analysis of Improvement Options

Upon assessment of the above existing deficiencies in the surrounding road network system, alternative road improvements (illustrated in Attachment 1) were developed to make up six possible road network scenarios for evaluation. The six road network scenarios, together with a base case "Do Nothing" scenario as described below, were tested in the City's transportation model (Emme/2). The traffic patterns generated on the road network for each scenario were then evaluated based on the effectiveness of the network to address the operational and performance issues identified and to accommodate the expected travel demand.

2.1 "Do Nothing" Scenario

The "Do Nothing" option is a base road network for 2011 in which all of the current committed road improvements are in place in addition to the existing road network. The "Do Nothing" option therefore consists of the following:

- existing road network today;
- extension of Garden City Road from Sea Island Way to Bridgeport Road; and
- completion of the Airport Connector Bridge.

2.2 New Road Improvement Scenarios

Upon establishment of the base road network, the following new road improvements were then added to the base road network to form six alternative road network scenarios for the purposes of assessing the impacts of each of the improvement options under traffic conditions in 2011:

- four lane Steveston Highway from No. 5 Road to Palmberg Road, including twinning the overpass;
- extension of two lane Rice Mill Road to No. 6 Road;
- four lane Blundell Road from No. 4 Road to No. 6 Road;
- extension of four lane Blundell Road eastward from No. 6 Road to Nelson Road; and
- full interchange at Blundell Road and Highway 99.

Table 2 below summarizes the six scenarios and their key road improvement options, along with the corresponding implications on traffic patterns.

Table 2
Scenarios of Combined Road Improvement Options and Their Implications

Scenario	Road Improvement Options	Implications on Traffic Patterns
A	• Four lane Steveston Highway from No. 5 Road to Palmberg Road, including widening of Hwy 99 overpass	• Traffic volumes on Steveston Highway and the Steveston Interchange increase significantly. • Widening of Steveston overpass significantly improves efficiency of Steveston Interchange and allows for suppressed traffic demand on Steveston Highway to use highway system.
B	• Two lane Rice Mill Road extended to No. 6 Road	• Traffic volumes on Steveston Highway not sensitive to the Rice Mill Road extension. • Extending Rice Mill Road to Steveston Highway will have little benefit to the Steveston Highway area network and the Steveston Interchange.
C	• Four lane Blundell Road from No. 4 Road to No. 6 Road, including widening of Hwy 99 overpass but no interchange • Four lane Blundell Road extended eastward to Nelson Road	• No traffic diversion from Steveston Highway. • Does not constitute practical alternative to relief traffic on Steveston Highway and improve east-west connectivity.
D	• Four lane Steveston Highway from No. 5 Road to Palmberg Road • Four lane Blundell Road from No. 4 Road to No. 6 Road, including widening of Hwy 99 overpass but no interchange • Two lane Blundell Road extended eastward to Nelson Road	• Traffic volumes on Steveston Highway and the Steveston Interchange increase significantly. • Four-lane Blundell Road east of No. 5 Road and extension of Blundell Road to Nelson Road without Blundell Interchange relieves traffic congestion at the Westminster Interchange. • Does not replace the need to widen the Steveston overpass.
E	• Four lane Blundell Road from No. 4 Road to No. 6 Road, including widening of Hwy 99 overpass • Four lane Blundell Road extended eastward to Nelson Road • Full interchange at Blundell Road and Highway 99	• Traffic volumes on Steveston Highway marginally reduced. • Construction of the Blundell Interchange provides some but not significant relief on the on/off ramp volumes at the Steveston Interchange. • Does not replace the need to widen the Steveston overpass.
F	• Four lane Steveston Highway from No. 5 Road to Palmberg Road • Four lane Blundell Road from No. 4 Road to No. 6 Road, including widening of Hwy 99 overpass • Two lane Blundell Road extended eastward to Nelson Road • Full interchange at Blundell Road and Highway 99	• Traffic volumes on Steveston Highway similar to Scenario C. • Little traffic diversion from Steveston Highway to Blundell Road with the addition of the Blundell Interchange, which is an indication of the high demand on Steveston Highway and the strong desire to use this corridor as a preferred route. • Construction of the Blundell Interchange provides some but not significant relief on the on/off ramp volumes at the Steveston Interchange.

3. Key Findings of Analysis

Based on the preliminary analysis carried out on the above six roadwork network scenarios, it is recommended that the following improvement strategies for Scenarios C and F (illustrated in Attachment 2), be explored further to improve the road network in south Richmond:

- widening of Steveston Highway from No. 5 Road to Palmberg Road and the Highway 99 overpass to four lanes with left-turn bays at the interchange;
- construction of a full Blundell Interchange at Highway 99 and widening of Blundell Road between No. 4 Road and the interchange to four lanes with left-turn bays at the interchange; and

- extension of Blundell Road from No. 6 Road to Nelson Road as a two- or four-lane road.

3.1 Widening of Steveston Highway and Overpass

Phase 1 of the study concluded that of all the recommended improvements tested, the widening of the Steveston Highway overpass to provide four lanes (with left-turn bays) was identified as a critical element of the Highway 99 system in the south Richmond area. The transportation model used in the study also indicated that the overpass widening at Steveston Interchange could not be effectively replaced by any other road network improvements tested (e.g. Blundell Interchange, Blundell Road extension and Rice Mill Road extension) as there continues to be a high demand by road users to use Steveston Highway as a preferred corridor of travel. Other benefits expected from the improvements are:

- enhancing the safety of the off-ramp operation, especially during rush hours;
- allowing the suppressed travel demand on Steveston Highway to use the highway system;
- enhancing the transit exchange operation in the area;
- improving the overall efficiency of the Steveston Interchange; and
- allowing planned development growth in the area.

3.2 Blundell Road Widening, Extension and New Interchange

Phase 1 results also concluded that the improvements of widening Blundell Road to four lanes, construction of a new full interchange at Highway 99 and extension of Blundell Road from No. 6 Road to Nelson Road would be effective in addressing the current and future road network deficiencies in the area. Although the Blundell Road and interchange improvements were not found to have noticeable impacts on diverting significant traffic from the Steveston Interchange, the strategy was however recognized to result in the following benefits:

- allowing for suppressed travel demand in the east-west direction in central Richmond to use the highway system;
- relieving traffic congestion to some extent at both Steveston Interchange and Westminster Interchange;
- providing some, but not significant, relief on the on/off ramp volumes at the Steveston Interchange; and
- allowing planned development growth in the area.

Given the benefits associated with each of the road improvement strategies, the improvements related to both Steveston Interchange and Blundell Interchange should be carried forward for more detailed assessment. Improvements to these two interchanges will not only address existing traffic safety concerns and capacity constraints in the area but also support future development in the south and east Richmond, including the Riverport and Fraserport areas.

4. Next Steps

Of the six scenarios analyzed in Phase 1, the study team selected the road improvement strategies included in Scenarios C and F for further analysis in Phase 2, which involves the preparation of functional design drawings and detailed estimates of costs, benefits, impacts and property requirements. These two scenarios involve the following road improvements:

- widening of Steveston Interchange overpass;
- widening of Steveston Highway between the interchange and Palmberg Road;

- new full interchange at Highway 99 and Blundell Road;
- widening of Blundell Road between No. 4 Road and the new interchange; and
- extension of Blundell Road as a two- or four-lane road from Blundell Road to Nelson Road.

Upon completion of Phase 2 in July 2001, staff will engage in more detailed discussions with BCTFA and MoT on the development of an implementation strategy for the recommended improvements. The implementation strategy is expected to include issues such as operational features, phasing, timing, and funding of the individual components of the improvements. It is anticipated that the upcoming discussions will provide opportunities for potential private partnership with developments in the surrounding area for the implementation of the improvements.

FINANCIAL IMPACT

None at this time. Council has previously approved the cost of the current study.

CONCLUSION

Staff have been working with BC Transportation Financing Authority (BCTFA), Ministry of Transportation (MoT) and TransLink on the joint *South Richmond Sub-Area Transportation Study* to develop a co-ordinated strategy for pursuing the transportation improvements necessary to address the existing road and traffic deficiencies in the area, particularly at the Steveston Interchange. Phase 1 of the study, the identification of transportation deficiencies and the analysis of alternative improvement options, has now been completed.

Phase 1 findings identified the following road improvements to the area road network that are recommended to be carried forward to Phase 2 for functional design and more detailed assessment on cost and property requirements:

1. Widen Steveston Highway to four lanes from No. 5 Road to Palmberg Road and twin the Steveston Highway overpass;

2. Construct a full Blundell Interchange at Highway 99 and widen Blundell Road to four lanes from No. 4 Road to the Blundell Interchange; and

3. Extend Blundell Road from No. 6 Road to Nelson Road as a two- or four-lane road.

Phase 2 of the study is expected to be completed by July 2001, at which time an implementation strategy will be developed for the recommended improvements upon further discussions between staff, BCTFA, MoT and developers in the area.

For Mimi Sukhdeo, P. Eng.
Transportation Engineer

For Joan Caravan
Transportation Planner

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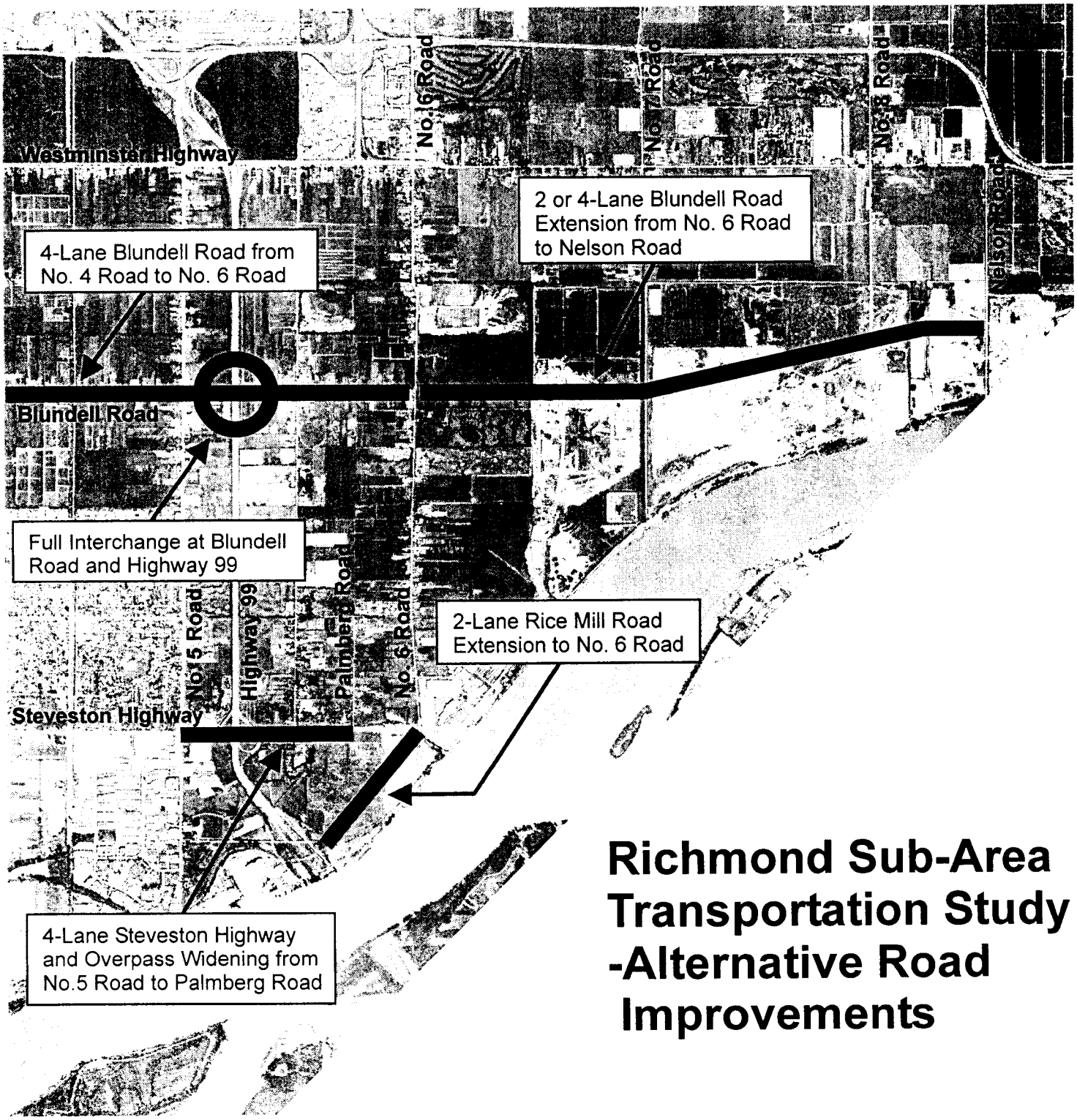
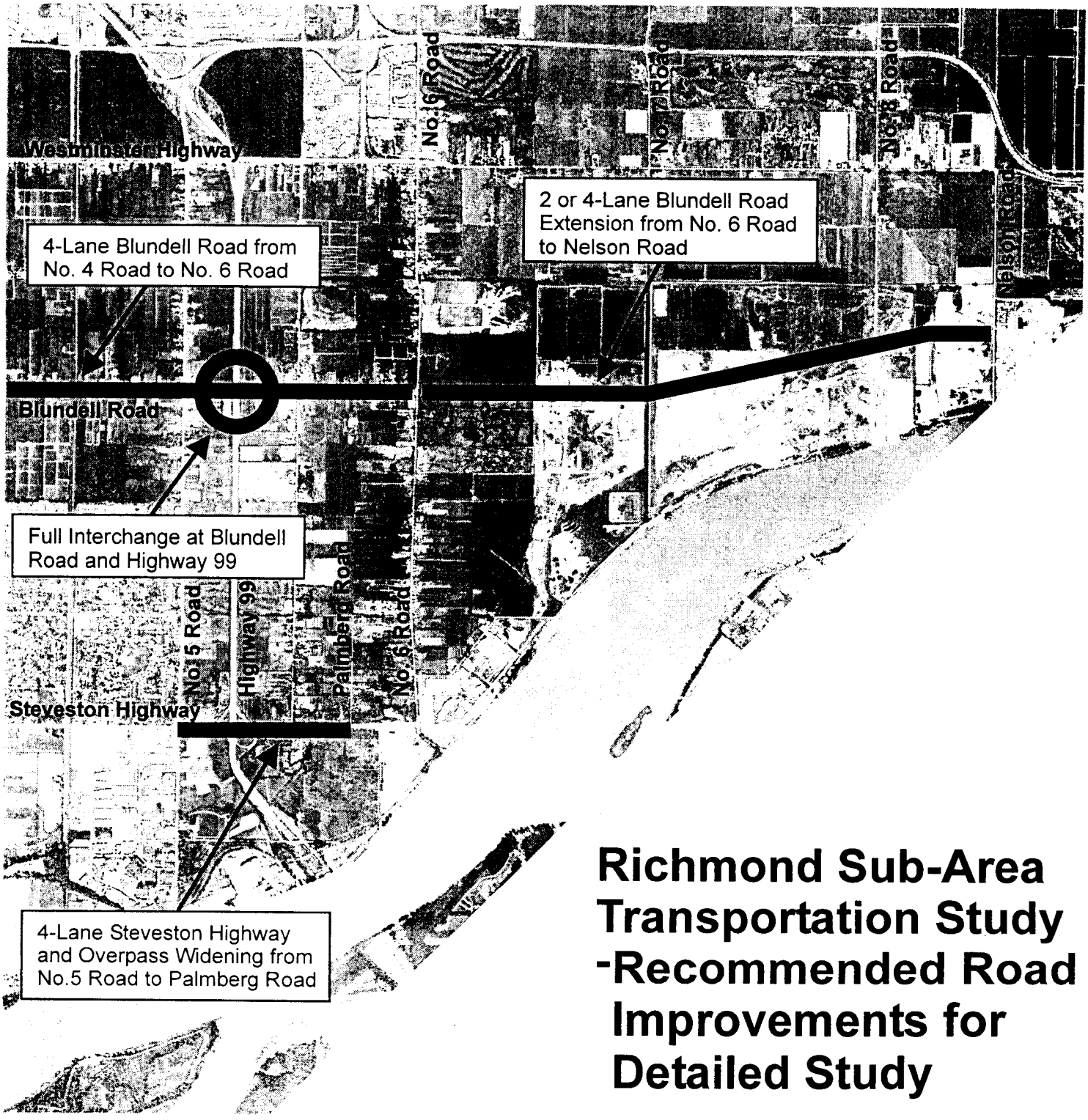


Richmond Sub-Area Transportation Study -Alternative Road Improvements



Richmond Sub-Area Transportation Study -Recommended Road Improvements for Detailed Study