



CITY OF WHITEHORSE
2002 City-Wide Transportation Study
Summary

Prepared by

UMA Engineering Ltd.

3030 Gilmore Diversion

Burnaby, BC V5G 3B4

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1.0 Introduction

In June, 2002 Whitehorse awarded UMA Engineering Ltd. the assignment to prepare a City-Wide Transportation Study. The analysis work commenced in June 2002 and ended in 2003.

1.1 General Description

The City-Wide Transportation Plan consists of:

1. Summary and Recommendations
2. Section 1: Issues and Goals
3. Section 2: Road Network and Traffic Operations
4. Section 3: Transportation Safety
5. Section 4: Alternative Modes
6. Section 5: Downtown Parking

Each section has been developed as a separate Working Paper and provides the background analysis, detailed review and recommendations for the sectional topic. The Summary Plan combines the section recommendations, integrates them and prioritizes them into an overall Transportation Plan.

The philosophy of the Plan is articulated in Section 1: Issues and Goals. The other sections provide the details on how this philosophy is applied to different parts of the City's transportation mandate. It is important to note that "Whitehorse Moves, Community Transportation Workshop Report", a separate and independent community transportation initiative, occurred in October 2002 during the Transportation Plan project. The goals of the Transportation Plan and Whitehorse Moves are similar and ideas and concepts derived from the Workshop were assessed and, where possible, have been incorporated into the new Transportation Plan. Not all of the Whitehorse Moves concepts were adapted, but some important ones were – notably the concept of using traffic roundabouts for intersection control and the ideas for creating "road diets" and pedestrian/bicycle friendly travel corridors.

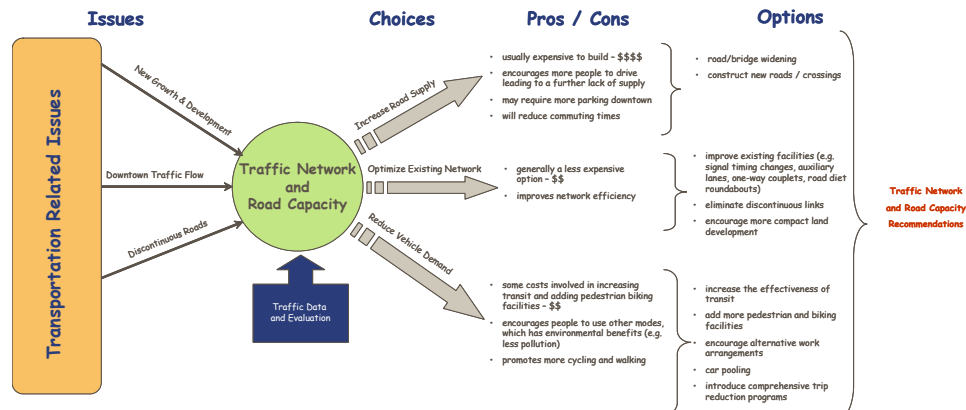


2.0 Guiding Principles

The Plan philosophy is summarized in the Goals of the document as developed in Section 1 of the Plan. The philosophy supports the City’s Official Community Plan (adopted in 2002) which sets out a 20 year vision for Whitehorse. The Section 1 Goals are:

- **Community and Environmental Quality Goal**
 - provide transportation infrastructure and services that enhance quality of life as well as the quality of the natural environment
- **Mobility Goal**
 - provide for the safe, convenient and accessible movement of people and goods throughout the City for all modes of travel and all people.
- **Transportation Planning Goal**
 - provide transportation infrastructure and services that support long-term plans and are consistent with current guidelines and standards.
- **Sustainability – Affordability Goal**
 - provide transportation infrastructure and services in a manner that is efficient and cost-effective, making the best use of available resources.

The issues, analysis and recommendations within the Plan Sections are guided by the Plan Goals. Key issues and community concerns are catalogued in Section 1 and then are assessed in Sections 2 to 5. All five sections provide recommendations to address their respective issues. The Summary Plan incorporates the sectional recommendations and provides a prioritized list of recommended actions for short term and long term implementation. The Plan Goals are used to establish the long term objectives.





3.0 Summary Plan and Section Recommendations

The findings for the four sections of transportation issues are summarily described as follows:

3.1 Section 2: Road Network and Traffic Operations

Section 2 – Traffic Network and Operations involves traffic analyses and road network operations review. Operational issues pertain to issues of network connectivity, delay and congestion versus issues of safety. Issues pertaining to safety, alternative modes and parking are provided in other sections of the report.

Traffic network and operation issues were identified in Section 1 and are listed in general as follows:

- Congestion through the downtown core and left turn traffic on downtown routes
- Need for future major road widenings on Hamilton Boulevard
- Inefficient traffic flow at select intersections
- Number of lanes on 4th and 2nd Avenues

During the course of this Study the City initiated an independent transportation initiative that looked at the City's transportation system from a sustainability and community liveability perspective. The "Whitehorse Moves" initiative involved the community, excited public interest and provided some recommendations directly impacting the City-Wide Transportation Study. Two specific concepts – use of roundabouts for intersection control and use of "road diets" for road capacity control – were examined and adapted into some of the alternatives.

The assessment followed the following process: analysis of existing conditions (population 20,500 – effectively unchanged from the IMC 1992 study), analysis of future conditions (population 25,000 – the 20 year growth horizon) assuming no improvements, evaluation of alternatives and of other issues, analysis of future conditions with recommended road network, concluding with the long-term plan, road classification and plan recommendations. Current traffic count data and current land development plans were incorporated into transportation models used for analysis.

The City's 1992 TModel2 afternoon peak hour model was updated and used to assess the long-term (OCP) road network program. A new micro-simulation model of the downtown area was developed

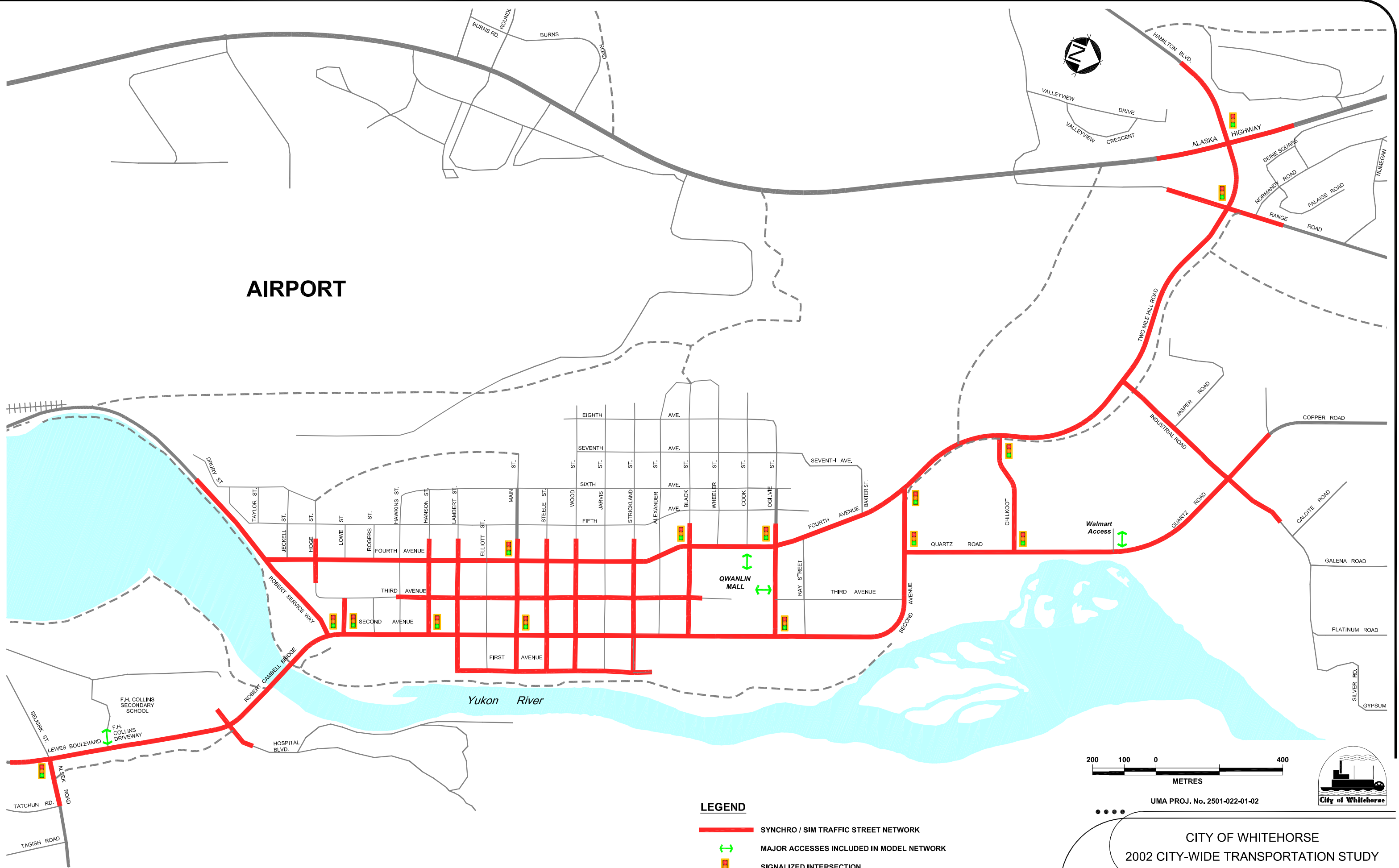


to assess existing traffic concerns and analyze alternative improvements for the City core. Traffic signal analyses were included.

The City's TModel2 system-level network model was used to assess, outside of the downtown area, the City's long term road requirements. To project future traffic volumes, land use forecasts in the City's TModel2 model were adjusted to reflect changes in land use that had occurred since 1992 and were then adjusted again to accommodate an estimated population of 25,000 (the 20 year growth horizon). During the course of analysis it was found that, outside of the downtown core, the traffic volumes generated by the IMC 1992 study model are being overestimated. This was adjusted using intersection count data for the evaluation of major areas external to downtown regarding Hamilton Boulevard and Takhini/Porter Creek areas. In general however, Tmodel2 trip distribution forecast results were used for 20 year growth traffic volumes.

To assist with transportation-related decision-making, a model utilizing micro-simulation modeling software (Synchro – SimTraffic v. 5.0) for the downtown area of the City of Whitehorse was developed. The micro-simulation model was built to represent afternoon peak hour conditions, which is consistent with the City's existing TModel2 model and provided the basis for subsequent analyses.

AIRPORT



- LEGEND**
- SYNCHRO / SIM TRAFFIC STREET NETWORK
 - ↔ MAJOR ACCESSES INCLUDED IN MODEL NETWORK
 - SIGNALIZED INTERSECTION

UMA PROJ. No. 2501-022-01-02

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2002 CITY-WIDE TRANSPORTATION STUDY



MICRO - SIMULATION MODEL NETWORK - FIG. 2 - 3.3



3.1.1 Existing Conditions

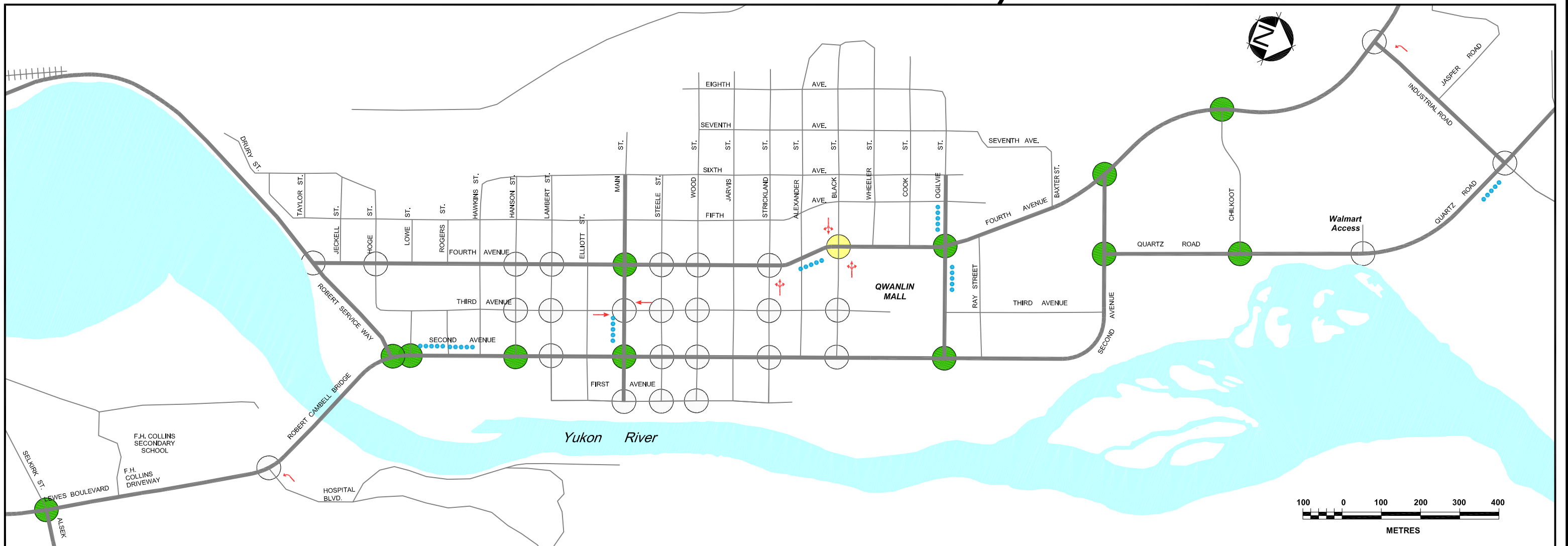
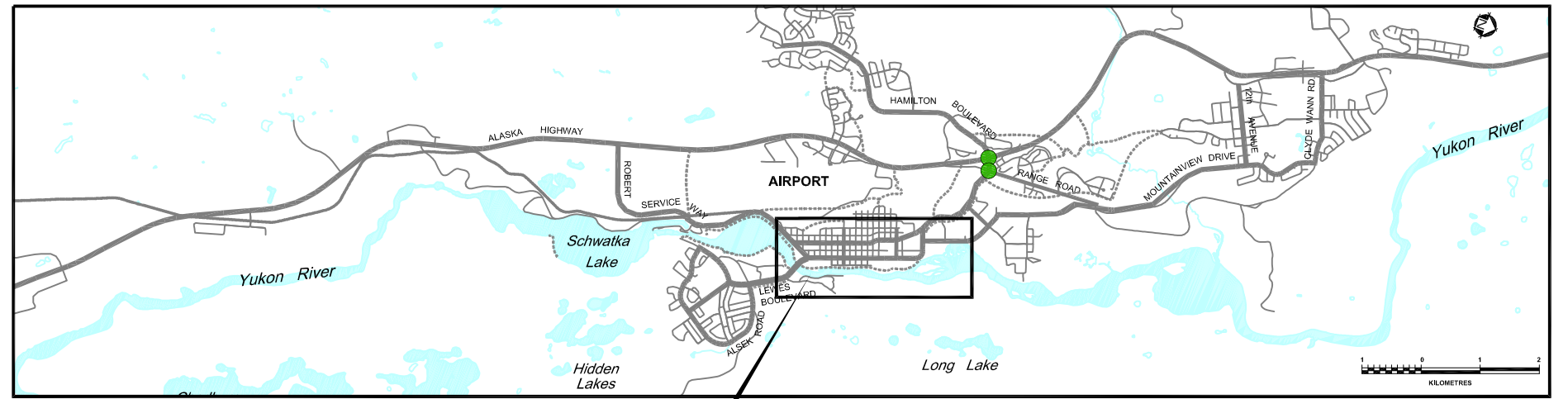
The Level of Service (LOS) and queuing statistics at major intersections in the micro-simulation model were used as the main operational indicators for traffic analysis. LOS ratings vary from Level A (the best) to Level F (the worst). Most municipalities consider LOS levels of D or E to be the minimum acceptable rating for street operations.

Existing traffic conditions were analyzed. Results of the existing condition analysis for the downtown model study area indicate that generally traffic operates acceptably. Traffic queues occur during afternoon peak period conditions for short durations (5 minutes) on 2nd Avenue southbound approaching the Robert Campbell Bridge, on 4th Avenue northbound near Black Street, on Quartz Road at Industrial and on Ogilvie Street eastbound at 4th Avenue. There are delays at intersections for some minor leg movements as noted below.







- Main Street at 3rd Avenue – north and southbound movements LOS E and F
- Industrial Road at Two Mile Hill – westbound left turn movements at LOS F
- Strickland Street at 4th Avenue – westbound approach movements LOS E
- Black Street at 4th Avenue – north and southbound movements LOS E
- Lewes Street at Hospital Road – left-turn movements from Hospital Road LOS F

3.1.2 Future Conditions

Future conditions were examined to identify what new issues might arise if no improvements were made to the road network. Future analysis was based on the medium growth target identified in the OCP for the next 20 years (population = 25,000). Results of the future condition analysis for the downtown model study area, indicate that if no road improvements were provided, the network would experience some delays, but in general would still operate acceptably. Traffic queues during the afternoon peak period would lengthen somewhat (5 – 10 minutes) from that of existing conditions. In addition, without improvements, the intersection movements at the above noted intersections as well as at Quartz Road and Industrial are expected to experience poor performance.



LEGEND

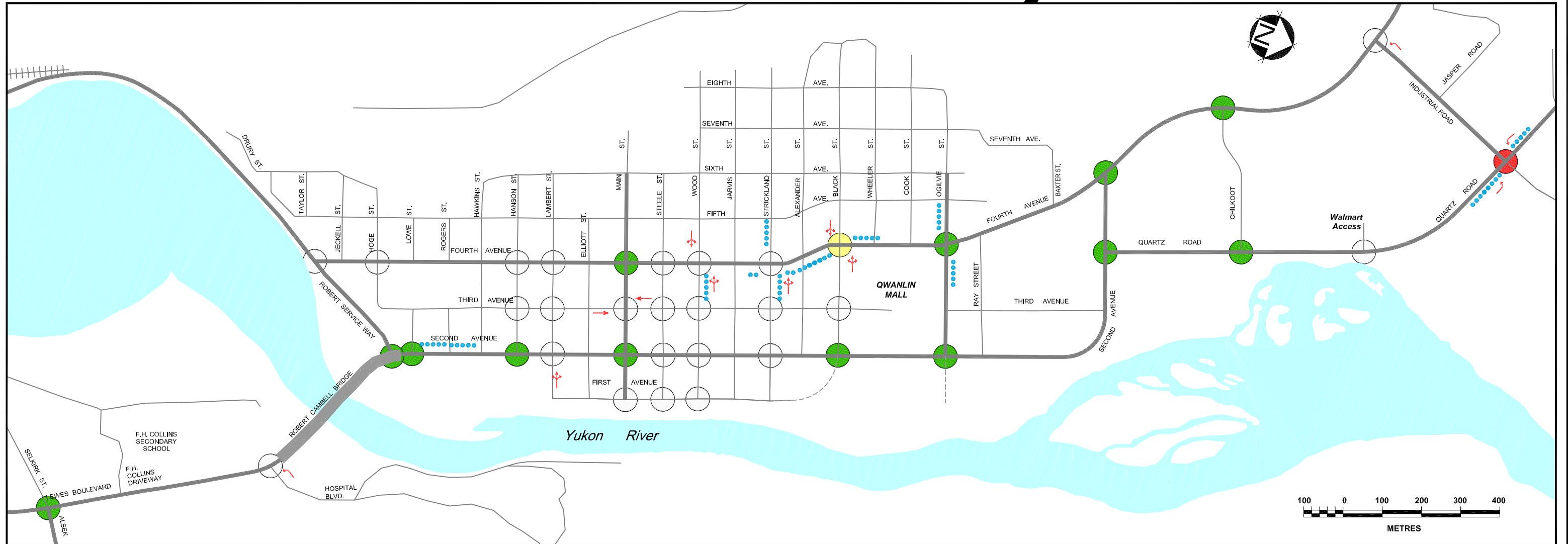
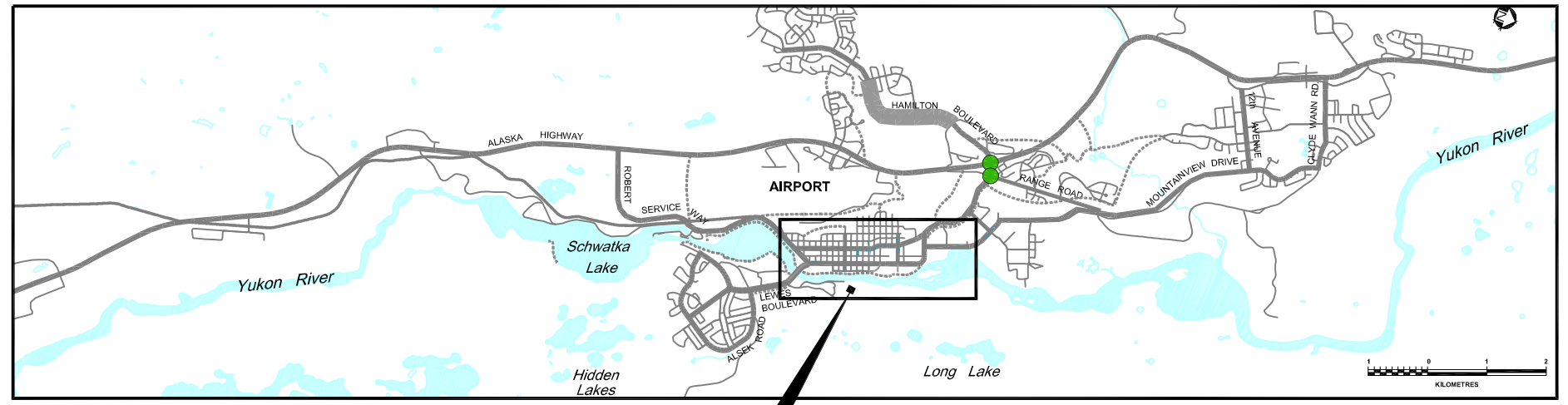
-  INTERSECTION ANALYZED
-  INTERSECTION OPERATING ACCEPTABLY (LOS A, B & C)
-  INTERSECTION APPROACHING CONGESTION (LOS D)
-  CONGESTED INTERSECTIONS (LOS E & F)
-  PROBLEM MOVEMENT (LOS E & F)
-  TRAFFIC QUEUES & DIRECTION

ANALYSIS BASED ON:
 - WEEKDAY PM PEAK PERIOD










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 2002 CITY-WIDE TRANSPORTATION STUDY





LEGEND

-  INTERSECTION ANALYZED
-  INTERSECTION OPERATING ACCEPTABLY (LOS A, B & C)
-  INTERSECTION APPROACHING CONGESTION (LOS D)
-  CONGESTED INTERSECTIONS (LOS E & F)
-  PROBLEM MOVEMENT (LOS E & F)
-  TRAFFIC QUEUES & DIRECTION
-  ROADS APPROACHING OR AT CAPACITY

ANALYSIS BASED ON:
 - WEEKDAY PM PEAK PERIOD



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CAPACITY EVALUATION OF FUTURE TRAFFIC CONDITIONS (POPULATION 25, 000) FIG. 2- 4.4



Conditions in north and west Whitehorse were also analyzed.

It was found that with development of south Porter Creek and Lower Porter, without road improvements traffic conditions in north Whitehorse on Pine Street, 12th Avenue and a portion of Mountain View drive will be approaching capacity.

For west Whitehorse, with planned development, traffic conditions on Hamilton Boulevard are expected to perform acceptably. Once the Hillcrest Expansion Area beyond Copper Ridge is developed, however, traffic conditions on Hamilton Road will deteriorate, requiring the need for additional capacity.

3.1.3 Alternatives

To address issues raised by the City, the public and through analysis processes, alternatives for three key areas of the City were developed:

- Downtown
 - Do Nothing
 - Downtown Optimization (Traditional)
 - Convert 2nd and 4th Avenues to One-Way Couplet, Ogilvie Street to Robert Service Way
 - “Road Diet” Concepts, reducing 4 lanes to 3 lanes (one lane northbound and southbound with centre median turn lane)
- North Whitehorse (Porter Creek/Takhini)
 - Do nothing
 - Pine Street/College Access Road link, no Highway connection
 - Pine Street/College Access Road link, with Highway connection
 - Pine Street/Highway link, (Option 2 Concept, Reid Crowther 1992 report)
 - Pine Street/Mountain View Drive link (north of College)
- West Whitehorse (Granger/McIntyre Drive)
 - Do nothing to Hamilton Boulevard



- Widen Hamilton Boulevard to four lanes (no connection to RSW), Sumanik Drive to Falcon Way
- Extend Hamilton Boulevard as two lanes from existing south to Alaska Highway at Robert Service Way
- Extend Hamilton Boulevard as two lanes from existing south to Alaska Highway north of Robert Service Way (south of Hillcrest and north of Robert Service Way)

Issues related to other network elements including those pertinent to Riverdale and Marwell areas were also discussed and addressed.

New roadway and road improvement alternatives were assessed utilizing a broad set of qualitative criteria. The criteria are in four general categories: financial, customer service, socioeconomic and environmental. Each alternative was compared relative to each other and a choice recommended.

Downtown

The preferred option for downtown is the Preferred Road Diet Concept recommended for 4th Avenue and a portion of 2nd Avenue. This was based on:

- Minimal costs
- Provides an acceptable level of mobility for all users of the road network. Balances mobility needs for motorized vehicles (automobiles and transit vehicles) and non-motorized users (pedestrians and cyclists)
- Improves business access along 4th Avenue by providing a centre refuge storage lane
- Reduces noise and other forms of pollution
- Improves street ambient quality along 4th Avenue and portions of 2nd Avenue south of Hanson Street.

The results of the micro-simulation analysis indicate that during the afternoon rush hour, by 2025 and based on a population growth of 25,000 traffic queues are expected to occur on 2nd Avenue southbound approaching the Robert Campbell Bridge (up to 15 minutes), on Strickland westbound, and on Ogilvie Street eastbound at 4th Avenue. In addition, the following minor leg intersection movements are expected to experience poor performance:



- Main Street and 3rd Avenue – north-south LOS E and F
- Strickland Street and 4th Avenue – northbound movements LOS E
- Lambert Street – westbound through and right LOS E

As intersection delays are at locations which are primarily minor legs on major routes, these results are considered acceptable. It should be noted that roundabouts, although not analyzed in the micro-simulation model, could be installed as a form of intersection control on 4th Avenue between Robert Service Way and Lambert Street and along 3rd Avenue (but not at Main Street), and along 6th and 1st Avenues where geometrically feasible.

As a sensitivity analysis, traffic signal coordination of 2nd and 4th Avenues was conducted. With respect to 4th Avenue, it was found that interconnection and coordination of the existing traffic signal at Ogilvie Street with the full signal at Black Street reduces the build up of northbound queuing on 4th Avenue. With respect to 2nd Avenue, it was found that coordination did not measurably improve traffic operations. Coordination of the signals provides benefits for the major traffic flow directions at the expense of the traffic trying to enter 2nd Avenue from the minor streets. In the case of 2nd Avenue, coordination created less overall benefit to the road network.

To offset queuing and vehicle demand anticipated for the Robert Campbell Bridge, the increased use of alternative modes is recommended through increased transit ridership, cycling and walking.

North Whitehorse Recommendations

Each of the options was evaluated utilizing the evaluation criteria described previously. Highlights of the evaluation include:

- Of the five alternatives considered, the option ranked the highest was the Pine/Highway link with a total of 51 points.
- Benefits of the Pine Street/Highway option include:
 - Provides a new link in the transportation network connecting Porter Creek with Kopper King at the Alaska Highway and points south
 - Improves bike and pedestrian routes by adding new roadways that provide increased lighting, adequate travelling space and smoother surfaces. These new roadways would provide a suitable route for utilitarian travel for these modes.



- Disadvantages of this option include: some environmental impacts associated with new road facilities and the requirement for a creek crossing.

Based on the evaluation of options, it is recommended that the long-term network for the 25,000 population horizon include a road connection between Pine Street and the Alaska Highway at Kopper King. Additional pre-design is required to clarify alignments and mitigate potential environmental impacts. Motorized vehicle connections with the Takhini neighbourhood are not required from a transportation perspective, but connections are recommended to link cycling and pedestrian facilities.

West Whitehorse Recommendations

Existing Conditions - The YTG study on Hamilton Boulevard indicates that currently the signal at Sumanik Drive is not warranted for capacity needs. All the intersections along the corridor are operating acceptably.

Operational concerns, as observed along the Alaska and Klondike Highways are safety oriented and not capacity related. Issues along these highways are discussed in Section 3.

Based on a review of Sumanik Drive, it is recommended the roadway remain open to the Alaska Highway to serve as an alternative secondary access to the highway from the Valleyview neighbourhood located adjacent to Hamilton Boulevard. There have been no reported problems involving traffic crossing the highway from/to Sumanik and Range Road but this could be a concern with increased development in the future. It is therefore also recommended that traffic volumes and intersection operations be monitored at Sumanik Drive and the Alaska Highway. If safety or operational problems arise then restricting traffic movements to right in/right out only may need to be considered.

Future Conditions - Based on an evaluation of the future traffic volumes and road capacities improvements to Hamilton to serve the Copper Ridge area do not require twinning of Hamilton Boulevard. According to the OCP and YTG development plans, development over the next twenty years is planned to primarily occur in the Copper Ridge area (1990 developed residential lots). Hamilton Boulevard will not require expansion from its current configuration, until the



development occurs in the Beyond Copper Ridge area. At this point additional infrastructure is required.

The existing configuration of Hamilton Boulevard (2 lanes south of Sumanik Drive) will not serve the ultimate future development population planned for the area (4100 lots). Ultimate development is expected to occur post 20 years. If a connection with Alaska Highway does not proceed, then widening from two to four lanes will be required to service the demand.

As an alternative to four-laning Hamilton Boulevard, a two-lane extension of Hamilton Boulevard to connect with the Alaska Highway was evaluated. The results indicate that future development and the transportation network will be better served by connecting Hamilton Boulevard to the Alaska Highway either at Robert Service Way (RSW) or a point north. Benefits of the extension southward towards RSW include:

- More efficient use of the existing road system (improves distribution of traffic between RSW and Two Mile Hill providing two routes to downtown for motorists, transit, cyclists and pedestrians)
- Less built roadway (with the exception of the Alaska Highway intersection approaches, Hamilton Boulevard will not need to be four-lanes wide).
- A two-lane roadway compared to a four-lane roadway provides a safer environment for cyclists and pedestrians.
- Secondary emergency access can be provided in the event of an accident blocking one portion of the road.

3.1.4 Other Network Elements

The following provides the evaluation and recommendations regarding network signals, use of roundabouts, 3rd Avenue, the YTG egress on 2nd Avenue, Robert Campbell Bridge and Lewes Avenue in Riverdale, Quartz Road and Industrial Road in Marwell and emergency access needs for crossing the Yukon River.

Signals

A new traffic signal is recommended for Lewes at Hospital Road, a full signal is required at 4th Avenue at Black Street. Once Black Street is constructed through to 1st Avenue a traffic signal is



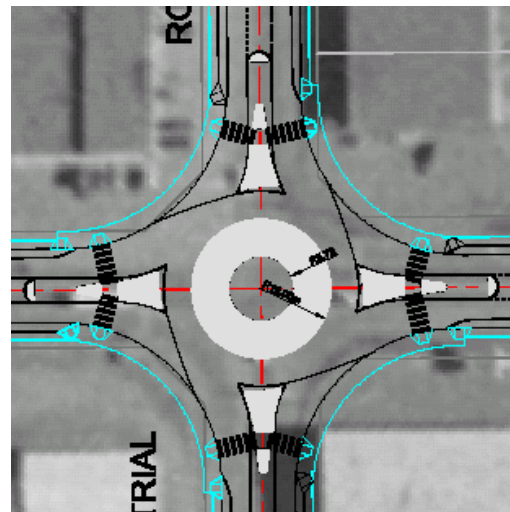
recommended at Black Street and 2nd Avenue and, with future population growth, at Quartz Road and Industrial Road. Signal timing adjustments are recommended at the following locations:

- 2nd Avenue at RSW, Lowe, Hanson, Main and Ogilvie Streets
- 4th Avenue at Main Street, Ogilvie Street and 2nd Avenue/Two Mile Hill
- Chilkoot at Two Mile Hill and Quartz Road
- Two Mile Hill at Alaska Highway and at Range Road
- Lewes Boulevard at Alsek Road

Details regarding signal timing adjustments for short and long-term conditions can be found in Appendix 2D.

Roundabouts

The Whitehorse Moves initiative recommended the use of roundabouts. Intersections that exceed the Federal Highway Administration (FHWA) volume/capacity recommendations (0.85) are not suitable for a single lane roundabout. This condition exists on the heavy volume arterial corridors of 2nd Avenue (from RSW to Two Mile Hill) and 4th Avenue (from Main Street to Two Mile Hill). As well, these road segments are heavy in the north-south direction, but not so in the east-west direction. Design guidelines state that roundabouts are not suited to intersections where the traffic volumes of the four legs of the intersection are unbalanced.



Roundabouts are a suitable method of intersection control on moderate volume roadways. They reduce vehicle traveling speeds and do not unnecessarily stop moving traffic. Reduced vehicle speeds enhance safety at the intersection for more vulnerable road users such as cyclists and pedestrians. It is recommended that, as a pilot project and where there are suitable conditions, roundabouts be used by the City for intersection control. Two suggested locations are:



- Robert Service Way and 4th Avenue
- Hamilton Boulevard and McIntyre Drive S.

Other possible locations for consideration are: Lewes Blvd/Nisutlin and Lewes/Alsek in Riverdale; Pine/12th and Mountainview/12th in Porter Creek.

3rd Avenue

It is recommended that, 3rd Avenue remain a pedestrian - oriented corridor. From a traffic operations perspective, continuous north-south travel should be discouraged from using this corridor. It is also recommended that 3rd Avenue, as a long term goal, be extended northward through the Qwanlin Mall to Ogilvie Street as a pedestrian corridor.

YTG Egress to 2nd Avenue

The current geometry of the YTG outbound access to 2nd Avenue adjacent the library requires drivers to merge with traffic traveling northbound along 2nd Avenue. Concerns have been raised regarding access configuration and operation. The concept developed by YTG, once constructed, will better accommodate traffic flow on 2nd Avenue and will improve pedestrian access through the area.

Robert Campbell Bridge

With the recommended network, traffic is approaching capacity on the Robert Campbell Bridge. From a transportation perspective, within the population horizon of 25,000 population, widening of the bridge for vehicle traffic is not recommended. This is contingent on:

- no new development in Riverdale area or to lands south or east
- Increasing transit ridership and increased use of other forms of alternative modes to/from Riverdale
- Widening the bridge to provide separate facilities for cyclists and pedestrians

Lewes Boulevard

Traffic operations in the area of FH Collins School were observed on Lewes Boulevard both during the afternoon peak period and in the morning peak period. Based on a review of traffic operations it



is recommended for safety and operational purposes, a northbound to westbound left-turn bay be constructed in the median adjacent the FH Collins driveway. YTG Education is currently considering the consolidation of accesses for F.H. Collins and Selkirk Elementary. The details of the actual configuration of this intersection will be influenced by YTG's decision and is outside of the scope of this plan.

Quartz Road at Industrial Road

To meet future demands, a roundabout and a traffic signal were considered for this location. A roundabout requires additional right-of-way which is deemed prohibitive, therefore a traffic signal is recommended. In order to incorporate bike lanes on Quartz Road, a three lane cross section was also considered. An assessment of future volumes was provided, the results indicate that one lane in each direction will accommodate the expected demand. Results also indicate that at Industrial, a three lane cross section on Quartz Road with left turn bays on all legs and a traffic signal would result in acceptable levels of service (LOS of B) at the intersection.

Emergency Access, Yukon River Crossing

Crossing of the Yukon River occurs via a two-lane structure at the Robert Campbell Bridge. Concerns were raised regarding the need for an additional crossing for emergency reasons. A new bridge and connecting roads would cost approximately \$15 million to \$20 million. A clear need and strong demand will be needed in the future to justify this expense. A review of the Yukon Energy dam area indicates that it would be feasible to drive a vehicle onto and across the dam. It is recommended that the dam be used to access the Riverdale area if, in an emergency, the Robert Campbell Bridge is unavailable for use. It is also recommended the City implement with Emergency Agencies and Yukon Energy an emergency exercise session to assess any hurdles or challenges regarding the use of this facility during an emergency.

A summary of the main findings and recommendations in Section 2: Road Network and Traffic Operations follows.



Section 2 – Road Network and Traffic Operations, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
1.	The goals of the new City – Wide Transportation Plan and the new City OCP are consistent in philosophy and vision. Neither document conflicts significantly with the “Whitehorse Moves” Community Transportation Initiative.	a.	The four transportation goals in Section 1 of the City-Wide Transportation Plan should be used as transportation planning and prioritization guidelines for future growth and development in Whitehorse.
2.	The City’s current major road network focuses on the needs of motorized vehicle traffic and in some areas alternative modes of travel - notably cycling and walking – are not well accommodated or encouraged.	a.	Encourage the choice for all modes of travel within the City by prioritizing for multi-modal transportation facilities.



Section 2 – Road Network and Traffic Operations, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
3.	<p>Currently the intersections and traffic movements on major streets and intersections in the City operate acceptably. The intersections operate at LOS D or better during peak periods. Some congestion queues (of 5 minutes or less) occur downtown on Main Street (at 2nd Avenue) and along 2nd Avenue (at Robert Campbell Bridge) and along 4th Avenue (at Ogilvie and at Black Streets) during peak rush periods. The peak period however, is on weekdays and lasts only about 15 minutes during the morning and afternoon rush. Some queuing also occurs on Quartz Road and Industrial Road and in the downtown on some unsignalized side streets for traffic wanting to turn onto 4th Avenue (at Strickland Street and at Black Street) during the rush period. Some existing traffic signals and intersections can be adjusted to improve current traffic operations.</p>	a.	<p>The minimum acceptable intersection level of service should be LOS D (HCM method) for major intersections on the City major road network. Some low volume traffic movements may exhibit LOS E or F during the peak period while still maintaining overall intersection acceptability.</p>
		b.	<p>For the current traffic conditions, signal timing adjustments should be done as per the phasing optimizations suggested in Appendix 2D of the Plan.</p>
		c.	<p>For the current traffic conditions, new intersection controls can be provided at Hospital and Lewes and the ped-activated signal at Black Street / 4th Avenue intersection should be upgraded to a full signal.</p>



Section 2 – Road Network and Traffic Operations, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
4.	<p>Downtown Area, Future Conditions: Model predicted traffic conditions for the 20 year growth horizon (City population = 25,000) indicate that the downtown area and major street intersections can generally still operate acceptably (LOS D or better) without signal or laning changes, however queuing and delays increase by 5 – 10 minutes and the rush period lengthens by a similar amount. Some traffic signal timing changes and intersection control improvements will reduce the queuing/delay increase issues.</p>	a.	<p>For future traffic conditions in the Downtown area, new traffic signals will be needed at Industrial/Quartz and Black/2nd intersections and the Black Street and Ogilvie Street signals on 4th Avenue will need to be coordinated.</p>
		b.	<p>For future traffic conditions at Robert Campbell Bridge, improved cycling and walking facilities and transit service is recommended to encourage the use of alternative transportation modes during peak times.</p>



Section 2 – Road Network and Traffic Operations, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
5.	<p>North Whitehorse, Future Conditions: With the development of the south Porter Creek area, there is increased traffic and vehicle use of Pine Street and 12th Avenue and these streets begin to approach capacity. Providing an additional road link out of this area will reduce the traffic impacts on these roads and the Porter Creek area. Further analysis of the road alignment is needed at the time of development to minimize and mitigate environmental concerns with regard to fish bearing stream crossing(s).</p>	a.	<p>To redistribute traffic for the south Porter Creek area and provide better trail continuity for cyclists and pedestrians it is recommended to provide a new road connecting Pine Street to the Alaska Highway. A multi-use trail connection between the new road and the Takhini neighbourhood will provide cycling/ped network continuity for the north Whitehorse area.</p>



Section 2 – Road Network and Traffic Operations, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
6.	<p>West Whitehorse – Future Conditions: Twinning of Hamilton Boulevard for traffic capacity needs is not required to accommodate the southward build out of the Copper Ridge development area. New lane capacity is not needed until the Beyond Copper Ridge area develops. The City's long term road network needs are best met by providing this capacity via a new 2-lane roadway extension south to the Alaska Highway.</p>	a.	<p>Provide a two lane southern extension of Hamilton Boulevard to the Alaska Highway when the Beyond Copper Ridge area develops. The final alignment of the extension is to be determined but the closer the intersection is to Robert Service Way, the higher the benefit.</p>



Section 2 – Road Network and Traffic Operations, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
7.	<p>Roundabouts are a suitable method of intersection control on moderate volume roadways. They reduce vehicle traveling speeds and do not stop moving traffic unnecessarily. Speed reduction tends to enhance safety at the intersection for more vulnerable road users such as cyclists and pedestrians. Roundabout usage should be considered where:</p> <ul style="list-style-type: none"> - the traffic volumes on all 4 legs are roughly balanced - the volume/capacity ratio is 0.85 or less - there is sufficient space for the road geometrics as per TAC - the longitudinal intersecting road grades are not too steep 	a.	<p>A roundabout should be considered at a suitable intersection location in the City. Some suggested locations for consideration are:</p> <ul style="list-style-type: none"> - Lewes Boulevard and Nisutlin Drive - a Hamilton Boulevard neighbourhood intersection such as Falcon Drive or Thompson Road or McIntyre Drive - Pine Street and 12th Avenue



Section 2 – Road Network and Traffic Operations, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
8.	<p>A “Road Diet” is a method of incorporating new shared roadway facilities (such as bike lanes, pedestrian refuge areas and dedicated turn lanes) into a multi-lane road without building new pavement width. A four lane road can be repainted to three lanes, using the centre lane as a left turn lane at intersections (or as a centre refuge area for mid-block pedestrian crossings) and bike lanes are added to the outside lanes. Motorized vehicle capacity is reduced somewhat but non-motorized vehicle capacity is increased, as is the overall operational safety of the road for all users.</p>	a.	<p>As a pilot project, configure 4th Avenue from Two Mile Hill to Robert Service way as a “road diet”. The function and safety performance of the road segment should be monitored for all transportation modes for at least a year. The entire downtown road network should also be monitored for any traffic pattern shifts as a result.</p>
		b.	<p>If the 4th Avenue road diet is successful, consider reconfiguring 2nd Avenue from Hanson Street to Robert Service Way as a “road diet”.</p>



Section 2 – Road Network and Traffic Operations, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
9.	From a road capacity perspective, there is no need for a new motorized vehicle bridge crossing of the Yukon River within the 20 year design growth horizon. Roadway access to and from the hospital is currently limited to driving over the river via the 2 lane Robert Campbell Bridge. There is a need to provide emergency road access across the river in the event of a blockage of the RC Bridge.	a.	It is recommended that the Yukon Energy dam be used for emergency road access across the Yukon River and that a formal agreement between the City, area emergency agencies and Yukon Energy be arranged to effect this.



3.2 Section 3: Transportation Safety

The transportation safety review involved assessing data, conducting site inspections of schools and problem areas, assessing pedestrian and cycling concerns and discussing speeding issues with enforcement personnel and the public. An accident review of City streets and the Alaska Highway was conducted from data for the last three years and high accident frequency areas and locations were identified.

City Arterial and Collector Roadways Safety:

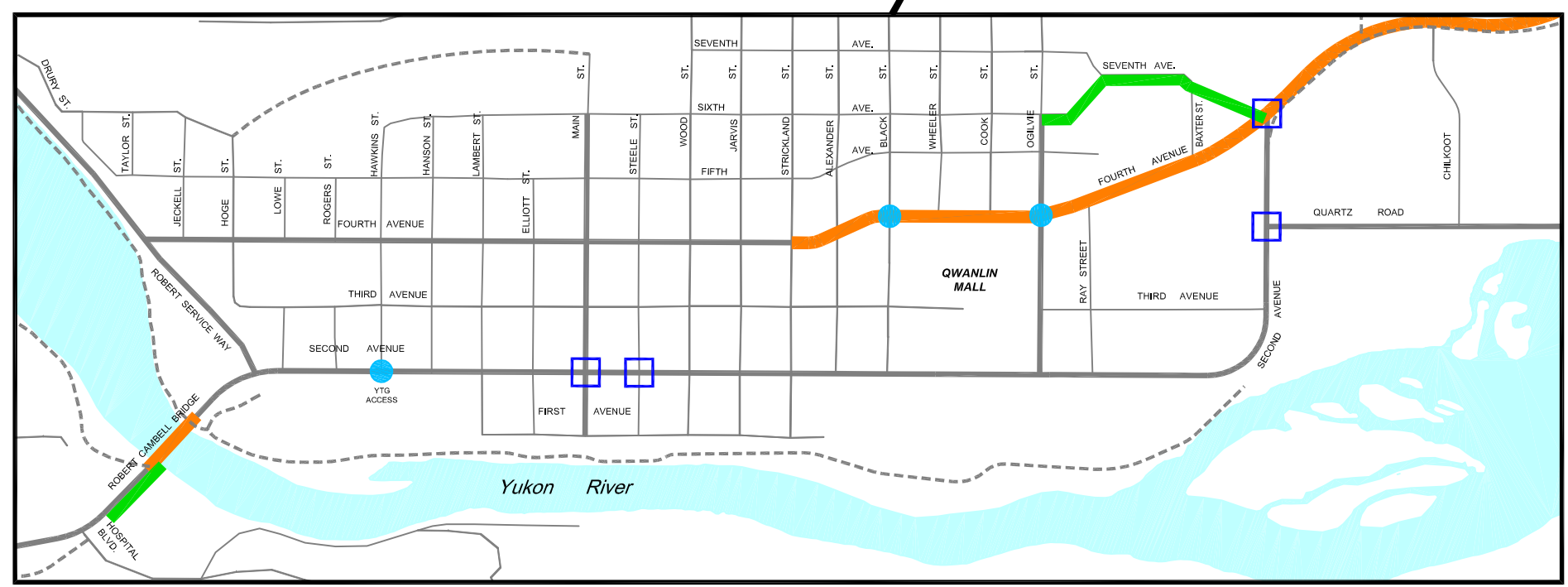
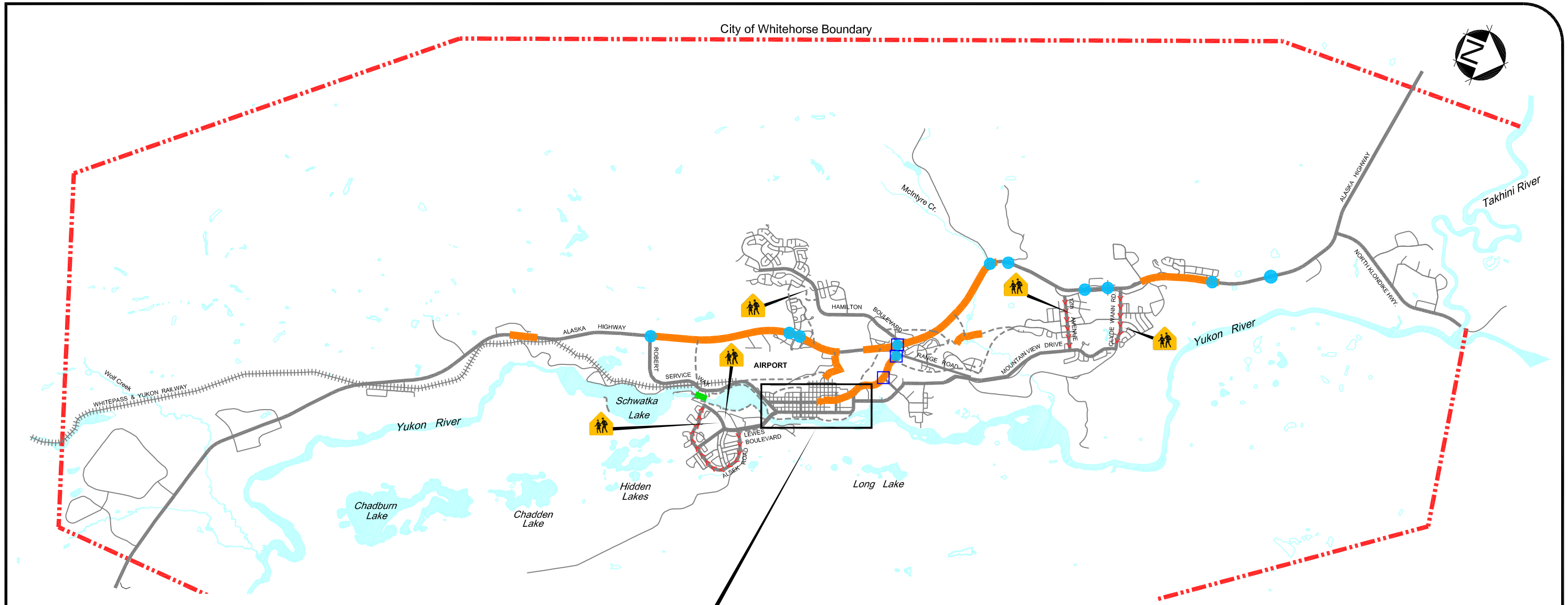
Not surprisingly, the most accidents occur on roads with the highest traffic volumes but three high accident corridors were noteworthy:

- Two Mile Hill between the Alaska Highway and 2nd/4th Avenue
- 2nd Avenue between 2nd/4th Avenue and Robert Campbell Bridge
- 4th Avenue between 2nd/4th Avenue and Main Street

Almost all accidents involving pedestrians and cyclists occurred on these 3 corridors and many of them occurred in the Downtown area on 2nd Avenue between Steele and Black Streets.

Specific intersections in Whitehorse where high accident rates occur are:

- Two Mile Hill/Alaska Highway
- Two Mile Hill/2nd+4th Avenue
- 2nd Avenue/Main Street
- 2nd Avenue/Quartz Avenue
- Two Mile Hill/Range Road
- 4th Avenue/Main Street



LEGEND

- INTERSECTIONS WITH SAFETY RELATED CONCERNS
- LOCATIONS WITH 5 OR MORE VEHICLE ACCIDENTS (2001)
- CYCLING SAFETY CONCERNS
- CYCLING NETWORK DISCONTINUITY
- - - - SPEEDING IN RESIDENTIAL NEIGHBOURHOODS
- SCHOOLS EVALUATED

1 0 1 2 3 4
KILOMETRES

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FIGURE 3-1.1 TRANSPORTATION SAFETY



Alaska Highway (Central Zone) Safety

Within the Whitehorse City boundaries, the Alaska Highway is examined as two zones. The highway portion between the intersections of Robert Service Way and Clyde Wann Road is called the central zone. This length of the Highway is the busiest portion within the City limits and activity ranges from airport related traffic in the south to Porter Creek commuter related traffic in the north. The Alaska Highway and roadway intersections with the Alaska Highway are within the jurisdiction of the Yukon Government and some exhibit a higher susceptibility for accidents than others. Of predominant note is the number of accidents at the Two Mile Hill/Alaska Highway intersection. Accidents at this signalized and busy intersection appear to involve driver visibility difficulties between left turning traffic and oncoming through traffic using the highway.

Other issues in the central zone include:

- intersections that can be re-aligned/consolidated (Burns Road, Airport Access Road, Lobird Road)
- connecting roads that can be improved to current TAC standards for geometric design and access safety (Fish Lake Road, City Landfill access, Sumanik Drive)
- consistent and constant shoulders along the highway to allow for proper auxiliary lanes and continuous cycling routes

Alaska Highway (North and South Zones) Safety

The south zone of the Alaska Highway extends from Robert Service Way to the Cowley Creek area just north of the South Klondike Highway. The Alaska Highway north zone extends from Clyde Wann Road to the northern city limits and includes the North Klondike Highway. Access onto and off of the highway is a common requirement at the primary entrance roads to City neighbourhoods such as Cowley Creek, Mary Lake, Wolf Creek, McRae, Crestview, MacPherson and Hidden Valley. As well, the highway is one of the main cycling routes used to and from these neighbourhoods.

Some of the risk elements existing in the north and south Alaska Highway zones are:

- road shoulders (which also act as bike lanes) disappear or end at intersections with auxiliary lanes



- auxiliary lane markings on the highway appear to be inconsistent with current TAC and MUTCD standards

Speeding in Residential Areas

Discussions with the RCMP and neighbourhood representatives indicate there is speeding activity occurring on minor collector streets in the residential neighbourhoods such as Porter Creek and Riverdale. The implementation of traffic calming features aimed at speed reduction is one method to mitigate this issue. It is noted that traffic calming measures are intended to be self-enforcing as opposed to regulatory traffic control devices that require enforcement.

Rather than just tackle the issue of speed however it is recommended the City develop a process to address traffic calming in residential neighbourhoods. The *Canadian Guide to Neighbourhood Traffic Calming* provides an overall process for developing and implementing traffic calming initiatives.

School Zones

Meetings with school representatives were held at the following elementary schools: Jack Hulland, Holy Family, Selkirk, Christ the King, and Elijah Smith. In addition conditions were monitored at FH Collins, Whitehorse Elementary and Takhini. Activities at pedestrian crossings, school site accesses, pick-up/drop-off zones, bus zones and parking facilities as well as existing signage were reviewed. At Elijah Smith it is recommended that Hamilton Boulevard remain as a two lane roadway with improved crossing traffic controls at Thompson Drive N to minimize potential safety conflicts.

Because schools generate a significant amount of pedestrian trips and increasingly more pick-up and drop-off vehicle traffic, special care must be taken to ensure that the potential for pedestrian-vehicle conflicts is reduced. Child pedestrians do not possess the ability to judge vehicle speeds and acceptable gaps in traffic, their peripheral vision is not as well developed as adults. Physical treatments (signal timing adjustments, traffic calming), together with special safety programs (Safe Routes to School, Parent Parking Patrol), should be used to maximize child pedestrian safety around schools.

Downtown Pedestrian Crossings

A field review of downtown pedestrian facilities was provided during summer 2002. The review area included all streets within the downtown area from 1st Avenue to 4th Avenue and from the Robert



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Campbell Bridge and Robert Service Way (RSW) to 2nd Avenue at Two Mile Hill In general issues were identified regarding sidewalk provisions, crosswalk locations, wheelchair accessibility at intersections and crosswalks (curb letdowns), intersection sight visibility, and issues pertaining to traffic controls (signage and paint markings).

A summary of the main findings and recommendations in Section 3: Transportation Safety follows.



Section 3 – Transportation Safety, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
1.	<p>The 3 year accident history review indicates that motor vehicle safety concerns exist at some high volume major road intersections. There are five noteworthy intersections and they group on four main corridor segments: the Alaska Highway Central Zone, Two Mile Hill (from Alaska Highway to 2nd/4th Avenues), Second Avenue (Quartz Road to Main Street) and 4th Avenue (Two Mile Hill to Main Street). Most accidents relate (or suggest a relationship) to left turn movements. In the case of Alaska Highway/Two Mile Hill unopposed left turn lanes for north and south bound highway traffic and a large intersection have been cited as creating visibility difficulties. Two Mile Hill is on a relatively steep grade where speeding and side accesses have been reported as issues for motorists and cyclists. 2nd Avenue in the downtown area exhibits perceived unsafe pedestrian crossings, speeding and uncontrolled accesses. 4th Avenue (north of Main Street) and the Alaska Highway have poor shared roadway facilities for cycling users.</p>	a.	<p>The three corridor segments in question require a full safety audit to detail the geometric and operational concerns for motor vehicles and other users. Conflict analysis is required where details are available, particularly where other transportation modes (cycling and walking) are involved. Technical portions of the audits should be reviewed against current and nationally recognized transportation standards and authorities such as TAC, ITE and CITE.</p>
		b.	<p>Upon review and acceptance of the safety audits improvements should be implemented in a comprehensive, multi-modal fashion.</p>



Section 3 – Transportation Safety, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
2.	<p>The Alaska Highway master plan is based on a corridor study conducted by YTG in the early 1990's. The size of the intersection with Two Mile Hill is based on a future 6 lane facility developed in this plan. Current traffic forecasts suggest that this ultimate facility will not be required soon and that a 4 lane facility will be adequate for the foreseeable future.</p>	a.	<p>The Alaska Highway Central Zone requires a corridor plan update at the same time as the Two Mile Hill safety audit to properly address the Two Mile Hill / Alaska Highway intersection safety issue and the functional needs of the major road network within the coming 20 year design period.</p>
3.	<p>Two Mile Hill experiences the most safety issues. This corridor segment will be a high priority to be improved. Issues to be addressed are: the Alaska Highway/Two Mile Hill intersection, direct commercial accesses onto the roadway and an off-road cycling path for the south side of the road.</p>	a.	<p>Geometric, traffic control and multi-modal safety improvements should be designed and implemented as soon as practical for the Alaska Highway/Two Mile Hill intersection</p>
		b.	<p>An access management policy should be prepared and put in place for major arterial roadways for use on the Two Mile Hill corridor and other major City routes.</p>



Section 3 – Transportation Safety, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
4.	4 th Avenue is a highly desired cycling route into the downtown core that is congested at peak periods, has on street parking and traffic/pedestrian signal issues between Main Street and Two Mile Hill. Dealing with these issues will be a high priority.	a.	Upgrade traffic signals and convert 4 th Avenue to a “road diet” to address safety issues for cyclists.
5.	2 nd Avenue is a 4 lane arterial carrying heavy volumes of commuter traffic through and to the downtown. Traffic is known to speed on this roadway and downtown pedestrians wishing to cross are intimidated by the traffic volumes and speeds.	a.	Upgrade the pedestrian crossing standards to increase the visibility of designated pedestrian crossing locations.



3.3 Section 4 - Alternative Modes Plan Summary

“Alternative transportation modes” refers to utilitarian provisions for cyclists, pedestrians and transit users. Utilitarian, versus recreational, refers to those trips on the network that serve connections between home and work, school or shopping. Multi-use trails and the roadways are considered in developing a network to serve cycling and pedestrian routes. Facilities for recreational purposes are not addressed through this study, however snowmobile and cross-country skiing were considered in the context of providing utilitarian trail routes for winter usage. Trail linkages for cyclists and pedestrians, continuous routes through the downtown and shared routes on public roadways were assessed.

The Alternatives Modes phase involved the collection and review of background information, field reviews (both walking and cycling), the identification of alternative mode related transportation issues that concern the residents of Whitehorse, recommended solutions and strategies.

On going consultation was obtained through out the planning process and involved such major stakeholders as the cycling advocates, neighbourhood associations, City staff and YTG. Two Public Open House’s were held, June 19, 2002 and December 4, 2002 to confirm issues and review solutions. The December open house followed the Whitehorse Moves charette weekend.

Primary issues identified and addressed through this report include:

- Inadequate pedestrian facilities, crossings and routes
- Discontinuous or inadequate cycling routes on roadways and dedicated trails
- Underutilized and/or inefficient transit service and facilities

For pedestrians, most of the issues are found in the Downtown area or in the main walking corridors into the downtown area. There is a lack of sidewalks and pedestrian facilities at the north end of town, particularly on 2nd Avenue, 3rd Avenue, Black Street and Quartz Road. There are few benches downtown, elderly pedestrians need places to rest when they are walking. Puckett’s Gulch leading to Airport Trail is not well lit and has an unstable surface. At many intersections the curb letdowns do not line up with the painted crosswalk, this is particularly dangerous for visibly challenged and wheelchair bound pedestrians that are being directed into traffic. There are no audible traffic signals or tactile push buttons to assist the visibly challenged in the downtown area.



Also, there are obstructions on the sidewalks that impact visibly challenged and physically challenged pedestrians. Some pedestrians find it difficult to cross 2nd Avenue at some locations.

For cyclists, route discontinuity is a significant issue. As well, the ability to cycle safely alongside motorized vehicles on City streets and the Alaska Highway is an added concern. It was also noted that there is a lack of bicycle parking facilities in the Downtown area. Specific cycling problem locations were identified, notably the Alaska Highway, Two Mile Hill, Robert Campbell Bridge, 2nd Avenue and 4th Avenue.

Transit related issues vary but generally include such concerns as low transit ridership, poor evening service for both disabled patrons and college students, service not starting early enough in the morning, and lack of transit shelters in residential neighbourhoods.

To address issues pertaining to alternative modes, planning principles and strategies to encourage alternative modes, network plans and facility guidelines were prepared.

3.3.1 Planning Principles

In keeping with the City's long term vision, OCP policies and goals and objectives outlined in this plan, the following recommends principles to guide future planning, design and implementation of pedestrian, cycling and transit networks and facilities.

Pedestrian Planning Principles

- A continuous network of attractive, safe and direct pedestrian facilities is essential to and throughout downtown Whitehorse.
- Pedestrian systems need to be planned and designed for persons of all physical abilities.
- Connections to areas of Whitehorse outside the downtown are a necessary feature of the plan.
- Pedestrian systems should provide direct access to transit service.
- Intersection design should place a high priority on the access and safety requirements of pedestrians.
- Pedestrians should be adequately separated from vehicle traffic on all public roadways.
- Personal security aspects of pedestrian systems need to be addressed at the planning, design and operation stages.



- Areas around schools and playgrounds should be maintained as pedestrian-friendly environments.
- New land development or redevelopment initiatives need to provide safe and accessible pedestrian connections to existing facilities.

Bicycle Planning Principles

- A continuous network of safe, and direct bicycle facilities is essential.
- The planning and design of bicycle facilities should accommodate persons of all ages and cycling abilities.
- Bicycle facilities should be designed to encourage predictable bicyclist behaviour.
- Every street should be considered a cycling street and all locations accessible by motor vehicle should be accessible by bicycle.
- Connections to and provisions along territorial facilities must be achieved to ensure an integrated system.
- Adequate end-of-trip facilities should be provided at major destinations.
- Personal security and safety should be a priority in the planning and development of bicycle facilities.
- Access to public transit by cyclists should be promoted to maximize multi-modal transportation opportunities.
- Standards for the design, location and maintenance of bicycle facilities should be adopted.
- Complementary programs – including awareness, encouragement, education and enforcement – should be initiated and actively supported by the community.
- Involve the community in the planning, design and implementation of bicycle facilities.

Transit Planning Principles

- The road network should provide for efficient transit operations.
- Alternative transit models should be considered and adopted where feasible.
- The planning and design of transit services and facilities should accommodate persons of all ages and abilities.
- Transit routing should link major land uses and destinations.



- Multi-modal connections with transit should be available.
- Transit supportive “Transportation Demand Management” strategies should be implemented.
- Transit should be reliable by providing on-time service.
- Security and safety of transit users should be a priority.
- Involve the community in the planning and design of transit services.

3.3.2 Strategies to Encourage Alternative Modes

Based on the stakeholder input received, the 1999 Transportation Survey, and current guidelines, strategies are provided to identify ways to increase the use of transit, bike and pedestrian routes in the downtown and surrounding area. These strategies are known as Transportation Demand Management (TDM).

The provision of a wide array of transportation choices such as effective bicycle and pedestrian facilities, efficient transit service, and programs designed to encourage ridesharing, telecommuting and other travel choices ultimately contribute toward the liveability of a community.

The five main categories of TDM measures are as follows, additional details on each can be found in Section 4:

- Non-motorized transportation
- Transit
- Alternative work arrangements
- Ridesharing
- Comprehensive trip reduction programs

TDM strategies – similar to bicycle and pedestrian facility improvements – are generally deemed beneficial additions to the transportation system. Although each individual TDM strategy contributes in its own way to a reduction in motor vehicle travel, specific strategies may be more effective than others in influencing travel behaviour. Initially the City will need to provide a lead role in the development of the TDM strategies. Strategies aimed at employers will take time to



implement, however those associated with improving alternative mode facilities and parking are within the City's jurisdiction and are therefore recommended for priority implementation.

To address pedestrian and cycling continuity issues, a Pedestrian Network Plan and a Bicycle Network Plan were prepared. Planning principles and facilities guidelines have been provided to set the network routes in place – as stand alone facilities and as joint routes with roadways.

3.3.3 Pedestrian Network Plan

The Pedestrian Network Plan assigns priority to routes that provide direct, safe and convenient access to and through the downtown area. Figure 4.1 focuses on key routes accessing the downtown and Figure 4.2 facilities through the downtown area. It is recommended that development, design and implementation of each of these routes follow the pedestrian planning principles and guidelines provided in Section 4. It is recommended the City place a priority on improvements and maintenance needs associated with these routes.

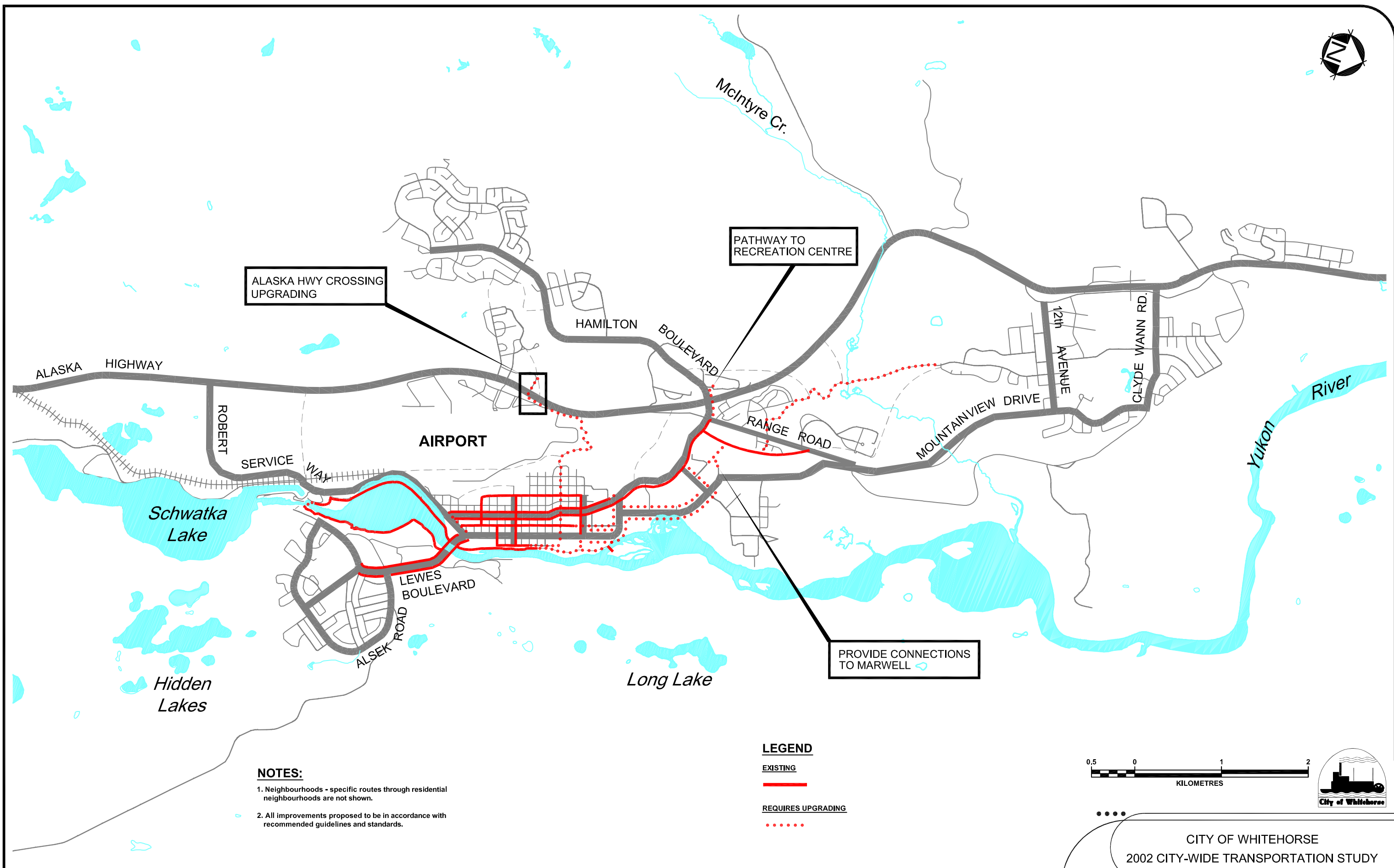
Key recommendations are as follows:

- Pedestrian Routes to Downtown
 - That a functional level concept be developed for the Airport Trail and Puckett's Gulch route.
 - that development of pedestrian facilities (either through the use of multi-use pathways or sidewalks) be initiated as part of the overall planning for the area for the Porter Creek – Takhini area.
 - providing suitable pedestrian surfaces to connect existing sidewalks and pathways on Two Mile Hill to the Recreation Centre on Hamilton Boulevard, connections from Range Road to the Marwell industrial area, and that raised sidewalks be provided along Quartz Road from 2nd Avenue to Industrial Road.
- Downtown Pedestrian Needs
 - a pedestrian corridor be extended northward through the Qwanlin Mall, including a entrance to 3rd Avenue along the 3rd Avenue alignment.
 - in the downtown area sidewalks be constructed on both sides of roads designated arterial/major collector and minor collector in accordance with recommended guidelines and standards.



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- In the area of the public library, while 2nd Avenue remains a four-lane corridor, it is recommended for safety reasons, crossing of 2nd Avenue occur at the signalized intersection of Hanson Street.
- the City initiate a program to improve wheelchair accessibility in the downtown area.
- the City initiate a program to upgrade the traffic controls (signage and paint markings) at marked crosswalks in the downtown area to reflect current standards and guidelines.
- Because it is difficult to provide an exclusive pathway only for pedestrians, it is recommended designs of multi-use pathways reflect the wide range of users to ensure that a safe and effective facility is provided.



ALASKA HWY CROSSING UPGRADING

PATHWAY TO RECREATION CENTRE

PROVIDE CONNECTIONS TO MARWELL

- NOTES:**
1. Neighbourhoods - specific routes through residential neighbourhoods are not shown.
 2. All improvements proposed to be in accordance with recommended guidelines and standards.

LEGEND

EXISTING
 ———

REQUIRES UPGRADING
 ·····



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PEDESTRIAN NETWORK PLAN - MAJOR ROUTES FIG. 4- 4.1



3.3.4 Bicycle Network Plan

The plan developed addresses issues and concerns voiced by residents and staff. It was developed in concert with the bicycle planning principles noted above. The bicycle plan incorporates major routes linking trips to, from and through the downtown. These routes provide direct access to destinations, minimizing delays wherever possible. Similar to the pedestrian network plan, – both the trail network and the road network have been utilized in the development of the bicycle network. The plan provided is intended for utilitarian cycle travel (to and from work, school or shopping) whereas the Whitehorse Trail Map provides information on recreational type routes. Proposed major cycle routes to and through the downtown are shown in this section. Since streets in residential neighbourhoods essentially carry low traffic volumes and are deemed acceptable for cycling, specific routing through residential neighbourhoods was not provided as part of the plan.

The plans and recommendations provided in this section represent a preliminary evaluation of on-street bicycle routes and facilities. While alignments and corridors have been identified within a conceptual bicycle network, site specific designs and key connections are to be considered in greater detail prior to implementation. Specific routes and treatments should be refined with input from members of the community that cycle. Cycle routes include both on and off-road facilities, on-road facilities include the use of paved roadway shoulders, signed routes and bike lanes. Off-road facilities assume the use or development of multi-use pathways.

Key recommendations are as follows:

- Bicycle facilities recommended with this plan include on-road facilities such as paved shoulders, signed routes and bike lanes and off-road facilities in the form of multi-use pathways. It is recommended that development, design and implementation of each of these routes follow the bicycle planning principles and the bicycle facilities guidelines referenced.
- The City, together with interested community groups initiate a program to sign the major bicycle route corridor located both on and off-road.
- It is recommended the City address other plan elements including:
 - Regulatory revisions
 - Implementation Strategy



- A monitoring plan
- Development of appropriate maintenance programs
- Development of secure and convenient end-of-trip facilities
- Promotion of education and program development
- Bicycle Links to Downtown
 - with future improvements to the Alaska Highway corridor, additional shoulder provisions for cyclists should be provided. In the meantime additional warning signage is recommended.
 - At the intersections of Alaska Highway at Hamilton Boulevard and at Range Road and Two Mile Hill it is recommended signal operations be adjusted and/or improved to better accommodate cyclists (and pedestrians).
 - A new off-road bicycle path be constructed on the south side of Two Mile Hill
 - With respect to the Robert Campbell Bridge the following improvements are recommended: modify the Traffic Bylaw to allow cyclists on the bridge sidewalk, add a railing to separate vehicles and pedestrians/cyclists, add pathways under south end of bridge, add signs to promote directional use by pedestrians and cyclists in that cyclists may use the sidewalks but should yield to pedestrians and In the long term. It is recommended that the bridge be widened to provide a space for cyclists so that cyclists, pedestrians and vehicles are physically separated.
 - New and/or upgraded off-road facilities are recommended for Two Mile Hill and Hamilton Boulevard north of Sumanek Drive and it is recommended the prohibition restricting cyclists from traveling on the roadway of Two Mile Hill between Alaska Highway and 4th Avenue be removed.
- Bicycle Routes – Downtown
 - One of the main issues for the downtown area is the lack of a clear route north and south through the downtown. To address this shortfall the plan recommends three north-south routes: 4th Avenue, Robert Service Way to Two Mile Hill, 6th Avenue, Ogilvie Street to Hawkins Street and the Riverfront trail, Robert Campbell Bridge to Quartz Road
 - In the east-west direction Black Street is selected as the major cycle route, but due to the grid network in the downtown area, most of the minor streets are suitable for cycle travel.



It is important to provide bicycle facilities that are based on accepted design standards. Consistent application of these standards ensures that bicycle facilities in the City of Whitehorse provide maximum safety and effectiveness, attracting as many cyclists as possible. Design guidelines developed for the plan are based on the material from a number of sources, including:

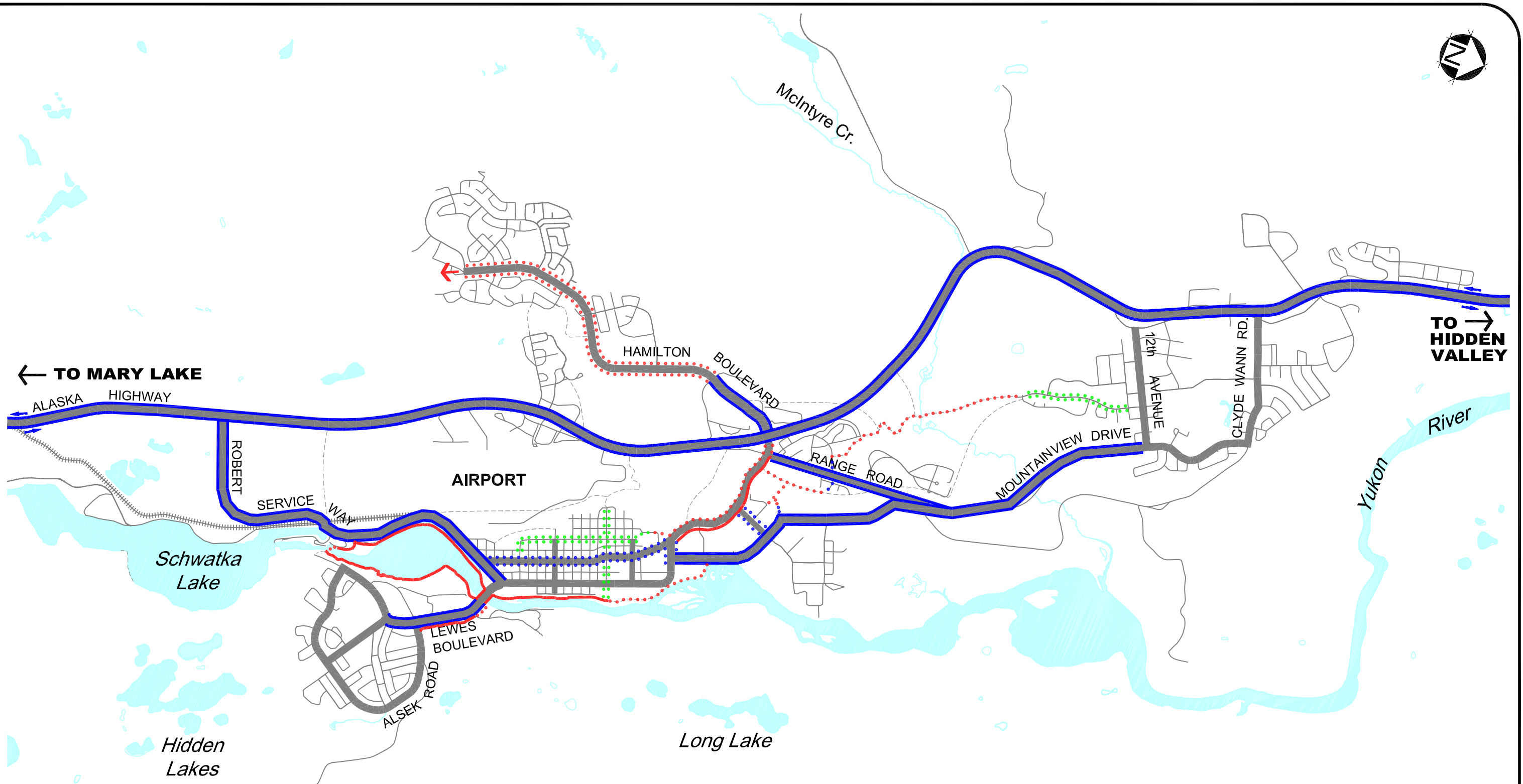
- Bikeway Traffic Control Guidelines for Canada, published by the Transportation Association of Canada (TAC), December 1998
- Manual on Uniform Traffic Control Devices (MUTCD), published by the Transportation Association of Canada (TAC), September 1998
- Geometric Design Guide for Canadian Roads, published by the Transportation Association of Canada (TAC), September 1999

Bicycle facilities provided on new and existing roads require guidelines to ensure consistency and that both motor vehicles and cyclists can effectively share the road network. Three different types of on-street bicycle facilities are proposed for the existing road network in Whitehorse: paved shoulders, signed bicycle routes, and bicycle lanes.

Multi-use pathways are proposed for off-street facilities, segregated from motor vehicle traffic, except where pathways intersect roads. Off-street pathways provide transportation and recreational opportunities for many users including cyclists, pedestrians, wheelchair users, winter recreation users and others. The City's Trail Plan provides standards for multi-use trails. Additional details to assist in the design multi-use pathways can be found in the *Geometric Design Guide for Canadian Roads*.

Applicable to both on-road and off-road bicycling facilities, correctly installed signs and pavement markings will provide consistent and clear information for cyclists and the motoring public. Three important types of signs are: regulatory, warning and guide signs. Details regarding the shape, colour, content, use, application and installation of these signs can be found in more detail in the *Bikeway Traffic Control Guidelines for Canada*.

At minimum, end-of-trip facilities to support bicycle usage should include bicycle parking, showers, storage lockers and change rooms. It is recommended that the City of Whitehorse develop end-of-trip facility guidelines as part of by-law requirements for on-site parking.



NOTES:

1. Neighbourhood - specific routing through residential neighbourhoods are not shown.
2. All improvements proposed to be in accordance with recognized guidelines and standards.
3. Concept illustrated is intended for utilitarian cycle travel (to and from work, school, shopping). For recreational cycling routes please refer to the Whitehorse Trail Map.

LEGEND

- | | |
|--|---------------------------------|
| | EXISTING |
| | ON-ROAD (SHOULDER / BIKE LANES) |
| | OFF-ROAD (TRAIL, PATHWAY) |
| | REQUIRES UPGRADING |
| | ON-ROAD (SHOULDER / BIKE LANES) |
| | OFF-ROAD (TRAIL, PATHWAY) |
| | ON ROAD (SIGNAGE ONLY) |



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3.3.5 Transit Network Review

The City's transit service issues were reviewed from a strategic viewpoint – as opposed to the functional point of view conducted by the City itself in 2002. A strategic plan establishes relationships between land use and transit, and identifies appropriate transit supportive measures aimed at improving ridership and promoting transit as a viable travel alternative. Several long-term transit supportive measures are discussed. They include:

- attracting ridership by being responsive to the needs of the market
- considering the use of alternative service providers
- providing service to high demand locations

As well, discussion is provided regarding bus facilities that attract and integrate with other transportation users such as cyclists and pedestrians. The benefits of integrating transit with Transportation Demand Management (TDM) techniques to reduce the use of single occupant vehicles on the City roadways are also reviewed.

A summary of the main findings and recommendations in Section 4: Alternative Modes Plan Summary follows.



Section 4 – Alternative Modes Plan Summary, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
1.	There is a perception in the city population that transportation planning and design is focused on motor vehicle needs and that the needs of alternative transportation modes (cycling, walking and transit) are not addressed as well, to the detriment of the City's goals about the environment and the benefits of active transportation.	a.	The City should institute and implement policies and transportation facilities that provide alternative travel choices to their citizens and encourage people to use active transportation modes.
2.	The general perception in the city population is that pedestrian facilities are not always adequate or inviting and do not promote walking, particularly into, through and out of the downtown area. Pedestrian routes are often not continuous. Not all major road corridors provide parallel sidewalks or trails. Trails are not well maintained throughout the year. Commercial developments are not designed to be pedestrian friendly. Adequate pedestrian facilities should be in place to accommodate the elderly, people with disabilities and people with strollers.	a.	The City should institute pedestrian planning principles as outlined in the Plan to develop an effective pedestrian environment in Whitehorse for all levels and types of active people.
		b.	The City should develop a Pedestrian Network Plan as outlined in the Study to provide direct, safe and convenient access to and through the downtown area.



Section 4 – Alternative Modes Plan Summary, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
3.	<p>Cycling in Whitehorse is popular. The City of Whitehorse wants to provide travel choices to their citizens and encourage more people to cycle – for transportation, recreation, environmental and health reasons. Several issues inhibit this goal: direct cycling commuting trail corridors are not available from all residential areas to downtown; there is a lack of bike parking facilities in the downtown; the existing cycling path on the north side of Two Mile Hill is not perceived to be adequate to serve the needs of the cycling public; cyclists are forced to travel in the vehicle portion of the Alaska Highway where the shoulder has been reduced; Robert Campbell Bridge is too narrow to accommodate shared usage with vehicles and pedestrians.</p>	a.	<p>The City should institute bicycle planning principles as outlined in the Plan to develop an effective pedestrian environment in Whitehorse for all levels of cyclists.</p>
		b.	<p>The City should develop a Bicycle Network Plan as outlined in the Study to provide direct, safe and safely shared access to and through the downtown area using multi-use trails and, where necessary, major City streets and the Alaska Highway.</p>



Section 4 – Alternative Modes Plan Summary, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
4	<p>Transit provides an alternative means of mobility for persons without access to a vehicle, and gives those that can choose between alternatives, a viable option to driving. During peak periods, transit can accommodate a significant portion of travel, reducing demands on the road network and, subsequently, the infrastructure required. The key challenges in developing a transit plan for Whitehorse are to:</p> <ul style="list-style-type: none"> - Provide transit service that is an attractive alternative to the automobile - Develop a service strategy that evolves with the community to shape travel behaviour - Provide transit service that is financially viable 	a.	<p>The City should institute a strategic transit plan as outlined in the Study to encourage transit ridership by having an efficient transit network with multi-modal connections with facilities provided for all ages and abilities that links major land uses and destinations in the City.</p>
		b.	<p>It is recommended the City initially take a lead role in the development of the TDM strategies. Strategies aimed at employers will take time to implement, however those associated with improving alternative mode facilities and parking are within the City's jurisdiction and are therefore recommended for implementation.</p>



3.4 Section 5: Downtown Parking

Review of the City's downtown parking included collecting current data regarding the on-street parking stall inventory and the stall occupancy and stall turnover rates in the downtown Core Commercial area. Analysis of the data confirmed that the parking characteristics remain similar to those encountered and used by a number of parking studies done in the City over the past dozen years.

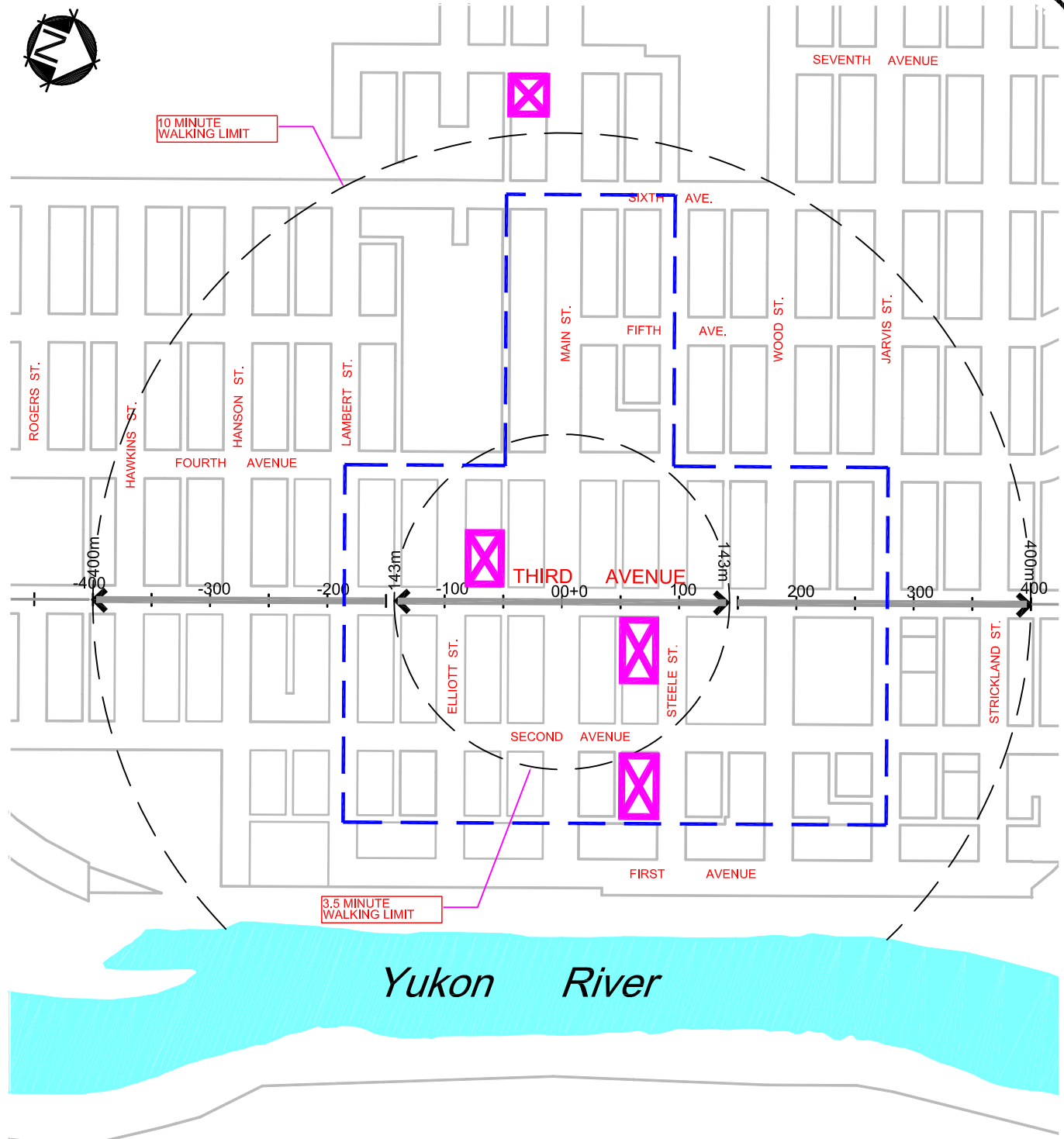
There is not an immediate crisis in downtown parking. The existing parking supply is sufficient, but since the demand for parking in the downtown is high, particularly for long term employee parking, spaces should not be reduced. On-street parking should be maximized and the concept of a multi-level parkade should not be considered for at least a five year period. The policy of allowing developers to pay cash-in-lieu of providing parking spaces can be continued but the monies collected should be considered for all parking related expenditures such as on-street bicycle parking facilities, improved bus shelters and/or enhanced pedestrian corridors.

Parking demand is high and the City should provide for a greater variety of transportation choices and incentives to the downtown as a strategy to reduce parking demand. These may include designated stalls for people who car pool, improved transit service and facilities and additional cycling/pedestrian facilities.

Several previous studies and the latest Whitehorse Moves report assert that there is a parking management problem. There is not enough convenient on-street parking. In consultation with the Downtown Business Association, a Parking Management Plan should be prepared to ensure that all parking stalls in the downtown core are used more efficiently.

To encourage customers to continue to shop downtown, parking operations should ensure that off-street parking lots are used for employee parking only during working hours, Monday to Friday and otherwise be available to shoppers and tourists. Also, the controlled parking zone (metered and time limited stalls on public roads) should be extended to all streets in the Commercial-Downtown area and enforced appropriately.

A summary of the main findings and recommendations in Section 5: Downtown Parking follows.



LEGEND



-  SIGNIFICANT OFF STREET PARKING
-  CC ZONE BOUNDARY



Figure 2

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COMFORTABLE WALKING DISTANCES



Section 5 – Downtown Parking, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
1.	The existing parking supply is sufficient. There is not an immediate crisis in downtown parking. but since the demand for parking in the downtown is high, particularly for long term employee parking, spaces should not be reduced.	a.	In the short term, do not increase the public parking supply in the area zoned as Core Commercial. The concept of a multi-level parkade should not be considered for at least a 5-year period (2007-2008). At that time, the supply of downtown parking may be reconsidered
2.	Parking demand is high and the City should provide for a greater variety of transportation choices and incentives to the downtown as a strategy to reduce parking demand.	a.	Consider alternative transportation methods to the downtown core, including a bus loop, bike lanes and pedestrian walkways. Work with businesses to provide support and opportunities for employees to consider other transportation choices.



Section 5 – Downtown Parking, Summary of Conclusions and Recommendations

Item	Conclusion	Recommendation	
3	There is a parking management problem. As observed by Dan Burden, author of Whitehorse Moves, there is a sufficient supply of off-street parking, but not enough convenient on-street parking.	a.	Prepare a Parking Management Plan for the downtown core in consultation with the Downtown Business Association to maximize the efficient use of downtown core stalls and to identify or designate areas for employee parking versus customer parking.



4.0 Recommended Transportation Improvements Summary

4.1 Corridor Summary

Each section of the report has a list of short term and long term improvement recommendations. The Plan Summary groups and prioritizes the different recommendations into a multi-modal staged plan to manage and improve the City's transportation network.

Many of the mobility issues and safety concerns overlap on the main City arterial roads and the Alaska Highway. It is important to note that road design historically has addressed the needs of the roadway design vehicle - namely commercial vehicles and automobiles. The needs and safety of vulnerable road users such as pedestrians, cyclists, motorcyclists, the physically challenged and visually impaired have not always been fully considered in the design guidelines. The current Transportation Association of Canada design approach is to consider all users of the road in an integrated fashion.

Current road operating issues and current safety concerns - as reported by all users and derived from analysis in Sections 2 through 5 of the Plan – provide priorities for transportation improvement actions. The transportation goals set out in Section 1 of the Plan establish the long term objectives that integrate the individual improvements to achieve the desired benefits for the community.

For summary purposes, the long term and short term recommendations for network/traffic operations, safety, and alternative modes are grouped into the following major road corridors:

4.1.1 Two Mile Hill (Highway to 4th Avenue) Corridor

- Functional design for all modes and then design safety audit on the corridor section from Alaska Highway to 4th Avenue
- Roadway geometric design, pedestrian crossing, cycling route and signal timing improvements to Two Mile Hill/Alaska Highway intersection
- Roadway geometric design, pedestrian crossing, cycling route and signal timing improvements to Two Mile Hill/Range Road intersection
- Separate cycling path on south side of road from Alaska Highway to 4th Avenue and allow cycling on the road
- Enforce posted speed limits



4.1.2 4th Avenue (2nd Avenue Ext. to Main Street) Corridor

- Review and upgrade existing signal timings and upgrade the Black Street pedestrian signal to a full signal
- Functional design for all modes and then design safety audit on the corridor section from Two Mile Hill to Robert Service Way
- Convert 4th Avenue to a “road diet” (3 lanes + bicycle lanes on each side) from Two Mile Hill to Robert Service Way

4.1.3 2nd Avenue (4th Avenue to Hanson Street) Corridor

- Perform safety audit on the road section from 4th Avenue to Robert Campbell Bridge
- Upgrade pedestrian crossings to recommended standards and locations on 2nd Avenue

4.1.4 2nd Avenue (Hanson Street to Hospital Boulevard) Corridor

- Improve Robert Campbell Bridge to separate and accommodate all modes of travel to reduce peak vehicle demand on the bridge
- Add pathways under the south end of the bridge
- Install intersection controls on Lewes Boulevard at Hospital Road
- Improve transit service to Riverdale to reduce peak vehicle demand on the bridge
- Convert 2nd Avenue to a “road diet” between Hanson Street and Robert Service Way – subject to the satisfactory performance of the 4th Avenue “road diet”

4.1.5 Alaska Highway Corridor

- Update the Alaska Highway Corridor plan to address current and future needs
- Provide consistent and constant shoulders along the highway to allow for proper auxiliary lanes and continuous cycling routes
- Provide longitudinal and auxiliary lane markings on the highway to be consistent with current TAC and MUTCD standards



4.2 Improvements Summary

A recommended improvements program for existing and future safety and road network issues was developed and prioritized for short term and long term needs. These follow the corridor summary plan and are itemized in the following:

Table 4.1 – Recommended Improvements Program

No.	Item	Summary of Transportation Plan Improvements	Associated Costs
		Short Term Needs (for current safety and capacity related issues):	
1		Review and upgrade signal timings at existing signalized intersections	\$10,000
2		Upgrade the pedestrian signal at Black Street and 4 th Avenue to be a full signal	\$125,000
3		Conduct Corridor Safety Audit for Two Mile Hill from the intersection with the Alaska Highway to the intersection with 4 th Avenue/2 nd Avenue Ext	\$50,000
4		Conduct Corridor Safety Audit for 2 nd Avenue from 4 th /2 nd Avenue Ext to Lewes Boulevard/Hospital Road	\$75,000
5		Conduct functional design and design safety audit for 4 th Avenue from Two Mile Hill to Robert Service Way	\$50,000
6		Update the Alaska Highway Corridor Study	\$150,000 (by YTG)
7		Two Mile Hill / Alaska Highway Intersection Improvements	\$250,000 (with YTG)
8		Two Mile Hill / Range Road Intersection Improvements	\$100,000 (with YTG)
9		Reconfigure 4 th Avenue to a “Road Diet” south of Two Mile Hill	\$750,000
10		Review Pedestrian Crossing Standards and upgrade 2 nd Avenue and 4 th Avenue pedestrian crossing markings	\$150,000
11		Reconfigure Quartz Road /Copper Road to a “Road Diet” from 2 nd Avenue to Tlingit	\$75,000
12		Install multi-use pathway/trail under south end of Robert Campbell Bridge	\$75,000
13		Upgrade intersection control at Lewes Boulevard / Hospital Road intersection	\$150,000



No.	Item	Summary of Transportation Plan Improvements	Associated Costs
14		Prepare Access Management Plan for land development access control	\$50,000
15		Prepare Traffic Calming Policy for motor vehicle speeding control in residential areas	\$50,000
16		Institute "Safe Routes to School" program in partnership with Schools	\$50,000
17		Develop and implement Parking Management Plan for the downtown core and re-examine the need for a parkade	\$50,000
18		Initiate an Emergency Planning session to formalize and facilitate the use of the Yukon Energy power dam as an emergency access route crossing of the Yukon River	\$10,000
		Long Term Needs (for future safety and capacity related issues):	
19		Upgrade Robert Campbell Bridge to separate and accommodate cycling and pedestrian traffic	\$350,000
20		Construct multi-use trail on south side of Two Mile Hill from Alaska Highway to 4 th /2 nd Avenue Ext intersection	\$350,000
21		Construct/complete off road multi-use trails along both sides of Hamilton Boulevard from Copper Ridge to Alaska Highway	\$500,000
22		Upgrade intersection control at Quartz and Industrial Roads when traffic volumes and intersection operation warrants	\$150,000
23		Convert 2 nd Avenue to a "road diet" between Hanson Street and Robert Service Way – subject to satisfactory network performance after monitoring 4 th Avenue road diet	\$500,000
24		Upgrade intersection control at Robert Service Way/4 th Avenue intersection	\$250,000
25		Extend Pine Street to Kopper King at the Alaska Highway when Porter Creek development warrants – including an extension to Takhini North for alternative transportation modes	\$2,500,000
26		Extend 3 rd Avenue as a pedestrian corridor through the Quanlin Mall area when a redevelopment opportunity arises	\$100,000
27		Extend Hamilton Boulevard south to the Alaska Highway as a two lane facility for the ultimate development of the west Whitehorse area (McIntyre and Granger)	\$5,000,000

Alaska Highway Corridor

- Update the Alaska Highway Corridor Study
- Provide consistent width and continuous highway shoulders for cycling use
- Review existing intersection geometries and existing line painting using current TAC Guidelines and MUTCD Guidelines.

Hamilton Boulevard Corridor

- Retain as two lane roadway south of existing twinned section
- Add off-road trails for cycling and pedestrian use
- Consider intersection control option such as roundabout for main neighbourhood access road

Two Mile Hill Corridor

- Functional plan for all transportation modes and then design safety audit
- Two Mile Hill/Alaska Highway intersection improvements
- Off-road cycling path on south side of road from Highway to 4th Avenue
- Enforce posted speed limits

Fourth Avenue (South) Corridor

- Convert 4th Avenue to a "road diet", three vehicle lanes and two bike lanes
- Consider a traffic roundabout for intersection control at 4th Avenue and Robert Service Way

Fourth Avenue (North) Corridor

- Adjust signal timings to reduce congestion
- Upgrade Black Street pedestrian signal to full-signal status
- Functional plan for all transportation modes and then design safety audit from 4th Avenue to Robert Service Way.
- Convert 4th Avenue to three lane cross-section and bike lanes each side ("road diet")

Quartz/Copper Corridor

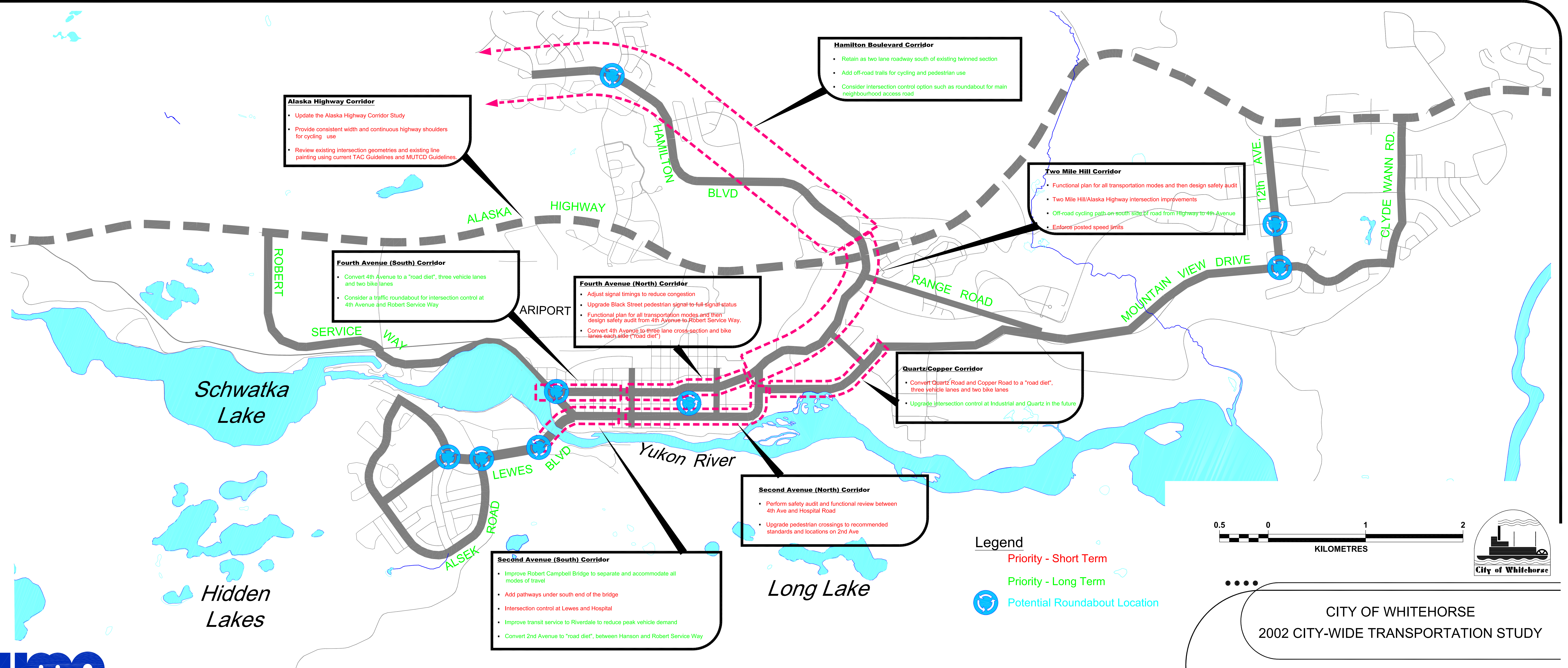
- Convert Quartz Road and Copper Road to a "road diet", three vehicle lanes and two bike lanes
- Upgrade intersection control at Industrial and Quartz in the future

Second Avenue (North) Corridor

- Perform safety audit and functional review between 4th Ave and Hospital Road
- Upgrade pedestrian crossings to recommended standards and locations on 2nd Ave

Second Avenue (South) Corridor

- Improve Robert Campbell Bridge to separate and accommodate all modes of travel
- Add pathways under south end of the bridge
- Intersection control at Lewes and Hospital
- Improve transit service to Riverdale to reduce peak vehicle demand
- Convert 2nd Avenue to "road diet", between Hanson and Robert Service Way



Legend

- Priority - Short Term
- Priority - Long Term
- Potential Roundabout Location



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